



## **MAGNET Office Help**

Version 3.0

Part Number 1001299-01

Revision C

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March, 2015**

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# Introduction

MAGNET Office is a module based system that utilizes a full featured CAD environment for the processing, editing, adjustment and graphical representation of survey data, reconstruction of road and site designs, initial roadway and site design, and the creation of 3D models for use with Topcon's 3DMC systems.

Available modules for MAGNET Office are:

- MAGNET Tools — Provides calculation and adjustment of coordinates based on observations created with the family of Topcon and Sokkia instruments. This product is included in the MAGNET Office Topo and Site Modules.
- MAGNET Topo — Provides a CAD environment that includes survey specific functionality for the import, review, processing and adjustment of survey data. Contains specific functionality for the graphical representation of the survey with scaled plotting for the preparation of the survey plat deliverable.
- MAGNET Site — Provides design functionality in a CAD environment for the import/export, editing and graphic representation of design data. Includes specific 3D Modeling functionality to quickly elevate design data imported without elevation. Generates standard Topcon TP3 files for use with 3DMC hardware systems.
- MAGNET Resurface — Provides paving specific routines to generate optimal paving designs based on smoothness and ride-ability in a CAD environment. Utilizes specific and unique functionality to allow versatile designs based on profile and/or cross section requirements.

Surveyors, Engineers, Geodesists, 3D Model specialists, and draftsman can use MAGNET Office for:

- Processing TS, DL, and/or RTK and GPS observations,
- Least Squares Network adjustment,
- Instant reporting of unadjusted traverse closures,
- Compass rule, including angle balance, adjustments,
- Importing files on a computer or from a device
- Exporting data to files on a computer or device
- Upload/Download data to a project on MAGNET Enterprise
- Creating, viewing and editing a digital terrain model (surface),
- Raising/lowering surfaces for subgrade creation,
- Generating subgrade volumes,
- Generating cut/fill volumes and maps,
- Elevating lines, arcs, strings for 3D model creation,
- Upload/Download data to SiteLink,
- Remotely access construction machines using SiteLink,
- Creating pad designs,
- Creating, viewing and editing road and X-section templates
- Creating, viewing and editing of roadway horizontal and vertical alignment data.
- Creating, viewing and editing profile data generated from surfaces and/or points, strings,
- Creating, viewing and editing cross section data generated from surfaces and/or points, strings,
- Creating Sub-Division designs,
- Adding text and multiline text to drawings,
- Adding symbols, legends, borders and title blocks to drawings,
- Plotting "to scale" drawings.

MAGNET Office makes use of "Views" and "Editors" for surveying and design related tasks.

- Use the Survey View for all CAD related functionality as well as all Cogo functionality.
- Use the Road View for design functionality when using vertical/horizontal alignments and templates for design creation or recreation.
- Use the Spreadsheet Entry/Editor for manual point entry or modifications in a spreadsheet environment,
- Use the Raw Data Editor to review, process and modify Total Station measurements.

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# Table Of Contents

---

|  |           |
|--|-----------|
| <b>Software End User License Agreement</b> ..... | <b>2</b>  |
| <b>Introduction</b> .....                        | <b>5</b>  |
| <b>Table Of Contents</b> .....                   | <b>7</b>  |
| <b>File Tab</b> .....                            | <b>35</b> |
| Standard group .....                             | 36        |
| New icon .....                                   | 36        |
| Open icon .....                                  | 37        |
| Save icon .....                                  | 37        |
| Save As icon .....                               | 37        |
| Close icon .....                                 | 37        |
| Project Manager icon .....                       | 38        |
| Exit icon .....                                  | 38        |
| Import/Export group .....                        | 39        |
| Import icon .....                                | 39        |
| Export icon .....                                | 41        |
| Data Transfer icon .....                         | 46        |
| Export to Pocket 3D .....                        | 47        |
| Sync Utility icon .....                          | 47        |
| Genio Translation Table icon .....               | 49        |
| Autocad Layer Translation Table icon .....       | 50        |
| Plot Window group .....                          | 52        |
| Create icon .....                                | 52        |
| Reposition icon .....                            | 53        |
| Show icon .....                                  | 53        |
| Delete icon .....                                | 53        |
| List icon .....                                  | 53        |
| Editor group .....                               | 54        |
| Drawing icon .....                               | 54        |
| Symbol icon .....                                | 54        |
| Line Style icon .....                            | 55        |
| Print group .....                                | 56        |
| Print Setup icon .....                           | 56        |
| Print icon .....                                 | 56        |

|                          |           |
|--------------------------|-----------|
| <b>Edit Tab</b> .....    | <b>57</b> |
| Undo/Redo group .....    | 58        |
| Undo icon .....          | 58        |
| Undo History icon .....  | 58        |
| Redo icon .....          | 58        |
| Redo History icon .....  | 59        |
| Repeat icon .....        | 59        |
| Clipboard group .....    | 60        |
| Cut icon .....           | 60        |
| Copy icon .....          | 60        |
| Paste icon .....         | 60        |
| Paste Special icon ..... | 61        |
| Delete icon .....        | 61        |
| Properties group .....   | 62        |
| Properties icon .....    | 62        |
| Selection group .....    | 83        |
| Select All icon .....    | 83        |
| Select Point icon .....  | 83        |
| Linked Point icon .....  | 83        |
| Invert icon .....        | 84        |
| Deselect All icon .....  | 84        |
| Select By group .....    | 85        |
| Select By icon .....     | 85        |
| By Region icon .....     | 92        |
| De-Select By icon .....  | 92        |
| By Name icon .....       | 93        |
| By DTM icon .....        | 94        |
| Edit group .....         | 95        |
| Codes icon .....         | 95        |
| <b>View Tab</b> .....    | <b>96</b> |
| Edit Layers group .....  | 97        |
| Layers icon .....        | 97        |
| Add icon .....           | 99        |
| Order icon .....         | 100       |



---

|                                     |     |
|-------------------------------------|-----|
| Delete icon .....                   | 100 |
| Layer Control group .....           | 102 |
| Layer Off icon .....                | 103 |
| Isolate icon .....                  | 103 |
| Restore icon .....                  | 103 |
| Set Layer icon .....                | 103 |
| All On icon .....                   | 103 |
| All Off icon .....                  | 103 |
| Groups icon .....                   | 104 |
| Add to Group icon .....             | 105 |
| Display/Hide Group icon .....       | 105 |
| Add to Group - Design icon .....    | 106 |
| Add to Group - Existing icon .....  | 106 |
| Add to Group - Misc icon .....      | 107 |
| Display Group - Design icon .....   | 107 |
| Display Group - Existing icon ..... | 107 |
| Display Group - Misc icon .....     | 107 |
| Hide Group - Design icon .....      | 107 |
| Hide Group - Existing icon .....    | 107 |
| Hide Group - Misc icon .....        | 108 |
| Refresh group .....                 | 109 |
| Redraw icon .....                   | 109 |
| Regen icon .....                    | 109 |
| Navigate group .....                | 110 |
| Window icon .....                   | 110 |
| Previous icon .....                 | 111 |
| All icon .....                      | 111 |
| In icon .....                       | 111 |
| Out icon .....                      | 111 |
| Box icon .....                      | 111 |
| Point icon .....                    | 111 |
| Pan icon .....                      | 112 |
| Save View icon .....                | 112 |
| Named View icon .....               | 112 |
| Features group .....                | 114 |

---

|                               |            |
|-------------------------------|------------|
| 3D View icon .....            | 114        |
| Tables icon .....             | 114        |
| B/G Images icon .....         | 115        |
| Google Earth/Map icon .....   | 115        |
| Options group .....           | 116        |
| Toolbar icon .....            | 116        |
| Ruler icon .....              | 117        |
| Status Bar icon .....         | 117        |
| Grid icon .....               | 118        |
| Scale Bar icon .....          | 118        |
| Display group .....           | 119        |
| Point Number icon .....       | 119        |
| Point Height icon .....       | 119        |
| Point Code icon .....         | 119        |
| Point Notes icon .....        | 119        |
| <b>Settings Tab .....</b>     | <b>120</b> |
| Settings group .....          | 121        |
| Project Settings icon .....   | 121        |
| Program Settings icon .....   | 121        |
| Display icon .....            | 122        |
| Grid/Snap icon .....          | 122        |
| Default Properties icon ..... | 122        |
| Text Styles icon .....        | 122        |
| Justification icon .....      | 123        |
| Annotation icon .....         | 125        |
| Contour icon .....            | 126        |
| Customization group .....     | 127        |
| Custom Colors icon .....      | 127        |
| Shortcut Keys icon .....      | 127        |
| Command Aliases icon .....    | 128        |
| Create Modes group .....      | 129        |
| Coordinate icon .....         | 129        |
| Latitude Longitude icon ..... | 129        |
| Direction icon .....          | 130        |

---

|                                  |            |
|----------------------------------|------------|
| Create Points icon .....         | 130        |
| Defaults group .....             | 131        |
| Elevation icon .....             | 131        |
| Use in Surface icon .....        | 131        |
| Breakline icon .....             | 131        |
| Snap Modes group .....           | 132        |
| Pt icon .....                    | 132        |
| EndPt icon .....                 | 133        |
| IntPt icon .....                 | 133        |
| MidPt icon .....                 | 133        |
| ArcCen icon .....                | 133        |
| Line icon .....                  | 134        |
| Perpern icon .....               | 134        |
| GridPt icon .....                | 134        |
| PtElev icon .....                | 134        |
| <b>Insert Tab .....</b>          | <b>135</b> |
| Points group .....               | 136        |
| Add Point icon .....             | 136        |
| Latitude/Longitude icon .....    | 137        |
| Offset/Distance icon .....       | 138        |
| Offset/Angle icon .....          | 139        |
| Brg/Dist Intersection icon ..... | 140        |
| Multiple Intersection icon ..... | 142        |
| Sideshot icon .....              | 143        |
| Intersection icon .....          | 143        |
| Spreadsheet Entry icon .....     | 147        |
| Line group .....                 | 148        |
| Add Line icon .....              | 148        |
| Coordinates icon .....           | 149        |
| Join Two Points icon .....       | 150        |
| Join Multiple Points icon .....  | 150        |
| Tangent icon .....               | 151        |
| External Tangent icon .....      | 151        |
| Splay Corner icon .....          | 152        |
| Fit Line icon .....              | 154        |

---

|                                 |     |
|---------------------------------|-----|
| Rectangle As Lines icon .....   | 154 |
| Join Points icon .....          | 155 |
| Parallel icon .....             | 156 |
| Perpendicular icon .....        | 157 |
| Arc group .....                 | 160 |
| Add Arc icon .....              | 160 |
| Two Points icon .....           | 162 |
| Tangent from Line icon .....    | 164 |
| Fillet icon .....               | 166 |
| Chords icon .....               | 167 |
| Parallel icon .....             | 168 |
| Fit Arc icon .....              | 169 |
| Three Points icon .....         | 170 |
| Angle icon .....                | 171 |
| TP-IP icon .....                | 172 |
| Circle group .....              | 176 |
| Radius icon .....               | 176 |
| Diameter icon .....             | 177 |
| Two Points icon .....           | 177 |
| Text group .....                | 179 |
| Text icon .....                 | 179 |
| Text Box icon .....             | 183 |
| Keyword icon .....              | 186 |
| Bearing/Distance icon .....     | 190 |
| Slope/Grade icon .....          | 190 |
| Point Coordinate icon .....     | 191 |
| Point Elevation icon .....      | 195 |
| Point Notes icon .....          | 195 |
| Point Offset icon .....         | 195 |
| Arc Length icon .....           | 196 |
| Arc Radius icon .....           | 196 |
| Stacked Arc Labels icon .....   | 196 |
| Angle icon .....                | 196 |
| Label Total Distance icon ..... | 197 |

---

|                                   |            |
|-----------------------------------|------------|
| Polyline/Polygon group .....      | 198        |
| Polilyne icon .....               | 198        |
| Polygon Area icon .....           | 199        |
| Rectangle icon .....              | 200        |
| String group .....                | 202        |
| String icon .....                 | 202        |
| Parallel String icon .....        | 203        |
| Parallel Figure icon .....        | 204        |
| Feature group .....               | 206        |
| Table icon .....                  | 206        |
| Coordinate Table icon .....       | 210        |
| Symbol Table icon .....           | 211        |
| Line Style Table icon .....       | 212        |
| Line Annotation Table icon .....  | 214        |
| Arc Annotation Table icon .....   | 215        |
| Image/Pdf icon .....              | 216        |
| Attach icon .....                 | 216        |
| Background Image icon .....       | 217        |
| Link/Unlink icon .....            | 218        |
| View Attached/Linked icon .....   | 219        |
| Arrow group .....                 | 220        |
| Dimension icon .....              | 220        |
| Arrow icon .....                  | 220        |
| Curved Arrow icon .....           | 221        |
| <b>Modify Tab .....</b>           | <b>222</b> |
| Point group .....                 | 223        |
| Edit Points icon .....            | 223        |
| Renumber Points icon .....        | 226        |
| Renumber String Points icon ..... | 227        |
| Create from Entity icon .....     | 228        |
| Delete Points icon .....          | 229        |
| Line group .....                  | 230        |
| Segment Line icon .....           | 230        |
| Move Point/Line icon .....        | 234        |
| Insert Point into Line icon ..... | 235        |

---

|                                  |     |
|----------------------------------|-----|
| Delete Point on Line .....       | 235 |
| Flip Line icon .....             | 236 |
| Arc group .....                  | 237 |
| Segment Arc icon .....           | 237 |
| Convert Arc icon .....           | 240 |
| Modify Arc icon .....            | 241 |
| Insert Point into Arc icon ..... | 243 |
| Delete Point on Arc .....        | 244 |
| Mirror Arc icon .....            | 246 |
| String group .....               | 247 |
| Explode icon .....               | 247 |
| Filter Points icon .....         | 248 |
| Add Point icon .....             | 250 |
| Delete Point icon .....          | 251 |
| Swap Points icon .....           | 252 |
| Reverse icon .....               | 253 |
| Join/Create icon .....           | 253 |
| Break String icon .....          | 258 |
| Delete Segment icon .....        | 258 |
| Intersect icon .....             | 258 |
| Convert to Polyline icon .....   | 259 |
| Create from Lines icon .....     | 259 |
| Densify Points icon .....        | 259 |
| Edit String icon .....           | 260 |
| Text group .....                 | 261 |
| Convert icon .....               | 261 |
| Link icon .....                  | 262 |
| Unlink icon .....                | 262 |
| Rotate icon .....                | 262 |
| Create/Edit icon .....           | 263 |
| Delete icon .....                | 263 |
| Table Settings icon .....        | 264 |
| Left icon .....                  | 264 |
| Right icon .....                 | 265 |

---

|                                  |            |
|----------------------------------|------------|
| Top icon .....                   | 266        |
| Bottom icon .....                | 266        |
| Polygon Area group .....         | 268        |
| Convert to String icon .....     | 268        |
| Bring to Front icon .....        | 268        |
| Add Point icon .....             | 269        |
| Delete Point icon .....          | 270        |
| Polyline group .....             | 273        |
| To String icon .....             | 273        |
| Close String/Polyline icon ..... | 273        |
| Open String/Polyline icon .....  | 273        |
| Modify group .....               | 274        |
| Copy icon .....                  | 274        |
| Move icon .....                  | 275        |
| Rotate icon .....                | 276        |
| Rotate by direction icon .....   | 276        |
| Align icon .....                 | 277        |
| Scale icon .....                 | 279        |
| Offset icon .....                | 280        |
| Properties icon .....            | 280        |
| Match icon .....                 | 280        |
| Extend/Trim Line icon .....      | 281        |
| Multiple Trim icon .....         | 281        |
| Extend All icon .....            | 283        |
| Trim All icon .....              | 283        |
| To Boundary icon .....           | 283        |
| Delete by Bdy icon .....         | 286        |
| <b>Inquiry Tab .....</b>         | <b>288</b> |
| Inquiry group .....              | 289        |
| Point icon .....                 | 289        |
| Bearing Distance icon .....      | 291        |
| Offset Distance icon .....       | 292        |
| Linear Distance icon .....       | 292        |
| Area icon .....                  | 292        |
| Multiple Areas icon .....        | 293        |

---

|                                    |            |
|------------------------------------|------------|
| Angle icon .....                   | 293        |
| Mean Elevation icon .....          | 293        |
| Report group .....                 | 295        |
| List Data icon .....               | 295        |
| Duplicate Points icon .....        | 296        |
| Project Details icon .....         | 296        |
| Compare Jobs icon .....            | 297        |
| Images icon .....                  | 297        |
| Calculate group .....              | 298        |
| Inverse icon .....                 | 298        |
| Stakeout icon .....                | 300        |
| <b>Survey Tab .....</b>            | <b>302</b> |
| Survey group .....                 | 303        |
| Raw Data Editor icon .....         | 303        |
| Tools View icon .....              | 303        |
| Adjustment group .....             | 304        |
| Control Points icon .....          | 304        |
| Translate Rotate icon .....        | 305        |
| LS Transformation icon .....       | 306        |
| Traverse Adjustment icon .....     | 307        |
| Manual Entry group .....           | 309        |
| Traverse Editor icon .....         | 309        |
| LS Network Adjustment icon .....   | 309        |
| Deed Entry icon .....              | 309        |
| Legal Description icon .....       | 310        |
| Calculator group .....             | 312        |
| Geodetic Calculator icon .....     | 312        |
| Calculator icon .....              | 313        |
| Structure group .....              | 314        |
| Define icon .....                  | 314        |
| Locate icon .....                  | 314        |
| <b>Design Tab .....</b>            | <b>316</b> |
| Roads group .....                  | 317        |
| Create Alignment by IPs icon ..... | 318        |



---

|                                      |     |
|--------------------------------------|-----|
| Alignment from Lines icon .....      | 320 |
| Manual Road Entry icon .....         | 321 |
| Manual Alignment Entry icon .....    | 321 |
| Level Book icon .....                | 321 |
| Edit IP icon .....                   | 322 |
| Add IP icon .....                    | 324 |
| Insert IP icon .....                 | 324 |
| Delete IP icon .....                 | 324 |
| Alignment Text icon .....            | 324 |
| Delete Alignment Text icon .....     | 326 |
| Station Equation icon .....          | 326 |
| H/V Alignment from String icon ..... | 328 |
| Convert Alignment to String .....    | 329 |
| Create Center Line Points icon ..... | 329 |
| Catch Points icon .....              | 330 |
| Create Offset Strings icon .....     | 331 |
| Multi Sheet Plot Window icon .....   | 332 |
| Alignment icon .....                 | 332 |
| Offset icon .....                    | 333 |
| Pavement Check icon .....            | 334 |
| Cross Section group .....            | 336 |
| XS from DTM icon .....               | 336 |
| XS From Strings icon .....           | 340 |
| XS from Points icon .....            | 342 |
| Quick XSection icon .....            | 344 |
| XSection Volumes icon .....          | 345 |
| Import XSection icon .....           | 346 |
| Report XSection icon .....           | 347 |
| Profile group .....                  | 348 |
| Profile DTM icon .....               | 348 |
| Profile String icon .....            | 349 |
| Profile Points icon .....            | 349 |
| Quick Profile icon .....             | 350 |
| Profile Editor icon .....            | 350 |
| Profile Report icon .....            | 351 |

---

|  |     |
|--|-----|
| VC Report icon .....                       | 351 |
| Intersection group .....                   | 352 |
| Fillet Curb Return icon .....              | 352 |
| Cul-de-Sac icon .....                      | 355 |
| Trim Strings icon .....                    | 356 |
| Create Curb from String icon .....         | 357 |
| Create Island Curb icon .....              | 357 |
| Create Intersection icon .....             | 359 |
| View Intersection icon .....               | 359 |
| View Curb icon .....                       | 360 |
| Update Curb icon .....                     | 360 |
| Subdivision group .....                    | 362 |
| Lot Layout (min area) icon .....           | 362 |
| Lot by Interior Point icon .....           | 364 |
| Show Lots icon .....                       | 366 |
| Lot Report icon .....                      | 367 |
| Annotate Lots icon .....                   | 367 |
| Annotate Lots Back Boundary icon .....     | 367 |
| Annotate Lots Sides by Brg/Dist icon ..... | 368 |
| Annotate Lots Sides by Dist icon .....     | 368 |
| Delete Lot Annotation icon .....           | 369 |
| Create ePlan icon .....                    | 369 |
| Edit ePlan icon .....                      | 372 |
| Pad group .....                            | 378 |
| Create Pad icon .....                      | 378 |
| Pad Design icon .....                      | 379 |
| Sewer group .....                          | 382 |
| Create Sewer icon .....                    | 382 |
| Create BCIL icon .....                     | 384 |
| Create Sewer Network icon .....            | 384 |
| Add Pit icon .....                         | 385 |
| Delete Pit icon .....                      | 386 |
| Drainage group .....                       | 387 |
| Create Drainage icon .....                 | 387 |

---

|                                     |            |
|-------------------------------------|------------|
| Create Drainage Network icon .....  | 389        |
| Update Drainage Network icon .....  | 390        |
| Design Views group .....            | 392        |
| Roads icon .....                    | 392        |
| Profile icon .....                  | 393        |
| Intersection icon .....             | 393        |
| Resurface icon .....                | 394        |
| Drainage icon .....                 | 395        |
| Sewer icon .....                    | 396        |
| Cut/Fill icon .....                 | 396        |
| <b>Model Tab .....</b>              | <b>398</b> |
| Layer Group group .....             | 399        |
| Add to Group icon .....             | 399        |
| Add to Group - Design icon .....    | 400        |
| Add to group - Existing icon .....  | 400        |
| Add to Group - Misc icon .....      | 400        |
| Assign Layer to Group icon .....    | 401        |
| Color Settings icon .....           | 401        |
| Display/Hide Group icon .....       | 402        |
| Group Settings icon .....           | 403        |
| Display Group - Design icon .....   | 404        |
| Display Group - Existing icon ..... | 404        |
| Display Group - Misc icon .....     | 404        |
| Hide Group - Design icon .....      | 404        |
| Hide Group - Existing icon .....    | 404        |
| Hide Group - Misc icon .....        | 404        |
| Cleanup group .....                 | 406        |
| Data Cleanup icon .....             | 406        |
| Point by Elev TX .....              | 406        |
| Raster/Vector group .....           | 408        |
| Insert PDF/Image icon .....         | 408        |
| Recalibrate icon .....              | 410        |
| Trace icon .....                    | 410        |
| Extract Vectors icon .....          | 410        |
| Strings group .....                 | 412        |

---

|   |            |
|---|------------|
| Filter Points icon .....                    | 412        |
| Densify Strings icon .....                  | 414        |
| From Linework icon .....                    | 415        |
| Parallel String icon .....                  | 415        |
| Parallel Figure icon .....                  | 416        |
| Edit Strings icon .....                     | 417        |
| Elevate group .....                         | 418        |
| From Leader Text icon .....                 | 418        |
| From Contour Labels icon .....              | 419        |
| From Text icon .....                        | 420        |
| By Intersection icon .....                  | 421        |
| Drape Object icon .....                     | 421        |
| Set Elevation by Increment icon .....       | 422        |
| Set Start and End Elevation icon .....      | 422        |
| Set String Point Elevation icon .....       | 423        |
| Interpolate Elev along String icon .....    | 423        |
| DTM group .....                             | 424        |
| Create DTM icon .....                       | 424        |
| Display Contours icon .....                 | 428        |
| Display Zero Contour icon .....             | 428        |
| Display Mesh icon .....                     | 428        |
| Display Color Fill icon .....               | 429        |
| <b>Surface Tab .....</b>                    | <b>430</b> |
| DTM Settings group .....                    | 431        |
| Display Contours icon .....                 | 431        |
| Display Zero Contour icon .....             | 431        |
| Display Mesh icon .....                     | 431        |
| Display Color Fill icon .....               | 431        |
| DTM Settings icon .....                     | 431        |
| Compute Elevations group .....              | 433        |
| Point on Grade icon .....                   | 433        |
| Set Elev by Grade icon .....                | 433        |
| Intersect Grades icon .....                 | 434        |
| Set Point Elev by Reference Elev icon ..... | 434        |

---

|  |     |
|--|-----|
| Elevate by DTM group .....                         | 435 |
| Grid Points icon .....                             | 435 |
| Interpolate DTM icon .....                         | 435 |
| Elev Difference icon .....                         | 436 |
| Points from DTM icon .....                         | 437 |
| Create/Edit DTM group .....                        | 439 |
| Create DTM icon .....                              | 440 |
| By Depth Range icon .....                          | 444 |
| Create Elev Diff DTM icon .....                    | 444 |
| Create Cut/Fill DTM icon .....                     | 445 |
| Merge DTM icon .....                               | 445 |
| Merge by Elevation icon .....                      | 446 |
| Raise/Lower DTM icon .....                         | 447 |
| Modify DTM icon .....                              | 448 |
| Import DTM icon .....                              | 448 |
| Export DTM icon .....                              | 449 |
| Adjust DTM Slope .....                             | 449 |
| Update DTM icon .....                              | 450 |
| Check DTM icon .....                               | 450 |
| 3D View icon .....                                 | 451 |
| Convert Contour to String icon .....               | 451 |
| Create DTM Boundary icon .....                     | 453 |
| Edit Mesh group .....                              | 456 |
| Add Triangle icon .....                            | 456 |
| Swap Triangles icon .....                          | 457 |
| Show Triangles Properties icon .....               | 457 |
| Check/Edit Breaklines icon .....                   | 458 |
| Insert Breakline icon .....                        | 458 |
| Nightlight Points set to Use in Surface icon ..... | 459 |
| Decompose Triangle icon .....                      | 459 |
| Delete Triangles icon .....                        | 460 |
| By Line icon .....                                 | 460 |
| By Boundary icon .....                             | 461 |
| By Length or Angle icon .....                      | 461 |
| Boundary group .....                               | 463 |

---

|                                   |            |
|-----------------------------------|------------|
| Create Boundary icon .....        | 463        |
| Create Enclosing icon .....       | 464        |
| From Polygons icon .....          | 467        |
| Create List icon .....            | 467        |
| Edit Lists icon .....             | 468        |
| Volume group .....                | 469        |
| Compute icon .....                | 469        |
| Batch icon .....                  | 473        |
| Quick icon .....                  | 474        |
| <b>Library Tab .....</b>          | <b>475</b> |
| Code group .....                  | 476        |
| Global Codes icon .....           | 476        |
| Code Settings icon .....          | 476        |
| Points icon .....                 | 479        |
| Lines icon .....                  | 480        |
| Polygon Area icon .....           | 481        |
| Library group .....               | 483        |
| Colors icon .....                 | 483        |
| Text Styles icon .....            | 483        |
| Justification icon .....          | 484        |
| Annotation icon .....             | 485        |
| Legal Description icon .....      | 485        |
| Symbols icon .....                | 485        |
| Line Styles icon .....            | 486        |
| Output group .....                | 487        |
| Plot Settings icon .....          | 487        |
| Contour Settings icon .....       | 487        |
| Genio Translation icon .....      | 488        |
| ACAD Layer Definition icon .....  | 489        |
| ACAD Layer Translation icon ..... | 489        |
| Page Setup icon .....             | 490        |
| Create group .....                | 491        |
| Symbol icon .....                 | 491        |
| Line Style icon .....             | 491        |

---

|   |            |
|---|------------|
| Title Block icon .....                    | 492        |
| <b>Cloud Connections Tab .....</b>        | <b>494</b> |
| SiteLINK 3D group .....                   | 495        |
| Settings icon .....                       | 495        |
| Connect icon .....                        | 495        |
| Send Files icon .....                     | 495        |
| Chat icon .....                           | 496        |
| Inbox icon .....                          | 496        |
| Clients icon .....                        | 496        |
| Enterprise group .....                    | 497        |
| Logon icon .....                          | 497        |
| Chat icon .....                           | 498        |
| Connect to Project icon .....             | 498        |
| Options icon .....                        | 499        |
| Upload Files icon .....                   | 499        |
| Download Files icon .....                 | 499        |
| Upload Current Job icon .....             | 500        |
| Upload Current Job for Magnet Field ..... | 500        |
| Upload Current Job for 3DMC .....         | 500        |
| Tasks group .....                         | 502        |
| Tasks icon .....                          | 502        |
| Timecards icon .....                      | 502        |
| Redlines group .....                      | 503        |
| Redlines Settings icon .....              | 503        |
| Draw Redlines icon .....                  | 503        |
| <b>Window Tab .....</b>                   | <b>504</b> |
| Window group .....                        | 505        |
| New Window icon .....                     | 505        |
| Cascade icon .....                        | 505        |
| Tile Horizontally icon .....              | 505        |
| Tile Vertically icon .....                | 505        |
| <b>Help Tab .....</b>                     | <b>506</b> |
| Help group .....                          | 507        |
| Help icon .....                           | 507        |
| Display Hints icon .....                  | 507        |

---

|                                   |            |
|-----------------------------------|------------|
| Licensing and Version group ..... | 508        |
| Licenses icon .....               | 508        |
| Check for Updates icon .....      | 508        |
| About icon .....                  | 508        |
| <b>Editors .....</b>              | <b>509</b> |
| Point editor .....                | 510        |
| Standard group .....              | 511        |
| Import/Export group .....         | 511        |
| View group .....                  | 512        |
| Configure icon .....              | 512        |
| String Editor .....               | 513        |
| Elevation tab .....               | 513        |
| Position tab .....                | 514        |
| Settings tab .....                | 515        |
| Traverse editor .....             | 516        |
| File tab .....                    | 517        |
| Traverse icon .....               | 518        |
| Configure icon .....              | 519        |
| Alignment editor .....            | 520        |
| File tab .....                    | 521        |
| Road editor .....                 | 523        |
| Road editor ribbon .....          | 524        |
| Raw data editor .....             | 528        |
| File tab .....                    | 529        |
| Edit tab .....                    | 530        |
| View tab .....                    | 531        |
| Insert tab .....                  | 532        |
| Tools tab .....                   | 533        |
| Library tab .....                 | 534        |
| Window tab .....                  | 535        |
| Help tab .....                    | 536        |
| LS Network editor .....           | 537        |
| Deed Entry editor .....           | 538        |
| File tab .....                    | 539        |



---

|  |            |
|--|------------|
| Global survey codes editor .....               | 540        |
| Project survey codes editor .....              | 543        |
| <b>MAGNET Office Entities Properties .....</b> | <b>545</b> |
| Point properties .....                         | 546        |
| Line properties .....                          | 548        |
| Arc properties .....                           | 550        |
| Circle properties .....                        | 554        |
| String properties .....                        | 555        |
| Polyline properties .....                      | 557        |
| Polygon properties .....                       | 558        |
| Lot properties .....                           | 560        |
| Boundary properties .....                      | 563        |
| Pad properties .....                           | 565        |
| Text properties .....                          | 567        |
| Dimension properties .....                     | 569        |
| Arrow properties .....                         | 570        |
| Table properties .....                         | 571        |
| Alignment properties .....                     | 572        |
| Image Viewer .....                             | 573        |
| Layer properties .....                         | 574        |
| Avoidance .....                                | 575        |
| <b>MAGNET Office Settings .....</b>            | <b>579</b> |
| Project Settings dialog .....                  | 580        |
| Project details .....                          | 580        |
| Project diary .....                            | 581        |
| Project statistics .....                       | 582        |
| Project unit settings .....                    | 583        |
| Project symbols .....                          | 585        |
| Project coordinate system .....                | 586        |
| Project SiteLINK 3D server .....               | 586        |
| Program Settings dialog .....                  | 589        |
| Program user information .....                 | 589        |
| Program folders .....                          | 590        |
| Program libraries .....                        | 590        |
| Program unit settings .....                    | 592        |

---

|  |            |
|--|------------|
| Program symbols .....                        | 595        |
| Program coordinate system .....              | 595        |
| Program preferences .....                    | 596        |
| Display Settings dialog .....                | 598        |
| General display settings .....               | 598        |
| Defaults of the display settings .....       | 599        |
| Grid/Snap displaying settings .....          | 601        |
| Annotation Styles dialog .....               | 604        |
| Point annotation settings .....              | 604        |
| Line annotation settings .....               | 605        |
| Arc annotation settings .....                | 607        |
| Angle annotation settings .....              | 608        |
| Area annotation settings .....               | 609        |
| Dimension settings .....                     | 611        |
| Arrow settings .....                         | 611        |
| String annotation settings .....             | 612        |
| Lot annotation settings .....                | 613        |
| Bearing annotation settings .....            | 614        |
| Distance annotation settings .....           | 615        |
| Contour Settings dialog .....                | 617        |
| Creating contour settings sets .....         | 617        |
| Editing contour settings sets .....          | 618        |
| Background Images dialog .....               | 620        |
| Image recalibration by matching points ..... | 620        |
| Image recalibration by settings .....        | 622        |
| Annotation Table Settings dialog .....       | 625        |
| DTM Settings dialog .....                    | 626        |
| Color Fill Settings dialog .....             | 628        |
| Color Range Settings dialog .....            | 628        |
| Slope dialog .....                           | 628        |
| <b>MAGNET Office Libraries .....</b>         | <b>630</b> |
| Colors library .....                         | 630        |
| Text styles library .....                    | 631        |
| Creating text styles .....                   | 631        |

---

|   |     |
|---|-----|
| Editing text styles .....                     | 631 |
| Justification styles library .....            | 632 |
| Creating justification styles .....           | 633 |
| Editing justification styles .....            | 633 |
| Annotation styles library .....               | 635 |
| Point annotation settings .....               | 635 |
| Line annotation settings .....                | 636 |
| Arc annotation settings .....                 | 637 |
| Angle annotation settings .....               | 638 |
| Area annotation settings .....                | 639 |
| Dimension settings .....                      | 640 |
| Arrow settings .....                          | 641 |
| String annotation settings .....              | 641 |
| Lot annotation settings .....                 | 642 |
| Bearing annotation settings .....             | 643 |
| Distance annotation settings .....            | 644 |
| Legal description templates library .....     | 646 |
| Creating legal description templates .....    | 646 |
| Editing legal description templates .....     | 647 |
| Symbol library .....                          | 648 |
| Line styles library .....                     | 649 |
| Plot settings library .....                   | 650 |
| General tab .....                             | 651 |
| Survey Object tab .....                       | 651 |
| Grid tab .....                                | 651 |
| Contour tab .....                             | 653 |
| Annotations tab .....                         | 653 |
| Annotation Table Settings tab .....           | 653 |
| Contour settings library .....                | 655 |
| Creating library contour settings sets .....  | 655 |
| Editing library contour settings sets .....   | 656 |
| Genio translation tables library .....        | 658 |
| Creating genio translation tables .....       | 658 |
| Editing genio translation tables .....        | 659 |
| AutoCAD layer definition tables library ..... | 660 |

---

|   |            |
|---|------------|
| Creating AutoCAD layer definition tables .....  | 660        |
| Editing AutoCAD layer definition tables .....   | 661        |
| AutoCAD layer translation tables library .....  | 663        |
| Creating AutoCAD layer translation tables ..... | 663        |
| Editing AutoCAD layer translation tables .....  | 664        |
| Sewer library .....                             | 666        |
| Configuring sewer library .....                 | 666        |
| Drainage library .....                          | 668        |
| Configuring drainage library .....              | 668        |
| <b>Road Design View .....</b>                   | <b>671</b> |
| File tab .....                                  | 672        |
| View tab .....                                  | 673        |
| Settings tab .....                              | 674        |
| Alignment icon .....                            | 674        |
| Profile icon .....                              | 674        |
| Cross Section icon .....                        | 676        |
| Alignment tab .....                             | 678        |
| Add icon .....                                  | 678        |
| Edit icon .....                                 | 680        |
| Delete icon .....                               | 681        |
| Update Survey icon .....                        | 681        |
| Data Transfer Table icon .....                  | 681        |
| Cross Section tab .....                         | 683        |
| Add icon .....                                  | 684        |
| Sequence icon .....                             | 685        |
| Delete icon .....                               | 685        |
| Add icon .....                                  | 685        |
| Raise icon .....                                | 686        |
| Adjust Side Slope icon .....                    | 686        |
| Intersect Side Slope icon .....                 | 687        |
| Strip Depth icon .....                          | 687        |
| Volume Factors icon .....                       | 688        |
| Omit Stations icon .....                        | 688        |
| Compute Volumes icon .....                      | 689        |

---

|                                   |     |
|-----------------------------------|-----|
| Profile tab .....                 | 691 |
| Add IP icon .....                 | 692 |
| Add IP by Grade icon .....        | 693 |
| Add IP by Intersection icon ..... | 694 |
| Add IP by TP icon .....           | 695 |
| Move IP icon .....                | 695 |
| Modify IP icon .....              | 695 |
| Delete IP icon .....              | 696 |
| Delete All IPs icon .....         | 696 |
| Raise/Lower Design icon .....     | 697 |
| Compute VCs icon .....            | 697 |
| Compute Resheet Level icon .....  | 698 |
| Resheet Parameters icon .....     | 699 |
| Level Difference icon .....       | 699 |
| VC Report icon .....              | 699 |
| Design tab .....                  | 701 |
| Templates icon .....              | 702 |
| Super Elevation icon .....        | 703 |
| Create Super Table icon .....     | 705 |
| Compound Side Slope icon .....    | 708 |
| Symbol icon .....                 | 709 |
| Template icon .....               | 710 |
| Super Table icon .....            | 710 |
| Design Section icon .....         | 711 |
| Subgrade Template icon .....      | 712 |
| Subgrade Super icon .....         | 713 |
| Subgrade Section icon .....       | 713 |
| Pavement Parameters icon .....    | 714 |
| Side Slopes icon .....            | 715 |
| Fixed Offset Slopes icon .....    | 716 |
| Compound Slopes icon .....        | 716 |
| Ditches icon .....                | 717 |
| Shoulder Extension icon .....     | 718 |
| Compute Design icon .....         | 719 |
| Plotting tab .....                | 720 |

---

|                                   |            |
|-----------------------------------|------------|
| Profile Settings icon .....       | 720        |
| Cross Section Settings icon ..... | 726        |
| Standard Profile icon .....       | 730        |
| Offset Profile icon .....         | 730        |
| Cross Section icon .....          | 731        |
| Library tab .....                 | 732        |
| Templates icon .....              | 732        |
| Super Elevation Table icon .....  | 734        |
| Compound Side Slopes icon .....   | 735        |
| Sight Distance icon .....         | 736        |
| Symbol icon .....                 | 737        |
| Friction Factors icon .....       | 738        |
| Curve Radius icon .....           | 738        |
| Window tab .....                  | 740        |
| Help tab .....                    | 740        |
| <b>Profile Design View .....</b>  | <b>741</b> |
| File tab .....                    | 742        |
| View tab .....                    | 743        |
| Settings tab .....                | 744        |
| Display Settings icon .....       | 744        |
| Profile Settings icon .....       | 745        |
| Design tab .....                  | 745        |
| Add IP icon .....                 | 746        |
| Add IP by Grade icon .....        | 747        |
| Add IP by Intersection icon ..... | 748        |
| Modify IP icon .....              | 749        |
| Move IP icon .....                | 750        |
| Delete IP icon .....              | 750        |
| Delete All IPs icon .....         | 751        |
| Raise Design icon .....           | 751        |
| VC Report icon .....              | 751        |
| Plotting tab .....                | 752        |
| Plot Settings icon .....          | 752        |
| Window tab .....                  | 755        |

---

|                                       |            |
|---------------------------------------|------------|
| Help tab .....                        | 755        |
| <b>Intersection Design View .....</b> | <b>756</b> |
| File tab .....                        | 757        |
| View tab .....                        | 758        |
| Settings tab .....                    | 758        |
| Display Settings icon .....           | 759        |
| Add/Remove Strings icon .....         | 761        |
| Add/Remove Curbs icon .....           | 761        |
| Select Curb Template icon .....       | 762        |
| Curb tab .....                        | 763        |
| Add IP icon .....                     | 763        |
| Add IP by Grade icon .....            | 764        |
| Add IP by Intersection icon .....     | 765        |
| Modify IP icon .....                  | 766        |
| Move IP icon .....                    | 767        |
| Delete IP icon .....                  | 767        |
| Delete All IPs icon .....             | 768        |
| Raise Design icon .....               | 768        |
| VC Report icon .....                  | 768        |
| Plotting tab .....                    | 770        |
| Plot Settings icon .....              | 770        |
| Window tab .....                      | 773        |
| Help tab .....                        | 773        |
| <b>Resurface Design View .....</b>    | <b>774</b> |
| File tab .....                        | 774        |
| Edit tab .....                        | 775        |
| View tab .....                        | 776        |
| Settings tab .....                    | 777        |
| Alignment icon .....                  | 777        |
| Profile icon .....                    | 777        |
| Cross Section icon .....              | 779        |
| Resurfacing icon .....                | 780        |
| Alignment tab .....                   | 781        |
| Add icon .....                        | 781        |
| Edit icon .....                       | 782        |

---

|                                   |     |
|-----------------------------------|-----|
| Delete icon .....                 | 784 |
| Update Survey icon .....          | 784 |
| Data Transfer Table icon .....    | 784 |
| Profile tab .....                 | 785 |
| Add IP icon .....                 | 786 |
| Add IP by Grade icon .....        | 787 |
| Add IP by Intersection icon ..... | 788 |
| Move IP icon .....                | 789 |
| Modify IP icon .....              | 789 |
| Delete IP icon .....              | 790 |
| Delete All IPs .....              | 790 |
| Raise/Lower Design icon .....     | 791 |
| VC Report icon .....              | 791 |
| Cross Section tab .....           | 792 |
| Add Surface icon .....            | 792 |
| Sequence icon .....               | 793 |
| Delete icon .....                 | 793 |
| Add Point icon .....              | 794 |
| Raise icon .....                  | 794 |
| Design tab .....                  | 795 |
| Set Limits on Plan icon .....     | 796 |
| Edit Limits icon .....            | 797 |
| Over Surface icon .....           | 798 |
| At Lowest Point icon .....        | 798 |
| At Highest Point icon .....       | 798 |
| Along String icon .....           | 799 |
| Set Thickness icon .....          | 799 |
| Correct icon .....                | 799 |
| Raise/Lower Design icon .....     | 799 |
| Average icon .....                | 800 |
| Transition icon .....             | 800 |
| Apply to Current Range icon ..... | 801 |
| Smooth Profile icon .....         | 801 |
| Set Level icon .....              | 802 |



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|  |            |
|--|------------|
| Average Level icon .....               | 803        |
| Update from Cross Section icon .....   | 803        |
| Apply by Grade icon .....              | 804        |
| Plotting tab .....                     | 805        |
| Profile Plot Settings icon .....       | 805        |
| Cross Section Plot Settings icon ..... | 811        |
| Plot Standard Profile icon .....       | 815        |
| Plot Offset Profile icon .....         | 815        |
| Plot CrossSection icon .....           | 816        |
| Library tab .....                      | 817        |
| Window tab .....                       | 817        |
| Help tab .....                         | 817        |
| <b>Drainage Design View .....</b>      | <b>818</b> |
| File tab .....                         | 819        |
| View tab .....                         | 819        |
| Library tab .....                      | 820        |
| Default Data icon .....                | 820        |
| FFy Factors icon .....                 | 821        |
| Gutter Profiles icon .....             | 822        |
| Pit Inhelts icon .....                 | 823        |
| Pipe Sizes icon .....                  | 824        |
| Data tab .....                         | 825        |
| Specify Area for Pit icon .....        | 825        |
| Set Bypass Pit icon .....              | 825        |
| Edit Pit Data icon .....               | 826        |
| Edit All Pits icon .....               | 826        |
| Edit All Pipes icon .....              | 826        |
| Calcs tab .....                        | 828        |
| Hydrology icon .....                   | 828        |
| Pipe Design icon .....                 | 828        |
| Pipe Analysis icon .....               | 830        |
| Plot tab .....                         | 831        |
| Printed Reports icon .....             | 831        |
| Plot Calc icon .....                   | 831        |
| Profile Plot Settings icon .....       | 831        |

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|                                       |            |
|---------------------------------------|------------|
| Window tab .....                      | 834        |
| Help tab .....                        | 834        |
| <b>Sewer Design View .....</b>        | <b>835</b> |
| File tab .....                        | 836        |
| View tab .....                        | 836        |
| Library tab .....                     | 837        |
| Default Data icon .....               | 837        |
| Pipe Class icon .....                 | 838        |
| Data tab .....                        | 840        |
| Network Settings icon .....           | 840        |
| Edit Pit icon .....                   | 841        |
| Edit Pipe icon .....                  | 843        |
| Edit BCIL icon .....                  | 844        |
| Edit All Pits icon .....              | 844        |
| Edit All Pipes icon .....             | 845        |
| Update Network icon .....             | 846        |
| Calcs tab .....                       | 848        |
| Compute Pipe Design icon .....        | 848        |
| Edit Pipe Design icon .....           | 848        |
| Plot tab .....                        | 850        |
| Profile Settings icon .....           | 850        |
| Window tab .....                      | 852        |
| Help tab .....                        | 852        |
| <b>Cut/Fill Design View .....</b>     | <b>853</b> |
| File tab .....                        | 853        |
| View tab .....                        | 853        |
| Settings tab .....                    | 854        |
| Window tab .....                      | 854        |
| Help tab .....                        | 854        |
| <b>MAGNET Office Activation .....</b> | <b>856</b> |
| Online activation .....               | 857        |
| Network activation .....              | 859        |
| Offline activation .....              | 860        |

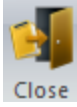
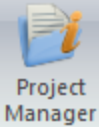
## File Tab

The *File* tab of the MAGNET Office ribbon contains control icons for basic operations. It is separated to five groups, described in the corresponding sections:

- "Standard group" section on the next page
- "Import/Export group" section on page 39
- "Plot Window group" section on page 52
- "Editor group" section on page 54
- "Print group" section on page 56

## Standard group

The *Standard* group from the *File* tab of the MAGNET Office ribbon, allows you to perform basic operations with projects.

|   |   |
|---|---|
|    | <p>New icon<br/>Click it to start a new project.</p>  |
|    | <p>Open icon<br/>Click it to open an existing project.</p>  |
|    | <p>Save icon<br/>Click it to save the current project.</p>  |
|    | <p>Save As icon<br/>Click it to save the current project with the new name, and/or in another location.</p> |
|    | <p>Close icon<br/>Click it to close the current project.</p>  |
|  | <p>Project Manager icon<br/>Click it to open the project file manager dialog.</p>                           |
|  | <p>Exit icon<br/>Click it to close the MAGNET Office application.</p>                                       |

### New icon

The **New** icon of the *Standard* group allows you to create a new project. Its shortcut key is *Ctrl+N*.

To create a new project:

1. In the *Standard* group of the *File* tab, click the **New** icon.  
The *Project details* dialog is displayed.
2. Type required information in the appropriate editboxes and click **Next**.  
The *Unit Settings* dialog is displayed.
3. In the *Unit Settings* dialog select the required measurement units and click **Finish**.  
The new project is created.

#### NOTE

These settings may be changed at any time at the *Unit Settings* tab of the **Project Settings** dialog. See "Project unit settings" section on page 583 for details.

## Open icon

The **Open** icon of the Standard group allows you to open an existing project. Its shortcut key is *Ctrl+O*.

To open an existing project:

1. In the *Standard* group of the *File* tab, click the **Open** icon.

The **Open** dialog is displayed.

2. From the *Files of type* drop-down list, select the required file format.
3. Navigate to the project location, select project file to be opened, and click **Open**.

The existing project is opened.

### TIP

To open a recent project, click  and elect the required project from the list of the recent projects .

## Save icon

The **Save** icon of the Standard group allows you to save the current project to its directory. Its shortcut key is *Ctrl+S*.

Click the icon to save all the changes in the project, made since last saving.

### NOTE

If you saving the project for a first time, the **Save As** dialog will appear.

## Save As icon

The **Save As** icon of the Standard group allows you to save the current project to a new location and/or with a new name.

To save the project:

1. In the *Standard* group of the *File* tab, click the **Save As** icon.  
The **Save As** dialog is displayed.
2. Navigate to the required folder.
3. In the *File name* editbox, type the new project name
4. If needed, from the *Save as type* drop-down list, select the required file type.
5. Click **Save**.

The project is saved.

## Close icon

The **Close** icon of the Standard group allows you to close the current project without closing the MAGNET Office application.

Click the icon to close the current project. If current project contains unsaved changes, a dialog will prompt you to save the project. Click **Yes** to save changes and close the project. Click **No** to discard changes and close the project.

### NOTE

Closing project with uncompleted actions is not allowed. If you click the during uncompleted action, a dialog will prompt you to complete the action first.

## Project Manager icon

The **Project Manager** icon of the Standard group allows you to store additional files inside a single MAGNET Office project file, and simplifies the management of the project-related files.

To open the Project File Manager, click the icon. The **Project File Manager** dialog will appear. It contains the list of the attached files and controlling buttons. Double clicking on the file name in the list opens it in the standard application associated with its file type. The buttons are described in the table below.

### Buttons of the **Project File Manager** dialog

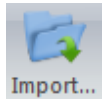
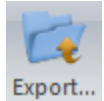
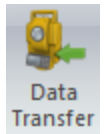
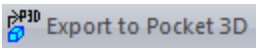
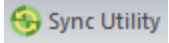
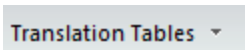
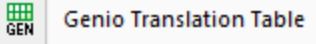
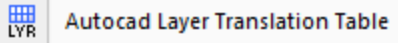
| Button           | Description   |
|------------------|---|
| <b>New</b>       | Click it to add a new document of the *.doc or *.xls type to the project. <ol style="list-style-type: none"><li>1. Click <b>New</b>.<br/>The <b>New Document</b> dialog is displayed.</li><li>2. In the <i>Document Name</i> editbox, type the name of the document and select its type from the <i>Document Type</i> drop-down list.</li><li>3. Click <b>OK</b>.<br/>The file is added to the project.</li></ol> |
| <b>Add</b>       | Click it to add an existing file of any type from the computer's file system to the project. After clicking, the <b>Open</b> dialog is displayed. Navigate to the file to be added and click <b>Open</b> .  |
| <b>Delete</b>    | Click it to delete the selected file from the project.  |
| <b>Save As</b>   | Click it to save an attached file in the computer's files system.   |
| <b>Open</b>      | Click it to open an attached file via the default system application for this file type.  |
| <b>Open With</b> | Click it to open an attached file via the specific application.   |
| <b>OK</b>        | Click it to save changes and close the <b>Project File Manager</b> dialog.  |
| <b>Cancel</b>    | Click it to close the <b>Project File Manager</b> dialog without saving any changes. After clicking a message window prompts to save changes.   |

## Exit icon

Click it to close the MAGNET Office application.

## Import/Export group

The *Import/Export* group from the *File* tab of the MAGNET Office ribbon, allows you to import data to a MAGNET Office project from various external sources, and to export data from a current project for external usage.

|  |  |
|--|--|
| <br>Import...                         | Import icon<br>Click it to start an import session.  |
| <br>Export...                         | Export icon<br>Click it to start an export session.  |
| <br>Data Transfer                     | Data Transfer icon<br>Click it to start a data transfer session.   |
| <br>Export to Pocket 3D               | Export to Pocket 3D<br>Click it to export a project data to a mobile device.   |
| <br>Sync Utility                      | Sync Utility icon<br>Click it to open the synchronization utility.   |
| <br>Translation Tables ▾              | Translation Tables icon<br>This icon contains the list of the second level icons for configuring translation tables. Click ▾ to expand the list of the second level icons. |
| <br>Genio Translation Table         | Genio Translation Table icon<br>Click it to configure settings for the data export to a Moss Genio file.   |
| <br>Autocad Layer Translation Table | Autocad Layer Translation Table icon<br>Click it to configure the AutoCAD layer to be used for translation.  |

### Import icon

The **Import** icon of the Import/Export group allows you to import measurement files of different types from the computer or a connected device to your project.

To import the measurement file to the project:

1. In the *Import/Export* group of the *File* tab, click the **Import** icon.  
The *Open* dialog is displayed.
2. From the *Files of Type* drop-down list, select the required file type.
3. Navigate to the file to be imported and click **Open**.
4. If needed, configure additional settings. They may be found in corresponding sections, listed below:
  - "Importing MAGNET Field jobs" section on the next page
  - "Importing TopSURV jobs" section on the next page
  - "Importing AutoCAD files" section on the next page
  - "Importing GENIO files" section on page 41

- "Importing 3DMC files" section on the facing page
- "Importing ASCII points files" section on the facing page

#### NOTE

Imported data may not display as it appears in other applications because data structures are often different. MAGNET Office can read the data from a range of formats. However, some of these formats may not be fully supported. For example, AutoCAD (\*.dwg) files may have complex entities compressed into blocks. These blocks must be exploded in AutoCAD prior to reading the data in MAGNET Office.

Some files contain embedded point numbers. If the current project contains existing data, then you may prefer to import these files into a new project, and then copy and paste the data into the open project, to renumber the points.

### Importing MAGNET Field jobs

When importing a MAGNET Field job (\*.mjf) file, the *Point Code and Attributes* dialog appears after clicking **Open**.

To configure the import settings:

1. In the *Point Code* group box, select whether to import point code, according to user selections or with the library description.
2. In the *Transfer* group box, select entities to be transferred.
3. In the *MJF and TSJ files* group box, select whether to import lines or not.
4. In the *Attributes* group box, configure the attribute displaying.
5. Tick the *Locked* checkbox to define, whether imported points will be locked or not.
6. Click **OK**.

### Importing TopSURV jobs

When importing a TopSURV job (\*.tsj or \*.tlsx) file, the *Point Code and Attributes* dialog appears after clicking **Open**.

To configure the import settings:

1. In the *Point Code* group box, select whether to import point code, according to user selections or with the library description.
2. In the *Transfer* group box, select entities to be transferred.
3. In the *MJF and TSJ files* group box, select whether to import lines or not.
4. In the *Attributes* group box, configure the attribute displaying.
5. Tick the *Locked* checkbox to define, whether imported points will be locked or not.
6. Click **OK**.

### Importing AutoCAD files

When exporting AutoCAD (\*.dwg or \*.dxf) files, the *Convert AutoCAD* dialog appears after clicking **Open**.

To configure the import settings:

1. In the *Distance Unit Conversion* group box, make the required selection:
  - No Conversion — select it to import the geometry into the units specified in the project settings.
  - From Inches — select it when you are inserting a drawing that was prepared in architectural units.



**NOTE**

If the units in the source drawing are set to metric, the dialog will contain From Millimeters radiobutton.

2. In the *Point Creation* group box, select required options for point's creation.
3. In the *Blocks* group box, select if needed to explode boxes, and if yes – select boxes to be exploded.
4. Click **OK**.

**Importing GENIO files**

When importing a GENIO (\*.gen or \*.crd) file, the **Import GENIO** dialog appears after clicking **Open**.

To configure the import settings:

1. Select whether layer creation will be based on the survey code or model.
2. Select whether data will be coded with two characters or four.
3. Select whether to remove duplicated points or not. If yes, specify the tolerance for duplication detecting.
4. Click **OK**.

**Importing 3DMC files**

When importing 3DMC (\*.rd3, \*.tn3, \*.pt3, \*.ln3), the **3DMC Import Files** dialog appears after clicking **Open**.

To configure the import settings, select entities to be imported and click **OK**.

**Importing ASCII points files**

When importing ASCII points (\*.pts, \*.asc, \*.xyz, \*.csv, \*.txt, \*.ctf) file, the **ASCII File Format** dialog appears after clicking **Open**.

To configure the import settings:

1. In the **Field Order** group box, specify the order of information in the source file.
2. In the *Input Mode* group box, make the required selection:
  - Direct Input – select it to simply import the point coordinates.
  - Projection – select it to project the point to the coordinate system projection of the project. For more information about coordinate system refer to "Project coordinate system" section on page 586.
  - Localization – select it to convert point coordinates to the project coordinate system.
3. In the *Data above is in* and *Project Settings* fields select appropriate values for the imported file and current project respectively.
4. If needed, in the *Coordinate System* group box, select coordinate systems for imported file and current project.
5. Click **OK**.

**Export icon**

The **Export** icon of the Import/Export group allows you to export your project to specified file type or to a Topcon/Sokkia device.

To export the current job:

1. In the *Import/Export* group of the *File* tab, click the **Export** icon.  
The **Save As** dialog is displayed.
2. Navigate to the required folder for file storing.

3. From the *Save as type* drop-down list, select the required file type, and type the file name in the *File Name* editbox.
4. Click **Save**.
5. If needed, configure additional export settings. Their description may be found in corresponding sections, listed below:
  - "Exporting to MAGNET Field Jobs" section below
  - "Exporting to 3DMC Project File" section below
  - "Exporting to AutoCAD files" section on the facing page
  - "Exporting to Land XML Files" section on the facing page
  - "Exporting to Genio Moss String" section on page 44
  - "Exporting to 3DMC Files" section on page 44
  - "Exporting to ASCII point files" section on page 45
  - "Exporting to Leica Road Runner Files" section on page 45
  - "Exporting to 3D View Files" section on page 45

*TIP*

To export raw data, click the *Data Transfer* icon.

## Exporting to MAGNET Field Jobs

When exporting to a MAGNET Field job (\*.mjf) file, the **Export** dialog appears after clicking **Save**.

To configure the export settings:

1. In the *Select From* group box, select one of the following radiobuttons:
  - *All* — to export all the supported data from the project, regardless visible it or not. Data from inactive layers will be available for transferring.
  - *Active* — to export only the supported visible data from the survey view.
  - *Selection* — to export only the supported data within a selection set.
2. If needed, in the *Export Options* group box, select the types of project entities to export.
3. If needed, at the *Points*, *Lines*, *Alignment*, *Profile* and *DTM* tabs, select objects to export.
4. Click **OK**.

## Exporting to 3DMC Project File

When exporting to a 3DMC project (\*.tp3), the **Export** dialog appears after clicking **Save**.

To configure the export settings:

1. In the *Select From* group box, select the appropriate option. Options described in the table below.
2. If needed, in the *Export Options* group box, select the types of project entities to export.
3. If needed, at the *Points*, *Lines*, *Alignment*, *Profile* and *DTM* tabs, select objects to export.
4. Click **OK**.

**Selection options**

| Option           | Description  |
|------------------|--|
| <i>All</i>       | Select it to export all the supported data from the project, regardless visible it or not. Data from inactive layers will be available for transferring. |
| <i>Active</i>    | Select it to export only the supported visible data from the main survey view.   |
| <i>Selection</i> | Select it to export only data, which support transferring, within a selection set.   |

**Exporting to AutoCAD files**

This section describes how to export to an Autodesk RealDWG Files (\*.dwg or \*.dxf) files. For information about AutoCAD Layer Translation Table configuration, refer to "Autocad Layer Translation Table icon" section on page 50.

When exporting Autodesk RealDWG file, the "Export AutoCAD DWS Options" dialog is displayed after clicking **Save**.

To configure export:

1. Configure the parameters of the *Export AutoCAD DWS Options* dialog as needed. Fields are described in the table below.
2. Click **OK**.

The data is exported.

**Fields of the *Export AutoCAD DWG Options* dialog.**

| Parameter                       | Description  |
|---------------------------------|--|
| <i>Select From</i>              | Selects either to export all existing layers or only the active ones.  |
| <i>Point Heights</i>            | Selects either to export point heights or not. If yes, select either to export non-Use in Surface points with zero heights or not.   |
| <i>Distance Unit Conversion</i> | Selects either <i>No Conversion</i> to export data without conversion if it will be processed as ground units, or <i>To Millimeters</i> , to convert it to metric system, if it will be processed as plan units. |
| <i>Unit Settings</i>            | Selects either to retain unit settings or not.   |
| <i>Export Triangles as</i>      | Defines how triangles, the current DTM and contours will be exported.  |
| <i>Export Stings as</i>         | Defines either to export strings as 2D polylines or as 3D polylines.   |
| <i>Annotation and Symbols</i>   | Defines the way of creating layer for the annotations and symbols, and the way for exporting annotations.  |

**Exporting to Land XML Files**

When exporting to a Land XML (\*.xml) file, the *XML Export Selection* dialog appears after clicking **Save**.

To configure export settings:

1. In the *Select from* group box, select the required radiobutton:
  - *All* — to export all project data.
  - *Selection* — to export only data from the current selection.
  - *Active* — to export only data from the active layers.

2. Tick checkboxes for the project entities to be imported.
3. Click **OK**.

## Exporting to Genio Moss String

This section describes how to export to a Genio Moss String (\*.gen) files. For information about Genio Translation Table configuration, refer to "Genio Translation Table icon" section on page 49.

When exporting to a Genio Moss String, the *Moss Export Selection* dialog is displayed after clicking **Save**.

To configure export:

1. Configure the parameters in the *Moss Export Selection* dialog as you need. Fields are described in the table below.
2. Click **OK**.

### Fields of the *Moss Export Selection* dialog.

| Parameter                     | Description  |
|-------------------------------|--|
| <i>Select From</i>            | Defines the selection of data for export. Select the required radiobutton: <ul style="list-style-type: none"> <li>• <i>All</i> — to export all of the design data available for transfer within the project. Visibility of this data is not a prerequisite. Design data from layers which are turned off will be available for selection to be transferred.</li> <li>• <i>Selection</i> — to select only data, which supports transferring, within a selection set for inclusion within the exported *.tp3 file.</li> <li>• <i>Active</i> — to select only supported visible data from the main survey view for inclusion within the exported *.tp3 file.</li> </ul> |
| <i>Model Name</i>             | Defines the file name for the exported model.  |
| <i>Use Translation Table</i>  | Defines the usage of the translation tables. Tick the checkbox to use translation tables, and select the required radiobutton: <ul style="list-style-type: none"> <li>• <i>Translate Code</i> — to use translation table for codes.</li> <li>• <i>Translate Layer</i> — to use translation table for layers.</li> </ul>  |
| <i>Points</i>                 | Tick it to export points.  |
| <i>Lines</i>                  | Tick it to export lines.   |
| <i>Strings</i>                | Tick it to export strings.   |
| <i>Alignments</i>             | Tick it to export alignments.  |
| <i>Text</i>                   | Tick it to export breaks.  |
| <i>New String at Breaks</i>   | Tick it to enable exporting strings with breaks in between.  |
| <i>Alignment Format</i>       | Select either 6D, 12D or Both.   |
| <i>Cross Sections Surface</i> | Tick it to export surface as cross sections. Select the required surface from the drop-down list.  |

## Exporting to 3DMC Files

When exporting to a 3DMC file (\*.rd3, \*.tn3, \*.pt3, \*.ln3), the *Export* dialog appears after clicking **Save**.

To configure the export settings:

1. In the *Select From* group box, select one of the following radiobuttons:
  - *All* — to export all the supported data from the project, regardless visible it or not. Data from inactive layers will be available for transferring.
  - *Active* — to export only the supported visible data from the survey view.
  - *Selection* — to export only the supported data within a selection set.
2. If needed, in the *Export Options* group box, select the types of project entities to export.
3. If needed, at the *Points*, *Lines*, *Alignment*, *Profile* and *DTM* tabs, select objects to export.
4. Click **OK**.

## Exporting to ASCII point files

When exporting to an ASCII point (\*.pts, \*.xyz, \*.asc, \*.txt, \*.csv) file, the **Export Points** dialog appears after clicking **Save**.

To configure the export settings:

1. In the *Select From* group box, select one of the following radiobuttons:
  - *All* — to export all the supported data from the project, regardless visible it or not. Data from inactive layers will be available for transferring.
  - *Active* — to export only the supported visible data from the survey view.
  - *Selection* — to export only the supported data within a selection set.
2. In the *Delimiter* group box, select how points will be delimited in the exported file.
3. In the *Field Order* group box, select the order of information in the exported file.
4. In the *Decimal Places* editbox, type the quantity of decimal places to export.
5. Click **OK**.

## Exporting to Leica Road Runner Files

When exporting to a Leica Road Runner (\*.dbr) file, the **Road Runner Export Selection** dialog appears after clicking **Save**.

To configure export settings:

1. In the *Select From* group box, select one of the following radiobuttons:
  - *All* — to export all the supported data from the project, regardless visible it or not. Data from inactive layers will be available for transferring.
  - *Active* — to export only the supported visible data from the survey view.
  - *Selection* — to export only the supported data within a selection set.
2. Select project entities to export.
3. Click **OK**.

## Exporting to 3D View Files

3D viewer is included in the MAGNET Office. It allows you to view the DTM surface in 3D view. If an alignment exists in the project, you can virtually 'drive' along the road.

When exporting to a 3D View (\*.w3d) file, the **Export W3D** dialog is displayed after clicking **Save**.

To configure export:

1. In the *Select From* group box, select one of the following radiobuttons:
  - *All Data* — to export all existing data.
  - *Active Layers* — to export only entities, that belong to the active layers.
  - *Current Selection* — to export only selected entities.
2. In the *Driver Offset* group box, specify the amount and direction of the offset from the required alignment, for virtual 'driving', by using the *Offset* editbox, and *Left* and *Right* radiobuttons.
3. In the *Driver Offset* group box, specify the speed of virtual 'driving', by using the *Alignment Spacing* editbox.
4. Select surfaces to export into 3D view from the list.
5. Tick the *Transfer Linework* checkbox, to define whether to export lines, strings, arcs, circles and polylines or not.
6. Tick the *Drape Lines* checkbox, to define whether to drape all selected lines onto the selected surface or not.
7. Tick the *Transfer Points* checkbox, to define whether to transfer points into the 3D view or not.
8. Click **OK**.

## Data Transfer icon

The **Data Transfer** icon of the Import/Export group allows you to transfer data from your project to file to a device.

To transfer data:

1. In the *Import/Export* group of the *File* tab, click the **Data Transfer** icon.  
The **Transfer Data** dialog is displayed.
2. From the *Instrument* drop-down list, select your device.
3. Configure the adjustments as your need. Parameters are described in the table below.
4. Do one of the following:
  - Click **Upload** button to upload data to a mobile device
  - Click **Export** to export data to a file.
  - Click **Load File** to upload a previously saved ASCII Points (\*.pts) or Upload (\*.upl) file.

NOTE

To terminate the data transfer, click **Abort**.

To check the current instrument driver, click **Driver Detail**.
5. Click **Finish** to finish the data transferring.

### Parameters of the *Transfer Data* dialog

| Parameter         | Description  |
|-------------------|--|
| <i>Instrument</i> | Defines instrument manufacturer and data format.   |
| <i>Data Type</i>  | Defines data type to be transferred.   |
| <i>Com Port</i>   | Defines serial port of the computer to which a mobile device is connected.   |
| <i>Baud Rate</i>  | Defines data transfer speed between instruments, which use serial communication. This rate must be the same on both the device and the computer. |

| Parameter                             | Description   |
|---------------------------------------|---|
| <i>Data Bit</i>                       | Defines the order of transmission from the least to the most significant bit. The value of this parameter must be the same on both the device and the computer.           |
| <i>Stop Bit</i>                       | Defines the last part of a character frame consists of either 1, or 1.5 or 2 stop bits. The value of this parameter must be the same on both the device and the computer. |
| <i>Parity</i>                         | Detects errors and supervises data transfer accuracy. The value of this parameter must be the same on both the device and the computer.                                   |
| <i>Flow Control</i>                   | Defines the way to control data transfer and stop signals. The value of this parameter must be the same on both the device and the computer.                              |
| <i>Points with No Height - Output</i> | Defines the height value for points with undefined points.  |

## Export to Pocket 3D

The **Export to Pocket 3D** icon of the Import/Export group allows you to export a 3DMC project file (\*.tp3) to your mobile device. Data to be transferred are selected during the export process.

To export a 3DMC project file to a mobile device:

1. Connect your mobile device to the computer.
2. In the *Import/Export* group of the *File* tab, click the **Export to Pocket 3D** icon.

The **Select Pocket 3D Data Path** dialog is displayed.

3. Select destination folder for export.
4. Click **OK**.

The **Export** dialog is displayed.

5. In the *Select From* group box, select one of the following radiobuttons:
  - *All* — to export all the supported data from the project, regardless visible it or not. Data from inactive layers will be available for transferring.
  - *Active* — to export only the supported visible data from the survey view.
  - *Selection* — to export only the supported data within a selection set.
6. If needed, in the *Export Options* panel, select the types of project entities to export.
7. If needed, in the *Points*, *Lines*, *Alignment*, *Profile* and *DTM* tabs, select certain objects to export.
8. Click **OK**.

Selected data is exported to the mobile device.

## Sync Utility icon

The **Sync Utility** icon of the Import/Export group allows you to keep your mobile device synchronized with the MAGNET Office.

To synchronize a mobile device with the PC:

1. Connect your mobile device to the computer.
2. In the *Import/Export* group of the *File* tab, click the **Sync Utility** icon.

The **Desktop-CE Device Synchronization** dialog is displayed.

3. If needed, click **File View** to manually select files for synchronization. For more information refer to "File Transfer - Copy From dialog" section below.
4. Click **Settings** to configure synchronization. Options described in the table below.
5. Click **Synchronize** to synchronize files at the mobile device and the PC.

**Synchronization options**

| Field  | Description  |
|--|--|
| <i>Desktop directory</i>                     | Defines the files location on the PC.  |
| <i>CE device directory</i>                   | Defines the files location on the mobile device.   |
| <i>Sync Files</i>                            | Defines the file types for synchronization.  |
| <i>Overwrite old files</i>                   | Tick it to replace older files with the newer ones with the same name and type during synchronization. |
| <i>Preview Files</i>                         | Select it to preview files before saving.  |
| <i>Warn on overwrite</i>                     | Select it to give a warning before overwriting files.  |
| <i>Create backup</i>                         | Select it to create backup copy before synchronization.  |
| <i>Startup automatically when connected.</i> | Select it to automatically launch the synch utility when mobile device is connected.                   |

**File Transfer - Copy From dialog**

The *File Transfer - Copy From* dialog allows you to manually select files for synchronization between a mobile device and the PC.

To synchronize a mobile device with the PC:

1. Connect your mobile device to the computer.
2. In the *Import/Export* group of the *File* tab, click the **Sync Utility** icon.

The *Desktop-CE Device Synchronization* dialog is displayed.

3. Click **File View**.

The *File Transfer - Copy From* dialog is displayed.

4. Do one of the following:
  - Click the *Device CE* tab to copy files from the mobile device to the PC.
  - Click the *PC* tab to copy files from the PC to the mobile device.
5. Click **Settings** to configure synchronization. Options described in the table below.
6. If needed, click **Refresh** to reload the list of the files.
7. Select files to be copied.
8. Do one of the following:
  - On the *Device CE* tab, click **Copy Selected File(s) from Device to PC** to copy the selected files from the mobile device to the PC.
  - On the *PC* tab, click **Copy Selected File(s) from PC to Device** to copy the selected files from the PC to the mobile device.



- Click **Copy All Selected File(s)** to copy selected files from the PC to the mobile device and from the mobile device to the PC.
- Click **Synchronize** to synchronize files on the mobile device and the PC.

### Synchronization options

| Field  | Description  |
|--|--|
| <i>Desktop directory</i>                     | Defines the files location on the PC.  |
| <i>CE device directory</i>                   | Defines the files location on the mobile device.   |
| <i>Sync Files</i>                            | Defines the file types for synchronization.  |
| <i>Overwrite old files</i>                   | Tick it to replace older files with the newer ones with the same name and type during synchronization. |
| <i>Preview Files</i>                         | Tick it to preview files before saving.  |
| <i>Warn on overwrite</i>                     | Tick it to give a warning before overwriting files.  |
| <i>Create backup</i>                         | Tick it to create backup copy before synchronization.  |
| <i>Startup automatically when connected.</i> | Tick it to automatically launch the synch utility when mobile device is connected to the PC.           |

## Genio Translation Table icon

The **Genio Translation Table** icon of the Import/Export group allows you to define settings for the data export to a Moss Genio file.

To configure a Genio table:

1. Set the active layers, contours and annotations as required for your Moss Genio file.
2. In the *Import/Export* group of the *File* tab, click the **Genio Translation Table** icon.

The **Moss Export LookUp Table** dialog is displayed. This table converts MAGNET Office entities to specified Moss Strings.

3. Configure Genio table parameters as you need. Parameters are described in the table below.
4. Click **OK**.

The Genio table is configured.

### Parameters of the Genio table.

| Parameter        | Description  |
|------------------|--|
| <i>Entity</i>    | Defines the entity for export. Possible values are: <ul style="list-style-type: none"> <li>• Alignment</li> <li>• Line</li> <li>• Point</li> <li>• String</li> </ul> |
| <i>Code/Name</i> | Used if you have already crated MAGNET Office strings or alignments, which will be converted to the specified Moss String.   |

| Parameter          | Description   |
|--------------------|---|
| <i>Layer</i>       | Defines layer from to be converted into the specified Moss string name. |
| <i>Moss String</i> | Defines the name for a Moss String.                                     |

#### Buttons of the *Moss Export LookUp Table* dialog.

| Button               | Description   |
|----------------------|---|
| <b>Save To Lib</b>   | Click it to copy the current table to the library. Type the name of the library in the dialog and click <b>OK</b> . |
| <b>Copy From Lib</b> | Click it to load saved table from an existing library. Select the source library and click <b>OK</b> .              |
| <b>Insert</b>        | Click it to inserts additional row in the table above the active row.   |
| <b>Delete</b>        | Click it to delete active row from the table.   |
| <b>Restore</b>       | Click it to discard all unsaved changes.  |
| <b>OK</b>            | Click it to save the changes and close the dialog.  |
| <b>Cancel</b>        | Click it to close the dialog without saving any changes.  |

## Autocad Layer Translation Table icon

The **Autocad Layer Translation Table** icon of the Import/Export group allows you to specify the AutoCAD layer to be used for translation to the MAGNET Office.

After clicking, the *Layer Translation Table* dialog appears, the table is automatically filled with the active layers from the project. If the AutoCAD layer name used in the table does not exist in the definition table, then the corresponding MAGNET Office layer name will be marked with a 0 setting.

### *TIP*

*The Autocad default layer 0 cannot be deleted or renamed. All exported files must have a 0 layer.*

To configure the layer translation table:

1. In the *Import/Export* group of the *File* tab, click the **Autocad Layer Translation Table** icon.

The *Layer Translation Table* dialog is displayed. The *Layer* column of the table contains active layers from the MAGNET Office project. The *Acad Layer* column contains the corresponding layer to which the MANGET Office layer will be translated.

2. Configure the table as you need. Table fields and dialog buttons are described below.
3. Click **OK** to save changes and close the dialog.

The translation table is configured.

#### Fields of the layer translation table

| Parameter               | Description                               |
|-------------------------|---|
| <i>Acad Layer Table</i> | Lists definition tables from the library. |

| <b>Parameter</b>        | <b>Description</b>   |
|-------------------------|--|
| <i>Annotation Layer</i> | Defines the layer, where annotations will be placed. By default, they are placed in \$LYR\$_Annotation, where \$LYR\$ is the layer name. All line/arc annotation tables are placed into the default layer 0. |
| <i>Contours Layer</i>   | Defines the layer where all contours will be placed. By default, they are placed in \$DTM\$_Contours, where \$DTM\$ is the DTM name from which the contours are determined.                                  |
| <i>Triangles Layer</i>  | Defines the layer where all triangles will be placed. By default, they are placed in \$DTM\$_Triangles, where \$DTM\$ is the DTM name from which the triangles are determined.                               |
| <i>Slope Layer</i>      | Defines the layer where all slope arrows will be placed. By default, they are placed in \$DTM\$_SlopeArrow, where \$DTM\$ is the DTM name from which the slope arrows are determined.                        |
| <i>Undefined Layer</i>  | Defaults to layer 0. All entities in non-specified Autocad layers in the table are put into this layer.  |

#### **Buttons of the Layer Translation Table dialog**

| <b>Button</b>        | <b>Description</b>   |
|----------------------|--|
| <b>Copy From Lib</b> | Click it to copy the current table to the library. A dialog prompts you to retain current autocad layer names Click <b>Yes</b> or <b>No</b> for your choice. Select the source library and click <b>OK</b> . |
| <b>Save To Lib</b>   | Click it to copy the current table to the library. Type the name of the library in the dialog box and click <b>OK</b> .  |
| <b>Insert</b>        | Click it to insert additional row in the table above the active row.   |
| <b>Delete</b>        | Click it to delete active row from the table.  |
| <b>Update</b>        | Click ti to update the table to include all layers from the current project.   |
| <b>Settings</b>      | Click it to open the layer definition table.   |
| <b>OK</b>            | Click it to save the changes and close the dialog.   |
| <b>Cancel</b>        | Click it to close the dialog without saving any changes.   |

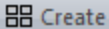
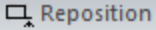
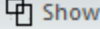
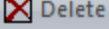

## Plot Window group

The *Plot Window* group from the *File* tab of the MAGNET Office ribbon, allows you to create and manage plot windows. Plot windows are linked drawings, displayed in the drawing view. They are defined with a specified plot scale, title block and orientation. Plot window displays all data from currently active layers within its borders.

Drawing dynamically represents the selected area of the survey view. You may turn on or off layers displaying in the drawing. If you add a new layer to the project where the drawing is already exists, you may turn this layer on for displaying in the drawing. Any annotation, which was unavailable at the moment of drawing creation, may be activated later. If entities are added, removed or edited on the active layer, they will be automatically updated in the drawing.

You may create several drawing in one project and save them using unique names.

The group contains five icons, described in the table below.

|   |  |
|---|--|
|    | <p>Create icon<br/>Click it to create a new plot window.</p>                         |
|    | <p>Reposition icon<br/>Click it to edit an existing plot window.</p>                 |
|    | <p>Show icon<br/>Click it to show the plot windows positions in the survey view.</p> |
|   | <p>Delete icon<br/>Click it to delete an existing plot window.</p>                   |
|  | <p>List icon<br/>Click it to display the list of the plot windows.</p>               |

### Create icon

The **Create** icon of the Plot Window group allows you to create a new drawing in the project.

To create a new drawing:

1. In the *Plot Window* group of the *File* tab, click the **Create** icon.

The **Open** dialog is displayed.

2. Select the required title block, and click **Open**.

The title block is displayed in the survey view. Its bottom-left corner is in the center of the survey view.

3. Modify the size and position of the drawing, by using the mouse:
  - Drag the plot window through the survey view by using the bottom left corner.
  - Re-size the plot window by using the top right corner.
  - Rotate the plot window around the bottom left corner, by using the bottom-right handle.
  - To change the title block, click **Title Block** and select a new one.
4. On the bottom panel, click **OK**.

The drawing of the selected area is displayed in the new window.

---

## Reposition icon

The **Reposition** icon of the Plot Window group allows you to relocate or/and resize or/and rotate an existing plot window.

To edit an existing plot window:

1. In the *Plot Window* group of the *File* tab, click the **Reposition** icon.  
The **Select Drawing** dialog is displayed.
2. Select the required drawing from the drop-down list, and click **OK**.  
The selected drawing is highlighted.
3. Modify the size and position of the drawing, by using the mouse:
  - Drag the plot window through the survey view by using the bottom left corner.
  - Resize the plot window by using the top right corner.
  - Rotate the plot window around the bottom left corner, by using the bottom-right handle.
  - To change the title block, click **Title Block** and select a new one.
4. On the bottom panel, click **OK**.

The drawing of the selected area is displayed in the new window.

## Show icon

The **Show** icon of the Plot Window group allows you to see all existing drawings in the project. Its shortcut key is *F10*.

Click this icon to highlight all existing drawings in the project.

## Delete icon

The **Delete** icon of the Plot Window group allows you to delete an existing drawing.

### *TIP*

*This icon is active only when at least one drawing exists in the project, and the Show icon is active.*

To delete an existing icon:

1. Make sure that the **Show** icon is active.
2. In the *Plot Window* group of the *File* tab, click the **Delete** icon.
3. Click within borders the required drawing.

The dialog asks your confirmation for deleting.

4. Click **Yes**.

The drawing is deleted.

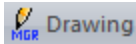
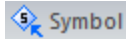
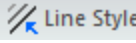
## List icon

The **List** icon of the Plot Window group allows you to list all existing plot windows in the project.

To list existing plot windows, click the icon. The list with detailed information for all existing plot windows is displayed.

## Editor group

The *Editor* group from the *File* tab of the MAGNET Office ribbon allows you to manage the drawings, symbols and line styles in the project.

|  |   |
|--|---|
|  Drawing    | Drawing icon<br>Click it to open the drawing manager window.        |
|  Symbol     | Symbol icon<br>Click it to open the symbol manager window.          |
|  Line Style | Line Style icon<br>Click it to open the line styles manager window. |

### Drawing icon

The **Drawing** icon of the Plot Window group allows you to manage drawings in the project.

After clicking, the *Drawings* dialog appears. It contains list of all drawings, existing in the project. Buttons are described below.

#### Buttons of the *Drawings* dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to add a new drawing.                     |
| <b>Open</b>   | Click it to open the selected drawing for editing. |
| <b>Rename</b> | Click it to rename the selected drawing.           |
| <b>Delete</b> | Click it to delete the selected drawing.           |
| <b>Close</b>  | Click it to close the dialog.                      |

The drawing editor allows you to add supplementary information, such as points, lines, arrows and text.

#### NOTE

All supplementary information exists at the drawing only. The survey view remains unchanged.

### Symbol icon

The **Symbol** icon of the Editor group allows you to manage symbols in the project.

After clicking, the *Symbol Manager* dialog appears. It contains list of all symbols, existing in the project. Buttons are described below.

#### Buttons of the *Symbol Manager* dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to add a new symbol.                            |
| <b>Open</b>   | Click it to open the selected symbol for editing.        |
| <b>Rename</b> | Click it to rename the selected symbol.                  |
| <b>Delete</b> | Click it to delete the selected symbol from the project. |

| Button                   | Description  |
|--------------------------|--|
| <b>Save to Library</b>   | Click it to save the selected symbol to the MAGNET Office symbol library.      |
| <b>Copy from Library</b> | Click it to add a symbol from the MAGNET Office symbol library to the project. |
| <b>OK</b>                | Click it to save the changes and close the dialog.                             |
| <b>Cancel</b>            | Click it to close the dialog without saving changes.                           |

## Line Style icon

The **Line Style** icon of the Editor group allows you to manage line styles in the project.

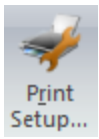
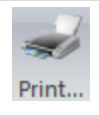
After clicking, the *Line Style Manager* dialog appears. It contains list of all symbols, existing in the project. Buttons are described below.

### Buttons of the *Line Style Manager* dialog

| Button                   | Description   |
|--------------------------|---|
| <b>New</b>               | Click it to add a new line style.   |
| <b>Open</b>              | Click it to open the selected line style for editing.                                   |
| <b>Rename</b>            | Click it to rename the selected line style.   |
| <b>Delete</b>            | Click it to delete the selected line style from the project.                            |
| <b>Save to Library</b>   | Click it to save the selected line style to the MAGNET Office line styles library.      |
| <b>Copy from Library</b> | Click it to add a line style from the MAGNET Office line styles library to the project. |
| <b>OK</b>                | Click it to save the changes and close the dialog.                                      |
| <b>Cancel</b>            | Click it to close the dialog without saving changes.                                    |

## Print group

The *Print* group from the *File* tab of the MAGNET Office ribbon allows you to prepare you project for printing and to print it.

|   |  |
|---|--|
|  | <p>Print Setup icon<br/>Click it to configure the print settings.</p>        |
|  | <p>Print icon<br/>Click it to print drawing from the survey view window.</p> |

### Print Setup icon

The **Print Setup** icon of the Print group allows you to configure the print settings for the project.

To configure print settings:

1. In the *Print* group of the *File* tab, click the **Print Setup** icon.  
The *Print Setup* dialog is displayed.
2. In the *Printer* group box, select and configure the printer.
3. In the *Paper* group box, configure the paper settings.
4. In the *Orientation* group box, select either the portrait or the landscape paper orientation.
5. Click **OK**.

### Print icon

The **Print** icon of the Print group allows you to print your project. Its shortcut key is *Ctrl+P*.

To print your project:

1. In the *Print* group of the File tab, click the **Print** icon.  
The *Print* dialog is displayed.
2. In the *Print Format* group box, specify the scale for printing.
3. In the *Orientation* group box, select either the portrait or the landscape orientation, and if needed specify the rotation.
4. In the *Print Color* group box, select either the color or the black-and-white print.
5. In the *Page Range* group box, specify the pages to be printed.
6. Click **OK**.

#### TIP

The **Print Setup** button of the *Print* dialog has the same functionality as the Print Setup icon.



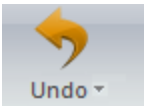

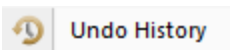
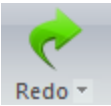

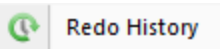

## Edit Tab

The *Edit* tab of the MAGNET Office ribbon contains control icon for work flow operations. It is separated to six groups, described in the corresponding sections:

- "Undo/Redo group" section on the next page
- "Clipboard group" section on page 60
- "Properties group" section on page 62
- "Selection group" section on page 83
- "Select By group" section on page 85
- "Edit group" section on page 95

## Undo/Redo group

The *Undo/Redo* group from the *Edit* tab of the MAGNET Office ribbon allows you to manage actions, performed in the MAGNET Office. It contains five icons, described in the table below.

|   |   |
|---|---|
|  | <p>Undo icon</p> <p>Click it to cancel the last action. This icon also contains second level icon. Click  to see it.</p>           |
|  | <p>Undo History icon</p> <p>Click it to cancel several actions at once.</p>   |
|  | <p>Redo icon</p> <p>Click it to restore the last canceled action. This icon also contains second level icon. Click  to see it.</p> |
|  | <p>Redo History icon</p> <p>Click it to restore several actions at once.</p>  |
|  | <p>Repeat icon</p> <p>Click it to repeat the last action.</p>   |

### Undo icon

The **Undo** icon of the Undo/Redo group allows you to cancel the last performed action. Its shortcut key is *Ctrl+Z*.

*TIP*

To cancel several actions at once, click  and select *Undo History* icon.

### Undo History icon

The **Undo History** of the Undo/Redo group allows you to cancel several actions at once.

To cancel actions:

1. In the *Undo/Redo* group of the *Edit* tab, click the **Undo History** icon.

The *Undo History* dialog is displayed.

2. Select actions to be canceled.
3. Click **OK**.

Actions are canceled.

### Redo icon

The **Redo** icon of the Undo/Redo group allows you to restore recently canceled action. Its shortcut key is *Ctrl+Y*.

*TIP*

To restore several actions at once, click *Redo History* icon.

## Redo History icon

The **Redo History** icon of the Undo/Redo group allows you to restore several canceled actions at once.

To restore actions:

1. In the *Undo/Redo* group of the *Edit* tab, click the **Redo History** icon.

The **Redo History** dialog is displayed.

2. Select actions to be restored.
3. Click **OK**.


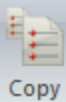
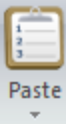


Actions are restored.

## Repeat icon

Click it to repeat the last performed action.

## Clipboard group

The *Clipboard* group from the *Edit* tab of the MAGNET Office ribbon allows you to use the system's clipboard. It contains five icons, described in the table below.

|  |  |
|--|--|
|  <p>Cut</p>           | <p>Cut icon<br/>Click it to cut the selected object to the clipboard.</p>                            |
|  <p>Copy</p>          | <p>Copy icon<br/>Click it to copy the selected object to the clipboard.</p>                          |
|  <p>Paste</p>         | <p>Paste icon<br/>Click it to paste an object from the clipboard.</p>                                |
|  <p>Paste Special</p> | <p>Paste Special icon<br/>Click it to paste an object to the specified place in the survey view.</p> |
|  <p>Delete</p>        | <p>Delete icon<br/>Click it to delete the selected object.</p>                                       |

### Cut icon

Click it to cut the selected objects to the clipboard. Its shortcut key is *Ctrl+X*.

### Copy icon

Click it to copy the selected objects to the clipboard. Its shortcut key is *Ctrl+C*.

### Paste icon

Click it to insert objects from the clipboard to your project. Its hotkey is *Ctrl+V*.

The "Paste" command inserts new objects exactly to the same coordinates, as the original objects. For pasting to different location, use the Paste Special icon.

After pasting it is possible to:

- Drag the object through the survey view by using the bottom left corner of its frame, while holding the *Shift* key.
- Resize the object by using the top right or top left corner of its frame, while holding the *Shift* key.
- Rotate the object around the bottom left corner of its frame, by using the bottom-right handle, while holding the *Shift* key.

The ***Duplicated Point Name Detected*** dialog may appears after insertion. Define the way to rename new points and click **OK**.

## Paste Special icon

The **Paste Special** icon allows you to inset object to the different coordinates from the original one.

To perform a special paste:


1. In the *Clipboard* group of the *Edit* tab, click the **Paste Special** icon.
2. If needed, specify the way to rename duplicated points.
3. In the survey view, click the place to be base point for insertion (bottom right corner of the frame).
4. On the bottom panel, specify the offset from the original coordinates by X and Y axes, rotation and scale of the new object.
5. Press *Enter*.

## Delete icon

Click it to delete the selected objects. Its shortcut key is *Del*.

## Properties group

The *Properties* group from the *Edit* tab of the MAGNET Office ribbon allows you to edit the parameters of the selected object or the group of objects. It contains one icon, described in the table below.

|   |  |
|---|--|
|  | <p>Properties icon<br/>Click it to edit the parameters of the selected object.</p> |
|---|--|

### Properties icon

The **Properties** icon of the Properties group allows you to edit the properties of the selected object or group of objects. Its shortcut key is *Alt+Enter*.

To edit object's properties:

1. In the survey view, select the required object.
2. In the *Properties* group of the *Edit* tab, click the **Properties** icon.  
The *Edit Properties* dialog is displayed.
3. Make the required configurations. For more information refer to "MAGNET Office entities properties" section on page 545.
4. Click **OK**.

#### NOTE

This icon has the same functionality as the Properties icon from the Modify group of the Modify tab.

### Point properties

A point is a two- or three-dimensional in space and it is the main entity in MAGNET Office, on which all other entities are derived.

The *Editing Points* dialog allows you to edit properties of the selected point. Buttons and fields of the dialog are described in the tables below.

#### The non-editable fields of the *Edit Point* dialog

| Field                 | Description  |
|-----------------------|--|
| <i>Point No.</i>      | A unique point identifier in the project database. One project cannot contain two points with the same numbers. Point numbers or names may be numeric or alphanumeric. The number or name is allocated when the point is created automatically by the MAGNET Office or manually by user, and cannot be changed after that. |
| <i>Easting</i>        | The east or X component of a point position.   |
| <i>Northing</i>       | The north or Y component of a point position.  |
| <i>No of Linkages</i> | The point is the basic entity, from which all other entities are derived. This field indicates how many entities are depending on this point.  |

**The editable fields of the *Edit Point* dialog**

| <b>Field</b>          | <b>Description</b>   |
|-----------------------|--|
| <i>Code</i>           | An additional alphanumeric description, attached to the point. Point codes are usually used for automatically assigning properties to points and for controlling line string between points during the reduction process. The feature codes and the properties are stored in the Survey Codes Library. |
| <i>Elevation</i>      | The height, reduced level, or Z component of a point position. MAGNET Office allows creating points with or without height. Tick checkbox near the elevation's editbox to activate it. An unticked checkbox means that the point has no height.  |
| <i>Use in Surface</i> | Defines whether the point with the defined elevation may be included in a digital terrain model (DTM).   |
| <i>Layer</i>          | Defines a layer to which the point belongs to.   |
| <i>Color</i>          | Defines a color for point displaying.  |
| <i>Mark</i>           | Defines displaying of the point on the screen.   |
| <i>Description</i>    | Short description of the point.  |
| <i>Symbol</i>         | Defines appearance of the point both on the screen and in the printed copy. You may choose symbol from the symbol library. For more information about symbols, refer to "Symbol icon" section on page 54.  |
| <i>X/Y Scale</i>      | Defines the symbol scale for displaying. Some symbols are too small; others are too big for correct displaying. To display them right, make sure to select the appropriate scale. Note that some symbols are unscalable and plot at the size they were designed.                                       |
| <i>Rotation</i>       | Defines the rotation of the symbol. Rotation value is degrees. Rotations are absolute a value of the DDD.MMSS format will rotate the symbol by specified angle.  |
| <i>Locked</i>         | Tick it to lock the point, so its properties cannot be edited, and the point cannot be moved with a mouse.   |
| <i>Annotation</i>     | Defines attributes to be displayed as the point annotation.  |

**The buttons of the *Edit Point* dialog**

| <b>Button</b>              | <b>Description</b>  |
|----------------------------|---|
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. This button is active only when at least one checkbox from the <i>Annotation</i> group box is ticked. For more information refer to "Point annotation settings" section on page 604. |
| <b>Set Properties</b>      | Click it to set current properties as the default for points. New points will be created with these properties.   |
| <b>Get Properties</b>      | Click it to apply existing default properties to the point.   |
| <b>Attributes</b>          | Click it to add new attributes to the point.  |

| Button             | Description   |
|--------------------|---|
| <b>Images/Pdfs</b> | Click it to attach an image or a PDF file to the point. The picture will be displayed near the point. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>      | Click it to delete the point and close the dialog.  |
| <b>Apply</b>       | Click it to apply changes.  |
| <b>Notes</b>       | Click it to add a short note.   |
| <b>Symbols...</b>  | Click it to manage extra symbols for the point.   |
| <b>OK</b>          | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>      | Click it to close the dialog without saving changes.  |

## Line properties

A line is a connection between two points, and defined by a start point and an end point. The bearing and distance of the line are defined by the start and end points positions.

The *Edit Line* dialog allows you to edit properties of the selected line. Buttons and fields of the dialog are described in the tables below.

### The non-editable fields of the *Edit Line* dialog

| Field              | Description   |
|--------------------|---|
| <i>Start Point</i> | Displays the start point number.  |
| <i>End Point</i>   | Displays the end point number.  |
| <i>Bearing</i>     | Displays the line bearing. A number to the left of the field displays original bearing. |
| <i>Distance</i>    | Display the line length.  |

### The editable fields of the *Edit Line* dialog

| Field             | Description  |
|-------------------|--|
| <i>Layer</i>      | Defines layer to which the line belongs to. Note that the line and its points may belong to the different layers.  |
| <i>Color</i>      | Defines a color for line displaying.   |
| <i>Line Style</i> | Defines appearance of the line both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to Line Style icon.   |
| <i>Thickness</i>  | Defines the width of the line in millimeters when plotted.   |
| <i>Break Line</i> | A line may be defined as a breakline. Line must join two Use in Surface points with heights for that. MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle. |
| <i>Annotation</i> | Tick it to turn on line annotation with its bearing, distance or both.   |



| Field                           | Description  |
|---------------------------------|--|
| <i>In Line Annotation Table</i> | Tick it to display the line annotation in the Line Annotation Table. If this table is plotted, the line is marked with a number, which is listed in the table with the appropriate bearing and distance. See "Line Annotation Table icon" section on page 214 for details. |

#### Buttons of the *Edit Line* dialog

| Button                     | Description  |
|----------------------------|--|
| <b>Set Properties</b>      | Click it to set current properties as the default for lines. New lines will be created with these properties.  |
| <b>Get Properties</b>      | Click it to load existing default properties for lines.  |
| <b>Reverse</b>             | Click it to swap the start and end points of the line.   |
| <b>Attributes</b>          | Click it to add new attributes to the line.  |
| <b>Image/Pdfs</b>          | Click it to attach an image or a PDF to the line. The picture will be displayed near the line. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>              | Click it to delete the line and close the dialog.  |
| <b>Apply</b>               | Click it to apply changes.   |
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. For more information refer to "Line annotation settings" section on page 605.                                   |
| <b>OK</b>                  | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>              | Click it to close the dialog without saving changes.   |

### Arc properties

An arc is a part of a circumference, defined by three points. It may be either a start point, an end point and the center point of circumference, or three points, belongs to one circumference.

The *Edit Arc* dialog allows you to edit properties of the selected arc. Buttons and fields of the dialog are described in the table below.

#### NOTE

Dialog for the arc, defined by the three points, belongs to one circumference, called **Edit 3-Point Arc**.

#### The non-editable fields of the *Edit Arc* dialog

| Field               | Description   |
|---------------------|---|
| <i>Start Point</i>  | Displays the number of the start point.   |
| <i>End Point</i>    | Displays the number of the end point.   |
| <i>Center Point</i> | Displays the number of the center point. This field exists in the <i>Edit Arc</i> dialog only.        |
| <i>Third Point</i>  | Displays the number of the third point. This field exists in the <i>Edit 3-Point Arc</i> dialog only. |
| <i>Radius</i>       | Displays the radius of the arc.   |

| Field                 | Description   |
|-----------------------|---|
| <i>Arc Length</i>     | Displays the length of the arc.   |
| <i>Internal Angle</i> | Displays the internal angle of the arc. It is marked as "IA" at figure 1 below.     |
| <i>Start Bearing</i>  | Displays the start bearing of the arc. It is marked as "SB" at figure 1 below.      |
| <i>End Bearing</i>    | Displays the end bearing of the arc. It is marked as "EB" at figure 1 below.        |
| <i>Segment Area</i>   | Displays the area of the arc segment. It is filled with purple at figure 2 below.   |
| <i>Sector Area</i>    | Displays the area of the arc sector. It is filled with purple at figure 3 below.    |
| <i>Chord Length</i>   | Displays the length of the arc main chord. It is marked as "CH" at figure 1 below.  |
| <i>Chord Bearing</i>  | Displays the bearing of the arc main chord. It is marked as "HB" at figure 1 below. |

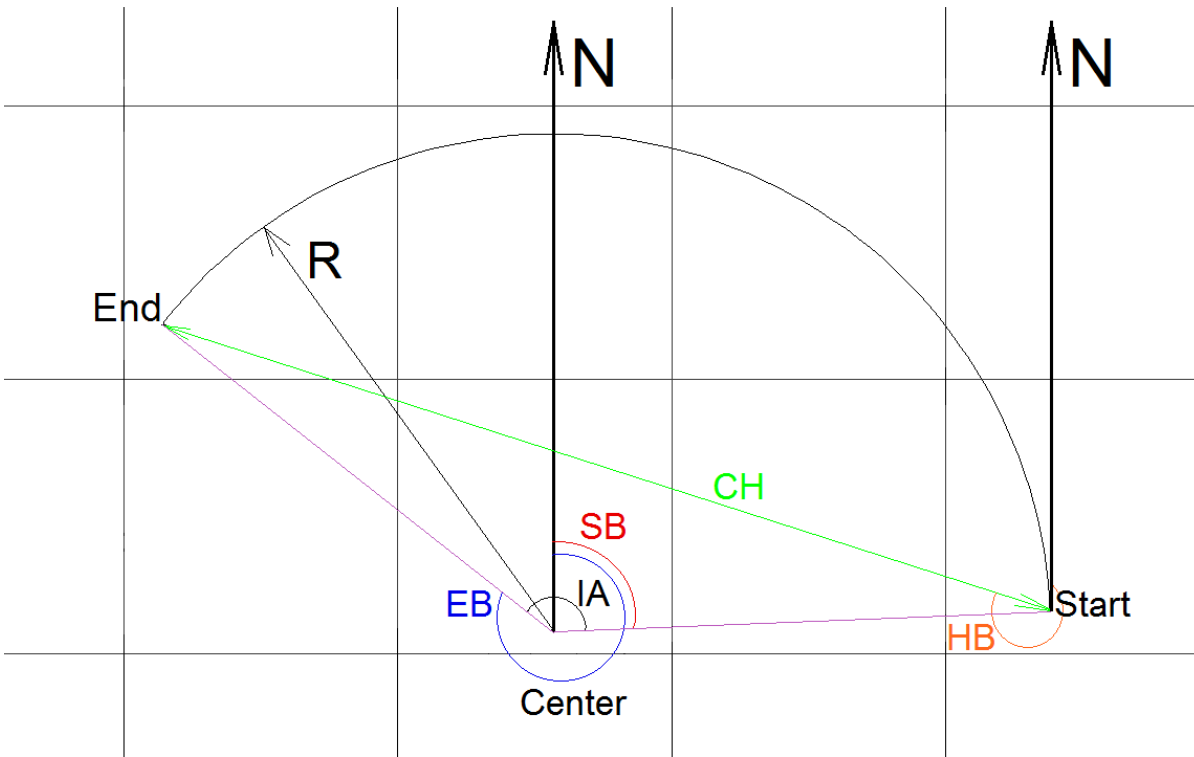


Figure 1. Arc parameters

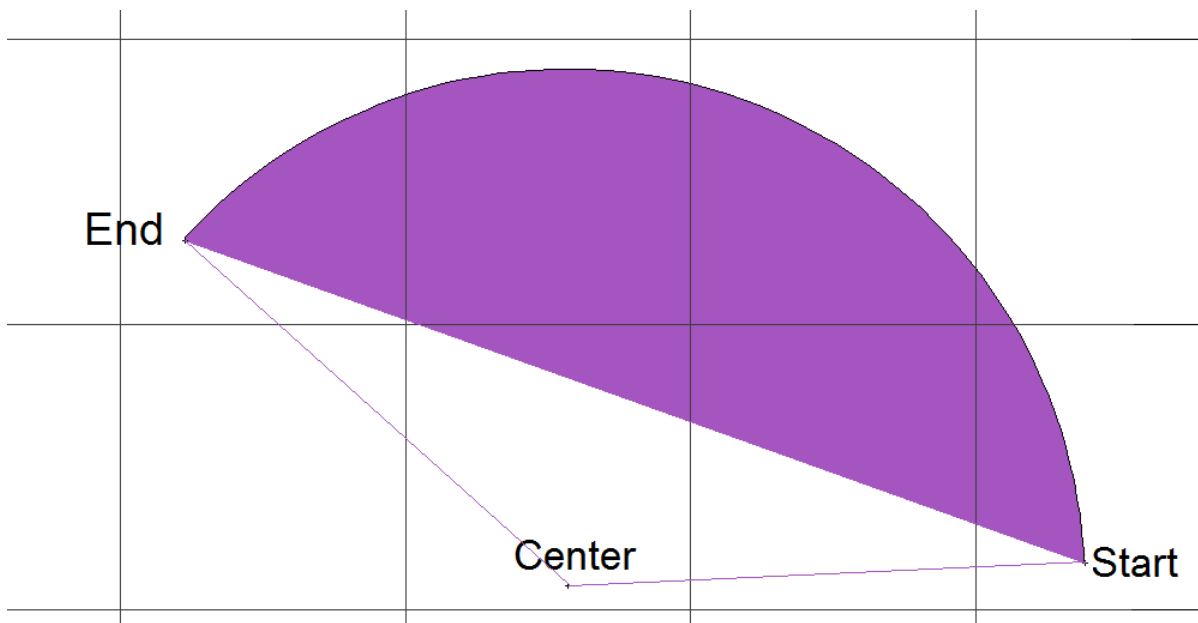


Figure 2. Segment

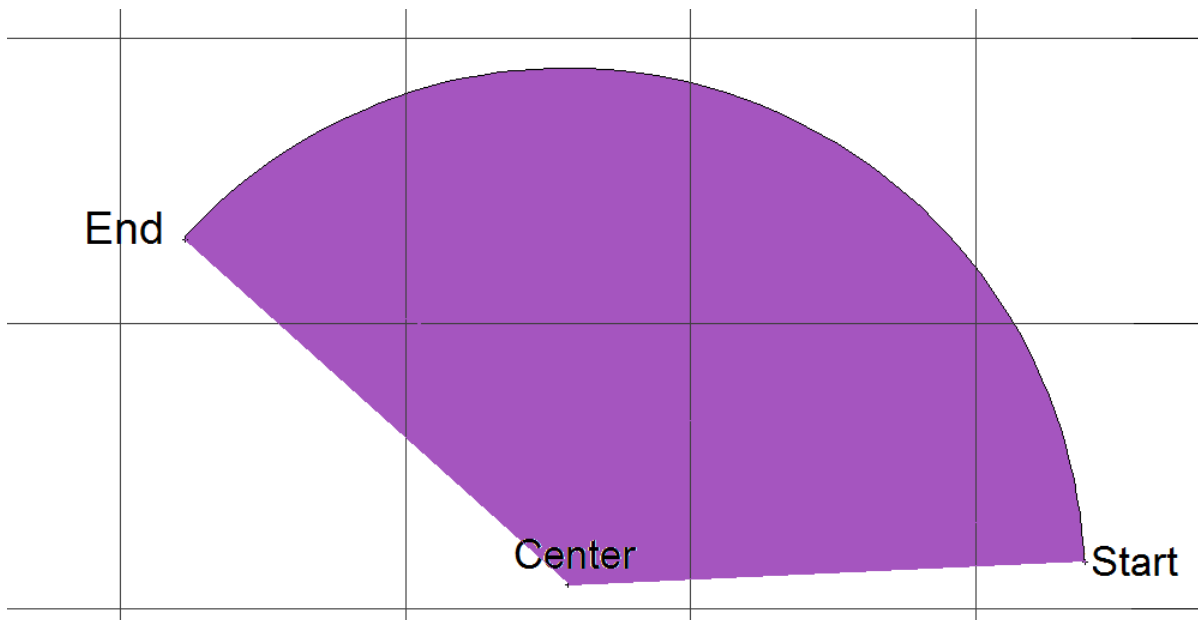


Figure 3. Sector

The editable fields of the *Edit Arc* dialog

| Field             | Description  |
|-------------------|--|
| <i>Layer</i>      | Defines layer to which the arc belongs to. Note that the arc and its points may belong to the different layers.  |
| <i>Color</i>      | Defines a color for arc displaying.  |
| <i>Line Style</i> | Defines appearance of the arc both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>  | Defines the width of the arc in millimeters when plotted.  |

| Field                          | Description  |
|--------------------------------|--|
| <i>Break Line</i>              | An arc may be defined as breakline. The arc must be defined by three Use in Surface points for that. If ticked, MAGNET Office treats a breakline as an arc across which you cannot form a triangle.                                |
| <i>Annotation</i>              | Tick it to turn on arc annotation. Possible values for annotation are: <ul style="list-style-type: none"> <li>• Radius</li> <li>• Arc length</li> <li>• Internal angle</li> <li>• Chord length</li> <li>• Chord bearing</li> </ul> |
| <i>In Arc Annotation Table</i> | Tick it to display the arc annotation in the Arc Annotation Table. If this table is plotted, the arc is marked with a number, which is listed in the table with the appropriate attributes.  |

#### Buttons of the *Edit Arc* dialog

| Button                     | Description  |
|----------------------------|--|
| <b>Set Properties</b>      | Click it to set current properties as the default for arcs. New arcs will be created with these properties.  |
| <b>Get Properties</b>      | Click it to apply existing default properties to the arcs.   |
| <b>Reverse</b>             | Click it to swap start and end points of the arc.  |
| <b>Attributes</b>          | Click it to add new attributes to the arc.   |
| <b>Images/Pdfs</b>         | Click it to attach an image or a PDF to the arc. The picture will be displayed near the arc. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>              | Click it to delete the arc and close the dialog.   |
| <b>Apply</b>               | Click it to apply changes.   |
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. For more information refer to "Arc annotation settings" section on page 607.                                  |
| <b>OK</b>                  | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>              | Click it to close the dialog without saving changes.   |

#### Circle properties

A circle is defined by its center point and radius.

The *Edit Circle* dialog allows you to edit properties of the selected circle. Buttons and fields of the dialog are described below.

#### The non-editable fields of the *Edit Circle* dialog

| Field               | Description  |
|---------------------|--|
| <i>Center Point</i> | Displays the number of the center point.                       |
| <i>Easting</i>      | Displays the east or X component of the center point position. |

| Field                | Description   |
|----------------------|---|
| <i>Northing</i>      | Displays the north or Y component of the center point position. |
| <i>Circumference</i> | Displays the length of the circumference.                       |
| <i>Area</i>          | Displays the area of the circle.                                |

#### The editable fields of the *Edit Circle* dialog

| Field            | Description   |
|------------------|---|
| <i>Radius</i>    | Defines the radius of the circle.   |
| <i>Layer</i>     | Defines layer to which the circle belongs to. Note that the circle and its center point may belong to the different layers.   |
| <i>Color</i>     | Defines a color for circle displaying.  |
| <i>Line Type</i> | Defines appearance of the circle both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i> | Defines the width of the circle in millimeters when plotted.  |

#### Buttons of the *Edit Circle* dialog

| Button                | Description  |
|-----------------------|--|
| <b>Set Properties</b> | Click it to set current properties as the default for circles. New circles will be created with these properties.  |
| <b>Get Properties</b> | Click it to load existing default properties for circles.  |
| <b>Attributes</b>     | Click it to add new attributes to the circle.  |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the circle. The picture will be displayed near the circle. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the circle and close the dialog.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.   |

### String properties

A string defined by several points, joined by lines and/or arcs to become one entity. The string may be a 3D object, if all points that define it have elevation values. A smoothing algorithm may be applied to the string for plotting purposes; it has no influence on any computations.

The *Edit String* dialog allows you to edit properties of the selected string. Buttons and fields of the dialog are described below.

#### The non-editable fields of the *Edit String* dialog

| Field              | Description                                    |
|--------------------|--|
| <i>Start Point</i> | Displays the number of the string start point. |
| <i>End Point</i>   | Displays the number of the string end point.   |

| <b>Field</b>      | <b>Description</b>                            |
|-------------------|---|
| <i>Num Points</i> | Display quantity of the points in the string. |
| <i>Length</i>     | Display the length of the string.             |

#### The editable fields of the *Edit String* dialog

| <b>Field</b>       | <b>Description</b>  |
|--------------------|---|
| <i>Name</i>        | Defines the name of the string.   |
| <i>Layer</i>       | Defines layer to which the string belongs to. Note that the string and its points may belong to the different layers.   |
| <i>Color</i>       | Defines a color for string displaying.  |
| <i>Line Style</i>  | Defines appearance of the string both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>   | Defines the width of the string in millimeters when plotted.  |
| <i>is Smoothed</i> | Select it to apply a smoothing spline algorithm to the string. It is used for plotting purposes and has no influence on any computations.   |
| <i>Service</i>     | Select is to make the string a service for use in obstruction definition.   |
| <i>Break Line</i>  | A string may be defined as breakline. The string must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.             |
| <i>Annotation</i>  | Tick it to turn on the string annotation.   |

#### Buttons of the *Edit String* dialog

| <b>Button</b>              | <b>Description</b>   |
|----------------------------|--|
| <b>Set Properties</b>      | Click it to set current properties as the default for strings. New strings will be created with these properties.  |
| <b>Get Properties</b>      | Click it to load existing default properties for strings.  |
| <b>Reverse</b>             | Click it to swap the start and end points of the string.   |
| <b>Images/Pdfs</b>         | Click it to attach an image or a PDF to the string. The picture will be displayed near the string. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>              | Click it to delete the string and close the dialog.  |
| <b>Service Detail</b>      | Click it to configure a service.   |
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. For more information refer to "String annotation settings" section on page 612.                                     |
| <b>OK</b>                  | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>              | Click it to close the dialog without saving changes.   |

## Polyline properties

A polyline defined by several lines, joined to become one entity. Note that polyline does not have start, end or node points as independent entities.

The ***Edit Polyline*** dialog allows you to edit properties of the selected polyline. Buttons and fields of the dialog are described below.

### The editable fields of the ***Edit Polyline*** dialog

| Field             | Description   |
|-------------------|---|
| <i>Layer</i>      | Defines layer to which the polyline belongs to.   |
| <i>Color</i>      | Defines a color for polyline displaying.  |
| <i>Thickness</i>  | Defines the width of the polyline in millimeters when plotted.  |
| <i>Line Style</i> | Defines appearance of the polyline both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.           |
| <i>Elevation</i>  | The height, reduced level, or Z component of the polyline. MAGNET Office allows to create polylines with or without height. Tick near the elevation edit-box to activate it. Unticked checkbox means that polyline has no height. |
| <i>Break Line</i> | A polyline may be defined as a breakline. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.   |

### Buttons of the ***Edit Polyline*** dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for polylines. New polylines will be created with these properties. |
| <b>Get Properties</b> | Click it to load existing default properties for polylines.   |
| <b>Delete</b>         | Click it to delete the polyline and close the dialog.   |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Polygon properties

A polygon is a closed shape, defined by several points, joined by lines and/or arcs to become one entity. A polygon may be selected by its centroid point.

You can move the polygon nodes to change its shape, by holding the *Shift* key and moving the node with a mouse. You can also move the entire polygon in the same way, by using its centroid point.

A polygon may be filled with a pattern, hatching, or shading.

A polygon is the base entity for a lot, boundary or pad.

The ***Edit Polygon Area*** dialog allows you to edit properties of the selected polygon. Buttons and fields of the dialog are described below.

### The non-editable fields of the ***Edit Polygon Area*** dialog

| Field       | Description                       |
|-------------|-----------------------------------|
| <i>Area</i> | Displays the area of the polygon. |

| <b>Field</b>       | <b>Description</b>   |
|--------------------|--|
| <i>Perimeter</i>   | Displays the length of the polygon perimeter.                                  |
| <i>Start Point</i> | Displays the number of the polygon start point.                                |
| <i>End Point</i>   | Displays the number of the polygon end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the polygon. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the polygon.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the polygon.                              |
| <i>CentroidX</i>   | Displays the X or north component of the polygon centroid point position.      |
| <i>CentroidY</i>   | Displays the Y or east component of the polygon centroid point position.       |

**The editable fields of the *Edit Polygon Area* dialog**

| <b>Field</b>             | <b>Description</b>  |
|--------------------------|---|
| <i>Layer</i>             | Defines layer to which the polygon belongs to. Note that the polygon and its points, lines and arcs may belong to the different layers.   |
| <i>Clipping Boundary</i> | When ticked, contours, going through the polygon, will not be displayed when plotted.   |
| <i>Break Line</i>        | A polygon may be defined as breakline. The polygon must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.   |
| <i>Line Color</i>        | Defines a color for polygon edges displaying.   |
| <i>Line Style</i>        | Defines appearance of the polygon edges both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.                            |
| <i>Thickness</i>         | Defines the width of the polygon edge in millimeters when plotted.  |
| <i>Filling Color</i>     | Defines the color for polygon area filling and strength of the pattern.   |
| <i>Filling Space</i>     | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.  |
| <i>Pattern</i>           | Defines pattern style for polygon area filling.   |
| <i>Symbol</i>            | Defines the symbol for polygon area filling.  |
| <i>Line Style</i>        | Defines the line style for polygon area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the edit-box below. |
| <i>Cross</i>             | Defines whether to activate the cross-hatching of the polygon area.   |
| <i>Opaque</i>            | When ticked, the displaying of the filling is turned off.   |
| <i>Draw Edge</i>         | Defines whether to draw the edge line around the polygon or not.  |



**Buttons of the *Edit Polygon Area* dialog**

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for polygons. New polygons will be created with these properties.   |
| <b>Get Properties</b> | Click it to apply existing default properties to the polygon.   |
| <b>Attributes</b>     | Click it to add new attributes to the polygon.  |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the polygon. The picture will be displayed near the polygon centroid point. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the polygon and close the dialog.  |
| <b>Apply</b>          | Click it to apply changes.  |
| <b>Save File</b>      | Click it to save the polygon as a platform (*. <i>bld</i> ) or house (*. <i>hse</i> ) file.   |
| <b>Convert</b>        | Click it to convert the polygon to a boundary, lot, pad or string.  |
| <b>Surface Area</b>   | Click it to compute the area of DTM, crossing with the polygon.   |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

**Lot properties**

A lot is a closed figure, created by lines and/or arcs. A lot is a type of polygon with the additional attributes to define it as an allotment in a subdivision. Lots can be automatically annotated with bearing, distance, area, lot numbers, and angles

You can move the lot nodes to change its shape, by holding the *Shift* key and moving the node with a mouse. You can also move the entire lot in the same way, by using its centroid point.

The *Edit Lot* dialog allows you to edit properties of the selected lot. Buttons and fields of the dialog are described below.

**The non-editable fields of the *Edit Lot* dialog**

| Field              | Description  |
|--------------------|--|
| <i>Area</i>        | Displays the area of the lot.  |
| <i>Perimeter</i>   | Displays the length of the lot perimeter.                                  |
| <i>Start Point</i> | Displays the number of the lot start point.                                |
| <i>End Point</i>   | Displays the number of the lot end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the lot. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the lot.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the lot.                              |
| <i>CentroidX</i>   | Displays the X or north component of the lot centroid point position.      |
| <i>CentroidY</i>   | Displays the Y or east component of the lot centroid point position.       |

**The editable fields of the *Edit Lot* dialog**

| <b>Field</b>             | <b>Description</b>   |
|--------------------------|--|
| <i>Name</i>              | Defines the name of the lot.   |
| <i>Layer</i>             | Defines layer to which the lot belongs to. Note that the lot and its points, lines and arcs may belong to the different layers.  |
| <i>Line Color</i>        | Defines a color for lot edges displaying.  |
| <i>Line Style</i>        | Defines appearance of the lot edges both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.                           |
| <i>Thickness</i>         | Defines the width of the lot edge in millimeters when plotted.   |
| <i>Filling Color</i>     | Defines the color for lot area filling.  |
| <i>Filling Space</i>     | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.   |
| <i>Pattern</i>           | Defines pattern style for lot area filling.  |
| <i>Symbol</i>            | Defines the symbol for lot area filling.   |
| <i>Line Style</i>        | Defines the line style for lot area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the editbox below. |
| <i>Cross</i>             | Select it to activate the cross-hatching of the lot area.  |
| <i>Opaque</i>            | When ticked, the lot is places in front of any entities, and cut them at a certain distance around the lot.  |
| <i>DP Number</i>         | Defines a deposited plan — previous survey plan with reference number  |
| <i>Code</i>              | Defines a code for the lot area.   |
| <i>House No</i>          | Defines a number of the house, located at the lot.   |
| <i>Street</i>            | Defines a name of the street, going through the lot.   |
| <i>Clipping Boundary</i> | When ticked, contours, going through the lot, will not be displayed when plotted.  |
| <i>Break Line</i>        | A lot may be defined as breakline. The lot must be defined by Use in Surface points for that. If selected, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.  |
| <i>Annotation</i>        | Select it to turn on lot annotation. Possible values for annotation are: <ul style="list-style-type: none"> <li>• Lot Name</li> <li>• Lot Area</li> <li>• Lot Angle</li> <li>• Lot Lines</li> <li>• Lot Arcs</li> <li>• Back Boundary</li> </ul>   |
| <i>Draw Edge</i>         | Tick it to draw the lot edge.  |

**Buttons of the *Edit Lot* dialog**

| Button                | Description  |
|-----------------------|--|
| <b>Set Properties</b> | Click it to set current properties as the default for lots. New lots will be created with these properties.  |
| <b>Get Properties</b> | Click it to apply existing default properties to the lot.  |
| <b>Attributes</b>     | Click it to add new attributes to the lot.   |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the lot. The picture will be displayed near the lot. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the lot and close the dialog.   |
| <b>Convert</b>        | Click it to convert the lot to boundary, pad or string.  |
| <b>Apply</b>          | Click it to apply changes.   |
| <b>Surface Area</b>   | Click it to compute the area of DTM, crossing with the lot.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.   |

**Boundary properties**

A boundary is a series of connected lines and/or arcs, formed into a closed figure. In fact, a boundary is a named polygon. It is used for various routines, such as:

- Compute volumes within the boundary
- Delete triangles inside or outside the boundary
- Select entities inside the boundary for other options

A boundary may be selected by its centroid point.

You can move the boundary nodes to change its shape, by holding the *Shift* key and moving the node with a mouse. You can also move the entire boundary in the same way, by using its centroid point.

A boundary may be filled with a pattern, hatching, or shading.

The ***Edit Boundary*** dialog allows you to edit properties of the selected boundary. Buttons and fields of the dialog are described below.

**The non-editable fields of the *Edit Boundary* dialog**

| Field              | Description   |
|--------------------|---|
| <i>Area</i>        | Displays the area of the boundary.  |
| <i>Perimeter</i>   | Displays the length of the boundary perimeter.                                  |
| <i>Start Point</i> | Displays the number of the boundary start point.                                |
| <i>End Point</i>   | Displays the number of the boundary end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the boundary. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the boundary.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the boundary.                              |
| <i>CentroidX</i>   | Displays the X or north component of the boundary centroid point position.      |

| <b>Field</b>     | <b>Description</b>  |
|------------------|---|
| <i>CentroidY</i> | Displays the Y or east component of the boundary centroid point position. |

**The editable fields of the *Edit Boundary* dialog**

| <b>Field</b>             | <b>Description</b>   |
|--------------------------|--|
| <i>Name</i>              | Defines the name of the boundary.  |
| <i>Layer</i>             | Defines layer to which the boundary belongs to. Note that the boundary and its points, lines, and arcs may belong to the different layers.   |
| <i>Clipping Boundary</i> | When ticked, contours, going through the boundary, will not be displayed when plotted.   |
| <i>Break Line</i>        | A boundary may be defined as breakline. The boundary must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.  |
| <i>Line Color</i>        | Defines a color for boundary edge displaying.  |
| <i>Line Style</i>        | Defines appearance of the boundary edge both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.                             |
| <i>Thickness</i>         | Defines the width of the boundary edge in millimeters when plotted.  |
| <i>Filling Color</i>     | Defines the color for boundary area filling and strength of the pattern.   |
| <i>Filling Space</i>     | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.   |
| <i>Pattern</i>           | Defines pattern style for boundary area filling.   |
| <i>Symbol</i>            | Defines the symbol for boundary area filling.  |
| <i>Line Style</i>        | Defines the line style for boundary area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the edit-box below. |
| <i>Cross</i>             | Tick it to activate the cross-hatching of the boundary area.   |
| <i>Opaque</i>            | When ticked, the displaying of the filling is turned off.  |
| <i>Draw Edge</i>         | Tick it to draw the boundary edge.   |

**Buttons of the *Edit Boundary* dialog**

| <b>Button</b>         | <b>Description</b>  |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for boundaries. New boundaries will be created with these properties. |
| <b>Get Properties</b> | Click it to apply existing default properties to the boundary.  |
| <b>Attributes</b>     | Click it to add new attributes to the boundary.   |

| Button              | Description   |
|---------------------|---|
| <b>Images/Pdfs</b>  | Click it to attach an image or a PDF to the boundary. The picture will be displayed near the boundary centroid point. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>       | Click it to delete the boundary and close the dialog.   |
| <b>Apply</b>        | Click it to apply changes.  |
| <b>Save File</b>    | Click it to save the boundary as a platform (*.bld) or house (*.hse) file.  |
| <b>Convert</b>      | Click it to convert the boundary to lot, pad or string.   |
| <b>Surface Area</b> | Click it to compute the area of DTM, crossing with the boundary.  |
| <b>OK</b>           | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>       | Click it to close the dialog without saving changes.  |

## Pad properties

A pad is a series of connected lines and/or arcs, formed into a closed figure around the extents of the buildings or other pad. In fact, a pad is a named polygon. It is used for identification of a pad and side slopes suitable for the placement of buildings.

A pad may be selected by its centroid point.

You can move the pad nodes to change its shape, by holding the *Shift* key and moving the node with a mouse. You can also move the entire pad in the same way, by using its centroid point.

A pad may be filled with a pattern, hatching, or shading.

The **Edit Pad** dialog allows you to edit properties of the selected pad. Buttons and fields of the dialog are described below.

### The non-editable fields of the **Edit Pad** dialog

| Field              | Description  |
|--------------------|--|
| <i>Area</i>        | Displays the area of the pad.  |
| <i>Perimeter</i>   | Displays the length of the pad edge.                                       |
| <i>Start Point</i> | Displays the number of the pad start point.                                |
| <i>End Point</i>   | Displays the number of the pad end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the pad. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the pad.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the pad.                              |
| <i>CentroidX</i>   | Displays the X or north component of the pad centroid point position.      |
| <i>CentroidY</i>   | Displays the Y or east component of the pad centroid point position.       |

### The editable fields of the **Edit Pad** dialog

| Field       | Description                  |
|-------------|------------------------------|
| <i>Name</i> | Defines the name of the pad. |

| <b>Field</b>             | <b>Description</b>   |
|--------------------------|--|
| <i>Layer</i>             | Defines layer to which the pad belongs to. Note that the pad and its points, lines, and arcs may belong to the different layers.   |
| <i>Clipping Boundary</i> | When ticked, contours, going through the pad, will not be displayed when plotted.  |
| <i>Break Line</i>        | A pad may be defined as breakline. The pad must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.  |
| <i>Line Color</i>        | Defines a color for pad edge displaying.   |
| <i>Line Style</i>        | Defines appearance of the pad edge both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.                            |
| <i>Thickness</i>         | Defines the width of the pad edge in millimeters when plotted.   |
| <i>Filling Color</i>     | Defines the color for pad area filling and strength of the pattern.  |
| <i>Filling Space</i>     | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.   |
| <i>Pattern</i>           | Defines pattern style for pad area filling.  |
| <i>Symbol</i>            | Defines the symbol for pad area filling.   |
| <i>Line Style</i>        | Defines the line style for pad area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the editbox below. |
| <i>Cross</i>             | Tick it to activate the cross-hatching of the pad area.  |
| <i>Opaque</i>            | When ticked, the displaying of the filling is turned off.  |
| <i>Draw Edge</i>         | Tick it to draw the pad edge.  |

#### **Buttons of the *Edit Pad* dialog**

| <b>Button</b>         | <b>Description</b>  |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for pads. New pads will be created with these properties.   |
| <b>Get Properties</b> | Click it to apply existing default properties to the pad.   |
| <b>Attributes</b>     | Click it to add new attributes to the pad.  |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the pad. The picture will be displayed near the pad centroid point. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the pad and close the dialog.  |
| <b>Apply</b>          | Click it to apply changes.  |

| Button              | Description   |
|---------------------|---|
| <b>Save File</b>    | Click it to save the pad as a platform (*. <i>bld</i> ) or house (*. <i>hse</i> ) file. |
| <b>Convert</b>      | Click it to convert the boundary to lot, pad or string.                                 |
| <b>Surface Area</b> | Click it to compute the area of DTM, crossing with the pad.                             |
| <b>OK</b>           | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>       | Click it to close the dialog without saving changes.                                    |

## Text properties

A text is a group of alpha, numeric or alphanumeric characters, located in the survey view. It is displayed on one or multiple lines. Text entities are non-scalable, defined text height remains the same, regardless of the plotting scale.

The *Edit Text* dialog allows you to edit properties of the selected text. Buttons and fields of the dialog are described in the tables below.

### Fields of the *Edit Text* dialog

| Field                  | Description  |
|------------------------|--|
| <i>Easting</i>         | Defines the east or Y component of the text position.  |
| <i>Northing</i>        | Defines the north or X component of the text position.   |
| <i>Layer</i>           | Defines the layer to which the text belongs to.  |
| <i>Bearing</i>         | Defines the bearing of the text. Bearing is measured clockwise from north.   |
| <i>Color</i>           | Defines a color for text displaying.   |
| <i>Font</i>            | Defines a font for text displaying.  |
| <i>Char Height</i>     | Defines the height of the text char  |
| <i>Text Style</i>      | Defines the pre-configured text style. For information about configuring text styles, refer to "Text Styles icon" section on page 122. |
| <i>Char Style</i>      | Defines the usage bold/italic/underline formatting or not.   |
| <i>Insertion Style</i> | Defines the position of the insertion point relative to the text string. Refer to pictures below for details.                          |
| <i>Use Text Style</i>  | Tick it to use the pre-configured text style, selected in the <i>Text Style</i> drop-down list.  |
| <i>Draw Box</i>        | Tick it to draw a frame around the text.   |
| <i>Opaque</i>          | Select it to place the text in front of any entities, and cut them at a certain distance around the text.                              |
| <i>Main editbox</i>    | Defines the text string to be displayed.   |

### Buttons of the *Edit Text* dialog

| Button                | Description   |
|-----------------------|---|
| <b>Parallel To</b>    | Click it to set the text to be parallel to an existing entity.  |
| <b>Set Properties</b> | Click it to set current properties as the default for text. New text will be created with these properties. |

| Button                | Description  |
|-----------------------|--|
| <b>Get Properties</b> | Click it to load existing default properties for text. |
| <b>Delete</b>         | Click it to delete the text and close the dialog.      |
| <b>Upper</b>          | Convert all chars of the text to uppercase.            |
| <b>Lower</b>          | Convert all chars of the text to lowercase.            |
| <b>Invert</b>         | Invert the current upper/lowercase condition.          |
| <b>Capitalize</b>     | Convert the first char of each word to uppercase.      |
| <b>OK</b>             | Click it to apply changes and close the dialog.        |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.   |

## Dimension properties

A dimension entity measures the distance between two existing points and displays it as annotation for line between these points with arrows on each end.

The *Edit Dimension* dialog allows you to edit properties of the selected dimension. Buttons and fields of the dialog are described below.

### Fields of the *Edit Dimension* dialog

| Field              | Description   |
|--------------------|---|
| <i>Layer</i>       | Defines the layer to which the dimension belongs to.  |
| <i>Color</i>       | Defines a color for dimension displaying.   |
| <i>Thickness</i>   | Defines the width of the dimension line in millimeters when plotted.  |
| <i>Line Style</i>  | Defines appearance of the dimension line both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Arrow Head</i>  | Defines the style of the arrow head.  |
| <i>Head Angle</i>  | Defines the angle of the arrow head.  |
| <i>Head Length</i> | Defines the length of the arrow head.   |

### Buttons of the *Edit Dimension* dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for dimensions. New dimensions will be created with these properties. |
| <b>Get Properties</b> | Click it to apply existing default properties to the dimension.   |
| <b>Delete</b>         | Click it to delete the dimension and close the dialog.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |



## Arrow properties

An arrow is a special line or series of lines with an arrow head at one or both ends. The arrow can be used as an indicator on a plan. Various arrow head styles are available with user-defined dimensions for the arrow head. Arrow heads are non-scalable, defined arrow head remains the same, regardless of the plotting scale.

The **Edit Arrow** dialog allows you to edit properties of the selected arrow. Buttons and fields of the dialog are described below.

### Fields of the **Edit Arrow** dialog

| Field              | Description   |
|--------------------|---|
| <i>Layer</i>       | Defines the layer to which the arrow belongs to.  |
| <i>Color</i>       | Defines a color for arrow displaying.   |
| <i>Thickness</i>   | Defines the width of the arrow line in millimeters when plotted.  |
| <i>Line Style</i>  | Defines appearance of the arrow line both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Arrow Head</i>  | Defines the style of the arrow head.  |
| <i>Head Angle</i>  | Defines the angle of the arrow head.  |
| <i>Head Length</i> | Defines the length of the arrow head.   |

### Buttons of the **Edit Arrow** dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for arrows. New arrows will be created with these properties. |
| <b>Get Properties</b> | Click it to apply existing default properties to the arrow.   |
| <b>Delete</b>         | Click it to delete the arrow and close the dialog.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Image Viewer

The image viewer allows you to attach images or/and PDF files to the MAGNET Office entities.

To open the image viewer, click **Images/Pdfs** in the properties dialog of the appropriate entity. Left panel contains the list of the attached images and/or PDF files. Right panel displays the preview of the currently selected image/PDF file. Buttons are described in the table below.

### Buttons of the image viewer



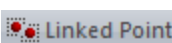
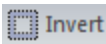
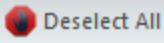
| Button              | Description  |
|---------------------|--|
| <b>View Pdf</b>     | Click it to open the selected PDF file in the default system PDF reader.<br>NOTE<br>This button is displayed only when a PDF file is selected. |
| <b>Attach Image</b> | Click it to attach a new image or PDF file to the entity.  |
| <b>Delete</b>       | Click it to delete the selected image/PDF file.  |

| <b>Button</b> | <b>Description</b>   |
|---------------|--|
| <b>OK</b>     | Click it to save the changes and close the image viewer.   |
| <b>Cancel</b> | Click it to close the image viewer without saving changes. |

To display an image or/and a PDF file in the survey view, tick the checkbox near the required image/PDF file in the left panel, and click **OK**.

## Selection group

The *Selection* group allows from the *Edit* tab of the MAGNET Office ribbon you to perform operations with object selections. It contains five icons, described in the table below.

|   |   |
|---|---|
|  | <p>Select All icon</p> <p>Click it to select all active objects in the survey view.</p>     |
|  | <p>Select Point icon</p> <p>Click it to turn on the point selection mode.</p>               |
|  | <p>Linked Point icon</p> <p>Click it to select points, linked with the selected object.</p> |
|  | <p>Invert icon</p> <p>Click it to invert the object selection in the project.</p>           |
|  | <p>Deselect All icon</p> <p>Click it to remove all current selections.</p>                  |

### Select All icon

The **Select All** icon of the Selection group allows you to select all active data of your project. Its shortcut is *Ctrl+A*.

Click the icon to select all active objects in the survey view.

### Select Point icon

The **Select Point** icon of the Selection group allows you to select one point in your project.

To select a point:

1. In the *Selection* group of the *Edit* tab, click the **Select Point** icon.  
The input bar is displayed at the bottom panel.
2. In the *Number* editbox, type the number of the required point.
3. Do one of the following:
  - Press *Enter*.
  - Left click on the survey view.

The point is selected.

### Linked Point icon

The **Linked Point** icon of the Selection group allows you to add points of the currently select object to the selection.

To use the functionality of the icon:

1. Select the required object, which is based on points.
2. In the *Selection* group of the *Edit* tab, click the **Linked Points** icon.

The selection is expanded, and includes the selected object itself, and also points, on which it is based.

## **Invert icon**

The **Invert** icon of the Selection group allows you to invert current selection.

Click the icon to deselect all currently selected objects, and select all other objects.

## **Deselect All icon**



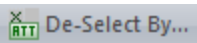
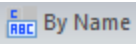

The **Deselect All** icon of the Selection group allows you to deselect all currently selected objects.

*TIP*

*Other way to cancel any selection is to do the left click outside of the selection area.*

## Select By group

The *Select By* group from the *Edit* tab of the MAGNET Office ribbon allows you to perform objects selections by criteria. It contains five icons, described in the table below.

|   |  |
|---|--|
|  | <p>Select By icon<br/>Click it to perform the selection by criteria.</p>                           |
|  | <p>By Region icon<br/>Click it to perform the selection within a specified area.</p>               |
|  | <p>De-Select By icon<br/>Click it to perform deselection by criteria.</p>                          |
|  | <p>By Name icon<br/>Click it to perform the selection by specified object name.</p>                |
|  | <p>By DTM icon<br/>Click it to perform the selection within the defined digital terrain model.</p> |

### Select By icon

The **Select By** icon of the Select By group allows you to select objects by a certain criteria.

To perform a configured selection:

1. In the *Select By* group of the *Edit* tab, click the **Select By** icon.

The **Select by:** dialog is displayed.

#### NOTE

If any objects has been already selected when clicked, dialog will be named **Select From Current Selection by:** and the selection will be performed only within the current selection.

2. Configure the filters for each entity at the respective tab. Detailed description may be found in corresponding sections:
  - "Layers tab" section on the next page
  - "Points tab" section on the next page
  - "Lines tab" section on page 87
  - "Arcs tab" section on page 88
  - "Circles tab" section on page 88
  - "Strings tab" section on page 89
  - "Polylines tab" section on page 89
  - "Polygons tab" section on page 90
  - "Lots tab" section on page 91
  - "Text tab" section on page 91
3. Make sure, that in the *Results* group box of the *Layer* tab, you have selected the required action to be performed after selection:
  - *View* — to simply select required objects.
  - *List* — to select required objects and list them in the data listing.

- *Edit Properties* — to select required objects and edit their properties.
4. Click **OK**

The objects are selected.

#### Buttons of the *Select by:* dialog

| Button         | Description   |
|----------------|---|
| <b>Save</b>    | Click it to save the current configuration. For more information refer to "Saving selections" section on page 92. |
| <b>Restore</b> | Click to discard changes and load the currently selected configuration.   |
| <b>Reset</b>   | Click it to reset the layers to how they appeared at the fist icon clicking.                                      |
| <b>Delete</b>  | Click it to delete the currently selected configuration.  |
| <b>OK</b>      | Click it to select objects by as configured.  |
| <b>Cancel</b>  | Click it to close the dialog.   |

### Layers tab

The *Layers* tab of the *Select by:* dialog allows you to configure the selection by layer. For more information about the *Select by:* dialog, refer to "Select By icon" section on the previous page.

To configure the filter by layer :

1. In the layer list, select the layers for objects selection. You may use either **Select All**, or **Select None** buttons from the *Layers* group box.
2. If needed in the *Layers* group box, tick the *Apply Layers to All Entities* checkbox to perform selection though all the existing entities.
3. In the *Results* group box, select the action to be performed after selection:
  - *View* — to simply select required objects.
  - *List* — to select required objects and list them in the data listing.
  - *Edit Properties* — to select required objects and edit their properties.
4. Do one of the following:
  - Click **Save** to save your selection. For more information refer to "Saving selections" section on page 92.
  - Click another tab to set more filters.
  - Click **OK** to select the objects.

### Points tab

The *Points* tab of the *Select by:* dialog allows configuring the selection of points. For more information about the *Select by:* dialog, refer to "Select By icon" section on the previous page. You may filter points by name, code, mark, etc. Points, matching each of the specified criteria will be selected.

To configure the filter by points:

1. Tick the *Select Points* checkbox to include points into selection.
2. Set up the required parameters. Fields are described in the table below.
3. Do one of the following:

- Click **Save** to save your selection. For more information refer to "Saving selections" section on page 92.
- Click another tab to set more filters.
- Click **OK** to select the objects.

#### Fields of the *Points* tab

| Field                              | Description  |
|------------------------------------|--|
| <i>Name</i>                        | Type point name (point number) to select points by name. Separate names by commas, or use a hyphen to specify the name range.<br><i>Example: 50-53, 95 will select points 50, 51, 52, 53, and 95.</i>  |
| <i>Code</i>                        | Type point code to select points by code. Separate codes by commas, or use a hyphen to specify an alphabetical code range. This range can contain only first character of the code range.<br><i>Example: R-T will select points with any code starting with R or S but none of those starting with T unless a code of the single character T is available.</i> |
| <i>Elevation From To</i>           | Type the lowest elevation in the range in the <i>From</i> editbox, followed by the highest elevation in the range in the <i>To</i> editbox, to select points by height.  |
| <i>All Set</i>                     | Tick it to select all points, matching specified range, with the active elevation.   |
| <i>All Unset</i>                   | Tick it to select all points with the inactive elevation.  |
| <i>Use in Surface</i>              | Tick it to select all points, matching specified range, and marked as Use in Surface.  |
| <i>Attributes Name</i>             | Tick it to select points by attribute name, specified in the drop-down list below.   |
| <i>Attributes Name with Values</i> | Tick it to select points by attribute value, specified in the editbox below.   |
| <i>Mark</i>                        | Select a required mark, or set of marks to select points by mark.  |
| <i>Symbol</i>                      | Select a required symbol, or set of symbols to select points by symbol.  |
| <i>Color</i>                       | Select required color, or set of colors to select points by color.   |

#### Lines tab

The *Lines* tab of the **Select by:** dialog allows configuring the selection of lines. For more information about the **Select by:** dialog, refer to "Select By icon" section on page 85. You may filter lines by style, thickness, color, etc. Lines, matching each of the specified criteria will be selected.

To configure the filter by lines:

1. Tick the *Select Lines* checkbox to include lines into selection.
2. Set up the required parameters. Fields are described in the table below.
3. Do one of the following:
  - Click **Save** to save your selection. For more information refer to "Saving selections" section on page 92.
  - Click another tab to set more filters.
  - Click **OK** to select the objects.

**Fields of the *Lines* tab**

| Field               | Description  |
|---------------------|--|
| <i>Select Lines</i> | Tick it to include lines into selection.   |
| <i>Breaklines</i>   | Tick it to select only breaklines.   |
| <i>Style</i>        | Select a required line style, or set of line styles to select lines by style.      |
| <i>Thickness</i>    | Select a required thickness, or set of thicknesses to select lines by thicknesses. |
| <i>Color</i>        | Select required color, or set of colors to select lines by color.                  |

**Arcs tab**

The *Arcs* tab of the **Select by:** dialog allows configuring the selection of arcs. For more information about the **Select by:** dialog, refer to "Select By icon" section on page 85. You may filter arcs by style, thickness, color, etc. Arcs, matching each of the specified criteria will be selected.

To configure the filter by arcs:

1. Tick the *Select Arcs* checkbox to include arcs into selection.
2. Set up the required parameters. Fields are described in the table below.
3. Do one of the following:
  - Click **Save** to save your selection. For more information refer to "Saving selections" section on page 92.
  - Click another tab to set more filters.
  - Click **OK** to select the objects.

**Fields of the *Arcs* tab**

| Field              | Description   |
|--------------------|---|
| <i>Select Arcs</i> | Tick it to include arcs into selection  |
| <i>Breaklines</i>  | Tick it to select only the breaklines in entities.                                |
| <i>Style</i>       | Select a required line style, or set of line styles to select arcs by line style. |
| <i>Thickness</i>   | Select a required thickness, or set of thicknesses to select arcs by thicknesses. |
| <i>Color</i>       | Select required color, or set of colors to select arcs by color.                  |

**Circles tab**

The *Circles* tab of the **Select by:** dialog allows configuring the selection of circles. For more information about the **Select by:** dialog, refer to "Select By icon" section on page 85. You may filter circles by style, thickness, color, etc. Circles, matching each of the specified criteria will be selected.

To configure the filter by circles:

1. Tick the *Select Circles* checkbox to include circles into selection.
2. Set up the required parameters. Description of the fields may be found below.
3. Do one of the following:
  - Click **Save** to save your selection. For more information refer to "Saving selections" section on page 92.



- Click another tab to set more filters.
- Click **OK** to select the objects.

#### Fields of the *Circles* tab

| Field                 | Description  |
|-----------------------|--|
| <i>Select Circles</i> | Tick it to include circles into selection.   |
| <i>Breaklines</i>     | Tick it to select only breaklines.   |
| <i>Style</i>          | Select a required line style, or set of line styles to select circles by line style. |
| <i>Thickness</i>      | Select a required thickness, or set of thicknesses to select circles by thicknesses. |
| <i>Color</i>          | Select required color or set of colors to select circles by color.                   |

#### Strings tab

The *Strings* tab of the **Select by:** dialog allows configuring the selection of strings. For more information about the **Select by:** dialog, refer to "Select By icon" section on page 85. You may filter strings by style, thickness, color, etc. Strings, matching each of the specified criteria will be selected.

To configure the filter by strings:

1. Tick the *Select Strings* checkbox to include strings into selection.
2. Set up the required parameters. Fields are described in the table below.
3. Do one of the following:
  - Click **Save** to save your selection. For more information refer to "Saving selections" section on page 92.
  - Click another tab to set more filters.
  - Click **OK** to select the objects.

#### Fields of the *Strings* tab

| Field                 | Description  |
|-----------------------|--|
| <i>Select Strings</i> | Tick it to include strings into selection.   |
| <i>Breaklines</i>     | Tick it to select only breaklines.   |
| <i>Name</i>           | Type string name, to select strings by names.  |
| <i>Style</i>          | Select a required line style, or set of line styles to select strings by line style. |
| <i>Thickness</i>      | Select a required thickness, or set of thicknesses to select strings by thicknesses. |
| <i>Color</i>          | Select required color, or set of colors to select strings by color.                  |

#### Polylines tab

The *Polylines* tab of the **Select by:** dialog allows configuring the selection of polylines. For more information about the **Select by:** dialog, refer to "Select By icon" section on page 85. You may filter polylines by style, thickness, color, etc. Polylines, matching each of the specified criteria will be selected.

To configure the filter by polylines:

1. Tick the *Select Polylines* checkbox to include polylines into selection.
2. Set up the required parameters. Description of the fields may be found below.
3. Do one of the following:

- Click **Save** to save your selection. For more information refer to "Saving selections" section on page 92.
- Click another tab to set more filters.
- Click **OK** to select the objects.

#### Fields of the *Polylines* tab

| Field                    | Description  |
|--------------------------|--|
| <i>Select Polylines</i>  | Tick it to include polylines into selection.   |
| <i>Breaklines</i>        | Tick it to select only breaklines.   |
| <i>Elevation From To</i> | Type the lowest elevation in the range in the "From" editbox, followed by the highest elevation in the range in the "To" editbox, to select polylines by height. |
| <i>All Set</i>           | Tick it to select all polylines, matching specified range, with the active elevation.  |
| <i>All Unset</i>         | Tick it to select all polylines with the inactive elevation.   |
| <i>Style</i>             | Select a required line style, or set of line styles to select polylines by line style.   |
| <i>Thickness</i>         | Select a required thickness, or set of thicknesses to select polylines by thicknesses.   |
| <i>Color</i>             | Select required color, or set of colors to select polylines by color.  |

#### Polygons tab

The *Polygons* tab of the **Select by:** dialog allows configuring the selection of polygons. For more information about the **Select by:** dialog, refer to "Select By icon" section on page 85. You may filter polygons by line style, thickness, color, etc. Polygons, matching each of the specified criteria will be selected.

To configure the filter by polygons:

1. Tick the *Select Polygons* checkbox to include polygons into selection.
2. Set up the required parameters. Fields are described in the table below.
3. Do one of the following:
  - Click **Save** to save your selection. For more information refer to "Saving selections" section on page 92.
  - Click another tab to set more filters.
  - Click **OK** to select the objects.

#### Fields of the *Polygons* tab

| Field                     | Description                                       |
|---------------------------|---|
| <i>Select Polygons</i>    | Tick it to include polygons into selection        |
| <i>Breaklines</i>         | Tick it to select only breaklines.                |
| <i>All</i>                | Tick it to select all polygons and boundaries.    |
| <i>Exclude Boundaries</i> | Tick it to exclude boundaries from the selection. |
| <i>Boundaries Only</i>    | Tick it to select only boundaries.                |

| Field            | Description   |
|------------------|---|
| <i>Style</i>     | Select a required line style, or set of line styles to select polygons by line style. |
| <i>Thickness</i> | Select a required thickness, or set of thicknesses to select polygons by thicknesses. |
| <i>Color</i>     | Select required color, or set of colors to select polygons by color.                  |

### Lots tab

The *Lots* tab of the **Select by:** dialog allows configuring the selection by lot. For more information about the **Select by:** dialog, refer to "Select By icon" section on page 85. You may filter lots by line style, thickness, color, etc. Lots, matching each of the specified criteria will be selected.

To configure the filter by lots:

1. Tick the *Select Lots* checkbox to include lots into selection.
2. Set up the required parameters. Fields are described in the table below.
3. Do one of the following:
  - Click **Save** to save your selection. For more information refer to "Saving selections" section on the next page.
  - Click another tab to set more filters.
  - Click **OK** to select the objects.

#### Fields of the *Lots* tab

| Field              | Description   |
|--------------------|---|
| <i>Select Lots</i> | Tick it to include lots into selection.   |
| <i>Breaklines</i>  | Tick it to select only breaklines.  |
| <i>Code</i>        | Type a code, to select lots by code.  |
| <i>DP Number</i>   | Type a DP number or numbers range, to select lots by DP number.                   |
| <i>Style</i>       | Select a required line style, or set of line styles to select lots by line style. |
| <i>Thickness</i>   | Select a required thickness, or set of thicknesses to select lots by thicknesses. |
| <i>Color</i>       | Select required color, or set of colors to select lots by color.                  |

### Text tab

The *Text* tab of the **Select by:** dialog allows configuring the selection by text. For more information about the **Select by:** dialog, refer to "Select By icon" section on page 85. You may filter text by style, size, color, etc. Text, matching each of the specified criteria will be selected.

To configure the filter by text:

1. Tick the *Select Text* checkbox to include lines into selection.
2. Set up the required parameters. Description of the fields may be found below.
3. Do one of the following:
  - Click **Save** to save your selection. For more information refer to "Saving selections" section on the next page.
  - Click another tab to set more filters.
  - Click **OK** to select the objects.

**Fields of the Text tab**

| Field              | Description   |
|--------------------|---|
| <i>Select Text</i> | Tick it to include lines into selection.  |
| <i>Font</i>        | Select a required font, or set of fonts to select text by font.                 |
| <i>Size</i>        | Select a required font size, or set of font sizes to select text by font style. |
| <i>Style</i>       | Select a required text style, or set of text styles to select text by style.    |
| <i>Color</i>       | Select required color, or set of colors to select texts by color.               |

**Saving selections**

It is possible to save the configuration for selection. To save the current configuration:

1. At the bottom toolbar, click **Save**.  
The **Select By - Name** dialog is displayed.
2. In the *Name* editbox, type the name for the selection.
3. If needed, in the *Comment* editbox, type the short description.
4. Click **OK**.

The configuration is saved.

To load the previously save configuration, select it from the drop-down list at the bottom toolbar.

**By Region icon**

The **By Region** icon of the Select By group allows you to perform selection by criteria within the specified region.

To perform selection in specified region:

1. In the *Select By* group of the *Edit* tab, click the **By Region** icon.  
The **Select By Region** dialog is displayed.
2. In the *Selection* group box, specify the way to define the region for selection:
  - *Select by Points* — to define the region by drawing its border with points.
  - *Select By Window* — to define the region by drawing its border with a rectangle.
  - *Select by Boundary* — to define the region by an existing boundary. If so, select the required boundary from the drop-down list, located to the right of the radiobutton.
3. In the *Entities* group box, specify the entities to be selected.
4. In the *Results* group box, select the action to be performed after selection:
  - *View* — to simply select required objects.
  - *List* — to select required objects and list them in the data listing.
  - *Edit Properties* — to select required objects and edit their properties.
5. Click **OK**

The objects are selected.

**De-Select By icon**

The **De-Select By** icon of the Select By group allows you to deselect objects by a certain criteria.

To perform a configured deselection:

1. In the *Select By* group of the *Edit* tab, click the ***De-Select By*** icon.  
The ***De-Select by:*** dialog is displayed.
2. Configure the filters for each entity at the respective tab. Detailed description may be found in corresponding sections:
  - "Layers tab" section on page 86
  - "Points tab" section on page 86
  - "Lines tab" section on page 87
  - "Arcs tab" section on page 88
  - "Circles tab" section on page 88
  - "Strings tab" section on page 89
  - "Polylines tab" section on page 89
  - "Polygons tab" section on page 90
  - "Lots tab" section on page 91
  - "Text tab" section on page 91
3. Make sure, that in the *Results* group box of the *Layers* tab, you have selected the required action to be performed after selection:
  - *View* — to simply deselect required objects.
  - *List* — to deselect required objects and list them in the data listing.
  - *Edit Properties* — to deselect required objects and edit properties of the rest objects.
4. Click **OK**  
The objects are deselected.

#### Buttons of the ***De-Select by:*** dialog

| Button         | Description   |
|----------------|---|
| <b>Save</b>    | Click it to save the current configuration. For more information refer to "Saving selections" section on the previous page. |
| <b>Restore</b> | Click to discard changes and load the currently selected configuration.   |
| <b>Reset</b>   | Click it to reset the layers to how they appeared at the first icon clicking.   |
| <b>Delete</b>  | Click it to delete the currently selected configuration.  |
| <b>OK</b>      | Click it to select objects by as configured.  |
| <b>Cancel</b>  | Click it to close the dialog.   |

## By Name icon

The **By Name** icon of the *Select By* group allows you to select entities by their names.

To perform the selection by name:

1. In the *Select by* group of the *Edit* tab, click the **By Name** icon.  
The ***Select by Name*** dialog is displayed.
2. In the *Selection* group box, specify the required entity and its name.
3. In the *Results* group box, select the action to be performed after selection:

- *View* — to simply select required objects.
  - *List* — to select required objects and list them in the data listing.
  - *Edit Properties* — to select required objects and edit their properties.
4. Click **OK**

The objects are selected.

## By DTM icon

The **By DTM** icon of the *Select By* group allows you to perform the selection by criteria within the defined digital terrain model (DTM).

To perform the selection within DTM:


1. In the *Select By* group of the *Edit* tab, click the **By DTM** icon.  
The **Select By DTM** dialog is displayed.
2. In the *Select From* field, specify the area for selection:
  - *All Layers* — to select objects, belong to all existing layers
  - *Active Layers* — to select objects, belongs only to active layers
  - *Selection* — to select objects only from the current selection
3. From the *Reference DTM* drop-down list, select the DTM within which the selection will be performed.
4. In the *Depth Range From DTM* field specify the depth range around the DTM for selection.
5. Click **OK**.

Objects are selected.

---

## Edit group

The *Edit* group from the *Edit* tab of the MAGNET Office ribbon allows you to edit project survey codes. It contains one icon, described in the table below.

|  |   |
|--|---|
| <br>Codes | <p>Codes icon<br/>Click it to configure the project survey codes.</p> |
|--|---|

### Codes icon

The **Codes** icon of the Edit group allows you to edit project survey codes.

The *Project Survey Codes* dialog, opened at *Project Survey Codes* tab appears after clicking. For more information, refer to "Project survey codes editor" section on page 543.

## View Tab

The *View* tab of the MAGNET Office ribbon contains control icons for layout configuring. It is separated to seven groups, described in the corresponding sections:

- "Edit Layers group" section on the facing page
- "Layer Control group" section on page 102
- "Refresh group" section on page 109
- "Navigate group" section on page 110
- "Features group" section on page 114
- "Options group" section on page 116
- "Display group" section on page 119



## Edit Layers group



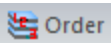

The *Edit Layers* group from the *View* tab of the MAGNET Office ribbon allows you to perform operations with layers.

A layer may be described as a sheet of transparent film, which may be viewed one in a time, or several layers at once, combined to a "sandwich." Each entity belongs to one layer only, and will be invisible, if its layer is inactive.

Newly created project usually has only one layer with the **\$\$DEFAULT** name, unless other is configured.

Only one layer may be current at once. It is marked with the asterisk in the *Layer Settings* dialog. More information about *Layer Settings* dialog may be found in "Layers icon" section below. All data, added to project, by using Insert tab functions, will be located on the current layer.

The group contains four icons, described in the table below.

|  |  |
|--|--|
|   | Layers icon<br>Click it to configure layers.         |
|   | Add icon<br>Click it to add a new layer.             |
|   | Order icon<br>Click it to change the layers order.   |
|  | Delete icon<br>Click it to delete an existing layer. |

### Layers icon

The **Layers** icon of the Edit Layers group allows you to manage layers in the current project. Its keyboard shortcut is *Ctrl+L*.

To open the layer manager, click the icon. The *Layer Settings* dialog appears. It displays the list of the layers in the project with the following properties for each layer:

- Layer Name
- Active flag
- Lock flag
- Overlay flag
- Color
- Mark
- Symbol
- Line Type
- Line Width
- Text Style

The current layer is marked with the asterisk. Properties are described in the table below.

#### Layer properties

| Property          | Description                    |
|-------------------|--------------------------------|
| <i>Layer Name</i> | Defines the name of the layer. |

| <b>Property</b>     | <b>Description</b>   |
|---------------------|--|
| <i>Active</i>       | Defines whether the layer is active or inactive. Objects from inactive layers will not be displayed in the survey view.  |
| <i>Lock</i>         | Defines whether the layer is locked (i.e. cannot be changed) or not.   |
| <i>Overlay</i>      | When ticked, entities which belong to the layer will be darkened, and not available for editing, i.e. all entities will be look like a background image.   |
| <i>Color</i>        | Defines the default color for the layer. All entities, which belong to this layer and have <i>By Layer</i> value of the <i>Color</i> parameter will be painted with it.  |
| <i>Point Mark</i>   | Defines the default point mark for the layer. All points, which belong to this layer and have <i>By Layer</i> value of the <i>Mark</i> parameter will have such mark.  |
| <i>Line Type</i>    | Defines the default line style for the layer. All lines, arcs, circles, strings, polylines, polygon, lots, pads and boundaries, which belong to this layer and have <i>By Layer</i> value of the <i>Line Style</i> parameter will have such line style.        |
| <i>Line Width</i>   | Defines the default line thickness for the layer. All lines, arcs, circles, strings, polylines, polygon, lots, pads and boundaries, which belong to this layer and have <i>By Layer</i> value of the <i>Thickness</i> parameter will have such line thickness. |
| <i>Point Symbol</i> | Defines the default point symbol for the layer. All points, which belong to this layer and have <i>By Layer</i> value of the <i>Symbol</i> parameter will have such symbol.  |
| <i>Text Style</i>   | Defines the default text style for the layer.  |

#### Buttons of the *Layer Settings* dialog

| <b>Button</b>        | <b>Description</b>  |
|----------------------|---|
| <b>OK</b>            | Click it to save the changes and close the dialog.  |
| <b>Cancel</b>        | Click it to discard the changes and close the dialog.   |
| <b>New</b>           | Click it to create a new layer. For more information refer to "Add icon" section on the facing page.  |
| <b>Edit</b>          | Click it to edit the selected layers. For more information, refer to Layer properties.  |
| <b>Delete</b>        | Click it to delete the selected layers. If the current layer is deleted, the <b>\$\$DEFAULT</b> layer becomes the current one.  |
| <b>Delete Empty</b>  | Click to delete layers which don't contain any entities.  |
| <b>Merge</b>         | Click it to transfer objects from selected layers to another existing layer.  |
| <b>Set Current</b>   | Click it to set selected layer as the current. The current layer is marked with the asterisk. All new objects will be created at the current layer, unless other is configured. |
| <b>Invert On/Off</b> | Click it to turn on inactive layer and turn off active ones. The current layer cannot be turned off.  |
| <b>Off</b>           | Click it to turn off selected layers. The current layer cannot be turned off.   |

| Button                  | Description   |
|-------------------------|---|
| <b>On</b>               | Click it to turn on selected layers.  |
| <b>Select All</b>       | Click it to select all existing layers in the dialog.   |
| <b>Invert Selection</b> | Click it to invert the selection of the layers in the dialog.   |
| <b>Prefix/Suffix</b>    | Click it to add a prefix or a suffix to the layer name.   |
| <b>List Layers</b>      | Click it to generate a layers report.   |
| <b>Add Group</b>        | Click it to create a new layer group. For more information, refer to "Groups icon" section on page 104. |
| <b>Select Group</b>     | Click it to select all layers belongs to the defined group.   |
| <b>Group Settings</b>   | Click it to configure the layer group settings.   |
| <b>Avoidance</b>        | Click it to configure the avoidance settings. See "Avoidance" section on page 575 for details.          |

## Add icon

The **Add** icon of the Edit Layers group allows you to create a new layer.

To create a new layer:

1. In the *Edit Layers* group of the *View* tab, click the **Add** icon.  
The *Add New Layer* dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

The new layer is created.

### Layer properties

| Property          | Description   |
|-------------------|---|
| <i>Layer Name</i> | Defines the name of the layer.  |
| <i>Active</i>     | Defines whether the layer is active or inactive. Objects from inactive layers will not be displayed in the survey view.   |
| <i>Lock</i>       | Defines whether the layer is locked (i.e. cannot be changed) or not.  |
| <i>Overlay</i>    | When ticked, entities which belong to the layer will be darkened, and not available for editing, i.e. all entities will be look like a background image.  |
| <i>Color</i>      | Defines the default color for the layer. All entities, which belong to this layer and have <i>By Layer</i> value of the <i>Color</i> parameter will be painted with it.   |
| <i>Point Mark</i> | Defines the default point mark for the layer. All points, which belong to this layer and have <i>By Layer</i> value of the <i>Mark</i> parameter will have such mark.   |
| <i>Line Type</i>  | Defines the default line style for the layer. All lines, arcs, circles, strings, polylines, polygon, lots, pads and boundaries, which belong to this layer and have <i>By Layer</i> value of the <i>Line Style</i> parameter will have such line style. |

| Property            | Description  |
|---------------------|--|
| <i>Line Width</i>   | Defines the default line thickness for the layer. All lines, arcs, circles, strings, polylines, polygon, lots, pads and boundaries, which belong to this layer and have <i>By Layer</i> value of the <i>Thickness</i> parameter will have such line thickness. |
| <i>Point Symbol</i> | Defines the default point symbol for the layer. All points, which belong to this layer and have <i>By Layer</i> value of the <i>Symbol</i> parameter will have such symbol.  |
| <i>Text Style</i>   | Defines the default text style for the layer.  |
| <i>Avoidance</i>    | To activate avoidance data, tick the checkbox and click <b>Avoidance</b> . See "Avoidance" section on page 575 for details.  |

## Order icon

The **Order** icon of the Edit Layers group allows you to change the order of layer appearance in the Survey view.

To change the layers order:

1. In the *Edit Layers* group of the *View* tab, click the **Order** icon.  
The **Layer Display Order** dialog is displayed. Buttons of the dialog are described in the table below.
2. Select the layers to be moved.
3. Move them as you need.
4. Click **OK**.

### Buttons of the *Layer Display Order* dialog

| Button                | Description   |
|-----------------------|---|
| <b>Move to Top</b>    | Click it to move the selected layers to the top position. Order of layers within the selection remains the same.    |
| <b>Move to Bottom</b> | Click it to move the selected layers to the bottom position. Order of layers within the selection remains the same. |
| <b>Move Up</b>        | Click it to move each of the selected layers to one position upward.  |
| <b>Move Down</b>      | Click it to move each of the selected layers to one position downward.  |
| <b>Clear</b>          | Click it to clear the selection of the layers.  |
| <b>Invert</b>         | Click it to invert the selection of the layers.   |
| <b>OK</b>             | Click it to save the changes and close the dialog.  |
| <b>Cancel</b>         | Click it to close the dialog without saving the changes.  |

## Delete icon

The **Delete** icon of the Edit Layers group allows you to delete existing layers.

### NOTES

The **\$\$DEFAULT** layer cannot be deleted.

If the current layer was deleted, the **\$\$DEFAULT** layer becomes the current.

To delete a layer:

1. In the *Edit Layers* of the *View* tab, click the **Delete** icon.

The **Delete Layer** dialog is displayed.

2. Select layers to be deleted.

*TIP*

*To select all layers, tick the checkbox in the bottom left corner of the dialog.*

3. Click **OK**.

## Layer Control group

The *Layer Control* group from the *View* tab of the MAGNET Office ribbon allows you to manage existing layers. It contains eighteen icons.

|   |   |
|---|---|
|    | Layer Off icon<br>Click it to turn off an existing layer.   |
|    | Isolate icon<br>Click it to isolate a layer.  |
|    | Restore icon<br>Click it to restore layer settings.   |
|    | Set Layer icon<br>Click it to set a layer as the current one.   |
|    | All On icon<br>Click it to activate all layers.   |
|    | All Off icon<br>Click it to deactivate all layers.  |
|    | Groups icon<br>Click it to configure layer groups. This icon also contains the list of the second level icons. Click  to see it. |
|  | Add to Group icon<br>Click it to add layers to the group by selecting entities in the survey view.  |
|  | Display/Hide Group icon<br>Click it to turn on/off layers from the defined groups.  |
|  | Add to Group - Design icon<br>Click it to add layers to the pre-defined "Design" group.   |
|  | Add to Group - Existing icon<br>Click it to add layers to the pre-defined "Existing" group.   |
|  | Add to Group - Misc icon<br>Click it to add layers to the pre-defined "Misc" group.   |
|  | Display Group - Design icon<br>Click it to turn on all layers, belong to the "Design" group.  |
|  | Display Group - Existing icon<br>Click it to turn on all layers, belong to the "Existing" group.  |
|  | Display Group - Misc icon<br>Click it to turn on all layers, belong to the "Misc" group.  |
|  | Hide Group - Design icon<br>Click it to turn off all layers, belong to the "Design" group.  |
|  | Hide Group - Existing icon<br>Click it to turn off all layers, belong to the "Existing" group.  |
|  | Hide Group - Misc icon<br>Click it to turn off all layers, belong to the "Misc" group.  |

## Layer Off icon

The **Layer Off** icon of the Layer Control group allows you to turn off an existing layer, by selecting an object from this layer.

To turn the layer off:

1. In the *Layer Control* group of the *View* tab, click the **Layer Off** icon.
2. In the survey view, click an object, which belongs to the layer to be turned off.

The layer is turned off. All entities, which belong to it are not displayed.

## Isolate icon

The **Isolate** icon of the Layer Control group allows you to isolate a layer, by selecting an object, which belongs to this layer. Isolating means that all layers will be turned off; except for the selected one.

To isolate a layer:

1. In the *Layer Control* group of the *View* tab, click the **Isolate** icon.
2. In the survey view, click an object, which belongs to the layer to be isolated.

The layer is isolated, and set as the current. Only entities, which belong to it are displayed. All other layers are turned off.

## Restore icon

The **Restore** icon of the Layer Control group allows you to restore the layers activity settings since the last usage of the Layer Off icon or the Isolate icon.

Click it to restore the values of the on/off layers parameter, as in was before the last usage of the Layer Off icon or the Isolate icon.

## Set Layer icon

The **Set Layer** icon of the Layer Control group allows you to set a layer as the current one, by selecting an object, which belongs to this layer.

To set layer as a current:

1. In the *Layer Control* group of the *View* tab, click the **Set Layer** icon.
2. In the survey view, click an object, which belongs to the layer to be set as the current.

The layer is set as the current.

## All On icon

Click the **All On** icon of the Layer Control group to turn on all existing layers in the project.

## All Off icon


Click the **All Off** icon of the Layer Control group to turn off all existing layers in the project, except for the current one.

## Groups icon

The **Groups** icon of the Layer Control group allows you to configure sets of layers.

The **Layer Group Settings** dialog appears after clicking the icon. Buttons and fields of the dialog are described in the table below. The main field displays the list of the layers of the currently selected group with their On/Off flags.

### Fields of the *Layer Group Settings* dialog

| Field              | Description   |
|--------------------|---|
| <i>Group Name</i>  | Contains the name of the currently selected layer group. The drop-down list of all available groups may be seen by clicking  . |
| <i>Description</i> | Contains the short description of the selected group.   |

### Buttons of the *Layer Group Settings* dialog

| Button                  | Description   |
|-------------------------|---|
| <b>Add Layer</b>        | Click it to add an existing layer to the currently selected group.<br>The <b>Layer List</b> dialog appears after clicking. Select layers to be added to the group and click <b>OK</b> .<br>You may also type the name of the new layer in the <i>New Layer</i> editbox. The new layer will be created and added to the group after clicking <b>OK</b> . |
| <b>Remove Layer</b>     | Click it to remove the selected layers from the group.  |
| <b>Invert Selection</b> | Click it to invert the selection of the layers in the dialog.   |
| <b>Select All</b>       | Click it to select all layers in the dialog.  |
| <b>Invert On/Off</b>    | Click it to turn on inactive layer and turn off active ones.  |
| <b>On</b>               | Click it to activate a selected layer in the group. Note that this property is internal for the group, and does not affect to the global layer activity settings.   |
| <b>Off</b>              | Click it to deactivate a selected layer in the group. Note that this property is internal for the group, and does not affect to the global layer activity settings.   |
| <b>New</b>              | Click it to create a new group.   |
| <b>Reset</b>            | Click it to discard all resent unsaved changes.   |
| <b>Rename</b>           | Click it to rename the currently selected group.  |
| <b>Delete</b>           | Click it to delete the currently selected group.  |
| <b>Copy From Lib</b>    | Click it to apply previously saved group settings from the MAGNET Office library.   |
| <b>Save to Lib</b>      | Click it to save current group settings to the MAGNET Office library.   |
| <b>OK</b>               | Click it to save changes and close the dialog.  |
| <b>Cancel</b>           | Click it to close the dialog without saving changes.  |



## Add to Group icon

The **Add to Group** icon of the Layer Control group allows you to add layers to group by selecting objects in the survey view, which belong to the required layers.

To add layers to a group:

1. In the *Layer Control* group of the *View* tab, click the **Add to Group** icon.  
The **Add Layer To Group** dialog is displayed.
2. From the *Group Name* drop-down list, select the group to which layers will be added.
3. If needed, in the *Description* editbox, edit short description of the group.
4. If needed, tick the *Remove layers from other groups* checkbox. If ticked, the selected layers will be excluded from all other groups.
5. Click **OK**.
6. In the survey view, click objects, which belong to the required layers. An information string on the bottom panel displays the name of the last added layer.
7. When finished, press *ESC*.

The layers are added to the group.

## Display/Hide Group icon

The **Display/Hide Group** icon of the Layer Control group allows you to turn on/off layers, which belongs to a specific group.

To turn on/off a group:

1. In the *Layer Control* group of the *View* tab, click the **Display/Hide Group** icon.  
The **Layer Group Selection** dialog is displayed.
2. Select layers to be turned on/off.
3. Do one of the following:
  - Tick the *Activate all layers in the selected groups* checkbox to turn on layers from the selected group.
  - Untick the *Activate all layers in the selected groups* checkbox to turn off layers from the selected group.
4. Tick the *Other Layers* checkbox to change visibility of layers, which don't belong to the selected groups. If this checkbox is unticked, the visibility of other layers will not change. If ticked, do one of the following:
  - Select the *Off* radiobutton to turn off other layers.
  - Select the *On* radiobutton to turn on other layers.
5. Click **OK**.

### NOTE

If the current layer is among layers to be turned off, the message window will warn about it after clicking **OK** and the **\$\$DEFAULT** layer will be set as the current.

### Fields of the *Layer Group Selection* dialog

| Field   | Description  |
|---|--|
| <i>Activate all layers in the selected groups</i> | Tick it to turn on all layers from the selected group. |

| Field               | Description  |
|---------------------|--|
| <i>Other Layers</i> | Tick it to define whether to change visibility of layers, which don't belong to the selected groups or not. If ticked, select either <i>On</i> or <i>Off</i> radiobutton below to turn on or turn off layers respectively. |

**Buttons of the *Layer Group Selection* dialog**

| Button                  | Description   |
|-------------------------|---|
| <b>OK</b>               | Click it to apply changes and close the dialog.                             |
| <b>Cancel</b>           | Click it to close the dialog without saving changes.                        |
| <b>Invert Selection</b> | Click it to deselect currently selected groups and select the other groups. |
| <b>Select All</b>       | Click it to select all existing groups.                                     |

## Add to Group - Design icon

The **Add to Group - Design** icon of the *Layer Control* group allows you to add layers to the pre-defined "Design" group by selecting objects in the survey view, which belong to required layers.

The "Design" group is created to simplify group managing in the project, and reserved for newly created entities in the working area.

To add layers to the "Design" group:

1. In the *Layer Control* group of the *View* tab, click the **Add to Group - Design** icon.
2. In the survey view, select objects, which belongs to the required layers. An information string on the bottom panel displays the name of the last added layer.
3. When finished adding layers, press *ESC*.

The layers are added to the "Design" group.

## Add to Group - Existing icon

The **Add to Group - Existing** icon of the *Layer Control* group allows you to add layers to the pre-defined "Existing" group by selecting objects in the survey view, which belong to required layers.

The "Existing" group is created to simplify group managing in the project, and reserved for entities, which are already exists in the working area.

To add layers to the "Existing" group:

1. In the *Layer Control* group of the *View* tab, click the **Add to Group - Existing** icon.
2. In the survey view, select objects, which belongs to the required layers. An information string on the bottom panel displays the name of the last added layer.
3. When finished adding layers, press *ESC*.

The layers are added to the "Existing" group.

---

## Add to Group - Misc icon

The **Add to Group - Misc** icon of the Layer Control group allows you to add layers to the pre-defined "Misc" group by selecting object in the survey view, which belong to required layers.

The "Misc" group is created to simplify group managing in the project, and reserved for various entities, which are don't belong to the "Design" of "Existing" groups.

To add layers to the "Misc" group:

1. In the *Layer Control* group of the *View* tab, click the **Add to Group - Misc** icon.
2. In the survey view, select objects, which belongs to the required layers. An information string on the bottom panel displays the name of the last added layer.
3. When finished adding layers, press *ESC*.

The layers are added to the "Misc" group.

## Display Group - Design icon

The **Display Group - Design** icon of the Layer Control group allows you to turn on all layers, which belong to the "Design" group and turn off all other layers.

### NOTE

If the "Design" group does not contain any layer, this icon is inactive.

## Display Group - Existing icon

The **Display Group - Existing** icon of the Layer Control group allows you to turn on all layers, which belong to the "Existing" group and turn off all other layers.

### NOTE

If the "Existing" group does not contain any layer, this icon is inactive.

## Display Group - Misc icon

The **Display Group - Misc** icon of the Layer Control group allows you to turn on all layers, which belong to the "Misc" group and turn off all other layers.

### NOTE

If the "Misc" group does not contain any layer, this icon is inactive.

## Hide Group - Design icon

The **Hide Group - Design** icon of the Layer Control group allows you to turn off all layers, which belong to the "Design" group. Visibility of other layers will not change.

### NOTE

If the "Design" group does not contain any layer, this icon is inactive.

## Hide Group - Existing icon

The **Hide Group - Existing** icon of the Layer Control group allows you to turn off all layers, which belong to the "Existing" group. Visibility of other layers will not change.

### NOTE

If the "Existing" group does not contain any layer, this icon is inactive.

## Hide Group - Misc icon



The **Hide Group - Misc** icon of the Layer Control group allows you to turn off all layers, which belong to the "Misc" group. Visibility of other layers will not change.

### NOTE

If the "Misc" group does not contain any layer, this icon is inactive.

## Refresh group

The *Refresh* group from the *View* tab of the MAGNET Office ribbon, allows you to renew lookout of the project. It contains two icons, described in the table below.

|   |  |
|---|--|
| <br>Redraw | <p>Redraw icon<br/>Click it to refresh the displaying of the current view.</p> |
| <br>Regen  | <p>Regen icon<br/>Click it to regenerate the current view.</p>                 |

### Redraw icon


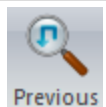
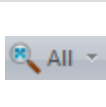

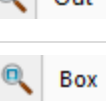
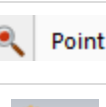
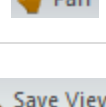
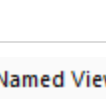
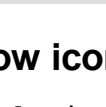
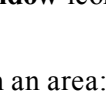
Click the **Redraw** icon of the Refresh group to refresh the entities displaying in the current window.

### Regen icon

Click the **Regen** icon of the Refresh group to regenerate the data displaying by reading data from the project data-base.

## Navigate group

The *Navigate* group from the *View* tab of the MAGNET Office ribbon allows you to manage the scale of the survey view. It contains five icons, and five second level icons, described in the table below.

|   |  |
|---|--|
|    | <p>Window icon</p> <p>Click it to draw a rectangle area to be fits the screen.</p>   |
|    | <p>Previous icon</p> <p>Click it to return to the previous view.</p>   |
|    | <p>All icon</p> <p>Click it to fit all data in the view. This icon also contains the list of the second level icons. Click ▾ to see it.</p>    |
|    | <p>In icon</p> <p>Click it to zoom in the center area of the survey view.</p>  |
|    | <p>Out icon</p> <p>Click it to zoom out the center area of the survey view.</p>  |
|   | <p>Box icon</p> <p>Click it to make the specified area fits the screen.</p>  |
|  | <p>Point icon</p> <p>Click it to view a point with the defined scale.</p>  |
|  | <p>Pan icon</p> <p>Click it to scroll the view.</p>  |
|  | <p>Save View icon</p> <p>Click it to save the current view. This icon also contains the list of the second level icons. Click ▾ to see it.</p> |
|  | <p>Named View icon</p> <p>Click it to manage saved views.</p>  |

### Window icon

The **Window** icon of the *Navigate* group allows you to draw a rectangle area, which will be zoomed to fit the screen.

To zoom an area:

1. In the *Navigate* group of the *View* tab, click the **Window** icon.
2. In the survey view draw a required rectangle area, by defining its opposite points.

The selected area is zoomed to fit the screen.

There is also a second way to zoom an area:

1. In the survey view, draw a required rectangle area, as for mass entities selection.  
The rectangle is displayed as the dashed yellow border.
2. In the *Navigate* group of the *View* tab, click the **Window** icon.

The selected area is zoomed to fit the screen.

**NOTE**

The **Zoom Window** item of the context menu for survey view has the same functionality.

## Previous icon

Click the **Previous** icon of the *Navigate* group to return to the previous scale and position settings of the survey view.

**NOTE**

The **Zoom Prev** item of the context menu for the survey view has the same functionality.

## All icon

Click the **All** icon of the *Navigate* group to fit all the data to the screen.

**NOTE**

The **Zoom Extents** item of the context menu for the survey view has the same functionality.

## In icon

Click the **In** icon of the *Navigate* group to zoom in the center of the survey view.

**NOTES**

You may zoom in the current pointer position by scrolling up the mouse wheel.

The **Zoom In** item of the context menu for survey view has the same functionality.

## Out icon

Click the **Out** icon of the *Navigate* group to zoom out the center of the survey view.

**NOTES**

You may zoom out the current pointer position by scrolling down the mouse wheel.

The **Zoom Out** item of the context menu for survey view has the same functionality.

## Box icon

The **Box** icon of the *Navigate* group allows you to zoom in an area of the survey view, defined by the rectangle.

To zoom in a survey view area:

1. In the *Navigate* group of the *View* tab, click the **Box** icon.  
The yellow rectangle is displayed around the mouse pointer.
2. Point to the area to be zoomed, and do the left click.  
The selected area is zoomed.
3. If needed, select required area again and do the left click.
4. When finished, press *ESC*.

**NOTE**

The **Zoom Box** item of the context menu for the survey view has the same functionality.

## Point icon

The **Point** icon of the *Navigate* group allows you to display the selected point with the defined scale.

To zoom the point:

1. In the *Navigate* group of the *View* tab, click the **Point** icon.  
The control panel is displayed at the bottom of the MAGNET Office window.
2. In the *Scale* editbox, specify the required scale.
3. Do one of the following:
  - In the *Number* editbox, specify the number of the required point and press *Enter*.
  - Click the required point in the survey view.

The point is zoomed.

#### NOTE

The **Zoom Point** item of the context menu for the survey view has the same functionality.

## Pan icon

The **Pan** icon of the *Navigate* group allows you to scroll the survey view by dragging it.

To scroll the survey view:

1. In the *Navigate* group of the *View* tab, click the **Pan** icon.
2. Drag and move survey view as you need.
3. When finished, do one of the following:
  - Press *ESC*.
  - Do the right click and select **Cancel** from the context menu.

#### NOTE

The **Pan** item of the context menu for the survey view has the same functionality.

## Save View icon

The **Save View** icon of the *Navigate* group allows you to save the current scale and position of the survey view for future usage.

To save the current view:

1. In the *Navigate* group of the *View* tab, click the **Save View** icon.  
The *New View Name* dialog is displayed.
2. Type the name of the view in the editbox.
3. Click **OK**.

The current view is saved.

#### NOTE

The **Save View** item of the context menu for the survey view has the same functionality.

## Named View icon

The **Named Views** icon of the *Navigate* group allows you to manage the saved views.

The *Named Views* dialog appears after clicking. It contains the list of the saved views. Buttons of the dialog described in the table below. You may sort the list of the views by selecting the appropriate radiobutton:

- *Name* — to sort views by their names.
- *Last Used* — to sort views by their usage.
- *Both* — to display two lists, separated by dotted line — sorted by name and by usage.



**Buttons of the *Named View* dialog**

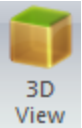
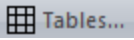
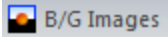
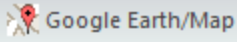
| <b>Button</b>      | <b>Description</b>  |
|--------------------|---|
| <b>Set Current</b> | Click it to display the selected view.                            |
| <b>Delete</b>      | Click it to delete the selected view.                             |
| <b>Details</b>     | Click it to display detailed information about the selected view. |
| <b>Print</b>       | Click it to generate report with the views information.           |
| <b>OK</b>          | Click it to close the dialog.                                     |

**NOTE**

The **Saved Views** item of the context menu for the survey view contains the list of the saved views and **Named Views** item, which opens the **Named Views** dialog.

## Features group

The *Features* group from the *View* tab of the MAGNET Office ribbon allows you to use the additional features of the view. It contains four icons, described in the table below.

|   |  |
|---|--|
|  | <p style="text-align: center;"><b>3D View icon</b><br/>Click it to open the current project in the 3D viewer.</p>                        |
|  | <p style="text-align: center;"><b>Tables icon</b><br/>Click it to manage existing tables.</p>  |
|  | <p style="text-align: center;"><b>B/G Images icon</b><br/>Click it to manage background images.</p>                                      |
|  | <p style="text-align: center;"><b>Google Earth/Map icon</b><br/>Click it to view the current project in Google Earth or Google Maps.</p> |

### 3D View icon

The **3D View** icon of the *Features* group allows you to view your project in three dimensions.

To view project in 3D:

1. In the *Features* group of the *View* tab, click the **3D View** icon.  
The **3D View** dialog is displayed.
2. In the *Select From* group box, select one of the following:
  - *All Data* – to display all existing data.
  - *Active Layers* – to display only entities, which belong to the active layers.
  - *All Data* – to display only selected entities.
3. In the *Driver Offset* group box, specify the amount and direction of the offset from the required alignment, for virtual "driving", by using the *Offset* editbox, and *Left* and *Right* radiobuttons.
4. In the *Driver Offset* group box, specify the speed of virtual "driving", by using the *Alignment Spacing* editbox.
5. Select surfaces to export into 3D view from the list.
6. Tick the *Transfer Linework* checkbox, to define whether to export lines or not.
7. Tick the *Drape Lines* checkbox, to define whether to drape all selected lines onto the selected surface or not.
8. Tick the *Transfer Points* checkbox, to define whether to transfer points into the 3D view or not.
9. Click **OK**.

The selected data is displayed in the 3DView in the new window.

### Tables icon

The **Tables** icon of the *Features* group allows you to manage exiting tables in the project.

The *Status* dialog appears after clicking. It contains the list of the exiting tables and information about their on/off status.

To turn on/off displaying of a table, tick/untick in the appropriate row of the table.

Click **Switch All On** to turn on displayed of all existing tables.

Click **Switch All Off** to turn off displayed of all existing tables.

## B/G Images icon

The **B/G Images** of the Features group allows you to manage background images in the project.

The **Background Images** dialog appears after clicking. For more information refer to "Background Images dialog" section on page 620.

### NOTE

This icon has the same functionality as the Recalibrate icon of the Raster/Vector group at the Model tab.

## Google Earth/Map icon

The **Google Earth/Map** icon of the Features group allows you to view objects from your project on the Google Map, or in the Google Earth application.

### NOTE

A coordinate system projection must be defined to use this feature. For more information about coordinate system projection, refer to "Project coordinate system" section on page 586.

To view the project data on the Google Map or in the Google Earth:

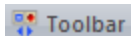
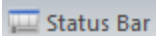
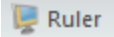

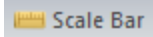
1. In the *Features* group of the *View* tab, click the **Google Earth/Map** icon.

The **Google Earth/Map** dialog is displayed.

2. In the *Select From* group box, select one of the following radiobuttons:
  - *All* — to display all existing entities.
  - *Selection* — to display currently selected entities.
  - *Active* — to display entities, which belong to the active layers.
3. Select objects types to be displayed.
4. Select DTMs to be displayed.
5. In the *Output* group box, select one of the following:
  - *Google Earth* — to display data in the Google Earth application.
  - *Export to KML* — to export data to a Google Map (\*.kml) file.
6. Click **OK**.

## Options group

The *Options* group from the *View* tab of the MAGNET Office ribbon, allows you to configure the view options. It contains five icons, described in the table below.

|   |   |
|---|---|
|  | <p>Toolbar icon<br/>Click it to configure toolbar.</p>  |
|  | <p>Status Bar icon<br/>Click it to switch on/off the status bar.</p>                              |
|  | <p>Ruler icon<br/>Click it to switch on/off the ruler.</p>  |
|  | <p>Grid icon<br/>Click it to switch on/off the grid lines.</p>                                    |
|  | <p>Scale Bar icon<br/>Click it to turn on/off displaying of the scale bar in the survey view.</p> |

### Toolbar icon

The **Toolbar** icon of the Options group allows you to configure the MAGNET Office toolbar. Toolbar buttons duplicate functions of the ribbon icons, to provide a quicker access to these functions, without switching ribbon tabs. MAGNET Office toolbar is user configurable. You may add or remove toolbars, move them and configure buttons on them.

To configure toolbars:

1. In the *Options* group of the *View* tab, click the **Toolbar** icon.  
The **Configure Toolbars** dialog is displayed. The buttons of the dialog is described in the table below.
2. Select required toolbars for displaying.
3. Click **OK**.
4. If needed, move the toolbars, by dragging them with the mouse.

#### Buttons of the *Configure Toolbars* dialog

| Button                 | Description   |
|------------------------|---|
| <b>New</b>             | Click it to create a new toolbar.   |
| <b>Customize</b>       | Click it to customize the selected toolbar. For more information refer to "Customizing toolbars" section on the facing page. The <i>Properties</i> and <i>Text</i> toolbars cannot be customized. |
| <b>Delete</b>          | Click it to delete the selected toolbar from the list. The <i>Properties</i> and <i>Text</i> toolbars cannot be deleted.  |
| <b>Save Layout</b>     | Click it to save the current toolbar settings in an initialization (*.ini) file.  |
| <b>Restore Layout</b>  | Click it to load previously saved toolbar settings from an initialization (*.ini) file.   |
| <b>Restore Default</b> | Click it to restore the default toolbar settings.   |
| <b>Import</b>          | Click it to import the current toolbar settings in an initialization (*.ini) file.  |

| Button        | Description  |
|---------------|--|
| <b>Export</b> | Click it to export toolbar settings from an initialization (*.ini) file. |
| <b>Close</b>  | Click it to close the dialog.  |

**TIP**

To quickly open the **Configure Toolbars** dialog, do the right click at any toolbar.

**Customizing toolbars**

The **Customize toolbar** dialog allows you to add new or remove buttons from the toolbar, insert separators and change button position in the toolbar.

To add a button to the toolbar:

1. In the *Options* group of the *View* tab, click the **Toolbar** icon.  
The **Configure Toolbars** dialog is displayed.
2. Select the required toolbar and click **Customize**.  
The **Customize toolbar** dialog is displayed.
3. From the *Category* drop-down list, select the required button category.
4. In the *Available toolbar buttons* list, select the required button.
5. Click >>.

The button is added to the bottom position.

To remove a button, select it and click <<.

**Buttons of the Customize Toolbar dialog**

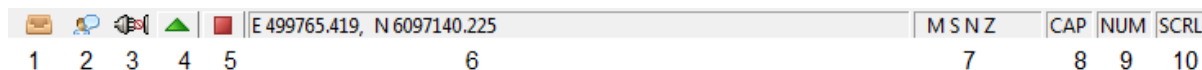
| Button           | Description  |
|------------------|--|
| >>               | Click it to add the selected button to the toolbar.                                |
| <<               | Click it to remove the selected button or separator from the toolbar.              |
| <b>Move Up</b>   | Click it to move the selected button or separator to the left on the toolbar.      |
| <b>Move Down</b> | Click it to move the selected button or separator to the right on the toolbar.     |
| <b>Sep After</b> | Click it to insert a separator to the right from the selected button or separator. |
| <b>Restore</b>   | Click it to restore the default settings.  |
| <b>Close</b>     | Click it to close the dialog.  |

**Ruler icon**

Click the **Ruler** icon of the Options group to turn on/off displaying of the ruler on the screen.

**Status Bar icon**

The **Status Bar** icon of the Options group allows you to turn on/off status bar on the bottom of MAGNET Office window.

**The status bar**

|    |  |
|----|--|
| 1  | The SiteLINK 3D Inbox icon.  |
| 2  | The SiteLINK 3D Chat icon.   |
| 3  | The SiteLINK 3D Connect icon.  |
| 4  | The DTM Settings icon.   |
| 5  | The Display icon   |
| 6  | Displays the current pointer coordinates and quantity of selected objects. |
| 7  | Displays the units, used in the project.                                   |
| 8  | Displays whether the caps lock activated.                                  |
| 9  | Displays whether the num lock activated.                                   |
| 10 | Displays whether the scroll lock activated.                                |

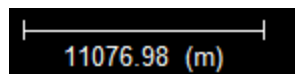
## Grid icon

Click the **Grid** icon of the Options group to turn on/off displaying of the grid.

The grid may be configured on the *Grid/Snap* tab of the **Display Settings** dialog. For more information, refer to "Grid/Snap displaying settings" section on page 601.

## Scale Bar icon

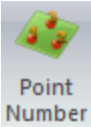
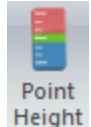
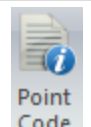
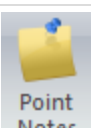
Click the **Scale Bar** icon of the Options group to turn on/off displaying of the scale bar in the top right corner of the survey view.



**Scale bar**

## Display group

The *Display* group from the *View* tab of the MAGNET Office ribbon allows you to configure point's annotation in the survey view. It contains three icons, described in the table below.

|  |   |
|--|---|
| <br>Point<br>Number | <p>Point Number icon<br/>Click it to switch on/off displaying of the point numbers.</p> |
| <br>Point<br>Height | <p>Point Height icon<br/>Click it to switch on/off displaying of the point heights.</p> |
| <br>Point<br>Code   | <p>Point Code icon<br/>Click it to switch on/off displaying of the point codes.</p>     |
| <br>Point<br>Notes  | <p>Point Notes icon<br/>Click it to switch on/off displaying of the point notes.</p>    |

### Point Number icon

Click the **Point Number** icon of the Display group to turn on/off displaying of the point numbers in the survey view.

### Point Height icon

Click the **Point Height** icon of the Display group to turn on/off displaying of the point elevations in the survey view.

### Point Code icon

Click the **Point Code** icon of the Display group to turn on/off displaying of the point codes in the survey view.

### Point Notes icon

Click the **Point Notes** icon of the Display group to turn on/off displaying of the point notes in the survey view.

## Settings Tab

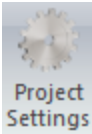
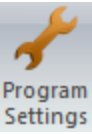
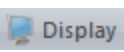
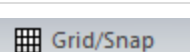
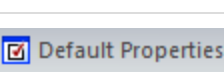
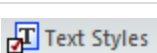
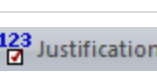
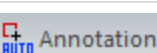
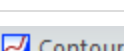
The *Settings* tab of the MAGNET Office ribbon contains control icons for editing various project and MAGNET Office settings. It is separated to five groups, described in the corresponding sections:

- "Settings group" section on the facing page
- "Customization group" section on page 127
- "Create Modes group" section on page 129
- "Defaults group" section on page 131
- "Snap Modes group" section on page 132



## Settings group

The *Settings* group from the *Settings* tab of the MAGNET Office ribbon allows you to configure various settings. It contains nine icons, described in the table below.

|   |   |
|---|---|
|    | Project Settings icon<br>Click it to edit the project settings.           |
|    | Program Settings icon<br>Click to edit the MAGNET Office settings.        |
|    | Display icon<br>Click it to edit the display general settings.            |
|    | Grid/Snap icon<br>Click it to edit the grid settings.                     |
|    | Default Properties icon<br>Click it to edit display default settings.     |
|    | Text Styles icon<br>Click it to manage the text styles.                   |
|   | Justification icon<br>Click it to edit the number justification settings. |
|  | Annotation icon<br>Click it to edit the automatic annotation settings.    |
|  | Contour icon<br>Click it to edit the contour settings.                    |

### Project Settings icon

The **Project Settings** icon of the Settings group allows you to configure the settings of the current project. Note that these settings will apply only to the current project. Default program settings will not change. You may configure them by using the Program Settings icon.

The *Project Settings* dialog appears after clicking. For more information, refer to "Project Settings dialog" section on page 580.

### Program Settings icon

The **Program Settings** icon of the Settings group allows you to configure the MAGNET Office settings. Note that these settings are global and will apply to all new projects. You may change these settings for a particular project by using the Project Settings icon.

The *Program Settings* dialog appears after clicking. For more information, refer to "Program Settings dialog" section on page 589.

## Display icon

The **Display** icon of the Settings group allows you to configure general display settings. Its shortcut key is *Ctrl+G*. You may also use the hot key at the bottom panel.

The *Display* tab of the Display Settings dialog appears after clicking. For more information refer to "General display settings" section on page 598

## Grid/Snap icon

The **Grind/Snap** icon of the Settings group allows you to configure grid settings and snap modes.

The *Grind/Snap* tab of the Display Settings dialog appears after clicking. For more information refer to "Grid/Snap displaying settings" section on page 601

## Default Properties icon

The **Default Properties** icon of the Settings group allows you to configure defaults of the display settings.

The *Default Properties* tab of the Display Settings dialog appears after clicking. For more information refer to "Defaults of the display settings" section on page 599

## Text Styles icon

The **Text Styles** icon of the Settings group allows you to manage text styles. Text styles define layout of all textual data in the MAGNET Office — point numbers, entities annotations, etc.

The **TEXT STYLE** dialog appears after clicking. It contains the list of the existing text styles and font, size, color and formatting for each style. Buttons of the dialog are described in the table below.

### Buttons of the *Text Style* dialog

| Button               | Description  |
|----------------------|--|
| <b>New</b>           | Click it to create a new text style. For more information refer to "Creating text styles" section on the facing page.    |
| <b>Modify</b>        | Click it to edit an existing text style. For more information refer to "Editing text styles" section on the facing page. |
| <b>Rename</b>        | Click it to rename an existing text style.<br>NOTE<br>The <b>\$\$DEFAULT</b> text style cannot be renamed.               |
| <b>Delete</b>        | Click it to delete an existing text style.<br>NOTE<br>The <b>\$\$DEFAULT</b> text style cannot be deleted.               |
| <b>Copy From Lib</b> | Click it to load a text style from the library. For more information refer to "Text styles library" section on page 631. |
| <b>OK</b>            | Click it to save changes and close the dialog.   |
| <b>Cancel</b>        | Click it to close the dialog without saving changes.   |

---

## Creating text styles

To create a new text style:

1. In the *Settings* group of the *Settings* tab, click the **Text Styles** icon.  
The *Text Style* dialog is displayed.
2. Click **New**.  
The *Text Style* dialog is displayed.
3. In the *Name* editbox, type the name of the new text style.
4. From the *Font* drop-down list, select the font.
5. From the *Size* drop-down list, select the font size, or type your own value.
6. From the *Color* drop-down list, select the font color, or create a custom color for font. For more information, refer to "Custom Colors icon" section on page 127.
7. In the *Style* group box define the bold, italic and underscore formatting.
8. Review your font style in the *Preview* field. If needed, change the font parameters.
9. Click **OK**.  
The text style is created.

### NOTE

The newly created style exists only in the current project. It is not added to the Text styles library.

## Editing text styles

To edit an existing text style:

1. In the *Settings* group of the *Settings* tab, click the **Text Styles** icon.  
The *Text Style* dialog is displayed.
2. Select text style to be edited.
3. Click **Modify**.  
The *Text Style* dialog is displayed.  

### NOTE

You cannot change the name of the text style in this dialog. To rename a text style, use the **Rename** button of the main dialog.
4. From the *Font* drop-down list, select the font.
5. From the *Size* drop-down list, select the font size, or type your own value.
6. From the *Color* drop-down list, select the font color, or create a custom color for font. For more information, refer to "Custom Colors icon" section on page 127.
7. In the *Style* group box define the bold, italic and underscore formatting.
8. Review your font style in the *Preview* field. If needed, change the font parameters.
9. Click **OK**.  
The parameters of the text style are changed.

### NOTE

These changes will apply only to text styles in the current project, and don't affect to the styles in the Text styles library.

## Justification icon

The **Justification** icon of the Settings group allows you to manage the number justification styles.

Justification style defines the format of the number and its decimal precision. It controls the appearance of the numerical values used in such text items as height annotation, grid values, chainage, and levels in road drawings.

The *Number Justification Style* dialog appears after clicking. Buttons of the dialog are described in the table below.

#### Buttons of the *Number Justification Style* dialog

| Button               | Description  |
|----------------------|--|
| <b>New</b>           | Click it to create a new justification style. For more information refer to "Creating justification styles" section below.                 |
| <b>Modify</b>        | Click it to edit an existing justification style. For more information refer to "Editing justification styles" section on the facing page. |
| <b>Rename</b>        | Click it to rename an existing justification style.<br>NOTE<br>The <b>\$\$DEFAULT</b> justification style cannot be renamed.               |
| <b>Delete</b>        | Click it to delete an existing justification style.<br>NOTE<br>The <b>\$\$DEFAULT</b> justification style cannot be deleted.               |
| <b>Copy From Lib</b> | Click it to load a justification style from the library. For more information refer to "Justification styles library" section on page 632. |
| <b>OK</b>            | Click it to save changes and close the dialog.   |
| <b>Cancel</b>        | Click it to close the dialog without saving changes.   |

## Creating justification styles

To create a new justification style:

- In the *Settings* group of the *Settings* tab, click the **Justification** icon.  
The *Number Justification Style* dialog is displayed.
- Click **New**.  
The *Number Style* dialog is displayed.
- In the *Name* editbox, type the name of the new justification style.
- In the *Width* editbox, type the number of digits, used in the style. Note, that it includes the characters used for the decimal point and decimal figures
- In the *Precision* editbox, type the number of decimal places.
- Select either left of right justified position.
- Configure the following parameters:
  - Zero Padding* — tick it to fill the empty character spaces with zeroes.
  - Space Fill* — tick it to make a number right-justified with prefixed spaces to make up the number of characters in the width.
  - Display Decimal* — tick it to display the decimal point.
  - Rounding* — tick it to round a number to the precision setting.

8. Click **OK**.

The new justification style is created.

#### NOTE

The newly created style exists only in the current project. It is not added to the Justification styles library.

## Editing justification styles

To edit an existing justification style:

1. In the *Settings* group of the *Settings* tab, click the **Justification** icon.

The *Number Justification Style* dialog is displayed.

2. Select justification style to be edited.
3. Click **Modify**.

The *Number Style* dialog is displayed.

#### NOTE

You cannot change the name of the justification style in this dialog. To rename a justification style, use the **Rename** button of the *Number Justification Style* dialog.

4. In the *Width* editbox, type the number of digits, used in the style. Note that it includes the characters used for the decimal point and decimal figures
5. In the *Precision* editbox, type the number of decimal places.
6. Select either left of right justified position.
7. Configure the following parameters:
  - *Zero Padding* – tick it to fill the empty character spaces with zeroes.
  - *Space Fill* – tick it to make a number right-justified with prefixed spaces to make up the number of characters in the width.
  - *Display Decimal* – tick it to display the decimal point.
  - *Rounding* – tick it to round a number to the precision setting.

8. Click **OK**.

The parameters of the justification style are changed.

#### NOTE

These changes will apply only to justification styles in the current project, and don't affect to the styles in the Justification styles library.

## Annotation icon

Many entities in MAGNET Office have attributes, which can be annotated for displaying on the screen, or for plotting on a printed plan. Several of annotation styles are available to set appropriate annotation formats to suit international and national schemes. To display the annotation for the entities, the individual entity must have its annotation option turned on. The current annotation setting for the entity is applied when its annotation option is turned on.

The **Annotation** icon of the *Settings* group allows you to manage annotation styles.

The *Annotation Styles* dialog appears after clicking. For more information refer to "Annotation Styles dialog" section on page 604.

#### NOTE

These annotation settings will be applied to the current project only. Settings from the annotation styles library will not change. For more information about annotation styles library, refer to "Annotation styles

library" section on page 635.

## Contour icon

The **Contour** icon of the Settings group allows you to configure contour settings.

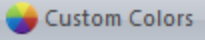
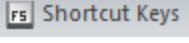
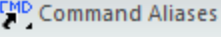
The **Contour Settings** dialog appears after clicking. For more information refer to "Contour Settings dialog" section on page 617.

### NOTE

These contour settings will be applied to the current project only. Settings from the contour settings library will not change. For more information about contour settings library, refer to Contour settings library.

## Customization group

The *Customization* group from the *Settings* tab of the MAGNET Office ribbon allows you to configure colors, shortcut keys and command aliases. It contains three icons, described in the table below.

|   |  |
|---|--|
|  | Custom Colors icon<br>Click it to create custom colors.          |
|  | Shortcut Keys icon<br>Click it to assign MAGNET Office hot keys. |
|  | Command Aliases icon<br>Click it to edit command aliases.        |

### Custom Colors icon

The **Custom Colors** icon of the Customization group allows you to manage the MAGNET Office color palette.

To create a new color:

1. In the *Customization* group of the *Settings* tab, click the **Custom Colors** icon.  
The *Create Custom Colors* dialog is displayed.
2. In the *Custom Colors* palette select a cell for the new color.
3. Do one of the following:
  - Configure the new color by using the color palette and shade bar.
  - Manually enter the required data in the *Hue*, *Sat*, *Lum*, *Red*, *Green* and *Blue* editboxes.
4. Click **Add to Custom Colors**.  
The configured color is added to the selected cell.
5. Click **OK**.

To save the current palette to the library, click **Save to Lib**.

To load previously saved configuration, click **Load from Lib**.

### Shortcut Keys icon

The **Shortcut Keys** icon of the Customization group allows you to configure the shortcut keys for the MAGNET Office.

The *Shortcut Keys* dialog appears after clicking. Buttons are described in the table below.

#### Buttons of the *Shortcut Keys* dialog

| Button                | Description   |
|-----------------------|---|
| <b>Define</b>         | Click it to define a command for the selected key.  |
| <b>Delete</b>         | Click it to delete the command from the selected key.                                       |
| <b>Reset</b>          | Click it to restore the default command for the selected key.                               |
| <b>Save Layout</b>    | Click it to save the current shortcut keys configuration in an initialization (*.ini) file. |
| <b>Restore Layout</b> | Click it to load previously saved configuration from an initialization (*.ini) file.        |
| <b>OK</b>             | Click it to save changes and close the dialog.  |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Defining shortcut keys

To define a shortcut key:

1. In the *Customization* group of the *Settings* tab, click the **Shortcut Keys** icon.

The **Shortcut Keys** dialog is displayed.

2. Select the required key and Click **Define**.

The **Shortcut Key** dialog is displayed. Commands in the list are presented by their aliases. For more information refer to "Command Aliases icon" section below.

3. Select the required command from the *Command* drop-down list and click **OK**.

The command is displayed near the key name.

4. Click **OK**.

## Command Aliases icon

The **Command Aliases** icon of the Customization group allows you to manage the aliases of the MAGNET Office commands. An alias is the command nickname which is used, for example, when defining shortcut keys.

To define a command alias:

1. In the *Customization* group of the *Settings* tab, click the **Command Aliases** icon.

The **Command Aliases** dialog is displayed.

2. From the *Module* drop-down list, select the required module.

3. Select the required command and click **Define**.

The **Edit** dialog is displayed.

4. Type the command alias in the editbox and click **OK**.

5. If needed, click **Save** to save the current configuration as the default one.

6. Click **OK**.

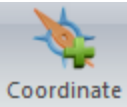


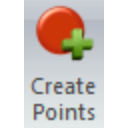


## Create Modes group

The position of a point is defined by its coordinates. The defaults for the MAGNET Office are North and East coordinates from the origin, defined by the coordinate system projection. Besides, there are two more ways to define the position of a point – the Sideshot mode, when point position defined by the distance and bearing from the reference point, and the Latitude/Longitude mode, when point position is defined by the geographic latitude and longitude coordinates. However, regardless of the point creation mode, MAGNET Office will use the North and East coordinates for further work with points and other entities. Scaling will be performed automatically.

These creating modes may be automatically set by several commands. For example, Add Line icon automatically switches to the sideshot point creation mode, assuming that the end point will be created by a bearing and distance from the start point.

The *Create Modes* group from the *Settings* tab of the MAGNET Office ribbon allows you to select point creation mode. It contains four icons, described in the table below.

|   |   |
|---|---|
|  <p>Coordinate</p>             | <p>Coordinate icon<br/>Click it to activate the "Coordinate" point creation mode.</p>                 |
|  <p>Latitude<br/>Longitude</p> | <p>Latitude Longitude icon<br/>Click it to activate the "Latitude/Longitude" point creation mode.</p> |
|  <p>Direction</p>             | <p>Direction icon<br/>Click it to activate "Sideshot" point creation mode.</p>                        |
|  <p>Create<br/>Points</p>    | <p>Create Points icon<br/>Click it to turn on/off creating points in entities.</p>                    |

### NOTE

The "Coordinate", "Latitude/Longitude" and "Sideshot" modes are mutually exclusive. When one mode is active, other is disabled.

### Coordinate icon

The **Coordinate** icon of the Create Modes group allows you to use the "Coordinate" point creation mode.

In this mode the grid coordinates are used. Point position is defined by the East (or X) and North (or Y) distance from the origin. The origin is defined by the coordinate system projection and datum. Each point is located independently of the rest points.

When creating points in this mode, you may specify the Northing and Easting coordinates in the appropriate edit-boxes at the bottom toolbar, or click the required place in the survey view.

When moving point to a new position a pop-up box displays the North and East offsets.

### Latitude Longitude icon

The **Latitude Longitude** icon of the Create Modes group allows you to use the "Latitude/Longitude" point creation mode.

In this mode the geographic latitude and longitude coordinates are used. Point position is defined by the latitude and longitude. The geographical coordinate system is defined by coordinate system projection and datum. Each point is located independently of the rest points.

When creating points in this mode, you may specify the Latitude and Longitude coordinates in the appropriate edit-boxes at the bottom toolbar, or click the required place in the survey view.

Calculation from the geographic to the grid coordinates will be performed automatically. MAGNET Office will use the grid coordinates for further work with the point.

### **CAUTION**

***A coordinate system projection must be defined to use this mode.***

## **Direction icon**

The **Direction** icon of the Create Modes group allows you to use the "Sideshot" point creation mode.

In this mode polar coordinates are used. Point position is defined by bearing and distance from the reference point.

When creating points in this mode, you may specify the bearing and distance from the reference point in the appropriate editboxes at the bottom toolbar, or click the required place in the survey view.

Calculation from the polar to the grid coordinates will be performed automatically. MAGNET Office will use the grid coordinates for further work with the point.

## **Create Points icon**

The **Create Points** icon of the Create Modes group allows you to turn on/off "Create Points" mode of creating lines, arcs, circles and polygons.

When this mode is turned on, the entities are created as usual, i.e. points are created at each node of line, arc, polygon and circle center.

When this mode is turned off, all lines, arcs, circles and polygons are created without creating any points.

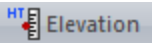
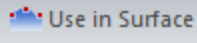
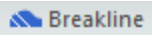
### **NOTES**

String always created with points at nodes, regardless to this mode.

You may use the polyline to create a line without creating points.

## Defaults group

The *Defaults* group from the *Settings* tab of the MAGNET Office ribbon allows you to configure some of point and line creation settings. It contains three icons, described in the table below.

|   |  |
|---|--|
|  | <p style="text-align: center;">Elevation icon<br/>Click it to create points with elevation.</p>                        |
|  | <p style="text-align: center;">Use in Surface icon<br/>Click it to make next created point a Use in Surface point.</p> |
|  | <p style="text-align: center;">Breakline icon<br/>Click it to make next created line to be a breakline.</p>            |

### Elevation icon

The **Elevation** icon of the Defaults group allows you to turn on/off creating point with the elevation turned on by default.

When this mode is turned off, new points will be created with the inactive elevation. However, you may tick *Elevation* checkbox to activate elevation while creating a point, or do it later in the Point properties dialog.

When this mode is turned on, new points will be created with the active elevation. You may specify the value in the *Elevation* editbox while creating a point, or do it later in the Point properties dialog.

### Use in Surface icon

The **Use in Surface** icon of the Defaults group allows you to turn on/off creating points set as Use in Surface by default.

When this mode is turned off, new points will be created as usual. However, you may tick *Use in Surface* checkbox while creating a point to make it possible to use this point in surfaces, or do it later in the Point properties dialog.

When this mode is turned on, new points will be created as Use in Surface points.

### Breakline icon

The **Breakline** icon of the Defaults group allows you to turn on/off creating lines set as the breaklines by default.





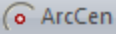

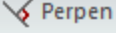
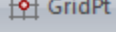
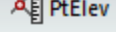
When this mode is turned off, new lines will be created as usual. However, you may tick *Break Line* checkbox while creating a line to make it a breakline, or do it later in the Line properties dialog.

When this mode is turned on, new lines will be created as the breaklines.

## Snap Modes group

When creating entities in the survey view, they supposed to be on their right places. For example, you might need to place the end point of a line exactly to the start point of another line. It might be easy to do at the small scale, but at large scales it is easy to miss the required point, and place your entity near it. Snap modes are created to help you to place points exactly to the required locations.

The *Snap Modes* group from the *Settings* tab of the MAGNET Office ribbon gives you quick access to the snap modes. It contains nine icons, described in the table below.

|   |   |
|---|---|
|    | <p>Pt icon<br/>Click it to turn on/off the "Point" snap mode.</p>                 |
|    | <p>EndPt icon<br/>Click it to turn on/off the "End Point" snap mode.</p>          |
|    | <p>IntPt icon<br/>Click it to turn on/off the "Intersection Point" snap mode.</p> |
|    | <p>MidPt icon<br/>Click it to turn on/off the "Middle Point" snap mode.</p>       |
|    | <p>ArcCen icon<br/>Click it to turn on/off the "Arc Center" snap mode.</p>        |
|   | <p>Line icon<br/>Click it to turn on/off the "Line" snap mode.</p>                |
|  | <p>Perpern icon<br/>Click it to turn on/off the "Perpendicular" snap mode.</p>    |
|  | <p>GridPt icon<br/>Click it to turn on/off the "Grid" snap mode.</p>              |
|  | <p>PtElev icon<br/>Click it to turn on/off the "3D" snap mode.</p>                |

### NOTE

Snap modes are mutually exclusive — when one mode is selected; others are disabled, except for the "Point" and "3D" modes, which can be combined with any other snap mode.

## Pt icon

The **Pt** icon of the Snap Modes group allows you to turn on/off the nearest point snap mode.

The tolerance area is located around a point, and will be treated as the point itself. It means the following:

- If you try to create a new point within the snap tolerance of the existing one, MAGNET Office will treat it like the duplicate point.
- If you try to create a point, which is the part of entity, for example the start or the end point of a line, within the snap tolerance of the existing point, MAGNET Office will automatically use this point instead.
- If you click within the snap tolerance of a point, it will be selected. If the wrong entity is selected, do the right-click, and select **Next Selection** in the shortcut menu.

---

## EndPt icon

The **EndPt** icon of the Snap Modes group allows you to turn on/off the end point snap mode.

The tolerance area is located around the start and end points of lines, arcs and strings. It means the following:

- If you try to create a new point within the snap tolerance of the existing start or end point of a line, an arc or a string, MAGNET Office will treat it like the duplicate point.
- If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance of the existing start or end point of a line, an arc, MAGNET Office will automatically use this point of a line, an arc or a string instead.
- If you click within the snap tolerance of an start or end point of a line, an arc or a string, it will be selected. If the wrong entity is selected, do the right-click, and select **Next Selection** in the shortcut menu.

## IntPt icon

The **IntPt** icon of the Snap Modes group allows you to turn on/off the intersect snap mode. The tolerance area is located around the intersection points of two crossing entities. It means the following:

- If you try to create a new point within the snap tolerance of the existing intersection point, MAGNET Office will treat it like the duplicate point.
- If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance of the existing intersection point, MAGNET Office will automatically use this intersection point instead.
- If you click within the snap tolerance of an intersection point, it will be selected. If the wrong entity is selected, do the right-click, and select **Next Selection** in the shortcut menu.

## MidPt icon

The **MidPt** icon of the Snap Modes group allows you to turn on/off the middle point snap mode. The tolerance area is located around the middle points of lines, arc or strings. It means the following:

- If you try to create a new point within the snap tolerance of the existing middle point of a line, an arc or a string, MAGNET Office will treat it like the duplicate point.
- If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance of the existing middle point of a line, an arc or a string, MAGNET Office will automatically use this middle point instead.
- If you click within the snap tolerance of a middle point of a line, an arc or a string, it will be selected. If the wrong entity is selected, do the right-click, and select **Next Selection** in the shortcut menu.

## ArcCen icon

The **ArcCen** icon of the Snap Modes group allows you to turn on/off the arc center snap mode. The tolerance area is located around the arc center points. It means the following:

- If you try to create a new point within the snap tolerance of the existing arc center point, MAGNET Office will treat it like the duplicate point.
- If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance of the existing arc center point, MAGNET Office will automatically use this arc center point instead.
- If you click within the snap tolerance of an arc center point, it will be selected. If the wrong entity is selected, do the right-click, and select **Next Selection** in the shortcut menu.

## Line icon

The **Line** icon of the Snap Modes group allows you to turn on/off the line snap mode. The tolerance area is located near the lines. It means the following:

- If you try to create a new point within the snap tolerance of the existing line or string, MAGNET Office will place this point on the line, or include in into the string.
- If you try to create the end point of a line, an arc of a string, within the snap tolerance of the existing line or string, MAGNET Office will automatically this point on the line or the string.

## Perpern icon

The **Perpern** icon of the Snap Modes group allows you to turn on/off the perpendicular snap mode. It means that if you try to locate the end point of a line within the snap tolerance of the existing line of string, the new line will be created as perpendicular to this line or string.

## GridPt icon

The **GridPt** icon of the Snap Modes group allows you to turn on/off the grid point snap mode. The tolerance area is located near the grin lines intersections. It means the following:

- If you try to create a new point within the snap tolerance, it will be located exactly at the grid intersection point.
- If you try to create a point, which is the part of entity, for example the start or the end point of a line withing the snap tolerance, MAGNET Office will place exactly at the grid intersection point.

## PtElev icon

The **PtElev** icon of the Snap Modes group allows you to turn on/off the 3D snap mode. If you try to create a new point, located on an object its elevation will be calculated, basing on the slope of the line/sting segment/etc.

## Insert Tab










The *Insert* tab of the MAGNET Office ribbon contains control icons for adding various entities to the project. It is separated to nine groups, described in corresponding sections:

- "Points group" section on the next page
- "Line group" section on page 148
- "Arc group" section on page 160
- "Circle group" section on page 176
- "Text group" section on page 179
- "Polyline/Polygon group" section on page 198
- "String group" section on page 202
- "Feature group" section on page 206
- "Arrow group" section on page 220

## Points group

A point is the main entity of the MAGNET Office. It is a two- or three-dimensional in space, on which all other entities are derived. A point represent a unique position in space, defined by its coordinates — Northing and Easting (or X and Y respectively). A point also may have an elevation. Besides, a point may be defined by its geographical latitude and longitude coordinates. Each point has a unique alphanumeric ID (it is usually a number) to identify it in the project database.

The *Points* group from the *Insert* tab of the MAGNET Office ribbon allows you to add new points to the survey view. It contains four icons and four second level icons, described in the table below.

|   |   |
|---|---|
|                          | <b>Add Point icon</b><br>Click it to add a new point to the survey view. This icon also contains the list of the second level icons. Click  to see it. |
|  Latitude/Longitude      | <b>Latitude/Longitude icon</b><br>Click it to add a new point to the survey view by using the Latitude/Longitude method.  |
|  Offset/Distance         | <b>Offset/Distance icon</b><br>Click it to add a new point to the survey view by using the Offset/Distance method.  |
|  Offset/Angle           | <b>Offset/Angle icon</b><br>Click it to add a new point to the survey view by using the Offset/Angle method.  |
|  Brg/Dist Intersection | <b>Brg/Dist Intersection icon</b><br>Click it to add a new point to the survey view by using the Bearing/Distance Intersection method   |
|  Multiple Intersection | <b>Multiple Intersection icon</b><br>Click it to add points at intersections of existing objects.   |
|  Sideshot              | <b>Sideshot icon</b><br>Click it to add new points by using the Sideshot method.  |
|  Intersection          | <b>Intersection icon</b><br>Click it to add a new point to the survey view by using the Intersection method.  |
|  Spreadsheet Entry     | <b>Spreadsheet Entry icon</b><br>Click it to manually add new points to the survey view.  |

### Add Point icon

The **Add Point** icon of the Points group allows you to add a new point to the survey view by using the current creation mode. For more information about creation modes, refer to "Create Modes group" section on page 129.

To create a point:

1. In the *Points* group of the *Insert* tab, click the **Add Point** icon.  
The input panel is displayed at the bottom toolbar.
2. If needed, configure parameters at the bottom toolbar. Fields are described in the table below.
3. Locate the point position. Do one of the following:



- Fill in appropriate fields at the input panel and press *Enter*.
  - Click the point position in the survey view.
4. If needed, repeat steps 2 and 3 to create more points.
  5. When finished, press *Esc*.

#### Fields of the input panel, when creating points

| Field                        | Description   |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the next new point.   |
| <i>East</i>                  | Defines the East (X) coordinate of the next new point.<br>NOTE<br>This field available only in "Coordinate" point creation mode. For more information, refer to "Coordinate icon" section on page 129.                  |
| <i>North</i>                 | Defines the North (Y) coordinate of the next new point.<br>NOTE<br>This field available only in "Coordinate" point creation mode. For more information, refer to "Coordinate icon" section on page 129.                 |
| <i>Elev</i>                  | Defines the elevation of the next new point.  |
| <i>Latitude</i>              | Defines the latitude coordinate of the next new point.<br>NOTE<br>This field available only in "Latitude/Longitude" point creation mode. For more information, refer to "Latitude Longitude icon" section on page 129.  |
| <i>Longitude</i>             | Defines the longitude coordinate of the next new point.<br>NOTE<br>This field available only in "Latitude/Longitude" point creation mode. For more information, refer to "Latitude Longitude icon" section on page 129. |
| <i>Bearing</i>               | Defines the bearing of the next new point from the reference point.<br>NOTE<br>This field available only in "Sideshot" point creation mode. For more information, refer to "Direction icon" section on page 130.        |
| <i>Distance</i>              | Defines the distance from the reference point to the next new point.<br>NOTE<br>This field available only in "Sideshot" point creation mode. For more information, refer to "Direction icon" section on page 130.       |
| <i>Code</i>                  | Defines the code of the next new point.   |
| <i>Use in Surface</i>        | Defines whether the next new point may be used for DTM creation or not.   |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the next new point will be interpolated.   |

## Latitude/Longitude icon

The **Latitude/Longitude** icon of the Points group allows you to add a new point to the survey view by using the "Latitude/Longitude" creation mode. For more information about creation modes, refer to "Create Modes group" section on page 129.

To add a new point by using the latitude and longitude coordinates:

1. In the *Points* group of the *Insert* tab, click the **Latitude/Longitude** icon.  
The input panel is displayed at the bottom toolbar.
2. If needed, configure parameters at the bottom panel. Fields are described in the table below.
3. Locate the point position. Do one of the following:
  - Fill in the *Latitude* and *Longitude* editboxes at the input panel and press *Enter*.
  - Click the point position in the survey view.
4. If needed, repeat steps 2 and 3 to create more points.
5. When finished, press *Esc*.

**Fields of the input panel, when creating points in the "Latitude/Longitude" mode**

| Field                        | Description   |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the next new point.                                 |
| <i>Elev</i>                  | Defines the elevation of the next new point.                              |
| <i>Latitude</i>              | Defines the latitude coordinate of the next new point.                    |
| <i>Longitude</i>             | Defines the longitude coordinate of the next new point.                   |
| <i>Code</i>                  | Defines the code of the next new point.                                   |
| <i>Use in Surface</i>        | Defines whether the next new point may be used for DTM creation or not.   |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the next new point will be interpolated. |

## Offset/Distance icon

The **Offset/Distance** icon of the *Points* group allows you to add a new point to the survey view at a distance along a reference line, arc, string or alignment or/and at a perpendicular offset from a reference line, arc, string or alignment. See picture below for details.

To add a new point by using the offset/distance method:

1. In the *Points* group of the *Insert* tab, click the **Offset/Distance** icon.  
The input panel is displayed at the bottom toolbar.
2. If needed, configure parameters at the bottom panel. Fields are described in the table below
3. Select the reference point, line, arc, string or alignment.

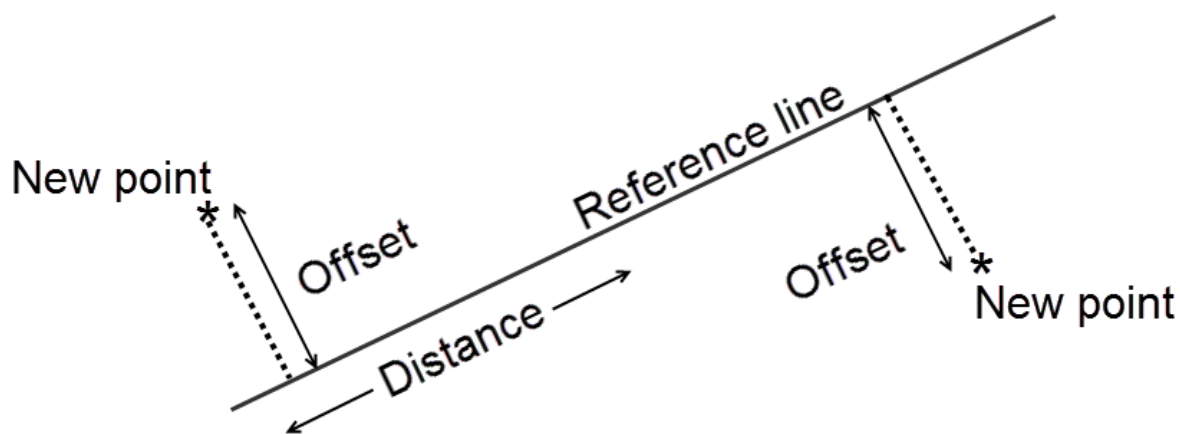
**NOTE**

If you select a point as the reference entity, MAGNET Office prompts you to select a second point to define the reference line between them.

4. Locate the point position. Do one of the following:
  - Fill in the *Offset* and *Distance* fields at the input panel and press *Enter*.
  - Click the point position in the survey view.
5. If needed, repeat steps 2 and 3 to create more points.
6. When finished, press *Esc*.

**Fields of the input panel, when creating points in the "Offset/Distance" mode**

| Field                 | Description  |
|-----------------------|--|
| <i>Number</i>         | Defines the number of the next new point.  |
| <i>Offset</i>         | Defines the offset from the reference entity. See picture below for details.         |
| <i>Dist</i>           | Defines the distance at the reference entity. See picture below for details.         |
| <i>Length</i>         | Display the length of the reference entity.  |
| <i>Elev</i>           | Defines the elevation of the next new point.   |
| <i>Code</i>           | Defines the code of the next new point.  |
| <i>Use in Surface</i> | Defines whether the next new point may be used for DTM creation or not.              |
| <i>Write Offset</i>   | If ticked, the new point will be annotated with dimension from the reference entity. |

**Distance along the reference line and offset from the reference line****Offset/Angle icon**

The **Offset/Angle** icon of the Points group allows you to add a new point to the survey view as a radiation from a start point. The angle of a radiation is measured from the reference line clockwise, distance is measured from the start point.

To add a new point by using the offset/angle method:

1. In the *Points* group of the *Insert* tab, click the **Offset/Angle** icon.

The input panel is displayed at the bottom toolbar.

2. If needed, configure parameters at the bottom panel. Fields are described in the table below
3. Select the reference point, line, arc, string or alignment.

**NOTE**

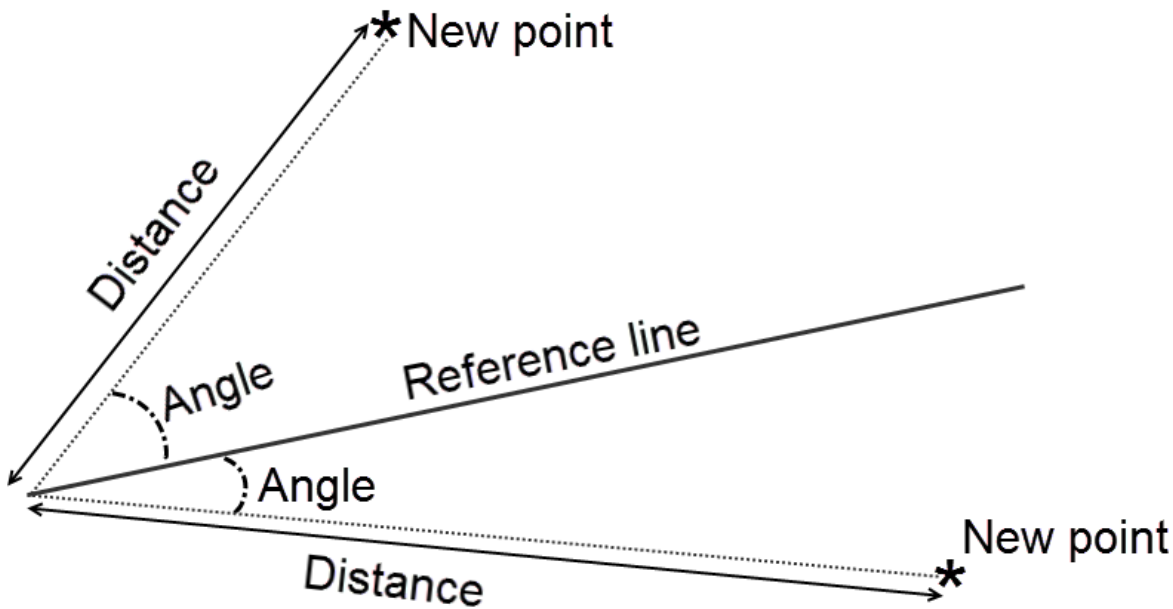
If you select a point as the reference entity, MAGNET Office prompts you to select a second point to define the reference line between them.

4. Locate the point position. Do one of the following:
  - Fill in the *Angle* and *Dist* fields at the input panel and press *Enter*.
  - Click the point position in the survey view.

5. If needed, repeat step 4 to create more points.
6. When finished, press *Esc*.

**Fields of the input panel, when creating points in the "Offset/Distance" mode**

| Field                 | Description   |
|-----------------------|---|
| <i>Number</i>         | Defines the number of the next new point.                                   |
| <i>Angle</i>          | Defines the angle from the reference entity. See picture below for details. |
| <i>Dist</i>           | Defines the offset from the start point. See picture below for details.     |
| <i>Elev</i>           | Defines the elevation of the next new point.                                |
| <i>Code</i>           | Defines the code of the next new point.                                     |
| <i>Use in Surface</i> | Defines whether the next new point may be used for DTM creation or not.     |



**Angle from the reference line and offset the start point**

**Brg/Dist Intersection icon**

The **Brg/Dist Intersection** icon of the Points group allows you to add a new point to the survey view at the specified bearings and distances from two existing points.

To add a new point by using the offset/angle method:

1. In the *Points* group of the *Insert* tab, click the **Brg/Dist Intersection** icon.
2. Select the first point.  
The input panel is displayed at the bottom toolbar.
3. Define the first reference line. Do one of the following:

- Type the bearing and distance in the appropriate checkboxes at bottom toolbar and press *Enter*.
- Click the required position in the survey view.

The input panel is displayed at the bottom toolbar.

4. Specify the offset of the reference line from the point and press *Enter*.
5. Repeat steps from 2 to 4 to define second point and reference line.

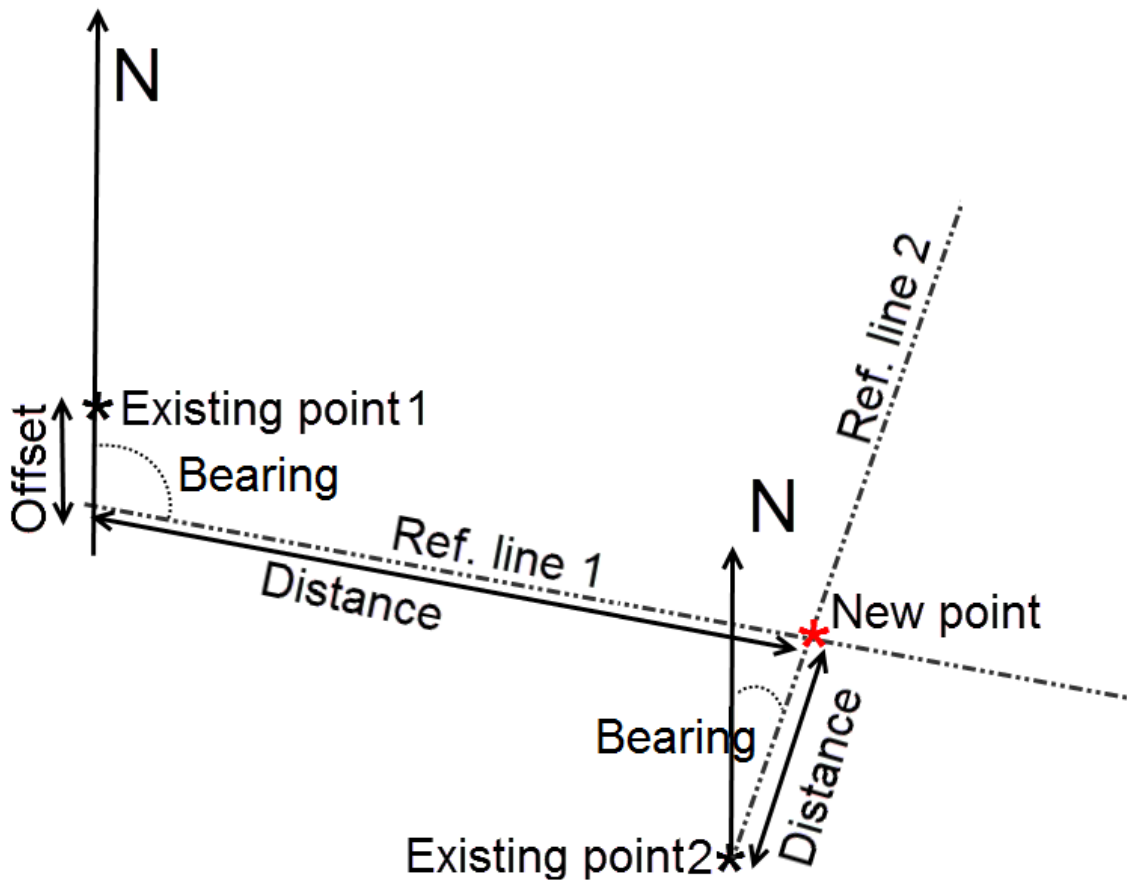
The new point is located at the intersection of two reference lines.

6. Review the parameters of the new point at the bottom toolbar, and press *Enter* to confirm it.

The point is created.

#### Fields of the input panel, when creating points in the "Bearing/Distance Intersection" mode

| Field                        | Description   |
|------------------------------|---|
| <i>Bearing</i>               | Defines bearing of the reference line.                                    |
| <i>Distance</i>              | Defines distance from the existing point.                                 |
| <i>Offset</i>                | Defines offset of the reference line from the existing point.             |
| <i>Number</i>                | Defines the number of the next new point.                                 |
| <i>East</i>                  | Displays the East (X) coordinate of the new point.                        |
| <i>North</i>                 | Displays the North (Y) coordinate of the new point.                       |
| <i>Elev</i>                  | Defines the elevation of the next new point.                              |
| <i>Code</i>                  | Defines the code of the next new point.                                   |
| <i>Use in Surface</i>        | Defines whether the next new point may be used for DTM creation or not.   |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the next new point will be interpolated. |



Angle from the reference line and offset the start point

## Multiple Intersection icon

The **Multiple Intersection** icon of the Points group allows you to add a new point or points at the intersection of lines, arcs and circles. Newly created points will not be a part of existing entities. You may pre-select objects, or select them while running the option.

To create a point, with pre-selecting objects:

1. In the survey view, select the required objects.
2. In the *Points* group of the *Insert* tab, click the **Multiple Intersection** icon.
3. If needed, at the bottom toolbar tick the *Interpolate Elevation* checkbox to calculate heights of the new points.
4. Press *Enter*.

The points are created.

To create a point, without pre-selection:

1. In the *Points* group of the *Insert* tab, click the **Multiple Intersection** icon.
2. If needed, at the bottom toolbar tick the *Interpolate Elevation* checkbox to calculate heights of the new points.

3. Continuously select the required objects.
4. Points are created at all intersections of the selected objects.

## Sideshot icon

The **Sideshot** icon of the Points group allows you to add a new point to the survey view by using the "Sideshot" creation mode. For more information about "Sideshot" creation mode, refer to "Direction icon" section on page 130.

To create a point:

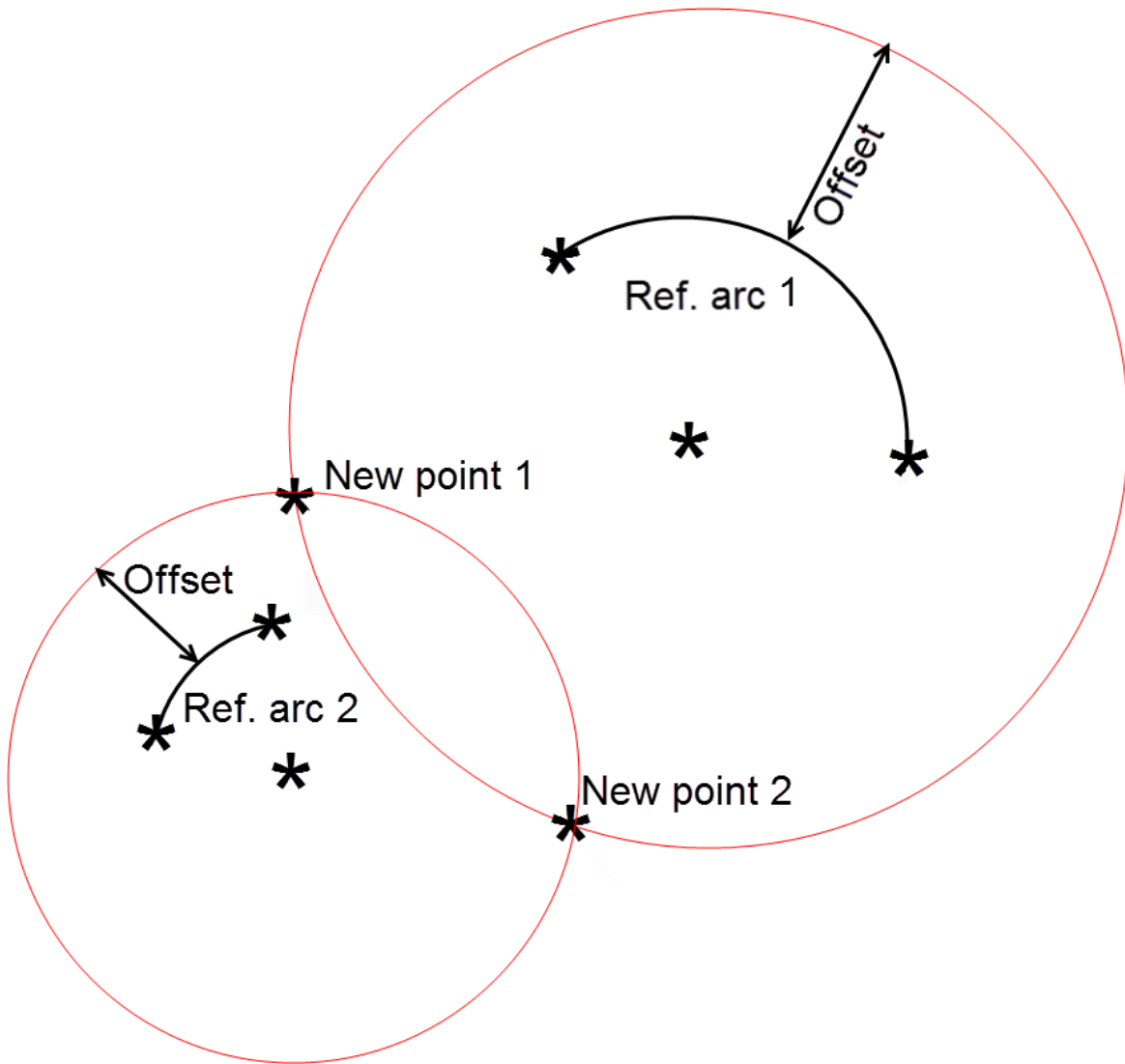
1. In the *Points* group of the *Insert* tab, click the **Sideshot** icon.  
The input panel is displayed at the bottom toolbar.
2. Define a reference point. Select an existing point, or create a new one.
3. Locate the point position. Do one of the following:
  - Fill in the *Bearing* and *Distance* fields at the input panel and press *Enter*.
  - Click the point position in the survey view.
4. If needed, repeat step 3 to create more points.
5. When finished, press *Esc*.

### Fields of the input panel, when creating points

| Field                        | Description   |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the next new point.   |
| <i>East</i>                  | Defines the East (X) coordinate of a reference point.<br>NOTE<br>This field available only when creating a reference point. |
| <i>North</i>                 | Defines the North (Y) coordinate of a reference point.<br>NOTE<br>This field available only when creating a reference point |
| <i>Bearing</i>               | Defines the bearing of the next new point from the reference point.   |
| <i>Distance</i>              | Defines the distance from the reference point to the next new point.  |
| <i>Elev</i>                  | Defines the elevation of the next new point.  |
| <i>Code</i>                  | Defines the code of the next new point.   |
| <i>Use in Surface</i>        | Defines whether the next new point may be used for DTM creation or not.   |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the next new point will be interpolated.   |

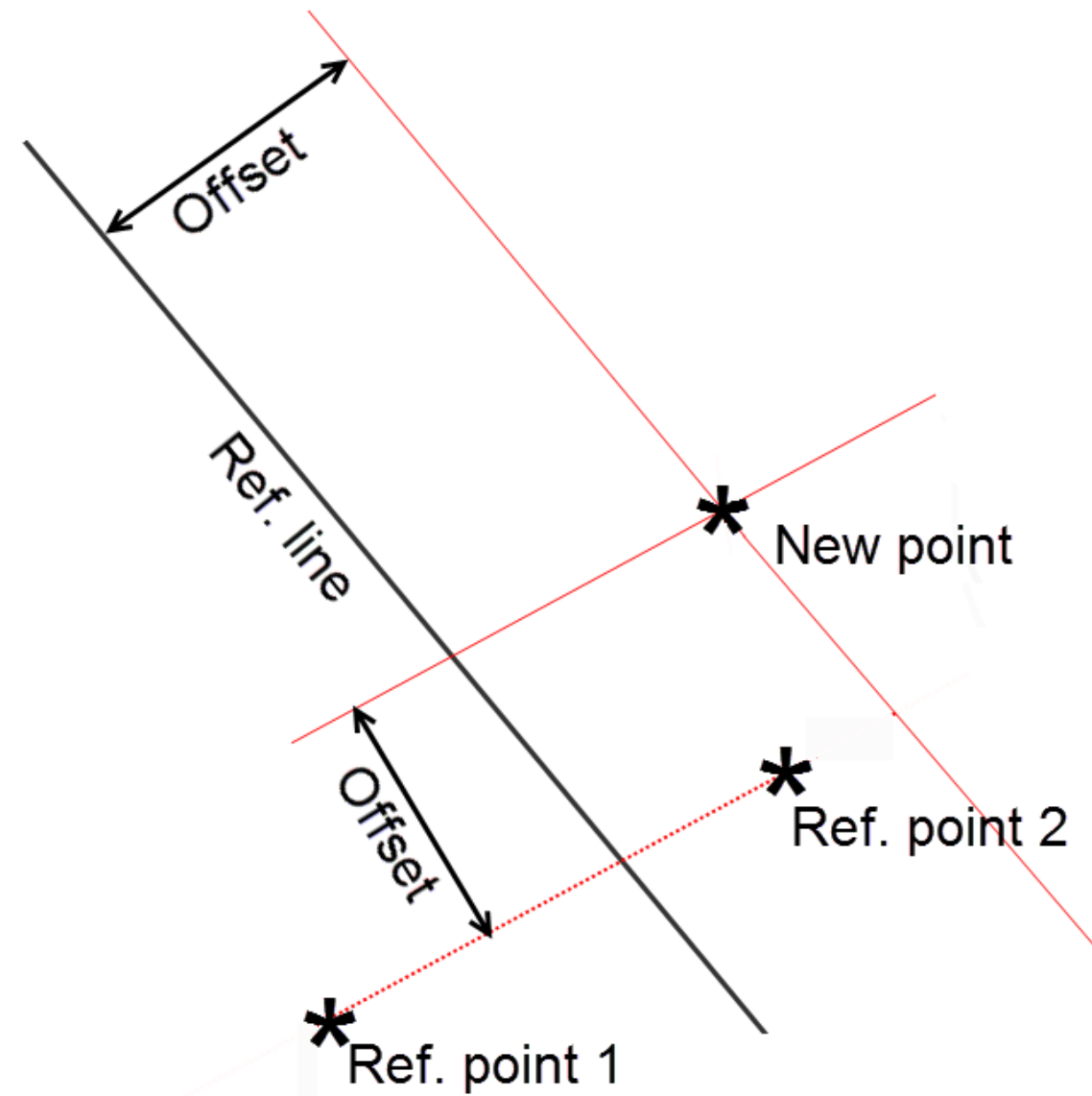
## Intersection icon

The **Intersection** icon of the Points group allows you to add a new point or points at the intersection of lines, arcs and circles. The entity for intersection may have an offset from the reference entity. See pictures below for details.

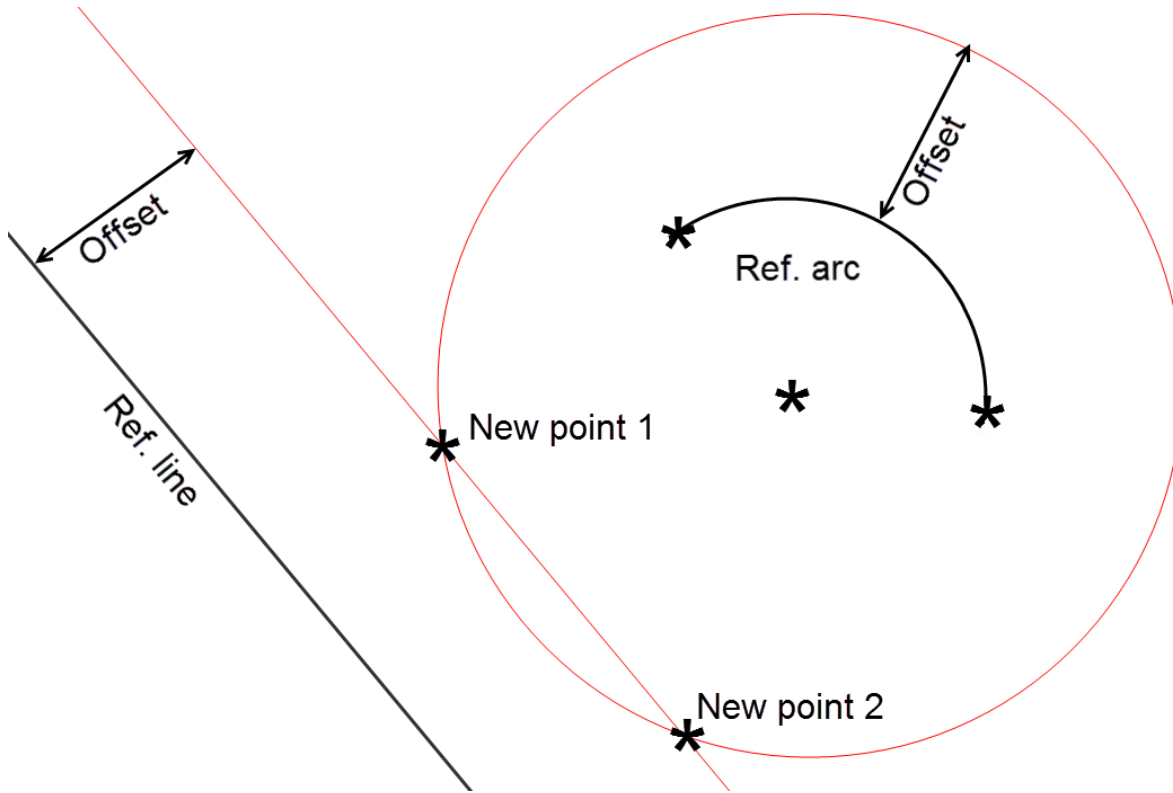


**Intersection of two arcs**





Intersection of two lines



### Intersection of line and arc

To create a point:

1. In the *Points* group of the *Insert* tab, click the **Intersection** icon.
2. Select the required point, line, arc or circle.

*TIP*

*If you need to select a point, you may type its number in the From Point editbox at the bottom toolbar and press Enter.*

3. If you have selected a reference point, you need to select second point, or specify the bearing from the first point to define the line. Do one of the following:
  - Select the required point in the survey view.
  - In the *To Point* editbox at the bottom panel type the number of the required and press *Enter*.
  - Click the required position in the survey view.
  - In the *Bearing* editbox at the bottom panel type the required bearing and press *Enter*.
4. In the *Offset* editbox at the bottom panel, type the required offset from the reference entity and press *Enter*.
5. Repeat steps from 2 to 4 do select second reference entity.

The **Intersection Point Height** dialog is displayed.

6. If needed, in the *Required Height* editbox, define the elevation of the new point.
7. Click **OK**.
8. At the bottom toolbar, review the properties of the new point. Fields are described in the table below. Do one of the following:

- Press *Enter* to create a new point.
  - Click *Esc* to discard creation of a new point.
9. If the intersection contains two new points, repeat steps form 6 to 8 for the second point.

#### Fields of the bottom toolbar, when reviewing a point

| Field                        | Description   |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the new point.                                    |
| <i>East</i>                  | Displays the East (X) coordinate of the new point.                      |
| <i>North</i>                 | Defines the North (Y) coordinate of the new point.                      |
| <i>Elev</i>                  | Defines the elevation of the new point.                                 |
| <i>Code</i>                  | Defines the code of the t new point.                                    |
| <i>Use in Surface</i>        | Defines whether the next new point may be used for DTM creation or not. |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the new point will be interpolated.    |

## Spreadsheet Entry icon













The **Spreadsheet Entry** icon of the Points group allows you to manually add new points to the survey view, by using the point entry table.

The Point editor window appears after clicking. For more information, refer to "Point editor" section on page 510.

## Line group

A line is a connection between two points, and defined by a start point and an end point. The bearing and distance of the line are defined by the start and end points positions. If both points have elevations, than the line will be a 3D line. A line may be defined as a breakline for using in a surface model.

The *Line* group from the *Insert* tab of the MAGNET Office ribbon allows you to add new lines to the survey view. It contains four icons and eight second level icons, described in the table below.

|  |   |
|--|---|
|                       | <p>Add Line icon</p> <p>Click it to add a new line to the survey view. This icon also contains the list of the second level icons. Click ▾ to see it.</p> |
|  Coordinates          | <p>Coordinates icon</p> <p>Click it to add a line by defining the coordinates of its points.</p>  |
|  Join Two Points      | <p>Join Two Points icon</p> <p>Click it to add a new line by joining two existing points.</p>   |
|  Join Multiple Points | <p>Join Multiple Points icon</p> <p>Click it to connect all existing point one by one.</p>  |
|  Tangent              | <p>Tangent icon</p> <p>Click it to add a new line as the tangent to an existing arc or a circle.</p>  |
|  External Tangent    | <p>External Tangent icon</p> <p>Click it to add a new line as the tangent between two existing arc-/circles.</p>  |
|  Splay Corner       | <p>Splay Corner icon</p> <p>Click it to add a new line as the splay corner between two existing lines.</p>  |
|  Fit Line           | <p>Fit Line icon</p> <p>Click it to add a new line as the best fit to the suggested points.</p>   |
|  Rectangle as Lines | <p>Rectangle As Lines icon</p> <p>Click it to add a new rectangle, consists of the four lines.</p>  |
|  Join Points        | <p>Join Points icon</p> <p>Click it to add a new line by connecting existing points.</p>  |
|  Parallel           | <p>Parallel icon</p> <p>Click it to add a new line as a parallel to an existing one.</p>  |
|  Perpendicular      | <p>Perpendicular icon</p> <p>Click it to add a new line as a perpendicular to an existing one.</p>  |

### Add Line icon

The **Add Line** icon of the Line group allows you to add a new line to the survey view. In this mode the position of the end point is defined as the bearing and distance from the start point.

To create a line:

1. In the *Line* group of the *Insert* tab, click the **Add Line** icon.

The input panel for point creation is displayed at the bottom toolbar. Description of the fields may be found in the table below.

2. Locate the start point of the line, by using the "Coordinate" or "Latitude/Longitude" method. For more information about adding points refer to "Add Point icon" section on page 136.

**NOTE**

If a point was selected, when clicking the "Add Line" icon, it automatically become the start point of the new line.

3. Locate the end point of the line, by using the "Sideshot" method. For more information refer to "Sideshot icon" section on page 143.

The line is created.

4. If needed, create more lines. The end point of the last line will automatically set as the start point of the next line.
5. When finished, press *Esc*.

#### Fields of the input panel, when creating lines

| Field                        | Description  |
|------------------------------|--|
| <i>Number</i>                | Defines the number of the next new point.  |
| <i>East</i>                  | Defines the East (X) coordinate of the line start point.<br><b>NOTE</b><br>This field available only when creating the start point.  |
| <i>North</i>                 | Defines the North (Y) coordinate of the line start point.<br><b>NOTE</b><br>This field available only when creating the start point. |
| <i>Elev</i>                  | Defines the elevation of the line point.   |
| <i>Bearing</i>               | Defines the bearing of the line.<br><b>NOTE</b><br>This field available only when creating the end point.                            |
| <i>Distance</i>              | Defines the line length.<br><b>NOTE</b><br>This field available only when creating the end point.                                    |
| <i>Code</i>                  | Defines the code of the line start/end point.  |
| <i>Use in Surface</i>        | Defines whether the next new point may be used for DTM creation or not.  |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the line start/end point will be interpolated.  |
| <i>BreakLine</i>             | Defines whether the new line will be a breakline.  |

## Coordinates icon

The **Coordinates** icon of the Line group allows you to add a new line to the survey view by specifying coordinates of its start and end points. In this mode the end point is defined by its East and North coordinates, independently from the start point.

To create a line, by using the coordinates method:

1. In the *Line* group of the *Insert* tab, click the **Coordinates** icon.

The input panel for point is displayed at the bottom toolbar. For more information about adding points refer to "Add Point icon" section on page 136.

2. Locate the start point of the line, by using the "Coordinate" method.

**NOTE**

If a point was selected, when clicking the "Add line" icon, it automatically become the start point of the new line.

3. Locate the end point of the line, by using the "Coordinates" method.

The line is created.

4. If needed, create more lines. The end point of the last line will automatically set as the start point of the next line.
5. When finished, press *Esc*.

## Join Two Points icon

The **Join Two Points** icon of the *Line* group allows you to add a new line to the survey view by joining two existing points in the survey view.

To create a line, by joining existing points:

1. In the *Line* group of the *Insert* tab, click the **Join Two Points** icon.

The input panel for point number is displayed at the bottom toolbar.

2. Define the start point of the line. Do one of the following:

- Click the required point in the survey view.
- Type the required point number in the *Start Point* editbox at the bottom toolbar and press *Enter*.

**NOTE**

If a point was selected, when clicking the **Add Line** icon, it automatically become the start point of the new line.

3. Define the end point of the line. Do one of the following:

- Click the required point in the survey view.
- Type the required point number in the *End Point* editbox at the bottom toolbar and press *Enter*.

The line is created.

4. If needed, repeat steps 2 and 3 to create more lines.
5. When finished, press *Esc*.

**NOTE**

When using this mode, the end point of the last line will not be automatically assigned as the start point of the next line. You have to define start point manually for each new line. To continuously join more than two points, use the **Join Points** icon. For more information, refer to "Join Points icon" section on page 155.

## Join Multiple Points icon

The **Join Multiple Points** icon of the *Line* group allows you to add new lines to the survey view by joining existing points one after one in order of point numbers. After clicking, point number 1 will be connected with point number 2, point number 2 with point number 3 and so on.

## Tangent icon

The **Tangent** icon of the Line group allows you to add a new line to the survey view as the tangent to an existing arc or circle.

A tangent may be defined by an arc, by a point and an arc or by a point and a circle.

To create a tangent line, defined by an arc:

1. In the *Line* group of the *Insert* tab, click the **Tangent** icon.
2. In the survey view select an existing arc.

The start or the end point of the arc, depending which is closer to the place of clicking, is defined as the start point of the new tangent line.

The input panel is displayed at the bottom toolbar as for "Sideshot" point creation mode, but with the defined bearing.

3. Locate the end point of the line. Do one of the following:
  - Click the required place in the survey view.
  - Specify the distance in the *Distance* editbox at the bottom toolbar. For more information refer to "Sideshot icon" section on page 143.

The tangent line is created.

To create a tangent line, defined by a point and an arc/circle:

1. In the *Line* group of the *Insert* tab, click the **Tangent** icon.
2. In the survey view select an existing point.

The point is defined as the start point of the new tangent line.

3. In the survey view, select an existing arc or a circle.

The input panel is displayed at the bottom toolbar as for "Sideshot" point creation mode, but with the defined bearing.

4. If needed, specify the length of the new line and other parameters. By default the end point is located at the tangency point.
5. To accept the newly created line, do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The tangent line is created.

## External Tangent icon

The **External Tangent** icon of the Line group allows you to add a new line to the survey view as the tangent to two existing arcs or circles with the start and end points at the tangency points.

To create a tangent line to two arcs/circles:

1. In the *Line* group of the *Insert* tab, click the **External Tangent** icon.
2. In the survey view, select the first arc or circle.
3. In the survey view, select the second arc or circle.

The input panel for the first point is displayed at the bottom toolbar with the defined East and North coordinates for the start point of the new line.

4. If needed, configure point properties. Description may be found in the table below.
5. Confirm the start point. Do one of the following:

- Press *Enter*.
- Left click in the survey view.

The input panel for the first point is displayed at the bottom toolbar with the defined East and North coordinates for the end point.

6. Repeat steps 4 and 5 for the end point of the new line.

The new tangent line is created.

#### Fields of the input panel, when confirming points

| Field                        | Description   |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the new tangency point.                                 |
| <i>East</i>                  | Displays the East (X) coordinate of the new tangency point.                   |
| <i>North</i>                 | Displays the North (Y) coordinate of the new tangency point.                  |
| <i>Elev</i>                  | Defines the elevation of the new tangency point.                              |
| <i>Code</i>                  | Defines the code of the new tangency point.                                   |
| <i>Use in Surface</i>        | Defines whether the next new point may be used for DTM creation or not.       |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the new tangency point will be interpolated. |

## Splay Corner icon

The **Splay Corner** icon of the Line group allows you to add a new line to the survey view as a splay corner between two lines. See pictures below for details.

To create a line as a splay corner:

1. In the *Line* group of the *Insert* tab, click the **Splay Corner** icon.
2. In the survey view, select the first line.
3. In the survey view, select the second line.

The input panel is displayed at the bottom toolbar.

4. Define the position of the new line. Do one of the following:
  - Locate it in the survey view.
  - Configure the parameters at the bottom toolbar. Description of the fields may be found in the table below.

The input panel is displayed at the bottom toolbar with the defined East and North coordinates for the start point of the new line.

5. Review the parameters of the start point, if needed change them. For more information about point parameters refer to "Add Point icon" section on page 136.
6. To confirm the start point do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The input panel is displayed at the bottom toolbar with the defined East and North coordinates for the end point of the new line.



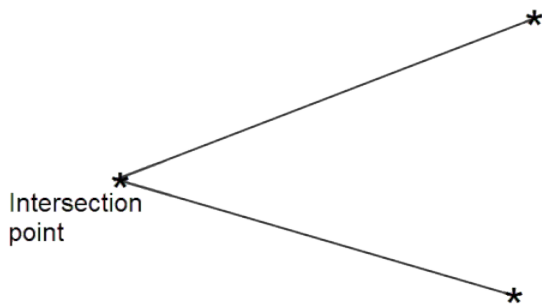
7. Repeat steps 5 and 6 for the end point of the new line.

The splay corner line is created.

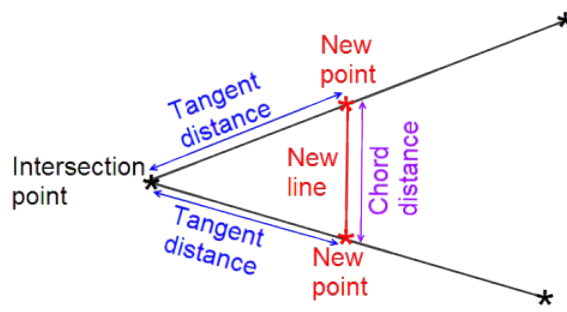
**Fields of the input panel when defining splay corner line position**

| Field                   | Description  |
|-------------------------|--|
| <i>Chord Distance</i>   | Defines the length of the splay corner line. See pictures below for details.   |
| <i>Tangent Distance</i> | Defines the distance from the intersection point to the splay corner line. See pictures below for details.                               |
| <i>Truncate Lines</i>   | Defines whether the parts of the line between intersection point and splay corner lines will be deleted. See pictures below for details. |

Before

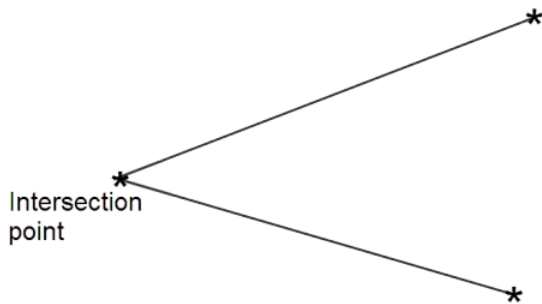


After

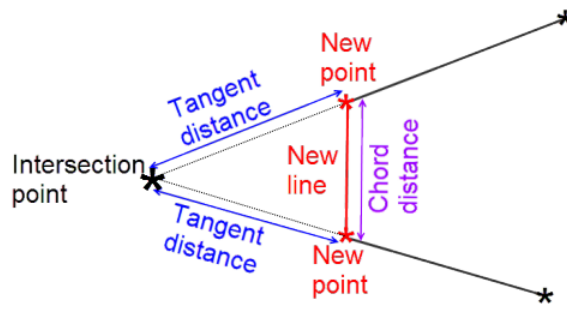


**Splay corner without truncating lines**

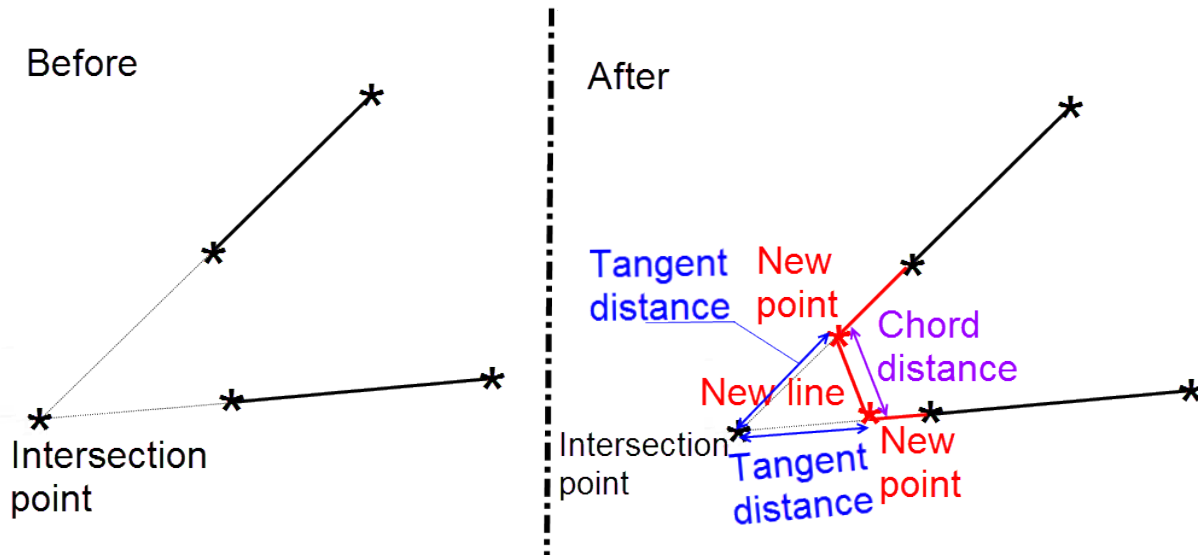
Before



After



**Splay corner with truncated lines**



Splay corner when line doesn't actually intersect

## Fit Line icon

The **Fit Line** icon of the Line group allows you to add a new line to the survey view as the best fit through the suggested points.

To add a fitted line:

1. In the *Line* group of the *Insert* tab, click the **Fit Line** icon.
2. Suggest the points for the line. Do one of the following:
  - Select the required points in the survey view.
  - Type the number of the required point in the *Point Number* editbox at the bottom toolbar and press *Enter*.
3. When finished suggesting points, press *Ecs*.

The **Fit a Line** dialog is displayed.

4. In the *Maximum Offset* editbox, specify the required tolerance.
5. Tick the *Fixed Point* checkbox, to define whether to use exactly the specify points, or it is allowed to create new ones.
6. Click **OK**.

The new line is created, and a report, containing information about points used, points excluded and points created, is displayed.

## Rectangle As Lines icon

The **Rectangle As Lines** icon of the Line group allows you to add to the survey view a rectangle, consisting of four lines.

To create a rectangle:

1. In the *Line* group of the *Insert* tab, click the **Rectangle As Lines** icon.

The input panel for creating point in the "Coordinates" mode is displayed. For more information, refer to "Add Point icon" section on page 136.

2. Locate the first point of the rectangle.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

3. Define the size of the rectangle. Do one of the following:

- Locate the opposite point in the survey view.
- Specify the width and height of the rectangle in the appropriate editboxes at the bottom toolbar and press *Enter*.

The rectangle is created.

#### Fields of the bottom toolbar, when creating a rectangle

| Field                        | Description   |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the second rectangle point.   |
| <i>Width</i>                 | Defines the width of the rectangle.   |
| <i>Height</i>                | Defines the height of the rectangle.  |
| <i>Elev</i>                  | Defines the elevation of all rectangle points, except for the first point.                              |
| <i>Code</i>                  | Defines the code of all rectangle points, except for the first point.                                   |
| <i>Use in Surface</i>        | Defines whether the rectangle points may be used for DTM creation or not.                               |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the rectangle points, except for the first point will be interpolated. |
| <i>Breakline</i>             | Defines whether the lines of the rectangle may be used for DTM creation.                                |

## Join Points icon

The **Join Points** icon of the *Line* group allows you to add a new line to the survey view by joining existing points in the survey view.

To create a line, by joining existing points:

1. In the *Line* group of the *Insert* tab, click the **Join Points** icon.

The input panel for point number is displayed at the bottom toolbar.

2. Define the start point of the line. Do one of the following:

- Click the required point in the survey view.
- Type the required point number in the *Start Point* editbox at the bottom toolbar and press *Enter*.

#### NOTE

If a point was selected, when clicking the "Add line" icon, it automatically become the start point of the new line.

3. Define the end point of the line. Do one of the following:

- Click the required point in the survey view.
- Type the required point number in the *Next Point* editbox at the bottom toolbar and press *Enter*.

The line is created.

4. If needed, continue creating lines. The end point of the last line will automatically set as the start point of

the next line.

5. When finished, press *Esc*.

## Parallel icon

The **Parallel** icon of the Line group allows you to add a new line to the survey view as a parallel to an existing one, with the same length.

To create a parallel line:

1. In the *Line* group of the *Insert* tab, click the **Parallel** icon.
2. In the survey view, select a line or a point.

### NOTE

If you have selected a point, you need to select the second point, to define a line between them.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

3. Specify the position of the new line. Do one of the following:
  - Locate it in the survey view.
  - Define the position by specifying the offset and distance in the appropriate editboxes at the bottom toolbar. See picture below for details.

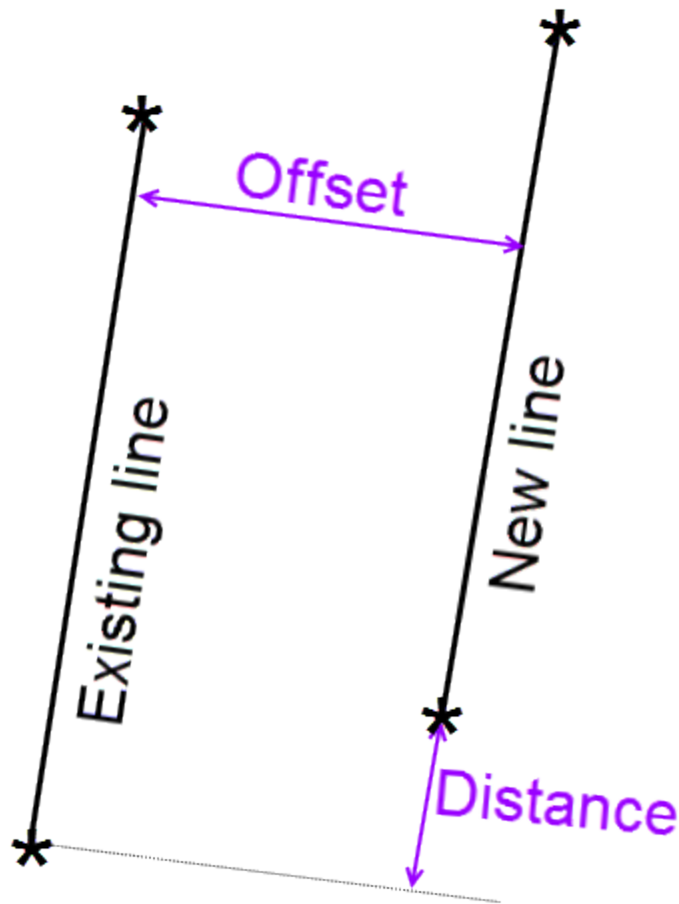
The input panel is displayed at the bottom toolbar with the defined East and North coordinates for the start point of the new line.

4. Review the parameters of the start point, if needed change them. For more information about point parameters refer to "Add Point icon" section on page 136.
5. To confirm the start point do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The line is created.

### Fields of the bottom toolbar, when creating a parallel line

| Field                 | Description   |
|-----------------------|---|
| <i>Number</i>         | Defines the number of the new line start point.   |
| <i>Offset</i>         | Defines the offset from the reference line. See picture below for details.  |
| <i>Dist</i>           | Defines the offset along the reference line position. See picture below for details.  |
| <i>Length</i>         | Displays the length of the new line, which is the same as the reference line length.  |
| <i>Count</i>          | Defines quantity of the new parallels line. If the quantity is more than one, lines will be located with the same offset from each other. |
| <i>Elev</i>           | Defines the elevation of the new line start point.  |
| <i>Code</i>           | Defines the code of the new line start point.   |
| <i>Use in Surface</i> | Defines whether the start point of the new line may be used for DTM creation or not.  |



### Creating a parallel line

## Perpendicular icon

The **Perpendicular** icon of the Line group allows you to add a new line to the survey view as a perpendicular to an existing line, an arc, a string or an alignment.

To create a parallel line:

1. In the *Line* group of the *Insert* tab, click the **Perpendicular** icon.
2. In the survey view, select a line, an arc, a string, an alignment or a point.

#### NOTE

If you have selected a point, you need to select the second point, to define a line between them.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

3. Specify the position of the new line. Do one of the following:
  - Locate it in the survey view.
  - Define the position by specifying the offset and distance in the appropriate editboxes at the bottom toolbar. See picture below for details.

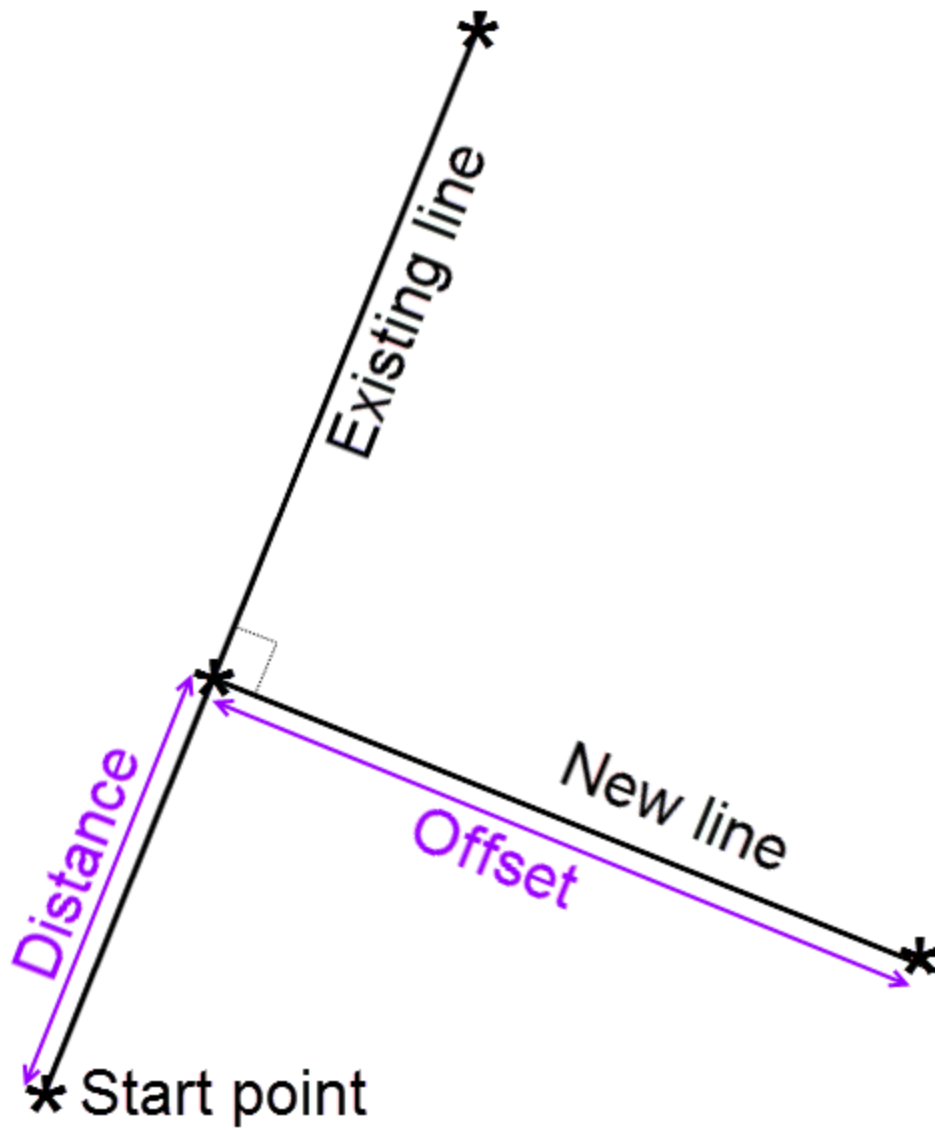
The input panel is displayed at the bottom toolbar with the defined East and North coordinates for the end point of the new line.

4. Review the parameters of the end point, if needed change them. For more information about point parameters refer to "Add Point icon" section on page 136.
5. To confirm the end point do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The line is created. The end point of the new line is located at the existing entity.

**Fields of the bottom toolbar, when creating a perpendicular line**

| <b>Field</b>                 | <b>Description</b>  |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the new line point.   |
| <i>Offset</i>                | Defines the offset from the reference entity. See picture below for details.                      |
| <i>Dist</i>                  | Defines the offset distance from the reference entity start point. See picture below for details. |
| <i>Length</i>                | Displays the length of the reference entity.  |
| <i>Elev</i>                  | Defines the elevation of the new line point.  |
| <i>Code</i>                  | Defines the code of the new line point.   |
| <i>Use in Surface</i>        | Defines whether the point of the new line may be used for DTM creation or not.                    |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the line point will be interpolated.                             |



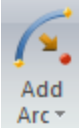

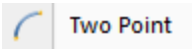
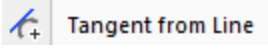

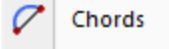
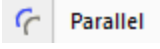

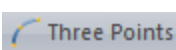
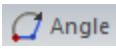
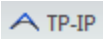
Creating a parallel line

## Arc group

An arc is the curve between two points, which is the segment of the circumference. It is defined by the position of the start and the end points, and the center point. Besides, MAGNET Office has an arc entity, which is defined by the three points, which belongs to one circumference, and does not have the center point. Such arcs are called "Three point arc".

If all points in arc have elevations, then the arc will be a 3D arc. An arc may be defined as a breakline for using in a surface model.

The *Arc* group from the *Insert* tab of the MAGNET Office ribbon allows you to add new arcs to the project. It contains four icons, and six second level icons, described in the table below.

|   |  |
|---|--|
|    | <b>Add Arc icon</b><br>Click it to add a new arc to the project. This icon also contains the list of the second level icons. Click  to see it. |
|    | <b>Two Points icon</b><br>Click it to add a new arc, defined by two points.  |
|    | <b>Tangent from Line icon</b><br>Click it to add a new arc, in such way, that an existing line, a string or an arc will be the tangent to the newly created arc.   |
|   | <b>Fillet icon</b><br>Click it to add an arc as a fillet between two existing entities.  |
|  | <b>Chords icon</b><br>Click it to replace an existing arc or circle with the set of chords.  |
|  | <b>Parallel icon</b><br>Click it to create a new arc as the parallel to an existing one.   |
|  | <b>Fit Arc icon</b><br>Click it to add a new arc as the best fit to the suggested points   |
|  | <b>Three Points icon</b><br>Click to add a new arc, defined by three points, belongs to the one circumference.   |
|  | <b>Angle icon</b><br>Click it to add a new arc by using the angle method.  |
|  | <b>TP-IP icon</b><br>Click it to add a new arc at intersection points of two existing lines/strings.   |

### Add Arc icon

The **Add Arc** icon of the Arc group allows you to add a new arc to the survey view. This icon creates an arc, defined by two points and the center point.

To create an arc:

1. In the *Arc* group of the *Insert* tab, click the **Add Arc** icon.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.



2. Locate the start point of the arc. For more information about adding points refer to "Add Point icon" section on page 136.

**NOTE**

If a point was selected, when clicking the **Add Arc** icon, it automatically become the start point of the new line.

3. Locate the end point of the arc, by using the "Sideshot" method. For more information, refer to Sideshot icon.

The input panel for defining arc center point is displayed at the bottom toolbar.

4. Locate the center point of the arc. You may also define arc radius, by using the *Radius* editbox at bottom toolbar.

The input panel is displayed at the bottom toolbar, with the defined East and North coordinates for the center point of the arc.

5. If needed, configure additional parameters. See table below for details.
6. To accept the arc center point, do one of the following:

- Press *Enter*.
- Left click in the survey view.

The arc is created.

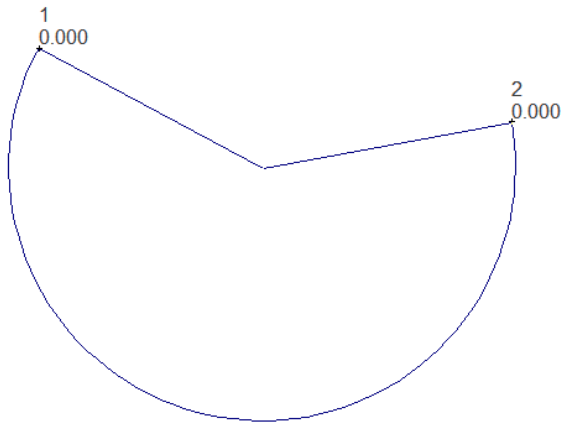
7. When finished, press *Esc*.

**Fields of the input panel, when creating arcs**

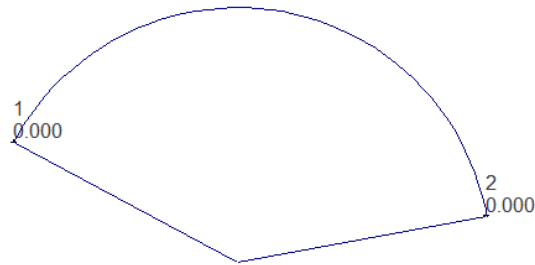
| <b>Field</b>                 | <b>Description</b>  |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the arc point.  |
| <i>East</i>                  | Defines the East (X) coordinate of the arc start point.<br><b>NOTE</b><br>This field available only when creating the start point of the arc.                                     |
| <i>North</i>                 | Defines the North (Y) coordinate of arc start point.<br><b>NOTE</b><br>This field available only when creating the start point of the arc.  |
| <i>Elev</i>                  | Defines the elevation of the arc point.   |
| <i>Code</i>                  | Defines the code of the arc point.  |
| <i>Bearing</i>               | Defines the bearing of the arc end point from the arc start point.<br><b>NOTE</b><br>This field available only in when creating the end point of the arc.                         |
| <i>Distance</i>              | Defines the distance from the arc start point to the arc end point. I.e. arc chord length.<br><b>NOTE</b><br>This field available only in when creating the end point of the arc. |
| <i>Use in Surface</i>        | Defines whether the arc point may be used for DTM creation or not.  |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the arc point will be interpolated.  |
| <i>BreakLine</i>             | Defines whether the new arc will be a breakline.  |

| Field            | Description  |
|------------------|--|
| <i>Radius</i>    | Defines the radius of the new arc.<br>NOTE<br>This field available only when creating the center point of the arc.   |
| <i>Clockwise</i> | Defines the direction from the arc start point to the arc end point.<br>NOTE<br>This field available only when creating the center point of the arc.                             |
| <i>Major</i>     | Defines which part of the circumference will be used for the arc. See picture below for details.<br>NOTE<br>This field available only when creating the center point of the arc. |

### Major



### Minor



Major and minor arcs

## Two Points icon

The **Two Points** icon of the Add Arc icon allows you to add a new arc to the survey view, defined by the start point, end point and radius, without creation of the center point.

To create a two-point arc:

1. In the *Arc* group of the *Insert* tab, click the **Two Points** icon.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

2. Locate the start point of the arc. For more information about adding points refer to "Add Point icon" section on page 136.

**NOTE**

If a point was selected, when clicking the **Add Arc** icon, it automatically become the start point of the new line.

3. Locate the end point of the arc, by using the "Sideshot" method. For more information, refer to Sideshot icon.

The input panel for defining arc radius is displayed at the bottom toolbar. Fields are described in the table below.

4. Define the arc radius. Do one of the following:
  - In the *Radius* editbox at bottom toolbar, type the required radius and press *Enter*.
  - Click the required place in the survey view.

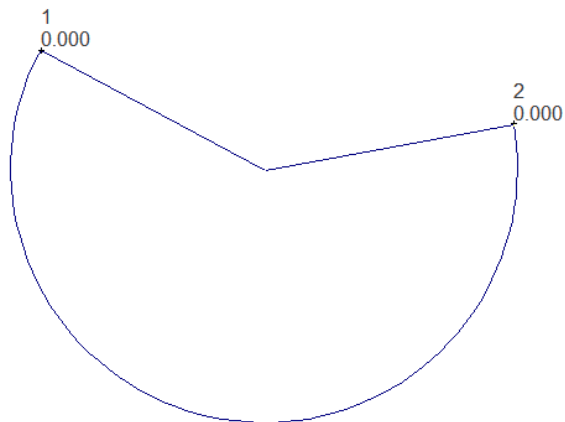
The arc is created.

5. If needed, create more arcs. The end point of each previous arc will be automatically used as the start point of the next arc.
6. When finished, press *Esc*.

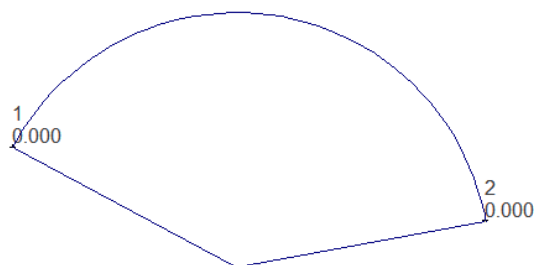
#### Fields of the input panel, when creating arcs

| Field                        | Description  |
|------------------------------|--|
| <i>Number</i>                | Defines the number of the arc point.   |
| <i>East</i>                  | Defines the East (X) coordinate of the arc start point.<br>NOTE<br>This field available only when creating the start point of the arc.                                     |
| <i>North</i>                 | Defines the North (Y) coordinate of arc start point.<br>NOTE<br>This field available only when creating the start point of the arc.  |
| <i>Elev</i>                  | Defines the elevation of the arc point.  |
| <i>Code</i>                  | Defines the code of the arc point.   |
| <i>Bearing</i>               | Defines the bearing of the arc end point from the arc start point.<br>NOTE<br>This field available only in when creating the end point of the arc.                         |
| <i>Distance</i>              | Defines the distance from the arc start point to the arc end point. I.e. arc chord length.<br>NOTE<br>This field available only in when creating the end point of the arc. |
| <i>Use in Surface</i>        | Defines whether the arc point may be used for DTM creation or not.   |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the arc point will be interpolated.   |
| <i>BreakLine</i>             | Defines whether the new arc will be a breakline.   |
| <i>Radius</i>                | Defines the radius of the new arc.<br>NOTE<br>This field available only when defining the radius of the arc.   |
| <i>Clockwise</i>             | Defines the direction from the arc start point to the arc end point.<br>NOTE<br>This field available only when defining the radius of the arc.                             |
| <i>Major</i>                 | Defines which part of the circumference will be used for the arc. See picture below for details.<br>NOTE<br>This field available only when defining the radius of the arc. |

## Major



## Minor



**Major and minor arcs**

## Tangent from Line icon

The **Tangent from Line** icon of the Arc group allows you to add a new arc to the survey view, in such way, that an existing line, a string or an arc will be the tangent to the newly created arc.

To create a tangent arc:

1. In the *Arc* group of the *Insert* tab, click the **Tangent from Line** icon.
2. In the survey view, select an existing line, string or arc.

The start or end point of the existing line, the string or the arc, is automatically defined as the start point of the new arc. The *Radius* editbox is displayed at the bottom toolbar.

3. Locate the radius of the new arc. Do one of the following:
  - Click the required place in the survey view.
  - In the *Radius* editbox at the bottom toolbar, type the required radius of the new arc and press *Enter*.

The input panel is displayed at the bottom toolbar with the defined East and North coordinates for the arc center point.

4. Review the parameters of the arc center point, if needed change them. For more information about point parameters refer to "Add Point icon" section on page 136.
5. To confirm the arc center point do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The input panel for defining the arc length is displayed at the bottom toolbar. Fields are described in the table below.

6. Define the end point of the arc. Do one of the following:
  - Click the required place in the survey view.
  - In the *Angle* editbox at the bottom toolbar, type the required angle of the new arc and press *Enter*.

- In the *Chord* editbox at the bottom toolbar, type the required chord length of the new arc and press *Enter*.
- In the *Length* editbox at the bottom toolbar, type the required length of the arc and press *Enter*.

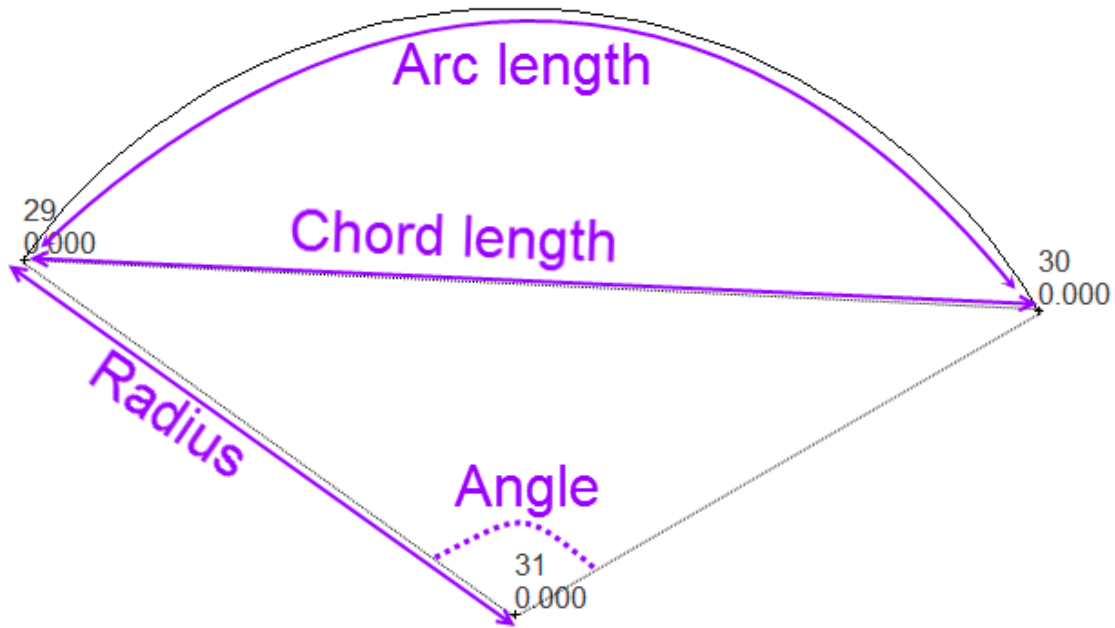
The input panel is displayed at the bottom toolbar with the defined East and North coordinates for the arc end point.

7. Review the parameters of the arc end point, if needed change them. For more information about point parameters refer to "Add Point icon" section on page 136.
8. To confirm the arc end point do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The arc is created.

#### Fields of the bottom toolbar, when creating tangent arc

| Field            | Description  |
|------------------|--|
| <i>Radius</i>    | Defines the radius of the new arc.<br>NOTE<br>This field available only when creating arc center point.  |
| <i>Angle</i>     | Defines the angle of the new arc. See picture below for details.<br>NOTES<br>This field available only when creating arc end point.<br>When specifying this parameter, the values of the "Chord" and "Length" parameters are calculating automatically.        |
| <i>Chord</i>     | Defines the chord length of the new arc. See picture below for details.<br>NOTES<br>This field available only when creating arc end point.<br>When specifying this parameter, the values of the "Angle" and "Length" parameters are calculating automatically. |
| <i>Length</i>    | Defines the length of the new arc. See picture below for details.<br>NOTES<br>This field available only when creating arc end point.<br>When specifying this parameter, the values of the "Angle" and "Chord" parameters are calculating automatically.        |
| <i>Clockwise</i> | Defines the direction of the arc from the start to the end point.<br>NOTE<br>This field available only when creating arc end point.  |



**Parameters of the arc**

**Fillet icon**

The **Fillet** icon of the Arc group allows you to add a new arc to the survey view as a fillet between two existing lines, strings, arcs or circles.

To create a fillet arc:

1. In the *Arc* group of the *Insert* tab, click the **Fillet** icon.
2. In survey view, select the first line, arc, string or circle. The start point of the new arc will be located on it.
3. In survey view, select the second line, arc, string or circle. The end point of the new arc will be located on it.

The input panel is displayed at the bottom toolbar.

4. Tick the *Truncate* checkbox, to trim the original entities to the new tangent points. If unticked, all existing entities will remain unchanged.
5. Define the radius of the new arc. Do one of the following:
  - Click the required place in the survey view.
  - In the *Radius* editbox at the bottom toolbar, type the required radius of the new arc and press *Enter*.

The new arc is created.

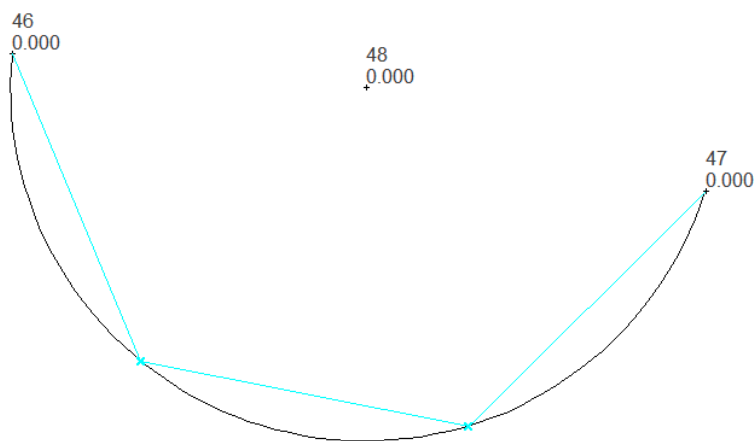
**Fields of the bottom panel, when creating the fillet arc**

| Field         | Description                        |
|---------------|------------------------------------|
| <i>Radius</i> | Defines the radius of the new arc. |

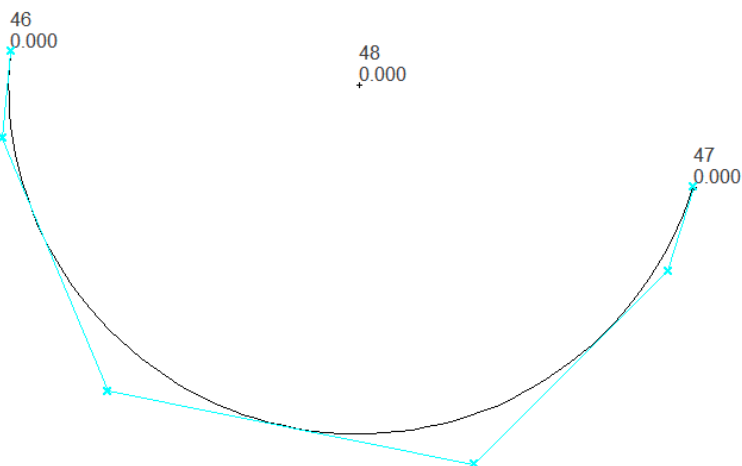
| Field           | Description   |
|-----------------|---|
| <i>Truncate</i> | Defines whether the existing entities will be trimmed to the new tangent points or will remain unchanged. |

## Chords icon

The **Chords** icon of the Arc group allows you to replace an existing arc or a circle with the set of chords inside or outside of the arc or the circle. Chords inside the arc or the circle will have the same length. Chords outside of the arc will contain the defines quantity of tangents with the same length, plus two half-length chords. See picture below for details. Each chord will be an independent line.



### Chords inside the arc



### Chords outside of the arc

To divide an arc to chords:

1. In the *Arc* group of the *Insert* tab, click the **Chords** icon.
2. In the survey view, select the required arc or circle.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

3. Define the quantity of chords and their position.
4. Do one of the following:
  - Left click in the survey view.
  - Press *Enter*.

The arc or the circle is replaced with its chords.

**Fields of the bottom toolbar, when configuring replacement of an arc or a circle with chords**

| Field                           | Description   |
|---------------------------------|---|
| <i>Number</i>                   | Defines the quantity of chords to be created.                   |
| <i>Inside arc</i>               | Select to place the cords inside the arc or the circles.        |
| <i>Outside</i>                  | Select to place the cords outside of the arc or the circles.    |
| <i>Parallel to inside chord</i> | Tick to make outside chord to be parallel to the inside chords. |

## Parallel icon

The **Parallel** icon of the Arc group allows you to create a new arc as the parallel to an existing one.

To create a parallel arc:

1. In the *Arc* group of the *Insert* tab, click the **Parallel** icon.
2. In the survey view, select the required arc.

The input panel is displayed at the bottom toolbar. Field description may be found in the table below.

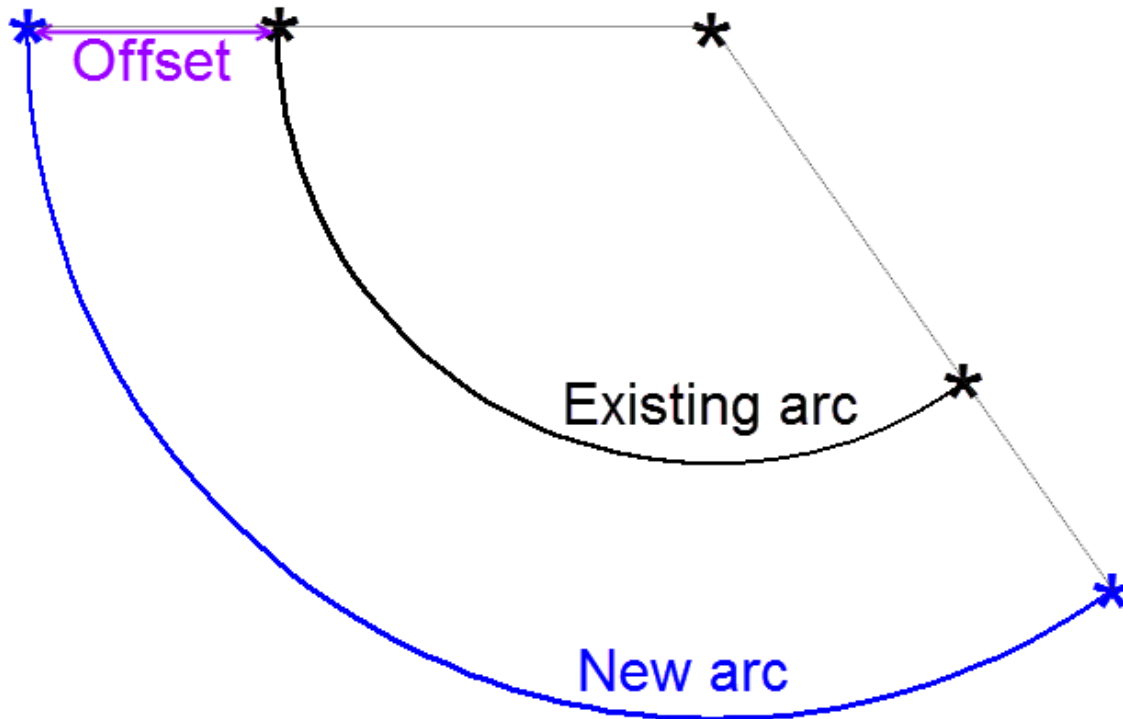
3. Define the position of the new parallel arc. Do one of the following:
  - Click the required place in the survey view.
  - In the *Offset* editbox, at the bottom toolbar, type the required offset from the reference arc and press *Enter*. See picture below for details.

The arc is created.

**Field of the bottom toolbar, when creating parallel arc**

| Field         | Description   |
|---------------|---|
| <i>Offset</i> | Defines the offset from the reference arc. See picture below for details. |





### The parallel arc

## Fit Arc icon

The **Fit Arc** icon of the Arc group allows you to add a new arc to the survey view as the best fit through the suggested points.

To add a fitted line:

1. In the *Arc* group of the *Insert* tab, click the **Fit Arc** icon.
2. Suggest the points for the arc. Do one of the following:
  - Select the required points in the survey view.
  - Type the number of the required point in the *Point Number* editbox at the bottom toolbar and press *Enter*.
3. When finished suggesting points, press *Ecs*.  
The **Fit an Arc** dialog is displayed.
4. In the *Maximum Offset* editbox, specify the required tolerance.
5. Tick the *Tangent* checkbox, to define the new as the tangent to two existing lines.
6. Tick the *Delete points* checkbox, to delete the arc center point after arc creation or not.
7. Click **OK**.

The new arc is created, and a report, containing information about points used, points excluded and points created, is displayed.

## Three Points icon

The **Three Points** icon of the Arc group allows you to add a new arc to the survey view, defined by three points from one circumference.

To create an arc, defined by three points:

1. In the *Arc* group of the *Insert* tab, click the **Three Points** icon.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

2. Locate the start point of the arc. For more information about adding points refer to "Add Point icon" section on page 136.

**NOTE**

If a point was selected, when clicking the **Three Points** icon, it automatically become the start point of the new line.

3. Locate the second point of the arc, by using the "Sideshot" method. For more information, refer to "Sideshot icon" section on page 143.
4. Locate the third point of the arc, by using the "Sideshot" method.

The arc is created.

5. When finished, press *Esc*.

### Fields of the input panel, when creating arcs

| Field                        | Description  |
|------------------------------|--|
| <i>Number</i>                | Defines the number of the arc point.   |
| <i>East</i>                  | Defines the East (X) coordinate of the arc start point.<br><b>NOTE</b><br>This field available only when creating the start point of the arc.                                    |
| <i>North</i>                 | Defines the North (Y) coordinate of arc start point.<br><b>NOTE</b><br>This field available only when creating the start point of the arc.                                       |
| <i>Elev</i>                  | Defines the elevation of the arc point.  |
| <i>Code</i>                  | Defines the code of the arc point.   |
| <i>Bearing</i>               | Defines the bearing of the arc second/end point from the arc start point.<br><b>NOTE</b><br>This field available only in when creating the second and the end point of the arc.  |
| <i>Distance</i>              | Defines the distance from the arc start point to the arc second/end point.<br><b>NOTE</b><br>This field available only in when creating the second and the end point of the arc. |
| <i>Use in Surface</i>        | Defines whether the arc point may be used in surface or not.   |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the arc point will be interpolated.   |
| <i>BreakLine</i>             | Defines whether the new arc will be a breakline.   |

## Angle icon

The **Angle** icon of the Arc group allows you to add a new arc to the survey view, defined by its angle.

To create an arc, defined by angle:

1. In the *Arc* group of the *Insert* tab, click the **Angle** icon.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

2. Locate the start point of the new arc. For more information about adding points refer to "Add Point icon" section on page 136.

**NOTE**

If a point was selected, when clicking the **Add Arc** icon, it automatically become the start point of the new line.

3. Locate the end point of the arc, by using the "Sideshot" method. For more information, refer to Sideshot icon.

The input pane is displayed at the bottom toolbar. Fields are described in the table below.

4. Locate the end point of the arc. Do one of the following:
  - Click the required place in the survey view.
  - In the *Angle* editbox at the bottom toolbar, type the required angle of the new arc and press *Enter*.
  - In the *Chord* editbox at the bottom toolbar, type the required chord length of the new arc and press *Enter*.
  - In the *Length* editbox at the bottom toolbar, type the required length of the arc and press *Enter*.

The input panel is displayed at the bottom toolbar with the defined East and North coordinates for the arc end point.

5. Review the parameters of the arc end point, if needed change them. For more information about point parameters refer to "Add Point icon" section on page 136.
6. To confirm the arc end point do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The arc is created.

### Fields of the bottom toolbar, when creating an arc, defined by its angle

| Field         | Description   |
|---------------|---|
| <i>Number</i> | Defines the number of the arc point.  |
| <i>East</i>   | Defines the East (X) coordinate of the arc start point.<br>NOTE<br>This field available only when creating the start point of the arc |
| <i>North</i>  | Defines the North (Y) coordinate of arc start point.<br>NOTE<br>This field available only when creating the start point of the arc.   |
| <i>Elev</i>   | Defines the elevation of the arc point.   |
| <i>Code</i>   | Defines the code of the arc point.  |

| Field                        | Description  |
|------------------------------|--|
| <i>Bearing</i>               | Defines the bearing of the arc center point from the arc start point.<br>NOTE<br>This field available only in when creating the center point of the arc.   |
| <i>Distance</i>              | Defines the distance from the arc start point to the arc center point. I.e. the arc radius.<br>NOTE<br>This field available only in when creating the end point of the arc.  |
| <i>Use in Surface</i>        | Defines whether the arc point may be used in surface or not.   |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the arc point will be interpolated.   |
| <i>BreakLine</i>             | Defines whether the new arc will be a breakline.   |
| <i>Angle</i>                 | Defines the angle of the new arc. See picture below for details.<br>NOTES<br>This field available only when creating arc end point.<br>When specifying this parameter, the values of the "Chord" and "Length" parameters are calculating automatically.        |
| <i>Chord</i>                 | Defines the chord length of the new arc. See picture below for details.<br>NOTES<br>This field available only when creating arc end point.<br>When specifying this parameter, the values of the "Angle" and "Length" parameters are calculating automatically. |
| <i>Length</i>                | Defines the length of the new arc. See picture below for details.<br>NOTES<br>This field available only when creating arc end point.<br>When specifying this parameter, the values of the "Angle" and "Chord" parameters are calculating automatically.        |
| <i>Clockwise</i>             | Defines the direction of the arc from the start to the end point.<br>NOTE<br>This field available only when creating arc end point.  |

## TP-IP icon

The **TP-IP** icon of the Arc group allows you to add a new arc to the survey view, tangential to two existing lines or strings.

To create a new arc, tangential to two existing lines or strings:

1. In the *Arc* group of the *Insert* tab, click the **TP-IP** icon.
2. In the survey view, select two reference lines or strings.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

3. By using the *Truncate Lines* checkbox, define whether the reference lines will be truncated or not. See picture below for details.

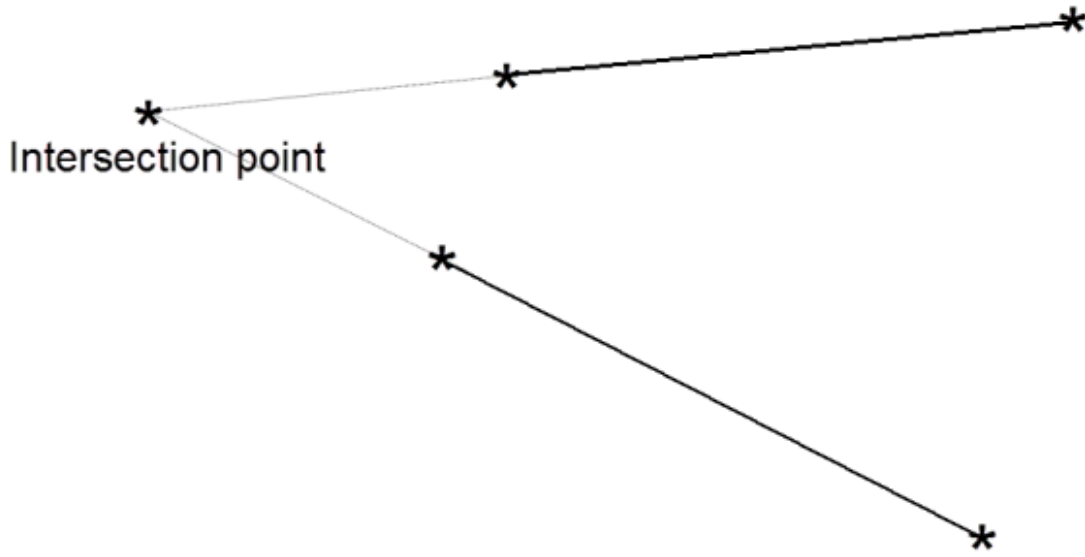
4. Locate the arc. Do one of the following:
  - Click the required place in the survey view.
  - In the *Radius* editbox at the bottom toolbar, type the required radius of the arc and press *Enter*. See picture below for details.
  - In the *Tangent Distance* editbox at the bottom toolbar, type the required distance between existing lines or strings intersection point and tangency points with the arc and press *Enter*. See picture below for details.

The arc is created.

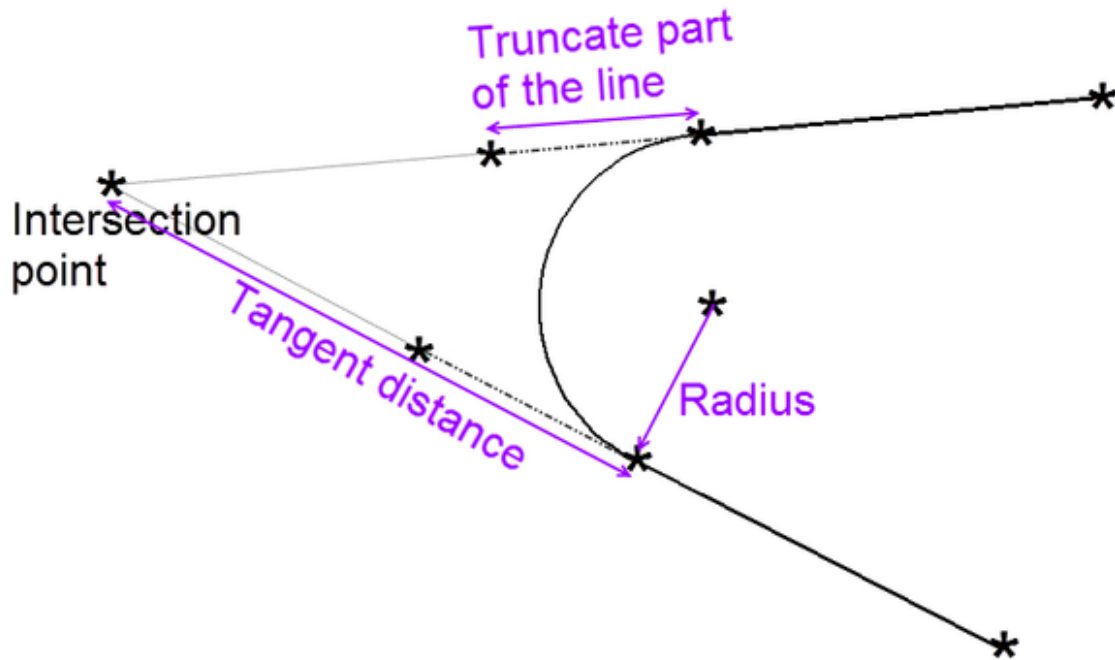
**Fields of the bottom toolbar, when creating arc, tangential to two existing lines**

| <b>Field</b>            | <b>Description</b>  |
|-------------------------|---|
| <i>Radius</i>           | Defines the radius of the new arc. See picture below for details.   |
| <i>Tangent Distance</i> | Defines the distance between intersection point of existing lines or strings and the tangency point. See picture below for details. |
| <i>Truncate Lines</i>   | Tick to cut/continue existing lines or strings to the tangency point. If unticked, existing lines or strings will remain unchanged. |

## Before



## After



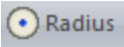
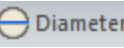
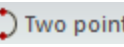
Creating a new arc, tangent to two existing lines



## Circle group

A circle may be described as an arc, which has the full circumference, without start and end points on it.

The *Circle* group from the *Insert* tab of the MAGNET Office ribbon allows you to add a new circle to the project. It contains three icons, described in the table below.

|   |   |
|---|---|
|  | <p>Radius icon</p> <p>Click it to add a new circle by specifying its center and radius.</p>               |
|  | <p>Diameter icon</p> <p>Click it to add a new circle by specifying its center and diameter.</p>           |
|  | <p>Two Points icon</p> <p>Click it to add a new circle by specifying two points on its circumference.</p> |

### Radius icon

The **Radius** icon of the Circle group allows you to add a new circle to the survey view by specifying its center point and radius.

To create a new circle:

- In the *Circle* group of the *Insert* tab, click the **Radius** icon.
 

The input panel for point creation is displayed at the bottom toolbar. For more information refer to "Add Point icon" section on page 136.
- Locate the center point of the circle, by using the "Coordinate" method.
 

The input panel is displayed at the bottom toolbar.
- Define the radius of the circle. Do one of the following:
  - Click the required place in the survey view.
  - In the *Radius* editbox at the bottom toolbar, type the required radius of the circle and press *Enter*.

The circle is created.

- When finished, press *Esc*.

#### Fields of the input panel, when creating circles

| Field                        | Description  |
|------------------------------|--|
| <i>Number</i>                | Defines the number of the next new point.                                      |
| <i>East</i>                  | Defines the East (X) coordinate of the circle center point.                    |
| <i>North</i>                 | Defines the North (Y) coordinate of the circle first point.                    |
| <i>Elev</i>                  | Defines the elevation of the next new point.                                   |
| <i>Code</i>                  | Defines the code of the circle center point.                                   |
| <i>Use in Surface</i>        | Defines whether the circle center point may be used in surface or not.         |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the circle center point will be interpolated. |
| <i>BreakLine</i>             | Defines whether the new circle will be a breakline.                            |
| <i>Radius</i>                | Defines the radius of the new circle.  |



## Diameter icon

The **Diameter** icon of the Circle group allows you to add a new circle to the survey view by specifying its center point and diameter.

To create a new circle:

1. In the *Circle* group of the *Insert* tab, click the **Diameter** icon.

The input panel for point creation is displayed at the bottom toolbar. Fields are described in the table below.

2. Locate the center point of the circle, by using the "Coordinate" method. For more information refer to "Add Point icon" section on page 136.

The input panel is displayed at the bottom toolbar.

3. Define the diameter of the circle. Do one of the following:

- Click the required place in the survey view.
- In the *Diameter* editbox at the bottom toolbar, type the required diameter of the circle and press *Enter*.

The circle is created.

4. When finished, press *Esc*.

### Fields of the input panel, when creating circles

| Field                        | Description  |
|------------------------------|--|
| <i>Number</i>                | Defines the number of the next new point.                                      |
| <i>East</i>                  | Defines the East (X) coordinate of the circle center point.                    |
| <i>North</i>                 | Defines the North (Y) coordinate of the circle first point.                    |
| <i>Elev</i>                  | Defines the elevation of the next new point.                                   |
| <i>Code</i>                  | Defines the code of the circle center point.                                   |
| <i>Use in Surface</i>        | Defines whether the circle center point may be used in surface or not.         |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the circle center point will be interpolated. |
| <i>BreakLine</i>             | Defines whether the new circle will be a breakline.                            |
| <i>Diameter</i>              | Defines the diameter of the new circle.  |

## Two Points icon

The **Two Points** icon of the Circle group allows you to add a new circle to the survey view, defined by two points, belong to its circumference, at the same diameter.

To create a circle, defined by two points:

1. In the *Circle* group of the *Insert* tab, click the **Two Points** icon.

The input panel for point creation is displayed at the bottom toolbar. Fields are described in the table below.

2. Locate the first point of the circle, by using the "Coordinate" method. For more information refer to "Add Point icon" section on page 136.

The input panel for point creation in "Sideshot" method is displayed at the bottom toolbar.

3. Locate the second point of the circle, by using the "Sideshot" method. For more information refer to "Sideshot icon" section on page 143.

The circle is created.

4. When finished, press *Esc*.
















#### Fields of the input panel, when creating circles

| Field                        | Description   |
|------------------------------|---|
| <i>Number</i>                | Defines the number of the next new point.   |
| <i>East</i>                  | Defines the East (X) coordinate of the circle first point.<br>NOTE<br>This field available only when creating the first point.        |
| <i>North</i>                 | Defines the North (Y) coordinate of the circle first point.<br>NOTE<br>This field available only when creating the first point.       |
| <i>Elev</i>                  | Defines the elevation of the next new point.  |
| <i>Bearing</i>               | Defines the bearing from the first circle point to the second.<br>NOTE<br>This field available only when creating the second point.   |
| <i>Distance</i>              | Defines the distance between the first and second circle points.<br>NOTE<br>This field available only when creating the second point. |
| <i>Code</i>                  | Defines the code of the circle center point.  |
| <i>Use in Surface</i>        | Defines whether the circle center point may be used in surface or not.  |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the circle center point will be interpolated.  |
| <i>BreakLine</i>             | Defines whether the new circle will be a breakline.   |

## Text group

The *Text* group from the *Insert* tab of the MAGNET Office ribbon allows you to add textual entities to the project. Note that the text entities are just "labels", which is used for annotation, and other informational properties. They are not used in data processing.

The group contains three icons, and twelve second level icons, described in the table below.

|  |  |
|--|--|
|                         | Text icon<br>Click it to add a simple text to the project.   |
|                         | Text Box icon<br>Click it to add a new text box to the project.  |
|                         | Text icon<br>This icon contains the list of the second level icons. Click  to see it. |
|  Keyword                | Keyword icon<br>Click it to add a keyword to the survey view.  |
|  Bearing/Distance       | Bearing/Distance icon<br>Click it to add text information about bearing and length of an existing line.  |
|  Slope/Grade            | Slope/Grade icon<br>Click it to add text information about slope of the existing line.   |
|  Point Coordinate       | Point Coordinate icon<br>Click it to add text information about coordinates of an existing point.  |
|  Point Elevation      | Point Elevation icon<br>Click it to add text information about height of an existing point.  |
|  Point Notes          | Point Notes icon<br>Click it to add point note as text information.  |
|  Point Offset         | Point Offset icon<br>Click it to add text information about distance form an existing point to another entity.   |
|  Arc Length           | Arc Length icon<br>Click it to add text information about length of an existing arc.   |
|  Arc Radius           | Arc Radius icon<br>Click it to add text information about radius of an existing arc.   |
|  Stacked Arc Labels   | Stacked Arc Labels icon<br>Click it to add an existing arc annotation as the text entity.  |
|  Angle                | Angle icon<br>Click it to add text information about angle between two existing lines.   |
|  Label Total Distance | Label Total Distance icon<br>Click it to add text information about total length of the string.  |

### Text icon

The **Text** icon of the Text group allows you to add text entities to the survey view.

To create a text:

1. In the *Text* group of the *Insert* tab, click the **Text** icon.

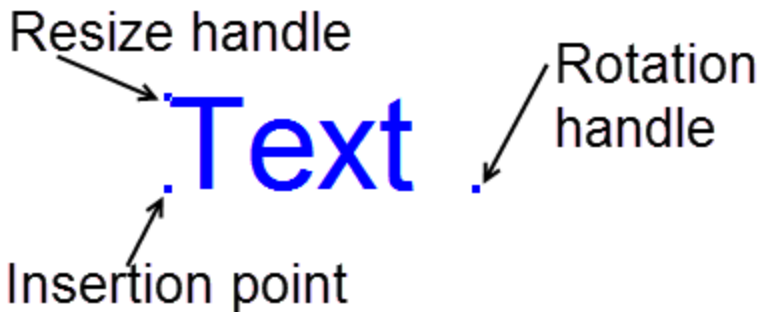
The input panel is displayed at the bottom toolbar. Fields are described in the table below.

2. Locate the insertion point of the text. Do one of the following:
  - Click the required place in the survey view.
  - Type the required East and North coordinates in the appropriate editboxes at the bottom toolbar and press *Enter*.
3. Type the required text.
4. If needed, in the *Bearing* editbox at the bottom toolbar, type the required bearing for the text.
5. If needed, define the insertion style of the text. See pictures below for details.
6. Press *Enter*.

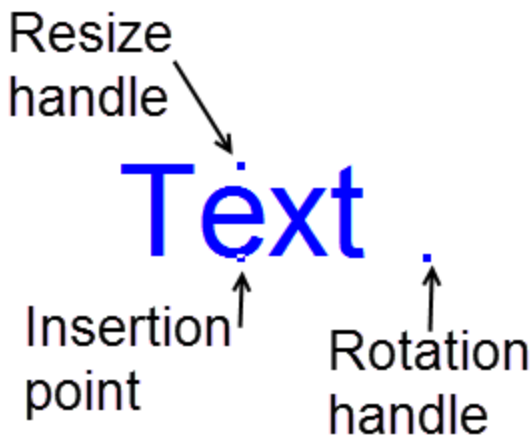
The text is created.

**Fields of the bottom toolbar, when creating text**

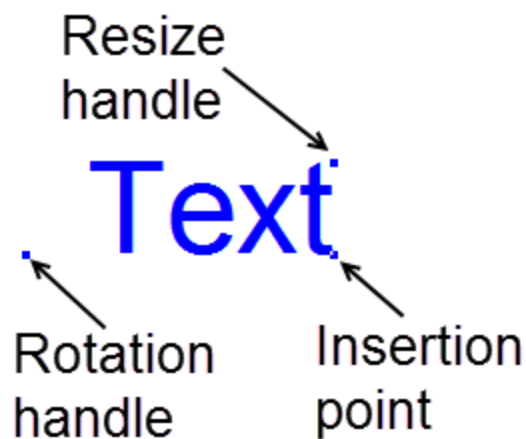
| Field            | Description   |
|------------------|---|
| <i>East</i>      | Defines the East (X) coordinate of the text insertion point.  |
| <i>North</i>     | Defines the North (Y) coordinate of the text insertion point. |
| <i>Bearing</i>   | Defines the bearing of the text.                              |
| <i>Insertion</i> | Defines the insertion style. See pictures below for details.  |



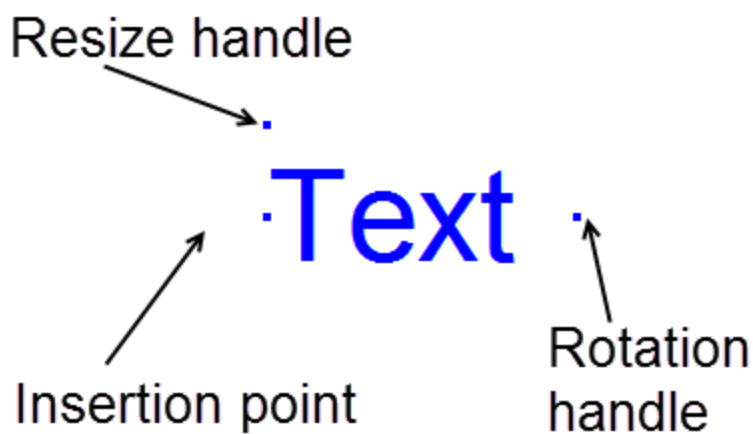
**Bottom left text insertion style**



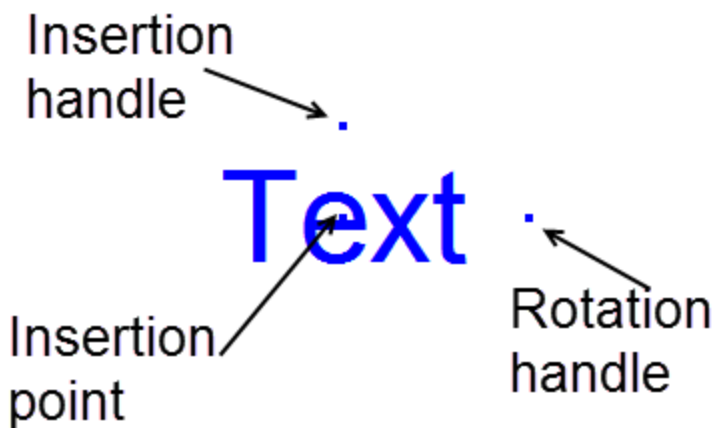
**Bottom center text insertion style**



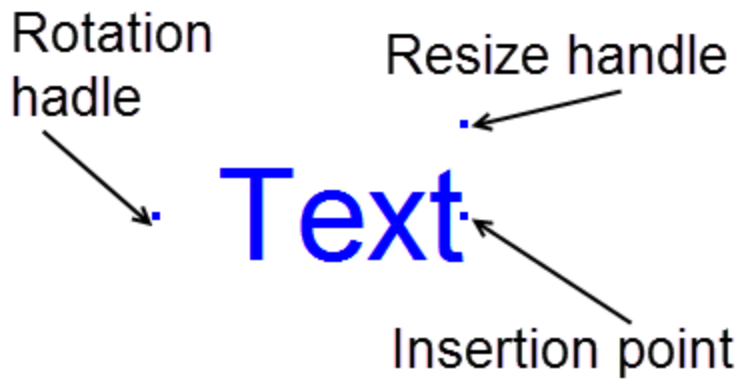
Bottom right text insertion style



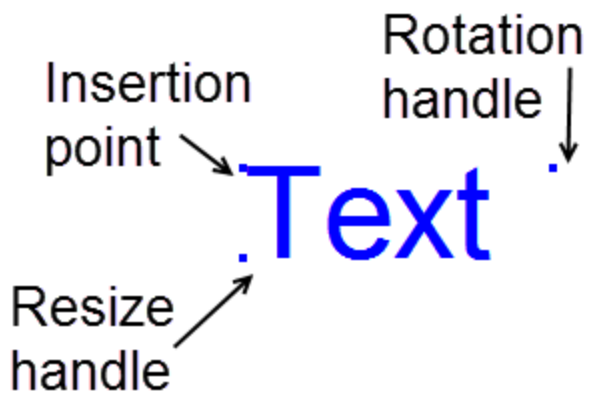
Center left text insertion style



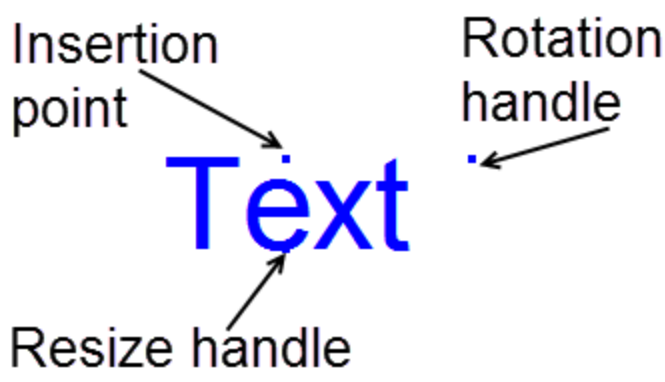
Center center text insertion style



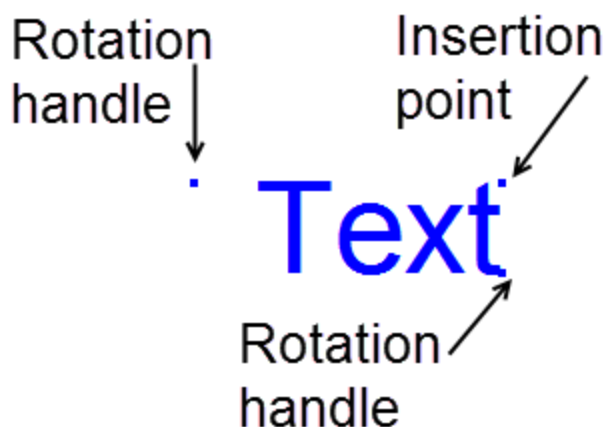
Center right text insertion style



Top left text insertion style



Top center text insertion style



### Top right text insertion style

## Text Box icon

The **Text Box** icon of the Text group allows you to add a boxed text to the survey view. All the text will stay inside the box.

To create a boxed text:

1. In the *Text* group of the *Insert* tab, click the **Text Box** icon.  
The input panel is displayed at the bottom toolbar for point creation.
2. Locate the first point of the box, by using the "Coordinate" method. For more information, refer to "Add Point icon" section on page 136.
3. Locate the second point of the box, by using the "Sideshot" method. For more information, refer to "Sideshot icon" section on page 143.

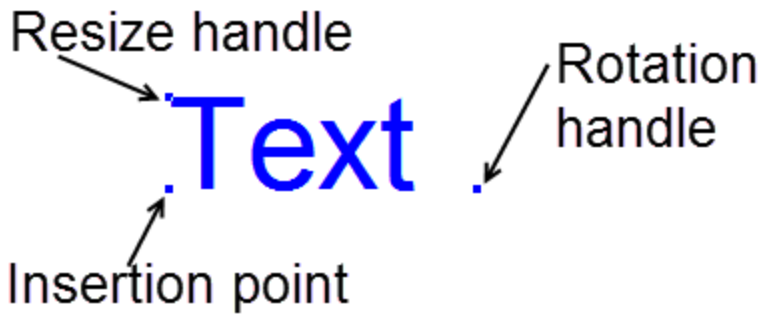
The yellow box for the text is displayed in the survey view. The input panel for text is displayed at the bottom toolbar.

4. Type the required text.
5. If needed, in the *Bearing* editbox at the bottom toolbar, type the required bearing for the text.
6. If needed, define the insertion style of the text. See pictures below for details.
7. Press *Enter*.

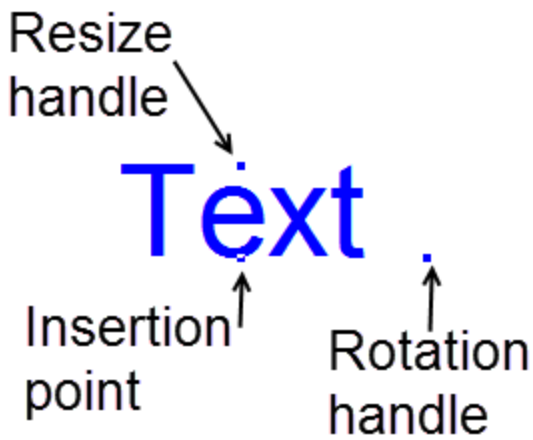
The boxed text is created.

### Fields of the bottom toolbar, when creating text

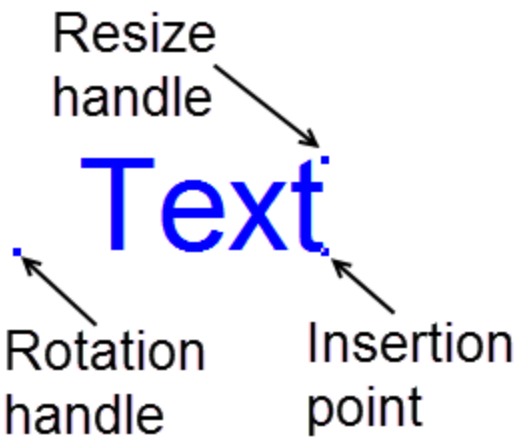
| Field            | Description   |
|------------------|---|
| <i>East</i>      | Defines the East (X) coordinate of the text insertion point.  |
| <i>North</i>     | Defines the North (Y) coordinate of the text insertion point. |
| <i>Bearing</i>   | Defines the bearing of the text.                              |
| <i>Insertion</i> | Defines the insertion style. See pictures below for details.  |



Bottom left text insertion style

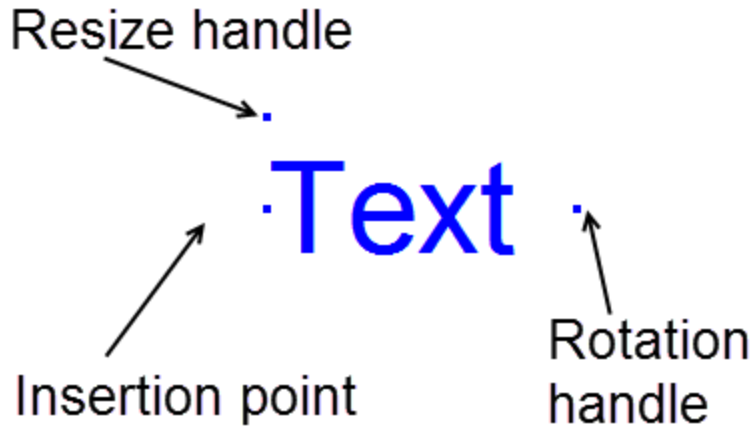


Bottom center text insertion style

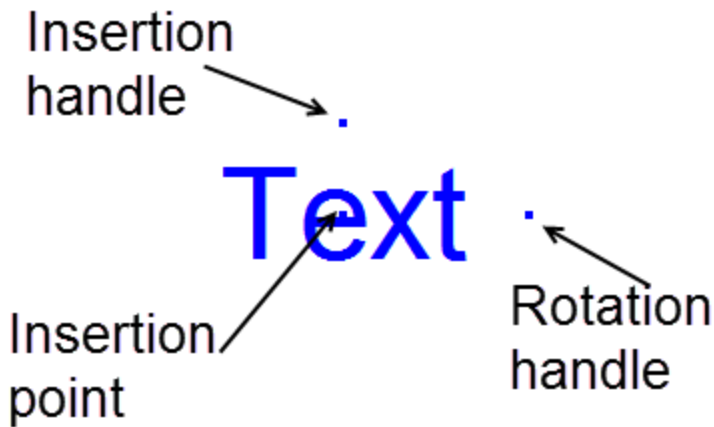


Bottom right text insertion style

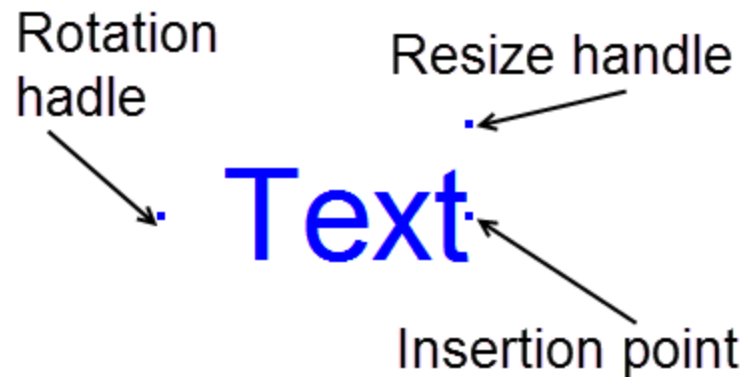




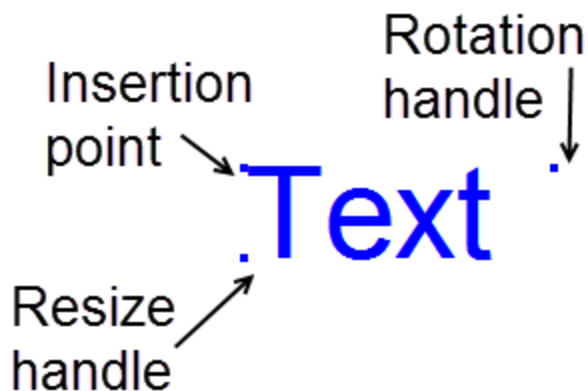
Center left text insertion style



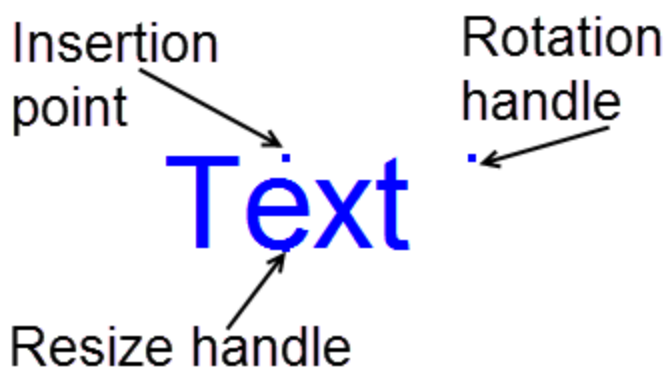
Center center text insertion style



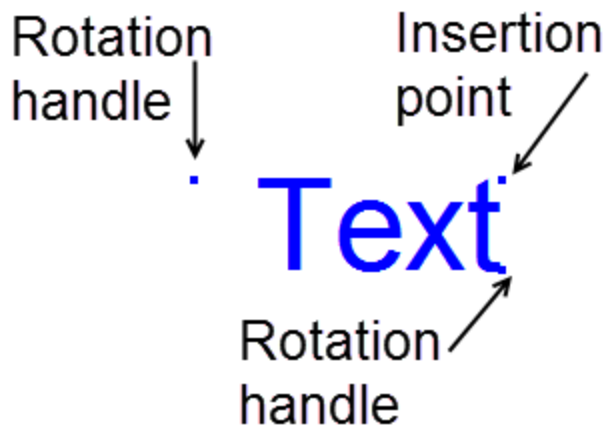
Center right text insertion style



Top left text insertion style



Top center text insertion style



Top right text insertion style

## Keyword icon

The *Keyword* icon of the Text group allows you to simplify creating of the title block. A keyword is a value, which will be automatically replaced with the required data when plotting.

To add a keyword:

1. In the *Text* group of the *Insert* tab, click the **Keyword** icon.

The **Keyword** dialog is displayed.

2. Select the required keyword and Click **OK**.

The input panel for text creation is displayed at the bottom toolbar.

3. Locate the insert point of the text. Do one of the following:

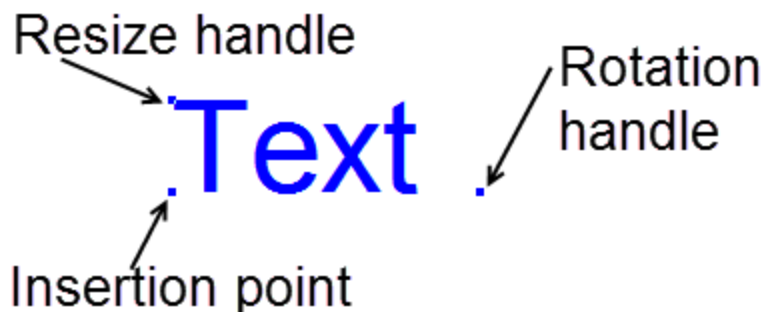
- Click the required place in the survey view.
- Type the required East and North coordinates in the appropriate editboxes at the bottom toolbar and press *Enter*.

4. If needed, in the *Bearing* editbox at the bottom toolbar, type the required bearing for the text.

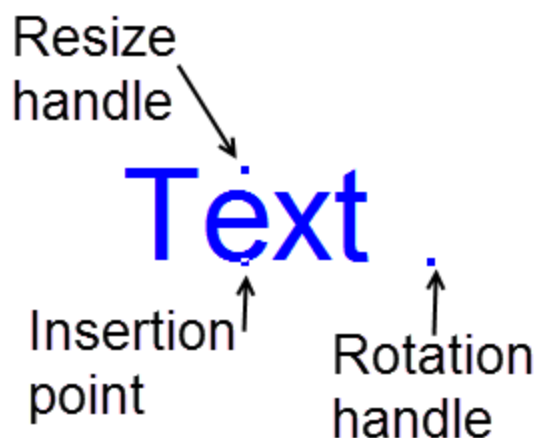
5. If needed, define the insertion style of the text. See pictures below for details.

6. Press *Enter*.

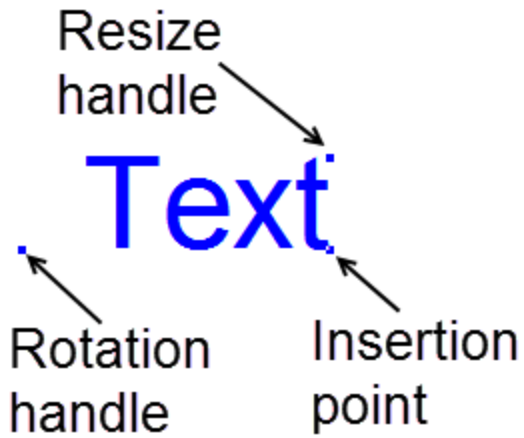
The keyword is added.



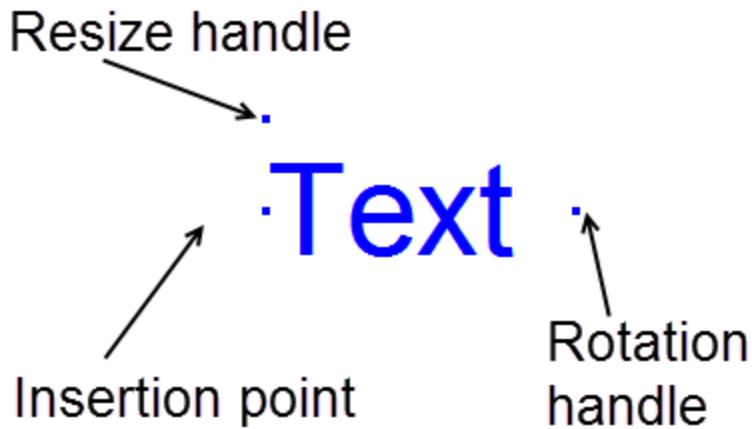
**Bottom left text insertion style**



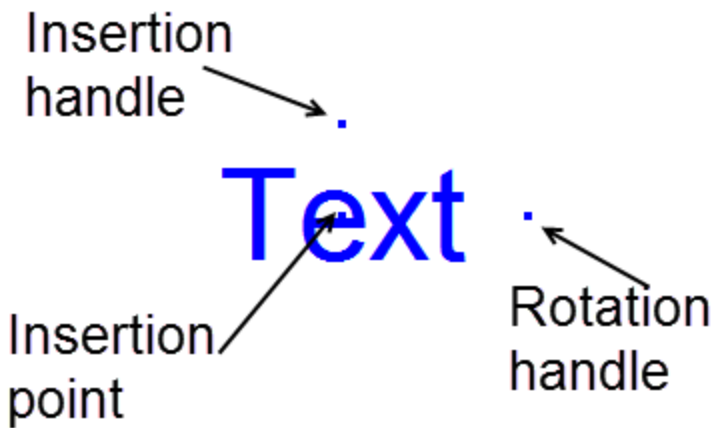
**Bottom center text insertion style**



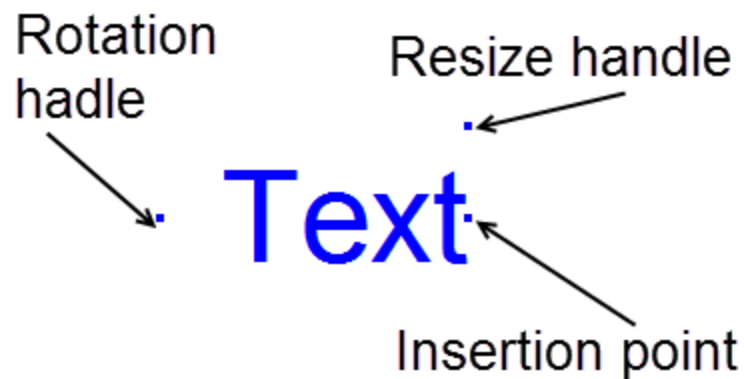
Bottom right text insertion style



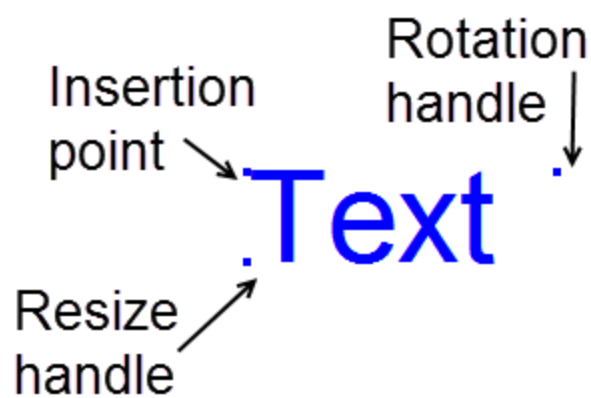
Center left text insertion style



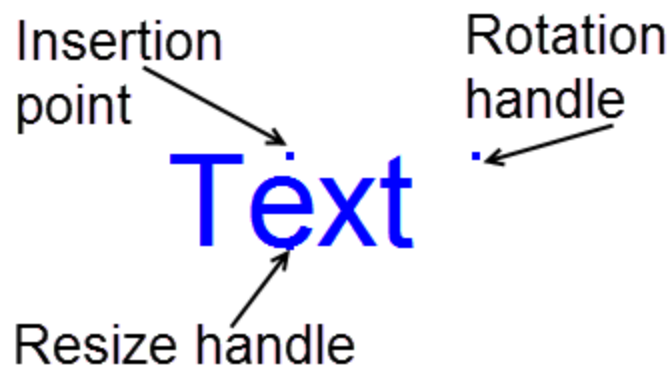
Center center text insertion style



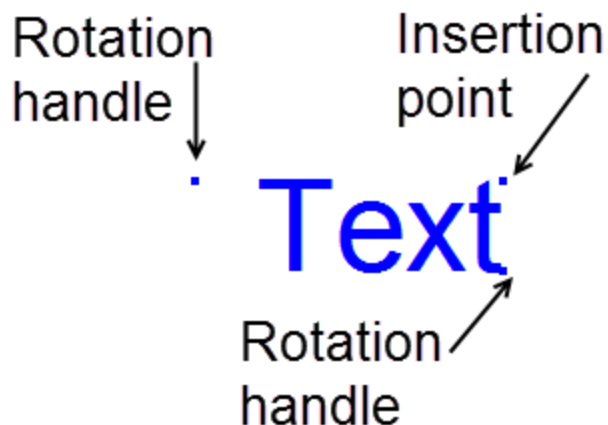
Center right text insertion style



Top left text insertion style



Top center text insertion style



### Top right text insertion style

## Bearing/Distance icon

The **Bearing/Distance** icon of the Text group allows you to add information about bearing and distance of the existing line as two text entities. Note that this is not the line annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the line will be moved or deleted, and will not change, even if the line bearing and distance will change.

To add a bearing/distance text:

1. In the *Text* group of the *Insert* tab, click the **Bearing/Distance** icon.
2. In the survey view, select the required line or a pair of points.

The bearing and distance of the line are displayed as defined by the Line annotation settings. You may edit them as a usual text.

## Slope/Grade icon

The **Slope/Grade** icon of the Text group allows you to add information about the slope of the existing line as the text entity. Note that this is not the line annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the line will be moved or deleted, and will not change, even if the line parameters will change.

To add a slope/grade text:

1. In the *Text* group of the *Insert* tab, click the **Slope/Grade** icon.
2. In the survey view, select the required line or a pair of points.

The slope of the line is displayed as defined by the Line annotation settings. You may edit them as a usual text.

3. If needed, configure the slope text. Right click, and select the **Slope Text Settings** item from the context menu.

The *Slope Text Settings* dialog is displayed. Fields are described in the table below.

4. Make the required configurations and click **OK**.

**Fields of the *Slope Text Settings* dialog**

| <b>Fields</b>              | <b>Description</b>   |
|----------------------------|--|
| <i>Text Style</i>          | Defines the text style for the slope text. Select the required style from the drop-down list. Click <b>Modify</b> to edit the current style. See "Text Styles icon" section on page 122 for details. |
| <i>Justification Style</i> | Defines the justification style for the slope text. Select the required style from the drop-down list.   |
| <i>Percentage</i>          | Select to display the line slope in percent.   |
| <i>Degree</i>              | Select it to display the line slope in degrees.  |
| <i>Ratio</i>               | Select it to display the line slope as the ratio between the length of the line and the height of the end point.   |

**Point Coordinate icon**

The **Point Coordinate** icon of the Text group allows you to add information about coordinates of the existing point as the text entity. Note that this is not the point annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the point will be moved or deleted, and will not change, even if the point position will change.

To add a point coordinates text:

1. In the *Text* group of the *Insert* tab, click the **Point Coordinate** icon.

The **Text From Point Coordinates** dialog is displayed. Fields are described in the table below.

2. Configure the parameters as you need, and Click **OK**.
3. In the survey view, select the required point.

The point coordinate text is added. The input panel is displayed at the bottom toolbar.

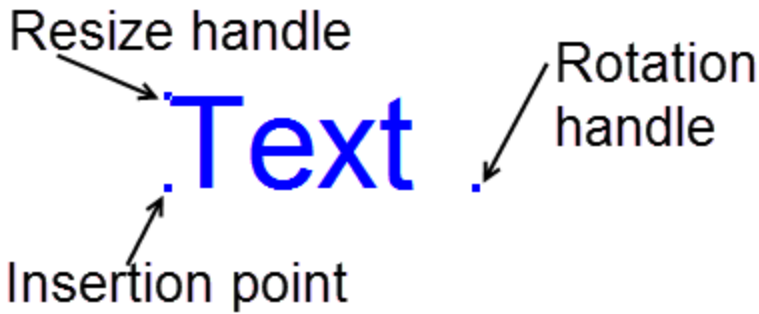
4. If needed, change the insertion point position. Do one of the following:
  - Drag the insertion point in the survey view, by using the mouse.
  - Type the required East and North coordinates in the appropriate editboxes at the bottom toolbar and press *Enter*.
5. If needed, in the *Bearing* editbox at the bottom toolbar, type the required bearing for the text.
6. If needed, define the insertion style of the text. See pictures below for details.
7. Press *Enter*.

The point coordinate text is created.

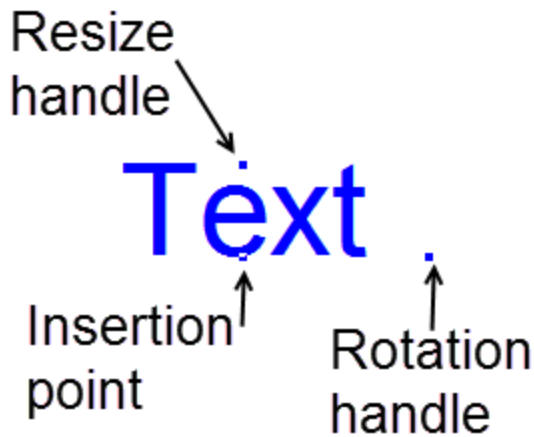
**Fields of the *Text From Point Coordinates* dialog**

| <b>Field</b>         | <b>Description</b>   |
|----------------------|--|
| <i>Layer</i>         | Defines the layer at which the point coordinate text will be located.  |
| <i>Text Style</i>    | Defines the text style for the point coordinate text. For more information about text styles, refer to "Text Styles icon" section on page 122.                     |
| <i>Justification</i> | Defines the justification style for the point coordinate text. For more information about justification styles, refer to "Justification icon" section on page 123. |
| <i>Position</i>      | Defines the insertion style for the point coordinate text. For more information, refer to "Text icon" section on page 179.   |

| Field                       | Description  |
|-----------------------------|--|
| <i>Text Before Northing</i> | Defines the text to be placed before the North coordinate.                 |
| <i>Text Before Easting</i>  | Defines the text to be placed before the East coordinate.                  |
| <i>Text After Northing</i>  | Defines the text to be placed after the North coordinate.                  |
| <i>Text After Easting</i>   | Defines the text to be placed after the East coordinate.                   |
| <i>Radiobuttons</i>         | Defines the order and relative position of the North and East coordinates. |

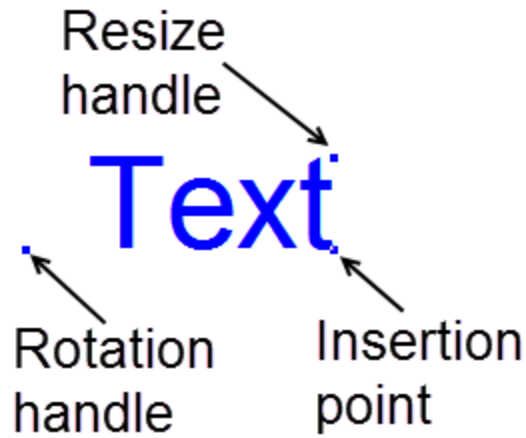


**Bottom left text insertion style**

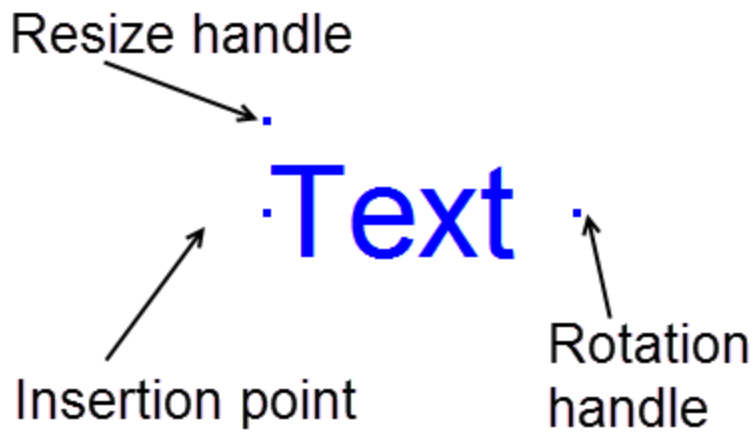


**Bottom center text insertion style**

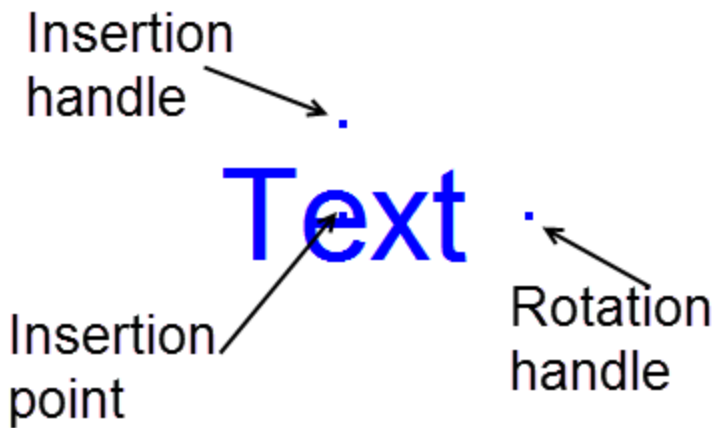




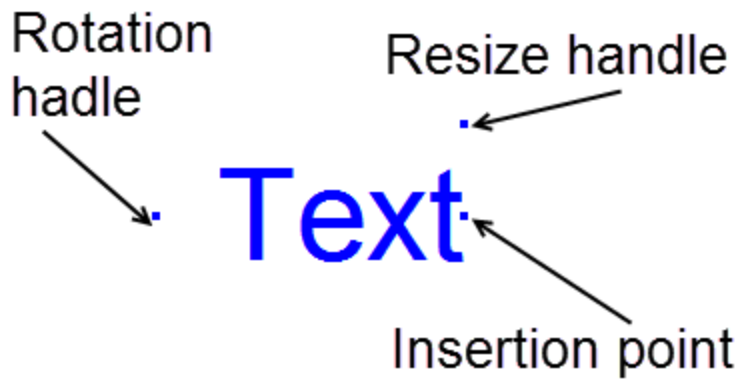
Bottom right text insertion style



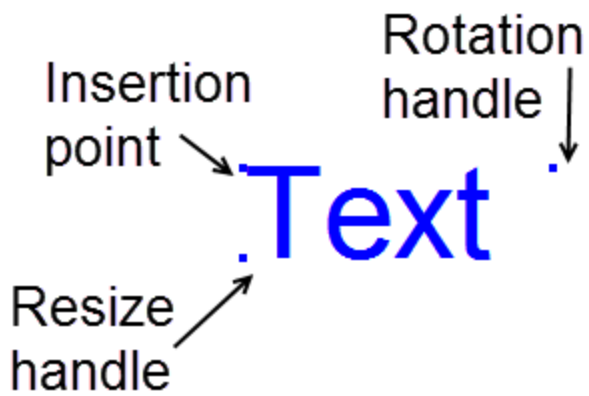
Center left text insertion style



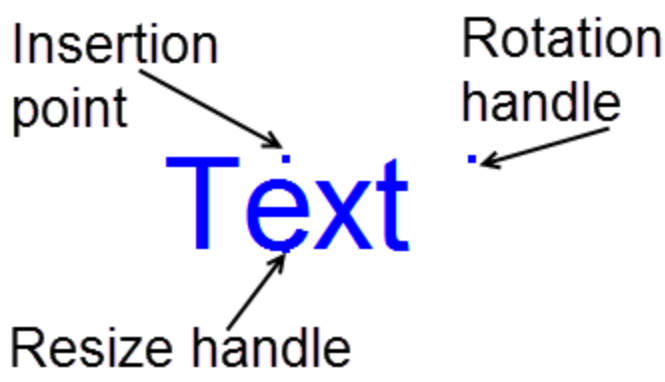
Center center text insertion style



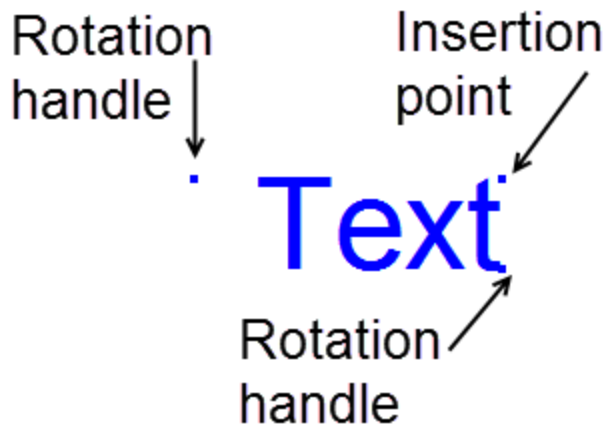
Center right text insertion style



Top left text insertion style



Top center text insertion style



### Top right text insertion style

## Point Elevation icon

The **Point Elevation** icon of the Text group allows you to add information about elevation of the existing point as the text entity. Note that this is not the point annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the point will be moved or deleted, and will not change, even if the point elevation will change.

To add a point elevation text:

1. In the *Text* group of the *Insert* tab, click the **Point Elevation** icon.
2. In the survey view, select the required points.

The point elevation text is displayed as defined by the Point annotation settings. You may edit them as a usual text.

## Point Notes icon

The **Point Notes** icon of the Text group allows you to add point notes to the Survey view. Note that this is not the point annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the point will be moved or deleted, and will not change, even if the point elevation will change.

To add a point offset text:

1. In the *Text* group of the *Insert* tab, click the **Point Notes** icon.
2. In the survey view, select the required point.

The point offset text with the dimension line is displayed as defined by the Dimension settings. You may edit them as a usual text.

## Point Offset icon

The **Point Offset** icon of the Text group allows you to add information about distance from the existing point to another entity as the dimension line text entity. Note that this is not the point annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the point will be moved or deleted, and will not change, even if the point elevation will change.

To add a point offset text:

1. In the *Text* group of the *Insert* tab, click the **Point Offset** icon.
2. In the survey view, select the required point.
3. In the survey view, select the second entity.

The point offset text with the dimension line is displayed as defined by the Dimension settings. You may edit them as a usual text.

## Arc Length icon

The **Arc Length** icon of the Text group allows you to add information about length of the existing arc as the text entity. Note that this is not the arc annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the arc will be moved or deleted, and will not change, even if the arc length will change.

To add an arc length text:

1. In the *Text* group of the *Insert* tab, click the **Arc Length** icon.
2. In the survey view, select the required arc.

The arc length text is displayed as defined by the Arc annotation settings. You may edit them as a usual text.

## Arc Radius icon

The **Arc Radius** icon of the Text group allows you to add information about radius of the existing arc as the text entity. Note that this is not the arc annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the arc will be moved or deleted, and will not change, even if the arc radius will change.

To add an arc radius text:

1. In the *Text* group of the *Insert* tab, click the **Arc Radius** icon.
2. In the survey view, select the required arc.

The arc radius text is displayed as defined by the Arc annotation settings. You may edit them as a usual text.

## Stacked Arc Labels icon

The **Stacked Arc Labels** icon of the Text group allows you to add all annotation information about the existing arc as the text entity. Note that this is not the arc annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the arc will be moved or deleted, and will not change, even if the arc parameter will change.

To add an arc labels text:

1. In the *Text* group of the *Insert* tab, click the **Stacked Arc Labels** icon.
2. In the survey view, select the required arc.

The arc labels text is displayed as defined by the Arc annotation settings. You may edit them as a usual text.

## Angle icon

The **Angle** icon of the Text group allows you to add information about angle between two existing lines as the text entity. Note that this is not the angle annotation, but automatically generated text entity. Unlike the annota-

tion, it remains on its place if the lines will be moved or deleted, and will not change, even if the angle will change.

To add angle information as text:

1. In the *Text* group of the *Insert* tab, click the **Angle** icon.

The *Internal Angle* editbox is displayed at the bottom toolbar.

2. If needed, tick the *Internal Angle* checkbox. Internal angle defines as the smallest angle between entities.
3. In the survey view, select the required entities.

The angle is displayed as defined by the Angle annotation settings. You may edit them as a usual text.

## Label Total Distance icon

The **Label Total Distance** icon of the *Text* group allows you to add information about total length of the string, alignment or polyline as the text entity. Note that this is not the annotation, but automatically generated text entity. Unlike the annotation, it remains on its place if the string will be moved or deleted, and will not change, even if the string length will change.

To add distance information as text:

1. In the *Text* group of the *Insert* tab, click the **Label Total Distance** icon.

The *Label Total Distance* dialog is displayed.

2. From the *Layer* drop-down list, select the layer where distance text will be placed.
3. From the *Text* drop-down list, select the text style for distance text.
4. From the *Justification* drop-down list, select the justification style for distance text.
5. If needed, in the *Prefix* and *Suffix* specify prefix and suffix of the distance text.
6. Click **OK**.

The distance text is displayed as defined by the Distance annotation settings. You may edit them as a usual text.

## Polyline/Polygon group

A polyline is a continuous line consists of a set of connected segments. A polyline has not points at nodes.

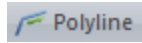
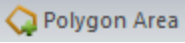
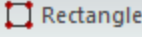
A polyline may be described as the set of connected lines, without points at their nodes, combined in one entity.

A polygon is a closed shape, defined by several points, joined by lines and/or arcs to become one entity.

You can move the polygon nodes to change its shape, by holding the *Shift* key and moving the node with a mouse.

You can also move the entire polygon in the same way, by using its centroid point. A polygon is the base entity for a lot, boundary or pad.

The *Polyline/Polygon* group from the *Insert* tab of the MAGNET Office ribbon allows you to add a polyline or polygon to the project. It contains three icons, described in the table below.

|   |   |
|---|---|
|  | <p>Polyline icon<br/>Click it to add a polyline to the survey view.</p>                 |
|  | <p>Polygon Area icon<br/>Click it to add a polygon to the survey view.</p>              |
|  | <p>Rectangle icon<br/>Click it to add a rectangle shape polygon to the survey view.</p> |

### Polyline icon

The **Polyline** icon of the Polyline/Polygon group allows you to add a new polyline to the survey view.

To create a polyline:

1. In the *Polyline/Polygon* group of the *Insert* tab, click the **Polyline** icon.

The input panel for point creation is displayed at the bottom toolbar. Description of the fields may be found in the table below.

2. Locate the start point of the polyline, by using the "Coordinate" method. For more information about adding points refer to "Add Point icon" section on page 136.

#### **NOTE**

**The point entity will not be created. This coordinates defines only the start position of the polyline.**

3. Locate the other points of the polyline, by using the "Sideshot" method. For more information refer to "Sideshot icon" section on page 143.
4. When finished, press *Esc*.

The polyline is created.

#### Fields of the input panel, when creating polylines

| Field         | Description   |
|---------------|---|
| <i>Number</i> |   |
| <i>East</i>   | <p>Defines the East (X) coordinate of the polyline start point.<br/>NOTE<br/>This field available only when creating the start point.</p> |

| Field                        | Description   |
|------------------------------|---|
| <i>North</i>                 | Defines the North (Y) coordinate of the polyline start point.<br>NOTE<br>This field available only when creating the start point.                         |
| <i>Elev</i>                  | Defines the elevation of the polyline.  |
| <i>Bearing</i>               | Defines the bearing of the further polyline node from the previous one.<br>NOTE<br>This field available only when creating the second and further points. |
| <i>Distance</i>              | Defines the distance from the previous polyline node to further one.<br>NOTE<br>This field available only when creating the second and further points.    |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the polyline start/end point will be interpolated.   |
| <i>BreakLine</i>             | Defines whether the new polyline will be a breakline.   |

## Polygon Area icon

The **Polygon Area** icon of the Polyline/Polygon group allows you to add a new polygon to the survey view.

To create a new polygon:

- In the *Polyline/Polygon* group of the *Insert* tab, click the **Polygon Area** icon.  
The input panel for point creation is displayed at the bottom toolbar. Description of the fields may be found in the table below.
- Locate the nodes of the polygon.
- To close the polygon area do one of the following:
  - Locate the last point at the same place as the first point.
  - Press *Esc*. The message window prompts to save the polygon. Click **OK**. The last created point will be connected with the first point with the shortest line possible.

The *Edit Polygon Area* dialog is displayed.

- Review the properties of the newly created polygon, if needed change them. For more information refer to "Polygon properties" section on page 558.  
NOTE  
You may convert a polygon to a lot, boundary or a pad. For more information refer to "Polygon conversion" section on the next page.
- Click **OK**.

The polygon is created.

### Fields of the input panel, when creating polygons

| Field         | Description   |
|---------------|---|
| <i>Number</i> | Defines the number of the next new point.             |
| <i>East</i>   | Defines the East (X) coordinate of the polygon point. |

| <b>Field</b>                 | <b>Description</b>   |
|------------------------------|--|
| <i>North</i>                 | Defines the North (Y) coordinate of the polygon point.                   |
| <i>Elev</i>                  | Defines the elevation of the polygon point.                              |
| <i>Code</i>                  | Defines the code of the polygon point.                                   |
| <i>Use in Surface</i>        | Defines whether the polygon point may be used in surface or not.         |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the polygon point will be interpolated. |
| <i>BreakLine</i>             | Defines whether the lines of the new polygon be a breakline.             |

## Polygon conversion

A polygon is the base entity for a lot, boundary or pad. It means, that for creating these entities, you have to create a polygon, and then convert it.

To convert a polygon:

1. Create a polygon. For more information refer to "Polygon Area icon" section on the previous page.
2. In the *Edit Polygon Area* dialog, click **Convert**.

The *Polygon Conversion* dialog is displayed.

3. From the *Convert To* list, select the target entity.
4. In the *Name* editbox, type the name of the new entity.
5. Click **OK**.

## Rectangle icon

The **Rectangle** icon of the Polyline/Polygon group allows you to add a rectangle shape polygon to the survey view.

To create a rectangle shape polygon:

1. In the *Polyline/Polygon* group of the *Insert* tab, click the **Rectangle** icon.

The input panel for creating point in the "Coordinates" mode is displayed. For more information, refer to "Add Point icon" section on page 136.

2. Locate the first point of the rectangle.

The input panel is displayed at the bottom toolbar.

3. Define the parameters of the rectangle. Do one of the following:
  - Locate the opposite point in the survey view.
  - Specify the parameters at the bottom toolbar. Fields are described in the table below.

The rectangle is created.

### Fields of the bottom toolbar, when creating a rectangle polygon

| <b>Field</b>  | <b>Description</b>                                |
|---------------|---|
| <i>Number</i> | Defines the number of the second rectangle point. |



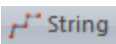
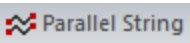
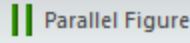
---

| <b>Field</b>                 | <b>Description</b>  |
|------------------------------|---|
| <i>Width</i>                 | Defines the width of the rectangle.   |
| <i>Height</i>                | Defines the height of the rectangle.  |
| <i>Elev</i>                  | Defines the elevation of all rectangle points, except for the first point.                              |
| <i>Code</i>                  | Defines the code of all rectangle points, except for the first point.                                   |
| <i>Use in Surface</i>        | Defines whether the rectangle points may be used in surface or not.                                     |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the rectangle points, except for the first point will be interpolated. |
| <i>Breakline</i>             | Defines whether the lines of the rectangle may be used for DTM creation                                 |

## String group

A string is the series of point (which are called nodes), connected by lines and/or arc, to become one entity. A string may be marked with the user-defined code. If all points in a string have elevations, than the string will be a 3D string. A string may be defined as a breakline for using in a surface model.

The *String* group from the *Insert* tab of the MAGNET Office ribbon allows you to add string entities to the survey view. It contains three icons, described in the table below.

|   |  |
|---|--|
|  String          | String icon<br>Click it to add a string to the project.                                |
|  Parallel String | Parallel String icon<br>Click it to add a new string as a parallel to an existing one. |
|  Parallel Figure | Parallel Figure icon<br>Click it to add a new figure as a parallel to an existing one. |

## String icon

The **String** icon of the String group allows you to add a new string to the survey view.

To create a string:

1. In the *String* group of the *Insert* tab, click the **String** icon.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

### NOTE

If a point was selected, when clicking the **String** icon, it automatically become the start point of the new string.

2. Locate the first point of the string by using the "Coordinate" method. For more information refer to "Add Point icon" section on page 136.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

3. Locate the second and further points of the string, by using the "Sideshot" or "Coordinate" method. For more information about "Sideshot" method, refer to "Sideshot icon" section on page 143.

### TIP

To switch the creation mode use the *Coordinate* icon and the *Direction* icon from the *Create Modes* group of the *Settings* tab, or corresponding icons at the toolbar.

4. When finished, press *Esc*.

The **Create String** dialog is displayed.

5. Review the properties of the newly created string, if needed change them. For more information, refer to "String properties" section on page 555.
6. Click **OK**.

The string is created.

### Fields of the input panel, when creating strings

| Field         | Description                               |
|---------------|---|
| <i>Number</i> | Defines the number of the next new point. |

| Field                        | Description  |
|------------------------------|--|
| <i>East</i>                  | Defines the East (X) coordinate of the string point.   |
| <i>North</i>                 | Defines the North (Y) coordinate of the string point.  |
| <i>Elev</i>                  | Defines the elevation of the string point.   |
| <i>Bearing</i>               | Defines the bearing of the string point from the previous one.<br>NOTE<br>This field available only when creating second or further points.      |
| <i>Distance</i>              | Defines the distance from the previous string node to further one.<br>NOTE<br>This field available only when creating second or further points.. |
| <i>Code</i>                  | Defines the code of the string point.  |
| <i>Use in Surface</i>        | Defines whether the string point may be used in surface or not.  |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the string point will be interpolated.  |
| <i>BreakLine</i>             | Defines whether the new string will be a breakline.  |

## Parallel String icon

The **Parallel String** icon of the String group allows you to add a new string to the survey view, based on an existing string.

To create a parallel sting:

1. In the *String* group of the *Insert* tab, click the **Parallel String** icon.
2. In the survey view, select the required source string.

### NOTE

If a string was selected, when clicking the icon, it will be used as the source string.

The **Parallel String** dialog is displayed. Fields are described in the table below.

3. In the *Offset* editbox, specify the required offset from the original entity.
4. Define the required height option for the parallel string.
5. Click **OK**.
6. In the survey view, select from which side of the existing string the new one will be placed.

The new string is created and the **Edit String** dialog is displayed.

7. Review the parameters of the newly created string, and click **OK** to accept it. For more information about the string parameters refer to "String properties" section on page 555.
8. Do one of the following:
  - Press *Enter* to add more strings with the same parameters.
  - Press *Ecs* to finish the parallel string creation.

### Fields of the **Parallel String** dialog

| Field         | Description  |
|---------------|--|
| <i>Offset</i> | Defines the offset of the new parallel string from the original one. |

| Field                   | Description  |
|-------------------------|--|
| <i>Constant Height</i>  | Select this radiobutton to create the new string with the same elevation for all nodes. If selected, specify the height of the new string in the appropriate editbox.  |
| <i>Fixed CrossFall</i>  | Select this radiobutton to create the new string with the nodes elevations defined by the fixed slope in percents from the original string nodes elevations. If selected, specify the slope percentage of the new string in the appropriate editbox. Positive slope means that the new string will be higher than the original one. Negative slope means that the new string will be lower than the original one.  |
| <i>Fixed Difference</i> | Select this radiobutton to create the new string with the node elevation, defined by the fixed difference from the original string nodes elevations. If selected, specify the required difference in the appropriate editbox. It will be subtracted or added to the original string nodes elevations.  |
| <i>Ratio</i>            | Select this radiobutton to create the new string with the nodes elevations defined by the fixed slope, defined as ratio, from the original string nodes elevations. If selected, specify the slope ratio of the new string in the appropriate editbox. Note that you are defining the denominator of the ratio. Positive slope means that the new string will be higher than the original one. Negative slope means that the new string will be lower than the original one. |
| <i>No Height</i>        | Select this radiobutton to create the new string without elevation.  |

## Parallel Figure icon

The **Parallel Figure** icon of the String group allows you to add two new strings to the survey view as the parallel to an existing line, arc, string or alignment.

To create a parallel figure:

1. In the *String* group of the *Inset* tab, click the **Parallel Figure** icon.
2. In the survey view, select the required source string.

### NOTE

If a string was selected, when clicking the icon, it will be used as the source string.

The **Parallel Figure** dialog is displayed. Fields are described in the table below.

3. Do one of the following:
  - In the *Road Template* group box, tick the checkbox and select the required road template from the drop-down list.
  - In the "Offset Strings" panel, configure the offsets of the new strings from the original string and the height of the new string.
4. Click **OK**.

The new string is created and the **Edit String** dialog is displayed.

5. Review the parameters of the newly created string, and click **OK** to accept it. For more information about the string parameters refer to "String properties" section on page 555. Repeat for the second string.

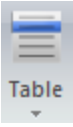

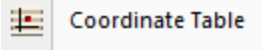
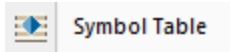
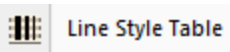
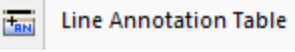
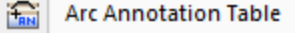


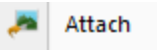
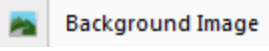
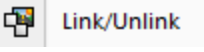

The parallel strings are created.

**Fields of the *Parallel String* dialog**

| <b>Field</b>            | <b>Description</b>  |
|-------------------------|---|
| <i>Template</i>         | Defines the road template for the parallel strings. Click <b>Edit Templates</b> to edit the currently selected template. See "Templates icon" section on page 702 for details.  |
| <i>Left Offset</i>      | Defines the offset of the new parallel string, located to the left from the original one.   |
| <i>Right Offset</i>     | Defines the offset of the new parallel string, located to the right from the original one.  |
| <i>Constant Height</i>  | Select this radiobutton to create the new string with the same elevation for all nodes. If selected, specify the height of the new string in the appropriate editbox.   |
| <i>Fixed CrossFall</i>  | Select this radiobutton to create the new string with the nodes elevations defined by the fixed slope in percents from the original string nodes elevations. If selected, specify the slope percentage of the new string in the appropriate editbox. Positive slope means that the new string will be higher than the original one. Negative slope means that the new string will be lower than the original one. |
| <i>Fixed Difference</i> | Select this radiobutton to create the new string with the node elevation, defined by the fixed difference from the original string nodes elevations. If selected, specify the required difference in the appropriate editbox. It will be subtracted or added to the original string nodes elevations.   |
| <i>No Height</i>        | Select this radiobutton to create the new string without elevation.   |

## Feature group

The *Feature* group from the *Insert* tab of the MAGNET Office ribbon allows you to insert additional table and picture entities to the project. It contains two icons and nine second level icons, describe in the table below.

|   |  |
|---|--|
|    | <p><b>Table icon</b><br/>Click it to add a table to the project. This icon also contains the list of the second level icons. Click  to see it.</p>                      |
|    | <p><b>Coordinate Table icon</b><br/>Click it to add a table, containing information about existing points, lines or arcs.</p>  |
|    | <p><b>Symbol Table icon</b><br/>Click it to add a table, containing information about how the symbols are used in the project.</p>   |
|    | <p><b>Line Style Table icon</b><br/>Click it to add a table, containing information about how the symbols are used in the project.</p>   |
|    | <p><b>Line Annotation Table icon</b><br/>Click it to add the line annotation table to the survey view.</p>   |
|    | <p><b>Arc Annotation Table icon</b><br/>Click it to add the arc annotation table to the survey view.</p>   |
|  | <p><b>Image/Pdf icon</b><br/>Click it to add an image or a PDF file to the project. This icon also contains the list of the second level icons. Click  to see it.</p> |
|  | <p><b>Attach icon</b><br/>Click it to attach a picture to an existing entity.</p>  |
|  | <p><b>Background Image icon</b><br/>Click it to add a background image to the survey view.</p>   |
|  | <p><b>Link/Unlink icon</b><br/>Click it to link/unlink an image to an existing entity.</p>   |
|  | <p><b>View Attached/Linked icon</b><br/>Click it to view the list of the images, attached/linked to an existing entity.</p>  |

### Table icon

The **Table** icon of the *Feature* group allows you to add an empty table to the survey view.

To create an empty table:

1. In the *Feature* group of the *Insert* tab, click the **Table** icon.  
The *Table Properties* dialog is displayed.
2. In the *Name* editbox, type the name of the new table.
3. In the *Rows* editbox, define the quantity of rows in the new table.
4. In the *Columns* editbox, define the quantity of columns in the new table.

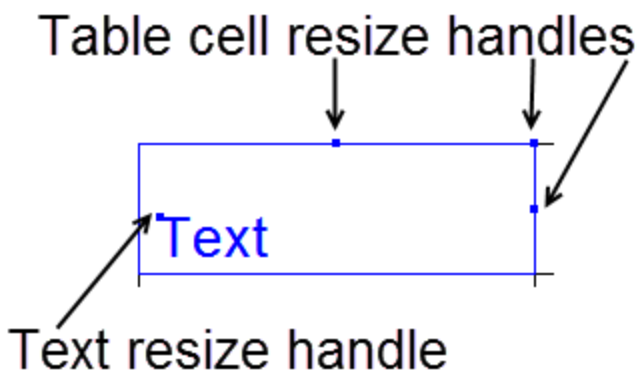
5. Review other properties, if needed change them. Fields are described in the table below.
6. Click **OK**.
7. Locate the top left corner of the table. Do one of the following:
  - Click the required place in the survey view.
  - Specify the East and North coordinates in the appropriate editboxes at the bottom toolbar.

The table is created.

#### Fields of the *Table Properties* dialog

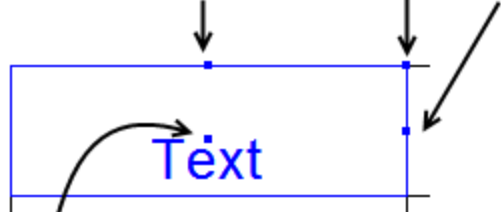
| Field                  | Description   |
|------------------------|---|
| <i>Name</i>            | Defines the name of the table.  |
| <i>Rows</i>            | Defines the quantity of rows in the table.  |
| <i>Columns</i>         | Defines the quantity of columns in the table.   |
| <i>Min Height</i>      | Defines the minimum height of the table rows.   |
| <i>Min Width</i>       | Defines the minimum width of the table columns.   |
| <i>Color</i>           | Defines the color of the table borders.   |
| <i>Font</i>            | Defines the font of the text in the table.  |
| <i>Char Height</i>     | Defines the font size of the text in the table.   |
| <i>Text Style</i>      | Defines the text style, used in the table.  |
| <i>Char Style</i>      | Defines whether the text formatting in the table.   |
| <i>Insertion Style</i> | Defines the justification style, used in table cells. See pictures below for details.                 |
| <i>Use Text Style</i>  | Tick to use the font settings from the text style, instead of mentioned above.                        |
| <i>Opaque</i>          | Tick to place the table in front of any entities, and cut them at a certain distance around the text. |
| <i>Draw Box</i>        | Tick to draw external border of the table.  |

#### Table justification styles



#### Bottom left justification style

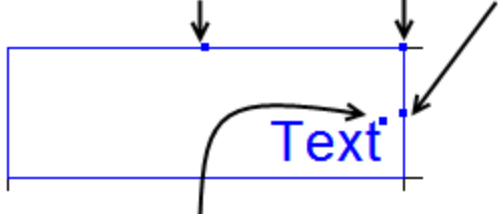
Table cell resize handles



Text resize handle

**Bottom middle justification style**

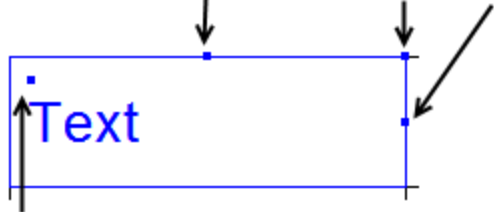
Table cell resize handles



Text resize handle

**Bottom right justification style**

Table cell resize handles

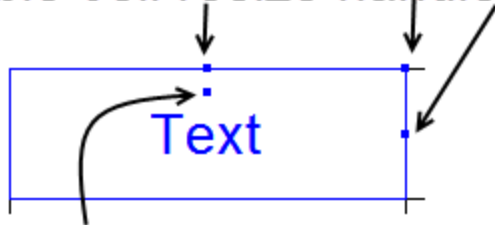


Text resize handle

**Center left justification style**



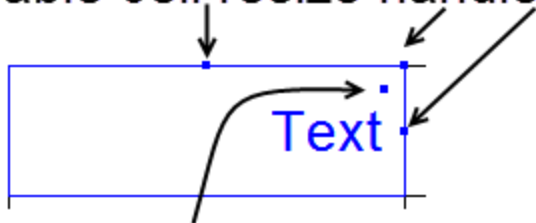
## Table cell resize handles



Text resize handle

## Center middle justification style

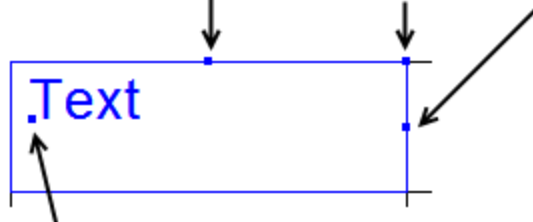
## Table cell resize handles



Text resize handle

## Center right justification style

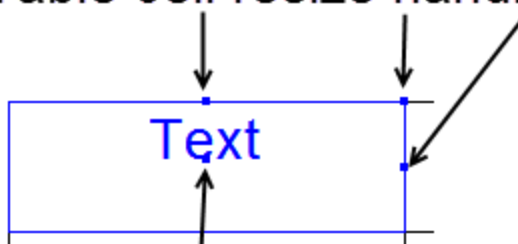
## Table cell resize handles



Text resize handle

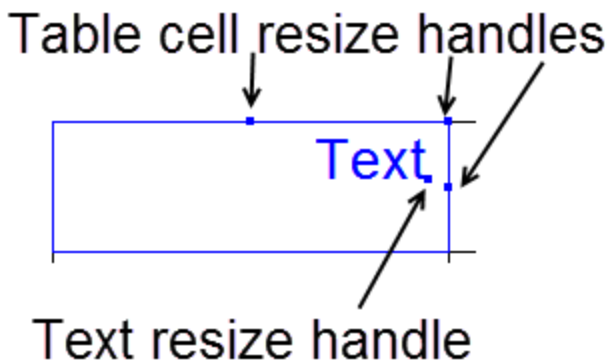
## Top left justification style

## Table cell resize handles



Text resize handle

## Top middle justification style



**Top right justification style**

**Coordinate Table icon**

The **Coordinate Table** icon of the Feature group allows you to add a table, containing information about the existing points, lines or arcs to the survey view.

To create a coordinate table:

1. Select entities to be included to the table.
2. In the *Feature* group of the *Insert* tab, click the **Coordinate Table** icon.

The **Coordinate Table** dialog is displayed. Fields and buttons of the dialog are described in the tables below.

3. Configure the table as you need.
4. Click **OK**.
5. Locate the top left corner of the table. Do one of the following:
  - Click the required place in the survey view.
  - Specify the East and North coordinates in the appropriate editboxes at the bottom toolbar.

The table is created.

**Fields of the Coordinate Table toolbar**

| Field                    | Description   |
|--------------------------|---|
| <b>Column</b>            |   |
| <i>Category</i>          | Defines the entity type for the table. Select either points, or lines or arcs from the drop-down list.                                      |
| <i>Available</i>         | Contains the list of the available values for current selection entity type.  |
| <i>Current</i>           | Contains the list of the values to be included into table.  |
| <b>Table</b>             |   |
| <i>Name</i>              | Defines the name of the table.  |
| <i>Current Selection</i> | Tick to include currently selected entities into the table. The appropriate "Rows" editbox displayed the quantity of the selected entities. |

| Field                        | Description  |
|------------------------------|--|
| <i>Additional Empty Rows</i> | Tick to add empty rows to the table. If ticked, type the quantity of empty rows in the appropriate "Rows" editbox. |
| <i>Uppercase</i>             | If ticked, all text in the table will be in uppercase.   |
| <i>Fit Text</i>              | Tick to make table sizes automatically fit the text.   |

#### Buttons of the *Coordinate Table* dialog

| Button            | Description   |
|-------------------|---|
| >>                | Click it to add the currently selected available value to the table.  |
| <<                | Click it to remove currently selected value from the table.   |
| <b>Move Up</b>    | Click it to move currently selected value up in the list. It means that the corresponding column of the table will be moved to the left.    |
| <b>Move Down</b>  | Click it to move currently selected value down in the list. It means that the corresponding column of the table will be moved to the right. |
| <b>Comment</b>    | Click it to add the empty "Comments" column.  |
| <b>Restore</b>    | Click it to restore the default values set.   |
| <b>Properties</b> | Click it to edit the properties of the table. For more information, refer to "Table properties" section on page 571.                        |
| <b>OK</b>         | Click it to save changes and place the coordinate table in the survey view.   |
| <b>Cancel</b>     | Click it to close the dialog without adding the coordinate tablet to the survey view.   |

## Symbol Table icon

The **Symbol Table** icon of the Feature group allows you to add a table, containing information about how the symbols are used in the project.

To create a symbol table:

1. In the *Feature* group of the *Insert* tab, click the **Symbol Table** icon.  
The *Symbol Table* dialog is displayed. Fields and buttons of the dialog are described below.
2. Fill in the table. Do the following:
  1. In the *Symbol* column, select the required symbol from the drop-down list.
  2. In the *Description* column type the description of the symbol usage.
3. If needed, configure the additional parameters of the table.
4. Click **OK**.
5. Locate the top left corner of the table. Do one of the following:
  - Click the required place in the survey view.
  - Specify the East and North coordinates in the appropriate editboxes at the bottom toolbar.

The table is created.

**Fields of the *Symbol Table* dialog**

| <b>Field</b>                 | <b>Description</b>   |
|------------------------------|--|
| <i>Symbol</i>                | Defines the symbols to be placed into the table.   |
| <i>Description</i>           | Defines the description of the symbols in the table.   |
| <b>Table</b>                 |  |
| <i>Name</i>                  | Defines the name of the table.   |
| <i>Rows</i>                  | The first <i>Rows</i> editbox displayed the quantity of the selected entities.                                     |
| <i>Additional Empty Rows</i> | Tick to add empty rows to the table. If ticked, type the quantity of empty rows in the second <i>Rows</i> editbox. |
| <i>Uppercase</i>             | If ticked, all text in the table will be in uppercase.   |
| <i>Fit Text</i>              | Tick to make table sizes automatically fit the text.   |
| <i>Center Symbol</i>         | Tick to place symbols in the center of the cell, regardless of the defined insertion style.                        |

**Buttons of the *Symbol Table* dialog**

| <b>Field</b>             | <b>Description</b>  |
|--------------------------|---|
| <b>From Job</b>          | Click it to insert all symbols, used in the current project.  |
| <b>From Library</b>      | Click it to insert all symbols from the library.  |
| <b>Current Selection</b> | Click it to insert all symbols, used in the current selection.  |
| <b>Insert</b>            | Click it to insert a new row above the currently selected one.  |
| <b>Restore</b>           | Click it to discard all changes.  |
| <b>Delete</b>            | Click it to delete a row.<br><i>TIP</i><br>Click the number of the required row to activate this button.                        |
| <b>Append LineStyles</b> | Click it to switch to the <i>Line Style Table</i> dialog. For more information, refer to "Line Style Table icon" section below. |
| <b>Properties</b>        | Click it to edit the properties of the table. For more information, refer to "Table properties" section on page 571.            |
| <b>OK</b>                | Click it to save changes and place the symbol table in the survey view.   |
| <b>Cancel</b>            | Click it to close the dialog without adding the symbol tablet to the survey view.   |

**Line Style Table icon**

The **Line Style Table** icon of the Feature group allows you to add a table, containing information about how the line styles are used in the project.

To create a line style table:

1. In the *Feature* group of the *Insert* tab, click the **Line Style Table** icon.  
The **Line Style Table** dialog is displayed. Fields and buttons of the dialog are described below.
2. Fill in the table. Do the following:
  1. In the *LineStyle* column, select the required line style from the drop-down list.
  2. In the *Description* column type the description of the line style usage.
3. If needed, configure the additional parameters of the table.
4. Click **OK**.
5. Locate the top left corner of the table. Do one of the following:
  - Click the required place in the survey view.
  - Specify the East and North coordinates in the appropriate editboxes at the bottom toolbar.

The table is created.

#### Fields of the **Line Style Table** dialog

| Field                        | Description  |
|------------------------------|--|
| <i>Symbol</i>                | Defines the line styles to be placed into the table.   |
| <i>Description</i>           | Defines the description of the line styles in the table.   |
| <b>Table</b>                 |  |
| <i>Name</i>                  | Defines the name of the table.   |
| <i>Rows</i>                  | The first <i>Rows</i> editbox displayed the quantity of the selected entities.                                     |
| <i>Additional Empty Rows</i> | Tick to add empty rows to the table. If ticked, type the quantity of empty rows in the second <i>Rows</i> editbox. |
| <i>Uppercase</i>             | If ticked, all text in the table will be in uppercase.   |
| <i>Fit Text</i>              | Tick to make table sizes automatically fit the text.   |
| <i>Center LineStyle</i>      | Tick to place line styles in the center of the cell, regardless of the defined insertion style.                    |

#### Buttons of the "Symbol Table" dialog

| Field                    | Description  |
|--------------------------|--|
| <b>From Job</b>          | Click it to insert all line styles, used in the current project.   |
| <b>From Library</b>      | Click it to insert all line styles from the library.   |
| <b>Current Selection</b> | Click it to insert all line styles, used in the current selection.   |
| <b>Insert</b>            | Click it to insert a new row above the currently selected one.   |
| <b>Restore</b>           | Click it to discard all changes.   |
| <b>Delete</b>            | Click it to delete a row.<br><i>TIP</i><br>Click the number of the required row to activate this button.                 |
| <b>Append Symbols</b>    | Click it to switch to the "Symbol Table" dialog. For more information, refer to "Symbol Table icon" section on page 211. |

| Field             | Description  |
|-------------------|--|
| <b>Properties</b> | Click it to edit the properties of the table. For more information, refer to "Table properties" section on page 571. |
| <b>OK</b>         | Click it to save changes and place the line style table in the survey view.  |
| <b>Cancel</b>     | Click it to close the dialog without adding the line styles table to the survey view.                                |

## Line Annotation Table icon

The **Line Annotation Table** icon of the Feature group allows you to add the line annotation table to the survey view.

When you tick *Annotation* and *In Line Annotation Table* checkboxes in the Line properties, the line is marked with number, which corresponds with the row in the line annotation table, which contains information about lines lengths and bearings.

To create the line annotation table, in the *Feature* group of the *Insert* tab, click the **Line Annotation Table** icon.

To move the line annotation table, select it and drag to the required place by using the handles at the table corners.

To configure the parameters of the line annotation table:

1. Do the double click inside the table.  
The *Annotation Table Settings* dialog is displayed.
2. Make the required configurations in the *Line Table* group box of the dialog. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Line Table* group box from the *Annotation Table Settings* dialog

| Field                  | Description   |
|------------------------|---|
| <i>Insertion Point</i> | Defines the X (East) and Y (North) coordinates of the table bottom left corner.   |
| <i>Columns</i>         | Defines the quantity of column sets.  |
| <i>Text Style</i>      | Defines the text style, used in the table.  |
| <i>ID Text Style</i>   | Defines the text style, used for line marks.  |
| <i>Sorted by</i>       | Select the parameter for table data sorting.  |
| <i>Ascending</i>       | Tick to sort the table data in the ascending order. If unticked, data will be sorted in the descending order.           |
| <i>Display</i>         | Tick to display the line annotation table in the survey view. If unticked, the line annotation table will be invisible. |

### Buttons of the *Annotation Table Settings* dialog

| Button       | Description                               |
|--------------|---|
| <b>Reset</b> | Click it to restore the default settings. |

| Button          | Description   |
|-----------------|---|
| <b>Renumber</b> | Click it to renumber the line marks, starting from 1. |
| <b>Refresh</b>  | Click it to refresh the line annotation table.        |
| <b>OK</b>       | Click it to save the changes and close the dialog.    |
| <b>Cancel</b>   | Click it to close the dialog without saving changes.  |

## Arc Annotation Table icon

The **Arc Annotation Table** icon of the *Feature* group allows you to add the arc annotation table to the survey view.

When you tick *Annotation* and *In Arc Annotation Table* checkboxes in the Arc properties, the arc is marked with number, which corresponds with the row in the line annotation table, which contains information about arc.

To create the arc annotation table, in the *Feature* group of the *Insert* tab, click the **Arc Annotation Table** icon.

To move the arc annotation table, select it and grab to the required place by using the handles at the table corners.

To configure the parameters of the arc annotation table:

1. Do the double click inside the table.

The *Annotation Table Settings* dialog is displayed.

2. Make the required configurations in the *Arc Table* group box of the dialog. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Arc Table* group box from the *Annotation Table Settings* dialog

| Field                  | Description   |
|------------------------|---|
| <i>Insertion Point</i> | Defines the X (East) and Y (North) coordinates of the table bottom left corner.                                       |
| <i>Columns</i>         | Defines the quantity of column sets.  |
| <i>Text Style</i>      | Defines the text style, used in the table.  |
| <i>ID Text Style</i>   | Defines the text style, used for line marks.  |
| <i>Sorted by</i>       | Select the parameter for table data sorting.  |
| <i>Ascending</i>       | Tick to sort the table data in the ascending order. If unticked, data will be sorted in the descending order.         |
| <i>Display</i>         | Tick to display the arc annotation table in the survey view. If unticked, the arc annotation table will be invisible. |

### Buttons of the *Annotation Table Settings* dialog

| Button          | Description  |
|-----------------|--|
| <b>Reset</b>    | Click it to restore the default settings.            |
| <b>Renumber</b> | Click it to renumber the arc marks, starting from 1. |
| <b>Refresh</b>  | Click it to refresh the arc annotation table.        |
| <b>OK</b>       | Click it to save the changes and close the dialog.   |
| <b>Cancel</b>   | Click it to close the dialog without saving changes. |

## Image/Pdf icon

The **Image/Pdf** icon of the Feature group allows you to add a picture from an image (\*.bmp, \*.jpeg, \*.jpg, \*.jp2, \*.tiff, \*.tif, \*.png, \*.sid) or PDF (\*.pdf) file to the survey view.

To add a picture to the survey view:

1. In the *Feature* group of the *Insert* tab, click the **Image/Pdf** icon.  
The **Open** dialog is displayed.
2. Select the required file and click **OK**.
3. If you have selected a PDF (\*.pdf) file, define the required page in the **Extract Image** dialog.

The picture is displayed in the center of the survey view.

4. To confirm insertion do one of the following:
  - Left click in the survey view.
  - Press *Enter*.

The picture is added.

You may move, resize and rotate the picture. To do that:

1. Click the required picture.  
The picture is bordered with the yellow rectangle.
2. Use the following handles:
  - Handle in the bottom left corner to move the picture.
  - Handle in the bottom right corner to rotate the picture around the bottom left corner.
  - Handle in the top right corner to resize the picture.

Double click on the picture opens the "Image" dialog. Fields are described in the table below.

### Fields of the *Image* dialog

| Field                  | Description  |
|------------------------|--|
| <i>Opaque</i>          | Tick to place the picture in front of any entities.                              |
| <i>Insertion Point</i> | Displays the East and North coordinates  |
| <i>Dimension</i>       | Displays the height and width of the picture.                                    |
| <i>Rotation</i>        | Displays the rotation angle of the picture. The positive direction in clockwise. |

## Attach icon

The **Attach** icon of the Feature group allows you to attach a picture from an image (\*.bmp, \*.jpeg, \*.jpg, \*.jp2, \*.tiff, \*.tif, \*.png, \*.sid) or PDF (\*.pdf) file to an existing entity in the survey view.

To attach a picture to an entity:

1. In the *Feature* group of the *Insert* tab, click the **Attach** icon.
2. Select the required entity in the survey view.

#### NOTE

If an entity was selected, when clicking the icon, the picture will be attached to it.

The **Open** dialog is displayed.



3. Select the required file and Click **OK**.

The picture is attached to an entity.

To manage the attached pictures, use the Image Viewer. You may open it from the *Edit Properties* dialog for the entity. For more information, refer to "Image Viewer" section on page 573.

## Background Image icon

The **Background Image** icon of the Feature group allows you to add the background images to the survey view.

A background image is a picture, which is placed behind all entities in the project. Its aim is to help the user in the design of the project – to simplify the creation of the existing objects and understanding of how new object will interact with them. It may be satellite photo of the area, its map, etc. A background image may be calibrated, which means that the area of the image will be matched to the entities in the survey view.

To add a background image to the survey view:

1. In the *Feature* group of the *Insert* tab, click the **Background Image** icon.

The *Open* dialog is displayed.

2. Select the required file and click **OK**.

The *Insert Background Image* dialog is displayed.

3. In the *Background image name* editbox, type the name of the background image.
4. From the *Transparency* drop-down list, select the required transparency of the background picture. 100% is fully transparent (i.e. invisible) picture, 0% is fully opaque picture.
5. In the *Position/Scale Image* group box, select the required option for image positioning:
  - *From geo-reference file* – select it to load the positioning data from the georeference ESRI World File.
  - *By plotting scale* – select it to define the position of the background by defining the scale between the actual picture size and its size in the survey view and rotation of the image. See "Positioning by plotting scale" section below for details.
  - *By Matching Points* – select it to define the position of the background image by matching the point entities in the survey view with the points at the image. See "Positioning by matching points" section on the next page for details.
  - *Position by image* – select it to define the position of the background image by picking the line on the image and defining its length and bearing. See "Positioning by known line" section on the next page for details.

6. Click **OK**.

The background image is added.

## Positioning by plotting scale

When position a background image by known line, you need to specify the scale between the actual picture size and its size in the survey view and rotation of the image

If you have selected the *By plotting scale* option in the *Insert Background Image* dialog, do the following:

1. In the *Scale* editbox, define the scale of the background image.
2. In the *North Orientation* editbox, define the rotation of the background image.

### TIP

*Rotation is defined around the anchor point, the positive direction is counterclockwise.*

3. Click **OK**.

The background image is added.

## Positioning by matching points

If you have selected the *By Matching Points* option in the **Insert Background Image** dialog, do the following:

1. Pick the matching point entity. Do one of the following:
  - Click the required point in the survey view.
  - Type the required point number in the *Number* editbox at the bottom toolbar, and press *Enter*.
2. Click the corresponding point on the image.
3. Repeat steps 1 and 2 for all required points.
4. When finished, do the right click, and select **Accept the image** in the context menu.

The background image is added.

## Positioning by known line

When position a background image by known line, you need to pick the known line and define its length and bearing.

If you have selected the *Position by image* option in the **Insert Background Image** dialog, do the following:

1. In the *Scale and Rotation* group box, click **Pick >>**.
2. Pick the known line on the picture.
3. In the *Actual Distance* editbox, type the length of the known line.
4. Define the bearing of the known line. Do one of the following:
  - In the *Rotation* editbox, define the bearing of the known line.
  - In the *North Orientation* editbox, define the rotation of the background image.

### *TIP*

*Rotation is defined around the anchor point, the positive direction is counterclockwise.*

5. Click **OK**.

The background image is added.

## Link/Unlink icon

The **Link/Unlink** icon of the Feature group allows you to set/remove the connection between an existing entity in the survey view and an image. If the entity to which the image is linked is selected, the image will be selected too. If the linked entity is deleted, the image will also be removed. If the entity will be moved, scaled, etc., the relative position of the image will be maintained. The image will also be displayed on drawings, along with the entity.

To link/unlink an image:

1. In the *Features* group of the *Insert* tab, click the **Link/Unlink** icon.
2. In the survey view, select the required entity.

**NOTE**

If an entity was selected, when clicking the icon, images will be linked to it.

3. In the survey view, select the image to be linked/unlinked.
4. When finished, press *Esc*.

The image is linked/unlinked to the entity.

## View Attached/Linked icon

The **View Attached/Linked** icon of the *g* allows you to view the list of the images, which is attached or linked to an entity in the survey view.

To view the attached/linked images:

1. In the *Features* group of the *Insert* tab, click the **View Attached/Linked** icon.
2. In the survey view, select the required entity.

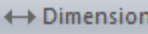
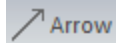
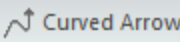
**NOTE**

If an entity was selected, when clicking the icon, the MAGNET Office will display the linked/attached images for it.

The **Image Viewer** dialog is displayed, with the list of the attached images. For more information about the image viewer, refer to "Image Viewer" section on page 573.

## Arrow group

The *Arrow* group from the *Insert* tab of the MAGNET Office ribbon allows you to draw arrows and dimensions. It contains three icons, described in the table below.

|  |   |
|--|---|
|  Dimension    | Dimension icon<br>Click it to add a dimension to the survey view.       |
|  Arrow        | Arrow icon<br>Click it to add a simple arrow to the survey view.        |
|  Curved Arrow | Curved Arrow icon<br>Click it to add a curved arrow to the survey view. |

### Dimension icon

The **Dimension** icon of the *Arrow* group allows you to add a dimension entity to the survey view. A dimension is the line with arrows on both ends, containing annotation of the dimension length, so it may be used for measuring the distance between two points.

To create a dimension:

1. In the *Arrow* group of the *Insert* tab, click the **Dimension** icon.  
The input panel is displayed at the bottom toolbar. Fields are described in the table below.
2. At the bottom toolbar, in the *Offset* editbox, specify the offset from the entities.
3. At the bottom toolbar, from the *Style* drop-down list, select the dimension style.
4. In the survey view, click the start point.
5. In the survey view, click the end point.

The dimension is added.

#### Fields of the bottom toolbar, when creating dimensions

| Field         | Description   |
|---------------|---|
| <i>Offset</i> | Defines the offset of the dimension line from the entities. |
| <i>Style</i>  | Defines the style of the dimension.                         |

### Arrow icon

The **Arrow** icon of the *Arrow* group allows you to add arrows to the survey view.

To create an arrow:

1. In the *Arrows* group of the *Insert* tab, click the **Arrow** icon.
2. Click the required places in the survey view, to create segments of the arrow. Note that only the last segment will have the arrow head.
3. When finished, press *Esc*.

The message window prompts to save the arrow.

4. Click **Yes**.

The arrow is created.

## Curved Arrow icon

The **Curved Arrow** icon of the Arrow group allows you to add curved arrows to the survey view.

To create a curved arrow:

1. In the *Arrows* group of the *Insert* tab, click the **Curved Arrow** icon.
2. In the survey view, click the start and end points of the arrow.  
The arrow is added to the survey view.
3. By using the handles, while holding the *Shift* key, configure the required shape of the arrow.  
The arrow is created.


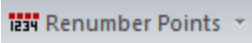


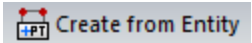
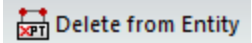
## Modify Tab

The *Modify* tab of the MAGNET Office ribbon contains control icons, which allows you to perform various modifications of the existing entities in the survey view. It is separated to eight groups:

- "Point group" section on the facing page
- "Line group" section on page 230
- "Arc group" section on page 237
- "String group" section on page 247
- "Text group" section on page 261
- "Polygon Area group" section on page 268
- "Polyline group" section on page 273
- "Modify group" section on page 274

## Point group

The *Point* group from the *Modify* tab of the MAGNET Office ribbon allows you to modify the existing points in the project. It contains five icons and one second level icons, described in the table below.

|   |  |
|---|--|
|  <p>Edit Points</p>            | <p><b>Edit Points icon</b><br/>Click it to edit the existing points.</p>   |
|                                | <p><b>Renumber Points icon</b><br/>Click it to renumber the existing points. This icon also contains the second level icon. Click  to see it.</p> |
|  <p>Renumber String Points</p> | <p><b>Renumber String Points icon</b><br/>Click it to renumber points from an existing string.</p>   |
|                                | <p><b>Create from Entity icon</b><br/>Click it to create new points from the existing pointless entities in the project.</p>   |
|                                | <p><b>Delete Points icon</b><br/>Click it to delete points from the existing entities.</p>   |

### Edit Points icon

The **Edit Points** icon of the Point group allows you to edit several existing points at once.

To edit existing points:

1. In the *Point* group of the *Modify* tab, click the **Edit Points** icon.  
The **Multiple Point Edit** dialog is displayed. Buttons of the dialog are described in the table below.
2. In the *Selection Criteria* group box, specify the required criteria for points selection. Fields are described in the table below.
3. Click **Find**.
4. The list of the points, matching the defined search criteria is displayed at the right side of the dialog. If needed, select the required points in it. If nothing selected, changes will be applied to all the points from the list.
5. In the *Properties to Change* group box, make the required configurations. Fields are described in the table below.
6. When finished, do one of the following:
  - Click **OK** to apply the changes and close the dialog.
  - Click **Apply** to apply changes without closing the dialog. Use this, if you need to perform more configurations.

The properties of the points are changed.

#### Fields of the *Multiple Point Edit* dialog

| Field | Description               |
|-------|---------------------------|
|       | <b>Selection Criteria</b> |

| Field                       | Description  |
|-----------------------------|--|
| <i>Select From</i>          | <p>Defines the search space. Select one of the following values:</p> <ul style="list-style-type: none"> <li>• <i>All Layers</i> — to search among points, located on all existing layers</li> <li>• <i>Active Layers</i> — to search among points, located on the currently active layers</li> <li>• <i>Selection</i> — to search among points from the current selection.</li> </ul>  |
| <i>Point Range</i>          | <p>Defines the point alphanumerical range for search, from the lowest point number of the range to the highest one. Specify the lower and upper bounds of the range in the appropriate editboxes.</p>  |
| <i>Layer Range</i>          | <p>Defines the layer depth range for search, from the most bottom layer to the top one. Select the required bound layers from the appropriate drop-down lists.</p>   |
| <i>Code Range</i>           | <p>Defines the code alphanumerical range for search.</p> <p>To perform search by code range, tick the <i>Has Code</i> checkbox, and select the required bound codes from the appropriate drop-down lists. If the <i>Has Code</i> checkbox is not ticked, only points, which have not code will be selected.</p>  |
| <i>Elevation Range</i>      | <p>Defines the numerical elevation range for search.</p> <p>To perform the search by elevation range, tick the <i>Has Ele</i> checkbox and specify the required bound elevations in the appropriate editboxes. If the <i>Has Ele</i> editbox is not ticked, only points, which have not elevations, will be selected.</p>  |
| <i>Use in Surface</i>       | <p>Defines whether Use in Surface points will be included to selection, or not. Use the following algorithm:</p> <ul style="list-style-type: none"> <li>• If both <i>Use in Surface</i> and <i>Yes/No</i> checkboxes are ticked, only Use in Surface points will be included into selection.</li> <li>• If <i>Use in Surface</i> checkbox is ticked, and the <i>Yes/No</i> checkbox is not ticked, all Use in Surface points will be excluded from selection.</li> </ul> |
| <i>Locked</i>               | <p>Defines whether locked points will be included to selection, or not. Use the following algorithm:</p> <ul style="list-style-type: none"> <li>• If both <i>Locked</i> and <i>Yes/No</i> checkboxes are ticked, only locked points will be included into selection.</li> <li>• If <i>Locked</i> checkbox is ticked, and the <i>Yes/No</i> checkbox is not ticked, all locked points will be excluded from selection.</li> </ul>   |
| <i>Color</i>                | <p>Defines the color of the points to be included to selection. Select the required color from the drop-down menu. Only points of the defined color will be included to selection.</p>   |
| <b>Properties to Change</b> |  |
| <i>Layer</i>                | <p>Defines layer to which the selected points will be moved.</p>   |
| <i>Color</i>                | <p>Defines a color for the selected points displaying.</p>   |
| <i>Point Mark</i>           | <p>Defines the mark for the selected points displaying.</p>  |
| <i>Code</i>                 | <p>Defines the code for the selected points.</p>   |



| <b>Field</b>          | <b>Description</b>  |
|-----------------------|---|
| <i>Has Elev</i>       | Defines whether elevation of the selected points will be active.<br>Tick the <i>On/Off</i> checkbox to turn point elevations on. If <i>On/Off</i> checkbox is not ticked, elevations will be deactivated.   |
| <i>Elevation</i>      | Defines the elevation of the selected points.<br><b>NOTE</b><br>The elevation must be active for using this option.   |
| <i>Use in Surface</i> | Defines whether the selected points may be used for DTM creation.<br>Tick the <i>Yes/No</i> checkbox to mark the points as Use in Surface. If the <i>Yes/No</i> checkbox is not ticked, the point will may not be used for DTM creation.  |
| <i>Locked</i>         | Defines whether the selected points will be locked.<br>Tick the <i>Yes/No</i> checkbox to lock the points. If <i>Yes/No</i> checkbox is not ticked, the point will not be locked.   |
| <i>Symbol</i>         | Defines the symbol for the selected points. For more information about symbols, refer to "Symbol icon" section on page 54.  |
| <i>X/Y Scale</i>      | Defines the selected points symbols scale for displaying. Some symbols are too small; others are too big for correct displaying. To display them right, make sure to select the appropriate scale. Note that some symbols are unscalable and plot at the size they were designed. |
| <i>Rotation</i>       | Defines the rotation of the selected point's symbols. Rotation value is degrees. Rotations are absolute a value of the DDD.MMSS format will rotate the symbol by specified angle.   |
| <i>Annotation</i>     | Defines attributes to be displayed as the selected point's annotations.   |

#### **Buttons of the *Multiple Point Edit* dialog**

| <b>Button</b>               | <b>Description</b>   |
|-----------------------------|--|
| <b>Find</b>                 | Click it to find the points, matching specified search criteria.   |
| <b>Set Properties</b>       | Click it to set current properties as the default for points. New points will be created with these properties.  |
| <b>Get Properties</b>       | Click it to load existing default properties for points  |
| <b>Annotations Settings</b> | Click it to configure the points annotation displaying. This button is active only when at least one checkbox from the <i>Annotation</i> group box is ticked. For more information refer to "Annotation icon" section on page 125. |
| <b>Apply</b>                | Click it to apply the changes without closing the dialog.  |
| <b>OK</b>                   | Click it to apply the changes and close the dialog.  |
| <b>Cancel</b>               | Click it to close the dialog without applying changes.   |
| <b>Invert</b>               | Click it to invert the points selection.   |
| <b>Clear</b>                | Click it to remove the points selection.   |

## Renumber Points icon

The **Renumber Points** icon of the Point group allows you to automatically redefine the point numbers.

To renumber the points:

1. In the survey view select the required objects.

### **CAUTION**

***If no objects are selected, than all points in the project will be renumbered.***

2. In the *Point* group of the *Modify* tab, click the **Renumber Points** icon.

The *Renumber Points* dialog is displayed.

3. Configure the renumbering as you need. Fields are described in the table below.
4. Click **OK**.

The points are renumbered and the report, containing information about the old and new names of the points is displayed.

### Non-editable fields of the "Renumber Points" dialog

| Field                    | Description   |
|--------------------------|---|
| <i>Points Selected</i>   | Displays the quantity of the selected points. If no points selected, displays the quantity of the points in the entire job. |
| <i>Sel Lowest Pt No</i>  | Displays the lowest point number in the current selection.  |
| <i>Sel Highest Pt No</i> | Displays the highest point number in the current selection.   |
| <i>Job Lowest Pt No</i>  | Displays the lowest point number in the entire job.   |
| <i>Job Highest Pt No</i> | Displays the highest point number in the entire job.  |

### Editable fields of the "Renumber Points" dialog

| Field                            | Description  |
|----------------------------------|--|
| <i>Renumber All</i>              | Select to renumber all points in the selection, with the new numbers starting from the value, specified in the "Start Number" editbox.   |
| <i>Value to Add</i>              | <p>Tick to add a specific value to all selected point numbers. Specify the value in the appropriate editbox. It will be added to all selected points.</p> <p><i>For example, if the value is 100, than the point 7 becomes 107 and the point 485 becomes 585.</i></p> <p>An alphanumeric value may be used here as well. It will be added as the prefix to the current point numbers.</p> <p><i>For example, if the value is AA, than the point 7 becomes AA7 and the point 485 becomes AA485.</i></p> |
| <i>Range</i>                     | Tick to renumber only the points from the specific range. Specify the range in the appropriate editbox.  |
| <i>Alphanumeric numbers only</i> | Select to renumber only the point with the alphanumeric numbers, with the new numbers starting from the value, specified in the <i>Start Number</i> editbox.   |

| Field                                 | Description   |
|---------------------------------------|---|
| <i>Retain Num Part</i>                | Tick to remove the letters from the point numbers. If the point with the remaining number already exists, the next from the job highest point number will be used.<br><i>For example, the point AA7 becomes 7. If the 7 point already exists among with the AA7, and the highest point number in the job is 485, the AA7 point becomes 486.</i> |
| <i>Strip Underscore Suffix/Prefix</i> | Removes the underscore suffix and/or prefix, depending on the selected options from the point number.   |
| <i>Start Number</i>                   | Defines the start value for point renumbering. By default it is the next from the job highest point number.   |
| <i>By Number Order</i>                | Select to arrange the renumbering in order of the existing numbers.   |
| <i>By Creation Order</i>              | Select to arrange the renumbering in order of the points creation.  |
| <i>Obey Layer Order</i>               | Tick to arrange the renumbering in order of layers, starting from the bottom one to the top one. Within one layer the selected arrangement method will be used.   |

## Renumber String Points icon

The **Renumber Sting Points** icon of the Point group allows you to automatically redefine the numbers of points in a particular string.

To renumber the string points:

1. In the survey view select the required string.
2. In the *Point* group of the *Modify* tab, click the **Renumber String Points** icon.  
The **Renumber Points** dialog is displayed.
3. Configure the renumbering as you need. Fields are described in the table below.
4. Click **OK**.

The points are renumbered and the report, containing information about the old and new names of the points is displayed.

### Non-editable fields of the *Renumber Points* dialog

| Field                    | Description   |
|--------------------------|---|
| <i>Points Selected</i>   | Displays the quantity of the selected points. If no points selected, displays the quantity of the points in the entire job. |
| <i>Sel Lowest Pt No</i>  | Displays the lowest point number in the current selection.  |
| <i>Sel Highest Pt No</i> | Displays the highest point number in the current selection.   |
| <i>Job Lowest Pt No</i>  | Displays the lowest point number in the entire job.   |
| <i>Job Highest Pt No</i> | Displays the highest point number in the entire job.  |

**Editable fields of the *Renumber Points* dialog**

| <b>Field</b>                          | <b>Description</b>   |
|---------------------------------------|--|
| <i>Renumber All</i>                   | Select to renumber all points in the selection, with the new numbers starting from the value, specified in the "Start Number" editbox.   |
| <i>Value to Add</i>                   | <p>Tick to add a specific value to all selected point numbers. Specify the value in the appropriate editbox. It will be added to all selected points.</p> <p><i>For example, if the value is 100, than the point 7 becomes 107 and the point 485 becomes 585.</i></p> <p>An alphanumeric value may be used here as well. It will be added as the prefix to the current point numbers.</p> <p><i>For example, if the value is AA, than the point 7 becomes AA7 and the point 485 becomes AA485.</i></p> |
| <i>Range</i>                          | Tick to renumber only the points from the specific range. Specify the range in the appropriate editbox.  |
| <i>Alphanumeric numbers only</i>      | Select to renumber only the point with the alphanumeric numbers, with the new numbers starting from the value, specified in the "Start Number" editbox.  |
| <i>Retain Num Part</i>                | <p>Tick to remove the letters from the point numbers. If the point with the remaining number already exists, the next from the job highest point number will be used.</p> <p><i>For example, the point AA7 becomes 7. If the 7 point already exists among with the AA7, and the highest point number in the job is 485, the AA7 point becomes 486.</i></p>   |
| <i>Strip Underscore Suffix/Prefix</i> | Removes the underscore suffix and/or prefix, depending on the selected options from the point number.  |
| <i>Start Number</i>                   | Defines the start value for point renumbering. By default it is the next from the job highest point number.  |

**Create from Entity icon**

The **Create from Entity** icon of the Point group allows you to create points at pointless entities. New points will be created at the same layer with the entity and with the same height.

To create points at the pointless entity:

1. In the survey view, select the required pointless entity.
2. In the *Point* group of the *Modify* tab, click the **Create from Entity** icon.  
The message prompts you to display a report.
3. Click **Yes** or **No** as you need.  
The points are created.

## Delete Points icon

The **Delete Points** icon of the Point group allows you to delete points from entities. Strings after that become the polylines.

To remove points from the entity:

1. In the survey view, select the required entity.
2. In the *Point* group of the *Modify* tab, click the **Delete Points** icon.

The message prompts you to display a report.

3. Click **Yes** or **No** as you need.

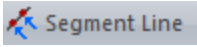
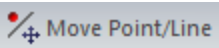
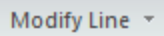




The points are deleted.

### **CAUTION**

***Properties of the deleted points cannot be restored. If you run this function accidentally, use the Undo icon, or Ctrl+Z shortcut.***

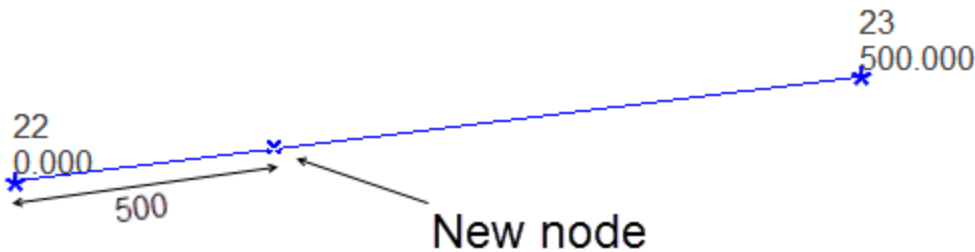
## Line group

The *Line* group from the *Modify* tab of the MAGNET Office ribbon allows you to edit the existing lines in the project. It contains three icons and three second level icons, described in the table below.

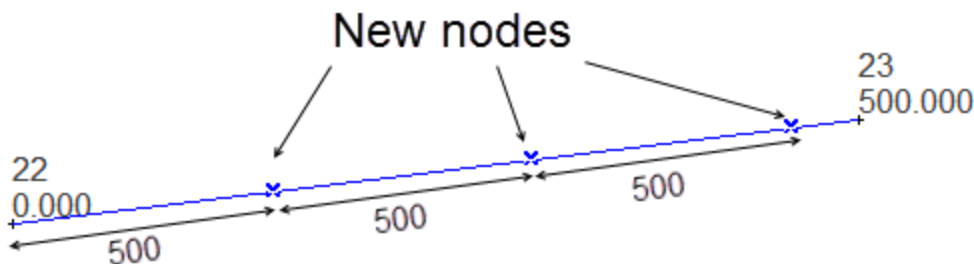
|   |  |
|---|--|
|  | <p>Segment Line icon</p> <p>Click it to divide a line to segments by adding points to it.</p>  |
|  | <p>Move Point/Line icon</p> <p>Click it to move an existing point or line.</p>   |
|  | <p>Modify Line icon</p> <p>This icon contains the list of the second level icons. Click  to see it.</p> |
|  | <p>Insert Point into Line icon</p> <p>Click it to move an existing point to an existing line/string.</p>   |
|  | <p>Delete Point on Line</p> <p>Click it to remove points from a collinear line</p>   |
|  | <p>Flip Line icon</p> <p>Click it to flip the start and end points of the line.</p>  |

### Segment Line icon

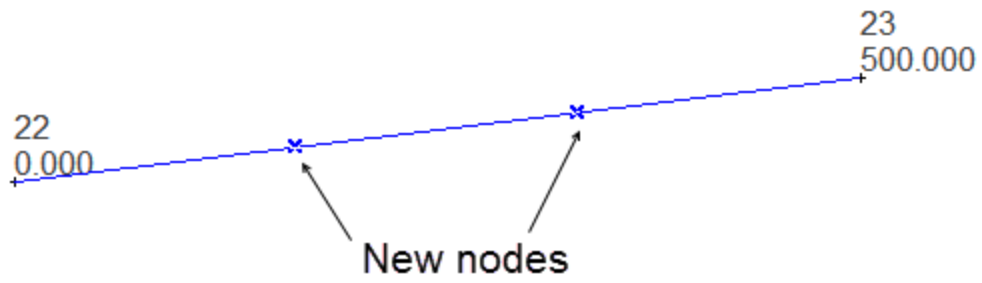
The **Segment Line** icon of the Line group allows you to divide an existing line or string into several segments, either by defined segments length from the start point of the entity or by equal parts. See pictures below for details.



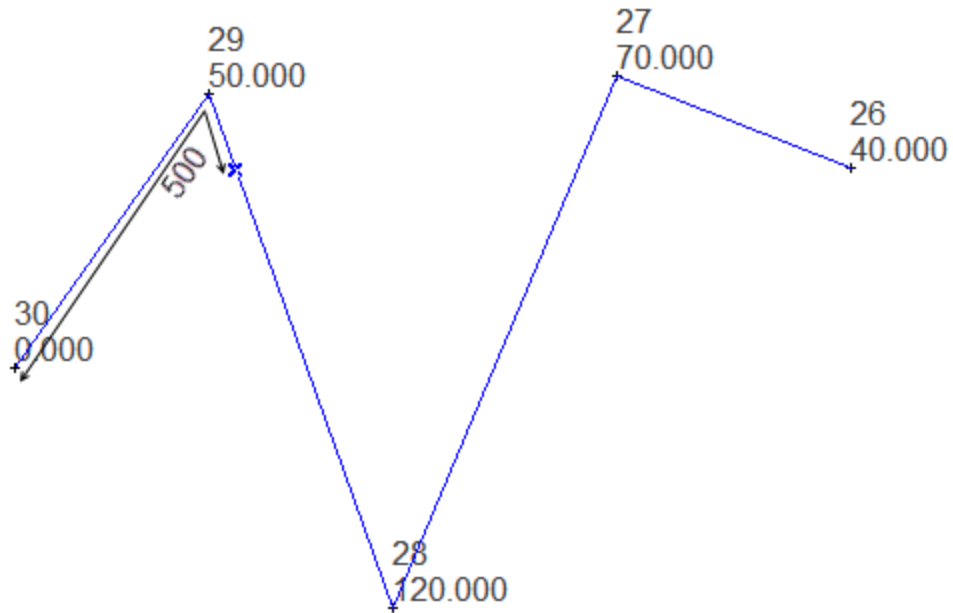
#### Single distance line segmenting



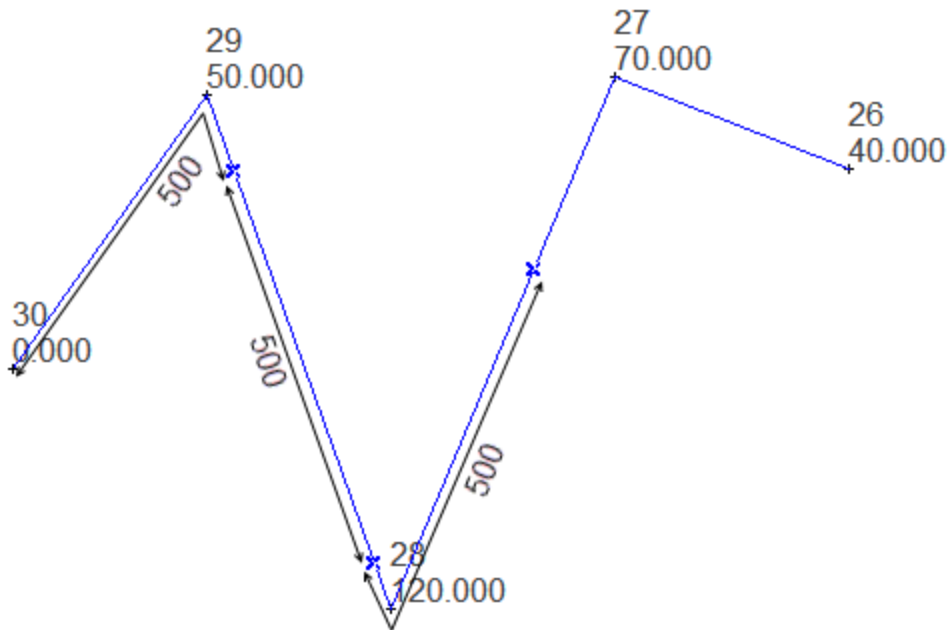
#### Multiple distance line segmenting



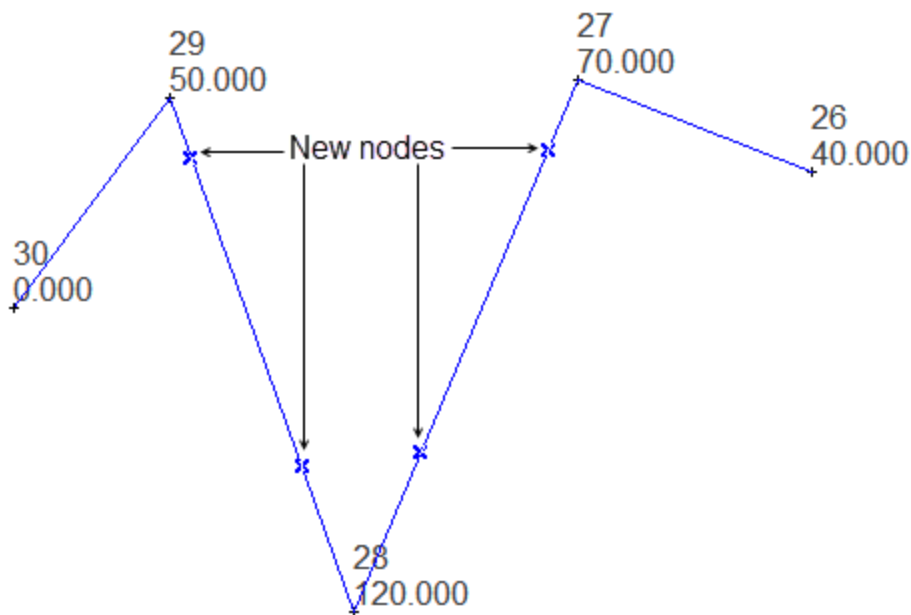
### Equal distances line segmenting



### Single distance string segmenting



**Multiple distance string segmenting**



**Equal distances string segmenting**

The required segmentation may be configured at the input panel for this option, located at the bottom toolbar. Fields are described in the table below.



**Fields of the input panel, when segmenting a line**

| Field   | Description   |
|---|---|
| <i>Distance</i>   | Defines the length of each segment. Measured from the start/end point of the entity and from each new node in case of multiple segments. See pictures above for details.          |
| <i>Divide by Distance</i>   | Tick to divide the line/string to as many segments of length, specified in the <i>Distance</i> editbox, as possible.  |
| <i>Segments</i>   | Defines the quantity of segments for division.  |
| <i>Divide Equally</i>   | Tick to divide the line/string to the segments of the same length.  |
| <i>Interpolate Z</i>  | Tick to automatically calculate the elevations of the newly created nodes.  |
| <i>Fix Start Point</i>  | When ticked, the distance will always be measured from the start point of the string, regardless of the segmenting.<br>NOTE<br>This field available only when segmenting strings. |
| <i>TIP</i><br><i>The first field of the input panel displays the length of the selected entity.</i> |   |

**Single distance segmenting**

To divide a line or string:

1. In the *Line* group of the *Modify* tab, click the **Segment Line** icon.
2. In the survey view, click the required line or string. Note that the distance will be measured from the start/end point, depending which is nearest to the place of clicking.

## NOTE

If a line/string was selected, when clicking the **Segment Line** icon, it will be used for division.

The input panel is displayed at the bottom toolbar. Fields are described in the table above.

3. Make sure, that the *Segments* editbox at the bottom toolbar has the value of "1".
4. If needed, at the bottom toolbar tick the *Interpolate Z* checkbox to automatically calculate elevation of the new node.
5. Locate the new node. Do one of the following:
  - Click the required place in the survey view.
  - In the *Distance* editbox at the bottom toolbar, specify the required segment length.

The line/string is divided; the last created segment is selected for further division.

6. If needed, repeat the division.
7. When finished, press *Esc*.

**Multiple distance segmenting**

To divide a line or string to several segments:

1. In the *Line* group of the *Modify* tab, click the **Segment Line** icon.
2. In the survey view, click the required line or string. Note that the distance will be measured from the start/end point, depending which is nearest to the place of clicking.

## NOTE

If a line/string was selected, when clicking the **Segment Line** icon, it will be used for division.

The input panel is displayed at the bottom toolbar. Fields are described in the table above.

3. In the *Distance* editbox at the bottom toolbar, specify the required segment length.
4. If needed, at the bottom toolbar tick the *Interpolate Z* checkbox to automatically calculate elevation of the new node.
5. Do one of the following:
  - At the bottom toolbar, tick the *Divide by Distance* checkbox, to create as many segments of the defined length as possible.
  - In the *Segments* editbox at the bottom toolbar, specify the quantity of segments.
6. Confirm the segmentation. Do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The line/string is divided.

### Equal distance segmenting

To divide a line or string to several segments:

1. In the *Line* group of the *Modify* tab, click the **Segment Line** icon.
2. In the survey view, click the required line or string. Note that the distance will be measured from the start/end point, depending which is nearest to the place of clicking.

#### NOTE

If a line/string was selected, when clicking the **Segment Line** icon, it will be used for division.

The input panel is displayed at the bottom toolbar. Fields are described in the table above.

3. In the *Segments* editbox at the bottom toolbar, specify the quantity of segments.
4. If needed, at the bottom toolbar tick the *Interpolate Z* checkbox to automatically calculate elevation of the new node.
5. At the bottom toolbar, tick the *Divide Equally* checkbox.
6. Confirm the segmentation. Do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The line/string is divided.

### Move Point/Line icon

The **Move Point/Line** icon of the *Line* group allows you to move an existing point or line to a new place, defined as the bearing and distance from the original location.

To move a point/line:

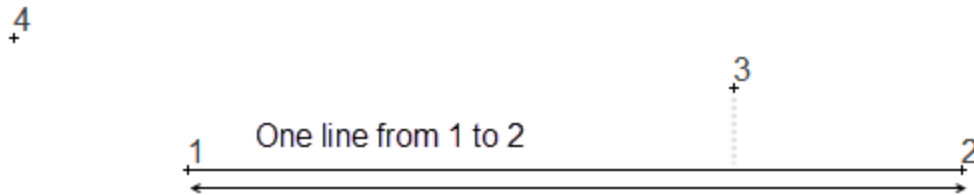
1. In the *Line* group of the *Modify* tab, click the **Move Point/Line** icon.
2. In the survey view, select the required point/line. Note that the new position of the line will be defined from the start/end point, depending which is nearest to the place of clicking.
3. Locate the new point/line position. Do one of the following:
  - Click the required place in the survey view.
  - At the bottom toolbar, specify the bearing and distance to the new position in the appropriate edit-boxes.

The point/line is moved.

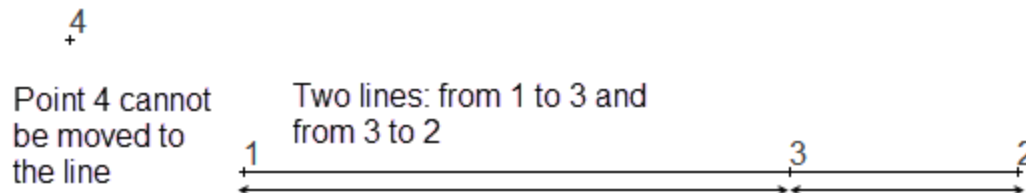
## Insert Point into Line icon

The **Insert Point into Line** icon of the Line group allows you to perpendicularly move an existing point to an existing line/string. After that, a line splits into two. A point moved to a string becomes a string node.

### Before



### After



### Insertion point into the line

To insert a point into a line/string:

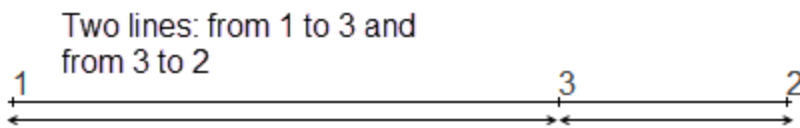
1. In the *Line* group of the *Modify* tab, click the **Insert Point into Line** icon.
2. In the survey view, select the required line/string.
3. In the survey view, select the required point.
 

The point is moved to the line/string.
4. If needed, select more points.
5. When finished, press *Esc*.

## Delete Point on Line

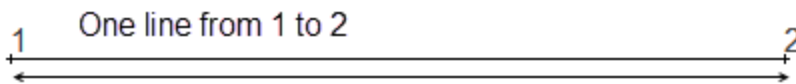
The **Delete Point on Line** icon of the Line group allows you to remove points from a multi segment collinear line. The line segments will be converted to one line.

## Before




---

## After



### Delete point on line

#### **CAUTION**

***The start and end points cannot be deleted.***

To delete a point from a line:

1. In the *Line* group of the *Modify* tab, click the **Delete Point on Line** icon.
2. If needed, in the *Tolerance Angle* editbox at the bottom toolbar, specify the required tolerance for line segments collinear.
3. In the survey view, select the required point.  
The point is deleted.
4. If needed, delete more points.
5. When finished, press *Esc*.

### Flip Line icon

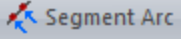
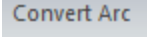
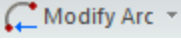



The Flip **Line** icon of the *Line* group allows you to switch the start and end points of a line. The start point becomes the end point, and the end point becomes the start point.

To flip a line:

1. In the *Line* group of the *Modify* tab, click the **Flip Line** icon.
2. In the survey view, select the required line.  
The start and end points of the line is switched.
3. If needed, select more lines.
4. When finished, press *Esc*.

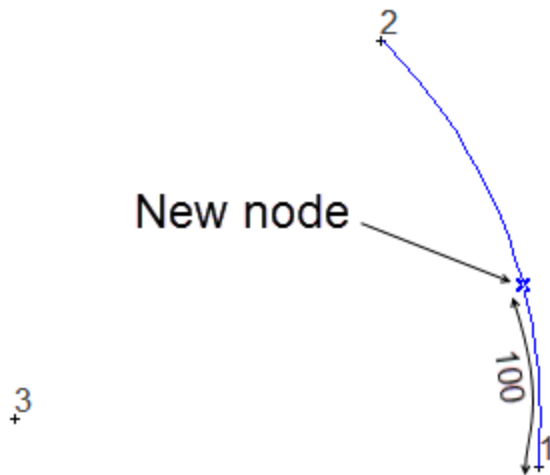
## Arc group

The *Arc* group from the *Modify* tab of the MAGNET Office ribbon allows you to edit the existing arcs. It contains three icons and three second-level icons, described in the table below.

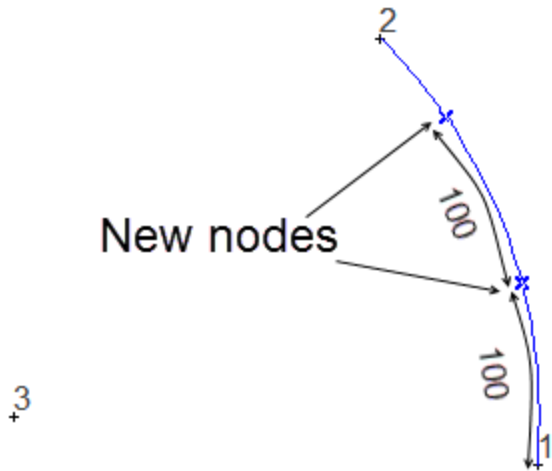
|   |   |
|---|---|
|  Segment Arc           | <p>Segment Arc icon</p> <p>Click it to divide an arc to segments by adding points on it.</p>    |
|  Convert Arc           | <p>Convert Arc icon</p> <p>Click it to convert an arc from existing arc format to another.</p>  |
|  Modify Arc ▾          | <p>Modify Arc icon</p> <p>Click it to modify an existing arc. Click ▾ to see it.</p>            |
|  Insert Point into Arc | <p>Insert Point into Arc icon</p> <p>Click it to move an existing point to an existing arc.</p> |
|  Delete Point on Arc   | <p>Delete Point on Arc</p> <p>Click it to t to remove points from an existing arc.</p>          |
|  Mirror Arc            | <p>Mirror Arc icon</p> <p>Click it to "mirror" an existing arc.</p>                             |

### Segment Arc icon

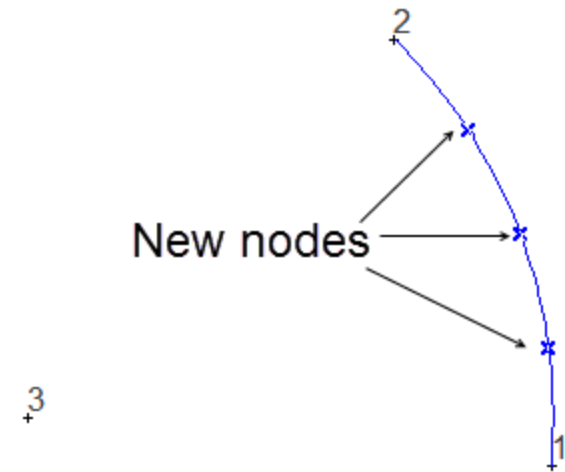
The **Segment Arc** icon of the Arc group allows you to divide an existing arc into several segments, either by defined segments length from the start point of the entity or by equal parts. See pictures below for details.



Single distance arc segmenting



**Multiple distance arc segmenting**



**Equal distances arc segmenting**

The required segmentation may be configured at the input panel for this option. It located at the bottom toolbar. Fields are described in the table below.

**Fields of the input panel, when segmenting an arc**

| Field                     | Description  |
|---------------------------|--|
| <i>Distance</i>           | Defines the length of each segment. Measured from the start/end point of the entity and from each new node in case of multiple segments. See pictures above for details. |
| <i>Divide by Distance</i> | Tick to divide the arc to as many segments of length, specified in the <i>Distance</i> editbox, as possible.   |
| <i>Segments</i>           | Defines the quantity of segments for division.   |
| <i>Divide Equally</i>     | Tick to divide the arc to the segments of the same length.   |
| <i>Interpolate Z</i>      | Tick to automatically calculate the elevations of the newly created nodes.   |

| Field  | Description  |
|--|--|
| <i>Fix Start Point</i>   | When ticked, the distance will always be measured from the start point of the arc, regardless of the segmenting. |
| <p><b>TIP</b><br/> <i>The first field of the input panel displays the length of the selected entity.</i></p> |  |

### Single distance segmenting

To divide an arc:

1. In the *Arc* group of the *Modify* tab, click the **Segment Arc** icon.
2. In the survey view, click the required arc. Note that the distance will be measured from the start/end point, depending which is nearest to the place of clicking.

**NOTE**

If an arc was selected, when clicking the **Segment Arc** icon, it will be used for division.

The input panel is displayed at the bottom toolbar. Fields are described in the table above.

3. Make sure, that the *Segments* editbox at the bottom toolbar has the value of "1".
4. If needed, at the bottom toolbar tick the *Interpolate Z* checkbox to automatically calculate elevation of the new node.
5. Locate the new node. Do one of the following:
  - Click the required place in the survey view.
  - At the bottom toolbar, in the *Distance* editbox, specify the required segment length.

The arc is divided; the last created segment is selected for further division.

6. If needed, repeat the division.
7. When finished, press *Esc*.

### Multiple distance segmenting

To divide an arc to several segments:

1. In the *Arc* group of the *Modify* tab, click the **Segment Arc** icon.
2. In the survey view, click the required arc. Note that the distance will be measured from the start/end point, depending which is nearest to the place of clicking.

**NOTE**

If an arc was selected, when clicking the **Segment Arc** icon, it will be used for division.

The input panel is displayed at the bottom toolbar. Fields are described in the table above.

3. In the *Distance* editbox at the bottom toolbar, specify the required segment length.
4. If needed, at the bottom toolbar tick the *Interpolate Z* checkbox to automatically calculate elevation of the new node.
5. Do one of the following:
  - At the bottom toolbar, tick the *Divide by Distance* checkbox, to create as many segments of the defined length as possible.
  - In the *Segments* editbox at the bottom toolbar, specify the quantity of segments.
6. Confirm the segmentation. Do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The arc is divided.

## Equal distance segmenting

To divide an arc to several segments:

1. In the *Arc* group of the *Modify* tab, click the **Segment Arc** icon.
2. In the survey view, click the required arc. Note that the distance will be measured from the start/end point, depending which is nearest to the place of clicking.

### NOTE

If an arc was selected, when clicking the **Segment Arc** icon, it will be used for division.

The input panel is displayed at the bottom toolbar. Fields are described in the table above.

3. In the *Segments* editbox at the bottom toolbar, specify the quantity of segments.
4. If needed, at the bottom toolbar tick the *Interpolate Z* checkbox to automatically calculate elevation of the new node.
5. At the bottom toolbar, tick the *Divide Equally* checkbox.
6. Confirm the segmentation. Do one of the following:
  - Press *Enter*.
  - Left click in the survey view.

The arc is divided.

## Convert Arc icon

The **Convert Arc** icon of the *Arc* group allows you to convert an existing arc from the one arc type to another.

### TIP

*A 3-Point arc – an arc defined by the three points, which belong to one circumference.*

*A 2-Point arc – an arc defined by the two points, which belong to one circumference and the center point. The center point is not saved as the MAGNET Office point entity.*

*A centre point arc – an arc defined by the two points which belong to one circumference and the center point. The center point is saved as the MAGNET Office point entity.*

To convert an arc:

1. In the *Arc* group of the *Modify* tab, click the **Convert Arc** icon.  
The **Convert Arc** dialog is displayed. Fields are described in the table below.
2. In the **Convert Arc** dialog, make the required *Convert From* and *Convert To* configurations.
3. Click **OK**.
4. In the survey view, select the arc for conversion.

The arc is converted.

5. If needed, select more arcs.
6. When finished, press *Esc*.

### Fields of the *Convert Arc* dialog

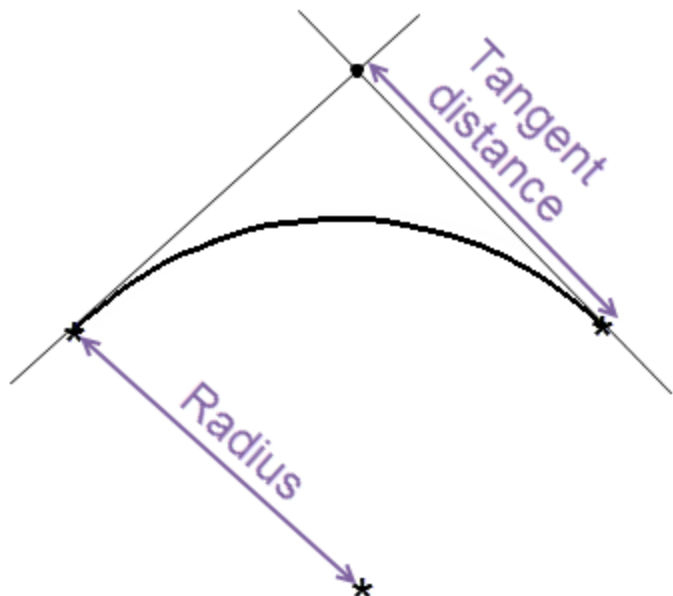
| Field | Description         |
|-------|---------------------|
|       | <b>Convert From</b> |



| <b>Field</b>                 | <b>Description</b>   |
|------------------------------|--|
| <i>3 Point Arc</i>           | When ticked, 3 point arcs will be used for conversion. Otherwise, 3 point arcs will be unable for conversion.  |
| <i>2 Point Arc</i>           | When ticked, 2 point arcs will be used for conversion. Otherwise, 2 point arcs will be unable for conversion.  |
| <i>Center Point Arc</i>      | When ticked, center point arcs will be used for conversion. Otherwise, center point arcs will be unable for conversion.  |
| <i>Convert To</i>            | Defines the target arc type for conversion. Select the required type from the drop-down list.<br>NOTE<br>The currently selected arc type is not available for selection at the Convert From group box. |
| <i>Delete Unused Points</i>  | When ticked, the unused point will be deleted after conversion.<br><i>For example, when converting the center point arc to the 2 point arc, the center point will be deleted.</i>                      |
| <i>Interpolate Elevation</i> | When ticked, the elevation of the newly created points will be interpolated from the elevations of the existing points.<br>NOTE<br>This field available only when converting to the 3 point arc.       |
| <i>Use in Surface</i>        | Defines whether the newly created point may be used in surface or not.<br>NOTE<br>This field available only when converting to the 3 point arc.  |

## Modify Arc icon

The **Modify Arc** icon of the Arc group allows you to modify an existing arc by changing its radius or tangent distance. See picture below for details.



### Arc radius and tangent distance

#### Fields of the input panel when modifying arcs

| Field                       | Description   |
|-----------------------------|---|
| <i>Radius</i>               | Defines the radius of the arc. See picture above for details.   |
| <i>Tangent Distance</i>     | Defines the tangent distance of the arc. See picture above for details.   |
| <i>Modify Tangent Lines</i> | When ticked, the tangent lines of the arc will be modified along with the arc to fit new parameters. Otherwise, tangent lines remain unchanged. |
| <i>Orig. Radius</i>         | Displays the original radius of the arc. See picture above for details.   |
| <i>Orig. Tan. Dist.</i>     | Displays the original tangent distance of the arc. See picture above for details.   |

To modify an arc:

1. In the *Arc* group of the *Modify* tab, click the **Modify Arc** icon.
2. In the survey view, select the required arc.

**NOTE**

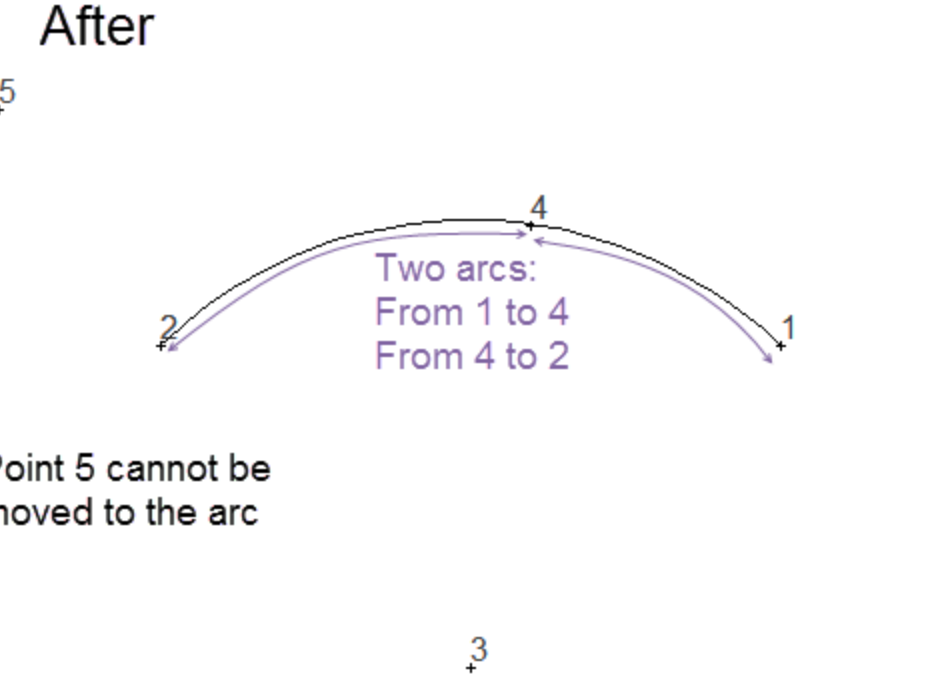
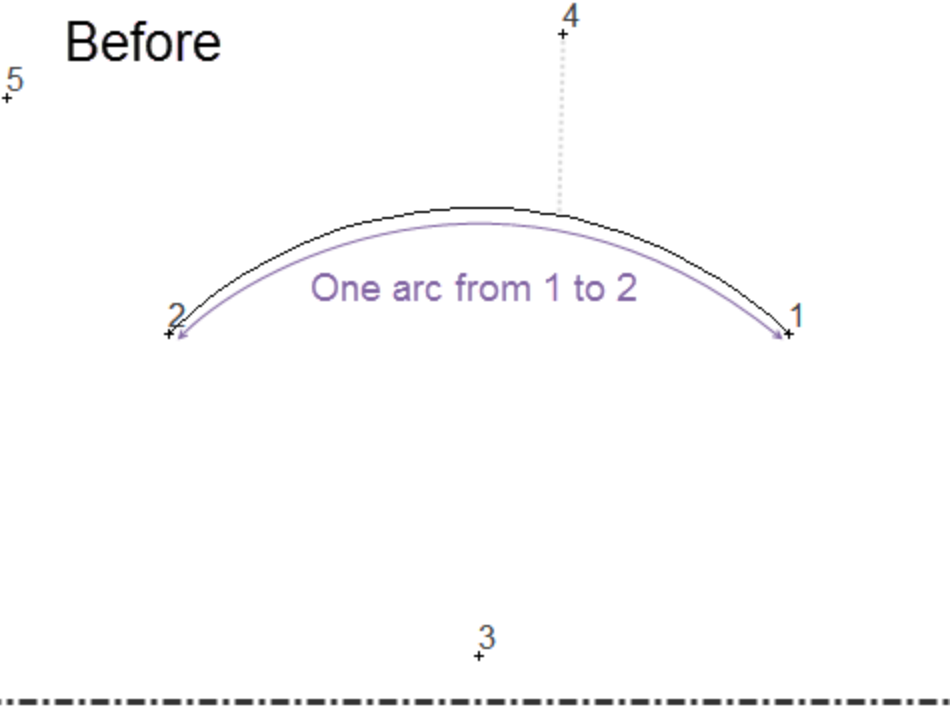
If an arc was selected, when clicking the **Modify Arc** icon, it will be used.

The input panel is displayed at the bottom toolbar. Fields are described in the table above.

3. Do one of the following:
  - In the survey view, move the points of the selected arc by using the mouse.
  - In the *Radius* editbox at the input panel, type the required arc radius.
  - In the *Tangent Distance* editbox at the input panel, type the required length of the tangent line.
4. Press *Enter*.
5. If needed, repeat for another arc.
6. When finished, press *Esc*.

### Insert Point into Arc icon

The **Insert Point into Arc** icon of the Arc group allows you to perpendicularly move an existing point to an existing arc. After that, an arc splits into two.



Point 5 cannot be moved to the arc

Insertion point into the arc

To insert a point into an arc:

1. In the *Arc* group of the *Modify* tab, click the **Insert Point into Arc** icon.
2. In the survey view, select the required arc.

### NOTE

If an arc was selected, when clicking the **Insert Point into Arc** icon, it will be used for point insertion.

3. In the survey view, select the required point.

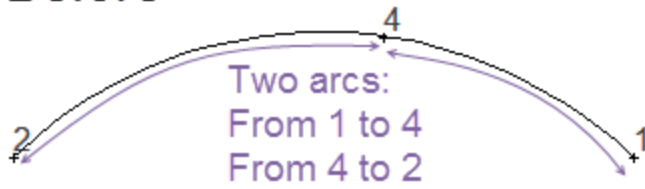
The point is moved to the arc.

4. If needed, select more points.
5. When finished, press *Esc*.

## Delete Point on Arc

The **Delete Point on Arc** icon of the *Arc* group allows you to remove points from a multi segment arc. The arc segments will be converted to one arc.

Before



3

After



3

#### Delete point on arc

##### **CAUTION**

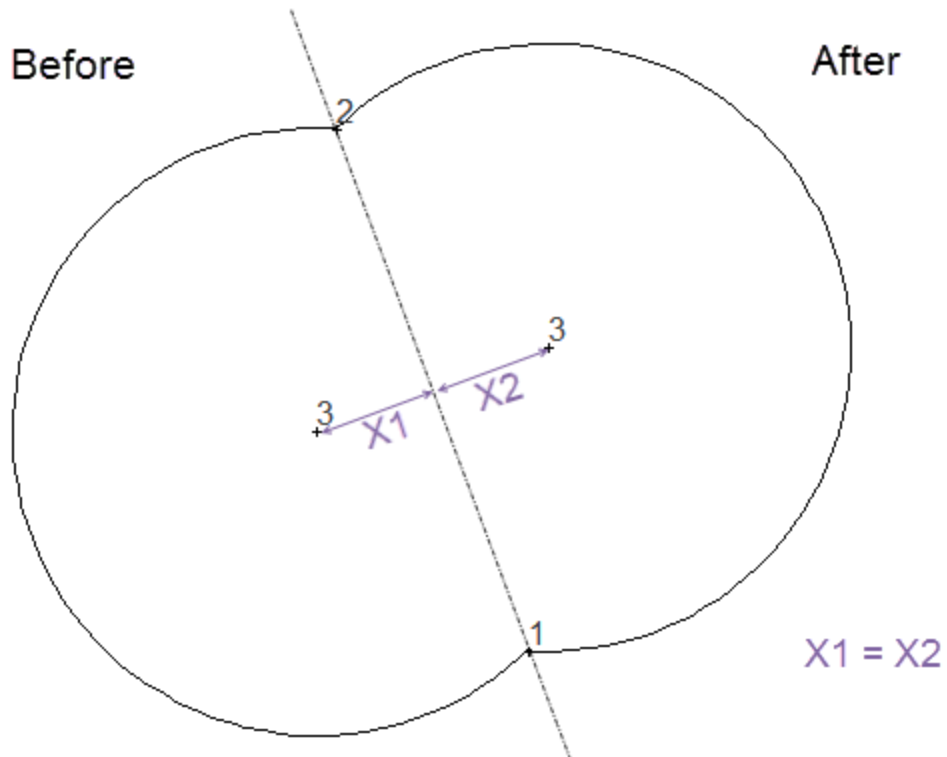
***The start and end points cannot be deleted.***

To delete a point from a line:

1. In the *Arc* group of the *Modify* tab, click the **Delete Point on Arc** icon.
2. In the survey view, select the required point.  
The point is deleted.
3. If needed, delete more points.
4. When finished, press *Esc*.

## Mirror Arc icon

The **Mirror Arc** icon of the Arc group allows you to "mirror" an existing arc. See picture below for details. The start and end points of the arc will be switched. The start point becomes the end point, and the end point becomes the start point.



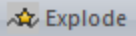
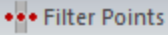












### Mirroring arc

To mirror an arc:

1. In the *Arc* group of the *Modify* tab, click the **Mirror Arc** icon.
2. In the survey view, select the required arc.  
The arc is mirrored. The start and end points of the arc is switched.
3. If needed, select more arcs.
4. When finished, press *Esc*.

## String group

The *String* group from the *Modify* tab of the MAGNET Office ribbon allows you to edit the existing strings. It contains three icons and twelve second level icons, described in the table below.

|   |   |
|---|---|
|  Explode               | Explode icon<br>Click it to convert string or polyline into points and individual lines.        |
|  Filter Points         | Filter Points icon<br>Click it to reduce the number of points at a string.                      |
| Modify String ▾   | Modify String icon<br>This icon contains the list of the second level icons. Click ▾ to see it. |
|  Add Point             | Add Point icon<br>Click it to add existing points to an existing string/polygon.                |
|  Delete Point          | Delete Point icon<br>Click it to remove points from an existing string/polygon.                 |
|  Swap Points           | Swap Points icon<br>Click it to flip the start and end points of the string segment.            |
|  Reverse               | Reverse icon<br>Click it to flip the start and end points of the string/polygon.                |
|  Join/Create           | Join/Create icon<br>Click it to join existing strings in one entity.                            |
|  Break String         | Break String icon<br>Click it to divide one string to two connected strings.                    |
|  Delete Segment      | Delete Segment icon<br>Click it to remove a segment from a string.                              |
|  Intersect           | Intersect icon<br>Click it to add the intersection point for two crossing strings.              |
|  Convert to Polyline | Convert to Polyline icon<br>Click it to convert an existing string to a polyline.               |
|  Create from Lines   | Create from Lines icon<br>Click it to create a string from the set of existing lines/arcs.      |
|  Densify Points      | Densify Points icon<br>Click it to add more points to an existing string.                       |
|  Edit Strings        | Edit String icon<br>Click it to edit an existing string.  |

### Explode icon

The **Explode** icon of the String group allows you to convert an existing string/polyline/polygon/ to individual lines/arcs/points.

To explode a string/polyline/polygon:

1. In the *String* group of the *Modify* tab, click the **Explode** icon.
2. In the survey view, select the required string/polyline/polygon.

#### NOTE

If a string/polyline/polygon was selected, when clicking the icon, it will be exploded.

3. If you trying to explode a boundary, the confirmation message box appears. Click **Yes**.

The entity is exploded.

#### NOTE

Polylines don't have points. When exploding a polyline, the result will be lines without points. To create points on them, use the **Create Points** icon from the Point group of the Modify tab. See "Create from Entity icon" section on page 228 for details.

You may configure additional properties of explosion. To do so:

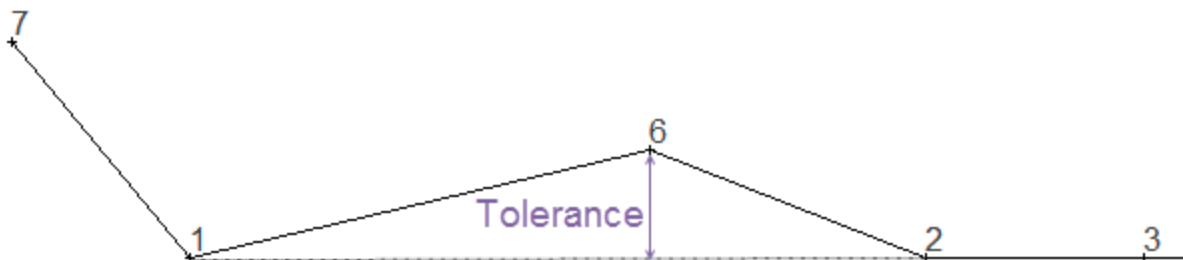
1. In the *String* group of the *Modify* tab, click the **Explode** icon.
2. Press *O*.

The **Explode String** dialog is displayed.

3. Select one of the following:
  - *Create 2 Point Arc*— to explode an entity into 2 point arcs.
  - *Create 3 Point Arc* — to explode an entity into 3 point arcs.
  - *Create Arc With Center Point* — to explode an entity into arcs with center points.
4. If needed, tick the *Set as Default Setting* to use the configures settings as defaults.
5. Click **OK**.
6. In the survey view, select the required entity for explosion.

## Filter Points icon

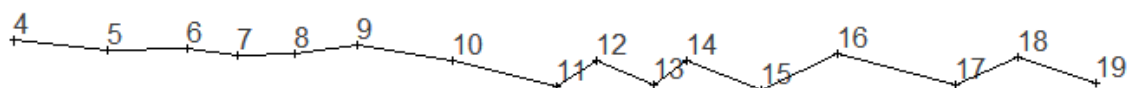
The **Filter Points** icon of the String group allows you to reduce the quantity of points on an existing string. This option removes points from strings within the specified tolerance. See pictures below for details.



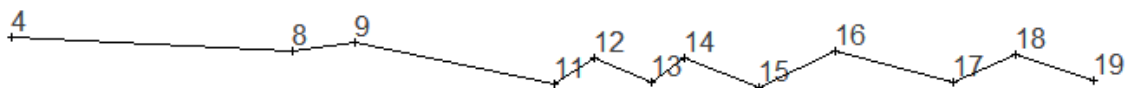
### Tolerance



## Before



## After



### Horizontal reducing

## Before



## After



### Vertical reducing

To filter points of an existing string:

1. In the *String* group of the *Modify* tab, click the **Filter Points** icon.  
The **Filter Tolerance** dialog is displayed. Fields are described in the table below.
2. In the **Filter Tolerance** dialog, make the required configurations and click **OK**.
3. In the survey view, select the required string.

#### NOTE

If a string was selected, when clicking the icon, it will be used as the source string.

Points, matching the specified tolerance, are removed from the string.

4. If needed, select more strings.
5. When finished, press *Esc*.

### Fields of the **Filter Tolerance** dialog

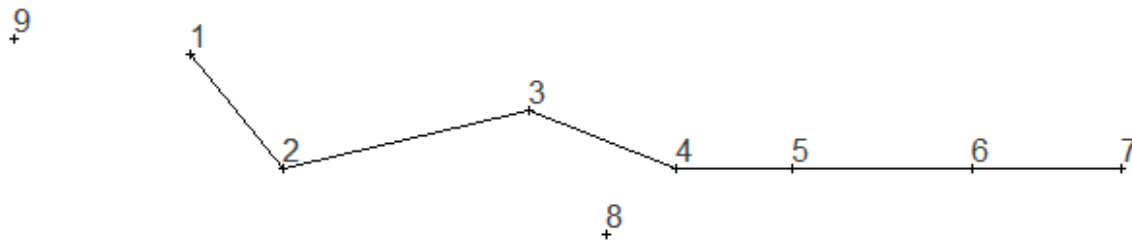
| Field                       | Description   |
|-----------------------------|---|
| <i>Horizontal tolerance</i> | Defines the horizontal tolerance for point filtering. |

| Field                     | Description   |
|---------------------------|---|
| <i>Vertical tolerance</i> | Defines the vertical tolerance for point filtering. To activate the vertical tolerance, tick the appropriate checkbox.<br>NOTE<br>When vertical filtering is not applied, points within the specified horizontal tolerance will be filtered regardless of the elevation. When vertical filtering is applied, only points which matching both the horizontal and vertical tolerances will be filtered. |
| <b>Filtered points</b>    |   |
| <i>Retain</i>             | When selected, filtered points will be removed from the string, but not deleted from the survey view. Tick the <i>Set non-Use in Surface</i> checkbox, to set them non-use in surface.  |
| <i>Delete</i>             | When selected, filtered points will be deleted from the line and the survey view.   |

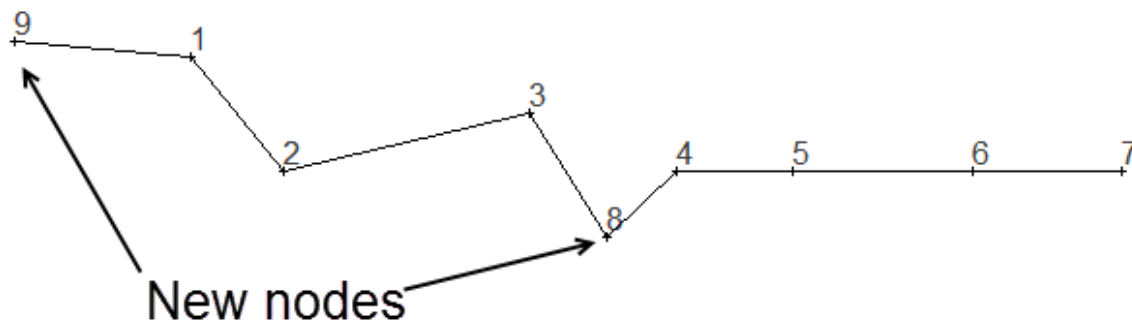
## Add Point icon

The **Add Point** icon of the String group allows you to add an existing point to an existing string/polygon. A point moved to a string becomes a string node. See picture below for details.

## Before



## After



### Adding points to the string

To add a point to a string/polygon:

1. In the *String* group of the *Modify* tab, click the **Add Point** icon.
2. In the survey view, select the required string/polygon.

#### NOTE

If a string was selected, when clicking the icon, it will be used for points adding.

3. In the survey view, select the required point.

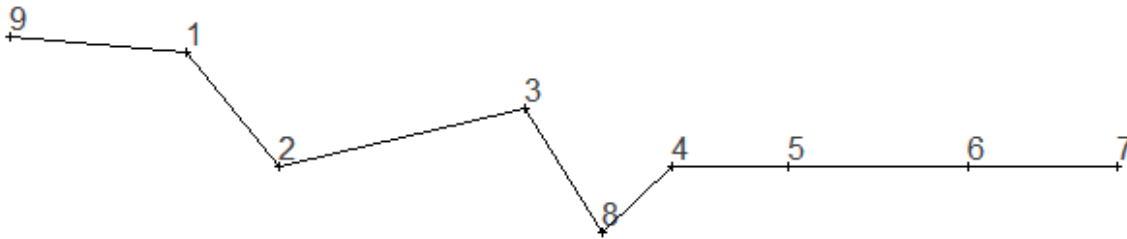
The point is added to the string/polygon.

4. If needed, select more points.
5. When finished, press *Esc*.

### Delete Point icon

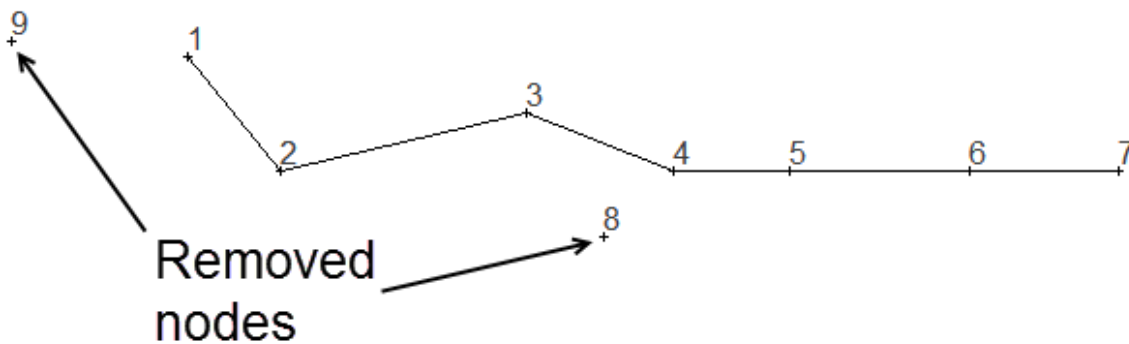
The **Delete Point** icon of the String group allows you to remove nodes from an existing string/polygon. See picture below for details.

## Before




---

## After



### Removing points from the string

To remove a point from a string/polygon:

1. In the *String* group of the *Modify* tab, click the **Delete Point** icon.
2. In the survey view, select the required string/polygon.

#### NOTE

If a string was selected, when clicking the icon, it will be used for points removing.

3. Select the required point.

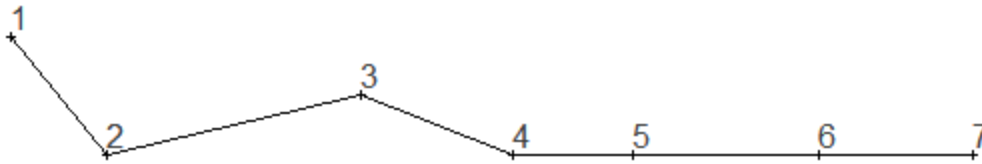
The point is removed from the string/polygon.

4. If needed, select more points.
5. When finished, press *Esc*.

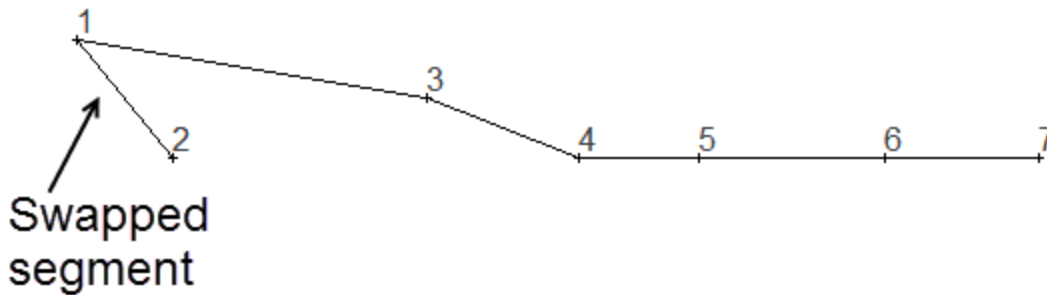
### Swap Points icon

The **Swap Points** icon of the String group allows you to switch the start and end points of a string segment. The start point becomes the end point, and the end point becomes the start point. See picture below for details.

Before



After



### Swapping string segment

To swap a string segment:

1. In the *String* group of the *Modify* tab, click the **Swap Points** icon.
2. In the survey view, select the required string.
3. Select the required segment.

The start and end points of the segment is switched.

4. If needed, select more segments.
5. When finished, press *Esc*.

### Reverse icon

The **Reverse** icon of the *String* group allows you to switch the start and end points of an existing string/polygon. The start point becomes the end point, and the end point becomes the start point.

To reverse a string/polygon:

1. In the *String* group of the *Modify* tab, click the **Reverse** icon.
2. In the survey view, select the required string/polygon.

The start and end points of the string/polygon is switched.

3. If needed, select more strings/polygons.
4. When finished, press *Esc*.

### Join/Create icon

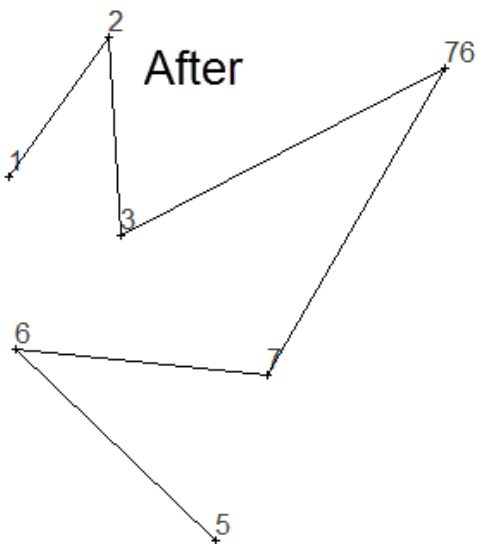
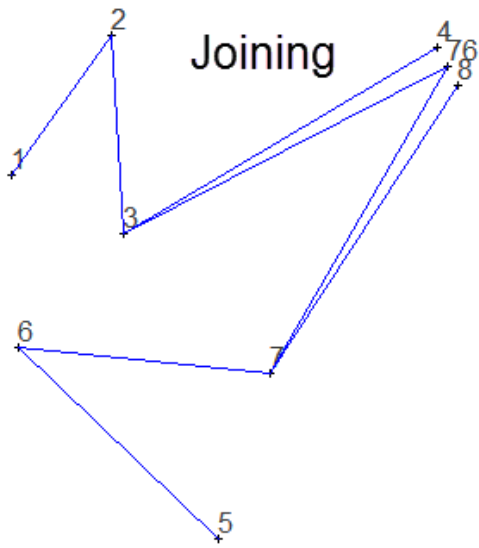
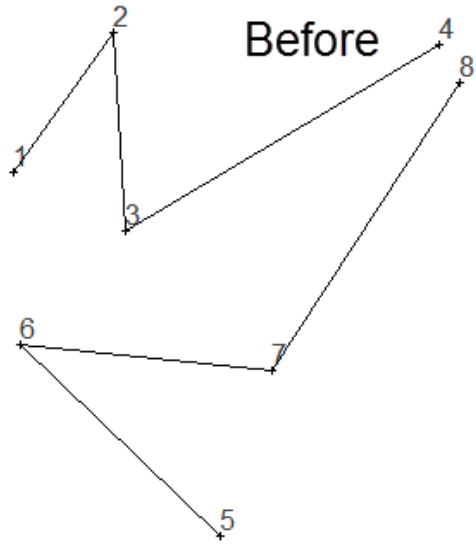
The **Join/Create** icon of the *String* group allows you to join existing strings/lines and combine them in one entity.

To join existing strings/lines:

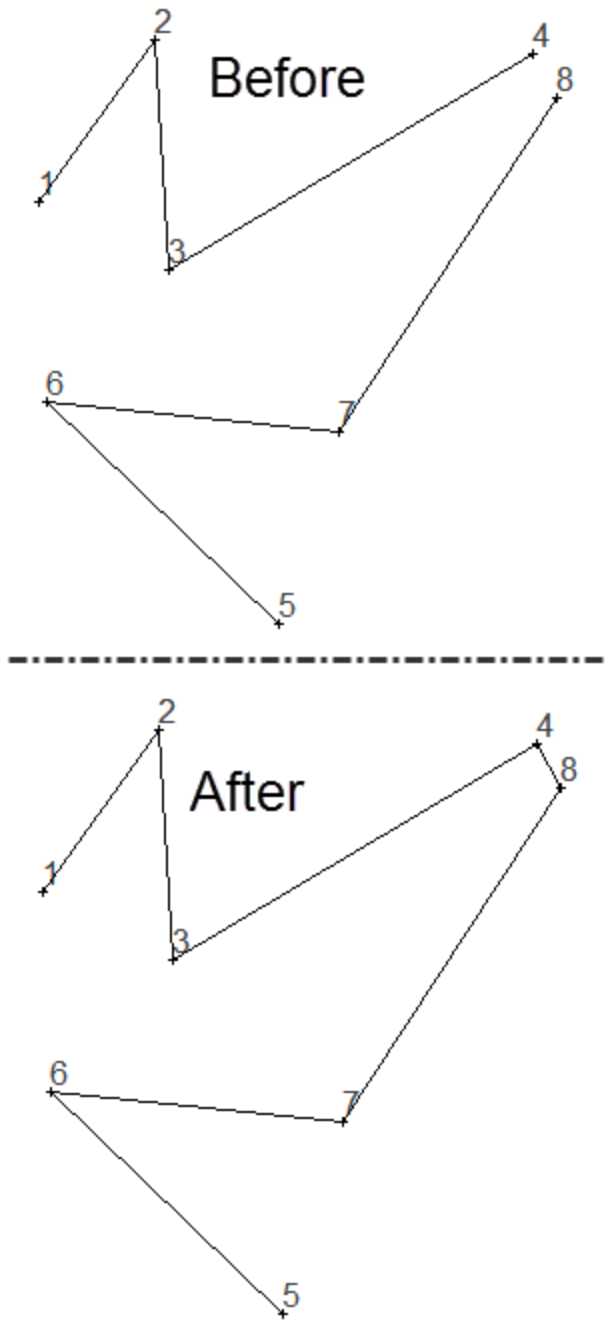
1. In the *String* group of the *Modify* tab, click the **Join/Create** icon.  
 The ***Join/Create Strings with Common Point*** dialog is displayed. Fields are described in the table below.
2. In the *Connection Method* group box, select the required method. See pictures below for details.
3. If needed, configure more parameters.
4. Click **OK**.
5. In the survey view, continuously select the two required strings.  
 The strings are joined.
6. If needed, select more pairs of strings.
7. When finished, press *Esc*.

**Fields of the *Join/Create Strings with Common Point* dialog**

| Field                                   | Description  |
|---|--|
| <i>Join gaps between</i>                | Define the range of gaps between line end points, which may be joined. Strings, gaps between which are less or more than defined will not be joined. Specify the gaps range in the appropriate editboxes, or click <b>Pick</b> and pick it in the survey view. |
| <i>Connection Methods</i>               | Defines the way to connect two strings. See pictures below for details.  |
| <i>Join only in the same layers</i>     | When ticked only strings, which belong to the same layer may be joined.  |
| <i>Join only at the same elevations</i> | When ticked only strings, which endpoints have the same elevations may be joined.  |

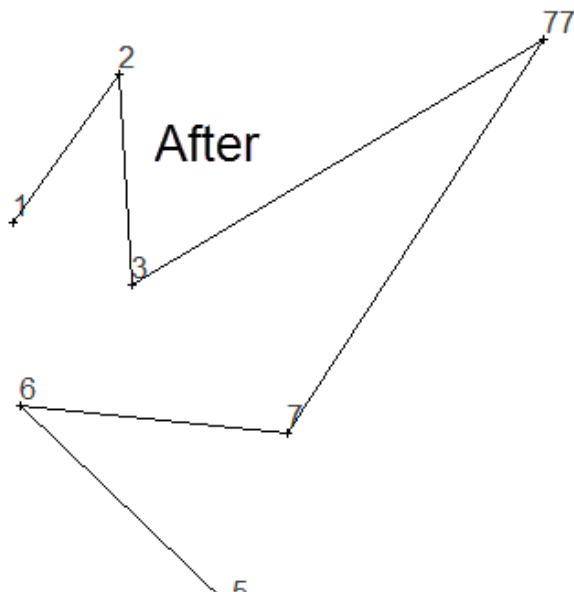
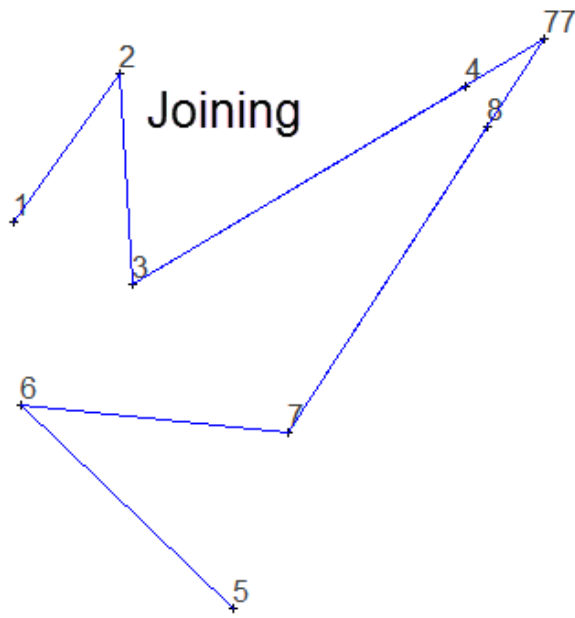
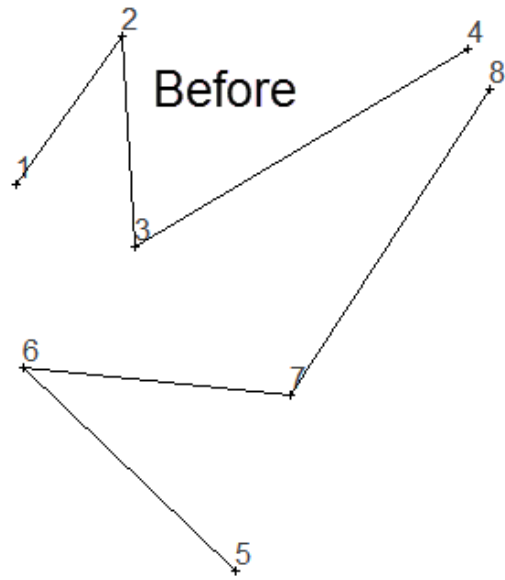


**Average endpoints connection method**



**Directly connect endpoint connection method**





## Fillet with zero radius connection method

### Break String icon

The **Break String** icon of the String group allows you to divide a solid string to two connected strings. Each of the new strings becomes independent entity.

To break a string:

1. In the *String* group of the *Modify* tab, click the **Break String** icon.
2. In the survey view, select the required string.
3. Select the break point.

The string is divided.

### Delete Segment icon

The **Delete Segment** icon of the String group allows you to remove a segment from an existing solid string. If this segment is located in the middle of the string, the string will be divided to two strings. Each of the new strings becomes independent entity.

To delete a segment from a string:

1. In the *String* group of the *Modify* tab, click the **Delete Segment** icon.
2. In the survey view, select the required string.
3. Select the required segment.

The segment is deleted.

### Intersect icon

The **Intersect** icon of the String group allows you to add a point to the intersection of two strings. The strings must physically cross each other. Each existing string will be divided by this point into two. After all two strings turn into four strings with one common point, each of them is independent entity.

To intersect strings:

1. In the *String* group of the *Modify* tab, click the **Intersect** icon.
2. In the survey view, select the required strings.

The input panel is displayed at the bottom toolbar, with the prompted properties for the intersection point.

3. Review the properties of the intersection point, if needed, change them.
4. To confirm the intersection point do one of the following:
  - Left click in the survey view.
  - Press *Enter*.

The intersection point is created.

#### Fields of the input panel for the intersection point, when creating points

| Field  | Description                                   |
|--------|---|
| Number | Defines the number of the intersection point. |

| Field                 | Description   |
|-----------------------|---|
| East                  | Displays the East (X) coordinate of the intersection point.                   |
| North                 | Displays the North (Y) coordinate of the intersection point.                  |
| Elev                  | Defines the elevation of the intersection point.                              |
| Code                  | Defines the code of the intersection point.                                   |
| Use in Surface        | Defines whether the intersection point may be used in surface or not.         |
| Interpolate Elevation | Defines whether the elevation of the intersection point will be interpolated. |

## Convert to Polyline icon

The **Convert to Polyline** icon of the String group allows you to convert an existing string to a polyline. All points from the string will be deleted.

To create a polyline from a string:

1. In the *String* group of the *Modify* tab, click the **Convert to Polyline** icon.
2. In the survey view, select the required string.

### NOTE

If a string was selected, when clicking the icon, it will be converted to polyline.

The string is converted to a polyline.

## Create from Lines icon

The **Create from Lines** icon of the String group allows you to convert the set of the connected independent lines/arcs to a one solid string.

### NOTE

Lines must have common points.

To create a string from existing lines/arc:

1. In the survey view, select the required lines/arcs.
2. In the *String* group of the *Modify* tab, click the **Create from Lines** icon.

The string is created.

### TIP

*If not all selected lines/arcs are included into a new string, check for overlapping lines/arc and verify that all selected entities are lines/arcs. Strings cannot be used in this function.*

## Densify Points icon

The **Densify Points** icon of the String group allows you to increase the quantity of points on an existing string.

To add more points to a string:

1. In the *String* group of the *Modify* tab, click the **Densify Points** icon.
2. In the survey view, select the required string.

**NOTE**

If a string was selected, when clicking the icon, it will be used for points insertion.

The **Densify Points** dialog is displayed. Fields are described in the table below.

3. In the **Densify Points** dialog, specify the spacing for the new points in the appropriate editboxes.
4. If needed, configure more settings.
5. Click **OK**.
6. The new points are created on the string.

**Fields of the *Densify Points* dialog**

| Field                               | Description  |
|-------------------------------------|--|
| <i>Spacing on Straight Segments</i> | Defines the spacing for the new points at the straight segments of the string.                   |
| <i>Spacing on Curved Segments</i>   | Defines the spacing for the new points at the curved (created from arcs) segments of the string. |
| <i>Interpolate Elevations</i>       | When ticked, elevations of the newly created points will be interpolated from existing values.   |
| <i>Use in Surface</i>               | Defines whether the newly created point may be used in surface or not.                           |

## Edit String icon

The **Edit String** icon of the *String* group allows you to edit an existing string.

To edit a string:

1. In the *String* group of the *Modify* tab, click the **Edit String** icon.
2. In the survey view, select the required string.

**NOTE**

If a string was selected, when clicking the icon, it will be used for editing.

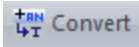


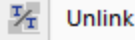
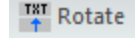
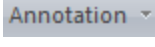

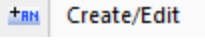
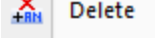
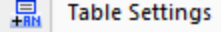
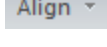

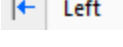
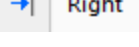
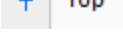
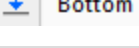
The **String Editor** panel is displayed at the left side of the MAGNET Office window.

3. At the **String Editor** panel, make the required configurations. For more information, refer to "String Editor" section on page 513.
4. When finished, click **Close**.

The string is edited.

## Text group

The *Text* group from the *Modify* tab of the MAGNET Office ribbon allows you to edit the existing text entities in the project. It contains five icons and eight second level icons, described in the table below.

|   |   |
|---|---|
|    | <p>Convert icon<br/>Click it to convert annotations to text.</p>  |
|    | <p>Link icon<br/>Click it to link the text to a project entity. This icon also contains the second-level icon. Click  to see it.</p> |
|    | <p>Unlink icon<br/>Click it to unlink a text from an entity.</p>  |
|    | <p>Rotate icon<br/>Click it to rotate an existing text.</p>   |
|    | <p>Annotation icon<br/>This icon contains the list of the second level icons. Click  to see it.</p>                                  |
|    | <p>Create/Edit icon<br/>Click it to create annotations for the existing entities.</p>   |
|    | <p>Delete icon<br/>Click it to delete existing annotations.</p>   |
|    | <p>Table Settings icon<br/>Click it to configure the annotation tables.</p>   |
|  | <p>Align icon<br/>This icon contains the list of the second level icons. Click  to see it.</p>                                     |
|  | <p>Left icon<br/>Click it to set the alignment of the left edge of the text.</p>  |
|  | <p>Right icon<br/>Click it to set the alignment of the right edge of the text.</p>  |
|  | <p>Top icon<br/>Click it to set the alignment of the top edge of the text.</p>  |
|  | <p>Bottom icon<br/>Click it to set the alignment of the bottom edge of the text.</p>  |

### Convert icon

The **Convert** icon of the Text group allows you to convert entities annotations to the regular text entities.

To convert an annotation to text:

1. In the survey view, select the required entities.
2. In the *Text* group of the *Modify* tab, click the **Convert** icon.  
The *Annotation Conversion* dialog is displayed.
3. In the *Annotation Conversion* dialog, make the required configurations and click **OK**.  
The annotations are converted.

**Fields of the *Annotation Conversion* dialog**

| Field                          | Description   |
|--------------------------------|---|
| <i>To Text</i>                 | When selected, an annotation will be converted to a regular text entity.                                      |
| <i>To Linked Text</i>          | When selected, an annotation will be converted to the text entity, linked to the parent entity.               |
| <i>Created in parent Layer</i> | Defines whether the new text will be created in the same layer as the parent entity, or in the current layer. |

**Link icon**

The **Link** icon of the Text group allows you to set the connection between an existing entity in the survey view and a text. If the entity to which the text is linked is selected, the text will be selected too. If the linked entity is deleted, the text will also be removed. If the entity will be moved, scaled, etc., the relative position of the text will be maintained. The text will also be displayed on drawings, along with the entity.

To link a text:

1. In the *Text* group of the *Modify* tab, click the **Link** icon.
2. In the survey view, select the required entity.

**NOTE**

If an entity was selected, when clicking the icon, text will be linked to it.

3. In the survey view, select the required text entities to be linked.
4. When finished, press *Esc*.

The text is linked to the entity.

**Unlink icon**

The **Unlink** icon of the Text group allows you to remove the connection between an existing entity in the survey view and a text.

To unlink a text:

1. In the *Text* group of the *Modify* tab, click the **Unlink** icon.
2. In the survey view, select the required entity.

**NOTE**

If an entity was selected, when clicking the icon, text will be linked to it.

3. In the survey view, select the required text entities to be unlinked.
4. When finished, press *Esc*.

The text is unlinked from the entity.

**Rotate icon**

The **Rotate** icon of the Text group allows you to rotate an existing text.

To rotate a text:

1. In the *Text* group of the *Modify* tab, click the **Rotate** icon.
2. In the survey view, select the required text.

**NOTE**

If a text was selected, when clicking the icon, the text will be used for rotation.

The input panel is displayed at the bottom toolbar.

3. Define the rotation angle. Do one of the following:
  - In the *Angle* editbox at the bottom panel, specify the required rotation angle.
  - In the *From Point* and *To Point* editboxes at the bottom toolbar, specify the numbers of the points which forms a line, to which the text will be set parallel.
  - In the survey view, draw a line, to which the text will be set parallel.

The text is rotated.

**Fields of the bottom toolbar when rotating text**

| Field             | Description  |
|-------------------|--|
| <i>Angle</i>      | Defines the text rotation angle.   |
| <i>From Point</i> | Defines the start point of a line, to which the text will be set parallel. |
| <i>To Point</i>   | Defines the end point of a line, to which the text will be set parallel.   |

**Create/Edit icon**

The **Create/Edit** icon of the Text group allows you to create annotation for existing entities.

To create annotations:

1. If needed, in the survey view, select the required entities.
2. In the *Text* group of the *Modify* tab, click the **Create/Edit** icon.

The **Create Annotation** dialog is displayed.

3. In the **Create Annotation** dialog, make the required configurations. Fields are described in the table below.
4. Click **OK**.

The annotations are created.

**Fields of the Create Annotation dialog**

| Fields                         | Description   |
|--------------------------------|---|
| <i>Apply To</i>                | Defines whether the annotations will be created for all existing entities or currently selected entities.                                       |
| <i>Create</i>                  | Defines the entities types for which annotations will be created.   |
| <i>Existing Annotation</i>     | When ticked, the existing annotations will be regenerated and refreshed.  |
| <i>Non-existing Annotation</i> | When ticked, the annotation for non-annotated entities will be created. Otherwise, only existing annotations will be regenerated and refreshed. |

**Delete icon**

The **Delete** icon of the Text group allows you to delete existing annotations.

To delete annotations:

1. In the survey view, select the required entities.
2. In the *Text* group of the *Modify* tab, click the **Delete** icon.

The annotations are deleted.

## Table Settings icon

The **Table Settings** icon of the *Text* group allows you to configure the parameters of the line/arc annotation tables.

To configure the annotation table parameters:

1. In the *Text* group of the *Modify* tab, click the **Table Settings** icon.  
The *Annotation Table Settings* dialog is displayed.
2. In the *Line Table* group box, make the required configurations.
3. In the *Arc Table* group box, make the required configurations.
4. Click **OK**.

The annotation tables are configured.

### Fields of the *Annotation Table Settings* dialog

| Field           | Description   |
|-----------------|---|
| Insertion Point | Defines the X (East) and Y (North) coordinates of the table bottom left corner.   |
| Columns         | Defines the quantity of column sets.  |
| Text Style      | Defines the text style, used in the table.  |
| ID Text Style   | Defines the text style, used for line marks.  |
| Sorted by       | Select the parameter for table data sorting.  |
| Ascending       | Tick to sort the table data in the ascending order. If unticked, data will be sorted in the descending order.                   |
| Display         | Tick to display the line/arc annotation table in the survey view. If unticked, the line/arc annotation table will be invisible. |

### Buttons of the *Annotation Table Settings* dialog

| Button          | Description   |
|-----------------|---|
| <b>Reset</b>    | Click it to restore the default settings.                 |
| <b>Renumber</b> | Click it to renumber the line/arc marks, starting from 1. |
| <b>Refresh</b>  | Click it to refresh the line/arc annotation table.        |
| <b>OK</b>       | Click it to save the changes and close the dialog.        |
| <b>Cancel</b>   | Click it to close the dialog without saving changes.      |

## Left icon

The **Left** icon of the *Text* group allows you to define the alignment of the left edge of the text.



To align a text:

1. In the *Text* group of the *Modify* tab, click the **Left** icon.  
The input panel is displayed at the bottom toolbar.
2. Define the alignment. Do one of the following:
  - In the *From Point* and *To Point* editboxes at the bottom toolbar, specify the numbers of the points which forms a line, to which the text will be aligned.
  - In the survey view, draw a line, to which the text will be aligned.
  - In the survey view, select the required line to which the text will be aligned.
3. In the survey view, select the required text.

**NOTE**

If a text was selected, when clicking the icon, the text will be used for alignment.

The text is rotated.

**Fields of the bottom toolbar when rotating text**

| Field                | Description  |
|----------------------|--|
| <i>From Point</i>    | Defines the start point of a line, to which the text will be set parallel. |
| <i>To Point</i>      | Defines the end point of a line, to which the text will be set parallel.   |
| <i>Rotate text</i>   | When ticked the text will be rotated to fits the alignment.                |
| <i>Perpendicular</i> | When ticked the text will rotated to be perpendicular to the alignment.    |
| <i>Invert Text</i>   | When ticked the text will be flipped to fits the alignment.                |

## Right icon

The **Right** icon of the *Text* group allows you to define the alignment of the right edge of the text.

To align a text:

1. In the *Text* group of the *Modify* tab, click the **Right** icon.  
The input panel is displayed at the bottom toolbar.
2. Define the alignment. Do one of the following:
  - In the *From Point* and *To Point* editboxes at the bottom toolbar, specify the numbers of the points which forms a line, to which the text will be aligned.
  - In the survey view, draw a line, to which the text will be aligned.
  - In the survey view, select the required line to which the text will be aligned.
3. In the survey view, select the required text.

**NOTE**

If a text was selected, when clicking the icon, the text will be used for rotation.

The text is rotated.

**Fields of the bottom toolbar when rotating text**

| Field             | Description  |
|-------------------|--|
| <i>From Point</i> | Defines the start point of a line, to which the text will be set parallel. |
| <i>To Point</i>   | Defines the end point of a line, to which the text will be set parallel.   |

| Field                | Description   |
|----------------------|---|
| <i>Rotate text</i>   | When ticked the text will be rotated to fits the alignment.             |
| <i>Perpendicular</i> | When ticked the text will rotated to be perpendicular to the alignment. |
| <i>Invert Text</i>   | When ticked the text will be flipped to fits the alignment.             |

## Top icon

The **Top** icon of the Text group allows you to define the alignment of the top edge of the text.

To align a text:

1. In the *Text* group of the *Modify* tab, click the **Top** icon.

The input panel is displayed at the bottom toolbar.

2. Define the alignment. Do one of the following:

- In the *From Point* and *To Point* editboxes at the bottom toolbar, specify the numbers of the points which forms a line, to which the text will be set parallel.
- In the survey view, draw a line, to which the text will be set parallel.
- In the survey view, select the required line.

3. In the survey view, select the required text.

NOTE

If a text was selected, when clicking the icon, the text will be used for rotation.

The text is rotated.

### Fields of the bottom toolbar when rotating text

| Field                | Description  |
|----------------------|--|
| <i>From Point</i>    | Defines the start point of a line, to which the text will be set parallel. |
| <i>To Point</i>      | Defines the end point of a line, to which the text will be set parallel.   |
| <i>Rotate text</i>   | When ticked the text will be rotated to fits the alignment.                |
| <i>Perpendicular</i> | When ticked the text will rotated to be perpendicular to the alignment.    |
| <i>Invert Text</i>   | When ticked the text will be flipped to fits the alignment.                |

## Bottom icon

The **Bottom** icon of the Text group allows you to define the alignment of the bottom edge of the text.

To align a text:

1. In the *Text* group of the *Modify* tab, click the **Bottom** icon.

The input panel is displayed at the bottom toolbar.

2. Define the alignment. Do one of the following:

- In the *From Point* and *To Point* editboxes at the bottom toolbar, specify the numbers of the points which forms a line, to which the text will be set parallel.

- In the survey view, draw a line, to which the text will be set parallel.
  - In the survey view, select the required line.
3. In the survey view, select the required text.

**NOTE**

If a text was selected, when clicking the icon, the text will be used for rotation.

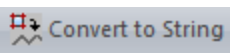
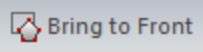
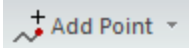

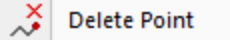
The text is rotated.

**Fields of the bottom toolbar when rotating text**

| <b>Field</b>         | <b>Description</b>   |
|----------------------|--|
| <i>From Point</i>    | Defines the start point of a line, to which the text will be set parallel. |
| <i>To Point</i>      | Defines the end point of a line, to which the text will be set parallel.   |
| <i>Rotate text</i>   | When ticked the text will be rotated to fits the alignment.                |
| <i>Perpendicular</i> | When ticked the text will rotated to be perpendicular to the alignment.    |
| <i>Invert Text</i>   | When ticked the text will be flipped to fits the alignment.                |

## Polygon Area group

The *Polygon Area* group from the *Modify* tab of the MAGNET Office ribbon allows you to edit existing polygons. It contains three icons and one second level icon, described in the table below.

|   |  |
|---|--|
|  | <p>Convert to String icon<br/>Click it to convert an existing polygon to the closed string.</p>  |
|  | <p>Bring to Front icon<br/>Click it to display polygon in front of all other entities.</p>   |
|  | <p>Add Point icon<br/>Click it to add new points to a polygon. This icon also contains the second-level icon. Click  to see it.</p> |
|  | <p>Delete Point icon<br/>Click it to remove points from the polygon.</p>   |

### Convert to String icon

The **Convert to String** icon of the Polygon Area group allows you to replace an existing polygon with the closed string.

To convert a polygon to a string:

1. In the *Polygon Area* group of the *Modify* tab, click the **Convert to String** icon.
2. In the survey view, select the required polygon.

#### NOTE

If a polygon was selected, when clicking the icon, it will be converted to string.

The polygon is converted to the closed string.

#### NOTE

This function works also for the polygon based entities — lot, pad, and boundary.

### Bring to Front icon

The **Bring to Front** icon of the Polygon Area group allows you to display an existing polygon in front of another existing polygon and other entities.

To display a polygon in front:

1. In the *Polygon Area* group of the *Modify* tab, click the **Bring to Front** icon.
2. In the survey view, select the required polygon.

#### NOTE

If a polygon was selected, when clicking the icon, it will be displayed in front.

The polygon is converted to the closed string.

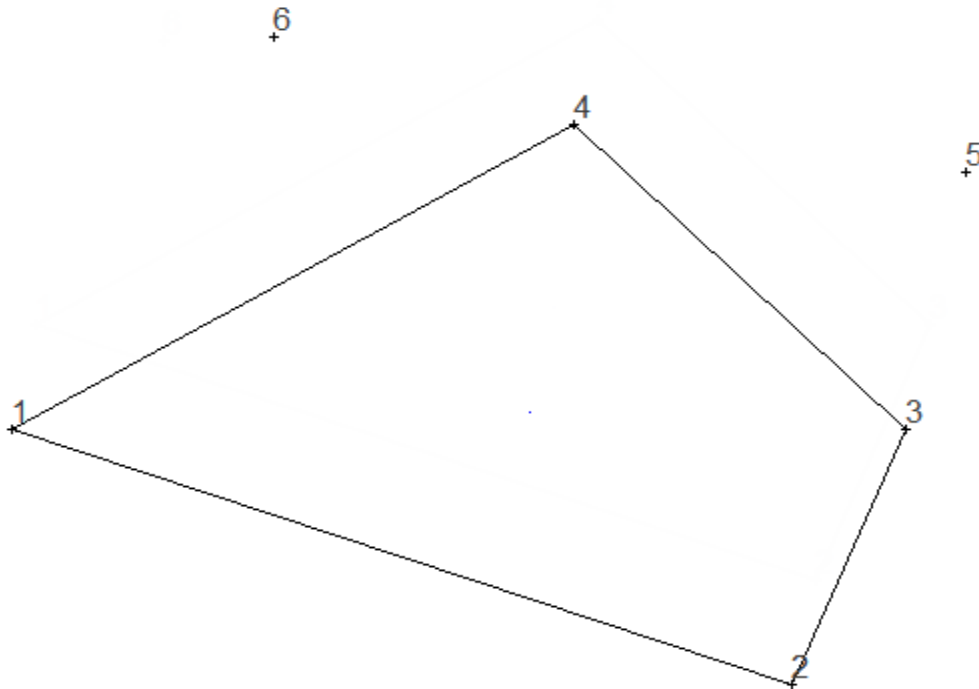
#### NOTE

This function works also for the polygon based entities — lot, pad, and boundary.

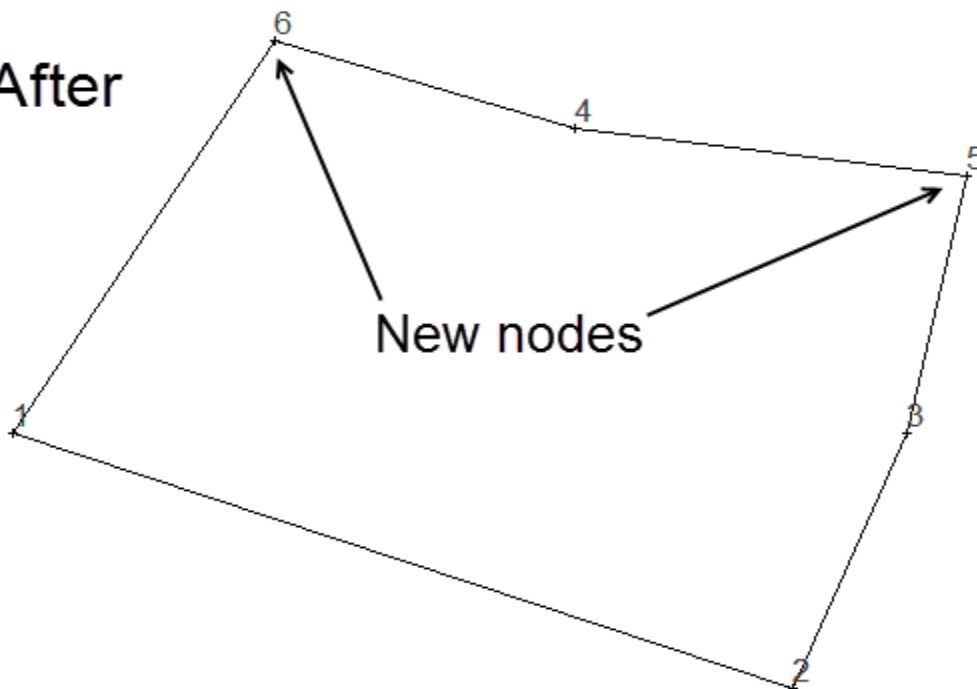
## Add Point icon

The **Add Point** icon of the Polygon Area group allows you to add an existing point to an existing polygon/string. A point moved to a polygon becomes a polygon node. See picture below for details.

### Before



### After



Adding points to the polygon

To add a point to a polygon/string:

1. In the *Polygon Area* group of the *Modify* tab, click the **Add Point** icon.
2. In the survey view, select the required polygon/string.

**NOTE**

If a polygon/string was selected, when clicking the icon, it will be used for points adding.

3. In the survey view, select the required point.

The point is added to the polygon/string.

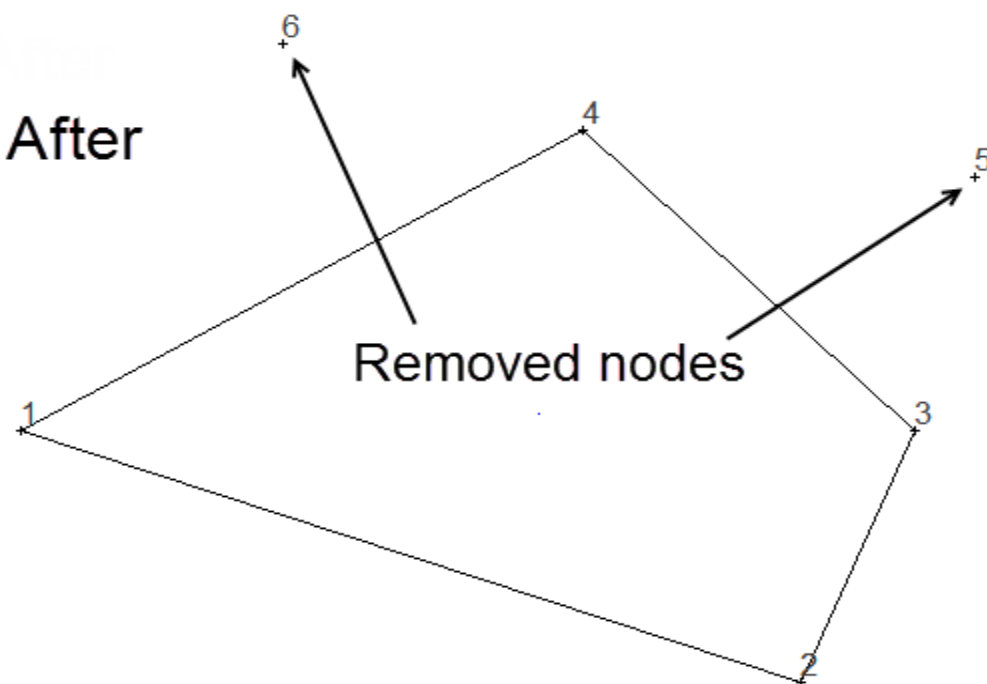
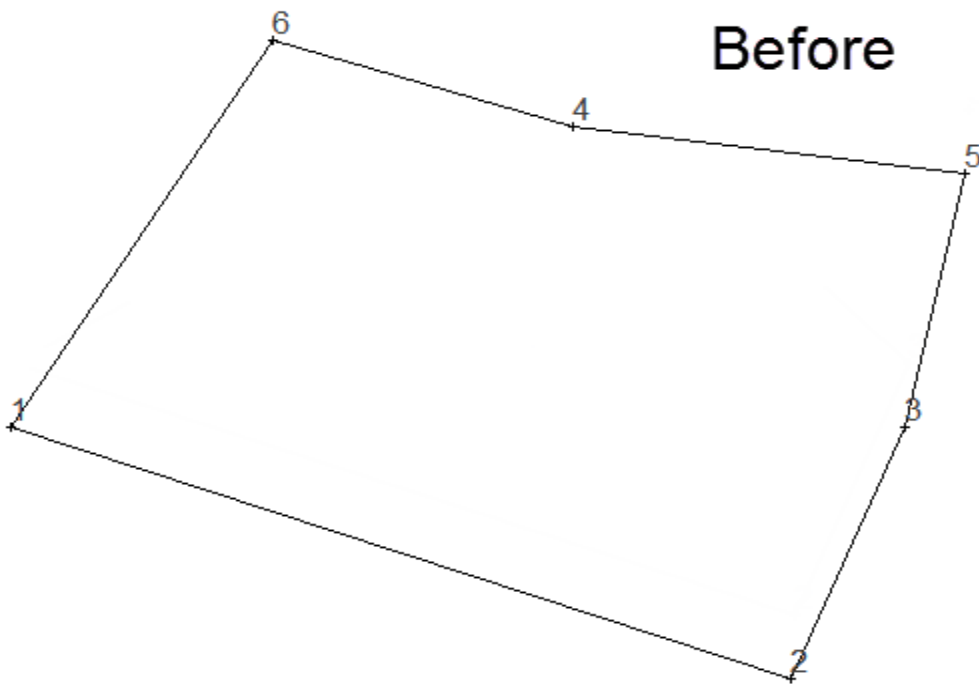
4. If needed, select more points.
5. When finished, press *Esc*.

**NOTE**

This function works also for the polygon based entities — lot, pad, and boundary.

## Delete Point icon

The **Delete Point** icon of the Polygon Area group allows you to remove nodes from an existing polygon/string. See picture below for details.



### Removing points from the polygon

To remove a point from a polygon/string:

1. In the *Polygon Area* group of the *Modify* tab, click the **Delete Point** icon.
2. In the survey view, select the required polygon/string.

**NOTE**

If a polygon was selected, when clicking the icon, it will be used for points removing.

3. Select the required point.

The point is removed from the polygon/string.

4. If needed, select more points.
5. When finished, press *Esc*.

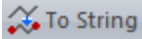
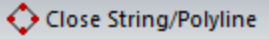
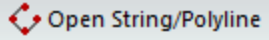
**NOTE**

This function works also for the polygon based entities — lot, pad, and boundary.



## Polyline group

The *Polyline* group from the *Modify* tab of the MAGNET Office ribbon allows you to edit existing polylines. It contains three icons, described in the table below.

|   |  |
|---|--|
|  | <p style="text-align: center;"><b>To String icon</b><br/>Click it to convert an existing polyline to the string.</p>         |
|  | <p style="text-align: center;"><b>Close String/Polyline icon</b><br/>Click it to close an existing string/polyline.</p>      |
|  | <p style="text-align: center;"><b>Open String/Polyline icon</b><br/>Click it to open an existing closed string/polyline.</p> |

### To String icon

The **To String** icon of the Polyline group allows you to replace an existing polyline with the string.

To convert a polyline to a string:

1. In the *Polyline* group of the *Modify* tab, click the **To String** icon.
2. In the survey view, select the required polyline.

#### NOTE

If a polyline was selected, when clicking the icon, it will be converted to string.

New points are created at polyline nodes. The message window prompts to set new points as Use in Surface.

3. Click **Yes** or **No** as you need.

The polyline is converted to the string.

### Close String/Polyline icon

The **Close String/Polyline** icon of the Polyline group allows you to close an existing polyline or string by inserting additional segment, connecting the last and the first nodes of the polyline or string.

To close a polyline/string:

1. In the *Polyline* group of the *Modify* tab, click the **Close String/Polyline** icon.
2. In the Survey view, select the required polylines/strings.
3. When finished, press *Esc*.

### Open String/Polyline icon

The **Open String/Polyline** icon of the Polyline group allows you to close an existing polyline or string by inserting additional segment, connecting the last and the first nodes of the polyline or string.

To close a polyline/string:

1. In the *Polyline* group of the *Modify* tab, click the **Close String/Polyline** icon.
2. In the Survey view, select the required polylines/strings.
3. When finished, press *Esc*.

## Modify group

The *Modify* group from the *Modify* tab of the MAGNET Office ribbon allows you to perform various basic configurations of the existing entities. It contains nine icons, described in the table below.

|  |  |
|--|--|
|  Copy                 | Copy icon<br>Click it to copy an existing entity.  |
|  Move                 | Move icon<br>Click it to move an existing entity.  |
|  Rotate               | Rotate icon<br>Click it to rotate an existing entity.  |
|  Rotate by Dir        | Rotate by direction icon<br>Click it to rotate an entity by direction.   |
|  Align                | Align icon<br>Click it to align an existing entity to another.   |
|  Scale                | Scale icon<br>Click it to scale an existing entity.  |
|  Offset               | Offset icon<br>Click it to move an existing line, arc or circle.   |
|  Properties           | Properties icon<br>Click it to manually edit properties of an existing entity.   |
|  Match               | Match icon<br>Click it to copy properties from one existing entity to another.   |
|  Extend/Trim Line ▾ | Extend/Trim Line icon<br>Click it to edit length of an existing line. This icon also contains the second-level icons. Click ▾ to see them. |
|  Multiple Trim      | Multiple Trim icon<br>Click it to trim several lines/arc at once   |
|  Extend All         | Extend All icon<br>Click it to extend an existing entity to the nearest line.  |
|  Trim All           | Trim All icon<br>Click it to trim an existing entity to the nearest line.  |
|  To Boundary        | To Boundary icon<br>Click it to trim an existing line/arc/string to an existing boundary.  |
|  Delete by Bdy      | Delete by Bdy icon<br>Click it to trim an existing line/arc/string to an existing boundary.  |

### Copy icon

The **Copy** icon of the Modify group allows you to copy an existing entity.

When creating a copy, you have to define the base and destination points for new copy. The position of the new copy will be in the same correlation with the original entity, as the correlation of the base and the destination point. For example, if the destination point has the 78 degrees bearing and 100 meters distance from the base

point, each point of the copy will have the 78 degrees bearing and 100 meters distance from the corresponding point of the original entity.

**CAUTION**

***The base and destination points only define the correlation between the original entity and copy position. The copy will not be placed to them.***

To copy an entity:

1. In the *Modify* group of the *Modify* tab, click the **Copy** icon.
2. In the survey view, select the required entity.

**NOTE**

If an entity was selected, when clicking the icon, it will be copied.

The input panel is displayed at the bottom toolbar.

3. Select the base for new copy. Do one of the following:
  - Click the required place in the survey view.
  - In the *Number* editbox at the bottom toolbar, specify the number of the existing point.
  - In the *East* and *North* editboxes at the bottom toolbar, specify the appropriate coordinates of the required place.
4. Select the destination point for new copy. Do one of the following:
  - Click the required place in the survey view.
  - In the *Number* editbox at the bottom toolbar, specify the number of the existing point.
  - In the *East* and *North* editboxes at the bottom toolbar, specify the appropriate coordinates of the required place.

The copy of the selected entity is added.

## Move icon

The **Move** icon of the *Modify* group allows you to move an existing entity to the new place.

When moving an entity, you have to define the base and destination points for new copy. The new position will be in the same correlation with the original position, as the correlation of the base and the destination point. For example, if the destination point has the 78 degrees bearing and 100 meters distance from the base point, the new position of each point of the entity will have the 78 degrees bearing and 100 meters distance from the corresponding point of the original position.

**CAUTION**

***The base and destination points only define the correlation between the original and new positions. The new position will not be at them.***

To move an entity:

1. In the *Modify* group of the *Modify* tab, click the **Move** icon.
2. In the survey view, select the required entity.

**NOTE**

If an entity was selected, when clicking the icon, it will be moved.

The input panel is displayed at the bottom toolbar.

3. Select the base for new position. Do one of the following:
  - Click the required place in the survey view.
  - In the *Number* editbox at the bottom toolbar, specify the number of the existing point.

- In the *East* and *North* editboxes at the bottom toolbar, specify the appropriate coordinates of the required place.
4. Select the destination point for new position. Do one of the following:
    - Click the required place in the survey view.
    - In the *Number* editbox at the bottom toolbar, specify the number of the existing point.
    - In the *East* and *North* editboxes at the bottom toolbar, specify the appropriate coordinates of the required place.

The entity is moved.

## Rotate icon

The **Rotate** icon of the Modify group allows you to rotate an existing entity.

When rotating an entity, you have to define the base point for the rotation. The entity will be rotated around it. It may be the node of the rotated entity, any existing point, or any place in the survey view. The positive direction of rotation is clockwise.

To rotate an entity:

1. In the *Modify* group of the *Modify* tab, click the **Rotate** icon.
2. In the survey view, select the required entity.

### NOTE

If an entity was selected, when clicking the icon, it will be rotated.

The input panel is displayed at the bottom toolbar.

3. Select the base point for the rotation. Do one of the following:
  - Click the required place in the survey view.
  - In the *Number* editbox at the bottom toolbar, specify the number of the existing point.
  - In the *East* and *North* editboxes at the bottom toolbar, specify the appropriate coordinates of the required place.
4. In the *Rotation* editbox at the bottom toolbar, specify the required rotation angle.

The **Rotate Confirmation** dialog is displayed. It contains information about the base point coordinates and the defined rotation angle.

5. If needed, in the *Rotation* editbox, change the rotation angle.
6. Click **OK**.

The entity is rotated.

## Rotate by direction icon

The **Rotate by direction** icon of the Modify group allows you to define the rotation of an entity by two directions. The angle between them is the angle of direction. The positive direction of rotation is counter clockwise.

When rotating an entity, you have to define the base point for the rotation. The entity will be rotated around it. It may be the node of the rotated entity, any existing point, or any place in the survey view.

To rotate an entity:

1. In the *Modify* group of the *Modify* tab, click the **Rotate by direction** icon.
2. In the survey view, select the required entity.

**NOTE**

If an entity was selected, when clicking the icon, it will be rotated.

The input panel is displayed at the bottom toolbar.

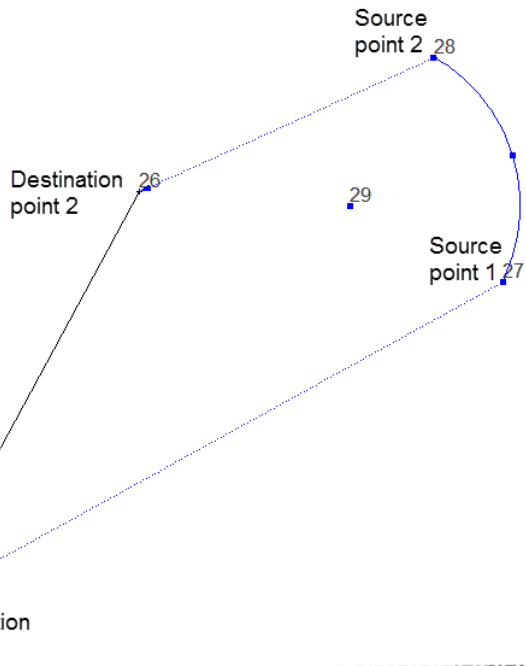
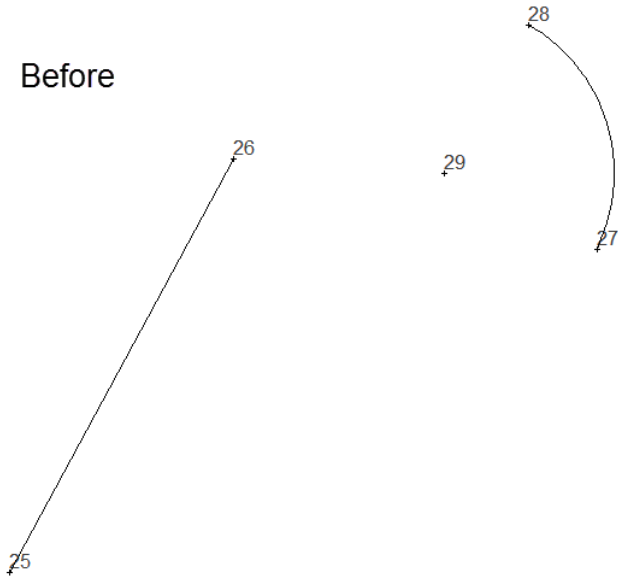
3. Select the base point for the rotation. Do one of the following:
  - Click the required place in the survey view.
  - In the *Number* editbox at the bottom toolbar, specify the number of the existing point.
  - In the *East* and *North* editboxes at the bottom toolbar, specify the appropriate coordinates of the required place.
4. Define the reference direction. Do one of the following:
  - Set existing points as the start and end points of the direction. You may either specify their names in the *From Point* and *To Point* editboxes at the bottom toolbar, or click required points in the survey view.
  - Click the required places in the survey view.
5. Define the new direction. Do one of the following:
  - Set existing points as the start and end points of the direction. You may either specify their names in the *From Point* and *To Point* editboxes at the bottom toolbar, or click required points in the survey view.
  - Click the required places in the survey view.

The entity is rotated.

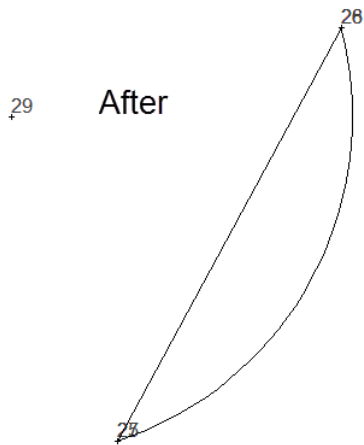
## Align icon

The **Align** icon of the *Modify* group allows you to align and scale an existing entity to another entity or set of points. Points may be both MAGNET Office point entities and any places in the survey view. See picture below for details.

Before



After



## Align

To align an entity:

1. In the *Modify* group of the *Modify* tab, click the **Align** icon.
2. In the survey view, select the required entity.

The input toolbar is displayed at the bottom toolbar. Fields are described in the table below.

3. Define the first source point. Do one of the following:
  - Click the required point/place in the survey view.
  - In the *Number* editbox at the bottom toolbar, specify the number of the existing point.
  - In the *East* and *North* editboxes at the bottom toolbar, specify the required coordinates.
4. Define the first destination point in the same way.

The yellow arrow is displayed in the survey view, from the source to the destination point.

5. Define the second source and destination points.  
The message window prompts to apply the scale.
6. Click **Yes**.

The entity is aligned.

### Fields of the bottom toolbar, when aligning an entity

| Field         | Description   |
|---------------|---|
| <i>Number</i> | Defines the number of the source/destination point.               |
| <i>East</i>   | Defines the East (X) coordinate of the source/destination point.  |
| <i>North</i>  | Defines the North (Y) coordinate of the source/destination point. |

## Scale icon

The **Scale** icon of the *Modify* group allows you to rotate an existing entity.

To scale an entity:

1. In the *Modify* group of the *Modify* tab, click the **Scale** icon.
2. In the survey view, select the required entity.

#### NOTE

If an entity was selected, when clicking the icon, it will be scaled.

The input panel is displayed at the bottom toolbar.

3. Select the base point. Do one of the following:
  - Click the required place in the survey view.
  - In the *Number* editbox at the bottom toolbar, specify the number of the existing point.
  - In the *East* and *North* editboxes at the bottom toolbar, specify the appropriate coordinates of the required place.
4. In the *Rotation* editbox at the bottom toolbar, specify the required rotation angle.

The **Rotate Confirmation** dialog is displayed. It contains information about the base point coordinates and the defined rotation angle.

5. If needed, in the *Rotation* editbox, change the rotation angle.

6. Click **OK**.

The entity is rotated.

## Offset icon

The **Offset** icon of the Modify group allows you to move an existing entity to the defined distance.

To move an entity:

1. In the *Modify* group of the *Modify* tab, click the **Offset** icon.
2. In the survey view, select the required entity.
3. In the *Offset* editbox at the bottom toolbar, specify the required distance for moving.
4. If you want to create a copy, and save the original entity, tick the *Keep the original* checkbox.
5. Press *Enter*.
6. In the survey view, select from which side of the existing string the new one will be placed.

The entity is moved/copied.

## Properties icon

The **Properties** icon of the Modify group allows you to edit the properties of the selected object or group of objects. Its shortcut key is *Alt+Enter*.

To edit object's properties:

1. In the survey view, select the required entity.
2. In the *Modify* group of the *Modify* tab, click the **Properties** icon.  
The "Edit Properties" dialog is displayed.
3. Make the required configuration. For more information refer to "MAGNET Office entities properties" section on page 545.
4. Click **OK**.

### NOTE

This icon has the same functionality as the Properties icon from the Properties group of the Edit tab.

## Match icon

The **Match** icon of the Modify group allows you to copy the properties from one existing entity to another.

To copy the properties:

1. In the *Modify* group of the *Modify* tab, click the **Match** icon.
2. In the survey view, select the source entity.
3. In the survey view, select the target entity.

The properties are copied.

4. If needed, select more target entities.
5. When finished, press *Esc*.



## Extend/Trim Line icon

The **Extend/Trim Line** icon of the Modify group allows you to change the length of an existing line/arc/string.

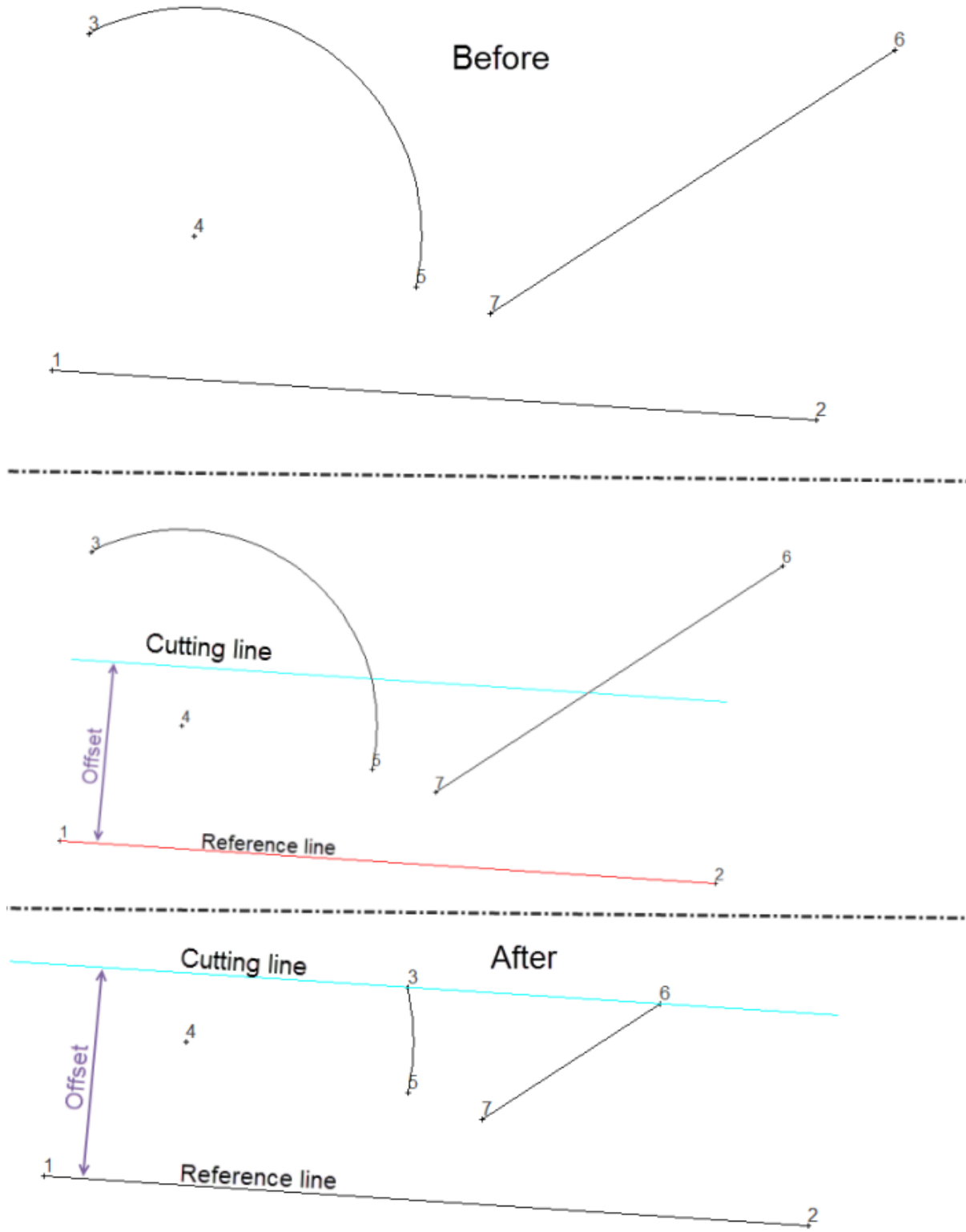
To change the length of a line/arc/string

1. In the *Modify* group of the *Modify* tab, click the **Extend/Trim Line** icon.
2. In the survey view, select the required line/arc/string.  
The input panel is displayed at the bottom toolbar.
3. In the *Length* editbox at the bottom toolbar, specify the required length of the entity.  
The length of the line/arc/string is changed.

## Multiple Trim icon

The **Multiple Trim** icon of the Modify group allows you to change the length of several existing lines/arcs at once.

The reference line/arc is used for this option, to define the trim. See picture below for details.



**Multiple trim**

To trim several lines/arc at once:

1. In the *Modify* group of the *Modify* tab, click the **Multiple Trim** icon.
2. In the survey view, select the reference line/arc.
3. In the *Offset* editbox at the bottom toolbar, specify the required offset of the cutting line.
4. In the survey view select the required lines/arcs to be trimmed.

## Extend All icon

The **Extend All** icon of the *Modify* group allows you to extend an existing line/arc/string to the nearest line/arc/string.

To extend lines/arcs/strings:

1. In the *Modify* group of the *Modify* tab, click the **Extend All** icon.
2. In the survey view, continuously select the required lines/arcs/strings.
3. When finished, press *Esc*.

## Trim All icon

The **Trim All** icon of the *Modify* group allows you to trim an existing line/arc/string to the nearest line/arc/string.

To trim lines/arcs/strings:

1. In the *Modify* group of the *Modify* tab, click the **Trim All** icon.
2. In the survey view, continuously select the required lines/arcs/strings.
3. When finished, press *Esc*.

## To Boundary icon

The **To Boundary** icon of the *Modify* group allows you to trim an existing line/arc/string to an existing boundary.

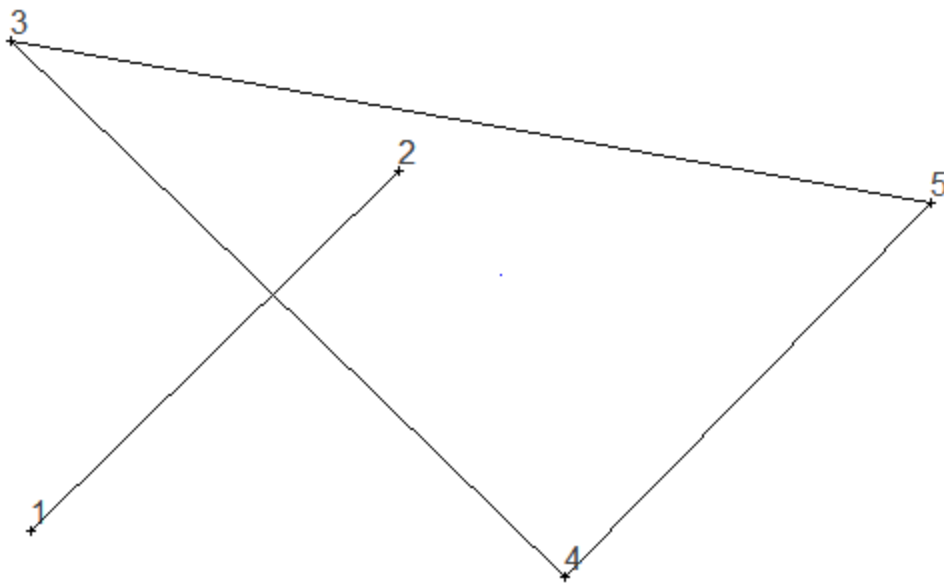
To trim a line/arc/string to a boundary:

1. In the *Modify* group of the *Modify* tab, click the **To Boundary** icon.
2. In the survey view, select the required line/arc/string.
3. Select the required boundary. Do one of the following:
  - In the survey view, click the required boundary.
  - From the **Boundary** drop-down list at the bottom toolbar, select the required boundary.
4. At the bottom toolbar, click **Trim**.
5. The **Extend/Trim Options** dialog is displayed.
6. In the **Extend/Trim Options** dialog, make the required configurations. Fields are described in the table below.
7. Click **OK**.

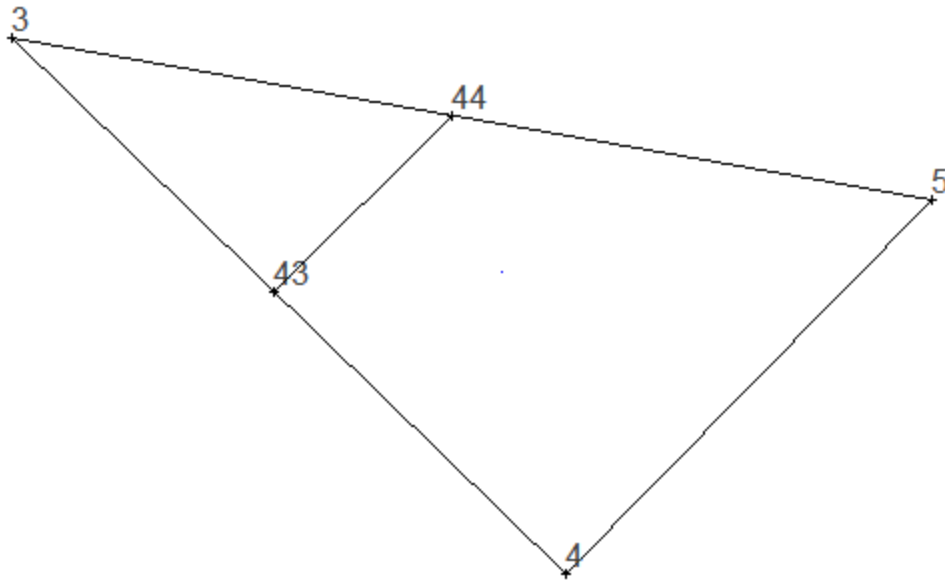
The line/arc/string is trimmed.

**Fields of the *Extend/Trim Options* dialog**

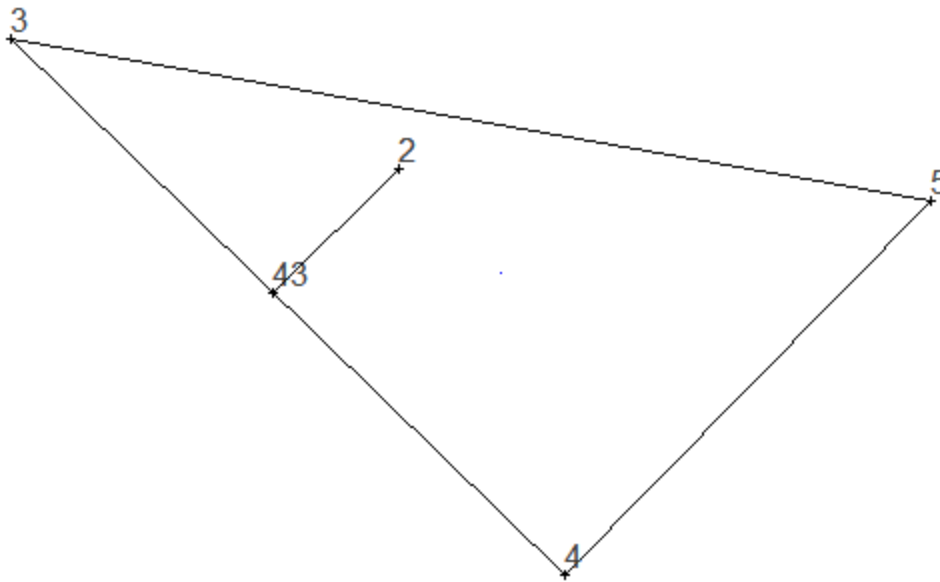
| Field   | Description  |
|---|--|
| <i>Extend to Boundary</i>                     | When ticked, the selected line will be moved to fits the boundary. See pictures below for details.   |
| <i>Trim</i>                                   | When ticked, the selected line will be trimmed, according to the selected option. See pictures below for details.                          |
| <i>Trim Outside</i>                           | When selected, the line part outside of the boundary will be trimmed. Inside part remains the same. See pictures below for details.        |
| <i>Trim Inside</i>                            | When selected, the line part inside of the boundary will be trimmed. Outside part remains the same. See pictures below for details.        |
| <i>Segment at Intersection</i>                | When selected the new point will be created at the intersection with the boundary, dividing line into two. See pictures below for details. |
| <i>Calculate Intersection Point Elevation</i> | When ticked, the elevated of the newly created point will be interpolated.   |



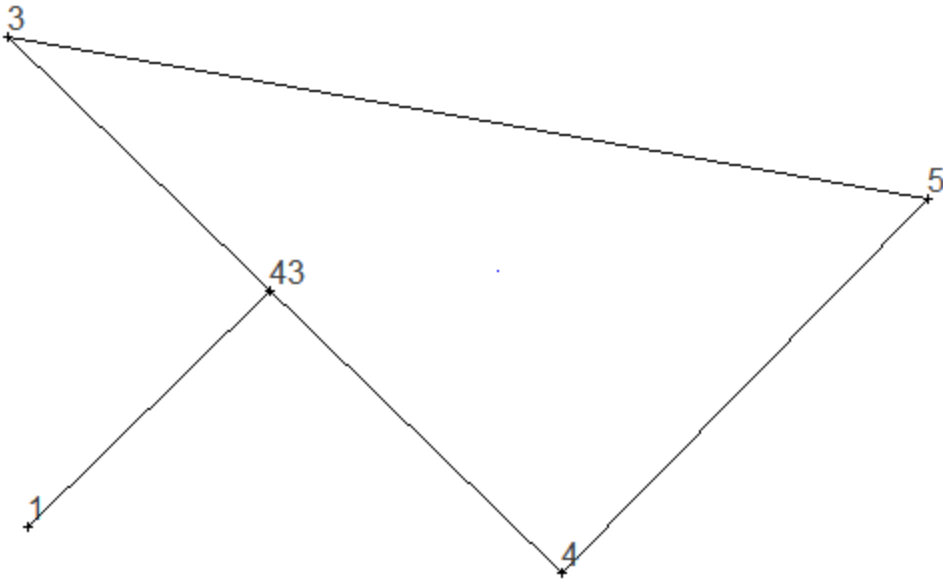
**The original entities**



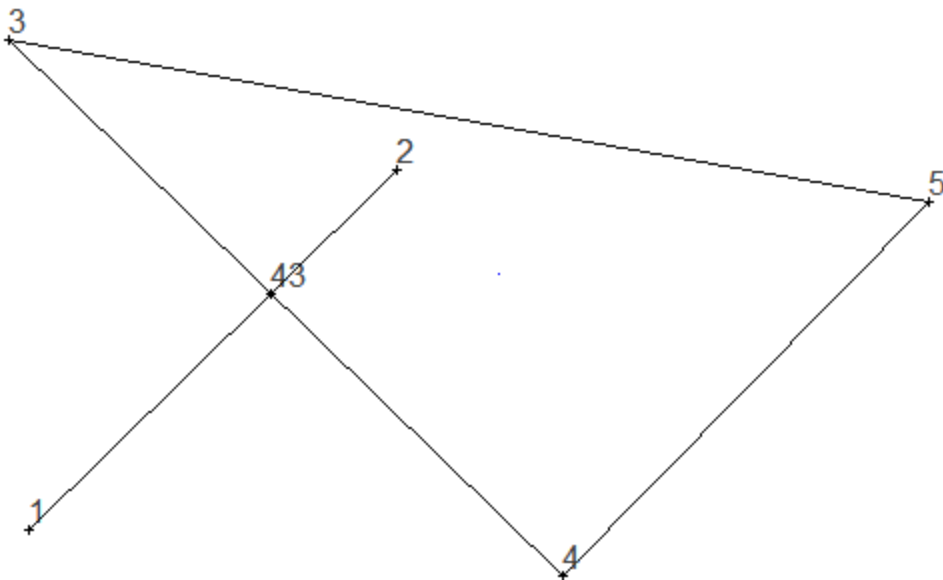
**Extend to Boundary**



**Trim Outside**



### Trim Inside



### Segment at Intersection

## Delete by Bdy icon

The **Delete by Bdy** icon of the Modify group allows you to delete all entities inside/outside of an existing boundary.

To delete entities by a boundary:

1. In the *Modify* group of the *Modify* tab, click the **Delete by Bdy** icon.

The **Delete By Boundary** dialog is displayed.

2. Define whether to delete objects inside, or outside of the boundary, by selecting appropriate radiobutton.
3. In the *Layer* group box, define from which layers objects will be deleted. Select one of the following radiobuttons:
  - *Active Layers* — to delete objects from currently active layers only.
  - *All Layers* — to delete objects from all layers.
4. In the *Boundary* group box, define the reference boundary. Select one of the options:
  - By drawing the boundary of free shape. To do so:
    1. Select the *Freenand* radiobutton.
    2. Click **OK**.
    3. In the survey view, draw the required boundary point by point.  
Objects are deleted when you close the boundary.
  - By drawing the rectangle boundary. To do so:
    1. Select the *By Window* radiobutton.
    2. Click **OK**.
    3. In the survey view, draw the required boundary by defining its opposite corners position.  
Objects are deleted.
  - By using an existing boundary entity. To do so:
    1. Select the *By Boundary* radiobutton.
    2. From the drop-down list, select the required boundary.
    3. Click **OK**.  
Objects are deleted.

#### Fields of the *Extend/Trim Options* dialog

| Field                 | Description   |
|-----------------------|---|
| <i>Delete Inside</i>  | Select to delete objects inside of boundary.  |
| <i>Delete Outside</i> | Select to delete objects outside of boundary.   |
| <i>Layer</i>          | Defines from which layers objects will be deleted. Select the required radiobutton: <ul style="list-style-type: none"> <li>• <i>Active Layers</i> — to delete objects from currently active layers only.</li> <li>• <i>All Layers</i> — to delete objects from all layers.</li> </ul> |
| <i>Boundary</i>       | Defines the reference boundary. Select the required radiobutton:<br><i>Freehand</i> — to draw the reference boundary of free shape.<br><i>By Window</i> — to draw the rectangle reference boundary.   |

## Inquiry Tab

The *Inquiry* tab of the MAGNET Office ribbon contains control icons, which allows you to get information about project entities. It is separated to three groups:

- "Inquiry group" section on the facing page
- "Report group" section on page 295
- "Calculate group" section on page 298



## Inquiry group

The *Inquiry* group from the *Inquiry* tab of the MAGNET Office ribbon allows you to get geodesic information about project objects. It contains eight icons, described in the table below.

|   |   |
|---|---|
| <br>Point            | <p style="text-align: center;">Point icon<br/>Click it to view and edit point properties.</p>   |
| <br>Bearing Distance | <p style="text-align: center;">Bearing Distance icon<br/>Click it to get information about distance and bearing between any two points.</p>       |
| <br>Offset Distance  | <p style="text-align: center;">Offset Distance icon<br/>Click it to get the offset and distance between a point and a line/circle/arc/string.</p> |
| <br>Linear Distance  | <p style="text-align: center;">Linear Distance icon<br/>Click it to measure the linear distance of several objects.</p>                           |
| <br>Area             | <p style="text-align: center;">Area icon<br/>Click it to display information about an existing area.</p>  |
| <br>Multiple Areas | <p style="text-align: center;">Multiple Areas icon<br/>Click it to display information about several existing enclosed areas.</p>                 |
| <br>Angle          | <p style="text-align: center;">Angle icon<br/>Click it to calculate angle between two lines, defined by three points.</p>                         |
| <br>Mean Elevation | <p style="text-align: center;">Mean Elevation icon<br/>Click it to calculate the mean elevation for the selection of points.</p>                  |

### Point icon

The **Point** icon of the Inquiry group allows you to view and edit information about an existing point.

To view the point information:

1. In the *Inquiry* group of the *Inquiry* tab, click the **Point** icon.
2. Select the required point. Do one of the following:
  - In the survey view, click the required point.
  - In the *Point Name* editbox at the bottom toolbar, specify the required point number.

The **Edit Point** dialog is displayed. Fields and buttons are described in the tables below.

3. Review the point properties. If needed, change them.

**The non-editable fields of the *Edit Point* dialog**

| Field                 | Description  |
|-----------------------|--|
| <i>Point No.</i>      | A unique point identifier in the project database. One project cannot contain two points with the same numbers. Point numbers or names may be numeric or alphanumeric. The number or name is allocated when the point is created automatically by the MAGNET Office or manually by user, and cannot be changed after that. |
| <i>Easting</i>        | The east or X component of a point position.   |
| <i>Northing</i>       | The north or Y component of a point position.  |
| <i>No of Linkages</i> | The point is the basic entity, from which all other entities are derived. The <i>No of Linkages</i> field indicates how many entities are depends on this point.   |

**The editable fields of the *Edit Point* dialog**

| Field                 | Description  |
|-----------------------|--|
| <i>Code</i>           | An additional alphanumeric description, attached to the point. Point codes are usually used for automatically assigning properties to points and for controlling line string between points during the reduction process. The feature codes and the properties are stored in the Survey Codes Library. |
| <i>Elevation</i>      | The height, reduced level, or Z component of a point position. MAGNET Office allows creating points with or without height. Tick near the elevation editbox to activate it. An unticked mark means that the point has no height.   |
| <i>Use in Surface</i> | Defines whether the point with the defined elevation may be included in a digital terrain model.   |
| <i>Layer</i>          | Defines layer to which the point belongs to.   |
| <i>Color</i>          | Defines a color for point displaying.  |
| <i>Mark</i>           | Defines displaying of each point on the screen.  |
| <i>Description</i>    | Short description of the point.  |
| <i>Symbol</i>         | Defines appearance of the point both on the screen and on the printed copy. You may choose symbol from the symbol library. For more information about symbols, refer to "Symbol icon" section on page 54.  |
| <i>X/Y Scale</i>      | Defines the symbol scale for displaying. Some symbols are too small; others are too big for correct displaying. To display them right, make sure to select the appropriate scale. Note that some symbols are non-scalable and plot at the size they were designed.                                     |
| <i>Rotation</i>       | Defines the rotation of the symbol. Rotation value is degrees. Rotations are absolute a value of the DDD.MMSS format will rotate the symbol by specified angle.  |

| Field             | Description  |
|-------------------|--|
| <i>Locked</i>     | Select it to lock the point, so its properties cannot be edited, and the point cannot be moved with a mouse. |
| <i>Annotation</i> | Defines attributes to be displayed as the point annotation.  |

#### The buttons of the *Edit Point* dialog

| Button                     | Description   |
|----------------------------|---|
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. This button is active only when at least one checkbox from the <i>Annotation</i> group box is selected. For more information refer to "Annotation icon" section on page 125. |
| <b>Set Properties</b>      | Click it to set current properties as the default for points. New points will be created with these properties.   |
| <b>Get Properties</b>      | Click it to load existing default properties for points.  |
| <b>Attributes</b>          | Click it to add new attributes to the point.  |
| <b>Images/Pdfs</b>         | Click it to attach an image or a PDF to the point. The picture will be displayed near the point. For more information about configuring images, refer to "Image Viewer" section on page 573.                                  |
| <b>Delete</b>              | Click it to delete the point and close the dialog.  |
| <b>Apply</b>               | Click it to apply changes.  |
| <b>Notes</b>               | Click it to add a short note.   |
| <b>Symbols...</b>          | Click it to manage extra symbols for the point.   |
| <b>OK</b>                  | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>              | Click it to close the dialog without saving changes.  |

## Bearing Distance icon

The **Bearing Distance** icon of the *Inquiry* group allows you to measure bearing, distance and slope between two existing points or any places in the survey view.

To measure the bearing/distance:

1. In the *Inquiry* group of the *Inquiry* tab, click the **Bearing Distance** icon.
2. Select the start point of the inquiry. Do one of the following:
  - In the *From Point* editbox at the bottom toolbar, specify the required point number.
  - Click the required point in the survey view.
3. Select the end point of the inquiry. Do one of the following:
  - In the *To Point* editbox at the bottom toolbar, specify the required point number.
  - Click the required point in the survey view.

The *Inquire Bearing & distance* window is displayed. It contains information about the start and end point; plus bearing, distance, and slope between them.

## Offset Distance icon

The **Offset Distance** icon of the Inquiry group allows you to measure offset and distance between an existing point and line/arc/string.

To measure the bearing/distance:

1. In the *Inquiry* group of the *Inquiry* tab, click the **Bearing Distance** icon.
2. In the survey view, select the line/arc/string, or two points to define a line.
3. Select the required point. Do one of the following:
  - In the *Point Name* editbox at the bottom toolbar, specify the required point number.
  - Click the required point in the survey view.

The *Inquire Offset Distance* window is displayed. It contains information about the offset and distance of the selected point from the selected line/arc/string.

4. If needed, tick *Label* checkbox, to annotate the offset.
5. Click **OK**.

## Linear Distance icon

The **Linear Distance** icon of the Inquiry group allows you to measure distance of existing lines, arcs, strings and polylines.

To measure the distance:

1. In the survey view select the required objects.
2. In the *Inquiry* group of the *Inquiry* tab, click the **Linear Distance** icon.

The *Inquire Linear Distance* dialog is displayed. The *Total Linear Distance* field displays the total linear distance of all selected entities.

3. From the *Units* drop-down list, select the required linear units.
4. If needed, tick the *Generate Report* checkbox. If so, select the information to be listed, by ticking the appropriate checkboxes.
5. Click **OK**.

The linear distance report is displayed.

## Area icon

The **Area** icon of the Inquiry group allows you to measure the area and perimeter of an existing polygon or polygon based entity.

To measure the polygon area:

1. In the *Inquiry* group of the *Inquiry* tab, click the **Area** icon.
2. In the survey view, select the required polygon; or draw an enclosed area, by using existing points, lines, arcs and stings.

The *Area Calculation* dialog is displayed. It contains information about the area, perimeter, centroid point coordinates and quantity of nodes.

3. If needed, from the drop-down list to the right of the *Area* field, select the area units.

4. If needed, tick the *Label Area* checkbox, to annotate the polygon with the text.
5. If needed, tick the *Position Label* checkbox, to manually locate the annotation text.
6. Click **OK**.
7. Locate annotation text as you need. See "Text icon" section on page 179 for details.

## Multiple Areas icon

The **Multiple Areas** icon of the Inquiry group allows you to measure the area and perimeter of several existing polygon based entities or enclosed strings.

### NOTE

Enclosed areas, consists of lines/arcs cannot be measured by this function.

To measure the polygon area:

1. In the survey view, select the required objects.
2. In the *Inquiry* group of the *Inquiry* tab, click the **Multiple Areas** icon.  
The *Inquire Multiple Area* dialog is displayed.
3. If needed, tick the *Label Area* checkbox, to annotate the polygon with the text.
4. If needed, tick the *Position Total Area Label* checkbox, to manually locate the annotation text of the summary area.
5. If needed, tick the *Generate Report* checkbox, to generate detailed report about selected areas.
6. Click **OK**.

## Angle icon

The **Angle** icon of the Inquiry group allows you to measure angle between two lines/string segments or three points.

To measure an angle:

1. In the *Inquiry* group of the *Inquiry* tab, click the **Angle** icon.
2. In the survey view select the required lines/string segments/points.

### TIP

You may specify the numbers of the required points in the Point Name editbox at the bottom toolbar.

The *Inquire Angle* dialog is displayed. It contains information about points, defining the angle; internal and external angles.

3. If needed, tick the *Label* checkbox, to annotate the internal or external angle with the text.
4. Click **OK**.

## Mean Elevation icon

The **Mean Elevation** icon of the Inquiry group allows you to calculate mean elevation for the selection of points.

To measure a mean elevation:

1. In the survey view select the required set of points.
2. In the *Inquiry* group of the *Inquiry* tab, click the **Mean Elevation** icon.

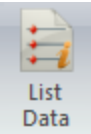
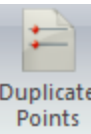
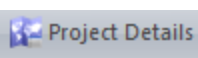
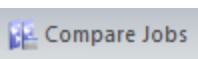
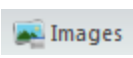
The *Inquire Mean Elevation* dialog is displayed. It contains information about lowest, highest, and average elevations; and quantity of the selected points.

3. Click **OK** to close the dialog.



## Report group

The *Report* group from the *Inquiry* tab of the MAGNET Office ribbon allows you to get the project information. It contains five icons, described in the table below.

|   |   |
|---|---|
|  | <p style="text-align: center;">List Data icon<br/>Click it to list the data of selected entities.</p>             |
|  | <p style="text-align: center;">Duplicate Points icon<br/>Click it to check the project for duplicated points.</p> |
|  | <p style="text-align: center;">Project Details icon<br/>Click it to list the project details.</p>                 |
|  | <p style="text-align: center;">Compare Jobs icon<br/>Click it to compare the current job with another job.</p>    |
|  | <p style="text-align: center;">Images icon<br/>Click it to list images in the project.</p>                        |

### List Data icon

The **List Data** icon of the Report group allows you to list the information about all existing data in the project. It has various filters to help you get the required information.

To list project data:

1. In the *Report* group of the *Inquiry* tab, click the **List Data** icon.  
The **List Data Selection** dialog is displayed.
2. In the *Select From* group box, define the required selection range:
  - *All Data* – select it to include to the listing all existing data.
  - *Active Layers* – select it to include to the listing only data from the currently active layers.
  - *Current Selection* – select it to include to the listing only currently selected objects.
3. Select the entities for listing, by checking the appropriate editboxes.

*TIP*

*To select all possible entities, click **All Entities**.*

4. If needed, define additional point filtering by point numbers, codes or heights. To do so:
  1. Tick the appropriate editboxes.
  2. Specify the range in the appropriate *From* and *To* editboxes.
5. If needed, define additional filtering by layer range. To do so:
  1. Tick the *Layer Range* editbox.
  2. Specify the range by selection the appropriate layers from the drop-down lists.
6. Click **OK**.

The report is displayed, containing information about the project data, according to user selections.

## Duplicate Points icon

The **Duplicate Points** icon of the Report group allows you to detect and delete duplicated points.

To detect duplicated points:

1. In the *Report* group of the *Inquiry* tab, click the **Duplicate Points** icon.

The **Duplicated Points** dialog is displayed.

2. In the *Check Points* group box define the area for duplicate searching. Select one of the following options:
  - *XY* – select it to search horizontal duplicate points.
  - *XYZ* – select it to search 3D duplicate points.
3. In the *XY Tolerance* editbox, specify the horizontal tolerance for duplicate points.
4. In the *Z Tolerance* editbox, specify the vertical tolerance for duplicate points.
5. Click **OK**.

The duplicated points are highlighted in the survey view.

6. Right click the survey view, and select the **Delete** item from the context menu.

The **Delete Duplicated Points** dialog is displayed.

7. Select the required option for duplicate points.
8. Click **OK**.

The selected option is performed, and the report for duplicated points is generated.

## Project Details icon

The **Project Details** icon of the Report group allows you to generate a report with the information about the project.

To display information about the project:

1. In the *Report* group of the *Inquiry* tab, click the **Project Details** icon.

The **List Job Details** dialog is displayed.

2. In the **List Job Details** dialog, make the required configurations. Fields are described in the table below.
3. Click **OK**.

The report with the project information is displayed.

### Fields of the **List Job Details** dialog

| Field                          | Description  |
|--------------------------------|--|
| <i>Current Job</i>             | When selected, the information about the current project will be included into report.   |
| <i>All Jobs</i>                | When selected, the information about all projects from the defined directory will be included into report.   |
| <i>Include Job Description</i> | When ticked, the project parameters, such as company, name, comment, etc. will be included into report. See "Project details" section on page 580 for details. |



## Compare Jobs icon

The **Compare Jobs** icon of the Report group allows you to compare the points from the current job with points from another existing job.

To compare the jobs:

1. In the *Report* tab of the *Inquiry* tab, click the **Compare Jobs** icon.  
The **Points Comparison** dialog is displayed.
2. In the *Select From* group box, define the source points area. Select one of the following radiobuttons:
  - *All Data* – to include all existing point into comparison.
  - *Active Layers* – to include to comparison only points from the currently active layers. Points from inactive layers will not be included.
  - *Current Selection* – to include to comparison only currently selected points. Unselected points will not be included.
3. In the *Comparison Job* field, select the job for comparison.
4. In the *XY Tolerance* editbox, specify the horizontal tolerance for comparison. Points, distance between which is more than specified tolerance will not be compared.
5. In the *XY Minimum* editbox, specify the minimum distance for comparison. Points, distance between which is less than specified minimum will not be compared.
6. If needed to include the vertical part into comparing, in the *Height* group box, tick the *Compare Z* checkbox, and specify vertical tolerance and minimum in the appropriate editboxes.
7. Click **OK**.

The report, containing information about compared point's differences is displayed.

## Images icon

The **Images** icon of the Report group allows you to search for the entities, which has the attached images.

To search for the images in the project:

1. In the *Report* group of the *Inquiry* tab, click the **Images** icon.  
The **Entities Selection** dialog is displayed.
2. In the *Select From* group box, define the required selection range:
  - *Active Layers* – select it to search for images in entities from the currently active layers.
  - *Current Selection* – select it to search for images in entities only currently selected objects.
3. In the *Select Entities* groupbox, select the entities for search, by checking the appropriate editboxes.

*TIP*



*To select all possible entities, click **All Entities**.*

4. If needed, tick the *Generate Report* checkbox.
5. Click **OK**.

The entities, containing the attached images are highlighted.

## Calculate group

The *Calculate* group from the *Inquiry* tab of the MAGNET Office ribbon allows you to get the information so that the surveyors can set out their job in the field. It contains two icons, described in the table below.

|   |  |
|---|--|
|  <p>Inverse</p>  | <p style="text-align: center;">Inverse icon<br/>Click it to generate an inverse report.</p>        |
|  <p>Stakeout</p> | <p style="text-align: center;">Stakeout icon<br/>Click it to generate a stakeout point report.</p> |

### Inverse icon

The **Inverse** icon of the Calculate group allows you to generate the inverse report. It contains information about the bearing and distance between points with known coordinates.

It has three report options:

- *Radiations* – one point is defined as occupied point and the MAGNET Office calculate bearings and distances from this point to the specified points. See "Radiations inverse" section below for details.
- *Traverse* – the occupied is defined, the MAGNET Office calculates bearing and distance between this point and the specified point, and then moves the occupied point to the specified point. See "Traverse inverse" section on the facing page for details.
- *Two Points* – MAGNET Office calculate bearing and distance between specified pair of points. The first selected point is used as the occupation point. See "Two points inverse" section on page 300 for details.

### Radiations inverse

In the radiations inverse mode, one point is occupied and all the inverse come from the occupation point to the specified points.

To generate the inverse report by using the radiation method:

1. In the *Calculate* group of the *Inquiry* tab, click the **Inverse** icon.  
The **Inverse Report Options** dialog is displayed.
2. In the *Options* group box, select the *Radiations* radiobutton.
3. In the Modes group box, select one of the following:
  - *Bearing* — to use the current bearing mode for direction defining. Zero angle will be defined as the direction strict to the north from the occupied point. Positive direction is clockwise.
  - *Angle* — in this mode the backsight point is required. Zero angle will be defined as the direction from the occupied point to the backsight point. Positive direction is clockwise.
4. Click **OK**.
5. In the survey view, select the occupied point.
6. If you have selected the *Angle* option at the step 3, in the survey view, select the backsight point.  
The report preview is displayed at the bottom toolbar.
7. In the survey view, select point for the report.
8. Repeat step 7 to add more points.

9. When finished, press *Esc*.
10. At the bottom toolbar, click one of the following buttons:
  - **Save** — to save the newly created report.
  - **Edit** — to edit the newly created report in the report editor or the defined external editor.

NOTE

For external editor usage, it must be defined at the Preferences tab of the **Program Settings** dialog. See "Program preferences" section on page 596 for details.

- **Print** — to print the newly created report.
- **Close** — to close the report panel without saving changes.

## Traverse inverse

In the traverse inverse mode, inverse is performed between specified pair of points. The first selected point is used as the occupied point

To generate the inverse report by using the traverse method:

1. In the *Calculate* group of the *Inquiry* tab, click the **Inverse** icon.

The *Inverse Report Options* dialog is displayed.

2. In the *Options* group box, select the *Traverse* radiobutton.
3. In the Modes group box, select one of the following:
  - *Bearing* – to use the current bearing mode for direction defining. Zero angle will be defined as the direction strict to the north from the occupied point. Positive direction is clockwise.
  - *Angle* – in this mode the backsight point is required. Zero angle will be defined as the direction from the occupied point to the backsight point. Positive direction is clockwise.

4. Click **OK**.

5. In the survey view, select the first occupied point.

6. If you have selected the *Angle* option at the step 3, in the survey view, select the first backsight point.

The report preview is displayed at the bottom toolbar.

7. In the survey view, select the point for report.

The selected point is defined as the new occupied point.

8. If you have selected the *Angle* option at the step 3, in the survey view, select the backsight point.

9. Repeat steps 7 and 8 to add more points.

10. When finished, press *Esc*.

11. At the bottom toolbar, click one of the following buttons:

- **Save** – to save the newly created report.
- **Edit** – to edit the newly created report in the report editor or the defined external editor.

NOTE

For external editor usage, it must be defined at the Preferences tab of the **Program Settings** dialog. See "Program preferences" section on page 596 for details.

- **Print** – to print the newly created report.
- **Close** – to close the report panel without saving changes.

## Two points inverse

In the two points inverse mode, occupation point continuously moves as the inverses are specified to each new specified inverse point. Inversing around a property description is an example of a traverse inverse

To generate the inverse report by using the traverse method:

1. In the *Calculate* group of the *Inquiry* tab, click the **Inverse** icon.

The **Inverse Report Options** dialog is displayed.

2. In the *Options* group box, select the *Two Points* radiobutton.
3. In the Modes group box, select one of the following:
  - *Bearing* – to use the current bearing mode for direction defining. Zero angle will be defined as the direction strict to the north from the occupied point. Positive direction is clockwise.
  - *Angle* – in this mode the backsight point is required. Zero angle will be defined as the direction from the occupied point to the backsight point. Positive direction is clockwise.
4. Click **OK**.
5. In the survey view, select the occupied point.
6. If you have selected the *Angle* option at the step 3, in the survey view, select the first backsight point.

The report preview is displayed at the bottom toolbar.

7. In the survey view, select the point for report.
8. Repeat steps through 8 to 10 to add more points.
9. When finished, press *Esc*.
10. At the bottom toolbar, click one of the following buttons:
  - **Save** — to save the newly created report.
  - **Edit** — to edit the newly created report in the report editor or the defined external editor.

### NOTE

For external editor usage, it must be defined at the Preferences tab of the **Program Settings** dialog. See "Program preferences" section on page 596 for details.

- **Print** — to print the newly created report.
- **Close** — to close the report panel without saving changes.

## Stakeout icon

The **Stakeout** icon of the *Calculate* group allows you to generate the stakeout report. It contains information about the bearing and distance between the defined occupied point and other existing points with known coordinates.

To generate the stakeout report:

1. In the *Calculate* group of the *Inquiry* tab, click the **Stakeout** icon.

The **Setout Selection** dialog is displayed.

2. In the **Setout Selection** dialog, make the required configurations. Fields of the dialog are described in the table below.
3. Click **OK**.
4. In the survey view, select the occupied point.
5. If needed, in the survey view, select the backsight point.

The report preview is displayed at the bottom toolbar.

6. If needed, select more occupied points.
7. When finished, press *Esc*.
8. At the bottom toolbar, click one of the following buttons:
  - **Save** — to save the newly created report.
  - **Edit** — to edit the newly created report in the report editor or the defined external editor.

**NOTE**

For external editor usage, it must be defined at the Preferences tab of the **Program Settings** dialog. See "Program preferences" section on page 596 for details.

- **Print** — to print the newly created report.
- **Close** — to close the report panel without saving changes.

**Fields of the Stakeout Selection dialog**

| Field                          | Description  |
|--------------------------------|--|
| <i>Select from</i>             | Defines the source points for stakeout report. Select one of the following options: <ul style="list-style-type: none"> <li>• <i>All</i> – to use all existing points</li> <li>• <i>Selection</i> – to use points from the current selection</li> </ul>   |
| <i>Sort By</i>                 | Defines the way of sorting the report. Select one of the following options: <ul style="list-style-type: none"> <li>• <i>Number</i> – to sort by point numbers.</li> <li>• <i>Bearing</i> – to sort by bearings from the occupied point.</li> <li>• <i>Distance</i> – to sort by distance from the occupied point.</li> </ul> |
| <i>Use Turned Angle</i>        | When ticked, the bearing is measured by using the backsight point. Zero angle will be defined as the direction from the occupied point to the backsight point. Positive direction is clockwise.  |
| <i>Maximum Radial Distance</i> | Defines maximum distance to points, which may be included to stakeout report. Points, distance to which exceeds the specified value will not be included to report.  |



## Survey Tab

The *Survey* tab of the MAGNET Office ribbon contains control icons, which allows you to work with the survey instruments of the MAGNET Office. It is separated to five groups, described in the corresponding sections:

- "Survey group" section on the facing page
- "Adjustment group" section on page 304
- "Manual Entry group" section on page 309
- "Calculator group" section on page 312
- "Structure group" section on page 314

## Survey group

The *Survey* group from the *Survey* tab of the MAGNET Office ribbon allows you to work with the survey measurements. It contains two icons, described in the table below.

|  |  |
|--|--|
|  <p>Raw Data Editor</p> | <p>Raw Data Editor icon<br/>Click it to edit the raw data from the hardware.</p> |
|  <p>Tools View</p>      | <p>Tools View icon<br/>Click it to open the MAGNET Tools application.</p>        |

### Raw Data Editor icon

The **Raw Data Editor** icon of the Survey group allows you to edit raw measurements of various survey instruments.

To edit a raw data:

1. In the *Survey* group of the *Survey* tab, click the **Raw Data Editor** icon.  
The **Raw Data Editor** dialog is displayed. It contains the list of the existing raw data containers.
2. Do one of the following:
  - Click **New** to create the new raw data container.
  - Select an existing raw data container and click **Open**.

The raw data editor is opened. For more information, refer to "Raw data editor" section on page 528.

#### Buttons of the *Raw Data Editor* dialog





| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create the new raw data container.               |
| <b>Open</b>   | Click it to open an existing raw data container for editing. |
| <b>Rename</b> | Click it to rename an existing raw data container.           |
| <b>Delete</b> | Click it to delete an existing raw data container.           |
| <b>OK</b>     | Click it to close the dialog.                                |

### Tools View icon

Click the **Tools View** icon of the Survey group to open the MAGNET Tools application.

## Adjustment group

The *Adjustment* group from the *Survey* tab of the MAGNET Office ribbon allows you to adjust an existing data in the project. It contains three icons, described in the table below.

|  |   |
|--|---|
| <br>Control Points      | <p>Control Points icon<br/>Click it to create or edit control points.</p>   |
| <br>Translate Rotate    | <p>Translate Rotate icon<br/>Click it to translate, rotate or scale project entities.</p>   |
| <br>LS Transformation   | <p>LS Transformation icon<br/>Click it to transform data from one coordinate system to another using a least square transformation.</p> |
| <br>Traverse Adjustment | <p>Traverse Adjustment icon<br/>Click it to apply a traverse adjustment to a series of lines.</p>                                       |

### Control Points icon

The **Control Points** icon of the [Point group](#) allows you to manage the control points.

Control points are reference points at or near the project sight that provide access to the project coordinate system. Control files contain coordinate data for the control points. In the case of GPS applications, they also provide a mathematical link between the GPS and project coordinate systems.

To define existing points as the control points:

1. In the *Adjustment* group of the *Survey* tab, click the **Control Points** icon.  
The **Control Points** dialog opened at the *Control Points* tab is displayed.
2. Click **Pick**.
3. Do one of the following:
  - In the survey view, select the required.
  - At the bottom toolbar, in the *Number* editbox, continuously specify the numbers of the required points.
4. When finished, press *Esc*.
5. Double click point in the list.  
The **Control Point** dialog is displayed.
6. Define the usage of this point for horizontal and vertical localization, by ticking the appropriate checkboxes.
7. Specify the WGS84 coordinates in the appropriate editboxes.
8. Click **OK**.



## Translate Rotate icon

The **Translate Rotate** icon of the Adjustment group allows you to translate, rotate or scale project data. You may also move the data to a new coordinate position, or rotate it around a nominated point.

To transform a data:

1. In the *Adjustment* group of the *Survey* tab, click the **Translate Rotate** icon.  
The *Translate/Rotate* dialog is displayed.
2. In the *Translate/Rotate* dialog, make the required configurations. Fields are described in the table below.
3. Click **OK**.

The data is transformed.

### Fields of the *Translate/Rotate* dialog

| Field              | Description  |
|--------------------|--|
| <i>Database</i>    | <p>Defines the data for transformation. Select one of the following radiobuttons:</p> <ul style="list-style-type: none"> <li>• <i>All</i> – all data in the project will be transformed.</li> <li>• <i>Active</i> – only data from the currently active layers will be transformed.</li> <li>• <i>Selection</i> – only currently selected data will be transformed.</li> </ul>   |
| <i>DTM</i>         | <p>Defines the surface for transformation. Select one of the following radiobuttons:</p> <ul style="list-style-type: none"> <li>• <i>All</i> – all surfaces in the project will be transformed.</li> <li>• <i>None</i> – no surfaces will be transformed.</li> <li>• <i>Current DTM</i> – only current surface will be transformed.</li> </ul>   |
| <i>Origin</i>      | <p>Defines the reference point for transformation. All other entities will be transformed relative to this point. It will be the start point of movement, it will remain on its place when scaling. Rotation will be performed around this point.</p> <p>You may define it in two ways:</p> <ul style="list-style-type: none"> <li>• Specify the point number in the <i>Point Name</i> editbox. The <i>Easting</i> and <i>Notrhing</i> editboxes will be filled in automatically with the coordinates of the specified point.</li> <li>• Specify the point coordinates in the <i>Easting</i> and <i>Northing</i> editboxes.</li> </ul> |
| <i>Destination</i> | <p>Fields of this groupbox defines the destination point for data moving.</p>  |
| <i>Point Name</i>  | <p>Defines the destination point as the place in the survey view. It will be the place, where origin point is moved. All other entities will be moved relative to the origin point.</p> <p>You may define it in two ways:</p> <ul style="list-style-type: none"> <li>• Specify the point number in the <i>Point Name</i> editbox. The <i>Easting</i> and <i>Notrhing</i> editboxes will be filled in automatically with the coordinates of the specified point.</li> <li>• Specify the point coordinates in the <i>Easting</i> and <i>Northing</i> editboxes.</li> </ul>   |

| Field           | Description  |
|-----------------|--|
| <i>Offset</i>   | <p>Defines the destination point as the offset from the origin point. It will be the place, where origin point is moved. All other entities will be moved relative to the origin point.</p> <p>You may define it two ways:</p> <ul style="list-style-type: none"> <li>• Specify the bearing and distance of the offset in the appropriate edit-boxes.</li> <li>• Specify the coordinates increment/decrement. To do so: <ol style="list-style-type: none"> <li>1. Tick the <i>Coordinate</i> checkbox.<br/>The <i>Bearing</i> and <i>Distance</i> editboxes are replaced with the <i>Easting</i> and <i>Northing</i> editboxes.</li> <li>2. Specify the East and North coordinates increment/decrement in the appropriate editboxes. For decrement defying use the negative values.</li> </ol> </li> </ul> |
| <i>Rotation</i> | Defines the rotation angle in degrees. Positive direction is clockwise.  |
| <i>Scale</i>    | Defines the scale for transformation.  |

## LS Transformation icon

The **LS Transformation** icon of the Adjustment group allows you to transform selected data from one coordinate system or datum to another using a Least Squares Transformation. Ensure that at least three corresponding points exist in each coordinate system within the project data.

To perform the LS transformation:

1. In the survey view, select the object to be transformed.
2. In the *Adjustment* group of the *Survey* tab, click the **LS Transformation** icon.

The **LS Transformation** dialog is displayed.

3. Click **Add**.
4. In the survey view, select the point to be transformed.
5. In the survey view, select the corresponded fixed point.

The points are connected with the yellow arrow.

6. If needed, repeat steps 4 and 5 to add more points.
7. When all required points are defined, press *Esc*.

The **LS Transformation** dialog is displayed, containing coordinate information.

### *TIP*

*To transform data without scaling it, tick the Scale Factor checkbox, and specify the value "1".*

8. Click **Compute** to calculate the transformation parameters.
9. Review and analyze the result. Note any discrepancies, which may cause unacceptable errors.
10. Do one of the following:

- To delete a line, select it and click **Delete**.
  - To edit a line:
    1. Select the required line and click **Edit**.  
The *LS Edit* dialog is displayed.
    2. Redefine the fixed and/or matching points and click **OK**.
11. Click **Update DB** to apply changes.
- The data is transformed and moved. The transformation report is displayed.

#### Fields of the *LS Transformation* dialog

| Field               | Description   |
|---------------------|---|
| <i>Use</i>          | When ticked, the appropriate line will be used in transformation.   |
| <i>Match Pt</i>     | Displays the number of the matching point.  |
| <i>Easting</i>      | Displays the East coordinate of the matching/fixed point.   |
| <i>Northing</i>     | Displays the North coordinate of the matching/fixed point.  |
| <i>Fix Pt</i>       | Displays the number of the fixed point.   |
| <i>E Residual</i>   | Displays easting residuals.   |
| <i>N Residual</i>   | Displays northing residuals.  |
| <i>Scale Factor</i> | Displays the calculated transformation scale factor.<br>If checkbox is ticked, defines the used-specified scale factor. |
| <i>Swing</i>        | Displays the calculated transformation swing.   |
| <i>E Shift</i>      | Displays the calculated transformation easting shift.   |
| <i>N Shift</i>      | Displays the calculated transformation northing shift.  |

## Traverse Adjustment icon

The **Traverse Adjustment** icon of the Adjustment group allows you to apply a traverse adjustment to a series of selected points or lines.

To perform the traverse adjustment:

1. In the *Adjustment* group of the *Survey* tab, click the **Traverse Adjustment** icon.
2. In the survey view, continuously select the required points of the lines.
3. When finished, right click and select **Adjust Traverse** from the context menu.  
The *Traverse Adjustment* dialog is displayed.
4. In the *Traverse Type* group box, select the required traverse type:
  - Loop – starts and ends at the same point.
  - Non-loop – starts and ends at different points. Requires a fixed coordinate for the traverse end point.
5. In the *Adjustment* group box, select the required method.
6. If you have selected *Non-loop* traverse type, specify the fixed point. Do one of the following:
  - In the *Fixed Pt* editbox, specify the point number.
  - Specify the required East, North and Height coordinates in the appropriate editboxes.
7. If needed, tick the *Adjust Elevations* checkbox.
8. Click **Adjust**.

The adjustment is performed.

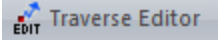
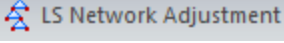
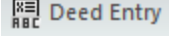
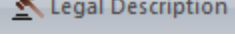
9. If needed, click **Report** to generate the adjustment report.
10. Click **Finish** to close the *Traverse Adjustment* dialog.

**Fields of the *Traverse Adjustment* dialog**

| <b>Field</b>        | <b>Description</b>   |
|---------------------|--|
| <i>Start</i>        | Displays the number and the coordinates of the start point.  |
| <i>End Pt</i>       | Displays the number and the coordinates of the end point.  |
| <i>Fixed Pt</i>     | In the loop mode, displays the number and coordinates of the fixed point.<br>In the non-loop mode, defines the number and coordinates of the fixed point for the traverse end point. |
| <i>E-Misclosure</i> | Displays the easting misclosure.   |
| <i>D-Misclosure</i> | Displays the distance misclosure.  |
| <i>N-Misclosure</i> | Displays the northing misclosure.  |
| <i>Total-Dist</i>   | Displays the perimeter of the traverse.  |
| <i>H-Misclose</i>   | Displays the height misclosure.  |
| <i>Miscl-Ratio</i>  | Displays the misclosure accuracy as a ratio.   |

## Manual Entry group

The *Manual Entry* group from the *Survey* tab of the MAGNET Office ribbon allows you to manually enter data to the project. It contains four icons, described in the table below.

|   |  |
|---|--|
|  | Traverse Editor icon<br>Click it to manually add traverse data to the project.       |
|  | LS Network Adjustment icon<br>Click it to perform a least square network adjustment. |
|  | Deed Entry icon<br>Click it to create or edit a deed entry.                          |
|  | Legal Description icon<br>Click it to add a legal description to the project.        |

### Traverse Editor icon

The **Traverse Editor** icon of the Manual Entry group allows you to input traverse data for reduction and adjustment. The traverse may be specified as observed angles, observed angles, quadrant bearings, bearings in units of degrees, minutes and seconds, or decimal degrees or grads. Distances may be entered as slope or horizontal in meters, feet, decimal feet, or links.

To edit traverses:

1. In the *Manual Entry* group of the *Survey* tab, click the **Traverse Editor** icon.  
The *Traverse Data Manager* dialog is displayed.
2. Do one of the following:
  - Click **New** to create a new traverse.
  - Select an existing traverse and click **Open** to edit it.
The *Traverse Editor* is displayed.
3. Make the required configurations. For more information refer to "Traverse editor" section on page 516.

### LS Network Adjustment icon

The **LS Network Adjustment** icon of the Manual Entry group allows you to configure the LS network.

To manage a LS Network:

1. In the *Manual Entry* group of the *Survey* tab, click the **LS Network Adjustment** icon.  
The *Network Data Manager* dialog is displayed.
2. Do one of the following:
  - Click **New** to create a new traverse.
  - Select an existing traverse and click **Open** to edit it.
The *LS Network Editor* is displayed.
3. Make the required configurations.

### Deed Entry icon

The **Deed Entry** icon of the Manual Entry group allows you to enter line and curve data that comprise deed descriptions. You may:

- Customize the data type and order displayed.
- Add or hide data columns using the right-click shortcut menu.
- Save deeds for future reference and drawing.
- Edit the order of the data entry by dragging the columns to place them in the required order.

To manage deed entries:

1. In the *Manual Entry* group of the *Survey* tab, click the **Deed Entry** icon.

The *Deed Entry Manager* dialog is displayed.

2. Do one of the following:
  - Click **New** to create a new deed entry.
  - Select an existing deed entry and click **Open** to edit it.

The *Deed Entries Editor* is displayed.

3. Make the required configurations. For more information refer to "Deed Entry editor" section on page 538.

## Legal Description icon

The **Legal Description** icon of the *Manual Entry* group allows you to generate the legal description of a land parcel and save it to the file or in the survey view.

To create a legal description:

1. In the *Manual Entry* group of the *Survey* tab, click the **Legal Description** icon.
2. In the survey view, select the required enclosed area.
3. MAGNET Office assumes a start point, indicated by a solid red circle. Do one of the following:
  - Press *Esc* to accept the start point.
  - In the survey view, select the required point.
4. Define the commencement path. Select the required point, line or string.
5. Select additional reference points. When finished, press *Esc*.

The *Legal Description Settings* dialog is displayed.

6. Review the parameters. If needed, change them.
7. Click **OK**.

The property description is displayed in the internal editor

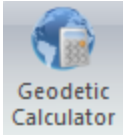
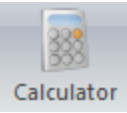
### Fields of the *Legal Description Settings* dialog

| Field                    | Description  |
|--------------------------|--|
| <i>Template Name</i>     | Defines the description template for the legal description creation.<br>Select an existing template from the drop down list, or create new, by clicking <b>Template</b> . See "Legal description templates library" section on page 646 for details. |
| <i>Direction</i>         | Defines the direction of the land parcel description.  |
| <i>Coordinate Prefix</i> | Defines the prefix for coordinate listing in the description.  |
| <i>Arc Description</i>   | Defines terminology for curves description.  |
| <i>Area Unit Text</i>    | Defines terminology for areas description.   |

| <b>Field</b>                    | <b>Description</b>   |
|---------------------------------|--|
| <i>Distance Unit Text</i>       | Defines terminology for distances description.   |
| <i>Major Cardinal Direction</i> | Defines terminology for major cardinal directions description.   |
| <i>Minor Cardinal Direction</i> | Defines terminology for minor cardinal directions description.   |
| <i>Decimal Place</i>            | <p>Defines the decimal place settings for angular, linear and area values.</p> <p>Tick the Number Words checkbox to replace numeric data with text.</p> <p><i>For example the distance of 134.50 would be displayed as one hundred thirty-four point five zero.</i></p> <p>The <i>Add</i> field allows you to add a comma to area values greater than specified in the appropriate editbox.</p> <p><i>For example if 1000 is specified resulting in an area value of 1,000 when displayed.</i></p> |
| <i>Insert Text in Job</i>       | <p>Tick to inserts the description text into the active project as multiline text.</p> <p>Select the layer for text insertion from the drop down list.</p>   |

## Calculator group

The *Calculator* group from the *Survey* tab of the MAGNET Office ribbon allows you to perform calculations. It contains two icons, described in the table below.

|  |   |
|--|---|
|  <p>Geodetic Calculator</p> | <p>Geodetic Calculator icon<br/>Click it to open the coordinate calculator.</p> |
|  <p>Calculator</p>          | <p>Calculator icon<br/>Click it to open the default system calculator.</p>      |

### Geodetic Calculator icon

The **Geodetic Calculator** icon of the Calculator group allows you to calculate map projection (grid) coordinates using geodetic coordinates and vice versa.

If you are applying a geoid model to the elevation computations, a geoid file (\*.*gff* or \*.*jff*) must be available. A geoid file provides information about the separation between the purely geometric, ellipsoidal representation of the earth and the physical model of the earth that closely approximates mean sea level (the geoid). For example, use a geoid model to obtain approximate mean sea level heights from GPS measured ellipsoidal heights.

### Transforming geodetic coordinates to the grid coordinates

To transform geodetic coordinates to the grid coordinates:

1. In the *Calculator* group of the *Survey* tab, click the **Geodetic Calculator** icon.

The *Coordinate Calculator* dialog is displayed.

2. In the *Select projection* list, select the required projection.
3. If needed, in the *Projection ellipsoid* group box, define the ellipsoid.
4. In the *Datum* group box, select the source and destination datums from the appropriate drop-down lists.
5. If needed, in the *Geoid file* group box, click ... and define the external geoid file.
6. In the *Conversion* group box, select the *Geodetic -> Projection (direct)* radiobutton.
7. In the *Geodetic coordinates* group box, specify the required latitude, longitude and ellipsoidal height in the appropriate editboxes.
8. Click **Calc**.

The following calculated coordinates are displayed:

- Geocentric coordinates (X, Y, Z) in the appropriate editboxes of the *Geodetic coordinates* group box.
  - Grid coordinates (Easting, Northing, Elevation) in the appropriate editboxes of the *Projection coordinates* group box.
9. If needed, you may add the point with the calculated coordinates to the survey view. To do so:
    1. In the *Projection coordinates* group box, in the *Point No.* editbox, specify the point number.
    2. If needed, in the *Projection coordinates* group box, in the *Code* editbox, specify the point code.
    3. In the *Projection coordinates* group box, click **Save**.
  10. Click **Close** to close the dialog.



## Transforming grid coordinates to the geodetic coordinates

To transform grid coordinates to the geodetic coordinates:

1. In the *Calculator* group of the *Survey* tab, click the **Geodetic Calculator** icon.  
The *Coordinate Calculator* dialog is displayed.
2. In the *Select projection* list, select the required projection.
3. If needed, in the *Projection ellipsoid* group box, define the ellipsoid.
4. In the *Datum* group box, select the source and destination datums from the appropriate drop-down lists.
5. If needed, in the *Geoid file* group box, click ... and define the external geoid file.
6. In the *Conversion* group box, select the *Projection-> Geodetic(iverse)* radiobutton.
7. In the *Geodetic coordinates* group box, specify the required latitude, longitude and ellipsoidal height in the appropriate editboxes.
8. Click **Calc**.

The following calculated coordinates are displayed:

- Geodetic coordinates (Lat, Lot, ellipsoidal height) in the appropriate editboxes of the *Geodetic coordinates* group box.
  - Geocentric coordinates (X, Y, Z) in the appropriate editboxes of the *Geodetic coordinates* group box.
9. Click **Close** to close the dialog.

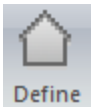

## Calculator icon

Click the **Calculator** icon of the Calculator group to open the default system calculator.

## Structure group

The *Structure* group from the *Survey* tab of the MAGNET Office ribbon allows you to work with structures. A structure is a series of interconnected lines and/or arcs that form a closed figure around the extents of a structure. It can be inserted into any job and then moved, located, and rotated using several tools. Finally, the structure is saved to an exact position, where the points are coordinated and fixed. A structure may represent a house outline or other features such as a dam, a cul-de-sac, a traffic island, or a roundabout.

The group contains two icons, described in the table below.

|   |   |
|---|---|
|  | <p style="text-align: center;"><b>Define icon</b><br/>Click it to define and save a structure.</p>                |
|  | <p style="text-align: center;"><b>Locate icon</b><br/>Click it to place an existing structure to the project.</p> |

### Define icon

The **Define** icon of the Structure group allows you to outline a structure and save the selected points, lines, and arcs to a nominated file name. The data may represent a structure outline or other feature, such as a dam, cul-de-sac head, traffic island, or roundabout.

To define a structure:

1. In the *Structure* group of the *Survey* tab, click the **Define** icon.
2. Click in the survey view to locate the first corner of the window which will select all of the data in the window of the structure.
3. Locate the second corner of the window.
4. Define the insertion point. Do one of the following:
  - Click the required place in the survey view.
  - Specify the required East and North coordinates in the appropriate editboxes at the bottom toolbar.

The *Save As* dialog is displayed.

5. Navigate to the required folder, type the name of the structure in the *File name* editbox and click **Save**.

The structure is defined

### Locate icon

The **Locate** icon of the Structure group allows you to create points, lines, and arcs representing a structure or other object previously saved as the \*.hse file. The object may be moved and manipulated so it is positioned exactly at the required rotation and offset correctly from boundaries using a range of functions.

To locate a structure:










1. In the *Structure* group of the *Survey* tab, click the **Locate** icon.

The *Open* dialog is displayed.

2. Select the required structure file and click **Open**.

- The structure is displayed on the screen with the pointer attached to the insertion point.
3. Define the position of the insertion point.
  4. If needed, configure the options by using the toolbar. Buttons are described in the table below.
  5. Click **Save**.

#### Buttons of the structure toolbar

| Field  | Description  |
|--|--|
|  <b>Display Offsets</b> | Displays the lines or arcs from which  |
|  <b>Direction</b>       | Rotates the structure around the insertion point to a nominated bearing.   |
|  <b>Swing</b>           | Rotates the structure around the insertion point to a nominated angle.   |
|  <b>Parallel</b>        | Rotates the structure with a line of the structure parallel to a nominated line in the project with an optional offset setting between the lines.        |
|  <b>Offset to Line</b>  | Offsets the insertion point from a line or if offsets are displayed to several boundary lines, it sets the offsets of the closest point from a boundary. |
|  <b>Y Mirror</b>        | Creates a mirror image of the structure around the Y-axis of the structure.  |
|  <b>X Mirror</b>        | Creates a mirror image of the structure around the X-axis of the structure.  |
|  <b>Corner</b>        | Snaps the insertion point to a selected point in the project. Any current rotation applied to the structure is held.                                     |
|  <b>Save</b>          | Saves the structure in the current position, creating the points, lines, and arcs on the current layer with properties as set on the property bar.       |

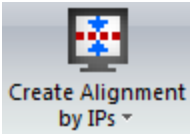






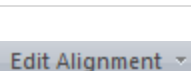








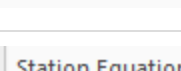



## Design Tab





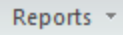



The *Design* tab of the MAGNET Office ribbon contains control icons, which allows you to create various new entities at your projects location. It separated to nine groups:

- "Roads group" section on the facing page
- "Cross Section group" section on page 336
- "Profile group" section on page 348
- "Intersection group" section on page 352
- "Subdivision group" section on page 362
- "Pad group" section on page 378
- "Sewer group" section on page 382
- "Drainage group" section on page 387
- "Design Views group" section on page 392

## Roads group

The *Roads* group from the *Design* tab of the MAGNET Office ribbon allows you to create and manage alignments and roads in the project. It contains four icons, and nineteen second level icons, described in the table below.

|   |  |
|---|--|
|                                | <p><b>Create Alignment by IPs icon</b><br/>Click it to create an alignment. This icon also contains the list of the second level icons. Click  to see them.</p> |
|  Create Alignment by Elements  | <p><b>icon</b><br/>Click it to</p>   |
|  Alignment from Lines          | <p><b>Alignment from Lines icon</b><br/>Click it to convert existing strings or lines to an alignment.</p>   |
|  Manual Road Entry             | <p><b>Manual Road Entry icon</b><br/>Click it to manually create a road.</p>   |
|  Manual Alignment Entry        | <p><b>Manual Alignment Entry icon</b><br/>Click it to manually create a new alignment.</p>   |
|  Level Book                    | <p><b>Level Book icon</b><br/>Click it to define the cross sectional survey data.</p>  |
|                                | <p><b>Edit Alignment icon</b><br/>This icon contains the list of the second level icons for editing existing alignments. Click  to see them.</p>                |
|  Edit IP                       | <p><b>Edit IP icon</b><br/>Click it to edit an existing horizontal intersection point.</p>   |
|  Add IP                      | <p><b>Add IP icon</b><br/>Click it to add a new horizontal intersection point.</p>   |
|  Insert IP                   | <p><b>Insert IP icon</b><br/>Click it to insert a new horizontal intersection point to an existing alignment.</p>  |
|  Delete IP                   | <p><b>Delete IP icon</b><br/>Click it to delete an existing intersection point.</p>  |
|  Alignment Text              | <p><b>Alignment Text icon</b><br/>Click it to add a chainage text along an alignment.</p>  |
|  Delete Alignment Text       | <p><b>Delete Alignment Text icon</b><br/>Click it to delete an existing chainage text along an alignment.</p>  |
|  Station Equation            | <p><b>Station Equation icon</b><br/>Click it to add station equation information to a existing road.</p>   |
|                              | <p><b>Alignments icon</b><br/>This icon contains list of the second level icons for creating new alignments, described below. Click  to see it.</p>           |
|  H/V Alignment from String   | <p><b>H/V Alignment from String icon</b><br/>Click it to create a horizontal/vertical alignment from an existing string.</p>   |
|  Convert Alignment to String | <p><b>Convert Alignment to String</b><br/>Click it to convert an alignment to a string.</p>  |

|   |   |
|---|---|
|  Create Center Line Points | Create Center Line Points icon<br>Click it to create points on an existing alignment.   |
|  Catch Points              | Catch Points icon<br>Click it to compute catch points from points on an alignment.  |
|  Create Offset Strings     | Create Offset Strings icon<br>Click it to create string, parallel to an existing alignment.   |
|  Multi Sheet Plot Windows  | Multi Sheet Plot Window icon<br>Click it to create a linked drawing.  |
|  Reports ▾                 | Reports icon<br>This icon contains list of the second level icons for generating reports. Click ▾ to expand the list of the second level icons. |
|  Alignment                 | Alignment icon<br>Click it to generate the alignment report.  |
|  Offset                    | Offset icon<br>Click it to list points within the defined offset from the alignment.  |
|  Pavement Check            | Pavement Check icon<br>Click it to generate a report, detailing Station/Chainage and offset of points along a nominated alignment.              |

## Create Alignment by IPs icon

The **Create Alignment by IPs** icon of the Roads group allows you to create a new alignment.

To create an alignment:

1. In the *Roads* group of the *Design* tab, click the **Create Alignment by IPs** icon.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

2. Locate the intersection points of the alignment by using the "Coordinate" method. For more information refer to "Add Point icon" section on page 136.
3. When finished, press *Esc*.

The **Create Alignment** dialog is displayed.

4. Review the properties of the newly created alignment, if needed change them. Fields are described in the table below.
5. Click **OK**.

The alignment is created.

### Fields of the input panel, when creating alignments

| Field         | Description   |
|---------------|---|
| <i>Number</i> | Defines the number of the next intersection point.                    |
| <i>East</i>   | Defines the East (X) coordinate of the alignment intersection point.  |
| <i>North</i>  | Defines the North (Y) coordinate of the alignment intersection point. |
| <i>Elev</i>   | Defines the elevation of the alignment intersection point.            |

| <b>Field</b>                 | <b>Description</b>  |
|------------------------------|---|
| <i>Code</i>                  | Defines the code of the alignment intersection point.                                   |
| <i>Use in Surface</i>        | Defines whether the alignment intersection point may be used in surface or not.         |
| <i>Interpolate Elevation</i> | Defines whether the elevation of the alignment intersection point will be interpolated. |
| <i>BreakLine</i>             | Defines whether the new alignment will be a breakline.                                  |

#### The non-editable fields of the *Edit Alignment* dialog

| <b>Field</b>      | <b>Description</b>   |
|-------------------|--|
| <i>Start IP</i>   | Displays the number of the alignment start intersection point.         |
| <i>End IP</i>     | Displays the number of the alignment end intersection point.           |
| <i>Num Points</i> | Display quantity of the intersection points in the alignment.          |
| <i>End Chain</i>  | Displays the chainage or running distance at the end of the alignment. |
| <i>Length</i>     | Display the length of the alignment.                                   |

#### The editable fields of the *Edit Alignment* dialog

| <b>Field</b>       | <b>Description</b>   |
|--------------------|--|
| <i>Name</i>        | Defines the name of the alignment.   |
| <i>Start Chain</i> | Defines the chainage or the running distance of the alignment start intersection point.  |
| <i>Layer</i>       | Defines layer to which the alignment belongs to. Note that the alignment and its points may belong to the different layers.  |
| <i>Color</i>       | Defines a color for alignment displaying.  |
| <i>Line Style</i>  | Defines appearance of the alignment both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>   | Defines the width of the alignment in millimeters when plotted.  |

#### Buttons of the *Edit Alignment* dialog

| <b>Button</b>         | <b>Description</b>   |
|-----------------------|--|
| <b>Set Properties</b> | Click it to set current properties as the default for alignments. New alignments will be created with these properties.  |
| <b>Get Properties</b> | Click it to load existing default properties for alignments.   |
| <b>Reverse</b>        | Click it to swap the start and end points of the alignment.  |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the alignment. The picture will be displayed near the alignment. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the alignment and close the dialog.   |
| <b>OK</b>             | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.   |

## Alignment from Lines icon

The **Alignment from Lines** icon of the Roads group allows you to create a new alignment from existing lines/arcs.

To create an alignment:

1. In the survey view, select the required lines/arc.
2. In the *Roads* group of the *Design* tab, click the **Alignment from Lines** icon.

The selected entities are converted into alignment segments. The input panel is displayed at the bottom toolbar. Fields are described in the table below.

3. In needed, locate the further intersection points of the alignment by using the "Coordinate" and/or "Sideshot" methods. For more information refer to "Add Point icon" section on page 136 or "Sideshot icon" section on page 143.

*TIP*

To switch the creation mode use the *Coordinate* icon and the *Direction* icon from the *Create Modes* group of the *Settings* tab, or corresponding icons at the toolbar.

4. When finished, press *Esc*.

The **Create Alignment** dialog is displayed.

5. Review the properties of the newly created alignment, if needed change them. For more information, refer to "Alignment properties" section on page 572.
6. Click **OK**.

The alignment is created.

### Fields of the input panel, when creating alignments

| Field                 | Description   |
|-----------------------|---|
| <i>Number</i>         | Defines the number of the next new intersection point.  |
| <i>East</i>           | Defines the East (X) coordinate of the alignment intersection point.  |
| <i>North</i>          | Defines the North (Y) coordinate of the alignment intersection point.   |
| <i>Bearing</i>        | Defines the bearing of the alignment intersection point from the previous one.<br>NOTE<br>This field available only when creating second or further intersection points.      |
| <i>Distance</i>       | Defines the distance from the previous alignment intersection point to further one.<br>NOTE<br>This field available only when creating second or further intersection points. |
| <i>Elev</i>           | Defines the elevation of the alignment intersection point.  |
| <i>Code</i>           | Defines the code of the alignment intersection point.   |
| <i>Use in Surface</i> | Defines whether the alignment intersection point may be used in surface or not.   |



| Field                        | Description   |
|------------------------------|---|
| <i>Interpolate Elevation</i> | Defines whether the elevation of the alignment intersection point will be interpolated. |
| <i>BreakLine</i>             | Defines whether the new alignment will be a breakline.                                  |

## Manual Road Entry icon

The **Manual Road Entry** icon of the Roads group allows you to manually create a road or edit an existing one.

To create/edit a road:

1. In the *Roads* group of the *Design* tab, click the **Manual Road Entry** icon.

The *Manual Road Entry Manager* dialog is displayed.

2. Do one of the following:
  - Click **New** to create a new alignment.
  - Select an existing traverse and click **Open** to edit it.

The **Road Editor** is displayed.

3. Make the required configurations. For more information refer to "Road editor" section on page 523.

## Manual Alignment Entry icon

The **Manual Alignment Entry** icon of the Roads group allows you to manually create an alignment or edit an existing one.

To create/edit an alignment:

1. In the *Roads* group of the *Design* tab, click the **Manual Alignment Entry** icon.

The *Traverse Data Manager* dialog is displayed.

2. Do one of the following:
  - Click **New** to create a new alignment.
  - Select an existing traverse and click **Open** to edit it.

The **Alignment Editor** is displayed.

3. Make the required configurations. For more information refer to "Alignment editor" section on page 520.

## Level Book icon

The **Level Book** icon of the Roads group allows you to specify the cross sectional survey data in the form of staff reading, chainage, and offset to be used in road design. You may also specify reduced levels here.

To define the cross sectional data:

1. In the *Roads* group of the *Design* tab, click the **Level Book** icon.

The *Level Book Manager* dialog is displayed.

2. Do one of the following:
  - Click **New** to create a new cross sectional entry.
  - Select an existing entry and click **Open** to edit it.

The *Level Book* dialog is displayed.

3. Make the required configurations. Fields are described in the table below.
4. Click **OK**.

#### Fields of the *Level Book* dialog

| Field              | Description  |
|--------------------|--|
| <i>Back Sight</i>  | Defines the observed reading to the backsight.   |
| <i>Inter Sight</i> | Defines observed reading to the intermediate sight.  |
| <i>Fore Sight</i>  | Defines the observed reading to the fore sight.  |
| <i>Level</i>       | Defines the known reduced levels only at the appropriate back sights.  |
| <i>Chainage</i>    | Defines the chainage or distance for the observation. This field only needs to be specified when the chainage changes.   |
| <i>Offset</i>      | Defines the offset of the observation point from the centerline. Negative values are taken as being to the left of the centerline in the direction of increasing chainage. |
| <i>Code</i>        | Defines an alpha-numerical code for the observation. This field is optional.   |

#### Buttons of the *Level Book* dialog

| Button         | Description   |
|----------------|---|
| <b>Insert</b>  | Click it to insert an additional row in the level book table.         |
| <b>Delete</b>  | Click it to delete an existing row in the level book table.           |
| <b>Restore</b> | Click it to discard changes, and return the last saved configuration. |
| <b>OK</b>      | Click it to apply the changes and close the dialog.                   |
| <b>Cancel</b>  | Click it to close the dialog.   |

## Edit IP icon

The **Edit IP** icon of the Roads group allows you to edit details for the curve geometry at a Horizontal Intersection Point (HIP), by using the curve calculators based on the speed environment and other factors or to update and edit the existing curve geometry.

To edit an intersection point:

1. In the *Roads* group of the *Design* tab, click the **Edit IP** icon.
2. In the survey view, select the required alignment.
3. At the alignment, select the required intersection point.

The *Edit Alignment HIP* dialog is displayed.

4. Do one of the following:
  - Make the required configurations and click **OK**. Fields are described in the table below.
  - Click **Delete** to delete an intersection point.

**Fields of the *Edit Alignment HIP* dialog**

| <b>Field</b>                 | <b>Description</b>  |
|------------------------------|---|
| <i>IP Name</i>               | Displays the number of the intersection point (IP).   |
| <i>Align Name</i>            | Displays the name of the alignment to which the IP belongs to.  |
| <i>Easting</i>               | Defines the East coordinate of the IP.  |
| <i>Northing</i>              | Defines the North coordinate of the IP.   |
| <i>Speed</i>                 | Defines the speed environment for the curve. You may select the value from the drop-down list, or specify your own value. It is used to define the minimum curve radius and other curve values.   |
| <i>Radius</i>                | Defines the curve radius.   |
| <i>Rate of Rotation</i>      | Defines the distance, required to rotate the road crossfall from the normal crossfall of the standard road template leg to full super-elevation   |
| <i>Required Super</i>        | Defines the super-elevation value in percent.   |
| <i>Entry Spiral Length</i>   | Defines the length of the entry spiral. Specify 0.000 for a circular curve with no transition.  |
| <i>Exit Spiral Length</i>    | Defines the length of the exit spiral. Specify 0.000 for a circular curve with no transition.   |
| <i>Curve Radius Table</i>    | Defines the curve radius table. It is used to set up local standards for the minimum curve radius for a defined speed environment. You may select the required table from the drop-down list.   |
| <i>Friction Factor Table</i> | Defines the curve radius table. It is used to set up local standards for the friction factor for a defined speed environment. You may select the required table from the drop-down list.  |
| <i>Minimum Radius</i>        | Displays the friction factor radius for the alignment curves, defined by the speed environment, specified in the <i>Speed</i> field.  |
| <i>Maximum Radius</i>        | Displays the maximum radius that can be used for curves within the existing geometry. It depends on the design of the previous curve and/or following curve and their definition, including the position of their IPs and tangent spiral points or tangent arc points.                |
| <i>Arc Length</i>            | Calculated from the radius entered, the geometry of the arc at the curve, and the tangent point positions   |
| <i>Calculated Super</i>      | Defines the maximum recommended super-elevation for the curve.  |
| <i>Spiral Length</i>         | Displays the recommended spiral length for designing a transitional curve, comprising a spiral-arc-spiral.  |
| <i>Max Spiral Length</i>     | Displays the maximum spiral length that can be used for the curve within the existing geometry. It depends on the design of the previous curve and/or the following curve and their definitions, including the position of their IPs and tangent spiral points or tangent arc points. |

## Add IP icon

The **Add IP** icon of the Roads group allows you to add extra intersection point (IP) to the end of an existing alignment.

To add an IP to an existing alignment:

1. In the *Roads* group of the *Design* tab, click the **Add IP** icon.
2. In the survey view, select the required alignment.
3. Locate the additional points, by using the "Coordinate" method. For more information, refer to "Add Point icon" section on page 136.
4. When finished, press *Esc*.

## Insert IP icon

The **Insert IP** icon of the Roads group allows you to insert new intersection point (IP) at the beginning of the existing alignment or in between two existing IPs.

To insert an IP:

1. In the *Roads* group of the *Design* tab, click the **Insert IP** icon.
2. In the survey view, select the required alignment.
3. Click the existing IP, which is the nearest to the location of the new point.
4. Locate the additional points, by using the "Coordinate" method. For more information, refer to "Add Point icon" section on page 136.
5. When finished, press *Esc*.

## Delete IP icon

The **Delete IP** icon of the Roads group allows you to delete an intersection point (IP) to the end of an existing alignment.

To delete an IP from an alignment:

1. In the *Roads* group of the *Design* tab, click the **Delete IP** icon.
2. In the survey view, select the required alignment.
3. Select the IP to be deleted.

The IP is deleted from the alignment. Note that it still exists as the point entity, independent from the alignment.

4. If needed, delete more points.
5. When finished, press *Esc*.

## Alignment Text icon

The **Alignment Text** icon of the Roads group allows you to add the chainage or running distance labels along an existing alignment.

To add labels to an alignment:

1. In the *Roads* group of the *Design* tab, click the **Alignment Text** icon.

The *Select Alignment* dialog is displayed.

2. Select the required alignment and click **OK**.

The *Alignment Text* dialog is displayed.

Each row of table represents an alignment segment. You can fill in one row – in this case this settings will apply for the full length of the alignment; or several rows to apply different settings to different alignment sections. This may be necessary due to the way the alignment changes direction, and the need to show the alignment text in different positions to avoid confusion with other data.

3. Specify the labeling details. Fields are described in the table below.
4. Click **OK**.

The *Additional Chainages* dialog is displayed. You may specify an additional chainages here.

*For example: the default chainages spacing is 100 meters, but you may configure creating labels at each 10 meters at the segment from 500 to 630 meters.*

5. If needed, configure the additional chainages and click **OK**.

The alignment is labeled.

#### Fields of the *Alignment Text* dialog's table

| Field                | Description   |
|----------------------|---|
| <b>Chainage</b>      |   |
| <i>Start</i>         | Defines the start chainage for the text.                    |
| <i>End</i>           | Defines the end chainage for the text.                      |
| <i>Offset</i>        | Defines the offset of the text from the alignment.          |
| <i>Position</i>      | Defines the position of the text relative to the alignment. |
| <i>Reverse</i>       | When ticked, the text will be turned around by 180 degrees. |
| <b>Table</b>         |   |
| <i>Text</i>          | Defines the text style for the alignment labels.            |
| <i>Justification</i> | Defines the justification style for the alignment labels.   |

#### Fields of the *Alignment Text* dialog

| Field                        | Description   |
|------------------------------|---|
| <i>Text Orientation</i>      | Defines the orientation of the alignment labels.  |
| <i>Show Tick Marks</i>       | Tick to display tick marks on the alignment at the cross section position                   |
| <i>Align text to page</i>    | Tick to assist with layout, depending on the shape and position of the alignment.           |
| <i>Size</i>                  | Defines the size of the tick marks.   |
| <i>Layer</i>                 | Defines the layer to which the alignment labels and ticks belongs to.                       |
| <i>Cross Section Spacing</i> | Select this radiobutton to use the cross section spacing for the alignment label chainages. |

| Field                  | Description  |
|------------------------|--|
| <i>Specify Spacing</i> | Select this radiobutton to manually define the spacing for straight and curved segments of the alignment.                          |
| <i>None</i>            | Select this radiobutton to place the alignment labels only at the IPs of the alignment.  |
| <i>Label TP's</i>      | Tick to label the tangent point (TP) points of the alignment. Define the label position in the <i>TP Label Position</i> group box. |
| <i>Format</i>          | Defines the layout of the spacing.   |

#### Fields of the *Additional Chainages* dialog's table

| Field                 | Description                                     |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the start of the additional chainage.   |
| <i>End Chainage</i>   | Defines the end of the additional chainage.     |
| <i>Spacing</i>        | Defines the spacing of the additional chainage. |
| <i>Omit</i>           | Tick to omit the additional chainage row.       |

#### Fields of the *Additional Chainages* dialog

| Field                 | Description                                   |
|-----------------------|---|
| <i>Start Chainage</i> | Displays the start chainage of the alignment. |
| <i>End Chainage</i>   | Defines the end chainage of the alignment.    |

## Delete Alignment Text icon

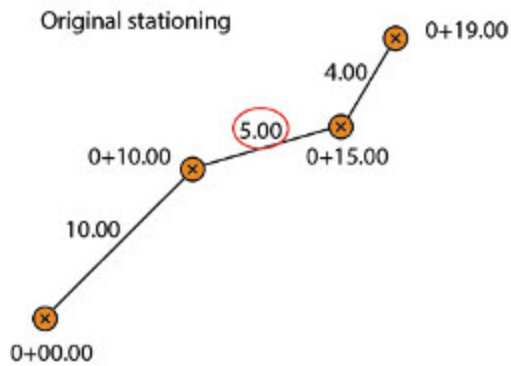
The **Delete Alignment Text** icon of the Roads group allows you to delete the text labels from an existing alignment.

To delete labels from the alignment:

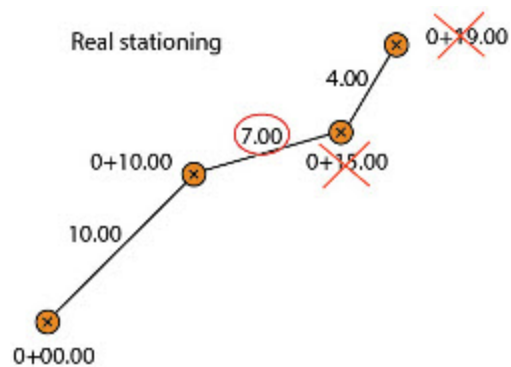
1. In the *Roads* group of the *Design* tab, click the **Delete Alignment Text** icon.  
The *Select Alignment* dialog is displayed.
2. Select the required alignment and click **OK**.  
The labels are deleted.

## Station Equation icon

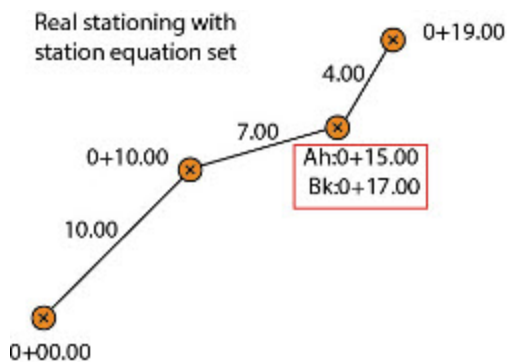
While designing a road there may be a situation when the original stationing does not fit to the actual alignment, and a new center line stationing may be needed. Station Equations are a method to link an old and a new roadway stationing. Station equations are used to change the stationing forward or back from some spot along the alignment. Approaching stationing, behind the spot, where station equation applied is called Back Station, departing stationing, which is after this spot is called Ahead Station.



Original stationing — second segment is 5 meters long, the third station is 0+15.00, and the end station is 0+19.00.



The second segment has been prolonged to 7 meters. Third station became 0+17.00, and the end station became 0+21.00.



The Station Equation is applied to the third station. Its formula is  $Back = 0+17.00$ ,  $Ahead = 0+15.00$ . The end station is 0+19.00 again.

The **Station Equation** icon of the Roads group allows you to add station equations to existing alignments.

To add station equations to an alignment:

1. In the *Roads* tab of the *Design* tab, click the **Station Equation** icon.  
The **Station Equations** dialog is displayed.
2. From the *Alignment* drop-down list, select the alignment, to which station equations will be assigned.
3. In the *Name* column of the table, specify the name of the station equation.
4. In the *Back* column of the table, specify the stationing for the approaching segment.
5. In the *Ahead* column of the table, specify the stationing for the departing segment.

6. If needed, fill in more rows of the table.
7. Click **OK**.

#### Fields of the *Station Equations* dialog

| Field                 | Description   |
|-----------------------|---|
| <i>Alignment</i>      | Defines the alignment to which the station equations will be assigned. Select the required alignment from the drop-down list. |
| <i>Start Chainage</i> | Displays the start chainage of the selected alignment.  |
| <i>End Chainage</i>   | Displays the end chainage of the selected alignment.  |
| <i>Name</i>           | Define the name of the station equation.  |
| <i>Back</i>           | Defines stationing of the approaching segment, behind the spot, where station equation is applied                             |
| <i>Ahead</i>          | Defines stationing of the departing segment, after the spot, where station equation is applied                                |

## H/V Alignment from String icon

The **H/V Alignment from String** icon of the Roads group allows you to create an horizontal/vertical alignment from an existing elevated string.

To create an alignment from a string:

1. In the *Roads* group of the *Design* tab, click the **H/V Alignment from String** icon.
2. In the survey view, select the required sting.  
The **Create H/V Alignment from String** dialog is displayed.
3. Review the properties, if needed, change them. Fields are described in the table below.
4. Click **OK**.

The alignment is created.

#### Fields of the *Create H/V Alignment from String* dialog

| Field              | Description   |
|--------------------|---|
| <i>Name</i>        | Defines the name of the alignment.  |
| <i>Start IP</i>    | Displays the number of the alignment start intersection point.                          |
| <i>End IP</i>      | Displays the number of the alignment end intersection point.                            |
| <i>Num Points</i>  | Display quantity of the intersection points in the alignment.                           |
| <i>Start Chain</i> | Defines the chainage or the running distance of the alignment start intersection point. |
| <i>End Chain</i>   | Displays the chainage or running distance at the end of the alignment.                  |
| <i>Length</i>      | Displays the length of the alignment.   |



| Field                        | Description  |
|------------------------------|--|
| <i>Layer</i>                 | Defines layer to which the alignment belongs to. Note that the alignment and its points may belong to the different layers.  |
| <i>Color</i>                 | Defines a color for alignment displaying.  |
| <i>Line Style</i>            | Defines appearance of the alignment both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>             | Defines the width of the alignment in millimeters when plotted.  |
| <i>Cross Section Spacing</i> | Defines the chainage spacing for the straight and curved segments of the alignment.  |

## Convert Alignment to String

The **Convert Alignment to String** icon of the Roads group allows you to convert an existing alignment to a simple string.

### **WARNING**

***This conversation cannot be canceled. Save the project before using it.***

To convert an alignment to a string:

1. In the *Roads* group of the *Design* tab, click the **Convert Alignment to String** icon.
2. In the survey view, select the required alignment.

The warning dialog is displayed.

3. Click **Yes**.

The dialog prompts you to keep the intersection points of the alignment.

4. Click **Yes** or **No** as you need.

The alignment is converted to a string.

## Create Center Line Points icon

The **Create Center Line Points** icon of the Roads group allows you to create points on the center line at nominated spacing on a selected layer.

To create center line points:

1. In the *Roads* group of the *Design* tab, click the **Create Center Line Points** icon.

The **Select Alignment** dialog is displayed.

2. Select the required alignment and click **OK**.

The **Center Line Points** dialog is displayed.

3. Review the properties, if needed, change them. Fields are described in the table below.
4. Click **OK**.

If you have ticked the *Additional Chainages* checkbox, the **Additional Chainages** dialog is displayed. You may specify an additional chainages here.

For example if the default chainages spacing is 100 meters, but you may configure creating center line points at each 10 meters at the segment from 500 to 630 meters.

5. Configure additional chainages as you need and click **OK**.

#### Fields of the *Center Line Points* dialog

| Field                       | Description  |
|-----------------------------|--|
| <i>Alignment Name</i>       | Displays the name of the alignment.  |
| <i>Layer Name</i>           | Defines the layer, where center line points will be created.                               |
| <i>Start Chainage</i>       | Defines the start chainage for point creation.   |
| <i>End Chainage</i>         | Defines the end chainage for point creation.   |
| <i>Default Spacing</i>      | Defines the chainage spacing for the straight and curved segments of the alignment.        |
| <i>Include TP's</i>         | Tick to include tangent point (TP) points from the string or alignment in the computation. |
| <i>Duplicate Points</i>     | Tick to create a duplicate point if a point already exists at the center line.             |
| <i>Additional Chainages</i> | Tick to create the additional chainages for point's creation.                              |

#### Fields of the *Additional Chainages* dialog's table

| Field                 | Description                                     |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the start of the additional chainage.   |
| <i>End Chainage</i>   | Defines the end of the additional chainage.     |
| <i>Spacing</i>        | Defines the spacing of the additional chainage. |
| <i>Omit</i>           | Tick to omit the additional chainage row.       |

#### Fields of the *Additional Chainages* dialog

| Field                 | Description                                   |
|-----------------------|---|
| <i>Start Chainage</i> | Displays the start chainage of the alignment. |
| <i>End Chainage</i>   | Defines the end chainage of the alignment.    |

## Catch Points icon

The **Catch Points** icon of the Roads group allows you to compute catch points on a DTM surface from points on an alignment or string at a defined grade. The points on the alignment or string must have valid elevations.

To create catch points:

1. In the *Roads* group of the *Design* tab, click the **Catch Points** icon.
2. In the survey view, select the required sting.  
The **Catch Points** dialog is displayed.
3. Review the properties, if needed, change them. Fields are described in the table below.

4. Click **OK**.  
The *Preferred Chainages* dialog is displayed.
5. If needed, specify the required chainages, and click **OK**.  
The MAGNET Office prompts the first point.
6. Review the properties, and confirm the point.
7. Repeat for the rest of the points.

#### Fields of the *Catch Points* dialog

| Field                        | Description  |
|------------------------------|--|
| <i>String Name</i>           | Displays the name of the selected string or alignment.   |
| <i>String Layer</i>          | Displays the layer of the selected string or alignment.  |
| <i>DTM Name</i>              | Defines the DTM for the computation. Select the required DTM from the drop-down list.                    |
| <i>Default Spacing</i>       | Defines the default spacing for straight and curved segments of the alignment.                           |
| <i>Cut Slope Grade 1 in</i>  | Defines the grade to be used for computing cut slopes and a color for the cut slope string and points.   |
| <i>Fill Slope Grade 1 in</i> | Defines the grade to be used for computing fill slopes and a color for the fill slope string and points. |
| <i>Start Station</i>         | Defines the start chainage of the alignment.   |
| <i>End Station</i>           | Defines the end chainage of the alignment.   |
| <i>Intercept Layer</i>       | Defines the layer for the new slope entities or enter a new layer name.                                  |
| <i>Include TP's</i>          | Tick to include tangent point (TP) points from the string or alignment in the computation.               |
| <i>Points At</i>             |  |
| <i>Slope Left</i>            | Select to compute the slope to the left or right of the selected string or alignment.                    |
| <i>Slope Right</i>           |  |

## Create Offset Strings icon

The **Create Offset Strings** icon of the Roads group allows you to create strings, parallel to an existing string, with nodes, referenced to an existing alignment.

To create offset strings:

1. In the *Roads* group of the *Design* tab, click the **Create Offset Strings** icon.  
The *Select Alignment* dialog is displayed.
2. Select the required alignment and click **OK**.  
The *Offset Strings* dialog is displayed.
3. In the *Start Chainage* and *End Chainage* editboxes, specify the start and end stations of the alignment, between which the offset string will be created.
4. Tick the *Offset String 1* editbox.
5. From the *String* drop-down list, select the existing string to which the new string will be parallel.

6. In the *Name* editbox, type the name of the new string.
7. In the *Offset* editbox, specify the required offset of the new string.
8. If needed, tick the *Offset String 2* editbox, and repeat steps 5 to 7 create second offset string.
9. Click **OK**.

The offset string is created.

## Multi Sheet Plot Window icon

The **Multi Sheet Plot Window** icon of the Roads group allows you to create a linked drawing. The drawing is defined with a nominated plot scale, title block, and orientation. The drawing displays all of the data currently on active layers in the survey view.

You can turn layers on/off in the drawing. Any layer added to the project after the drawing was created may be turned on in the drawing. Any annotation that was not available at the time the drawing was created may be activated.

To create a multi sheet plot window:

1. In the *Roads* group of the *Design* tab, click the **Multi Sheet Plot Window** icon.
2. In the survey view, select the required alignment or string.

The *Open* dialog is displayed.

3. Select the required title block, and click **Open**.

The title block is displayed in the survey view. Its bottom-left corner is in the center of the survey view.

4. Modify the size and position of the drawing, by using the mouse:
  - Drag the plot window through the survey view by using the bottom left corner.
  - Resize the plot window by using the top right corner.
  - Rotate the plot window around the bottom left corner, by using the bottom-right handle.
  - To change the title block, Click **Title Block** and select a new one.

The additional plot windows automatically appear in the survey view, as you configure the first one to make the entire alignment fits the plot windows.

5. On the bottom panel, click **OK**.

The drawing of the selected area is displayed in the new window.

## Alignment icon

The **Alignments** icon of the Roads group allows you to generate the alignment report, listing all of the alignment details.

To create an alignment report:

1. In the *Roads* group of the *Design* tab, click the **Alignment** icon.

The *Alignment List Selection* dialog is displayed.

2. Select the required alignment and click **OK**.

The *Center Line Points* dialog is displayed.

3. Review the properties, if needed, change them. Fields are described in the table below.

4. Click **OK**.

If you have ticked the *Additional Chainages* checkbox, the *Additional Chainages* dialog is displayed. You may specify an additional chainage here.

5. Configure additional chainages as you need and click **OK**.

The report is generated and displayed.

**Fields of the *Alignment List Selection* dialog**

| Field                       | Description   |
|-----------------------------|---|
| <i>Alignment Name</i>       | Displays the name of the alignment.   |
| <i>Start Chainage</i>       | Defines the start chainage for the report.  |
| <i>End Chainage</i>         | Defines the end chainage for the report.  |
| <i>Default Spacing</i>      | Defines the chainage spacing for the straight and curved segments of the alignment.   |
| <i>Include TPs</i>          | Tick to include tangent point (TP) points from the string or alignment to the report. |
| <i>Moss Format</i>          | Defines whether the moss format will be used.   |
| <i>Additional Chainages</i> | When ticked, the additional chainages may be added to the report.                     |

**Fields of the *Additional Chainages* dialog's table**

| Field                 | Description                                     |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the start of the additional chainage.   |
| <i>End Chainage</i>   | Defines the end of the additional chainage.     |
| <i>Spacing</i>        | Defines the spacing of the additional chainage. |
| <i>Omit</i>           | Tick to omit the additional chainage row.       |

**Fields of the *Additional Chainages* dialog**

| Field                 | Description                                   |
|-----------------------|---|
| <i>Start Chainage</i> | Displays the start chainage of the alignment. |
| <i>End Chainage</i>   | Defines the end chainage of the alignment.    |

## Offset icon

The **Offset** icon of the Roads group allows you to generate the offset report, listing all of the points within a specified offset of an alignment. The list will display the chainage and offset for each of these points.

To generate the offset report:

1. In the *Roads* group of the *Design* tab, click the **Offset** icon.

The *Offset Report* dialog is displayed.

## 2. Review the properties, if needed, change them. Fields are described in the table below.

3. Click **OK**.

The report is generated and displayed.

**Fields of the *Offset Report* dialog**

| Field                           | Description  |
|---------------------------------|--|
| <i>Select From</i>              | Defines the points range for report.   |
| <i>Offset Symbol</i>            | Defines the offset symbol for report layout.   |
| <i>Format</i>                   | Defines the chainage format.   |
| <i>Alignment</i>                | Defines the alignment, around which the points will be searched.   |
| <i>Start Chainage</i>           | Defines the start chainage to be used in the report.   |
| <i>End Chainage</i>             | Defines the end chainage to be used in the report.   |
| <i>Left Offset</i>              | Defines offset area to the left of the alignment.  |
| <i>Right Offset</i>             | Defines offset area to the right of the alignment.   |
| <i>Print If Height &gt; (m)</i> | Defines the minimum height for points in report. Point, with elevation less, than defined won't be included into report. |

**Pavement Check icon**

The **Pavement Check** icon of the Roads group allows you to generate a report detailing Station/Chainage and offset of points selected with reference to a selected alignment. Height difference to a nominated design DTM is also computed with points outside the tolerance marked with an asterisk in the report produced.

A DTM should be selected to compare the height difference with. Upper and lower tolerances are nominated which are then used in the report and checked against the selected data

To generate the pavement report:

1. In the *Roads* group of the *Design* tab, click the **Pavement Check** icon.  
The ***Pavement Check Report*** dialog is displayed.
2. Review the properties, if needed, change them. Fields are described in the table below.
3. Click **OK**.

The report is generated and displayed.

**Fields of the *Pavement Check Report* dialog**

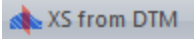
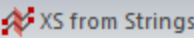
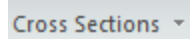

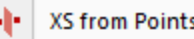
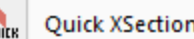

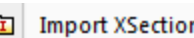
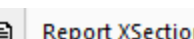
| Field                 | Description   |
|-----------------------|---|
| <i>Select From</i>    | Defines the data for the report. Select one of the following: <ul style="list-style-type: none"> <li>• All Data – to display all existing data.</li> <li>• Active Layers – to display only entities, which belong to the active layers.</li> <li>• All Data – to display only selected entities.</li> </ul> |
| <i>Alignment</i>      | Defines the alignment to be used in the report.   |
| <i>Start Chainage</i> | Defines the start chainage of the alignment segment to be used in the report.   |
| <i>End Chainage</i>   | Defines the end chainage of the alignment segment to be used in the report.   |

---

| <b>Field</b>           | <b>Description</b>                                     |
|------------------------|--|
| <i>Left Offset</i>     | Defines the left offset from the alignment.            |
| <i>Right Offset</i>    | Defines the right offset from the alignment.           |
| <i>DTM</i>             | Defines the DTM to compare the height difference with. |
| <i>Upper Tolerance</i> | Defines the tolerance of comparison above DTM.         |
| <i>Lower Tolerance</i> | Defines the tolerance of comparison below DTM.         |
| <i>Depth</i>           | Defines the tolerance of comparison inside DTM.        |
| <i>Excel format</i>    | Tick to generate the report in MS Excel format.        |

## Cross Section group

The *Cross Section* group from the *Design* tab of the MAGNET Office ribbon allows you to work with the cross sections. It contains three icons and five second level icons, described in the table below.

|  |  |
|--|--|
|   | <p>XS from DTM icon</p> <p>Click it to extract a cross section from an existing digital terrain model.</p>   |
|   | <p>XS From Strings icon</p> <p>Click it to extract a cross section from strings.</p>   |
|   | <p>Cross Section icon</p> <p>This icon contains the list of the second order icons for various cross section operations. Click  to expand the list of the second level icons.</p> |
|   | <p>XS from Points icon</p> <p>Click it to create cross sections from points.</p>   |
|   | <p>Quick XSection icon</p> <p>Click it to generate cross section for previewing.</p>   |
|   | <p>XSection Volumes icon</p> <p>Click it to calculate cross section volumes.</p>   |
|   | <p>Import XSection icon</p> <p>Click it to export an external cross section files.</p>   |
|  | <p>Report XSection icon</p> <p>Click it to list cross sections from the current surface.</p>   |

### XS from DTM icon

The **XS from DTM** icon of the Cross Section group allows you to extract cross sections for a selected alignment from a triangular mesh, for use in road design and plotting. The mesh represents a surface, which is usually the existing or natural surface. Points are added to the cross section where the cross section intersects triangle sides, providing offset and level data.

You may specify the spacing between these sections and nominate additional chainages as required. Cross sections will be generated at these spacing with a point extracted for the offset where the cross section line intersects the side of a triangle. The level allocated to this offset point is calculated from the triangle intercept.

To extract the cross sections:

1. In the *Cross Section* group of the *Design* tab, click the **XS from DTM** icon.

The *Select Alignment* dialog is displayed.

2. Select the required alignment and click **OK**.

#### NOTE

If data has previously been extracted for the same alignment, the cross sections will be overwritten and updated.

The *Extract Cross Sections from DTM* dialog is displayed.

3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.



The *Additional Chainages* dialog is displayed.

5. If needed, configure the additional chainages. Fields are described in the table below.
6. Click **OK**.

The cross sections are extracted and marked with yellow lines in the survey view. You may review and them in the road view under the name of the alignment used. See "Roads icon" section on page 392 for details.

#### Fields of the *Extract Cross Sections from DTM* dialog

| Field                       | Description   |
|-----------------------------|---|
| <i>Alignment Name</i>       | Displays the name of the selected alignment.  |
| <i>Surface Name</i>         | The first surface is set to NATURAL. The cross sections will be held as a natural surface in the roads view with this name. Other names may be used for further surfaces.<br><br><i>TIP</i><br><i>Do not use DESIGN, BOXING, or a SUBGRADE names.</i> |
| <i>DTM Name</i>             | Select the required DTM from the drop-down list.  |
| <i>Filter Tolerance</i>     | Defines the tolerance of the cross sectional data. See "Cross section filter tolerance" section on the next page for details.<br><br>The default value is 0.00 which means no filtering will be applied.  |
| <i>Start Chainage</i>       | The start chainage of the selected alignment is displayed. This value can be modified if cross sections are only required within a specified range of chainages.  |
| <i>End Chainage</i>         | The end chainage of the selected alignment is displayed. This value can be modified if cross sections are only required within a specified range of chainages.  |
| <i>Left Offset</i>          | Defines the left offset at which the cross section will be extracted to the left of the alignment.  |
| <i>Right Offset</i>         | Defines the right offset at which the cross section will be extracted to the right of the alignment.  |
| <i>Compute Obstructions</i> | Tick to nominate an obstruction string. See "Compute obstructions" section on page 339 for details.   |
| <i>Additional Offsets</i>   | Defines a specified offset, if all the cross sections must have a point and level computed at this offset. Several new offsets may be entered. All offsets to the left of the alignment should be entered as a negative offset                        |
| <i>Include TPs</i>          | Tick to extract cross sections at each tangent (TP) point. A cross section will be created at each point between HIPs on straights, at tangent arc points, tangent spiral points and arc spiral points  |
| <i>Cross Sections At</i>    | The default is to extract cross sections at the half angle from the alignment. You may choose to extract cross sections at right angles before the TP, or at right angles after the TP.   |

| Field                               | Description  |
|-------------------------------------|--|
| <i>Default Spacing</i>              | This setting defaults to a spacing of 20m between each cross section extracted along the alignment. Different spacing may be set for straights and curves, such as straights set to 10.00m spacing and curves to 5.00m spacing. If cross sections are only required at the TP points set the default spacing to 0.00 |
| <i>Cross Sections at Breaklines</i> | A cross section will be extracted wherever the alignment crosses a breakline in the Survey View.   |
| <i>Create CL Points at DTM</i>      | Tick to display the change in elevation along the profile/alignment based on every DTM triangle intersection.<br>NOTE<br>Additional cross sections will not be extracted. This feature is only used for graphical representation.  |

#### Fields of the *Additional Chainages* dialog's table

| Field                 | Description                                     |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the start of the additional chainage.   |
| <i>End Chainage</i>   | Defines the end of the additional chainage.     |
| <i>Spacing</i>        | Defines the spacing of the additional chainage. |
| <i>Omit</i>           | Tick to omit the additional chainage row.       |

#### Fields of the *Additional Chainages* dialog

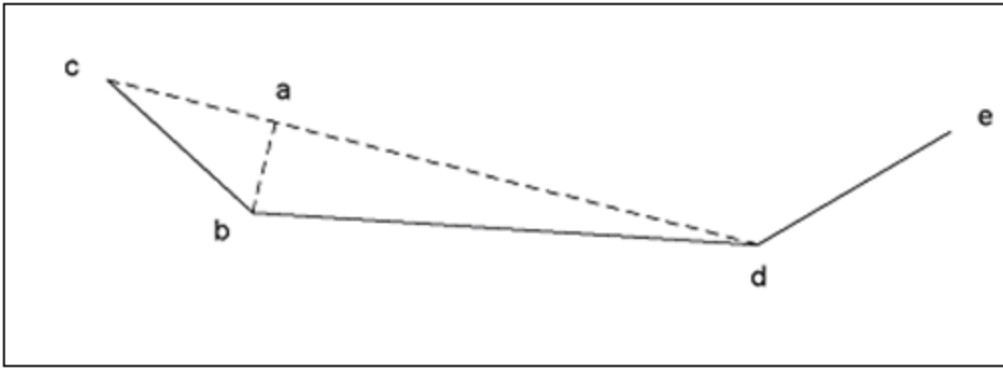
| Field                 | Description                                   |
|-----------------------|---|
| <i>Start Chainage</i> | Displays the start chainage of the alignment. |
| <i>End Chainage</i>   | Defines the end chainage of the alignment.    |

### Cross section filter tolerance

The filtering of the cross sections points are used to filter out unnecessary points.

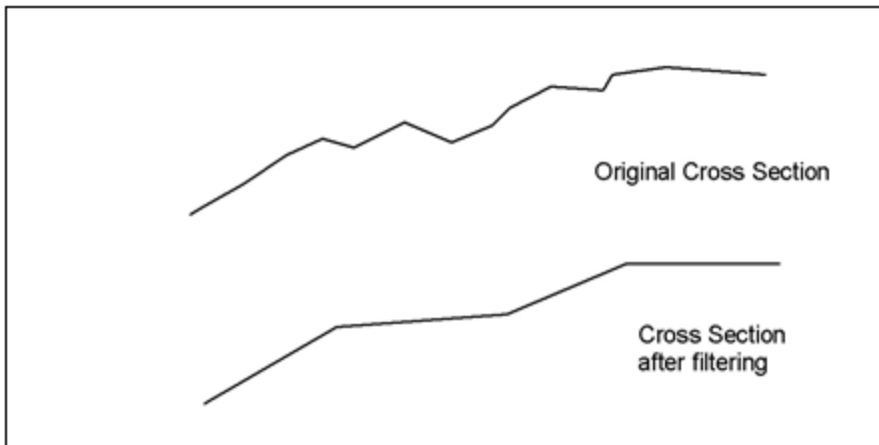
The tolerance value is compared to height differences between the points in each cross section. Adjacent points in the cross section are tested. If the tolerance is greater than the actual height difference between adjacent points then some points will not be included in the cross sections as shown below. The centre line level will not be affected by filter tolerance.

For example, the filter tolerance may be set to 0.010m to filter out points from a close triangular model over a fairly flat terrain. See picture below.



### Cross section filtering procedure

Points **c**, **b**, **d** and **e** are points in the cross section, while point **a** is on the line **cd**, which is perpendicular to the point **b**. If the **ab** distance is smaller or equal to the specified Filter Tolerance value then the point **b** will be deleted from the cross section. If point **b** is deleted from the cross section then the line **ce** would be tested with point **d**. If point **b** is not deleted from the cross section then the line **eb** will be tested with point **d** and so on across the cross section. You may see example of filtering result on the picture below.



### Cross section filtering result

## Compute obstructions

Obstructions such as existing underground services may be displayed in the cross section and long section windows in the roads view.

An obstruction is created as a string in the survey view, with the node points defining the level of the obstruction in or above the ground surface. The string is saved and named and set as a service.

To configure this option:

1. Tick the *Compute Obstructions* checkbox.
2. Click **Set Obstructions**.

The *Select Obstructions* dialog is displayed.

3. Select the required service strings from the *Valid Service String* list and click >>.
4. The selected strings are displayed in the *Selected Obstructions* list. If needed to remove a string, select it and click <<.
5. Click **OK**.

## XS From Strings icon

The **XS from Strings** icon of the Cross Section group allows you to extract cross sectional data along a designed alignment from a surface defined by 3D stringlines.

You may specify the spacing between these sections and nominate additional chainages as required. Cross sections will be generated at these spacing with a point extracted for the offset where the cross section line intersects each stringline. The level allocated to this offset point is calculated from the grade line between adjacent points on each stringline.

A string may be a string entity, a series of lines or lines and arcs. Any lines and arcs must be defined as breaklines. The points defining these entities must have elevations.

To extract the cross sections:

1. In the *Cross Section* group of the *Design* tab, click the **XS from Strings** icon.

The **Select Alignment** dialog is displayed.

2. Select the required alignment and click **OK**.

### NOTE

If data has previously been extracted for the same alignment, the cross sections will be overwritten and updated.

The **Extract Cross Sections from Strings** dialog is displayed.

3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.

The **Additional Chainages** dialog is displayed.

5. If needed, configure the additional chainages. Fields are described in the table below.
6. Click **OK**.

The cross sections are extracted and marked with yellow lines in the survey view. You may review and them in the road view under the name of the alignment used. See "Roads icon" section on page 392 for details.

### Fields of the **Extract Cross Sections from Strings** dialog

| Field                   | Description   |
|-------------------------|---|
| <i>Alignment Name</i>   | Displays the name of the selected alignment.  |
| <i>Surface Name</i>     | The first surface is set to NATURAL. The cross sections will be held as a natural surface in the roads view with this name. Other names may be used for further surfaces.<br><br><i>TIP</i><br><i>Do not use DESIGN, BOXING, or a SUBGRADE names.</i> |
| <i>Filter Tolerance</i> | Defines the tolerance of the cross sectional data. See "Cross section filter tolerance" section on page 338 for details.<br><br>The default value is 0.00 which means no filtering will be applied.   |

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>Start Chainage</i>          | The start chainage of the selected alignment is displayed. This value can be modified if cross sections are only required within a specified range of chainages.   |
| <i>End Chainage</i>            | The end chainage of the selected alignment is displayed. This value can be modified if cross sections are only required within a specified range of chainages.   |
| <i>Left Offset</i>             | Defines the left offset at which the cross section will be extracted to the left of the alignment.   |
| <i>Right Offset</i>            | Defines the right offset at which the cross section will be extracted to the right of the alignment.   |
| <i>Compute Obstructions</i>    | Tick to nominate an obstruction string. See "Compute obstructions" section on page 339 for details.  |
| <i>Additional Offsets</i>      | Defines a specified offset, if all the cross sections must have a point and level computed at this offset. Several new offsets may be entered. All offsets to the left of the alignment should be entered as a negative offset   |
| <i>Include TPs</i>             | Tick to extract cross sections at each tangent (TP) point. A cross section will be created at each point between HIPs on straights, at tangent arc points, tangent spiral points and arc spiral points   |
| <i>Cross Sections At</i>       | The default is to extract cross sections at the half angle from the alignment. You may choose to extract cross sections at right angles before the TP, or at right angles after the TP.  |
| <i>Default Spacing</i>         | This setting defaults to a spacing of 20m between each cross section extracted along the alignment. Different spacing may be set for straights and curves, such as straights set to 10.00m spacing and curves to 5.00m spacing. If cross sections are only required at the TP points set the default spacing to 0.00 |
| <i>Create CL Points at DTM</i> | Tick to display the change in elevation along the profile/alignment based on every DTM triangle intersection.<br><b>NOTE</b><br>Additional cross sections will not be extracted. This feature is only used for graphical representation.   |
| <i>Intersect Break-lines</i>   | Tick to ensure that stringlines defined by lines or arcs are intercepted to produce the correct cross section data.  |
| <i>Generate Road Strings</i>   | Tick to create any stringlines, defined as string entities, as road strings for use in the roads view.   |

**Fields of the *Additional Chainages* dialog's table**

| <b>Field</b>          | <b>Description</b>                              |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the start of the additional chainage.   |
| <i>End Chainage</i>   | Defines the end of the additional chainage.     |
| <i>Spacing</i>        | Defines the spacing of the additional chainage. |
| <i>Omit</i>           | Tick to omit the additional chainage row.       |

**Fields of the *Additional Chainages* dialog**

| Field                 | Description                                   |
|-----------------------|---|
| <i>Start Chainage</i> | Displays the start chainage of the alignment. |
| <i>End Chainage</i>   | Defines the end chainage of the alignment.    |

**XS from Points icon**

The **XS from Points** icon of the Cross Section group allows you to extract cross sectional data along a designed alignment from points surveyed at cross section positions perpendicular to the alignment. It is used when the centreline or a traverse line has been marked in the field and the surveyor has observed data in the form of cross sections from this centreline or traverse line.

No DTM is required as this routine simply extracts the points on the active layers that are within the user-defined envelope. No interpolation occurs in this method. The detail picked up in the field can be manipulated so that it is shifted on to a design centreline.

The tolerance parameters define an envelope around each centreline point. Any point that lies within this envelope will be assigned to the cross section at the chainage of the centreline point. Make sure points can only be assigned to one cross section.

Cross sections will be generated where there is a suitable point at or near the centreline with further points offset at this position.

The points must have elevations.

To extract the cross sections:

1. In the *Cross Section* group of the *Design* tab, click the **XS from Points** icon.

The **Select Alignment** dialog is displayed.

2. Select the required alignment and click **OK**.

**NOTE**

If data has previously been extracted for the same alignment, the cross sections will be overwritten and updated.

The **Extract Cross Sections from XYZ** dialog is displayed.

3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.

The cross sections are extracted and the report is displayed. You may review and cross sections in the road view under the name of the alignment used. See "Roads icon" section on page 392 for details.

**Fields of the *Extract Cross Sections from XYZ* dialog**

| Field                 | Description   |
|-----------------------|---|
| <i>Alignment Name</i> | Displays the name of the selected alignment. Extracted cross sections will be stored under this name. |

| Field                                  | Description   |
|--|---|
| <i>Surface Name</i>                    | <p>The first surface is set to NATURAL. The cross sections will be held as a natural surface in the roads view with this name. Other names may be used for further surfaces.</p> <p><i>TIP</i><br/>Do not use DESIGN, BOXING, or a SUBGRADE names.</p>  |
| <i>Start Chainage</i>                  | <p>The start chainage of the selected alignment is displayed. This value can be modified if cross sections are only required within a specified range of chainages.</p>   |
| <i>End Chainage</i>                    | <p>The end chainage of the selected alignment is displayed. This value can be modified if cross sections are only required within a specified range of chainages.</p>   |
| <i>Tolerance Distance</i>              | <p>Defines the offset from the alignment where points within the Tolerance Required will be included in the cross section.</p> <p>As the offset increases beyond this tolerance distance value, the Tolerance Required value is doubled as the Tolerance Distance value is doubled and so on to create a cone of tolerance beyond this initial Tolerance Distance.</p>  |
| <i>Tolerance Required</i>              | <p>This is the Tolerance used for the above Tolerance Distance. If the perpendicular from the point to the line of the cross section is measured, and the distance is less than the Tolerance Required, the point is included in the cross section.</p> <p>If the perpendicular from the point to the line of the cross section is measured, and the distance is more than the Tolerance Required, the point is rejected and is not included in the cross section.</p> <p>The Tolerance value is doubled as the Tolerance Distance is doubled and so on</p> |
| <i>Maximum Offset</i>                  | <p>This is the maximum distance from the alignment. Points with an offset greater than this distance are ignored and will not be included in a cross section.</p>   |
| <i>Chainage Tolerance</i>              | <p>This value allows observations at the alignment to be assigned a preferred chainage rather than the actual running chainage.</p> <p><i>For example, if the observed point is 0.01m from the preferred chainage of 20.00, the actual chainage would be 20.01. If the tolerance is set to 0.05, the point will be assigned a chainage of 20.00 instead of 20.01. This is normally the preferred chainage and this feature compensates for slight observation errors.</i></p>   |
| <i>Zero Offset Tolerance</i>           | <p>Any point within this distance of the alignment will be assumed to be a centre line point. A cross section will be extracted at this point and the point will be given an offset of 0.00.</p>  |
| <i>Cross Sections By Code CHMARK</i>   | <p>Tick to extract a cross section at points on the alignment that are coded with CHMARK or 555</p>   |
| <i>Force Offset of CL point to 0.0</i> | <p>Tick to force any point within the zero offset tolerance from the alignment to be assumed to lie on the centre line. It is allocated an offset of 0.00. A cross section will be extracted at this position</p>   |

| Field                    | Description   |
|--------------------------|---|
| <i>Cross Sections At</i> | The default is to extract cross sections at the half angle from the alignment. You may choose to extract cross sections at right angles before the TP, or at right angles after the TP. |

## Quick XSection icon

The **Quick XSection** icon of the Cross Section group allows you to generate cross sections for previewing without having to create an alignment and to extract the cross sections. The cross sections are defined by specifying spacing along a centerline that is defined by two or more points in sequence, by a line or series of lines, or by a string. An existing alignment may also be used.

### **IMPORTANT**

**Cross section created by this function is only available for preview. It will not be saved after finishing the function. To create the cross section use any appropriate option from the Cross Section group of the Design tab.**

The Cross Section View displays the cross sections at a specified spacing with specified offsets to the left and to the right of the defined centerline. A centerline profile also displays.

To create a quick cross section:

1. In the *Cross Section* group of the *Design* tab, click the **Quick XSection** icon.
2. Do one of the following:
  - In the survey view, select an existing string/line along which the cross section will be created.
  - In the survey view, draw a string along which the cross section will be created. When finished, right click and select **View Section** item from the context menu.

The **Display Settings** dialog is displayed.

3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.

The cross section is created and displayed in the cross section view. Refer to the section below for details.

### Fields of the **Display Settings** dialog

| Field   | Description  |
|---|--|
| <b>Create profile points</b>                            |  |
| <i>At specified stations</i>                            | Tick to display sections at the stations defined below by the start and end station values using intermediate spacing.                       |
| <i>At the intersection with DTM triangles</i>           | Tick to display sections at every point where the centerline intersects with a DTM's triangle edge.  |
| <i>At the points of the line, string, or alignment.</i> | Tick to display sections at every point clicked when defining the centerline or at each point used to define the line, string, or alignment. |
| <i>Add profile point on fly</i>                         | Tick to enable the adding of a cross section at a new position in the cross section view.  |
| <b>Station</b>  |  |



| Field               | Description  |
|---------------------|--|
| <i>Start</i>        | Defines the starting position for the station.                 |
| <i>Spacing</i>      | Defines the spacing between stations.                          |
| <i>End</i>          | Defines the final station position of the selected centerline. |
| Cross Section       |  |
| <i>Left offset</i>  | Defines the offset to the left of the centerline.              |
| <i>Right offset</i> | Defines the offset to the right of the centerline.             |

### Cross section view

The cross section view of three panels:

- The top left panel displays the data from the survey view.
- The top right panel displays the cross section for the station selected, with the offset elevation values for each leg of the section.
- The bottom panel displays the profile along the centerline, with the station chainage and elevation at the centerline for each cross section.

Each panel has a context menu that displays zoom options; alternatively, use the scroll wheel of the mouse. The cross section (top right) and profile (bottom) panels have options to exaggerate the vertical scale of the display.

The input panel at the bottom toolbar displays the current station position and the spacing and offset previously entered, together with arrow buttons to move through the sections. Fields of the input panel are described in the table below.

### Fields of the input panel in the cross section view

| Field               | Description   |
|---------------------|---|
| <i>Chainage</i>     | Displays the chainage of the selected cross section.                              |
| <i>Spacing</i>      | Displays the spacing between cross sections.                                      |
| <i>Left Offset</i>  | Displays the offset to the left of the centerline at the selected cross section.  |
| <i>Right Offset</i> | Displays the offset to the right of the centerline at the selected cross section. |

## XSection Volumes icon

The **XSection Volumes** icon of the Cross Section group allows you to calculate the volume between any two surfaces available in the roads view. The feature uses the volumes from cross-section algorithms that take account of any curvature in the alignment.

Multiple surfaces must be available in the Roads View to compute volumes using this option. One surface may be defined at a datum level.

To calculate the cross section volume:

1. In the *Cross Section* group of the *Design* tab, click the **XSection Volumes** icon.  
The **Cross Section Volumes** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

The volume report is displayed.

**Fields of the Cross Section Volumes dialog**

| Field                  | Description  |
|------------------------|--|
| <i>Alignment</i>       | Defines the alignment and road data for the volume computation. Select the required alignment from the drop-down list.   |
| <i>Design Surface</i>  | Defines the surface which will be used as the design one in the volume computation. Select the required surface from the drop-down list.                         |
| <i>Level</i>           | If needed, datum level may be used instead of the design surface. Specify the required level in the editbox.   |
| <i>Natural Surface</i> | Defines the surface which will be used as the natural one in the volume computation. Select the required surface from the drop-down list.                        |
| <i>Level</i>           | If needed, datum level may be used instead of the natural surface. Specify the required level in the editbox.  |
| <i>Start Chainage</i>  | The start chainage of the selected alignment is displayed. This value can be modified if cross sections are only required within a specified range of chainages. |
| <i>End Chainage</i>    | The end chainage of the selected alignment is displayed. This value can be modified if cross sections are only required within a specified range of chainages.   |

**Import XSection icon**

The **Import XSection** icon of the Cross Section group allows you to load cross section data from an external file.

The following file types are supported:

- Cross Section (\*.xxx, \*.txt, \*.csv) file
- GENIO (\*.gen) file
- Standard Survey (\*.rd) file
- CLIP (\*.trv) file
- ISPOL (\*.sc1) file
- InRoads (\*.soe) file
- GeoPAK (\*.gen, \*.soe) file

To import a cross section data:

1. In the *Cross Section* group of the *Design* tab, click the **Import XSection** icon.  
The **Open** dialog is displayed.
2. Select the required file type.
3. Navigate to the required file and open it.  
The **Import Cross Section** dialog is displayed.
4. Configure the parameters. Fields are described in the table below.
5. Click **OK**.

**Fields of the *Import Cross Section* dialog**

| <b>Field</b>         | <b>Description</b>                                 |
|----------------------|--|
| <i>Alignment</i>     | Defines the base alignment for the cross sections. |
| <i>Surface</i>       | Defines the base surface for the cross sections.   |
| <i>Surface Type</i>  | Defines the type of the base surface.              |
| <i>Create Points</i> | Tick to create points at cross sections.           |
| <i>Layer</i>         | Defines to which layer will belong points.         |

**Report XSection icon**

The **Report XSection** icon of the Cross Section group allows you to generate a report, listing the cross section for the defined surface.



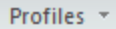

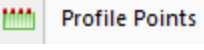
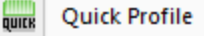
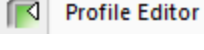
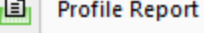
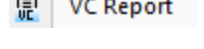
To generate the cross section report:

1. In the *Cross Section* group of the *Design* tab, click the **Report XSection** icon.  
The **List Cross Sections** dialog is displayed.
2. From the *Road Name* drop-down list, select the required road.
3. From the *Surface Name* drop-down list, select the required DTM.
4. If needed, tick *Moss Format* checkbox to generate report in the moss format.
5. If needed, tick *Mirror Cross Section Output* checkbox to "mirror" the cross section representation in the report.
6. Click **OK**.

The report is generated and displayed.

## Profile group

The *Profile* group from the *Design* tab of the MAGNET Office ribbon allows you to work with the surface's profiles. Profiles represent the existing, design, and final configurations of a surface. The group contains three icons and five second level icons, described in the tables below.

|   |  |
|---|--|
|    | <p><b>Profile DTM icon</b><br/>Click it to create a profile from an existing digital terrain model and a string.</p>   |
|    | <p><b>Profile String icon</b><br/>Click it to create a profile from points along a string.</p>   |
|    | <p><b>Profiles icon</b><br/>This icon contains the list of the second level icons for various profiles operations. Click  to expand the list of the second level icons.</p> |
|    | <p><b>Profile Points icon</b><br/>Click it to create a profile from points along the string, or point within defined offset distance from the string.</p>  |
|    | <p><b>Quick Profile icon</b><br/>Click it to create a profile from an existing string of alignment.</p>  |
|    | <p><b>Profile Editor icon</b><br/>Click it to edit an existing profile.</p>  |
|   | <p><b>Profile Report icon</b><br/>Click it to generate a report about existing profiles.</p>   |
|  | <p><b>VC Report icon</b><br/>Click it to calculate levels for the different strings involved in a profile.</p>   |

### Profile DTM icon

The **Profile DTM** icon of the Profile group allows you to create profiles from an existing DTM and a string/alignment. The profile created from a string can be edited to design a final configuration, including vertical curves. The surface does not need to be displayed in order to create the profile from the DTM; however, a surface must exist in the project.

To create a profile from DTM:

1. In the *Profile* group of the *Design* tab, click the **Profile DTM** icon.
2. In the survey view, select the required string/alignment.

The **Create Profile from DTM** dialog is displayed.

3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.

The profile is created and opened in the profile view. See "Profile design view" section on page 741 for details.

#### Fields of the *Create Profile from DTM* dialog

| Field       | Description                      |
|-------------|----------------------------------|
| <i>Name</i> | Defines the name of the profile. |

| Field                                   | Description  |
|---|--|
| <i>Start Chainage</i>                   | Defines the start chainage for the profile.  |
| <i>Create NS from DTM</i>               | Tick to create a profile from a specified DTM.<br>When creating vertical intersection points from the string, the DTM will reflect the natural surface (NS) profile. To specify a DTM, select it from the drop-down list.  |
| <i>Create VIPs</i>                      | Tick to create vertical intersection points (VIP) from the selected string. Usually, the string would represent a design grade. String VIPs can be added, deleted, and modified in the profile editor.<br>If this check box is not ticked, then there will be not a profile created for the highlighted string. When using this option, the color of the selected string will be used to represent the string profile in the profile view. |
| <i>Additional leaders for NS points</i> | Tick to draw leaders to each break point encountered in the DTM along the profile alignment.   |

## Profile String icon

The **Profile String** icon of the Profile group allows you create a profile from points along a string or alignment.

To create a profile:

1. In the *Profile* group of the *Design* tab, click the **Profile String** icon.
2. In the survey view, select the required string/alignment.

The **Profile from String** dialog is displayed.

3. In the *Name* editbox, specify the name of the profile.

NOTE

You cannot specify a name, when using an alignment.

4. If needed, tick the *Open Profile View* checkbox, to open the profile after creation. See "Profile design view" section on page 741 for details.

## Profile Points icon

The **Profile Points** icon of the Profile group allows you to Use the Profile from Points command to create a profile from points along a string or an alignments as well as points within a specified offset distance from the selected string/alignment.

To create a profile form points:

1. In the *Profile* group of the *Design* tab, click the **Profile Points** icon.
2. In the survey view, select the required string/alignment.

The **Profile from Points** dialog is displayed.

3. In the *Name* editbox, specify the name of the profile.

NOTE

You cannot specify a name, when using an alignment.

4. Configure the rest of the settings. Fields are described in the table below.

5. Click **OK**.

The profile is created.

**Fields of the *Profile from Points* dialog**

| Field                    | Description  |
|--------------------------|--|
| <i>Name</i>              | Defines the name of the profile.   |
| <i>Left Offset</i>       | Defines the distance to the left for points from the selected string. Points within this distance will be included in the profile.   |
| <i>Right Offset</i>      | Defines the distance to the right for points from the selected string. Points within this distance will be included in the profile.  |
| Use String Points        |  |
| <i>In Profile</i>        | Select to include the string points in the profile. String points must have elevation when using this option.  |
| <i>To create VIPs</i>    | Select to create vertical intersection points (VIP) from the string points. Typically, the string represents a design grade. String VIPs can be added, deleted, and modified in the profile editor. When using this option, the selected string color is used to represent the string profile in the profile editor. |
| <i>Neither</i>           | Select to exclude string points from the profile creation.   |
| <i>Open Profile View</i> | Tick to open the profile after creation. See "Profile design view" section on page 741 for details.  |

## Quick Profile icon

The **Quick Profile** icon of the Profile group allows you to create a profile from selecting a line or alignment. A surface (DTM) is required for using this option.

This feature provides a quick analysis of a surface for planning purposes. You cannot edit the profile, but you can plot the profile if necessary.

To create a quick profile:

1. In the *Profile* group of the *Design* tab, click the **Quick Profile** icon.
2. Create the first point of the profile string. See "Add Point icon" section on page 136 for details.
3. Create second and further point of the profile strings.
4. When finished, right click and select **View Profile** item from the context menu.

The newly created profile is opened in the profile view. See "Profile design view" section on page 741 for details.

## Profile Editor icon

The **Profile Editor** icon of the Profile group allows you to view and edit existing profiles.

To edit a profile:

1. In the *Profile* group of the *Design* tab, click the **Profile Editor** icon.

The **Profiles** dialog is displayed.

2. Select the required profile from the list and click **Open**.

The profile is opened in the profile view. See "Profile design view" section on page 741 for details.

To rename a profile:

1. In the *Profile* group of the *Design* tab, click the **Profile Editor** icon.

The **Profiles** dialog is displayed.

2. Select the required profile from the list and click **Rename**.

3. Type the new name and press *Enter*.

The profile is renamed.

To rename a profile:

1. In the *Profile* group of the *Design* tab, click the **Profile Editor** icon.

The **Profiles** dialog is displayed.

2. Select the required profile from the list and click **Delete**.

The profile is deleted.

## Profile Report icon

The **Profile Report** icon of the Profile group allows you to view the report listing information about existing profiles.

To generate a profile report:

1. In the *Profile* group of the *Design* tab, click the **Profile Report** icon.

The **Profiles** dialog is displayed.

2. Select the required profiles from the list and click **Open**.

The report, listing selected profile details is displayed.

## VC Report icon

The **VC Report** icon of the Profile group allows you to generate a report, listing levels for the different strings involved in a design, such as the addition of a curb and channel to an existing road or widening a lane of a road using the existing pavement grading.

To generate a VC Report:

1. In the *Profile* group of the *Design* tab, click the **VC Report** icon.

The **Profiles** dialog is displayed.

2. Select the required profiles from the list and click **Open**.

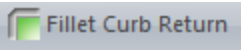
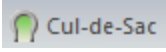
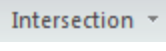








The **VC Details** dialog is displayed.

3. Configure the parameters as you need and click **OK**.

The report, listing selected profile details is displayed.

## Intersection group

The *Intersection* group from the *Design* tab of the MAGNET Office ribbon allows you to build up the component curbs (stringlines) through an intersection. These curbs (curb returns) need to be defined before an intersection can be created. Curbs are particular strings defined through intersections between one road and another. The group contains three icons and seven second level icons, described in the table below.

|   |  |
|---|--|
|                          | Fillet Curb Return icon<br>Click it to create a fillet curb return.  |
|                          | Cul-de-Sac icon<br>Click it to create a culdesac.  |
|                          | Intersection icon<br>This icon contains the list of the sub-icons for various intersections operations. Click  to expand the list of the sub-icons. |
|  Trim Strings            | Trim Strings icon<br>Click it to merge overlapping strings with road.  |
|  Create Curb from String | Create Curb from String icon<br>Click it to convert a string, a polygon, an arc or a line into a curb.   |
|  Create Island Curb      | Create Island Curb icon<br>Click it to create an island curb around an existing polygon or a enclosed area.  |
|  Create Intersection    | Create Intersection icon<br>Click it to create an intersection from existing curb or strings.  |
|  View Intersection     | View Intersection icon<br>Click it to review/update an existing intersection.  |
|  View Curb             | View Curb icon<br>Click it to review an existing curb.   |
|  Update Curb           | Update Curb icon<br>Click it to update an existing curb.   |

### Fillet Curb Return icon

The **Fillet Curb Return** icon of the *Intersection* group allows you to create a filleted arc between any two entities that are strings, lines, or arcs to define a curb return. The end result is a graded curb line between the curb of one road and that of an intersecting road.

To create the fillet curb return:

1. In the *Intersection* group of the *Design* tab, click the **Fillet Curb Return** icon.
2. In the survey view, select the first string/line/arc.
3. In the survey view, select the second string/line/arc.
4. Define the radius of the fillet. Do one of the following:
  - Click the required place in the survey view.
  - In the *Radius* editbox at the bottom toolbar, specify the fillet radius.
5. Select the starting tangent point for the fillet.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.



6. Define the segmentation of the fillet. You may define it in two ways:
  - Divide the curb by distance. To do so:
    1. At the bottom toolbar, tick the checkbox near the *Distance* editbox.
    2. At the bottom toolbar, in the *Distance* editbox, specify the length of each segment. Note that the last segment may be shorter, than previous ones, if the segment length is not multiple to the curb length. See picture below for details.
    3. If needed, at the bottom toolbar tick the *Interpolate Z* checkbox to automatically calculate elevation of the new node.
  - Divide the curb to equal segments. To do so:
    1. At the bottom toolbar, tick the *Divide Equally* checkbox.
    2. At the bottom toolbar, in the *Segments* editbox, specify the quantity of segments. See picture below for details.
    3. If needed, at the bottom toolbar tick the *Interpolate Z* checkbox to automatically calculate elevation of the new node.
7. Confirm the segmentation. Do one of the following:
  - Press *Enter*.
  - Left click in the survey view.
8. Define the *From* and *To* point, by clicking them in the survey view.  
The **Create Fillet Curb Return** dialog is displayed.
9. Review the parameters, if needed, change them. Fields are described in the table below.
10. Click **OK**.

The curb is created.

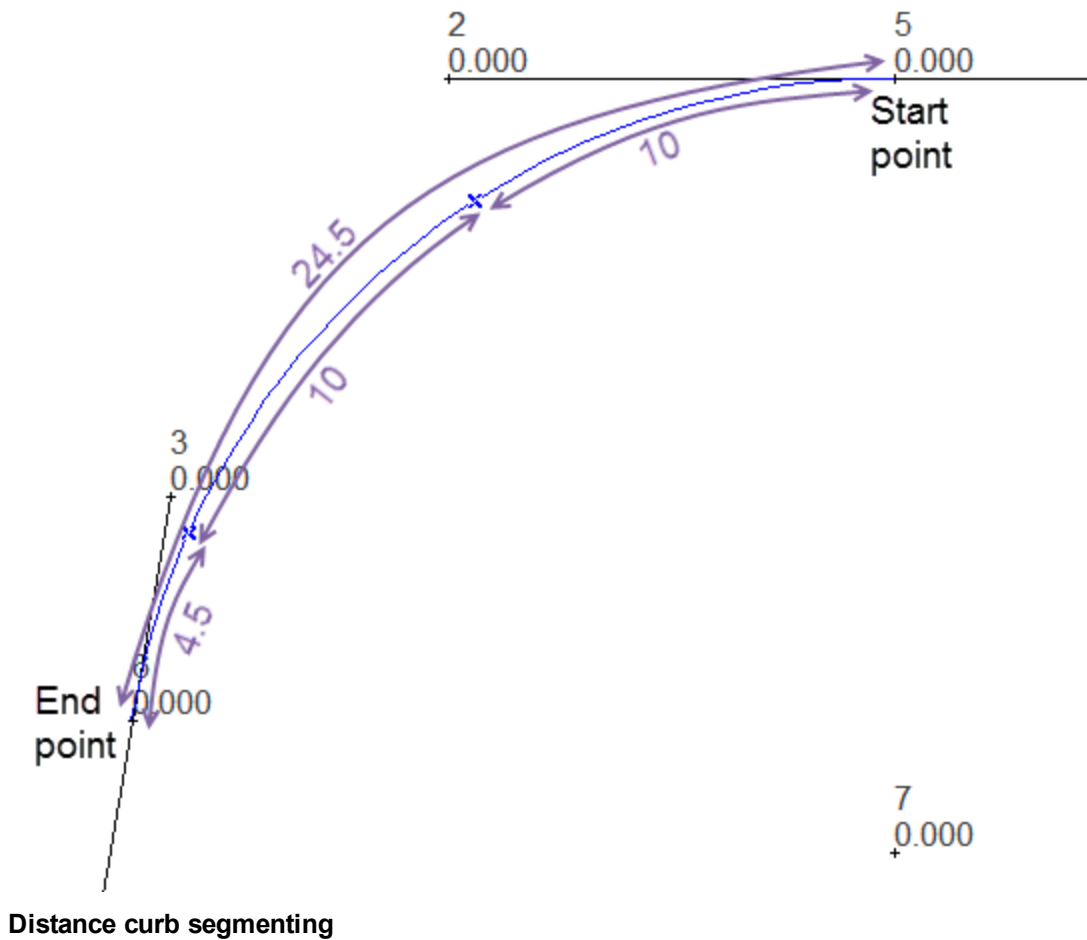
#### Fields of the input panel, when creating a fillet curb

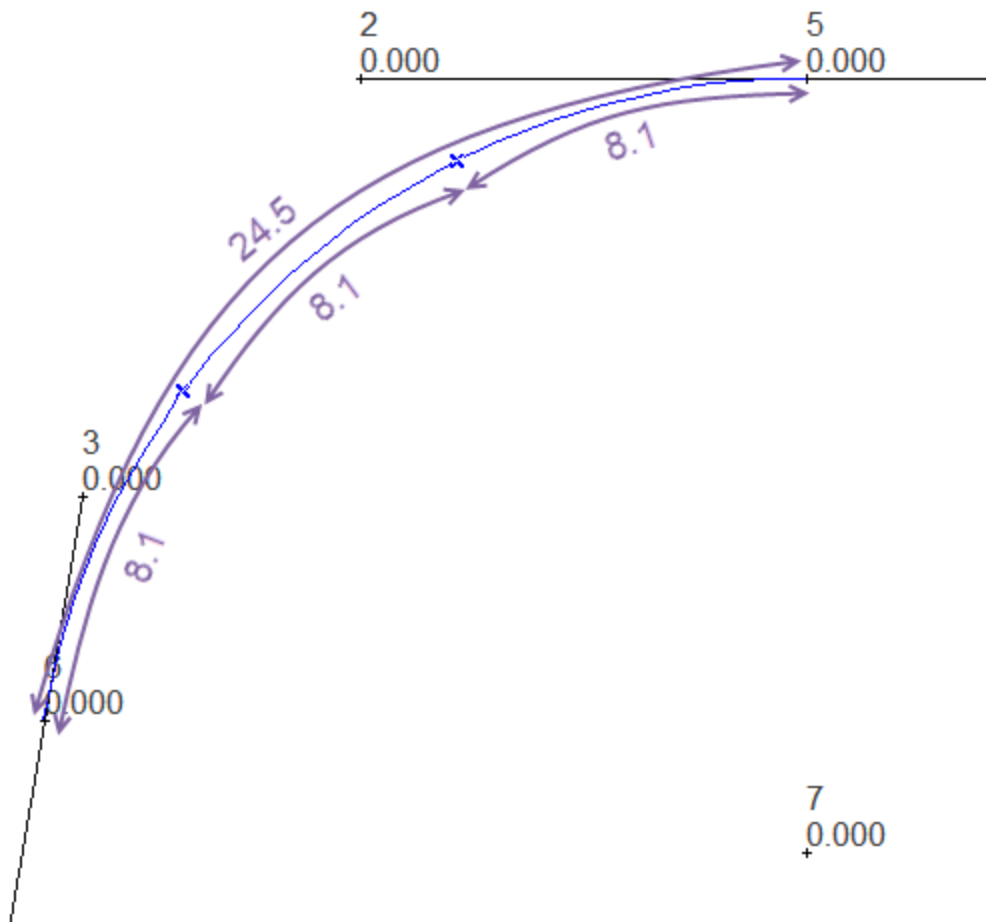
| Field   | Description  |
|---|--|
| <i>Distance</i>   | Defines the length of each segment. Measured from the start/end point of the entity and from each new node in case of multiple segments. See pictures above for details. |
| <i>Divide by Distance</i>   | Tick to divide the arc to as many segments of length, specified in the "Distance" editbox, as possible.  |
| <i>Segments</i>   | Defines the quantity of segments for division.   |
| <i>Divide Equally</i>   | Tick to divide the arc to the segments of the same length.   |
| <i>Interpolate Z</i>  | Tick to automatically calculate the elevations of the newly created nodes.   |
| <i>Fix Start Point</i>  | When ticked, the distance will always be measured from the start point of the arc, regardless of the segmenting.   |
| <b>TIP</b><br><i>The first field of the input panel displays the length of the selected entity.</i> |  |

#### Fields of the Create a Fillet Curb Return dialog

| Field       | Description  |
|-------------|--|
| <i>Name</i> | Defines the name of the fillet curb. This name will be used in the fillet curb string and profile. |

| Field                                   | Description   |
|---|---|
| <i>Start Chainage</i>                   | Defines the start chainage for the fillet curb.   |
| <i>Template</i>                         | Defines the template for fillet curb profile.   |
| <i>Create NS from DTM</i>               | Tick to extract natural surface of the fillet curb profile from an existing DTM. Select the required DTM from the drop-down list.   |
| <i>Create VIPs</i>                      | Tick to define the “design surface” that displays in the profile view as a best-fit curve through the nodes. If the note points on the string have elevations, these may be defined as the VIPs of the Design surface on the profile. |
| <i>Additional leaders for NS points</i> | Tick to create additional leader lines for each change in level on the natural surface.   |
| <i>Open Curb View</i>                   | Tick to display the curb view after creating. See "Profile design view" section on page 741 for details.  |





Equal segments curbing segmenting

## Cul-de-Sac icon

The **Cul-de-Sac** icon of the Intersection group allows you to create cul-de-sac between any two entities that are strings, lines, or arcs. In the end they will be connected with a smooth cul-de-sac curb.

To create a cul-de-sac:

1. In the *Intersection* group of the *Design* tab, click the **Cul-de-Sac** icon.
2. In the survey view, continuously select two curbs to be connected.
3. In the survey view, select the center point for cul-de-sac.

The **Create a Culdesac** dialog is displayed.

4. In the *Culdesac Radius* editbox, specify the radius of the culdesac.
5. In the left and right *Radius* editboxes, specify the radius for the fillet curbs, which will connect culdesac with the existing curbs.
6. Select *Preview Only* radiobutton to preview the culdesac with the defined parameters.

**TIP**

You may skip the culdesac previewing, by selecting the *Create radiobutton*.

7. Click **OK**.

The culdesac is previewed. The message prompts you to return to culdesac design.

8. Click **Yes**.

The *Create a Culdesac* dialog is displayed.

9. Select *Create* radiobutton.

10. If needed, configure the additional options, by ticking the *Create Curb*, *Segment* and *Trim* checkboxes.

11. Click **OK**.

12. In the survey view, select the start and end points.

The *Create a Culdesac* dialog is displayed.

13. Review the parameters, if needed, change them. Fields are described in the table below.

14. Click **OK**.**Fields of the *Create a Culdesac* dialog**

| <b>Field</b>                            | <b>Description</b>  |
|---|---|
| <i>Name</i>                             | Defines the name of the culdesac. This name will be used in the culdesac string and profile.  |
| <i>Start Chainage</i>                   | Defines the start chainage for the culdesac.  |
| <i>Template</i>                         | Defines the template for culdesac profile.  |
| <i>Create NS from DTM</i>               | Tick to extract natural surface of the culdesac profile from an existing DTM. Select the required DTM from the drop-down list.  |
| <i>Create VIPs</i>                      | Tick to define the “design surface” that displays in the profile view as a best-fit curve through the nodes. If the note points on the string have elevations, these may be defined as the VIPs of the Design surface on the profile. |
| <i>Additional leaders for NS points</i> | Tick to create additional leader lines for each change in level on the natural surface.   |
| <i>Open Curb View</i>                   | Tick to display the curb view after creating. See "Profile design view" section on page 741 for details.  |

**Trim Strings icon**

The road design generates several strings for the gutters on each side of the intersecting roads. After completing the design of the curb returns, a template is applied to those strings, creating additional overlapping strings for each curb.

The **Trim Strings** icon of the Intersection group allows you to locate overlapping strings and merge them with the road strings to finish the design.

To merge overlapping strings with road strings:

1. In the survey view, draw a rectangle selecting the strings you want to merge.
2. In the *Intersection* group of the *Design* tab, click the **Trim Strings** icon.

The confirmation message is displayed.

3. Click **Yes**.

## Create Curb from String icon

The **Create Curb from String** icon of the Intersection group allows you to convert a string, a polygon, an arc, or a line into a curb. Source entity must have defined start and end points. The result is a curb line that can be formed with profile data from a DTM or from the position and levels of the string notes, as long as these points have elevations.

To convert a string/polygon/arc/line into a curb:

1. In the *Intersection* group of the *Design* tab, click the **Create Curb from String** icon.
2. In the survey view, select the required string/polygon/arc/line.
3. Select the node, which will become the start point of the curb.
4. Select the node, which will become the end point of the curb.

These two tangent point positions need to define the entire length of an existing string, if only part of a string will be used for the curb. The first TP point will become the start chainage on the profile of the curb.

The **Create Curb from String** dialog is displayed.

5. Review the parameters, if needed, change them. Fields are described in the table below.
6. Click **OK**.

The curb is created.

### Fields of the **Create Curb from String** dialog

| Field                                   | Description   |
|---|---|
| <i>Name</i>                             | Defines the name of the curb. This name will be used in the curb string and profile.  |
| <i>Start Chainage</i>                   | Defines the start chainage for the curb.  |
| <i>Template</i>                         | Defines the template for curb profile.  |
| <i>Create NS from DTM</i>               | Tick to extract natural surface of the curb profile from an existing DTM. Select the required DTM from the drop-down list.  |
| <i>Create VIPs</i>                      | Tick to define the “design surface” that displays in the profile view as a best-fit curve through the nodes. If the note points on the string have elevations, these may be defined as the VIPs of the Design surface on the profile. |
| <i>Additional leaders for NS points</i> | Tick to create additional leader lines for each change in level on the natural surface.   |
| <i>Open Curb View</i>                   | Tick to display the curb view after creating. See "Profile design view" section on page 741 for details.  |

## Create Island Curb icon

The **Create Island Curb** icon of the Intersection group allows you to a curb around the extents of a polygon or of an enclosed area, formed by lines/strings/arcs. One node of the polygon or shape will be the starting point of the curb. The polygon or shape will usually represent a traffic island. A circular roundabout can be defined as a circle.

To create an island curb:

1. In the *Intersection* group of the *Design* tab, click the **Create Island Curb** icon.
2. In the survey view, select the required polygon or enclosed area.

**NOTE**

To select an enclosed area, click its border, not the inside area.

3. Select the start point of the curb.

The ***Curb Point Level*** dialog is displayed.

4. Select the option for defining curb level and number of IPs. Fields are described in the table below.
5. Click **OK**.

The ***Create Island Curb*** dialog is displayed.

6. Review the properties, if needed change them. Fields are described in the table below.
7. Click **OK**.

The island curb is created.

**Fields of the *Curb Point Level* dialog**

| <b>Field</b>   | <b>Description</b>   |
|--|--|
| <i>Set Levels From DTM</i>   | Select to get the curb point level from an existing DTM. Select the required DTM from the drop-down list.                      |
| <i>Set from Existing Levels and Interpolate Levels for Points Without Levels</i> | Select to use get the curb point level from elevations of existing points. Elevation for points without it will be calculated. |
| <i>Set Uniform Levels</i>  | Select to manually set curb point level. Specify the required elevation in the editbox.  |
| <i>Number of IP</i>  | Defines the number of intersection points to display on the main screen.   |

**Fields of the *Create Island Curb* dialog**

| <b>Field</b>                            | <b>Description</b>  |
|---|---|
| <i>Name</i>                             | Defines the name of the island curb. This name will be used in the island curb string and profile.  |
| <i>Start Chainage</i>                   | Defines the start chainage for the island curb.   |
| <i>Template</i>                         | Defines the template for island curb profile.   |
| <i>Create NS from DTM</i>               | Tick to extract natural surface of the island curb profile from an existing DTM. Select the required DTM from the drop-down list.   |
| <i>Create VIPs</i>                      | Tick to define the “design surface” that displays in the profile view as a best-fit curve through the nodes. If the note points on the string have elevations, these may be defined as the VIPs of the Design surface on the profile. |
| <i>Additional leaders for NS points</i> | Tick to create additional leader lines for each change in level on the natural surface.   |
| <i>Open Curb View</i>                   | Tick to display the curb view after creating. See "Profile design view" section on page 741 for details.  |

## Create Intersection icon

The **Create Intersection** icon of the Intersection group allows you to create an intersection from existing curbs and profile strings.

Be sure that all unneeded layers are turned OFF. An intersection should be created only from the Curb Returns and the CL strings of the road. You may also need other strings between the CL and curb returns if these string impact on the final surface through the intersection.

To create an intersection:

1. In the *Intersection* group of the *Design* tab, click the **Create Intersection** icon.
2. In the survey view, draw a rectangle to define the intersection.  
The **Create Intersection** dialog is displayed.
3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.
5. The intersection is created and opened in the intersection view. See "Intersection design view" section on page 756 for details.

### Fields of the **Create Intersection** dialog

| Field                        | Description   |
|------------------------------|---|
| <i>Intersection Name</i>     | Defines the name of the intersection.   |
| <b>Curb</b>                  |   |
| <i>Selected Curbs</i>        | Lists all selected curbs. To add curbs to the intersection, select them and click =>                          |
| <i>Curbs in Intersection</i> | Lists all curbs, which will be used in intersection. To remove curbs from                                     |
| <b>DTM</b>                   |   |
| <i>Design Surface DTM</i>    | Click <b>Settings</b> to configure the design DTM. See "DTM Settings dialog" section on page 626 for details. |
| <i>Natural Surface DTM</i>   | Select the DTM which will be used as natural surface from the drop-down list.                                 |

## View Intersection icon

The **View Intersection** icon of the Intersection group allows you to view and edit existing intersections.

To view an intersection:

1. In the *Intersection* group of the *Design* tab, click the **View Intersection** icon.  
The **Intersections** dialog is displayed.
2. Select the required intersection from the list and click **Open**.  
The intersection is opened in the Intersection view. See "Intersection design view" section on page 756 for details.

To rename an intersection:

1. In the *Intersection* group of the *Design* tab, click the **View Intersection** icon.  
The **Intersections** dialog is displayed.

2. Select the required intersection from the list and click **Rename**.
3. Type the new name and press *Enter*.

The intersection is renamed.

To rename an intersection:

1. In the *Intersection* group of the *Design* tab, click the **View Intersection** icon.

The **Intersections** dialog is displayed.

2. Select the required intersection from the list and click **Delete**.

The intersection is deleted.

## View Curb icon

The **View Curb** icon of the Intersection group allows you to open an existing curb in the profile view.

To view a curb:

1. In the *Intersection* group of the *Design* tab, click the **View Curb** icon.
2. In the survey view, select the required curb.

Selected curb is opened in the profile design view. See "Profile design view" section on page 741 for details.

## Update Curb icon

The **Update Curb** icon of the g allows you to update the parameters of an existing curb.

To update a curb:

1. In the *Intersection* group of the *Design* tab, click the **Update Curb** icon.
2. In the survey view, select the required curb.  
The **Update Curb Return** dialog is displayed.
3. Review the parameters, if needed, change them. Fields are described in the table below.
4. Click **OK**.

The curb is updated.

### Fields of the **Update Curb Return** dialog

| Field                     | Description  |
|---------------------------|--|
| <i>Name</i>               | Defines the name of the curb. This name will be used in the curb string and profile.                                       |
| <i>Start Chainage</i>     | Defines the start chainage for the curb.   |
| <i>Template</i>           | Defines the template for curb profile.   |
| <i>Create NS from DTM</i> | Tick to extract natural surface of the curb profile from an existing DTM. Select the required DTM from the drop-down list. |














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| <b>Field</b>                            | <b>Description</b>  |
|---|---|
| <i>Create VIPs</i>                      | Tick to define the “design surface” that displays in the profile view as a best-fit curve through the nodes. If the note points on the string have elevations, these may be defined as the VIPs of the Design surface on the profile. |
| <i>Additional leaders for NS points</i> | Tick to create additional leader lines for each change in level on the natural surface.   |
| <i>Open Curb View</i>                   | Tick to display the curb view after updating. See "Profile design view" section on page 741 for details.  |

## Subdivision group

The *Subdivision* group from the *Design* tab of the MAGNET Office ribbon allows you to create and manage land lots. It contains three icons, and nine second level icons, described in the table below.

|  |  |
|--|--|
|  Lot Layout (min area)            | Lot Layout (min area) icon<br>Click it to create a lot within a specified area.  |
|  Lot by Interior Point            | Lot by Interior Point icon<br>Click it to create a lot from closed areas or polygons.  |
| Subdivision ▾  | Subdivision icon<br>This icon contains the list of the second level icons for various lots operations. Click ▾ to expand the list of the second level icons. |
|  Show Lots                        | Show Lots icon<br>Click it to highlight all visible lots in the survey view.   |
|  Lot Report                       | Lot Report icon<br>Click it to list all lots on the active layers or in the current selection.   |
|  Annotate Lots                    | Annotate Lots icon<br>Click it to annotate a lot.  |
|  Annotate Lot Back Boundary      | Annotate Lots Back Boundary icon<br>Click it to annotate the collinear back boundary of the lot with bearing distance.                                       |
|  Annotate Lot Sides by Brg/Dist | Annotate Lots Sides by Brg/Dist icon<br>Click it to annotate nominated boundaries of the lot with a bearing and distance.                                    |
|  Annotate Lot Sides By Dist     | Annotate Lots Sides by Dist icon<br>Click it to annotate nominated boundaries of the lot with a distance.  |
|  Delete Lot Annotation          | Delete Lot Annotation icon<br>Click it to remove all annotations from the lot.   |
|  Create ePlan                   | Create ePlan icon<br>Click it to create a new ePlan.   |
|  Edit ePlan                     | Edit ePlan icon<br>Click it to edit an existing ePlan.   |

### Lot Layout (min area) icon

The **Lot Layout (min area)** icon of the Subdivision group allows you to create one or several lots within specified closed area composed of lines/strings/arcs. It computes the position of the last boundary line to complete a lot of a known area.

There are two ways to create a line, which close the area of a new lot:

- "Bearing" method. Creates closing line with the defined bearing.
- "Pivot" method. Creates closing line, pivoted about an existing point.

Each of these methods may be combined with the "Frontage" method. Frontage method allows you to specify boundary width at the edge of the lot.

### Bearing method

To create a lot, closed by line with the defined bearing:

1. In the *Subdivision* group of the *Design* tab, click the **Lot Layout (min area)** icon.
2. In the survey view, select the required enclosed area.

The message window prompts to accept the selected area.

3. Click **Yes**.

4. Select the starting edge of the new lot.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

5. Select the *Bearing* radiobutton and specify the required bearing of the lot boundary in the editbox.
6. In the *Area* editbox, specify the area of the new lot.
7. Do one of the following:
  - Press *Enter*.
  - Right click and select **Create** from the context menu.

The new lot is created.

8. If needed, create more lots, by using the most suitable method.
9. When finished, press *Esc*.

The message window prompts to convert the remaining area to lot.

10. Click **Yes** or **No** as you need.

### Pivot method

To create a lot, closed by line pivoted about an vertex point:

1. In the *Subdivision* group of the *Design* tab, click the **Lot Layout (min area)** icon.
2. In the survey view, select the required enclosed area.

The message window prompts to accept the selected area.

3. Click **Yes**.

4. Select the starting edge of the new lot.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

5. Select the *Pivot* radiobutton.
6. Select the required vertex point.
7. In the *Area* editbox, specify the area of the new lot.
8. Do one of the following:
  - Press *Enter*.
  - Right click and select **Create** from the context menu.

The new lot is created.

9. If needed, create more lots, by using the most suitable method.
10. When finished, press *Esc*.

The message window prompts to convert the remaining area to lot.

11. Click **Yes** or **No** as you need.

### Frontage method

To create a lot, closed by using the "Frontage" method:

1. In the *Subdivision* group of the *Design* tab, click the **Lot Layout (min area)** icon.
2. In the survey view, select the required enclosed area.

The message window prompts to accept the selected area.

3. Click **Yes**.
4. Select the starting edge of the new lot.

The input panel is displayed at the bottom toolbar. Fields are described in the table below.

5. Select either "Bearing" or "Pivot" method. See sections above for details.
6. Tick the *Frontage* checkbox.
7. In the survey view, select the frontage edge.
8. The **Front Distance** dialog is displayed.
9. Specify the frontage distance and click **OK**.

The new lot is created.

10. If needed, create more lots, by using the most suitable method.
11. When finished, press *Esc*.

The message window prompts to convert the remaining area to lot.

12. Click **Yes** or **No** as you need.

#### Fields of the bottom toolbar, when creating lots

| Field                 | Description  |
|-----------------------|--|
| <i>Lot No</i>         | Defines the number of the next new lot.  |
| <i>Bearing</i>        | Defines the using of the "Bearing" method and the bearing of the closing line. |
| <i>Pivot</i>          | Defines the using of the "Pivot" method.                                       |
| <i>Frontage</i>       | Defines the using of the "Frontage" method and frontage distance.              |
| <i>Area</i>           | Defines the area of the next new lot.  |
| <i>Remaining Area</i> | Displays the remaining area within the closed lines.                           |

## Lot by Interior Point icon

The **Lot by Interior Point** icon of the *Subdivision* group allows you to convert existing polygon/boundary/pad or enclosed area formed by lines/arcs/strings to a lot.

### NOTE

This function does not work with polylines.

To convert polygon or enclosed area to a lot:

1. In the *Subdivision* group of the *Design* tab, click the **Lot by Interior Point** icon.
2. In the survey view, select the required polygon/enclosed area.

The message window prompts you to accept the polygon/enclosed area.

3. Click **Yes**.

The **Edit Lot** dialog is displayed. Fields are described in the table below.

4. Make the required configurations and click **OK**.
5. If needed, select more polygons/enclosed areas.
6. When finished, press *Esc*.

#### The non-editable fields of the *Edit Lot* dialog

| Field              | Description  |
|--------------------|--|
| <i>Area</i>        | Displays the area of the lot.  |
| <i>Perimeter</i>   | Displays the length of the lot perimeter.                                  |
| <i>Start Point</i> | Displays the number of the lot start point.                                |
| <i>End Point</i>   | Displays the number of the lot end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the lot. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the lot.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the lot.                              |
| <i>CentroidX</i>   | Displays the X or east component of the lot centroid point position.       |
| <i>CentroidY</i>   | Displays the Y or north component of the lot centroid point position.      |

#### The editable fields of the *Edit Lot* dialog

| Field                | Description  |
|----------------------|--|
| <i>Name</i>          | Defines the name of the lot.   |
| <i>Layer</i>         | Defines layer to which the lot belongs to. Note that the lot and its points may belong to the different layers.  |
| <i>Line Color</i>    | Defines a color for lot border displaying.   |
| <i>Line Style</i>    | Defines appearance of the lot border both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.                          |
| <i>Thickness</i>     | Defines the width of the lot boundary in millimeters when plotted.   |
| <i>Filling Color</i> | Defines the color for lot area filling.  |
| <i>Filling Space</i> | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.   |
| <i>Pattern</i>       | Defines pattern style for lot area filling.  |
| <i>Symbol</i>        | Defines the symbol for lot area filling.   |
| <i>Line Style</i>    | Defines the line style for lot area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the editbox below. |
| <i>Cross</i>         | Select it to activate the cross-hatching of the lot area.  |
| <i>Opaque</i>        | When ticked, the lot is places in front of any entities, and cut them at a certain distance around the lot.  |
| <i>DP Number</i>     | Defines a deposited plan – previous survey plan with reference number  |
| <i>Code</i>          | Defines a code for the lot area.   |

| <b>Field</b>             | <b>Description</b>   |
|--------------------------|--|
| <i>House No</i>          | Defines a number of the house, located at the lot.   |
| <i>Street</i>            | Defines a name of the street, going through the lot.   |
| <i>Clipping Boundary</i> | When ticked, contours, going through the lot, will not be displayed when plotted.  |
| <i>Break Line</i>        | A lot may be defined as breakline. The lot must be defined by Use in Surface points for that. If selected, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.  |
| <i>Annotation</i>        | Select it to turn on lot annotation. Possible values for annotation are: <ul style="list-style-type: none"> <li>• Lot Name</li> <li>• Lot Area</li> <li>• Lot Angle</li> <li>• Lot Lines</li> <li>• Lot Arcs</li> <li>• Back Boundary</li> </ul> |
| <i>Draw Edge</i>         | Tick to define whether to draw the border line around the lot or not.  |
| <i>Skip</i>              | Tick to apply the settings made for the first lot to additional lots in this session.  |

#### **Buttons of the *Edit Lot* dialog**

| <b>Button</b>         | <b>Description</b>   |
|-----------------------|--|
| <b>Set Properties</b> | Click it to set current properties as the default for lots. New lots will be created with these properties.  |
| <b>Get Properties</b> | Click it to load existing default properties for lots.   |
| <b>Attributes</b>     | Click it to add new attributes to the lot.   |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the lot. The picture will be displayed near the lot. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the lot and close the dialog.   |
| <b>Convert</b>        | Click it to convert the lot to boundary, pad or string.  |
| <b>Apply</b>          | Click it to apply changes.   |
| <b>Surface Area</b>   | Click it to compute the area of DTM, crossing with the lot.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.   |

## **Show Lots icon**

Click the **Show Lots** icon of the Subdivision group to highlight existing lots in the survey view.

## Lot Report icon

The **Lot Report** icon of the Subdivision group allows you to list all lots or lots in the current selection.

To generate a lot report:

1. In the *Subdivision* group of the *Design* tab, click the **Lot Report** icon.  
The **List Lots** dialog is displayed.
2. In the *Select From* group box, define which lots will be included into report.
3. If needed, configure additional parameters. Fields are described in the table below.
4. Click **OK**.

The lot report is displayed.

### Fields of the *List Lots* dialog

| Field               | Description  |
|---------------------|--|
| <i>Select From</i>  | Defines the lot selection for the report. <ul style="list-style-type: none"> <li>• <i>All Lots</i> – all existing lots will be listed.</li> <li>• <i>Current Selection</i> – only lots from current selection will be listed.</li> </ul> |
| <i>Code</i>         | Defines the code or codes range for filtering the lot selection.   |
| <i>DP Number</i>    | Defines the DP number or DP numbers range for filtering the lot selection.   |
| <i>House Number</i> | Defines the house number or house numbers range for filtering the lot selection.   |

## Annotate Lots icon

The Annotate Lots icon of the Subdivision group allows you to annotate lots by using the default annotations settings. See "Lot annotation settings" section on page 613 for details.

To annotate a lot:

1. In the *Subdivision* group of the *Design* group, click the **Annotate Lots** icon.
2. In the survey select the required lot.  
The lot is annotated.
3. To annotate more lots, click the **Annotate Lots** icon once again.

## Annotate Lots Back Boundary icon

The **Annotate Lots Back Boundary** icon of the Subdivision group allows you to annotate collinear back boundary of the selected lots as defined in the lot annotation settings. See "Lot annotation settings" section on page 613 for details.

### NOTE

The *Back Boundary* option of the lot annotation settings must be turned on to use this feature.

To annotate lot back boundary:

1. In the Subdivision group of the Design tab, click the **Annotate Lots Back Boundary** icon.
2. In the survey view, select the required lots, by dragging a rectangle around them.
3. Select the boundary of one lot from the selection.

The selected boundary is highlighted with red.

4. Continuously select the adjacent collinear boundaries of other lots.
5. Right click and select **Annotate** from the context menu.

The selected boundaries are annotated.

#### NOTE

Boundary here means the edge of the lot, not the polygon based MAGNET Office entity.

## Annotate Lots Sides by Brg/Dist icon

The **Annotate Lots Sides by Brg/Dist** icon of the Subdivision group allows you to annotate the boundaries of the lot with its bearing and distance, as defined by the annotation settings. See "Bearing annotation settings" section on page 614 and "Distance annotation settings" section on page 615 for details.

To annotate lot edges:

1. In the Subdivision group of the Design tab, click the **Annotate Lots Sides by Brg/Dist** icon.
2. In the survey view, select the required lot, by dragging a rectangle around it
3. Select the required boundaries of the lot.

The selected boundaries are highlighted with red.

4. Right click and select **Annotate** from the context menu.

The selected boundaries are annotated.

5. When finished, press *Esc*.

#### NOTE

Boundary here means the edge of the lot, not the polygon based MAGNET Office entity.

## Annotate Lots Sides by Dist icon

The **Annotate Lots Sides by Dist** icon of the Subdivision group allows you to annotate the boundaries of the lot with its distance, as defined by the annotation settings. See "Distance annotation settings" section on page 615 for details.

To annotate lot edges:

1. In the Subdivision group of the Design tab, click the **Annotate Lots Sides by Dist** icon.
2. In the survey view, select the required lot, by dragging a rectangle around it
3. Select the required boundaries of the lot.

The selected boundaries are highlighted with red.

4. Right click and select **Annotate** from the context menu.

The selected boundaries are annotated.

5. When finished, press *Esc*.

#### NOTE

Boundary here means the edge of the lot, not the polygon based MAGNET Office entity.



## Delete Lot Annotation icon

The **Delete Lot Annotation** icon of the Subdivision group allows you to remove annotations from the boundaries of a lot.

To delete lot edges annotations:

1. In the Subdivision group of the Design tab, click the **Delete Lot Annotation** icon.
2. In the survey view, select the required lot, by dragging a rectangle around it
3. Select the required boundaries of the lot.

The selected boundaries are highlighted with red.

4. Right click and select the required option from the context menu.

The selected annotations are deleted.

5. When finished, press *Esc*.

### NOTE

Boundary here means the edge of the lot, not the polygon based MAGNET Office entity.

## Create ePlan icon

The **Create ePlan** icon of the Subdivision group allows you to create a new ePlan.

ePlan is an edit/export feature, which helps you to prepare your data from MAGNET Office job for creation of the appropriate LandXML file for electronic lodgement to the lands department. It is designed specifically for New South Wales State in Australia.

Please carefully read ePlan notes before creating your own ePlan.

To create an ePlan:

1. In the *Subdivision* group of the *Design* tab, click the **Create ePlan** icon.

The **Create ePlan** dialog is displayed.

2. In the **Create ePlan** dialog, make the required configurations and click **OK**. Fields are described in the table below.

The **ePlan editor** dialog is displayed.

3. If needed, change the properties of newly created ePlan. See "Edit ePlan icon" section on page 372 for details.
4. Click **Exit** to close the dialog and return to the survey view.

### Fields of the *Create ePlan* dialog

| Field               | Description  |
|---------------------|--|
| <i>ePlan Name</i>   | Defines the name of the ePlan.   |
| <i>Description</i>  | Defines the short description of the ePlan.  |
| <i>Jurisdiction</i> | Defines the jurisdiction of the land – New South Wales   |
| <i>MGA Zone</i>     | Defines the MGA zone. Set automatically, if the coordinate system is defined in the Project Settings dialog. |

| Field                              | Description  |
|------------------------------------|--|
| <i>Monuments for Survey Marks</i>  | Defines which monument types will be used as the survey marks.<br><b>NOTE</b><br>The monument type is defined by the value of the Code field in the point properties.                          |
| <i>Survey Marks</i>                | Defines which points of the types, defined by the <i>Monuments for Survey Marks</i> list will be used as the survey marks.   |
| <i>Datum Line</i>                  | Select the start and end points from the appropriate dropdown list to define the ePlan orientation.  |
| <i>Proposed Parcels and Points</i> | Define layers where proposed parcels, proposed roads, proposed easements and any associated new points are located.<br><b>CAUTION</b><br><b>Do not tick any layer holding existing parcels</b> |
| <i>Survey Observations</i>         | Define layers where surveyed observations are located.   |

## ePlan notes

There are some specific rules for project, which will be converted to ePlan.

The data for ePlan uses the existing entities from your project. Basically this data will consist of points (some will represent Monuments for Survey Control Marks or Reference marks), lines (measured, adopted and calculated observations), and lots (new and adjoining parcels and their boundaries). Various entities may need further data (or elements) defined.

For example, State Survey Marks will require the "oID" element to be added and existing Monuments will require the Original Survey number – the plan number that placed the mark. Various other details are required for observations and parcels.

### ePlan naming conventions

Naming and layer conventions are critical to achieving good results. They are described in the table below:

#### ePlan naming conventions

|                              |   |
|------------------------------|---|
| <i>State Survey Marks</i>    | Point codes for such marks must be <i>SSM</i> or <i>PM</i> .    |
| <i>Monument Marks</i>        | Point codes for such marks must use a valid monument type.      |
| <i>New Parcel Name</i>       | Lot name for new parcels is the new Lot number, for example 10. |
| <i>Adjoining Parcel Name</i> | Lot name comprises lot number/plan number, for example 5/87410. |
| <i>Easement Parcel Name</i>  | Prefix easement number with "e", for example "e3", "e6".        |
| <i>Road Parcel Name</i>      | Prefix road number with "R", for example "R1", "R2".            |

**Data preparation**

To achieve the correct dataset for the creation of an ePlan, it is essential that the civilcad data is prepared appropriately using the rules, described in the table below.

| <b>ePlan Data</b>               | <b>Entity</b> | <b>Field</b> | <b>Description</b>  |
|---------------------------------|---------------|--------------|---|
| <b><i>State Survey Mark</i></b> | Point         | Code         | Must be <i>SSM</i> or <i>PM</i> .<br>Each plan must have at least three survey control marks – two for plan orientation and one for checking.   |
|                                 |               | Layer        | Use the "Observation" or the "Points" layer or a separate "SM" layer.   |
| <b><i>Reference Marks</i></b>   | Point         | Code         | Use valid monument name such as <i>DH&amp;W</i> , <i>GIP</i> , <i>Peg</i> .   |
|                                 |               | Layer        | Use the "Observation" layer or a suitable "Reference" layer.  |
| <b><i>Boundary Points</i></b>   | Point         | Code         | No code required.   |
|                                 |               | Layer        | New boundary points created by this plan must be on the relevant layer for new parcels.<br>Existing boundary points should be on another layer, such as "Adjoining Parcels" layer or on their own layer.                                |
| <b><i>New Parcels</i></b>       | Lot           | Code         | Use the new lot number – no other characters should be specified.   |
|                                 |               | Layer        | Create new allotment parcels on their own layer, for example "Parcels_Proposed".<br>New points created by these parcels should be located on the same layer.  |
| <b><i>Easement Parcels</i></b>  | Lot           | Name         | Prefix easement number with 'e' – no other characters should be specified.  |
|                                 |               | Layer        | Create new easement parcels on their own layer for example "Parcels_Easement" or "Easement".<br>New easement parcels points should be located on the same layer.<br>Any existing easement parcels should be located on a separate layer |

| ePlan Data               | Entity | Field | Description  |
|--------------------------|--------|-------|--|
| <b>Road Parcels</b>      | Lot    | Name  | Prefix easement number with 'R' – no other characters should be specified.   |
|                          |        | Layer | Create new road parcels on their own layer for example "Parcels_Roads" or "Roads".<br>New road parcels points should be located on the same layer.<br>Any existing road parcels should be located on a separate layer.   |
| <b>Adjoining Parcels</b> | Lot    | Name  | Use lot number/DP number, for example 5/87410.   |
|                          |        | Layer | Create new adjoining parcels on their own layer for example "Parcels_Lots" or "Parcels_Adjoining".<br>New adjoining parcels points should be located on the same layer.<br><b>NOTE</b><br>Parcels included for adjoining information, may abut or be remote from the subject land. |
| <b>Observations</b>      | Line   |       | Surveyed observations to position and check Survey Marks and any other Monumented Marks.<br>Boundary observations are taken from the proposed parcel definition.   |
|                          | Layer  |       | Keep observation data on separate "Observation" layers.  |
| <b>Curved Boundary</b>   | Arc    |       | Any curved boundary of a parcel must be created as a 2-point arc with a centre point. Do not use 3 point arcs.   |
|                          | Layer  |       | Should be created on appropriate parcel layer.   |

### Attributes

The database structure designed by the Department of Lands requires a surveyor to include additional data for some of the entities that are written into the LandXML file.

These include identification number, currency date, class, and order of State Survey Control Marks, original survey plan for monumented Survey Marks and the state and condition of such marks.

Many of these additional elements have a list of defined values to select from, while others will require the surveyor to enter a text string or numeric value.

You may configure this by using the *Attribute* property for each particular entity. See "MAGNET Office entities properties" section on page 545 for details.

### **Edit ePlan icon**

The **Edit ePlan** icon of the Subdivision group allows you to edit an existing ePlan LandXML file.

ePlan is an edit/export feature, which helps you to prepare your data from MAGNET Office job for creation of the appropriate LandXML file for electronic lodgement to the lands department. It is designed specifically for New South Wales state in Australia.

Please carefully read ePlan notes before editing ePlans.

To edit an ePlan:

1. In the *Subdivision* group of the *Design* tab, click the **Edit ePlan** icon.

The **Open** dialog is displayed.

2. Open the required ePlan file.

The **ePlan editor** dialog is displayed. If errors are found, they will be listed in the bottom right panel of the dialog (marked as 3 at the picture below).

3. Make the required configurations. Refer to descriptions below for details.
4. Click **Save**.
5. Click **Exit** to close the dialog.

The screenshot shows the ePlan editor dialog with three numbered callouts:

- 1**: Points tree view showing a list of points from Point (1) to Point (13).
- 2**: A table showing the details for the selected 'Point'.
- 3**: An error list at the bottom right of the dialog.

| Point     |            |
|-----------|------------|
| name      | 2          |
| northing  | 124.382716 |
| easting   | 377.12620  |
| elevation | 0.000000   |
| desc      |            |
| state     | existing   |
| pntSurv   | boundary   |
| oID       |            |

Point (4): oID required.  
 Point (10): oID required.  
 Point (11): oID required.  
 Point (12): oID required.  
 Point (13): oID required.  
 Survey Header: surveyorReference required.  
 Survey Header Personnel: name required.  
 Survey Header AdministrativeDate: adminDate required.

Jurisdiction: New South Wales    MGA Zone: 57    Datum Line From: 4    To: 10  
 Project: untitled1    Created: 2013-10-04 16:23:05

ePlan editor dialog

**Fields of the ePlan editor dialog**

| Field               | Description   |
|---------------------|---|
| <i>Jurisdiction</i> | Displays the jurisdiction of the land – New South Wales                                   |
| <i>MGA Zone</i>     | Displays the MGA zone.  |
| <i>Datum Line</i>   | Displays the start and end points of the datum line, which defines the ePlan orientation. |
| <i>Project</i>      | Displays the project, from which the ePlan is created.                                    |
| <i>Created</i>      | Displays the ePlan creation time and date.  |

**Buttons of the ePlan editor dialog**

| Button           | Description   |
|------------------|---|
| <b>Open</b>      | Click it to open an ePlan for editing.  |
| <b>Validate</b>  | Click it to validate currently opened ePlan. Found errors will be displayed in the bottom right panel of the dialog (marked as 3 at the picture above). |
| <b>Save As</b>   | Click it to save the ePlan with the new name, and/or in the another location.   |
| <b>Report</b>    | Click it to generate a report, listed errors in the ePlan.  |
| <b>Copy From</b> | Click it to load settings from another ePlan file.  |
| <b>Exit</b>      | Click it to close the dialog.   |

The data in the file comprises groups of data for Points, Parcels, Survey (including Observations) and Survey Marks. These are listed at the left panel of the dialog (marked as 1 at the picture below). The data in this panel is defined from the naming conventions, layers and other rules.

**Points group**

Click the plus sign to extend the list of the points. Click to a point to display its details on the top right panel (marked as 2 at the picture above).

Each point in the dataset has a point number (name), coordinates and elevation (if available) The points represent boundary points, traverse points, reference marks, permanent survey marks and various administrative points.

The fields marked in red may be edited but their value must be chosen from the pre-configured lists.

**Fields of Point record**

| Field        | Description  |
|--------------|--|
| <i>state</i> | May have <i>Existing</i> or <i>Proposed</i> value. No further settings required.<br><br><i>TIP</i><br><i>Values for new points from the Proposed layers are automatically set to Proposed.</i> |

| Field          | Description  |
|----------------|--|
| <i>pntSurv</i> | <p>Depending on the type of the point may have one of the following values:</p> <ul style="list-style-type: none"> <li>• <i>Control</i> for State Survey Marks.</li> <li>• <i>Reference</i> for Monumented Reference Marks.</li> <li>• <i>Boundary</i> for parcel boundary points.</li> <li>• <i>Sideshot</i> for centre points of arcs, centre points of parcels and any other undefined points.</li> </ul> <p><i>TIP</i></p> <p><i>If the point needs an alternative definition, you may define its pntSurv attribute and select the required value.</i></p> |
| <i>oID</i>     | Required for Survey Control Points. Its value is the Mark Number from SCIMS.   |

### Parcels group

Click the plus sign to extend the list of the parcels. Click to a parcel to display its details on the top right panel (marked as 2 at the picture above).

Each parcel in the dataset has its name and its area displayed. The parcels list represents adjoining parcels, proposed parcels for new lots, easement parcels and road parcels.

The fields marked in red may be edited but their value must be chosen from the pre-configured lists.

#### Fields of Parcel record

| Field        | Description  |
|--------------|--|
| <i>state</i> | <p>May have <i>Existing</i> or <i>Proposed</i> value. No further settings required.</p> <p><i>TIP</i></p> <p><i>Values for new points from the Proposed layers are automatically set to Proposed.</i></p>  |
| <i>class</i> | <p>May have one of the following values:</p> <ul style="list-style-type: none"> <li>• <i>Lot.</i></li> <li>• <i>Road.</i></li> <li>• <i>Restriction on use of land.</i></li> </ul> <p><i>TIP</i></p> <p><i>Set other parcel classes with the 'class' Attribute for the parcel and select a suitable value, such as "Easement".</i></p> |
| <i>desc</i>  | Road parcels and easement parcels must have the <i>desc</i> field set. For road parcel it should contain the name of the road. For easement parcel it should describes the easement such as <i>easement for drainage 1 wide</i> or <i>restriction on use of land</i> .   |

### Survey group

Click the plus sign to extend the list of the parcels. Click to a parcel to display its details on the top right panel (marked as 2 at the picture above).

The *Survey Header* section holds the *Name* and *desc* properties for the dataset. Check the other settings to ensure they are appropriate

The Instrument Setups list the point number used for an observation to another point; no further input required

The Observation Group lists all the reduced observations in the dataset. These are:

- *ReducedObservation* — point to point line observation that represents a surveyed, adopted or calculated observation including.
- *ReducedArcObservation* — point to point arc observation.
- *RedHorizontalPosition* — details of horizontal position of a survey control mark.
- *RedVerticalPosition* — details of vertical position of a survey control mark (only mandatory for plans defining stratum boundaries that use a survey control mark as one of the required bench marks).

#### Fields of ReducedObservation record

| Field               | Description   |
|---------------------|---|
| <i>desc</i>         | The value is set to <i>Boundary</i> (parcel boundaries) or <i>Road</i> (parcel boundaries adjacent to a Road parcel). All other observations are set to <i>Connection</i> .                       |
| <i>distanceType</i> | The value does not need to be set for <i>Measured</i> as it is assumed by ePlan for the observation. This element only needs to be defined if the observation has not been measured in the survey |
| <i>azimuthType</i>  |   |

#### Fields of ReducedArcObservation record

| Field                | Description  |
|----------------------|--|
| <i>arcType</i>       | Only set this if the arc has not been measured in the survey.<br><i>TIP</i><br>You may define the Arc Type attribute with the value <i>Adopted</i> or <i>Calculate</i> . |
| <i>adoptedSurvey</i> | If the observation is adopted, use the <i>adoptedSurvey</i> attribute for the arc to set the required plan number.   |

#### Fields of RedHorizontalPosition record

| Field                         | Description                                |
|-------------------------------|--|
| <i>RedHorPos.class</i>        | Set the class for the State Survey Mark.   |
| <i>RedHorPos.order</i>        | Set the order for the State Survey Mark.   |
| <i>RedHorPos.currencyDate</i> | Specify the date in the format YYYY-MM-DD. |

#### NOTE

This data relates to the State Survey Marks; use Attributes for the point representing the State Survey Mark. The Horizontal Fix is set to SCIMS and the Datum to MGA.

#### Fields of RedVerticalPosition record

| Field                          | Description                              |
|--------------------------------|--|
| <i>RedHorPos.class</i>         | Set the class for the State Survey Mark. |
| <i>RedHorPos.order</i>         | Set the order for the State Survey Mark. |
| <i>RedVerObs.verticalDatum</i> | This is usually set to <i>AHD</i> .      |



**NOTE**

This data relates to the State Survey Marks and is entered as Attributes for the point used to define the State Survey Mark. Only mandatory for Strata surveys where the SSM is used for a bench mark.

**Survey Marks group**

Click the plus sign to extend the list of the survey marks. Click to a survey mark to display its details on the top right panel (marked as 2 at the picture above).

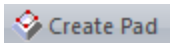
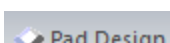
The survey marks are monumented points in the dataset. Each Survey Mark has its point number and its monument type displayed in the details.

**Fields of Survey Mark record**

| <b>Field</b>        | <b>Description</b>   |
|---------------------|--|
| <i>state</i>        | By default existing Survey Marks are set to <i>Found</i> – proposed survey marks are set to <i>Placed</i> . Other values may relevant.   |
| <i>originSurvey</i> | All existing Survey Marks require the origin survey. The value entered is the plan number that placed the mark or last changed the mark. |
| <i>condition</i>    | If needed, select the appropriate value from the drop-down list.   |

## Pad group

The *Pad* group from the *Design* tab of the MAGNET Office ribbon allows you to work with buildings pads. It contains two icons, described in the table below.

|   |  |
|---|--|
|  | <p style="text-align: center;"><b>Create Pad icon</b><br/>Click it to create a new pad.</p>  |
|  | <p style="text-align: center;"><b>Pad Design icon</b><br/>Click it to compute the elevation of a building pad and slope positions at a defined grade from the pad to a nominated existing surface.</p> |

### Create Pad icon

The **Create Pad** icon of the Pad group allows you to create a new pad. The pad can be created from existing points, lines, strings, or polygon, or from new points.

The pad is saved with a unique name. You can create the pad with no elevation or with elevations that are relative to each other to define a surface. A complex pad may also include points with elevations in the body of the polygon, so that a surface model of the pad can be created.

To create a pad:

1. In the *Pad* group of the *Design* tab, click the **Create Pad** icon.

The input panel for point creation is displayed at the bottom toolbar. Description of the fields may be found in the table below.

2. Locate the nodes of the pad.
3. To close the pad area do one of the following:
  - Locate the last point at the same place as the first point.
  - Press *Esc*. The message window prompts to save the pad. Click **OK**. The last created point will be connected with the first point with the shortest line possible.

The *Edit Pad* dialog is displayed.

4. In the *Name* editbox, type the name of the newly created pad.
5. Review the rest of the pad properties of the newly created polygon, if needed change them. For more information refer to "Pad properties" section on page 565.
6. Click **OK**.

The pad is created.

#### Fields of the input panel, when creating pads

| Field                 | Description   |
|-----------------------|---|
| <i>Number</i>         | Defines the number of the next new point.                               |
| <i>East</i>           | Defines the East (X) coordinate of the pad point.                       |
| <i>North</i>          | Defines the North (Y) coordinate of the pad point.                      |
| <i>Elev</i>           | Defines the elevation of the pad point.                                 |
| <i>Code</i>           | Defines the code of the pad point.                                      |
| <i>Use in Surface</i> | Defines whether the line start/end point may be used in surface or not. |

| Field                        | Description  |
|------------------------------|--|
| <i>Interpolate Elevation</i> | Defines whether the elevation of the pad point will be interpolated. |
| <i>BreakLine</i>             | Defines whether the lines of the new pad be a breakline.             |

## Pad Design icon

The **Pad Design** icon of the Pad group allows you to compute the elevation of a building pad and slope positions at a defined grade from the pad to a nominated existing surface. A new surface is created for the pad and slopes. This surface may be merged with the existing surface to create an overall finished surface. A volumes computation for cut and fill volumes is displayed during the design process with the option to position the pad at a level where the cut volume equals the fill volume.

The pad may have its own surface model to represent the grade changes across the pad.

To design a pad surface:

1. In the *Pad* group of the *Design* tab, click the **Pad Design** icon.

The **Pad Design** dialog, opened at *Settings* tab is displayed.

2. Define the pad for design. Do one of the following:
  - Select it from the *Pad* drop down list.
  - Click **Load File** to load pad from an external Civilcad bld (\*.bld) file.
3. Configure the other properties. Fields are described in the table below.
4. Click **OK**.

The **Pad Design** dialog, opened at *Design Parameters* tab is displayed.

The various fields on this tab allow you to set a range of properties to compute and to test a suitable final layout for the pad. MAGNET Office calculates the volumes for the defined side slopes, the height of the pad, and its surface if used, relative to the levels on the natural surface.

5. Configure the parameters as you need. Fields are described in the table below.
6. Do one of the following:

- Click **Compute** to calculate initial cut and fill volumes.

Be aware that the slopes may only be computed as long as the side slopes and levels chosen allow for the slope to be inside the extents of the available natural surface. Error messages will appear if a computation cannot be made.

The maximum distance defined may not relate to the slopes and pad level. You may need to modify the angular setting, especially on complex shaped pads. You may need to adjust the spacing between the slope intercept (cross section) calculations.

- Click **Cut = Fill**. The Cut=Fill computation is an interactive procedure and may take some time to achieve a result if complex surfaces are involved. The iteration limit on the *Settings* tab may need to be increased.
7. Once the pad position and volumes suit the project design, the pad position levels, surface, and slopes should be saved to the survey view by clicking **Save**.
  8. When the data has been saved to the survey view, click **OK** to close the **Pad Design** dialog.

**Fields of the *Settings* tab of the *Pad Design* dialogs**

| <b>Field</b>                  | <b>Description</b>   |
|-------------------------------|--|
| <i>Design Name</i>            | Defines the name of the pad design.  |
| <i>Pad</i>                    | Defines the pad for design. You may select pad existing in the current project from the drop-down list, or load it from an external Civilcad bld (*.bld) file.   |
| <i>Natural Surface</i>        | Defines an existing surface to be used for the slope intercepts. Tick the <i>Display NS</i> checkbox to display the natural surface mesh in the design process window.   |
| <i>Pad Surface (Optional)</i> | Defines an existing surface that represents the grades across the pad (optional). If no surface exists, then a plane surface is computed from the relative levels of the points defining the pad edges. Tick the <i>Display Pad</i> checkbox to display the natural surface mesh in the design process window. |
| <i>Movable</i>                | Enables movement of the pad to another position. This is useful when positioning a standard pad to different locations.  |
| <i>Insert Point</i>           | Defines one of the pad nodes as insertion point.   |
| <i>Index</i>                  | Defines the number of the pad node, which will be used as insertion point. Pad node index numbers are annotated in the <i>Pad Preview</i> window. The current insertion point is highlighted with red.   |
| <i>X, Y, Z</i>                | Defines the coordinates of the pad insertion point.  |
| <i>Rotation</i>               | Defines the rotation of the pad around insertion point.  |
| <i>Scale</i>                  | Changes pad scale.   |
| <i>Iteration Limit</i>        | Defines the quantity of iteration, when computing the pad surface. The default value is 30. It may need to be increased for complex pads, where more calculations are needed to position the pad and compute the slope intercepts and volumes. This is important when computing equal cut/fill volumes.        |

**Fields of the *Design Parameters* tab of the *Pad Design* dialogs**

| <b>Field</b>        | <b>Description</b>  |
|---------------------|---|
| <i>Color</i>        | Defines the color for displaying cut, fill, natural surface and pad surface respectively.   |
| <i>Spacing</i>      | Tick the <i>Approximate Arc</i> checkbox to approximate arc with chord lines and specify the arc to chord distance for curved breaklines in the <i>Arc-to-chord Distance</i> editbox. |
| <b>Slope</b>        |   |
| <i>Cut 1</i>        | Defines horizontal component of the slope in a cut situation.   |
| <i>Fill 1</i>       | Defines horizontal component of the slope in a fill situation.  |
| <i>Max Distance</i> | Defines the maximum distance in meters from the pad perimeters that the routine will search for a slope intercept within the existing surface.  |

| <b>Field</b>              | <b>Description</b>   |
|---------------------------|--|
| <i>Factor</i>             | Defines the swelling or shrinking factor, which leads to increasing or decreasing volume by specified ratio.   |
| <b>Bench</b>              |  |
| <i>Depth</i>              | Defines how often a bench will be calculated in the side slope.  |
| <i>Width</i>              | Defines the width of the bench.  |
| <i>Level</i>              | Start with an approximate level for the insert point on the pad. Click <b>Compute</b> to check the volumes at this level and display the slope lines and cut/fill sections.  |
| <i>Increment</i>          | Defines the increment to which the pad will be raised or loved after clicking <b>Raise</b> or <b>Lower</b> .   |
| <i>Fill</i>               | Displays the computed fill volume.   |
| <i>Cut</i>                | Displays the computed cut volume.  |
| <i>Control Line Layer</i> | The data on this layer is displayed in the preview window as a guide to the position on the pad and the extents of the computed slopes. Data on a specific layer may be critical to these computations. Any layer that is in the project may be displayed. |
| <i>Batter Layer</i>       | This layer holds the cut and fill batter lines and points when the computation is complete, and the data is saved in the Survey View.  |

## Sewer group

The *Sewer* group from the *Design* tab of the MAGNET Office ribbon allows you to:

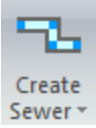

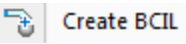

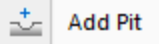
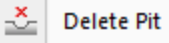
- Specify sufficient data to describe an urban sewerage network with one outfall per pipe network.
- Interactively design the pipes to obtain optimum combination of pipe slope and depth, and to avoid any obstructions.

Before you start your sewer design, configure a new layer for the sewer line you are about to create as well as setting its colour, line style and the symbol for the pits. All sewer lines will be created as strings. The points defining the string represent the pits.

You should also have valid sewer library configuration. See "Sewer library" section on page 666 for details.

Sewer design requires a design of a network of pits and pipes. The pits, points, and pipes, strings, are initially defined in the survey view. After the network is created it may be opened for reviewing and editing in the sewer view.

The group contains three icons and three second level icons, described in the table below.

|   |   |
|---|---|
|    | <p><b>Create Sewer icon</b><br/>Click it to create a sewer string. This icon also contains the list of the second-level icons. Click  to see them.</p> |
|    | <p><b>Create BCIL icon</b><br/>Click it to define the BCIL data.</p>  |
|  | <p><b>Create Sewer Network icon</b><br/>Click it to create a sewer network from existing sewer channels.</p>  |
|  | <p><b>Add Pit icon</b><br/>Click it to add an existing point as the pit to the sewer pipeline.</p>  |
|  | <p><b>Delete Pit icon</b><br/>Click it to remove an existing pit point from the sewer pipeline.</p>   |

### Create Sewer icon

The **Create Sewer** icon of the Sewer group allows you to create sewer strings.

Note, that all sewer lines will be created as strings. The points defining the string represent the pits. Each manhole (pit) point must be given an initial elevation which becomes the lid level for the pit. The string defines the order of pits (manholes) in a line and should start from the Upstream pit (manhole).

To create a sewer string:

1. In the *Sewer* group of the *Design* tab, click the **Create Sewer** icon.
2. In the survey view, locate the pit point.  
The **Pit Data at Point** dialog is displayed.
3. Configure the parameters. Fields are described in the table below.
4. Click **OK**.
5. Locate the second and further pits in a same way. When finished, press *Esc*.  
The message prompts to save the string.
6. Click **Yes**.

The *Create Sewer String* dialog is displayed.

7. Review the properties, if needed, change them. Fields are described in the tables below.
8. Click **OK**.

The sewer string is created.

#### Fields of the *Pit Data at Point* dialog

| Field                      | Description   |
|----------------------------|---|
| <i>Elevation</i>           | Defines the lid level for the pit.  |
| <i>Pit name</i>            | Defines the pit name.   |
| <b>Pit name</b>            |   |
| <i>From the dialog</i>     | Select to manually define the pit name in the respective editbox.   |
| <i>From the point name</i> | Select to use the point number as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox. |
| <i>From the point code</i> | Select to use the point code as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox.   |

#### Non-editable fields of the *Create Sewer String* dialog

| Field              | Description  |
|--------------------|--|
| <i>Start Point</i> | Displays the number of the sewer string start point. |
| <i>End Point</i>   | Displays the number of the sewer string end point.   |
| <i>Num Points</i>  | Display quantity of the points in the sewer string.  |
| <i>Length</i>      | Display the length of the sewer string.              |

#### Editable fields of the *Create Sewer String* dialog

| Field              | Description   |
|--------------------|---|
| <i>Name</i>        | Defines the name of the sewer string.   |
| <i>Layer</i>       | Defines layer to which the sewer string belongs to.   |
| <i>Color</i>       | Defines a color for sewer string displaying.  |
| <i>Line Style</i>  | Defines appearance of the sewer string both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>   | Defines the width of the sewer string in millimeters when plotted.  |
| <i>is Smoothed</i> | Select it to apply a smoothing spline algorithm to the sewer string. It is used for plotting purposes and has no influence on any computations.   |
| <i>Break Line</i>  | A sewer string may be defined as breakline. The string must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.             |

## Create BCIL icon

The BCIL (Block Control Invert Level) is a tool will ensure that Magnet Office designs the sewer pipe low enough to carter for a specified minimum slope from the drain point at the house so the house may be connected to the sewer line properly.

### NOTE

The BCIL is an optional feature.

BCIL data are defined in the survey view by the point entities, with the special point code. There are three types of the BCIL points:

- House Connection (HC) — this point should have *@HCxxxx* code.
- Sewer Connection (SC) — this point should have *@SCxxxx* code.
- Intermediate Connection (IC) — this point should have *@ICxxxx* code.

The *xxxx* parts in the point codes represent any alphanumeric string. Usually it defined by the lot name. BCIL points from the same lots should have the same alphanumeric parts.

All BCIL point must have defined elevations and must be located at the same layer with the sewer line to which they are must be connected.

The **Create BCIL** icon of the Sewer group allows you to associate the BCIL points with the sewer design or update the BCIL information, if any changes were made with the BCIL points or sewer.

To add the BCIL data to a sewer design:

1. In the survey view, create the BCIL points matching requirements, described above.
2. In the *Sewer* group of the *Design* tab, click the **Create BCIL** icon.

The points are added to the sewer design, and the report is displayed.

## Create Sewer Network icon

The **Create Sewer Network** icon of the Sewer group allows you to create sewer network from existing sewer strings.

To create a sewer network:

1. In the *Sewer* group of the *Design* tab, click the **Create Sewer Network** icon.
2. In the survey view, select the main sewer string. All sewer strings, which are connected to it, will be used in design.

The **Create Sewer Network** dialog is displayed.

3. In the *Network Name* editbox, specify the name of the new network.
4. From the *Network Settings* drop-down list, select the required library settings set. See "Sewer library" section on page 666 for details.
5. If needed, define the primary and secondary DTMs by ticking the appropriate checkboxes and selecting DTMs from the drop-down lists to generate surfaces.
6. Nominate obstruction strings. See "Compute obstructions" section on the facing page for details.
7. In the *Pit Name* group box, define the pit name creation method.
8. Click **OK**.



**Fields of the Create Sewer Network dialog**

| Field                       | Description   |
|-----------------------------|---|
| <i>Network Name</i>         | Defines the name of the new sewer network.  |
| <i>Network Settings</i>     | Defines the used set of the library settings. See "Sewer library" section on page 666 for details.                            |
| <i>Primary DTM</i>          | Defines the primary DTM for generating surface.   |
| <i>Secondary DTM</i>        | Defines the secondary DTM for generating surface.   |
| <i>Compute Obstructions</i> | Defines obstruction strings. See "Compute obstructions" section below for details.  |
| <b>Pit name</b>             |   |
| <i>From the dialog</i>      | Select to manually define the pit name in the respective editbox.   |
| <i>From the point name</i>  | Select to use the point number as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox. |
| <i>From the point code</i>  | Select to use the point code as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox.   |

**Compute obstructions**

MAGNET Office allows you to specify obstructions along a given pipe reach at certain depths and to specify the clearances required. All obstruction points created in the survey view must be given heights and be joined into a string.

An obstruction is created as a string in the survey view, with the node points defining the level of the obstruction in or above the ground surface. The string is saved and named and set as a service.

Other networks such as Drainage networks are automatically identified as an obstruction if the other network crosses a sewer line. Drainage network pipe sizes are extracted directly from Drainage Design.

To configure this option:

1. Tick the *Compute Obstructions* checkbox.
2. Click **Set Obstructions**.  
The *Select Obstructions* dialog is displayed.
3. Select the required service strings from the *Valid Service String* list and click >>.
4. The selected strings are displayed in the *Selected Obstructions* list. If needed to remove a string, select it and click <<.
5. Click **OK**.

**Add Pit icon**

The **Add Pit** icon of the Sewer group allows you to add an existing point as the pit to the sewer pipeline.

To add a point as a pit:

1. In the *Sewer* group of the *Design* tab, click the **Add Pit** icon.
2. In the survey view, select the required point.
3. In the survey view, select the pipe section of a sewer string to which pit will be added.

The pit is added.

## Delete Pit icon

The **Delete Pit** icon of the Sewer group allows you to remove an existing pit point from the sewer pipeline.

To remove a pit from a sewer pipeline:

1. In the *Sewer* group of the *Design* tab, click the **Delete Pit** icon.
2. In the survey view, select the required p.

The pit is deleted.

3. Update level and obstruction data in the sewer view. See "Sewer design view" section on page 835 for details.

## Drainage group

The *Drainage* from the *Design* tab of the MAGNET Office ribbon group allows you to:

- Define sufficient data to describe an urban drainage network with one outfall per pipe network.
- Perform hydrological calculations to calculate surface runoff, channel flow and pipe flow.
- Interactively design the pipes to obtain the optimum combination of pipe diameter/slope/depth and to avoid any obstructions.
- Perform a back-water check to ensure satisfactory hydraulic performance.
- Produce printed or plotted reports of the calculations, as well as plots of the longitudinal sections.




Before you start your drainage design, configure a new layer for the drainage line you are about to create as well as setting its colour, line style and the symbol for the pits. All drainage lines will be created as strings. The points defining the string represent the pits.

You should also have valid drainage library configuration. See "Drainage library" section on page 668 for details.

Drainage design requires a design of a network of pits and pipes. The pits, points, and pipes, strings, are initially defined in the survey view. After the network is created it may be opened for reviewing and editing in the drainage view.

Each manhole (pit) point must be given an initial elevation; this becomes the lid level for the pit. The string defines the order of pits (manholes) in a line and should start from the Upstream pit (manhole).

The group contains three icons, described in the table below.

|  |   |
|--|---|
|                                  | <p style="text-align: center;">Create Drainage icon<br/>Click it to create a single drainage channel.</p>                                 |
|  <b>Create Drainage Network</b> | <p style="text-align: center;">Create Drainage Network icon<br/>Click it to create a drainage network from existing drainage strings.</p> |
|  <b>Update Drainage Network</b> | <p style="text-align: center;">Update Drainage Network icon<br/>Click it to edit an existing drainage network.</p>                        |

### Create Drainage icon

The **Create Drainage** icon of the Drainage group allows you to create drainage strings.

Note, that all drainage lines will be created as strings. The points defining the string represent the pits. Each manhole (pit) point must be given an initial elevation which becomes the lid level for the pit. The string defines the order of pits (manholes) in a line and should start from the Upstream pit (manhole).

To create a drainage string:

1. In the *Drainage* group of the *Design* tab, click the **Create Drainage** icon.
2. In the survey view, locate the pit point.  
The **Pit Data at Point** dialog is displayed.
3. Configure the parameters. Fields are described in the table below.
4. Click **OK**.
5. Locate the second and further pits in a same way. When finished, press *Esc*.

The message prompts to save the string.

6. Click **Yes**.

The **Create Drainage String** dialog is displayed.

## 7. Review the properties, if needed, change them. Fields are described in the tables below.

8. Click **OK**.

The sewer string is created.

**Fields of the *Pit Data at Point* dialog**

| <b>Field</b>               | <b>Description</b>  |
|----------------------------|---|
| <i>Elevation</i>           | Defines the lid level for the pit.  |
| <i>Pit name</i>            | Defines the pit name.   |
| <b>Pit name</b>            |   |
| <i>From the dialog</i>     | Select to manually define the pit name in the respective editbox.   |
| <i>From the point name</i> | Select to use the point number as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox. |
| <i>From the point code</i> | Select to use the point code as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox.   |

**Non-editable fields of the *Create Drainage String* dialog**

| <b>Field</b>       | <b>Description</b>                                      |
|--------------------|---|
| <i>Start Point</i> | Displays the number of the drainage string start point. |
| <i>End Point</i>   | Displays the number of the drainage string end point.   |
| <i>Num Points</i>  | Display quantity of the points in the drainage string.  |
| <i>Length</i>      | Display the length of the drainage string.              |

**Editable fields of the *Create Drainage String* dialog**

| <b>Field</b>       | <b>Description</b>   |
|--------------------|--|
| <i>Name</i>        | Defines the name of the drainage string.   |
| <i>Layer</i>       | Defines layer to which the drainage string belongs to.   |
| <i>Color</i>       | Defines a color for drainage string displaying.  |
| <i>Line Style</i>  | Defines appearance of the drainage string both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>   | Defines the width of the drainage string in millimeters when plotted.  |
| <i>is Smoothed</i> | Select it to apply a smoothing spline algorithm to the drainage string. It is used for plotting purposes and has no influence on any computations.   |

| Field             | Description  |
|-------------------|--|
| <i>Break Line</i> | A drainage string may be defined as breakline. The string must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle. |

## Compute obstructions

MAGNET Office allows you to specify obstructions along a given pipe reach at certain depths and to specify the clearances required. All obstruction points created in the survey view must be given heights and be joined into a string.

An obstruction is created as a string in the survey view, with the node points defining the level of the obstruction in or above the ground surface. The string is saved and named and set as a service.

Other networks such as Sewer networks are automatically identified as an obstruction if the other network crosses a sewer line. Sewer network pipe sizes are extracted directly from Sewer Design.

To configure this option:

1. Tick the *Compute Obstructions* checkbox.
2. Click **Set Obstructions**.

The *Select Obstructions* dialog is displayed.

3. Select the required service strings from the *Valid Service String* list and click >>.
4. The selected strings are displayed in the *Selected Obstructions* list. If needed to remove a string, select it and click <<.
5. Click **OK**.

## Create Drainage Network icon

The **Create Drainage Network** icon of the Drainage group allows you to create drainage network from existing drainage strings.

To create a drainage network:

1. In the survey view, select the main drainage string. All drainage strings, which are connected to it will be used in design.
2. In the *Drainage* group of the *Design* tab, click the **Create Drainage Network** icon.  
The *Create Drainage Network* dialog is displayed.
3. In the *Network Name* editbox, specify the name of the new network.
4. From the *Network Settings* drop-down list, select the required library settings set. See "Drainage library" section on page 668 for details.
5. If needed, define the primary and secondary DTMs by ticking the appropriate checkboxes and selecting DTMs from the drop-down lists to generate surfaces.
6. Nominate obstruction strings. See "Compute obstructions" section above for details.
7. In the *Pit Name* group box, define the pit name creation method.
8. From the *Main Line* drop-down list, select the main drainage string.
9. Click **OK**.

**Fields of the *Create Drainage Network* dialog**

| <b>Field</b>                | <b>Description</b>  |
|-----------------------------|---|
| <i>Network Name</i>         | Defines the name of the new drainage network.   |
| <i>Network Settings</i>     | Defines the used set of the library settings. See "Drainage library" section on page 668 for details.                         |
| <i>Primary DTM</i>          | Defines the primary DTM for generating surface.   |
| <i>Secondary DTM</i>        | Defines the secondary DTM for generating surface.   |
| <i>Compute Obstructions</i> | Defines obstruction strings. See "Compute obstructions" section on page 385 for details.                                      |
| <b>Pit name</b>             |   |
| <i>From the dialog</i>      | Select to manually define the pit name in the respective editbox.   |
| <i>From the point name</i>  | Select to use the point number as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox. |
| <i>From the point code</i>  | Select to use the point code as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox.   |
| <i>Main Line</i>            | Defines the main drainage string in the network.  |

**Update Drainage Network icon**

The **Update Drainage Network** icon of the Drainage group allows you to update an existing drainage network if any changes were made with network entities from the survey view.

To update a drainage network:

1. In the survey view, select the main drainage string of the existing network.
2. In the *Drainage* group of the *Design* tab, click the **Update Drainage Network** icon.  
The *Update Drainage Network* dialog is displayed.
3. From the *Network Name* drop-down list, select the network for editing.
4. If needed, define the primary and secondary DTMs by ticking the appropriate checkboxes and selecting DTMs from the drop-down lists to generate surfaces.
5. Nominate obstruction strings. See "Compute obstructions" section on the previous page for details.
6. In the *Pit Name* group box, define the pit name creation method.
7. From the *Main Line* dropdown list, select the main drainage string.
8. Click **OK**.

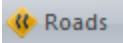
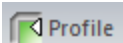
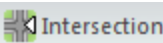
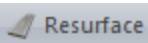
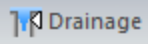
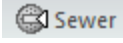
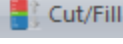
**Fields of the *Update Drainage Network* dialog**

| <b>Field</b>        | <b>Description</b>                              |
|---------------------|---|
| <i>Network Name</i> | Defines drainage network for editing.           |
| <i>Primary DTM</i>  | Defines the primary DTM for generating surface. |

| <b>Field</b>                | <b>Description</b>  |
|-----------------------------|---|
| <i>Secondary DTM</i>        | Defines the secondary DTM for generating surface.   |
| <i>Compute Obstructions</i> | Defines obstruction strings. See "Compute obstructions" section on page 385 for details.                                      |
| <b>Pit name</b>             |   |
| <i>From the dialog</i>      | Select to manually define the pit name in the respective editbox.   |
| <i>From the point name</i>  | Select to use the point number as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox. |
| <i>From the point code</i>  | Select to use the point code as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox.   |
| <i>Main Line</i>            | Defines the main drainage string in the network.  |

## Design Views group

The *Design Views* group from the *Design* tab of the MAGNET Office ribbon allows you to view and edit project design data. It contains seven icons, described in the table below.

|   |  |
|---|--|
|  | Roads icon<br>Click it to review/update an existing road.                  |
|  | Profile icon<br>Click it to review/update an existing profile.             |
|  | Intersection icon<br>Click it to review/update an existing intersection.   |
|  | Resurface icon<br>Click it to manage roads resurfacing.                    |
|  | Drainage icon<br>Click it to review/update an existing drainage.           |
|  | Sewer icon<br>Click it to review/update an existing sewer.                 |
|  | Cut/Fill icon<br>Click it to review/update an existing cut/fill color map. |

### Roads icon

The **Roads** icon of the Design Views group allows you to create new or view and edit an existing road. Click the icon to open the **Roads** dialog, listing all existing roads.

To edit a road:

1. Select the required road from the list and click **Open**.

The road is opened in the road view. See "Road design view" section on page 671 for details.

To rename a road:

1. Select the required profile from the list and click **Rename**.
2. Type the new name and press *Enter*.

The road is renamed.

To delete a road:

1. Select the required road from the list and click **Delete**.

The road is deleted.

To create a new road:

1. Click **New**.

The **Create Road Design** dialog is displayed.

2. From the *Alignment* drop-down list, select the base alignment for a road.
3. Configure the natural surface and cross section parameters as you need. Fields are described in the table below.



**Fields of the *Create Road Design* dialog**

| <b>Field</b>                | <b>Description</b>   |
|-----------------------------|--|
| <i>Alignment</i>            | Defines the base alignment for the road.   |
| <b>Natural Surface</b>      |  |
| <i>Name</i>                 | Defines the name of the road natural surface.  |
| <i>From DTM</i>             | Select to extract road natural surface from an existing DTM.                                       |
| <i>From Level</i>           | Select to define a natural surface from the specified level.                                       |
| <i>Left Limit</i>           | Defines the road width to the left from the base alignment.  |
| <i>Right Limit</i>          | Defines the road width to the right from the base alignment.                                       |
| <b>Cross Section</b>        |  |
| <i>Include TPs and IPs</i>  | Tick to create cross sections at TPs and IPs.  |
| <i>Cross Section at IPs</i> | Defines the cross section position at the IPs.   |
| <i>Spacing</i>              | Defines the base spacing between cross sections for straight and curved segments of the alignment. |

**Profile icon**

The **Profile** icon of the Design Views group allows you to view and edit existing profiles.

Click the icon to open the **Profiles** dialog, listing all existing profiles.

To edit a profile:

1. Select the required profile from the list and click **Open**.

The profile is opened in the profile view. See "Profile design view" section on page 741 for details.

To rename a profile:

1. Select the required profile from the list and click **Rename**.
2. Type the new name and press *Enter*.

The profile is renamed.

To delete a profile:

1. Select the required profile from the list and click **Delete**.

The profile is deleted.

**Intersection icon**

The **Intersection** icon of the Design Views group allows you to view and edit existing intersections.

Click the icon to open the **Intersections** dialog, listing all existing intersections.

To view an intersection:

1. Select the required intersection from the list and click **Open**.

The intersection is opened in the Intersection view. See "Intersection design view" section on page 756 for details.

To rename an intersection:

1. Select the required intersection from the list and click **Rename**.
2. Type the new name and press *Enter*.

The intersection is renamed.

To delete an intersection:

1. Select the required intersection from the list and click **Delete**.

The intersection is deleted.

## Resurface icon

The **Resurface** icon of the Design Views group allows you to renew the asphalt surface of an existing road.

Click the icon to open the **Resurface** dialog, listing all existing roads.

To edit a road:

1. Select the required road from the list and click **Open**.

The road is opened in the resurface view. See "Resurface design view" section on page 774 for details.

To rename a road:

1. Select the required profile from the list and click **Rename**.
2. Type the new name and press *Enter*.

The road is renamed.

To delete a road:

1. Select the required road from the list and click **Delete**.

The road is deleted.

To create a new surface for road:

1. Click **New**.
2. In the survey view, select the base strings for resurfacing. Press *Esc* when finished.  
The **Create New Resurface Data** dialog is displayed.
3. From the *Select Center Line* list, select the required base string. If the required string is not in the list, click **Pick>>** and select it the survey view.
4. If needed, define the profile elevation file in the appropriate field.
5. Click **OK**.
6. The Create Alignment dialog is displayed.
7. Configure the parameters as you need. Fields are described in the table below.
8. Click **OK**.

The road is opened in the resurface view. See "Resurface design view" section on page 774 for details.

### Fields of the **Edit Alignment** dialog

| Field           | Description  |
|-----------------|--|
| <i>Name</i>     | Defines the name of the alignment.                             |
| <i>Start IP</i> | Displays the number of the alignment start intersection point. |
| <i>End IP</i>   | Displays the number of the alignment end intersection point.   |

| Field              | Description  |
|--------------------|--|
| <i>Num IPs</i>     | Display quantity of the intersection points in the alignment.  |
| <i>Start Chain</i> | Defines the chainage or the running distance of the alignment start intersection point.  |
| <i>End Chain</i>   | Displays the chainage or running distance at the end of the alignment.   |
| <i>Length</i>      | Display the length of the alignment.   |
| <i>Layer</i>       | Defines layer to which the alignment belongs to. Note that the alignment and its points may belong to the different layers.  |
| <i>Color</i>       | Defines a color for alignment displaying.  |
| <i>Line Style</i>  | Defines appearance of the alignment both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>   | Defines the width of the alignment in millimeters when plotted.  |

#### Buttons of the *Edit Alignment* dialog

| Button                | Description  |
|-----------------------|--|
| <b>Set Properties</b> | Click it to set current properties as the default for alignments. New alignments will be created with these properties.  |
| <b>Get Properties</b> | Click it to load existing default properties for alignments.   |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the alignment. The picture will be displayed near the alignment. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the alignment and close the dialog.   |
| <b>OK</b>             | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.   |

## Drainage icon

The **Drainage** icon of the Design Views group allows you to view and edit existing drainage networks.

Click the icon to open the *Drains* dialog, listing all existing drainage networks.

To edit a drainage network:

1. Select the required network from the list and click **Open**.

The road is opened in the road view. See "Drainage design view" section on page 818 for details.

To rename a drainage network:

1. Select the required network from the list and click **Rename**.
2. Type the new name and press *Enter*.

The drainage network is renamed.

To delete a drainage network:

1. Select the required network from the list and click **Delete**.

The drainage network is deleted.

## Sewer icon

The **Sewer** icon of the Design Views group allows you to view and edit existing sewer networks.

Click the icon to open the **Sewers** dialog, listing all existing sewer networks.

To edit a sewer network:

1. Select the required network from the list and click **Open**.

The road is opened in the road view. See "Sewer design view" section on page 835 for details.

To rename a sewer network:

1. Select the required network from the list and click **Rename**.
2. Type the new name and press *Enter*.

The sewer network is renamed.

To delete a sewer network:

1. Select the required network from the list and click **Delete**.

The sewer network is deleted.

## Cut/Fill icon

The **Cut/Fill** icon of the Design Views group allows you to view and edit existing cut/fill color maps.

Click the icon to open the Cut/Fills dialog, listing all existing cut/fill color maps.

To view a cut/fill map:

1. Select the required cut/fill map from the list and click **Open**.

The color map is opened in the Cut/Fill view. See "Cut/Fill design view" section on page 853 for details.

To rename a cut/fill color map:

1. Select the required cut/fill map from the list and click **Rename**.
2. Type the new name and press *Enter*.

The color map is renamed.

To delete a cut/fill map:

1. Select the required cut/fill color map from the list and click **Delete**.

The color map is deleted.

To create a new cut/fill map:

1. Click **New**.

The **Create Cut/Fill DTM** dialog is displayed.

2. From the *First DTM* drop-down list, select the DTM for a calculation of height difference.
3. Specify one of the following:
  - From the *Second DTM* drop-down list, select the DTM for a calculation of depth difference.
  - Tick the *From Level* checkbox, and specify an elevation from which the elevation difference will be calculated in the editbox.

4. In the *Output DTM* editbox, specify the name of the resulting DTM.
5. Define the colors for cut and fill in the appropriate drop-down lists.
6. Click **OK**.



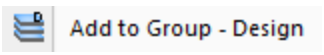
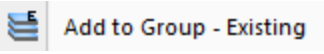
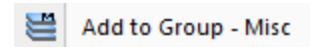
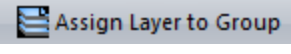
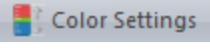
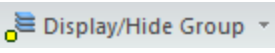

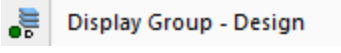
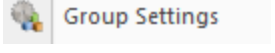
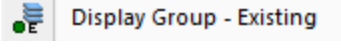
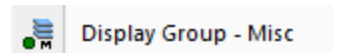
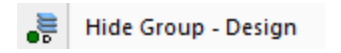
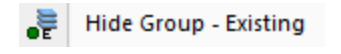
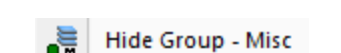
## Model Tab

The *Model* tab of the MAGNET Office ribbon contains control icons, which allows you to recreate existing location of your project, and create new objects here. It is separated to six groups:

- "Layer Group group" section on the facing page
- "Cleanup group" section on page 406
- "Raster/Vector group" section on page 408
- "Strings group" section on page 412
- "Elevate group" section on page 418
- "DTM group" section on page 424

## Layer Group group

The *Layer Group* group from the *Model* tab of the MAGNET Office ribbon allows you to configure project's layers. It contains four icons and ten second level icons, described in the table below.

|   |   |
|---|---|
|    | <p><b>Add to Group icon</b><br/>Click it to add layer to the layer group. This icon also contains the list of the second-level icons. Click  to see them.</p>            |
|    | <p><b>Add to Group - Design icon</b><br/>Click it to add layer to the 'Design' layer group.</p>   |
|    | <p><b>Add to group - Existing icon</b><br/>Click it to add layer to the 'Existing' layer group</p>  |
|    | <p><b>Add to Group - Misc icon</b><br/>Click it to add layer to the 'Miscellaneous' layer group.</p>  |
|    | <p><b>Assign Layer to Group icon</b><br/>Click it to add layers to a layer group.</p>   |
|    | <p><b>Color Settings icon</b><br/>Click it to configure colors layout in the project.</p>   |
|    | <p><b>Display/Hide Group icon</b><br/>Click it to configure layer groups visibility. This icon also contains the list of the second-level icons. Click  to see them.</p> |
|  | <p><b>Display Group - Design icon</b><br/>Click it turn on displaying of the 'Design' layer group.</p>  |
|  | <p><b>Group Settings icon</b><br/>Click it to configure layer groups.</p>   |
|  | <p><b>Display Group - Existing icon</b><br/>Click it to turn on displaying of the 'Existing' layer group.</p>   |
|  | <p><b>Display Group - Misc icon</b><br/>Click it to turn on displaying of the 'Miscellaneous' layer group.</p>  |
|  | <p><b>Hide Group - Design icon</b><br/>Click it to turn off displaying of the 'Design' layer group.</p>   |
|  | <p><b>Hide Group - Existing icon</b><br/>Click it to turn off displaying of the 'Existing' layer group.</p>   |
|  | <p><b>Hide Group - Misc icon</b><br/>Click it to turn off displaying of the 'Miscellaneous' layer group.</p>  |

### Add to Group icon

The **Add to Group** icon of the Layer Group group allows you to add layers to group by selecting entities in the survey view, which belong to required layers.

To add layers to a group:

1. In the *Layer Group* group of the *Model* tab, click the **Add to Group** icon.

The **Add Layer To Group** dialog is displayed.

2. From the *Group Name* drop-down list, select the group to which layers will be added.
3. If needed, in the *Description* editbox, edit short description of the group.
4. If needed, tick the *Remove layers from other groups* checkbox. If it is selected, the selected layers will be excluded from all other groups.
5. Click **OK**.
6. In the survey view, select entities which belong to the required layers. An information string on the bottom panel displays the name of the last added layer.
7. When finished adding layers, press *ESC*.

The layers are added to the group.

## Add to Group - Design icon

The **Add to Group - Design** icon of the Layer Group group allows you to add layers to the pre-defined "Design" group by selecting entities in the survey view, which belong to required layers.

The "Design" group is created to simplify group managing in the project, and reserved for newly created entities in the working area.

To add layers to the "Design" group:

1. In the *Layer Group* group of the *Model* tab, click the **Add to Group - Design** icon.
2. In the survey view, select entities, which belong to the required layers. An information string on the bottom panel displays the name of the last added layer.
3. When finished adding layers, press *ESC*.

The layers are added to the "Design" group.

## Add to group - Existing icon

The **Add to Group - Existing** icon of the Layer Group group allows you to add layers to the pre-defined "Existing" group by selecting entities in the survey view, which belong to required layers.

The "Existing" group is created to simplify group managing in the project, and reserved for newly created entities in the working area.

To add layers to the "Existing" group:

1. In the *Layer Group* group of the *Model* tab, click the **Add to Group - Existing** icon.
2. In the survey view, select entities, which belong to the required layers. An information string on the bottom panel displays the name of the last added layer.
3. When finished adding layers, press *ESC*.

The layers are added to the "Existing" group.

## Add to Group - Misc icon

The **Add to Group - Misc** icon of the Layer Group group allows you to add layers to the pre-defined "Misc" group by selecting entities in the survey view, which belong to required layers.



The "Misc" group is created to simplify group managing in the project, and reserved for newly created entities in the working area.

To add layers to the "Misc" group:

1. In the *Layer Group* group of the *Model* tab, click the **Add to Group - Misc** icon.
2. In the survey view, select entities, which belong to the required layers. An information string on the bottom panel displays the name of the last added layer.
3. When finished adding layers, press *ESC*.

The layers are added to the "Misc" group.

## Assign Layer to Group icon

The **Assign Layer to Group** icon of the Layer Group group allows you to assign layers to layer groups.

To assign layer to a group:

1. In the *Layer Group* group of the *Model* tab, click the **Assign Layer to Group** icon.

The control panel is displayed at the left part of the screen.

2. Select the required layers.

### NOTE

You may quickly add layers to pre-configured groups — "Design", "Existing" or "Misc", by clicking the appropriate button.

3. Click **Layer group**.

The *Layer group* dialog is displayed.

4. From the *Layer group* drop-down list, select the required group.
5. Click **OK**.

The layers are added to the group.

### Buttons of the panel

| Button                 | Description  |
|------------------------|--|
| <b>Select All</b>      | Click it to select all layers in the list.                                 |
| <b>On</b>              | Click it to turn selected layers on.                                       |
| <b>Off</b>             | Click it to turn selected layers off.                                      |
| <b>Layer Group</b>     | Click it to assign selected layers to a group.                             |
| <b>Add to Design</b>   | Click it to assign selected layers to the pre-configured group "Design".   |
| <b>Add to Existing</b> | Click it to assign selected layers to the pre-configured group "Existing". |
| <b>Add to Misc</b>     | Click it to assign selected layers to the pre-configured group "Misc".     |
| <b>Close</b>           | Click it to close the control panel.                                       |

## Color Settings icon

The **Color Settings** icon of the Layer Group group allows you to assign colors to entities which belong to a pre-configured layer groups — Design, Existing and Miscellaneous.

To assign colors:

1. In the *Layer Group* group of the *Model* tab, click the **Color Settings** icon.  
The *Surface Settings* dialog is displayed.
2. Specify the required colors, by using the appropriate drop-down list for each layer group.
3. Click **OK**.

## Display/Hide Group icon

The **Display/Hide Group** icon of the *Layer Group* group allows you to turn on/off layers, which belongs to the specific groups.

To turn on/off a group:

1. In the **Layer Group** group of the *Model* tab, click the **Display/Hide Group** icon.  
The *Layer Group Selection* dialog is displayed.
2. Select layers to be turned on/off.
3. Do one of the following:
  - Tick the *Activate all layers in the selected groups* checkbox to turn on layers from the selected group.
  - Untick the *Activate all layers in the selected groups* checkbox to turn off layers from the selected group.
4. Tick the *Other Layers* checkbox to change visibility of layers, which don't belong to the selected groups. If this checkbox is unticked, the visibility of other layers will not change. If ticked, do one of the following:
  - Select the *Off* radiobutton to turn off other layers.
  - Select the *On* radiobutton to turn on other layers.
5. Click **OK**.

### NOTE

If the current layer is among layers to be turned off, the message window will warn about it after clicking **OK** and the **\$\$DEFAULT** layer will be set as the current.

### Fields of the *Layer Group Selection* dialog

| Field   | Description   |
|---|---|
| <i>Activate all layers in the selected groups</i> | Tick it to turn on all layers from the selected group.  |
| <i>Other Layers</i>                               | Tick it to define whether to change visibility of layers, which don't belong to the selected groups or not. If ticked, select <i>On</i> or <i>Off</i> radiobutton below to turn on or turn off layers respectively. |

### Buttons of the *Layer Group Selection* dialog

| Button                  | Description   |
|-------------------------|---|
| <b>OK</b>               | Click it to apply changes and close the dialog.                             |
| <b>Cancel</b>           | Click it to close the dialog without saving changes.                        |
| <b>Invert Selection</b> | Click it to deselect currently selected groups and select the other groups. |


| Button     | Description                             |
|------------|---|
| Select All | Click it to select all existing groups. |

## Group Settings icon

The **Group Settings** icon of the Layer Group group allows you to configure sets of layers.

The *Layer Group Settings* dialog appears after clicking the icon. Buttons and fields of the dialog are described in the table below. The main field displays the list of the layers of the currently selected group with their On/Off flags.

### Fields of the *Layer Group Settings* dialog

| Field       | Description  |
|-------------|--|
| Group Name  | Contains the name of the currently selected layer group. The drop-down list of all available group may be seen by clicking  . |
| Description | Contains the short description of the selected group.  |

### Buttons of the *Layer Group Settings* dialog

| Button           | Description   |
|------------------|---|
| Add Layer        | Click it to add an existing layer to the currently selected group. The <i>Layer List</i> dialog appears after clicking. Select layers to be added to the group and Click <b>OK</b> . You may also type the name of the new layer in the <i>New Layer</i> editbox. The new layer will be created and added to the group after clicking <b>OK</b> . |
| Remove Layer     | Click it to remove the selected layers from the group.  |
| Invert Selection | Click it to invert the selection of the layers in the dialog.   |
| Select All       | Click it to select all layers in the dialog.  |
| Invert On/Off    | Click it to turn on inactive layer and turn off active ones.  |
| On               | Click it to activate a selected layer in the group. Note that this property is internal for the group, and does not affect to the global layer activity settings.   |
| Off              | Click it to deactivate a selected layer in the group. Note that this property is internal for the group, and does not affect to the global layer activity settings.   |
| New              | Click it to create a new group.   |
| Reset            | Click it to discard all resent unsaved changes.   |
| Rename           | Click it to rename the currently selected group.  |
| Delete           | Click it to delete the currently selected group.  |
| Copy From Lib    | Click it to load previously saved group settings from the MAGNET Office library.  |
| Save to Lib      | Click it to save current group settings to the MAGNET Office library.   |
| OK               | Click it to save changes and close the dialog.  |
| Cancel           | Click it to close the dialog without saving changes.  |

## Display Group - Design icon

The **Display Group - Design** icon of the Layer Group group allows you to turn on all layers, which belong to the "Design" group. Visibility of other layers will not change.

### NOTE

If the "Design" group does not contain any layer, this icon is inactive.

## Display Group - Existing icon

The **Display Group - Existing** icon of the Layer Group group allows you to turn on all layers, which belong to the "Existing" group. Visibility of other layers will not change.

### NOTE

If the "Existing" group does not contain any layer, this icon is inactive.

## Display Group - Misc icon

The **Display Group - Misc** icon of the Layer Group group allows you to turn on all layers, which belong to the "Misc" group. Visibility of other layers will not change.

### NOTE

If the "Misc" group does not contain any layer, this icon is inactive.

## Hide Group - Design icon

The **Hide Group - Design** icon of the Layer Group group allows you to turn off all layers, which belong to the "Design" group. Visibility of other layers will not change.

### NOTE

If the "Design" group does not contain any layer, this icon is inactive.

## Hide Group - Existing icon

The **Hide Group - Existing** icon of the Layer Group group allows you to turn off all layers, which belong to the "Existing" group. Visibility of other layers will not change.

### NOTE

If the "Existing" group does not contain any layer, this icon is inactive.

## Hide Group - Misc icon

The **Hide Group - Misc** icon of the Layer Group group allows you to turn off all layers, which belong to the "Misc" group. Visibility of other layers will not change.

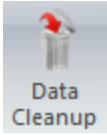

### NOTE

If the "Misc" group does not contain any layer, this icon is inactive.



## Cleanup group

The *Cleanup* group from the *Model* tab of the MAGNET Office ribbon allows you to remove unused and duplicated data. It contains two icons, described in the table below.

|   |   |
|---|---|
|  <p>Data Cleanup</p>     | <p>Data Cleanup icon<br/>Click it to remove unused, unrequired and duplicated data.</p>                                     |
|  <p>Point by Elev TX</p> | <p>Point by Elev TX<br/>Click it to convert crossing lines into symbols and set points elevations from the text labels.</p> |

### Data Cleanup icon

The **Data Cleanup** icon of the Cleanup group allows you to remove unused, unrequired and duplicated data, and reduce the size of the project database.

To clean up the project:

1. In the *Cleanup* group of the *Model* tab, click the **Data Cleanup** icon.

The *Data Cleanup* dialog is displayed.

2. In the *Select From* group box, specify which data will be used – either all existing or only currently selected – by selecting the appropriate radiobutton.
3. Configure the cleanup by ticking the required checkboxes.
4. Click **OK**.

The message prompts you to view the report.

5. Click **Yes** or **No** as you need.

### Point by Elev TX

The **Point by Elev TX** of the Cleanup group allows you to convert crossing lines into symbols and set points elevations from the text labels.

This feature is useful for imported jobs with cross point marks, which was imported as two crossing lines.

To convert lines and set points elevations:

1. In the *Cleanup* group of the *Model* tab, click the **Point by Elev TX** icon.

The *Create Points by Elevation Text* dialog is displayed.

2. Define which actions will be performed – converting crossing lines to symbols, setting elevations by text labels or both, by ticking the appropriate checkboxes.
3. Click **OK**.
4. If needed, in the survey view select the sample crossing lines.
5. If needed, in the survey view select the sample elevation text.

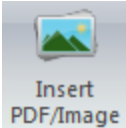
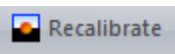
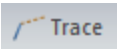
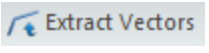
If there are some points with unassigned elevations left, the message window prompts to manually assign elevations to them.

6. Do one of the following:

- Click **No** to keep these points without elevations.
- Click **Yes** to manually pick elevations for them. The un-elevated points are highlighted. Do the following:
  1. In the survey view, select the point to which elevation will be assigned.
  2. In the survey view, select the corresponding text label.
  3. Repeat for all un-elevated points.
  4. When finished, press Esc.

## Raster/Vector group

The *Raster/Vector* group from the *Model* tab of the MAGNET Office ribbon allows you to work with the additional pictures in the project. It contains four icons, described in the table below.

|   |  |
|---|--|
|  <p>Insert PDF/Image</p> | <p>Insert PDF/Image icon<br/>Click it to add an image to the project.</p>                      |
|  <p>Recalibrate</p>      | <p>Recalibrate icon<br/>Click it to edit an existing image.</p>                                |
|  <p>Trace</p>            | <p>Trace icon<br/>Click it to trace data from an existing background image.</p>                |
|  <p>Extract Vectors</p>  | <p>Extract Vectors icon<br/>Click it to extract vectors from an existing background image.</p> |

### Insert PDF/Image icon

The **Insert PDF/Image** icon of the Raster/Vector group allows you to add the background images to the survey view.

A background image is a picture, which is placed behind all entities in the project. Its aim is to help the user in the design of the project – to simplify the creation of the existing objects and understanding of how new object will interact with them. It may be satellite photo of the area, its map, etc. A background image may be calibrated, which means that the area of the image will be matched to the entities in the survey view.

To add a background image to the survey view:

1. In the *Raster/Vector* group of the *Model* tab, click the **Insert PDF/Image** icon.  
The *Open* dialog is displayed.
2. Select the required file and click **OK**.  
The *Insert PDF/Raster Image* dialog is displayed. Fields are described in the table below.
3. In the *Background image name* editbox, type the name of the background image.
4. From the *Transparency* drop-down list, select the required transparency of the background picture. 100% is fully transparent (i.e. invisible) picture, 0% is fully opaque picture.
5. In the *Position/Scale Image* group box, select the required option for image positioning:
  - From geo-reference file – select it to load the positioning data from the georeference ESRI World File.
  - By plotting scale – select it to define the position of the background by defining the scale between the actual picture size and its size in the survey view and rotation of the image. See "Positioning by plotting scale" section on the facing page for details.
  - By Matching Points – select it to define the position of the background image by matching the point entities in the survey view with the points at the image. See "Positioning by matching points" section on the facing page for details.
  - Position by image – select it to define the position of the background image by picking the line on the image and defining its length and bearing. See "Positioning by known line" section on the facing page for details.



6. Click **OK**.

The background image is added.

### Positioning by plotting scale

When position a background image by known line, you need to specify the scale between the actual picture size and its size in the survey view and rotation of the image

If you have selected the *By plotting scale* option in the **Insert PDF/Raster Image** dialog, do the following:

1. In the *Scale* editbox, specify the scale of the background image.
2. In the *North Orientation* editbox, specify the rotation of the background image.

*TIP*

*Rotation is defined around the anchor point, the positive direction is counterclockwise.*

3. Click **OK**.

The background image is added.

### Positioning by matching points

If you have selected the *By Matching Points* option in the **Insert PDF/Raster Image** dialog, do the following:

1. Pick the matching point entity. Do one of the following:
  - Click the required point in the survey view.
  - Type the required point number in the *Number* editbox at the bottom toolbar, and press *Enter*.
2. Click the corresponding point on the image.
3. Repeat steps 1 and 2 for all required points.
4. When finished, do the right click, and select **Accept the image** in the context menu.

The background image is added.

### Positioning by known line

When position a background image by known line, you need to pick the known line and define its length and bearing.

If you have selected the "Position by image" option in the "Insert Background Image" dialog, do the following:

1. In the *Scale and Rotation* group box, click **Pick >>**.
2. Pick the known line on the picture.
3. In the *Actual Distance* editbox, specify the length of the known line.
4. Define the bearing of the known line. Do one of the following:
  - In the *Rotation* editbox, specify the bearing of the known line.
  - In the *North Orientation* editbox, specify the rotation of the background image.

*TIP*

*Rotation is defined around the anchor point, the positive direction is counterclockwise.*

5. Click **OK**.

The background image is added.

## Recalibrate icon

The **Recalibrate** icon of the Raster/Vector group allows you to manage background images in the project.

The **Background Images** dialog appears after clicking. For more information refer to "Background Images dialog" section on page 620.

### NOTE

This icon has the same functionality as the B/G Images icon of the Features group at the View tab.

## Trace icon

The **Trace** icon of the Raster/Vector group allows you to extract polylines from an attached picture, which contains dashed lines.

To extract polylines:

1. In the Raster/Vector group of the Model tab, click the Trace icon.  
The **Trace** dialog is displayed.
2. Configure the parameters as you need and click **OK**.
3. At the required picture, click on the segment of the target dashed line.
4. At the required picture, click the adjacent segment of the target dashed line.

The polyline segment is traced.

5. If needed, press + or - to change the elevation of the line.
6. Do one of the following:
  - If needed, to continue, repeat steps from 4 to 6.
  - Press *Enter* to save the traced polyline.
  - Press *Backspace* to undo tracing.
  - Press *Esc* to abort tracing.

The message window prompts you to save the traced line.

2. Click **Yes** or **No** as you need.
7. When finished, press *Esc*.

## Extract Vectors icon

The **Extract Vectors** icon of the Raster/Vector group allows you to create polylines, based on the vectors of the background image.

To extract vectors:

1. In the *Raster/Vector* group of the *Model* tab, click the **Extract Vector** icon.  
The **Extract Vectors** dialog is displayed.
2. From the *Background Image* drop-down list, select the required background image.  
The quantity of vectors in the selected image is displayed in the *Number of Vectors* field.
3. Select one of the following radiobuttons:
  - *All vectors* — to extract all possible vectors from the image.
  - *Window selection* — to extract vectors only from the selected area.

4. From the *To Layer* drop-down list, select the layer to which the extracted vectors will be added.

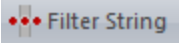
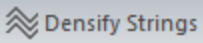
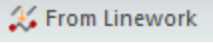
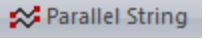
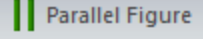
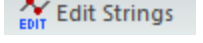
*TIP*

*Tick the *Layers by Color* checkbox to automatically define layers by the colors of the original image.*

5. Click **OK**.
6. If you have selected the *Window selection* option in step 3, draw an area for vector exacting and press *Enter*.
7. If needed, repeat previous step.
8. When finished, press *Esc*.

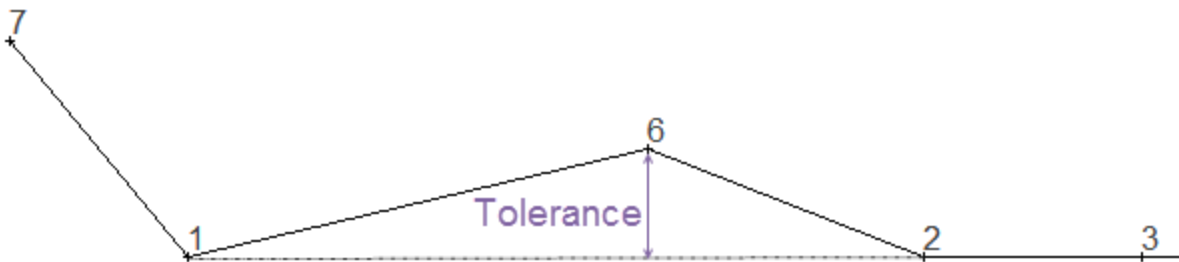
## Strings group

The *Strings* group from the *Model* tab of the MAGNET Office ribbon allows you to edit existing strings. It contains six icons, described in the table below.

|   |   |
|---|---|
|  | <p>Filter Points icon<br/>Click it to reduce the number of points at a string.</p>                |
|  | <p>Densify Strings icon<br/>Click it to make strings denser.</p>                                  |
|  | <p>From Linework icon<br/>Click it to create strings from existing lines and arcs.</p>            |
|  | <p>Parallel String icon<br/>Click it to add a new string as a parallel to an existing one.</p>    |
|  | <p>Parallel Figure icon<br/>Click it to create a new figure as a parallel to an existing one.</p> |
|  | <p>Edit Strings icon<br/>Click it to edit an existing string.</p>                                 |

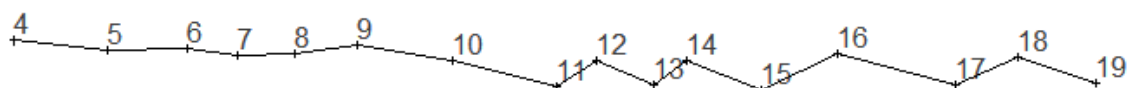
### Filter Points icon

The **Filter Points** icon of the Strings group allows you to reduce the quantity of points on an existing string. This option removes points from strings within the specified tolerance. See pictures below for details.

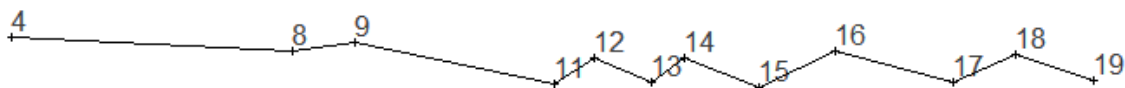


### Tolerance

## Before

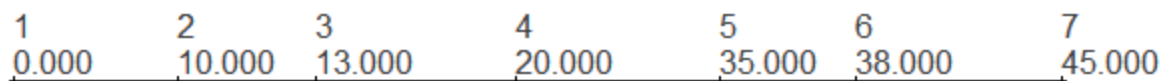


## After



### Horizontal reducing

## Before



## After



### Vertical reducing

To filter points of an existing string:

1. In the *Strings* group of the *Model* tab, click the **Filter Points** icon.  
The **Filter Tolerance** dialog is displayed. Fields are described in the table below.
2. In the **Filter Tolerance** dialog, make the required configurations and click **OK**.
3. In the survey view, select the required string.

#### NOTE

If a string was selected, when clicking the icon, it will be used as the source string.

Points, matching the specified tolerance, are removed from the string.

4. If needed, select more strings.
5. When finished, press *Esc*.

### Fields of the **Filter Tolerance** dialog

| Field                       | Description   |
|-----------------------------|---|
| <i>Horizontal tolerance</i> | Defines the horizontal tolerance for point filtering. |

| Field                     | Description  |
|---------------------------|--|
| <i>Vertical tolerance</i> | <p>Defines the vertical tolerance for point filtering. To activate the vertical tolerance, tick the appropriate checkbox.</p> <p>NOTE</p> <p>When vertical filtering is not applied, points within the specified horizontal tolerance will be filtered regardless of the elevation. When vertical filtering is applied, only points which matching both the horizontal and vertical tolerances will be filtered.</p> |
| <b>Filtered points</b>    |  |
| <i>Retain</i>             | When selected, filtered points will be removed from the string, but not deleted from the survey view. Tick the <i>Set non-Use in Surface</i> checkbox, to block usage the point for DTM creation.  |
| <i>Delete</i>             | When selected, filtered points will be deleted from the line and the survey view.  |

## Densify Strings icon

The **Densify Strings** icon of the Strings group allows you to increase the quantity of points on an existing string.

To add more points to a string:

1. In the survey view, select the required string.

### NOTE

If no string was selected, when clicking the icon, all existing strings will be used.

2. In the *Strings* group of the *Model* tab, click the **Densify Strings** icon.  
The **Densify Strings** dialog is displayed. Fields are described in the table below.
3. In the **Densify Strings** dialog, specify the spacing for the new points in the appropriate editboxes.
4. If needed, configure more parameters.
5. Click **OK**.
6. The new points are created on the string.

### Fields of the *Densify Strings* dialog

| Field                               | Description  |
|-------------------------------------|--|
| <i>Spacing on Straight Segments</i> | Defines the spacing for the new points at the straight segments of the string.                   |
| <i>Spacing on Curved Segments</i>   | Defines the spacing for the new points at the curved (created from arcs) segments of the string. |
| <i>Interpolate Elevations</i>       | When ticked, elevations of the newly created points will be interpolated from existing values.   |
| <i>Use in Surface</i>               | When ticked, the newly created points may be used for DTM creation.                              |

## From Linework icon

The **From Linework** icon of the Strings group allows you to convert existing lines and arcs to strings.

To perform the conversion, click the icon. All existing lines and arcs will be converted to strings. Entities, which have common points, will be converted to a single string.

## Parallel String icon

The **Parallel String** icon of the Strings group allows you to add a new string to the survey view, based on an existing string.

To create a parallel string:

1. In the *Strings* group of the *Model* tab, click the **Parallel String** icon.
2. In the survey view, select the required source string.

The **Parallel String** dialog is displayed. Fields are described in the table below.

3. In the *Offset* editbox, specify the required offset from the original entity.
4. Define the required height option for the parallel string.
5. Click **OK**.
6. In the survey view, select from which side of the existing string the new one will be placed.

The new string is created and the **Edit String** dialog is displayed.

7. Review the parameters of the newly created string, and click **OK** to accept it. For more information about the string parameters refer to "String properties" section on page 555.
8. Do one of the following:
  - Press *Enter* to add more strings with the same parameters.
  - Press *Ecs* to finish the parallel string creation.

### Fields of the **Parallel String** dialog

| Field                   | Description  |
|-------------------------|--|
| <i>Offset</i>           | Defines the offset of the new parallel string from the original one.   |
| <i>Constant Height</i>  | Select this radiobutton to create the new string with the same elevation for all nodes. If selected, specify the height of the new string in the appropriate editbox.  |
| <i>Fixed CrossFall</i>  | Select this radiobutton to create the new string with the nodes elevations defined by the fixed slope in percent from the original string nodes elevations. If selected, specify the slope percentage of the new string in the appropriate editbox. Positive slope means that the new string will be higher than the original one. Negative slope means that the new string will be lower than the original one. |
| <i>Fixed Difference</i> | Select this radiobutton to create the new string with the node elevation, defined by the fixed difference from the original string nodes elevations. If selected, specify the required difference in the appropriate editbox. It will be subtracted or added to the original string nodes elevations.  |

| Field            | Description  |
|------------------|--|
| <i>Ratio</i>     | Select this radiobutton to create the new string with the nodes elevations defined by the fixed slope, defined as ratio, from the original string nodes elevations. If selected, specify the slope ratio of the new string in the appropriate editbox. Note that you are defining the denominator of the ratio. Positive slope means that the new string will be higher than the original one. Negative slope means that the new string will be lower than the original one. |
| <i>No Height</i> | Select this radiobutton to create the new string without elevetaion.   |

## Parallel Figure icon

The **Parallel Figure** icon of the Strings group allows you to add two new strings to the survey view as the parallel to an existing line, arc, string or alignment.

To create a parallel figure:

1. In the *Strings* group of the *Model* tab, click the **Parallel Figure** icon.
2. In the survey view, select the required source string.

The **Parallel Figure** dialog is displayed. Fields are described in the table below.

3. Do one of the following:
  - In the *Road Template* group box, tick the checkbox and select the required road template from the drop-down list.
  - In the *Offset Strings* group box, configure the offsets of the new strings from the original string and the height of the new string.
4. Click **OK**.

The new string is created and the **Edit String** dialog is displayed.

5. Review the parameters of the newly created string, and click **OK** to accept it. For more information about the string parameters refer to "String properties" section on page 555. Repeat for the second string.

The parallel strings are created.

### Fields of the *Parallel String* dialog

| Field                  | Description  |
|------------------------|--|
| <i>Template</i>        | Defines the road template for the parallel strings. Click <b>Edit Templates</b> to edit the currently selected template. See "Templates icon" section on page 702 for details. |
| <i>Left Offset</i>     | Defines the offset of the new parallel string, located to the left from the original one.  |
| <i>Right Offset</i>    | Defines the offset of the new parallel string, located to the right from the original one.   |
| <i>Constant Height</i> | Select this radiobutton to create the new string with the same elevation for all nodes. If selected, specify the height of the new string in the appropriate editbox.          |



| Field                   | Description   |
|-------------------------|---|
| <i>Fixed CrossFall</i>  | Select this radiobutton to create the new string with the nodes elevations defined by the fixed slope in percents from the original string nodes elevations. If selected, specify the slope percentage of the new string in the appropriate editbox. Positive slope means that the new string will be higher than the original one. Negative slope means that the new string will be lower than the original one. |
| <i>Fixed Difference</i> | Select this radiobutton to create the new string with the node elevation, defined by the fixed difference from the original string nodes elevations. If selected, specify the required difference in the appropriate editbox. It will be subtracted or added to the original string nodes elevations.   |
| <i>No Height</i>        | Select this radiobutton to create the new string without elevation.   |

## Edit Strings icon

The **Edit String** icon of the Strings group allows you to edit an existing string.

To edit a string:

1. In the *Strings* group of the *Model* tab, click the **Edit String** icon.
2. In the survey view, select the required string.

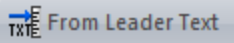
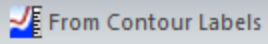
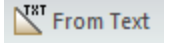
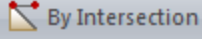
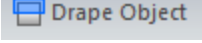
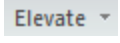




The **String Editor** panel is displayed at the left side of the MAGNET Office window.

3. At the **String Editor** panel, make the required configurations. For more information, refer to "String Editor" section on page 513.
4. When finished, click **Close**.

The string is edited.

## Elevate group

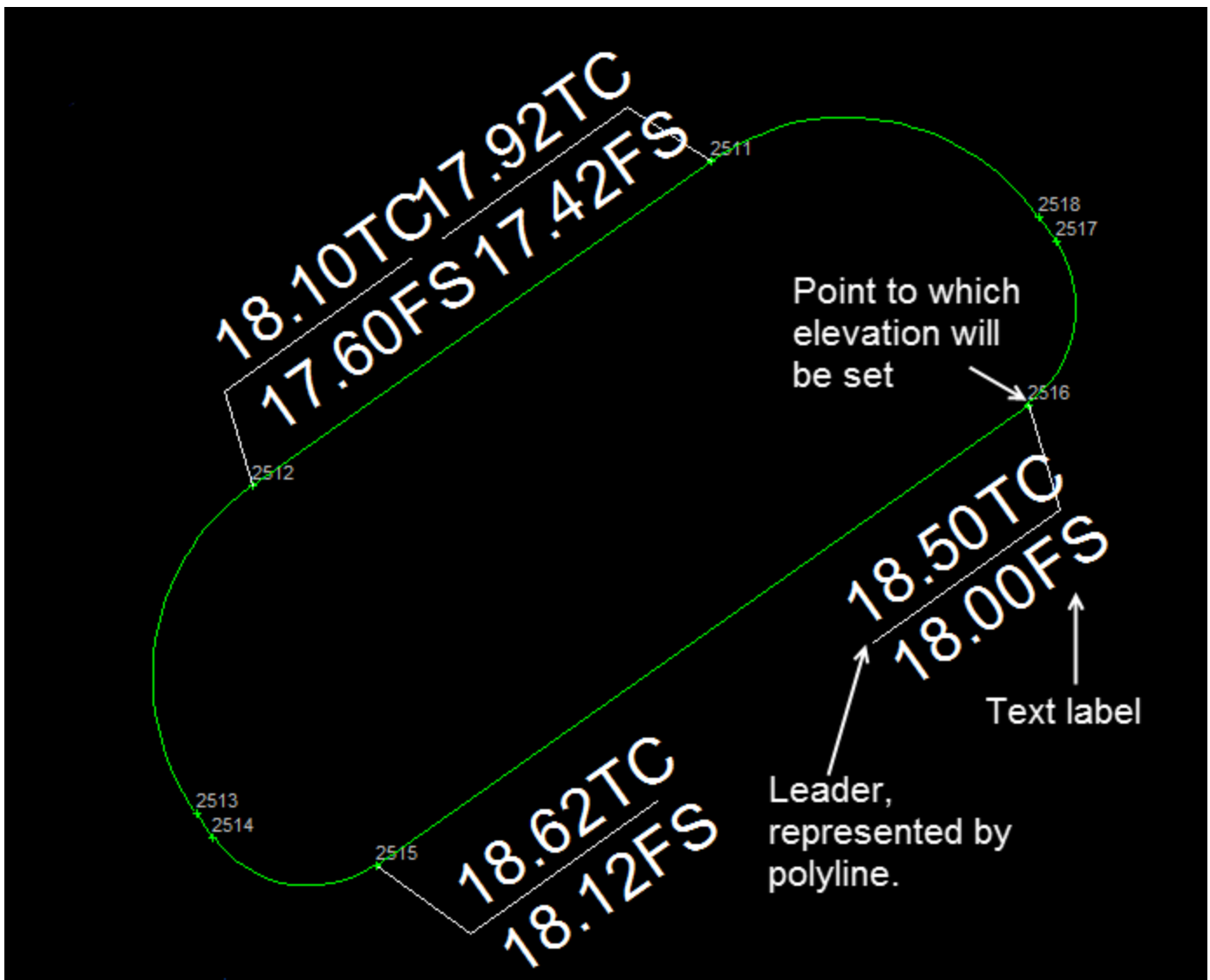
The *Elevate* group from the *Model* tab of the MAGNET Office ribbon allows you to work with the objects elevation. It contains six icons and four second level icons, described in the table below.

|   |  |
|---|--|
|  From Leader Text                | From Leader Text icon<br>Click it to set elevations from leader text.  |
|  From Contour Labels             | From Contour Labels icon<br>Click it to set contour strings elevations from contour labels.  |
|  From Text                       | From Text icon<br>Click it to set elevation from a numerical text.   |
|  By Intersection                 | By Intersection icon<br>Click it to set elevation by intersection from other entities.   |
|  Drape Object                    | Drape Object icon<br>Click it to set elevation by draping object on surface.   |
|  Elevate ▾                       | Elevate icon<br>This icon contains the list of the second level icons for various operations with elevation. Click ▾ to expand the list of the second level icons. |
|  Set Elevation by Increment      | Set Elevation by Increment icon<br>Click it to set elevation by specifying a base elevation and its increment.   |
|  Set Start and End Elevation   | Set Start and End Elevation icon<br>Click it to set start and end elevation for a string or a polyline.  |
|  Set String Point Elevation    | Set String Point Elevation icon<br>Click it to set one elevation for all string points.  |
|  Interpolate Elev along String | Interpolate Elev along String icon<br>Click it set string points elevations by interpolating elevation between two points with valid elevations.                   |

### From Leader Text icon

The **From Leader Text** icon of the Elevate group allows you to set the elevation for points, labeled with the leader text with the value, taken from the label.

This feature is useful for imported drawing, which does not have elevation, but elevation written in text labels, with leaders pointing to the point. Leader may be represented by a polyline or a string. See picture below for details.



### Elevation from leader text

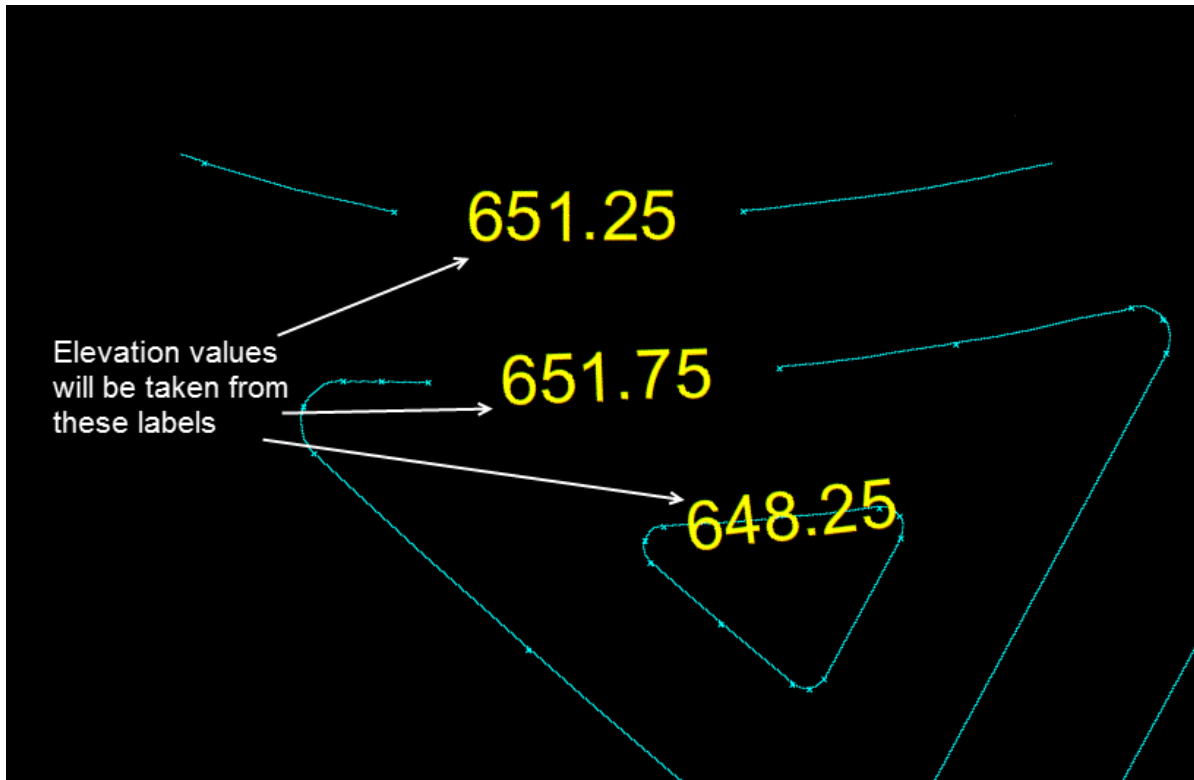
To set the elevation from leader text:

1. In the *Elevate* group of the *Model* tab, click the **From Leader Text** icon.
2. In the survey view, select the required text label.
3. In the survey view, select the required leader.

The elevation is set.

### From Contour Labels icon

Click **From Contour Labels** icon of the *Elevate* group to set elevation along the string points based on the text in between the strings. See picture below for details.



## From Text icon

The **From Text** icon of the Elevate group allows you to set elevation of the target entities from an existing numeric text.

### NOTE

If the reference text contains any alpha characters, they will be ignored. For example, text "100G" will be read as "100".

For line, the same elevation, based on the defined text, will be assigned to both start and end points of the line.

For line/arc, the same elevation, based on the defined text, will be assigned to start, end and center points of the arc.

For string, the same elevation, based on the defined text, will be assigned to all string nodes.

For polyline, the elevation, based on the defined text, will be assigned to the polyline.

To calculate elevation from text:

1. In the *Elevate* group of the *Model* tab, click the **From Text** icon.
2. If needed, define the base elevation. To do so:
  1. Right click in the survey view.
  2. In the context menu, click the Set a Base Elevation item.  
The *SiteMaster* dialog is displayed.
  3. Specify the base elevation.
  4. Click **OK**.

3. In the survey view, select the required target entity.
4. In the survey view, select the required text.  
The elevation is assigned.
5. If needed, repeat steps 3 and 4.
6. When finished, press *Esc*.

## By Intersection icon

The **By Intersection** icon of the Elevate group allows you to set the elevation of the selected entities by using their intersections with entities with the defined elevation.

For line or arc the same elevation, based on the existing elevations of the reference entity, will be assigned to both start and end points of the line/arc.

For string, the new point will be created at the intersection, with the calculated elevation assigned. The rest of the string nodes remain unchanged.

For polyline, the new point will be created at the intersection, with the calculated elevation assigned. Points with zero elevation will be created at the rest of the polyline nodes.

To set elevations:

1. In the *Elevate* group of the *Model* tab, click the **By Intersection** icon.
2. In the survey view, select the target object, for which elevation will be set.  
The elevation is calculated. The new point with the calculated elevation is created at the target object.
3. If needed, select more entities.
4. When finished, press *Esc*.

## Drape Object icon

The **Drape Object** icon of the Elevate group allows you to interpolate heights from a defined reference DTM to an existing string or polyline.

To interpolate heights:

1. In the *Elevate* group of the *Model* tab, click the **Drape Object** icon.
2. In the survey view, select the required string/polyline.  
The **DTM and Layer Selection** dialog is displayed.
3. From the *DTM* drop-down list, select the required reference DTM.
4. From the *Layer* drop-down list, select the layer to which the new points will be placed.
5. Click **OK**.  
The heights are interpolated.
6. If needed, repeat steps from 2 to 5 to interpolate heights for more strings/polylines.
7. When finished, press *Esc*.

## Set Elevation by Increment icon

The **Set Elevation by Increment** icon of the Elevate group allows you to set the elevation of selected entities by specifying a base elevation and then an increment to change each object's elevation.

In this function you need to draw a line, which continuously cross required target entities. The base elevation will be assigned to the first intersected entity; elevation of each further entity will be changed to the increment value.

For line, the calculated elevation will be assigned to both start and end points of the line.

For line/arc, the calculated elevation will be assigned to start, end and center points of the arc.

For string, the calculated elevation will be assigned to all string nodes.

For polyline, the calculated elevation will be assigned to the polyline.

### *TIP*

*The increment value may be negative.*

To set elevation by increment:

1. In the *Elevate* group of the *Model* tab, click the **Set Elevation by Increment** icon.
2. The input panel is displayed at the bottom toolbar.
3. Draw a line, which continuously cross required target entities. You may create nodes in one of the following ways:
  - Click the required place in the survey view.
  - Specify the number of the required points in the *Number* editbox of the bottom toolbar.
  - Specify the East and North coordinates of the required placed in the appropriate editboxes at the bottom toolbar.
4. When finished drawing line, press *Esc*.
5. The Assign Elevations dialog is displayed.
6. In the *Start Elevation* editbox, specify the base elevation. Note that it will be assigned to the first target entity.
7. In the *Increment* editbox, specify the increment value.
8. Click **OK**.

The elevations are assigned.

## Set Start and End Elevation icon

The **Set Start and End Elevation** icon of the Elevate group allows you to calculate the elevation of points along a polyline or string by specifying an elevation for the starting and ending point elevations. Polylines will be converted to strings after using this option.

To assign elevations:

1. In the *Elevate* group of the *Model* tab, click the **Set Start and End Elevation** icon.
2. In the survey view, select the required string or polyline.  
The *Assign Elevations* dialog is displayed.
3. Specify the start and end elevations in the appropriate editboxes.
4. Click **OK**.

5. If needed, repeat steps from 2 to 4.
6. When finished, press *Esc*.

## Set String Point Elevation icon

The **Set String Point Elevation** icon of the Elevate group allows you to set the same elevations to all points of the defined string.

To set elevations to string points:

1. In the *Elevate* group of the *Model* tab, click the **Set String Point Elevation** icon.
2. In the survey view, select the required string.

The **String Point Height** dialog is displayed.

3. In the *Point Height* editbox, specify the required elevation.
4. If needed, tick the *Use in Surface* checkbox, to allow usage of all the string points in DTM creation.
5. If needed, tick the *Active Layer Only* checkbox, to assign elevation only to points, which belong to currently active layers.
6. Click **OK**.

The elevations are assigned.

7. In needed, repeat steps from 2 to 6.
8. When finished, press *Esc*.

## Interpolate Elev along String icon

The **Interpolate Elev along String** icon of the Elevate group allows you to automatically calculate elevation for string nodes, which are located between two nodes with valid non-zero elevation.

To calculate elevation of string nodes:

1. In the *Elevate* group of the *Model* tab, click the **Interpolate Elev along String** icon.
2. In the survey view, select the required string.


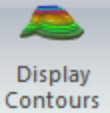
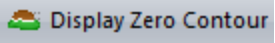
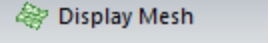
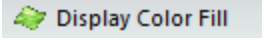
The **Interpolate Elevation for String** dialog is displayed.

3. Tick the required checkboxes and click **OK**.

The elevations are calculated.

## DTM group

The *DTM* group from the *Model* tab of the MAGNET Office ribbon allows you to create and view digital terrain models (surface models). It contains three icons, described in the table below.

|   |  |
|---|--|
|  <p>Create DTM</p>           | <p>Create DTM icon<br/>Click it to create a new surface model.</p>   |
|  <p>Display Contours</p>     | <p>Display Contours icon<br/>Click it to turn on/off displaying of the DTM contours.</p>                                   |
|  <p>Display Zero Contour</p> | <p>Display Zero Contour icon<br/>Click it to turn on/off displaying of the contour at the current DTM zero elevations.</p> |
|  <p>Display Mesh</p>         | <p>Display Mesh icon<br/>Click it to turn on/off displaying of the DTM meshes.</p>   |
|  <p>Display Color Fill</p>   | <p>Display Color Fill icon<br/>Click it to turn on/off displaying of the DTM filling.</p>                                  |

### Create DTM icon

The **Create DTM** icon of the DTM group allows you to create a new digital terrain model, by using existing entities from the survey view.

You may create a DTM in two following ways:

- Create a DTM from any existing entities in the survey view.
- Trim a DTM to an existing boundary.

#### NOTE

Only Use in Surface points and entities based on them may be included to a DTM.

To create a DTM from any existing entities:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Create DTM** icon.

The **Create DTM - Selection** dialog is displayed.

2. In the Selection group box, select one of the following options:
  - *All* — to include all existing entities to a DTM.
  - *Active* — to include entities from the currently active layers.
  - *Current Selection* — to include the currently selected entities.
  - *Layer Group* — to include entities, which belongs to the layers of the defined group. Select the required group from the drop-down list.

3. Click **OK**.

The **Create DTM** dialog is displayed.

4. Make the required configurations. See "Create DTM dialog" section on the facing page for details.
5. Click **OK**.

The DTM is created.



To trim a DTM to an existing boundary:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Create DTM** icon.  
The **Create DTM - Selection** dialog is displayed.
2. In the *Boundary* group box, tick the *Trim DTM to Boundary* checkbox.
3. Select the appropriate option in the *Delete Triangle* group box.
4. If needed, tick the *Approximate arc* checkbox, and specify the arc to chord distance for curved breaklines in the *Arc-to-chord distance* editbox.
5. In the *Boundary Name* list, select the required boundary. Do one of the following:
  - Click the boundary name in the list.
  - Click **Pick Boundary** and select the boundary in the survey view.
  - Click **New Boundary** and create a new boundary in the survey view.
6. Click **OK**.  
The **Create DTM** dialog is displayed.
7. Make the required configurations. See "Create DTM dialog" section below for details.
8. Click **OK**.  
The DTM is created.

## Create DTM dialog

The **Create DTM** dialog allows you to configure the creation of a new DTM. It appears during the creation of a new DTM. For more information about creating DTMs, refer to "Create DTM icon" section on the previous page.

To configure the DTM, set up the required properties at each tab of the dialog. Fields are described in the tables below.

You may use the contour settings library to load the pre-configured contour settings.

To load contour library settings:

1. At the *Contour* tab of the **Create DTM** dialog, click **Load Library Settings**.  
The selection dialog is displayed.
2. Select the required library settings, and click **OK**.

To save current contour settings to the library:

1. At the *Contour* tab of the **Create DTM** dialog, click **Save Library Settings**.  
The selection dialog is displayed.
2. Select existing library settings from the drop-down list, or type the name of a new library.
3. Click **OK**.

### Fields of the *General* tab of the **Create DTM** dialog

| Field             | Description  |
|-------------------|--|
| <i>Name</i>       | Defines the name of the DTM.                                   |
| <i>Num Points</i> | Displays the quantity of the Use in Surface points in the DTM. |
| <i>Highest</i>    | Displays the highest elevation in the DTM.                     |
| <i>Lowest</i>     | Displays the lowest elevation in the DTM.                      |

| <b>Field</b>                         | <b>Description</b>   |
|--------------------------------------|--|
| <i>Ave. Elev</i>                     | Displays the average elevation in the DTM.   |
| <i>Plan Area</i>                     | Displays the horizontal area of the DTM.   |
| <i>Surface Area</i>                  | Displays the full surface area, including slopes.  |
| <i>Description</i>                   | Defines short DTM description.   |
| <b>Display</b>                       |  |
| <i>Mesh</i>                          | When ticked, the created triangular mesh will be displayed in the survey view. Select the required color form the drop-down list.  |
| <i>Contour</i>                       | When ticked, the contours will be displayed in the survey view.  |
| <i>Color Fill</i>                    | When ticked, the shadings and patterning will be colored. Click <b>Settings</b> to define the required colors. See "Color Fill Settings dialog" section on page 428 for details. |
| <i>Slope</i>                         | When ticked, the slopes will be colored. Click <b>Settings</b> to configure it. See "Slope dialog" section on the facing page for details.                                       |
| <b>Breaklines</b>                    |  |
| <i>Insert Breaklines</i>             | Tick to create additional triangles, so the triangle edges are formed along each breakline. If a breakline exists in the project, then this checkbox is automatically ticked.    |
| <i>Approximate curved breaklines</i> | Tick to create additional triangles, so the triangle edges are formed along chords of the curved breaklines.   |
| <i>Check Crossing Breaklines</i>     | Tick to insure the intersection is correct.  |
| <i>Arc-to-chord Distance</i>         | Defines the arc to chord distance for curved breaklines. The default is 0.200 m and is suitable for most models.   |

#### Fields of the **Contour** tab of the **Create DTM** dialog

| <b>Field</b>             | <b>Description</b>  |
|--------------------------|---|
| <b>Display</b>           |   |
| <i>Major</i>             | Defines the major contour interval. Set the line width and style, and tick the check box to display the major contours.                       |
| <i>Minor</i>             | Defines the minor contour interval. Set the line width and style, and tick the check box to display the major contours.                       |
| <i>Minimum Level</i>     | Defines the range of levels in which the contours are created. The range should be between the lowest and highest point elevation in the DTM. |
| <i>Maximum Level</i>     |   |
| <i>Major Start Level</i> | Defines the level where the first major contour is created.   |

| Field                            | Description   |
|----------------------------------|---|
| <i>Additional Major Contours</i> | Defines the levels where the extra contours will be created, in addition to the levels calculated by the MAGNET Office.   |
| <i>Additional Minor Contours</i> |   |
| <b>Color</b>                     |   |
| <i>Discrete Color</i>            | Defines the colors for the major and minor contour lines. Select the required colors from the appropriate drop-down lists.  |
| <i>Color Range</i>               | Defines the color range for contour lines displaying. Click <b>Define</b> to configure it. See "Color Range Settings dialog" section on the next page for details.        |
| <i>Low</i>                       | Defines the lowest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected.  |
| <i>High</i>                      | Defines the highest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected. |

#### Fields of the *Contour Label* tab of the *Create DTM* dialog

| Field                             | Description   |
|-----------------------------------|---|
| <i>Plot Major/Minor Labels</i>    | Plots major/minor labels on the contour.                  |
| <i>Remove Over-plotted Labels</i> | Removes overlapping contour labels.                       |
| <i>Plot Labels Along Contour</i>  | Places the labels along the contour.                      |
| <i>Plot End Labels</i>            | Plots labels at the end of the contour.                   |
| <i>Plot Labels Uphill</i>         | Places the labels at the uphill.                          |
| <i>Text Style</i>                 | Defines the text style for the labels.                    |
| <i>Justification Style</i>        | Defines the justification style for the labels.           |
| <i>Label Distance</i>             | Defines the spacing between the labels along the contour. |

#### Slope dialog

The **Slope** dialog allows you to analyze the slopes of the individual triangles. You can allocate different colors to the slope ranges with the option to set the shape of the arrows that display the slopes.

To configure the slope:

1. In the *Slope* group box, from the *General* tab of the *Create DTM* dialog, click **Settings**.  
The **Slope** dialog is displayed.
2. From the *Arrow Head* drop-down list, select the required arrow head shape.
3. From the *Arrow Angle* drop-down list, select the required angle of the arrow head, or specify custom value.
4. From the *Arrow Length* drop-down list, select the required length of the arrow, or specify custom value.

5. If needed, tick the *Drawing Units* checkbox, to plot the slope units.
6. In the table, specify consecutive steps for the slope range with an appropriate color for each slope
7. Click **OK**.

### Color Range Settings dialog

The **Color Range Settings** dialog allows you to configure gradual change in color for each minor contour interval from the highest to the lowest contour.

To configure the color range:

1. In the *Color* group box, from the *Contour* tab of the **Create DTM** dialog, click **Define**.

The **Color Range Settings** dialog is displayed.

2. In the *High Value* editbox, specify the highest value of the height range.
3. In the *Low Value* editbox, specify the lowest value of the height range.
4. In the *Interval* editbox, specify the interval of color changing.
5. Click **OK**.

### Color Fill Settings dialog

The **Color Fill Settings** dialog allows you to configure gradual change in color for filling boundaries from the highest to the lowest elevation.

To configure the color range:

1. In the *Color Fill* group box, from the *General* tab of the **DTM Settings** dialog, click **Settings**.

The **Fill Color** dialog is displayed.

2. In the *High Level* editbox, specify the highest value of the height range.
3. In the *Low Level* editbox, specify the lowest value of the height range.
4. In the *Datum Level* editbox, specify the level of the datum.
5. Select the required colors from the appropriate drop-down lists.
6. Click **OK**.

## Display Contours icon

Click the **Display Contours** icon of the DTM group to turn on/off displaying of the current DTM contours.

## Display Zero Contour icon

Click the **Display Zero Contour** icon of the DTM group to turn on/off displaying of the contour at the current DTM zero elevations.

## Display Mesh icon

Click the **Display Mesh** icon of the DTM group to turn on/off displaying of the current DTM mesh.

## Display Color Fill icon

Click the **Display Color Fill** icon of the DTM group to turn on/off displaying of the current DTM filling.

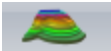




## Surface Tab

The *Surface* tab of the MAGNET Office ribbon contains control icons, which allows you to create and edit surfaces in your project. It is separated to seven groups:

- "DTM Settings group" section on the facing page
- "Compute Elevations group" section on page 433
- "Elevate by DTM group" section on page 435
- "Create/Edit DTM group" section on page 439
- "Edit Mesh group" section on page 456
- "Boundary group" section on page 463
- "Volume group" section on page 469

## DTM Settings group

The *DTM Settings* group from the *Surface* tab of the MAGNET Office ribbon allows you to edit existing digital terrain models. It contains three icons, described in the table below.

|  |  |
|--|--|
| <br>Display<br>Contours     | <p style="text-align: center;">Display Contours icon<br/>Click it to turn on/off displaying of the DTM contours.</p>                                   |
| <br>Display Zero<br>Contour | <p style="text-align: center;">Display Zero Contour icon<br/>Click it to turn on/off displaying of the contour at the current DTM zero elevations.</p> |
| <br>Display<br>Mesh         | <p style="text-align: center;">Display Mesh icon<br/>Click it to turn on/off displaying of the DTM meshes.</p>   |
| <br>Display<br>Color Fill   | <p style="text-align: center;">Display Color Fill icon<br/>Click it to turn on/off displaying of the DTM filling.</p>                                  |
| <br>DTM<br>Settings         | <p style="text-align: center;">DTM Settings icon<br/>Click it to edit an existing digital terrain model.</p>   |

### Display Contours icon

Click the **Display Contours** icon of the DTM Settings group to turn on/off displaying of the current DTM contours.

### Display Zero Contour icon

Click the **Display Zero Contour** icon of the DTM Settings group to turn on/off displaying of the contour at the current DTM zero elevations.

### Display Mesh icon

Click the **Display Mesh** icon of the DTM Settings group to turn on/off displaying of the current DTM mesh.

### Display Color Fill icon

Click the **Display Color Fill** icon of the DTM Settings group to turn on/off displaying of the current DTM filling.

### DTM Settings icon

The **DTM Settings** icon of the DTM Settings group allows you to manage DTMs in the current project.

To open the *DTM* dialog, click the icon. It displays the list of the layers in the project with their properties, described in the table below.

**Fields of the DTM dialog**

| <b>Field</b>       | <b>Description</b>  |
|--------------------|---|
| <i>Name</i>        | Displays the name of the DTM.                                   |
| <i>Mesh</i>        | Flags whether the displaying of the DTM mesh turned on/off.     |
| <i>Contours</i>    | Flags whether the displaying of the DTM contours turned on/off. |
| <i>Color Fill</i>  | Displays the filling color of the DTM.                          |
| <i>Color</i>       | Displays the mesh color of the DTM.                             |
| <i>Description</i> | Displays the description of the DTM.                            |
| <i>Num Pts</i>     | Displays the quantity of points in the DTM.                     |
| <i>Highest</i>     | Displays the elevation of the highest point of the DTM.         |
| <i>Lowest</i>      | Displays the elevation of the lowest point of the DTM.          |

The current DTM is marked with the asterisk.

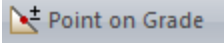
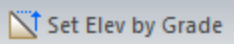
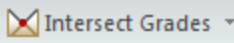

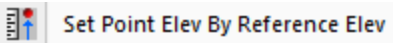
**Buttons of the DTM dialog**

| <b>Button</b>      | <b>Description</b>  |
|--------------------|---|
| <b>New</b>         | Click it to create a new DTM. For more information refer to "Create DTM icon" section on page 440.  |
| <b>Edit</b>        | Click it to edit the selected layers. For more information, refer to "DTM Settings dialog" section on page 626.   |
| <b>Delete</b>      | Click it to delete the selected DTM.  |
| <b>Set Current</b> | Click it to set the selected DTM as the current. The current DTM is marked with the asterisk. All new objects will be created at the current layer, unless other is configured. |
| <b>Rename</b>      | Click it to rename the selected DTM.  |
| <b>OK</b>          | Click it to save the changes and close the dialog.  |
| <b>Cancel</b>      | Click it to discard the changes and close the dialog.   |



## Compute Elevations group

The *Compute Elevation* group from the *Surface* tab of the MAGNET Office ribbon allows you to create points, which position is based on the existing points position and height and calculate elevations of entities, based on the reference elevations. It contains three icons and one second level icon, described in the table below.

|   |  |
|---|--|
|  | <p><b>Point on Grade icon</b><br/>Click it to create a new point on the grid line between two existing points at the required elevation.</p>   |
|  | <p><b>Set Elev by Grade icon</b><br/>Click it to set elevations on points by the grade of a nominated line.</p>  |
|  | <p><b>Intersect Grades icon</b><br/>Click it to create a new point between two existing points at a nominated elevation. This icon also contains the second level icon. Click  to see it.</p> |
|  | <p><b>Set Point Elev by Reference Elev icon</b><br/>Click it to set the point elevation by using slope from a reference point.</p>   |

### Point on Grade icon

The **Point on Grade** icon of the Compute Elevations group allows you to create a new point on the grade line between two existing points at a defined elevation.

#### NOTE

Both reference point must have defined elevation.

To create a point on grade:

1. In the *Elevate by DTM* group of the *Surface* tab, click the **Point on Grade** icon.
2. In the survey view, select the reference line, or two reference points.
3. In the *Height* editbox at the bottom toolbar, specify the height of the new point.

The new point is created.

### Set Elev by Grade icon

The **Set Elev by Grade** icon of Compute Elevations group allows you to set points elevations by the grade of a defined line that is used to define the slope. Select additional points to be shifted vertically onto this defined plane. The grade of the plane is defined by two existing points with elevations or an existing line joining points with elevations.

#### NOTE

The snap to the nearest point mode should be active for proper work of this function. See "Pt icon" section on page 132 for details.

To set point elevations by grade:

1. In the *Compute Elevations* group of the *Surface* tab, click the **Set Elev by Grade** icon.
2. In the survey view, select a line or two points to define a slope.

3. In the survey view, select points to set heights.
4. When finished, press *Ecs*.

## Intersect Grades icon

The **Intersect Grades** icon of the Compute Elevations group allows you to create a new point, based on the grade between two existing points. The new point will be located on the grade line, and its elevation will be calculated automatically.

To create a new point at the grade lines intersection:

1. In the *Compute Elevations* group of the *Surface* tab, click the **Intersect Grades** icon.
2. In the survey view, select the first reference point, or specify its number in the *Point Name* editbox at the bottom toolbar.
3. In the *Slope* editbox at the bottom toolbar, specify the slope of the grade line in percent.
4. In the survey view, select the second reference point, or specify its number in the *Point Name* editbox at the bottom toolbar.
5. In the *Slope* editbox at the bottom toolbar, specify the slope of the grade line in percent.
6. The point is created at the grade lines intersection.

## Set Point Elev by Reference Elev icon

The **Set Point Elev by Reference Elev** icon of the Compute Elevations group allows you to set the point elevation based on the slope from the reference point.

To set elevations:

1. In the *Compute Elevations* group of the *Surface* tab, click the **Set Point Elev by Reference Elev** icon.
2. In the survey view, select the point to which the elevation will be set.
3. In the survey view, select the reference point.


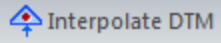
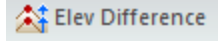
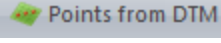
The input panel is displayed at the bottom toolbar. The *Reference Height* field displays the elevation of the reference point.

4. In the *Slope* editbox, specify the slope from the reference point in percent.

The elevation is set.

## Elevate by DTM group

The *Elevate by DTM* group from the *Surface* tab of the MAGNET Office ribbon allows you to configure elevations across an existing DTM. It contains four icons, described in the table below.

|   |  |
|---|--|
|  | <p>Grid Points icon</p> <p>Click it to create a grid of points with elevations across a project.</p> |
|  | <p>Interpolate DTM icon</p> <p>Click it to interpolate elevations for a selection of points.</p>     |
|  | <p>Elev Difference icon</p> <p>Click it to compare elevation of two surfaces.</p>                    |
|  | <p>Points from DTM icon</p> <p>Click it to create points at DTM nodes.</p>                           |

### Grid Points icon

The **Grid Points** icon of the Elevate by DTM group allows you to create a set of points, which imitate grid lines.

To create grid points:

1. In the *Elevate by DTM* group of the *Surface* tab, click the **Grid Points** icon.
2. Create the origin (bottom left) point of the grid by using the "Coordinate" method. See "Add Point icon" section on page 136 for details.

The *Create Grid Points* dialog is displayed.

3. Make the required configurations and click **OK**. Fields are described in the table below.

The grid points are created.

#### Fields of the *Create Grid Points* dialog

| Field                  | Description  |
|------------------------|--|
| <i>Origin</i>          | Defines the X (East) and Y (North) coordinates of the grid origin (bottom left) point. |
| <i>Spacing</i>         | Defines the spacing between grid lines.  |
| <i>No. of steps</i>    | Defines the quantity of grid lines.  |
| <i>Rotation</i>        | Defines the rotation of grid lines.  |
| <i>Layer</i>           | Defines the layer to which the grid point will belong to.                              |
| <i>Point numbering</i> | Defines the numbering format.  |

### Interpolate DTM icon

The **Interpolate DTM** icon of the Elevate by DTM group allows you to interpolate elevations for either a selection of points, located within the current DTM or for the points that define a boundary within the current DTM. The new elevations will be based on the elevations of the current DTM.

To interpolate heights:

1. If needed, in the survey view, select the required points.
2. In the *Elevate by DTM* group of the *Surface* tab, click the **Interpolate DTM** icon.

The *Interpolate Point Heights* dialog is displayed.

3. Define which elevations will be calculated. Select one of the following:
  - *Boundary* – to interpolate elevations for boundary nodes. Select the required boundary from the drop-down list.
  - *Current Selection* – to interpolate elevations for currently selected points.
4. Click **OK**.

The points elevations are interpolated, and the report is displayed.

## Elev Difference icon

The **Elev Difference** icon of the Elevate by DTM group allows you to vertically compare two surfaces. Using the East (X) and North (Y) positions of points in either or both surfaces, new points are generated with levels that equal the difference in elevation between the surfaces.

If a new layer is not used for the elevation difference points, then the points in the selected layer will have the existing elevations replaced with the height difference levels, so it is recommended to create a new layer for the computed points.

To compare the elevations:

1. In the *Elevate by DTM* group of the *Surface* tab, click the **Elev Difference** icon.  
The *Elevation Difference* dialog is displayed.
2. Make the required configurations. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Elevation Difference* dialog

| Field                    | Description   |
|--------------------------|---|
| <i>DTM 1</i>             | Defines the reference surface, from which the height differences are calculated.<br>Select the required project from the <i>Job 1</i> drop-down list, and the DTM from the second drop-down list. |
| <i>DTM 2</i>             | Defines the surface for points height comparison.<br>Select the required project from the <i>Job 2</i> drop-down list, and the DTM from the second drop-down list.                                |
| <i>Start Point</i>       | Defines the number of the first calculated point.   |
| <i>Layer</i>             | Defines the layer, to which the calculated points will be added.<br>If an existing layer is used, the elevations values of the existing points will be set to the elevation difference.           |
| <i>Elev. Tolerance</i>   | Defines the elevation tolerance for comparing. If the elevation difference is less than the tolerance, the average elevation can be used.   |
| <i>Average Elevation</i> | Defines the average point heights if the elevation difference is less than the tolerance specified.   |

| Field                             | Description  |
|-----------------------------------|--|
| <i>Use Point Coordinates From</i> | <p>Defines which points will be used in comparison. Select one of the following:</p> <ul style="list-style-type: none"> <li>• <i>Job 1</i> – New points are created at the same East (X) and North (Y) coordinates as those in Job 1. Each point will have an elevation which is the difference between the surfaces at this point position.</li> <li>• <i>Job 2</i> – New points are created at the same East (X) and North (Y) coordinates as those in Job 2. Each point will have an elevation, which is the difference between the surfaces at this point position.</li> <li>• <i>Job 1 and Job 2</i> – New points are created with the same East (X) and North (Y) coordinates as those in both Job 1 and Job 2. Each point will have an elevation, which is the difference between the surfaces at this point position.</li> </ul> |
| <i>Activated Layers Only</i>      | Tick to use only points, which belong to active layers.  |
| <i>Report</i>                     | Tick to generate a comparison report.  |

## Points from DTM icon

The **Points from DTM** icon of the Elevate by DTM group allows you to create points, basing on existing DTM.

There are four methods of points creation, each is described in the appropriate section below.

- Create point at all nodes of the DTM mesh.
- Create points only at selected nodes of the DTM mesh.
- Create points only at nodes, located within a "box", defined by a rectangle selection.
- Create points only at nodes, located within an existing boundary.

### Creating points at all nodes

To create points:

1. In the *Elevate by DTM* group of the *Surface* tab, click the **Points from DTM** icon.  
The *Create Points from DTM* dialog is displayed.
2. From the *From DTM* drop-down list, select the reference DTM.
3. From the *Create Points in Layer* drop-down list, select the layer to which the new points will be added, or type the name of a new layer.
4. In the *Create Method* group box, select the *Create All* radiobutton.
5. Click **OK**.

The points are created.

### Creating points at selected nodes

To create points:

1. In the *Elevate by DTM* group of the *Surface* tab, click the **Points from DTM** icon.  
The *Create Points from DTM* dialog is displayed.
2. From the *From DTM* drop-down list, select the reference DTM.
3. From the *Create Points in Layer* drop-down list, select the layer to which the new points will be added, or type the name of a new layer.

4. In the *Create Method* group box, select the *By Picked Points* radiobutton.
5. Click **OK**.
6. In the survey view, click the required nodes of the DTM mesh.
7. When finished, press *Esc*.

The points are created.

### Creating points within a box

To create points:

1. In the *Elevate by DTM* group of the *Surface* tab, click the **Points from DTM** icon.  
The *Create Points from DTM* dialog is displayed.
2. From the *From DTM* drop-down list, select the reference DTM.
3. From the *Create Points in Layer* drop-down list, select the layer to which the new points will be added, or type the name of a new layer.
4. In the *Create Method* group box, select the *By Window Selection* radiobutton.
5. Click **OK**.
6. In the survey view, draw the required rectangle area.

The points are created.

### Creating points within a boundary

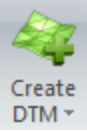

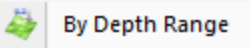
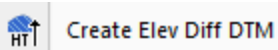
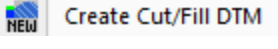
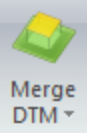


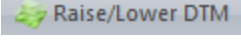
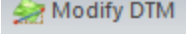
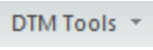

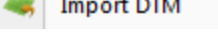

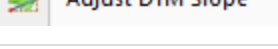
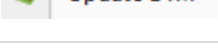
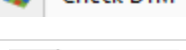
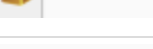
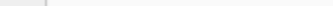
To create points:


1. In the *Elevate by DTM* group of the *Surface* tab, click the **Points from DTM** icon.  
The *Create Points from DTM* dialog is displayed.
2. From the *From DTM* drop-down list, select the reference DTM.
3. From the *Create Points in Layer* drop-down list, select the layer to which the new points will be added, or type the name of a new layer.
4. In the *Create Method* group box, select the *By Boundary* radiobutton.
5. Do one of the following:
  - Select the required boundary from the drop-down list and click **OK**.
  - Click **Pick Polygon**, and select the required boundary in the survey view.

The points are created.

## Create/Edit DTM group

The *Create/Edit DTM* group from the *Surface* tab of the MAGNET Office ribbon allows you to work with the digital terrain models. It contains five icons and eleven second level icons, described in the table below.

|   |  |
|---|--|
|    | <p><b>Create DTM icon</b><br/>Click it to create a new surface model (DTM). This icon also contains the list of the second level icons, for various creation modes. Click  to see them.</p> |
|    | <p><b>By Depth Range icon</b><br/>Click it to create a new DTM form a points, selected within a specified height from an existing DTM.</p>   |
|    | <p><b>Create Elev Diff DTM icon</b><br/>Click it to create a DTM, representing elevation difference of two existing DTMs.</p>  |
|    | <p><b>Create Cut/Fill DTM icon</b><br/>Click it to create a cut/fill map.</p>  |
|    | <p><b>Merge DTM icon</b><br/>Click it to create a new DTM by merging existing DTM surfaces into one. This icon also contains second level icon. Click  to see them.</p>                     |
|   | <p><b>Merge by Elevation icon</b><br/>Click it to create a new DTM by comparing heights of two existing DTMs.</p>  |
|  | <p><b>Raise/Lower DTM icon</b><br/>Click it to raise or lower an existing surface vertically.</p>  |
|  | <p><b>Modify DTM icon</b><br/>Click it to add vertices or remove point from existing DTM.</p>  |
|  | <p><b>DTM Tools icon</b><br/>This icon contains the list of the second level icons for various operations with surfaces. Click  to expand the list of the second level icons.</p>         |
|  | <p><b>Import DTM icon</b><br/>Click it to import an existing DTM from another project.</p>   |
|  | <p><b>Export DTM icon</b><br/>Click it to export an existing DTM from current project.</p>   |
|  | <p><b>Adjust DTM Slope</b><br/>Click it to edit an existing DTM.</p>   |
|  | <p><b>Update DTM icon</b><br/>Click it to an existing DTM it its base points have changed.</p>   |
|  | <p><b>Check DTM icon</b><br/>Click it to check the connectivity of triangles in a DTM.</p>   |
|  | <p><b>3D View icon</b><br/>Click it to open current project in the 3D viewer.</p>  |
|  | <p><b>Convert Contour to String icon</b></p>   |

|  |  |
|--|--|
|  | Click it to create an existing contour as a string.  |
|  <b>Create DTM Boundary</b> | <p>Create DTM Boundary icon</p> <p>Click it to create a DTM boundary inside or outside of an existing DTM.</p> |

## Create DTM icon

The **Create DTM** icon of the Create/Edit DTM group allows you to create a new digital terrain model, by using existing entities from the survey view.

You may create a DTM in two following ways:

- Create a DTM from any existing entities in the survey view.
- Trim an existing boundary to a DTM.

### NOTE

Only Use in Surface points and entities based on them may be included to a DTM.

To create a DTM from any existing entities:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Create DTM** icon.

The **Create DTM - Selection** dialog is displayed.

2. In the Selection group box, select one of the following options:
  - *All* — to include all existing entities to a DTM.
  - *Active* — to include entities from the currently active layers.
  - *Current Selection* — to include the currently selected entities.
  - *Layer Group* — to include entities, which belongs to the layers of the defined group. Select the required group from the drop-down list.
3. Click **OK**.

The **Create DTM** dialog is displayed.

4. Make the required configurations. See "Create DTM dialog" section on the facing page for details.
5. Click **OK**.

The DTM is created.

To trim a DTM to an existing boundary:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Create DTM** icon.

The **Create DTM - Selection** dialog is displayed.

2. In the *Boundary* group box, tick the *Trim DTM to Boundary* checkbox.
3. Select the appropriate option in the *Delete Triangle* group box.
4. If needed, tick the *Approximate arc* checkbox, and specify the arc to chord distance for curved breaklines in the *Arc-to-chord distance* editbox.
5. In the *Boundary Name* list, select the required boundary. Do one of the following:
  - Click the boundary name in the list.
  - Click **Pick Boundary** and select the boundary in the survey view.
  - Click **New Boundary** and create a new boundary in the survey view.
6. Click **OK**.

The **Create DTM** dialog is displayed.



7. Make the required configurations. See "Create DTM dialog" section below for details.
8. Click **OK**.

The DTM is created.

## Create DTM dialog

The *Create DTM* dialog allows you to configure the creation of a new DTM. It appears during the creation of a new DTM. For more information about creating DTMs, refer to "Create DTM icon" section on the previous page.

To configure the DTM, set up the required properties at each tab of the dialog. Fields are described in the tables below.

### Fields of the *General* tab of the *Create DTM* dialog

| Field                                | Description  |
|--------------------------------------|--|
| <i>Name</i>                          | Defines the name of the DTM.   |
| <i>Num Points</i>                    | Displays the quantity of the points in the DTM.  |
| <i>Highest</i>                       | Displays the highest elevation in the DTM.   |
| <i>Lowest</i>                        | Displays the lowest elevation in the DTM.  |
| <i>Ave. Elev</i>                     | Displays the average elevation in the DTM.   |
| <i>Plan Area</i>                     | Displays the horizontal area of the DTM.   |
| <i>Surface Area</i>                  | Displays the full surface area, including slopes.  |
| <i>Description</i>                   | Defines short DTM description.   |
| <b>Display</b>                       |  |
| <i>Mesh</i>                          | When ticked, the created triangular mesh will be displayed in the survey view. Select the required color form the drop-down list.  |
| <i>Contour</i>                       | When ticked, the contours will be displayed in the survey view.  |
| <i>Color Fill</i>                    | When ticked, the shadings and patterning will be colored. Click <b>Settings</b> to define the required colors. See "Color Fill Settings dialog" section on page 443 for details. |
| <i>Slope</i>                         | When ticked, the slopes will be colored. Click <b>Settings</b> to configure it. See "Slope dialog" section on page 443 for details.  |
| <b>Breaklines</b>                    |  |
| <i>Insert Breaklines</i>             | Tick to create additional triangles, so the triangle edges are formed along each breakline. If a breakline exists in the project, then this checkbox is automatically ticked.    |
| <i>Approximate curved breaklines</i> | Tick to create additional triangles, so the triangle edges are formed along chords of the curved breaklines.   |
| <i>Check Crossing Breaklines</i>     | Tick to insure the intersection is correct.  |
| <i>Arc-to-chord Distance</i>         | Defines the arc to chord distance for curved breaklines. The default is 0.200 m and is suitable for most models.   |

**Fields of the *Contour* tab of the *Create DTM* dialog**

| <b>Field</b>                     | <b>Description</b>  |
|----------------------------------|---|
| <b>Display</b>                   |   |
| <i>Major</i>                     | Defines the major contour interval. Set the line width and style, and tick the check box to display the major contours.   |
| <i>Minor</i>                     | Defines the minor contour interval. Set the line width and style, and tick the check box to display the major contours.   |
| <i>Minimum Level</i>             | Defines the range of levels in which the contours are created. The range should be between the lowest and highest point elevation in the DTM.                             |
| <i>Maximum Level</i>             |   |
| <i>Major Start Level</i>         | Defines the level where the first major contour is created.   |
| <i>Additional Major Contours</i> | Defines the levels where the extra contours will be created, in addition to the levels calculated by the MAGNET Office.   |
| <i>Additional Minor Contours</i> |   |
| <b>Color</b>                     |   |
| <i>Discrete Color</i>            | Defines the colors for the major and minor contour lines. Select the required colors from the appropriate drop-down lists.  |
| <i>Color Range</i>               | Defines the color range for contour lines displaying. Click <b>Define</b> to configure it. See "Color Range Settings dialog" section on page 444 for details.             |
| <i>Low</i>                       | Defines the lowest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected.  |
| <i>High</i>                      | Defines the highest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected. |

You may use the contour settings library to load the pre-configured contour settings.

To load contour library settings:

1. At the *Contour* tab of the *Create DTM* dialog, click **Load Library Settings**.  
The selection dialog is displayed.
2. Select the required library settings, and click **OK**.

To save current contour settings to the library:

1. At the *Contour* tab of the *Create DTM* dialog, click **Save Library Settings**.  
The selection dialog is displayed.
2. Select existing library settings from the drop-down list, or type the name of a new library.
3. Click **OK**.

**Fields of the *Contour Label* tab of the *Create DTM* dialog**

| <b>Field</b>                      | <b>Description</b>  |
|-----------------------------------|---|
| <i>Plot Major/Minor Labels</i>    | Plots major/minor labels on the contour.                  |
| <i>Remove Over-plotted Labels</i> | Removes overlapping contour labels.                       |
| <i>Plot Labels Along Contour</i>  | Places the labels along the contour.                      |
| <i>Plot End Labels</i>            | Plots labels at the end of the contour.                   |
| <i>Plot Labels Uphill</i>         | Places the labels at the uphill.                          |
| <i>Text Style</i>                 | Defines the text style for the labels.                    |
| <i>Justification Style</i>        | Defines the justification style for the labels.           |
| <i>Label Distance</i>             | Defines the spacing between the labels along the contour. |

**Color Fill Settings dialog**

The **Color Fill Settings** dialog allows you to configure gradual change in color for filling boundaries from the highest to the lowest elevation.

To configure the color range:

1. In the *Color Fill* group box, from the *General* tab of the **DTM Settings** dialog, click **Settings**.  
The **Fill Color** dialog is displayed.
2. In the *High Level* editbox, specify the highest value of the height range.
3. In the *Low Level* editbox, specify the lowest value of the height range.
4. In the *Datum Level* editbox, specify the level of the datum.
5. Select the required colors from the appropriate drop-down lists.
6. Click **OK**.

**Slope dialog**

The **Slope** dialog allows you to analyze the slopes of the individual triangles. You can allocate different colors to the slope ranges with the option to set the shape of the arrows that display the slopes.

To configure the slope:

1. In the *Slope* group box, from the *General* tab of the **Create DTM** dialog, click **Settings**.  
The **Slope** dialog is displayed.
2. From the *Arrow Head* drop-down list, select the required arrow head shape.
3. From the *Arrow Angle* drop-down list, select the required angle of the arrow head, or specify custom value.
4. From the *Arrow Length* drop-down list, select the required length of the arrow, or specify custom value.
5. If needed, tick the *Drawing Units* checkbox, to plot the slope units.
6. In the table, specify consecutive steps for the slope range with an appropriate color for each slope
7. Click **OK**.

### Color Range Settings dialog

The **Color Range Settings** dialog allows you to configure gradual change in color for each minor contour interval from the highest to the lowest contour.

To configure the color range:

1. In the *Color* group box, from the *Contour* tab of the **Create DTM** dialog, click **Define**.  
The **Color Range Settings** dialog is displayed.
2. In the *High Value* editbox, specify the highest value of the height range.
3. In the *Low Value* editbox, specify the lowest value of the height range.
4. In the *Interval* editbox, specify the interval of color changing.
5. Click **OK**.

### **By Depth Range icon**

The **By Depth Range** icon of the Create/Edit DTM group allows you to create DTM, based on points, located within the specified depth range from the reference DTM.

To create DTM by depth range:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **By Depth Range** icon.  
The **Create DTM by Depth Range** dialog is displayed.
2. In the *Point Selection Criteria* group box, configure the selection for points for DTM. Do the following:
  1. In the *Select From* field, define the search area.
  2. From the *Reference DTM* drop-down list, select the DTM to be reference.
  3. In the *Depth Range From DTM* field, specify the required depth range.
  4. Click **OK**.

The list of the selected points is displayed

3. Review the list of the points. If needed, change the criteria and repeat the search.
4. In the Create/Edit Options group box, configure the DTM creation. Do the following:
  1. In the *DTM Name* editbox, specify the name for the new DTM.
  2. In the *Layer* field, select the layer where new DTM will be placed from drop-down list or type the name of the new layer.
  3. In the *Code* field, select the code for the new DTM from the drop-down list, or type the name of the new code.
  4. Click **Process** to create DTM on the selected points.

The DTM is created.

5. If needed, repeat to create more DTMs.
6. When finished, click **OK**.

### **Create Elev Diff DTM icon**

The **Create Elev Diff DTM** icon of the Create/Edit DTM group allows you to create a cut/fill DTM, representing elevation difference between two existing DTMs.

To create a color map:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Create Elev Diff DTM** icon.  
The **Create elevation Difference DTM** dialog is displayed.
2. From the *First DTM* drop-down list, select the DTM for a calculation of height difference.
3. Specify one of the following:
  - Tick the *From Level* checkbox, and in the editbox, specify an elevation from which the elevation difference will be calculated.
  - From the *Second DTM* drop-down list, select the DTM for a calculation of depth difference.
  - Select *Second DTM from File* radiobutton, and click Browse to open the second DTM from an external TN3 (\*.tn3) file.
4. In the *Output DTM* editbox, specify the name of the resulting cut/fill color map.
5. Click **OK**.

## Create Cut/Fill DTM icon

The **Create Cut/Fill DTM** icon of the Create/Edit DTM group allows you to a cut/fill color map.

To create a color map:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Create Cut/Fill DTM** icon.  
The **Create Cut/Fill DTM** dialog is displayed.
2. From the *First DTM* drop-down list, select the DTM for a calculation of height difference.
3. Specify one of the following:
  - From the *Second DTM* drop-down list, select the DTM for a calculation of depth difference.
  - Tick the *From Level* checkbox, and specify an elevation from which the elevation difference will be calculated in the editbox.
4. In the *Output DTM* editbox, specify the name of the resulting DTM.
5. Define the colors for cut and fill in the appropriate drop-down lists.
6. Click **OK**.

## Merge DTM icon

The **Merge DTM** icon of the Create/Edit DTM group allows you to create a new DTM surface by merging one or more DTM surfaces into one. It also allows you to merge surface models from other projects into the existing project. The other project must be open in MAGNET Office to allow access to the DTM surfaces.

To merge DTMs:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Merge DTM** icon.  
The **Merge DTM** dialog is displayed.
2. From the *Merge (Design)* drop-down menu, select the DTMs to be merged, and the projects, to which the DTMs belongs to.
3. From the *With (Existing)* drop-down menu, select the DTM the others to be merged into.

This DTM should be the largest of all the DTMs to be merged. This DTM will be the Base, and all other DTMs will be used to create a new base. This DTM can also be select from another project. A prerequisite to this is for each project containing a DTM to be merged to be open.

4. In the *To Create* editbox, type the name of the new DTM.
5. Click **OK**.

The DTMs are merged.

To select a DTM from another project, open the project so it is available on the drop-down menu. A DTM cannot be used unless the project containing it is open in MAGNET Office.

The triangles displayed in the first or “design” DTM will replace the triangles in the equivalent coordinate positions in the second or existing DTM, using the outside edge of the first DTM as a slope line.

If the edge of the first DTM does not create a slope line on the surface with the second DTM, there will be an interpolation of heights between the two surfaces, which may not be what you expect.

## Merge by Elevation icon

The **Merge by Elevation** icon of the Create/Edit DTM group allows you to create a new project by comparing heights of points in two currently open projects where the heights for each point in the new project will be the lower of the heights in comparison. The two projects should cover approx. the same plan area. The current project is copied into the new project and the heights are edited as necessary. The result of this option will be a terrain model that contains the lowest heights from each project.

This feature is designed for mining sites where comparison of surface levels over time is needed.

### NOTE

At least two projects need to be opened before running the option. Each of the projects must have a DTM for interpolating the height of the points from the other project.

To perform merge by elevation:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Merge by Elevation** icon.  
The **Merge by Elevation** dialog is displayed.
2. In the *Reference* row, select the required project and DTM in it for comparison.
3. In the *With Base* row, select the required DTM from the current project for comparison,
4. In the *New* row, specify the names for the resulting DTM and project, where it will be stored.
5. Click **OK**.

### Fields of the *Merge by Elevation* dialog

| Field            | Description  |
|------------------|--|
| <i>Reference</i> | Defines the project and DTM in it, which will be used in comparison with DTM from the current project. |
| <i>With Base</i> | Defines the DTM from the current project, which will be used with comparison.                          |
| <i>New</i>       | Defines the name for the DTM and project, where results of the comparison will be stored.              |

## Raise/Lower DTM icon

The **Raise/Lower DTM** icon of the Create/Edit DTM group allows you to change the elevation of an existing DTM.

To lift or drop an existing DTM:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Raise/Lower DTM** icon.  
The **Raise/Lower DTM** dialog is displayed.
2. Make the required configurations. Fields are described in the table below.
3. Click **OK**.

### Fields of the **Raise/Lower DTM** dialog

| Field                              | Description  |
|------------------------------------|--|
| <i>DTM</i>                         | Defines the DTMs to be vertically adjusted. Select one of the following: <ul style="list-style-type: none"> <li>• <i>Current DTM</i> — to adjust only current DTM.</li> <li>• <i>All DTM</i> — to adjust all DTMs in the project.</li> <li>• <i>Selected DTM</i> — to adjust DTMs, selected from the list below.</li> </ul>  |
| <b>Boundary</b>                    |  |
| <i>Within DTM</i>                  | Select to adjust the selected DTMs within the boundary, defined in the DTM properties.   |
| <i>Within Boundary</i>             | Select to adjust the selected DTMs within a selected boundary.<br>Select the boundary from the drop-down list, or click <b>Pick Boundary</b> and select it in the survey view.   |
| <i>Approximate Arc</i>             | Tick to approximate the boundary's arcs when adjusting DTMs. Define the minimum distance between arc and chord in the <i>Arc-to-chord dist</i> editbox.  |
| <i>Snap tolerance</i>              | Define the tolerance of adjusting.   |
| <b>Operation</b>                   |  |
| <i>Raise DTM</i>                   | Select to lift the selected DTMs by the value, specified in the <i>By</i> editbox below.   |
| <i>Lower DTM</i>                   | Select to lower the selected DTMs by the value, specified in the <i>By</i> editbox below.  |
| <i>Treat boundary as breakline</i> | Tick to assist in crating vertical walls resulting from the elevation change of the surface when creating a new DTM or when updating an existing DTM.  |
| <i>Output</i>                      | Defines the output format. Select one of the following: <ul style="list-style-type: none"> <li>• <i>Update existing DTM</i> — to update existing DTMs with the new parameters.</li> <li>• <i>Create new DTM</i> — to create new DTMs with the new parameters. Existing DTMs will not change.</li> </ul> Tick <i>Trim to Boundary</i> checkbox to trim the modified DTM to the specified boundary |

## Modify DTM icon

The **Modify DTM** icon of the Create/Edit DTM group allows you to modify current DTM by adding vertices or removing points.

To add a vertex:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Modify DTM** icon.
2. In the survey view, select the required point. The point should be located inside the DTM.

The *Edit Surface* point dialog is displayed.

3. In the *Elevation* editbox, specify the height of the new vertex.
4. If needed, in the *Code* editbox, specify the code of the new vertex.
5. Click **OK**.

The vertex is added.

6. Repeat steps from 2 to 5 to add more vertices.
7. When finished, press *Esc*.

The message prompts you to save the changes in DTM.

8. Click **Yes**.

To remove a point from DTM:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Modify DTM** icon.
2. Right click and select **Remove Points** from the context menu.
3. In the survey view, click the required point.

The point is removed from the DTM.

4. Repeat step 3 to remove more points.
5. When finished, twice press *Esc*.

The message prompts you to save the changes in DTM.

6. Click **Yes**.

## Import DTM icon

The **Import DTM** icon of the Create/Edit DTM group allows you to load a DTM to the current project from an external file or another project.

To import a DTM from another project:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Import DTM** icon.

The *Import DTM* dialog is displayed.

2. Select the *From Project* radiobutton and click **OK**.

The *Import DTM* dialog is displayed.

3. From the *Project* drop-down list, select the source project.
4. From the *DTM To Import* drop-down list, select the DTM to import.
5. In the *DTM Name* editbox, specify the name for the DTM in current project.
6. Click **OK**.

The DTM is imported.



To import a DTM from an external file:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Import DTM** icon.  
The **Import DTM** dialog is displayed.
2. Select the *From File* radiobutton and click **OK**.  
The **Open** dialog is displayed.
3. Select the required file and click **Open**.  
The DTM is imported.

## Export DTM icon

The **Export DTM** icon of the *Create/Edit DTM* group allows you to save a DTM from the current project to an external file.

To export a DTM:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Export DTM** icon.  
The **Export DTM** dialog is displayed.
2. From the *DTM* drop-down list, select the DTM to export.
3. Click **OK**.  
The **Save As** dialog is displayed.
4. Save the DTM file as you need.

## Adjust DTM Slope

The **Adjust DTM Slope** icon of the *Create/Edit DTM* group allows you to edit nodes of an existing DTM.

To modify a DTM:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Adjust DTM Slope** icon.  
The control panel is displayed in the left side of the survey view. Preview area is displayed in the right side of the survey view.
2. From the *Design Surface* drop-down list, select DTM to be edited.
3. From the *Natural Surface* drop-down list, select DTM which will be used as the natural surface.
4. If needed, in the *Slope Range* group box, configure the displaying of the DTM slope.
5. In the preview area, click the DTM node to be edited. Clicked points are listed in the *Surface Points* list at the control panel. You may edit them by using one of the following ways:
  - Drag it to the new position by mouse.
  - Double click the node in the preview, and specify the required coordinates in the **Edit Surface Points** dialog.
  - Double click point in the list, and specify the required coordinates in the **Edit Surface Points** dialog.
6. If needed, in the *Volume* group box, click **Calculate**, to calculate the new volume.

### Fields of the control panel

| Field                 | Description                                  |
|-----------------------|--|
| <i>Design Surface</i> | Defines the design DTM which will be edited. |

| Field                   | Description   |
|-------------------------|---|
| <i>Natural Surface</i>  | Defines the DTM, which will represent natural surface.  |
| <i>Slope Range</i>      | Defines the layout of the preview. You may configure slope ranges and color for each of them.                 |
| <i>Shade Slope Zone</i> | Tick to fill the DTM segments with the color, defined for its slope.  |
| <i>Display Slope</i>    | Tick to display slope of the DTM segments.  |
| <i>Position</i>         | Displays the current coordinates of the pointer in the preview area.  |
| <i>Slope</i>            | Displays the slope of the DTM segment under pointer in the preview area.                                      |
| <i>Volume</i>           | Displays the volumes of the selected DTMs. After making changes, click <b>Calculate</b> to update the values. |
| <i>Surface Points</i>   | Displays the list of the clicked DTM nodes.   |

## Update DTM icon

The **Update DTM** icon of the Create/Edit DTM group allows you to update the DTM surface after editing the elevation values of a point or points that are already used for the DTM.

To update a DTM:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Update DTM** icon.

The *Update DTM* dialog is displayed.

2. In the *Point Data* group box, define which points will be used for DTM updating.
3. In the *DTM* group box, define which DTMs will be updated.
4. In the *Breakline* group box, define the breaklines updating.
5. Click **OK**.

The DTM is updated.

## Check DTM icon

The **Check DTM** icon of the Create/Edit DTM group allows you to check the connectivity of the triangles in the current DTM. It will highlight where the overlapping triangles (if any) are located and save them in the layer you selected. You can also check the boundaries (exterior and interior) of the DTM and report a self-intersecting boundary. Use this feature to check an imported DTM before using it in a project.

To check a DTM:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Check DTM** icon.

The *DTM Check* dialog is displayed.

2. In the *Boundary Check List*, define which boundaries will be checked.
3. Click **OK**.

## 3D View icon

The **3D View** icon of the Create/Edit DTM group allows you to view your project in three dimensions.

To view project in 3D:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **3D View** icon.  
The **3D View** dialog is displayed.
2. In the *Select From* group box, select one of the following radiobuttons:
  - *All Data* – to display all existing data.
  - *Active Layers* – to display only entities, which belong to the active layers.
  - *All Data* – to display only selected entities.
3. In the *Driver Offset* panel specify the amount and direction of the offset from the required alignment, for virtual "driving", by using the *Offset* editbox, and *Left* and *Right* radiobuttons.
4. In the *Driver Offset* panel specify the speed of virtual "driving", by using the *Alignment Spacing* editbox.
5. Select surfaces to export into 3D view from the list.
6. Tick the *Transfer Linework* checkbox, to define whether to export lines or not.
7. Tick the *Drape Lines* checkbox, to define whether to drape all selected lines onto the selected surface or not.
8. Tick the *Transfer Points* checkbox, to define whether to transfer points into the 3D view or not.
9. Click **OK**.

The selected data is displayed in the 3DView in the new window.

### NOTE

This icon has the same functionality as the 3D View icon of the Features group at the View tab.

## Convert Contour to String icon

The **Convert Contour to String** icon of the Create/Edit DTM group allows you to create a selected contour as a string. A series of points with the elevation of the contour line are created as nodes on the string. A range of contour lines may also be converted to strings. The contour strings are useful for defining slope lines or boundaries for such routines as landfill calculations.

### NOTE

Displaying of the contours must be turned on to use this feature.

To convert contour to string:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Convert Contour to String** icon.
2. In the survey view select the required contour.  
The **Create String** dialog is displayed.
3. Review the properties, if needed, change them. Fields are described in the table below.
4. Click **OK**.

If you defined non-existing layer for string or its points, the **Add New Layer** dialog is displayed.

5. Review the properties, if needed, change them. Fields are described in the table below.
6. Click **OK**.

The string is created.

**The non-editable fields of the *Create String* dialog**

| Field               | Description                                    |
|---------------------|--|
| <i>Num Points</i>   | Displays quantity of the points in the string. |
| <i>Length</i>       | Displays the length of the string.             |
| <i>Slope Length</i> | Displays the length of the slopped segments.   |

**The editable fields of the *Create String* dialog**

| Field                   | Description  |
|-------------------------|--|
| <i>Name</i>             | Defines the name of the string.  |
| <i>Layer</i>            | Defines layer to which the string will belong to. Note that the string and its points may belong to the different layers.<br>Default format is <i>CONSxx.xx</i> . The <i>xx.xx</i> represents the elevation level of the contour string to two decimal places.               |
| <i>Point Layer</i>      | Defines layer to which the points of the string will belong to. Note that the string and its points may belong to the different layers.<br>Default format is <i>CONSxx.xx</i> . The <i>xx.xx</i> represents the elevation level of the contour string to two decimal places. |
| <i>Color</i>            | Defines a color for string displaying.<br>Default value is the same with the source contour.   |
| <i>Line Style</i>       | Defines appearance of the string both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.  |
| <i>Thickness</i>        | Defines the width of the string in millimeters when plotted.   |
| <i>is Smoothed</i>      | Select it to apply a smoothing spline algorithm to the string. It is used for plotting purposes and has no influence on any computations.  |
| <i>Break Line</i>       | A string may be defined as breakline. The string must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.  |
| <i>Use String Layer</i> | Tick to use the same layer for string and its nodes.   |
| <i>Filter Points</i>    | Implements a filter to reduce the number of nodes created for the string.  |
| <i>Distance</i>         | Defines the linear filter tolerance.   |
| <i>Angle</i>            | Defines the angular filter tolerance.  |

**Buttons of the *Create String* dialog**

| Button                | Description   |
|-----------------------|---|
| <b>Get Properties</b> | Click it to load existing default properties for strings. |

| Button             | Description  |
|--------------------|--|
| <b>Images/Pdfs</b> | Click it to attach an image or a PDF to the string. The picture will be displayed near the string. For more information refer to "Image Viewer" section on page 573. |
| <b>OK</b>          | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>      | Click it to close the dialog without saving changes.   |

#### Fields of the *Add New Layer* dialog

| Property            | Description  |
|---------------------|--|
| <i>Layer Name</i>   | Defines the name of the layer.   |
| <i>Active</i>       | Defines whether the layer is active or turned off.   |
| <i>Lock</i>         | Defines whether the layer is locked (i.e. cannot be changed) or not.   |
| <i>Overlay</i>      | When ticked, entities which belong to the layer will be darkened, and not available for editing, i.e. all entities will be look like a background image.   |
| <i>Color</i>        | Defines the default color for the layer. All entities, which belongs to this layer and have <i>By Layer</i> value of the <i>Color</i> parameter will be painted with it.   |
| <i>Point Mark</i>   | Defines the default point mark for the layer. All points, which belong to this layer and have <i>By Layer</i> value of the <i>Mark</i> parameter will have such mark.  |
| <i>Line Type</i>    | Defines the default line style for the layer. All lines, arcs, circles, strings, polylines, polygon, lots, pads and boundaries, which belong to this layer and have <i>By Layer</i> value of the <i>Line Style</i> parameter will have such line style.        |
| <i>Line Width</i>   | Defines the default line thickness for the layer. All lines, arcs, circles, strings, polylines, polygon, lots, pads and boundaries, which belong to this layer and have <i>By Layer</i> value of the <i>Thickness</i> parameter will have such line thickness. |
| <i>Point Symbol</i> | Defines the default point symbol for the layer. All points, which belong to this layer and have <i>By Layer</i> value of the <i>Symbol</i> parameter will have such symbol.  |
| <i>Text Style</i>   | Defines the default text style for the layer.  |

## Create DTM Boundary icon

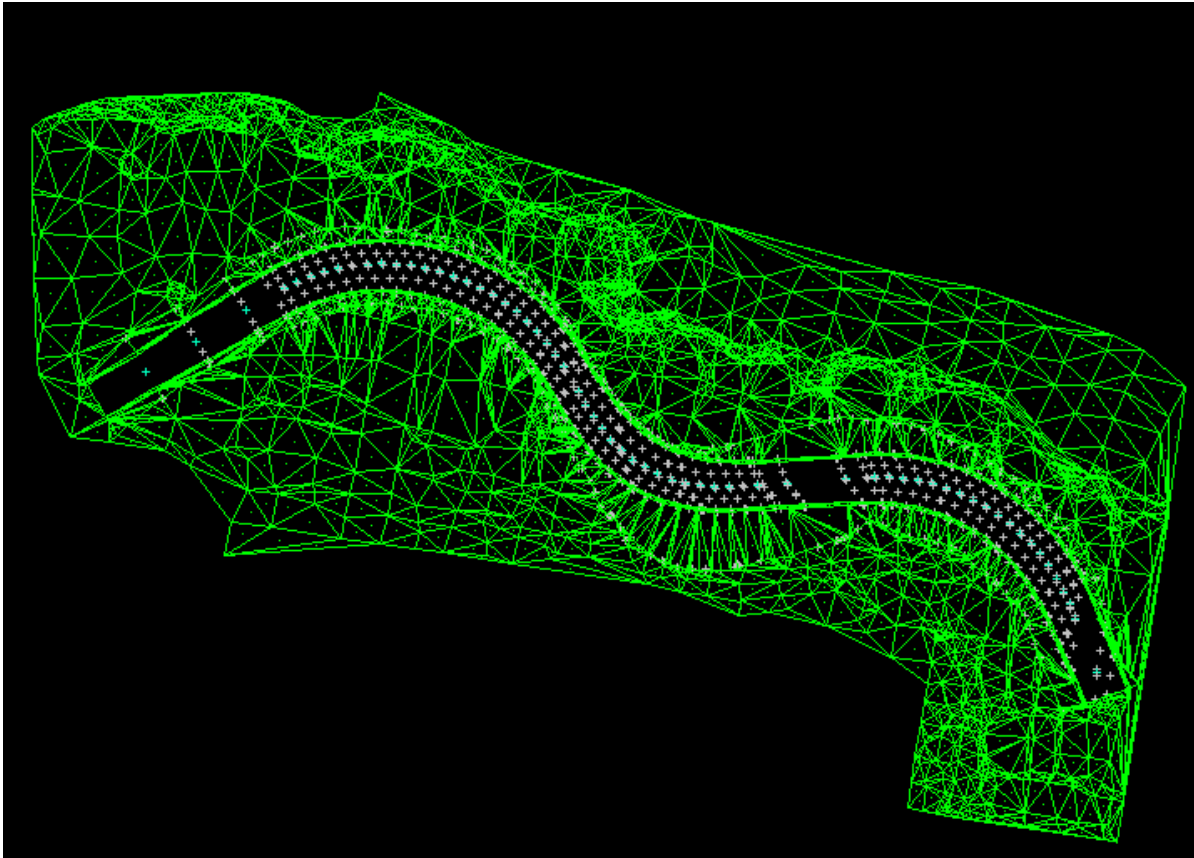
The **Create DTM Boundary** icon of the Create/Edit DTM group allows you to create a DTM boundary inside or outside of a DTM.

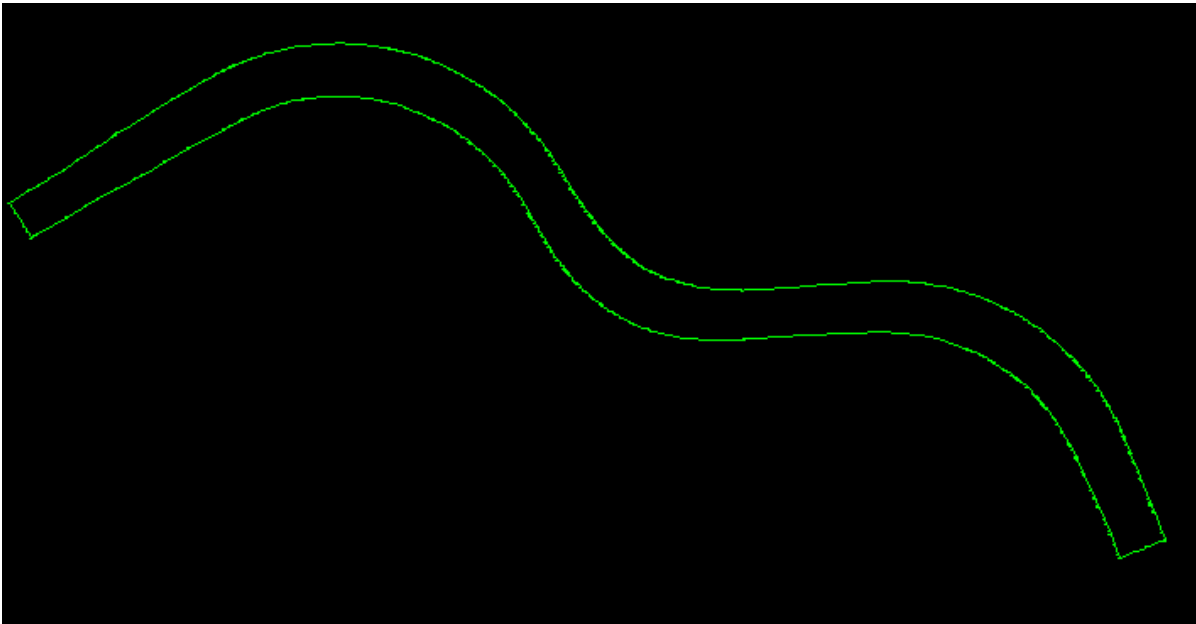
To create a boundary:

1. In the *Create/Edit DTM* group of the *Surface* tab, click the **Create DTM Boundary** icon.  
The *Create DTM Boundary* dialog is displayed.
2. Review the parameters, if needed, change them. Fields are described in the table below.
3. Click **OK**.  
The *DTM Boundary Created* dialog is displayed, containing list of the newly created boundaries.
4. Click **OK**.

**Fields of the *Create DTM Boundary* dialog**

| <b>Field</b>   | <b>Description</b>  |
|--|---|
| <i>From DTM</i>  | Defines the source DTM for boundary creation.   |
| <i>Create Boundary in Layer</i>                        | Defines layer in which the boundary will be created.  |
| <i>Prefix Boundary Name By</i>                         | Defines the prefix of boundary name.<br>By default it is the name of the source DTM.  |
| <i>Create Exterior Boundary</i>                        | Tick to create boundary at the exterior edge of the DTM. See pictures below for details.  |
| <i>Create Interior Boundary</i>                        | Tick to create boundary at the interior edge of the DTM. See pictures below for details.  |
| <i>Save Boundary in DTM Settings</i>                   | Tick to assign the boundary to the DTM.   |
| <i>Delete Boundary Created Previously From the DTM</i> | Tick to delete the previously created boundaries. Note that only boundaries of the same type (interior/exterior) as the newly creating will be deleted. |

**Source DTM**



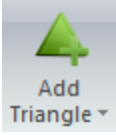







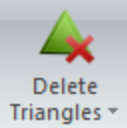




**Interior Boundary**



**Exterior Boundary**

## Edit Mesh group

The *Edit Mesh* group from the *Surface* tab of the MAGNET Office ribbon allows you to edit existing DTM meshes. It contains two icons and nine second level icons, described in the table below.

|   |  |
|---|--|
|    | <p><b>Add Triangle icon</b><br/>Click it to add a new triangle to the surface. This icon also contains the list of the second level icons for various operations with triangles. Click  to expand the list of the second level icons.</p> |
|  <b>Swap Triangles</b>                         | <p><b>Swap Triangles icon</b><br/>Click it to swap two triangles between each other.</p>   |
|  <b>Show Triangle Properties</b>               | <p><b>Show Triangles Properties icon</b><br/>Click it to display properties of the existing triangle.</p>  |
|  <b>Check/Edit Breaklines</b>                  | <p><b>Check/Edit Breaklines icon</b><br/>Click it to check existing breaklines and edit invalid ones.</p>  |
|  <b>Insert Breakline</b>                       | <p><b>Insert Breakline icon</b><br/>Click it to insert breaklines to the surface.</p>  |
|  <b>Highlight Points set to Use in Surface</b> | <p><b>Nightlight Points set to Use in Surface icon</b><br/>Click it to highlight points which may be used in DTM creation.</p>   |
|  <b>Decompose Triangle</b>                   | <p><b>Decompose Triangle icon</b><br/>Click it to decompose triangles in the current DTM.</p>  |
|    | <p><b>Delete Triangles icon</b><br/>Click it to delete triangles from the DTM. This icon also contains the list of the second level icons for various deleting modes. Click  to expand the list of the second level icons.</p>          |
|  <b>By Line</b>                              | <p><b>By Line icon</b><br/>Click it to delete triangles by drawing a line across triangles to be deleted.</p>  |
|  <b>By Boundary</b>                          | <p><b>By Boundary icon</b><br/>Click it to delete triangles by selecting points around the triangle to be deleted.</p>   |
|  <b>By Length or Angle</b>                   | <p><b>By Length or Angle icon</b><br/>Click it to delete triangles by nominating the maximum side length.</p>  |

### Add Triangle icon

The **Add Triangle** icon of the Edit Mesh group allows you to current DTM mesh.

To manually add triangles:



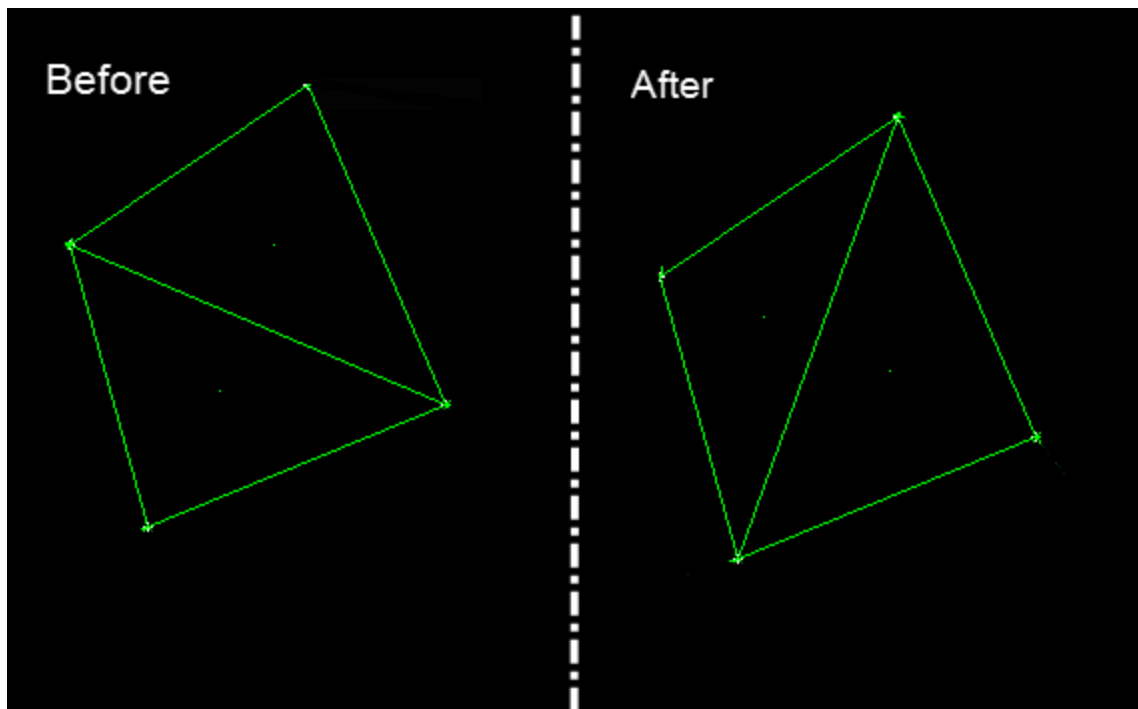
1. In the *Edit Mesh* group of the *Surface* tab, click the **Add Triangle** icon.
2. Continuously select the points for triangle. Preferably, they should be at the vertex of an existing triangle that is adjacent to the area where the new triangle will be formed.

The triangle is formed.

3. If needed, add more triangles.
4. When finished, press *Esc*.

## Swap Triangles icon

The **Swap Triangles** icon of the *Edit Mesh* group allows you to swap two adjacent triangles so that the triangles are defined to their opposite diagonals. See picture below for details.



### Swap two triangles

To swap triangles:

1. In the *Edit Mesh* group of the *Surface* tab, click the **Swap Triangles** icon.
2. Continuously select two triangles for swapping.
3. The common edge of triangles are changed to the opposite diagonal.
4. In needed, select more triangles.
5. When finished, press *Esc*.

## Show Triangles Properties icon

Click the **Show Triangles Properties** icon to display the properties of the selected triangle.

## Check/Edit Breaklines icon

The **Check/Edit Breaklines** icon of the Edit Mesh group allows you to scan all existing breaklines for any crossing breaklines, point which don't have the *Use in Surface* flag turned on; highlight the results and generate the report.

Crossing breaklines can cause an error in the surface model and produce inaccurate contours. Any crossing breakline is ignored by the breakline insertion routines.

Crossing breaklines are usually errors caused by incorrect stringing, field procedure, or mistakes in the code library. Check all crossing breaklines and modify, segment, or delete the lines to ensure the formation of an accurate surface model.

Crossing breaklines may occur in following cases:

- When the wrong string number is entered for a survey point in the field, so points are allocated to the wrong stringline.
- When the point is allocated the wrong feature code.
- When surveying the top and base of a vertical or near vertical feature. Make sure that shots at the top and base are in a similar position so the lines do not overlap.

To check breaklines:

1. In the *Edit Mesh* group of the *Surface* tab, click the **Check/Edit Breaklines** icon.

The **Check/Edit Breaklines** dialog is displayed.

2. Select whether to highlight all breaklines, or only invalid breaklines, by selecting the appropriate radio button.
3. If needed, tick the *Show report* checkbox, to generate the report, listing the breaklines errors.
4. Click **OK**.

The breaklines are highlighted.

5. The message window prompts whether to edit breaklines or not. Click **Yes** or **Not** as you need.

If you have ticked the *Show report* checkbox, the report is displayed.

6. Click the highlighted breakline to edit it.
7. When finished, press *Esc*.
8. The message window prompts you to update the DTM. Click **Yes** or **Not** as you need.

## Insert Breakline icon

The **Insert Breakline** icon of the Edit Mesh group allows you to insert existing breaklines — a line, string or arc, which defined as a breakline, but has not already been used — to the current DTM. It helps you to make sure that all breaklines have been inserted in the DTM after you have completed editing lines and arcs.

To insert breaklines to the DTM:

1. If needed, select the breaklines to be added to the DTM.
2. In the *Edit Mesh* group of the *Surface* tab, click the **Insert Breakline** icon.  
The **Insert Breaklines Into DTM** dialog is displayed.
3. In the *Selection* group box, define which breaklines will be used for insertion.
4. Configure the additional parameters as you need. Fields are described in the table below.

5. Click **OK**.
6. If you have selected Select a breakline option at step 3, continuously select the breaklines to be added to the DTM, when finished, press *Esc*.

#### Fields of the *Insert Breaklines Into DTM* dialog

| Field  | Description  |
|--|--|
| <i>Check Crossing Breaklines</i>             | Tick to prevent creation of self-crossing DTM.   |
| <i>Approximate Arcs</i>                      | Tick to create breaklines around curves.   |
| <i>Arc-to-Chord Distance</i>                 | Defines the distance between curve and the approximation chord. More triangles are formed around the curve when a smaller value is used. |
| <i>Use breaklines from the selected data</i> | Only selected breaklines will be used.   |
| <i>Breaklines in active layers</i>           | Only breaklines from the currently active layers will be used.   |
| <i>Select a breakline</i>                    | Only breaklines, selected by user will be used.  |

## Nightlight Points set to Use in Surface icon

The **Nightlight Points set to Use in Surface** icon of the Edit Mesh group allows you to check for points that have the *Use in Surface* flag turned on.

To check which points may be used for DTM creation:

1. In the *Edit Mesh* group of the *Surface* tab, click the **Nightlight Points set to Use in Surface** icon.
2. The message prompts you to generate the report, listing all Use in Surface points. Click **Yes** or **No** as you need.

The Use in Surface points are highlighted.

## Decompose Triangle icon

The **Decompose Triangle** icon of the Edit Mesh group allows you to decompose triangles in the current digital terrain model. When a line, arc, polygon, or string is selected, additional triangles are created along the entity as if the entity is a breakline. The purpose is to insert additional triangles that do not alter the existing contours.

The points defining the entity do not need to have levels or be set as Use in Surface. Heights may be allocated to these points at a later date to modify the DTM.

To decompose triangles:

1. If needed, select the entities to be added to the DTM.
2. In the *Edit Mesh* group of the *Surface* tab, click the **Decompose Triangle** icon.  
The *Decompose Triangles* dialog is displayed.
3. In the *Selection* group box, define which entities will be used for insertion.
4. Configure the additional parameters as you need. Fields are described in the table below.
5. Click **OK**.

6. If you have selected Select a breakline option at step 3, continuously select the entities to be added to the DTM, when finished, press *Esc*.

**Fields of the *Decompose Triangles* dialog**

| Field                              | Description  |
|------------------------------------|--|
| <i>Check Crossing Breaklines</i>   | Tick to prevent creation of self-crossing DTM.   |
| <i>Approximate Arcs</i>            | Tick to create lines around curves.  |
| <i>Arc-to-Chord Distance</i>       | Defines the distance between curve and the approximation chord. More triangles are formed around the curve when a smaller value is used. |
| <i>Lines in the selected data</i>  | Only selected entities will be used.   |
| <i>Breaklines in active layers</i> | Only breaklines from the currently active layers will be used.   |
| <i>Select a line</i>               | Only entities, selected by user will be used.  |

## Delete Triangles icon

The **Delete Triangles** icon of the Edit Mesh group allows you to delete triangles from the DTM mesh.

**NOTE**

Displaying of the mesh must be turned on, when using this option.

To delete triangles:

1. In the *Edit Mesh* group of the *Surface* tab, click the **Delete Triangle** icon.
2. Continuously select triangles to be deleted from the DTM.
3. When finished, press *Esc*.

## By Line icon

The **By Line** icon of the Edit Mesh group allows you to draw a string, comprising one or more segments, across triangles that you want to delete from the current DTM.

To delete triangles by line:

1. In the *Edit Mesh* group of the *Surface* tab, click the **By Line** icon.
2. In the survey view, draw a string across triangles you want to delete.
3. When finished drawing a string, press *Esc*.

The confirmation message is displayed.

4. Click **Yes**.

The triangles are deleted.

## By Boundary icon

The **By Boundary** icon of the Edit Mesh group allows you to delete triangles, located inside or outside of a defined boundary.

To delete triangles by boundary:

1. In the *Edit Mesh* group of the *Surface* tab, click the **By Boundary** icon.  
The **Delete Triangles By Boundary** dialog is displayed.
2. In the *Delete Triangles* group box, select which triangles will be deleted – either inside or outside of the boundary.
3. In the *Criteria for Deleting Triangles By Boundary* group box, configure the deleting criteria. Fields are described in the table below.
4. Define the boundary. Do one of the following:
  - Select an existing boundary from the list.
  - Click **Pick Boundary** to select the boundary in the survey view.
  - Click **New Boundary** to create a new boundary.
5. Click **OK**.  
The confirmation message is displayed.
6. Click **Yes**.  
The triangles are deleted.

### Fields of the *Delete Triangles by Boundary* dialog

| Field                   | Description   |
|-------------------------|---|
| <i>Delete Triangles</i> |   |
| <i>Clip Triangle</i>    | Tick to delete only the triangles that are totally enclosed in the boundary.  |
| <i>Approximate Arc</i>  | Tick to create additional triangles so triangle edges are formed along chords of the curved breaklines.   |
| <i>Delete</i>           | Deletes triangles crossing the boundary. If this option is selected, then choose one of the following: <ul style="list-style-type: none"> <li>• <i>At least 1 vertex inside/outside the boundary</i> – to delete all triangles that cross the boundary and have at least 1 vertex outside the boundary.</li> <li>• <i>At least 2 vertex inside/outside the boundary</i> – to delete all triangles that cross the boundary and have at least 2 vertex outside the boundary.</li> <li>• <i>Centroid inside/outside the boundary</i> – to delete all triangles that cross the boundary and have the centroid inside/outside the boundary.</li> </ul> |
| <i>Boundary Name</i>    | Lists the existing boundaries.  |

## By Length or Angle icon

The **By Length or Angle** icon of the Edit Mesh group allows you to delete triangles by nominating the maximum side length or angle of triangles for the DTM. All triangles with a side length or angle more than the maximum

will be deleted.

To delete triangles by side length:

1. In the Edit Mesh group of the Surface tab, click the **By Length or Angle** icon.

The *Delete Triangles* dialog is displayed.

2. In the *By Length* group box, select the radiobutton and specify the maximum side length.
3. Click **OK**.

The confirmation message is displayed.

4. Click **Yes**.

The triangles are deleted.

To delete triangles by angle:

1. In the Edit Mesh group of the Surface tab, click the **By Length or Angle** icon.

The *Delete Triangles* dialog is displayed.

2. In the *By Angle* group box, select the radiobutton and specify the maximum side length.
3. Select whether triangles with 1 or 2 vertexes with smaller angle will remain.
4. Click **OK**.

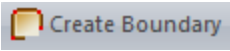
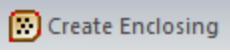
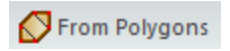
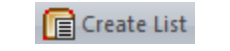
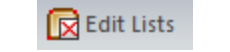
The confirmation message is displayed.

5. Click **Yes**.

The triangles are deleted.

## Boundary group

The *Boundary* group from the *Surface* tab of the MAGNET Office ribbon allows you to create and manage boundaries in the project. It contains five icons, described in the table below.

|  |  |
|--|--|
|  Create Boundary  | Create Boundary icon<br>Click it to create a new boundary.   |
|  Create Enclosing | Create Enclosing icon<br>Click it to create the enclosing boundary from existing points.           |
|  From Polygons    | From Polygons icon<br>Click it to create the boundary from two or more existing polygons.          |
|  Create List      | Create List icon<br>Click it to create a list of existing enclosed areas/boundaries.               |
|  Edit Lists       | Edit Lists icon<br>Click it to delete a boundary list or remove individual boundary from the list. |

### Create Boundary icon

The **Create Boundary** icon of the Boundary group allows you to add a new boundary to the survey view.

To create a new boundary:

1. In the *Boundary* group of the *Surface* tab, click the **Create Boundary** icon.

The input panel for point creation is displayed at the bottom toolbar. Description of the fields may be found in the table below.

2. Locate the nodes of the boundary.
3. To enclose the boundary do one of the following:
  - Locate the last point at the same place as the first point.
  - Press *Esc*. The message window prompts to save the boundary. Click **OK**. The last created point will be connected with the first point with the shortest line possible.

The *Edit Boundary* dialog is displayed.

4. Review the properties of the newly created boundary, if needed change them. For more information refer to "Boundary properties" section on page 563.
5. Click **OK**.

The polygon is created.

#### Fields of the input panel, when creating boundaries

| Field                 | Description  |
|-----------------------|--|
| <i>Number</i>         | Defines the number of the next new point.                        |
| <i>East</i>           | Defines the East (X) coordinate of the boundary point.           |
| <i>North</i>          | Defines the North (Y) coordinate of the boundary point.          |
| <i>Elev</i>           | Defines the elevation of the boundary point.                     |
| <i>Code</i>           | Defines the code of the boundary point.                          |
| <i>Use in Surface</i> | Defines whether the boundary point may be used for DTM creation. |

| <b>Field</b>                 | <b>Description</b>   |
|------------------------------|--|
| <i>Interpolate Elevation</i> | Defines whether the elevation of the boundary point will be automatically calculated by interpolation. |
| <i>BreakLine</i>             | Defines whether the lines of the new boundary be a breakline.  |

## Create Enclosing icon

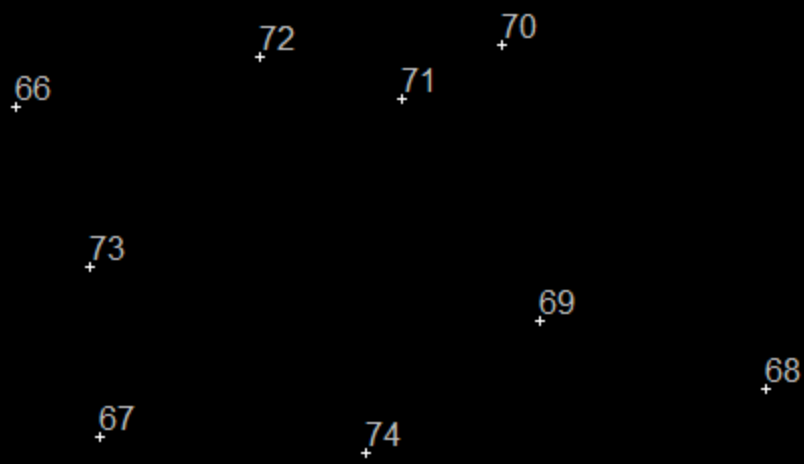
The **Create Enclosing** icon of the Boundary group allows you to create a boundary which encloses a defined set of points.

There are three methods for enclosing boundary creation:

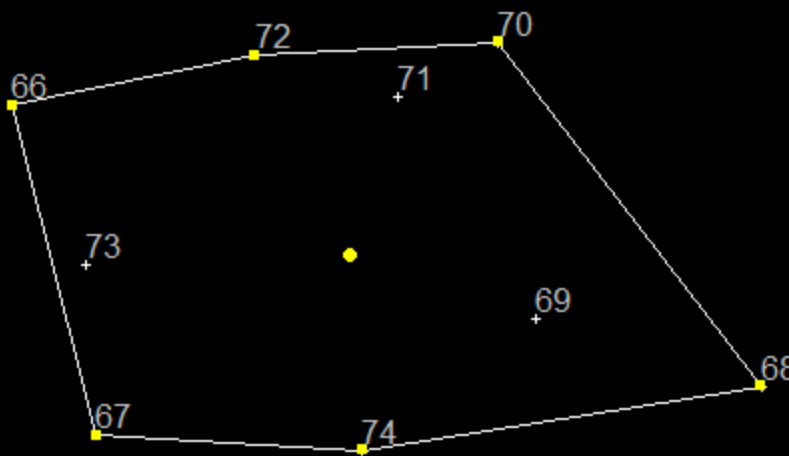
- Convex Boundary — creates a convex boundary around the extent of the selected points. The boundary will enclose all of the selected data.
- Tight Boundary — creates a boundary passing through each of the outer points selected, thus forming a shrink wrap of the points.
- Closed — shrink wraps the selected points and entities to form a continuous boundary along the outer edges of the selection.



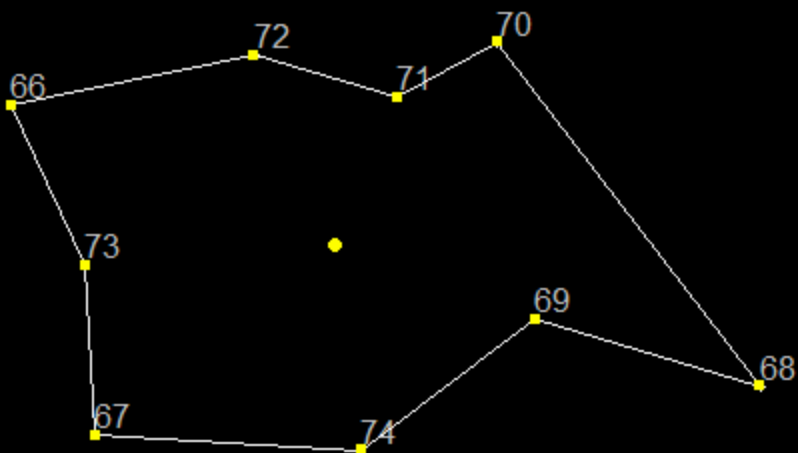
Before

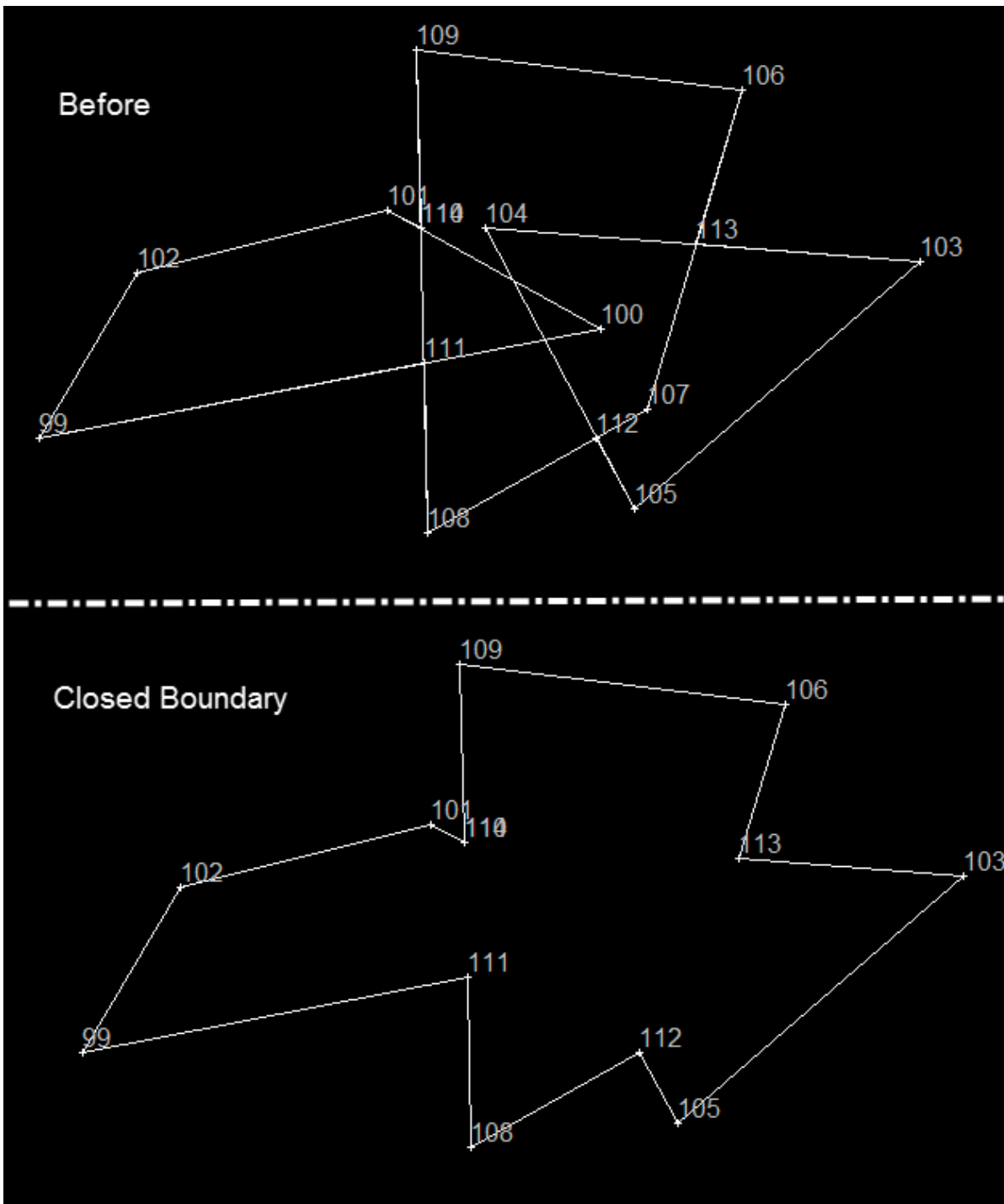


Convex Boundary



Tight Boundary



**Convex and tight boundaries****Close boundary**

To create an enclosing boundary:

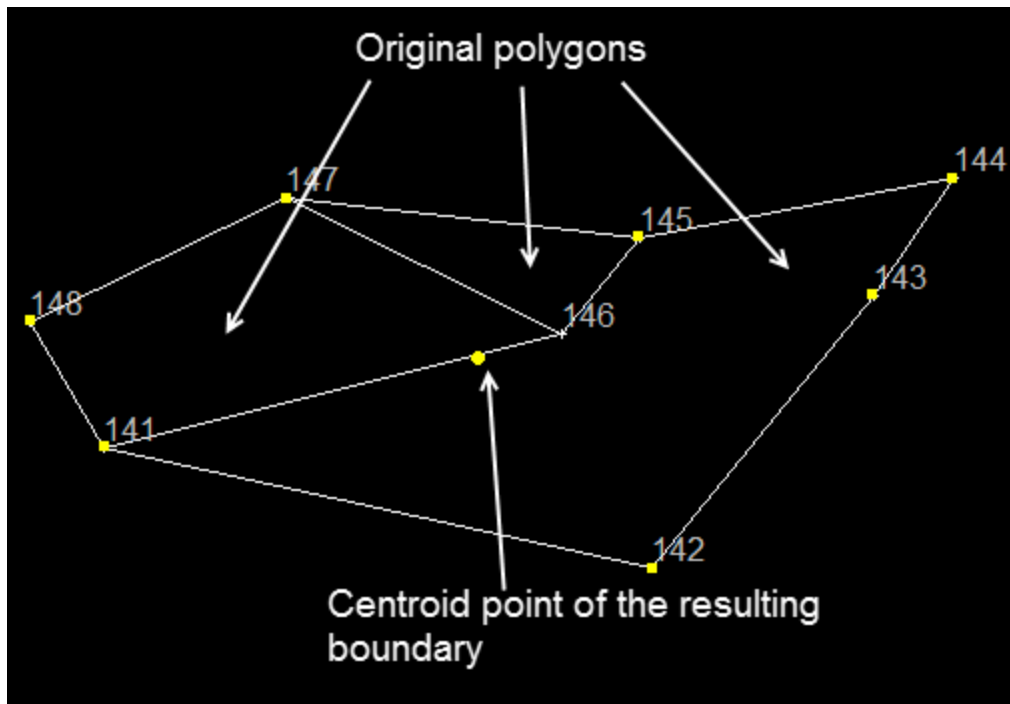
1. If needed, select the required entities.
2. In the *Boundary* group of the *Surface* tab, click the **Create Enclosing** icon.
3. The Create Enclosed Polygon dialog is displayed.

4. In the Selection group box, define the base points and entities for boundary creation. Select one of the following radiobuttons:
  - *All* — to use all existing points and entities.
  - *Current Selection* — to use only currently selected points and entities.
5. If needed, tick the *Ignore points without elevation* checkbox. Points with undefined elevations won't be used.
6. In the *Method* group box, select the appropriate creation method. See description above for details.
7. Click **OK**.

The boundary is created.

## From Polygons icon

The **From Polygons** icon of the Boundary group allows you to create a boundary from two or more existing connected polygons, i.e. polygons, which have common edge. Note that the original polygons won't be deleted.



### Boundary from the connected polygons

To create a boundary from existing polygons:

1. In the *Boundary* group of the *Surface* tab, click the **From Polygons** icon.
2. In the survey view, continuously select the required polygons.
3. When finished, press *Esc*.

The boundary is created.

## Create List icon

The **Create List** icon of the Boundary group allows you to create lists of existing boundaries and enclosed areas. This function defines a boundary for each closed area on the active layers displayed in the project.

To create a list of boundaries and enclosed areas:

1. In the *Boundary* group of the *Surface* tab, click the **Create List** icon.

The *Edit Boundary List Name* dialog is displayed.

2. In the *Name* editbox, type the name of the boundary list.
3. If needed, tick the *Include Existing Boundaries* checkbox.
4. Click **OK**.

The enclosed areas are converted to boundaries. The message window appears, displaying the boundaries, included to the list.

## Edit Lists icon

The **Edit Lists** icon of the *Boundary* group allows you to manage boundary lists.

To delete a boundary list:

1. In the *Boundary* group of the *Surface* tab, click the **Edit List** icon.

The *Edit Boundary Lists* dialog is displayed.

2. Select the required list and click **Delete**.

The message prompts you to delete included boundaries.

3. Click **Yes** or **No** as you need.

The boundary list is deleted.

To delete a boundary from a list:

1. In the *Boundary* group of the *Surface* tab, click the **Edit List** icon.

The *Edit Boundary Lists* dialog is displayed.

2. Select the required list and click **Edit**.

The boundary list dialog is displayed.

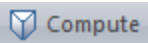
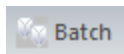
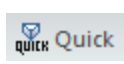
3. Select the required boundary and click **Delete**.
4. If needed, delete more boundaries.
5. Click **OK**.

6. Click **OK** to close the *Edit Boundary Lists* dialog.

The boundary is deleted from the list.

## Volume group

The *Volume* group from the *Surface* tab of the MAGNET Office ribbon allows you to calculate volumes in your project. It contains three icons, described in the table below.

|   |   |
|---|---|
|  | <p>Compute icon</p> <p>Click it to compute volume between two surfaces and a boundary.</p>  |
|  | <p>Batch icon</p> <p>Click it to calculate volumes for several stockpiles in project.</p>   |
|  | <p>Quick icon</p> <p>Click it to automatically calculate volume between an existing DTM and automatically created design DTM.</p> |

### Compute icon

The **Compute** icon of the Volume group allows you to calculate the volumes between two surface models within a defined boundary. The surface models may be in the same project or two projects.

One of the surfaces may be a defined datum level to represent a surface as a horizontal plane. In this case, no DTM is required for this surface.

### Volume computation methods

When computing volumes, keep in mind that:

- DTMs must exist for both surfaces unless a datum height is being used for one surface.
- If the DTMs are in different projects, both projects must be opened in the MAGNET Office and the design surface project should be the current project.
- A boundary must be defined for the computation. If two projects are used, the boundary should be in the current project.
- DTMs for both surfaces should fully cover the boundary area. If the triangular mesh does not cover the full extent of the boundary, the results will be unreliable. You should check the boundary areas specified in the output report. The areas for the natural and design surfaces should match the boundary area.
- For precise results, consider how well the mesh fits the actual terrain. If it is a good fit, then good results will be obtained.
- Make sure that all breaklines have been defined and inserted into the DTM; otherwise, the volumes computed may be inaccurate. Make sure there are no crossing breaklines.

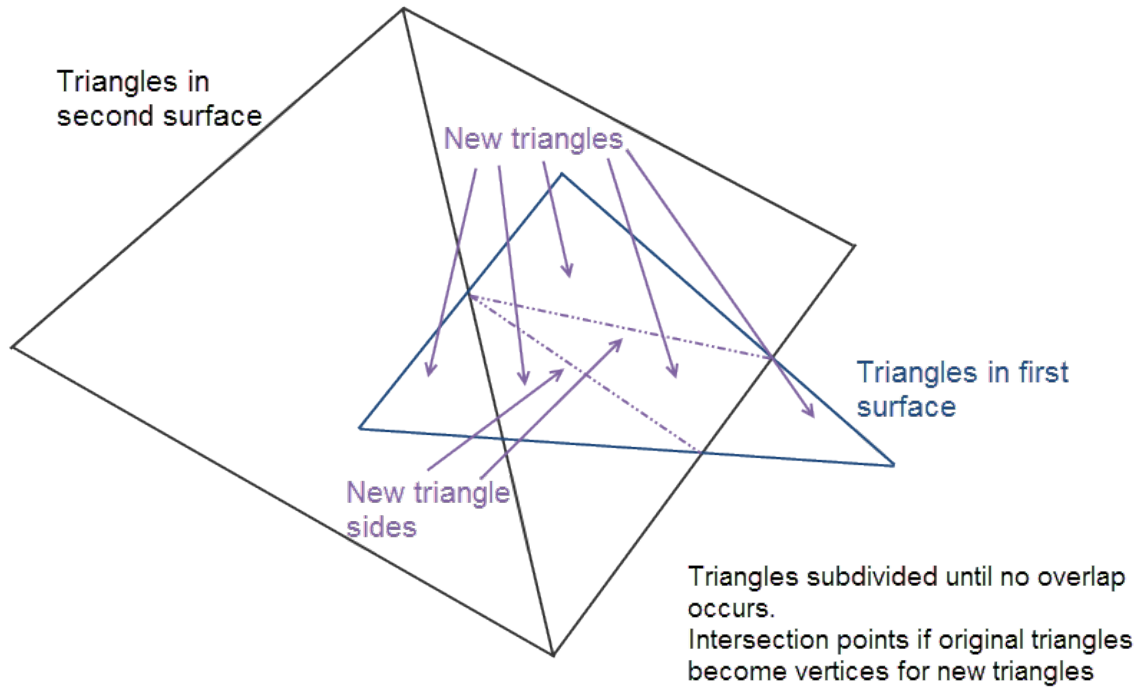
#### Prism method

This method calculates exact volumes, as it uses of the DTM triangles to calculate the volumes. The mesh has been computed from the exact data, so no interpolation is used in the computation.

The triangular mesh for one project is subdivided until each triangle for that project fits entirely inside a triangle for the other project and is all cut or all fill. For each triangle, a mean height and area are computed. Because the triangles in both projects are coincident, individual cut and fill volumes can be built up over the entire model. Picture below illustrates the subdivision of triangles. The original triangulation is not altered by this subdivision; the subdivided triangles are only used in the computation and are then discarded.

$$Volume(Tri)_X = Area(Tri)_X \times (Mean\ Hgt\ Tri_2 - Mean\ Hgt\ Tri_1)$$

Individual cut and fill volumes are then tabulated to produce total cut and total fill for the entire area within the boundary



**Prism method**

The prism method is the most accurate method of determining volumes in the MAGNET Office. The surveyed points are used for the triangular model, so there is no interpolation of data giving the closest result for the project data.

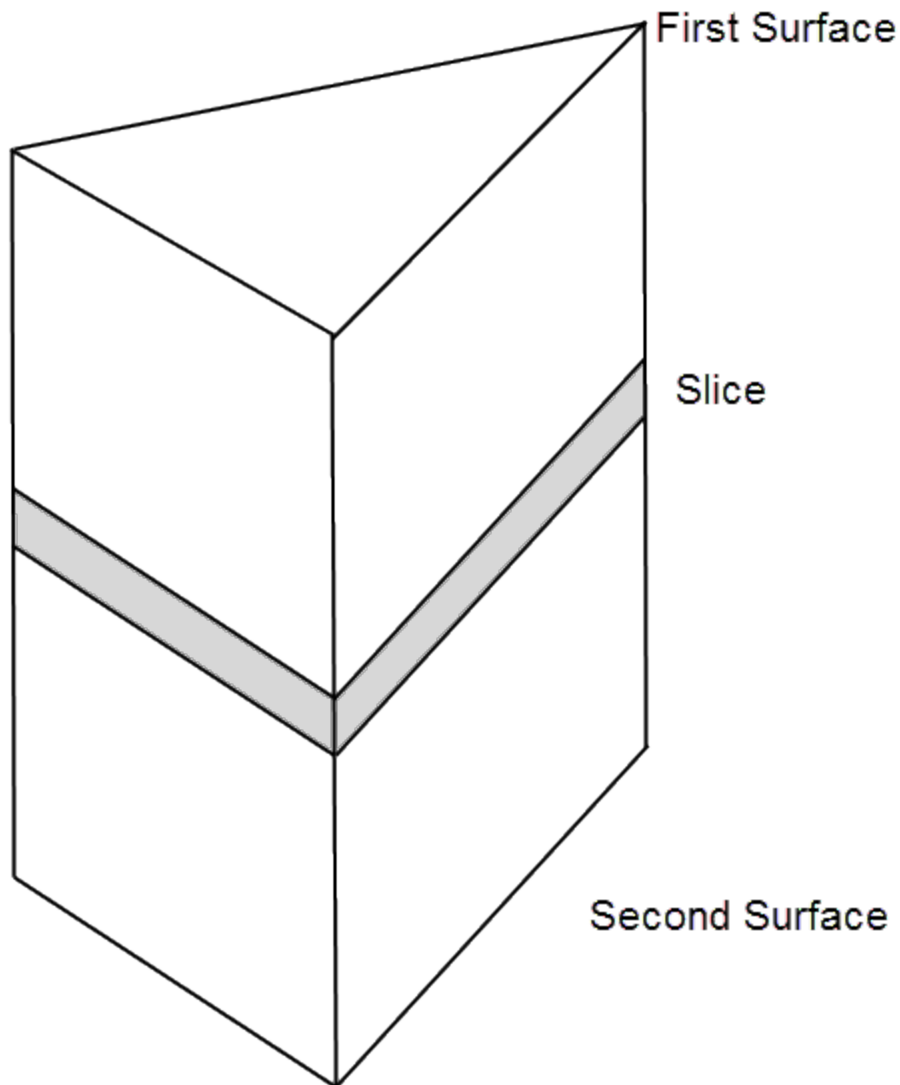
Slices method

This method computes volumes between specified contour intervals using the prismoidal method.

The surface area of the two models is in the form of 3-dimensional triangles. The slices method subdivides this existing triangular mesh until each triangle for the project fits entirely inside a triangle for the other project, is all cut or all fill, and is within the defined boundary. The volume for each subdivided triangle is bounded by up to seven planes; the three vertical sides, the natural surface, the design surface, and the two contour intervals defined by the slice interval, as shown on picture below.

MAGNET Office uses these subtriangle prisms to calculate volumes for each subtriangle prism and for each relevant slice. The results for each slice are accumulated.

$$Volume(Tri) = Area(Tri) \times average \Delta Z$$



### **Slices method**

The final report includes volumes between contours at the nominated interval and is suited to stockpiles, excavations, storm water ponds, dams, and reservoir computations. In the case of an excavation, the result will include cut and fill volumes, but the required answer will be either the total cut or total fill, depending on which surface is entered as the design surface.

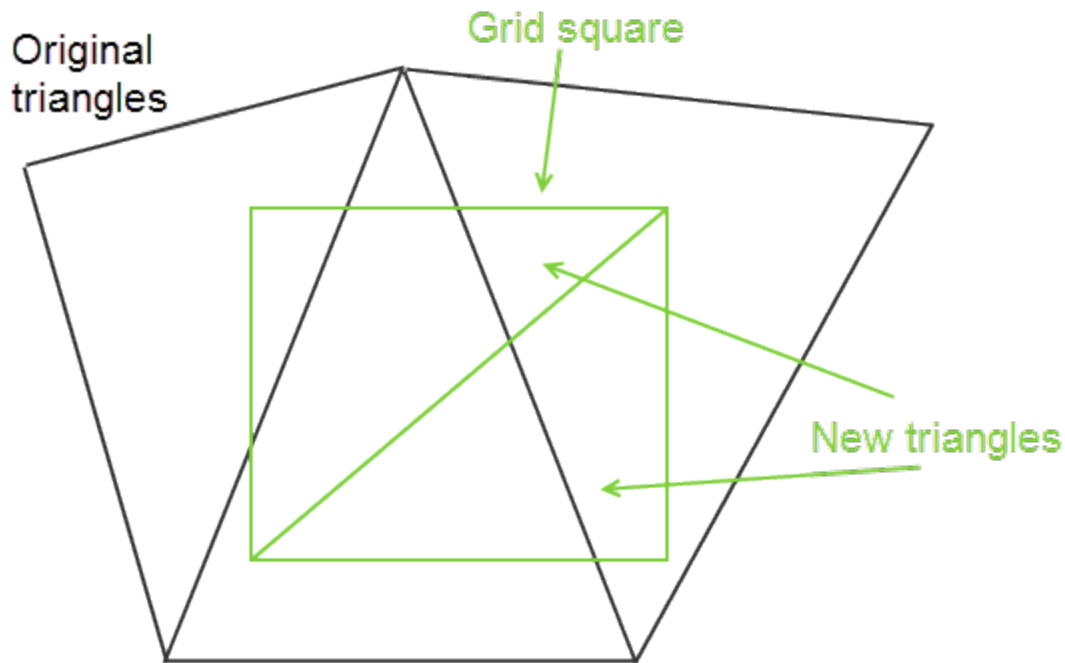
### **Grid method**

In this method, a rectangular grid is overlaid onto the data. At each grid node (intersection) a height is computed for each surface by interpolation from the triangular mesh. The grid spacing in both X and Y directions may be chosen. The accuracy of the answer will increase with a decrease in the grid spacing. The grid interval chosen should be relevant to the terrain involved. For example, for an open pit, it is recommended that the grid interval should be 1/5th the size of the smallest triangle.

This method can only give approximate results because the computation is made from interpolated points. The grid square is subdivided into two triangles for each surface.

The delta z's for each vertex of the triangles are calculated and the following formula is used to calculate the volume.

$$Volume(Tri) = Area(Tri) \times average \Delta Z$$



### Grid method

If the grid triangles are not all cut or all fill, then these triangles are further subdivided and the interpolation of the heights for these triangles is extracted from the grid levels, not the triangular mesh. The same formula is applied to these triangular prisms.

Subdivision of triangles also occurs if one of the grid points is outside the boundary. Triangles are formed to scissor against the boundary as shown below. If the height of the point outside the boundary is known or interpolated from the triangular mesh; then heights along the boundary will be a linear interpolation from the existing grid points. If the point outside the boundary is unknown, then heights along the boundary will be interpolated from the triangular mesh.

### Computing volumes

To compute volume:

1. In the *Volume* group of the *Surface* tab, click the **Compute** icon.  
The **Standard Volumes** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.



**Fields of the *Standard Volumes* dialog**

| <b>Field</b>            | <b>Description</b>   |
|-------------------------|--|
| <i>Design Surface</i>   | Defines the design surface for the computation. Select whether an existing DTM or a known datum level.   |
| <i>Natural Surface</i>  | Defines the natural surface for the computation. Select whether an existing DTM or a known datum level. DTM from another project may be used.  |
| <i>Boundary</i>         | Defines the boundary for the computation.  |
| <i>Cut and Fill DTM</i> | Tick to shade the output DTM. If ticked, select the cut and fill colors and define the name of the output DTM.   |
| <i>Factor</i>           | Defines the swelling or shrinking factor, which leads to increasing or decreasing volume by specified ratio.   |
| <i>Prismoidal</i>       | Tick to compute volumes by using the prismoidal method.  |
| <i>Slices</i>           | Tick to compute volumes by using the slices method. If ticked, defines the slices interval.  |
| <i>Grid</i>             | Tick to compute volumes by using the grid method. If ticked, configure the following parameters: <ul style="list-style-type: none"> <li>• <i>Rotation angle</i> — defines the rotation of the grid over the surface model.</li> <li>• <i>Spacing X</i> and <i>Spacing Y</i> — defines the spacing between grid nodes.</li> </ul> |
| <i>Tonnage</i>          | Tick to calculate also the weight of the volume. If ticked, define the density of the volume.  |

**Batch icon**

The **Batch** icon of the Volume group allows you to monitor progressive volumes on site or calculate volumes for numerous stockpiles within one project. It calculates volumes, using the prism method, between two surfaces within the same project or between two projects for each boundary in a defined boundary list.

Keep in mind following:

- DTMs must exist for both surfaces unless a datum height is being used for one surface.
- If the DTMs are in different projects, both projects must be opened in the MAGNET Office and the design surface project should be the current project.
- A boundary must be defined for the computation. If two projects are used, the boundary should be in the current project.
- DTMs for both surfaces should fully cover the boundary area. If the triangular mesh does not cover the full extent of the boundary, the results will be unreliable. You should check the boundary areas specified in the output report. The areas for the natural and design surfaces should match the boundary area.
- For precise results, consider how well the mesh fits the actual terrain. If it is a good fit, then good results will be obtained.
- Make sure that all breaklines have been defined and inserted into the DTM; otherwise, the volumes computed may be inaccurate. Make sure there are no crossing breaklines.

To compute volume:

1. In the *Volume* group of the *Surface* tab, click the **Batch** icon.

The **Batch Volume s** dialog is displayed.

2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

**Fields of the *Batch Volume s* dialog**

| Field                  | Description   |
|------------------------|---|
| <i>Calculate</i>       | Tick to include the line to calculation.                  |
| <i>Surface</i>         | Defines the design surface.                               |
| <i>Jobs</i>            | Defines the project, containing natural surface.          |
| <i>Surface 2 (Ref)</i> | Defines the natural surface.                              |
| <i>Boundary List</i>   | Defines the boundary for volume computation.              |
| <i>Comments</i>        | Defines any additional comments to be used in the report. |

## Quick icon

The **Quick** icon of the Volume group allows you to automatically create an existing DTM and a design DTM, then calculates a volume between the two surfaces. You must have data that defines, for example, both the toe of a stockpile and the stock pile itself.

To calculate volume:

1. In the *Volume* group of the *Surface* tab, click the **Quick** icon.
2. The **Quick Volume** dialog is displayed.
3. In the *Selection* group box, define the base points and entities for boundary creation. Select one of the following radiobuttons:
  - *All* – to use all existing points and entities.
  - *Current Selection* – to use only currently selected points and entities.
4. In the *Boundary* group box, define whether to use an existing boundary, or define a method for creating a new boundary. See "Create Enclosing icon" section on page 464 for details.
5. In the *Base* group box, define whether to use an existing DTM, or create a new one.
6. Tick the *Retain Created Boundary* checkbox, to save the boundary and place it on the current layer.
7. Tick the *Retain Created DTMs* checkbox, to save the DTMs created during the volume calculation.
8. If needed, tick the *Tonnage* to calculate the weight of the volume. If so, specify the density in the appropriate editbox.
9. Click **OK**.

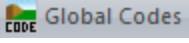
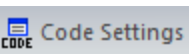
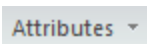

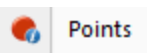

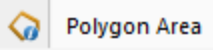
# Library Tab

The *Library* tab of the MAGNET Office ribbon contains control icons, which allows you to work with various libraries, used in the project. It is separated to four groups:

- "Code group" section on the next page
- "Library group" section on page 483
- "Output group" section on page 487
- "Create group" section on page 491

## Code group

The *Code* group from the *Library* tab of the MAGNET Office ribbon allows you to work with the survey codes. It contains three icons and three second level icons, described in the table below.

|   |   |
|---|---|
|  | <p>Global Codes icon<br/>Click it to open the library of global survey codes.</p>   |
|  | <p>Code Settings icon<br/>Click it to configure the survey codes.</p>   |
|  | <p>Attributes icon<br/>This icon contains the list of the second level icons for various operations with entities attributes. Click  to expand the list of the second level icons.</p> |
|  | <p>Points icon<br/>Click it to edit points attributes.</p>  |
|  | <p>Lines icon<br/>Click it to edit lines attributes.</p>  |
|  | <p>Polygon Area icon<br/>Click it to edit polygon area attributes.</p>  |

### Global Codes icon

The **Global Codes** icon of the Code group allows you to edit global survey codes.

The *Survey Codes* dialog, opened at *Global Survey Codes* tab appears after clicking. For more information, refer to "Global survey codes editor" section on page 540.

### Code Settings icon

The **Code Settings** icon of the Code group allows you to define the various settings for controlling the stringing together of feature codes. It has other settings for command codes and delimiters used to extend the functions available when survey codes are used in the field.

To set up the survey codes:

1. In the *Code* group of the *Library* tab, click the **Code Settings** icon.  
The *Survey Code Settings* dialog is displayed.
2. Make the required configurations. Fields are described in the table below.
3. Verify your settings:
  1. Click **Test**.  
The *Feature Code Test* dialog is displayed.
  2. Type the required feature code and click **OK**.
  3. Review the result in the message window.
4. If needed, change the settings and verify them.
5. Click **OK**.

**Fields of the Survey Code Settings dialog**

| <b>Field</b>                          | <b>Description</b>   |
|---------------------------------------|--|
| <i>Survey Code Format</i>             | Fields from this group box define the order in which the code, string numbers, and contour flags are entered in the instrument. The <i>Preview</i> box displays the settings.  |
| <i>Number of digits for stringing</i> | Defines the number of different strings available using the same descriptive survey code. Using two digits for the string would provide as many as 99 different strings using the same survey code. A threedigit string provides 999 different strings using the same survey code.   |
| <i>Prefix String Number</i>           | Tick if the string number prefixes the feature code. This is the usual setting - SScode such as: 03TB. Clear this check box if the string number is a suffix to the feature code — codeSS such as: TB03 or TB3.  |
| <i>Contour Flag</i>                   | <p>Tick if the contour flag is entered with the string number. This is essential when numeric feature codes are used.</p> <p>This check box may be selected although the contour digit is not entered with the alpha feature codes. In this case, the contour flag is assumed to be set at 2 which is "read the contour flag from the library" for this feature code. Other contour flags used are 0 which is "contour flag not set" and 1 which is "contour flag set."</p> <p>Clear the check box if no contour flags are used. If no flag is used, then the default setting for the Survey Code is applied to the point.</p> |
| <i>Prefix Contour Flag</i>            | <p>Tick if the contour digit is a suffix to the string number. This is the usual setting. SSCcode such as: 031TB or 030TB.</p> <p>Clear this check box if the contour digit prefixes the string number CSScode such as 103TB or 003TB.</p>   |
| <b>Survey Code Commands</b>           |  |
| <i>Delimiter</i>                      | The default is the asterisk. Another character should be chosen if the asterisk is not available on the data logger, such as + or #. The delimiter is used after the feature code to extend the survey code with further commands. The delimiter can indicate a second string and feature code to enable more than one string to be attached to a point, such as: 02FL*04FL point at the intersection of two fence lines 02FL*06TB point on a fence line and a bank.   |
| <i>Comment</i>                        | The default is the forward slash (/). The space character may also be used. The comment character is used after the feature code to indicate that all characters that follow it are optional comments, such as Tree species, manhole number or a note - TR RIMU or TR/RIMU or SWMH 5A or SWMH/ 5A  |
| <i>Start of Arc</i>                   | <p>The default is AS, but may be modified as necessary.</p> <p>The character is used after the delimiter character to indicate the point is the start of an arc, such as: 03TK*AS</p>  |

| Field                       | Description  |
|-----------------------------|--|
| <i>End of Arc</i>           | <p>The default is AE, but may be modified as necessary.</p> <p>The character is used after the delimiter character to indicate the point is the end of an arc, such as: 03TK*AE.</p> <p>When the data is reduced then a two- or three-point arc is created between the start and end points using another point on the string in between these points if available for the three-point arc.</p>  |
| <i>Close String</i>         | <p>The default is C but may be modified as necessary.</p> <p>The character is used after the delimiter character to indicate this point on the string in between these points if available for the three-point arc.</p>  |
| <i>Circle Radius</i>        | <p>The default is CR, but may be modified as necessary.</p> <p>The character is used after the delimiter character to indicate the radius of the circle, based on this point, such as: 03TK*CR5.</p>   |
| <i>Circle Circumference</i> | <p>The default is CE, but may be modified as necessary.</p> <p>The character is used after the delimiter character to indicate the circumference length of the circle, based on this point, such as: 03TK*CE5.</p>   |
| <i>Rectangle</i>            | <p>The default is R but may be modified as necessary.</p> <p>The character is used after the delimiter character on the third point of a rectangle. A new point is computed to form a rectangle with the other points, such as: 01BLD*R A new point will be computed at the fourth corner of the building and lines will join the first point on the string to the new point and from the labelled point to the new point. No level is computed for this new point.</p> <p>When three points are used, the rectangle is automatically squared off.</p> <p>You can also use two points and an offset such as: BLD*R3.5 A rectangle is created between these two points and a parallel line at the specified offset.</p> |
| <i>Scale</i>                | <p>The default is S but may be modified as necessary.</p> <p>The character is used after the delimiter character to set the symbol scale on the point. It is followed by a number representing the radial size of the point feature, such as: TRE*S3</p> <p>When the data is reduced, the point will have the symbol scale set to X scale = 3 and Y scale = 3.</p> <p>The symbol should usually be a scalable symbol.</p>  |
| <i>Check Measurement</i>    | <p>The default is CHK but may be modified as necessary.</p> <p>The character is used after the delimiter character to label a check shot to a back sight or other point with known coordinates, using the same point number already in the dataset.</p> <p>This usage only creates a check shot. It does not include the shot in the averaged calculations when more than one shot is made to one point, such as two shots on left and right face.</p>   |

| Field                | Description  |
|----------------------|--|
| <i>Contour</i>       | <p>The default is Z but may be modified as necessary.</p> <p>The character is used after the delimiter character to turn off the contour flag for this point, such as: 01FCE*Z</p> <p>This is useful if the level shot in the field is not reliable and should not be used in a DTM.</p>   |
| <i>Plot Height</i>   | <p>The default is Y but may be modified as necessary.</p> <p>The character is used after the delimiter character to turn off the height annotation flag for this point, such as: 01FCE*Y.</p> <p>This can be used with the contour flag as 01FCE*YZ.</p>   |
| <i>Offset String</i> | <p>These are used when it is not possible to observe the required point directly, but it is possible to offset the target by a known amount. Many instruments have these features on board, but these options can be used in the coding if the instrument does not compute offsets.</p>  |
| <b>Offsets</b>       |  |
| <i>Radial</i>        | <p>The default is R and is used after a decimal point, which directly follows the feature code with a positive or negative distance for the offset.</p> <p><i>Example: Code.R0.5 computes the point 0.5m further away from the observer than the target position and Code.R-1.00 computes the point 1m closer to the observer.</i></p>         |
| <i>Tangential</i>    | <p>The default is T and is used after a decimal point, which directly follows the feature code with a positive or negative distance for the offset.</p> <p><i>Example: Code.T0.5 computes the point 0.5m to the right of the observation at the target position and Code.T- 1.00 computes the point 1m to the left of the observation.</i></p> |
| <i>Height</i>        | <p>The default is H and is used after a decimal point which directly follows the feature code with a positive or negative distance for the offset.</p> <p><i>Example: Code.H0.3 computes the point 0.3m above the observation at the target position and Code.H-0.5 computes the point 0.5m below the observation.</i></p>                     |

## Points icon

The **Points** icon of the Code group allows you to manage the custom attributes for points.

The **Attributes - Points** dialog appears after clicking. It allows you to create new, edit or delete an existing attributes. See sections below for details.

Fields of the **Attributes - Points** dialog

| Field             | Description                                       |
|-------------------|---|
| <i>Name</i>       | Defines the name of the custom attribute.         |
| <i>Value Type</i> | Defines the type of the custom attribute's value. |

| Field                     | Description   |
|---------------------------|---|
| <i>Max Num Characters</i> | Defines the maximum length of the custom attribute's value. |
| <i>Default Value</i>      | Defines the default value of the custom attribute.          |

## Creating new attributes

To create a new attribute:

1. In the *Code* group of the *Library* tab, click the **Points** icon.  
The *Attributes - Points* dialog is displayed.
2. In the *Name* editbox, type the name of the new attribute.
3. From the *Value Type* drop-down list, select the type of the new attribute's value.
4. In the *Max Num Characters* editbox, specify the maximum length of the custom attribute's value.
5. In the *Default Value* editbox, specify the default value of the custom attribute.
6. Click **New**.

The attribute is created.

## Editing attributes

To edit an existing attribute:

1. In the *Code* group of the *Library* tab, click the **Points** icon.  
The *Attributes - Points* dialog is displayed.
2. Select the required attribute from the list.
3. Make the required configurations. Fields are described in the table above.
4. Click **Apply**.

The attribute is edited.

## Deleting attributes

To delete an existing attribute:

1. In the *Code* group of the *Library* tab, click the **Points** icon.  
The *Attributes - Points* dialog is displayed.
2. Select the required attribute from the list.
3. Click **Delete**.

The attribute is deleted.

## Lines icon

The **Lines** icon of the *Code* group allows you to manage the custom attributes for lines.

The *Attributes - Lines* dialog appears after clicking. It allows you to create new, edit or delete an existing attributes. See sections below for details.

Fields of the *Attributes - Lines* dialog



| Field                     | Description   |
|---------------------------|---|
| <i>Name</i>               | Defines the name of the custom attribute.                   |
| <i>Value Type</i>         | Defines the type of the custom attribute's value.           |
| <i>Max Num Characters</i> | Defines the maximum length of the custom attribute's value. |
| <i>Default Value</i>      | Defines the default value of the custom attribute.          |

## Creating new attributes

To create a new attribute:

1. In the *Code* group of the *Library* tab, click the **Lines** icon.  
The *Attributes - Lines* dialog is displayed.
2. In the *Name* editbox, type the name of the new attribute.
3. From the *Value Type* drop-down list, select the type of the new attribute's value.
4. In the *Max Num Characters* editbox, specify the maximum length of the custom attribute's value.
5. In the *Default Value* editbox, specify the default value of the custom attribute.
6. Click **New**.

The attribute is created.

## Editing attributes

To edit an existing attribute:

1. In the *Code* group of the *Library* tab, click the **Lines** icon.  
The *Attributes - Lines* dialog is displayed.
2. Select the required attribute from the list.
3. Make the required configurations. Fields are described in the table above.
4. Click **Apply**.

The attribute is edited.

## Deleting attributes

To delete an existing attribute:

1. In the *Code* group of the *Library* tab, click the **Lines** icon.  
The *Attributes - Lines* dialog is displayed.
2. Select the required attribute from the list.
3. Click **Delete**.

The attribute is deleted.

## Polygon Area icon

The **Polygon Areas** icon of the *Code* group allows you to manage the custom attributes for polygons.

The *Attributes - Polygon Areas* dialog appears after clicking. It allows you to create new, edit or delete an existing attributes. See sections below for details.

Fields of the *Attributes - Polygon Areas* dialog

| Field                     | Description   |
|---------------------------|---|
| <i>Name</i>               | Defines the name of the custom attribute.                   |
| <i>Value Type</i>         | Defines the type of the custom attribute's value.           |
| <i>Max Num Characters</i> | Defines the maximum length of the custom attribute's value. |
| <i>Default Value</i>      | Defines the default value of the custom attribute.          |

## Creating new attributes

To create a new attribute:

1. In the *Code* group of the *Library* tab, click the **Polygon Areas** icon.  
The *Attributes - Polygon Areas* dialog is displayed.
2. In the *Name* editbox, type the name of the new attribute.
3. From the *Value Type* drop-down list, select the type of the new attribute's value.
4. In the *Max Num Characters* editbox, specify the maximum length of the custom attribute's value.
5. In the *Default Value* editbox, specify the default value of the custom attribute.
6. Click **New**.

The attribute is created.

## Editing attributes

To edit an existing attribute:

1. In the *Code* group of the *Library* tab, click the **Polygon Areas** icon.  
The *Attributes - Polygon Areas* dialog is displayed.
2. Select the required attribute from the list.
3. Make the required configurations. Fields are described in the table above.
4. Click **Apply**.

The attribute is edited.

## Deleting attributes

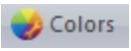
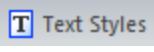

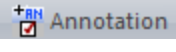
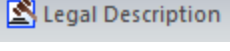
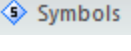
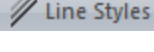
To delete an existing attribute:

1. In the *Code* group of the *Library* tab, click the **Polygon Areas** icon.  
The *Attributes - Polygon Areas* dialog is displayed.
2. Select the required attribute from the list.
3. Click **Delete**.

The attribute is deleted.

## Library group

The *Library* group from the *Library* tab of the MAGNET Office ribbon allows you to edit various MAGNET Office layout libraries. It contains seven icons, described in the table below.

|   |  |
|---|--|
|  | <p>Colors icon<br/>Click it to manage the custom colors library.</p>                         |
|  | <p>Text Styles icon<br/>Click it to modify text styles, used in MAGNET Office.</p>           |
|  | <p>Justification icon<br/>Click it to modify justification styles used in MAGNET Office.</p> |
|  | <p>Annotation icon<br/>Click it to modify annotation styles used in MAGNET Office.</p>       |
|  | <p>Legal Description icon<br/>Click it to create or modify legal description template.</p>   |
|  | <p>Symbols icon<br/>Click it to create or modify symbols in the library.</p>                 |
|  | <p>Line Styles icon<br/>Click it to create or modify line styles in the library.</p>         |

### Colors icon

The **Colors** icon of the Library group allows you to manage the MAGNET Office color palette. This palette is global, and available for all projects.

To create a new color:

1. In the *Library* group of the *Library* tab, click the **Colors** icon.  
The *Create Custom Colors* dialog is displayed.
2. In the *Custom Colors* palette select a cell for the new color.
3. Do one of the following:
  - Configure the new color by using the color palette and shade bar.
  - Manually enter the required data in the "Hue", "Sat", "Lum", "Red", "Green" and "Blue" editboxes.
4. Click **Add to Custom Colors**.  
The configured color is added to the selected cell.
5. Click **OK**.

To import the current palette to the color file, click **Import**.

To load previously configuration from the external file, click **Export**.

### Text Styles icon

The **Text Styles** icon of the Library group allows you to manage the text styles library. Text styles define layout of all textual data in the MAGNET Office – point numbers, entities annotations, etc. The settings, configured in the library are global, and available for all projects. See "Text styles library" section on page 631 for details.

The *Text styles* dialog appears after clicking. It contains the list of the existing text styles and font, size, color and formatting for each style. Buttons of the dialog are described in the table below.

**Buttons of the *Text Style* dialog**

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new text style. For more information refer to "Creating text styles" section on page 631.    |
| <b>Modify</b> | Click it to edit an existing text style. For more information refer to "Editing text styles" section on page 631. |
| <b>Rename</b> | Click it to rename an existing text style.<br>NOTE<br>The <b>\$\$DEFAULT</b> text style cannot be renamed.        |
| <b>Delete</b> | Click it to delete an existing text style.<br>NOTE<br>The <b>\$\$DEFAULT</b> text style cannot be deleted.        |
| <b>Import</b> | Click it to load a text style from an external file.  |
| <b>OK</b>     | Click it to save changes and close the dialog.  |
| <b>Cancel</b> | Click it to close the dialog without saving changes.  |

**Justification icon**

The **Justification** icon of the Library group allows you to manage the number justification styles library. The settings, configured in the library are global, and available for all projects. See "Justification styles library" section on page 632 for details.

Justification style defines the format of the number and its decimal precision. It controls the appearance of the numerical values used in such text items as height annotation, grid values, chainage, and levels in road drawings.

The **Justification Style** dialog appears after clicking. Buttons of the dialog are described in the table below.

**Buttons of the *Justification Style* dialog**

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new justification style. For more information refer to "Creating justification styles" section on page 633.    |
| <b>Modify</b> | Click it to edit an existing justification style. For more information refer to "Editing justification styles" section on page 633. |
| <b>Rename</b> | Click it to rename an existing justification style.<br>NOTE<br>The <b>\$\$DEFAULT</b> justification style cannot be renamed.        |
| <b>Delete</b> | Click it to delete an existing justification style.<br>NOTE<br>The <b>\$\$DEFAULT</b> justification style cannot be deleted.        |
| <b>OK</b>     | Click it to save changes and close the dialog.  |
| <b>Cancel</b> | Click it to close the dialog without saving changes.  |

## Annotation icon

Many entities in MAGNET Office have attributes, which can be annotated for displaying on the screen, or for plotting on a printed plan. Several annotation styles are available to set appropriate annotation formats to suit international and national schemes. To display the annotation for the entities, the individual entity must have its annotation option turned on. The current annotation setting for the entity is applied when its annotation option is turned on.

The **Annotation** icon of the Library group allows you to manage annotation styles. See "Annotation styles library" section on page 635 for details.

## Legal Description icon

The **Legal Description** icon of the Library group allows you to manage the legal descriptions templates library. These templates are global, and available in all projects. See "Legal description templates library" section on page 646 for details.

The legal description templates define the automatically generated text, based on the entities from the survey view, which describes these entities.

The *Legal Description Templates Library* dialog appears after clicking. Buttons of the dialog are described in the table below.

### Buttons of the *Legal Description Templates Library* dialog

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new legal description template. For more information refer to "Creating legal description templates" section on page 646.    |
| <b>Modify</b> | Click it to edit an existing legal description template. For more information refer to "Editing legal description templates" section on page 647. |
| <b>Rename</b> | Click it to rename an existing legal description template.<br>NOTE<br>The <b>\$\$DEFAULT</b> template cannot be renamed.                          |
| <b>Delete</b> | Click it to delete an existing legal description template.<br>NOTE<br>The <b>\$\$DEFAULT</b> template cannot be deleted.                          |
| <b>Import</b> | Click it to load the legal description template from an external XML (*.xml) file.  |
| <b>Export</b> | Click it to save the legal description template to an external XML (*.xml) file.  |
| <b>Cancel</b> | Click it to close the dialog.   |

## Symbols icon

The **Symbols** icon of the Library group allows you to manage the symbols library. These symbols are global and may be used in all projects.

Symbols are used for marking out points, which represent various entities in the survey view.

The *Symbols* dialog appears after clicking. Buttons of the dialog are described in the table below.

**Buttons of the *Symbols* dialog**

| <b>Button</b> | <b>Description</b>  |
|---------------|---|
| <b>New</b>    | Click it to create a symbol.  |
| <b>Modify</b> | Click it to edit an existing symbol.  |
| <b>Rename</b> | Click it to rename an existing symbol.  |
| <b>Delete</b> | Click it to delete an existing symbol.  |
| <b>Import</b> | Click it to load the symbol from an external AutoCAD drawing (*.dwg) or CivilCAD Symbol (*.bcd) file. |
| <b>OK</b>     | Click it to save the changes and close the dialog.  |
| <b>Cancel</b> | Click it to close the dialog.   |

**Line Styles icon**

The **Line Styles** icon of the Library group allows you to manage the line styles library. These line styles are global and may be used in all projects.

Line styles are used for marking the lines, which represent various entities in the survey view, by varying the layout of different lines.

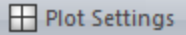
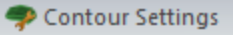
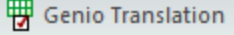
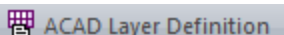
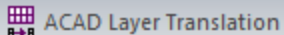
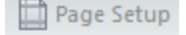
The **Line Styles** dialog appears after clicking. Buttons of the dialog are described in the table below.

**Buttons of the *Line Styles* dialog**

| <b>Button</b> | <b>Description</b>   |
|---------------|--|
| <b>New</b>    | Click it to create a line style.   |
| <b>Modify</b> | Click it to edit an existing line style.   |
| <b>Rename</b> | Click it to rename an existing line style.   |
| <b>Delete</b> | Click it to delete an existing line style.   |
| <b>Import</b> | Click it to load the line style from an external CivilCAD line style (*.blm) file. |
| <b>OK</b>     | Click it to save the changes and close the dialog.                                 |
| <b>Cancel</b> | Click it to close the dialog.  |

## Output group

The *Output* group from the *Library* tab of the MAGNET Office ribbon allows you to modify output layout of the project. It contains six icons, described in the table below.

|  |  |
|--|--|
|  Plot Settings          | Plot Settings icon<br>Click it to create or modify plot settings.  |
|  Contour Settings       | Contour Settings icon<br>Click it to create or modify contour settings.  |
|  Genio Translation      | Genio Translation icon<br>Click it to create or modify Genio Translation Table.  |
|  ACAD Layer Definition  | ACAD Layer Definition icon<br>Click it to setup a table of layer names and settings to be used on the AutoCAD Layer Translation table. |
|  ACAD Layer Translation | ACAD Layer Translation icon<br>Click it to define which AutoCAD layer to translate in place of MAGNET Office layer.                    |
|  Page Setup             | Page Setup icon<br>Click it to configure paper size for plotting.  |

### Plot Settings icon

The **Plot Settings** icon of the Output group allows you to configure plot settings library.

To manage the plot settings library:

1. In the *Output* group of the *Library* tab, click the **Plot Settings** icon.  
The *Library Plot Settings* dialog is displayed.
2. Make the required configurations. For more information, refer to "Plot settings library" section on page 650.
3. When finished, click **OK**.

#### Buttons of the *Library Plot Settings* dialog

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new contour settings set.  |
| <b>Modify</b> | Click it to modify an existing contour settings set.  |
| <b>Rename</b> | Click it to rename an existing contour settings set.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be renamed. |
| <b>Delete</b> | Click it to delete an existing contour settings set.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be deleted. |
| <b>OK</b>     | Click it to close the dialog.   |

### Contour Settings icon

The **Contour Settings** icon of the Output group allows you to configure contour settings library.

To manage the contour settings library:

1. In the *Output* group of the *Library* tab, click the **Contour Settings** icon.  
The *Library Contour Settings* dialog is displayed.
2. Make the required configurations. For more information, refer to "Contour settings library" section on page 655.
3. When finished, click **OK**.

#### Buttons of the *Library Contour Settings* dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new contour settings set. For more information, refer to "Creating library contour settings sets" section on page 655.      |
| <b>Modify</b> | Click it to modify an existing contour settings set. For more information, refer to "Editing library contour settings sets" section on page 656. |
| <b>Rename</b> | Click it to rename an existing contour settings set.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be renamed.                                    |
| <b>Delete</b> | Click it to delete an existing contour settings set.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be deleted.                                    |
| <b>OK</b>     | Click it to close the dialog.  |

## Genio Translation icon

The **Genio Translation** icon of the *Output* group allows you to manage genio translation tables.

To manage the genio tables library:

1. In the *Output* group of the *Library* tab, click the **Genio Translation** icon.  
The *Genio Translation Tables* dialog is displayed.
2. Make the required configurations. For more information, refer to "Genio translation tables library" section on page 658.
3. When finished, click **OK**.

#### Buttons of the *Genio Translation Tables* dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new genio translation table. For more information, refer to "Creating genio translation tables" section on page 658.      |
| <b>Modify</b> | Click it to modify an existing genio translation table. For more information, refer to "Editing genio translation tables" section on page 659. |
| <b>Rename</b> | Click it to rename an existing genio translation table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be renamed.                             |



| Button        | Description   |
|---------------|---|
| <b>Delete</b> | Click it to delete an existing genio translation tablet.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be deleted. |
| <b>OK</b>     | Click it to close the dialog.   |

## ACAD Layer Definition icon

The **ACAD Layer Definition** icon of the Output group allows you to manage tables of layer names and layer settings to use in the Autocad Layer Translation table for Aoutodesk RealDWG (\*.*dxf* or \*.*dwg*) files export.

To manage the layer definition tables library:

1. In the *Output* group of the *Library* tab, click the **ACAD Layer Definition** icon.  
The *Layer Definition Table* dialog is displayed.
2. Make the required configurations. For more information, refer to "AutoCAD layer definition tables library" section on page 660.
3. When finished, click **OK**.

### Buttons of the *Layer Definition Table* dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new layer definition table. For more information, refer to "Creating AutoCAD layer definition tables" section on page 660.      |
| <b>Modify</b> | Click it to modify an existing layer definition table. For more information, refer to "Editing AutoCAD layer definition tables" section on page 661. |
| <b>Rename</b> | Click it to rename an existing layer definition table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be renamed.                                    |
| <b>Delete</b> | Click it to delete an existing layer definition tablet.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be deleted.                                   |
| <b>OK</b>     | Click it to close the dialog.  |

## ACAD Layer Translation icon

The **ACAD Layer Translation** icon of the Output group allows you to specify which AutoCAD layer to translate in place of the MAGNET Office layer used in the project.

To manage the layer translation tables library:

1. In the *Output* group of the *Library* tab, click the **ACAD Layer Translation** icon.  
The *Layer translation Table* dialog is displayed.
2. Make the required configurations. For more information, refer to t.
3. When finished, click **OK**.

**Buttons of the *Layer translation Table* dialog**

| <b>Button</b> | <b>Description</b>   |
|---------------|--|
| <b>New</b>    | Click it to create a new layer translation table. For more information, refer to "Creating AutoCAD layer translation tables" section on page 663.      |
| <b>Modify</b> | Click it to modify an existing layer translation table. For more information, refer to "Editing AutoCAD layer translation tables" section on page 664. |
| <b>Rename</b> | Click it to rename an existing layer translation table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be renamed.                                     |
| <b>Delete</b> | Click it to delete an existing layer translation table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be deleted.                                     |
| <b>OK</b>     | Click it to close the dialog.  |

**Page Setup icon**

The **Page Setup** icon of the Output group allows you to fine-tune the drawing margins to ensure the project will plot on the chosen printer/plotter or to modify the sheet size. It configures the paper setup which is based on the paper size used in the title block used in drawing editor.

**NOTES**

This icon is available only if a drawing from the drawing editor is saved as a project.

The title block, which was used for the original drawing, will not change after using this feature.

To configure the drawing margins:

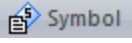
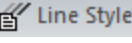
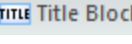
1. In the Output group of the Library tab, click the **Page Setup** icon.

The **Page Setup** dialog is displayed.

2. Make the required configurations and click **OK**.

## Create group

The *Create* group from the *Library* tab of the MAGNET Office ribbon allows you to add new entities to the library. It contains three icons, described in the table below.

|   |  |
|---|--|
|  | Symbol icon<br>Click it to add a new symbol to the library.                              |
|  | Line Style icon<br>Click it to add new, or modify an existing line style in the library. |
|  | Title Block icon<br>Click it to save a designed plan form as a title block.              |

### Symbol icon

The **Symbol** icon of the Create group allows you to save the figure, you have drawn in the survey view as the symbol.

To define the symbol:

1. In the survey view, draw the required symbol, by using MAGNET Office entities.
2. In the *Create* group of the *Library* tab, click the **Symbol** icon.
3. Select the insertion point, by clicking on it.

The *Symbol Name* dialog is displayed.

4. Define the name of the symbol. Do one of the following:
  - In the *Name* editbox, type the name for the symbol.
  - Select an existing line style from the *Existing Symbol* list to overwrite it.

The *Overwrite Job Symbol* checkbox will be ticked automatically.

5. If needed, tick the *Add to Symbol Library* checkbox to make the newly created symbol available in all projects.
6. Click **OK**.

The *Definition* dialog is displayed.

7. Make the required configurations and click **OK**.

The symbol is created.

#### Fields of the *Definition* dialog

| Field                  | Description  |
|------------------------|--|
| <i>Insertion Point</i> | Defines the start point of the symbol.                           |
| <i>Clipping</i>        | Defines the symbol clipping.                                     |
| <i>Scalable</i>        | Defines whether the symbol will be scalable, when plotting.      |
| <i>North Point</i>     | Defines whether the symbol will be used to mark the north point. |
| <i>Description</i>     | Defines the short description of the style.                      |

### Line Style icon

The **Line Style** icon of the Create group allows you to save the line, you have drawn in the survey view.

To define the line style:

1. In the survey view, draw the required line style, by using MAGNET Office entities.
2. In the *Create* group of the *Library* tab, click the **Line Style** icon.
3. Select the insertion point, by clicking on it.

**TIP**

*It is recommended to use the left end point of the line style as the insertion one.*

The **Line Style Name** dialog is displayed.

4. Define the name of the line style. Do one of the following:
  - In the *Name* editbox, type the name for the line style.
  - Select an existing line style from the *Existing Line Style* list to overwrite it.

The *Overwrite Job Line Style* checkbox will be ticked automatically.

5. If needed, tick the *Add to Line Style Library* checkbox to make the newly created style available in all projects.
6. Click **OK**.

The **Definition** dialog is displayed.

7. Make the required configurations and click **OK**.

The line style is created.

#### Fields of the **Definition** dialog

| Field              | Description  |
|--------------------|--|
| <i>Start Point</i> | Defines the start point of the line style segment.         |
| <i>Length</i>      | Defines the length of the line style segment.              |
| <i>Repeat</i>      | Defines whether the style will be repeatable.              |
| <i>Scalable</i>    | Defines whether the style will be scalable, when plotting. |
| <i>Description</i> | Defines the short description of the style.                |

## Title Block icon

The **Title Block** icon of the *Create* group allows you to save a designed plan form as a MAGNET Office title block. The title block defines a drawing, at a specified scale, position, and rotation. You may use it in the *Plot Window* group.

Design the title block in a project in the *Survey View* using the units as millimeters for all of the lines. Any text style can be used in the title block at the sizes currently defined in the *Text styles* library.

The title block should include the border on the sheet and any title information, which is standard to all drawings. Points with symbols, lines with line types, arcs, circles, strings, and text may be used to build up the frame of the plan form and insert detail in the title areas of the plan form.

You can insert keywords with the correct text style and their position defined, by using the **Keyword** icon. These keywords display as *\$keyword* and are replaced by the appropriate text string set in the *Project details* tab of the *Project Settings* dialog when the project is created.

Make sure the extents of the plan form will print on the specified sheet size on the printer/plotter. Each printer/plotter model has its own minimum margins between the edge of the paper and the plotted extents of data. When the design is completed, save the project for future reference or editing of the title block.

To create a title block:

1. In the *Create* group of *Library* tab, click the **Title Block** icon.

The **Page Setup** dialog is displayed.

2. In the *Paper* group box, define the size of the paper.
3. In the *Orientation* group box, define the paper orientation.
4. In the *Margins* group box, define the margins of the plotting in millimeters.
5. Click **OK**.

A rectangular window (solid yellow line with inner dashed green lines) displays attached to the mouse in the upper left corner of the plot or drawing area of the plan form.

6. Define the position of the origin point. Do one of the following:
  - Click the required place in the survey view.
  - At the bottom toolbar, specify the East and North coordinates in the appropriate editboxes.
7. Define the position of the first point to define the drawing area.
8. Define the position of the second point to define the drawing area, creating a yellow rectangle.

The **Save As** dialog is displayed.

9. Save the created title block.

## Cloud Connections Tab

The *Cloud Connections* tab of the MAGNET Office ribbon contains control icons, which allows you to manage your SiteLINK 3D and MAGNET Enterprise services. It contains two groups:




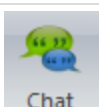
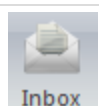
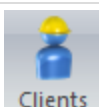
- "SiteLINK 3D group" section on the facing page
- "Enterprise group" section on page 497

## SiteLINK 3D group

The *SiteLINK 3D* group from the *Cloud Connections* tab of the MAGNET Office ribbon allows you to manage your SiteLINK 3D service.

Site-Link provides connection to projects in the field by allowing office personnel to see location of equipment and information it. In addition data can be sent to and received from the equipment in the field.

The group contains six icons, described in the table below.

|   |  |
|---|--|
| <br>Settings   | <p>Settings icon</p> <p>Click it to configure SiteLINK 3D server settings.</p> |
| <br>Connect    | <p>Connect icon</p> <p>Click it to connect to the SiteLINK 3D server.</p>      |
| <br>Send Files | <p>Send Files icon</p> <p>Click it to send files to SiteLINK 3D clients.</p>   |
| <br>Chat       | <p>Chat icon</p> <p>Click it to chat with SiteLINK 3D clients.</p>             |
| <br>Inbox     | <p>Inbox icon</p> <p>Click it to open SiteLINK 3D inbox.</p>                   |
| <br>Clients  | <p>Clients icon</p> <p>Click it to show SiteLINK 3D clients list.</p>          |

### Settings icon

The **Settings** icon of the SiteLINK 3D group allows you to configure the SiteLINK 3D server settings.

Click the icon to open the *SiteLINK 3D Server* tab of the **Project Settings** dialog. See "Project SiteLINK 3D server" section on page 586 for details.

### Connect icon

Click the **Connect** icon of the SiteLINK 3D group to connect to the SiteLINK3D server.

### Send Files icon

The **Send Files** icon of the SiteLINK 3D group allows you to send job files to other SiteLINK3D clients.

To send files:

1. In the *SiteLINK 3D* group of the *SiteLINK 3D* tab, click the **Send Files** icon.  
The **Send to SiteLINK 3D clients** dialog is displayed. The table in the left side of the dialog lists all SiteLINK clients project details.
2. In the right side of the dialog on the *File transfer* tab, configure the transmission and click **Send**.

## Chat icon

The **Chat** icon of the SiteLINK 3D group allows you to send instant messages to other SiteLINK3D clients.

To send files:

1. In the *SiteLINK 3D* group of the *SiteLINK 3D* tab, click the **Chat** icon.  
The **Send to SiteLINK 3D clients** dialog is displayed. The table in the left side of the dialog lists all SiteLINK clients project details.
2. In the left side of the dialog, select the message receiver.
3. In the right side of the dialog, on the *Messaging* tab, type your message and click **Send**.







## Inbox icon

Click the **Inbox** icon of the SiteLINK 3D group to view your Inbox folder with received files and messages.

## Clients icon

Click the **Clients** icon of the SiteLINK 3D group to open the SiteLINK3D clients list.

### Buttons of the SiteLINK3D clients list

| Fields  | Description   |
|---|---|
|    | Click it to connect or disconnect to the server                       |
|  | Click it to view selected SiteLINK clients at their current position. |
|  | Click it to send a data file to a selected SiteLINK client            |
|  | Click it to send a message to a selected SiteLINK client              |
|  | Click it to view all SiteLINK clients' information.                   |
|  | Click it to list data files transferred from SiteLINK clients         |



## Enterprise group

The *Enterprise* group from the *Cloud Connections* tab of the MAGNET Office ribbon allows you to use the MAGNET Enterprise service. It contains nine icons, described in the table below.

|   |   |
|---|---|
|    | <p>Logon icon<br/>Click it to connect with the Enterprise server.</p>   |
|    | <p>Chat icon<br/>Click it to send a message to a user or a group of users from your company.</p>  |
|    | <p>Connect to Project icon<br/>Click it to manage Enterprise projects.</p>  |
|    | <p>Options icon<br/>Click it to edit Enterprise account and connecting settings.</p>  |
|    | <p>Upload Files icon<br/>Click it to upload your files to the Enterprise server.</p>  |
|  | <p>Download Files icon<br/>Click it to download your files from the Enterprise server.</p>  |
|  | <p>Upload Current Job icon<br/>Click it to upload files of the current job to the Enterprise server.</p>  |
|  | <p>Upload Current Job for Magnet Field<br/>Click it to convert current job to MAGNET Field job format and upload it to the Enterprise server.</p> |
|  | <p>Upload Current Job for 3DMC<br/>Click it to convert current job to 3DMC format and upload it to the Enterprise server.</p>                     |

### Logon icon

The **Logon** icon of the Enterprise group allows you to connect to the MAGNET Enterprise server.

To connect to the server:

1. In the *Enterprise* group of the *Cloud Connections* tab, click the **Logon** icon.

The **Logon** dialog is displayed. Fields are described in the table below.

2. In the **Logon** dialog, make the required configurations.
3. Click **Logon**.

**Fields of the Logon dialog**

| Field                         | Description   |
|-------------------------------|---|
| <i>Login</i>                  | Defines the Enterprise login (an e-mail address), provided by the Enterprise administrator of your company or by dealer |
| <i>Save login</i>             | Tick to save the specified Enterprise login.  |
| <i>Password</i>               | Defines the Enterprise password, provided by the Enterprise administrator of your company or by dealer                  |
| <i>Save password</i>          | Tick to save the specified Enterprise password.   |
| <i>Auto logon on start-up</i> | Tick to automatically logon to MAGNET Enterprise each time you launch the MAGNET Office.                                |

**Chat icon**

The **Chat** icon of the Enterprise group allows you to communicate via the text messages with the MAGNET users in your company.

To communicate with other users:

1. In the *Enterprise* group of the *Cloud Connections* tab, click the **Chat** icon.  
The **Chat** window is displayed.
2. In the *Users* tab, select the required user or group of users.
3. Click **Start Chat**.  
The **Chats** tab is open.
4. Type your message and click **Send**.

**Connect to Project icon**

The **Connect to Project** icon of the Enterprise group allows you to upload/download data of your project to the Enterprise server.

You can create a project on the Enterprise server. After creating a project you can upload/download data to the project. You can create unlimited number of projects.

To create a project:

1. In the *Enterprise* group of the *Cloud Connections* tab, click the **Connect to Project** icon.  
The **Project** dialog is displayed.
2. In the *New Project* editbox, type the name of the project.
3. Click **Create**.  
The project is created.

To connect to an existing project:

1. In the *Enterprise* group of the *Cloud Connections* tab, click the **Connect to Project** icon.  
The **Project** dialog is displayed.
2. From the *Available Projects* list, select the required project.
3. Click **Connect**.

## Options icon

Click the **Options** icon of the *Enterprise* group allows you to edit your account (e-mail and password) and options of connection to the *Enterprise* server.

## Upload Files icon

The **Upload Files** icon of the *Enterprise* group allows you to upload your files to the *Enterprise* server.

To upload files to the *Enterprise* server:

1. If needed, connect to the *Enterprise* server. See "Logon icon" section on page 497 for details.
2. In the *Files* group of the *Enterprise* tab, click the **Upload Files** icon.  
The **Upload files** dialog is displayed.
3. In the *Files* group box, click **Add**.  
The **Open** dialog is displayed.
4. From the *Files of type* drop-down list, select the required file format.
5. Navigate to the location of the required file, select project it, and click **Open**.
6. In the *Recipients* group box, select the *Enterprise* project to which the files will be uploaded.
7. Click **Upload**.

## Download Files icon

The **Download Files** icon of the *Enterprise* group allows you to download files from the *Enterprise* server.

To download files:

1. If needed, connect to the *Enterprise* server. See "Logon icon" section on page 497 for details.
2. In the *Files* group of the *Enterprise* tab, click the **Download Files** icon.  
The **Download files** dialog is displayed.
3. In the *Files* group box, select the required inbox at the *Enterprise* server.
4. In the right panel, select the required files.
5. In the *Target* group box, do one of the following:
  - Tick the *Local directory* checkbox, to save the files on your computer. If so, click **Select** and define the directory for files.
  - Tick the *Import into current project* checkbox, to import files into current project.
6. Click **Download**.

## Upload Current Job icon

The **Upload Current Job** icon of the Enterprise group allows you to upload your current project to the Enterprise server.

To upload files to the Enterprise server:

1. If needed, connect to the Enterprise server. See "Logon icon" section on page 497 for details.
2. In the *Files* group of the *Enterprise* tab, click the **Upload Current Job** icon.

The **Upload Current Job** dialog is displayed.

3. In the *Files* group box, click **Add**.
4. In the *Recipients* group box, select the Enterprise project to which the files will be uploaded.
5. Click **Upload**.

## Upload Current Job for Magnet Field

The **Upload Current Job for Magnet Field** icon of the Enterprise group allows you to convert your current project to the Magnet Field format and upload it to the Enterprise server.

To upload files to the Enterprise server:

1. If needed, connect to the Enterprise server. See "Logon icon" section on page 497 for details.
2. In the *Files* group of the *Enterprise* tab, click the **Upload Current Job for Magnet Field** icon.

The **Enter a file name** dialog is displayed.

3. In the editbox, type the name for the job.
4. Click **OK**.

The **Export** dialog is displayed.

5. In the *Select From* group box, define which data will be uploaded, by selecting the appropriate radiobutton.
6. In the *Export Options* group box, define entities to be uploaded, by ticking the appropriate checkboxes.
7. You may select the exact points, lines, alignments, profiles and DTMs to be uploaded. To do so, select the required entities at the appropriate tabs at the right side of the **Export** dialog.
8. Click **OK**.

The **Upload Current Job** dialog is displayed.

9. In the *Recipients* group box, select the Enterprise project to which the files will be uploaded.
10. Click **Upload**.

## Upload Current Job for 3DMC

The **Upload Current Job for 3DMC** icon of the Enterprise group allows you to convert your current project to the 3DMC format and upload it to the Enterprise server.

To upload files to the Enterprise server:

1. If needed, connect to the Enterprise server. See "Logon icon" section on page 497 for details.
2. In the *Files* group of the *Enterprise* tab, click the **Upload Current Job for 3DMC** icon.

The **Upload Current Job** dialog is displayed.

3. In the *Recipients* group box, select the Enterprise project to which the files will be uploaded.
4. Click **Upload**.

The *Export* dialog is displayed.

5. In the *Select From* group box, define which data will be uploaded, by selecting the appropriate radiobutton.
6. In the *Export Options* group box, define entities to be uploaded, by ticking the appropriate checkboxes.
7. You may select the exact points, lines, alignments, profiles and DTMs to be uploaded. To do so, select the required entities at the appropriate tabs at the right side of the *Export* dialog.
8. Click **OK**.

## Tasks group

The *Tasks* group from the *Cloud Connections* tab of the MAGNET Office ribbon allows you to use the working time tracking feature of MAGNET Enterprise. The group contains two icons:

|   |  |
|---|--|
|  | <p style="text-align: center;">Tasks icon<br/>Click it to view Enterprise tasks.</p>       |
|  | <p style="text-align: center;">Timecards icon<br/>Click it to submit a timesheet card.</p> |

### Tasks icon

The **Tasks** icon of the Tasks group allows you to view the tasks for Enterprise project.

After clicking the icon the *Tasks* dialog is displayed. To view tasks, from the *Project* drop-down list, select the required project and click **Connect**. Tasks from the project will be displayed in the table from *Tasks* group box. For each task its name, start date, end date, and completed percentage are displayed.

### Timecards icon

The **Timecards** icon of the Tasks group allows you to track the time spent for tasks from an Enterprise project.

To submit a timesheet:

1. In the Tasks group of the Enterprise tab, click the Timecards icon.  
The *Timecards* dialog is displayed.
2. From the *Project* drop-down list, select the required project and click **Connect**.  
Tasks are displayed in the table from the *Tasks* group box.
3. Select the required week, using the **Prev** and **Next** buttons.

*NOTE*

*To return to the current week, click **Current**.*

4. Select the required task and specify daily working hours spent for it.
5. Click **Submit**.

*NOTES*



*If you specify only working hours, the Completed percentage will be calculated by Enterprise service after submitting timecard. If you specify the Completed percentage manually, Enterprise will set this value for task and automatic calculations for this task will stop.*

*The task has a completed status, when completion percentage reaches 100%. You can submit working hours for completed task.*

## Redlines group

Redlines are small sketches generated by a manager to communicate with field engineers and to use in processing data in MAGNET Office. They are stored in projects at the Enterprise server, and may only be displayed in the Survey View, when connected to the Enterprise project.

To display redlines connect to the Enterprise project. All existing redlines will be displayed in Survey View automatically. You may fit to screen any of them, by selecting the required redline from the drop-down list in the *Redlines* group. The group also contains two icons, described in the table below.

|   |   |
|---|---|
|  Redlines Settings | Redlines Settings icon<br>Click it to configure the visibility of redlines. |
|  Draw Redlines     | Draw Redlines icon<br>Click it to show redlines in empty project.           |

### Redlines Settings icon

The **Redlines Settings** icon of the Redlines group allows you to manage visibility of redlines.

To open the manager, click the icon. The **Redline Settings** dialog appears. It displays the list of the redlines in the Enterprise project with the visibility flags.

#### Buttons of the *Redlines Settings* dialog

| Button                  | Description   |
|-------------------------|---|
| <b>OK</b>               | Click it to save the changes and close the dialog.              |
| <b>Cancel</b>           | Click it to discard the changes and close the dialog.           |
| <b>Invert On/Off</b>    | Click it to turn on inactive redlines and turn off active ones. |
| <b>Off</b>              | Click it to turn off selected redlines.                         |
| <b>On</b>               | Click it to turn on selected redlines.                          |
| <b>Select All</b>       | Click it to select all existing layers in the dialog.           |
| <b>Invert Selection</b> | Click it to invert the selection of the layers in the dialog.   |

### Draw Redlines icon

The **Draw Redlines** icon of the Redlines group allows you to view redlines in newly created project.

Redlines don't display redlines in newly created project. To view them, click the icon.

## Window Tab





The *Window* tab of the MAGNET Office ribbon contains controls icon, which allows you to configure MAGNET Office window layout. It contains one group:

- "Window group" section on the facing page



## Window group

The *Window* group from the *Window* tab of the MAGNET Office ribbon contains control icons, which allow you to configure MAGNET Office window layout. It contains four icons, described in the table below.

|  |  |
|--|--|
| <br>New Window        | <p style="text-align: center;">New Window icon<br/>Click it to create a new window in the work area.</p>                 |
| <br>Cascade           | <p style="text-align: center;">Cascade icon<br/>Click it to cascade windows in the working area.</p>                     |
| <br>Tile Horizontally | <p style="text-align: center;">Tile Horizontally icon<br/>Click it to tile windows in the working area horizontally.</p> |
| <br>Tile Vertically   | <p style="text-align: center;">Tile Vertically icon<br/>Click it to tile windows in the working area vertically.</p>     |

### New Window icon

Click the **New Window** icon of the Window group to open the current project once again in the new window.

### Cascade icon

Click the **Cascade** icon of the Window group to cascade opened in the MAGNET Office windows.

### Tile Horizontally icon

Click the **Tile Horizontally** icon of the Window group to tile opened in the MAGNET Office windows horizontally.

### Tile Vertically icon

Click the **Tile Vertically** icon of the Window group to tile opened in the MAGNET Office windows vertically.



## Help Tab

The *Help* tab of the MAGNET Office ribbon contains control icons, which allows you to display help and licenses information. It is separated to two groups:

- "Help group" section on the facing page
- "Licensing and Version group" section on page 508

## Help group

The *Help* group from the *Help* tab of the MAGNET Office ribbon allows you to read product help and hints. It contains two icons, described in the table below.

|  |  |
|--|--|
| <br>Help                  | <p>Help icon<br/>Click it to open product help.</p>              |
| <br>HINT<br>Display Hints | <p>Display Hints icon<br/>Click it to display product hints.</p> |

### Help icon

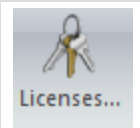
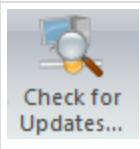
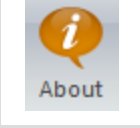
Click the **Help** icon of the Help group to open the title page of the MAGNET Office help.

### Display Hints icon

Click the **Display Hints** icon of the Help group to display the application hints.

## Licensing and Version group

The *Licensing and Version* group from the *Help* tab of the MAGNET Office ribbon allows you to view information about MAGNET Office application and available licenses. It contains two icons, described in the table below.

|   |  |
|---|--|
|  | <p>Licenses icon<br/>Click it to display licenses information.</p>                     |
|  | <p>Check for Updates icon<br/>Click it to check for available updates.</p>             |
|  | <p>About icon<br/>Click it to display information about MAGNET Office application.</p> |

### Licenses icon

The **Licenses** icon of the Licensing and Version group allows you to get the licensing information.

To view the license information, click the icon. The **Product Activation** window is displayed. It contains information about the activated modules and expiration date for each module.

To re-activate the software, click **Re-Activate**. See "MAGNET Office activation" section on page 856 for details.

### Check for Updates icon

The **Check for Update** icon of the Licensing and Version group allows you to check whether any updates are available for your MAGNET Office application.

### About icon

Click the **About** icon of the Licensing and Version group to get the information about MAGNET Office version, activated modules, serial number and device ID to which the serial number is assigned.

# Editors

Except for the survey view, MAGNET Office contains several editors for other needs. You may find their description in the corresponding sections:

- "Point editor" section on the next page
- "String Editor" section on page 513
- "Traverse editor" section on page 516
- "Alignment editor" section on page 520
- "Road editor" section on page 523
- "Raw data editor" section on page 528
- "LS Network editor" section on page 537
- "Deed Entry editor" section on page 538
- "Project survey codes editor" section on page 543
- "Global survey codes editor" section on page 540

## Point editor

The point editor allows you to manually input point data, and place this points in the survey view.

To add points, by using the point editor:

1. In the *Points* group of the *Insert* tab, click the **Spreadsheets Entry** icon.

The point editor is displayed. Table in the left side is for data entry and the right side displays the survey view.

2. Fill in required fields in the table. Description may be found below.
3. In the *View* group of the *File* tab from the point editor ribbon, click the **Save to Survey** icon.

The data is added to the survey view.

4. To return to the survey view do one of the following:
  - In the *Standard* group of the *File* tab, click the **Close** icon – to close the point editor and return to the survey view.
  - In the *View* group of the *File* tab, click the **Survey View** icon – to return to the survey view without closing the point editor.

### NOTE

By default the table contains 40 rows. To add more rows, do the right click on the table, and select "Insert Record" from the context menu.

### Fields of the point editor table

| Field     | Description  |
|-----------|--|
| PtNo      | Defines the number of the point.<br><i>TIP</i><br>If you leave this field empty, MAGNET Office will automatically fill it in with the next available point number. |
| Easting   | Defines the required Easting coordinate of the point.  |
| Northing  | Defines the required Northing coordinate of the point.   |
| Elevation | Defines the required elevation of the point.   |
| Code      | Defines the required point code.   |
| Latitude  | Defines the required Latitude coordinate of the point.<br><b>CAUTION</b><br><b>A coordinate system projection must be defined.</b>                                 |
| Longitude | Defines the required Longitude coordinate of the point.<br><b>CAUTION</b><br><b>A coordinate system projection must be defined.</b>                                |



The point editor has its own ribbon, which is differ from the MAGNET Office default ribbon.

- The *File* tab is divided to three groups. For more information refer to corresponding section:
  - "Standard group" section on the facing page
  - "Import/Export group" section on the facing page
  - "View group" section on page 512

- The *Edit* tab contains only the **Codes** icon. It has the same functionality as the "Codes icon" section on page 95 from the MAGNET Office default ribbon.
- The *Settings* tab contains only the **Configure** icon. For more information refer to "Configure icon" section on the next page from the MAGNET Office default ribbon.
- The *Library* tab contains two icons:
  - The **Global Codes** icon. It has the same functionality as the "Global Codes icon" section on page 476 from the MAGNET Office default ribbon.
  - The **Code Settings** icon. It has the same functionality as the "Code Settings icon" section on page 476 from the MAGNET Office default ribbon.
- The *Window* tab contains three icons:
  - The **Cascade** icon. It has the same functionality as the "Cascade icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Horizontally** icon. It has the same functionality as the "Tile Horizontally icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Vertically** icon. It has the same functionality as the "Tile Vertically icon" section on page 505 from the MAGNET Office default ribbon.

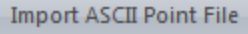
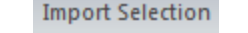
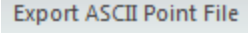
## Standard group

The *Standard* group of the *File* tab of the point editor ribbon allows you to perform basic file operations. It contains two icons, described in the table below.

|  |  |
|--|--|
| <br>Save   | <p style="text-align: center;"><u>Save icon</u></p> <p style="text-align: center;">Click it to save the current point editor document.</p> |
| <br>Close | <p style="text-align: center;"><u>Close icon</u></p> <p style="text-align: center;">Click it to close the point editor.</p>                |

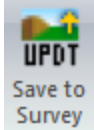

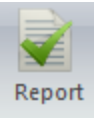
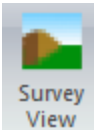
## Import/Export group

The *Import/Export* group of the *File* tab of the point editor ribbon allows you to import and/or export data to the point editor. It contains three icons, described in the table below.

|  |  |
|--|--|
| <br>Import ASCII Point File | <p style="text-align: center;"><u>Import ASCII Point File</u></p> <p>Click it to import points from a ASCII point (<i>*.pts</i>, <i>*.asc</i>, <i>*.xyz</i>, <i>*.csv</i>, <i>*.txt</i>) file to the point editor. For more information about importing ASCII files refer to "Import icon" section on page 39 and "Importing ASCII points files" section on page 41.</p> |
| <br>Import Selection        | <p style="text-align: center;"><u>Import ASCII Point File</u></p> <p>Click it to import points from the currently selected in the survey view objects.</p>   |
| <br>Export ASCII Point File | <p style="text-align: center;"><u>Import ASCII Point File</u></p> <p>Click it to import points from the point editor to an ASCII point (<i>*.pts</i>) file. For more information about importing ASCII files refer to "Export icon" section on page 41 and "Exporting to ASCII point files" section on page 45.</p>  |

## View group

The *View* group of the *File* tab of the point editor ribbon contains four icons, described in the table below.

|  |   |
|--|---|
|   | <p style="text-align: center;"><u>Save to Survey icon</u></p> <p>Click it to upload changes from the point editor to the survey view.</p>   |
|   | <p style="text-align: center;"><u>Regen icon</u></p> <p>Click it to recalculate points coordinates. The message window prompts to do one of the following:</p> <ul style="list-style-type: none"> <li>•Recalculate points latitude and longitude coordinates from easting and northing coordinates.</li> <li>•Recalculate points easting and northing coordinates from latitude and longitude coordinates.</li> </ul> <p><b>CAUTION</b><br/> <b><i>A coordinate system projection must be defined to use this mode.</i></b></p> |
|   | <p style="text-align: center;"><u>Report icon</u></p> <p>Click it to generate a report for manually created points.</p>   |
|  | <p style="text-align: center;"><u>Survey View icon</u></p> <p>Click it to switch to the survey view.</p>  |

## Configure icon

The **Configure** icon of the Point editor allows you to configure its settings.

To configure the point editor:

1. At the *Settings* tab of the point editor ribbon, click the **Configure** icon  
 The **Configuration** dialog is displayed.
2. To configure the point editor table layout, type the codes for the available data, displayed at the right panel of the dialog in the required order, separated with spaces.
3. To configure an edit sequence, click the "Edit Sequence" field and type the codes for the available data, displayed at the right panel of the dialog in the required order, separated with spaces.
4. Click **OK**.

To set the default configuration, click **Load Default**.

To set the current configuration as the default, click **Save Default**.

### NOTE

The **Configure** item of the context menu for the point editor has the same functionality.



## String Editor

The string editor allows you to edit an existing string, by changing the parameters of its points. It has three tabs, described in the corresponding sections:

- "Elevation tab" section below
- "Position tab" section on the next page
- "Settings tab" section on page 515

Make the required configurations on each tab, and then click **Close**.

To open the string editor, in the *String* group of the *Modify* tab from the MAGNET Office ribbon, click the **Edit String** icon.

### Elevation tab

The *Elevation* tab of the string editor allows you to configure the elevations of the string nodes. It contains the list of the string points, with its point numbers, elevations and slopes of the appropriate segments.

To edit the point's elevation:

1. Select the required point from the list.
2. Do one of the following:
  - In the *Elevation* editbox, specify the required point elevation.
  - In the *Slope* editbox, specify the required string segment slope.
3. If needed, in the *Base Elevation* editbox, specify the required base elevation.

#### Fields of the *Elevation* tab

| Field                 | Description  |
|-----------------------|--|
| <i>Elevation</i>      | Defines the elevation from the base of the selected point.<br>NOTE<br>When specifying this parameter, the value of the Slope parameter is calculating automatically.   |
| <i>Slope</i>          | Defines the slope of the string segment between the previous point and the currently selected point.<br>NOTE<br>When specifying this parameter, the value of the Elevation parameter is calculating automatically. |
| <i>Base Elevation</i> | Defines the base elevation of the string. It will be added to elevation of each point of the string.   |
| <b>Point list</b>     |  |
| <i>Point ID</i>       | Displays the point number.   |
| <i>Elevation</i>      | Displays the point elevation, including the base elevation.  |
| <i>Slope</i>          | Displays the slope of the string segment between the previous point and the currently selected point.  |

**Buttons of the *Elevation* tab**

| Button        | Description  |
|---------------|--|
| <b>Insert</b> | Click it to add a new string point.<br><br><i>TIP</i><br><i>Before editing the elevation of the newly created point, you must define its location at the <i>Position</i> tab first. See "<i>Position tab</i>" section below for details.</i> |
| <b>Delete</b> | Click it to delete the currently selected string point.  |

**Position tab**

The *Position* tab of the string editor allows you to configure the locations of the string nodes. It contains the list of the string points, with its point numbers, East and North coordinates.

To edit the point's position:

1. Select the required point from the list.
2. In the *Northing* editbox, specify the required North coordinate.
3. In the *Easting* editbox, specify the required East coordinate.

To add a new point:

1. Click **Insert**.

The new row is added to the point list.

2. In the *Northing* editbox, type the required North coordinate of the new point.
3. In the *Easting* editbox, type the required East coordinate of the new point.
4. Press Enter.

The point is added to the sting. The point number is assigned automatically.

5. To configure the elevation of the new point, use the *Elevation* tab. See "*Elevation tab*" section on the previous page for details.

**Fields of the *Position* tab**

| Field             | Description   |
|-------------------|---|
| <i>Northing</i>   | Defines the North coordinate of the selected point.             |
| <i>Easting</i>    | Defines the slope of the East coordinate of the selected point. |
| <b>Point list</b> |   |
| <i>Point ID</i>   | Displays the point number.                                      |
| <i>Northing</i>   | Displays the point North coordinate.                            |
| <i>Easting</i>    | Displays the point East coordinate.                             |

**Buttons of the *Position* tab**

| Button        | Description   |
|---------------|---|
| <b>Insert</b> | Click it to add a new string point.                     |
| <b>Delete</b> | Click it to delete the currently selected string point. |

## Settings tab

The *Settings* tab of the string editor allows you to configure its parameters. Fields of the tab are described in the table below.

### Fields of the *Settings* tab

| Field                       | Description   |
|-----------------------------|---|
| <i>Auto-Advance</i>         | If ticked, the string point, selected in the survey view, will be highlighted in the point list.  |
| <i>Auto-Center</i>          | If ticked, the string point, highlighted in the point list, will be placed to the center of the survey view.  |
| <i>Remove from database</i> | If ticked, the points, deleted by using the <b>Delete</b> button will be excluded from the string and deleted from the survey view. Otherwise, they will be removed from the string, but stay in the survey view. |
| <i>Slope mode</i>           | Defines the slope units.  |

## Traverse editor

The traverse editor allows you to manually input traverse data. To access traverse editor, in the *Manual Entry* group of the *Survey* tab, click the **Traverse Editor** icon.

Traverse may be defined as one of the following:

- A loop, where the traverse closes on the start station. The start and end stations are the same point with known coordinates.
- Open ended, where the start and end stations are different, but the coordinates of both points are known.

Traverses may also include side shots or radiations. These are calculated from the closed and adjusted traverse points.

The traverse editor contains ribbon with control icons and table for traverse data. Description of fields may be found in the table below. The right side of the editor has the preview screen.

### Fields of the traverse editor table

| Field            | Description   |
|------------------|---|
| <i>RecType</i>   | <p>Defines the current type of the Total Station observation. You may select one of the following:</p> <ul style="list-style-type: none"> <li>• BKB – backsight bearing point – the start measurement used as a reference line for orientation of next measurements from the station. This measurements contain the horizontal angle data</li> <li>• BS – backsight – the measurement to the previous occupation point in traverse survey. These measurements can contain the horizontal and vertical angles and slope distance data.</li> <li>• FS – foresight – the measurement to the next occupation point in traverse survey. These measurements can contain the horizontal and vertical angle and slope distance data.</li> <li>• PT – point – the point with the known East and North coordinates.</li> <li>• SS – side shot – the measurement from the station to the reflector. This measurement contains the horizontal and vertical angles and slope distance data.</li> </ul> |
| <i>From</i>      | Defines the number of the point at which the total station was set.   |
| <i>To</i>        | Defines the number of the point at which the reflector was set.   |
| <i>H-Angle</i>   | Defines the horizontal angle for the set up station to the observed point.  |
| <i>Azimuth</i>   | Defines the azimuth angle from the set up station to the observed point.  |
| <i>V-Angle</i>   | Defines the vertical angle from the set up station to the observed point.   |
| <i>Slp Dist</i>  | Defines the slope distance from the set up station to the observed point. If horizontal distances are being entered, this will be the horizontal distance if the vertical angle field is left empty.  |
| <i>Inst. Ht.</i> | Defines the instrument height at the set up point. The height is carried forward from one row to the next during reduction, so only changed heights need to be entered.   |

| Field             | Description  |
|-------------------|--|
| <i>Target Ht.</i> | Defines the height of the target at the observed point. The target height is carried forward from one row to the next during reduction, so only changed target heights need to be entered. |
| <i>Easting</i>    | Defines the known East coordinate of the point.  |
| <i>Northing</i>   | Defines the known North coordinate of the point.   |
| <i>Elevation</i>  | Defines the known height of the point.   |
| <i>Code</i>       | Defines the code for the observed point.   |

The traverse editor has its own ribbon, which is differ from the MAGNET Office default ribbon.


- The *File* tab is divided to two groups. For more information refer to "File tab" section below.
- The *Edit* tab contains only the **Codes** icon. It has the same functionality as the "Codes icon" section on page 95 from the MAGNET Office default ribbon.
- The *Adjustment* tab contains only the **Traverse** icon. For more information refer to "Traverse icon" section on the next page.
- The *Settings* tab contains two icons:
  - The **Azimuth** icon. It allows you to turn on/off the azimuth mode.
  - The **Configure** icon. It allows you to configure the traverse editor table. See "Configure icon" section on page 519 for details.
- The *Library* tab contains two icons:
  - The **Global Codes** icon. It has the same functionality as the "Global Codes icon" section on page 476 from the MAGNET Office default ribbon.
  - The **Code Settings** icon. It has the same functionality as the "Code Settings icon" section on page 476 from the MAGNET Office default ribbon.
- The *Window* tab contains three icons:
  - The **Cascade** icon. It has the same functionality as the "Cascade icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Horizontally** icon. It has the same functionality as the "Tile Horizontally icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Vertically** icon. It has the same functionality as the "Tile Vertically icon" section on page 505 from the MAGNET Office default ribbon.



## File tab

The File tab of the traverse editor ribbon allows you to perform the basic operations. It divided to two groups, described below

### Standard group

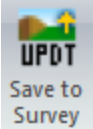

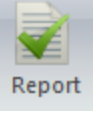
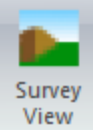
The *Standard* group of the *File* tab of the traverse editor ribbon allows you to perform basic file operations. It contains three icons, described in the table below.

|   |  |
|---|--|
|  | <p><u>Save icon</u></p> <p>Click it to save the current traverse document.</p> |
|---|--|

|  |  |
|--|--|
| <br>Open... | <p style="text-align: center;"><u>Open icon</u><br/>Click it to open an existing traverse for editing.</p> |
| <br>Close   | <p style="text-align: center;"><u>Close icon</u><br/>Click it to close the traverse editor.</p>            |

## View group

The *View* group of the *File* tab of the traverse editor ribbon contains four icons, described in the table below.

|   |  |
|---|--|
| <br>UPDT<br>Save to Survey | <p style="text-align: center;"><u>Save to Survey icon</u><br/>Click it to upload changes from the traverse editor to the survey view.</p>  |
| <br>Regen                  | <p style="text-align: center;"><u>Regen icon</u><br/>Click it to recalculate point's coordinates. The message window prompts to do one of the following:</p> <ul style="list-style-type: none"> <li>• Use the point coordinates from the project database.</li> <li>• Manually input the coordinates of the control point.</li> </ul> <p><b>CAUTION</b><br/><b><i>A coordinate system projection must be defined to use this mode.</i></b></p> |
| <br>Report               | <p style="text-align: center;"><u>Report icon</u><br/>Click it to generate a traverse report.</p>  |
| <br>Survey View          | <p style="text-align: center;"><u>Survey View icon</u><br/>Click it to switch to the survey view.</p>  |

## Traverse icon

The **Traverse** icon of the Traverse editor allows you to adjust the traverse.

Do the following:

1. In the *Adjustment* tab of the traverse editor ribbon, click the **Traverse** icon.  
The Control ***Point Coordinates*** dialog is displayed.
2. Do one of the following:
  - Select an existing point.
  - Specify the required coordinates.
3. Click **OK**  
The ***Traverse Adjustment*** dialog is displayed.
4. Select the required traverse from the list at the bottom-right of the dialog.

5. In the *Start Station* group box, define the traverse start point.
6. In the *End Station* group box, define the traverse end point.
7. In the *Adjustment* group box, select the adjustment method.
8. Click **Compute**.

The *Unadjusted traverse* dialog is displayed.

9. Review the properties, and click **Coordinates** to adjust the traverse.
10. Click **OK** to close the dialog.

## Configure icon

The **Configure** icon of the Traverse editor allows you to configure the traverse editor table.

To configure the traverse editor table:

- In the *Settings* tab of the traverse editor ribbon, click the **Configure** icon.
2. The **Configuration** dialog is displayed.
3. In the *Display Sequence* editbox, configure the table appearance, by using the variables from the right panel of the dialog. The columns of the table will be displayed in order, which you define.
4. In the *Edit Sequence* editbox, configure the editing sequence for each observation point type. The MAGNET Office will automatically move the cursor to the defined columns.
5. Click **OK**.

To save the configuration as default, click **Save Default**.

To load the default configuration, click **Load Default**.

## Alignment editor

The alignment editor allows you to manually create a new alignment or edit an existing one. It uses data that defines the full geometry of the alignment in terms of the lines and arcs that make up the horizontal alignment. The manual alignment entry includes the entities directly into the alignment so the IPs are simply points at which there is a tangential connection between one entity and the next.

The alignment editor contains ribbon with control icons and two tabs with tables for alignment data. The *Alignment* tab contains table for horizontal alignment (centerline), the *Profile* tab contains table for vertical alignment (profile). The right side of the editor has the preview screen.

Description of fields may be found in the table below.

### Fields of the *Alignment* tab table of the alignment editor

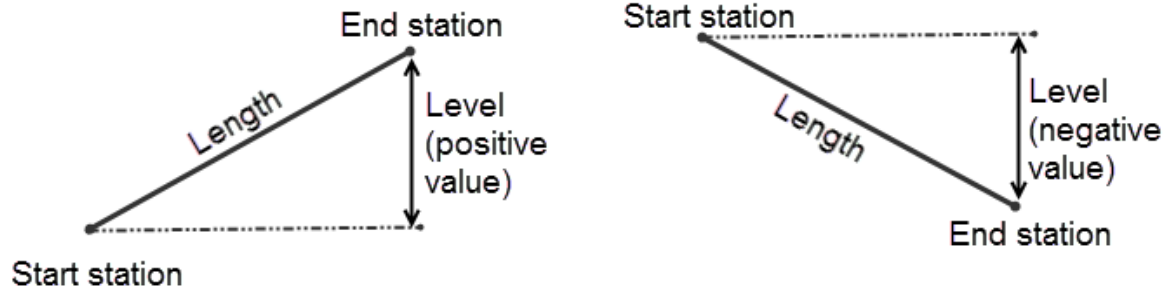
| Field            | Description   |
|------------------|---|
| <i>RecType</i>   | <p>Defines the current type of the Total Station observation. You may select one of the following:</p> <ul style="list-style-type: none"> <li>• ARC – arc, defined by its radius and arc length. Positive radius creates curve to the right, negative – curve to the left.</li> <li>• IP – intersection point, defined by its East and North coordinates.</li> <li>• PT – point, defined by its East and North coordinates.</li> <li>• SPIRAL – spiral, defined by its length, radius and if needed, spiral L1 and L2.</li> <li>• START – start point, defined by its East and North coordinates and the running distance.</li> <li>• STRAIGHT – straight line, defined by its bearing and length.</li> </ul> |
| <i>Station</i>   | Defines the station distance from the start chain.  |
| <i>Bearing</i>   | Defines the bearing of the alignment segment.   |
| <i>Azimuth</i>   | Defines the bearing of the alignment segment.   |
| <i>Length</i>    | Defines the length of the alignment segment.  |
| <i>Radius</i>    | Defines the radius of the alignment segment.  |
| <i>Easting</i>   | Defines the East coordinate of the alignment point.   |
| <i>Northing</i>  | Defines the North coordinate of the alignment point.  |
| <i>Spiral L1</i> | Defines the length of the first spiral of the compound curve.   |
| <i>Spiral L2</i> | Defines the length of the second spiral of the compound curve.  |

### Fields of the *Profile* tab of the alignment editor

| Field          | Description   |
|----------------|---|
| <i>Station</i> | Defines the start station of the vertical alignment segment.  |
| <i>Level</i>   | Defines the difference between the elevations of the start and end stations. See picture below for details. |



| Field         | Description  |
|---------------|--|
| <i>Length</i> | Defines the length of the vertical alignment segment. See picture below for details. |



### Vertical alignment

The alignment editor has its own ribbon, which is different from the MAGNET Office default ribbon.



- The *File* tab is divided into two groups. For more information refer to "File tab" section below.
- The *Window* tab contains three icons:
  - The **Cascade** icon. It has the same functionality as the "Cascade icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Horizontally** icon. It has the same functionality as the "Tile Horizontally icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Vertically** icon. It has the same functionality as the "Tile Vertically icon" section on page 505 from the MAGNET Office default ribbon.

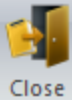
### File tab

The *File* tab of the alignment editor ribbon allows you to perform the basic operations. It is divided into two groups, described below.

#### Standard group

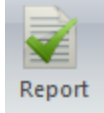
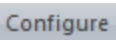
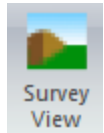
The *Standard* group of the *File* tab of the alignment editor ribbon allows you to perform basic file operations. It contains three icons, described in the table below.

|   |  |
|---|--|
|  | <p style="text-align: center;"><u>Save Entry icon</u></p> <p style="text-align: center;">Click it to save the current alignment document.</p>                            |
|  | <p style="text-align: center;"><u>Save Alignment icon</u></p> <p style="text-align: center;">Click it to save the current alignment to update it in the survey view.</p> |

|   |  |
|---|--|
|  | <p style="text-align: center;"><u>Close icon</u><br/>Click it to close the alignment editor.</p> |
|---|--|

### View group

The *View* group of the *File* tab of the alignment editor ribbon contains four icons, described in the table below.

|   |   |
|---|---|
|  | <p style="text-align: center;"><u>Report icon</u><br/>Click it to generate a traverse report.</p>       |
|  | <p style="text-align: center;">Configure icon<br/>Click it to configure the alignment editor table.</p> |
|  | <p style="text-align: center;"><u>Survey View icon</u><br/>Click it to switch to the survey view.</p>   |

### Configure icon

The **Configure** icon of the Alignment editor allows you to configure the traverse editor table.

To configure the alignment editor table:

1. In the *View* group from the *File* tab of the alignment editor ribbon, click the **Configure** icon.
2. The **Configuration** dialog is displayed.
3. In the *Display Sequence* editbox, configure the table appearance, by using the variables from the right panel of the dialog. The columns of the table will be displayed in order, which you define.
4. In the *Edit Sequence* editbox, configure the editing sequence for each observation point type. The MAGNET Office will automatically move the cursor to the defined columns.
5. Click **OK**.

To save the configuration as default, click **Save Default**.

To load the default configuration, click **Load Default**.

## Road editor

The road editor allows you to manually create a new alignment or edit an existing one. You can create roads data consisting of a horizontal alignment, profiles and offset strings, or from a horizontal alignment and cross sectional data.

The alignment editor contains ribbon with control icons and four tabs with tables for road data. See "Road editor ribbon" section on the next page for details. The right side of the editor has the preview screen.

- The *Alignment* tab contains table for horizontal alignment.
- The *Offset String* tab contains table for
- The *Profile* tab contains table for vertical alignment.

Description of fields may be found in the table below.

### Fields of the *Alignment* tab table of the road editor

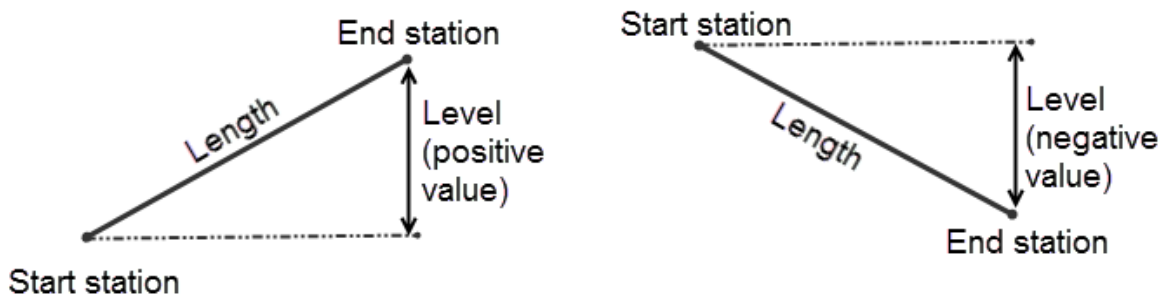
| Field            | Description  |
|------------------|--|
| <i>RecType</i>   | Defines the current type of the Total Station observation. You may select one of the following: <ul style="list-style-type: none"> <li>• ARC – arc, defined by its radius and arc length. Positive radius creates curve to the right, negative – curve to the left.</li> <li>• IP – intersection point, defined by its East and North coordinates.</li> <li>• PT – point, defined by its East and North coordinates.</li> <li>• SPIRAL – spiral, defined by its length, radius and if needed, spiral L1 and L2.</li> <li>• START – start point, defined by its East and North coordinates and the running distance.</li> <li>• STRAIGHT – straight line, defined by its bearing and length.</li> </ul> |
| <i>Station</i>   | Defines the station distance from the start chain.   |
| <i>Bearing</i>   | Defines the bearing of the alignment segment.  |
| <i>Azimuth</i>   | Defines the bearing of the alignment segment.  |
| <i>Length</i>    | Defines the length of the alignment segment.   |
| <i>Radius</i>    | Defines the radius of the alignment segment.   |
| <i>Easting</i>   | Defines the East coordinate of the alignment point.  |
| <i>Northing</i>  | Defines the North coordinate of the alignment point.   |
| <i>Spiral L1</i> | Defines the length of the first spiral of the compound curve.  |
| <i>Spiral L2</i> | Defines the length of the second spiral of the compound curve.   |

### Fields of the *Offset String* tab of the road editor

| Field             | Description   |
|-------------------|---|
| <i>Station</i>    | Defines the start station of the vertical alignment segment.  |
| <i>Offset</i>     | Defines the difference between the elevations of the start and end stations. See picture below for details. |
| <i>Cross Fall</i> | Defines the length of the vertical alignment segment. See picture below for details.                        |

**Fields of the *Profile* tab of the road editor**

| Field          | Description   |
|----------------|---|
| <i>Station</i> | Defines the start station of the vertical alignment segment.  |
| <i>Level</i>   | Defines the difference between the elevations of the start and end stations. See picture below for details. |
| <i>Length</i>  | Defines the length of the vertical alignment segment. See picture below for details.                        |

**Vertical alignment****Fields of the *Cross Section* tab of the road editor**

| Field          | Description   |
|----------------|---|
| <i>Station</i> | Defines the start station of the vertical alignment segment.  |
| <i>Offset</i>  | Defines the offset from the center line.  |
| <i>Level</i>   | Defines the difference between the elevations of the start and end stations. See picture below for details. |

**Road editor ribbon**



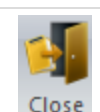
The road editor has its own ribbon, which is different from the MAGNET Office default ribbon.

- The *File* tab is divided into three groups. For more information refer to "File tab" section on the facing page.
- The *Window* tab contains three icons:
  - The **Cascade** icon. It has the same functionality as the "Cascade icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Horizontally** icon. It has the same functionality as the "Tile Horizontally icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Vertically** icon. It has the same functionality as the "Tile Vertically icon" section on page 505 from the MAGNET Office default ribbon.

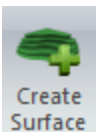

## File tab

The *File* tab of the road editor ribbon allows you to perform the basic operations. It is divided into two groups, described below.

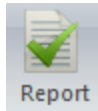
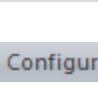
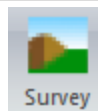
### Standard group

|   |   |
|---|---|
|  <p>Save Entry</p>     | <p style="text-align: center;"><u>Save Entry icon</u><br/>Click it to save the current alignment document.</p>                            |
|  <p>Save Alignment</p> | <p style="text-align: center;"><u>Save Alignment icon</u><br/>Click it to save the current alignment to update it in the survey view.</p> |
|  <p>Close</p>          | <p style="text-align: center;"><u>Close icon</u><br/>Click it to close the alignment editor.</p>  |

### Create group

|   |  |
|---|--|
|  <p>Create Surface</p> | <p style="text-align: center;">Create Surface icon<br/>Click it to create a surface.</p> |
|  <p>Create Road</p>  | <p style="text-align: center;">Create Road icon<br/>Click it to create a road.</p>       |

### View group

|  |   |
|--|---|
|  <p>Report</p>      | <p style="text-align: center;"><u>Report icon</u><br/>Click it to generate a traverse report.</p>       |
|  <p>Configure</p>   | <p style="text-align: center;">Configure icon<br/>Click it to configure the alignment editor table.</p> |
|  <p>Survey View</p> | <p style="text-align: center;"><u>Survey View icon</u><br/>Click it to switch to the survey view.</p>   |

### Create Surface icon

The **Create Surface** icon of the Road editor allows you to create a surface for road.

To create a surface:

1. At the *File* tab of the Road editor, click the **Create Surface** icon.

The *Create Surface* dialog is displayed.

2. Configure the parameters at the *Save Options* tab as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the *Save Options* tab of the *Create Surface* dialog

| Field                       | Description   |
|-----------------------------|---|
| <i>Station</i>              | Displays the start and end station of the base alignment.   |
| <i>Default Spacing</i>      | Defines the base spacing for straight and curved sections of the alignment.   |
| <i>Cross Section</i>        | Defines the creation of cross section for the alignment.  |
| <i>Calculated From</i>      | Defines the base information for the cross section. It may be specified at the <i>Cross Section</i> or <i>Offset String</i> tab of the road editor table. |
| <i>Include TPs and IPs</i>  | Tick to create cross sections at TPs and IPs.   |
| <i>Cross Section at IPs</i> | Defines the cross section position at the IPs.  |
| <i>DTM</i>                  | Defines the saving options for the calculated surface.  |
| <i>Strings</i>              | Defines the saving options for the calculated strings.  |

#### Create Road icon

The **Create Road** icon of the Road editor allows you to create a surface for road.

To create a road:

1. At the *File* tab of the Road editor, click the **Create Road** icon.  
The *Create Cross Section* dialog is displayed.
2. Configure the parameters at the *Save Options* tab as you need. Fields are described in the table below.
3. If needed, at the *Additional Stations* tab, specify the additional chainages for the road.
4. Click **OK**.

#### Fields of the *Save Options* tab of the *Create Cross Section* dialog

| Field                               | Description  |
|-------------------------------------|--|
| <i>Layer</i>                        | Defines the layer to which the base alignment belongs to.  |
| <i>Design Surface</i>               | Defines the name of the design surface.  |
| <i>Extract natural surface data</i> | Tick to extract natural surface for road.  |
| <i>Natural Surface</i>              | Defines the name of the natural surface. Select the appropriate DTM from the drop-down list below. |
| <i>Left Limit</i>                   | Defines the width of the natural surface to the left from the base alignment.                      |
| <i>Right Limit</i>                  | Defines the width of the natural surface to the right from the base alignment.                     |
| <i>Station</i>                      | Displays the start and end station of the base alignment.  |
| <i>Default Spacing</i>              | Defines the base spacing for straight and curved sections of the alignment.                        |

| <b>Field</b>                | <b>Description</b>  |
|-----------------------------|---|
| <i>Cross Section</i>        | Defines the creation of cross section for the alignment.  |
| <i>Calculated From</i>      | Defines the base information for the cross section. It may be specified at the <i>Cross Section</i> or <i>Offset String</i> tab of the road editor table. |
| <i>Include TPs and IPs</i>  | Tick to create cross sections at TPs and IPs.   |
| <i>Cross Section at IPs</i> | Defines the cross section position at the IPs.  |
| <i>Strings</i>              | Defines the saving options for the calculated strings.  |

#### **Fields of *Additional Stations* tab of the *Create Cross Station* dialog table**

| <b>Field</b>          | <b>Description</b>                              |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the start of the additional chainage.   |
| <i>End Chainage</i>   | Defines the end of the additional chainage.     |
| <i>Spacing</i>        | Defines the spacing of the additional chainage. |
| <i>Omit</i>           | Tick to omit the additional chainage row.       |

#### **Configure icon**

The **Configure** icon of the Road editor allows you to configure the traverse editor table.

To configure the alignment editor table:

1. In the *View* group from the *File* tab of the road editor ribbon, click the **Configure** icon.
2. The **Configuration** dialog is displayed.
3. In the *Display Sequence* editbox, configure the table appearance, by using the variables from the right panel of the dialog. The columns of the table will be displayed in order, which you define.
4. In the *Edit Sequence* editbox, configure the editing sequence for each observation point type. The MAGNET Office will automatically move the cursor to the defined columns.
5. Click **OK**.

To save the configuration as default, click **Save Default**.

To load the default configuration, click **Load Default**.

## Raw data editor

The raw data editor allows you to process data from survey instruments and data loggers. You can download raw survey data from the instrument directly into the computer. Data from this file is displayed in the left side of the editor. The graphical preview is displayed in the right side of the editor.

Data may be edited and regenerated to ensure the correct results are saved the job database and displayed in the survey view.

Raw data editor has its own ribbon, different from the MAGNET Office default one. It has eight tabs:

- "File tab" section on the facing page
- "Edit tab" section on page 530
- "View tab" section on page 531
- "Insert tab" section on page 532
- "Tools tab" section on page 533
- "Library tab" section on page 534
- "Window tab" section on page 535
- "Help tab" section on page 536

To view/edit raw data:

1. In the raw data editor do one of the following:
  - Download data from the survey instrument, by clicking the **Download Raw Data** icon.
  - Import raw data file, by using the **Import Raw Data File** icon.
  - Import neutral file, by using the **Import Neutral File** icon.

The records are listed in the left side of the raw data editor. The preview is displayed at the right.

2. To edit a record, double click it and make the required changes in a dialog.
3. To edit several records at once, select them and in the *Edit* group of the *Edit* tab, click the **Edit Selected Records** icon.
4. To delete a record, select it and press *Delete*.
5. To manually add a new record, click the appropriate icon from the *Insert* tab.

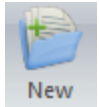
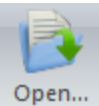



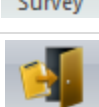


## File tab

The *File* tab of the raw data editor contains control icons which allow you to perform general operations in editor and export/import data files.



### Standard group

The *Standard* group allows you to perform general operations with raw data files. It contains six icons, described in the table below.

|  |  |
|--|--|
| <br>New                     | <u>New icon</u><br>Click it to create a new raw data entry                         |
| <br>Open...                 | <u>Open icon</u><br>Click it to open an existing raw data entry                    |
| <br>Save                    | <u>Save icon</u><br>Click it to save current raw data entry.                       |
| <br>Save Data As...         | <u>Save Data As icon</u><br>Click it to save raw data in a new entry               |
| <br>UPDT<br>Save To Survey | <u>Save To Survey icon</u><br>Click it to upload current entry to the survey view. |
| <br>Close                 | <u>Close icon</u><br>Click it to close the raw data editor.                        |

### Import/Export group

The *Import/Export* group allows you to import various measurement data to the raw data editor and save it as external file.


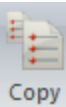

|   |  |
|---|--|
|  Download Raw Data...    | <u>Download Raw Data icon</u><br>Click it to download measurements directly from the survey instrument.                          |
|  Import Raw Data File... | <u>Import Raw Data File icon</u><br>Click it to import a file, containing raw survey measurements to the current raw data entry. |
| Import Neutral File...  | <u>Import Neutral File icon</u><br>Click it to import a civilcad neutral (*.neu) file, to the current raw data entry.            |
| Export Neutral File...  | <u>Export Neutral File icon</u><br>Click it to export current raw data entry to a civilcad neutral (*.neu) file.                 |

## Edit tab

The *Edit* tab of the raw data editor contains control icons which allow you to edit the measurements in the raw data entry.



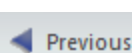
### Clipboard group

The *Clipboard* group allows you to cut, copy and paste measurements.

|   |  |
|---|--|
|  | <u>Cut icon</u><br>Click it to cut the selected object to the clipboard.   |
|  | <u>Copy icon</u><br>Click it to copy the selected object to the clipboard. |
|  | <u>Paste icon</u><br>Click it to paste an object from the clipboard.       |

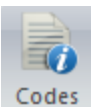
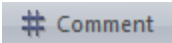
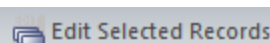
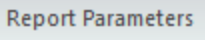
### Find group

The *Find* group allows you to search for the measurement by certain criteria.

|   |  |
|---|--|
|    | <u>Find icon</u><br>Click it to search for the measurement by certain criteria.                        |
|  | <u>Next icon</u><br>Click it to navigate to the next measurement, which match search criteria.         |
|  | <u>Previous icon</u><br>Click it to navigate to the previous measurement, which match search criteria. |

### Edit group

The *Edit* group allows you to edit measurements in the data raw entry.

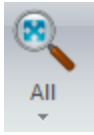








|   |  |
|---|--|
|  | <u>Codes icon</u><br>Click it to edit project survey codes. Set "Project survey codes editor" section on page 543 for details.       |
|  | <u>Comment icon</u><br>Click it to mark selected records as comments, i.e. they will be displayed in the list, but will not be used. |
|  | <u>Edit Selected Records icon</u><br>Click it to edit several selected records at once.  |
|  | <u>Report Parameters icon</u><br>Click it to configure the parameters of the raw data report.  |

## View tab

The *View* tab of the raw data editor contains control icons which allow you to configure preview of the data layout of the editor.

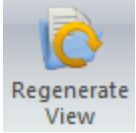
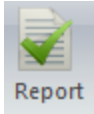
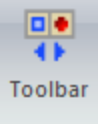
### Navigate group

The *Navigate* group allows you to manage the scale of the preview area. It contains five icons, and five second level icons, described in the table below.

|   |   |
|---|---|
|    | <p style="text-align: center;"><u>All icon</u></p> <p>Click it to fit all data in the view. This icon also contains the list of the second level icons. Click  to see it.</p> |
|    | <p style="text-align: center;"><u>Window icon</u></p> <p>Click it to draw a rectangle area to be fits the screen.</p>   |
|    | <p style="text-align: center;"><u>Previous icon</u></p> <p>Click it to return previous view.</p>  |
|    | <p style="text-align: center;"><u>In icon</u></p> <p>Click it to zoom in the center area of the preview area.</p>   |
|    | <p style="text-align: center;"><u>Out icon</u></p> <p>Click it to zoom out the center area of the preview area.</p>   |
|    | <p style="text-align: center;"><u>Point icon</u></p> <p>Click it to view a point with the defined scale.</p>  |
|  | <p style="text-align: center;"><u>Pan icon</u></p> <p>Click it to scroll the view.</p>  |
|  | <p style="text-align: center;"><u>Save View icon</u></p> <p>Click it to save the current view.</p>  |

### View group


The *View* group allows you to switch between views and configure the toolbar layout.

|   |   |
|---|---|
|  | <p style="text-align: center;"><u>All icon</u></p> <p>Click it to fit all data in the view.</p>                 |
|  | <p style="text-align: center;"><u>Window icon</u></p> <p>Click it to switch to the report.</p>                  |
|  | <p style="text-align: center;"><u>Previous icon</u></p> <p>Click it to configure the layout of the toolbar.</p> |

|   |   |
|---|---|
|  | <p style="text-align: center;"><u>Survey icon</u><br/>Click to switch to the survey view.</p> |
|---|---|

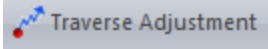
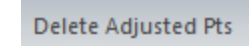
## Insert tab

The *Insert* tab of the raw data editor contains control icons which allow you to insert various records in the raw data entry. It has only one *Insert* group.

|   |  |
|---|--|
| <p style="text-align: center;">Comment</p>  | <p style="text-align: center;"><u>Comment icon</u><br/>Click it to insert the comment record to the raw data entry.</p>  |
| <p style="text-align: center;">Header Record ▾</p>  | <p style="text-align: center;"><u>Header Record icon</u><br/>Allows you to insert the header record to the raw data entry. Click to select the specific type of the header.</p>                |
| <p style="text-align: center;">Station Record ▾</p>   | <p style="text-align: center;"><u>Station Record icon</u><br/>Allows you to insert the station record to the raw data entry. Click to select the specific type of the station.</p>             |
| <p style="text-align: center;"> Point Record</p> | <p style="text-align: center;"><u>Point Record icon</u><br/>Click it to insert the point record to the raw data entry.</p>   |
| <p style="text-align: center;">Measurement Record ▾</p>   | <p style="text-align: center;"><u>Measurement Record icon</u><br/>Allows you to insert the measurement record to the raw data entry. Click to select the specific type of the measurement.</p> |
| <p style="text-align: center;">Miscellaneous ▾</p>  | <p style="text-align: center;"><u>Miscellaneous icon</u><br/>Allows you to insert the various record to the raw data entry. Click to select the specific type of the record.</p>               |

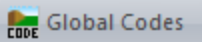
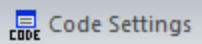
## Tools tab

The *Tools* tab of the raw data editor contains control icons which allow you to perform traverse adjustment. It has only one *Tools* group.

|   |  |
|---|--|
|  | <p style="text-align: center;"><u>Traverse Adjustment icon</u></p> <p style="text-align: center;">Click it to apply a traverse adjustment to the raw data. See "Traverse Adjustment icon" section on page 307 for details.</p> |
|  | <p style="text-align: center;"><u>Delete Adjusted Pts icon</u></p> <p style="text-align: center;">Click it to delete unnecessary points after traverse adjustment.</p>   |




## Library tab

The *Library* tab of the raw data editor contains control icons which allow you to configure survey codes. It has only one *Library* group.

|   |   |
|---|---|
|  | <p style="text-align: center;"><u>Global Codes icon</u></p> <p>Click it to manage global survey codes. See Global Codes icon for details.</p>                             |
|  | <p style="text-align: center;"><u>Code Settings icon</u></p> <p>Click it to configure survey code settings. See "Code Settings icon" section on page 476 for details.</p> |



## Window tab

The *Window* tab contains control icons, which allow you to configure raw data editor window layout. It has only one *Window* group.

|   |   |
|---|---|
| <br>Cascade              | <p style="text-align: center;"><u>Cascade icon</u><br/>Click it to cascade windows in the working area.</p>                     |
| <br>Tile<br>Horizontally | <p style="text-align: center;"><u>Tile Horizontally icon</u><br/>Click it to tile windows in the working area horizontally.</p> |
| <br>Tile<br>Vertically   | <p style="text-align: center;"><u>Tile Vertically icon</u><br/>Click it to tile windows in the working area vertically.</p>     |

## Help tab

The *Help* tab contain control icons which allow you to read product help. It has only one *Help* group.

|  |   |
|--|---|
| <br>Help  | <p style="text-align: center;"><u>Help icon</u><br/>Click it to open product help.</p>                                    |
| <br>About | <p style="text-align: center;"><u>About icon</u><br/>Click it to display information about MAGNET Office application.</p> |



## LS Network editor

The LS network editor allows you to manually input traverse data.

## Deed Entry editor

The deed entry editor allows you to manually create/edit line and curve data that comprise deed descriptions.

The deed entry editor contains ribbon with control icons and table for deed data. Description of fields may be found in the table below. The right side of the editor has the preview screen, which displays the deed, as you filling in the table.

### Fields of the traverse editor table

| Field                 | Description   |
|-----------------------|---|
| <i>Point</i>          | Defines the number of a point in the deed.  |
| <i>Easting</i>        | Defines the easting coordinate of a point in the deed.  |
| <i>Northing</i>       | Defines the northing coordinate of a point in the deed.   |
| <i>Elevation</i>      | Defines the height of a point in the deed.  |
| <i>Code</i>           | Defines the code of a point in the deed.  |
| <i>Azimuth</i>        | Defines the azimuth of the line which connects previous and current points in the deed table.             |
| <i>Bearing</i>        | Defines the bearing of the line which connects previous and current points in the deed table.             |
| <i>Horz Dist</i>      | Defines the horizontal distance of the line which connects previous and current points in the deed table. |
| <i>Radius</i>         | Defines the radius of the arc which connects previous and current points in the deed table.               |
| <i>Arc Length</i>     | Defines the length of the arc which connects previous and current points in the deed table.               |
| <i>Tangent Length</i> | Defines the length of the tangent to the arc which connect previous and current points in the deed table. |

The deed entry editor has its own ribbon, which is differ from the MAGNET Office default ribbon.

- The *File* tab is divided to three groups. For more information refer to "File tab" section on the facing page.
- The *Edit* tab contains only the **Codes** icon. It has the same functionality as the "Codes icon" section on page 95 from the MAGNET Office default ribbon.
- The *Library* tab contains two icons:
  - The **Global Codes** icon. It has the same functionality as the "Global Codes icon" section on page 476 from the MAGNET Office default ribbon.
  - The **Code Settings** icon. It has the same functionality as the "Code Settings icon" section on page 476 from the MAGNET Office default ribbon.
- The *Window* tab contains three icons:
  - The **Cascade** icon. It has the same functionality as the "Cascade icon" section on page 505 from the MAGNET Office default ribbon.
  - The **Tile Horizontally** icon. It has the same functionality as the "Tile Horizontally icon" section on page 505 from the MAGNET Office default ribbon.




- The **Tile Vertically** icon. It has the same functionality as the "Tile Vertically icon" section on page 505 from the MAGNET Office default ribbon.

## File tab

The File tab of the deed entry editor ribbon allows you to perform the basic operations. It divided to two groups, described below



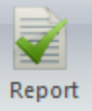
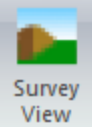
### Standard group

The *Standard* group of the *File* tab of the deed entry editor ribbon allows you to perform basic file operations. It contains three icons, described in the table below.

|  |   |
|--|---|
| <br>Save    | <p style="text-align: center;"><u>Save icon</u></p> <p style="text-align: center;">Click it to save the current deed entry document.</p>    |
| <br>Open... | <p style="text-align: center;"><u>Open icon</u></p> <p style="text-align: center;">Click it to open an existing deed entry for editing.</p> |
| <br>Close   | <p style="text-align: center;"><u>Close icon</u></p> <p style="text-align: center;">Click it to close the deed entry editor.</p>            |

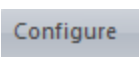
### View group

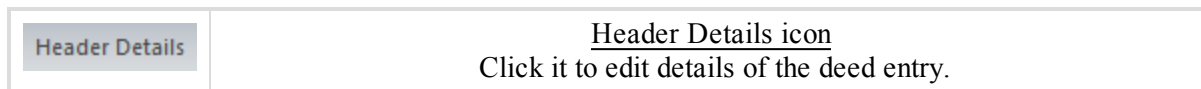
The *View* group of the *File* tab of the deed entry editor ribbon contains four icons, described in the table below.

|   |  |
|---|--|
| <br>UPDT<br>Save to Survey | <p style="text-align: center;"><u>Save to Survey icon</u></p> <p style="text-align: center;">Click it to upload changes from the deed entry editor to the survey view.</p>   |
| <br>Regen                  | <p style="text-align: center;"><u>Regen icon</u></p> <p style="text-align: center;">Click it to recalculate points coordinates. The report will be displayed.</p> <p style="text-align: center;"><b>CAUTION</b><br/><b><i>A coordinate system projection must be defined to use this mode.</i></b></p> |
| <br>Report                 | <p style="text-align: center;"><u>Report icon</u></p> <p style="text-align: center;">Click it to generate a deed report.</p>   |
| <br>Survey View            | <p style="text-align: center;"><u>Survey View icon</u></p> <p style="text-align: center;">Click it to switch to the survey view.</p>   |

### Settings group

The *Settings* group of the File tab of the deed entry editor ribbon contains two icons, described in the table below.

|  |   |
|--|---|
| <br>Configure | <p style="text-align: center;">Configure icon</p> <p style="text-align: center;">Click it to configure the layout of the deed entry editor table.</p> |
|--|---|



## Configure icon

The **Configure** icon of the Deed Entry editor allows you to configure the traverse editor table.

To configure the traverse editor table:

1. In the *Settings* group of the *File* tab of the deed entry editor ribbon, click the **Configure** icon.  
The **Configuration** dialog is displayed.
2. In the *Display Sequence* editbox, configure the table appearance, by using the variables from the right panel of the dialog. The columns of the table will be displayed in order, which you define.
3. In the *Edit Sequence* editbox, configure the editing sequence for each observation point type. The MAGNET Office will automatically move the cursor to the defined columns.
4. Click **OK**.

To save the configuration as default, click **Save Default**.

To load the default configuration, click **Load Default**.

## Global survey codes editor

The global survey codes editor allows you to edit survey codes, which may be used in any project, created in the MAGNET Office.

The editor contains the list of the global survey codes, with their properties and attributes. If column header is clicked, the survey code will be sorted by this column.

Fields and buttons of the editor are described in the tables below.

### Fields of the global survey codes editor

| Field                 | Description  |
|-----------------------|--|
| <i>Survey Code</i>    | Displays the name of the survey code.  |
| <i>Type</i>           | Defines the type of the survey code.   |
| <i>Description</i>    | Defines the short description of the survey code.                                      |
| <i>Layer</i>          | Defines the layer for the survey code.   |
| <b>Point Options</b>  |  |
| <i>Use in Surface</i> | Defines whether the points with the selected survey code may be used for DTM creation. |
| <i>Point Color</i>    | Defines the point color for points with the selected survey code.                      |
| <i>Marker</i>         | Defines the point marker for points with the selected survey code.                     |
| <i>Symbol</i>         | Defines the point symbol for points with the selected survey code.                     |
| <i>Annotation</i>     | Defines the point annotation settings for points with the selected survey code.        |

| <b>Field</b>               | <b>Description</b>   |
|----------------------------|--|
| <b>Line Options</b>        |  |
| <i>Auto String</i>         | When ticked, points with this code will be automatically connected with a line. It is useful for points on line features, such as fence lines, banks, and curbs.   |
| <i>Breakline</i>           | When ticked, lines strung from points with this code will be set as breaklines. It is useful for points on the surface of the survey, which are joined by lines that indicate a break in the surface grade. This can be applied to banks, curbs, drains, streams, and walls. |
| <i>Line Color</i>          | Defines the color for lines strung from points with this code.   |
| <i>Line Style</i>          | Defines the line style for lines strung from points with this code.  |
| <i>Line Width</i>          | Defines the line thickness for lines strung from points with this code.  |
| <b>Area Options</b>        |  |
| <i>Draw Edge</i>           | Defines, whether to draw the border line around the polygons, based on points with this code.  |
| <i>Area Fill Color</i>     | Defines the filling colors for the polygons, based on points with this code.   |
| <i>Area Fill Style</i>     | Defines the filling style for the polygons, based on points with this code.  |
| <i>Transparency</i>        | Defines the filling transparency for the polygons, based on points with this code.   |
| <i>Has Attributes</i>      | When ticked, additional custom attributes will be assigned to points with this code.   |
| <i>Prompt at each node</i> | When ticked, assigning of custom attributes will be prompted at each node.   |
| <b>Attributes Options</b>  |  |
| <i>Max Num Characters</i>  | Defines the maximum length of the custom attribute's value.  |
| <i>Default Value</i>       | Defines the default value of the custom attribute.   |
| <i>Name</i>                | Defines the name of the custom attribute.  |
| <i>Value Type</i>          | Defines the type of the custom attribute's value.  |
| <i>Required</i>            | Defines whether the custom attribute will be required.   |

**Buttons of the project survey codes editor**

| <b>Button</b> | <b>Description</b>  |
|---------------|---|
| <b>New</b>    | Click it to create a new survey code.   |
| <b>Apply</b>  | Click it to save the changes.   |
| <b>Delete</b> | Click it to delete the selected survey code.  |
| <b>Export</b> | Click it to save survey codes to an external MAGNET Field (*.xml), TopSURV code (*.xml) or GTS-700 Code (*.kod) file.                         |
| <b>Import</b> | Click it to load survey codes from an external MAGNET Field (*.xml), TopSURV code (*.xml) or CivilCAD Survey Code (*.lcd, *.bed, *.out) file. |

| <b>Button</b>              | <b>Description</b>  |
|----------------------------|---|
| <b>Report</b>              | Click it to generate the survey code report.  |
| <b>Set Properties</b>      | Click it to set the properties of the selected code as the default for new entity creation. |
| <b>Transfer to Project</b> | Click it to save the selected code in the project survey codes.                             |

## Project survey codes editor

The project survey codes editor allows you to edit survey codes, which will be used in the current project only.

The editor contains the list of the survey codes in project, with their properties and attributes. If column header is clicked, the survey code will be sorted by this column.

Fields and buttons of the editor are described in the tables below.

### Fields of the project survey codes editor

| Field                  | Description  |
|------------------------|--|
| <i>Survey Code</i>     | Displays the name of the survey code.  |
| <i>Type</i>            | Defines the type of the survey code.   |
| <i>Description</i>     | Defines the short description of the survey code.  |
| <i>Layer</i>           | Defines the layer for the survey code.   |
| <b>Point Options</b>   |  |
| <i>Use in Surface</i>  | Defines whether the points with the selected survey code may be used for DTM creation.   |
| <i>Point Color</i>     | Defines the point color for points with the selected survey code.  |
| <i>Marker</i>          | Defines the point marker for points with the selected survey code.   |
| <i>Symbol</i>          | Defines the point symbol for points with the selected survey code.   |
| <i>Annotation</i>      | Defines the point annotation settings for points with the selected survey code.  |
| <b>Line Options</b>    |  |
| <i>Auto String</i>     | When ticked, points with this code will be automatically connected with a line. It is useful for points on line features, such as fence lines, banks, and curbs.   |
| <i>Breakline</i>       | When ticked, lines strung from points with this code will be set as breaklines. It is useful for points on the surface of the survey, which are joined by lines that indicate a break in the surface grade. This can be applied to banks, curbs, drains, streams, and walls. |
| <i>Line Color</i>      | Defines the color for lines strung from points with this code.   |
| <i>Line Style</i>      | Defines the line style for lines strung from points with this code.  |
| <i>Line Width</i>      | Defines the line thickness for lines strung from points with this code.  |
| <b>Area Options</b>    |  |
| <i>Draw Edge</i>       | Tick it to draw the edge line of the polygons, based on points with this code.   |
| <i>Area Fill Color</i> | Defines the filling colors for the polygons, based on points with this code.   |
| <i>Area Fill Style</i> | Defines the filling style for the polygons, based on points with this code.  |
| <i>Transparency</i>    | Defines the filling transparency for the polygons, based on points with this code.   |
| <i>Has Attributes</i>  | When ticked, additional custom attributes will be assigned to points with this code.   |

| <b>Field</b>               | <b>Description</b>   |
|----------------------------|--|
| <i>Prompt at each node</i> | When ticked, assigning of custom attributes will be prompted at each node. |
| <b>Attributes Options</b>  |  |
| <i>Max Num Characters</i>  | Defines the maximum length of the custom attribute's value.                |
| <i>Default Value</i>       | Defines the default value of the custom attribute.                         |
| <i>Name</i>                | Defines the name of the custom attribute.                                  |
| <i>Value Type</i>          | Defines the type of the custom attribute's value.                          |
| <i>Required</i>            | Tick it to make the custom attribute required.                             |

**Buttons of the project survey codes editor**

| <b>Button</b>             | <b>Description</b>  |
|---------------------------|---|
| <b>Apply</b>              | Click it to save the changes.   |
| <b>Report</b>             | Click it to generate the survey code report.  |
| <b>Set Properties</b>     | Click it to set the properties of the selected code as the default for new entity creation. |
| <b>Transfer to Global</b> | Click it to save the selected code in the survey codes library.                             |



## MAGNET Office Entities Properties

Each entity, used in the MAGNET Office projects, has a set of properties, which allows you to configure them to fits your needs. You may edit properties of any object at any time, using by the *Edit Properties* dialog.

The *Edit Properties* dialog allows you to view and edit properties of the MAGNET Office entities, which are used in the survey view.

To edit properties of an object, or a group of objects, select them and click the Properties icon of the *Edit* tab. More information about properties of the particular entity type may be found in the corresponding sections:

- "Point properties" section on the next page
- "Line properties" section on page 548
- "Arc properties" section on page 550
- "Circle properties" section on page 554
- "String properties" section on page 555
- "Polyline properties" section on page 557
- "Polygon properties" section on page 558
- "Lot properties" section on page 560
- "Boundary properties" section on page 563
- "Pad properties" section on page 565
- "Text properties" section on page 567
- "Dimension properties" section on page 569
- "Arrow properties" section on page 570
- "Table properties" section on page 571
- "Alignment properties" section on page 572
- "Image Viewer" section on page 573
- "Layer properties" section on page 574

When editing several objects at once, the dialog has separate tabs for each object type. Fields are remains the same as for standalone editing. Make the required configurations on each tab, and click **OK**.

To apply some property to all selected objects, regardless of their type, click **Apply To All**.

## Point properties

A point is a two- or three-dimensional in space and it is the main entity in MAGNET Office, on which all other entities are derived.

The *Editing Points* dialog allows you to edit properties of the selected point. Buttons and fields of the dialog are described in the tables below.

### The non-editable fields of the *Edit Point* dialog

| Field                 | Description  |
|-----------------------|--|
| <i>Point No.</i>      | A unique point identifier in the project database. One project cannot contain two points with the same numbers. Point numbers or names may be numeric or alphanumeric. The number or name is allocated when the point is created automatically by the MAGNET Office or manually by user, and cannot be changed after that. |
| <i>Easting</i>        | The east or X component of a point position.   |
| <i>Northing</i>       | The north or Y component of a point position.  |
| <i>No of Linkages</i> | The point is the basic entity, from which all other entities are derived. This field indicates how many entities are depending on this point.  |

### The editable fields of the *Edit Point* dialog

| Field                 | Description  |
|-----------------------|--|
| <i>Code</i>           | An additional alphanumeric description, attached to the point. Point codes are usually used for automatically assigning properties to points and for controlling line string between points during the reduction process. The feature codes and the properties are stored in the Survey Codes Library. |
| <i>Elevation</i>      | The height, reduced level, or Z component of a point position. MAGNET Office allows creating points with or without height. Tick checkbox near the elevation's editbox to activate it. An unticked checkbox means that the point has no height.  |
| <i>Use in Surface</i> | Defines whether the point with the defined elevation may be included in a digital terrain model (DTM).   |
| <i>Layer</i>          | Defines a layer to which the point belongs to.   |
| <i>Color</i>          | Defines a color for point displaying.  |
| <i>Mark</i>           | Defines displaying of the point on the screen.   |
| <i>Description</i>    | Short description of the point.  |
| <i>Symbol</i>         | Defines appearance of the point both on the screen and in the printed copy. You may choose symbol from the symbol library. For more information about symbols, refer to "Symbol icon" section on page 54.  |

| <b>Field</b>      | <b>Description</b>   |
|-------------------|--|
| <i>X/Y Scale</i>  | Defines the symbol scale for displaying. Some symbols are too small; others are too big for correct displaying. To display them right, make sure to select the appropriate scale. Note that some symbols are unscalable and plot at the size they were designed. |
| <i>Rotation</i>   | Defines the rotation of the symbol. Rotation value is degrees. Rotations are absolute a value of the DDD.MMSS format will rotate the symbol by specified angle.  |
| <i>Locked</i>     | Tick it to lock the point, so its properties cannot be edited, and the point cannot be moved with a mouse.   |
| <i>Annotation</i> | Defines attributes to be displayed as the point annotation.  |

#### The buttons of the *Edit Point* dialog

| <b>Button</b>              | <b>Description</b>  |
|----------------------------|---|
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. This button is active only when at least one checkbox from the <i>Annotation</i> group box is ticked. For more information refer to "Point annotation settings" section on page 604. |
| <b>Set Properties</b>      | Click it to set current properties as the default for points. New points will be created with these properties.   |
| <b>Get Properties</b>      | Click it to apply existing default properties to the point.   |
| <b>Attributes</b>          | Click it to add new attributes to the point.  |
| <b>Images/Pdfs</b>         | Click it to attach an image or a PDF file to the point. The picture will be displayed near the point. For more information about configuring images, refer to "Image Viewer" section on page 573.                                     |
| <b>Delete</b>              | Click it to delete the point and close the dialog.  |
| <b>Apply</b>               | Click it to apply changes.  |
| <b>Notes</b>               | Click it to add a short note.   |
| <b>Symbols...</b>          | Click it to manage extra symbols for the point.   |
| <b>OK</b>                  | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>              | Click it to close the dialog without saving changes.  |

## Line properties

A line is a connection between two points, and defined by a start point and an end point. The bearing and distance of the line are defined by the start and end points positions.

The *Edit Line* dialog allows you to edit properties of the selected line. Buttons and fields of the dialog are described in the tables below.

### The non-editable fields of the *Edit Line* dialog

| Field              | Description   |
|--------------------|---|
| <i>Start Point</i> | Displays the start point number.  |
| <i>End Point</i>   | Displays the end point number.  |
| <i>Bearing</i>     | Displays the line bearing. A number to the left of the field displays original bearing. |
| <i>Distance</i>    | Display the line length.  |

### The editable fields of the *Edit Line* dialog

| Field                           | Description  |
|---------------------------------|--|
| <i>Layer</i>                    | Defines layer to which the line belongs to. Note that the line and its points may belong to the different layers.  |
| <i>Color</i>                    | Defines a color for line displaying.   |
| <i>Line Style</i>               | Defines appearance of the line both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to Line Style icon.   |
| <i>Thickness</i>                | Defines the width of the line in millimeters when plotted.   |
| <i>Break Line</i>               | A line may be defined as a breakline. Line must join two Use in Surface points with heights for that. MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.   |
| <i>Annotation</i>               | Tick it to turn on line annotation with its bearing, distance or both.   |
| <i>In Line Annotation Table</i> | Tick it to display the line annotation in the Line Annotation Table. If this table is plotted, the line is marked with a number, which is listed in the table with the appropriate bearing and distance. See "Line Annotation Table icon" section on page 214 for details. |

### Buttons of the *Edit Line* dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for lines. New lines will be created with these properties. |
| <b>Get Properties</b> | Click it to load existing default properties for lines.   |
| <b>Reverse</b>        | Click it to swap the start and end points of the line.  |
| <b>Attributes</b>     | Click it to add new attributes to the line.   |

---

| <b>Button</b>              | <b>Description</b>   |
|----------------------------|--|
| <b>Image/Pdfs</b>          | Click it to attach an image or a PDF to the line. The picture will be displayed near the line. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>              | Click it to delete the line and close the dialog.  |
| <b>Apply</b>               | Click it to apply changes.   |
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. For more information refer to "Line annotation settings" section on page 605.                                   |
| <b>OK</b>                  | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>              | Click it to close the dialog without saving changes.   |

## Arc properties

An arc is a part of a circumference, defined by three points. It may be either a start point, an end point and the center point of circumference, or three points, belongs to one circumference.

The *Edit Arc* dialog allows you to edit properties of the selected arc. Buttons and fields of the dialog are described in the table below.

### NOTE

Dialog for the arc, defined by the three points, belongs to one circumference, called **Edit 3-Point Arc**.

### The non-editable fields of the *Edit Arc* dialog

| Field                 | Description   |
|-----------------------|---|
| <i>Start Point</i>    | Displays the number of the start point.   |
| <i>End Point</i>      | Displays the number of the end point.   |
| <i>Center Point</i>   | Displays the number of the center point. This field exists in the <i>Edit Arc</i> dialog only.        |
| <i>Third Point</i>    | Displays the number of the third point. This field exists in the <i>Edit 3-Point Arc</i> dialog only. |
| <i>Radius</i>         | Displays the radius of the arc.   |
| <i>Arc Length</i>     | Displays the length of the arc.   |
| <i>Internal Angle</i> | Displays the internal angle of the arc. It is marked as "IA" at figure 1 below.                       |
| <i>Start Bearing</i>  | Displays the start bearing of the arc. It is marked as "SB" at figure 1 below.                        |
| <i>End Bearing</i>    | Displays the end bearing of the arc. It is marked as "EB" at figure 1 below.                          |
| <i>Segment Area</i>   | Displays the area of the arc segment. It is filled with purple at figure 2 below.                     |
| <i>Sector Area</i>    | Displays the area of the arc sector. It is filled with purple at figure 3 below.                      |
| <i>Chord Length</i>   | Displays the length of the arc main chord. It is marked as "CH" at figure 1 below.                    |
| <i>Chord Bearing</i>  | Displays the bearing of the arc main chord. It is marked as "HB" at figure 1 below.                   |

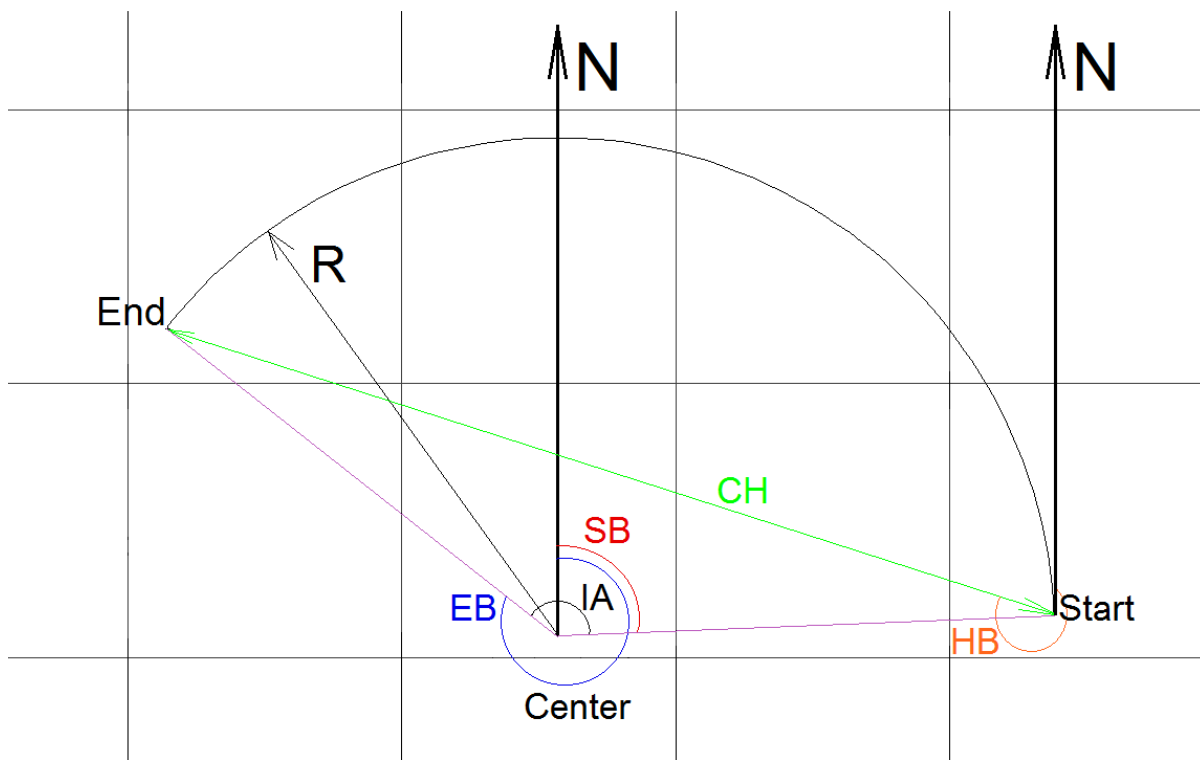


Figure 1. Arc parameters

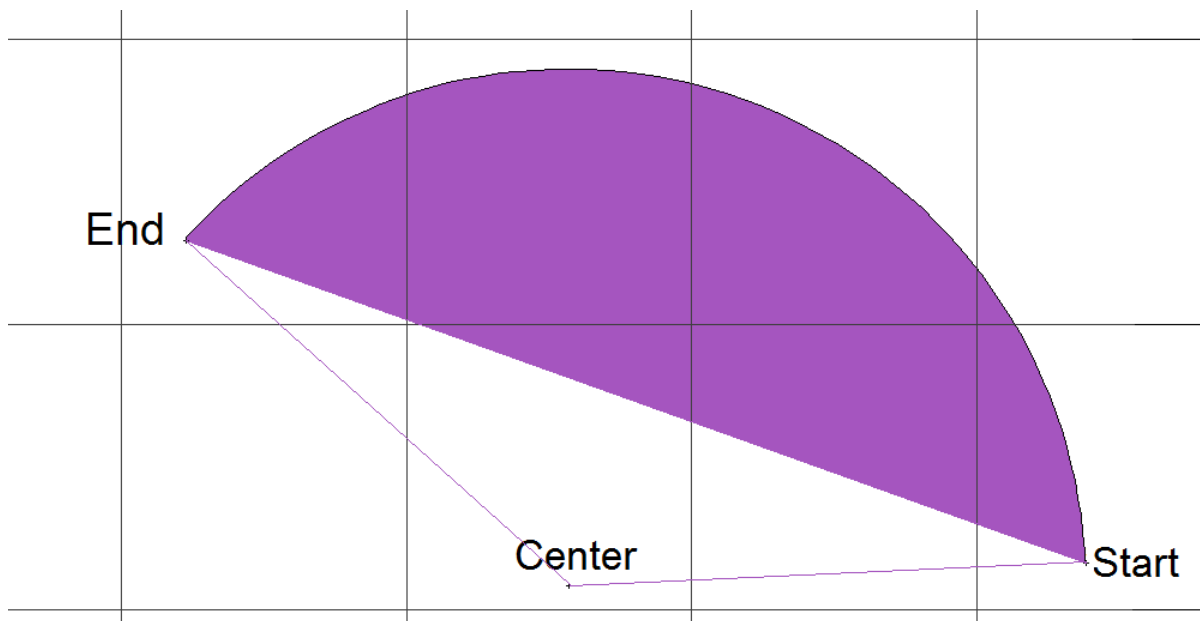
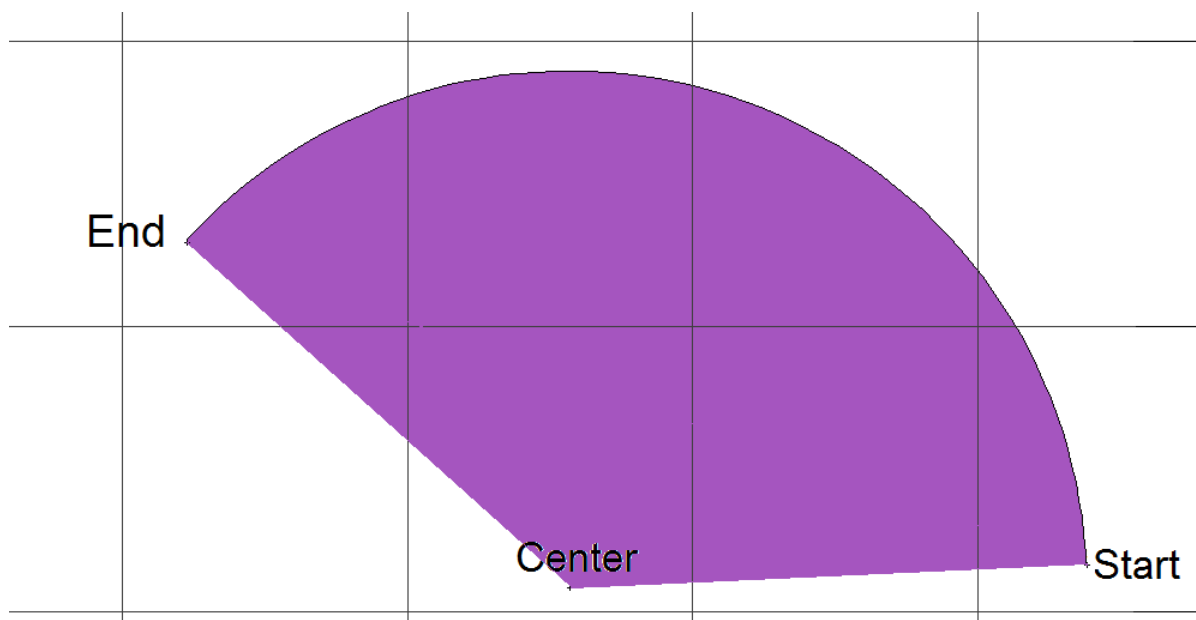


Figure 2. Segment



**Figure 3. Sector**

**The editable fields of the *Edit Arc* dialog**

| Field                          | Description  |
|--------------------------------|--|
| <i>Layer</i>                   | Defines layer to which the arc belongs to. Note that the arc and its points may belong to the different layers.  |
| <i>Color</i>                   | Defines a color for arc displaying.  |
| <i>Line Style</i>              | Defines appearance of the arc both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.                 |
| <i>Thickness</i>               | Defines the width of the arc in millimeters when plotted.  |
| <i>Break Line</i>              | An arc may be defined as breakline. The arc must be defined by three Use in Surface points for that. If ticked, MAGNET Office treats a breakline as an arc across which you cannot form a triangle.                                |
| <i>Annotation</i>              | Tick it to turn on arc annotation. Possible values for annotation are: <ul style="list-style-type: none"> <li>• Radius</li> <li>• Arc length</li> <li>• Internal angle</li> <li>• Chord length</li> <li>• Chord bearing</li> </ul> |
| <i>In Arc Annotation Table</i> | Tick it to display the arc annotation in the Arc Annotation Table. If this table is plotted, the arc is marked with a number, which is listed in the table with the appropriate attributes.  |



**Buttons of the *Edit Arc* dialog**

| <b>Button</b>              | <b>Description</b>   |
|----------------------------|--|
| <b>Set Properties</b>      | Click it to set current properties as the default for arcs. New arcs will be created with these properties.  |
| <b>Get Properties</b>      | Click it to apply existing default properties to the arcs.   |
| <b>Reverse</b>             | Click it to swap start and end points of the arc.  |
| <b>Attributes</b>          | Click it to add new attributes to the arc.   |
| <b>Images/Pdfs</b>         | Click it to attach an image or a PDF to the arc. The picture will be displayed near the arc. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>              | Click it to delete the arc and close the dialog.   |
| <b>Apply</b>               | Click it to apply changes.   |
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. For more information refer to "Arc annotation settings" section on page 607.                                  |
| <b>OK</b>                  | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>              | Click it to close the dialog without saving changes.   |

## Circle properties

A circle is defined by its center point and radius.

The *Edit Circle* dialog allows you to edit properties of the selected circle. Buttons and fields of the dialog are described below.

### The non-editable fields of the *Edit Circle* dialog

| Field                | Description   |
|----------------------|---|
| <i>Center Point</i>  | Displays the number of the center point.                        |
| <i>Easting</i>       | Displays the east or X component of the center point position.  |
| <i>Northing</i>      | Displays the north or Y component of the center point position. |
| <i>Circumference</i> | Displays the length of the circumference.                       |
| <i>Area</i>          | Displays the area of the circle.                                |

### The editable fields of the *Edit Circle* dialog

| Field            | Description   |
|------------------|---|
| <i>Radius</i>    | Defines the radius of the circle.   |
| <i>Layer</i>     | Defines layer to which the circle belongs to. Note that the circle and its center point may belong to the different layers.   |
| <i>Color</i>     | Defines a color for circle displaying.  |
| <i>Line Type</i> | Defines appearance of the circle both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i> | Defines the width of the circle in millimeters when plotted.  |

### Buttons of the *Edit Circle* dialog

| Button                | Description  |
|-----------------------|--|
| <b>Set Properties</b> | Click it to set current properties as the default for circles. New circles will be created with these properties.  |
| <b>Get Properties</b> | Click it to load existing default properties for circles.  |
| <b>Attributes</b>     | Click it to add new attributes to the circle.  |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the circle. The picture will be displayed near the circle. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the circle and close the dialog.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.   |

## String properties

A string defined by several points, joined by lines and/or arcs to become one entity. The string may be a 3D object, if all points that define it have elevation values. A smoothing algorithm may be applied to the string for plotting purposes; it has no influence on any computations.

The **Edit String** dialog allows you to edit properties of the selected string. Buttons and fields of the dialog are described below.

### The non-editable fields of the **Edit String** dialog

| Field              | Description                                    |
|--------------------|--|
| <i>Start Point</i> | Displays the number of the string start point. |
| <i>End Point</i>   | Displays the number of the string end point.   |
| <i>Num Points</i>  | Display quantity of the points in the string.  |
| <i>Length</i>      | Display the length of the string.              |

### The editable fields of the **Edit String** dialog

| Field              | Description   |
|--------------------|---|
| <i>Name</i>        | Defines the name of the string.   |
| <i>Layer</i>       | Defines layer to which the string belongs to. Note that the string and its points may belong to the different layers.   |
| <i>Color</i>       | Defines a color for string displaying.  |
| <i>Line Style</i>  | Defines appearance of the string both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>   | Defines the width of the string in millimeters when plotted.  |
| <i>is Smoothed</i> | Select it to apply a smoothing spline algorithm to the string. It is used for plotting purposes and has no influence on any computations.   |
| <i>Service</i>     | Select is to make the string a service for use in obstruction definition.   |
| <i>Break Line</i>  | A string may be defined as breakline. The string must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.             |
| <i>Annotation</i>  | Tick it to turn on the string annotation.   |

### Buttons of the **Edit String** dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for strings. New strings will be created with these properties. |
| <b>Get Properties</b> | Click it to load existing default properties for strings.   |
| <b>Reverse</b>        | Click it to swap the start and end points of the string.  |

| <b>Button</b>              | <b>Description</b>   |
|----------------------------|--|
| <b>Images/Pdfs</b>         | Click it to attach an image or a PDF to the string. The picture will be displayed near the string. For more information refer to "Image Viewer" section on page 573. |
| <b>Delete</b>              | Click it to delete the string and close the dialog.  |
| <b>Service Detail</b>      | Click it to configure a service.   |
| <b>Annotation Settings</b> | Click it to configure the annotation displaying. For more information refer to "String annotation settings" section on page 612.                                     |
| <b>OK</b>                  | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>              | Click it to close the dialog without saving changes.   |

## Polyline properties

A polyline defined by several lines, joined to become one entity. Note that polyline does not have start, end or node points as independent entities.

The ***Edit Polyline*** dialog allows you to edit properties of the selected polyline. Buttons and fields of the dialog are described below.

### The editable fields of the ***Edit Polyline*** dialog

| Field             | Description   |
|-------------------|---|
| <i>Layer</i>      | Defines layer to which the polyline belongs to.   |
| <i>Color</i>      | Defines a color for polyline displaying.  |
| <i>Thickness</i>  | Defines the width of the polyline in millimeters when plotted.  |
| <i>Line Style</i> | Defines appearance of the polyline both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55.           |
| <i>Elevation</i>  | The height, reduced level, or Z component of the polyline. MAGNET Office allows to create polylines with or without height. Tick near the elevation edit-box to activate it. Unticked checkbox means that polyline has no height. |
| <i>Break Line</i> | A polyline may be defined as a breakline. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.   |

### Buttons of the ***Edit Polyline*** dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for polylines. New polylines will be created with these properties. |
| <b>Get Properties</b> | Click it to load existing default properties for polylines.   |
| <b>Delete</b>         | Click it to delete the polyline and close the dialog.   |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Polygon properties

A polygon is a closed shape, defined by several points, joined by lines and/or arcs to become one entity. A polygon may be selected by its centroid point.

You can move the polygon nodes to change its shape, by holding the *Shift* key and moving the node with a mouse. You can also move the entire polygon in the same way, by using its centroid point.

A polygon may be filled with a pattern, hatching, or shading.

A polygon is the base entity for a lot, boundary or pad.

The ***Edit Polygon Area*** dialog allows you to edit properties of the selected polygon. Buttons and fields of the dialog are described below.

### The non-editable fields of the ***Edit Polygon Area*** dialog

| Field              | Description  |
|--------------------|--|
| <i>Area</i>        | Displays the area of the polygon.  |
| <i>Perimeter</i>   | Displays the length of the polygon perimeter.                                  |
| <i>Start Point</i> | Displays the number of the polygon start point.                                |
| <i>End Point</i>   | Displays the number of the polygon end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the polygon. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the polygon.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the polygon.                              |
| <i>CentroidX</i>   | Displays the X or north component of the polygon centroid point position.      |
| <i>CentroidY</i>   | Displays the Y or east component of the polygon centroid point position.       |

### The editable fields of the ***Edit Polygon Area*** dialog

| Field                    | Description  |
|--------------------------|--|
| <i>Layer</i>             | Defines layer to which the polygon belongs to. Note that the polygon and its points, lines and arcs may belong to the different layers.  |
| <i>Clipping Boundary</i> | When ticked, contours, going through the polygon, will not be displayed when plotted.  |
| <i>Break Line</i>        | A polygon may be defined as breakline. The polygon must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.                  |
| <i>Line Color</i>        | Defines a color for polygon edges displaying.  |
| <i>Line Style</i>        | Defines appearance of the polygon edges both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>         | Defines the width of the polygon edge in millimeters when plotted.   |
| <i>Filling Color</i>     | Defines the color for polygon area filling and strength of the pattern.  |

| <b>Field</b>         | <b>Description</b>  |
|----------------------|---|
| <i>Filling Space</i> | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.  |
| <i>Pattern</i>       | Defines pattern style for polygon area filling.   |
| <i>Symbol</i>        | Defines the symbol for polygon area filling.  |
| <i>Line Style</i>    | Defines the line style for polygon area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the edit-box below. |
| <i>Cross</i>         | Defines whether to activate the cross-hatching of the polygon area.   |
| <i>Opaque</i>        | When ticked, the displaying of the filling is turned off.   |
| <i>Draw Edge</i>     | Defines whether to draw the edge line around the polygon or not.  |

#### **Buttons of the *Edit Polygon Area* dialog**

| <b>Button</b>         | <b>Description</b>  |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for polygons. New polygons will be created with these properties.   |
| <b>Get Properties</b> | Click it to apply existing default properties to the polygon.   |
| <b>Attributes</b>     | Click it to add new attributes to the polygon.  |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the polygon. The picture will be displayed near the polygon centroid point. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the polygon and close the dialog.  |
| <b>Apply</b>          | Click it to apply changes.  |
| <b>Save File</b>      | Click it to save the polygon as a platform (*. <i>bld</i> ) or house (*. <i>hse</i> ) file.   |
| <b>Convert</b>        | Click it to convert the polygon to a boundary, lot, pad or string.  |
| <b>Surface Area</b>   | Click it to compute the area of DTM, crossing with the polygon.   |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Lot properties

A lot is a closed figure, created by lines and/or arcs. A lot is a type of polygon with the additional attributes to define it as an allotment in a subdivision. Lots can be automatically annotated with bearing, distance, area, lot numbers, and angles

You can move the lot nodes to change its shape, by holding the *Shift* key and moving the node with a mouse. You can also move the entire lot in the same way, by using its centroid point.

The **Edit Lot** dialog allows you to edit properties of the selected lot. Buttons and fields of the dialog are described below.

### The non-editable fields of the **Edit Lot** dialog

| Field              | Description  |
|--------------------|--|
| <i>Area</i>        | Displays the area of the lot.  |
| <i>Perimeter</i>   | Displays the length of the lot perimeter.                                  |
| <i>Start Point</i> | Displays the number of the lot start point.                                |
| <i>End Point</i>   | Displays the number of the lot end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the lot. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the lot.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the lot.                              |
| <i>CentroidX</i>   | Displays the X or north component of the lot centroid point position.      |
| <i>CentroidY</i>   | Displays the Y or east component of the lot centroid point position.       |

### The editable fields of the **Edit Lot** dialog

| Field                | Description  |
|----------------------|--|
| <i>Name</i>          | Defines the name of the lot.   |
| <i>Layer</i>         | Defines layer to which the lot belongs to. Note that the lot and its points, lines and arcs may belong to the different layers.  |
| <i>Line Color</i>    | Defines a color for lot edges displaying.  |
| <i>Line Style</i>    | Defines appearance of the lot edges both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>     | Defines the width of the lot edge in millimeters when plotted.   |
| <i>Filling Color</i> | Defines the color for lot area filling.  |
| <i>Filling Space</i> | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.   |
| <i>Pattern</i>       | Defines pattern style for lot area filling.  |
| <i>Symbol</i>        | Defines the symbol for lot area filling.   |



| <b>Field</b>             | <b>Description</b>   |
|--------------------------|--|
| <i>Line Style</i>        | Defines the line style for lot area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the editbox below. |
| <i>Cross</i>             | Select it to activate the cross-hatching of the lot area.  |
| <i>Opaque</i>            | When ticked, the lot is places in front of any entities, and cut them at a certain distance around the lot.  |
| <i>DP Number</i>         | Defines a deposited plan — previous survey plan with reference number  |
| <i>Code</i>              | Defines a code for the lot area.   |
| <i>House No</i>          | Defines a number of the house, located at the lot.   |
| <i>Street</i>            | Defines a name of the street, going through the lot.   |
| <i>Clipping Boundary</i> | When ticked, contours, going through the lot, will not be displayed when plotted.  |
| <i>Break Line</i>        | A lot may be defined as breakline. The lot must be defined by Use in Surface points for that. If selected, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.  |
| <i>Annotation</i>        | Select it to turn on lot annotation. Possible values for annotation are: <ul style="list-style-type: none"> <li>• Lot Name</li> <li>• Lot Area</li> <li>• Lot Angle</li> <li>• Lot Lines</li> <li>• Lot Arcs</li> <li>• Back Boundary</li> </ul>   |
| <i>Draw Edge</i>         | Tick it to draw the lot edge.  |

#### Buttons of the *Edit Lot* dialog

| <b>Button</b>         | <b>Description</b>   |
|-----------------------|--|
| <b>Set Properties</b> | Click it to set current properties as the default for lots. New lots will be created with these properties.  |
| <b>Get Properties</b> | Click it to apply existing default properties to the lot.  |
| <b>Attributes</b>     | Click it to add new attributes to the lot.   |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the lot. The picture will be displayed near the lot. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the lot and close the dialog.   |
| <b>Convert</b>        | Click it to convert the lot to boundary, pad or string.  |
| <b>Apply</b>          | Click it to apply changes.   |
| <b>Surface Area</b>   | Click it to compute the area of DTM, crossing with the lot.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.  |

| <b>Button</b> | <b>Description</b>                                   |
|---------------|--|
| <b>Cancel</b> | Click it to close the dialog without saving changes. |

## Boundary properties

A boundary is a series of connected lines and/or arcs, formed into a closed figure. In fact, a boundary is a named polygon. It is used for various routines, such as:

- Compute volumes within the boundary
- Delete triangles inside or outside the boundary
- Select entities inside the boundary for other options

A boundary may be selected by its centroid point.

You can move the boundary nodes to change its shape, by holding the *Shift* key and moving the node with a mouse. You can also move the entire boundary in the same way, by using its centroid point.

A boundary may be filled with a pattern, hatching, or shading.

The **Edit Boundary** dialog allows you to edit properties of the selected boundary. Buttons and fields of the dialog are described below.

### The non-editable fields of the **Edit Boundary** dialog

| Field              | Description   |
|--------------------|---|
| <i>Area</i>        | Displays the area of the boundary.  |
| <i>Perimeter</i>   | Displays the length of the boundary perimeter.                                  |
| <i>Start Point</i> | Displays the number of the boundary start point.                                |
| <i>End Point</i>   | Displays the number of the boundary end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the boundary. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the boundary.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the boundary.                              |
| <i>CentroidX</i>   | Displays the X or north component of the boundary centroid point position.      |
| <i>CentroidY</i>   | Displays the Y or east component of the boundary centroid point position.       |

### The editable fields of the **Edit Boundary** dialog

| Field                    | Description  |
|--------------------------|--|
| <i>Name</i>              | Defines the name of the boundary.  |
| <i>Layer</i>             | Defines layer to which the boundary belongs to. Note that the boundary and its points, lines, and arcs may belong to the different layers.   |
| <i>Clipping Boundary</i> | When ticked, contours, going through the boundary, will not be displayed when plotted.   |
| <i>Break Line</i>        | A boundary may be defined as breakline. The boundary must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.                |
| <i>Line Color</i>        | Defines a color for boundary edge displaying.  |
| <i>Line Style</i>        | Defines appearance of the boundary edge both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |

| <b>Field</b>         | <b>Description</b>   |
|----------------------|--|
| <i>Thickness</i>     | Defines the width of the boundary edge in millimeters when plotted.  |
| <i>Filling Color</i> | Defines the color for boundary area filling and strength of the pattern.   |
| <i>Filling Space</i> | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.   |
| <i>Pattern</i>       | Defines pattern style for boundary area filling.   |
| <i>Symbol</i>        | Defines the symbol for boundary area filling.  |
| <i>Line Style</i>    | Defines the line style for boundary area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the edit-box below. |
| <i>Cross</i>         | Tick it to activate the cross-hatching of the boundary area.   |
| <i>Opaque</i>        | When ticked, the displaying of the filling is turned off.  |
| <i>Draw Edge</i>     | Tick it to draw the boundary edge.   |

**Buttons of the *Edit Boundary* dialog**

| <b>Button</b>         | <b>Description</b>  |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for boundaries. New boundaries will be created with these properties.   |
| <b>Get Properties</b> | Click it to apply existing default properties to the boundary.  |
| <b>Attributes</b>     | Click it to add new attributes to the boundary.   |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the boundary. The picture will be displayed near the boundary centroid point. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the boundary and close the dialog.   |
| <b>Apply</b>          | Click it to apply changes.  |
| <b>Save File</b>      | Click it to save the boundary as a platform (*.bld) or house (*.hse) file.  |
| <b>Convert</b>        | Click it to convert the boundary to lot, pad or string.   |
| <b>Surface Area</b>   | Click it to compute the area of DTM, crossing with the boundary.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Pad properties

A pad is a series of connected lines and/or arcs, formed into a closed figure around the extents of the buildings or other pad. In fact, a pad is a named polygon. It is used for identification of a pad and side slopes suitable for the placement of buildings.

A pad may be selected by its centroid point.

You can move the pad nodes to change its shape, by holding the *Shift* key and moving the node with a mouse. You can also move the entire pad in the same way, by using its centroid point.

A pad may be filled with a pattern, hatching, or shading.

The **Edit Pad** dialog allows you to edit properties of the selected pad. Buttons and fields of the dialog are described below.

### The non-editable fields of the **Edit Pad** dialog

| Field              | Description  |
|--------------------|--|
| <i>Area</i>        | Displays the area of the pad.  |
| <i>Perimeter</i>   | Displays the length of the pad edge.                                       |
| <i>Start Point</i> | Displays the number of the pad start point.                                |
| <i>End Point</i>   | Displays the number of the pad end point.                                  |
| <i>Num Points</i>  | Displays the quantity of the points (excluding centroid point) in the pad. |
| <i>Num Lines</i>   | Displays the quantity of the lines in the pad.                             |
| <i>Num Arcs</i>    | Displays the quantity of the arcs in the pad.                              |
| <i>CentroidX</i>   | Displays the X or north component of the pad centroid point position.      |
| <i>CentroidY</i>   | Displays the Y or east component of the pad centroid point position.       |

### The editable fields of the **Edit Pad** dialog

| Field                    | Description   |
|--------------------------|---|
| <i>Name</i>              | Defines the name of the pad.  |
| <i>Layer</i>             | Defines layer to which the pad belongs to. Note that the pad and its points, lines, and arcs may belong to the different layers.  |
| <i>Clipping Boundary</i> | When ticked, contours, going through the pad, will not be displayed when plotted.   |
| <i>Break Line</i>        | A pad may be defined as breakline. The pad must be defined by Use in Surface points for that. If ticked, MAGNET Office treats a breakline as a line or arc across which you cannot form a triangle.                     |
| <i>Line Color</i>        | Defines a color for pad edge displaying.  |
| <i>Line Style</i>        | Defines appearance of the pad edge both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>         | Defines the width of the pad edge in millimeters when plotted.  |
| <i>Filling Color</i>     | Defines the color for pad area filling and strength of the pattern.   |

| <b>Field</b>         | <b>Description</b>   |
|----------------------|--|
| <i>Filling Space</i> | Defines the space between adjacent filling symbols and lines for X (horizontal) and Y (vertical) axis.   |
| <i>Pattern</i>       | Defines pattern style for pad area filling.  |
| <i>Symbol</i>        | Defines the symbol for pad area filling.   |
| <i>Line Style</i>    | Defines the line style for pad area hatching. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. You may specify the slope of the line in the editbox below. |
| <i>Cross</i>         | Tick it to activate the cross-hatching of the pad area.  |
| <i>Opaque</i>        | When ticked, the displaying of the filling is turned off.  |
| <i>Draw Edge</i>     | Tick it to draw the pad edge.  |

**Buttons of the *Edit Pad* dialog**

| <b>Button</b>         | <b>Description</b>  |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for pads. New pads will be created with these properties.   |
| <b>Get Properties</b> | Click it to apply existing default properties to the pad.   |
| <b>Attributes</b>     | Click it to add new attributes to the pad.  |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the pad. The picture will be displayed near the pad centroid point. For more information about configuring images, refer to "Image Viewer" section on page 573. |
| <b>Delete</b>         | Click it to delete the pad and close the dialog.  |
| <b>Apply</b>          | Click it to apply changes.  |
| <b>Save File</b>      | Click it to save the pad as a platform (*.bld) or house (*.hse) file.   |
| <b>Convert</b>        | Click it to convert the boundary to lot, pad or string.   |
| <b>Surface Area</b>   | Click it to compute the area of DTM, crossing with the pad.   |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Text properties

A text is a group of alpha, numeric or alphanumeric characters, located in the survey view. It is displayed on one or multiple lines. Text entities are non-scalable, defined text height remains the same, regardless of the plotting scale.

The *Edit Text* dialog allows you to edit properties of the selected text. Buttons and fields of the dialog are described in the tables below.

### Fields of the *Edit Text* dialog

| Field                  | Description  |
|------------------------|--|
| <i>Easting</i>         | Defines the east or Y component of the text position.  |
| <i>Northing</i>        | Defines the north or X component of the text position.   |
| <i>Layer</i>           | Defines the layer to which the text belongs to.  |
| <i>Bearing</i>         | Defines the bearing of the text. Bearing is measured clockwise from north.   |
| <i>Color</i>           | Defines a color for text displaying.   |
| <i>Font</i>            | Defines a font for text displaying.  |
| <i>Char Height</i>     | Defines the height of the text char  |
| <i>Text Style</i>      | Defines the pre-configured text style. For information about configuring text styles, refer to "Text Styles icon" section on page 122. |
| <i>Char Style</i>      | Defines the usage bold/italic/underline formatting or not.   |
| <i>Insertion Style</i> | Defines the position of the insertion point relative to the text string. Refer to pictures below for details.                          |
| <i>Use Text Style</i>  | Tick it to use the pre-configured text style, selected in the <i>Text Style</i> drop-down list.  |
| <i>Draw Box</i>        | Tick it to draw a frame around the text.   |
| <i>Opaque</i>          | Select it to place the text in front of any entities, and cut them at a certain distance around the text.                              |
| <i>Main editbox</i>    | Defines the text string to be displayed.   |

### Buttons of the *Edit Text* dialog

| Button                | Description   |
|-----------------------|---|
| <b>Parallel To</b>    | Click it to set the text to be parallel to an existing entity.  |
| <b>Set Properties</b> | Click it to set current properties as the default for text. New text will be created with these properties. |
| <b>Get Properties</b> | Click it to load existing default properties for text.  |
| <b>Delete</b>         | Click it to delete the text and close the dialog.   |
| <b>Upper</b>          | Convert all chars of the text to uppercase.   |
| <b>Lower</b>          | Convert all chars of the text to lowercase.   |
| <b>Invert</b>         | Invert the current upper/lowercase condition.   |

| <b>Button</b>     | <b>Description</b>                                   |
|-------------------|--|
| <b>Capitalize</b> | Convert the first char of each word to uppercase.    |
| <b>OK</b>         | Click it to apply changes and close the dialog.      |
| <b>Cancel</b>     | Click it to close the dialog without saving changes. |



## Dimension properties

A dimension entity measures the distance between two existing points and displays it as annotation for line between these points with arrows on each end.

The *Edit Dimension* dialog allows you to edit properties of the selected dimension. Buttons and fields of the dialog are described below.

### Fields of the *Edit Dimension* dialog

| Field              | Description   |
|--------------------|---|
| <i>Layer</i>       | Defines the layer to which the dimension belongs to.  |
| <i>Color</i>       | Defines a color for dimension displaying.   |
| <i>Thickness</i>   | Defines the width of the dimension line in millimeters when plotted.  |
| <i>Line Style</i>  | Defines appearance of the dimension line both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Arrow Head</i>  | Defines the style of the arrow head.  |
| <i>Head Angle</i>  | Defines the angle of the arrow head.  |
| <i>Head Length</i> | Defines the length of the arrow head.   |

### Buttons of the *Edit Dimension* dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for dimensions. New dimensions will be created with these properties. |
| <b>Get Properties</b> | Click it to apply existing default properties to the dimension.   |
| <b>Delete</b>         | Click it to delete the dimension and close the dialog.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Arrow properties

An arrow is a special line or series of lines with an arrow head at one or both ends. The arrow can be used as an indicator on a plan. Various arrow head styles are available with user-defined dimensions for the arrow head. Arrow heads are non-scalable, defined arrow head remains the same, regardless of the plotting scale.

The **Edit Arrow** dialog allows you to edit properties of the selected arrow. Buttons and fields of the dialog are described below.

### Fields of the **Edit Arrow** dialog

| Field              | Description   |
|--------------------|---|
| <i>Layer</i>       | Defines the layer to which the arrow belongs to.  |
| <i>Color</i>       | Defines a color for arrow displaying.   |
| <i>Thickness</i>   | Defines the width of the arrow line in millimeters when plotted.  |
| <i>Line Style</i>  | Defines appearance of the arrow line both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Arrow Head</i>  | Defines the style of the arrow head.  |
| <i>Head Angle</i>  | Defines the angle of the arrow head.  |
| <i>Head Length</i> | Defines the length of the arrow head.   |

### Buttons of the **Edit Arrow** dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for arrows. New arrows will be created with these properties. |
| <b>Get Properties</b> | Click it to apply existing default properties to the arrow.   |
| <b>Delete</b>         | Click it to delete the arrow and close the dialog.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Table properties

The *Table Properties* dialog allows you to edit properties of the selected table. Fields of the dialog are described in the table below.

### Fields of the *Table Properties* dialog

| Field                  | Description  |
|------------------------|--|
| <i>Name</i>            | Defines the name of the table.   |
| <i>Rows</i>            | Defines the quantity of rows in the table.   |
| <i>Columns</i>         | Defines the quantity of columns in the table.  |
| <i>Min Height</i>      | Defines the minimum height of the table rows.  |
| <i>Min Width</i>       | Defines the minimum width of the table columns.  |
| <i>Color</i>           | Defines the color of the table borders.  |
| <i>Font</i>            | Defines the font of the text in the table.   |
| <i>Char Height</i>     | Defines the font size of the text in the table.  |
| <i>Text Style</i>      | Defines the text style, used in the table.   |
| <i>Char Style</i>      | Defines the text formatting in the table.  |
| <i>Insertion Style</i> | Defines the position of the insertion point relative to the table.                                       |
| <i>Use Text Style</i>  | Tick it to use the font settings from the text style, instead of mentioned above.                        |
| <i>Opaque</i>          | Tick it to place the table in front of any entities, and cut them at a certain distance around the text. |
| <i>Draw Box</i>        | Tick it to draw the outer borders of the table.  |

## Alignment properties

An alignment defined by several points, joined by lines to become one entity. The alignment may be a 3D object, if all points that define it have elevation values.

The *Edit Alignment* dialog allows you to edit properties of the selected alignment. Buttons and fields of the dialog are described below.

### The non-editable fields of the *Edit Alignment* dialog

| Field             | Description  |
|-------------------|--|
| <i>Start IP</i>   | Displays the number of the alignment start intersection point.         |
| <i>End IP</i>     | Displays the number of the alignment end intersection point.           |
| <i>Num Points</i> | Display quantity of the intersection points in the alignment.          |
| <i>End Chain</i>  | Displays the chainage or running distance at the end of the alignment. |
| <i>Length</i>     | Display the length of the alignment.                                   |

### The editable fields of the *Edit Alignment* dialog

| Field              | Description  |
|--------------------|--|
| <i>Name</i>        | Defines the name of the alignment.   |
| <i>Start Chain</i> | Defines the chainage or the running distance of the alignment start intersection point.  |
| <i>Layer</i>       | Defines the layer, to which the alignment belongs to. Note that the alignment and its points may belong to the different layers.   |
| <i>Color</i>       | Defines a color for alignment displaying.  |
| <i>Line Style</i>  | Defines appearance of the alignment both on the screen and on the printed copy. You may choose them from the line styles library. For more information about line styles, refer to "Line Style icon" section on page 55. |
| <i>Thickness</i>   | Defines the width of the alignment in millimeters when plotted.  |

### Buttons of the *Edit Alignment* dialog

| Button                | Description   |
|-----------------------|---|
| <b>Set Properties</b> | Click it to set current properties as the default for alignments. New alignments will be created with these properties.   |
| <b>Get Properties</b> | Click it to apply existing default properties to the alignment.   |
| <b>Reverse</b>        | Click it to swap the start and end points of the alignment.   |
| <b>Images/Pdfs</b>    | Click it to attach an image or a PDF to the alignment. The picture will be displayed near the alignment. For more information refer to "Image Viewer" section on the facing page. |
| <b>Delete</b>         | Click it to delete the alignment and close the dialog.  |
| <b>OK</b>             | Click it to apply changes and close the dialog.   |
| <b>Cancel</b>         | Click it to close the dialog without saving changes.  |

## Image Viewer

The image viewer allows you to attach images or/and PDF files to the MAGNET Office entities.

To open the image viewer, click **Images/Pdfs** in the properties dialog of the appropriate entity. Left panel contains the list of the attached images and/or PDF files. Right panel displays the preview of the currently selected image/PDF file. Buttons are described in the table below.

### Buttons of the image viewer

| Button              | Description  |
|---------------------|--|
| <b>View Pdf</b>     | Click it to open the selected PDF file in the default system PDF reader.<br>NOTE<br>This button is displayed only when a PDF file is selected. |
| <b>Attach Image</b> | Click it to attach a new image or PDF file to the entity.  |
| <b>Delete</b>       | Click it to delete the selected image/PDF file.  |
| <b>OK</b>           | Click it to save the changes and close the image viewer.   |
| <b>Cancel</b>       | Click it to close the image viewer without saving changes.   |

To display an image or/and a PDF file in the survey view, tick the checkbox near the required image/PDF file in the left panel, and click **OK**.

## Layer properties

A layer may be described as a sheet of transparent film, which may be viewed one in a time, or several layers at once, combined to a "sandwich." Each entity belongs to one layer only, and will be invisible, if its layer is inactive.

The **Edit Survey Layer** dialog allows you to edit properties of the selected layer. Buttons and fields of the dialog are described in the tables below.

To edit layers properties:

1. In the *Edit Layers* group of the *View* tab, click the **Layers** icon.

The **Layer Settings** dialog is displayed.

2. Select layer to be edited.

3. Click **Edit**.

The **Edit Survey Layer** dialog is displayed.

4. Configure the layer parameters as you need.

5. Click **OK**.

### Fields of the *Edit Survey Layer* dialog

| Property            | Description  |
|---------------------|--|
| <i>Layer Name</i>   | Defines the name of the layer.   |
| <i>Active</i>       | Defines whether the layer is active or inactive. Objects from inactive layers will not be displayed in the survey view.  |
| <i>Lock</i>         | Defines whether the layer is locked (i.e. cannot be changed) or not.   |
| <i>Overlay</i>      | When ticked, entities which belong to the layer will be darkened, and not available for editing, i.e. all entities will be look like a background image.   |
| <i>Color</i>        | Defines the default color for the layer. All entities, which belong to this layer and have <i>By Layer</i> value of the <i>Color</i> parameter will be painted with it.  |
| <i>Point Mark</i>   | Defines the default point mark for the layer. All points, which belong to this layer and have <i>By Layer</i> value of the <i>Mark</i> parameter will have such mark.  |
| <i>Line Type</i>    | Defines the default line style for the layer. All lines, arcs, circles, strings, polylines, polygon, lots, pads and boundaries, which belong to this layer and have <i>By Layer</i> value of the <i>Line Style</i> parameter will have such line style.        |
| <i>Line Width</i>   | Defines the default line thickness for the layer. All lines, arcs, circles, strings, polylines, polygon, lots, pads and boundaries, which belong to this layer and have <i>By Layer</i> value of the <i>Thickness</i> parameter will have such line thickness. |
| <i>Point Symbol</i> | Defines the default point symbol for the layer. All points, which belong to this layer and have <i>By Layer</i> value of the <i>Symbol</i> parameter will have such symbol.  |
| <i>Avoidance</i>    | To activate avoidance data, tick the checkbox and click <b>Avoidance</b> . See "Avoidance" section on the facing page for details.   |

### Editing multiple layer

To edit the properties of several layers at once:

1. In the *Edit Layers* group of the *View* tab, click the **Layers** icon.

The *Layer Settings* dialog is displayed.

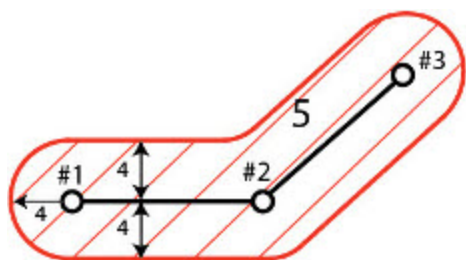
2. Select layers to be edited.
3. Click **Edit**.

The *Edit Survey Layers* dialog is displayed. The *Name* field contains *MULTIPLE\_EDIT* value and cannot be edited.

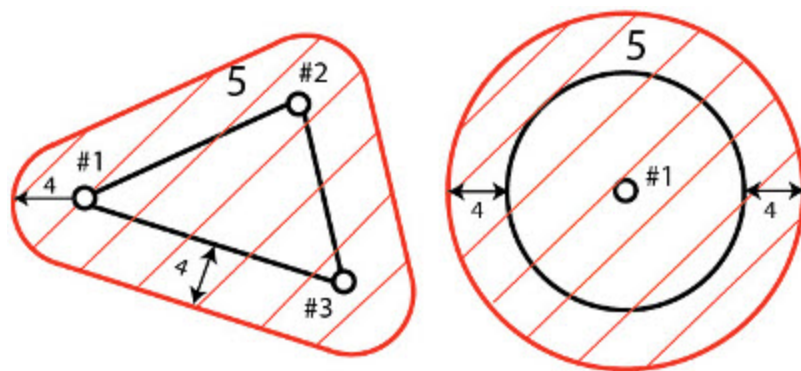
4. Configure the parameters as you need. These parameters will be applied to all selected layers.
5. Click **OK**.

## Avoidance

The Avoidance feature is used in the machine control for alarming operator if the machine enter avoidance area; and in the field software to avoid dangerous areas. Pictures below represent avoidance areas. MAGNET Office support this feature for import/export purposes.



Avoidance area for a line



Avoidance area for polygon/surface in the horizontal plane

### LEGEND

#1; #2; #3 — points

4 — proximity,

5 — boundary and avoidance areas.

To configure avoidance zones:

1. In the *Edit Layers* group of the *View* tab, click the **Layers** icon.  
The *Layer Settings* dialog is displayed.
2. Do one of the following:

- To edit an existing layer:
  1. Select the required layer.
  2. Click **Edit**.

The *Edit Survey Layer* dialog is displayed.

- To set avoidance in a new layer:
  1. Click **New**.

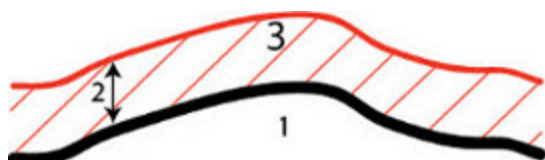
The *Add New Layer* dialog is displayed.

2. Configure the layer parameters. For more information refer to "Add icon" section on page 99.

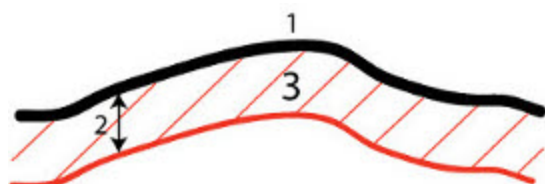
3. Tick checkbox to the left of **Avoidance** button.
4. Click **Avoidance**.

The *Edit Avoidance Data* dialog is displayed.

5. Tick the *Avoidance* checkbox.
6. In the *Layer* group box, define the avoidance area dimension, by selecting the appropriate radiobutton:
  - *2D* — to work in the horizontal plane only.
  - *3D* — to work in both horizontal and vertical planes.
7. In the *Surface* group box, define the avoidance mode, by selecting the appropriate radiobutton:
  - *Above* — the avoidance boundary will be placed above the surface. The alarm will be displayed if a measurement is performed within the avoidance boundary. See the "Above avoidance mode" picture below.
  - *Below* — the avoidance boundary will be placed below the surface. The alarm will be displayed if a measurement is performed within the avoidance boundary. See the "Below avoidance mode" picture below.
  - *Above/Below* — the avoidance boundary will be placed both above and below the surface. The alarm will be displayed if a measurement is performed within the avoidance boundary. See the "Above/Below avoidance mode" picture below.
  - *Outside* — the avoidance boundary will be placed both above and below the surface. The alarm will be displayed if a measurement is performed outside of the avoidance boundary. See the "Outside avoidance mode" picture below.
8. In the *Proximity* editbox, specify the size of the avoidance area.
9. Click **OK**.

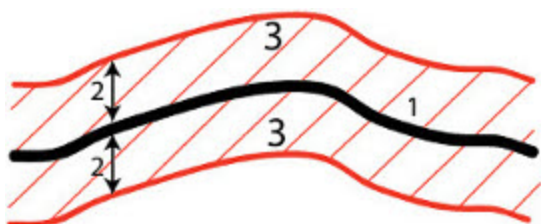


**Above avoidance mode**

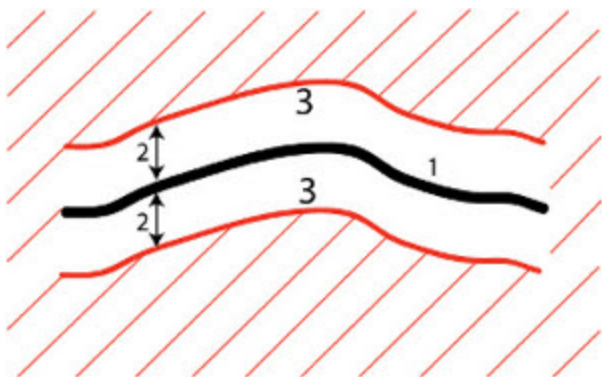


**Below avoidance mode**





**Above/Below avoidance mode**



**Outside avoidance mode**

**LEGEND**

1 — surface

2 — proximity

3 — boundary area

**Fields of the Edit Avoidance Data dialog**

| Field            | Description   |
|------------------|---|
| <i>Layer</i>     | Displays the name of the layer where avoidance will be set.   |
| <i>Avoidance</i> | Tick to activate avoidance for the layer.   |
| <b>Layer</b>     |   |
| <i>2D</i>        | Defines the work of the avoidance in the horizontal plane only  |
| <i>3D</i>        | Defines the work of the avoidance in both horizontal and vertical planes  |
| <b>Surface</b>   |   |
| <i>Above</i>     | Defines the Above avoidance mode. The avoidance boundary will be placed above the surface. The alarm will be displayed if a measurement is performed within the avoidance boundary. See the "Above avoidance mode" picture above. |
| <i>Below</i>     | Defines the Below avoidance mode. The avoidance boundary will be placed below the surface. The alarm will be displayed if a measurement is performed within the avoidance boundary. See the "Below avoidance mode" picture above. |

| <b>Field</b>       | <b>Description</b>   |
|--------------------|--|
| <i>Above/Below</i> | Defines the Above/Below avoidance mode. The avoidance boundary will be placed both above and below the surface. The alarm will be displayed if a measurement is performed within the avoidance boundary. See the "Above/Below avoidance mode" picture above. |
| <i>Outside</i>     | Defines the Outside avoidance mode. The avoidance boundary will be placed both above and below the surface. The alarm will be displayed if a measurement is performed outside of the avoidance boundary. See the "Outside avoidance mode" picture above.     |
| <i>Proximity</i>   | Defines the size of the avoidance area.  |

# MAGNET Office Settings

MAGNET Office allows user to configure various settings to more closely fit to your needs. You may find description of settings in the corresponding sections:

- "Project Settings dialog" section on the next page
- "Program Settings dialog" section on page 589
- "Display Settings dialog" section on page 598
- "Annotation Styles dialog" section on page 604
- "Contour Settings dialog" section on page 617
- "Annotation Table Settings dialog" section on page 625
- "Background Images dialog" section on page 620
- "DTM Settings dialog" section on page 626

## Project Settings dialog

The *Project Settings* dialog allows you to configure settings of the current project. These settings apply only to the current project, and have no influence to other projects. Default settings for the MAGNET Office are configured in the Program Settings dialog and applied to each new project.

To configure the project settings:

1. In the *Settings* group of the *Settings* tab, click the Project Settings icon.

The *Project Settings* dialog is displayed.

2. Configure the required settings at the appropriate tab. Description of each tab may be found in the corresponding sections:
  - "Project details" section below
  - "Project diary" section on the facing page
  - "Project statistics" section on page 582
  - "Project unit settings" section on page 583
  - "Project symbols" section on page 585
  - "Project coordinate system" section on page 586
  - "Project SiteLINK 3D server" section on page 586
3. Click **OK**.

Click **Print** to generate report of current project settings. It will be displayed in a new window, and may be printed, or saved to a file.

## Project details

The *Project Details* tab of the Project Settings dialog allows you to specify basic project information, such as company, location, etc.

To edit project details:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.  
The **Project Settings** dialog is displayed.
2. Click the *Project Details* tab.
3. Fill in required information. Fields are described in the table below.
4. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### Fields of the *Project Details* tab

| Field          | Description   |
|----------------|---|
| <i>Company</i> | Defines the name of the company. The field will be filled in automatically, if you save this information in the program settings. |
| <i>Name</i>    | Defines the name of the user. The field will be filled in automatically, if you save this information in the program settings.    |
| <i>Title</i>   | Defines the name of the project.  |

| Field                | Description  |
|----------------------|--|
| <i>Project Refer</i> | Defines the project reference.<br>NOTE<br>This is the user-defined label. The <i>Project Ref</i> is the default. You may change this parameter in the Program user information               |
| <i>Stage</i>         | Defines the project stage.<br>NOTE<br>This is the user-defined label. The <i>Stage</i> is the default. You may change this parameter in the Program user information                         |
| <i>Location</i>      | Defines the location of the project.<br>NOTE<br>This is the user-defined label. The <i>Location</i> is the default. You may change this parameter in the Program user information            |
| <i>Plan Number</i>   | Defines the project number in documentation.<br>NOTE<br>This is the user-defined label. The <i>Plan Number</i> is the default. You may change this parameter in the Program user information |
| <i>Comments</i>      | Type any relevant comments here.   |

## Project diary

The *Diary* tab of the Project Settings dialog allows you to tracking work with the project. You may add notes about performed procedures, and spent time.

The diary displays list of the entries, containing information about user, who had worked with the project, date, and amount of time spent. It is also displays total time, spent on the project.

### Creating new diary entries

To add a new entry to the project diary:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.

The **Project Settings** dialog is displayed.

2. Click the *Diary* tab.
3. Click **Add**.

The **New Diary Entry** dialog is displayed. The *Date* field contains current date.

4. In the *Name* editbox, type the name of the user. The field will be filled in automatically, if you save this information in the program settings.
5. In the *Time* editbox, type the amount of time spent.
6. In the *Comments* editbox, type the appropriate description of tracked activity.
7. Click **OK**.

The new entry is added to the project diary.

8. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

## Modifying existing diary entries

To modify an existing entry:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.

The **Project Settings** dialog is displayed.

2. Click the *Diary* tab.
3. Click **Modify**.

The **Modify Diary Entry** dialog is displayed. The "Date" field contains current date.

4. Change the required information.
5. Click **OK**.

The entry is modified.

6. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### NOTE

The "Total" entry cannot be modified.

## Deleting diary entries

To delete an entry:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.

The **Project Settings** dialog is displayed.

2. Click the *Diary* tab.
3. Select the required entry.
4. Click **Delete**.

The entry is deleted.

5. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### NOTE

The "Total" entry cannot be deleted.

## Project statistics

The *Statistics* tab of the Project Settings dialog displays the following information about the project:

- Number of layers
- Number of points
- Number of lines
- Number of arcs
- Number of circles
- Number of texts
- Number of strings

To view the statistics:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.

The **Project Settings** dialog is displayed.

2. Click the *Statistics* tab.
3. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

## Project unit settings

The *Unit Settings* tab of the Project Settings dialog allows you to configure measurement units in the project.

To configure unit settings:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.  
The **Project Settings** dialog is displayed.
2. Click the *Unit Settings* tab.
3. Make the required configurations. Fields are described in the table below.
4. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### Fields of the project unit settings

| Field                                  | Description  |
|--|--|
| <b>Units—Linear</b>                    |  |
| <i>Meters</i>                          | Select to define linear units as international standard unit of one meter.   |
| <i>Feet</i>                            | Select to define linear units as one foot, which is 0.3048 meters long.  |
| <i>US Feet</i>                         | Select to define linear units as one US foot, which is 0.3048006 meters long or 39.37 inches to the meter.   |
| <b>Units—Angular</b>                   |  |
| <i>Deg Min Sec</i>                     | Select to define angular units as degrees, minutes and seconds.<br>Data is entered and displayed in decimal format as DDD.MMSS. Seconds can be taken with decimal values.<br><i>For example: 65.142645 is 65 degrees, 14 minutes and 26.45 seconds.</i>  |
| <i>Degrees</i>                         | Select to define angular units as degrees only. Minutes and seconds are decimal part of the degree.  |
| <i>Gon</i>                             | Select to define angular units as gons. The full circle is divided into 400 gons. 100 gons is equal to 90 degrees.   |
| <b>Units</b>                           |  |
| <i>Volume</i>                          | Select unit for volumes calculation. Possible values are: <ul style="list-style-type: none"> <li>• Cubic Meters — if linear units are defined as meters.</li> <li>• Cubic Feet — if linear units are defined as feet or US feet.</li> <li>• Cubic Yards — if linear units are defined as feet or US feet.</li> </ul> |
| <b>Scale Factor and Mean Elevation</b> |  |

| <b>Field</b>                 | <b>Description</b>  |
|------------------------------|---|
| <i>Base Scale Factor</i>     | Defines the projection scale factor.<br>It is applied to all distances when computing coordinate positions. The ground distance will always be shown when computed lines or missing lines are inquired.   |
| <i>Mean Elevation</i>        | Defines the mean elevation for the project.   |
| <b>Rotation By</b>           |   |
| <i>Mathematical Angle</i>    | Defines the orientation in standard mode. East is 0 degrees and north is 90 degrees.  |
| <i>Survey Bearing</i>        | Defines the orientation in bearing mode. North is 0 degrees and east is 90 degrees.   |
| <b>Format Station</b>        |   |
| <i>Chainage</i>              | Defines the chainage format of stations distance displaying. The distance from the start point will be displaying as the ordinary number.<br><i>For example: if the length is 2145.87, the end station number will be 2145.87.</i>  |
| <i>Station</i>               | Defines the station format of stations distance displaying. The distance from the start point will be displaying as the station number and distance from it.<br><i>For example: if the length is 2145.87 and distance between stations is 100, the end station number will be 21+45.87.</i> |
| <b>Base—Horizontal Angle</b> |   |
| <i>North Azimuth</i>         | The horizontal angle is defined with zero degrees set to the north.   |
| <i>South Azimuth</i>         | The horizontal angle is defined with zero degrees set to the south.   |
| <b>Base—Vertical Angle</b>   |   |
| <i>Zenith</i>                | The vertical angle is defined with zero degrees set to the zenith (directly above). See figure 1 for details.   |
| <i>Vertical</i>              | The vertical angle is defined with zero degrees set parallel to the ground. See figure 1 for details.   |
| <i>Nadir</i>                 | The vertical angle is defined with zero degrees set to the nadir (directly below). See figure 1 for details.  |
| <b>Display—Coordinates</b>   |   |
| <i>East/North</i>            | Coordinates is displayed as east value, followed by the north value.  |
| <i>North/East</i>            | Coordinates is displayed as north value, followed by the east value.  |
| <b>Display—Directions</b>    |   |
| <i>Azimuth</i>               | The directions are displayed as azimuth angles. The North axis is zero and angles are counted clockwise.  |



| Field                 | Description   |
|-----------------------|---|
| <i>Quadrant</i>       | The directions are displayed as angles in quadrants. Quadrants are pictured at figure 2. Angles are counted clockwise within each quadrant.<br><i>For example: azimuth angle of 130 degrees will be displayed as S 50° E.</i> |
| <b>Display</b>        |   |
| <i>Elevation</i>      | Tick to display elevations on the screen.   |
| <b>Decimal Places</b> |   |
| <i>Linear</i>         | Defines the quantity of decimal places for linear units for displaying.   |
| <i>Angular</i>        | Defines the quantity of decimal places for angular units for displaying.  |

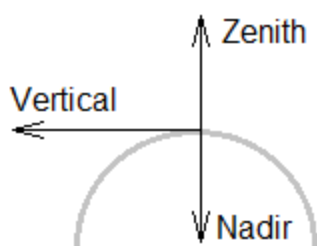


Figure 1. Vertical angles zero axis

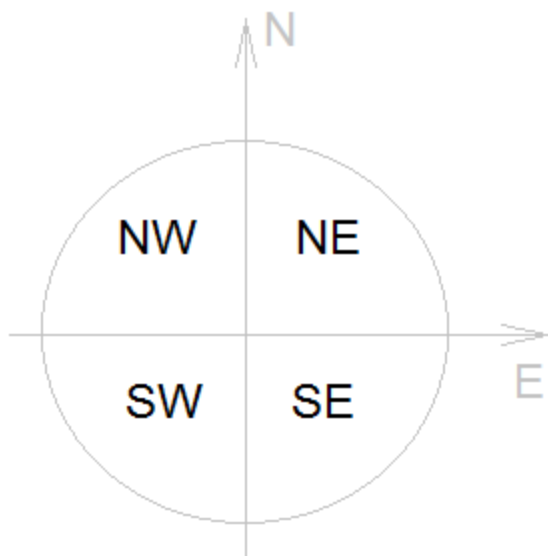


Figure 2. Quadrants

## Project symbols

The *Symbols* tab of the Project Settings dialog allows you to configure symbols for project layout.

To configure the symbols layout:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.  
The **Project Settings** dialog is displayed.
2. Click the *Symbols* tab.
3. Make the required configurations. Fields are described in the table below.
4. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

**Fields of the Symbols tab**

| Field                       | Description   |
|-----------------------------|---|
| <i>North Point Symbol</i>   | Defines the symbol of the north point. You may select it from the drop-down list.   |
| <i>Point Mark Plot Size</i> | Defines point marks size in millimeters for printing.   |
| <i>Annotation Symbols</i>   | Define the symbols to be displayed in annotations for different units. To change the default symbol, click and select the required font and symbol. |

**Project coordinate system**

The *Coordinate System* tab of the Project Settings dialog allows you to define the coordinate system location for the project.

To edit project coordinate system:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.  
The **Project Settings** dialog is displayed.
2. Click the *Coordinate System* tab.
3. From the *Select projection* list, select the required projection.  
Projection details are displayed on the *Selected Parameters* pane.
4. If you need projection ellipsoid different from the projection default one, in the *Projection ellipsoid* field untick the *Use default* checkbox, and select the required ellipsoid from the drop-down list.
5. If needed, select the datum from the *Datum* drop-down list.
6. If you need to use a geoid file in conjunction with the defined projection settings, in the *Geoid file* group box, Click ... and select the required file.
7. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.


To reset the coordinate system settings click **Clear Projection**.

**Project SiteLINK 3D server**

The *SiteLINK 3D Server* tab of the Project Settings dialog allows you to configure the project server for SiteLINK 3D service.


## Creating SiteLINK 3D server profiles

To create a SiteLINK 3D server profile:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.  
The **Project Settings** dialog is displayed.
2. Click the *SiteLINK 3D Server* tab.
3. In the *Server Profile* field, type the name of the profile.
4. Specify the required parameters. Fields are described in the table below.
5. Click  to save the profile.
6. Click **Connect** to connect to the server.
7. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.


## Changing SiteLINK 3D server profiles

To change the server profile:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.  
The **Project Settings** dialog is displayed.
2. Click the *SiteLINK 3D Server* tab.
3. From the *Server Profile* drop-down list, select the required profile.
4. Change the required parameters. Fields are described in the table below. To discard changes, click .
5. Click to save changes.
6. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

## Deleting SiteLINK 3D server profiles

To delete a profile:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.  
The **Project Settings** dialog is displayed.
2. Click the *SiteLINK 3D Server* tab.
3. From the *Server Profile* drop-down list, select the required profile.
4. Click .
5. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

## Parameters of the SiteLINK 3D server profile

### Fields of the *SiteLINK 3D Server* tab

| Field                 | Description   |
|-----------------------|---|
| <i>Server Profile</i> | Defines the name of the server profile. Also contains the list of the saved profiles. |

| Field  | Descriptoin   |
|--|---|
| <b>SiteLINK 3D Server</b>  |   |
| <i>Primary address</i>   | Defines the URL address and port for the primary SiteLINK 3D server.        |
| <i>Alternative address</i>   | Define the URL address and port for alternate SiteLINK 3D servers.          |
| <i>Password</i>  | Defines your SiteLINK 3D password.  |
| <i>Time-out</i>  | Defines the connection timeout in seconds.                                  |
| <i>Auto connect to SiteLINK 3D server when the project is opened</i> | Tick to automatically connect to the server each time you open the project. |

### Connecting to a SiteLINK 3D server

To connect to the server:

1. In the *Settings* group of the *Settings* tab, click the **Project Settings** icon.  
The **Project Settings** dialog is displayed.
2. Click the *SiteLINK 3D Server* tab.
3. From the *Server Profile* drop-down list, select the required profile.
4. In the *Status* group box, click **Connect**.
5. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

## Program Settings dialog

The *Program Settings* dialog allows you to configure the MAGNET Office settings. These settings are global and will apply to all new projects. Settings for a particular project are configured in the Project Settings dialog and applied only to this project.

To configure the MAGNET Office settings:

1. In the *Settings* group of the *Settings* tab, click the Program Settings icon.  
The *Project Settings* dialog is displayed.
2. Configure the required settings at the appropriate tab. Description of each tab may be found in the corresponding sections:
  - "Program user information" section below
  - "Program folders" section on the next page
  - "Program libraries" section on the next page
  - "Program unit settings" section on page 592
  - "Program symbols" section on page 595
  - "Program coordinate system" section on page 595
  - "Program preferences" section on page 596
3. Click **OK**.

Click **Print** to generate report of current project settings. It will be displayed in a new window, and may be printed, or saved to a file.

Click **Save** to save the current settings in an initialization (\*.ini) file.

Click **Load** to load previously saved settings.

### Program user information

The *User Information* tab of the Program Settings dialog allows you to configure identification information.

To edit user information:

1. In the *Settings* group of the *Settings* tab, click the **Program Settings** icon.  
The *Program Settings* dialog is displayed.
2. Click the *Project Details* tab.
3. Fill in required information in the appropriate fields. Description of the fields may be found in the table below.
4. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

#### Fields of the *User Information* tab

| Field             | Description                         |
|-------------------|-------------------------------------|
| <i>Company Id</i> | Defines the company identification. |
| <i>Company</i>    | Defines the company name.           |
| <i>Name</i>       | Defines the user name.              |
| <i>E-mail</i>     | Defines the user e-mail address.    |

| Field                          | Description   |
|--------------------------------|---|
| <i>SiteLINK 3D Client Name</i> | Defines username for the SiteLINK 3D service.   |
| <i>User defined labels</i>     | Defines four custom labels for the projects. Default values are: <ul style="list-style-type: none"><li>• Project Ref</li><li>• Stage</li><li>• Location</li><li>• Plan Number</li></ul> |

## Program folders

The *Folders* tab of the Program Settings dialog allows you to define paths for MAGNET Office data, libraries, temporary files and SiteLINK 3D inbox directories. You may store them on a file server or at a shared computer for network access.

To redefine a directory:

1. In the *Settings* group of the *Settings* tab, click the **Program Settings** icon.  
The **Program Settings** dialog is displayed.
2. Click the *Folders* tab.
3. Select the required folder, and click **Browse**.  
The **Select Folder** dialog is displayed.
4. Select the required folder, and click **OK**.
5. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

## Program libraries

The *Libraries* tab of the Program Settings dialog allows you to manage MAGNET Office libraries.

Libraries are files, which store regularly used information, like symbols, line styles, survey codes, etc. They are automatically identified and mapped while MAGNET Office installation. However, it is possible to redefine them if you need to work with the library that differs from the default one. List of libraries are displayed at the *Libraries* tab of the **Program Settings** dialog. These libraries are opened when a job is started. The following libraries are needed for proper MAGNET Office running:

- Global codes
- Symbols
- Line styles
- Text styles
- Roads
- Drain. See "Drainage library" section on page 668 for details.
- Sewer. See "Sewer library" section on page 666 for details.
- Survey

You may also specify a default job for MAGNET Office. For more information refer to "MAGNET Office default job" section below.

## Redefining libraries

To redefine a library:

1. In the *Settings* group of the *Settings* tab, click the **Program Settings** icon.

The *Program Settings* dialog is displayed.

2. Click the *Libraries* tab.
3. Select the required library, and click **Browse**.

The *Open* dialog is displayed.

4. Select the required file, and click **Open**.
5. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

## Editing libraries

To edit a library

1. In the *Settings* group of the *Settings* tab, click the **Program Settings** icon.

The *Program Settings* dialog is displayed.

2. Click the *Libraries* tab.
3. Select the required library, and click **Edit**. For more information about editing libraries, refer to "MAGNET Office libraries" section on page 630.
4. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

## MAGNET Office default job

Besides of managing libraries, the "Libraries" tab of the Program Settings dialog allows you to specify a default job for the MAGNET Office.

If the "Create new job from the default job" checkbox is ticked, the default job will be used as a template. All the settings from the Display Settings dialog dialog will be copied from the default job to a newly created one. All layers and the layers setting will be copied as well. User information will be automatically filled in, as in the default job.

To define a default job:

1. In the "Settings" group of the "Settings" tab, click the "Program Settings" icon.

The "Project Settings" dialog is displayed.

2. Click the "Libraries" tab.
3. To the right of the "Default Job" field, Click **Browse**.

The "Default Job" dialog is displayed.

4. Select the required job, and Click **Open**.
5. Tick the "Create new job from the default job" checkbox.
6. When finished, do one of the following:

- Click **OK** to close the dialog.
- Click another tab to configure more settings.

## Program unit settings

The *Unit Settings* tab of the Program Settings dialog allows you to configure measurement units.

To configure unit settings:

1. In the *Settings* group of the *Settings* tab, click the **Program Settings** icon.  
The **Program Settings** dialog is displayed.
2. Click the *Unit Settings* tab.
3. Make the required configurations. Fields are described in the table below.
4. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### Fields of the project unit settings

| Field                                  | Description   |
|--|---|
| <b>Units—Linear</b>                    |   |
| <i>Meters</i>                          | Select to define linear units as international standard unit of one meter.  |
| <i>Feet</i>                            | Select to define linear units as one foot, which is 0.3048 meters long.   |
| <i>US Feet</i>                         | Select to define linear units as one US foot, which is 0.3048006 meters long or 39.37 inches to the meter.  |
| <b>Units—Angular</b>                   |   |
| <i>Deg Min Sec</i>                     | Select to define angular units as degrees, minutes and seconds.<br>Data is entered and displayed in decimal format as DDD.MMSS. Seconds can be taken with decimal values.<br><i>For example: 65.142645 is 65 degrees, 14 minutes and 26.45 seconds.</i>   |
| <i>Degrees</i>                         | Select to define angular units as degrees only. Minutes and seconds are decimal part of the degree.   |
| <i>Gon</i>                             | Select to define angular units as gons. The full circle is divided into 400 gons. 100 gons is equal to 90 degrees.  |
| <b>Units</b>                           |   |
| <i>Volume</i>                          | Select unit for volumes calculation. Possible values are: <ul style="list-style-type: none"><li>• Cubic Meters – if linear units is defined as meters.</li><li>• Cubic Feet – if linear units is defined as feet or US feet.</li><li>• Cubic Yards – if linear units is defined as feet or US feet.</li></ul> |
| <b>Scale Factor and Mean Elevation</b> |   |



| <b>Field</b>                 | <b>Description</b>  |
|------------------------------|---|
| <i>Base Scale Factor</i>     | Defines the projection scale factor.<br>It is applied to all distances when computing coordinate positions. The ground distance will always be shown when computed lines or missing lines are inquired.   |
| <i>Mean Elevation</i>        | Defines the mean elevation for the project.   |
| <b>Rotation By</b>           |   |
| <i>Mathematical Angle</i>    | Defines the orientation in standard mode. East is 0 degrees and north is 90 degrees.  |
| <i>Survey Bearing</i>        | Defines the orientation in bearing mode. North is 0 degrees and east is 90 degrees.   |
| <b>Format Station</b>        |   |
| <i>Chainage</i>              | Defines the chainage format of stations distance displaying. The distance from the start point will be displaying as the ordinary number.<br><i>For example: if the length is 2145.87, the end station number will be 2145.87.</i>  |
| <i>Station</i>               | Defines the station format of stations distance displaying. The distance from the start point will be displaying as the station number and distance from it.<br><i>For example: if the length is 2145.87 and distance between stations is 100, the end station number will be 21+45.87.</i> |
| <b>Output</b>                |   |
| <i>Proposed Scale 1</i>      | Defines the intended output plot scale and enables the display of symbols, line types, and text as they will appear when printed or plotted.  |
| <b>Base—Horizontal Angle</b> |   |
| <i>North Azimuth</i>         | The horizontal angle is defined with zero degrees set to the north.   |
| <i>South Azimuth</i>         | The horizontal angle is defined with zero degrees set to the south.   |
| <b>Base—Vertical Angle</b>   |   |
| <i>Zenith</i>                | The vertical angle is defined with zero degrees set to the zenith (directly above). See figure 1 for details.   |
| <i>Vertical</i>              | The vertical angle is defined with zero degrees set parallel to the ground. See figure 1 for details.   |
| <i>Nadir</i>                 | The vertical angle is defined with zero degrees set to the nadir (directly below). See figure 1 for details.  |
| <b>Display—Coordinates</b>   |   |
| <i>East/North</i>            | Coordinates is displayed as east value, followed by the north value.  |
| <i>North/East</i>            | Coordinates is displayed as north value, followed by the east value.  |
| <b>Display—Directions</b>    |   |

| Field                 | Description  |
|-----------------------|--|
| <i>Azimuth</i>        | The directions is displayed as azimuth angles. The North axis is zero and angles are counted clockwise.  |
| <i>Quadrant</i>       | The directions is displayed as angles in quadrants. Quadrants are pictured at figure 2. Angles are counted clockwise within each quadrant.<br><i>For example: azimuth angle of 130 degrees will be displayed as S 50° E.</i> |
| <b>Display</b>        |  |
| <i>Elevation</i>      | Tick to display elevations on the screen.  |
| <b>Decimal Places</b> |  |
| <i>Linear</i>         | Defines the number of decimal places for linear units for displaying.  |
| <i>Angular</i>        | Defines the number of decimal places for angular units for displaying.   |

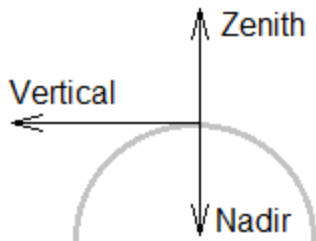


Figure 1. Vertical angles zero axis

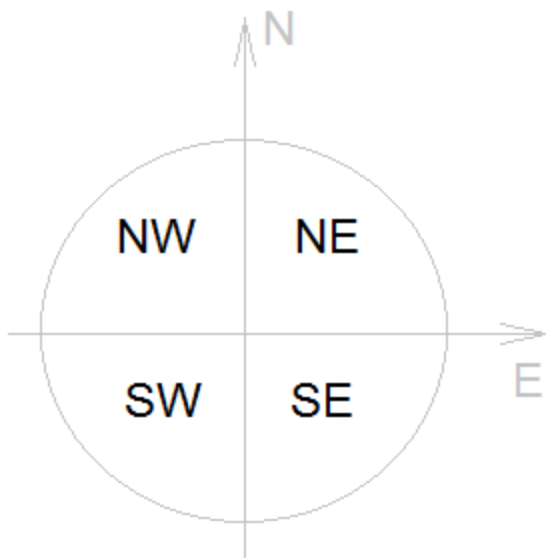


Figure 2. Quadrants

## Program symbols

The *Symbols* tab of the Program Settings dialog allows you to configure symbols for project layout.

To configure the symbols layout:

1. In the *Settings* group of the *Settings* tab, click the **Program Settings** icon.  
The **Program Settings** dialog is displayed.
2. Click the *Symbols* tab.
3. Make the required configurations. Fields are described in the table below.
4. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### Fields of the *Symbols* tab

| Field   | Description   |
|---|---|
| <i>North Point Symbol</i>                                     | Defines the symbol of the north point. You may select it from the drop-down list.   |
| <i>Point Mark Plot Size</i>                                   | Defines point marks size in millimeters for printing.   |
| <i>Clip lines around symbols and point marks when plotted</i> | Tick it to make line clip around symbols and point marks for printing.  |
| <i>Annotation Symbols</i>                                     | Define the symbols to be displayed in annotations for different units. To change the default symbol, click and select the required font and symbol. |

## Program coordinate system

The *Coordinate System* tab of the Program Settings dialog allows you to define default coordinate system projection for the MAGNET Office.

To edit default coordinate system:

1. In the *Settings* group of the *Settings* tab, click the **Program Settings** icon.  
The **Program Settings** dialog is displayed.
2. Click the *Coordinate System* tab.
3. Select the required projection.  
Projection details are displayed on the *Selected Parameters* pane.
4. If you need projection ellipsoid different from the projection default one, in the *Projection ellipsoid* field untick the *Use default* checkbox, and select the required ellipsoid from the drop-down list.
5. If needed, select the datum from the *Datum* drop-down list.
6. If you need to use a geoid file in conjunction with the defined settings, in the *Geoid file* group box, click ... and select the required file.
7. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

To reset the coordinate system settings click **Clear Projection**.

## Program preferences

The *Preferences* tab of the Program Settings dialog allows you to configure interface, report and saving settings.

To edit program preferences:

1. In the *Settings* group of the *Settings* tab, click the **Program Settings** icon.  
The **Program Settings** dialog is displayed.
2. Click the *Preferences* tab.
3. Make the required configurations. Fields are described in the table below.
4. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### Fields of the *Preferences* tab

| Field   | Description   |
|---|---|
| <b>User Interface</b>                               |   |
| <i>Maximize when opened</i>                         | Tick to maximize the views windows when project is opened or created.   |
| <i>Use enter key to move to next input field</i>    | Tick to move to the next input field, when press <i>Enter</i> , while manually input data.<br>If not ticked, use <i>Tab</i> to move to the next input field and press <i>Enter</i> to finish and apply changes. |
| <i>Copy selected entity properties</i>              | Tick to copy the properties of the selected entity to apply them to new entities that are connected.  |
| <i>Display Application Startup Dialog</i>           | Tick to turn on the startup dialog.   |
| <i>Select last entity created</i>                   | If ticked, the last created entity will be selected after completing the creation procedure.  |
| <i>Survey view background color</i>                 | Defines a background color for the survey view.   |
| <i>Language</i>                                     | Select the preferred language for the MAGNET Office.  |
| <i>Display views when opened</i>                    | Tick to open all existing views in the project when the project is opened.  |
| <i>Display entity detail when cursor flies over</i> | Tick to display a pop-up window with information about entity when pointing on it.  |
| <i>Point Display Size</i>                           | Select the size of point mark for screen displaying.  |

| Field  | Description   |
|--|---|
| <i>Automatic Contour on Import</i>                     | <p>Tick to automatically create contours from imported data that contains entities with an elevation.</p> <p>The prerequisite for this option is to have a code library that matches those of the imported data. These codes should each be set to “Use in Surface”. In most cases, the codes of the imported points will be unknown. Preferably, you should set the code named, “Default” to Use in Surface, so that all imported data with an unknown code or without a code will be set to Use in Surface. This allows the automatic contour setting to create both the contours and the DTM.</p> <p><b>NOTE</b><br/>This option works only when using the import utility. Opening a project will not automatically generate contours from the data.</p> |
| <i>Drawing view background color</i>                   | Defines a background color for the drawing view.  |
| <i>Default beep</i>                                    | Tick it to make the "ding" sound appear each time you select an object in the survey view. When not ticked, selection will be quite.  |
| <b>Report</b>  |   |
| <i>Use external editor</i>                             | Tick to use an external text editor for reports. Select it from the drop-down list, or click <b>Browse</b> and select the required application.   |
| <b>Save</b>  |   |
| <i>Enable Save Reminder</i>                            | Tick to enable save reminder. After specified time interval a message window prompts to save the data.  |
| <i>Enable Auto Save Recovery</i>                       | Tick to enable automatic saving after each specified time interval.   |
| <i>Create backup on Save in sub-directory .\BACKUP</i> | Tick this box to create a backup copy of the project each time you save it. The backup directory will be automatically created when you save the project for the first time.  |
| <i>Roads</i>   | Specify the maximum and minimum superelevation for curves.  |
| <i>Sewer Plot</i>                                      | Select either Drainage or Sewer for plot settings.  |
| <i>Product Updates</i>                                 | When ticked, the MAGNET Office will automatically check whether any updates are available for application within the interval defined in the drop-down list.  |

## Display Settings dialog

The *Display Settings* dialog allows you to configure data layout in the MAGNET Office.

To open a dialog click one of the three icons from the *Settings* group of the *Settings* tab — **Display** icon, **Grid/Snap** icon or **Default Properties** icon. Each of them will open a specific tab of the dialog, described in the corresponding sections:

- "General display settings" section below
- "Grid/Snap displaying settings" section on page 601
- "Defaults of the display settings" section on the facing page

### General display settings

The *Display* tab of the Display Settings dialog allows you to configure displaying of entities in the survey view.

To configure display settings:

1. In the *Settings* group of the *Settings* tab, click the **Display** icon.  
The *Display Settings* dialog is displayed.
2. Make the required configurations. Fields are described in the table below.
3. When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

#### Fields of the *Display* tab

| Field                          | Description  |
|--------------------------------|--|
| <b>Entities Display On/Off</b> |  |
| <i>Points</i>                  | Tick to display points. If this checkbox is not ticked, than the points, point marks and symbols will not be displayed.  |
| <i>Point Marks</i>             | Tick to display point marks as defined in the Point properties. If ticked, define the appropriate marks size, by selecting either <i>Small</i> or <i>Large</i> radiobutton.<br>If this checkbox is unticked, the points will be displayed as the dots. |
| <i>Point Symbols</i>           | Tick to display the point symbols, as defined in the Point properties.   |
| <i>Lines</i>                   | Tick to display lines. If this checkbox is unticked, than the lines will not be displayed.   |
| <i>Thickness</i>               | Tick to display lines with thickness as defined in the Line properties.  |
| <i>Line Styles</i>             | Tick to display lines in style, defined in the Line properties.  |
| <i>Polygon Area</i>            | Tick to display polygon areas. If this checkbox is unticked, than the polygons, boundaries, pads and lots will not be displayed.   |
| <i>Text</i>                    | Tick to display text. If this checkbox is unticked, than the text entities will not be displayed. Annotations will be displayed regardless to this option.   |

| Field                                   | Description  |
|---|--|
| <i>Images</i>                           | Tick to display images. If this checkbox is unticked, than the images and PDFs will not be displayed. Background images will be displayed regardless to this option. |
| <i>Use Clipping</i>                     | Tick to ensure the data is clipped to the drawing area of the title block.<br>NOTE<br>This option available only when the project is created from a drawing.         |
| <b>Point Information (Display Only)</b> |  |
| <i>Number</i>                           | Tick to turn on displaying of the points numbers. You may also use the Point Number icon.  |
| <i>Elevation</i>                        | Tick to turn on displaying of the points elevations. You may also use the Point Height icon.   |
| <i>Code</i>                             | Tick to turn on displaying of the points codes. You may also use the Point Code icon.  |
| <i>Auto hide</i>                        | Tick to automatically hide data, which cannot be read from the project database.   |
| <i>Text Size</i>                        | Define the text size for point information displaying, by selecting the appropriate radiobutton.   |
| <b>DTM</b>                              |  |
| <i>Surface Model</i>                    | Tick to display the DTM surface model, selected in the adjacent drop-down list.  |
| <i>Contours</i>                         | Tick to display the DTM contours, selected in the <i>Surface Model</i> drop-down list, by using the properties and contour intervals defined for the surface model.  |
| <b>Output</b>                           |  |
| <i>Proposed Scale 1</i>                 | Defines the intended output plot scale and enables the display of symbols, line types, and text as they will appear when printed or plotted.                         |

## Defaults of the display settings

The *Default Properties* tab of the Display Settings dialog allows you to configure defaults of the display settings.

To configure default display settings:

- In the *Settings* group of the *Settings* tab, click the **Default Properties** icon.  
The *Display Settings* dialog is displayed.
- Make the required configurations. Fields are described in the table below.
- When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### Fields of the *Default Properties* tab

| Field                              | Description   |
|------------------------------------|---|
| <i>Prompt for point properties</i> | Tick to turn on prompting of the additional attributes when creating new points. If unticked, only east and north coordinates will be prompted. |

| <b>Field</b>                              | <b>Description</b>   |
|---|--|
| <b>Default Point Properties</b>           |  |
| <i>Code</i>                               | Defines the default code for new points.   |
| <i>Elevation</i>                          | Defines the default elevation activity and value for new points.   |
| <i>Use in Surface</i>                     | Defines whether the new points may be used for DTM creation.   |
| <i>Next Point No</i>                      | Defines the number of the next new point.  |
| <i>Number Annotation</i>                  | Tick to turn on displaying of the point number annotations.  |
| <i>Elevation Annotation</i>               | Tick to turn on displaying of the point elevation annotations.   |
| <i>Code Annotation</i>                    | Tick to turn on displaying of the point code annotations.  |
| <b>Default Line/Arc/String Properties</b> |  |
| <i>Break Line</i>                         | Tick to define the new lines/arcs/strings as break lines.  |
| <i>Lines Annotation</i>                   | Tick to turn on displaying of the lines annotations.   |
| <i>Arcs Annotation</i>                    | Tick to turn on displaying of the arcs annotations.  |
| <i>String Annotation</i>                  | Tick to turn on displaying of the string annotations.  |
| <b>Default Lots Properties</b>            |  |
| <i>Lots Annotation</i>                    | Tick to turn displaying of the lots annotation.  |
| <b>Default Text Properties</b>            |  |
| <i>Rotation</i>                           | Defines the default rotation of the text.  |
| <b>Display Settings</b>                   |  |
| <i>Point Numbers</i>                      | Tick to turn on displaying of the point numbers annotation. Only points which have annotation turned on will be annotated.                       |
| <i>Point Elevations</i>                   | Tick to turn on displaying of the point elevations annotation. Only points which have annotation turned on will be annotated.                    |
| <i>Point Codes</i>                        | Tick to turn on displaying of the point codes annotation. Only points which have annotation turned on will be annotated.                         |
| <i>Point Attributes</i>                   | Tick to turn on displaying of the point attributes annotation. Only points which have annotation turned on will be annotated.                    |
| <i>Line Bearings</i>                      | Tick to turn on displaying of the lines bearings. Only lines which have annotation turned on will be annotated.                                  |
| <i>Line Lengths</i>                       | Tick to turn on displaying of the lines lengths. Only lines which have annotation turned on will be annotated.                                   |
| <i>Line Annotation Table</i>              | Tick to turn on displaying of the line annotation table. Only lines, which have appropriate annotation settings, will be displayed in the table. |



| Field                          | Description  |
|--------------------------------|--|
| <i>Lines Attributes</i>        | Tick to turn on displaying of the lines attributes. Only lines which have annotation turned on will be annotated.                              |
| <i>Arc Details</i>             | Tick to turn on displaying of the arcs details. Only arcs which have annotation turned on will be annotated.                                   |
| <i>Arc Annotation Table</i>    | Tick to turn on displaying of the arc annotation table. Only arcs, which have appropriate annotation settings, will be displayed in the table. |
| <i>String Details</i>          | Tick to turn on displaying of the strings details. Only strings which have annotation turned on will be annotated.                             |
| <i>Lot Details</i>             | Tick to turn on displaying of the lots details. Only lots which have annotation turned on will be annotated.                                   |
| <i>Polygon Area Attributes</i> | Tick to turn on displaying of the polygon attributes. Only polygons which have annotation turned on will be annotated.                         |

## Grid/Snap displaying settings

The *Grid/Snap* tab of the Display Settings dialog allows you to configure displaying of the grid and snap modes.

To configure display settings:

- In the *Settings* group of the *Settings* tab, click the **Grid/Snap** icon.  
The **Display Settings** dialog is displayed.
- Make the required configurations. Fields are described in the table below.
- When finished, do one of the following:
  - Click **OK** to close the dialog.
  - Click another tab to configure more settings.

### Fields of the *Grid/Snap* tab

| Field                           | Description   |
|---------------------------------|---|
| <b>Grid</b>                     |   |
| <i>Show Grid</i>                | Tick to turn on grid displaying.  |
| <i>Spacing</i>                  | Defines the major X and Y spacing for the grid.   |
| <i>Divisions</i>                | The major grid can be divided into sections, displayed with the dashed lines. These editboxes define the quantity of such sections for each major grid. If the divisions are set to 1, only the major grid spacing will be displayed. |
| <i>Origin</i>                   | Defines the grid start position. Note that changing the origin alters only the grid position, and does not affect to coordinates of the objects.  |
| <i>Color</i>                    | Defines color for major and minor grid lines.   |
| <i>Minimum Display Interval</i> | Defines a minimum value in pixels between two grid lines. If the grid spacing is less than the minimum pixel interval, then the divisions will not be displayed.  |
| <b>Snap</b>                     |   |

| Field            | Description  |
|------------------|--|
| <i>Snap</i>      | <p>Defines the snap tolerance, which is the distance the cursor must be away from the point before the point is no longer recognized. It is measured by the size of the cursor. The snap will be to the point closest to the center of the cursor or to the entity closest to the center. At the normal setting, the cursor is the standard size. At the 0.5x setting, the cursor is half of the standard size. At the 2x setting, the cursor is twice the standard size.</p>  |
| <b>Snap Mode</b> |  |
| <i>Point</i>     | <p>Tick to turn on the nearest point snap mode. The tolerance area is located around a point, and will be treated as the point itself. It means the following:</p> <ul style="list-style-type: none"> <li>• If you try to create a new point within the snap tolerance of the existing one, MAGNET Office will treat it like the duplicate point.</li> <li>• If you try to create a point, which is the part of entity, for example the start or the end point of a line, within the snap tolerance of the existing point, MAGNET Office will automatically use this point instead.</li> <li>• If you click within the snap tolerance of a point, it will be selected. If the wrong entity is selected, do the right-click, and select <b>Next Selection</b> in the shortcut menu.</li> </ul>  |
| <i>End Point</i> | <p>Select to turn on the end point snap mode. The tolerance area is located around the start and end points of lines, arcs and strings. It means the following:</p> <ul style="list-style-type: none"> <li>• If you try to create a new point within the snap tolerance of the existing start or end point of a line, an arc or a string, MAGNET Office will treat it like the duplicate point.</li> <li>• If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance of the existing start or end point of a line, an arc, MAGNET Office will automatically use this point of a line, an arc or a string instead.</li> <li>• If you click within the snap tolerance of an start or end point of a line, an arc or a string, it will be selected. If the wrong entity is selected, do the right-click, and select "Next Selection" in the shortcut menu.</li> </ul> |
| <i>Intersect</i> | <p>Select to turn on the intersection snap mode. The tolerance area is located around the intersection points of two crossing entities. It means the following:</p> <ul style="list-style-type: none"> <li>• If you try to create a new point within the snap tolerance of the existing intersection point, MAGNET Office will treat it like the duplicate point.</li> <li>• If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance of the existing intersection point, MAGNET Office will automatically use this intersection point instead.</li> <li>• If you click within the snap tolerance of an intersection point, it will be selected. If the wrong entity is selected, do the right-click, and select "Next Selection" in the shortcut menu.</li> </ul>  |

| Field                | Description   |
|----------------------|---|
| <i>Mid Point</i>     | <p>Select to turn on the middle point snap mode. The tolerance area is located around the middle points of lines, arc or strings. It means the following:</p> <ul style="list-style-type: none"> <li>• If you try to create a new point within the snap tolerance of the existing middle point of a line, an arc or a string, MAGNET Office will treat it like the duplicate point.</li> <li>• If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance of the existing middle point of a line, an arc or a string, MAGNET Office will automatically use this middle point instead.</li> <li>• If you click within the snap tolerance of a middle point of a line, an arc or a string, it will be selected. If the wrong entity is selected, do the right-click, and select <b>Next Selection</b> in the shortcut menu.</li> </ul> |
| <i>Arc Center</i>    | <p>Select to turn on the arc center snap mode. The tolerance area is located around the arc center points. It means the following:</p> <ul style="list-style-type: none"> <li>• If you try to create a new point within the snap tolerance of the existing arc center point, MAGNET Office will treat it like the duplicate point.</li> <li>• If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance of the existing arc center point, MAGNET Office will automatically use this arc center point instead.</li> <li>• If you click within the snap tolerance of an arc center point, it will be selected. If the wrong entity is selected, do the right-click, and select <b>Next Selection</b> in the shortcut menu.</li> </ul>   |
| <i>Line</i>          | <p>Select to turn on the line snap mode. The tolerance area is located near the lines. It means the following:</p> <ul style="list-style-type: none"> <li>• If you try to create a new point within the snap tolerance of the existing line or string, MAGNET Office will place this point on the line, or include in into the string.</li> <li>• If you try to create the end point of a line, an arc of a string, within the snap tolerance of the existing line or string, MAGNET Office will automatically this point on the line or the string.</li> </ul>   |
| <i>Perpendicular</i> | <p>Select to turn on the perpendicular snap mode. It means that if you try to locate the end point of a line within the snap tolerance of the existing line of string, the new line will be created as perpendicular to this line or string.</p>  |
| <i>Grid Point</i>    | <p>Select to turn on the grid point snap mode. The tolerance area is located near the grid lines intersections. It means the following:</p> <ul style="list-style-type: none"> <li>• If you try to create a new point within the snap tolerance, it will be located exactly at the grid intersection point.</li> <li>• If you try to create a point, which is the part of entity, for example the start or the end point of a line within the snap tolerance, MAGNET Office will place exactly at the grid intersection point.</li> </ul>   |

## Annotation Styles dialog

The *Annotation Styles* dialog allows you to manage the annotation styles for various entities.

To configure an annotation style:

1. In the *Settings* group of the *Settings* tab, click the **Annotation** icon.  
The *Annotation Styles* dialog is displayed.
2. Make the required configurations. More detailed information about each style may be found in the corresponding sections:
  - "Point annotation settings" section below
  - "Line annotation settings" section on the facing page
  - "Arc annotation settings" section on page 607
  - "Angle annotation settings" section on page 608
  - "Area annotation settings" section on page 609
  - "Dimension settings" section on page 611
  - "Arrow settings" section on page 611
  - "String annotation settings" section on page 612
  - "Lot annotation settings" section on page 613
  - "Bearing annotation settings" section on page 614
  - "Distance annotation settings" section on page 615
3. Click **OK** to close the dialog

### Point annotation settings

The *Point Annotation Settings* tab of the Annotation Styles dialog allows you to define the style for point annotations. The point annotation is displayed for points which have any of their three point annotation flags selected. Fields of the tab are described in the table below.

#### Fields of the *Point Annotation Settings* tab

| Field              | Description   |
|--------------------|---|
| <i>Text Style</i>  | Defines the text style for the point name, code and height annotation. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |
| <i>Order</i>       | Defines the order of the point code and height annotation. The proposed values are 1, 2 and 3, where 1 is the first attribute. If one of point annotation flags is not select, than it will not be displayed, and replaced with the next position.                                |
| <i>Text Before</i> | Defines the text before the point name, code, height, and note annotation.<br><i>For example: "ID=", "Code=", "H=", and "Note:".</i>  |
| <i>Text After</i>  | Defines the text after the point name, code and height annotation.<br><i>For example – m for "meters" after each point height.</i>  |

| Field                       | Description  |
|-----------------------------|--|
| <i>Rotation</i>             | Defines the orientation for the point name, code and height annotation. It is displayed in the rotation unit settings, as defined in the "Project unit settings" section on page 583. Horizontal position of the annotation text corresponds with the azimuth angle of 90 degrees. |
| <i>Following</i>            | If ticked, the annotation, with the <i>Order</i> attribute set to 2 will be placed to the right of the first attribute, and so on.   |
| <b>Alignment</b>            |  |
| <i>Height Centered</i>      | Tick to center annotation around the point.  |
| <i>Horizontal</i>           | Select either left or center or right position of the first attribute, regarding to position of the point.<br><i>For example: "Right" will place annotation to the right of the point.</i>   |
| <i>Vertical</i>             | Select either above or center or below position of the first attribute, regarding to position of the point.<br><i>For example: "Below" will place annotation below the point.</i>  |
| <i>Number Justification</i> | Defines the justification styles for the heights. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying justification styles, refer to "Editing justification styles" section on page 125.     |

To copy the annotation settings from the library:

1. In the *Settings* group of the *Settings* tab, click the **Annotation** icon.  
The **Annotation Styles** dialog is displayed.
2. Click the *Point Annotation Settings* tab.
3. Click **Get Default**.
4. Select the required library item and click **OK**. For more information about annotation styles library, refer to "Annotation styles library" section on page 635.

The settings are copied from the library.

## Line annotation settings

The *Line Annotation Settings* tab of the Annotation Styles dialog allows you to define the style for line annotations. The line annotation is displayed only for lines, which have annotation flag selected. Fields of the tab are described in the table below. See picture below for example of the annotation.

### Fields of the *Line Annotation Settings* tab

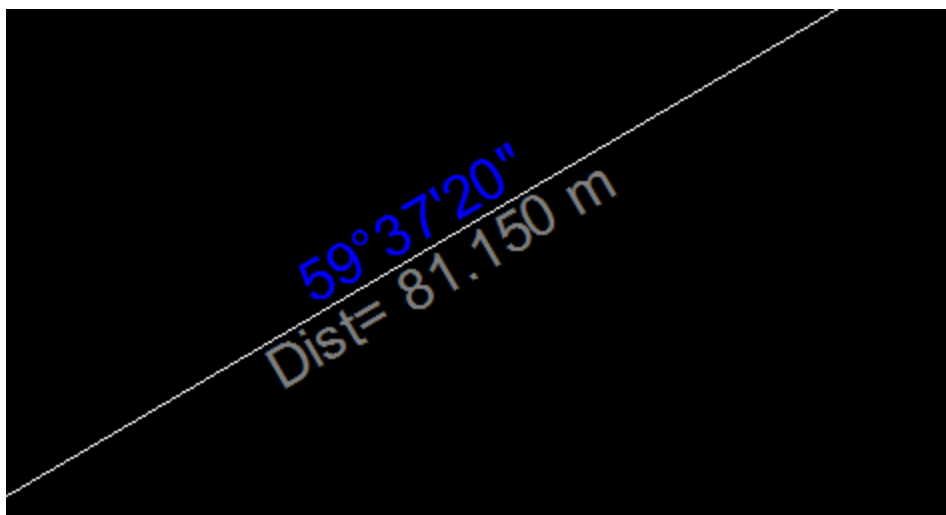
| Field                       | Description  |
|-----------------------------|--|
| <i>Type</i>                 | Defines the format of annotation displaying. A line means that annotation will be displayed relative to the line. Options without a line means, that annotation will be displayed above or below the line. |
| <i>Text Before Distance</i> | Type any text to be displayed before distance annotation.  |

| Field                             | Description   |
|-----------------------------------|---|
| <i>Text After Distance</i>        | Type any text to be displayed after distance annotation.  |
| <i>Bearing Settings</i>           | Defines the bearing settings. You may select the style from the drop-down list, or modify it at the Bearing annotation settings tab or in the Annotation styles library.    |
| <i>Distance Settings</i>          | Defines the distance settings. You may select the style from the drop-down list, or modify it at the Distance annotation settings tab or in the Annotation styles library.  |
| <i>Clear Distance</i>             | Defines the clearance in feet between the line and annotation.  |
| <i>Annotate</i>                   | Defines whether the annotation will be displayed above or below the line.   |
| <i>Spread Bearing</i>             | Tick to spread bearing along the line.  |
| <i>Show Short Line Annotation</i> | Tick to display annotations even for too short lines, where annotations don't fit along the line. If not selected, the line will be annotated only in the short line table. |

To copy the annotation settings from the library:

1. In the *Settings* group of the *Settings* tab, click the **Annotation** icon.  
The *Annotation Styles* dialog is displayed.
2. Click the *Line Annotation Settings* tab.
3. Click **Copy From Lib**.
4. Select the required library item and click **OK**. For more information about annotation styles library, refer to "Annotation styles library" section on page 635.

The settings are copied from the library.



Line annotation example

## Arc annotation settings

The *Arc Annotation Settings* tab of the Annotation Styles dialog allows you to define the style for arc annotations. The arc annotation is displayed only for arcs, which have annotation flag selected. Fields of the tab are described in the table below. See picture below for example of the annotation.

### Fields of the "Arc Annotation Settings" tab

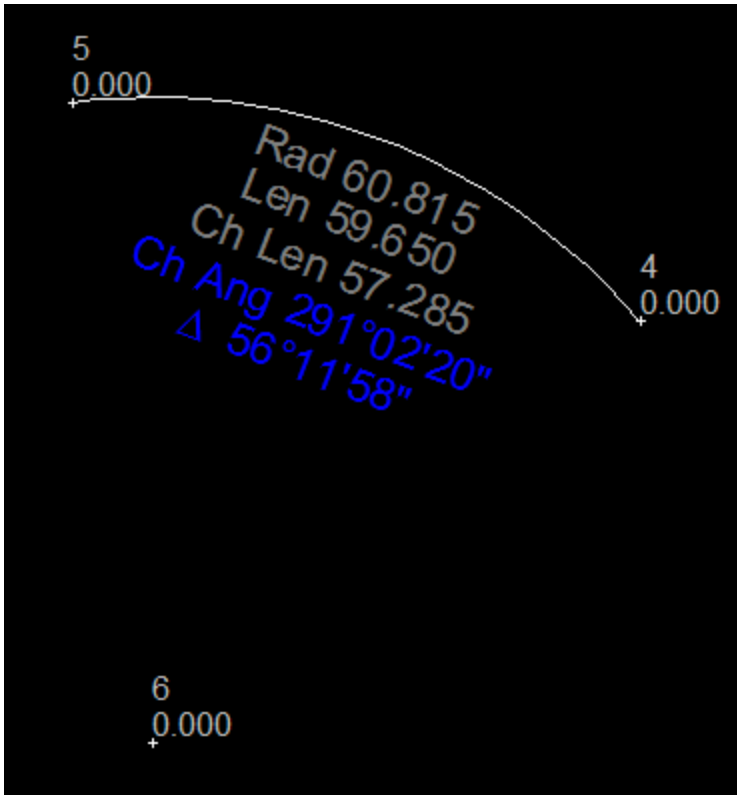
| Field                            | Description   |
|----------------------------------|---|
| <i>Arc Radius</i>                | Tick to display the arc radius annotation. In the <i>Plot Order</i> editbox, type the order of the arc radius displaying.   |
| <i>Arc Length</i>                | Tick to display the arc length annotation. In the <i>Plot Order</i> editbox, type the order of the arc length displaying.   |
| <i>Chord Length</i>              | Tick to display the chord length annotation. In the <i>Plot Order</i> editbox, type the order of the chord length displaying.   |
| <i>Chord Bearing</i>             | Tick to display the chord bearing annotation. In the <i>Plot Order</i> editbox, type the order of the chord bearing displaying.   |
| <i>Delta Angle</i>               | Tick to display the delta angle annotation. In the <i>Plot Order</i> editbox, type the order of the delta angle displaying.<br>NOTE<br>Delta angle is the angle between the arc radius to the start point, and arc radius to the end point. |
| <i>Distance Settings</i>         | Defines the distance settings for arc radius, arc length and chord length. You may select the style from the drop-down list or modify it at the Distance annotation settings tab, or in the Annotation styles library.                      |
| <i>Bearing Settings</i>          | Defines the bearing settings for chord bearing. You may select the style from the drop-down list or modify it at the Bearing annotation settings tab, or in the Annotation styles library.  |
| <i>Angle Settings</i>            | Defines the angle settings for delta angle. You may select the style from the drop-down list or modify it at the Angle annotation settings tab, or in the Annotation styles library.  |
| <i>Text Before</i>               | Type any text to be displayed before the arc radius, arc length, chord length, chord bearing and delta angle annotations.   |
| <i>Text After</i>                | Type any text to be displayed after the arc radius, arc length, chord length, chord bearing and delta angle annotations.  |
| <i>Along Arc</i>                 | Tick to spread annotations along the arc, one after the other.  |
| <i>Show Short Arc Annotation</i> | Tick to display annotations even for too short arcs, where annotations don't fit along the arc. If not selected, the arc will be annotated only in the short line table.  |

To copy the annotation settings from the library:

1. In the *Settings* group of the *Settings* tab, click the **Annotation** icon.  
The **Annotation Styles** dialog is displayed.
2. Click the *Arc Annotation Settings* tab.
3. Click **Copy From Lib**.

4. Select the required library item and click **OK**. For more information about annotation styles library, refer to "Annotation styles library" section on page 635.

The settings are copied from the library.



Example of the arc annotation

## Angle annotation settings

The *Angle Annotation Settings* tab of the Annotation Styles dialog allows you to define the style for angle annotations. Fields of the tab are described in the table below.

### Fields of the *Angle Annotation Settings* tab

| Field                                  | Description  |
|--|--|
| <i>Name</i>                            | Defines the current angle annotation style. You may select any existing style from the drop-down list.   |
| <i>Text Style Name</i>                 | Defines the text style for angle annotations. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |
| <i>Round Angles to nearest seconds</i> | Defines the value of angle seconds for rounding angles.  |
| <i>Show Trailing Zeros</i>             | Tick to display trailing zeros.  |



| Field                           | Description                                       |
|---------------------------------|---|
| <i>Show Trailing 00 Seconds</i> | Tick to display seconds, even if the value is 00. |
| <i>Show Trailing 00 Minutes</i> | Tick to display minutes, even if the value is 00. |

#### Buttons of the *Angle Annotation Settings* tab

| Button               | Description  |
|----------------------|--|
| <b>New</b>           | Click it to create a new angle annotation style.   |
| <b>Reset</b>         | Click it to restore previous angle annotation style settings.  |
| <b>Rename</b>        | Click it to rename current angle annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be renamed.  |
| <b>Delete</b>        | Click it to delete current angle annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be deleted.  |
| <b>Copy From Lib</b> | Click it to copy the annotation settings from the library. For more information about annotation styles library, refer to "Annotation styles library" section on page 635. |

## Area annotation settings

The *Area Annotation Settings* tab of the Annotation Styles dialog allows you to define the style for lot's area annotations. Fields of the tab are described in the table below.

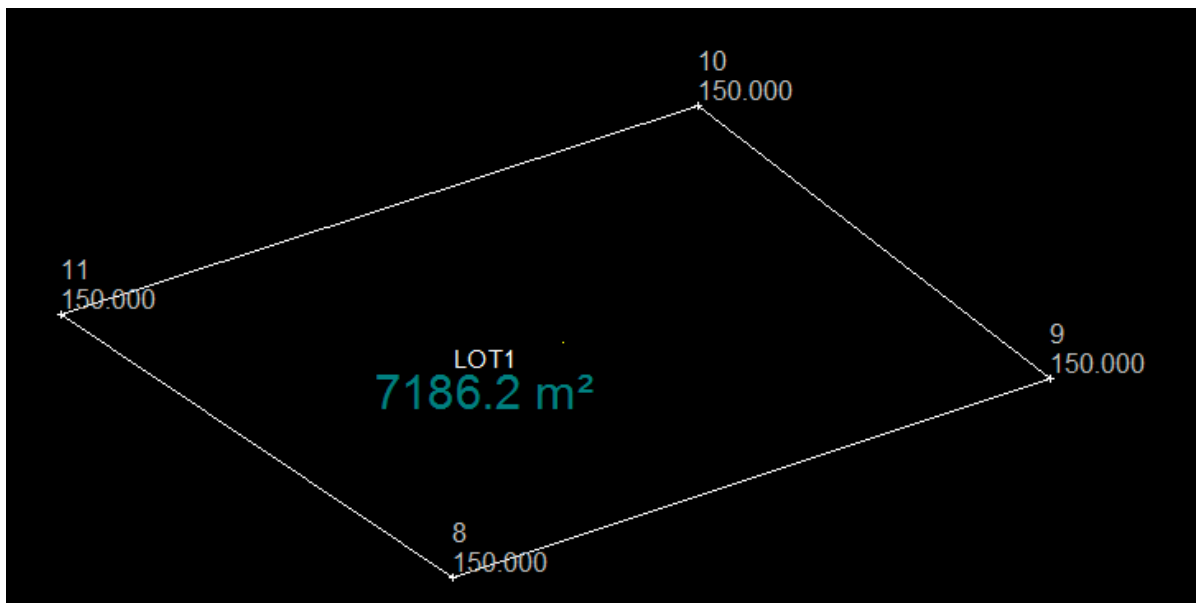
#### Fields of the *Area Annotation Settings* tab

| Field                          | Description   |
|--------------------------------|---|
| <i>Name</i>                    | Defines the current area annotation style. You may select any existing style from the drop-down list.   |
| <i>Text Style Name</i>         | Defines the text style for area annotations. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |
| <i>Use Significant Figures</i> | Displays the area annotation to the minimum number of significant figures entered in the appropriate editboxes.   |
| <i>Use Min no of Decimals</i>  | Displays the area annotation to the minimum number of decimal places entered in the appropriate editboxes for both major and minor units of area.   |
| <i>Round Down</i>              | Tick to round area value for annotation down, instead of standard rounding rules. If ticked, specify the rounding tolerance in the appropriate editbox.   |
| <i>Show Trailing Zeros</i>     | Tick to display trailing zeros.   |

| Field                        | Description   |
|------------------------------|---|
| <i>Show Trailing Decimal</i> | Tick to display decimals, even if the value is 00.  |
| <i>Squared Symbol</i>        | Tick to display squared symbol.   |
| <i>Minor Limit</i>           | Defines the maximum value of the area, which uses the minor units, before changing to major ones. |
| <i>Minor Unit Text</i>       | Defines the label for minor units. The sign of square units will be added automatically.          |
| <i>Major Unit Text</i>       | Defines the label for major units.  |

**Buttons of the Area Annotation Settings tab**

| Button               | Description  |
|----------------------|--|
| <b>New</b>           | Click it to create a new area annotation style.  |
| <b>Reset</b>         | Click it to restore previous area annotation style settings.   |
| <b>Rename</b>        | Click it to rename current area annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be renamed.   |
| <b>Delete</b>        | Click it to delete current area annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be deleted.   |
| <b>Copy From Lib</b> | Click it to copy the annotation settings from the library. For more information about annotation styles library, refer to "Annotation styles library" section on page 635. |



**Area annotation example**

## Dimension settings

The *Dimension Settings* tab of the Annotation Styles dialog allows you to configure the style for dimension annotations. Fields of the tab are described in the table below.

### Fields of the *Dimension Settings* tab

| Field                    | Description  |
|--------------------------|--|
| <i>Dimensioning</i>      | Defines the format of annotation displaying. A line means that annotation will be displayed relative to the line.  |
| <i>Distance Settings</i> | Defines the distance settings. You may select the style from the drop-down list or modify it at the Distance annotation settings tab, or in the Annotation styles library. |
| <i>Bearing Settings</i>  | Defines the bearing settings. You may select the style from the drop-down list or modify it at the Bearing annotation settings tab, or in the Annotation styles library.   |
| <i>Clearance</i>         | Defines the clearance in feet between the line and the annotation.   |
| <i>Offset</i>            | Defines the offset between the line and dimension entities.  |
| <i>Leader Line</i>       | Tick to add extension lines to the dimensions.   |
| <b>Arrow Head</b>        |  |
| <i>Type</i>              | Defines the arrow type. You may select it from the drop-down list.   |
| <i>Angle</i>             | Defines the angle of the arrow head in degrees. You may select it from the drop-down list or type your own value.  |
| <i>Length</i>            | Defines the length of the arrow head in millimeters. You may select it from the drop-down list or type your own value.   |

To copy the annotation settings from the library:

1. In the *Settings* group of the *Settings* tab, click the **Annotation** icon.  
The *Annotation Styles* dialog is displayed.
2. Click the *Dimension Settings* tab.
3. Click **Copy From Lib**.
4. Select the required library item and click **OK**. For more information about annotation styles library, refer to "Annotation styles library" section on page 635.

The settings are copied from the library.

## Arrow settings

The *Arrow Settings* tab of the Annotation Styles dialog allows you to define the style for arrow annotations. Fields of the tab are described in the table below.

### Fields of the *Arrow Settings* tab

| Field       | Description  |
|-------------|--|
| <i>Type</i> | Defines the arrow type. You may select it from the drop-down list. |

| Field         | Description  |
|---------------|--|
| <i>Angle</i>  | Defines the angle of the arrow head in degrees. You may select it from the drop-down list or type your own value.      |
| <i>Length</i> | Defines the length of the arrow head in millimeters. You may select it from the drop-down list or type your own value. |

To copy the annotation settings from the library:

1. In the *Settings* group of the *Settings* tab, click the **Annotation** icon.  
The *Annotation Styles* dialog is displayed.
2. Click the *Arrow Settings* tab.
3. Click **Copy From Lib**.
4. Select the required library item and click **OK**. For more information about annotation styles library, refer to "Annotation styles library" section on page 635.

The settings are copied from the library.

## String annotation settings

The *String Annotation Settings* tab of the Annotation Styles dialog allows you to turn on/off the annotation of the strings. Fields of the tab are described in the table below.

### Fields of the *String Annotation Settings* tab

| Field                        | Description  |
|------------------------------|--|
| <i>Lines</i>                 | Tick to turn on the line annotations.                              |
| <i>Arcs</i>                  | Tick to turn on the arc annotations.                               |
| <i>Line annotation table</i> | Tick to display the line annotations in the line annotation table. |
| <i>Arc annotation table</i>  | Tick to display the arc annotations in the arc annotation table.   |

To copy the annotation settings from the library:

1. In the *Settings* group of the *Settings* tab, click the **Annotation** icon.  
The *Annotation Styles* dialog is displayed.
2. Click the *String Annotation Settings* tab.
3. Click **Copy From Lib**.
4. Select the required library item and click **OK**. For more information about annotation styles library, refer to "Annotation styles library" section on page 635.

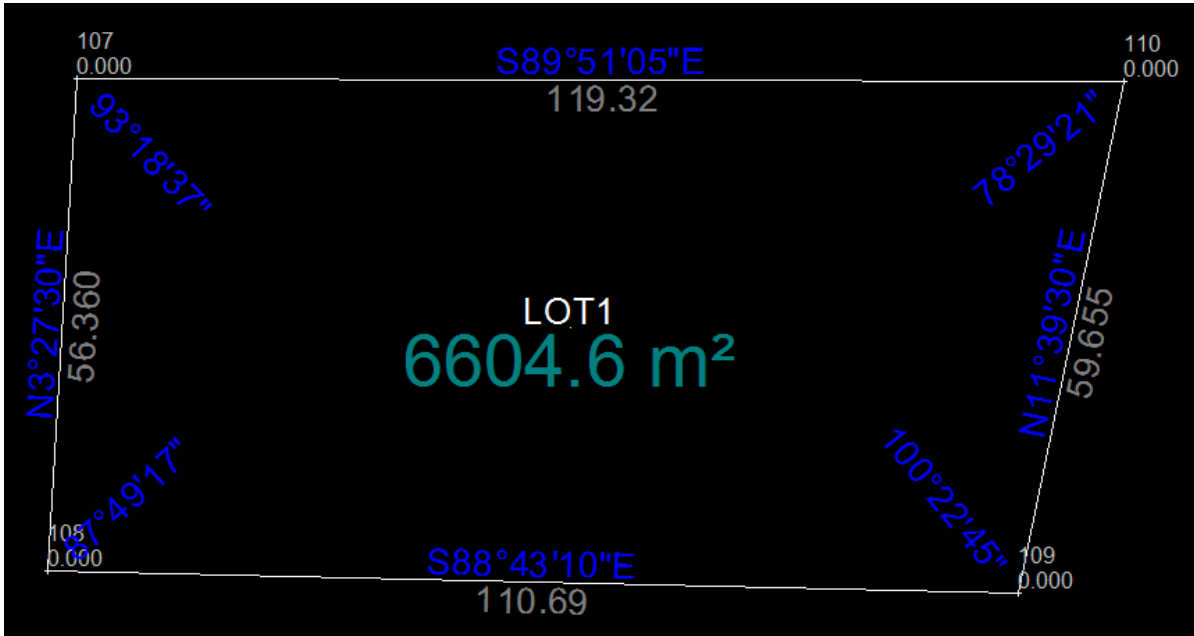
The settings are copied from the library.

## Lot annotation settings

The *Lot Annotation Settings* tab of the Annotation Styles dialog allows you to define the style for lot annotations. The lot annotation is displayed only for lots, which have annotation flag selected. Fields of the tab are described in the table below.

### Fields of the *Lot Annotation Settings* tab

| Field                                    | Description  |
|--|--|
| <i>Lot Name Prefix</i>                   | Defines the prefix, which will be displayed before the lot name.   |
| <i>Lot Name</i>                          | Tick to display lot name in annotation. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |
| <i>Area</i>                              | Tick to display lot area in the annotation. You may select the style from the drop-down list.  |
| <i>Angle</i>                             | Tick to display lot angles in the annotation. You may select the style from the drop-down list.  |
| <i>Lines</i>                             | Tick to display annotations of the lot lines.  |
| <i>Line Annotation Table</i>             | Tick to display the line annotations in the line annotation table.   |
| <i>Arcs</i>                              | Tick to display annotations of the lot arcs.   |
| <i>Arc annotation table</i>              | Tick to display the arc annotations in the arc annotation table.   |
| <i>Back Boundary</i>                     | Tick to display the annotation for the lot back edge.  |
| <i>Annotation of Angle</i>               | Tick to display the annotation of the internal lot angles.   |
| <i>Annotation of Complementary Angle</i> | Tick to display the annotation of the external lot angles.   |



Lot annotation example

### Bearing annotation settings

The *Bearing Annotation Settings* tab of the Annotation Styles dialog allows you to define the style for bearing annotations. Fields of the tab are described in the table below.

**Fields of the *Bearing Annotation Settings* tab**

| Field                  | Description   |
|------------------------|---|
| <i>Name</i>            | Defines the current bearing annotation style. You may select any existing style from the drop-down list.  |
| <i>Text Style Name</i> | Defines the text style for bearing annotations. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123.  |
| <i>Distance &lt;</i>   | Define the rounding of the bearing annotations. It has the following algorithm: <ul style="list-style-type: none"> <li>• If the distance is shorter, than the value from the first <i>Distance</i> editbox, than the bearing annotation will be rounded to the value from the first <i>Round To</i> editbox.</li> <li>• If the distance is longer, than the value from the first <i>Distance</i> editbox, but shorter than the value from the second <i>Distance</i> editbox, than the bearing annotation will be rounded to the value from the second <i>Round To</i> editbox.</li> <li>• If the distance is longer, than the value from the second <i>Distance</i> editbox, than the bearing annotation will be rounded to the value from the third <i>Round To</i> editbox.</li> </ul> |
| <i>Round To</i>        |   |

| <b>Field</b>                              | <b>Description</b>  |
|---|---|
| <i>Max Spread Distance</i>                | Defines the maximum distance among which annotation may be spread.  |
| <i>Show ' " &lt; 10 with leading zero</i> | Tick to display minutes and seconds less than 10 with a zero in the first position, i.e. 08 instead of 8. |
| <i>Show Trailing 00 Seconds</i>           | Tick to display seconds, even if the value is 00.   |
| <i>Show Trailing 00 Minutes</i>           | Tick to display minutes, even if the value is 00.   |

#### Buttons of the *Bearing Annotation Settings* tab

| <b>Button</b>        | <b>Description</b>   |
|----------------------|--|
| <b>New</b>           | Click it to create a new bearing annotation style.   |
| <b>Reset</b>         | Click it to restore previous bearing annotation style settings.  |
| <b>Rename</b>        | Click it to rename current bearing annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be renamed.  |
| <b>Delete</b>        | Click it to delete current bearing annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be deleted.  |
| <b>Copy From Lib</b> | Click it to copy the annotation settings from the library. For more information about annotation styles library, refer to "Annotation styles library" section on page 635. |

## Distance annotation settings

The *Distance Annotation Settings* tab of the Annotation Styles dialog allows you to define the style for distance annotations. Fields of the tab are described in the table below.

#### Fields of the *Distance Annotation Settings* tab

| <b>Field</b>           | <b>Description</b>  |
|------------------------|---|
| <i>Name</i>            | Defines the current distance annotation style. You may select any existing style from the drop-down list.   |
| <i>Text Style Name</i> | Defines the text style for distance annotations. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |

| Field                         | Description   |
|-------------------------------|---|
| <i>Distance &lt;</i>          | Define the rounding of the distance annotations. It has the following algorithm: <ul style="list-style-type: none"> <li>• If the distance is shorter, than the value from the first <i>Distance</i> editbox, than the distance annotation will be rounded to the value from the first <i>Round To</i> editbox.</li> <li>• If the distance is longer, than the value from the first <i>Distance</i> editbox, but shorter than the value from the second <i>Distance</i> editbox, than the distance annotation will be rounded to the value from the second <i>Round To</i> editbox.</li> <li>• If the distance is longer, than the value from the second <i>Distance</i> editbox, than the distance annotation will be rounded to the value from the third <i>Round To</i> editbox.</li> </ul> |
| <i>Round To</i>               |   |
| <i>Max Spread Distance</i>    | Defines the maximum distance among which annotation may be spread.  |
| <i>Show Trailing Zeros</i>    | Tick to display the trailing zeroes up to the number of decimals from the rounding settings.  |
| <i>Show Trailing Decimals</i> | Tick to display the trailing decimal points for integers.   |

#### Buttons of the *Distance Annotation Settings* tab

| Button               | Description  |
|----------------------|--|
| <b>New</b>           | Click it to create a new distance annotation style.  |
| <b>Reset</b>         | Click it to restore previous distance annotation style settings.   |
| <b>Rename</b>        | Click it to rename current distance annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be renamed.   |
| <b>Delete</b>        | Click it to delete current distance annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be deleted.   |
| <b>Copy From Lib</b> | Click it to copy the annotation settings from the library. For more information about annotation styles library, refer to "Annotation styles library" section on page 635. |



## Contour Settings dialog

The *Contour Settings* dialog allows you to manage the contour settings. It contains the list of the existing contour settings sets. You may create new sets, edit or delete existing sets. Buttons of the dialog are described in the table below.

### Buttons of the *Contour Settings* dialog

| Button               | Description   |
|----------------------|---|
| <b>New</b>           | Click it to create a new contour settings set. For more information, refer to "Creating contour settings sets" section below.   |
| <b>Modify</b>        | Click it to modify an existing contour settings set. For more information, refer to "Editing contour settings sets" section on the next page.                         |
| <b>Rename</b>        | Click it to rename an existing contour settings set.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be renamed.   |
| <b>Delete</b>        | Click it to delete an existing contour settings set.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be deleted.   |
| <b>Copy From Lib</b> | Click it to copy the contour settings from the library. For more information about contour settings library, refer to "Contour settings library" section on page 655. |
| <b>OK</b>            | Click it to close the dialog.   |

## Creating contour settings sets

To create a new set of contour settings:

- In the *Settings* group of the *Settings* tab, click the **Contour** icon.  
The *Contour Settings* dialog is displayed.
- Click **New**.  
The *Contour Settings* dialog is displayed.
- Make the required configurations. Fields are described in the table below.
- Click **OK**.  
The new set of contour setting is created.

### Fields of the *Contour Settings* dialog

| Field                | Description   |
|----------------------|---|
| <i>Name</i>          | Defines the name of the contour settings.   |
| <i>Major</i>         | Defines the major contour interval. Set the line width and style, and tick the check box to display the major contours.                       |
| <i>Minor</i>         | Defines the minor contour interval. Set the line width and style, and tick the check box to display the major contours.                       |
| <i>Minimum Level</i> | Defines the range of levels in which the contours are created. The range should be between the lowest and highest point elevation in the DTM. |
| <i>Maximum Level</i> |   |

| <b>Field</b>                      | <b>Description</b>  |
|-----------------------------------|---|
| <i>Major Start Level</i>          | Defines the level where the first major contour is created.   |
| <i>Additional Major Contours</i>  | Defines the levels where the extra contours will be created, in addition to the levels calculated by the MAGNET Office.   |
| <i>Additional Minor Contours</i>  |   |
| <i>Discrete Color</i>             | Defines the colors for the major and minor contour lines. Select the required colors from the appropriate drop-down lists.  |
| <i>Color Range</i>                | Defines the color range for contour lines displaying. Click <b>Define</b> to configure it.  |
| <i>Low</i>                        | Defines the lowest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected.  |
| <i>High</i>                       | Defines the highest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected. |
| <i>Plot Major/Minor Labels</i>    | Plots major/minor labels on the contour.  |
| <i>Remove Over-plotted Labels</i> | Removes overlapping contour labels.   |
| <i>Plot Labels Along Contour</i>  | Places the labels along the contour.  |
| <i>Plot End Labels</i>            | Plots labels at the end of the contour.   |
| <i>Plot Labels Uphill</i>         | Places the labels at the uphill.  |
| <i>Text Style</i>                 | Defines the text style for the labels.  |
| <i>Justification Style</i>        | Defines the justification style for the labels.   |
| <i>Label Distance</i>             | Defines the spacing between the labels along the contour.   |

## Editing contour settings sets

To edit an existing set of contour settings:

1. In the *Settings* group of the *Settings* tab, click the **Contour** icon.  
The **Contour Settings** dialog is displayed.
2. Select the required contour settings set, and click **Modify**.  
The **Contour Settings** dialog is displayed.
3. Make the required configurations. Fields are described in the table below.
4. Click **OK**.  
The set of contour settings is modified.

**Fields of the Contour Settings dialog**

| <b>Field</b>                      | <b>Description</b>  |
|-----------------------------------|---|
| <i>Name</i>                       | Defines the name of the contour settings.   |
| <i>Major</i>                      | Defines the major contour interval. Set the line width and style, and tick the check box to display the major contours.   |
| <i>Minor</i>                      | Defines the minor contour interval. Set the line width and style, and tick the check box to display the major contours.   |
| <i>Minimum Level</i>              | Defines the range of levels in which the contours are created. The range should be between the lowest and highest point elevation in the DTM.                             |
| <i>Maximum Level</i>              |   |
| <i>Major Start Level</i>          | Defines the level where the first major contour is created.   |
| <i>Additional Major Contours</i>  | Defines the levels where the extra contours will be created, in addition to the levels calculated by the MAGNET Office.   |
| <i>Additional Minor Contours</i>  |   |
| <i>Discrete Color</i>             | Defines the colors for the major and minor contour lines. Select the required colors from the appropriate drop-down lists.  |
| <i>Color Range</i>                | Defines the color range for contour lines displaying. Click <b>Define</b> to configure it.  |
| <i>Low</i>                        | Defines the lowest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected.  |
| <i>High</i>                       | Defines the highest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected. |
| <i>Plot Major/Minor Labels</i>    | Plots major/minor labels on the contour.  |
| <i>Remove Over-plotted Labels</i> | Removes overlapping contour labels.   |
| <i>Plot Labels Along Contour</i>  | Places the labels along the contour.  |
| <i>Plot End Labels</i>            | Plots labels at the end of the contour.   |
| <i>Plot Labels Uphill</i>         | Places the labels at the uphill.  |
| <i>Text Style</i>                 | Defines the text style for the labels.  |
| <i>Justification Style</i>        | Defines the justification style for the labels.   |
| <i>Label Distance</i>             | Defines the spacing between the labels along the contour.   |

## Background Images dialog

The *Background Images* dialog allows you to manage the background images for the survey view.

A background image is a picture, which is placed behind all entities in the project. Its aim is to help the user in the design of the project – to simplify the creation of the existing objects and understanding of how new object will interact with them. It may be satellite photo of the area, its map, etc. A background image may be calibrated, which means that the area of the image will be matched to the entities in the survey view.

The *Background Images* dialog contains table, with all background images listed. Fields are described in the table below.

### Fields of the *Background Images* table

| Field        | Description   |
|--------------|---|
| Image Name   | Displays the name of the background image.  |
| On           | Defines whether the background image is active and displayed in the survey view, or not.  |
| Marks        | Defines whether the anchor points displayed on the picture or not.  |
| Transparency | Defines the transparency of the background picture. 100% is fully transparent (i.e. invisible) picture, 0% is fully opaque picture. |

### Buttons of the *Background Images* dialog

| Button                          | Description  |
|---------------------------------|--|
| <b>OK</b>                       | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>                   | Click it to close the dialog without saving changes.   |
| <b>Recalibrate by Points</b>    | Click it to redefine the correspondence between the coordinates of the image pixels and the ground coordinate system by matching the points in the survey view with the points in the picture. See Image recalibration by matching points for details. |
| <b>Recalibration by Setting</b> | Click to redefine the anchor point, scale and rotation of the background image. See "Image recalibration by settings" section on page 622 for details.   |
| <b>Delete</b>                   | Click it to delete the selected background image. To activate this button, click the number of the required row in the table.  |
| <b>Switch All On</b>            | Click it to turn on displaying of all the background images.   |
| <b>Switch All Off</b>           | Click it to turn on displaying of all the background images.   |
| <b>Report</b>                   | Click it to generate a report about selected background images. To activate this button, click the number of the required row in the table.  |

## Image recalibration by matching points

MAGNET Office allows you to redefine the position of the background image by matching the point entities in the survey view with the points at the image.

To recalibrate an image, by adding more matching points:

1. Click one of the following icons:
  - The **B/G Images** icon in the *Features* group of the *View* tab,
  - The **Recalibrate** icon in the *Raster/Vector* group of the *Model* tab.

The **Background Images** dialog is displayed.

2. Select the required background picture, by clicking the number of the corresponding row in the table.
3. Click **Recalibrate by Points**.

The **Reposition Image** dialog is displayed. It contains table of the calibration points. Fields of the table and the dialog are described in the table below.

4. Click **Add**.

The input panel is displayed at the bottom toolbar.

5. Pick the matching point entity. Do one of the following:
  - Click the required point in the survey view.
  - Type the required point number in the *Number* editbox at the bottom toolbar, and press *Enter*.
6. Click the corresponding point on the image.
7. Repeat steps 5 and 6 for all required points.
8. When finished, do the right click, and select **Accept the image** in the context menu.

The **Reposition** dialog is displayed, containing newly added matching points.

9. Click **Close**.

The **Background Images** dialog is displayed. If needed, perform more configurations. For more information refer to "Background Images dialog" section on the previous page.

To remove matching points:

1. Click one of the following icons:
  - The **B/G Images** icon in the *Features* group of the *View* tab,
  - The **Recalibrate** icon in the *Raster/Vector* group of the *Model* tab.

The **Background Images** dialog is displayed.

2. Select the required background picture, by clicking the number of the corresponding row in the table.
3. Click **Recalibrate by Points**.

The **Reposition Image** dialog is displayed. It contains table of the calibration points. Fields of the table and the dialog are described in the table below.

4. Untick the *Incl* field for the required points.
5. Click **Close**.

The message window prompts to update the matching points.

6. Click **Yes**.

The **Background Images** dialog is displayed. If needed, perform more configurations. For more information refer to "Background Images dialog" section on the previous page.

#### Fields of the **Reposition Image** table

| Field        | Description  |
|--------------|--|
| <i>Incl</i>  | Define if the point included in the picture calibration. |
| <i>Pt No</i> | Displays the number of the point entity.                 |

| <b>Field</b>      | <b>Description</b>   |
|-------------------|--|
| <i>Easting</i>    | Displays the East (X) coordinate of the point entity.  |
| <i>Northing</i>   | Displays the North (Y) coordinate of the point entity.   |
| <i>Image X</i>    | Displays the X coordinate of the corresponding point at the picture. The origin of the picture coordinates is the bottom left corner of the picture. |
| <i>Image Y</i>    | Displays the Y coordinate of the corresponding point at the picture. The origin of the picture coordinates is the bottom left corner of the picture. |
| <i>Residule X</i> | Displays the X (East) axis residual of the matching point after calculating the calibration parameters.  |
| <i>Residule Y</i> | Displays the Y (North) axis residual of the matching point after calculating the calibration parameters.   |

#### **Fields of the *Reposition Image* dialog**

| <b>Field</b>        | <b>Description</b>                           |
|---------------------|--|
| <i>Scale Factor</i> | Displays the change of image scale.          |
| <i>Swing</i>        | Displays the image rotation.                 |
| <i>N Shift</i>      | Displays change of the North (Y) coordinate. |
| <i>E Shift</i>      | Displays change of the East (X) coordinate.  |

## **Image recalibration by settings**

MAGNET Office allows you to redefine the position of the background image by changing the anchor point, scale and rotation of the background image. The anchor point is a point entity in the survey view, which position on the picture is known. It is used to define adjoining point between the survey view and background image.

### **NOTE**

Matching point settings will be ignored after reposition by this settings.

To recalibrate a background picture by settings, you need to pick the anchor point and define the scale and rotation of the image. See the corresponding section for details:

- "Picking the anchor point" section on the facing page
- "Positioning by plotting scale" section on the facing page
- "Position by known line" section on page 624

#### **Fields of the *Reposition Image* dialog**

| <b>Field</b>                      | <b>Description</b>   |
|-----------------------------------|--|
| <i>Anchor Point</i>               | Displays the East and North coordinates of the background image anchor point. It also displays the number of the current anchor point and its coordinates on the picture. The origin of the picture coordinates is the bottom left corner. |
| <b>Position by plotting scale</b> |  |
| <i>Scale</i>                      | Defines the scale of the background image, based on its original plotting size.  |

| Field                    | Description  |
|--------------------------|--|
| <i>North orientation</i> | <p>Defines the rotation of the background image.</p> <p><b>IMPORTANT</b><br/> <b>This parameter defines the orientation of the picture itself, not the bearing of any project entity. Rotation is defined around the anchor point, the positive direction is counterclockwise.</b></p> |
| <b>Position by image</b> |  |
| <i>Actual Distance</i>   | Displays the actual distance for the specified line on the picture.  |
| <i>Rotation</i>          | Defines the bearing for the specified line on the picture.   |
| <i>North Orientation</i> | <p>Defines the rotation of the background image.</p> <p><b>IMPORTANT</b><br/> <b>This parameter defines the orientation of the picture itself, not the bearing of any project entity. Rotation is defined around the anchor point, the positive direction is counterclockwise.</b></p> |

## Picking the anchor point

The anchor point is a point entity in the survey view, which position on the picture is known. It is used to define adjoining point between the survey view and background image.

To pick the anchor point:

- Click one of the following icons:
  - The **B/G Images** icon in the *Features* group of the *View* tab,
  - The **Recalibrate** icon in the *Raster/Vector* group of the *Model* tab.

The **Background Images** dialog is displayed.

- Select the required background picture, by clicking the number of the corresponding row in the table.
- Click **Recalibrate by Settings**.

The **Reposition Image** dialog is displayed. See "Image recalibration by settings" section on the previous page for details.

- In the *Anchor Point* panel, click **Pick >>**.
- Pick the anchor point entity. Do one of the following:
  - Click the required point in the survey view.
  - Type the required point number in the *Number* editbox at the bottom toolbar, and press *Enter*.
- Click the corresponding point on the image.

The anchor point is defined. The **Reposition Image** dialog is displayed.

## Positioning by plotting scale

When position a background image by plotting scale, you need to specify the scale between the actual picture size and its size in the survey view and rotation of the image.

To scale picture by using the plotting scale:

- Click one of the following icons:
  - The **B/G Images** icon in the *Features* group of the *View* tab,
  - The **Recalibrate** icon in the *Raster/Vector* group of the *Model* tab.

The **Background Images** dialog is displayed.

2. Select the required background picture, by clicking the number of the corresponding row in the table.
3. Click **Recalibrate by Settings**.

The **Reposition Image** dialog is displayed. See "Image recalibration by settings" section on page 622 for details.

4. If needed, pick the anchor image. See "Picking the anchor point" section on the previous page for details.
5. In the *Scale and Rotation* panel, select the *Position by plotting scale* radiobutton.
6. In the *Scale* editbox, define the scale of the background image.
7. In the *North Orientation* editbox, define the rotation of the background image.

*TIP*

*Rotation is defined around the anchor point, the positive direction is counterclockwise.*

8. Click **OK**.

The picture is scaled. The **Background Images** dialog is displayed.

## Position by known line

When position a background image by known line, you need to pick the known line and define its length and bearing.

To scale picture by using the known line:

1. Click one of the following icons:
  - The **B/G Images** icon in the *Features* group of the *View* tab,
  - The **Recalibrate** icon in the *Raster/Vector* group of the *Model* tab.

The **Background Images** dialog is displayed.

2. Select the required background picture, by clicking the number of the corresponding row in the table.
3. Click **Recalibrate by Settings**.

The **Reposition Image** dialog is displayed. See "Image recalibration by settings" section on page 622 for details.

4. If needed, pick the anchor image. See "Picking the anchor point" section on the previous page for details.
5. In the *Scale and Rotation* panel, select the *Position by image* radiobutton.
6. In the *Scale and Rotation* panel, click **Pick >>**.
7. Pick the known line on the picture.
8. In the *Actual Distance* editbox, define the length of the known line.
9. Define the bearing of the known line. Do one of the following:
  - In the *Rotation* editbox, define the bearing of the known line.
  - In the *North Orientation* editbox, define the rotation of the background image.

*TIP*

*Rotation is defined around the anchor point, the positive direction is counterclockwise.*

10. Click **OK**.

The picture is scaled. The **Background Images** dialog is displayed.



## Annotation Table Settings dialog

The "Annotation Table Settings" dialog allows you to configure the parameters of the line and arc annotation tables. To open the dialog, do the double click inside the line or arc annotation table. Fields and buttons of the dialog are described below.

### Fields of the "Annotation Table Settings" dialog

| Field           | Description   |
|-----------------|---|
| Insertion Point | Defines the X (East) and Y (North) coordinates of the table bottom left corner.   |
| Columns         | Defines the quantity of column sets.  |
| Text Style      | Defines the text style, used in the table.  |
| ID Text Style   | Defines the text style, used for line/arc marks.  |
| Sorted by       | Select the parameter for table data sorting.  |
| Ascending       | Tick to sort the table data in the ascending order. If unticked, data will be sorted in the descending order.                   |
| Display         | Tick to display the line/arc annotation table in the survey view. If unticked, the line/arc annotation table will be invisible. |

### Buttons of the "Annotation Table Settings" dialog

| Button          | Description   |
|-----------------|---|
| <b>Reset</b>    | Click it to restore the default settings.                     |
| <b>Renumber</b> | Click it to renumber the line and arc marks, starting from 1. |
| <b>Refresh</b>  | Click it to refresh the line/arc annotation table.            |
| <b>OK</b>       | Click it to save the changes and close the dialog.            |
| <b>Cancel</b>   | Click it to close the dialog without saving changes.          |

## DTM Settings dialog

The *DTM Settings* dialog allows you to edit an existing DTM. It appears during the creation of a new DTM.

To edit a DTM:

1. In the *DTM Settings* group of the *Surface* tab, click the **DTM Settings** icon.  
The *DTM* dialog is displayed.
2. Select the required DTM and click **Edit**.  
The *DTM Settings* dialog is displayed.
3. Set up the required properties at each tab of the dialog. Fields are described in the tables below.
4. Click **OK**.

### Fields of the *General* tab of the *DTM Settings* dialog

| Field               | Description  |
|---------------------|--|
| <i>Name</i>         | Displays the name of the DTM.  |
| <i>Boundary</i>     |  |
| <i>Num Points</i>   | Displays the quantity of the points in the DTM.  |
| <i>Highest</i>      | Displays the highest elevation in the DTM.   |
| <i>Lowest</i>       | Displays the lowest elevation in the DTM.  |
| <i>Ave. Elev</i>    | Displays the average elevation in the DTM.   |
| <i>Plan Area</i>    | Displays the horizontal area of the DTM.   |
| <i>Surface Area</i> | Displays the full surface area, including slopes.  |
| <i>Description</i>  | Defines short DTM description.   |
| <b>Display</b>      |  |
| <i>Mesh</i>         | When ticked, the created triangular mesh will be displayed in the survey view. Select the required color from the drop-down list.  |
| <i>Contour</i>      | When ticked, the contours will be displayed in the survey view.  |
| <i>Color Fill</i>   | When ticked, the shadings and patterning will be colored. Click <b>Settings</b> to define the required colors. See "Color Fill Settings dialog" section on page 628 for details. |
| <i>Slope</i>        | When ticked, the slopes will be colored. Click <b>Settings</b> to configure it. See "Slope dialog" section on page 628 for details.  |

### Fields of the *Contour* tab of the *DTM Settings* dialog

| Field          | Description   |
|----------------|---|
| <b>Display</b> |   |
| <i>Major</i>   | Defines the major contour interval. Set the line width and style, and tick the check box to display the major contours. |

| <b>Field</b>                     | <b>Description</b>  |
|----------------------------------|---|
| <i>Minor</i>                     | Defines the minor contour interval. Set the line width and style, and tick the check box to display the major contours.   |
| <i>Minimum Level</i>             | Defines the range of levels in which the contours are created. The range should be between the lowest and highest point elevation in the DTM.                             |
| <i>Maximum Level</i>             |   |
| <i>Major Start Level</i>         | Defines the level where the first major contour is created.   |
| <i>Additional Major Contours</i> | Defines the levels where the extra contours will be created, in addition to the levels calculated by the MAGNET Office.   |
| <i>Additional Minor Contours</i> |   |
| <b>Color</b>                     |   |
| <i>Discrete Color</i>            | Defines the colors for the major and minor contour lines. Select the required colors from the appropriate drop-down lists.  |
| <i>Color Range</i>               | Defines the color range for contour lines displaying. Click <b>Define</b> to configure it. See "Color Range Settings dialog" section on the next page for details.        |
| <i>Low</i>                       | Defines the lowest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected.  |
| <i>High</i>                      | Defines the highest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected. |

You may use the contour settings library to load the pre-configured contour settings.

To load contour library settings:

1. At the *Contour* tab of the **DTM Settings** dialog, click **Load Library Settings**.  
The selection dialog is displayed.
2. Select the required library settings, and click **OK**.

To save current contour settings to the library:

1. At the *Contour* tab of the **DTM Settings** dialog, click **Save Library Settings**.  
The selection dialog is displayed.
2. Select existing library settings from the drop-down list, or type the name of a new library.
3. Click **OK**.

#### **Fields of the *Contour Label* tab of the **DTM Settings** dialog**

| <b>Field</b>                      | <b>Description</b>                       |
|-----------------------------------|--|
| <i>Plot Major/Minor Labels</i>    | Plots major/minor labels on the contour. |
| <i>Remove Over-plotted Labels</i> | Removes overlapping contour labels.      |
| <i>Plot Labels Along Contour</i>  | Places the labels along the contour.     |

| Field                      | Description   |
|----------------------------|---|
| <i>Plot End Labels</i>     | Plots labels at the end of the contour.                   |
| <i>Plot Labels Uphill</i>  | Places the labels at the uphill.                          |
| <i>Text Style</i>          | Defines the text style for the labels.                    |
| <i>Justification Style</i> | Defines the justification style for the labels.           |
| <i>Label Distance</i>      | Defines the spacing between the labels along the contour. |

## Color Fill Settings dialog

The **Color Fill Settings** dialog allows you to configure gradual change in color for filling boundaries from the highest to the lowest elevation.

To configure the color range:

1. In the **Color Fill** group box, from the **General** tab of the **DTM Settings** dialog, click **Settings**.  
The **Fill Color** dialog is displayed.
2. In the **High Level** editbox, specify the highest value of the height range.
3. In the **Low Level** editbox, specify the lowest value of the height range.
4. In the **Datum Level** editbox, specify the level of the datum.
5. Select the required colors from the appropriate drop-down lists.
6. Click **OK**.

## Color Range Settings dialog

The **Color Range Settings** dialog allows you to configure gradual change in color for each minor contour interval from the highest to the lowest contour.

To configure the color range:

1. In the **Color** group box, from the **Contour** tab of the **DTM Settings** dialog, click **Define**.  
The **Color Range Settings** dialog is displayed.
2. In the **High Value** editbox, specify the highest value of the height range.
3. In the **Low Value** editbox, specify the lowest value of the height range.
4. In the **Interval** editbox, specify the interval of color changing.
5. Click **OK**.

## Slope dialog

The **Slope** dialog allows you to analyze the slopes of the individual triangles. You can allocate different colors to the slope ranges with the option to set the shape of the arrows that display the slopes.

To configure the slope:

1. In the *Slope* group box, from the *General* tab of the *DTM Settings* dialog, click **Settings**.

The *Slope* dialog is displayed.

2. From the *Arrow Head* drop-down list, select the required arrow head shape.
3. From the *Arrow Angle* drop-down list, select the required angle of the arrow head, or specify custom value.
4. From the *Arrow Length* drop-down list, select the required length of the arrow, or specify custom value.
5. If needed, tick the *Drawing Units* checkbox, to plot the slope units.
6. In the table, specify consecutive steps for the slope range with an appropriate color for each slope
7. Click **OK**.

## MAGNET Office Libraries

The libraries in the MAGNET Office are the sets of various configurations, which are stored in the program directory. These sets are global and may be used in any project, created in the MAGNET Office.

Description of the existing libraries may be found in the appropriate sections:

- "Contour settings library" section on page 655
- "Colors library" section below
- "Text styles library" section on the facing page
- "Justification styles library" section on page 632
- "Annotation styles library" section on page 635
- "Legal description templates library" section on page 646
- "Symbol library" section on page 648
- "Line styles library" section on page 649
- "Plot settings library" section on page 650
- "Contour settings library" section on page 655
- "Genio translation tables library" section on page 658
- "AutoCAD layer definition tables library" section on page 660
- "AutoCAD layer translation tables library" section on page 663
- "Sewer library" section on page 666
- "Drainage library" section on page 668

### Colors library

The **Colors** library allows you to manage the MAGNET Office color palette. This palette is global, and available for all projects.

To create a new color:

1. In the *Library* group of the *Library* tab, click the **Colors** icon.  
The **Create Custom Colors** dialog is displayed.
2. In the **Custom Colors** palette select a cell for the new color.
3. Do one of the following:
  - Configure the new color by using the color palette and shade bar.
  - Manually enter the required data in the "Hue", "Sat", "Lum", "Red", "Green" and "Blue" editboxes.
4. Click **Add to Custom Colors**.  
The configured color is added to the selected cell.
5. Click **OK**.

To import the current palette to the color file, click **Import**.

To load previously configuration from the external file, click **Export**.

## Text styles library

Text styles define layout of all textual data in the MAGNET Office – point numbers, entities annotations, etc. The settings, configured in the library are global, and available for all projects.

To access the text styles library, in the *Library* group of the *Library* tab, click the **Text Styles** icon. The **Text styles** dialog appears after clicking. It contains the list of the existing text styles and font, size, color and formatting for each style. Buttons of the dialog are described in the table below.

### Buttons of the *Text Style* dialog

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new text style. For more information refer to "Creating text styles" section below.    |
| <b>Modify</b> | Click it to edit an existing text style. For more information refer to "Editing text styles" section below. |
| <b>Rename</b> | Click it to rename an existing text style.<br>NOTE<br>The <b>\$\$DEFAULT</b> text style cannot be renamed.  |
| <b>Delete</b> | Click it to delete an existing text style.<br>NOTE<br>The <b>\$\$DEFAULT</b> text style cannot be deleted.  |
| <b>Import</b> | Click it to load a text style from an external file.  |
| <b>OK</b>     | Click it to save changes and close the dialog.  |
| <b>Cancel</b> | Click it to close the dialog without saving changes.  |

## Creating text styles

To create a new text style:

1. In the *Library* group of the *Library* tab, click the **Text Styles** icon.  
The **Text Style** dialog is displayed.
2. Click **New**.  
The **Text Style** dialog is displayed.
3. In the *Name* editbox, type the name of the new text style.
4. From the *Font* drop-down list, select the font.
5. From the *Size* drop-down list, select the font size, or type your own value.
6. From the *Color* drop-down list, select the font color, or create a custom color for font. For more information, refer to "Custom Colors icon" section on page 127.
7. In the *Style* panel define the bold, italic and underscore formatting.
8. Review your font style in the *Preview* field. If needed, change the font parameters.
9. Click **OK**.

The text style is created.

## Editing text styles

To edit an existing text style:

1. In the *Library* group of the *Library* tab, click the **Text Styles** icon.

The **Text Style** dialog is displayed.

2. Select text style to be edited.
3. Click **Modify**.

The **Text Style** dialog is displayed.

**NOTE**

You cannot change the name of the text style in this dialog. To rename a text style, use the **Rename** button of the main dialog.

4. From the *Font* drop-down list, select the font.
5. From the *Size* drop-down list, select the font size, or type your own value.
6. From the *Color* drop-down list, select the font color, or create a custom color for font. For more information, refer to "Custom Colors icon" section on page 127.
7. In the *Style* panel define the bold, italic and underscore formatting.
8. Review your font style in the *Preview* field. If needed, change the font parameters.
9. Click **OK**.

The parameters of the text style are changed.

## Justification styles library

Justification style defines the format of the number and its decimal precision. It controls the appearance of the numerical values used in such text items as height annotation, grid values, chainage, and levels in road drawings. The settings, configured in the library are global, and available for all projects.

To access the text styles library, in the *Library* group of the *Library* tab, click the **Justification** icon. The **Justification Style** dialog appears after clicking. It contains the list of the existing justification styles with their parameters. Buttons of the dialog are described in the table below.

### Buttons of the **Justification Style** dialog

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new justification style. For more information refer to Creating justification styles.                          |
| <b>Modify</b> | Click it to edit an existing justification style. For more information refer to Editing justification styles.                       |
| <b>Rename</b> | Click it to rename an existing justification style.<br><b>NOTE</b><br>The <b>\$\$DEFAULT</b> justification style cannot be renamed. |
| <b>Delete</b> | Click it to delete an existing justification style.<br><b>NOTE</b><br>The <b>\$\$DEFAULT</b> justification style cannot be deleted. |
| <b>OK</b>     | Click it to save changes and close the dialog.  |
| <b>Cancel</b> | Click it to close the dialog without saving changes.  |



## Creating justification styles

To create a new library justification style:

1. In the *Library* group of the *Library* tab, click the **Justification** icon.  
The **Justification Style** dialog is displayed.
2. Click **New**.  
The **Number Style** dialog is displayed.
3. In the *Name* editbox, type the name of the new justification style.
4. In the *Width* editbox, type the number of digits, used in the style. Note that it includes the characters used for the decimal point and decimal figures
5. In the *Precision* editbox, type the number of decimal places.
6. Select either left of right justified position.
7. Configure the following parameters:
  - *Zero Padding* – tick to fill the empty character spaces with zeroes.
  - *Space Fill* – tick to make a number right-justified with prefixed spaces to make up the number of characters in the width.
  - *Display Decimal* – tick to display the decimal point.
  - *Rounding* – tick to round a number to the precision setting.
8. Click **OK**.  
The new justification style is created.

## Editing justification styles

To edit an existing justification style:

1. In the *Library* group of the *Library* tab, click the **Justification** icon.  
The **Justification Style** dialog is displayed.
2. Select justification style to be edited.
3. Click **Modify**.  
The **Number Style** dialog is displayed.  
NOTE  
You cannot change the name of the justification style in this dialog. To rename a justification style, use the **Rename** button of the "Number Justification Style" dialog.
4. In the *Precision* editbox, type the number of decimal places.
5. Select either left of right justified position.
6. Configure the following parameters:
  - *Zero Padding* – tick to fill the empty character spaces with zeroes.
  - *Space Fill* – tick to make a number right-justified with prefixed spaces to make up the number of characters in the width.
  - *Display Decimal* – tick to display the decimal point.
  - *Rounding* – tick to round a number to the precision setting.
7. Click **OK**.  
The parameters of the justification style are changed.

**NOTE**

These changes will apply only to justification styles in the current project, and don't affect to the styles in the Justification styles library.

## Annotation styles library

The Annotation Styles library allows you to manage the annotation styles for various entities. These styles are global and available in all projects.

To configure annotation styles library:

1. In the *Library* group of the *Library* tab, click the **Annotation** icon.

The **Annotation Styles** dialog is displayed.

2. Make the required configurations. More detailed information about each style may be found in the corresponding sections:
  - "Point annotation settings" section below
  - "Line annotation settings" section on the next page
  - "Arc annotation settings" section on page 637
  - "Angle annotation settings" section on page 638
  - "Area annotation settings" section on page 639
  - "Dimension settings" section on page 640
  - "Arrow settings" section on page 641
  - "String annotation settings" section on page 641
  - "Lot annotation settings" section on page 642
  - "Bearing annotation settings" section on page 643
  - "Distance annotation settings" section on page 644
3. Click **OK** to close the dialog

### Point annotation settings

The *Point Annotation Settings* tab of the Annotation styles library allows you to define the style for point annotations. The point annotation is displayed for points which have any of their three point annotation flags selected. Description of the fields and buttons may be found in the table below.

#### Fields of the *Point Annotation Settings* tab

| Field              | Description   |
|--------------------|---|
| <i>Name</i>        | Defines the name the point annotation settings set.   |
| <i>Text Style</i>  | Defines the text style for the point name, code and height annotation. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |
| <i>Order</i>       | Defines the order of the point code and height annotation. The proposed values are 1, 2 and 3, where 1 is the first attribute. If one of point annotation flags is not select, than it will not be displayed, and replaced with the next position.                                |
| <i>Text Before</i> | Defines the text before the point name, code and height annotation.<br><i>For example: "ID=", "Code=" and "H=".</i>   |
| <i>Text After</i>  | Defines the text after the point name, code and height annotation.<br><i>For example – m for "meters" after each point height.</i>  |

| Field                       | Description  |
|-----------------------------|--|
| <i>Rotation</i>             | Defines the orientation for the point name, code and height annotation. It is displayed in the rotation unit settings, as defined in the "Project unit settings" section on page 583. Horizontal position of the annotation text corresponds with the azimuth angle of 90 degrees. |
| <i>Following</i>            | If ticked, the annotation, with the <i>Order</i> attribute set to 2 will be placed to the right of the first attribute, and so on.   |
| <b>Alignment</b>            |  |
| <i>Height Centered</i>      | Tick to center annotation around the point.  |
| <i>Horizontal</i>           | Select either left or center or right position of the first attribute, regarding to position of the point.<br><i>For example: "Right" will place annotation to the right of the point.</i>   |
| <i>Vertical</i>             | Select either above or center or below position of the first attribute, regarding to position of the point.<br><i>For example: "Below" will place annotation below the point.</i>  |
| <i>Number Justification</i> | Defines the justification styles for the heights. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying justification styles, refer to "Editing justification styles" section on page 125.     |

**Buttons of the *Point Annotation Settings* tab**

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new point annotation settings set.                |
| <b>Reset</b>  | Click it to discard changes and reset settings to the last saved ones. |
| <b>Rename</b> | Click it to rename the point annotation settings set.                  |
| <b>Delete</b> | Click it to delete the point annotation settings set.                  |

**Line annotation settings**

The *Line Annotation Settings* tab of the Annotation styles library allows you to define the style for line annotations. The line annotation is displayed only for lines, which have annotation flag selected. Description of the fields and buttons may be found in the table below.

**Fields of the *Line Annotation Settings* tab**

| Field       | Description  |
|-------------|--|
| <i>Name</i> | Defines the name the line annotation settings set.   |
| <i>Type</i> | Defines the format of annotation displaying. A line means that annotation will be displayed relative to the line. Options without a line means, that annotation will be displayed above or below the line. |

| Field                             | Description  |
|-----------------------------------|--|
| <i>Text Before Distance</i>       | Type any text to be displayed before distance annotation.  |
| <i>Text After Distance</i>        | Type any text to be displayed after distance annotation.   |
| <i>Bearing Settings</i>           | Defines the bearing settings. You may select the style from the drop-down list, or modify it at the Bearing annotation settings tab or in the Annotation styles library.       |
| <i>Distance Settings</i>          | Defines the distance settings. You may select the style from the drop-down list, or modify it at the Distance annotation settings tab or in the Annotation styles library.     |
| <i>Clear Distance</i>             | Defines the clearance in feet between the line and annotation.   |
| <i>Annotate</i>                   | Defines whether the annotation will be displayed above or below the line.  |
| <i>Spread Bearing</i>             | Tick to spread bearing along the line.   |
| <i>Show Short Line Annotation</i> | Tick to display annotations even for too short lines, where annotations does not fit along the line. If not selected, the line will be annotated only in the short line table. |

#### Buttons of the *Line Annotation Settings* tab

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new line annotation settings set.                 |
| <b>Reset</b>  | Click it to discard changes and reset settings to the last saved ones. |
| <b>Rename</b> | Click it to rename the line annotation settings set.                   |
| <b>Delete</b> | Click it to delete the line annotation settings set.                   |

## Arc annotation settings

The *Arc Annotation Settings* tab of the Annotation styles library allows you to define the style for arc annotations. The arc annotation is displayed only for arcs, which have annotation flag selected. Description of the fields and buttons may be found in the table below.

#### Fields of the *Arc Annotation Settings* tab

| Field                | Description   |
|----------------------|---|
| <i>Name</i>          | Defines the name of the arc annotation settings set.  |
| <i>Arc Radius</i>    | Tick to display the arc radius annotation. In the <i>Plot Order</i> editbox, type the order of the arc radius displaying.       |
| <i>Arc Length</i>    | Tick to display the arc length annotation. In the <i>Plot Order</i> editbox, type the order of the arc length displaying.       |
| <i>Chord Length</i>  | Tick to display the chord length annotation. In the <i>Plot Order</i> editbox, type the order of the chord length displaying.   |
| <i>Chord Bearing</i> | Tick to display the chord bearing annotation. In the <i>Plot Order</i> editbox, type the order of the chord bearing displaying. |

| Field                            | Description   |
|----------------------------------|---|
| <i>Delta Angle</i>               | Tick to display the delta angle annotation. In the <i>Plot Order</i> editbox, type the order of the delta angle displaying.<br>NOTE<br>Delta angle is the angle between the arc radius to the start point, and arc radius to the end point. |
| <i>Distance Settings</i>         | Defines the distance settings for arc radius, arc length and chord length. You may select the style from the drop-down list or modify it at the Distance annotation settings tab.   |
| <i>Bearing Settings</i>          | Defines the bearing settings for chord bearing. You may select the style from the drop-down list or modify it at the Bearing annotation settings tab.   |
| <i>Angle Settings</i>            | Defines the angle settings for delta angle. You may select the style from the drop-down list or modify it at the Angle annotation settings tab.   |
| <i>Text Before</i>               | Type any text to be displayed before the arc radius, arc length, chord length, chord bearing and delta angle annotations.   |
| <i>Text After</i>                | Type any text to be displayed after the arc radius, arc length, chord length, chord bearing and delta angle annotations.  |
| <i>Along Arc</i>                 | Tick to spread annotations along the arc, one after the other.  |
| <i>Show Short Arc Annotation</i> | Tick to display annotations even for too short arcs, where annotations does not fit along the arc. If not selected, the arc will be annotated only in the short line table.   |

#### Buttons of the *Arc Annotation Settings* tab

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new arc annotation settings set.                  |
| <b>Reset</b>  | Click it to discard changes and reset settings to the last saved ones. |
| <b>Rename</b> | Click it to rename the arc annotation settings set.                    |
| <b>Delete</b> | Click it to delete the arc annotation settings set.                    |

## Angle annotation settings

The *Angle Annotation Settings* tab of the Annotation styles library allows you to define the style for angle annotations. Description of the fields and buttons may be found in the tables below.

#### Fields of the *Angle Annotation Settings* tab

| Field                  | Description  |
|------------------------|--|
| <i>Name</i>            | Defines the current angle annotation style.  |
| <i>Text Style Name</i> | Defines the text style for angle annotations. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |

| Field                                  | Description   |
|--|---|
| <i>Round Angles to nearest seconds</i> | Defines the value of angle seconds for rounding angles. |
| <i>Show Trailing Zeros</i>             | Tick to display trailing zeros.                         |
| <i>Show Trailing 00 Seconds</i>        | Tick to display seconds, even if the value is 00.       |
| <i>Show Trailing 00 Minutes</i>        | Tick to display minutes, even if the value is 00.       |

#### Buttons of the *Angle Annotation Settings* tab

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new angle annotation settings set.                |
| <b>Reset</b>  | Click it to discard changes and reset settings to the last saved ones. |
| <b>Rename</b> | Click it to rename the angle annotation settings set.                  |
| <b>Delete</b> | Click it to delete the angle annotation settings set.                  |

## Area annotation settings

The *Area Annotation Settings* tab of the Annotation styles library allows you to define the style for lot's area annotations. Description of the fields and buttons may be found in the tables below.

#### Fields of the *Area Annotation Settings* tab

| Field                          | Description   |
|--------------------------------|---|
| <i>Name</i>                    | Defines the current area annotation style. You may select any existing style from the drop-down list.   |
| <i>Text Style Name</i>         | Defines the text style for area annotations. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |
| <i>Use Significant Figures</i> | Displays the area annotation to the minimum number of significant figures entered in the appropriate editboxes.   |
| <i>Use Min no of Decimals</i>  | Displays the area annotation to the minimum number of decimal places entered in the appropriate editboxes for both major and minor units of area.   |
| <i>Round Down</i>              | Tick to round area value for annotation down, instead of standard rounding rules. If ticked, specify the rounding tolerance in the appropriate editbox.   |
| <i>Show Trailing Zeros</i>     | Tick to display trailing zeros.   |
| <i>Show Trailing Decimal</i>   | Tick to display decimals, even if the value is 00.  |
| <i>Squared Symbol</i>          | Tick to display squared symbol.   |

| Field                  | Description   |
|------------------------|---|
| <i>Minor Limit</i>     | Defines the maximum value of the area, which uses the minor units, before changing to major ones. |
| <i>Minor Unit Text</i> | Defines the label for minor units. The sign of square units will be added automatically.          |
| <i>Major Unit Text</i> | Defines the label for major units.  |

#### Buttons of the *Area Annotation Settings* tab

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new area annotation style.  |
| <b>Reset</b>  | Click it to restore previous area annotation style settings.   |
| <b>Rename</b> | Click it to rename current area annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be renamed. |
| <b>Delete</b> | Click it to delete current area annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be deleted. |

## Dimension settings

The *Dimension Settings* tab of the Annotation styles library allows you to configure the style for dimension annotations. Description of the fields and buttons may be found in the tables below.

#### Fields of the *Dimension Settings* tab

| Field                    | Description   |
|--------------------------|---|
| <i>Name</i>              | Defines the name of the dimension settings set.   |
| <i>Dimensioning</i>      | Defines the format of annotation displaying. A line means that annotation will be displayed relative to the line.                     |
| <i>Distance Settings</i> | Defines the distance settings. You may select the style from the drop-down list or modify it at the Distance annotation settings tab. |
| <i>Bearing Settings</i>  | Defines the bearing settings. You may select the style from the drop-down list or modify it at the Bearing annotation settings tab.   |
| <i>Clearance</i>         | Defines the clearance in feet between the line and the annotation.  |
| <i>Offset</i>            | Defines the offset between the line and dimension entities.   |
| <i>Leader Line</i>       | Tick to add extension lines to the dimensions.  |
| <b>Arrow Head</b>        |   |
| <i>Type</i>              | Defines the arrow type. You may select it from the drop-down list.  |



| Field         | Description  |
|---------------|--|
| <i>Angle</i>  | Defines the angle of the arrow head in degrees. You may select it from the drop-down list or type your own value.      |
| <i>Length</i> | Defines the length of the arrow head in millimeters. You may select it from the drop-down list or type your own value. |

#### Buttons of the *Dimension Settings* tab

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new dimension settings set.                       |
| <b>Reset</b>  | Click it to discard changes and reset settings to the last saved ones. |
| <b>Rename</b> | Click it to rename the dimension settings set.                         |
| <b>Delete</b> | Click it to delete the dimension settings set.                         |

## Arrow settings

The *Arrow Settings* tab of the Annotation styles library allows you to define the style for arrow annotations. Description of the fields and buttons may be found in the tables below.

#### Fields of the *Arrow Settings* tab

| Field         | Description  |
|---------------|--|
| <i>Name</i>   | Defines the name of the arrow settings set.  |
| <i>Type</i>   | Defines the arrow type. You may select it from the drop-down list.   |
| <i>Angle</i>  | Defines the angle of the arrow head in degrees. You may select it from the drop-down list or type your own value.      |
| <i>Length</i> | Defines the length of the arrow head in millimeters. You may select it from the drop-down list or type your own value. |

#### Buttons of the *Arrow Settings* tab

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new arrow settings set.                           |
| <b>Reset</b>  | Click it to discard changes and reset settings to the last saved ones. |
| <b>Rename</b> | Click it to rename the arrow settings set.                             |
| <b>Delete</b> | Click it to delete the arrow settings set.                             |

## String annotation settings

The *String Annotation Settings* tab of the Annotation styles library allows you to turn on/off the annotation of the strings. Description of the fields and buttons may be found in the table below.

**Fields of the *String Annotation Settings* tab**

| <b>Field</b>                 | <b>Description</b>   |
|------------------------------|--|
| <i>Name</i>                  | Defines the name of the string annotation settings set.            |
| <i>Lines</i>                 | Tick to turn on the line annotations.                              |
| <i>Arcs</i>                  | Tick to turn on the arc annotations.                               |
| <i>Line annotation table</i> | Tick to display the line annotations in the line annotation table. |
| <i>Arc annotation table</i>  | Tick to display the arc annotations in the arc annotation table.   |

**Buttons of the *String Annotation Settings* tab**

| <b>Button</b> | <b>Description</b>   |
|---------------|--|
| <b>New</b>    | Click it to create a new string annotation settings set.               |
| <b>Reset</b>  | Click it to discard changes and reset settings to the last saved ones. |
| <b>Rename</b> | Click it to rename the string annotation settings set.                 |
| <b>Delete</b> | Click it to delete the string annotation settings set.                 |

## Lot annotation settings

The *Lot Annotation Settings* tab of the Annotation styles library allows you to define the style for lot annotations. The lot annotation is displayed only for lots, which have annotation flag selected. Description of the fields may be found in the table below.

**Fields of the *Lot Annotation Settings* tab**

| <b>Field</b>                 | <b>Description</b>   |
|------------------------------|--|
| <i>Lot Name Prefix</i>       | Defines the prefix, which will be displayed before the lot name.   |
| <i>Lot Name</i>              | Tick to display lot name in annotation. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |
| <i>Area</i>                  | Tick to display lot area in the annotation. You may select the style from the drop-down list.  |
| <i>Angle</i>                 | Tick to display lot angles in the annotation. You may select the style from the drop-down list.  |
| <i>Lines</i>                 | Tick to display lot lines in the annotation.   |
| <i>Line Annotation Table</i> | Tick to display the line annotations in the line annotation table.   |
| <i>Arcs</i>                  | Tick to display lot arcs in the annotation.  |

| Field                                    | Description  |
|--|--|
| <i>Arc annotation table</i>              | Tick to display the arc annotations in the arc annotation table. |
| <i>Back Boundary</i>                     | Tick to display the annotation for the lot back boundary.        |
| <i>Annotation of Angle</i>               | Tick to display the annotation of the lot angles.                |
| <i>Annotation of Complementary Angle</i> | Tick to display complementary or supplementary angles.           |

#### Buttons of the *Lot Annotation Settings* tab

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new lot annotation settings set.                  |
| <b>Reset</b>  | Click it to discard changes and reset settings to the last saved ones. |
| <b>Rename</b> | Click it to rename the lot annotation settings set.                    |
| <b>Delete</b> | Click it to delete the lot annotation settings set.                    |

## Bearing annotation settings

The *Bearing Annotation Settings* tab of the Annotation styles library allows you to define the style for bearing annotations. Description of the fields and buttons may be found in the tables below.

#### Fields of the *Bearing Annotation Settings* tab

| Field                      | Description   |
|----------------------------|---|
| <i>Name</i>                | Defines the current bearing annotation style. You may select any existing style from the drop-down list.  |
| <i>Text Style Name</i>     | Defines the text style for bearing annotations. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123.  |
| <i>Distance &lt;</i>       | Define the rounding of the bearing annotations. It has the following algorithm: <ul style="list-style-type: none"> <li>• If the distance is shorter, than the value from the first <i>Distance</i> editbox, than the bearing annotation will be rounded to the value from the first <i>Round To</i> editbox.</li> <li>• If the distance is longer, than the value from the first <i>Distance</i> editbox, but shorter than the value from the second <i>Distance</i> editbox, than the bearing annotation will be rounded to the value from the second <i>Round To</i> editbox.</li> <li>• If the distance is longer, than the value from the second <i>Distance</i> editbox, than the bearing annotation will be rounded to the value from the third <i>Round To</i> editbox.</li> </ul> |
| <i>Round To</i>            |   |
| <i>Max Spread Distance</i> | Defines the maximum distance among which annotation may be spread.  |

| Field                                 | Description   |
|---------------------------------------|---|
| <i>Show &lt; 10 with leading zero</i> | Tick to display minutes and seconds less than 10 with a zero in the first position, i.e. 08 instead of 8. |
| <i>Show Trailing 00 Seconds</i>       | Tick to display seconds, even if the value is 00.   |
| <i>Show Trailing 00 Minutes</i>       | Tick to display minutes, even if the value is 00.   |

**Buttons of the *Bearing Annotation Settings* tab**

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new bearing annotation style.  |
| <b>Reset</b>  | Click it to restore previous bearing annotation style settings.   |
| <b>Rename</b> | Click it to rename current bearing annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be renamed. |
| <b>Delete</b> | Click it to delete current bearing annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be deleted. |

**Distance annotation settings**

The *Distance Annotation Settings* tab of the Annotation styles library allows you to define the style for distance annotations. Description of the fields and buttons may be found in the tables below.

**Fields of the *Distance Annotation Settings* tab**

| Field                  | Description   |
|------------------------|---|
| <i>Name</i>            | Defines the current distance annotation style. You may select any existing style from the drop-down list.   |
| <i>Text Style Name</i> | Defines the text style for distance annotations. You may select the style from the drop-down list or modify it, by clicking the <b>Modify</b> button. For more information about modifying text styles, refer to "Editing text styles" section on page 123. |

| Field                         | Description   |
|-------------------------------|---|
| <i>Distance &lt;</i>          | Define the rounding of the distance annotations. It has the following algorithm: <ul style="list-style-type: none"> <li>• If the distance is shorter, than the value from the first <i>Distance</i> editbox, than the distance annotation will be rounded to the value from the first <i>Round To</i> editbox.</li> <li>• If the distance is longer, than the value from the first <i>Distance</i> editbox, but shorter than the value from the second <i>Distance</i> editbox, than the distance annotation will be rounded to the value from the second <i>Round To</i> editbox.</li> <li>• If the distance is longer, than the value from the second <i>Distance</i> editbox, than the distance annotation will be rounded to the value from the third <i>Round To</i> editbox.</li> </ul> |
| <i>Round To</i>               |   |
| <i>Max Spread Distance</i>    | Defines the maximum distance among which annotation may be spread.  |
| <i>Show Trailing Zeros</i>    | Tick to display the trailing zeroes up to the number of decimals from the rounding settings.  |
| <i>Show Trailing Decimals</i> | Tick to display the trailing decimal points for integers.   |

#### Buttons of the *Distance Annotation Settings* tab

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new distance annotation style.  |
| <b>Reset</b>  | Click it to restore previous distance annotation style settings.   |
| <b>Rename</b> | Click it to rename current distance annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be renamed. |
| <b>Delete</b> | Click it to delete current distance annotation style.<br>NOTE<br>The <b>\$\$DEFAULT</b> style cannot be deleted. |

## Legal description templates library

The legal description templates define the automatically generated text, based on the entities from the survey view, which describes these entities.

To access the legal description templates library, in the *Library* group of the *Library* tab, click the **Legal Description** icon. The *Legal Description Templates Library* dialog appears after clicking. It contains the list of the existing templates. Buttons of the dialog are described in the table below.

### Buttons of the *Legal Description Templates Library* dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new legal description template. For more information refer to "Creating legal description templates" section below.                 |
| <b>Modify</b> | Click it to edit an existing legal description template. For more information refer to "Editing legal description templates" section on the facing page. |
| <b>Rename</b> | Click it to rename an existing legal description template.<br>NOTE<br>The <b>\$\$DEFAULT</b> template cannot be renamed.                                 |
| <b>Delete</b> | Click it to delete an existing legal description template.<br>NOTE<br>The <b>\$\$DEFAULT</b> template cannot be deleted.                                 |
| <b>Import</b> | Click it to load the legal description template from an external XML (*.xml) file.   |
| <b>Export</b> | Click it to save the legal description template to an external XML (*.xml) file.   |
| <b>Cancel</b> | Click it to close the dialog.  |

## Creating legal description templates

To create a new legal description template:

- In the *Library* group of the *Library* tab, click the **Legal Description** icon.  
The *Legal Description Template Library* dialog is displayed.
- Click **New**.  
The *Template Name* dialog is displayed.
- Type the name of the new template and click **OK**.  
The *Legal Description Template Design* dialog is displayed.
- From the *Template Components* list, select the required template component.
- In the *Component Content* field, type the required text.
- Repeat for all required template components.
- Click **Save**.
- Click **Close** to close the dialog.

To import the legal description template from an external XML (\*.xml) file, click **Import**.

To save the created description under a new name:

1. Click **Save As**.  
The *Template Name* dialog is displayed.
2. Type the name of the new template and click **OK**.
3. Click **Close**.

## Editing legal description templates

To edit an existing legal description template:

1. In the *Library* group of the *Library* tab, click the **Legal Description** icon.  
The *Legal Description Template Library* dialog is displayed.
2. Select the required template and click **Edit**.  
The *Legal Description Template Design* dialog is displayed.
3. From the *Template Components* list, select the required template component.
4. In the *Component Content* field, type the required text.
5. Repeat for all required template components.
6. Click **Save**.
7. Click **Close** to close the dialog.

To import the legal description template from an external XML (\*.xml) file, click **Import**.

To save the edited template under a new name:

1. Click **Save As**.  
The *Template Name* dialog is displayed.
2. Type the name of the new template and click **OK**.
3. Click **Close**.

## Symbol library

Symbols are used for marking out points, which represent various entities in the survey view.

To access the symbols library, in the *Library* group of the *Library* tab, click the **Symbols** icon. The *Symbols* dialog appears after clicking. It contains the list of the existing symbols. Buttons of the dialog are described in the table below.

### Buttons of the *Symbols* dialog

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a symbol.  |
| <b>Modify</b> | Click it to edit an existing symbol.  |
| <b>Rename</b> | Click it to rename an existing symbol.  |
| <b>Delete</b> | Click it to delete an existing symbol.  |
| <b>Import</b> | Click it to load the symbol from an external AutoCAD drawing (*.dwg) or CivilCAD Symbol (*.bcd) file. |
| <b>OK</b>     | Click it to save the changes and close the dialog.  |
| <b>Cancel</b> | Click it to close the dialog.   |



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## Line styles library

Line styles are used for marking the lines, which represent various entities in the survey view, by varying the layout of different lines.

To access the line styles library, in the *Library* group of the *Library* tab, click the **Line Styles** icon. The **Line Styles** dialog appears after clicking. It contains the list of the existing line styles. Buttons of the dialog are described in the table below.

### Buttons of the *Line Styles* dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a line style.   |
| <b>Modify</b> | Click it to edit an existing line style.   |
| <b>Rename</b> | Click it to rename an existing line style.   |
| <b>Delete</b> | Click it to delete an existing line style.   |
| <b>Import</b> | Click it to load the line style from an external CivilCAD line style (*.blm) file. |
| <b>OK</b>     | Click it to save the changes and close the dialog.                                 |
| <b>Cancel</b> | Click it to close the dialog.  |

## Plot settings library

The plot settings library contains global sets of plot settings, which are available in all projects. Note that if you change library settings in one project, they will change for all projects.

The library is managed by the **Library Plot Settings** dialog. It contains the list of the existing plot settings sets. You may create new sets, edit or delete existing sets.

To open the dialog, in the *Output* group of the *Library* tab, click the *Plot Settings* icon. Buttons of the dialog are described in the table below.

The plot settings, both new and existing ones, are configured in the **Library - Plot Settings** dialog. It appears after clicking **New** or **Modify** buttons, and contains seven tabs, described in appropriate section:

- "General tab" section on the facing page
- "Survey Object tab" section on the facing page
- "Grid tab" section on the facing page
- "Contour tab" section on page 653
- "Annotations tab" section on page 653
- "Annotation Table Settings tab" section on page 653

To create a new set of plot setting:

1. In the *Output* group of the *Library* tab, click the **Plot Settings** icon.  
The **Library Plot Settings** dialog is displayed.
2. Click **New**.  
The **Library - Plot Settings** dialog is displayed.
3. Make the required configurations on each tab. Detailed descriptions may be found in the appropriate sections, listed above.
4. Click **OK**.  
The new plot settings set is created.

To edit an existing set of plot settings:

1. In the *Output* group of the *Library* tab, click the **Plot Settings** icon.  
The **Library Plot Settings** dialog is displayed.
2. Select the required settings set and click **Modify**.  
The **Library - Plot Settings** dialog is displayed.
3. Make the required configurations on each tab. Detailed descriptions may be found in the appropriate sections, listed above.
4. Click **OK**.  
The new plot settings set is edited.

### Buttons of the **Library Plot Settings** dialog

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new library set of contour settings.       |
| <b>Modify</b> | Click it to modify an existing library set of contour settings. |

| Button        | Description  |
|---------------|--|
| <b>Rename</b> | Click it to rename an existing library set of contour settings.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be renamed. |
| <b>Delete</b> | Click it to delete an existing library set of contour settings.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be deleted. |
| <b>OK</b>     | Click it to close the dialog.  |

## General tab

The *General* tab of the *Library - Plot Settings* dialog allows you to configure the general plotting settings. Fields of the tab are described in the table below.

### Fields of the *General* tab of the *Library - Plot Settings* dialog

| Field                          | Description  |
|--------------------------------|--|
| <i>Name</i>                    | Defines the name of the plot settings set.   |
| <i>Entities</i>                | Defines the entities, which will be plotted, when using this set. Tick the required entities checkboxes to add them to plot.   |
| <i>Clipping</i>                | When ticked, the entities outside of the border will be clipped to prevent them from being plotted.  |
| <i>Display Word Coordinate</i> | Tick to display real world coordinates of the points. Otherwise, you cannot identify point coordinates.<br>NOTE<br>The coordinates can only be displayed and cannot be edited in any way in the plot window. |
| <i>Point Mark Plot Size</i>    | Defines a size for the point mark plotting.  |

## Survey Object tab

The *Survey Object* tab of the *Library - Plot Settings* dialog allows you to configure the appearance of survey objects in plotting.

Tick the required objects to add them to plotting.

## Grid tab

The *Grid* tab of the *Library - Plot Settings* dialog allows you to configure the appearance and configuration of grid, when plotting. Fields of the tab are described in the table below.

**Fields of the *General* tab of the *Library - Plot Settings* dialog**

| <b>Fields</b>              | <b>Description</b>   |
|----------------------------|--|
| <i>Grid Marker</i>         | <p>Defines the appearance of grid, when plotting. You may select one of the following options:</p> <ul style="list-style-type: none"> <li>• Full Grid – full grid will be plotted.</li> <li>• Grid Ticks at Border – only ticks of grid lines will be plotted at page borders.</li> <li>• Grid Ticks and Crosses – ticks of grid lines at page borders and crosses at grid lines intersections will be plotted.</li> </ul> |
| <b>Spacing</b>             |  |
| <i>Major</i>               | Defines the major X and Y spacing, grid lines color and style.   |
| <i>Divisions</i>           | The major grid can be divided into sections, displayed with the dashed lines. The <i>X</i> and <i>Y</i> editboxes define the quantity of such sections for each major grid. If the divisions are set to 1, only the major grid spacing will be displayed. Also defines division lines color and style.   |
| <i>Origin</i>              | Defines the grid start position. Note that changing the origin alters only the grid position, and does not affect to coordinates of the objects.   |
| <i>Size</i>                | Defines the size of grid ticks and crosses at grid lines intersections.  |
| <b>Text</b>                | These settings defines where the text labels for the grid cuts will be displayed   |
| <i>Left North</i>          | <p>Tick the <i>On</i> checkbox to display the text on the Left North grid. This is usually the vertical left margin of the drawing area.</p> <p>Tick the <i>Above Ticks</i> checkbox to write the text for the grid cuts above the tick line, otherwise it will be written beneath the tick line.</p>  |
| <i>Left East</i>           | <p>Tick the <i>On</i> checkbox to display the text on the Left East grid. This is usually the horizontal bottom margin of the drawing area.</p> <p>Tick the <i>Above Ticks</i> checkbox to write the text for the grid cuts above the tick line, otherwise it will be written beneath the tick line.</p>   |
| <i>Right North</i>         | <p>Tick the <i>On</i> checkbox to display the text on the Right North grid. This is usually the vertical right margin of the drawing area.</p> <p>Tick the <i>Above Ticks</i> checkbox to write the text for the grid cuts above the tick line, otherwise it will be written beneath the tick line.</p>  |
| <i>Right East</i>          | <p>Tick the <i>On</i> checkbox to display the text on the Right East grid. This is usually the horizontal top margin of the drawing area.</p> <p>Tick the <i>Above Ticks</i> checkbox to write the text for the grid cuts above the tick line, otherwise it will be written beneath the tick line.</p>   |
| <i>Justification Table</i> | Defines the justification style for the grid text.   |
| <i>Text Style Table</i>    | Defines the text style for the grid text.  |

| Fields              | Description  |
|---------------------|--|
| <i>Before North</i> | Defines the text to be displayed before the grid number. |
| <i>Before East</i>  |  |
| <i>After North</i>  | Defines the text to be displayed after the grid number.  |
| <i>After East</i>   |  |

## Contour tab

The *Contour* tab of the *Library - Plot Settings* dialog allows you to configure the contour plotting settings. Fields of the tab are described in the table below.

### Fields of the *Contour* tab of the *Library - Plot Settings* dialog

| Field                             | Description   |
|-----------------------------------|---|
| <i>Smoothing</i>                  | Defines the smoothing of contour lines.                   |
| <i>Plot Major/Minor Labels</i>    | Plots major/minor labels on the contour.                  |
| <i>Remove Over-plotted Labels</i> | Removes overlapping contour labels.                       |
| <i>Plot Labels Along Contour</i>  | Places the labels along the contour.                      |
| <i>Plot End Labels</i>            | Plots labels at the end of the contour.                   |
| <i>Plot Labels Uphill</i>         | Places the labels at the uphill.                          |
| <i>Text Style</i>                 | Defines the text style for the labels.                    |
| <i>Justification Style</i>        | Defines the justification style for the labels.           |
| <i>Label Distance</i>             | Defines the spacing between the labels along the contour. |

## Annotations tab

The *Annotations* tab of the *Library - Plot Settings* dialog allows you to configure the annotations plotting settings. Tick the required annotations to add them to plotting.

## Annotation Table Settings tab

The *Annotation Table Settings* tab of the *Library - Plot Settings* dialog allows you to configure the appearance of the line/arc annotation tables when plotting. Fields and buttons of the tab are described in the table below.

### Fields of the *Annotation Table Settings* tab of the *Library - Plot Settings* dialog

| Field                  | Description   |
|------------------------|---|
| <i>Insertion Point</i> | Defines the X (East) and Y (North) coordinates of the table bottom left corner. |
| <i>Columns</i>         | Defines the quantity of column sets.  |
| <i>Text Style</i>      | Defines the text style, used in the table.                                      |

| <b>Field</b>         | <b>Description</b>   |
|----------------------|--|
| <i>ID Text Style</i> | Defines the text style, used for line marks.   |
| <i>Sorted by</i>     | Select the parameter for table data sorting.   |
| <i>Ascending</i>     | Tick to sort the table data in the ascending order. If unticked, data will be sorted in the descending order.              |
| <i>Display</i>       | Tick to display the line/arc annotation table when plotting. If unticked, the line/arc annotation table will be invisible. |

**Buttons of the *Annotation Table* tab of the *Library - Plot Settings* dialog**

| <b>Button</b>   | <b>Description</b>  |
|-----------------|---|
| <b>Reset</b>    | Click it to restore the default settings.                 |
| <b>Renumber</b> | Click it to renumber the line/arc marks, starting from 1. |
| <b>Refresh</b>  | Click it to refresh the line/arc annotation table.        |

## Contour settings library

The contour settings library contains global sets of contour settings, which are available in all projects. Note that if you change library settings in one project, they will change for all projects.

The library is managed by the *Library Contour Settings* dialog. It contains the list of the existing contour settings sets. You may create new sets, edit or delete existing sets.

To open the dialog, in the *Output* group of the *Library* tab, click the **Contour Settings** icon.

Buttons of the dialog are described in the table below.

### Buttons of the *Library Contour Settings* dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new library set of contour settings. For more information, refer to "Creating library contour settings sets" section below.                 |
| <b>Modify</b> | Click it to modify an existing library set of contour settings. For more information, refer to "Editing library contour settings sets" section on the next page. |
| <b>Rename</b> | Click it to rename an existing library set of contour settings.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be renamed.   |
| <b>Delete</b> | Click it to delete an existing library set of contour settings.<br>NOTE<br>The <b>\$\$DEFAULT</b> set cannot be deleted.   |
| <b>OK</b>     | Click it to close the dialog.  |

## Creating library contour settings sets

To create a new contour settings set :

1. In the *Output* group of the *Library* tab, click the **Contour Settings** icon.  
The *Library Contour Settings* dialog is displayed.
2. Click **New**.  
The *Contour Settings* dialog is displayed.
3. Make the required configurations. Field are described in the table below.
4. Click **OK**.

The new set of contour settings is created.

### Fields of the *Contour Settings* dialog

| Field        | Description   |
|--------------|---|
| <i>Name</i>  | Defines the name of the contour settings.   |
| <i>Major</i> | Defines the major contour interval. Set the line width and style, and tick the check box to display the major contours. |
| <i>Minor</i> | Defines the minor contour interval. Set the line width and style, and tick the check box to display the major contours. |

| <b>Field</b>                      | <b>Description</b>  |
|-----------------------------------|---|
| <i>Minimum Level</i>              | Defines the range of levels in which the contours are created. The range should be between the lowest and highest point elevation in the DTM.                             |
| <i>Maximum Level</i>              |   |
| <i>Major Start Level</i>          | Defines the level where the first major contour is created.   |
| <i>Additional Major Contours</i>  | Defines the levels where the extra contours will be created, in addition to the levels calculated by the MAGNET Office.   |
| <i>Additional Minor Contours</i>  |   |
| <i>Discrete Color</i>             | Defines the colors for the major and minor contour lines. Select the required colors from the appropriate drop-down lists.  |
| <i>Color Range</i>                | Defines the color range for contour lines displaying. Click <b>Define</b> to configure it.  |
| <i>Low</i>                        | Defines the lowest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected.  |
| <i>High</i>                       | Defines the highest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected. |
| <i>Plot Major/Minor Labels</i>    | Plots major/minor labels on the contour.  |
| <i>Remove Over-plotted Labels</i> | Removes overlapping contour labels.   |
| <i>Plot Labels Along Contour</i>  | Places the labels along the contour.  |
| <i>Plot End Labels</i>            | Plots labels at the end of the contour.   |
| <i>Plot Labels Uphill</i>         | Places the labels at the uphill.  |
| <i>Text Style</i>                 | Defines the text style for the labels.  |
| <i>Justification Style</i>        | Defines the justification style for the labels.   |
| <i>Label Distance</i>             | Defines the spacing between the labels along the contour.   |

## Editing library contour settings sets

To edit an existing contour settings set :

1. In the *Output* group of the *Library* tab, click the **Contour Settings** icon.  
The **Library Contour Settings** dialog is displayed.
2. Select the required contour settings set, and click **Modify**.  
The **Contour Settings** dialog is displayed.
3. Make the required configurations. Field are described in the table below.



4. Click **OK**.

The contour settings set are modified.

**Fields of the Contour Settings dialog**

| <b>Field</b>                      | <b>Description</b>  |
|-----------------------------------|---|
| <i>Name</i>                       | Defines the name of the contour settings.   |
| <i>Major</i>                      | Defines the major contour interval. Set the line width and style, and tick the check box to display the major contours.   |
| <i>Minor</i>                      | Defines the minor contour interval. Set the line width and style, and tick the check box to display the major contours.   |
| <i>Minimum Level</i>              | Defines the range of levels in which the contours are created. The range should be between the lowest and highest point elevation in the DTM.                             |
| <i>Maximum Level</i>              |   |
| <i>Major Start Level</i>          | Defines the level where the first major contour is created.   |
| <i>Additional Major Contours</i>  | Defines the levels where the extra contours will be created, in addition to the levels calculated by the MAGNET Office.   |
| <i>Additional Minor Contours</i>  |   |
| <i>Discrete Color</i>             | Defines the colors for the major and minor contour lines. Select the required colors from the appropriate drop-down lists.  |
| <i>Color Range</i>                | Defines the color range for contour lines displaying. Click <b>Define</b> to configure it.  |
| <i>Low</i>                        | Defines the lowest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected.  |
| <i>High</i>                       | Defines the highest value of height range. Click the color button to choose a color from the palette. This displays the lowest DTM elevation with the color you selected. |
| <i>Plot Major/Minor Labels</i>    | Plots major/minor labels on the contour.  |
| <i>Remove Over-plotted Labels</i> | Removes overlapping contour labels.   |
| <i>Plot Labels Along Contour</i>  | Places the labels along the contour.  |
| <i>Plot End Labels</i>            | Plots labels at the end of the contour.   |
| <i>Plot Labels Uphill</i>         | Places the labels at the uphill.  |
| <i>Text Style</i>                 | Defines the text style for the labels.  |
| <i>Justification Style</i>        | Defines the justification style for the labels.   |
| <i>Label Distance</i>             | Defines the spacing between the labels along the contour.   |

## Genio translation tables library

The genio translation tables library contains global genio tables. Genio tables can basically have cross-section data, horizontal alignment data, and vertical alignment data. It is a generalized input/output format used to import/-export various design file formats.

The library is managed by the *Genio Translation Tables* dialog. It contains the list of the existing translation tables. You may create new tables, edit or delete existing ones.

To open the dialog, in the *Output* group of the *Library* tab, click the **Genio Translation** icon.

Buttons of the dialog are described in the table below.

### Buttons of the *Genio Translation Tables* dialog

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new genio translation table. For more information, refer to "Creating genio translation tables" section below.                   |
| <b>Modify</b> | Click it to modify an existing genio translation table. For more information, refer to "Editing genio translation tables" section on the facing page. |
| <b>Rename</b> | Click it to rename an existing genio translation table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be renamed.                                    |
| <b>Delete</b> | Click it to delete an existing genio translation table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be deleted.                                    |
| <b>OK</b>     | Click it to close the dialog.   |

## Creating genio translation tables

To create a new genio translation table:

- In the *Output* group of the *Library* tab, click the **Genio Translation** icon.  
The *Genio Translation Tables* dialog is displayed.
- Click **New**.  
The *Moss Export LookUp Table* dialog is displayed.
- Make the required configurations. Fields and buttons of the dialog are described in the tables below.
- Click **OK**.

### Fields of the *Moss Export LookUp Table* dialog

| Field             | Description                                |
|-------------------|--|
| <i>Table Name</i> | Defines the name of the translation table. |
| <i>Entity</i>     | Defines the entity for translation.        |
| <i>Code/Name</i>  | Defines the code of the entity.            |

| Field              | Description   |
|--------------------|---|
| <i>Layer</i>       | Defines the layer where entity will be placed.          |
| <i>Moss String</i> | Defines, whether the entity will be in the moss format. |

#### Buttons of the *Moss Export LookUp Table* dialog

| Button         | Description  |
|----------------|--|
| <b>Insert</b>  | Click it to add a row to the table.                                |
| <b>Delete</b>  | Click it to delete a row from the table.                           |
| <b>Restore</b> | Click it to discard all changes and load last saved configuration. |
| <b>OK</b>      | Click it to apply changes and close the dialog.                    |
| <b>Cancel</b>  | Click it to close the dialog.                                      |

## Editing genio translation tables

To edit an existing genio translation table:

1. In the *Output* group of the *Library* tab, click the **Genio Translation** icon.  
The *Genio Translation Tables* dialog is displayed.
2. Select the required table and click **Modify**.  
The *Moss Export LookUp Table* dialog is displayed.
3. Make the required configurations. Fields and buttons of the dialog are described in the tables below.
4. Click **OK**.

#### Fields of the *Moss Export LookUp Table* dialog

| Field              | Description   |
|--------------------|---|
| <i>Table Name</i>  | Defines the name of the translation table.              |
| <i>Entity</i>      | Defines the entity for translation.                     |
| <i>Code/Name</i>   | Defines the code of the entity.                         |
| <i>Layer</i>       | Defines the layer where entity will be placed.          |
| <i>Moss String</i> | Defines, whether the entity will be in the moss format. |

#### Buttons of the *Moss Export LookUp Table* dialog

| Button         | Description  |
|----------------|--|
| <b>Insert</b>  | Click it to add a row to the table.                                |
| <b>Delete</b>  | Click it to delete a row from the table.                           |
| <b>Restore</b> | Click it to discard all changes and load last saved configuration. |
| <b>OK</b>      | Click it to apply changes and close the dialog.                    |
| <b>Cancel</b>  | Click it to close the dialog.                                      |

## AutoCAD layer definition tables library

The AutoCAD layer definition tables library contains global Autocad definition tables. These tables define layer names and layer settings to use in the Autocad Layer Translation table for Aoutodesk RealDWG (\*.*dxf* or \*.*dwg*) files export.

The library is managed by the **Layer Definition Table** dialog. It contains the list of the existing definition tables. You may create new tables, edit or delete existing ones.

To open the dialog, in the *Output* group of the *Library* tab, click the **ACAD Layer Definition** icon.

Buttons of the dialog are described in the table below.

### Buttons of the **Layer Definition Table** dialog

| Button        | Description   |
|---------------|---|
| <b>New</b>    | Click it to create a new layer definition table. For more information, refer to "Creating AutoCAD layer definition tables" section below.                   |
| <b>Modify</b> | Click it to modify an existing layer definition table. For more information, refer to "Editing AutoCAD layer definition tables" section on the facing page. |
| <b>Rename</b> | Click it to rename an existing layer definition table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be renamed.   |
| <b>Delete</b> | Click it to delete an existing layer definition table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be deleted.   |
| <b>OK</b>     | Click it to close the dialog.   |

## Creating AutoCAD layer definition tables

To create a new layer definition table:

- In the *Output* group of the *Library* tab, click the **ACAD Layer Definition** icon.  
The **Layer Definition Table** dialog is displayed.
- Click **New**.  
The **Layer Definition Table** dialog is displayed.
- Make the required configurations. Fields and buttons of the dialog are described in the tables below.
- Click **OK**.

### Fields of the **Layer Definition Table** dialog

| Field                | Description   |
|----------------------|---|
| <i>Table Name</i>    | Defines the name of the translation table.                |
| <i>Autocad Layer</i> | Defines the name of the layer to be used in AutoCAD file. |
| <i>Color</i>         | Defines the default color of the layer.                   |

| Field             | Description                                      |
|-------------------|--|
| <i>Line Style</i> | Defines the default line style of the layer.     |
| <i>Thickness</i>  | Defines the default line thickness of the layer. |

#### Buttons of the *Layer Definition Table* dialog

| Button                | Description  |
|-----------------------|--|
| <b>Insert</b>         | Click it to add a row to the table.                                |
| <b>Delete</b>         | Click it to delete a row from the table.                           |
| <b>Restore</b>        | Click it to discard all changes and load last saved configuration. |
| <b>Get Job Layers</b> | Click it to load layers from the current project.                  |
| <b>OK</b>             | Click it to apply changes and close the dialog.                    |
| <b>Cancel</b>         | Click it to close the dialog.                                      |

## Editing AutoCAD layer definition tables

To edit an existing layer definition table:

- In the *Output* group of the *Library* tab, click the **ACAD Layer Definition** icon.  
The *Layer Definition Table* dialog is displayed.
- Select the require table and click **Modify**.  
The *Layer Definition Table* dialog is displayed.
- Make the required configurations. Fields and buttons of the dialog are described in the tables below.
- Click **OK**.

#### Fields of the *Layer Definition Table* dialog

| Field                | Description   |
|----------------------|---|
| <i>Table Name</i>    | Defines the name of the translation table.                |
| <i>Autocad Layer</i> | Defines the name of the layer to be used in AutoCAD file. |
| <i>Color</i>         | Defines the default color of the layer.                   |
| <i>Line Style</i>    | Defines the default line style of the layer.              |
| <i>Thickness</i>     | Defines the default line thickness of the layer.          |

#### Buttons of the *Layer Definition Table* dialog

| Button                | Description  |
|-----------------------|--|
| <b>Insert</b>         | Click it to add a row to the table.                                |
| <b>Delete</b>         | Click it to delete a row from the table.                           |
| <b>Restore</b>        | Click it to discard all changes and load last saved configuration. |
| <b>Get Job Layers</b> | Click it to load layers from the current project.                  |
| <b>OK</b>             | Click it to apply changes and close the dialog.                    |

| <b>Button</b> | <b>Description</b>            |
|---------------|-------------------------------|
| <b>Cancel</b> | Click it to close the dialog. |

## AutoCAD layer translation tables library

The AutoCAD layer translation tables library contains global Autocad translation tables. These tables contain two columns. The *Layer* column lists the layers in the MAGNET Office project, the *Acad Layer* column lists the corresponding layer the MAGNET Office layer will be translated into.

The library is managed by the **Layer Translation Table** dialog. It contains the list of the existing definition tables. You may create new tables, edit or delete existing ones.

To open the dialog, in the *Output* group of the *Library* tab, click the **ACAD Layer Translation** icon.

Buttons of the dialog are described in the table below.

### Buttons of the **Layer Translation Table** dialog

| Button        | Description  |
|---------------|--|
| <b>New</b>    | Click it to create a new layer definition table. For more information, refer to "Creating AutoCAD layer translation tables" section below.                 |
| <b>Modify</b> | Click it to modify an existing layer definition table. For more information, refer to "Editing AutoCAD layer translation tables" section on the next page. |
| <b>Rename</b> | Click it to rename an existing layer definition table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be renamed.  |
| <b>Delete</b> | Click it to delete an existing layer definition table.<br>NOTE<br>The <b>\$\$DEFAULT</b> table cannot be deleted.  |
| <b>OK</b>     | Click it to close the dialog.  |

## Creating AutoCAD layer translation tables

To create a new layer translation table:

1. In the *Output* group of the *Library* tab, click the **ACAD Layer Translation** icon.  
The **Layer Translation Table** dialog is displayed.
2. Click **New**.  
The **Layer Translation Table** dialog is displayed.
3. Make the required configurations. Fields and buttons of the dialog are described in the tables below.
4. Click **OK**.

### Fields of the **Layer Translation Table** dialog

| Field                   | Description   |
|-------------------------|---|
| <i>Table Name</i>       | Defines the name of the translation table.  |
| <i>Layer</i>            | Lists layer from the current project.   |
| <i>Acad Layer</i>       | Lists the name of the layer to be used in AutoCAD file.   |
| <i>Acad Layer Table</i> | Defines the layer definition table, to be used in export. For more information, refer to "AutoCAD layer definition tables library" section on page 660. |

| <b>Field</b>            | <b>Description</b>   |
|-------------------------|--|
| <i>Annotation Layer</i> | Defines the layer, where all annotations will be placed.                           |
| <i>Contours Layer</i>   | Defines the layer, where all contours will be placed.                              |
| <i>Triangles Layer</i>  | Defines the layer, where all triangles will be placed.                             |
| <i>Slope Layer</i>      | Defines the layer, where all slope arrows will be placed.                          |
| <i>Undefined Layer</i>  | Defines the layer, where all entities not specified to acad layers will be placed. |

**Buttons of the *Layer Translation Table* dialog**

| <b>Button</b>   | <b>Description</b>   |
|-----------------|--|
| <b>Insert</b>   | Click it to add a row to the table.  |
| <b>Delete</b>   | Click it to delete a row from the table.   |
| <b>Update</b>   | Click to update the table, and include all layers existing in the current project.   |
| <b>Settings</b> | Click it to open the layer definition table. For more information, refer to "AutoCAD layer definition tables library" section on page 660. |
| <b>OK</b>       | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>   | Click it to close the dialog.  |

## Editing AutoCAD layer translation tables

To edit an existing layer translation table:

1. In the *Output* group of the *Library* tab, click the **ACAD Layer Translation** icon.  
The *Layer Translation Table* dialog is displayed.
2. Select the required table and click **Modify**.  
The *Layer Translation Table* dialog is displayed.
3. Make the required configurations. Fields and buttons of the dialog are described in the tables below.
4. Click **OK**.

**Fields of the *Layer Translation Table* dialog**

| <b>Field</b>            | <b>Description</b>  |
|-------------------------|---|
| <i>Table Name</i>       | Defines the name of the translation table.  |
| <i>Layer</i>            | Lists layer from the current project.   |
| <i>Acad Layer</i>       | Lists the name of the layer to be used in AutoCAD file.   |
| <i>Acad Layer Table</i> | Defines the layer definition table, to be used in export. For more information, refer to "AutoCAD layer definition tables library" section on page 660. |
| <i>Annotation Layer</i> | Defines the layer, where all annotations will be placed.  |
| <i>Contours Layer</i>   | Defines the layer, where all contours will be placed.   |



| <b>Field</b>           | <b>Description</b>   |
|------------------------|--|
| <i>Triangles Layer</i> | Defines the layer, where all triangles will be placed.                             |
| <i>Slope Layer</i>     | Defines the layer, where all slope arrows will be placed.                          |
| <i>Undefined Layer</i> | Defines the layer, where all entities not specified to acad layers will be placed. |

**Buttons of the *Layer Translation Table* dialog**

| <b>Button</b>   | <b>Description</b>   |
|-----------------|--|
| <b>Insert</b>   | Click it to add a row to the table.  |
| <b>Delete</b>   | Click it to delete a row from the table.   |
| <b>Update</b>   | Click to update the table, and include all layers existing in the current project.   |
| <b>Settings</b> | Click it to open the layer definition table. For more information, refer to "AutoCAD layer definition tables library" section on page 660. |
| <b>OK</b>       | Click it to apply changes and close the dialog.  |
| <b>Cancel</b>   | Click it to close the dialog.  |

## Sewer library

The sewer library allows you to configure and store sewer parameters for the region where you work. It can be used for any sewer project. By default the information is stored in the *SewerLib.lsr* file in the Library directory. Once you configure the library, you may copy the file and use at other PCs in your company.

Also you may import civilcad sewer (\*.bse) library file. To do so:

1. In the **Program Settings** dialog, click the Libraries tab. For more information refer to "Program Settings dialog" section on page 589.
2. Double click the *Sewer* item in the library list.

The library edit dialog is displayed.

3. Click **Import**.

The **Open** dialog is displayed.

4. Navigate to the required file and open it.

## Configuring sewer library

To configure the sewer library double click the *Sewer* item in the *Libraries* tab of the **Program Settings** dialog. Configuration of the sewer library contains of two parts – default data and pipe class.

### Default data configuring

This is general data for all the pipes and pits in the current network. Click plus sign to extend the *Default Data* list. Double click a default data record to open the **Default Data** dialog for editing.

#### Fields of the **Default Data** dialog

| Field                    | Description   |
|--------------------------|---|
| <i>Name</i>              | Displays the name of the default data set.  |
| <i>Flow for Plotting</i> | Select the appropriate option.  |
| <b>Sewer Data</b>        |   |
| <i>Pit Diameter</i>      | Defines the diameter of the pit (manhole).  |
| <i>Min. Drop</i>         | Defines the minimum drop through the manhole from the higher upstream pipe to the lower downstream pipe.  |
| <i>Max. Drop</i>         | Defines the maximum drop through the manhole from the higher upstream pipe to the lower downstream pipe.  |
| <i>Pipe Class</i>        | Defines the pipe class for the data set.  |
| <i>BCIL Data</i>         | Block Control Invert Level.<br>These settings are optional, but useful for designing the main sewer line in relation to the connections at the house drain points. When using BCIL, MAGNET Office designs the sewer pipe at a suitable level to allow for a nominated minimum depth and slope from the drain point of each house. See "Create BCIL icon" section on page 384 for details. |

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| <b>Field</b>               | <b>Description</b>   |
|----------------------------|--|
| <i>Min. Cover</i>          | Defines the minimum cover over the connecting pipe from the house drain point. |
| <i>Drop at House Drain</i> | Defines the drop at the house drain.   |
| <i>Min. Slope (%)</i>      | Defines the minimum slope for the connecting pipe from the house drain point.  |
| <i>Drop into Sewer</i>     | Defines the drop into the sewer network.                                       |

To configure the color layout, click **Colors** and select the required colors.

### **Pipe class configuring**

The library holds pipe class details. It is taken from the combination of the definition labels used for the pipe type, pipe class and joint type. The cost (\$/m) column entries are not used by the program.

## Drainage library

The drainage library allows you to configure and store drainage parameters for the region where you work. It can be used for any drainage project. By default the information is stored in the *DrainLib.ldr* file in the Library directory. Once you configure the library, you may copy the file and use at other PCs in your company.

Also you may import civilcad drainage (\*.bfl) library file. To do so:

1. In the **Program Settings** dialog, click the Libraries tab. For more information refer to "Program Settings dialog" section on page 589.
2. Double click the *Drain* item in the library list.  
The library edit dialog is displayed.
3. Click **Import**.  
The *Open* dialog is displayed.
4. Navigate to the required file and open it.

## Configuring drainage library

To configure the drainage library double click the *Drain* item in the *Libraries* tab of the **Program Settings** dialog. Configuration of the drainage library contains of six parts:

- Default Data
- Flood Frequency factors (FFy Factors)
- Rainfall Data
- Gutter Profiles
- Pit Inlets
- Pipe Sizes

### Default Data configuring

This is general data for all the pipes and pits in the current network. Click plus sign to extend the *Default Data* list. Double click a default data record to open the **Default Data** dialog for editing.

#### Fields of the **Default Data** Dialog

| Field                     | Description  |
|---------------------------|--|
| <i>Rain</i>               | Defines the Rainfall Data for the network. See "Rainfall Data configuring" section below for details.          |
| <i>Inlet ID</i>           | Defines Pit Inlet style for the network. See "Pit Inlet configuring" section below for details.                |
| <i>Gutter ID</i>          | Defines the Gutter Profile style for the network. See "Gutter Profiles configuring" section below for details. |
| Default Hydrological Data |  |
| <i>Design Freq</i>        | Define the recurrence interval of the storm event.   |
| <i>Max Tc</i>             | Defines the minimum time of concentration in minutes required for the network.                                 |

| <b>Field</b>                  | <b>Description</b>   |
|-------------------------------|--|
| <i>Min Tc</i>                 | Defines the minimum time of concentration in minutes required for the network.   |
| <i>Surface Roughness</i>      | Defines the default surface roughness.   |
| <b>Default Hydraulic Data</b> |  |
| <i>Drop</i>                   | Defines the default setting for the drop through the manhole from the higher upstream pipe to the lower downstream pipe. |
| <i>Hz/deg Drop</i>            | Defines added drop per horiz degree of change between angle of upstream pipe and downstream pipe at pit.                 |
| <i>Freeboard</i>              | Defines the default freeboard for the design.  |
| <i>Pipe Class</i>             | Defines the pipe class for the design.   |
| <i>Mannings 'n' (pipe)</i>    | Defines the roughness parameter for the pipe surface.  |
| <i>Cover</i>                  | Defines the default setting for the cover from the natural surface to the top (obvert) of the pipe.                      |
| <i>Roughness</i>              | Defines default pipe roughness for design.   |
| <i>Min Slope</i>              | Defines the minimum pipe slope required in the design.   |
| <i>Manning 'n' (road)</i>     | Defines the roughness parameter for the road surfaces when calculating gutter flows.                                     |
| <i>Backwater HGL</i>          | Select the limiting of the level to match either the obvert or the actual water level                                    |

### **Flood Frequency factors configuring**

Flood Frequency factors for a given Average Recurrence Interval help you to adjust your runoff coefficient value. These FFy factors are selected along with the Rainfall Data for the pipe network.

### **Rainfall Data configuring**

This is where you specify the rainfall intensity for a given area for various recurrent storms via either MAP, or LOG, or IFD method. You can obtain copies of rainfall data in any format in any location from your local or regional authority.

### **Gutter Profiles configuring**

The next step in the library process is to define the various gutter profiles. They are used to calculate the flow time along the channel of the curb, and the flow width and depth in the curb channel. MAGNET Office creates a vertical wall at either side of the defined gutter to handle flow depths that exceed the capacity of the gutter profile.

To add a new point into the gutter profile, simply type a new offset and level and the profile will automatically resort the data. There is no need to define left and right hand gutter profiles.

### **Pit Inlet configuring**

This allows you to define the capacity of a curb inlet or catch pit. Pit inlets do not have unlimited inlet capacity. As the flow from the upstream gutter increases, eventually some water will fail to enter the inlet and it is referred

to as the bypass flow.

The curb inlet behavior can be described by the following formula:

$$Q_i = A + B \cdot (Q_u - A)$$

Where:

- $Q_i$  — flow entering the pit.
- $Q_u$  — flow arriving from upstream.
- $A$  — maximum inlet capacity before bypass occurs.
- $B$  — dimensionless coefficient. A fraction of excess entering pit.

The term  $(Q_u - A)$  represents the excess flow arriving at the pit and the coefficient  $B$  represents the fraction of this excess that will enter the pit (in addition to quantity  $A$ ).

In many cases the above algorithm is not sufficient to describe the curb inlet, so the software allows a second method of entering curb inlet data. The second method allows the user to enter a complete table of  $Q_u/Q_i$  values that will specify the desired inlet behavior. The two methods of entering the data are thus described as "AB" and "CURVE".

Whichever method is selected, the data is given an Inlet ID. This is then referred to during the hydrological calculations to describe the inlet capacity of a given pit.

The curb inlet screen allows you to select the method being used by clicking on the appropriate radiobutton. If the AB method is selected then the  $A$  &  $B$  values should be defined. The rest of the data can be ignored.

If the CURVE method is selected then  $Q_u/Q_i$  pairs should be defined in the *Flow\_Us* and *Flow\_In* fields of the table respectively. A new pair can be entered at the end of the list and the program will automatically re-sort the data based on increasing  $Q_u$ , and then re-draw the  $Q_u/Q_i$  relation in the graphic window. The graphic display serves as a check for any obvious errors.

## Pipe Sizes configuring

The library holds pipe class details. It is taken from the combination of the definition labels used for the pipe type, pipe class and joint type. The cost (\$/m) column entries are for informational purposes only and not used by the program.

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# Road Design View

The name "Road" is taken from that of the horizontal alignment used for the center line of the road. This alignment will be the zero offset of the cross sectional data used for the road.

A horizontal alignment may be created from a simple line, a string or an alignment frame with curve geometry applied at the horizontal intersection points along the alignment. Cross sectional data is extracted along the alignment from a natural or existing surface. This surface may be:

- A digital terrain model created from surveyed or imported data, typically used in "green field" designs or subdivisional development.
- Three-dimensional string data representing the changes in grade along individual feature lines, typically used when reconstructing or upgrading an existing road.
- Cross section point data surveyed at right angles to a pinned center line, usually at 10 or 20 meters spacing.

When the cross sections have been extracted, a road is listed in the list, which may be accessed via Roads icon.

The Road design view has three panels in the main view area:

- Alignment panel – displays the alignment and design strings. The plan data from the survey view may also be shown. Its location is top left.
- Cross Section panel – displays the cross section for one chainage. Several surfaces may be shown. Its location is top right.
- Profile panel – displays the profile for the natural surface and the design profile with vertical IP points, for the reference alignment or any one selected string. Its location is bottom.

The Road Design View has its own ribbon, different from the default MAGNET Office ribbon. Descriptions may be found in the appropriate sections:

- "File tab" section on the next page
- "View tab" section on page 673
- "Settings tab" section on page 674
- "Alignment tab" section on page 678
- "Cross Section tab" section on page 683
- "Profile tab" section on page 691
- "Design tab" section on page 701
- "Plotting tab" section on page 720
- "Library tab" section on page 732
- "Window tab" section on page 740
- "Help tab" section on page 740




## NOTE

The *Alignment*, the *Profile* and the *Cross Section* tabs share the same position in the Road design view ribbon. Displaying of these tabs depends on which panels of the Road design view is currently active.

To switch between tabs, click the appropriate panel:

- Alignment panel (top left) – to view the *Alignment* tab.
- Cross Section panel (top right) – to view the *Cross Section* tab.
- Profile panel (bottom) – to view the *Profile* tab.

## File tab

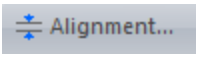
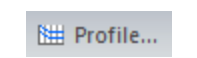
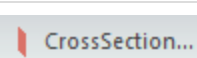
|  |  |
|--|--|
| <br>Open... | <p><u>O</u>pen icon<br/>Click it to open an existing road.</p>   |
| <br>Save    | <p><u>S</u>aver icon<br/>Click it to save the current road.</p>  |
| <br>Close   | <p><u>C</u>lose icon<br/>Click it to close the current road.</p> |



## View tab

| <b>Refresh group</b>  |  |
|---|--|
| <br>Redraw             | <u>Redraw icon</u><br>Click it to refresh the displaying of entities in the current view.            |
| <br>Regen              | <u>Regen icon</u><br>Click it to regenerate the current view.  |
| <b>Navigate group</b>   |  |
| <br>Zoom               | <u>Zoom icon</u><br>Click it to it to fit all data in the view.                                      |
| <br>Window             | <u>Window icon</u><br>Click it to draw a rectangle area to be fits the screen.                       |
| <br>Previous           | <u>Previous icon</u><br>Click it to return to the previous view.                                     |
| <br>In                 | <u>In icon</u><br>Click it to zoom in the center area of the survey view.                            |
| <br>Out              | <u>Out icon</u><br>Click it to zoom in the center area of the survey view.                           |
| <br>Pan              | <u>Pan icon</u><br>Click it to scroll the view   |
| <b>Features group</b>   |  |
| <br>Google Earth/Map | <u>Google Earth/Map icon</u><br>Click it to view the current project in Google Earth or Google Maps. |
| <br>Survey           | <u>Survey icon</u><br>Click it to switch to the survey view.   |
| <b>Options group</b>  |  |
| <br>Toolbar          | <u>Toolbar icon</u><br>Click it to <u>enable/disable</u> toolbars.                                   |
| <br>Status Bar       | <u>Status icon</u><br>Click it to <u>enable/disable</u> toolbar.                                     |

## Settings tab

|   |  |
|---|--|
|  Alignment...    | Alignment icon<br>Click it to configure the layout of the alignment panel.         |
|  Profile...      | Profile icon<br>Click it to configure the layout of the profile panel.             |
|  CrossSection... | Cross Section icon<br>Click it to configure the layout of the cross section panel. |

### Alignment icon

The **Alignment** icon of the Road design view allows you to configure the displaying of alignments at the alignment panel.

To configure the alignment displaying:

1. At the *Settings* tab of the Road design view, click the **Alignment** icon.  
The **Road Display Settings** dialog, opened at the *Alignment* tab is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the *Alignment* tab of the **Road Display Settings** dialog

| Field                        | Description   |
|------------------------------|---|
| <i>Display Strings</i>       | Tick to display the design strings after computation.   |
| <i>Display String TPs</i>    | Tick to show the tangent points on the design strings after computation. The tangent points will be displayed on the main design string.                                      |
| <i>Display String IPs</i>    | Tick to show the intersection points on every chainage of the design strings after computation  |
| <i>Display Peg Alignment</i> | Tick to show the alignment at the zero offset of the cross sections   |
| <i>Display Align TPs</i>     | Tick to show the tangent points on the alignment.   |
| <i>Display Align IPs</i>     | Tick to show the intersection points on the alignment.  |
| <i>Display Survey Data</i>   | Tick to display the data on active layers in the Survey View. If the triangular mesh and the contours are active in the Survey View, they will display in the Alignment pane. |

### Profile icon

The **Profile** icon of the Road design view allows you to configure the displaying of the profile panel.

To configure the profile displaying:

1. At the *Settings* tab of the Road design view, click the **Profile** icon.  
The **Road Display Settings** dialog, opened at the *Profile* tab is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the *Profile* tab of the **Road Display Settings** dialog

| Field                    | Description   |
|--------------------------|---|
| <i>Display Leaders</i>   | Tick to display the vertical leader lines in the profile view.  |
| <i>Design Levels</i>     | Tick to display the levels for the vertical profile design on each leader line.   |
| <i>Natural Levels</i>    | Tick to display the levels for the natural surface on each leader line.   |
| <i>Level Differences</i> | <p>Tick to display the difference between the levels of design and natural surfaces.</p> <ul style="list-style-type: none"> <li>• Fill – when design surface is above the natural surface. Displayed as positive value, followed by F. <i>For example, 0.15F.</i></li> <li>• Cut – when design surface is below the natural surface. Displayed as negative value, followed by C. <i>For example, -0.15C.</i></li> </ul>       |
| <i>CL Stations</i>       | Tick to display the chainage or running distance along the Road for the reference or pegged string. This is at the zero offset of the sections  |
| <i>Offset Stations</i>   | Tick to display the chainage or running distance along the current string.  |
| <i>IPs</i>               | Tick to display the level of the IP point for the profile design. The chainage and level is displayed vertically above the triangular symbol used to define an IP position.   |
| <i>Curve Length</i>      | Tick to to display the length of the vertical curves for each IP point of the profile design. The curve length is displayed at the top of the screen above a horizontal line that shows the position and length of the curve.   |
| <i>Hi/Low Points</i>     | Tick to display the high and low points on the formation levels of the vertical profile design. The chainage and level is displayed vertically above the high or low point and marked HI for high point and LO for low point.   |
| <i>Grades</i>            | Tick to display the grade of the designed profile line between two adjacent IP points. The grade is displayed as a positive or negative percentage below the curve length data at the top of the screen, and above a horizontal line that shows where the grades change at each IP point. The grade is measured from left to right, from the lower chainage or distance position to the higher chainage or distance position. |
| <i>Vertical Exag</i>     | This value defaults to 1.000. Increase to change the vertical scale as a ratio to the horizontal scale in the onscreen display. A value of 2.000 will set the vertical scale at twice the horizontal scale.   |
| <i>Precision</i>         | Defines the number of decimal places in the data displayed in the profile view.   |
| <i>Reference String</i>  | Select the string used to define the stations on the long section plot. This is not necessarily the current string  |
| <i>Envelope Details</i>  | The envelope allows you to see the design string profile designed within two different cross falls. This may be useful if you want to design a prefer string to match in with existing strings.   |

| Field             | Description  |
|-------------------|--|
| <i>Natural</i>    | Defines whether the envelope is calculated from the natural or design surface of the source. |
| <i>Design</i>     |  |
| <i>String</i>     | Defines the base string for the envelope.  |
| <i>Min X Fall</i> | Defines the minimum cross fall for the envelope.   |
| <i>Max X Fall</i> | Defines the maximum cross fall for the envelope.   |

## Cross Section icon

The **Cross Section** icon of the Road design view allows you to configure the displaying of the cross section panel.

To configure the profile displaying:

1. At the *Settings* tab of the Road design view, click the **Cross Section** icon.  
The **Road Display Settings** dialog, opened at the *Cross Section* tab is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

### Fields of the Cross Section tab of the Road Display Settings dialog

| Field                        | Description  |
|------------------------------|--|
| <i>Display Point Info</i>    | Tick to display the point information.<br>Select which information will be displayed - either Code, or Level or Offset by selecting the appropriate radiobutton.   |
| <i>Display Point Mark</i>    | Tick to display point marks.<br>Define the size of the marks, by selecting the appropriate radiobutton.  |
| <i>Display Text Size</i>     |  |
| <i>Display Cross Fall</i>    | Tick to display the cross fall on each leg of the cross section of the current surface. Crossfalls are hidden if the mapping scale is such that the data would overlap.  |
| <i>Display Road Reserve</i>  | Tick to display vertical yellow lines on the cross section where the two offsets in the next two fields represent the left and right road reserve or a known limitation of the design corridor. The center line will be marked with a vertical green line. These lines are a useful guide to mark specified offsets. |
| <i>Left Road Reserve</i>     | Defines the left road reserve. The default is 7.00m left of the center line  |
| <i>Right Road Reserve</i>    | Defines the right road reserve. The default is 7.00m right of the center line  |
| <i>Vertical Exaggeration</i> | This value defaults to 1.000. Increase to change the vertical scale as a ratio to the horizontal scale in the onscreen display. A value of 2.000 will set the vertical scale at twice the horizontal scale.  |

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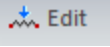

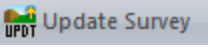
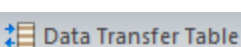
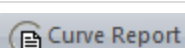
| <b>Field</b>            | <b>Description</b>   |
|-------------------------|--|
| <i>Natural Surface</i>  | The Natural Surface displayed in the cross section and long section panes. This surface will be set when cross sections are extracted from the survey view. The surface set in this field is the current natural surface |
| <i>Design Surface</i>   | The design surface displayed in the cross section and long section panes. The surface set in this field is the current design surface  |
| <i>Subgrade Surface</i> | Multiple subgrade surfaces may be computed, representing different materials of varying thicknesses. The surface set in this field is the current subgrade surface   |

## Alignment tab

### NOTE

The *Alignment* tab shares the same position with the *Profile* and the *Cross Section* tabs. Displaying of these tabs depends on which panels of the Road design view is currently active. To switch between tabs, click the appropriate panel:

- Alignment panel (top left) – to view the *Alignment* tab.
- Cross Section panel (top right) – to view the *Cross Section* tab.
- Profile panel (bottom) – to view the *Profile* tab.

| <b>String group</b>   |  |
|---|--|
|    | Add icon<br>Click it to a new string to the road design.   |
|    | Edit icon<br>Click it to edit a string in the road design.   |
|    | Delete icon<br>Click it to delete strings from the road design.  |
| <b>Transfer group</b>   |  |
|    | Update Survey icon<br>Click it to transfer data from the road design to the survey view.                       |
|  | Data Transfer Table icon<br>Click it to set up the parameters for transferring road data into the survey view. |
| <b>Report group</b>   |  |
|  | <u>Curve Report icon</u><br>Click it to generate a curve report.   |

## Add icon

The **Add** icon of the Road design view allows you to add a new string in the dataset or another alignment defined in the survey view.

To add a string:

1. At the *Alignment* tab of the Road design view, click the **Add** icon.  
The *Add String* dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

The new string is created. It is set as the current string.

**Fields of the Add String dialog**

| Field                           | Description  |
|---------------------------------|--|
| <i>Name</i>                     | <p>Defines the name of the new string.</p> <p>It is useful to allocated a name that suits the definition of the string, so that the user may easily select it</p> <p><i>For example, NESL new edge of seal left, or NEB new edge of bitumen, or R2 right side of a widened road</i></p>  |
| <i>Active</i>                   | <p>Tick to activate the string as a design string with its own design profile.</p> <p>If this string has VIPs designed for the design levels on the string this checkbox must be ticked to use these design levels.</p> <p>If the string has this checkbox ticked, but there are no design levels, then the levels on the natural surface will be automatically incorporated into the final design surface. This is a useful tool if an existing property boundary is to be used for the batter.</p>   |
| <i>Definition of the String</i> | <p>A string must follow a path along the data for the road. The following ways are available for defining a string:</p> <ul style="list-style-type: none"> <li>• Fixed Offset – the string will run at a specified offset from the reference alignment (zero offset of the road dataset). In the editbox, specify a negative offset to the left of the road or a positive offset to the right of the road.</li> <li>• Coded Offset – the string will follow a particular code from the Natural Surface cross sectional data, such as EML [edge metal left] and EMR [edge metal right].</li> <li>• Extension – the Code Offset and Alignment options may be modified by an offset to define the string to the left or right of the line following the code or alignment.</li> </ul> <p><i>For example, enter -1.5 to create the string 1.5m to the left of the line defined by the code offset or alignment definition.</i></p> <ul style="list-style-type: none"> <li>• Alignment – the string will follow a horizontal alignment created in the survey view.</li> <li>• String – the string will follow a string created in the survey view.</li> <li>• String By Intersecting Grade – the string at the position and level of intersection of two grades from two existing strings.</li> </ul> |
| <i>Start Chainage</i>           | <p>Defines the start chainage for the string. By default this is the start chainage of the main alignment.</p>   |
| <i>End Chainage</i>             | <p>Defines the end chainage for the string. By default this is the end chainage of the main alignment.</p>   |
| <i>Color</i>                    | <p>Defines a color for the design string.</p>  |
| <i>Plotting Label</i>           | <p>Defines a label to be used for this string in the long section plotting.</p>  |
| <i>Plot Label</i>               | <p>Tick to plot the label on the profile.</p>  |
| <i>Plot Design Details</i>      | <p>Tick to plot design levels along the string on the profile.</p>   |

## Edit icon

The **Edit** icon of the Road design view allows you change the definition of a string.

To edit a string:

1. In the Alignment panel, select the required string.
2. At the *Alignment* tab of the Road design view, click the **Edit** icon.  
The **Edit String** dialog is displayed.
3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.

The string is edited.

### Fields of the **Edit String** dialog

| Field                           | Description  |
|---------------------------------|--|
| <i>Name</i>                     | Displays the name of the string.   |
| <i>Active</i>                   | <p>Tick to activate the string as a design string with its own design profile.</p> <p>If this string has VIPs designed for the design levels on the string this checkbox must be ticked to use these design levels.</p> <p>If the string has this checkbox ticked, but there are no design levels, then the levels on the natural surface will be automatically incorporated into the final design surface. This is a useful tool if an existing property boundary is to be used for the batter.</p>   |
| <i>Definition of the String</i> | <p>A string must follow a path along the data for the road. The following ways are available for defining a string:</p> <ul style="list-style-type: none"> <li>• Fixed Offset – the string will run at a specified offset from the reference alignment (zero offset of the road dataset). In the editbox, specify a negative offset to the left of the road or a positive offset to the right of the road.</li> <li>• Coded Offset – the string will follow a particular code from the Natural Surface cross sectional data, such as EML [edge metal left] and EMR [edge metal right].</li> <li>• Extension – the Code Offset and Alignment options may be modified by an offset to define the string to the left or right of the line following the code or alignment.<br/><i>For example, enter -1.5 to create the string 1.5m to the left of the line defined by the code offset or alignment definition.</i></li> <li>• Alignment – the string will follow a horizontal alignment created in the survey view.</li> <li>• String – the string will follow a string created in the survey view.</li> </ul> |
| <i>Ref. Start Station</i>       | Displays the start chainage for the string.  |
| <i>Ref. End Station</i>         | Displays the end chainage for the string.  |



| Field                      | Description  |
|----------------------------|--|
| <i>Color</i>               | Defines a color for the design string.                                   |
| <i>Plotting Label</i>      | Defines a label to be used for this string in the long section plotting. |
| <i>Plot Label</i>          | Tick to plot the label on the profile.                                   |
| <i>Plot Design Details</i> | Tick to plot design levels along the string on the profile.              |

## Delete icon

The **Delete** icon of the Road design view allows you to delete strings from the road design.

To delete a string:

1. At the *Alignment* tab of the Road design view, click the **Delete** icon.  
The **Delete String** dialog is displayed.
2. In the *Strings* list, select strings to be deleted.
3. Click **Delete**.

The strings are deleted.

## Update Survey icon

The **Update Survey** icon of the Road design view allows you to update the survey view with the design surface strings and a surface model, as defined by the Data Transfer Table.

The design should be completed to use this option.

To update the survey data:

1. Configure the Data Transfer Table. See "Data Transfer Table icon" section below for details.
2. At the *Alignment* tab of the Road design view, click the **Update Survey** icon.

## Data Transfer Table icon

The **Data Transfer Table** icon of the Road design view allows you to set up the parameters for transferring road data into the survey view.

To configure the Data Transfer Table:

1. At the *Alignment* tab of the Road design view, click the **Data Transfer Table** icon.  
The **Transfer Data to Survey** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

**The Transfer Data to Survey dialog**

| Field                | Description  |
|----------------------|--|
| <i>Road Code</i>     | The name used to define each string in the road design. These strings comprise the reference alignment, the strings created for each template leg that is labelled and has its plot box ticked, and certain standard strings automatically named by the software, such as LBAT [left batter] and RT1 [table drain at the right leg 1].   |
| <i>Survey String</i> | The code of each point on this design string. This code will also name the string created in the survey view. This is set to the same name as the road code but may be modified.   |
| <i>Layer</i>         | The layer created to hold this string and all its node points in the survey view. This is set to the same name as the road code but may be modified. An existing layer may be selected from the pick list available in this field or a new name may be entered.  |
| <i>Transfer</i>      | Tick to transfer this string to the survey view with the option Update Survey.   |
| <i>Road Number</i>   | Allows you to add the road number to the Survey String name and the Layer name.<br>To add road number to the Survey String name: <ol style="list-style-type: none"> <li>1. Specify the required number in the editbox.</li> <li>2. Define whether it will be used as prefix or suffix, by selecting the appropriate radiobutton.</li> <li>3. Click <b>Survey String</b>.</li> </ol> To add road number to the layer name: <ol style="list-style-type: none"> <li>1. Specify the required number in the editbox.</li> <li>2. Define whether it will be used as prefix or suffix, by selecting the appropriate radiobutton.</li> <li>3. Click <b>Layer</b>.</li> </ol> |
| <i>Create DTM</i>    | Tick to create a DTM for the selected surface defined in the <i>Surface</i> field. Specify a name for the DTM in the editbox.<br>The DTM created will be the complete surface from the far left edge of the design to the far right edge of the design. These are usually the left and right batter lines. The surface is complete even if the user does not transfer all the strings from this surface.   |
| <i>Surface</i>       | Select the surface to be transferred to the survey view from the pick list of surfaces. This will usually be the Design surface, and the string names are displayed from the Design surface.   |

## Cross Section tab

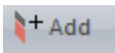
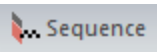
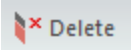
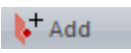
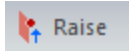
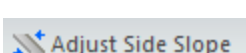
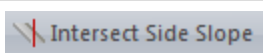
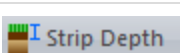
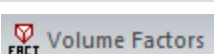
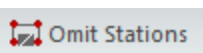
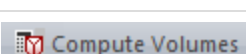
### NOTE

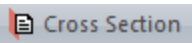
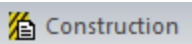
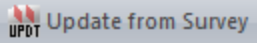
The *Cross Section* tab shares the same position with the *Profile* and the *Alignment* tabs. Displaying of these tabs depends on which panels of the Road design view is currently active. To switch between tabs, click the appropriate panel:

- Alignment panel (top left) – to view the *Alignment* tab.
- Cross Section panel (top right) – to view the *Cross Section* tab.
- Profile panel (bottom) – to view the *Profile* tab.

The Cross Section tab shares the same position in the Road design view ribbon with the Profile and the Alignment tabs. Displaying of these tabs depends on which panels of the Road design view is currently active. To switch between tabs, click the appropriate panel:

- Alignment panel (top left) – to view the Alignment tab.
- Cross Section panel (top right) – to view the Cross Section tab.
- Long Section panel (bottom) – to view the Profile tab.

| <b>Surface group</b>  |   |
|---|---|
|    | Add icon<br>Click it to add a surface to the road design.   |
|    | Sequence icon<br>Click it to re-order the subgrade surfaces.  |
|  | Delete icon<br>Click it to delete surfaces from the road design.  |
| <b>Points group</b>   |   |
|  | Add icon<br>Click it to add a new point to the cross section.   |
|  | Raise icon<br>Click it to raise/lower the level on a section of the current cross section.                          |
|  | Adjust Side Slope icon<br>Click it to adjust the slope of a single existing batter in the current cross section.    |
|  | Intersect Side Slope icon<br>Click it to add individual batters to a single cross section                           |
| <b>Volumes group</b>  |   |
|  | Strip Depth icon<br>Click it to specify the depth of stripping topsoil from the natural surface.                    |
|  | Volume Factors icon<br>Click it to define the cut/fill factor.  |
|  | Omit Stations icon<br>Click it to omit a chainage from the plotted cross sections and also from the volumes report. |
|  | Compute Volumes icon<br>Click it to calculate volumes in the road design.   |

| <b>Reports group</b>  |   |
|---|---|
|  | <u>Cross Section icon</u><br>Click it to generate a cross section report.                         |
|  | <u>Construction icon</u><br>Click it to generate a construction report.                           |
| <b>Survey group</b>   |   |
|  | <u>Update from Survey icon</u><br>Click it to re-extract the cross-sections from the survey view. |

## Add icon

The **Add**[Surface] icon of the Road design view allows you to add another surface to the road design. This surface is usually a subgrade surface but may be an alternate design surface.

To add a surface:

1. At the *Cross Section* tab of the Road design view, in the *Surface* group, click the **Add** icon.  
The **Add Surface** dialog is displayed.
2. In the *Surface Name* editbox, type the name of the surface. You may also select a name from the drop-down list.
3. Define the type of the surface, by selecting the appropriate radiobutton:
  - *Design* - when the new surface is to be a design surface.
  - *Subgrade* - if the new surface is to be a subgrade surface. If so, configure the following parameters:
    1. In the *Material* editbox, specify the material used. This is optional but the material will be listed on the subgrade volumes report.
    2. In the *Class* editbox, specify a character or characters to label and allocate the subgrade to a class. This is optional but the class may be used to categorize the subgrade on the volumes report.
4. If needed, tick the *Copy Current Data* checkbox box to copy the data allocated to the current design or subgrade surface to the new surface.
5. Click **OK**.

The surface is created and set as current Design or Subgrade surface.

### Fields of the **Add Surface** dialog

| Field               | Description  |
|---------------------|--|
| <i>Surface Name</i> | Defines the name of the new surface.   |
| <i>Surface Type</i> | Defines the type of the new surface.<br><i>Design</i> - when the new surface is to be a design surface.<br><i>Subgrade</i> - if the new surface is to be a subgrade surface. |
| <i>Material</i>     | Defines the material used. This is optional but the material will be listed on the subgrade volumes report.  |

| Field                    | Description   |
|--------------------------|---|
| <i>Class</i>             | Defines a character or characters to label and allocate the subgrade to a class. This is optional but the class may be used to categorize the subgrade on the volumes report. |
| <i>Copy Current Data</i> | Tick to copy the data allocated to the current design or subgrade surface to the new surface.   |

## Sequence icon

The **Sequence** icon of the Road design view allows you to re-order the subgrade surfaces. The sequence is originally defined in the order that the subgrade surfaces are created, with the first surface being the top subgrade surface. The sequence should be set correctly so that appropriate surfaces intersect each other.

To re-order surfaces:

1. At the *Cross Section* tab of the Road design view, click the **Sequence** icon.  
The *Subgrade Sequence* dialog is displayed.
2. Sort the surfaces as you need. Use the *Existing Surfaces* list to hold the surfaces while the sequence is being re-ordered.
3. Click **OK**.  
The subgrades are re-ordered.

## Delete icon

The **Delete** icon of the Road design view allows you to delete surfaces from the road design.

To delete a surface:

1. At the *Cross Section* tab of the Road design view, click the **Delete** icon.  
The *Delete Surface* dialog is displayed.
2. In the *Surfaces* list, select surfaces to be deleted.  
NOTE  
Natural and Design surfaces cannot be deleted.
3. Click **Delete**.  
The surfaces are deleted.

## Add icon

The **Add [Point]** icon of the Road design view allows you to point to a single cross section to modify the current surface of the section displayed in the cross section panel.

To add a point to the cross section:

1. In the *Profile* panel, select the required cross section.
2. Click the *Cross Section* panel, to activate the *Cross Section* tab.
3. At the *Cross Section* tab of the Road design view, in the Points group, click the **Add** icon.
4. Locate the new point. Do one of the following:

- Click the required place in the *Cross Section* panel.
  - Specify the offset and level of the new point in the appropriate editboxes at the bottom toolbar.
5. If needed, create more points.
  6. When finished, press *Esc*.

## Raise icon

The **Raise** icon of the Road design view allows you to raise or lower the level on a section of the current cross section in the cross section panel by a fixed amount. The section is defined by an offset range. Alternatively, the height changed may be applied to a point or points with a defined code.

To adjust height of a section:

1. At the *Cross Section* tab of the Road design view, click the **Raise** icon.

The **Raise XSect Points** dialog is displayed.

2. In the *Increment* editbox, specify the amount of height adjustment. Use the positive value to raise and negative value to lower the section.
3. Define which points will be adjusted. You may do it either by offset of the cross section, or by the point code. Do one of the following:
  - Select the *Offset From* radiobutton and specify the offset range in the editboxes. The height will be adjusted for all points within this offset range.
  - Select the *Code* radiobutton and select the required code from the drop-down list. The height will be adjusted for all points in this cross section with this code.
4. Click **OK**.

## Adjust Side Slope icon

The **Adjust Side Slope** icon of the Road design view allows you to adjust the slope of a single existing side slope in the current cross section by specifying an offset for the side slope intercept or a its slope.

This change will be lost if the Compute Design icon is used.

To adjust the slope:

1. In the *Profile* panel, select the required cross section.
2. Click the *Cross Section* panel, to activate the *Cross Section* tab.
3. Make sure that the Design surface is selected at the Property toolbar.
4. At the *Cross Section* tab of the Road design view, in the Points group,click the **Adjust Side Slope** icon.
5. Select an existing batter point on the Design Surface with the mouse.

The point is highlighted in yellow and the batter line will move with the point.

6. Specify the offset and slope in the appropriate editboxes at the bottom toolbar.
7. Press *Enter*.

## Intersect Side Slope icon

The **Intersect Side Slope** icon of the Road design view allows you to add individual batters to a single cross section where no batters exist. A hinge point for the batter is selected and a slope or offset is entered.

This change will be lost if the Compute Design icon is used.

To adjust the slope:

1. In the *Profile* panel, select the required cross section.
2. Click the *Cross Section* panel, to activate the *Cross Section* tab.
3. Make sure that the Design surface is selected at the Property toolbar.
4. At the *Cross Section* tab of the Road design view, in the Points group, click the **Intersect Side Slope** icon.
5. Select an existing batter point on the Design Surface with the mouse.

This point will be the point at the edge of a template from which a batter line will intersect the natural surface. A batter line is highlighted in yellow with the batter point moving along the natural surface.

6. Specify the offset and slope in the appropriate editboxes at the bottom toolbar.
7. Press *Enter*.

## Strip Depth icon

The **Strip Depth** icon of the Road design view allows you to specify the depth of stripping topsoil from the natural surface. This is usually stripped from the left batter offset to the right batter offset. The strip volume will be itemized in the volume report. The stripping volume will be applied to pavement volumes in the volumes report.

To specify the depth:

1. At the *Cross Section* tab of the Road design view, click the **Strip Depth** icon.  
The *Strip Depth* dialog is displayed.
2. Configure the strip depth table as you need. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Strip Depth* dialog

| Field              | Description   |
|--------------------|---|
| <i>Chainage</i>    | Defines the chainage where the stripping starts on the first row of the table. If the stripping depth changes, specify the start chainage of the new depth on the next row. The new strip depth will be applied from that chainage. There is no interpolation between the chainages on any two rows of data.<br><br>If the left and right string extents change, set up a new row of data with the start chainage for the new extents |
| <i>Depth</i>       | Defines the stripping depth in metres.  |
| <i>Left String</i> | Select the string which will be the left edge of the stripping.<br><br>This is usually the LBAT string but may be another feature. A new string may have to be created, especially if the edge of the stripping is a natural surface feature.   |

| Field               | Description  |
|---------------------|--|
| <i>Right String</i> | Select the string which will be the right edge of the stripping.<br>This is usually the RBAT string but may be another feature. A new string may have to be created, especially if the edge of the stripping is a natural surface feature. |

## Volume Factors icon

The **Volume Factors** icon of the Road design view allows you to define the cut/fill factor, which leads to increasing or decreasing volume by specified ratio.

To specify a volume factor:

1. At the *Cross Section* tab of the Road design view, click the **Volume Factors** icon.  
The **Volume Factor** dialog is displayed.
2. In the *Chainage* field, specify the chainage to which the cut/fill factor will be applied.
3. Specify the cut or fill factors in the appropriate fields.
4. Click **OK**.

## Omit Stations icon

The **Omit Stations** icon of the Road design view allows you to omit a chainage or a range of chainages from the plotted cross sections and also from the volumes report.

To omit chainages:

1. At the *Cross Section* tab of the Road design view, click the **Omit Stations** icon.  
The **Omit Chainage** dialog is displayed.
2. In the *Start Chainage* field, specify the chainage where the omission starts.
3. In the *End Chainage* field, specify the chainage where the omission ends.
4. Tick the *Break Vol* checkbox to break the volumes report between these two chainages. Leave unticked to omit chainages from the plot.
5. Click **OK**.

### Fields of the **Omit Chainage** dialog

| Field                 | Description   |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the chainage where the omission starts.<br><i>If one chainage is to be omitted from the cross section plot, the start chainage should be set at a value before the chainage being omitted, such as 79.00 above to omit chainage 80.00</i> |



| Field               | Description   |
|---------------------|---|
| <i>End Chainage</i> | Defines the chainage where the omission ends.<br><i>If one chainage is to be omitted from the cross section plot, the end chainage should be a value after the chainage being omitted, such as 81.00 above to omit chainage 80.00</i> |
| <i>Break Vol</i>    | Tick to break the volumes report between these two chainages. Leave unticked to omit chainages from the plot.   |

## Compute Volumes icon

The **Compute Volumes** icon of the Road design view allows you to create a customized volumes report that can be saved and printed. The information displayed on the report can be defined by various settings.

To compute volumes:

1. At the *Cross Section* tab of the Road design view, click the **Compute Volumes** icon.  
The **Volumes Report** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

The volume report is displayed.

### Fields of the **Volumes Report** dialog

| Field                              | Description   |
|------------------------------------|---|
| <i>Output Format</i>               | The following options are available: <ul style="list-style-type: none"> <li>• <i>Std Volumes</i> – this will produce the Volumes Report displaying the standard format.</li> <li>• <i>Multiple Subgrade Volumes</i> – this will produce a report listing the volumes of the various subgrade layers in the design. This report may be formatted in one of two ways: <ul style="list-style-type: none"> <li>• <i>Volumes by subgrade surface</i> – Volumes are listed for each subgrade layer.</li> <li>• <i>Volumes by subgrade class</i> – Volumes are listed by the class allocated to the subgrade surfaces defined in the option Add Surface.</li> <li>• <i>Include cut fill in XS listing</i> – Tick to list volumes between each cross section. The total volume will also be included into report. Leave unticked to produce a total volume only.</li> </ul> </li> </ul> |
| <i>Volumes for complete design</i> | This will compute volumes for the full length of the road design.   |
| <i>Volumes by chainage range</i>   | This will limit the computation of volumes between the start chainage and end chainage defined in the appropriate editboxes.  |
| <i>List by cross sections</i>      | Tick to list the volumes between each cross section in the dataset, with total volumes at the end of the report.<br>Untick the check box to produce a summary of the total volumes.   |

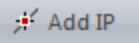
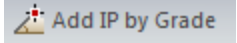
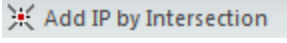
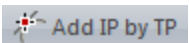
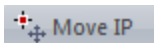
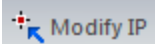
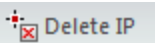

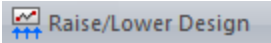
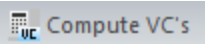
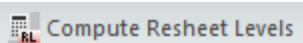
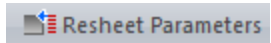
| <b>Field</b>                     | <b>Description</b>   |
|----------------------------------|--|
| <i>Include Areas</i>             | Tick to include the areas of cut and fill between adjacent cross sections.   |
| <i>Include Stripping Volumes</i> | Tick to include the stripping volumes between adjacent cross sections plus the total stripping volume. To include these volumes, define the required stripping parameters. See "Strip Depth icon" section on page 687 for details.   |
| <i>Include Pavement Volumes</i>  | Tick to include the pavement volumes between adjacent cross sections plus the total pavement volume.<br>The pavement volume is the top subgrade layer, between the design surface and the top subgrade surface. If only one subgrade is defined, this will be the pavement volume. |
| <i>Use Cross Section Limits</i>  | Tick to limit the volume computation between the left string and right string selected from the appropriate drop-down lists.   |




## Profile tab

### NOTE

The *Profile* tab shares the same position with the *Alignment* and the *Cross Section* tabs. Displaying of these tabs depends on which panels of the Road design view is currently active. To switch between tabs, click the appropriate panel:

- Alignment panel (top left) – to view the *Alignment* tab.
- Cross Section panel (top right) – to view the *Cross Section* tab.
- Profile panel (bottom) – to view the *Profile* tab.

| <b>Add IP group</b>  |   |
|--|---|
|  Add IP                   | Add IP icon<br>Click it to add a new IP to the profile.   |
|  Add IP by Grade          | Add IP by Grade icon<br>Click it to create a new IP at the grade line from an existing IP.  |
|  Add IP by Intersection   | Add IP by Intersection icon<br>Click it to create a new IP at the intersection of grades from two existing IPs.   |
|  Add IP by TP             | Add IP by TP icon<br>Click it to create a new IP based on the existing IPs and the slope of the tangent segment.  |
| <b>Edit IP group</b>   |   |
|  Move IP                | Move IP icon<br>Click it to move an existing IP to a new position.  |
|  Modify IP              | Modify IP icon<br>Click it to change properties of an existing IP.  |
|  Delete IP              | Delete IP icon<br>Click it to delete an existing IP from the profile design.  |
|  Delete All IP's        | Delete All IP's icon<br>Click it to delete all existing IPs from the profile design.  |
| <b>Profile group</b>   |   |
|  Raise/Lower Design     | Raise/Lower Design icon<br>Click it to adjust design by level.  |
|  Compute VC's           | Compute VC's icon<br>Click it to create a longitudinal design for a defined and selected string based on levels on the natural surface or on the design levels of another string. |
|  Compute Resheet Levels | Compute Resheet Level icon<br>Click it to compute a design profile that gives a minimum depth cover over the existing pavement.   |
|  Resheet Parameters     | Resheet Parameters icon<br>Click it to configure the parameters for the Compute Resheet Levels options.   |

| <b>Report group</b>  |   |
|--|---|
|  Level Difference | <p>Level Difference icon</p> <p>Click it to calculate level differences along the road between the defined strings.</p> |
|  Profile Report   | <p><u>Profile Report icon</u></p> <p>Click it to generate a profile report, listing all chainages.</p>                  |
|  VC Report        | <p>VC Report icon</p> <p>Click it to calculate levels for the different strings involved in a profile.</p>              |

## Add IP icon

The **Add IP** icon of the Road design view allows you to insert a new IP at a defined position.

To add an IP to the profile design:

1. At the *Profile* tab of the Road design view, click the **Add IP** icon.
2. Locate the new IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the chainage, level, approach and departure grades in the appropriate editboxes at the bottom toolbar.

The *IP Details* dialog is displayed.

3. Review the parameters, if needed change them. Fields are described in the table below.
4. Click **OK**.

### Fields of the *IP Details* dialog

| <b>Field</b>                | <b>Description</b>   |
|-----------------------------|--|
| <i>IP Chainage</i>          | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>             | Defines the level of the new IP.   |
| <i>Grade</i>                | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>     | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>    | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i> | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>       | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>            | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>              | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value |

| Field                          | Description  |
|--------------------------------|--|
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Add IP by Grade icon

The **Add IP by Grade** icon of the Road design view allows you to insert a new IP at a grade from an existing IP.

To add an IP by grade:

1. At the *Profile* tab of the Road design view, click the **Add IP by Grade** icon.
2. In the profile view, select the base IP.
3. Locate the new IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the chainage and grade from the base IP in the appropriate editboxes at the bottom toolbar.

The *IP Details* dialog is displayed.

4. Review the parameters, if needed change them. Fields are described in the table below.
5. Click **OK**.

### Fields of the *IP Details* dialog

| Field                       | Description  |
|-----------------------------|--|
| <i>IP Chainage</i>          | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>             | Defines the level of the new IP.   |
| <i>Grade</i>                | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>     | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>    | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i> | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>       | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>            | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>              | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value |
| <i>Design Speed</i>         | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.                 |

| Field                          | Description  |
|--------------------------------|--|
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Add IP by Intersection icon

The **Add IP by Intersection** icon of the Road design view allows you to insert a new IP at an intersection of grades from two existing IPs.

To add an IP:

1. At the *Profile* tab of the Road design view, click the **Add IP by Intersection** icon.
2. In the profile view, select the first base IP.
3. Define the grade from the first IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the grade in the appropriate editboxes at the bottom toolbar.
4. Repeat steps 2 and 3 for the second base IP.

The *IP Details* dialog is displayed.
5. Review the parameters, if needed change them. Fields are described in the table below.
6. Click **OK**.

### Fields of the *IP Details* dialog

| Field                       | Description  |
|-----------------------------|--|
| <i>IP Chainage</i>          | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>             | Defines the level of the new IP.   |
| <i>Grade</i>                | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>     | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>    | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i> | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>       | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>            | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>              | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value |

| Field                          | Description  |
|--------------------------------|--|
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Add IP by TP icon

The Add IP by TP icon of the Road design view allows you to create a new IP based on the existing IPs and the slope of the tangent segment.

To add an IP:

1. At the *Profile* tab of the Road design view, click the **Add IP by TP** icon.
2. At the *Profile* panel select the first and second TP.

The message prompts you to delete vertical IPs between selected intersection points.

3. Click **Yes** or **No** as you need.

The new IP is created.

## Move IP icon

The **Move IP** icon of the Road design view allows you to move an existing IP to a new position.

To change an IP:

1. At the *Profile* tab of the Road design view, click the **Modify IP** icon.
2. In the profile view, select the required IP.
3. Move the IP to a new position. Left click to confirm the position.

## Modify IP icon

The **Modify IP** icon of the Road design view allows you to change the parameters of an existing IP.

To change an IP:

1. At the *Profile* tab of the Road design view, click the **Modify IP** icon.
2. In the profile view, select the required IP.

The *IP Details* dialog is displayed.

3. Review the parameters, if needed change them. Fields are described in the table below.
4. Click **OK**.

**Fields of the *IP Details* dialog**

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>IP Chainage</i>             | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>                | Defines the level of the new IP.   |
| <i>Grade</i>                   | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

**Delete IP icon**

The **Delete IP** icon of the Road design view allows you to delete an existing IP from the profile design.

To delete an IP:

1. At the *Profile* tab of the Road design view, click the **Delete IP** icon.
2. In the profile view, select the required IP.

The IP is deleted.

**Delete All IPs icon**

The **Delete All IPs** icon of the Road design view allows you to delete all existing IPs from the profile design.

To delete all IPs:



1. At the *Profile* tab of the Road design view, click the **Delete All IPs** icon.

The confirmation message is displayed.

2. Click **Yes**.

The IPs are deleted.

## Raise/Lower Design icon

The **Raise/Lower Design** icon of the Road design view allows you to raise the level of all existing IPs within a nominated chainage range. This will raise or lower all or a section of the design profile.

To adjust a design:

1. At the *Profile* tab of the Road design view, click the **Raise/Lower Design** icon.

The **Raiser/Lower IP's** dialog is displayed.

2. In the *Raiser/Lower Amount* editbox, specify the required level change. Positive value will raise the IP levels; negative value will lower the IP levels.
3. In the *From Station* editbox, specify the start chainage of the range within which IP levels will be adjusted.
4. In the *To Station* editbox, specify the end chainage of the range within which IP levels will be adjusted.
5. Click **OK**.

The design is adjusted.

### Fields of the *Raiser/Lower IP's* dialog

| Field                      | Description  |
|----------------------------|--|
| <i>Raiser/Lower Amount</i> | Defines the required level change. Positive value will raise the IP levels, negative value will lower the IP levels. |
| <i>From Station</i>        | Defines the start chainage of the range within which IP levels will be adjusted.                                     |
| <i>To Station</i>          | Defines the end chainage of the range within which IP levels will be adjusted.                                       |

## Compute VCs icon

The **Compute VCs** icon of the Road design view allows you to create a longitudinal design for a defined and selected string based on levels on the natural surface or on the design levels of another string.

This option is the basis of stringline design. It is normally used in road reconstruction work to calculate levels for the different strings involved in the design, such as the addition of curb and channel to an existing road, or widening a lane of a road using the existing pavement grading.

The computed levels are based on existing levels for surveyed strings and design alignments using nominated grades and offsets from the existing information.

The option will create a VIP (vertical intersection point) at each cross section and the you can then edit this profile design if necessary.

To compute VCs:

1. In the *Alignment* panel, select the required string.
2. Click the *Profile* panel, to activate the *Profile* tab.
3. At the *Profile* tab of the Road design view, click the **Compute VCs** icon.

The **Compute VC** dialog is displayed.

4. Configure the parameters as you need. Fields are described in the table below.
5. Click **OK**.

The existing IPs are overwritten with the new levels and the reports is displayed.

#### Fields of the **Compute VC** dialog

| Field                       | Description   |
|-----------------------------|---|
| <i>Compute VC From</i>      | Defines the surface from which the VC levels will be computed.<br>Natural Surface   |
| <i>Calculate Level From</i> | Defines the string from which the levels of the new IPs will be calculated.<br>Select the required string from the drop-down list, it may be an existing string defined from an alignment, or coding from surveyed data, or from a string already computed in an intermediate design.   |
| <i>Use Grade</i>            | Defines the grade for the design levels from the string, selected in the <i>Calculate Level From</i> field. You may use one of the following ways of grade calculating, by selecting the appropriate radiobutton: <ul style="list-style-type: none"> <li>• <i>Constant</i> – a constant grade or cross fall from the level of the string, selected in the <i>Calculate Level From</i> field to the current string.</li> <li>• <i>From... To</i> – defines the grade from existing data between one string and another. This will be computed separately for each cross section. It is ideal for computing the existing cross fall from the crown of the road when the road is being widened, utilizing existing grades between the center line and road edge. To use select the required strings in the <i>From</i> and <i>To</i> drop-down lists.</li> </ul> |
| <i>Level Adjustment</i>     | Defines a level that will be added to the computed IP at each cross section. This would be used if an overlay is to be built over the existing surface from which the IPs are being calculated.   |

## Compute Resheet Level icon

The **Compute Resheet Level** icon of the Road design view allows you to compute a design profile that gives a minimum depth cover over the existing pavement.

The MAGNET Office essentially calculates a series of IPs (vertical intersection points) with zero vertical curve length for each chainage in the natural surface cross section dataset. This vertical curve design may be modified to suit design conditions, bearing in mind that the IP level computed at any cross section is the minimum overlay. For example, you may need to define curve lengths at some IPs.

You must configure road templates and superelevation tables must be configured before using this option. For details, see "Templates icon" section on page 702 and "Super Elevation icon" section on page 703 respectively. These will define the finished pavement shape that is required for the design. Other parameters for this option are defined in the Resheet Parameters table. See "Resheet Parameters icon" section on the facing page for details.

The resheet levels are computed from the defined crossfalls at each cross section. These are applied to any point on the natural surface at or within the string extents specified in the Resheet Parameters table. In effect, the shape of the finished cross section, complete with any superelevation, is laid on the current surface to find the

critical high point. The minimum overlay depth is added to the high point and the resulting level at the center line is adopted for the design IP level.

To use this option, prepare the required data and click the **Compute Resheet Level** icon.

## Resheet Parameters icon

The **Resheet Parameters** icon of the Road design view allows you to configure the parameters for the Compute Resheet Levels options.

Click the icon to open the *Resheet Parameters* table. Fill in required information and click **OK**. Fields are described in the table below.

### Fields of the *Resheet Parameters* table

| Field               | Description   |
|---------------------|---|
| <i>Chainage</i>     | Defines the chainage, where the resheet parameters start to be applied, on the first row of the table. If the minimum depth, left string and right string are the same for the full length of the road no further rows of data are required.<br>If the minimum depth or the string extents change, specify the start chainage of these settings on the next row. The settings will be applied from that chainage. |
| <i>Min Depth</i>    | Defines the minimum depth of the resheet or overlay in metres   |
| <i>Left String</i>  | Select the string that defines the left edge of the computation of the overlay.   |
| <i>Right String</i> | Select the string that defines the right edge of the computation of the overlay.  |

## Level Difference icon

The **Level Difference** icon of the Road design view allows you to calculate level differences along the road between the defined strings.

To calculate the difference between road levels:

1. At the *Profile* tab of the Road design view, click the **Level Difference** icon.  
The *Compute Level Differences* dialog is displayed.
2. From the *Design Surface* drop-down list, select the surface to be used as the design surface.
3. From the *Natural Surface* drop-down list, select the surface to be used as the natural surface.
4. From the *Left String* and *Right String* drop-down lists, select the edges of the level difference computation.
5. In the *Minimum Depth* editbox, specify the minimum difference, which will be added to the report.
6. Click **OK**.

The report, listed level difference details is displayed.









## VC Report icon




The **VC Report** icon of the Road design view allows you to generate a report, listing levels for the different strings involved in a design, such as the addition of a curb and channel to an existing road or widening a lane of a road using the existing pavement grading.

To generate a VC Report:

1. At the *Profile* tab of the Road design view, click the **VC Report** icon.  
The **VC Details** dialog is displayed.
2. Configure the parameters as you need and click **OK**.  
The report, listing selected profile details is displayed.

## Design tab

| <b>Templates/Tables group</b>   |   |
|---|---|
|  Templates             | <p>Templates icon</p> <p>Click it to manage road templates.</p>   |
|  Super Elevation       | <p>Super Elevation icon</p> <p>Click it to configure the super elevation table.</p>   |
|  Create Super Table    | <p>Create Super Table icon</p> <p>Click it to create the super elevation table by interfacing the definition of the HIPs.</p>   |
|  Compound Side Slope   | <p>Compound Side Slope icon</p> <p>Click it to define details of the compound side slopes.</p>  |
|  Symbol                | <p>Symbol icon</p> <p>Click it to attach symbols to the special survey codes.</p>   |
| <b>Selection group</b>  |   |
|  Template              | <p>Template icon</p> <p>Click it to define the design surface templates.</p>  |
|  Super Table           | <p>Super Table icon</p> <p>Click it to define super elevation tables to modify a road template.</p>   |
|  Design Section       | <p>Design Section icon</p> <p>Click it to define various sections of an existing surface, which are to be retained in the final design of road reconstruction work.</p> |
| <b>Subgrade Selection group</b>   |   |
|  Subgrade Template   | <p>Subgrade Template icon</p> <p>Click it to define details of the templates used for the individual subgrade surfaces.</p>   |
|  Subgrade Super      | <p>Subgrade Super icon</p> <p>Click it to apply superelevation tables to modify the templates of the individual subgrade surfaces.</p>                                  |
|  Subgrade Section    | <p>Subgrade Section icon</p> <p>Click it to define the section of an existing road surface to be retained as part of the subgrade surface.</p>                          |
|  Pavement Parameters | <p>Pavement Parameters icon</p> <p>Click it to define a subgrade surface based on a section of the template used for the surface above.</p>                             |
| <b>Side Slopes group</b>  |   |
|  Side Slopes         | <p>Side Slopes icon</p> <p>Click it to specify side slopes to be used in the road design by nominating side slope ratios.</p>   |
|  Fixed Offset Slopes | <p>Fixed Offset Slopes icon</p> <p>Click it to specify side slopes to be used in the road design by nominating the offset from the string.</p>                          |
|  Compound Slopes     | <p>Compound Slopes icon</p> <p>Click it to define the format of any compound side slopes.</p>   |

|  |  |
|--|--|
|  Ditches            | Ditches icon<br>Click it to define table drains for the road design.                 |
|  Shoulder Extension | Shoulder Extension icon<br>Click it to apply verges to a road design                 |
| <b>Compute group</b>   |  |
|  Compute Design     | Compute Design icon<br>Click it to compute and store the design surface of the road. |

## Templates icon

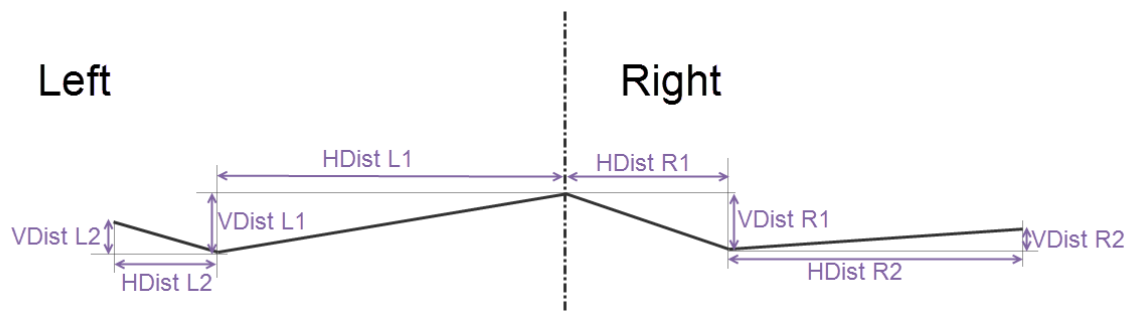
The **Templates** icon of the Road design view allows you to create and modify the road templates. A road template is the road cutting, which may be created from the base line.

Using of these templates may significantly simplify the roads creation. You only need to create the base line of the road, and use the "Parallel Figure" command to automatically create the road cutting. See "Parallel Figure icon" section on page 204 for details.

Buttons and fields of the dialog are described in the tables below

### Fields of the *Road Template* Dialog

| Field                 | Description   |
|-----------------------|---|
| <i>Template Name</i>  | Defines the name of the current template. This field also contains the list of the existing templates. Click to see it.   |
| <i>Vert. Exag.</i>    | Defines the vertical scale of the template preview.   |
| <b>Template table</b> |   |
| <i>HDist</i>          | Defines the horizontal size of the template segment. See picture below for details.   |
| <i>VDist</i>          | Defines the vertical size of the template segment. See picture below for details. Positive vertical distance means that the end point of the segment is higher than the start point. Negative vertical distance means that the end point of the segment is higher than the start point.   |
| <i>Slope</i>          | Defines the slope of the template segment. Positive slope means that the end point of the segment is higher than the start point. Negative slope means that the end point of the segment is higher than the start point.<br><br><b>IMPORTANT</b><br><b>The VDist field has the priority. If both VDist and Slope fields are filled in, the value from the VDist field will be used.</b> |
| <i>Label</i>          | Defines the name of the string, created by the template segment.  |
| <i>Plot</i>           | Defines whether the template segment will be plotted in the preview.  |



### Road template parameters

#### Buttons of the Road Template dialog

| Button              | Description  |
|---------------------|--|
| <b>New</b>          | Click it to create a new template.   |
| <b>Del Template</b> | Click it to delete the current template.   |
| <b>CopyToLeft</b>   | Click it to copy the right segments to the left.<br><b>CAUTION</b><br><b>The left segments will be overwritten. All existing left segments will be lost.</b>   |
| <b>CopyToRight</b>  | Click it to copy the left segments to the right.<br><b>CAUTION</b><br><b>The right segments will be overwritten. All existing right segments will be lost.</b> |
| <b>CopyFromLib</b>  | Click it to select the road template from the pre-configure set of templates, stored in the road template library.   |
| <b>CopyToLib</b>    | Click it to copy the current template to the library.  |
| <b>Insert</b>       | Click it to insert an additional row to the template table.  |
| <b>Delete</b>       | Click it to delete the selected row from the template table.   |
| <b>OK</b>           | Click it to save the changes and close the dialog.   |
| <b>Cancel</b>       | Click it to close the dialog without saving changes.   |

## Super Elevation icon

The **Super Elevation** icon of the Road design view allows you to define superelevation and widening details into individual tables so that changes may be applied to the design template at particular chainages.

Each table contains a number of rows of data that map the change of the crossfall and width of particular legs defined in the template. The rate of change is dictated by the data entered on any two adjacent rows. This information is available to any road in the current job. The Super Elevation Table is applied to the template at the chainages defined by the **Super Table** icon. See "Super Table icon" section on page 710 for details.

If a Super Elevation Table can be applied as a standard for many projects, its details should be stored in the library Super Elevation Table. See "Super Elevation Table icon" section on page 734 for details. You may load configuration from the current table to the library and copy library settings to the library, by using the **Copy from Lib** or **Copy To Lib** buttons respectively.

A Super Elevation Table will also be used to apply grade and width changes to the template used for subgrade surfaces.

To configure the Super Elevation Table:

1. At the *Design* tab of the Road design view, click the **Super Elevation** icon.

The **Super Table** dialog is displayed.

2. Do one of the following:
  - From the *Super Table* drop-down list, select the table for editing.
  - Click **New** to create a new super table, and type its name in the *Super Table* field.
3. Configure the parameters as you need. Fields are described in the table below. Also, keep in mind the following:
  - The first row of information in the table should relate to the existing design template. The first Dist From SS (Start Superelevation) must be 0, the first Offset To Control should be 0 and the first slope and width should be equal to the slope and width of the selected leg in the design template. The subsequent rows indicate the changes to be made to this template as distance increases along the alignment. The user inputs distance increments and a new cross fall and width to be applied at that point. Any cross section that lies between the two adjacent rows has its crossfall, and width if widening is applied, interpolated from this data.
  - If the curve is symmetrical and the superelevation returns to the standard template settings at the same rate as the approach into the curve, the user may simply enter the data from the Start of Superelevation to the Maximum Superelevation.
  - The option Super Table Selection is used to nominate the chainage at which a super table should start to be applied. If the table only maps the changes up to the maximum superelevation, the return to the standard template may be defined from the end of the maximum superelevation.
  - It is usual to apply these templates to the first and possibly subsequent legs. If the first leg is changed using these tables, the other legs will automatically join to the end point of this leg without the user having to apply changes to them.
  - Multiple superelevation changes can be applied at the same chainage range if required. For example it may be necessary to use one table to apply changes to one leg of the template, and another to apply changes to another leg where the rate of change is different for this leg. It may be possible to handle all the necessary changes with one table but multiple tables can be used if necessary.
4. Click **OK**.

#### Fields of the *Super Table* dialog

| Field              | Description  |
|--------------------|--|
| <i>Super Table</i> | Defines the name of the super table.<br>An existing table cannot be renamed.                 |
| <i>Radius</i>      | This is a label to assist you to select the appropriate table for a particular radius curve. |
| <i>Speed</i>       | This is a label to assist you to select the appropriate table for a particular design speed. |



| Field                      | Description  |
|----------------------------|--|
| <i>Left Leg/Right Leg</i>  | Defines the number relating to the left template leg and the right template leg that will be modified by the data in the two columns for width and crossfall beneath these fields.<br>Up to two template legs at each side of the template may be modified by the one super table. |
| <i>Label</i>               | Defines an optional label for particular points defined by each row of the super table. These will help the user to check the definitions of the changes in the table/   |
| <i>Dist (From) SS</i>      | Defines the distance from the start of the changes. The first row is usually set to 0 and the distances increase through the subsequent rows of data.  |
| <i>Offset (To) Control</i> | Defines the center line offset to allow for shift in transitions if these are not applied in the horizontal alignment. The first row must be set to 0 if these settings are used. If this column is left blank the offset to control is assumed to be 0.                           |
| <i>Width</i>               | Defines the width for the relevant template leg at the distance from the SS (start of the superelevation or widening)  |
| <i>XFall (%)</i>           | Defines the cross fall as a percentage for the relevant template leg at the distance from the SS. (start of the superelevation or widening)  |

## Create Super Table icon

The **Create Super Table** icon of the Road design view allows you to interface the definition of the HIP (horizontal intersection point) of each curve in the horizontal alignment with the selected design template(s), and create a suitable Super Elevation Table for that curve.

Before the user can open this option the templates must be defined and allocated to the design by using the Template icon. There is no need to have a vertical longitudinal design completed at this stage.

To define the Super Elevation Table:

1. At the *Design* tab of the Road design view, click the **Create Super Table** icon.

The **Create Super Table** dialog is displayed.

The first data for the first curve in the horizontal alignment is displayed. Many fields are greyed out. They contain data defined elsewhere in the dataset for the selected curve. Some will be modified as data is entered into the editable fields.

2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.
4. The **Super Table** dialog is displayed.
5. Review the parameters, if needed change them. See "Super Elevation icon" section on page 703 for details.

**Fields of the *Create Super Table* dialog**

| <b>Field</b>               | <b>Description</b>  |
|----------------------------|---|
| <i>Horiz IP</i>            | The first curve will be listed as Curve1. The drop-down list contains all the curves in the horizontal alignment in sequence  |
| <i>Table Name</i>          | Defines the super elevation table name. Type the proper name in the editbox.  |
| <i>Left Crossfall</i>      | Displays the crossfall of the left leg of the template.   |
| <i>Right Crossfall</i>     | Displays the crossfall of the right leg of the template.  |
| <i>Left Width</i>          | Displays the width of the left leg of the template.   |
| <i>Right Width</i>         | Displays the width of the right leg of the template.  |
| <i>Speed</i>               | Displays the design speed defined for the HIP.  |
| <i>Radius</i>              | Displays the radius of the curve defined for the HIP.   |
| <i>Super</i>               | Displays the superelevation defined for the HIP.  |
| <i>Calc Super Dev</i>      | Superelevation Development Length is the distance required from the start of superelevation (SS) through to the maximum superelevation (E).   |
| <b>Line Widening</b>       |   |
| <i>Widening</i>            | A calculated value is displayed for suitable widening of the template leg through the curve. Accept this or modify the width as required. If no widening is required set this to 0.000  |
| <i>Apply To Both Lanes</i> | Tick to widen both lanes through the curve.<br>Leave unticked to widen only the inside leg of the curve   |
| <i>Incl Ease</i>           | Untick this option unless required by local road design standards.<br>Tick only if required by the local road design standards to include ease and set the Interval for this data.  |
| <b>Approach</b>            | This data defines the superelevation changes going into the curve. The fields will depend on whether the curve is a plain curve or a spiral curve. For a plain curve the <i>Spiral Length</i> field is replaced with the <i>Dev/Ratio</i> field.  |
| <i>Spiral Length</i>       | Displays the spiral length applied to the curve design in the survey view.<br>NOTE<br>This field only displays for spiral curves.   |
| <i>Dev/Ratio</i>           | The development ratio of a plain curve may be selected. This ratio defines the percentage of the superelevation development length that is required prior to the tangent point approaching the curve and that required past the tangent point in the body of the curve. Select the appropriate ratio from the drop-down list.<br>For closely spaced or common curves, all or most of the development will be within the curve at the departure of the first curve and the approach of the second curve.<br>NOTE<br>This field only displays for plain curves. |

| <b>Field</b>           | <b>Description</b>  |
|------------------------|---|
| <i>Req Super Dev</i>   | Defines the required superelevation development length for the approach to the curve. This is usually that computed in the <i>Calc Super Dev</i> field.   |
| <i>Plan Transition</i> | Displays the plan transition. It is also known as the pavement rotation length.   |
| <i>Curve Type</i>      | <p>The following curve types are available:</p> <ul style="list-style-type: none"> <li>• <i>Normal</i> – The curve is positioned in the alignment so that the approach to the curve starts from the standard crossfalls defined in the template, and rotates to the maximum superelevation.</li> <li>• <i>Reverse</i> – The curve is positioned in the alignment so that the curve starts from the end of a previous curve, and reverses direction. All the development is within the curve. The curve starts from the 0% tangent point position and builds up to maximum superelevation.</li> <li>• <i>Compound</i> – The approach to this curve follows a previous curve in the same direction, with insufficient room between the curves to return to the standard crossfall of the template. Usually not recommended by the design rules of Roading Authorities, but may be necessary in some circumstances.</li> </ul> |
| <b>Departure</b>       | This data defines the superelevation changes leaving the curve. The fields will depend on whether the curve is a plain curve or a spiral curve. For a plain curve the <i>Spiral Length</i> field is replaced with the <i>Dev/Ratio</i> field.   |
| <i>Spiral Length</i>   | <p>Displays the spiral length applied to the curve design in the survey view.</p> <p>NOTE<br/>This field only displays for spiral curves.</p>   |
| <i>Dev Ratio</i>       | <p>The development ratio of a plain curve may be selected. This ratio defines the percentage of the superelevation development length that is required prior to the tangent point approaching the curve and that required past the tangent point in the body of the curve. Select the appropriate ratio from the drop-down list.</p> <p>For closely spaced or common curves, all or most of the development will be within the curve at the departure of the first curve and the approach of the second curve.</p> <p>NOTE<br/>This field only displays for plain curves.</p>   |
| <i>Req Super Dev</i>   | Defines the required superelevation development length for the approach to the curve. This is usually that computed in the <i>Calc Super Dev</i> field.   |
| <i>Plan Transition</i> | Displays the plan transition. It is also known as the pavement rotation length.   |

| Field             | Description  |
|-------------------|--|
| <i>Curve Type</i> | <p>The following curve types are available:</p> <p><i>Normal</i> – The curve is positioned in the alignment so that the departure from the curve rotates from the maximum superelevation back to the standard cross-falls defined in the template.</p> <p><i>Reverse</i> – The curve is positioned in the alignment so that it joins to the next curve, which reverses direction. All the development is within the curve. The curve rotates from the maximum superelevation and ends at the 0% tangent point position.</p> <p><i>Compound</i> – The departure from this curve allows insufficient room to return to the standard crossfall of the template, before the next curve, which turns in the same direction.</p> |

## Compound Side Slope icon

The **Compound Side Slope** icon of the Road design view allows you to define details of multiple and varying side slope legs to form compound side slopes. Each page or sheet of side slope information represents the detail for one leg of the side slope as it occurs in either a cut or fill situation. Up to four different side slope solutions may be defined on each sheet, of which only one will be applied. The side slope chosen at each cross section will depend on the depth to the natural surface compared to the calculated depth of the side slope. An unlimited number of side slope legs may be defined on multiple sheets.

Information defined in this option is available for any road in the current project. Side slope sheets are applied by using the Compound Slopes icon.

Compound side slope definitions, that meet standard specifications, should be defined by using the same option from the *Library* tab. See "Compound Side Slopes icon" section on page 735 for details. A sheet held in the library may be copied from the library into a job, so that it may be modified to suit the job, by clicking **Copy From Lib**, or a sheet may be copied to the library for use in other jobs, by clicking **Copy To Lib**. Library sheets may also be used directly in the road design.

To configure the compound side slope:

1. At the *Design* tab of the Road design view, click the **Compound Side Slope** icon.  
The **Compound Side Slope** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

### Fields of the **Compound Side Slope** dialog

| Field                      | Description   |
|----------------------------|---|
| <i>Compound Side Slope</i> | <p>The \$\$DEFAULT side slope is displayed. This data relates to one leg of the compound side slope.</p> <p>You may create new compound side slopes by clicking <b>New</b>. You may change the name of the compound side slope in this field.</p> |

| <b>Field</b>               | <b>Description</b>  |
|----------------------------|---|
| <i>Cut / Fill</i>          | Each section has four rows for defining four varying side slopes, dependent on the depth to the natural surface compared to the calculated depth of the side slope. The settings for cut and fill situations will often be different.   |
| <i>Depth</i>               | Defines the depth below the natural surface (cut) or above the natural surface (fill) up to which this side slope definition will be applied.   |
| <i>Horizontal Distance</i> | Defines the horizontal component of the side slope leg. This is usually positive but could be negative if defining a bridge structure.  |
| <i>Vertical Distance</i>   | Defines the vertical component of the side slope leg. This field is not used if the fixed side slope type is used. This value should be entered as a positive value, even in a fill situation. A negative value may be used to force a leg in the opposite direction to the norm. |
| <i>End Depth</i>           | Defines the end depth required. It is only used with normal and continue types of side slope.   |
| <i>Normal</i>              | The compound side slope is stopped if it intersects the natural surface.  |
| <i>Intersect</i>           | The side slope continues at the specified grade until the natural surface is intersected.   |
| <i>Fixed Width</i>         | The side slope intersects the natural surface at the specified width.   |
| <i>Fixed Depth</i>         | The side slope intersects the natural surface at the specified depth.   |
| <i>Continue</i>            | The side slope continues for the distance specified. The side slope will continue through the natural surface to complete the leg   |

## Symbol icon

The **Symbol** icon the Road design view allows you to define symbols that may be attached to particular feature codes on a cross section plot.

The symbol is selected from the list of symbols in the symbol library. It is allocated to a code that is available on any surface in the cross section.

To define symbols:

1. At the *Design* tab of the Road design view, click the **Symbol** icon.  
The **Symbol Table** dialog is displayed.
2. In the *Code* field, type the code to which the symbol will be attached.
3. In the *Symbol* field, select the required symbol from the drop-down list.
4. In the *Scale* field, type the required symbol scale.
5. Repeat steps from 2 to 4 for all required codes.
6. Click **OK**.

## Template icon

The **Template** icon the Road design view allows you to define a template that will be applied to create the design surface of a road at specified chainage ranges.

This option does not define the subgrade surfaces, superelevation, batters or table drains.

To configure the design surface templates:

1. At the *Design* tab of the Road Design view, click the **Template** icon.  
The **Template Selection** dialog is displayed.
2. In the *Chainage* field, type the chainage at which a template is applied.
3. In the *Template* fields, select the required template from the drop-down list. Templates in the current job are listed in blue text and those in the library in black text.
4. Repeat steps 2 and 3 for all required chainages. Each row defines the start of another template.
5. Click **OK**.

## Super Table icon

The **Super Table** icon the Road design view allows you to define a super elevation table that will be applied to modify a road template. These changes are made to either widen a leg of the template or to modify the crossfall (grade) of a leg of the template through a curve. In many cases both parameters will be changed.

This option only modifies the template legs defined in the super table from the chainage where the super table is applied until the changes are completed.

To define the super elevation tables:

1. At the *Design* tab of the Road design view, click the Super Table icon.  
The **Super Table Selection** dialog is displayed.
2. Fill in the table as you need. Fields are described in the table below.
3. Click **OK**.

### Fields of the **Super Table Selection** dialog

| Field                | Description   |
|----------------------|---|
| <i>Station Start</i> | Defines the chainage at which the super table is applied. Each row defines the start of another super table. The specified chainage relates to the running distance on the road where a superelevation change table will begin.   |
| <i>Station End</i>   | Defines the chainage where a super table is to be reversed. This is only used when the super table only defines the changes up to the maximum super-elevation for a symmetrical curve. The specified chainage will relate to the end of the maximum superelevation where the crossfalls reverse to their standard settings.<br><br>If no reversal is required, leave this field blank |
| <i>Super Table</i>   | Select the Super Table from the drop-down list. Super Tables in the current job are listed in blue text and those in the Library are listed in black text   |

| Field         | Description  |
|---------------|--|
| <i>Mirror</i> | Tick to mirror the changes defined in the super table. Do this to apply the changes to a curve that turns in the opposite direction to that defined in the table. The left leg changes are applied to the right leg and vice versa.<br>Leave this field unticked if the template changes are applied to the curve exactly as defined in the super table. |
| <i>Hinge</i>  | Select a code to hinge the super table off other than the CL.  |

## Design Section icon

The **Design Section** icon the Road design view allows you to define various sections of an existing surface, which are to be retained in the final design of road reconstruction work.

Each section is defined by a start and end chainage for its length and by a left and right string for its width. The strings must exist before this option can be used.

To defines surface sections:

1. At the *Design* tab of the Road design view, click the **Design Section** icon.  
The *Design Section Selection* dialog is displayed.
2. Fill in the table as you need. Fields are described in the table below.
3. If needed, click the >> at the end of each row to display the *Surface Record* table for defining subgrade surfaces.  
The *Surface Record* dialog is displayed.
4. Fill in the table as you need. Fields are described in the table below.
5. Click **OK**.
6. Click **OK** to close the *Design Section Selection* dialog and apply changes.

### Fields of the *Design Section Selection* dialog

| Field                 | Description   |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the start chainage to define a chainage range within which the selected section will be applied as part of the design surface.  |
| <i>End Chainage</i>   | Defines the end chainage to complete a chainage range within which the selected section will be applied as part of the design surface.  |
| <i>Left String</i>    | Select a string from the drop-down list to define the left limit of the section. This string is usually a natural surface string and must already have been added to the road dataset.  |
| <i>Left CutBack</i>   | Defines an optional offset to be applied to the selected string so that the surface will be cut back a fixed distance inside the string.  |
| <i>Right String</i>   | Select a string from the drop-down list to define the right limit of the section. This string is usually a natural surface string and must already have been added to the road dataset. |
| <i>Right CutBack</i>  | Defines an optional offset to be applied to the selected string so that the surface will be cut back a fixed distance inside the string.  |

| Field         | Description  |
|---------------|--|
| <i>Lift</i>   | Defines a height difference in meters to be added to the selected section, so that the final surface is raised by this amount to allow for an overlay. |
| <i>Active</i> | Tick to activate the section defined in this row of data.  |

#### Fields of the *Surface Record* dialog

| Field               | Description   |
|---------------------|---|
| <i>Surface Name</i> | Select a subgrade name from the drop-down list to define the depth of the subgrade at the extents of the section defined in the main table. |
| <i>Depth Left</i>   | Defines the depth to this surface from the left limits of the section defined in the main table.  |
| <i>Depth Right</i>  | Defines the depth to this surface from the right limits of the section defined in the main table.   |

## Subgrade Template icon

The **Subgrade Template** icon the Road design view allows you to define details of the templates used for the individual subgrade surfaces. These templates are usually different to the design surface template, especially if curbing is used. The templates are set up in a similar way to those used for the design surface, however the last leg of the subgrade is controlled by the *End Mode* setting in this table.

The order in which the subgrade surfaces are applied is determined by the Sequence icon.

To define templates for the individual subgrades:

1. At the *Design* tab of the Road design view, click the **Subgrade Template** icon.  
The *Subgrade Template Selection* dialog is displayed.
2. From the *Subgrade Surface* drop-down list, select the required surface.
3. Fill in the table as you need. Fields are described in the table below.
4. Click **OK**.

#### Fields of the *Subgrade Template Selection* dialog

| Field                   | Description  |
|-------------------------|--|
| <i>Subgrade Surface</i> | Select the subgrade surface in turn to define their own template details.<br>Each subgrade surface in the job will be in the drop-down list.                 |
| <i>Chainage</i>         | Defines the chainage at which a template is applied to the subgrade surface.<br>Each row defines the start of another template                               |
| <i>Template</i>         | Select the template from the drop-down list. Templates in the current job are listed in blue text and those in the library in black text.                    |
| <i>Depth</i>            | Defines the depth to the subgrade in metres. This is measured vertically below the design surface levels of the string that the subgrade is being applied to |



| Field                      | Description  |
|----------------------------|--|
| <i>Left/Right End Mode</i> | <p>These two fields control the way the last leg of the subgrade intersects with either the design surface or the subgrade level on a string to the left or right of the current string:</p> <ul style="list-style-type: none"> <li>• <i>None</i> – The end of the subgrade defined by this template will join to the end of the same subgrade defined on the adjacent string. If this does not exist the subgrade will join vertically with the design surface.</li> <li>• <i>Rural</i> – The end of the subgrade defined by this template will continue at the crossfall of the last leg until it intersects with the design surface. <ul style="list-style-type: none"> <li>• <i>Cut</i> – If this cannot be achieved in a cut situation, the leg continues out to the end of the design template, verge or table drain and joins vertically with the design surface at this point.</li> <li>• <i>Fill</i> – If this cannot be achieved in a fill situation where the subgrade is below the batter point, the leg continues out to the batter and joins vertically with the design surface at this point.</li> </ul> </li> <li>• <i>Urban</i> – The end of the subgrade defined by this template will turn vertically and intersect with the design surface at this point.</li> </ul> |

## Subgrade Super icon

The **Subgrade Super** icon the Road design view allows you to apply superelevation tables to modify the templates applied to the individual subgrade surfaces. In many cases the data in the super table defined for the design surface may be duplicated for the subgrade surfaces.

To modify the subgrade templates:

1. At the *Design* tab of the Road design view, click the **Subgrade Super** icon.  
The **Subgrade Super Selection** dialog is displayed.
2. From the *Subgrade Surface* drop-down list, select the required surface.
3. Fill in the table as you need. Fields descriptions may be found in the Super Table icon. Keep in mind, that each subgrade surface is selected in turn, so that suitable entries may be made for it.
4. Click **OK**.

## Subgrade Section icon

The **Subgrade Section** icon the Road design view allows you to define the section of an existing road surface to be retained as part of the subgrade surface or surfaces, when the road is being overlaid using the resheet options.

Each section is defined by a start and end chainage for its length and by a left and right string for its width. The strings must exist before this option can be used.

To configure the subgrade section selection:

1. At the *Design* tab of the Road design view, click the **Subgrade Section** icon.  
The **Subgrade Section Selection** dialog is displayed.
2. Fill in the table as you need. Fields are described in the table below.

### 3. Click **OK**.

When the Compute Design option is run, the existing natural surface lying between the two strings will be used as the part of each subgrade surface. Each subgrade surface will return to its specified depth at either side of this section.

If a subgrade surface is above part of the selected section, it will be defined as a surface over the selected section until it intersects the natural surface. At this point the natural surface will become part of the subgrade surface. This usually occurs only when considerable shape correction is being applied to the road.

#### Fields of the *Subgrade Section Selection* dialog

| Field                | Description   |
|----------------------|---|
| <i>Start Station</i> | Defines the start chainage to define a chainage range within which the subgrades will use the existing surface.   |
| <i>End Station</i>   | Defines the end chainage to define a chainage range within which the subgrades will use the existing surface.   |
| <i>Left String</i>   | Select a string from the drop-down list to define the left limit of the section. This string is usually a natural surface string and must already have been added to the road dataset.  |
| <i>Right String</i>  | Select a string from the drop-down list to define the right limit of the section. This string is usually a natural surface string and must already have been added to the road dataset. |
| <i>Active</i>        | Tick to activate the section defined in this row.   |

## Pavement Parameters icon

The **Pavement Parameters** icon the Road design view allows you to define a subgrade surface based on a section of the template used for the surface above. Two labels on the template define the section. The subgrade surface also follows the higher surface through any superelevation, so the user does not need to set up templates or superelevation tables when this feature is used.

Pavement parameters can be set up for different design strings with templates attached to them, enabling multiple subgrade sections for a single cross section.

To define a subgrade surface:

1. At the *Design* tab of the Road design view, click the **Pavement Parameters** icon.  
The *Pavement Parameters* dialog is displayed.
2. From the *Subgrade Surface* drop-down list, select the required surface.
3. Fill in the table as you need. Fields are described in the table below.
4. Click **OK**.

#### Fields of the *Pavement Parameters* dialog

| Field                   | Description  |
|-------------------------|--|
| <i>Subgrade Surface</i> | Select the subgrade surface in turn to define their own template details.<br>Each subgrade surface in the job will be in the drop-down list. |

| Field                      | Description   |
|----------------------------|---|
| <i>Station</i>             | Define the chainage at which the parameters on the row apply. If different parameters are required for a different segment of the design, enter data on a new row.  |
| <i>Thickness</i>           | Defines the thickness of this subgrade surface in meters.<br>This is the thickness of this particular surface, unlike the settings for subgrade templates that are set at a depth from the design surface.  |
| <i>Left Code</i>           | Defines the code for the left extent of the template used for the subgrade. This will be a label used in the definition of one leg of the design surface template.  |
| <i>Left Ext</i>            | If the pavement is to extend to the left of the template leg specified by the code, specify a distance in meters. Do not specify a negative value.  |
| <i>Left/Right End Mode</i> | These two fields control the way the last leg of the subgrade intersects with either the design surface or the subgrade level on a string to the left or right of the current string: <ul style="list-style-type: none"> <li>• <i>None</i> – The end of the subgrade defined by this template will join to the end of the same subgrade defined on the adjacent string. If this does not exist the subgrade will join vertically with the design surface.</li> <li>• <i>Rural</i> – The end of the subgrade defined by this template will continue at the crossfall of the last leg until it intersects with the design surface. <ul style="list-style-type: none"> <li>• <i>Cut</i> – If this cannot be achieved in a cut situation, the leg continues out to the end of the design template, verge or table drain and joins vertically with the design surface at this point.</li> <li>• <i>Fill</i> – If this cannot be achieved in a fill situation where the subgrade is below the batter point, the leg continues out to the batter and joins vertically with the design surface at this point.</li> </ul> </li> <li>• <i>Urban</i> – The end of the subgrade defined by this template will turn vertically and intersect with the design surface at this point.</li> </ul> |
| <i>Right Code</i>          | Defines the code for the right extent of the template used for the subgrade. This will be a label used in the definition of one leg of the design surface template.   |
| <i>Right Ext</i>           | If the pavement is to extend to the right of the template leg specified by the code, specify a distance in meters. Do not specify a negative value.   |

## Side Slopes icon

The **Side Slopes** icon the Road design view allows you to specify side slopes to be used in the road design by nominating side slope ratios. The ratios are defined as 1 for the vertical element and the value entered in the table as the horizontal element of the ratio.

A side slope is a leg that is attached to the end of the last template leg (the hinge point) and pivots round this point to follow the slope specified at a particular chainage until the side slope intersects with the natural surface. This position will become the batter point and will be the extent of the design surface. These points are labelled LBAT and RBAT on the design surface.

If you need side slopes to finish at a particular offset from the centreline, you should use the Fixed Offset Slopes icon.

To specify side slopes for the road design:

1. At the *Design* tab of the Road design view, click the **Side Slopes** icon.

The **Side Slopes** dialog is displayed.

2. Fill in the table as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the **Side Slopes** dialog

| Field                  | Description  |
|------------------------|--|
| <i>Start Chainage</i>  | Define the start chainage for the side slope settings defined on this row  |
| <i>Left/Right Cut</i>  | Defines the horizontal component of the side slope to be applied in cut situations to the left and right ends of the template. Leave a field blank if no sloping side slope is to be applied.  |
| <i>Left/Right Fill</i> | Defines the horizontal component of the side slope to be applied in fill situations to the left and right ends of the template. Leave a field blank if no sloping side slope is to be applied. |

## Fixed Offset Slopes icon

The **Fixed Offset Slopes** icon the Road design view allows you to specify side slopes to be used in the road design by nominating the offset from the string where the side slope intersects the natural surface. The side slope intercept is specified in meters to the left or right of the string.

To specify side slopes for the road design:

1. At the *Design* tab of the Road design view, click the **Fixed Offset Slopes** icon.

The **Fixed Offset Slopes** dialog is displayed.

2. Fill in the table as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the **Side Slopes** dialog

| Field                    | Description  |
|--------------------------|--|
| <i>Start Chainage</i>    | Define the start chainage for the side slope settings defined on this row  |
| <i>Left/Right Offset</i> | Defines the horizontal offset from the design string to create the side slope intercept with the natural surface. Leave the field blank if no fixed width side slope is required at one side of the string |

## Compound Slopes icon

The **Compound Slopes** icon the Road design view allows you to define the format of any compound side slopes required in the road design. You can select the format for each leg of the compound side slope from the legs

defined on individual pages by using the Compound Side Slope icon.

A compound side slope contains one or more legs that are used to create a suitable intercept with the natural surface, allowing for benching where the design of the road requires it. This is usually due to the difference in depth between the surfaces or the material in which the road is to be built.

This option is only used when sloping or fixed width batters are not suitable.

To assign the compound side slopes:

1. At the *Design* tab of the Road design view, click the **Compound Slopes** icon.  
The **Compound Side Slopes Selection** dialog is displayed.
2. Fill in the table as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the **Compound Side Slopes Selection** dialog

| Field                        | Description   |
|------------------------------|---|
| <i>Station Start</i>         | Defines the start chainage to define a chainage range within which the compound side slope will be applied.   |
| <i>Station End</i>           | Defines the end chainage to define a chainage range within which the compound batter will be applied.   |
| <i>Compound Batter Left</i>  | In this column select the sheet or page that will define the first leg of the compound side slope at the left side of the design. The second leg will be set on the second row and subsequent legs on the third row onwards, until the compound side slope has been completely defined. The last leg would usually enable an intercept with the natural surface.<br><br>Leave the rows blank if no compound batter is allocated at the left.  |
| <i>Compound Batter Right</i> | In this column select the sheet or page that will define the first leg of the compound side slope at the right side of the design. The second leg will be set on the second row and subsequent legs on the third row onwards, until the compound side slope has been completely defined. The last leg would usually enable an intercept with the natural surface.<br><br>Leave the rows blank if no compound batter is allocated at the left. |

## Ditches icon

The **Ditches** icon the Road design view allows you to define table drains for the road design. The table drain will be attached to the last leg of the road template and if a side slope is specified, the side slope will be attached to the last leg of the table drain. The table drain can be defined with one leg, forming a V-shaped drain with the side slope leg, or with two legs, forming a U-shaped drain with the side slope leg.

This option only applied in a cut situation.

To define table drains:

1. At the *Design* tab of the Road design view, click the **Ditches** icon.  
The **Ditches** dialog is displayed.
2. Fill in the table as you need. Fields are described in the table below.
3. Click **OK**.

The table drains will be created and displayed in the cross section pane when the Compute Design icon is clicked.

#### Fields of the *Ditches* dialog

| Field                 | Description  |
|-----------------------|--|
| <i>Start Chainage</i> | Defines the start chainage for the addition of the table drains defined on this row.   |
| <i>H1</i>             | Defines the horizontal component of the first leg of the drain in meters. Leave the field blank if no drain is to be applied.  |
| <i>V1</i>             | Defines the vertical component of the first leg of the drain in meters. The end of this leg will be lower than, or equal to, the start of the leg. This is defined as a depth so no minus sign should be entered.  |
| <i>H2</i>             | Defines the horizontal component of the second leg of the drain in meters. Leave the field blank if no second leg is required.   |
| <i>V2</i>             | Defines the vertical component of the second leg of the drain in meters. The end of the leg will be higher than, or equal to, the start of the leg. Enter 0.00 for a leg that has no crossfall   |
| <i>Mode</i>           | <p>The Mode is used to define whether the template is assumed to be in a cut situation at a cross section.</p> <p>Tick to apply the table drain, if the invert of the drain is below the natural surface level.</p> <p>Leave unticked to apply the table drain, if the end leg of the template is below the natural surface level.</p> |

## Shoulder Extension icon

The **Shoulder Extension** icon the Road design view allows you to apply verges to a road design. A verge is an extension of the last leg of the template and it continues at the existing crossfall for a specified width. Verges can be applied to a section of the road.

Verges are only applied where the template ends in a fill situation.

To apply a verge:

1. At the *Design* tab of the Road design view, click the **Shoulder Extension** icon.  
The *Shoulder Extension* dialog is displayed.
2. Fill in the table as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the *Shoulder Extension* dialog

| Field                 | Description   |
|-----------------------|---|
| <i>Start Chainage</i> | Defines the start chainage for the additional verges defined on this row. |

---

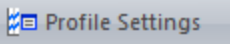
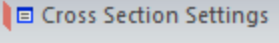
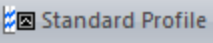
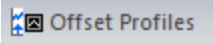
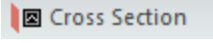
| <b>Field</b>       | <b>Description</b>   |
|--------------------|--|
| <i>Left Width</i>  | Defines the width of the verge. This extends the last left hand leg of the template by this horizontal width. Leave the field blank if no verge is to be applied.  |
| <i>Right Width</i> | Defines the width of the verge. This extends the last right hand leg of the template by this horizontal width. Leave the field blank if no verge is to be applied. |
| <i>Plot</i>        | Tick to plot a leader with levels for the verges on the cross sections.<br>Leave unticked to plot the lines only.  |

## Compute Design icon

The **Compute Design** icon the Road design view allows you to compute and store the design surface of the road. It should be used when any of the design parameters are altered to update the design surface in the alignment and cross section panes and to save the design ready for the next stage.

Click the icon to compute the design. The design surface is computed to reflect the new design parameters. The results are displayed in the road design view panels.

## Plotting tab

| Plot Settings group   |   |
|---|---|
|  | Profile Settings icon<br>Click it to configure profile plotting parameters.             |
|  | Cross Section Settings icon<br>Click it to configure cross section plotting parameters. |
| Plot group  |   |
|  | Standard Profile icon<br>Click it to plot a standard profile as a drawing.              |
|  | Offset Profile icon<br>Click it to plot an offset profile as a drawing                  |
|  | Cross Section icon<br>Click it to plot sheets of cross sections as a drawing.           |

### Profile Settings icon

The **Profile Settings** icon of the Road design view allows you to customize all of the parameters necessary to create a profile drawing.

You may use two formats of plotting:

- Standard Format – A leader line is defined for each chainage and level position of the natural and design surfaces.
- Grid Format – A grid is displayed with leaders at nominated intervals of chainage.

To configure a profile plotting:

1. At the *Plotting* tab of the Road design view, click the **Profile Settings** icon.  
The **Profile Plot Settings** dialog is displayed.
2. At the *General Plot Settings* tab, configure the position of the profile drawing on a title block; define the scales and the information included on the profile. See "General Plot Setting tab" section on the facing page for fields description.
3. At the *Standard Profile Settings* tab, configure the plot parameters for the two profile lines. See "Standard Profile Settings tab" section on page 723 for fields description.
4. At the *Offset Profile Settings* tab, define up to 8 profile lines along a selection of different strings and from different surfaces. It is only used when plotting offset profiles. See Offset Profile Settings tab for fields description.
5. At the *Profile Table* tab, define standard parameters for plotting profile sections. See "Profile Table tab" section on page 724 for fields description.
6. At the *Cut/Fill Settings* tab, define the plot parameters for the cut/fill row on the profile layout. See "Cut/Fill Settings tab" section on page 725 for fields description.
7. At the *Volumes Settings* tab, define the plot parameters for the volumes row on the profile layout. See "Volume Settings tab" section on page 726 for fields description.
8. Click **OK**.



## General Plot Setting tab

This section describes the *General Plot Settings* tab of the **Profile Plot Settings** dialog of the Road design view. At this tab you may position the profile drawing, or drawings, on a title block. Additional settings define the scales used the required information included on the profile.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *General Plot Settings* tab

| Field                            | Description   |
|----------------------------------|---|
| <i>Horizontal Scale (1 in .)</i> | Defines the horizontal scale for the profile.   |
| <i>Vertical Scale (1 in .)</i>   | Defines the vertical scale for the profile.   |
| <i>Start Position X</i>          | Defines the X coordinate of the starting position of the lower left corner of the profile layout. This is measured in millimeters from the bottom left corner of the title block.   |
| <i>Start Position Y</i>          | Defines the Y coordinate of the starting position of the lower left corner of the profile layout. This is measured in millimeters from the bottom left corner of the title block.   |
| <i>Minimum Datum</i>             | Select the radiobutton to this option to define a minimum datum level in millimeters on the plan. The value specified in the editbox sets the minimum distance of the profile line from the datum line of the profile layout.   |
| <i>Maximum Datum</i>             | If the <i>Minimum Datum</i> radiobutton is selected, specify the maximum datum level in millimeters on the plan. The specified value sets the maximum distance of the profile line from the datum line of the profile layout.<br>If the profile line is still rising when the maximum datum is reached, the datum will be reset to the minimum datum position |
| <i>Datum Level</i>               | Select the radiobutton to this option to define a fixed datum level (in meters) in the editbox. The profile line will be drawn relevant to this level on the profile.   |
| <i>Max Plot Length</i>           | Defines the maximum plot length of the profile layout in millimeters on the selected title block. This length will need to be modified for smaller paper sizes.<br><i>For example, Max Plot Length = 700 represents 700mm on an A1 sheet.</i>   |
| <i>Start Station</i>             | Defines the start chainage of the profile for this drawing.<br>Default is 0.000 and can be used if the full length of the road is to be plotted   |
| <i>End Station</i>               | Defines the end chainage of the profile for this drawing.<br>Default is 99999.999 and can be used if the full length of the road is to be plotted   |

| <b>Field</b>                   | <b>Description</b>  |
|--------------------------------|---|
| <i>Title Block</i>             | Defines the required title block to the drawing. Select it from the library by clicking >>.   |
| <i>Plot Grid</i>               | Tick to plot in a Grid Format.  |
| <i>Station Interval</i>        | Defines the chainage intervals.   |
| <i>Horizontal Interval</i>     | Defines the space between the horizontal grid lines in meters.  |
| <i>Vertical Interval</i>       | Defines the space between the vertical grid lines in meters.  |
| <i>Grid Height</i>             | Defines the height of the grid above the datum line on the drawing in millimetres.<br>If this height is greater than the height available on the title block, the plot will stop at the extents of the title block.                               |
| <i>Plot Datum</i>              | Tick to plot the datum value at the left hand end of the datum line.  |
| <i>Plot IPs</i>                | Tick to plot the levels of the IP positions on the leader line below the profile line.  |
| <i>Plot Min/Max</i>            | Tick to plot the high and low point details on the surface of the design profile.   |
| <i>Plot Obstructions</i>       | Tick to plot any obstructions.  |
| <i>Plot VC Length</i>          | Tick to plot all the vertical curve lengths. These are plotted in a horizontal line between the profile line and the datum line.  |
| <i>Plot VC Grade</i>           | Tick to plot all the grades between IPs. These are plotted in a horizontal line between the profile line and the datum line.  |
| <i>Super Elevation Details</i> | Tick to plot an extra row of data at the bottom of the profile. The super-elevation details for the various curves in the design are plotted.   |
| <i>Plot Cut/Fill</i>           | Tick to plot an extra row of data above the surface levels. The cut or fill difference between the natural surface and design surface is plotted. The parameters from the Cut/Fill Settings tab must be configured to achieve the correct results |
| <i>Plot Volumes</i>            | Tick to plot an extra row of data above the surface levels. The volumes between the adjacent cross sections are displayed as cut and fill. The parameters from the Volume Settings tab must be configured to achieve the correct results.         |
| <i>Alignment Details</i>       | Tick to plot an extra row of data below the chainages of the profile. The horizontal alignment details for the road are plotted.  |
| <i>Extra Row</i>               | Tick to include an extra row at the bottom of the profile figure for additional information.  |
| <i>With Leader</i>             | Tick to extend the leader lines through this new row.<br>Leave unticked to leave the row free of leader lines.  |

## Standard Profile Settings tab

This section describes the *Standard Profile Settings* tab of the **Profile Plot Settings** dialog of the Road design view. At this tab you may configure the plot parameters for the two profile lines. Use it to plot a profile containing only the design and natural surface profiles of the current string. Select line types and colors for these two surfaces.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *Standard Profile Settings* tab

| Field                  | Description  |
|------------------------|--|
| <i>Design Surface</i>  | <p>Tick the <i>Active</i> checkbox to plot the profile of the design surface and its data. Specify a label in the editbox. The label is used to name this row of levels on the profile plot.</p> <p>Select the color, line type and thickness of the design profile line, and select the text style used for the design surface levels.</p>    |
| <i>Natural Surface</i> | <p>Tick the <i>Active</i> checkbox to plot the profile of the natural surface and its data. Specify a label in the editbox. The label is used to name this row of levels on the profile plot.</p> <p>Select the color, line type and thickness of the natural profile line, and select the text style used for the natural surface levels.</p> |
| <i>Justification</i>   | Select the required justification table from the drop-down list to set the format and precision of the chainage and level numerical data on the profile plot.  |
| <i>Plot Sequence</i>   | Define the order in which the three lines of detail will be plotted.   |

## Offset Profile Settings tab

This section describes the *Offset Profile Settings* tab of the **Profile Plot Settings** dialog of the Road design view. At this tab you may define up to 8 profile lines along a selection of different strings and from different surfaces. Each profile line may have a separate datum by allocating spacing by using the *Sep* column. This data is only used when plotting offset profiles.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *Offset Profile Settings* tab

| Field          | Description  |
|----------------|--|
| <i>Active</i>  | Tick to define and later plot the profile of a string on a nominated surface. When the checkbox is ticked the row is activated for data entry. |
| <i>String</i>  | Selected a string from the drop-down list. The strings will be from the natural surface data and any strings created for the design.           |
| <i>Surface</i> | Select a surface from the drop-down list. The surfaces listed will be every natural, design and subgrade surface created for the road.         |

| Field                | Description  |
|----------------------|--|
| <i>Label</i>         | Specify a label in this field. The label is used to name the levels for this profile on the profile plot.  |
| <i>Color</i>         | Select a color for the profile line defined on this row.   |
| <i>Sep</i>           | For all profile lines at the same datum, leave this field set to 0.00<br>To allocate a separation to the profiles on the profile plot, specify a value in millimeters. |
| <i>Justification</i> | Select the required justification table from the drop-down list to set the format and precision of the chainage and level numerical data on the profile plot.          |

In each row you may click >> to open the *Additional Offset Profile Specification* dialog.

#### Fields of the *Additional Offset Profile Specification* dialog

| Field             | Description  |
|-------------------|--|
| <i>Text Style</i> | Defines the text style used for the levels of this profile line. |
| <i>Line Style</i> | Defines the line style used for this profile line.               |
| <i>Thickness</i>  | Defines the line thickness used for this profile line.           |

### Profile Table tab

This section describes the *Profile Table* tab of the *Profile Plot Settings* dialog of the Road design view. At this tab you may define standard parameters for plotting longitudinal sections. The parameters stored in the profile table will be used for both offset profile and standard profile drawings.

The Profile Table is used to define the appearance of the profile layout with respect to grid lines, leaders, horizontal line spacings, labels, text types and colors.

You may save the configuration to the default one, by clicking **Save To Lib**. These settings will be available in other projects.

To load previously saved configuration, click **Load From Lib**.

#### Fields of the *Profile Table* tab

| Field                    | Description   |
|--------------------------|---|
| <i>Horizontal Lines</i>  | Defines the color and thickness for the horizontal lines. |
| <i>Grid/Leader Lines</i> | Defines the color and thickness for the horizontal lines. |
| <i>Line Spacing</i>      | Defines the spacing between the horizontal lines.         |
| <i>Station Tolerance</i> | Defines the tolerance for the chainage grid.              |
| <i>Station Format</i>    | Defines the format of chainage displaying.                |
| <i>Station Label</i>     | Defines the label and the text style for station labels.  |
| <i>Stations</i>          | Defines the text and justification styles for stations.   |
| <i>Datum</i>             | Defines the text and justification styles for datum.      |

| Field             | Description  |
|-------------------|--|
| <i>IP Max/Min</i> | Defines the text and justification styles for max and min IPs.                               |
| <i>VC Grade</i>   | Defines the text and justification styles; and the line color for the VC grade lines.        |
| <i>VC Length</i>  | Defines the text and justification styles; and the line color for the VC length lines.       |
| <i>Align</i>      | Defines the text and justification styles; and the line color for the alignment lines.       |
| <i>Super</i>      | Defines the text and justification styles; and the line color for the super elevation lines. |

## Cut/Fill Settings tab

This section describes the *Cut/Fill Settings* tab of the **Profile Plot Settings** dialog of the Road design view. At this tab you may define the plot parameters for the cut/fill row on the profile layout.

This option enables the correct level differences between nominated surfaces to be computed and plotted on the profile. When using the standard profile option, the cut/fill differences will be between the natural surface and design surface at the center line or string position.

When using the offset profile option, the cut/fill differences may be defined between any nominated surfaces.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *Cut/Fill Settings* tab

| Field                    | Description   |
|--------------------------|---|
| <i>First Line</i>        | Defines the number for the first surface to compute the cut/fill.<br>If plotting standard profile the natural surface is surface 2 and the design surface is surface 1.<br>If plotting offset profile the surface number is taken from the row number on the Offset Profile Settings tab. |
| <i>Second Line</i>       | Defines the number of the second surface to complete the cut/fill.  |
| <i>First Line Text</i>   | Defines the text required on the first line of the label in a 2 line format, or the only line of the label in a 1 line format.  |
| <i>Second Line Text</i>  | Defines the text required on the Second line of the label in a 2 line format, or the only line of the label in a 1 line format.   |
| <i>Text Style (Cut)</i>  | Defines the text style used for the cut data.   |
| <i>Text Style (Fill)</i> | Defines the text style used for the fill data.  |
| <i>Justification</i>     | Defines the justification style used for the cut/fill data.   |
| <i>Cut Text Before</i>   | Defines text that is required before each cut numeric.  |
| <i>Cut Text After</i>    | Defines text that is required after each cut numeric.   |

| Field                   | Description  |
|-------------------------|--|
| <i>Fill Text Before</i> | Defines text that is required before each fill numeric.  |
| <i>Fill Text After</i>  | Defines text that is required after each fill numeric.   |
| <i>Line Format</i>      | Defines the line format: <ul style="list-style-type: none"> <li>• <i>1 Line</i> – fill depth is written as a negative number such as -1.2 and cut depth is written as a positive number such as +1.5</li> <li>• <i>2 Lines</i> – fill depth is written as a negative number on the first line and cut depth is written as a positive number on the second line.</li> </ul> |
| <i>Sign</i>             | <ul style="list-style-type: none"> <li>• <i>Show +/-</i> – Select to show the positive and negative sign on the cut and fill values. This would usually be selected for a 1 line format.</li> <li>• <i>No Sign</i> – Select to show no signs on the cut and fill values. This may be used if a 2 lines format is chosen.</li> </ul>  |

## Volume Settings tab

This section describes the *Volumes Settings* tab of the **Profile Plot Settings** dialog of the Road design view. At this tab you may define the plot parameters for the volumes row on the long section layout.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *Volumes Settings* tab

| Field                    | Description  |
|--------------------------|--|
| <i>Text</i>              | Defines the text used as a label for this row of data on the profile.  |
| <i>Text Style (Cut)</i>  | Defines the text style used for the cut volumes.   |
| <i>Text Style (Fill)</i> | Defines the text style used for the fill volumes.  |
| <i>Justification</i>     | Defines the justification table used for the format and precision of the numeric data plotted for the volumes. |

## Cross Section Settings icon

The **Cross Section Settings** icon of the Road design view allows you to customize all of the parameters necessary to create a cross section drawing.

To configure a cross section plotting:

1. At the *Plotting* tab of the Road design view, click the **Cross Section Settings** icon.  
The **Cross Section Plot Settings** dialog is displayed.
2. At the *Cross Section Plot Settings* tab, configure the position of the cross section drawing on a title block; define the scales and the information included on the cross section. See "Cross Section Plot Setting tab" section on the facing page for fields description.
3. At the *Surface Plot Settings* tab, define the plot parameters for the various surfaces included in the drawing. See "Surface Plot Settings tab" section on page 729 for fields description.

4. At the *Cross Section Table* tab, define the standard plot parameters for the cross section layout, including the text styles used.
5. Click **OK**.

### Cross Section Plot Setting tab

This section describes the *Cross Section Plot Settings* tab of the **Cross Section Plot Settings** dialog of the Road design view. At this tab you may position the cross section drawing, or drawings, on a title block. Additional settings define the scales used the required information included on the cross section.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

#### Fields of the *Cross Section Plot Settings* tab

| Field                                  | Description  |
|--|--|
| <i>Horizontal Scale (1 in .)</i>       | Defines the horizontal scale for the cross section.  |
| <i>Vertical Scale (1 in .)</i>         | Defines the vertical scale for the cross section.  |
| <i>Start Position X</i>                | Defines the X coordinate of the starting position of the lower left corner of the cross section layout. This is measured in millimeters from the bottom left corner of the title block.  |
| <i>Start Position Y</i>                | Defines the Y coordinate of the starting position of the lower left corner of the cross section layout. This is measured in millimeters from the bottom left corner of the title block.  |
| <i>Left / Right Plot Limit-Figures</i> | Defines the offset limits for the plotting of offset and level figures.<br>Defines an offset in meters to the left and right of the center line or string around which the sections are designed. Any data outside this limit is excluded from the cross sections. |
| <i>Left / Right Plot Limit-Lines</i>   | Defines the offset limits for the plotting of lines.<br>Defines an offset in meters to the left and right of the center line or string around which the sections are designed. Any data outside this limit is excluded from the cross sections                     |
| <i>Start Chainage</i>                  | Defines the start chainage of the cross sections for this drawing.<br>Default is 0.000 and can be used if the full length of the road is to be plotted.  |
| <i>End Chainage</i>                    | Defines the end chainage of the cross sections for this drawing.<br>Default is 99999.999 and can be used if the full length of the road is to be plotted.  |
| <i>Title Block</i>                     | Defines the required title block to the drawing. Select it from the library by clicking >>.  |

| Field                          | Description  |
|--------------------------------|--|
| <i>Datum Level</i>             | <p>Tick to specify a fixed datum level (in metres) in the editbox. The cross sections will be drawn relevant to this level on all the sections, even when the grade of the road changes.</p> <p>Leave unticked for the datum to be reset to a suitable value by the software, following the rules in the cross section Table.</p>  |
| <i>Design Level Selections</i> | <p>The format of the fields in this section will be dependent on the setting for the radiobutton in the <i>Type</i> field below. They are only applied on rural format cross sections.</p>   |
| <i>Type</i>                    | <ul style="list-style-type: none"> <li>• <i>Offsets</i> – The editboxes from the <i>Design Level Selection</i> group box are set for the input of specified offsets. Specify a minus sign for offsets to the left of the center line. Levels will be interpolated from the design surface at these offsets and plotted on the cross sections at these positions for rural format cross sections.</li> <li>• <i>Labels(Codes)</i> – The editboxes from the <i>Design Level Selection</i> group box are set for the input of the labels or codes applied to the ends of particular legs of the cross section. Levels will be interpolated from the design surface at these points and plotted on the rural format cross sections.</li> </ul> |
| <i>Spacing</i>                 | <ul style="list-style-type: none"> <li>• <i>Regular</i> – Cross sections are positioned on the sheet by the row spacing set in the Cross Section Table, so that this vertical spacing is applied from the datum line of the first section to the datum line of the next section.</li> <li>• <i>Auto</i> – Cross sections are positioned on the sheet by the Auto row spacing set in the Cross Section Table, so that this vertical spacing is applied from the highest point on the first section to the datum line of the next section.</li> </ul>  |
| <i>X Fall Fomat</i>            | <ul style="list-style-type: none"> <li>• <i>Percent (%)</i> – the crossfall will be represented in percents withing the specified range.</li> <li>• <i>Ratio (1:x)</i> – the crossfall will be represented as ratio.</li> </ul>  |
| <i>Level Difference</i>        | <p>Tick to plot the height difference between the natural and design surfaces at each offset on the full format cross sections. These are plotted in an extra row above the surface levels. Where the design surface is cut below the natural surface the level difference is negative.</p>  |
| <i>Plot Sign On XFall</i>      | <p>Tick to plot the minus sign on the crossfall, if the crossfall is activated on the Surface Plot Settings tab.</p>   |
| <i>Plot Volumes</i>            | <p>Tick to plot the volumes between this cross section and the previous one. The volumes must have been computed using the Compute Volumes icon.</p>   |



| Field                                      | Description   |
|--|---|
| <i>Plot design level on natural leader</i> | <p>Tick to plot the design surface levels on the leader lines for the natural surface when a full format cross section is plotted.</p> <p>A design level will be interpolated and plotted wherever there is a leader line relating to the natural surface.</p> <p>Leave unticked to plot the design levels only where the leader lines relate to the design surface.</p>                  |
| <i>Plot natural level on design leader</i> | <p>Tick to plot the natural surface levels on the leader line for the design surface when a full format cross section is plotted.</p> <p>A natural surface level will be interpolated and plotted wherever there is a leader line relating to the design surface.</p> <p>Leave unticked to plot the natural surface levels only where the leader lines relate to the natural surface.</p> |
| <i>Plot Obstructions</i>                   | Tick to plot any obstructions.  |
| <i>Mirror Cross Section</i>                | Tick to mirror the cross section plotting for the both sides.   |

## Surface Plot Settings tab

This section describes the *Surface Plot Settings* tab of the *Cross Section Plot Settings* dialog of the Road design view. At this tab you may define the plot parameters for the various surfaces included in the drawing. Additional options allow you to label cross sections with cross falls and plot symbols on each section.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *Surface Plot Settings* tab

| Field              | Description   |
|--------------------|---|
| <i>Active</i>      | Tick to plot the surface defined on this row of the dialog.   |
| <i>Surface</i>     | Select the required surface from the drop-down list.  |
| <i>Label</i>       | Defines the surface name, used to label rows of levels on the full format cross sections.   |
| <i>Plot Levels</i> | Tick to plot the levels for this surface, or leave unticked to plot no levels for this surface. Subgrades usually have this box unticked. A row of levels is included in the full format cross sections. The centreline level is displayed for the surface for rural format cross sections. |
| <i>Plot Lines</i>  | Tick to plot the line work for this surface. If the check box is unticked no lines will appear on the plot for this surface.  |
| <i>Plot XFalls</i> | Tick to plot the crossfalls on the surface. Leave unticked to exclude crossfalls. Normally this checkbox is only ticked for the design surface.   |

| Field               | Description  |
|---------------------|--|
| <i>Plot Leads</i>   | Tick to plot the leader lines for this surface on the full format cross section. Normally this checkbox is ticked for the natural and design surfaces but not for the subgrades.   |
| <i>Plot Symbols</i> | Tick to plot the symbols defined in the symbol table. See "Symbol icon" section on page 709 for details. Normally this box is ticked only for the Natural surface to marked specific features such as fence lines, boundaries or existing seal positions |
| <i>Plot Codes</i>   | Tick to plot the survey codes from the cross section. If ticked, click >> and specify the codes for plotting in the table.   |
| <i>Color</i>        | Defines the color plotted for this surface on the cross sections.  |
| <i>Angle</i>        | Defines the angle for the display of design levels specified for rural format cross sections using the field <i>Design Level Selection</i> from the Cross Section Plot Setting tab.  |

In each row you may click >> to open the **More Surface Plot Specification** dialog.

#### Fields of the **More Surface Plot Specification** dialog

| Field                | Description   |
|----------------------|---|
| <i>Text Style</i>    | Defines the text style used for the levels of this surface. |
| <i>Line Style</i>    | Defines the line style used for this surface.               |
| <i>Thickness</i>     | Defines the line thickness used for this surface.           |
| <i>Justification</i> | Defines the justification style used for this surface.      |

## Standard Profile icon

The **Standard Profile** icon of the Road design view allows you to plot a standard long section as a drawing in the drawings view. A standard long section contains profiles of the natural surface and the design surface for the current string in the roads view.

Click the icon to plot the profile. The drawings view is opened as the current view and a linked drawing is created containing the sheet or sheets that make up the long section drawing.

If more than one sheet is required to plot the long section at the required scale on the selected title block, multiple sheets will be created within the one drawing.

If the design in the roads design view is modified, the linked drawing may be updated in the drawings view by using the **Regen** icon. There is no need to use the **Standard Profile** icon again from the roads view, as this will create another drawing, losing any modifications already made in the drawings view.

## Offset Profile icon

The **Offset Profile** icon of the Road design view allows you to plot an offset long section as a drawing in the drawings view. An offset long section contains up to 8 profiles along various strings and surfaces in the roads view.

Click the icon to plot the profile. The drawings view is opened as the current view and a linked drawing is created containing the sheet or sheets that make up the offset long section drawing.

If more than one sheet is required to plot the long section at the required scale on the selected title block, multiple sheets will be created within the one drawing.

If the design in the roads design view is modified, the linked drawing may be updated in the drawings view by using the **Regen** icon. There is no need to use the **Offset Profile** icon again from the roads view, as this will create another drawing, losing any modifications already made in the drawings view.

## **Cross Section icon**

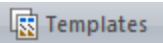
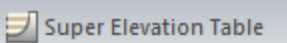
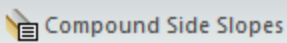
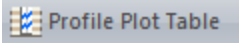
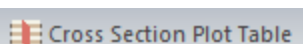
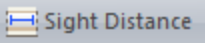
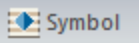
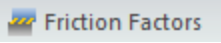
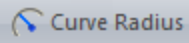
The **Cross Section** icon of the Road design view allows you to plot sheets of cross sections as a drawing in the drawings view.

Click the icon to plot the cross section. The drawings view is opened as the current view and a linked drawing is created containing the sheet or sheets that make up the cross section drawing.

If more than one sheet is required to plot the cross section at the required scale on the selected title block, multiple sheets will be created within the one drawing.

If the design in the roads design view is modified, the linked drawing may be updated in the drawings view by using the **Regen** icon. There is no need to use the **Cross Section** icon again from the roads view, as this will create another drawing, losing any modifications already made in the drawings view.

## Library tab

| <b>Templates group</b>   |   |
|--|---|
|  Templates                | <b>Templates icon</b><br>Click it to manage road templates library.   |
|  Super Elevation Table    | <b>Super Elevation Table icon</b><br>Click it to configure the super elevation table library.                           |
|  Compound Side Slopes     | <b>Compound Side Slopes icon</b><br>Click it to define details of the compound side slopes library.                     |
| <b>Plot Table group</b>  |   |
|  Profile Plot Table       | <b>Profile Plot Table icon</b><br>Click it to configure the standard parameters for plotting profile sections.          |
|  Cross Section Plot Table | <b>Cross Section Plot Table icon</b><br>Click it to configure the standard plot parameters for the cross section layout |
| <b>Reference group</b>   |   |
|  Sight Distance           | <b>Sight Distance icon</b><br>Click it to manage the sight distance tables.   |
|  Symbol                  | <b>Symbol icon</b><br>Click it to attach symbols to the special survey codes  |
|  Friction Factors       | <b>Friction Factors icon</b><br>Click it to manage the friction factor tables.  |
|  Curve Radius           | <b>Curve Radius icon</b><br>Click it to manage the curve radius tables.   |

## Templates icon

The **Templates** icon of the Road design view allows you to create and modify the library road templates. A road template is the road cutting, which may be created from the base line.

Road templates from the library are available for all MAGNET Office projects.

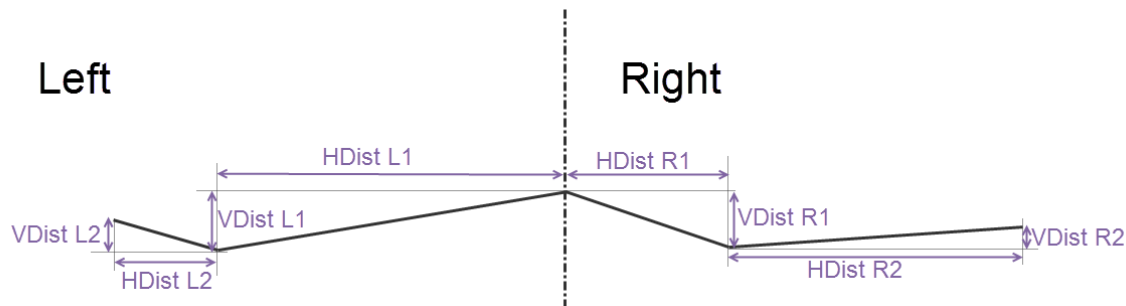
Using of these templates may significantly simplify the roads creation. You only need to create the base line of the road, and use the "Parallel Figure" command to automatically create the road cutting. See "Parallel Figure icon" section on page 204 for details.

Buttons and fields of the dialog are described in the tables below

### Fields of the *Road Template* Dialog

| Field                | Description   |
|----------------------|---|
| <i>Template Name</i> | Defines the name of the current template. This field also contains the list of the existing templates. Click to see it. |

| Field                 | Description   |
|-----------------------|---|
| <i>Vert. Exag.</i>    | Defines the vertical scale of the template preview.   |
| <b>Template table</b> |   |
| <i>HDist</i>          | Defines the horizontal size of the template segment. See picture below for details.   |
| <i>VDist</i>          | Defines the vertical size of the template segment. See picture below for details. Positive vertical distance means that the end point of the segment is higher than the start point. Negative vertical distance means that the end point of the segment is higher than the start point.   |
| <i>Slope</i>          | Defines the slope of the template segment. Positive slope means that the end point of the segment is higher than the start point. Negative slope means that the end point of the segment is higher than the start point.<br><br><b>IMPORTANT</b><br><b>The VDist field has the priority. If both VDist and Slope fields are filled in, the value from the VDist field will be used.</b> |
| <i>Label</i>          | Defines the name of the string, created by the template segment.  |
| <i>Plot</i>           | Defines whether the template segment will be plotted in the preview.  |



**Road template parameters**

**Buttons of the Road Template dialog**

| Button              | Description  |
|---------------------|--|
| <b>New</b>          | Click it to create a new template.   |
| <b>Del Template</b> | Click it to delete the current template.   |
| <b>CopyToLeft</b>   | Click it to copy the right segments to the left.<br><br><b>CAUTION</b><br><b>The left segments will be overwritten. All existing left segments will be lost.</b>   |
| <b>CopyToRight</b>  | Click it to copy the left segments to the right.<br><br><b>CAUTION</b><br><b>The right segments will be overwritten. All existing right segments will be lost.</b> |
| <b>Insert</b>       | Click it to insert an additional row to the template table.  |
| <b>Delete</b>       | Click it to delete the selected row from the template table.   |

| Button | Description  |
|--------|--|
| OK     | Click it to save the changes and close the dialog.   |
| Cancel | Click it to close the dialog without saving changes. |

## Super Elevation Table icon

The **Super Elevation Table** icon of the Road design view allows you to define superelevation and widening details into individual tables so that changes may be applied to the design template at particular chainages.

Each table contains a number of rows of data that map the change of the crossfall and width of particular legs defined in the template. The rate of change is dictated by the data entered on any two adjacent rows. This information is available to any road in the current job.

The library Super Elevation Table can be applied as a standard for many projects.

A Super Elevation Table will also be used to apply grade and width changes to the template used for subgrade surfaces.

To configure the Super Elevation Table:

1. At the *Library* tab of the Road design view, click the **Super Elevation** icon.

The **Super Table** dialog is displayed.

2. Do one of the following:

- From the *Super Table* drop-down list, select the table for editing.
- Click **New** to create a new super table, and type its name in the *Super Table* field.

3. Configure the parameters as you need. Fields are described in the table below. Also, keep in mind the following:

- The first row of information in the table should relate to the existing design template. The first Dist From SS (Start Superelevation) must be 0, the first Offset To Control should be 0 and the first slope and width should be equal to the slope and width of the selected leg in the design template. The subsequent rows indicate the changes to be made to this template as distance increases along the alignment. The user inputs distance increments and a new cross fall and width to be applied at that point. Any cross section that lies between the two adjacent rows has its crossfall, and width if widening is applied, interpolated from this data.
- If the curve is symmetrical and the superelevation returns to the standard template settings at the same rate as the approach into the curve, the user may simply enter the data from the Start of Superelevation to the Maximum Superelevation.
- The option Super Table Selection is used to nominate the chainage at which a super table should start to be applied. If the table only maps the changes up to the maximum superelevation, the return to the standard template may be defined from the end of the maximum superelevation.
- It is usual to apply these templates to the first and possibly subsequent legs. If the first leg is changed using these tables, the other legs will automatically join to the end point of this leg without the user having to apply changes to them.
- Multiple superelevation changes can be applied at the same chainage range if required. For example it may be necessary to use one table to apply changes to one leg of the template, and another to apply changes to another leg where the rate of change is different for this leg. It may be possible to

handle all the necessary changes with one table but multiple tables can be used if necessary.

4. Click **OK**.

**Fields of the *Super Table* dialog**

| <b>Field</b>               | <b>Description</b>   |
|----------------------------|--|
| <i>Super Table</i>         | Defines the name of the super table.<br>An existing table cannot be renamed.   |
| <i>Radius</i>              | This is a label to assist you to select the appropriate table for a particular radius curve.   |
| <i>Speed</i>               | This is a label to assist you to select the appropriate table for a particular design speed.   |
| <i>Left Leg/Right Leg</i>  | Defines the number relating to the left template leg and the right template leg that will be modified by the data in the two columns for width and crossfall beneath these fields.<br>Up to two template legs at each side of the template may be modified by the one super table. |
| <i>Label</i>               | Defines an optional label for particular points defined by each row of the super table. These will help the user to check the definitions of the changes in the table/   |
| <i>Dist (From) SS</i>      | Defines the distance from the start of the changes. The first row is usually set to 0 and the distances increase through the subsequent rows of data.  |
| <i>Offset (To) Control</i> | Defines the center line offset to allow for shift in transitions if these are not applied in the horizontal alignment. The first row must be set to 0 if these settings are used. If this column is left blank the offset to control is assumed to be 0.                           |
| <i>Width</i>               | Defines the width for the relevant template leg at the distance from the SS (start of the superelevation or widening)  |
| <i>XFall (%)</i>           | Defines the cross fall as a percentage for the relevant template leg at the distance from the SS. (start of the superelevation or widening)  |

## Compound Side Slopes icon

The **Compound Side Slope** icon of the Road design view allows you to define details of multiple and varying side slope legs to form compound side slopes. Each page or sheet of side slope information represents the detail for one leg of the side slope as it occurs in either a cut or fill situation. Up to four different side slope solutions may be defined on each sheet, of which only one will be applied. The side slope chosen at each cross section will depend on the depth to the natural surface compared to the calculated depth of the side slope. An unlimited number of side slope legs may be defined on multiple sheets.

These compound side slope definitions, meet standard specifications, and available for all MAGNET Office projects.

To configure the compound side slope:

1. At the *Library* tab of the Road design view, click the **Compound Side Slope** icon.

The **Compound Side Slope** dialog is displayed.

2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the *Compound Side Slope* dialog

| Field                      | Description   |
|----------------------------|---|
| <i>Compound Side Slope</i> | The \$\$DEFAULT side slope is displayed. This data relates to one leg of the compound side slope.<br>You may create new compound side slopes by clicking <b>New</b> . You may change the name of the compound side slope in this field.   |
| <i>Cut / Fill</i>          | Each section has four rows for defining four varying side slopes, dependent on the depth to the natural surface compared to the calculated depth of the side slope. The settings for cut and fill situations will often be different.   |
| <i>Depth</i>               | Defines the depth below the natural surface (cut) or above the natural surface (fill) up to which this side slope definition will be applied.   |
| <i>Horizontal Distance</i> | Defines the horizontal component of the side slope leg. This is usually positive but could be negative if defining a bridge structure.  |
| <i>Vertical Distance</i>   | Defines the vertical component of the side slope leg. This field is not used if the fixed side slope type is used. This value should be entered as a positive value, even in a fill situation. A negative value may be used to force a leg in the opposite direction to the norm. |
| <i>End Depth</i>           | Defines the end depth required. It is only used with normal and continue types of side slope.   |
| <i>Normal</i>              | The compound side slope is stopped if it intersects the natural surface.  |
| <i>Intersect</i>           | The side slope continues at the specified grade until the natural surface is intersected.   |
| <i>Fixed Width</i>         | The side slope intersects the natural surface at the specified width.   |
| <i>Fixed Depth</i>         | The side slope intersects the natural surface at the specified depth.   |
| <i>Continue</i>            | The side slope continues for the distance specified. The side slope will continue through the natural surface to complete the leg   |

## Sight Distance icon

The **Sight Distance** icon of the Road design view allows you to manage the sight distance tables library.

A sight distance table is used when editing a vertical IP, to create a vertical curve that is based on sight distance criteria from the applicable standards such. You set up multiple tables in the library based on local standards.

These tables will be available for all MAGNET Office projects.

To create a new sight distance table:

1. At the *Library* tab of the Road design view, click the **Sight Distance** icon.  
The *Sight Distance* dialog is displayed.
2. Click **New**.



3. In the *Sight Distance* editbox, type the name of the new sight distance table.
4. Fill in the table. Fields are described in the table below.
5. Click **OK**.

To edit an existing sight distance table:

1. At the *Library* tab of the Road design view, click the **Sight Distance** icon.  
The *Sight Distance* dialog is displayed.
2. From the *Sight Distance* drop-down list, select the required sight distance table.
3. Fill in the table. Fields are described in the table below.
4. Click **OK**.

#### Fields of the *Sight Distance* dialog

| Field                 | Description   |
|-----------------------|---|
| <i>Sight Distance</i> | This is the name of the current sight distance table.   |
| <i>Speed</i>          | Defines the design speed for the parameters on this row of data.  |
| <i>Stopping</i>       | Defines the visibility required (in meters) to see an object in the lane of travel and stop before striking it.   |
| <i>Intermediate</i>   | Defines a value (in meters) that enables a driver to travel a road in comfort with reasonably safe overtaking opportunities. This is used in a situation where the Overtaking sight distance provision is prohibited by cost. |
| <i>Overtaking</i>     | Defines a value (in meters) that provides sufficient visibility to detect oncoming vehicles in time to allow safe overtaking of a vehicle moving below the speed limit.   |
| <i>Headlight</i>      | Defines a value (in meters) that enables a drive to sight a stopped vehicle. This is usually only used at low speeds.   |

## Symbol icon

The **Symbol** icon the Road design view allows you to define symbols that may be attached to particular feature codes on a cross section plot.

The symbol is selected from the list of symbols in the symbol library. It is allocated to a code that is available on any surface in the cross section.

To define a new symbols table:

1. At the *Library* tab of the Road design view, click the **Symbol** icon.  
The *Symbol Table* dialog is displayed.
2. Click **New**.
3. In the *Symbol Table* editbox, type the name of the new symbol table.
4. In the *Code* field, type the code to which the symbol will be attached.
5. In the *Symbol* field, select the required symbol from the drop-down list.
6. In the *Scale* field, type the required symbol scale.
7. Repeat steps from 4 to 6 for all required codes.
8. Click **OK**.

To edit an existing symbols table:

1. At the *Library* tab of the Road design view, click the **Symbol** icon.  
The **Symbol Table** dialog is displayed.
2. From the *Symbol Table* drop-down list, the required symbol table.
3. In the *Code* field, type the code to which the symbol will be attached.
4. In the *Symbol* field, select the required symbol from the drop-down list.
5. In the *Scale* field, type the required symbol scale.
6. Repeat steps from 4 to 6 for all required codes.
7. Click **OK**.

## Friction Factors icon

The **Friction Factors** icon of the Road design view allows you to manage the friction factor tables library.

A friction factor table is used, when editing a Horizontal IP, to define the maximum design values of side friction for the type of pavement surface, at nominated design speeds.

The table will be set up for the applicable standards. You may set up multiple tables in the library based on local standards. These tables will be available for all MAGNET Office projects.

Variables are defined and applied for a specified design speed when computing the superelevation for the curve.

To create a new friction factor table:

1. At the *Library* tab of the Road design view, click the *Friction Factors* icon.  
The **Friction Factors** dialog is displayed.
2. Click **New**.
3. In the *Friction Factors* editbox, type the name of the new friction factors table.
4. In the *Speed* field, specify the design speed.
5. In the *Friction Factors* field, specify the corresponding friction factor.
6. Click **OK**.

To edit an existing friction factor table:

1. At the *Library* tab of the Road design view, click the *Friction Factors* icon.  
The **Friction Factors** dialog is displayed.
2. From the *Friction Factors* drop-down list, the required friction factors table.
3. In the *Speed* field, specify the design speed.
4. In the *Friction Factors* field, specify the corresponding friction factor.
5. Click **OK**.

## Curve Radius icon

The **Curve Radius** icon of the Road design view allows you to manage the curves radius tables library.

A curve radius table is used, when editing a Horizontal IP, to define the minimum curve radius at nominated design speeds.

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The table will be set up for the applicable standards. You may set up multiple tables in the library based on local standards. These tables will be available for all MAGNET Office projects.

Variables are defined and applied for a specified design speed when computing the minimum radius for the curve.


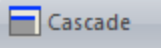
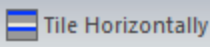
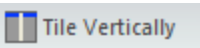
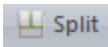
To create a new curve radius table:

1. At the *Library* tab of the Road design view, click the *Curve Radius* icon.  
The ***Curve Radius*** dialog is displayed.
2. Click **New**.
3. In the *Radius Table* editbox, type the name of the new curve radius table.
4. In the *Speed* field, specify the design speed.
5. In the *Radius (min)* field, specify the corresponding minimal radius of a curve.
6. Click **OK**.



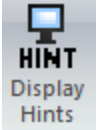
To edit an existing curve radius table:

1. At the *Library* tab of the Road design view, click the *Curve Radius* icon.  
The ***Curve Radius*** dialog is displayed.
2. From the *Radius Table* drop-down list, the required curve radius table.
3. In the *Speed* field, specify the design speed.
4. In the *Radius (min)* field, specify the corresponding minimal radius of a curve.
5. Click **OK**.

## Window tab

|  |  |
|--|--|
|  <p>New Window</p>        | <p style="text-align: center;"><u>New icon</u></p> <p style="text-align: center;">Click it to open current road design in another window.</p>                  |
|  <p>Cascade</p>           | <p style="text-align: center;"><u>Cascade icon</u></p> <p style="text-align: center;">Click it to cascade windows in the working area.</p>                     |
|  <p>Tile Horizontally</p> | <p style="text-align: center;"><u>Tile Horizontally icon</u></p> <p style="text-align: center;">Click it to tile windows in the working area horizontally.</p> |
|  <p>Tile Vertically</p>   | <p style="text-align: center;"><u>Tile Vertically icon</u></p> <p style="text-align: center;">Click it to tile windows in the working area vertically.</p>     |
|  <p>Split</p>             | <p style="text-align: center;"><u>Split icon</u></p> <p style="text-align: center;">Click it to change the sizes of the road design view panels.</p>           |

## Help tab

|  |  |
|--|--|
|  <p>Help</p>                            | <p style="text-align: center;"><u>Help icon</u></p> <p style="text-align: center;">Click it to open product help.</p>                                    |
|  <p>About</p>                         | <p style="text-align: center;"><u>About icon</u></p> <p style="text-align: center;">Click it to display information about MAGNET Office application.</p> |
|  <p><b>HINT</b><br/>Display Hints</p> | <p style="text-align: center;"><u>Display Hints icon</u></p> <p style="text-align: center;">Click it to display product hints.</p>                       |

# Profile Design View

The Profile Design View allows you to view and edit existing profiles to produce suitable grading of the road for vehicles turning from one road into the other at the intersection. These new design levels may then be updated in the Survey View to provide finished surfaces. For information about creating profiles refer to "Profile group" section on page 348.




A profile may be created from a string, polygon, line or arc. It is usually used to represent the horizontal shape and vertical design profile of a profile line that runs from one road through an arc into another road at an intersection.

This option may also be used to create a simple long section through the surveyed or design levels of a pipe line or service or other feature.

The Profile Design View has its own ribbon, different from the default MAGNET Office ribbon. Descriptions may be found in the appropriate sections:

- "File tab" section on the next page
- "View tab" section on page 743
- "Settings tab" section on page 744
- "Design tab" section on page 745
- "Plotting tab" section on page 752
- "Window tab" section on page 755
- "Help tab" section on page 755

## File tab

|  |   |
|--|---|
| <br>Open... | <p><u>Open icon</u><br/>Click it to open an existing profile.</p>   |
| <br>Save    | <p><u>Saver icon</u><br/>Click it to save the current profile.</p>  |
| <br>Close   | <p><u>Close icon</u><br/>Click it to close the current profile.</p> |

## View tab

| <b>Refresh group</b>   |   |
|--|---|
| <br>Redraw          | <u>Redraw icon</u><br>Click it to refresh the displaying of entities in the current view. |
| <b>Navigate group</b>  |   |
| <br>Zoom<br>▼       | <u>Zoom icon</u><br>Click it to it to fit all data in the view.                           |
|  Window             | <u>Window icon</u><br>Click it to draw a rectangle area to be fits the screen.            |
|  Previous           | <u>Previous icon</u><br>Click it to return to the previous view.                          |
|  In                 | <u>In icon</u><br>Click it to zoom in the center area of the survey view.                 |
|  Out                | <u>Out icon</u><br>Click it to zoom in the center area of the survey view.                |
| <br>Pan            | <u>Pan icon</u><br>Click it to scroll the view  |
| <b>View group</b>  |   |
| <br>Toolbar       | <u>Toolbar icon</u><br>Click it to enable/disable toolbar.                                |
| <br>Status<br>Bar | <u>Status icon</u><br>Click it to enable/disable toolbar.                                 |

## Settings tab

|                  |   |
|------------------|---|
| Display Settings | Display Settings icon<br>Click it to configure the layout of the main view. |
| Profile Settings | Profile Settings icon<br>Click it to configure the profile surfaces.        |

### Display Settings icon

The **Display Setting** icon of the Profile design view allows you to configure which information will be displayed in the profile view.

To configure the profile view layout:

1. At the *Settings* tab of the Profile design view, click the **Display Settings** icon.  
The **Profile** dialog is displayed.
2. Define which information should be displayed by ticking the appropriate checkboxes. Fields are described in the table below.
3. Click **OK**.

#### Fields of the **Profile** dialog

| Field                    | Description   |
|--------------------------|---|
| <i>Display Leaders</i>   | Tick to display the vertical leader lines in the profile view.  |
| <i>Design Levels</i>     | Tick to display the levels for the vertical profile design on each leader line.   |
| <i>Natural Levels</i>    | Tick to display the levels for the natural surface on each leader line.   |
| <i>Level Differences</i> | <p>Tick to display the difference between the levels of design and natural surfaces.</p> <ul style="list-style-type: none"> <li>• Fill – when design surface is above the natural surface. Displayed as positive value, followed by F. <i>For example, 0.15F.</i></li> <li>• Cut – when design surface is below the natural surface. Displayed as negative value, followed by C. <i>For example, -0.15C.</i></li> </ul> |
| <i>Peg Chainage</i>      | Tick to display the peg chainage or running distance along the profile curb. This chainage would be the same with the Shift chainage for a curb, so only tick one option.   |
| <i>Shift Chainage</i>    | Tick to display the shift chainage or running distance along the curb. This chainage would be the same with the Peg chainage for a curb, so only tick one option.   |
| <i>IPs</i>               | Tick to display the level of the IP point for the profile design. The chainage and level is displayed vertically above the triangular symbol used to define an IP position.   |



| Field                 | Description   |
|-----------------------|---|
| <i>Curve Length</i>   | Tick to to display the length of the vertical curves for each IP point of the profile design. The curve length is displayed at the top of the screen above a horizontal line that shows the position and length of the curve.   |
| <i>Hi/Low Points</i>  | Tick to display the high and low points on the formation levels of the vertical profile design. The chainage and level is displayed vertically above the high or low point and marked HI for high point and LO for low point.   |
| <i>Grades</i>         | Tick to display the grade of the designed profile line between two adjacent IP points. The grade is displayed as a positive or negative percentage below the curve length data at the top of the screen, and above a horizontal line that shows where the grades change at each IP point. The grade is measured from left to right, from the lower chainage or distance position to the higher chainage or distance position. |
| <i>Vertical Exag</i>  | This value defaults to 1.000. Increase to change the vertical scale as a ratio to the horizontal scale in the onscreen display. A value of 2.000 will set the vertical scale at twice the horizontal scale.   |
| <i>Precision</i>      | Defines the number of decimal places in the data displayed in the profile view.   |
| <i>Start Chainage</i> | Defines the start chainage of the profile.  |

## Profile Settings icon

The **Profile Settings** icon of the Profile design view allows you to configure the displaying of the profile and the natural surface in the profile view.

Click the icon to open the **Profile Settings** dialog.

To configure a surface layout:

1. Do one of the following:
  - Double click the required surface in the list.
  - Select the required surface in the list, and click **Edit**.

The **Settings** dialog is displayed.

2. In the *Name* editbox, type the name of the surface.
3. Define whether the surface is active or not, by ticking the *Active* checkbox.
4. From the *Color* drop-down list, select the color for the surface displaying.
5. Click **OK**.

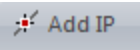
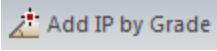
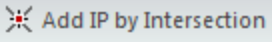
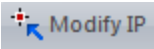
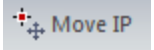
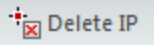
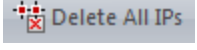
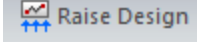
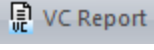
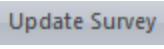
To set a surface as current, select the required surface in the list, and click **Set Current**.

To delete a surface from the design, select the required surface in the list, and click **Delete**.

## Design tab

The *Design* tab of the Profile design view allows you to add, modify and delete IPs of the profile, so its initial design may be changed. These changes may be posted back to the survey view, to change the appropriate data in that view.

The tab contains 10 icons, divided to four groups, described in the table below.

| <b>Add IP group</b>   |   |
|---|---|
|    | Add IP icon<br>Click it to add a new IP to the profile.   |
|    | Add IP by Grade icon<br>Click it to create a new IP at the grade line from an existing IP.                      |
|    | Add IP by Intersection icon<br>Click it to create a new IP at the intersection of grades from two existing IPs. |
| <b>Edit IP group</b>  |   |
|    | Modify IP icon<br>Click it to change properties of an existing IP.  |
|    | Move IP icon<br>Click it to move an existing IP to a new position.  |
|    | Delete IP icon<br>Click it to delete an existing IP from the profile design.                                    |
|    | Delete All IPs icon<br>Click it to delete all existing IPs from the profile design.                             |
|    | Raise Design icon<br>Click it to adjust design by level.  |
| <b>Report group</b>   |   |
|  | VC Report icon<br>Click it to calculate levels for the different strings involved in a profile.                 |
| <b>Transfer group</b>   |   |
|  | <u>Update Survey icon</u><br>Click it to update changes in the profile design to the survey view.               |

## Add IP icon

The **Add IP** icon of the Profile design view allows you to insert a new IP at a defined position.

To add an IP to the profile design:

1. At the *Design* tab of the Profile design view, click the **Add IP** icon.
2. Locate the new IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the chainage, level, approach and departure grades in the appropriate editboxes at the bottom toolbar.

The *IP Details* dialog is displayed.

3. Review the parameters, if needed change them. Fields are described in the table below.
4. Click **OK**.

**Fields of the *IP Details* dialog**

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>IP Chainage</i>             | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>                | Defines the level of the new IP.   |
| <i>Grade</i>                   | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

**Add IP by Grade icon**

The **Add IP by Grade** icon of the Profile design view allows you to insert a new IP at a grade from an existing IP.

To add an IP by grade:

1. At the *Design* tab of the Profile design view, click the **Add IP by Grade** icon.
2. In the profile view, select the base IP.
3. Locate the new IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the chainage and grade from the base IP in the appropriate editboxes at the bottom toolbar.

The *IP Details* dialog is displayed.

4. Review the parameters, if needed change them. Fields are described in the table below.
5. Click **OK**.

**Fields of the *IP Details* dialog**

| <b>Field</b>       | <b>Description</b>                                       |
|--------------------|--|
| <i>IP Chainage</i> | Defines the chainage of the new intersection point (IP). |

| Field                          | Description  |
|--------------------------------|--|
| <i>IP Level</i>                | Defines the level of the new IP.   |
| <i>Grade</i>                   | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Add IP by Intersection icon

The **Add IP by Intersection** icon of the Profile design view allows you to insert a new IP at an intersection of grades from two existing IPs.

To add an IP:

1. At the *Design* tab of the Profile design view, click the **Add IP by Intersection** icon.
2. In the profile view, select the first base IP.
3. Define the grade from the first IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the grade in the appropriate editboxes at the bottom toolbar.
4. Repeat steps 2 and 3 for the second base IP.

The *IP Details* dialog is displayed.

5. Review the parameters, if needed change them. Fields are described in the table below.
6. Click **OK**.

**Fields of the *IP Details* dialog**

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>IP Chainage</i>             | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>                | Defines the level of the new IP.   |
| <i>Grade</i>                   | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

**Modify IP icon**

The **Modify IP** icon of the Profile design view allows you to change the parameters of an existing IP.

To change an IP:

1. At the *Design* tab of the Profile design view, click the **Modify IP** icon.
2. In the profile view, select the required IP.  
The *IP Details* dialog is displayed.
3. Review the parameters, if needed change them. Fields are described in the table below.
4. Click **OK**.

**Fields of the *IP Details* dialog**

| <b>Field</b>       | <b>Description</b>                                       |
|--------------------|--|
| <i>IP Chainage</i> | Defines the chainage of the new intersection point (IP). |
| <i>IP Level</i>    | Defines the level of the new IP.                         |
| <i>Grade</i>       | Displays the grid at the new IP.                         |

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Move IP icon

The **Move IP** icon of the Profile design view allows you to move an existing IP to a new position.

To move an IP:

1. At the *Design* tab of the Profile design view, click the **Move IP** icon.
2. In the profile view, select the required IP.
3. In the profile view, click the new place for the IP.

The IP is moved.

## Delete IP icon

The **Delete IP** icon of the Profile design view allows you to delete an existing IP from the profile design.

To delete an IP:

1. At the *Design* tab of the Profile design view, click the **Delete IP** icon.
2. In the profile view, select the required IP.

The IP is deleted.

## Delete All IPs icon

The **Delete All IPs** icon of the Profile design view allows you to delete all existing IPs from the profile design.

To delete all IPs:

1. At the *Design* tab of the Profile design view, click the **Delete All IPs** icon.  
The confirmation message is displayed.
2. Click **Yes**.  
The IPs are deleted.

## Raise Design icon

The **Raise Design** icon of the Profile design view allows you to raise the level of all existing IPs within a nominated chainage range. This will raise or lower all or a section of the design profile.

To adjust a design:

1. At the *Design* tab of the Profile design view, click the **Raise Design** icon.  
The *Raiser/Lower IP's* dialog is displayed.
2. In the *Raiser/Lower Amount* editbox, specify the required level change. Positive value will raise the IP level, negative value will lower the IP level.
3. In the *From Station* editbox, specify the start chainage of the range within which IP levels will be adjusted.
4. In the *To Station* editbox, specify the end chainage of the range within which IP levels will be adjusted.
5. Click **OK**.  
The design is adjusted.

### Fields of the *Raiser/Lower IP's* dialog

| Field                      | Description  |
|----------------------------|--|
| <i>Raiser/Lower Amount</i> | Defines the required level change. Positive value will raise the IP levels, negative value will lower the IP levels. |
| <i>From Station</i>        | Defines the start chainage of the range within which IP levels will be adjusted.                                     |
| <i>To Station</i>          | Defines the end chainage of the range within which IP levels will be adjusted.                                       |

## VC Report icon

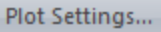
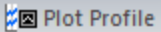
The **VC Report** icon of the Profile design view allows you to generate a report, listing levels for the different strings involved in a design, such as the addition of a curb and channel to an existing road or widening a lane of a road using the existing pavement grading.

To generate a VC Report:

1. At the *Design* tab of the Profile design view, click the **VC Report** icon.  
The **VC Details** dialog is displayed.
2. Configure the parameters as you need and click **OK**.  
The report, listing selected profile details is displayed.

## Plotting tab

The *Plotting* tab of the Profile design view allows you to configure the parameters required on the plotted long section, and the creation of the long section drawing in the Drawings View.

|  |   |
|--|---|
|  Plot Settings... | <b>Plot Settings icon</b><br>Click it to configure the profile plot settings. |
|  Plot Profile     | <b>Plot Profile icon</b><br>Click it to plot the profile.                     |

### Plot Settings icon

The **Plot Setting** icon of the Profile design view allows you to position the profile drawing, or drawings, on a title block of choice. Additional settings define the scales used and the required information included on the profile.

Two formats may be used:

- Standard Format – A leader line is defined for each chainage and level position of the natural and design surfaces.
- Grid Format – A grid is displayed with leaders at nominated intervals of chainage.

To configure the profile view:

1. At the *Plotting* tab of the Profile Design view, click the **Plot Settings** icon.  
The *Profile Plot Settings* dialog is displayed.
2. Make the required configurations on each tab of the dialog. Fields are described in the table below.
3. Click **OK**.

#### Fields of the *General Plot Settings* tab of the *Profile Plot Settings* dialog

| Field                   | Description  |
|-------------------------|--|
| <i>Horizontal Scale</i> | Defines the horizontal scale for the profile.  |
| <i>Start Position X</i> | Defines the X coordinate of the starting position of the lower left corner of the profile layout. This is measured in millimeters from the bottom left corner of the title block                                   |
| <i>Minimum Datum</i>    | Select the radio button to set a minimum datum level in millimeters on the plan. The value specified in the editbox field sets the minimum distance of the profile line from the datum line of the profile layout. |
| <i>Datum Level</i>      | Select the radio button to specify a fixed datum level (in meters) in the editbox field. The profile line will be drawn relevant to this level.  |
| <i>Start Station</i>    | Defines the start chainage of the profile for this drawing.  |
| <i>Title Block</i>      | Defines the title block for plotting.  |
| <i>Vertical Scale</i>   | Defines the vertical scale for the profile.  |
| <i>Start Position Y</i> | Defines the Y coordinate of the starting position of the lower left corner of the profile layout. This is measured in millimeters from the bottom left corner of the title block                                   |

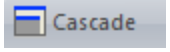
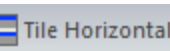
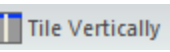


| <b>Field</b>               | <b>Description</b>  |
|----------------------------|---|
| <i>Maximum Datum</i>       | If the radio button is set to <i>Minimum Datum</i> , specify the maximum datum level in millimeters on the plan. The value entered sets the maximum distance of the profile line from the datum line of the profile layout. |
| <i>Max Plot Length</i>     | Defines the maximum plot length of the profile layout in millimeters on the selected title block. This length will need to be modified for smaller paper sizes. Max Plot Length = 700 represents 700 mm on an A1 sheet      |
| <i>End Station</i>         | Defines the end chainage of the profile for this drawing.   |
| <i>Plot Grid</i>           | Tick to plot in a Grid format.  |
| <i>Station Interval</i>    | Defines the chainage interval for plotting.   |
| <i>Horizontal Interval</i> | Defines the space between the horizontal grid lines in meters.  |
| <i>Vertical Interval</i>   | Defines the space between the vertical grid lines in meters.  |
| <i>Grid Height</i>         | Defines the height of the grid above the datum line on the drawing in millimeters.<br>If this height is greater than the height available on the title block, the plot will stop at the extents of the title block          |
| <i>Plot Datum</i>          | Tick to plot the datum value at the left hand end of the datum line.  |
| <i>Plot IPs</i>            | Tick to plot the levels of the IP positions on the leader line below the profile line.  |
| <i>Plot Max/Min</i>        | Tick to plot the high and low point details on the profile line.  |
| <i>Plot Obstructions</i>   | Tick to plot any obstructions.  |
| <i>Plot VC Length</i>      | Tick to plot all the vertical curve lengths. These are plotted in a horizontal line between the profile line and the datum line.  |
| <i>Plot VC Grade</i>       | Tick box to plot all the grades between IPs. These are plotted in a horizontal line between the profile line and the datum line.  |
| <i>Extra Row</i>           | Tick to include an extra row at the bottom of the long section figure for additional information.   |
| <i>With Leader</i>         | Tick to extend the leader lines through this new row.   |
| <i>Level Differences</i>   | Tick to plot the height difference between the natural surface and the design surface at each station. You may configure the level difference layout at the <i>Level Diff Settings</i> tab of the dialog.                   |

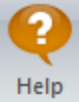


**Fields of the *Standard Profile Settings* tab of the *Profile Plot Settings* dialog**

| <b>Field</b>           | <b>Description</b>   |
|------------------------|--|
| <i>Design Surface</i>  | <p>Tick the <i>Active</i> checkbox to plot the profile of the design surface and its data.</p> <p>Type the appropriate label in the editbox to mark the row of levels on the long section plot.</p> <p>Select the colour, line type and thickness of the design profile line.</p> <p>Select the text style used for the design line levels.</p>  |
| <i>Natural Surface</i> | <p>Tick the <i>Active</i> checkbox to plot the profile of the natural surface and its data.</p> <p>Type the appropriate label in the editbox to mark the row of levels on the long section plot.</p> <p>Select the colour, line type and thickness of the design profile line.</p> <p>Select the text style used for the design line levels.</p> |
| <i>Justification</i>   | <p>Select the Number Justification Table from the drop-down list to set the format and precision of the chainage and level data on the long section plot.</p>  |
| <i>Plot Sequence</i>   | <p>Select the order in which the three lines of detail will be plotted. By default the line of Design levels is above the line of Natural Surface levels with the Chainage levels on the bottom line. Change the settings if another order is required.</p>  |

## Window tab

|   |   |
|---|---|
|  Cascade           | <p><u>Cascade icon</u><br/>Click it to cascade windows in the working area.</p>                     |
|  Tile Horizontally | <p><u>Tile Horizontally icon</u><br/>Click it to tile windows in the working area horizontally.</p> |
|  Tile Vertically   | <p><u>Tile Vertically icon</u><br/>Click it to tile windows in the working area vertically.</p>     |

## Help tab

|   |   |
|---|---|
|  Help                  | <p><u>Help icon</u><br/>Click it to open product help.</p>                                    |
|  About                 | <p><u>About icon</u><br/>Click it to display information about MAGNET Office application.</p> |
|  HINT<br>Display Hints | <p><u>Display Hints icon</u><br/>Click it to display product hints.</p>                       |

## Intersection Design View

An Intersection comprises a number of curb strings and a design surface (DTM) that define all the grade lines through the intersection of two or more roads. The curb strings will follow the grade lines around the lip of a curb from one road into the next, and around traffic islands such as roundabouts. Other strings may also be defined as curbs to represent the grading along the center lines through the intersection. The various curb returns and string lines defined as curbs are created using the control icons from the Intersection group of the Design tab.

Standard strings may also be incorporated into the intersection design; however the levels on these strings may not be modified in the Intersection design view.

In the Intersection design view you will interactively modify the levels on the individual curbs to update the surface model.



The Intersection design view has three panels in the main view area:

- Plan panel — displays curbs, other strings and the DTM. Its location is top left.
- Cross Section — displays the design surface as a cross section along the current position of the indicator bar in the Plan panel. Each movement of the indicator bar in the Plan panel will display a different cross section through the data. Its location is top right
- Curb or Long Section — displays the long section profile and the current design IPs, with curve lengths where these have been computed around the curved part of the curb return. Its location is bottom.

The Intersection Design View has its own ribbon, different from the default MAGNET Office ribbon. Descriptions may be found in the appropriate sections:

- "File tab" section on the facing page
- "View tab" section on page 758
- "Settings tab" section on page 758
- "Curb tab" section on page 763
- "Plotting tab" section on page 770
- "Window tab" section on page 773
- "Help tab" section on page 773

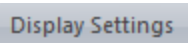
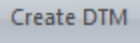
## File tab

|  |  |
|--|--|
| <br>Open... | <p style="text-align: center;"><u>Open icon</u><br/>Click it to open an existing intersection.</p>   |
| <br>Save    | <p style="text-align: center;"><u>Saver icon</u><br/>Click it to save the current intersection.</p>  |
| Close  | <p style="text-align: center;"><u>Close icon</u><br/>Click it to close the current intersection.</p> |

## View tab

| <b>Refresh group</b>  |   |
|---|---|
| <br>Redraw       | <u>Redraw icon</u><br>Click it to refresh the displaying of entities in the current view. |
| <b>Navigate group</b>   |   |
| <br>Zoom         | <u>Zoom icon</u><br>Click it to it to fit all data in the view.                           |
|  Window          | <u>Window icon</u><br>Click it to draw a rectangle area to be fits the screen.            |
|  Previous        | <u>Previous icon</u><br>Click it to return to the previous view.                          |
|  In              | <u>In icon</u><br>Click it to zoom in the center area of the survey view.                 |
|  Out             | <u>Out icon</u><br>Click it to zoom in the center area of the survey view.                |
| <br>Pan         | <u>Pan icon</u><br>Click it to scroll the view  |
| <b>View group</b>   |   |
| <br>Toolbar    | <u>Toolbar icon</u><br>Click it to enable/disable toolbar.                                |
| <br>Status Bar | <u>Status icon</u><br>Click it to enable/disable toolbar.                                 |

## Settings tab

| <b>Settings</b>  |  |
|--|--|
|  Display Settings | Display Settings icon<br>Click it to configure layout of the main view.  |
| <b>DTM</b>   |  |
|  Create DTM       | <u>Create DTM icon</u><br>Click it to create a new DTM. See "Create DTM icon" section on page 440 for details. |

|                             |  |
|-----------------------------|--|
| <b>Trim DTM</b>             | <u>Trim DTM icon</u><br>Click it to trim a DTM to an existing boundary. See "Create DTM icon" section on page 440 for details. |
| <b>Strings/Curbs</b>        |  |
| <b>Add/Remove Strings</b>   | Add/Remove Strings icon<br>Click it to add to/remove strings from the intersection design.                                     |
| <b>Add/Remove Curbs</b>     | Add/Remove Curbs icon<br>Click it to add to/remove curbs from the intersection design.   |
| <b>Select Curb Template</b> | Select Curb Template icon<br>Click it to assign road templates to curbs in the intersection design.                            |

## Display Settings icon

The **Display Settings** icon of the Intersection design view allows you to configure which information will be displayed in the intersection view.

To configure the intersection view layout:

1. At the *Settings* tab of the Intersection design view, click the **Display Settings** icon.  
The **Display Settings** dialog is displayed.
2. Make the required configurations. Fields are described in the table below.
3. Click **OK**.

### Fields of the **Display Settings** dialog

| Field                         | Description  |
|-------------------------------|--|
| <i>Plan tab</i>               |  |
| <i>DTM</i>                    | Tick the appropriate checkboxes to display the triangular model of the intersection and contours through the intersection.   |
| <i>Reference String Color</i> | Defines the color for the reference string.  |
| <i>Profile tab</i>            |  |
| <i>Display Leaders</i>        | Tick to display the vertical leader lines in the intersection view.  |
| <i>Design Levels</i>          | Tick to display the levels for the vertical profile design on each leader line.  |
| <i>Natural Levels</i>         | Tick to display the levels for the natural surface on each leader line.  |
| <i>Level Differences</i>      | Tick to display the difference between the levels of design and natural surfaces. <ul style="list-style-type: none"> <li>• Fill – when design surface is above the natural surface. Displayed as positive value, followed by F. <i>For example, 0.15F.</i></li> <li>• Cut – when design surface is below the natural surface. Displayed as negative value, followed by C. <i>For example, -0.15C.</i></li> </ul> |
| <i>Peg Chainage</i>           | Tick to display the peg chainage or running distance along the profile curb. This chainage would be the same with the Shift chainage for a curb, so only tick one option.  |

| <b>Field</b>              | <b>Description</b>  |
|---------------------------|---|
| <i>Shift Chainage</i>     | Tick to display the shift chainage or running distance along the curb. This chainage would be the same with the Peg chainage for a curb, so only tick one option.   |
| <i>IPs</i>                | Tick to display the level of the IP point for the profile design. The chainage and level is displayed vertically above the triangular symbol used to define an IP position.   |
| <i>Curve Length</i>       | Tick to to display the length of the vertical curves for each IP point of the profile design. The curve length is displayed at the top of the screen above a horizontal line that shows the position and length of the curve.   |
| <i>Hi/Low Points</i>      | Tick to display the high and low points on the formation levels of the vertical profile design. The chainage and level is displayed vertically above the high or low point and marked HI for high point and LO for low point.   |
| <i>Grades</i>             | Tick to display the grade of the designed profile line between two adjacent IP points. The grade is displayed as a positive or negative percentage below the curve length data at the top of the screen, and above a horizontal line that shows where the grades change at each IP point. The grade is measured from left to right, from the lower chainage or distance position to the higher chainage or distance position. |
| <i>Vertical Exag</i>      | This value defaults to 1.000. Increase to change the vertical scale as a ratio to the horizontal scale in the onscreen display. A value of 2.000 will set the vertical scale at twice the horizontal scale.   |
| <i>Precision</i>          | Defines the number of decimal places in the data displayed in the profile view.   |
| <i>Start Chainage</i>     | Defines the start chainage of the profile.  |
| <i>Cross Section tab</i>  |   |
| <i>Display Point Info</i> | Tick to display the point information.<br>Select which information will be displayed - either Code, or Level or Offset by selecting the appropriate radiobutton.  |
| <i>Display Point Mark</i> | Tick to display point marks.<br>Define the size of the marks, by selecting the appropriate radiobutton.   |
| <i>Display Point Mark</i> | Tick to display point marks.<br>Define the size of the marks, by selecting the appropriate radiobutton.   |
| <i>Colors</i>             | Defines the colors for design and natural surfaces.   |
| <i>Display Cross Fall</i> | Tick to display the cross fall of the design legs.  |



## Add/Remove Strings icon

Any strings that are available in the survey view may be added to or removed from the display in the Intersection View. The levels on these strings will also be incorporated into the DTM.

The **Add/Remove Strings** icon of the Intersection design view allows you to add to or remove strings from the intersection design.

To add strings to the view:

1. At the *Settings* tab of the Intersection design view, click the **Add/Remove Strings** icon.

The *Add/Remove Strings* dialog is displayed.

2. In the *Strings in the area* list, select the strings to be added to the design.
3. Click **Add**.

The strings are added to the design.

4. Click **OK**.

To remove strings from the view:

1. At the *Settings* tab of the Intersection design view, click the **Add/Remove Strings** icon.

The *Add/Remove Strings* dialog is displayed.

2. In the *Selected Strings* list, select the strings to be added to the design.
3. Click **Remove**.

The strings are deleted from the design.

4. Click **OK**.

## Add/Remove Curbs icon

Any curbs that are available in the survey view may be added to or removed from the intersection. The levels on these curbs will also be incorporated into the DTM

The **Add/Remove Curbs** icon of the Intersection design view allows you to add to or remove from curbs to the intersection design.

To add curbs to the view:

1. At the *Settings* tab of the Intersection design view, click the **Add/Remove Curbs** icon.

The *Add/Remove Curbs* dialog is displayed.

2. In the *Curbs in the area* list, select the curbs to be added to the design.
3. Click **Add**.

The curbs are added to the design.

4. Click **OK**.

To remove curbs from the view:

1. At the *Settings* tab of the Intersection design view, click the **Add/Remove Curbs** icon.

The *Add/Remove Curbs* dialog is displayed.

2. In the *Selected Curbs* list, select the curbs to be added to the design.
3. Click **Remove**.

The curbs are deleted from the design.

4. Click **OK**.

## Select Curb Template icon

The **Select Curb Template** icon of the Intersection design view allows you to define a template for each curb in the intersection design.

To assign to or change the template of curbs:

1. At the *Settings* tab of the Intersection design view, click the **Select Curb Template** icon.

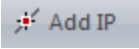
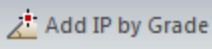
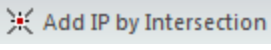
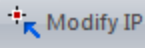
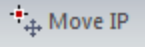
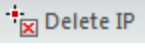
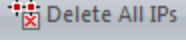
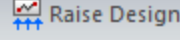
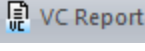
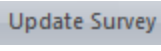
The *Curb Template Selection* dialog is displayed.

2. In the Curb column of the table, type the name of the template.
3. In the Template column of the table, select the required road template. See "Templates icon" section on page 702 for details.
4. Repeat steps 2 and 3 for all required curbs.
5. Click **OK**.

To edit road templates, click **Edit Templates**. See "Templates icon" section on page 702 for details.

## Curb tab

The *Curb* tab of the Intersection design view allows you to add, modify and delete IPs of the intersection, so its initial design may be changed. These changes may be posted back to the survey view, to change the appropriate data in that view.

| <b>Add IP group</b>   |   |
|---|---|
|    | Add IP icon<br>Click it to add a new IP to the intersection.  |
|    | Add IP by Grade icon<br>Click it to create a new IP at the grade line from an existing IP.                      |
|    | Add IP by Intersection icon<br>Click it to create a new IP at the intersection of grades from two existing IPs. |
| <b>Edit IP group</b>  |   |
|    | Modify IP icon<br>Click it to edit an existing IP.  |
|    | Move IP icon<br>Click it to move an existing IP to a new position.  |
|    | Delete IP icon<br>Click it to delete an existing IP from the intersection design.                               |
|   | Delete All IPs icon<br>Click it to delete all existing IPs from the intersection design.                        |
|  | Raise Design icon<br>Click it to adjust design by level.  |
| <b>Report group</b>   |   |
|  | VC Report icon<br>Click it to calculate levels for the different strings involved in a intersection.            |
| <b>Transfer group</b>   |   |
|  | Update Survey icon<br>Click it to update changes in the intersection design to the survey view.                 |

### Add IP icon

The **Add IP** icon of the Intersection design view allows you to insert a new IP at a defined position.

To add an IP to the intersection design:

1. At the *Curb* tab of the Intersection design view, click the **Add IP** icon.
2. Locate the new IP. Do one of the following:
  - Click the required place in the intersection view.
  - Specify the chainage, level, approach and departure grades in the appropriate editboxes at the bottom toolbar.

The *IP Details* dialog is displayed.

3. Review the parameters, if needed change them. Fields are described in the table below.
4. Click **OK**.

#### Fields of the *IP Details* dialog

| Field                          | Description  |
|--------------------------------|--|
| <i>IP Chainage</i>             | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>                | Defines the level of the new IP.   |
| <i>Grade</i>                   | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Add IP by Grade icon

The **Add IP by Grade** icon of the Intersection design view allows you to insert a new IP at a grade from an existing IP.

To add an IP by grade:

1. At the *Curb* tab of the Intersection design view, click the **Add IP by Grade** icon.
2. In the intersection view, select the base IP.
3. Locate the new IP. Do one of the following:
  - Click the required place in the intersection view.
  - Specify the chainage and grade from the base IP in the appropriate editboxes at the bottom toolbar.

The *IP Details* dialog is displayed.

4. Review the parameters, if needed change them. Fields are described in the table below.
5. Click **OK**.

**Fields of the *IP Details* dialog**

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>IP Chainage</i>             | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>                | Defines the level of the new IP.   |
| <i>Grade</i>                   | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

**Add IP by Intersection icon**

The **Add IP by Intersection** icon of the Intersection design view allows you to insert a new IP at an intersection of grades from two existing IPs.

To add an IP:

1. At the *Curb* tab of the Intersection design view, click the **Add IP by Intersection** icon.
2. In the intersection view, select the first base IP.
3. Define the grade from the first IP. Do one of the following:
  - Click the required place in the intersection view.
  - Specify the grade in the appropriate editboxes at the bottom toolbar.
4. Repeat steps 2 and 3 for the second base IP.

The *IP Details* dialog is displayed.
5. Review the parameters, if needed change them. Fields are described in the table below.
6. Click **OK**.

**Fields of the *IP Details* dialog**

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>IP Chainage</i>             | Defines the chainage of the new intersection point (IP).   |
| <i>IP Level</i>                | Defines the level of the new IP.   |
| <i>Grade</i>                   | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

**Modify IP icon**

The **Modify IP** icon of the Intersection design view allows you to change the parameters of an existing IP.

To change an IP:

1. At the *Curb* tab of the Intersection design view, click the **Modify IP** icon.
2. In the intersection view, select the required IP.  
The *IP Details* dialog is displayed.
3. Review the parameters, if needed change them. Fields are described in the table below.
4. Click **OK**.

**Fields of the *IP Details* dialog**

| <b>Field</b>       | <b>Description</b>                                       |
|--------------------|--|
| <i>IP Chainage</i> | Defines the chainage of the new intersection point (IP). |
| <i>IP Level</i>    | Defines the level of the new IP.                         |

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>Grade</i>                   | Displays the grid at the new IP.   |
| <i>Approach Grade %</i>        | Displays the grade of the road approaching this IP from the previous IP at the lower chainage  |
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Move IP icon

The **Move IP** icon of the Intersection design view allows you to move an existing IP to a new position.

To move an IP:

1. At the *Curb* tab of the Intersection design view, click the **Move IP** icon.
2. In the intersection view, select the required IP.
3. In the intersection view, click the new place for the IP.

The IP is moved.

## Delete IP icon

The **Delete IP** icon of the Intersection design view allows you to delete an existing IP from the intersection design.

To delete an IP:

1. At the *Curb* tab of the Intersection design view, click the **Delete IP** icon.
2. In the intersection view, select the required IP.

The IP is deleted.

## Delete All IPs icon

The **Delete All IPs** icon of the Intersection design view allows you to delete all existing IPs from the intersection design.

To delete all IPs:

1. At the *Curb* tab of the Intersection design view, click the **Delete All IPs** icon.

The confirmation message is displayed.

2. Click **Yes**.

The IPs are deleted.

## Raise Design icon

The **Raise Design** icon of the Intersection design view allows you to raise the level of all existing IPs within a nominated chainage range. This will raise or lower all or a section of the design intersection.

To adjust a design:

1. At the *Curb* tab of the Intersection design view, click the **Raise Design** icon.

The **Raiser/Lower IP's** dialog is displayed.

2. In the *Raiser/Lower Amount* editbox, specify the required level change. Positive value will raise the IP levels, negative value will lower the IP levels.
3. In the *From Station* editbox, specify the start chainage of the range within which IP levels will be adjusted.
4. In the *To Station* editbox, specify the end chainage of the range within which IP levels will be adjusted.
5. Click **OK**.

The design is adjusted.

### Fields of the *Raiser/Lower IP's* dialog

| Field                      | Description  |
|----------------------------|--|
| <i>Raiser/Lower Amount</i> | Defines the required level change. Positive value will raise the IP levels, negative value will lower the IP levels. |
| <i>From Station</i>        | Defines the start chainage of the range within which IP levels will be adjusted.                                     |
| <i>To Station</i>          | Defines the end chainage of the range within which IP levels will be adjusted.                                       |

## VC Report icon

The **VC Report** icon of the Intersection design view allows you to generate a report, listing levels for the different strings involved in a design, such as the addition of a curb and channel to an existing road or widening a lane of a road using the existing pavement grading.

To generate a VC Report:

1. At the *Curb* tab of the Intersection design view, click the **VC Report** icon.

The **VC Details** dialog is displayed.

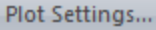
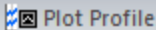


2. Configure the parameters as you need and click **OK**.

The report, listing selected intersection details is displayed.

## Plotting tab

The *Plotting* tab of the Intersection design view allows you to configure the parameters required on the plotted long section, and the creation of the long section drawing in the Drawings View.

|   |   |
|---|---|
|  | <p style="text-align: center;"><b>Plot Settings icon</b><br/>Click it to configure the profile plot settings.</p> |
|  | <p style="text-align: center;"><b>Plot Profile icon</b><br/>Click it to plot the profile.</p>                     |

### Plot Settings icon

The **Plot Setting** icon of the Intersection design view allows you to position the intersection drawing, or drawings, on a title block of choice. Additional settings define the scales used and the required information included on the intersection.

Two formats may be used:

- Standard Format – A leader line is defined for each chainage and level position of the natural and design surfaces.
- Grid Format – A grid is displayed with leaders at nominated intervals of chainage.

To configure the intersection view:

1. At the *Plotting* tab of the Intersection Design view, click the **Plot Settings** icon.  
The **Profile Plot Settings** dialog is displayed.
2. Make the required configurations on each tab of the dialog. Fields are described in the table below.
3. Click **OK**.

#### Fields of the **General Plot Settings** tab of the **Profile Plot Settings** dialog

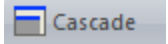
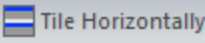
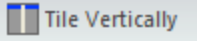
| Field                   | Description  |
|-------------------------|--|
| <i>Horizontal Scale</i> | Defines the horizontal scale for the profile.  |
| <i>Start Position X</i> | Defines the X coordinate of the starting position of the lower left corner of the profile layout. This is measured in millimeters from the bottom left corner of the title block                                   |
| <i>Minimum Datum</i>    | Select the radio button to set a minimum datum level in millimeters on the plan. The value specified in the editbox field sets the minimum distance of the profile line from the datum line of the profile layout. |
| <i>Datum Level</i>      | Select the radio button to specify a fixed datum level (in meters) in the editbox field. The profile line will be drawn relevant to this level.  |
| <i>Start Station</i>    | Defines the start chainage of the profile for this drawing.  |
| <i>Title Block</i>      | Defines the title block for plotting.  |
| <i>Vertical Scale</i>   | Defines the vertical scale for the profile.  |

| <b>Field</b>               | <b>Description</b>  |
|----------------------------|---|
| <i>Start Position Y</i>    | Defines the Y coordinate of the starting position of the lower left corner of the profile layout. This is measured in millimeters from the bottom left corner of the title block  |
| <i>Maximum Datum</i>       | If the radio button is set to <i>Minimum Datum</i> , specify the maximum datum level in millimeters on the plan. The value entered sets the maximum distance of the profile line from the datum line of the profile layout. |
| <i>Max Plot Length</i>     | Defines the maximum plot length of the profile layout in millimeters on the selected title block. This length will need to be modified for smaller paper sizes. Max Plot Length = 700 represents 700mm on an A1 sheet       |
| <i>End Station</i>         | Defines the end chainage of the profile for this drawing.   |
| <i>Plot Grid</i>           | Tick to plot in a Grid format.  |
| <i>Station Interval</i>    | Defines the chainage interval for plotting.   |
| <i>Horizontal Interval</i> | Defines the space between the horizontal grid lines in metres.  |
| <i>Vertical Interval</i>   | Defines the space between the vertical grid lines in metres.  |
| <i>Grid Height</i>         | Defines the height of the grid above the datum line on the drawing in millimeters.<br>If this height is greater than the height available on the title block, the plot will stop at the extents of the title block          |
| <i>Plot Datum</i>          | Tick to plot the datum value at the left hand end of the datum line.  |
| <i>Plot IPs</i>            | Tick to plot the levels of the IP positions on the leader line below the profile line.  |
| <i>Plot Max/Min</i>        | Tick to plot the high and low point details on the profile line.  |
| <i>Plot Obstructions</i>   | Tick to plot any obstructions.  |
| <i>Plot VC Length</i>      | Tick to plot all the vertical curve lengths. These are plotted in a horizontal line between the profile line and the datum line.  |
| <i>Plot VC Grade</i>       | Tick box to plot all the grades between IPs. These are plotted in a horizontal line between the profile line and the datum line.  |
| <i>Extra Row</i>           | Tick to include an extra row at the bottom of the long section figure for additional information.   |
| <i>With Leader</i>         | Tick to extend the leader lines through this new row.   |



**Fields of the *Standard Profile Settings* tab of the *Profile Plot Settings* dialog**

| <b>Field</b>           | <b>Description</b>   |
|------------------------|--|
| <i>Design Surface</i>  | <p>Tick the <i>Active</i> checkbox to plot the profile of the design surface and its data.</p> <p>Type the appropriate label in the editbox to mark the row of levels on the long section plot.</p> <p>Select the colour, line type and thickness of the design profile line.</p> <p>Select the text style used for the design line levels.</p>  |
| <i>Natural Surface</i> | <p>Tick the <i>Active</i> checkbox to plot the profile of the natural surface and its data.</p> <p>Type the appropriate label in the editbox to mark the row of levels on the long section plot.</p> <p>Select the colour, line type and thickness of the design profile line.</p> <p>Select the text style used for the design line levels.</p> |
| <i>Justification</i>   | <p>Select the Number Justification Table from the drop-down list to set the format and precision of the chainage and level data on the long section plot.</p>  |
| <i>Plot Sequence</i>   | <p>Select the order in which the three lines of detail will be plotted. By default the line of Design levels is above the line of Natural Surface levels with the Chainage levels on the bottom line. Change the settings if another order is required.</p>  |

## Window tab

|   |   |
|---|---|
|  Cascade           | <p style="text-align: center;"><u>Cascade icon</u><br/>Click it to cascade windows in the working area.</p>                     |
|  Tile Horizontally | <p style="text-align: center;"><u>Tile Horizontally icon</u><br/>Click it to tile windows in the working area horizontally.</p> |
|  Tile Vertically   | <p style="text-align: center;"><u>Tile Vertically icon</u><br/>Click it to tile windows in the working area vertically.</p>     |

## Help tab

|   |   |
|---|---|
|  Help  | <p style="text-align: center;"><u>Help icon</u><br/>Click it to open product help.</p>                                    |
|  About | <p style="text-align: center;"><u>About icon</u><br/>Click it to display information about MAGNET Office application.</p> |

## Resurface Design View

The Resurface design view allows you to create a new road design for existing road, for example when renovating the road surface by laying new asphalt, within the constraints that apply to that particular project.

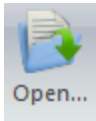


The Resurface design view has three panels in the main view area:

- Alignment panel – displays the alignment and design strings. The plan data from the survey view may also be shown. Its location is top left.
- Profile panel – displays the profiles for the natural surface and the design profile with vertical IP points, for the reference alignment and strings. Its location is top right.
- Cross Section panel – displays the cross section for one chainage. Several surfaces may be shown. Its location is bottom.

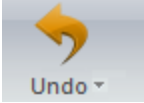


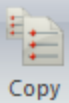
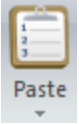
The Resurface design view has its own ribbon, different from the default MAGNET Office ribbon. Descriptions may be found in the appropriate sections:

- "File tab" section below
- "Edit tab" section on the facing page
- "View tab" section on page 776
- "Settings tab" section on page 777
- "Alignment tab" section on page 781
- "Profile tab" section on page 785
- "Cross Section tab" section on page 792
- "Design tab" section on page 795
- "Plotting tab" section on page 805
- "Library tab" section on page 817
- "Window tab" section on page 817
- "Help tab" section on page 817

### File tab

|  |  |
|--|--|
|  <p>Open...</p> | <p style="text-align: center;"><u>Open icon</u></p> <p>Click it to open an existing resurface alignment.</p> |
|  <p>Save</p>    | <p style="text-align: center;"><u>Save icon</u></p> <p>Click it to save the current resurface alignment.</p> |
|  <p>Close</p>   | <p style="text-align: center;"><u>Close icon</u></p> <p>Click it to close the resurface alignment.</p>       |

## Edit tab

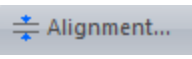
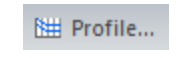
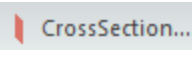
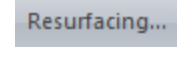
| <b>Undo/Redo group</b>  |  |
|---|--|
|  | <p><u>Undo icon</u><br/>Click it to cancel the last action.</p>                    |
|  | <p><u>Redo icon</u><br/>Click it to restore the last canceled action.</p>          |
| <b>Clipboard group</b>  |  |
|  | <p><u>Cut icon</u><br/>Click it to cut the selected object to the clipboard.</p>   |
|  | <p><u>Copy icon</u><br/>Click it to copy the selected object to the clipboard.</p> |
|  | <p><u>Paste icon</u><br/>Click it to paste an object from the clipboard.</p>       |

## View tab

| <b>Refresh group</b>  |  |
|---|--|
| <br>Redraw             | <u>Redraw icon</u><br>Click it to refresh the displaying of entities in the current view.            |
| <br>Regen              | <u>Regen icon</u><br>Click it to regenerate the current view.  |
| <b>Navigate group</b>   |  |
| <br>Zoom               | <u>Zoom icon</u><br>Click it to it to fit all data in the view.                                      |
| <br>Window             | <u>Window icon</u><br>Click it to draw a rectangle area to be fits the screen.                       |
| <br>Previous           | <u>Previous icon</u><br>Click it to return to the previous view.                                     |
| <br>In                | <u>In icon</u><br>Click it to zoom in the center area of the survey view.                            |
| <br>Out              | <u>Out icon</u><br>Click it to zoom in the center area of the survey view.                           |
| <br>Pan              | <u>Pan icon</u><br>Click it to scroll the view   |
| <b>Features group</b>   |  |
| <br>Show/Hide String | <u>Show/Hide Strong icon</u><br>Click it to configure the string visibility.                         |
| <br>Google Earth/Map | <u>Google Earth/Map icon</u><br>Click it to view the current project in Google Earth or Google Maps. |
| <br>Survey           | <u>Survey icon</u><br>Click it to switch to the survey view.   |
| <b>Options group</b>  |  |
| <br>Toolbar          | <u>Toolbar icon</u><br>Click it to enable/disable toolbars.  |
| <br>Status Bar       | <u>Status icon</u><br>Click it to enable/disable toolbar.  |



## Settings tab

|   |  |
|---|--|
|  | Alignment icon<br>Click it to configure the layout of the alignment panel.         |
|  | Profile icon<br>Click it to configure the layout of the profile panel.             |
|  | Cross Section icon<br>Click it to configure the layout of the cross section panel. |
|  | Resurfacing icon<br>Click it to configure the layout of new road surface.          |

### Alignment icon

The **Alignment** icon of the Resurface design view allows you to configure the displaying of alignments at the alignment panel.

To configure the alignment displaying:

1. At the *Settings* tab of the Resurface design view, click the **Alignment** icon.  
The **Road Display Settings** dialog, opened at the *Alignment* tab is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

#### Fields of the *Alignment* tab of the *Road Display Settings* dialog

| Field                        | Description   |
|------------------------------|---|
| <i>Display Strings</i>       | Tick to display the design strings after computation.   |
| <i>Display String TPs</i>    | Tick to show the tangent points on the design strings after computation. The tangent points will be displayed on the main design string.                                      |
| <i>Display String IPs</i>    | Tick to show the intersection points on every chainage of the design strings after computation  |
| <i>Display Peg Alignment</i> | Tick to show the alignment at the zero offset of the cross sections   |
| <i>Display Align TPs</i>     | Tick to show the tangent points on the alignment.   |
| <i>Display Align IPs</i>     | Tick to show the intersection points on the alignment.  |
| <i>Display Survey Data</i>   | Tick to display the data on active layers in the Survey View. If the triangular mesh and the contours are active in the Survey View, they will display in the Alignment pane. |

### Profile icon

The **Profile** icon of the Resurface design view allows you to configure the displaying of the profile panel.

To configure the profile displaying:

1. At the *Settings* tab of the Resurface design view, click the **Profile** icon.  
The **Road Display Settings** dialog, opened at the *Profile* tab is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

**Fields of the *Profile* tab of the *Road Display Settings* dialog**

| <b>Field</b>             | <b>Description</b>  |
|--------------------------|---|
| <i>Display Leaders</i>   | Tick to display the vertical leader lines in the profile view.  |
| <i>Design Levels</i>     | Tick to display the levels for the vertical profile design on each leader line.   |
| <i>Natural Levels</i>    | Tick to display the levels for the natural surface on each leader line.   |
| <i>Level Differences</i> | <p>Tick to display the difference between the levels of design and natural surfaces.</p> <ul style="list-style-type: none"> <li>• Fill – when design surface is above the natural surface. Displayed as positive value, followed by F. <i>For example, 0.15F.</i></li> <li>• Cut – when design surface is below the natural surface. Displayed as negative value, followed by C. <i>For example, -0.15C.</i></li> </ul>       |
| <i>CL Stations</i>       | Tick to display the chainage or running distance along the Road for the reference or pegged string. This is at the zero offset of the sections  |
| <i>Offset Stations</i>   | Tick to display the chainage or running distance along the current string.  |
| <i>IPs</i>               | Tick to display the level of the IP point for the profile design. The chainage and level is displayed vertically above the triangular symbol used to define an IP position.   |
| <i>Curve Length</i>      | Tick to display the length of the vertical curves for each IP point of the profile design. The curve length is displayed at the top of the screen above a horizontal line that shows the position and length of the curve.  |
| <i>Hi/Low Points</i>     | Tick to display the high and low points on the formation levels of the vertical profile design. The chainage and level is displayed vertically above the high or low point and marked HI for high point and LO for low point.   |
| <i>Grades</i>            | Tick to display the grade of the designed profile line between two adjacent IP points. The grade is displayed as a positive or negative percentage below the curve length data at the top of the screen, and above a horizontal line that shows where the grades change at each IP point. The grade is measured from left to right, from the lower chainage or distance position to the higher chainage or distance position. |
| <i>Vertical Exag</i>     | This value defaults to 1.000. Increase to change the vertical scale as a ratio to the horizontal scale in the onscreen display. A value of 2.000 will set the vertical scale at twice the horizontal scale.   |
| <i>Precision</i>         | Defines the number of decimal places in the data displayed in the profile view.   |
| <i>Reference String</i>  | Select the string used to define the stations on the long section plot. This is not necessarily the current string  |

| Field                   | Description   |
|-------------------------|---|
| <i>Envelope Details</i> | The envelope allows you to see the design string profile designed within two different cross falls. This may be useful if you want to design a prefer string to match in with existing strings. |
| <i>Natural</i>          | Defines whether the envelope is calculated from the natural or design surface of the source.  |
| <i>Design</i>           | Design  |
| <i>String</i>           | Defines the base string for the envelope.   |

## Cross Section icon

The **Cross Section** icon of the Resurface design view allows you to configure the displaying of the cross section panel.

To configure the profile displaying:

1. At the *Settings* tab of the Resurface design view, click the **Cross Section** icon.  
The **Road Display Settings** dialog, opened at the *Cross Section* tab is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Cross Section* tab of the **Road Display Settings** dialog

| Field                        | Description  |
|------------------------------|--|
| <i>Display Point Info</i>    | Tick to display the point information.<br>Select which information will be displayed - either Code, or Level or Offset by selecting the appropriate radiobutton.   |
| <i>Display Point Mark</i>    | Tick to display point marks.<br>Define the size of the marks, by selecting the appropriate radiobutton.  |
| <i>Display Text Size</i>     |  |
| <i>Display Cross Fall</i>    | Tick to display the cross fall on each leg of the cross section of the current surface. Crossfalls are hidden if the mapping scale is such that the data would overlap.  |
| <i>Display Road Reserve</i>  | Tick to display vertical yellow lines on the cross section where the two offsets in the next two fields represent the left and right road reserve or a known limitation of the design corridor. The center line will be marked with a vertical green line. These lines are a useful guide to mark specified offsets. |
| <i>Left Road Reserve</i>     | Defines the left road reserve. The default is 7.00 m left of the center line   |
| <i>Right Road Reserve</i>    | Defines the right road reserve. The default is 7.00 m right of the center line   |
| <i>Vertical Exaggeration</i> | This value defaults to 1.000. Increase to change the vertical scale as a ratio to the horizontal scale in the onscreen display. A value of 2.000 will set the vertical scale at twice the horizontal scale.  |

| <b>Field</b>            | <b>Description</b>   |
|-------------------------|--|
| <i>Natural Surface</i>  | The Natural Surface displayed in the cross section and long section panes. This surface will be set when cross sections are extracted from the survey view. The surface set in this field is the current natural surface |
| <i>Design Surface</i>   | The design surface displayed in the cross section and long section panes. The surface set in this field is the current design surface  |
| <i>Subgrade Surface</i> | Multiple subgrade surfaces may be computed, representing different materials of varying thicknesses. The surface set in this field is the current subgrade surface   |

## Resurfacing icon

The **Resurfacing** icon of the Resurface design view allows you to configure the layout of the changes made in the road design.

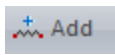
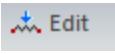
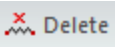
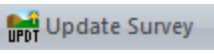
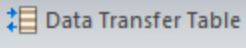
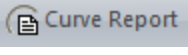
To configure the resurface displaying:

1. At the *Settings* tab of the Resurface design view, click the **Profile** icon.  
The **Road Display Settings** dialog, opened at the *Resurface* tab is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Resurface* tab of the *Road Display Settings* dialog

| <b>Field</b>                          | <b>Description</b>  |
|---------------------------------------|---|
| <i>Profile view</i>                   | Defines the layout of the profile panel.                          |
| <i>Profile and cross section view</i> | Defines the color layout of the profile and cross section panels. |
| <i>Movement Information</i>           | Defines the information, which will be displayed while            |
| <i>Shading</i>                        | Defines the color of shading.                                     |
| <i>Volume Calculation</i>             | Defines the data for calculation volume of a new surface.         |

## Alignment tab

| <b>String group</b>   |  |
|---|--|
|  Add                 | Add icon<br>Click it to a new string to the road design.   |
|  Edit                | Edit icon<br>Click it to edit a string in the road design.   |
|  Delete              | Delete icon<br>Click it to delete strings from the road design.  |
| <b>Transfer group</b>   |  |
|  Update Survey       | Update Survey icon<br>Click it to transfer data from the road design to the survey view.                       |
|  Data Transfer Table | Data Transfer Table icon<br>Click it to set up the parameters for transferring road data into the survey view. |
| <b>Report group</b>   |  |
|  Curve Report        | Curve Report icon<br>Click it to generate a curve report.  |

### Add icon

The **Add** icon of the Resurface design view allows you to add a new string in the dataset or another alignment defined in the survey view.

To add a string:

1. At the *Alignment* tab of the Resurface design view, click the **Add** icon.  
The **Add String** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

The new string is created. It is set as the current string.

#### Fields of the **Add String** dialog

| Field       | Description   |
|-------------|---|
| <i>Name</i> | <p>Defines the name of the new string.</p> <p>It is useful to allocated a name that suits the definition of the string, so that the user may easily select it</p> <p><i>For example, NESL new edge of seal left, or NEB new edge of bitumen, or R2 right side of a widened road</i></p> |

| Field                           | Description  |
|---------------------------------|--|
| <i>Active</i>                   | <p>Tick to activate the string as a design string with its own design profile.</p> <p>If this string has VIPs designed for the design levels on the string this checkbox must be ticked to use these design levels.</p> <p>If the string has this checkbox ticked, but there are no design levels, then the levels on the natural surface will be automatically incorporated into the final design surface. This is a useful tool if an existing property boundary is to be used for the batter.</p>   |
| <i>Definition of the String</i> | <p>A string must follow a path along the data for the road. The following ways are available for defining a string:</p> <ul style="list-style-type: none"> <li>• Fixed Offset – the string will run at a specified offset from the reference alignment (zero offset of the road dataset). In the editbox, specify a negative offset to the left of the road or a positive offset to the right of the road.</li> <li>• Coded Offset – the string will follow a particular code from the Natural Surface cross sectional data, such as EML [edge metal left] and EMR [edge metal right].</li> <li>• Extension – the Code Offset and Alignment options may be modified by an offset to define the string to the left or right of the line following the code or alignment.</li> </ul> <p><i>For example, enter -1.5 to create the string 1.5m to the left of the line defined by the code offset or alignment definition.</i></p> <ul style="list-style-type: none"> <li>• Alignment – the string will follow a horizontal alignment created in the survey view.</li> <li>• String – the string will follow a string created in the survey view.</li> <li>• String By Intersecting Grade – the string at the position and level of intersection of two grades from two existing strings.</li> </ul> |
| <i>Start Chainage</i>           | Defines the start chainage for the string. By default this is the start chainage of the main alignment.  |
| <i>End Chainage</i>             | Defines the end chainage for the string. By default this is the end chainage of the main alignment.  |
| <i>Color</i>                    | Defines a color for the design string.   |
| <i>Plotting Label</i>           | Defines a label to be used for this string in the long section plotting.   |
| <i>Plot Label</i>               | Tick to plot the label on the profile.   |
| <i>Plot Design Details</i>      | Tick to plot design levels along the string on the profile.  |

## Edit icon

The **Edit** icon of the Resurface design view allows you change the definition of a string.

To edit a string:

1. In the Alignment panel, select the required string.
2. At the *Alignment* tab of the Resurface design view, click the **Edit** icon.  
The **Edit String** dialog is displayed.
3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.

The string is edited.

#### Fields of the *Edit String* dialog

| Field                           | Description  |
|---------------------------------|--|
| <i>Name</i>                     | Displays the name of the string.   |
| <i>Active</i>                   | <p>Tick to activate the string as a design string with its own design profile.</p> <p>If this string has VIPs designed for the design levels on the string this checkbox must be ticked to use these design levels.</p> <p>If the string has this checkbox ticked, but there are no design levels, then the levels on the natural surface will be automatically incorporated into the final design surface. This is a useful tool if an existing property boundary is to be used for the batter.</p>   |
| <i>Definition of the String</i> | <p>A string must follow a path along the data for the road. The following ways are available for defining a string:</p> <ul style="list-style-type: none"> <li>• Fixed Offset – the string will run at a specified offset from the reference alignment (zero offset of the road dataset). In the editbox, specify a negative offset to the left of the road or a positive offset to the right of the road.</li> <li>• Coded Offset – the string will follow a particular code from the Natural Surface cross sectional data, such as EML [edge metal left] and EMR [edge metal right].</li> <li>• Extension – the Code Offset and Alignment options may be modified by an offset to define the string to the left or right of the line following the code or alignment.</li> </ul> <p><i>For example, enter -1.5 to create the string 1.5m to the left of the line defined by the code offset or alignment definition.</i></p> <ul style="list-style-type: none"> <li>• Alignment – the string will follow a horizontal alignment created in the survey view.</li> <li>• String – the string will follow a string created in the survey view.</li> </ul> |
| <i>Ref. Start Station</i>       | Displays the start chainage for the string.  |
| <i>Ref. End Station</i>         | Displays the end chainage for the string.  |
| <i>Color</i>                    | Defines a color for the design string.   |
| <i>Plotting Label</i>           | Defines a label to be used for this string in the long section plotting.   |
| <i>Plot Label</i>               | Tick to plot the label on the profile.   |
| <i>Plot Design Details</i>      | Tick to plot design levels along the string on the profile.  |

## Delete icon

The **Delete** icon of the Resurface design view allows you to delete strings from the road design.

To delete a string:

1. At the *Alignment* tab of the Resurface design view, click the **Delete** icon.

The **Delete String** dialog is displayed.

2. In the *Strings* list, select strings to be deleted.
3. Click **Delete**.

The strings are deleted.

## Update Survey icon

The **Update Survey** icon of the Resurface design view allows you to update the survey view with the design surface strings and a surface model, as defined by the Data Transfer Table.

The design should be completed to use this option.

To update the survey data:

1. Configure the Data Transfer Table. See "Data Transfer Table icon" section below for details.
2. At the *Alignment* tab of the Resurface design view, click the **Update Survey** icon.

## Data Transfer Table icon

The **Data Transfer Table** icon of the Resurface design view allows you to set up the parameters for transferring road data into the survey view.

To configure the Data Transfer Table:

1. At the *Alignment* tab of the Resurface design view, click the **Data Transfer Table** icon.  
The **Transfer Data to Survey** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

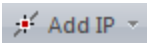
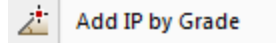
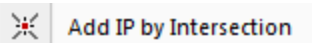
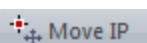
### The **Transfer Data to Survey** dialog

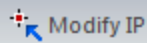
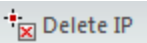
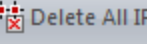
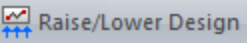
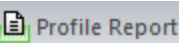
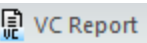
| Field                | Description  |
|----------------------|--|
| <i>Road Code</i>     | The name used to define each string in the road design. These strings comprise the reference alignment, the strings created for each template leg that is labelled and has its plot box ticked, and certain standard strings automatically named by the software, such as LBAT [left batter] and RT1 [table drain at the right leg 1]. |
| <i>Survey String</i> | The code of each point on this design string. This code will also name the string created in the survey view. This is set to the same name as the road code but may be modified.   |



| Field              | Description  |
|--------------------|--|
| <i>Layer</i>       | The layer created to hold this string and all its node points in the survey view. This is set to the same name as the road code but may be modified. An existing layer may be selected from the pick list available in this field or a new name may be entered.  |
| <i>Transfer</i>    | Tick to transfer this string to the survey view with the option Update Survey.   |
| <i>Road Number</i> | Allows you to add the road number to the Survey String name and the Layer name.<br>To add road number to the Survey String name: <ol style="list-style-type: none"> <li>1. Specify the required number in the editbox.</li> <li>2. Define whether it will be used as prefix or suffix, by selecting the appropriate radiobutton.</li> <li>3. Click <b>Survey String</b>.</li> </ol> To add road number to the layer name: <ol style="list-style-type: none"> <li>1. Specify the required number in the editbox.</li> <li>2. Define whether it will be used as prefix or suffix, by selecting the appropriate radiobutton.</li> <li>3. Click <b>Layer</b>.</li> </ol> |
| <i>Create DTM</i>  | Tick to create a DTM for the selected surface defined in the <i>Surface</i> field. Specify a name for the DTM in the editbox.<br>The DTM created will be the complete surface from the far left edge of the design to the far right edge of the design. These are usually the left and right batter lines. The surface is complete even if the user does not transfer all the strings from this surface.   |
| <i>Surface</i>     | Select the surface to be transferred to the survey view from the pick list of surfaces. This will usually be the Design surface, and the string names are displayed from the Design surface.   |

## Profile tab

| IP  |  |
|---|--|
|  | <b>Add IP icon</b><br>Click it to add a new IP to the profile.   |
|  | <b>Add IP by Grade icon</b><br>Click it to create a new IP at the grade line from an existing IP.                      |
|  | <b>Add IP by Intersection icon</b><br>Click it to create a new IP at the intersection of grades from two existing IPs. |
|  | <b>Move IP icon</b><br>Click it to move an exiting IP to a new position.   |

|  |   |
|--|---|
|  Modify IP          | Modify IP icon<br>Click it to change properties of an existing IP.                              |
|  Delete IP          | Delete IP icon<br>Click it to delete an existing IP from the profile design.                    |
|  Delete All IP's    | Delete All IPs<br>Click it to delete all existing IPs from the profile design.                  |
| <b>Profile group</b>   |   |
|  Raise/Lower Design | Raise/Lower Design icon<br>Click it to adjust design by level.                                  |
| <b>Report group</b>  |   |
|  Profile Report     | Profile Report icon<br>Click it to generate a profile report, listing all chainages.            |
|  VC Report          | VC Report icon<br>Click it to calculate levels for the different strings involved in a profile. |

## Add IP icon

The **Add IP** icon of the Resurface design view allows you to insert a new IP at a defined position.

To add an IP to the profile design:

1. At the *Profile* tab of the Resurface design view, click the **Add IP** icon.
2. Locate the new IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the chainage, level, approach and departure grades in the appropriate editboxes at the bottom toolbar.

The *IP Details* dialog is displayed.

3. Review the parameters, if needed change them. Fields are described in the table below.
4. Click **OK**.

### Fields of the *IP Details* dialog

| Field                       | Description   |
|-----------------------------|---|
| <i>IP Chainage</i>          | Defines the chainage of the new intersection point (IP).                                      |
| <i>IP Level</i>             | Defines the level of the new IP.  |
| <i>Grade</i>                | Displays the grid at the new IP.  |
| <i>Approach Grade %</i>     | Displays the grade of the road approaching this IP from the previous IP at the lower chainage |
| <i>Departure Grade %</i>    | Displays the grade of the road departing from this IP to the next IP at the higher chainage.  |
| <i>Algebraic Difference</i> | Displays the change in grade. Calculated as Departure Grade – Approach Grade.                 |
| <i>Maximum Length</i>       | Displays the maximum curve length available to fit a vertical curve at this IP.               |

| Field                          | Description  |
|--------------------------------|--|
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Add IP by Grade icon

The **Add IP by Grade** icon of the Resurface design view allows you to insert a new IP at a grade from an existing IP.

To add an IP by grade:

1. At the *Profile* tab of the Resurface design view, click the **Add IP by Grade** icon.
2. In the profile view, select the base IP.
3. Locate the new IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the chainage and grade from the base IP in the appropriate editboxes at the bottom toolbar.

The *IP Details* dialog is displayed.

4. Review the parameters, if needed change them. Fields are described in the table below.
5. Click **OK**.

### Fields of the *IP Details* dialog

| Field                       | Description   |
|-----------------------------|---|
| <i>IP Chainage</i>          | Defines the chainage of the new intersection point (IP).                                      |
| <i>IP Level</i>             | Defines the level of the new IP.  |
| <i>Grade</i>                | Displays the grid at the new IP.  |
| <i>Approach Grade %</i>     | Displays the grade of the road approaching this IP from the previous IP at the lower chainage |
| <i>Departure Grade %</i>    | Displays the grade of the road departing from this IP to the next IP at the higher chainage.  |
| <i>Algebraic Difference</i> | Displays the change in grade. Calculated as Departure Grade – Approach Grade.                 |
| <i>Maximum Length</i>       | Displays the maximum curve length available to fit a vertical curve at this IP.               |

| Field                          | Description  |
|--------------------------------|--|
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Add IP by Intersection icon

The **Add IP by Intersection** icon of the Resurface design view allows you to insert a new IP at an intersection of grades from two existing IPs.

To add an IP:

1. At the *Profile* tab of the Resurface design view, click the **Add IP by Intersection** icon.
2. In the profile view, select the first base IP.
3. Define the grade from the first IP. Do one of the following:
  - Click the required place in the profile view.
  - Specify the grade in the appropriate editboxes at the bottom toolbar.
4. Repeat steps 2 and 3 for the second base IP.

The *IP Details* dialog is displayed.

5. Review the parameters, if needed change them. Fields are described in the table below.
6. Click **OK**.

### Fields of the *IP Details* dialog

| Field                       | Description   |
|-----------------------------|---|
| <i>IP Chainage</i>          | Defines the chainage of the new intersection point (IP).                                      |
| <i>IP Level</i>             | Defines the level of the new IP.  |
| <i>Grade</i>                | Displays the grid at the new IP.  |
| <i>Approach Grade %</i>     | Displays the grade of the road approaching this IP from the previous IP at the lower chainage |
| <i>Departure Grade %</i>    | Displays the grade of the road departing from this IP to the next IP at the higher chainage.  |
| <i>Algebraic Difference</i> | Displays the change in grade. Calculated as Departure Grade – Approach Grade.                 |

| Field                          | Description  |
|--------------------------------|--|
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Move IP icon

The **Move IP** icon of the Resurface design view allows you to move an existing IP to a new position.

To change an IP:

1. At the *Profile* tab of the Resurface design view, click the **Modify IP** icon.
2. In the profile view, select the required IP.
3. Move the IP to a new position. Left click to confirm the position.

## Modify IP icon

The **Modify IP** icon of the Resurface design view allows you to change the parameters of an existing IP.

To change an IP:

1. At the *Profile* tab of the Resurface design view, click the **Modify IP** icon.
2. In the profile view, select the required IP.  
The **IP Details** dialog is displayed.
3. Review the parameters, if needed change them. Fields are described in the table below.
4. Click **OK**.

### Fields of the *IP Details* dialog

| Field                   | Description   |
|-------------------------|---|
| <i>IP Chainage</i>      | Defines the chainage of the new intersection point (IP).                                      |
| <i>IP Level</i>         | Defines the level of the new IP.  |
| <i>Grade</i>            | Displays the grid at the new IP.  |
| <i>Approach Grade %</i> | Displays the grade of the road approaching this IP from the previous IP at the lower chainage |

| <b>Field</b>                   | <b>Description</b>   |
|--------------------------------|--|
| <i>Departure Grade %</i>       | Displays the grade of the road departing from this IP to the next IP at the higher chainage.   |
| <i>Algebraic Difference</i>    | Displays the change in grade. Calculated as Departure Grade – Approach Grade.  |
| <i>Maximum Length</i>          | Displays the maximum curve length available to fit a vertical curve at this IP.  |
| <i>VC Length</i>               | Select the radiobutton and specify the length of the parabolic vertical curve at this IP.  |
| <i>K Value</i>                 | Select the radiobutton and specify the K Value. This is the value required for a 1% change in grade. The VC length is computed from this value   |
| <i>Design Speed</i>            | Select the radiobutton and select the speed from the drop-down list to compute the VC length from the Sight Distance criteria.   |
| <i>Sight Distance Criteria</i> | These are used to compute suitable curve lengths.  |
| <i>Sight Distance</i>          | Select a sight distance table from the drop-down list. These tables are set up in the roads library and relate the design speed to suitable sight distances that are allowed for in local standards. |

## Delete IP icon

The **Delete IP** icon of the Resurface design view allows you to delete an existing IP from the profile design.

To delete an IP:

1. At the *Profile* tab of the Resurface design view, click the **Delete IP** icon.
2. In the profile view, select the required IP.

The IP is deleted.

## Delete All IPs

The **Delete All IPs** icon of the Resurface design view allows you to delete all existing IPs from the profile design.

To delete all IPs:

1. At the *Profile* tab of the Resurface design view, click the **Delete All IPs** icon.

The confirmation message is displayed.

2. Click **Yes**.

The IPs are deleted.

## Raise/Lower Design icon

The **Raise/Lower Design** icon of the Resurface design view allows you to raise the level of all existing IPs within a nominated chainage range. This will raise or lower all or a section of the design profile.

To adjust a design:

1. At the *Profile* tab of the Resurface design view, click the **Raise/Lower Design** icon.  
The **Raiser/Lower IP's** dialog is displayed.
2. In the *Raiser/Lower Amount* editbox, specify the required level change. Positive value will raise the IP levels, negative value will lower the IP levels.
3. In the *From Station* editbox, specify the start chainage of the range within which IP levels will be adjusted.
4. In the *To Station* editbox, specify the end chainage of the range within which IP levels will be adjusted.
5. Click **OK**.

The design is adjusted.

### Fields of the *Raiser/Lower IP's* dialog

| Field                      | Description  |
|----------------------------|--|
| <i>Raiser/Lower Amount</i> | Defines the required level change. Positive value will raise the IP levels, negative value will lower the IP levels. |
| <i>From Station</i>        | Defines the start chainage of the range within which IP levels will be adjusted.                                     |
| <i>To Station</i>          | Defines the end chainage of the range within which IP levels will be adjusted.                                       |

## VC Report icon

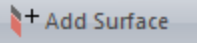
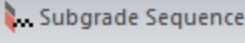
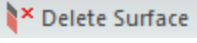
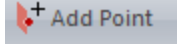
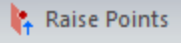
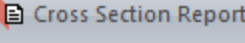
The **VC Report** icon of the Resurface design view allows you to generate a report, listing levels for the different strings involved in a design, such as the addition of a curb and channel to an existing road or widening a lane of a road using the existing pavement grading.

To generate a VC Report:

1. At the *Profile* tab of the Resurface design view, click the **VC Report** icon.  
The **VC Details** dialog is displayed.
2. Configure the parameters as you need and click **OK**.

The report, listing selected profile details is displayed.

## Cross Section tab

| Surface group   |   |
|---|---|
|  | <b>Add Surface icon</b><br>Click it to add a surface to the road design.                          |
|  | <b>Sequence icon</b><br>Click it to re-order the subgrade surfaces.                               |
|  | <b>Delete icon</b><br>Click it to delete surfaces from the road design.                           |
| Points group  |   |
|  | <b>Add Point icon</b><br>Click it to add a new point to the cross section.                        |
|  | <b>Raise icon</b><br>Click it to raise/lower the level on a section of the current cross section. |
| Reports group   |   |
|  | <b><u>Cross Section Report icon</u></b><br>Click it to generate a cross section report.           |

### Add Surface icon

The **Add Surface** icon of the Resurface design view allows you to add another surface to the road design. This surface is usually a subgrade surface but may be an alternate design surface.

To add a surface:

1. At the *Cross Section* tab of the Resurface design view click the **Add Surface** icon.  
The **Add Surface** dialog is displayed.
2. In the *Surface Name* editbox, type the name of the surface. You may also select a name from the drop-down list.
3. Define the type of the surface, by selecting the appropriate radiobutton:
  - *Design* — when the new surface is to be a design surface.
  - *Subgrade* — if the new surface is to be a subgrade surface. If so, configure the following parameters:
    1. In the *Material* editbox, specify the material used. This is optional but the material will be listed on the subgrade volumes report.
    2. In the *Class* editbox, specify a character or characters to label and allocate the subgrade to a class. This is optional but the class may be used to categorize the subgrade on the volumes report.
4. If needed, tick the *Copy Current Data* checkbox box to copy the data allocated to the current design or subgrade surface to the new surface.
5. Click **OK**.

The surface is created and set as current Design or Subgrade surface.



**Fields of the Add Surface dialog**

| Field                    | Description   |
|--------------------------|---|
| <i>Surface Name</i>      | Defines the name of the new surface.  |
| <i>Surface Type</i>      | Defines the type of the new surface.<br><i>Design</i> - when the new surface is to be a design surface.<br><i>Subgrade</i> - if the new surface is to be a subgrade surface.  |
| <i>Material</i>          | Defines the material used. This is optional but the material will be listed on the subgrade volumes report.   |
| <i>Class</i>             | Defines a character or characters to label and allocate the subgrade to a class. This is optional but the class may be used to categorize the subgrade on the volumes report. |
| <i>Copy Current Data</i> | Tick to copy the data allocated to the current design or subgrade surface to the new surface.   |

**Sequence icon**

The **Subgrade Sequence** icon of the Resurface design view allows you to re-order the subgrade surfaces. The sequence is originally defined in the order that the subgrade surfaces are created, with the first surface being the top subgrade surface. The sequence should be set correctly so that appropriate surfaces intersect each other.

To re-order surfaces:

1. At the *Cross Section* tab of the Resurface design view, click the **Sequence** icon.  
The **Subgrade Sequence** dialog is displayed.
2. Sort the surfaces as you need. Use the *Existing Surfaces* list to hold the surfaces while the sequence is being re-ordered.
3. Click **OK**.  
The subgrades are re-ordered.

**Delete icon**

The **Delete Surface** icon of the Resurface design view allows you to delete surfaces from the road design.

To delete a surface:

1. At the *Cross Section* tab of the Resurface design view, click the **Delete Surface** icon.  
The **Delete Surface** dialog is displayed.
2. In the *Surfaces* list, select surfaces to be deleted.  
NOTE  
Natural and Design surfaces cannot be deleted.
3. Click **Delete**.  
The surfaces are deleted.

## Add Point icon

The **Add Point** icon of the Resurface design view allows you to point to a single cross section to modify the current surface of the section displayed in the cross section panel.

To add a point to the cross section:

1. In the *Profile* panel, select the required cross section.
2. At the *Cross Section* tab of the Resurface design view, click the **Add Point** icon.
3. Locate the new point. Do one of the following:
  - Click the required place in the *Cross Section* panel.
  - Specify the offset and level of the new point in the appropriate editboxes at the bottom toolbar.
4. If needed, create more points.
5. When finished, press *Esc*.

## Raise icon

The **Raise Points** icon of the Resurface design view allows you to raise or lower the level on a section of the current cross section in the cross section panel by a fixed amount. The section is defined by an offset range. Alternatively, the height changed may be applied to a point or points with a defined code.

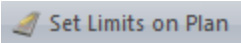
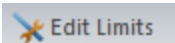
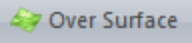
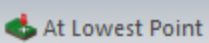
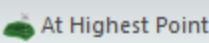
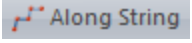
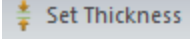
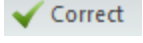
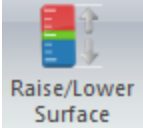
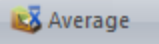
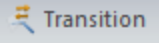
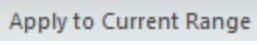
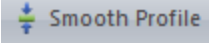
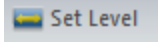
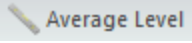
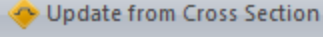
To adjust height of a section:

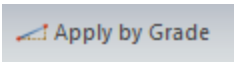
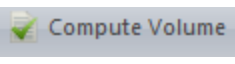
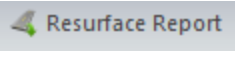
1. At the *Cross Section* tab of the Resurface design view, click the **Raise Points** icon.

The **Raise XSect Points** dialog is displayed.

2. In the *Increment* editbox, specify the amount of height adjustment. Use the positive value to raise and negative value to lower the section.
3. Define which points will be adjusted. You may do it either by offset of the cross section, or by the point code. Do one of the following:
  - Select the *Offset From* radiobutton and specify the offset range in the editboxes. The height will be adjusted for all points within this offset range.
  - Select the *Code* radiobutton and select the required code from the drop-down list. The height will be adjusted for all points in this cross section with this code.
4. Click **OK**.

## Design tab

| <b>Limits group</b>   |  |
|---|--|
|  Set Limits on Plan          | Set Limits on Plan icon<br>Click it to define the resurfacing limits.                                |
|  Edit Limits                 | Edit Limits icon<br>Click it to edit an existing resurfacing limits set.                             |
| <b>Minimum Thickness</b>  |  |
|  Over Surface                | Over Surface icon<br>Click it to calculate minimum thickness over the surface.                       |
|  At Lowest Point             | At Lowest Point icon<br>Click it to calculate minimum thickness at lowest point of the surface.      |
|  At Highest Point            | At Highest Point icon<br>Click it to calculate minimum thickness at highest point of the surface.    |
|  Along String                | Along String icon<br>Click it to calculate minimum thickness along a reference string.               |
|  Set Thickness               | Set Thickness icon<br>Click it to manually set thickness of the asphalt.                             |
|  Correct                    | Correct icon<br>Click it to correct minimum asphalt thickness.                                       |
| <b>Design group</b>   |  |
|  Raise/Lower Surface       | Raise/Lower Design icon<br>Click it to tune the design or natural surface.                           |
| <b>Cross Slopes group</b>   |  |
|  Average                   | Average icon<br>Click it to apply an average cross slope to strings.                                 |
|  Transition                | Transition icon<br>Click it to apply a transition cross slope to strings.                            |
|  Apply to Current Range    | Apply to Current Range icon<br>Click it to manually configure the cross slopes.                      |
| <b>Profile group</b>  |  |
|  Smooth Profile            | Smooth Profile icon<br>Click it to create a smooth profile.  |
|  Set Level                 | Set Level icon<br>Click it to define a profile elevation.  |
|  Average Level             | Average Level icon<br>Click it to create a smooth profile by averaging its elevations.               |
|  Update from Cross Section | Update from Cross Section icon<br>Click it to transfer the changes from cross sections to a profile. |

|   |  |
|---|--|
|  | Apply by Grade icon<br>Click it to apply a profile slope over the strings. |
| <b>Reports group</b>  |  |
|  | Compute Volume icon<br>Click it to recalculate volumes.                    |
|  | Resurface Report icon<br>Click it to generate a resurface report.          |

## Set Limits on Plan icon

The **Set Limits on Plan** icon of the Resurface design view allows you to set the resurfacing parameters for the selected segment of the road.

To set limits:

1. At the *Design* tab of the Resurface design view, click the **Set Limits on Plan** icon.
2. At the Alignment panel, select the required start and end chainages.
3. At the Alignment panel, select the string which will be used in resurfacing.
4. When finished, press *Esc*.

The **Set Limits** dialog is displayed.

5. Configure the parameters as you need. Fields are described in the table below. To activate parameter, tick its checkbox, to activate all parameters, tick the *All check boxes* checkbox.
6. Click **OK**.

### Fields of the **Set Limits** dialog

| Field                      | Description   |
|----------------------------|---|
| <i>From station (m)</i>    | Defines the start station of the resurfacing design.  |
| <i>To station (m)</i>      | Defines the end station of the resurfacing design.  |
| <i>String</i>              | Defines the strings to which the resurface changing will be applied. Select required strings in the drop-down list. |
| <i>Min thickness (mm)</i>  | Defines the minimum thickness of the asphalt surface.   |
| <i>Max thickness (mm)</i>  | Defines the maximum thickness of the asphalt surface.   |
| <i>Min milling (mm)</i>    | Defines the minimum allowed thickness of milling.   |
| <i>Max milling (mm)</i>    | Defines the maximum allowed thickness of milling.   |
| <i>Min cross slope (%)</i> | Defines the minimum slope of cross sections (from the centerline to the road edge).                                 |
| <i>Max cross slope (%)</i> | Defines the maximum slope of cross sections (from the centerline to the road edge).                                 |

| Field                      | Description   |
|----------------------------|---|
| <i>Min long slope (%)</i>  | Defines the minimum slope of profile (from one IP to another).  |
| <i>Max cross slope (%)</i> | Defines the maximum slope of cross sections (from one IP to another).   |
| <i>Relative slope band</i> | Defines the maximum slope angle between approaching and departing alignment segments at one IP, which may be defined as "smooth". |

## Edit Limits icon

The **Edit Limits** icon of the Resurface design view allows you to edit an existing resurfacing parameters.

To set limits:

1. At the *Design* tab of the Resurface design view, click the **Edit Limits** icon.  
The **Edit Limits** dialog is displayed.
2. From the String drop-down list, select the string for editing.
3. Configure the parameters as you need. Fields are described in the table below.
4. Click **OK**.

### Fields of the **Edit Limits** dialog

| Field                      | Description   |
|----------------------------|---|
| <i>From station (m)</i>    | Defines the start station of the resurfacing design.  |
| <i>To station (m)</i>      | Defines the end station of the resurfacing design.  |
| <i>String</i>              | Defines the strings to which the resurface changing will be applied. Select required strings in the drop-down list.               |
| <i>Min thickness (mm)</i>  | Defines the minimum thickness of the asphalt surface.   |
| <i>Max thickness (mm)</i>  | Defines the maximum thickness of the asphalt surface.   |
| <i>Min milling (mm)</i>    | Defines the minimum allowed thickness of milling.   |
| <i>Max milling (mm)</i>    | Defines the maximum allowed thickness of milling.   |
| <i>Min cross slope (%)</i> | Defines the minimum slope of cross sections (from the centerline to the road edge).   |
| <i>Max cross slope (%)</i> | Defines the maximum slope of cross sections (from the centerline to the road edge).   |
| <i>Min long slope (%)</i>  | Defines the minimum slope of profile (from one IP to another).  |
| <i>Max cross slope (%)</i> | Defines the maximum slope of cross sections (from one IP to another).   |
| <i>Relative slope band</i> | Defines the maximum slope angle between approaching and departing alignment segments at one IP, which may be defined as "smooth". |

## Over Surface icon

The **Over Surface** icon of the Resurface design view allows you to apply minimum thickness of the asphalt, defined in limits, over the entire design surface. In that case level of asphalt will be calculated at each point along alignment strings over the entire surface.

To set minimum thickness:

1. At the *Design* tab of the Resurface design view, click the **Over Surface** icon.  
The *Apply Min Thickness over Surface* dialog is displayed.
2. In needed, in the *From station (m)* and *To station (m)* ediboxes, specify the chainage range to which min thickness will be applied.
3. In the *String* drop-down list, select strings to which min thickness will be applied.
4. Click **OK**.

## At Lowest Point icon

The **At Lowest Point** icon of the Resurface design view allows you to apply minimum thickness of the asphalt, defined in limits, at lowest point of the surface. In that case level of asphalt will be calculated at lowest point of the surface and spread all over it.

To set minimum thickness:

1. At the *Design* tab of the Resurface design view, click the **At Lowest Point** icon.  
The *Apply Min Thickness at Lowest Point* dialog is displayed.
2. In needed, in the *From station (m)* and *To station (m)* ediboxes, specify the chainage range to which min thickness will be applied.
3. In the *String* drop-down list, select strings to which min thickness will be applied.
4. Click **OK**.

## At Highest Point icon

The **At Highest Point** icon of the Resurface design view allows you to apply minimum thickness of the asphalt, defined in limits, at highest point of the surface. In that case level of asphalt will be calculated at highest point of the surface and spread all over it.

To set minimum thickness:

1. At the *Design* tab of the Resurface design view, click the **At Highest Point** icon.  
The *Apply Min Thickness at Lowest Point* dialog is displayed.
2. In needed, in the *From station (m)* and *To station (m)* ediboxes, specify the chainage range to which min thickness will be applied.
3. In the *String* drop-down list, select strings to which min thickness will be applied.
4. Click **OK**.

---

## Along String icon

The **Along String** icon of the Resurface design view allows you to apply minimum thickness of the asphalt, defined in limits, along a reference string. In that case level of asphalt will be calculated at points of the reference string and spread all over surface.

To set minimum thickness:

1. At the *Design* tab of the Resurface design view, click the **Along String** icon.  
The *Apply Min Thickness along String* dialog is displayed.
2. In needed, in the *From station (m)* and *To station (m)* ediboxes, specify the chainage range to which min thickness will be applied.
3. In the *String* drop-down list, select strings to which min thickness will be applied.
4. From the *Reference String* drop-down list, select the string along which min thickness will be calculated.
5. Click **OK**.

## Set Thickness icon

The **Set Thickness** icon of the Resurface design view allows you to define thickness of the asphalt, over the entire design surface. In that case level of asphalt will be calculated at each point along alignment strings over the entire surface.

To set thickness:

1. At the *Design* tab of the Resurface design view, click the **Set Thickness** icon.  
The *Set Thickness* dialog is displayed.
2. In needed, in the *From station (m)* and *To station (m)* ediboxes, specify the chainage range to which min thickness will be applied.
3. In the *Thickness* editbox, type the required asphalt thickness.
4. Click **OK**.

## Correct icon

The **Correct** icon of the Resurface design view allows you to correct minimum thickness of the asphalt. In that case level of asphalt will be re-calculated at points of the reference string and spread all over surface.

To correct minimum thickness:

1. At the *Design* tab of the Resurface design view, click the **Correct** icon.  
The *Correct Min Thickness* dialog is displayed.
2. In needed, in the *From station (m)* and *To station (m)* ediboxes, specify the chainage range to which min thickness will be applied.
3. In the *String* drop-down list, select strings to which min thickness will be applied.
4. Click **OK**.

## Raise/Lower Design icon

The **Raise/Lower Design** icon of the g allows you to raise/lower design and/or natural surfaces.

To raise/lower a surface:

1. At the *Design* tab of the Resurface design view, click the **Raise/Lower Surface** icon.  
The **Raise/Lower Surface** dialog is displayed.
2. In the *Surface* group box, define the surface which will be tuned, by selecting the appropriate radiobutton.
3. In needed, in the *From station (m)* and *To station (m)* editboxes, specify the chainage range to which min thickness will be applied.
4. In the *String* drop-down list, select strings to which min thickness will be applied.
5. Define the direction and amount of tuning, by selecting either *Raise* or *Lower* radiobutton and typing the amount in the appropriate editbox.
6. Click **OK**.

## Average icon

The **Average** icon of the Resurface design view allows you to apply an average cross slope over the points on the selected strings per cross section, basing on the design surface or the natural surface. In the result a straight between the left and right of the selected strings parallel with the average of either the points on the natural surface or the design surface will be created.

To apply an average cross slope:

1. At the *Design* tab of the Resurface design view, click the **Average** icon.  
The **Average Cross Slope** dialog is displayed.
2. In the *Surface* group box, define the surface which will be tuned, by selecting the appropriate radiobutton.
3. In needed, in the *From station (m)* and *To station (m)* editboxes, specify the required chainage range.
4. In the *String* drop-down list, select strings to which min thickness will be applied.
5. From the *Reference String* drop-down list, select the string which is used as reference one. When recalculating elevations for the new cross fall, elevation of this string will not change.
6. Click **OK**.

## Transition icon

The **Transition** icon of the Resurface design view allows you to apply cross slopes resulting in a linear transition within the specified chainage range over the selected strings.

To apply a cross slope transition:

1. At the *Design* tab of the Resurface design view, click the **Transition** icon.  
The **Cross Slope Transition** dialog is displayed.
2. In the *From station (m)* and *To station (m)* editboxes, specify the chainage range to which min thickness will be applied.
3. In the *String* drop-down list, select strings to which min thickness will be applied.
4. From the *Reference String* drop-down list, select the string which is used as reference one. When recalculating elevations for the new cross fall, elevation of this string will not change.
5. Click **OK**.



## Apply to Current Range icon

The **Apply to Current Range** icon of the Resurface design view allows you to configure cross slopes sections (a slope from the centerline to the road edge) within the specified range of chainages.

To apply the cross slope:

1. At the *Design* tab of the Resurface design view, click the **Apply to Current Range** icon.  
The *Apply Design by Cross Fall* dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Apply Design by Cross Fall* dialog

| Field                         | Description  |
|-------------------------------|--|
| <i>From Chainage (m)</i>      | Defines the start station of the resurfacing design.   |
| <i>To Chainage (m)</i>        | Defines the end station of the resurfacing design.   |
| <i>Cross Fall (%)</i>         | Defines the cross fall slope value.  |
| <i>From String</i>            | Defines the start string of the cross fall.  |
| <i>To String</i>              | Defines the end string of the cross fall.  |
| <i>Elev Ref String</i>        | Defines the string which is used as reference one. When recalculating elevations for the new cross fall, elevation of this string will not change. |
| <b>Cross Fall Calculation</b> |  |
| <i>Left to Right</i>          | Slope is counted from left string to right with the defined value.   |
| <i>Right to Left</i>          | Slope is counted from right string to left with the defined value.   |
| <i>Treated as Crown</i>       | Slope is counted from the reference string to the left and the right ones with the defined value.  |

## Smooth Profile icon

The **Smooth Profile** icon of the Resurface design view allows you to create a smooth profile within the specified chainage range. It means tuning the slope between approaching and departing alignment segments at one IP to the defining value, by using the selecting ratio between filling and milling the surface.

To smooth a profile:

1. At the *Design* tab of the Resurface design view, click the **Smooth Profile** icon.  
The *Smooth Profile* dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Smooth Profile* dialog

| Field                    | Description  |
|--------------------------|--|
| <i>From Chainage (m)</i> | Defines the start station of the resurfacing design. |

| Field                                 | Description  |
|---------------------------------------|--|
| <i>To Chainage (m)</i>                | Defines the end station of the resurfacing design.   |
| <i>String</i>                         | Select strings to which smoothing will be applied.   |
| <i>Spacing</i>                        | Defines the spacing of points at which smoothness will be controlled.<br>Default value is <i>0.00</i> , in that case IPs of alignments will be used for spacing.   |
| <i>Max allowed relative slope (%)</i> | Defines the maximum slope between approaching and departing alignment segments at one IP, with which profile may be defined as "smooth".   |
| <i>Fill/Mill Ratio</i>                | Defines the ratio between filling (lifting) and milling (lowering) which may be used to achieve smoothing. Define the required value by using slider, or type it in the editbox.<br><br>The value <i>0</i> defines using mill only, which means that only removing of the existing surface will be used, and not any new asphalt will be added.<br><br>The value <i>100</i> defines using fill only, which means that only adding of the new asphalt will be used, and any part of the existing one will not be removed. |

## Set Level icon

The **Set Level** icon of the Resurface design view allows you to define the elevation of the profile within the specified chainage range.

To set the profile elevation:

1. At the *Design* tab of the Resurface design view, click the **Set Level** icon.  
The **Set Level** dialog is displayed.
2. In the *From station (m)* and *To station (m)* editboxes, specify the chainage range to which the elevation will be applied.
3. In the *String* drop-down list, select strings to which level will be applied.
4. In the *Level* editbox, type the required elevation value.
5. Click **OK**.

### Fields of the **Set Level** dialog

| Field                    | Description  |
|--------------------------|--|
| <i>From Chainage (m)</i> | Defines the start station of the resurfacing design. |
| <i>To Chainage (m)</i>   | Defines the end station of the resurfacing design.   |
| <i>String</i>            | Select strings to which leveling will be applied.    |
| <i>Level</i>             | Defines the required elevation value.                |

## Average Level icon

The **Average Level** icon of the Resurface design view allows you to create a smooth profile between specified chainages range by averaging elevations over the specified distances.

To smooth a profile:

1. At the *Design* tab of the Resurface design view, click the **Average Level** icon.  
The **Average Level** dialog is displayed.
2. In the *From station (m)* and *To station (m)* editboxes, specify the chainage range to which smoothing will be applied.
3. In the *String* drop-down list, select strings to which smoothing will be applied.
4. In the *Avg Length* editbox, type the required averaging distance.
5. Click **OK**.

### Fields of the Average Level dialog

| Field                    | Description  |
|--------------------------|--|
| <i>From Chainage (m)</i> | Defines the start station of the resurfacing design.                       |
| <i>To Chainage (m)</i>   | Defines the end station of the resurfacing design.                         |
| <i>String</i>            | Select strings to which smoothing will be applied.                         |
| <i>Avg Length</i>        | Defines the required distance, over which the elevations will be averaged. |

## Update from Cross Section icon

The **Update from Cross Section** icon of the Resurface design view allows you to transfer the changes from the cross sections to the profile.

To update a profile:

1. At the *Design* tab of the Resurface design view, click the **Update from Cross Section** icon.  
The **Update Profile from Cross Section** dialog is displayed.
2. In the *From station (m)* and *To station (m)* editboxes, specify the chainage range to which the changes will be applied.
3. In the *String* drop-down list, select strings to which changes will be applied.
4. Click **OK**.

### Fields of the Update Profile from Cross Section dialog

| Field                    | Description  |
|--------------------------|--|
| <i>From Chainage (m)</i> | Defines the start station of the resurfacing design. |
| <i>To Chainage (m)</i>   | Defines the end station of the resurfacing design.   |
| <i>String</i>            | Select strings to which changes will be applied.     |

## Apply by Grade icon

The **Apply by Grade** icon of the Resurface design view allows you to apply a profile slope over the strings.

To update a profile:

1. At the *Design* tab of the Resurface design view, click the **Apply by Grade** icon.

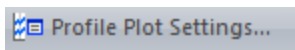
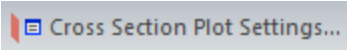
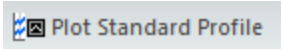
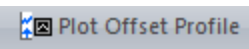
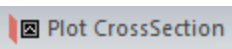
The *Apply Design by Grade* dialog is displayed.

2. In the *From station (m)* and *To station (m)* editboxes, specify the chainage range to which the grade will be applied.
3. In the *Grade* editbox, specify the required grade.
4. Click **OK**.

### Fields of the *Apply Design by Grade* dialog

| Field                    | Description  |
|--------------------------|--|
| <i>From Chainage (m)</i> | Defines the start station of the resurfacing design. |
| <i>To Chainage (m)</i>   | Defines the end station of the resurfacing design.   |
| <i>Grade</i>             | Defines the required profile grade.                  |

## Plotting tab

| Plot Settings group   |  |
|---|--|
|  | Profile Plot Settings icon<br>Click it to configure profile plotting parameters.             |
|  | Cross Section Plot Settings icon<br>Click it to configure cross section plotting parameters. |
|  | Plot Standard Profile icon<br>Click it to plot a standard profile as a drawing.              |
|  | Plot Offset Profile icon<br>Click it to plot an offset profile as a drawing.                 |
|  | Plot CrossSection icon<br>Click it to plot sheets of cross sections as a drawing.            |

### Profile Plot Settings icon

The **Profile Plot Settings** icon of the Resurface design view allows you to customize all of the parameters necessary to create a profile drawing.

You may use two formats of plotting:

- Standard Format – A leader line is defined for each chainage and level position of the natural and design surfaces.
- Grid Format – A grid is displayed with leaders at nominated intervals of chainage.

To configure a profile plotting:

1. At the *Plotting* tab of the Resurface design view, click the **Profile Plot Settings** icon.  
The **Profile Plot Settings** dialog is displayed.
2. At the *General Plot Settings* tab, configure the position of the profile drawing on a title block; define the scales and the information included on the profile. See "General Plot Setting tab" section on the next page for fields description.
3. At the *Standard Profile Settings* tab, configure the plot parameters for the two profile lines. See "Standard Profile Settings tab" section on page 808 for fields description.
4. At the *Offset Profile Settings* tab, define up to 8 profile lines along a selection of different strings and from different surfaces. It is only used when plotting offset profiles. See *Offset Profile Settings* tab for fields description.
5. At the *Profile Table* tab, define standard parameters for plotting profile sections. See "Profile Table tab" section on page 809 for fields description.
6. At the *Cut/Fill Settings* tab, define the plot parameters for the cut/fill row on the profile layout. See "Cut/Fill Settings tab" section on page 810 for fields description.
7. At the *Volumes Settings* tab, define the plot parameters for the volumes row on the profile layout. See "Volume Settings tab" section on page 811 for fields description.
8. Click **OK**.

## General Plot Setting tab

This section describes the *General Plot Settings* tab of the **Profile Plot Settings** dialog of the Resurface design view. At this tab you may position the profile drawing, or drawings, on a title block. Additional settings define the scales used the required information included on the profile.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *General Plot Settings* tab

| Field                            | Description   |
|----------------------------------|---|
| <i>Horizontal Scale (1 in .)</i> | Defines the horizontal scale for the profile.   |
| <i>Vertical Scale (1 in .)</i>   | Defines the vertical scale for the profile.   |
| <i>Start Position X</i>          | Defines the X coordinate of the starting position of the lower left corner of the profile layout. This is measured in millimeters from the bottom left corner of the title block.   |
| <i>Start Position Y</i>          | Defines the Y coordinate of the starting position of the lower left corner of the profile layout. This is measured in millimeters from the bottom left corner of the title block.   |
| <i>Minimum Datum</i>             | Select the radiobutton to this option to define a minimum datum level in millimeters on the plan. The value specified in the editbox sets the minimum distance of the profile line from the datum line of the profile layout.   |
| <i>Maximum Datum</i>             | If the <i>Minimum Datum</i> radiobutton is selected, specify the maximum datum level in millimeters on the plan. The specified value sets the maximum distance of the profile line from the datum line of the profile layout.<br>If the profile line is still rising when the maximum datum is reached, the datum will be reset to the minimum datum position |
| <i>Datum Level</i>               | Select the radiobutton to this option to define a fixed datum level (in meters) in the editbox. The profile line will be drawn relevant to this level on the profile.   |
| <i>Max Plot Length</i>           | Defines the maximum plot length of the profile layout in millimeters on the selected title block. This length will need to be modified for smaller paper sizes.<br><i>For example, Max Plot Length = 700 represents 700 mm on an A1 sheet.</i>  |
| <i>Start Station</i>             | Defines the start chainage of the profile for this drawing.<br>Default is 0.000 and can be used if the full length of the road is to be plotted   |
| <i>End Station</i>               | Defines the end chainage of the profile for this drawing.<br>Default is 99999.999 and can be used if the full length of the road is to be plotted   |

| <b>Field</b>                   | <b>Description</b>  |
|--------------------------------|---|
| <i>Title Block</i>             | Defines the required title block to the drawing. Select it from the library by clicking >>.   |
| <i>Plot Grid</i>               | Tick to plot in a Grid Format.  |
| <i>Station Interval</i>        | Defines the chainage intervals.   |
| <i>Horizontal Interval</i>     | Defines the space between the horizontal grid lines in meters.  |
| <i>Vertical Interval</i>       | Defines the space between the vertical grid lines in meters.  |
| <i>Grid Height</i>             | Defines the height of the grid above the datum line on the drawing in millimeters.<br>If this height is greater than the height available on the title block, the plot will stop at the extents of the title block.                               |
| <i>Plot Datum</i>              | Tick to plot the datum value at the left hand end of the datum line.  |
| <i>Plot IPs</i>                | Tick to plot the levels of the IP positions on the leader line below the profile line.  |
| <i>Plot Min/Max</i>            | Tick to plot the high and low point details on the surface of the design profile.   |
| <i>Plot Obstructions</i>       | Tick to plot any obstructions.  |
| <i>Plot VC Length</i>          | Tick to plot all the vertical curve lengths. These are plotted in a horizontal line between the profile line and the datum line.  |
| <i>Plot VC Grade</i>           | Tick to plot all the grades between IPs. These are plotted in a horizontal line between the profile line and the datum line.  |
| <i>Super Elevation Details</i> | Tick to plot an extra row of data at the bottom of the profile. The super-elevation details for the various curves in the design are plotted.   |
| <i>Plot Cut/Fill</i>           | Tick to plot an extra row of data above the surface levels. The cut or fill difference between the natural surface and design surface is plotted. The parameters from the Cut/Fill Settings tab must be configured to achieve the correct results |
| <i>Plot Volumes</i>            | Tick to plot an extra row of data above the surface levels. The volumes between the adjacent cross sections are displayed as cut and fill. The parameters from the Volume Settings tab must be configured to achieve the correct results.         |
| <i>Alignment Details</i>       | Tick to plot an extra row of data below the chainages of the profile. The horizontal alignment details for the road are plotted.  |
| <i>Extra Row</i>               | Tick to include an extra row at the bottom of the profile figure for additional information.  |
| <i>With Leader</i>             | Tick to extend the leader lines through this new row.<br>Leave unticked to leave the row free of leader lines.  |

## Standard Profile Settings tab

This section describes the *Standard Profile Settings* tab of the **Profile Plot Settings** dialog of the Resurface design view. At this tab you may configure the plot parameters for the two profile lines. Use it to plot a profile containing only the design and natural surface profiles of the current string. Select line types and colors for these two surfaces.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *Standard Profile Settings* tab

| Field                  | Description  |
|------------------------|--|
| <i>Design Surface</i>  | <p>Tick the <i>Active</i> checkbox to plot the profile of the design surface and its data. Specify a label in the editbox. The label is used to name this row of levels on the profile plot.</p> <p>Select the color, line type and thickness of the design profile line, and select the text style used for the design surface levels.</p>    |
| <i>Natural Surface</i> | <p>Tick the <i>Active</i> checkbox to plot the profile of the natural surface and its data. Specify a label in the editbox. The label is used to name this row of levels on the profile plot.</p> <p>Select the color, line type and thickness of the natural profile line, and select the text style used for the natural surface levels.</p> |
| <i>Justification</i>   | Select the required justification table from the drop-down list to set the format and precision of the chainage and level numerical data on the profile plot.  |
| <i>Plot Sequence</i>   | Define the order in which the three lines of detail will be plotted.   |

## Offset Profile Settings tab

This section describes the *Offset Profile Settings* tab of the **Profile Plot Settings** dialog of the Resurface design view. At this tab you may define up to 8 profile lines along a selection of different strings and from different surfaces. Each profile line may have a separate datum by allocating spacing by using the *Sep* column. This data is only used when plotting offset profiles.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *Offset Profile Settings* tab

| Field         | Description  |
|---------------|--|
| <i>Active</i> | Tick to define and later plot the profile of a string on a nominated surface. When the checkbox is ticked the row is activated for data entry. |
| <i>String</i> | Selected a string from the drop-down list. The strings will be from the natural surface data and any strings created for the design.           |



| Field                | Description  |
|----------------------|--|
| <i>Surface</i>       | Select a surface from the drop-down list. The surfaces listed will be every natural, design and subgrade surface created for the road.                                 |
| <i>Label</i>         | Specify a label in this field. The label is used to name the levels for this profile on the profile plot.  |
| <i>Color</i>         | Select a color for the profile line defined on this row.   |
| <i>Sep</i>           | For all profile lines at the same datum, leave this field set to 0.00<br>To allocate a separation to the profiles on the profile plot, specify a value in millimeters. |
| <i>Justification</i> | Select the required justification table from the drop-down list to set the format and precision of the chainage and level numerical data on the profile plot.          |

In each row you may click >> to open the *Additional Offset Profile Specification* dialog.

#### Fields of the *Additional Offset Profile Specification* dialog

| Field             | Description  |
|-------------------|--|
| <i>Text Style</i> | Defines the text style used for the levels of this profile line. |
| <i>Line Style</i> | Defines the line style used for this profile line.               |
| <i>Thickness</i>  | Defines the line thickness used for this profile line.           |

### Profile Table tab

This section describes the *Profile Table* tab of the *Profile Plot Settings* dialog of the Resurface design view. At this tab you may define standard parameters for plotting longitudinal sections. The parameters stored in the profile table will be used for both offset profile and standard profile drawings.

The Profile Table is used to define the appearance of the profile layout with respect to grid lines, leaders, horizontal line spacing, labels, text types and colors.

You may save the configuration to the default one, by clicking **Save To Lib**. These settings will be available in other projects.

To load previously saved configuration, click **Load From Lib**.

#### Fields of the *Profile Table* tab

| Field                    | Description   |
|--------------------------|---|
| <i>Horizontal Lines</i>  | Defines the color and thickness for the horizontal lines. |
| <i>Grid/Leader Lines</i> | Defines the color and thickness for the horizontal lines. |
| <i>Line Spacing</i>      | Defines the spacing between the horizontal lines.         |
| <i>Station Tolerance</i> | Defines the tolerance for the chainage grid.              |
| <i>Station Format</i>    | Defines the format of chainage displaying.                |
| <i>Station Label</i>     | Defines the label and the text style for station labels.  |
| <i>Stations</i>          | Defines the text and justification styles for stations.   |

| Field             | Description  |
|-------------------|--|
| <i>Datum</i>      | Defines the text and justification styles for datum.   |
| <i>IP Max/Min</i> | Defines the text and justification styles for max and min IPs                                |
| <i>VC Grade</i>   | Defines the text and justification styles; and the line color for the VC grade lines.        |
| <i>VC Length</i>  | Defines the text and justification styles; and the line color for the VC length lines.       |
| <i>Align</i>      | Defines the text and justification styles; and the line color for the alignment lines.       |
| <i>Super</i>      | Defines the text and justification styles; and the line color for the super elevation lines. |

### Cut/Fill Settings tab

This section describes the *Cut/Fill Settings* tab of the **Profile Plot Settings** dialog of the Resurface design view. At this tab you may define the plot parameters for the cut/fill row on the profile layout.

This option enables the correct level differences between nominated surfaces to be computed and plotted on the profile. When using the standard profile option, the cut/fill differences will be between the natural surface and design surface at the center line or string position.

When using the offset profile option, the cut/fill differences may be defined between any nominated surfaces.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

#### Fields of the *Cut/Fill Settings* tab

| Field                    | Description   |
|--------------------------|---|
| <i>First Line</i>        | Defines the number for the first surface to compute the cut/fill.<br>If plotting standard profile the natural surface is surface 2 and the design surface is surface 1.<br>If plotting offset profile the surface number is taken from the row number on the Offset Profile Settings tab. |
| <i>Second Line</i>       | Defines the number of the second surface to complete the cut/fill.  |
| <i>First Line Text</i>   | Defines the text required on the first line of the label in a 2 line format, or the only line of the label in a 1 line format.  |
| <i>Second Line Text</i>  | Defines the text required on the Second line of the label in a 2 line format, or the only line of the label in a 1 line format.   |
| <i>Text Style (Cut)</i>  | Defines the text style used for the cut data.   |
| <i>Text Style (Fill)</i> | Defines the text style used for the fill data.  |

| Field                   | Description  |
|-------------------------|--|
| <i>Justification</i>    | Defines the justification style used for the cut/fill data.  |
| <i>Cut Text Before</i>  | Defines text that is required before each cut numeric.   |
| <i>Cut Text After</i>   | Defines text that is required after each cut numeric.  |
| <i>Fill Text Before</i> | Defines text that is required before each fill numeric.  |
| <i>Fill Text After</i>  | Defines text that is required after each fill numeric.   |
| <i>Line Format</i>      | Defines the line format: <ul style="list-style-type: none"> <li>• <i>1 Line</i> – fill depth is written as a negative number such as -1.2 and cut depth is written as a positive number such as +1.5</li> <li>• <i>2 Lines</i> – fill depth is written as a negative number on the first line and cut depth is written as a positive number on the second line.</li> </ul> |
| <i>Sign</i>             | <ul style="list-style-type: none"> <li>• <i>Show +/-</i> – Select to show the positive and negative sign on the cut and fill values. This would usually be selected for a 1 line format.</li> <li>• <i>No Sign</i> – Select to show no signs on the cut and fill values. This may be used if a 2 lines format is chosen.</li> </ul>  |

## Volume Settings tab

This section describes the *Volumes Settings* tab of the **Profile Plot Settings** dialog of the Resurface design view. At this tab you may define the plot parameters for the volumes row on the long section layout.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

### Fields of the *Volumes Settings* tab

| Field                    | Description  |
|--------------------------|--|
| <i>Text</i>              | Defines the text used as a label for this row of data on the profile.  |
| <i>Text Style (Cut)</i>  | Defines the text style used for the cut volumes.   |
| <i>Text Style (Fill)</i> | Defines the text style used for the fill volumes.  |
| <i>Justification</i>     | Defines the justification table used for the format and precision of the numeric data plotted for the volumes. |

## Cross Section Plot Settings icon

The **Cross Section Plot Settings** icon of the Resurface design view allows you to customize all of the parameters necessary to create a cross section drawing.

To configure a cross section plotting:

1. At the *Plotting* tab of the Resurface design view, click the **Cross Section Plot Settings** icon.  
The **Cross Section Plot Settings** dialog is displayed.
2. At the *Cross Section Plot Settings* tab, configure the position of the cross section drawing on a title block; define the scales and the information included on the cross section. See "Cross Section Plot Setting tab" section on the next page for fields description.

3. At the *Surface Plot Settings* tab, define the plot parameters for the various surfaces included in the drawing. See "Surface Plot Settings tab" section on page 814 for fields description.
4. At the *Cross Section Table* tab, define the standard plot parameters for the cross section layout, including the text styles used.
5. Click **OK**.

### Cross Section Plot Setting tab

This section describes the *Cross Section Plot Settings* tab of the **Cross Section Plot Settings** dialog of the Resurface design view. At this tab you may position the cross section drawing, or drawings, on a title block. Additional settings define the scales used the required information included on the cross section.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

#### Fields of the *Cross Section Plot Settings* tab

| Field                                  | Description  |
|--|--|
| <i>Horizontal Scale</i><br>(1 in .)    | Defines the horizontal scale for the cross section.  |
| <i>Vertical Scale</i> (1 in .)         | Defines the vertical scale for the cross section.  |
| <i>Start Position X</i>                | Defines the X coordinate of the starting position of the lower left corner of the cross section layout. This is measured in millimeters from the bottom left corner of the title block.  |
| <i>Start Position Y</i>                | Defines the Y coordinate of the starting position of the lower left corner of the cross section layout. This is measured in millimeters from the bottom left corner of the title block.  |
| <i>Left / Right Plot Limit-Figures</i> | Defines the offset limits for the plotting of offset and level figures.<br>Defines an offset in meters to the left and right of the center line or string around which the sections are designed. Any data outside this limit is excluded from the cross sections. |
| <i>Left / Right Plot Limit-Lines</i>   | Defines the offset limits for the plotting of lines.<br>Defines an offset in meters to the left and right of the center line or string around which the sections are designed. Any data outside this limit is excluded from the cross sections                     |
| <i>Start Chainage</i>                  | Defines the start chainage of the cross sections for this drawing.<br>Default is 0.000 and can be used if the full length of the road is to be plotted.  |
| <i>End Chainage</i>                    | Defines the end chainage of the cross sections for this drawing.<br>Default is 99999.999 and can be used if the full length of the road is to be plotted.  |
| <i>Title Block</i>                     | Defines the required title block to the drawing. Select it from the library by clicking >>.  |

| Field                                      | Description  |
|--|--|
| <i>Datum Level</i>                         | <p>Tick to specify a fixed datum level (in meters) in the editbox. The cross sections will be drawn relevant to this level on all the sections, even when the grade of the road changes.</p> <p>Leave unticked for the datum to be reset to a suitable value by the software, following the rules in the cross section Table.</p>  |
| <i>Design Level Selections</i>             | <p>The format of the fields in this section will be dependent on the setting for the radiobutton in the <i>Type</i> field below. They are only applied on rural format cross sections.</p>   |
| <i>Type</i>                                | <ul style="list-style-type: none"> <li>• <i>Offsets</i> – The editboxes from the <i>Design Level Selection</i> group box are set for the input of specified offsets. Specify a minus sign for offsets to the left of the centre line. Levels will be interpolated from the design surface at these offsets and plotted on the cross sections at these positions for rural format cross sections.</li> <li>• <i>Labels(Codes)</i> – The editboxes from the <i>Design Level Selection</i> group box are set for the input of the labels or codes applied to the ends of particular legs of the cross section. Levels will be interpolated from the design surface at these points and plotted on the rural format cross sections.</li> </ul> |
| <i>Spacing</i>                             | <ul style="list-style-type: none"> <li>• <i>Regular</i> – Cross sections are positioned on the sheet by the row spacing set in the Cross Section Table, so that this vertical spacing is applied from the datum line of the first section to the datum line of the next section.</li> <li>• <i>Auto</i> – Cross sections are positioned on the sheet by the Auto row spacing set in the Cross Section Table, so that this vertical spacing is applied from the highest point on the first section to the datum line of the next section.</li> </ul>  |
| <i>X Fall Format</i>                       | <ul style="list-style-type: none"> <li>• <i>Percent (%)</i> — the crossfall will be represented in percents withing the specified range.</li> <li>• <i>Ratio (1:x)</i> — the crossfall will be represented as ratio.</li> </ul>  |
| <i>Level Difference</i>                    | <p>Tick to plot the height difference between the natural and design surfaces at each offset on the full format cross sections. These are plotted in an extra row above the surface levels. Where the design surface is cut below the natural surface the level difference is negative.</p>  |
| <i>Plot Sign On XFall</i>                  | <p>Tick to plot the minus sign on the crossfall, if the crossfall is activated on the Surface Plot Settings tab.</p>   |
| <i>Plot Volumes</i>                        | <p>Tick to plot the volumes between this cross section and the previous one.</p>   |
| <i>Plot design level on natural leader</i> | <p>Tick to plot the design surface levels on the leader lines for the natural surface when a full format cross section is plotted.</p> <p>A design level will be interpolated and plotted wherever there is a leader line relating to the natural surface.</p> <p>Leave unticked to plot the design levels only where the leader lines relate to the design surface.</p>   |

| Field                                      | Description   |
|--|---|
| <i>Plot natural level on design leader</i> | <p>Tick to plot the natural surface levels on the leader line for the design surface when a full format cross section is plotted.</p> <p>A natural surface level will be interpolated and plotted wherever there is a leader line relating to the design surface.</p> <p>Leave unticked to plot the natural surface levels only where the leader lines relate to the natural surface.</p> |
| <i>Plot Obstructions</i>                   | Tick to plot any obstructions.  |
| <i>Mirror Cross Section</i>                | Tick to mirror the cross section plotting for the both sides.   |

### Surface Plot Settings tab

This section describes the *Surface Plot Settings* tab of the *Cross Section Plot Settings* dialog of the Resurface design view. At this tab you may define the plot parameters for the various surfaces included in the drawing. Additional options allow you to label cross sections with cross falls and plot symbols on each section.

You may save the configuration as the default one, by clicking **Save Default**. These settings will be available in other projects.

To load previously saved configuration, click **Load Default**.

#### Fields of the *Surface Plot Settings* tab

| Field               | Description   |
|---------------------|---|
| <i>Active</i>       | Tick to plot the surface defined on this row of the dialog.   |
| <i>Surface</i>      | Select the required surface from the drop-down list.  |
| <i>Label</i>        | Defines the surface name, used to label rows of levels on the full format cross sections.   |
| <i>Plot Levels</i>  | Tick to plot the levels for this surface, or leave unticked to plot no levels for this surface. Subgrades usually have this box unticked. A row of levels is included in the full format cross sections. The centreline level is displayed for the surface for rural format cross sections. |
| <i>Plot Lines</i>   | Tick to plot the line work for this surface. If the check box is unticked no lines will appear on the plot for this surface.  |
| <i>Plot X Falls</i> | Tick to plot the crossfalls on the surface. Leave unticked to exclude crossfalls. Normally this checkbox is only ticked for the design surface.   |
| <i>Plot Leads</i>   | Tick to plot the leader lines for this surface on the full format cross section. Normally this checkbox is ticked for the natural and design surfaces but not for the subgrades.  |
| <i>Plot Symbols</i> | Tick to plot the symbols defined in the symbol table. Normally this box is ticked only for the Natural surface to marked specific features such as fence lines, boundaries or existing seal positions   |

| Field             | Description   |
|-------------------|---|
| <i>Plot Codes</i> | Tick to plot the survey codes from the cross section. If ticked, click >> and specify the codes for plotting in the table.  |
| <i>Color</i>      | Defines the color plotted for this surface on the cross sections.   |
| <i>Angle</i>      | Defines the angle for the display of design levels specified for rural format cross sections using the field <i>Design Level Selection</i> from the Cross Section Plot Setting tab. |

In each row you may click >> to open the *More Surface Plot Specification* dialog.

#### Fields of the *More Surface Plot Specification* dialog

| Field                | Description   |
|----------------------|---|
| <i>Text Style</i>    | Defines the text style used for the levels of this surface. |
| <i>Line Style</i>    | Defines the line style used for this surface.               |
| <i>Thickness</i>     | Defines the line thickness used for this surface.           |
| <i>Justification</i> | Defines the justification style used for this surface.      |

## Plot Standard Profile icon

The **Plot Standard Profile** icon of the Resurface design view allows you to plot a standard long section as a drawing in the drawings view. A standard long section contains profiles of the natural surface and the design surface for the current string in the roads view.

Click the icon to plot the profile. The drawings view is opened as the current view and a linked drawing is created containing the sheet or sheets that make up the long section drawing.

If more than one sheet is required to plot the long section at the required scale on the selected title block, multiple sheets will be created within the one drawing.

If the design in the roads design view is modified, the linked drawing may be updated in the drawings view by using the **Regen** icon. There is no need to use the **Plot Standard Profile** icon again from the roads view, as this will create another drawing, losing any modifications already made in the drawings view.

## Plot Offset Profile icon

The **Plot Offset Profile** icon of the Resurface design view allows you to plot an offset long section as a drawing in the drawings view. An offset long section contains up to 8 profiles along various strings and surfaces in the roads view.

Click the icon to plot the profile. The drawings view is opened as the current view and a linked drawing is created containing the sheet or sheets that make up the offset long section drawing.

If more than one sheet is required to plot the long section at the required scale on the selected title block, multiple sheets will be created within the one drawing.

If the design in the roads design view is modified, the linked drawing may be updated in the drawings view by using the **Regen** icon. There is no need to use the **Plot Offset Profile** icon again from the roads view, as this will create another drawing, losing any modifications already made in the drawings view.

## Plot CrossSection icon

The **Plot CrossSection** icon of the Resurface design view allows you to plot sheets of cross sections as a drawing in the drawings view.



Click the icon to plot the cross section. The drawings view is opened as the current view and a linked drawing is created containing the sheet or sheets that make up the cross section drawing.

If more than one sheet is required to plot the cross section at the required scale on the selected title block, multiple sheets will be created within the one drawing.


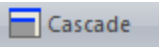
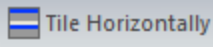
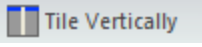
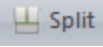
If the design in the roads design view is modified, the linked drawing may be updated in the drawings view by using the **Regen** icon. There is no need to use the **Plot CrossSection** icon again from the roads view, as this will create another drawing, losing any modifications already made in the drawings view.



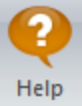

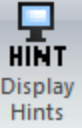
## Library tab

| Library group  |   |
|--|---|
|  Profile Plot Table       | <u>Profile Plot Table icon</u><br>Click it to configure the standard parameters for plotting profile sections.          |
|  Cross Section Plot Table | <u>Cross Section Plot Table icon</u><br>Click it to configure the standard plot parameters for the cross section layout |

## Window tab

|   |   |
|---|---|
|  New Window        | <u>New icon</u><br>Click it to open current road design in another window.                  |
|  Cascade           | <u>Cascade icon</u><br>Click it to cascade windows in the working area.                     |
|  Tile Horizontally | <u>Tile Horizontally icon</u><br>Click it to tile windows in the working area horizontally. |
|  Tile Vertically | <u>Tile Vertically icon</u><br>Click it to tile windows in the working area vertically.     |
|  Split           | <u>Split icon</u><br>Click it to change the sizes of the road design view panels.           |

## Help tab

|   |   |
|---|---|
|  Help                  | <u>Help icon</u><br>Click it to open product help.                                    |
|  About                 | <u>About icon</u><br>Click it to display information about MAGNET Office application. |
|  HINT<br>Display Hints | <u>Display Hints icon</u><br>Click it to display product hints.                       |

## Drainage Design View

The Drainage design view is the final step of the drainage design in the MAGNET Office. It comes into action when you have already configured the drainage library and define drainage network in the survey view. You may find details in Drainage library and Drainage group respectively.

### *TIP*




*You may also manage sewer library by using the icons from the Library tab of the Sewer design view.*

The work area of the Design design displays the Design network with each pit and line labeled.





The Drainage design view has its own ribbon, different from the default MAGNET Office ribbon. Descriptions may be found in the appropriate sections:

- "File tab" section on the facing page
- "View tab" section on the facing page
- "Library tab" section on page 820
- "Data tab" section on page 825
- "Calcs tab" section on page 828
- "Plot tab" section on page 831
- "Window tab" section on page 834
- "Help tab" section on page 834

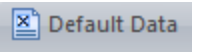
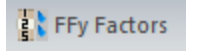
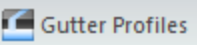
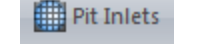
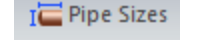
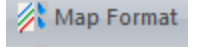
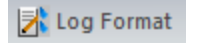
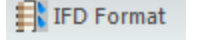
## File tab

|  |   |
|--|---|
| <br>Open... | <p style="text-align: center;"><u>Open icon</u></p> <p style="text-align: center;">Click it to open an existing drainage network.</p> |
| <br>Save    | <p style="text-align: center;"><u>Save icon</u></p> <p style="text-align: center;">Click it to save the current drainage network.</p> |
| <br>Close   | <p style="text-align: center;"><u>Close icon</u></p> <p style="text-align: center;">Click it to close the drainage network.</p>       |

## View tab

| <b>Refresh group</b>  |  |
|---|--|
|  Surface Profile | <p style="text-align: center;"><u>Surface Profile icon</u></p> <p style="text-align: center;">Click it to view the profile of the natural and design surfaces.</p> |
|  Survey          | <p style="text-align: center;"><u>Survey icon</u></p> <p style="text-align: center;">Click it to switch to the survey view.</p>                                    |
| <b>View group</b>   |  |
| <br>Toolbar    | <p style="text-align: center;"><u>Toolbar icon</u></p> <p style="text-align: center;">Click it to enable/disable toolbar.</p>                                      |
| <br>Status Bar | <p style="text-align: center;"><u>Status icon</u></p> <p style="text-align: center;">Click it to enable/disable status bar.</p>                                    |

## Library tab

| Library group   |  |
|---|--|
|  Default Data    | Default Data icon<br>Click it to configure the default data of the drainage library.               |
|  FFy Factors     | FFy Factors icon<br>Click it to configure and store Flood Frequency factors.                       |
|  Gutter Profiles | Gutter Profiles icon<br>Click it to define the various gutter profiles.                            |
|  Pit Inlets      | Pit Inlets icon<br>Click it to define the capacity of a curb inlet or catch pit.                   |
|  Pipe Sizes      | Pipe Sizes icon<br>Click it to configure the pipe diameters in the pipe classes.                   |
| Rainfall Data group   |  |
|  Map Format      | <u>Map Format icon</u><br>Click it to configure the rainfall data by using the map format.         |
|  Log Format      | <u>Log Format icon</u><br>Click it to configure the rainfall data by using the logarithmic format. |
|  IFD Format     | <u>IFD Format icon</u><br>Click it to configure the rainfall data by using the IDF format.         |

### Default Data icon

The **Default Data** icon of the Drainage design view allows you to configure and store drainage parameters for the region where you work.

To create a new default data dataset:

1. At the *Library* tab of the Drainage design view, click the **Default Data** icon.  
The **Default Data** dialog is displayed.
2. Click **New**.
3. In the *Name* editbox, type the name of the new dataset.
4. Configure the parameters as you need. Fields are described in the table below.
5. To configure the color layout, click **Colors** and select the required colors.
6. Click **OK**.

To edit an existing default data dataset:

1. At the *Library* tab of the Drainage design view, click the **Default Data** icon.  
The **Default Data** dialog is displayed.
2. From the *Name* drop-down list, select the required dataset.
3. Configure the parameters as you need. Fields are described in the table below.
4. To configure the color layout, click **Colors** and select the required colors.
5. Click **OK**.

**Fields of the *Default Data* dialog**

| <b>Field</b>                     | <b>Description</b>   |
|----------------------------------|--|
| <i>Name</i>                      | Defines the name of the default data dataset.  |
| <i>Rain</i>                      | Defines the Rainfall Data for the network. See "Rainfall Data configuring" section below for details.                    |
| <i>Inlet ID</i>                  | Defines Pit Inlet style for the network. See "Pit Inlet configuring" section below for details.                          |
| <i>Gutter ID</i>                 | Defines the Gutter Profile style for the network. See "Gutter Profiles configuring" section below for details.           |
| <b>Default Hydrological Data</b> |  |
| <i>Design Freq</i>               | Define the recurrence interval of the storm event.   |
| <i>Max Tc</i>                    | Defines the minimum time of concentration in minutes required for the network.   |
| <i>Min Tc</i>                    | Defines the minimum time of concentration in minutes required for the network.   |
| <i>Surface Roughness</i>         | Defines the default surface roughness.   |
| <b>Default Hydraulic Data</b>    |  |
| <i>Drop</i>                      | Defines the default setting for the drop through the manhole from the higher upstream pipe to the lower downstream pipe. |
| <i>Hz/deg Drop</i>               | Defines added drop per horiz degree of change between angle of upstream pipe and downstream pipe at pit.                 |
| <i>Freeboard</i>                 | Defines the default freeboard for the design.  |
| <i>Pipe Class</i>                | Defines the pipe class for the design.   |
| <i>Mannings 'n' (pipe)</i>       | Defines the roughness parameter for the pipe surface.  |
| <i>Cover</i>                     | Defines the default setting for the cover from the natural surface to the top (obvert) of the pipe.                      |
| <i>Roughness</i>                 | Defines default pipe roughness for design.   |
| <i>Min Slope</i>                 | Defines the minimum pipe slope required in the design.   |
| <i>Manning 'n' (road)</i>        | Defines the roughness parameter for the road surfaces when calculating gutter flows.                                     |
| <i>Backwater HGL</i>             | Select the limiting of the level to match either the obvert or the actual water level.                                   |

**FFy Factors icon**

The **FFy Factors** icon of the Drainage design view allows you to configure and store Flood Frequency factors.

Flood Frequency factors for a given Average Recurrence Interval help you to adjust your runoff coefficient value. These FFy factors are selected along with the Rainfall Data for the pipe network.

To create a new Flood Frequency factors dataset:

1. At the *Library* tab of the Drainage design view, click the **FFy Factors** icon.  
The *Flood Frequency Factors* dialog is displayed.
2. Click **New**.
3. In the *Name* editbox, type the name of the new dataset.
4. Configure the parameters as you need.
5. Click **OK**.

To edit an existing default data dataset:

1. At the *Library* tab of the Drainage design view, click the **FFy Factors** icon.  
The *Flood Frequency Factors* dialog is displayed.
2. From the *Name* drop-down list, select the required dataset.
3. Configure the parameters as you need.
4. Click **OK**.

## Gutter Profiles icon

The **Gutter Profiles** icon of the Drainage design view allows you to define the various gutter profiles.

They are used to calculate the flow time along the channel of the curb, and the flow width and depth in the curb channel. MAGNET Office creates a vertical wall at either side of the defined gutter to handle flow depths that exceed the capacity of the gutter profile.

To create a new gutter profile:

1. At the *Library* tab of the Drainage design view, click the **Gutter Profiles** icon.  
The *Gutter Profiles* dialog is displayed.
2. Click **New**.
3. In the *Name* editbox, type the name of the new profile.
4. Configure the parameters as you need. Simply type a new offset and level and the profile will automatically re-sort the data. There is no need to define left and right hand gutter profiles.
5. Click **OK**.

To edit an existing gutter profile:

1. At the *Library* tab of the Drainage design view, click the **Gutter Profiles** icon.  
The *Gutter Profiles* dialog is displayed.
2. From the *Name* drop-down list, select the required dataset.
3. Configure the parameters as you need. Simply type a new offset and level and the profile will automatically re-sort the data. There is no need to define left and right hand gutter profiles.
4. Click **OK**.

## Pit Inhelts icon

The **Pit Inhelts** icon of the Drainage design view allows you to define the capacity of a curb inlet or catch pit.

Pit inlets do not have unlimited inlet capacity. As the flow from the upstream gutter increases, eventually some water will fail to enter the inlet and it is referred to as the bypass flow.

The curb inlet behavior can be described by the following formula:

$$Q_i = A + B \cdot (Q_u - A)$$

Where:

- $Q_i$  – flow entering the pit.
- $Q_u$  – flow arriving from upstream.
- $A$  – the maximum inlet capacity before bypass occurs.
- $B$  – dimensionless coefficient. A fraction of excess entering pit.

The term  $(Q_u - A)$  represents the excess flow arriving at the pit and the coefficient  $B$  represents the fraction of this excess that will enter the pit (in addition to quantity  $A$ ).

In many cases the above algorithm is not sufficient to describe the curb inlet, so the software allows a second method of entering curb inlet data. The second method allows the user to enter a complete table of  $Q_u/Q_i$  values that will specify the desired inlet behavior. The two methods of entering the data are thus described as "AB" and "CURVE".

Whichever method is selected, the data is given an Inlet ID. This is then referred to during the hydrological calculations to describe the inlet capacity of a given pit.

The curb inlet screen allows you to select the method being used by clicking on the appropriate radiobutton. If the AB method is selected then the  $A$  &  $B$  values should be defined. The rest of the data can be ignored.

If the CURVE method is selected then  $Q_u/Q_i$  pairs should be defined in the *Flow\_Us* and *Flow\_In* fields of the table respectively. A new pair can be entered at the end of the list and the program will automatically re-sort the data based on increasing  $Q_u$ , and then re-draw the  $Q_u/Q_i$  relation in the graphic window. The graphic display serves as a check for any obvious errors.

To create a new pit inhelts dataset:

1. At the *Library* tab of the Drainage design view, click the **Pit Inhelts** icon.  
The **Pit Inhelts** dialog is displayed.
2. Click **New**.
3. In the *Name* editbox, type the name of the new dataset.
4. Configure the parameters as you need.
5. Click **OK**.

To edit an existing gutter profile:

1. At the *Library* tab of the Drainage design view, click the **Pit Inhelts** icon.  
The **Pit Inhelts** dialog is displayed.
2. From the *Name* drop-down list, select the required dataset.
3. Configure the parameters as you need.
4. Click **OK**.

## Pipe Sizes icon

The **Pipe Sizes** icon of the Drainage design view allows you to configure the pipe diameters in the pipe classes.

The library holds pipe class details. It is taken from the combination of the definition labels used for the pipe type, pipe class and joint type. The cost (\$/m) column entries are for informational purposes only and not used by the program.

To create a new pipe sizes dataset:









1. At the *Library* tab of the Drainage design view, click the **Pipe Sizes** icon.  
The **Pipe Sizes** dialog is displayed.
2. Click **New**.
3. In the *Name* editbox, type the name of the new dataset.
4. Configure the parameters as you need.
5. Click **OK**.

To edit an existing pipe sizes dataset:

1. At the *Library* tab of the Drainage design view, click the **Pipe Sizes** icon.  
The **Pipe Sizes** dialog is displayed.
2. From the *Name* drop-down list, select the required dataset.
3. Configure the parameters as you need.
4. Click **OK**.



## Data tab

| <b>Settings group</b>  |   |
|--|---|
|  Network Settings     | <u>Network Settings icon</u><br>Click it to configure common design parameters of the drainage network. |
|  Specify Area for Pit | Specify Area for Pit icon<br>Click it to define catchment area for the pit.                             |
|  Set Bypass Pit       | Set Bypass Pit icon<br>Click it to define a bypass pits.  |
| <b>Edit group</b>  |   |
|  Edit Pit Data        | Edit Pit Data icon<br>Click it to edit properties of the selected pit.                                  |
|  Edit All Pits        | Edit All Pits icon<br>Click it to edit properties of all existing pits.                                 |
|  Edit All Pipes       | Edit All Pipes icon<br>Click it to edit properties of all existing pipes.                               |
| <b>Other group</b>   |   |
|  Copy to Clipboard    | <u>Copy to Clipboard icon</u><br>Click it to copy the selected object to the clipboard.                 |
|  Create Pipe Text    | <u>Create Pipe icon</u><br>Click it to write pipe data as the annotation.                               |

### Specify Area for Pit icon

The **Specify Area for Pit** icon of the Drainage design view allows you to define polygons in the survey view for the catchment areas of the various pits. Instead of typing in the data for each pit, the area can be selected from the polygons.

To define catchment area for the pit:

1. At the *Data* tab of the Drainage design view, click the **Specify Area for Pit** icon.
2. In the working area select the required pit.  
The *Area Option* dialog is displayed.
3. Click either **Full Area** or **Part Area** as you need.  
The *Pit Area Data* dialog is displayed.
4. Click **Polygon** and select the required polygon in the working area.
5. Click **OK**.

### Set Bypass Pit icon

The **Set Bypass Pit** icon of the Drainage design view allows you to nominate a bypass pit, which will catch the bypass flow from the other overflowed pit.

To set a bypass pit:

1. At the *Data* tab of the Drainage design view, click the **Set Bypass Pit** icon.
2. In the working area, select the pit which seems to be overflowed.
3. In the working area, select the pit which will be used as the bypass pit.
4. If needed, repeat steps 2 and 3.
5. When finished, press *Esc*.

## Edit Pit Data icon

The **Edit Pit Data** icon of the Drainage design view allows you to view and edit properties of one selected pit (manhole) in the sewer network.

You may also double click the required pit to edit its parameters.

To edit pit parameters:

1. In the work area of the Drainage design view, select the required pit.
2. At the *Data* tab, click the **Edit Pit Data** icon.

The *Pit Details* dialog is displayed.

3. Review the parameters, if needed change them.
4. Do one of the following:
  - Click **Next** to proceed to the next pit in the flow.
  - Click **Prev** to proceed to the previous pit in the flow.
  - Click **OK** to close the dialog.

You may select a pit for editing in one of the following ways:

- Select the required pit in the work area of the Drainage design view and click **Edit Pit Data**.
- Double click the required pit in the work area of the Drainage design view.
- By using the **Next** or **Prev** buttons of the *Pit Details* dialog.

## Edit All Pits icon

The **Edit All Pits** icon of the Drainage design view allows you to edit properties of all existing pits (manholes) in the sewer network.

To edit pit parameters:

1. At the *Data* tab of Drainage design view, click the **Edit All Pits** icon.

The *Edit All Pits* dialog is displayed.
2. Configure the parameters as you need.
3. Click **OK**.

## Edit All Pipes icon

The **Edit All Pits** icon of the Drainage design view allows you to edit properties of all existing pipes in the sewer network.

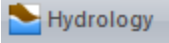
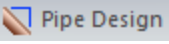
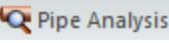
### *TIP*

*To edit parameters of the exact pipe, double click it in the working area.*

To edit pit parameters:

1. At the *Data* tab of the Drainage design view, click the **Edit All Pipes** icon.  
The *Edit All Pipes* dialog is displayed.
2. Configure the parameters as you need.
3. Click **OK**.

## Calcs tab

| Calcs group   |   |
|---|---|
|  | Hydrology icon<br>Click it to calculate a hydrology data. |
|  | Pipe Design icon<br>Click it to calculate pipe design.    |
|  | Pipe Analysis icon<br>Click it to analyze the design.     |

### Hydrology icon

The **Hydrology** icon of the Drainage design view allows you to calculate runoff, gutter flow, pipe flow and bypass flow. It assumes that the water entering a pit will flow down the pipe (ignores surcharge). As you run option you will be prompted to select a method for computing the flows.

To compute hydrology:

- At the *Calcs* tab of the Drainage design view, click the **Hydrology** icon.  
The *Hydrological Calculation Options* dialog is displayed.
- Select the required methods:
  - Program calculate from contributing areas* – to use the areas defined in the Pit Area Data option.
  - User Input (see pit data, alternate flow)* – to use the flows defined in the *User input–alternate to contributing areas (Analysis)* field from the **Pit Details** dialog. If you use this section you must have entered the flows for every pit in the Pit Details dialog box.
  - Ilsax flow (see pit data)* – use this if you have calculated flows from ILSAX.
  - Assumed velocity (m/s)* – If no design has been done, the program will simply use the value typed in the editbox. Range of input: 1m/s to 3m/s.
  - Designed pipe velocity (pipe full or part full)* – to use the actual velocity taken from the last pipe design or analysis process.
  - Designed pipe (Equiv pipe-full vel, Q/A)* – to use the equivalent pipe-full velocity taken from the last pipe design or analysis process.
- Click **OK**.

### Pipe Design icon

The **Pipe Design** icon of the Drainage design view allows you to re-compute/edit the pipe design of current drainage network.

To re-compute the design:

- At the *Calcs* tab of the Drainage design view, click the **Pipe Design** icon.  
The *Pipe Design* dialog is displayed.
- Click **Re-Design**.  
The *Pipe Design Options* dialog is displayed.

3. Configure the design and click **OK**.

The design is computed. The *Pipe Design* dialog is displayed.

4. Review the design, if needed, change it.
5. When finished, do one of the following:
  - Click Select Pipe to select another pipe from the list.
  - Click Next Pipe to proceed to the next pipe in the flow.
  - Click Prev Pipe to proceed to the previous pipe in the flow.
  - Click **OK** to close the dialog.

To edit the design:

1. At the *Calcs* tab of the Drainage design view, click the **Pipe Design** icon.

The *Pipe Design* dialog is displayed.

2. Click **Modify Design**.

The *Pipe Design* dialog is displayed.

3. Review the design, if needed, change it.
4. When finished, do one of the following:
  - Click Select Pipe to select another pipe from the list.
  - Click Next Pipe to proceed to the next pipe in the flow.
  - Click Prev Pipe to proceed to the previous pipe in the flow.
  - Click **OK** to close the dialog.

#### Buttons of the *Pipe Design* dialog

| Button                 | Description   |
|------------------------|---|
| <b>Set Diam</b>        | Click it to change the diameter of the pipe to another size from the pipe class list.   |
| <b>Set K</b>           | Click it to set the pit loss coefficient for the upstream pit. This may be obtained from Missouri charts and added to any angular loss factor.  |
| <b>Set Slope</b>       | Click it to set downstream invert to a level based on the slope from the upstream invert.   |
| <b>Set All U/S Inv</b> | Click it to re-calculate the invert levels back upstream from the current pit or the outlet. Set either the outfall from a pit invert level or a known outfall level                  |
| <b>Move Parallel</b>   | Click it to move the pipe, resetting the upstream and downstream invert levels by a relative value, prefixed with a '+' or '-' sign. Click <b>Repeat</b> to repeat the last movement. |
| <b>Move U/S Inv</b>    | Click it to specify a new level for the upstream invert or change the level by a relative value. Click <b>Repeat</b> to repeat the last movement.                                     |
| <b>Move D/S Inv</b>    | Click it to specify a new level for the downstream invert or change the level by a relative value. Click <b>Repeat</b> to repeat the last movement.                                   |
| <b>Clear U/S Inv</b>   | Click it to reposition the upstream invert using the design constraints in your data.   |
| <b>Clear D/S Inv</b>   | Click it to reposition the downstream invert using the design constraints in your data.   |

| Button                | Description   |
|-----------------------|---|
| <b>Clear Both Inv</b> | Click it to reposition both the upstream and downstream invert using the design constraints in your data. |
| <b>Select Pipe</b>    | Click it to select a pipe from the list.  |
| <b>Next</b>           | Click it to proceed to the next pipe in the flow.   |
| <b>Prev</b>           | Click it to proceed to the previous pipe in the flow.   |
| <b>Redraw</b>         | Click it to refresh the preview.  |
| <b>Calc BW</b>        | Click it to run a backwater analysis of the system.   |
| <b>Show BW</b>        | Click it to display the backwater analysis. Check for surcharging at a pit.                               |

## Pipe Analysis icon

The **Pipe Analysis** icon of the Drainage design view allows you to analyze design of current drainage network without saving it and applying changes.

To analyze the design:

1. At the *Calcs* tab of the Drainage design view, click the **Pipe Analysis** icon..

The *Pipe Analysis Options* dialog is displayed.

2. Configure the design and click **OK**.

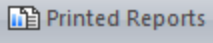
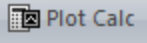
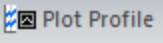
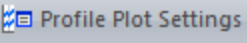
The design is computed. The *Pipe Design* dialog is displayed.

3. Review the design, if needed, change it.
4. When finished, do one of the following:
  - Click **Select Pipe** to select another pipe from the list.
  - Click **Next Pipe** to proceed to the next pipe in the flow.
  - Click **Prev Pipe** to proceed to the previous pipe in the flow.
  - Click **OK** to close the dialog.

### Buttons of the *Pipe Design* dialog

| Button                 | Description  |
|------------------------|--|
| <b>Set K</b>           | Click it to set the pit loss coefficient for the upstream pit. This may be obtained from Missouri charts and added to any angular loss factor.                       |
| <b>Set All U/S Inv</b> | Click it to re-calculate the invert levels back upstream from the current pit or the outlet. Set either the outfall from a pit invert level or a known outfall level |
| <b>Select Pipe</b>     | Click it to select a pipe from the list.   |
| <b>Next</b>            | Click it to proceed to the next pipe in the flow.  |
| <b>Prev</b>            | Click it to proceed to the previous pipe in the flow.  |
| <b>Redraw</b>          | Click it to refresh the preview.   |
| <b>Calc BW</b>         | Click it to run a backwater analysis of the system.  |
| <b>Show BW</b>         | Click it to display the backwater analysis. Check for surcharging at a pit.  |

## Plot tab

| Reports group   |   |
|---|---|
|  | Printed Reports icon<br>Click it to plot a report as a drawing.           |
| Plotting group  |   |
|  | Plot Calc icon<br>Click it to plot a calculation as a drawing.            |
|  | Plot Profile icon<br>Click it to plot a profile as a drawing.             |
| Settings group  |   |
|  | Profile Plot Settings icon<br>Click it to configure the profile plotting. |

### Printed Reports icon

The **Printed Reports** icon of the Drainage design view allows you to plot a drainage report as a drawing.

To plot a report:

1. At the *Plot* tab of the Drainage design view, click the **Printed Reports** icon.  
The *Select Reports* dialog is displayed.
2. Select the report for plotting from the list.
3. Click **OK**.  
The report is plotted.

### Plot Calc icon

The **Plot Calc** icon of the Drainage design view allows you to plot a drainage calculation as a drawing.

To plot a calculation:

1. At the *Plot* tab of the Drainage design view, click the **Plot Calc** icon.  
The *Select Calc Sheet To Plot* dialog is displayed.
2. Select the calculation for plotting from the list.
3. In the *Title Block* field, define the title block for plotting.
4. In the *Offset* field, define the coordinates of the plotting position.
5. Click **OK**.  
The calculation is plotted.

### Profile Plot Settings icon

The **Profile Plot Settings** icon of the Drainage design view allows you to customize all of the parameters necessary to create a profile drawing.

To configure a profile plotting:

1. At the *Plot* tab of the Drainage design view, click the **Profile Settings** icon.  
The **Plot Profile** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **Colors** to configure the color layout of plotting.
- 4.





**Fields of the *Plot Profile* dialog**

| <b>Filed</b>            | <b>Description</b>   |
|-------------------------|--|
| <i>Title</i>            | Defines the name of the drawing.   |
| <i>Line</i>             | Defines the drainage line for plotting.  |
| <i>Start Pit</i>        | Defines the upstream pit from which you wish to start the long section plot. Only the pits in the nominated pipe line will be displayed.   |
| <i>End Pit</i>          | Defines the last downstream pit of the pipe line.  |
| <i>Horizontal Scale</i> | Defines the horizontal scale for profile plotting.   |
| <i>Vertical Scale</i>   | Defines the vertical scale for profile plotting.   |
| <i>Start</i>            |  |
| <i>Start Position X</i> | Defines the X coordinate of the starting position of the plot on the sheet of paper in mm.   |
| <i>Start Position Y</i> | Defines the Y coordinate of the starting position of the plot on the sheet of paper in mm.   |
| <i>Minimum Level</i>    | Defines the minimum distance of the profile line from the datum line. This is not used if the datum level is set.  |
| <i>Maximum Level</i>    | Defines the maximum distance of the profile line from the datum line   |
| <i>Bottom Spacing</i>   | Defines the text spacing in mm for plotting the bottom rows of data.   |
| <i>Top Spacing</i>      | Defines the text spacing in mm for plotting the top rows of data.  |
| <i>Circle Diameter</i>  | Circular size for pit labels in mm.  |
| <i>Max Plot Length</i>  | Defines the maximum length of the plot in mm. This will be dependent on the size of the title block.   |
| <i>Start Chainage</i>   | Defines the chainage for the first pit plotted on the drainage line.   |
| <i>Datum Level</i>      | Defines the datum level. If blank, the minimum datum level is used.  |
| <i>Pit Label</i>        | Defines a generic label for all the pits – leave blank if not required.  |
| <i>Datum Rounding</i>   | This will round the datum to the nearest multiple of the entered value. (eg. specify 1.0 and the datum will be to the nearest metre) This field will have no effect if the datum level is set. |
| <i>Title Block</i>      | Click << to define the title block for plotting.   |
| <i>Plot Scale Info</i>  | Tick to plot the horizontal & vertical scales on each sheet.   |






| <b>Filed</b>                         | <b>Description</b>   |
|--------------------------------------|--|
| <i>Plot titles (to LH side)</i>      | Tick to plot the titles of each row of data on the left hand side of the linework.   |
| <i>Plot Second Surface</i>           | Tick to plot the second surface if it exists   |
| <i>Plot Reverse</i>                  | Tick to plot the profile from the downstream pit to the upstream pit (ie. Uphill). The default (unticked) is downhill or upstream to downstream.         |
| <i>Plot HGL (Backwater)</i>          | Tick to plot the Backwater HGL and select whether HGL is limited to Obvert or is the Actual water level.   |
| <i>Plot Depth to invert</i>          | Tick to plot the depth to the invert level of the pipe.  |
| <i>Plot Capacity</i>                 | Tick to show capacity in cubic meters per second.  |
| <i>Plot Velocity</i>                 | Tick to show velocity for that pipe reach.   |
| <i>Plot Flow</i>                     | Tick to show flow rate in cubic meters per second.   |
| <i>Plot All lines</i>                | Tick to plot all the drainage lines of this network. They will plot on separate sheets unless the <i>Plot Multiple Lines on Page</i> checkbox is ticked. |
| <i>Plot Obstructions</i>             | Tick to plot the obstructions in the appropriate position on the plot.   |
| <i>Plot Obstructions Description</i> | Tick to plot description of obstruction as text adjacent to the obstruction.   |
| <i>Plot Multiple Lines on Page</i>   | Tick to maximize the usage of page area to fit the profiles of multiple lines on the sheet.  |
| <i>Plot at Surface Points</i>        | Tick to plot a leader line to surface changes between pits with depth to invert and chainage.  |
| <i>Plot Pipe Diameter</i>            | Tick to plot pipe size row.  |
| <i>Next to D</i>                     | If ticked, pipe class plots next to the diameter. If unticked, the pipe class plots below the pipe diameter.   |
| <i>Text Table</i>                    | Defines the text tables to be used in plotting.  |
| <i>Justification Table</i>           | Defines the justification tables to be used in plotting.   |

## Window tab

|  |   |
|--|---|
| <br>New Window        | <p style="text-align: center;"><u>New Window icon</u><br/>Click it to create a new window in the work area.</p>                 |
| <br>Cascade           | <p style="text-align: center;"><u>Cascade icon</u><br/>Click it to cascade windows in the working area.</p>                     |
| <br>Tile Horizontally | <p style="text-align: center;"><u>Tile Horizontally icon</u><br/>Click it to tile windows in the working area horizontally.</p> |
| <br>Tile Vertically   | <p style="text-align: center;"><u>Tile Vertically icon</u><br/>Click it to tile windows in the working area vertically.</p>     |

## Help tab

|   |   |
|---|---|
| <br>Help                          | <p style="text-align: center;"><u>Help icon</u><br/>Click it to open product help.</p>                                    |
| <br>About                        | <p style="text-align: center;"><u>About icon</u><br/>Click it to display information about MAGNET Office application.</p> |
| <br><b>HINT</b><br>Display Hints | <p style="text-align: center;"><u>Display Hints icon</u><br/>Click it to display product hints.</p>                       |

## Sewer Design View

The Sewer design view is the final step of the sewer design in the MAGNET Office. It comes into action when you have already configured the sewer library and define sewer network in the survey view. You may find details in "Sewer library" section on page 666 and "Sewer group" section on page 382 respectively.

### *TIP*




*You may also manage sewer library by using the icons from the Library tab of the Sewer design view.*

The work area of the Sewer design displays the Sewer network with each pit and line labeled.

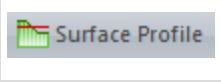
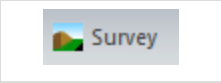
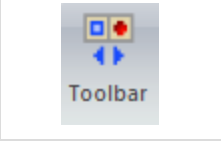
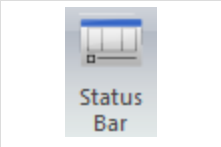
The Sewer design view has its own ribbon, different from the default MAGNET Office ribbon. Descriptions may be found in the appropriate sections:

- "File tab" section on the next page
- "View tab" section on the next page
- "Library tab" section on page 837
- "Data tab" section on page 840
- "Calcs tab" section on page 848
- "Plot tab" section on page 850
- "Window tab" section on page 852
- "Help tab" section on page 852



## File tab

|  |  |
|--|--|
| <br>Open... | <p style="text-align: center;"><u>Open icon</u></p> <p style="text-align: center;">Click it to open an existing sewer network.</p> |
| <br>Save    | <p style="text-align: center;"><u>Save icon</u></p> <p style="text-align: center;">Click it to save the current sewer network.</p> |
| <br>Close   | <p style="text-align: center;"><u>Close icon</u></p> <p style="text-align: center;">Click it to close the sewer network.</p>       |

## View tab

|   |  |
|---|--|
| <b>Refresh group</b>  |  |
|    | <p style="text-align: center;"><u>Surface Profile icon</u></p> <p style="text-align: center;">Click it to view the profile of the natural and design surfaces.</p> |
|   | <p style="text-align: center;"><u>Survey icon</u></p> <p style="text-align: center;">Click it to switch to the survey view.</p>                                    |
| <b>View group</b>   |  |
|  | <p style="text-align: center;"><u>Toolbar icon</u></p> <p style="text-align: center;">Click it to enable/disable toolbar.</p>                                      |
|  | <p style="text-align: center;"><u>Status icon</u></p> <p style="text-align: center;">Click it to enable/disable status bar.</p>                                    |

## Library tab

|  |   |
|--|---|
|  Default Data | <p>Default Data icon<br/>Click it to manage the sewer library default data.</p> |
|  Pipe Class   | <p>Pipe Class icon<br/>Click it to manage the sewer library pipe classes.</p>   |

### Default Data icon

The **Default Data** icon of the Sewer design view allows you to manage the sewer library default data. This is general data for all the pipes and pits in the current network.

To create a new default data dataset:

1. At the *Library* tab of the Sewer design view, click the **Default Data** icon.  
The **Default Data** dialog is displayed.
2. Click **New**.
3. In the *Name* editbox, type the name of the new dataset.
4. Configure the parameters as you need. Fields are described in the table below.
5. To configure the color layout, click **Colors** and select the required colors.
6. Click **OK**.

To edit an existing default data dataset:

1. At the *Library* tab of the Sewer design view, click the **Default Data** icon.  
The **Default Data** dialog is displayed.
2. From the *Name* drop-down list, select the required dataset.
3. Configure the parameters as you need. Fields are described in the table below.
4. To configure the color layout, click **Colors** and select the required colors.
5. Click **OK**.

#### Fields of the **Default Data** dialog

| Field                    | Description  |
|--------------------------|--|
| <i>Name</i>              | Displays the name of the default data set.   |
| <i>Flow for Plotting</i> | Select the appropriate option.   |
| <b>Sewer Data</b>        |  |
| <i>Pit Diameter</i>      | Defines the diameter of the pit (manhole).   |
| <i>Min. Drop</i>         | Defines the minimum drop through the manhole from the higher upstream pipe to the lower downstream pipe. |
| <i>Max. Drop</i>         | Defines the maximum drop through the manhole from the higher upstream pipe to the lower downstream pipe. |
| <i>Pipe Class</i>        | Defines the pipe class for the data set.   |

| Field                      | Description   |
|----------------------------|---|
| <b>BCIL Data</b>           | Block Control Invert Level.<br>These settings are optional, but useful for designing the main sewer line in relation to the connections at the house drain points. When using BCIL, MAGNET Office designs the sewer pipe at a suitable level to allow for a nominated minimum depth and slope from the drain point of each house. See "Create BCIL icon" section on page 384 for details. |
| <i>Min. Cover</i>          | Defines the minimum cover over the connecting pipe from the house drain point   |
| <i>Drop at House Drain</i> | Defines the drop at the house drain.  |
| <i>Min. Slope (%)</i>      | Defines the minimum slope for the connecting pipe from the house drain point.   |
| <i>Drop into Sewer</i>     | Defines the drop into the sewer network   |

## Pipe Class icon

The **Pipe Class** icon of the Sewer design view allows you to manage the sewer library pipe classes. The library holds pipe class details. It is taken from the combination of the definition labels used for the pipe type, pipe class and joint type.

To create a new pipe class dataset:

1. At the *Library* tab of the Sewer design view, click the **Pipe Class** icon.  
The **Pipe Class** dialog is displayed.
2. Click **New**.
3. In the *Pipe Class Definition* groupbox, specify the following information:
  - In the *Pipe Type* editbox, type the abbreviation for the pipe type.
  - In the *Joint Type* editbox, type the abbreviation for the joint type.
  - In the *Pipe Class* editbox, type the abbreviation for the pipe class.
  - In the *Plot Annotation* editbox, type any relevant information to be used to annotate pipes. This field is optional.

The name of the pipe class will be automatically generated from this information.

4. Fill in the pipe class table.
5. Click **OK**.

To rename a pipe class dataset:

1. At the *Library* tab of the Sewer design view, click the **Pipe Class** icon.  
The **Pipe Class** dialog is displayed.
2. From the *Pipe Class* drop-down list, select the required dataset.
3. Click **Rename**.
4. In the *Pipe Class Definition* groupbox, specify the following information:

- In the *Pipe Type* editbox, type the abbreviation for the pipe type.
- In the *Joint Type* editbox, type the abbreviation for the joint type.
- In the *Pipe Class* editbox, type the abbreviation for the pipe class.
- In the *Plot Annotation* editbox, type any relevant information to be used to annotate pipes. This field is optional.

The name of the pipe class will be automatically generated from this information.

5. Click **OK**.

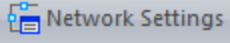
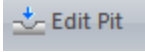
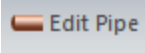
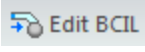
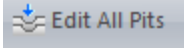
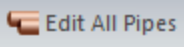
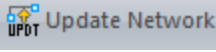
To edit a pipe class dataset:

1. At the *Library* tab of the Sewer design view, click the **Pipe Class** icon.

The **Pipe Class** dialog is displayed.

2. From the *Pipe Class* drop-down list, select the required dataset.
3. In needed, In the *Plot Annotation* editbox, type any relevant information to be used to annotate pipes.
4. Fill in the pipe class table.
5. Click **OK**.

## Data tab

| <b>Settings group</b>  |  |
|--|--|
|  Network Settings | Network Settings icon<br>Click it to configure the sewer network settings.           |
| <b>Edit group</b>  |  |
|  Edit Pit         | Edit Pit icon<br>Click it to edit properties of the selected pit.                    |
|  Edit Pipe        | Edit Pipe icon<br>Click it to edit properties of the selected pipe.                  |
|  Edit BCIL        | Edit BCIL icon<br>Click it to edit the BCIL data.                                    |
| <b>Edit All group</b>  |  |
|  Edit All Pits    | Edit All Pits icon<br>Click it to edit several pits at once.                         |
|  Edit All Pipes   | Edit All Pipes icon<br>Click it to edit several pipes at once.                       |
| <b>Update group</b>  |  |
|  Update Network  | Update Network icon<br>Click it to update sewer network to include all changes made. |

## Network Settings icon

The **Network Setting** icon of the Sewer design view allows you to view and edit properties of the current sewer network.

To edit sewer network parameters:

1. At the *Data* tab of the Sewer design view, click the **Network Settings** icon.  
The **Sewer Design** dialog, opened at the *Network Settings* tab is displayed.
2. Review the parameters, if needed change them. Fields are described in the table below.
3. Click **OK**.

### Fields of the *Pit Data* tab of the *Sewer Design* dialog

| Field                | Description                                      |
|----------------------|--|
| <i>Color</i>         | Defines the colors for the sewer network layout. |
| <i>Network Name</i>  | Displays the name of the network.                |
| <i>Description</i>   | Type any relevant description of the network.    |
| <i>Primary DTM</i>   | Displays the primary DTM of the sewer design.    |
| <i>Secondary DTM</i> | Displays the secondary DTM of the sewer design.  |



| <b>Field</b>               | <b>Description</b>   |
|----------------------------|--|
| <i>Default Sewer Data</i>  | Defines the default values for the elements of the sewer network.  |
| <i>Pit Diameter</i>        | Defines the diameter of the pit (manhole).   |
| <i>Pipe Class</i>          | Defines the pipe class. It is displayed as a combination of the type of pipe, its class and the joint type.  |
| <i>Min Drop</i>            | Defines the minimum drop through the pit. This drop will be automatically applied to every pit PLUS the Hz/deg angle change drop.  |
| <i>Max Drop</i>            | Defines the maximum drop through the pit.  |
| <i>Hz/deg Drop</i>         | Defines the additional drop added to the minimum drop through the pit. Drop applied is calculated on the angle change between a pipe reach entering a pit and the pipe reach leaving a pit |
| <i>Chainage Origin</i>     | Displays the properties of the main sewer line.  |
| <i>Sewer Line</i>          | Displays the name of the main sewer line.  |
| <i>U/S Pit</i>             | Displays the upstream pit of the main sewer line.  |
| <i>D/S Pit</i>             | Displays the downstream pit of the main sewer line.  |
| <i>Start At</i>            | Defines where the start chainage will be located – either at the upstream or at the downstream pit.  |
| <i>Start Chainage</i>      | Defines the start chainage at the beginning of the main sewer line.  |
| <i>Default BCIL Data</i>   | Defines the default values for the BCIL data. See "Create BCIL icon" section on page 384 for details.  |
| <i>Min. Cover</i>          | Defines the minimum cover over the connecting pipe from the house drain point  |
| <i>Drop at House Drain</i> | Defines the drop at the house drain.   |
| <i>Min. Slope (%)</i>      | Defines the minimum slope for the connecting pipe from the house drain point.  |
| <i>Drop into Sewer</i>     | Defines the drop into the sewer network  |
| <i>Use BCIL</i>            | Tick to use the BCIL data in the current Sewer design.   |

## Edit Pit icon

The **Edit Pit** icon of the Sewer design view allows you to view and edit properties of one selected pit (manhole) in the sewer network.

You may also double click the required pit to edit its parameters.

To edit pit parameters:

1. In the work area of the Sewer design view, select the required pit.
2. At the *Data* tab, click the **Edit Pit** icon.

The **Sewer Design** dialog, opened at the *Pit Data* tab is displayed.

3. Review the parameters, if needed change them. Fields are described in the table below.

4. Do one of the following:
  - Click **Select** to edit another pit.
  - Click **Next** to proceed to the next pit in the flow.
  - Click **Prev** to proceed to the previous pit in the flow.
  - Click **OK** to close the dialog.

You may select a pit for editing in one of the following ways:

- Select the required pit in the work area of the Sewer design view and click **Edit Pit**.
- Double click the required pit in the work area of the Sewer design view.
- At the *Pit Data* tab of the **Sewer Design** dialog, click **Select** and select the required pit from the list.
- Select the required pit at the preview area at the *Pit Data* tab of the **Sewer Design** dialog.

#### Fields of the *Pit Data* tab of the **Sewer Design** dialog

| Field               | Description  |
|---------------------|--|
| <i>Pit Name</i>     | Displays the name of the pit.  |
| <i>Easting</i>      | Displays the East coordinate of the pit.   |
| <i>Northing</i>     | Displays the North coordinate of the pit.  |
| <i>U/S Pit</i>      | Displays the pit immediately upstream from the selected pit.   |
| <i>Sewer Line</i>   | Displays the sewer line to which the pit belongs to.   |
| <i>D/S Pit</i>      | Displays the pit immediately downstream from the selected pit.   |
| <i>Chainage</i>     | Displays the running chainage of this pit from the last outlet pit of the main terminating sewer line.   |
| <i>Pit Comment</i>  | Type any relevant comment for the pit.   |
| <i>Pit Type</i>     | Defines the type for depicting the pit.  |
| <i>Invert Level</i> | Displays the design invert level at outlet of the pit.   |
| <i>Lid Level</i>    | Defines the level of point depicting pit lid level.  |
| <i>Survey Level</i> | Displays level of surface where pit intersects with the nominated primary DTM.   |
| <i>Pit Diameter</i> | Defines the diameter of the pit (manhole).   |
| <i>Min Drop</i>     | Defines the minimum drop through the pit. This drop will be automatically applied to every pit PLUS the Hz/deg angle change drop.  |
| <i>Max Drop</i>     | Defines the maximum drop through the pit.  |
| <i>Hz/deg Drop</i>  | Defines the additional drop added to the minimum drop through the pit. Drop applied is calculated on the angle change between a pipe reach entering a pit and the pipe reach leaving a pit |
| <i>Locked</i>       | Tick to lock the properties of the pit, so they cannot be changed by any function in the Sewer design view.  |

## Edit Pipe icon

The **Edit Pipe** icon of the Sewer design view allows you to view and edit properties of one selected pipe in the sewer network.

You may also double click the required pipe to edit its parameters.

To edit pipe parameters:

1. In the work area of the Sewer design view, select the required pipe.
2. At the *Data* tab, click the **Edit Pipe** icon.

The **Sewer Design** dialog, opened at the *Pipe Data* tab is displayed.

3. Review the parameters, if needed change them. Fields are described in the table below.
4. Do one of the following:
  - Click **Select** to edit another pipe.
  - Click **Next** to proceed to the next pipe in the flow.
  - Click **Prev** to proceed to the previous pipe in the flow.
  - Click **OK** to close the dialog.

You may select a pipe for editing in one of the following ways:

- Select the required pipe in the work area of the Sewer design view and click **Edit Pipe**.
- Double click the required pipe in the work area of the Sewer design view.
- At the *Pipe Data* tab of the **Sewer Design** dialog, click **Select** and select the required pipe from the list.
- Select the required pipe at the preview area at the *Pipe Data* tab of the **Sewer Design** dialog.

### Fields of the *Pipe Data* tab of the **Sewer Design** dialog

| Field                        | Description  |
|------------------------------|--|
| <i>Sewer Line</i>            | Displays the sewer line to which the pipe belongs to.  |
| <i>U/S Pit</i>               | Displays the pit at the upstream end of the pipe.  |
| <i>D/S Pit</i>               | Displays the pit at the downstream end of the pipe.  |
| <i>Length</i>                | Displays the length of the pipe, i.e. the distance between U/S and D/S pits.                                 |
| <i>Pipe Comment</i>          | Type any relevant comment for the pipe.  |
| <i>Min Slope (%)</i>         | Defines the minimum slope for this pipe reach.   |
| <i>Min Cover</i>             | Defines the minimum cover for this pipe reach.   |
| <i>NPipes</i>                | Defines the number of pipes.   |
| <i>Pipe Class</i>            | Defines the pipe class. It is displayed as a combination of the type of pipe, its class and the joint type.  |
| <i>Set-up by Pipe Design</i> | Defines the pipe diameter. The U/S invert and D/S invert are based on it.                                    |
| <i>Locked</i>                | Tick to lock the properties of the pipe, so they cannot be changed by any function in the Sewer design view. |

## Edit BCIL icon

The **Edit BCIL** icon of the Sewer design view allows you to configure the parameters of the BCIL (Block Control Invert Level) points.

The BCIL (Block Control Invert Level) is a tool will ensure that Magnet Office designs the sewer pipe low enough to carter for a specified minimum slope from the drain point at the house so the house may be connected to the sewer line properly.

### NOTE

The BCIL is an optional feature.

BCIL data are defined in the survey view by the point entities, with the special point code. There are three types of the BCIL points:

- House Connection (HC) – this point should have *@HCxxxx* code.
- Sewer Connection (SC) – this point should have *@SCxxxx* code.
- Intermediate Connection (IC) – this point should have *@ICxxxx* code.

The *xxxx* part in the point codes represents any alphanumeric string. Usually it defined by the lot name. BCIL points from the same lots should have the same alphanumeric parts.

All BCIL point must have defined elevations and must be located at the same layer with the sewer line to which they are must be connected.

To edit the BCIL parameters:

1. At the *Data* tab of the Sewer design view, click the **Edit BCIL** icon.

The **Block Control Invert Level** dialog is displayed.

2. Select the required BCIL point. Do one of the following:
  - From the *Name* drop-down list, select the required point.
  - Click **Find** and perform search by point name.
3. Review the parameters, if needed, change them.
4. Click **OK**.

## Edit All Pits icon

The **Edit All Pits** icon of the Sewer design view allows you to view and edit properties of several pits (man-holes) in the sewer network at once.

To edit pit parameters:

1. At the *Data* tab of the Sewer design view, click the **Edit All Pits** icon.

The **Edit All Pits** dialog is displayed.

2. Define the pit selection for editing. Do one of the following:
  - Select the *All Pits* radiobutton to edit all existing pits.
  - Select the *Pits by Line* radiobutton. If so, configure the selection. Do one of the following:
    - From the *Line* drop-down list, select the required sewer line.
    - From the *U/S Pit* and *D/S Pit* drop-down lists, select the start and end pits of the required sewer line.

3. Tick the checkboxes for the parameters to be changed and specify their values in the appropriate fields. Fields are described in the table below.
4. Click **OK**.

#### Fields of the *Pit Data* tab of the *Sewer Design* dialog

| Field               | Description  |
|---------------------|--|
| <i>Select From</i>  | Defines the selection of the pits to be edited.  |
| <i>Line</i>         | Define the sewer line to which the pits to be edited belongs to.   |
| <i>U/S Pit</i>      | Displays the start pit of the sewer line to which the pits to be edited belongs to.  |
| <i>D/S Pit</i>      | Displays the end pit of the sewer line to which the pits to be edited belongs to.  |
| <i>Comment</i>      | Type any relevant comment for the pits.  |
| <i>Min Drop</i>     | Defines the minimum drop through the pit. This drop will be automatically applied to every pit PLUS the Hz/deg angle change drop.  |
| <i>Pit Diameter</i> | Defines the diameter of the pit (manhole).   |
| <i>Max Drop</i>     | Defines the maximum drop through the pit.  |
| <i>Hz/deg Drop</i>  | Defines the additional drop added to the minimum drop through the pit. Drop applied is calculated on the angle change between a pipe reach entering a pit and the pipe reach leaving a pit |

## Edit All Pipes icon

The **Edit All Pipes** icon of the Sewer design view allows you to view and edit properties of the several pipes in the sewer network at once.

To edit pipe parameters:

1. At the *Data* tab of the Sewer design view, click the **Edit All Pipes** icon.  
The *Sewer Design* dialog, opened at the *Pipe Data* tab is displayed.
2. Define the pit selection for editing. Do one of the following:
  - Select the *All Pipes* radiobutton to edit all existing pipes.
  - Select the *Pipes by Line* radiobutton. If so, configure the selection. Do one of the following:
    - From the *Line* drop-down list, select the required sewer line.
    - From the *U/S Pit* and *D/S Pit* drop-down lists, select the start and end pits of the required sewer line.
3. Tick the checkboxes for the parameters to be changed and specify their values in the appropriate fields. Fields are described in the table below.
4. Click **OK**.

#### Fields of the *Pipe Data* tab of the *Sewer Design* dialog

| Field              | Description   |
|--------------------|---|
| <i>Select From</i> | Defines the selection of the pipes to be edited.                  |
| <i>Line</i>        | Define the sewer line to which the pipes to be edited belongs to. |

| Field                        | Description  |
|------------------------------|--|
| <i>U/S Pit</i>               | Displays the start pit of the sewer line to which the pipes to be edited belongs to.                         |
| <i>D/S Pit</i>               | Displays the end pit of the sewer line to which the pipes to be edited belongs to.                           |
| <i>Length</i>                | Displays the length of the pipe, i.e. the distance between U/S and D/S pits.                                 |
| <i>Pipe Comment</i>          | Type any relevant comment for the pipes.   |
| <i>Locked</i>                | Tick to lock the properties of the pipe, so they cannot be changed by any function in the Sewer design view. |
| <i>Min Slope (%)</i>         | Defines the minimum slope for this pipe reach.   |
| <i>Min Cover</i>             | Defines the minimum cover for this pipe reach.   |
| <i>NPipes</i>                | Defines the number of pipes.   |
| <i>Pipe Class Definition</i> | Defines the pipe class. It is displayed as a combination of the type of pipe, its class and the joint type.  |
| <i>Pipe Diameter</i>         | Defines the pipe diameter. The U/S invert and D/S invert are based on it.                                    |

## Update Network icon

The **Update Network** icon of the Sewer design view allows you to update current sewer network to apply all the changes made.

To update a sewer network:

1. At the *Data* tab of the Sewer design view, click the **Update Network** icon.  
The **Update Sewer Network** dialog is displayed.
2. From the *Network Name* drop-down list, select the required network.
3. From the *Network Settings* drop-down list, select the required library settings set. See "Sewer library" section on page 666 for details.
4. If needed, define the primary and secondary DTMs by ticking the appropriate checkboxes and selecting DTMs from the drop-down lists to generate surfaces.
5. Nominate obstruction strings. See "Compute obstructions" section on the facing page for details.
6. In the *Pit Name* group box, define the pit name creation method.
7. Click **OK**.

### Fields of the Create Sewer Network dialog

| Field                | Description                                       |
|----------------------|---|
| <i>Network Name</i>  | Defines the name of the new sewer network.        |
| <i>Primary DTM</i>   | Defines the primary DTM for generating surface.   |
| <i>Secondary DTM</i> | Defines the secondary DTM for generating surface. |

| <b>Field</b>                | <b>Description</b>  |
|-----------------------------|---|
| <i>Compute Obstructions</i> | Defines obstruction strings. See "Compute obstructions" section below for details.  |
| <b>Pit name</b>             |   |
| <i>From the dialog</i>      | Select to manually define the pit name in the respective editbox.   |
| <i>From the point name</i>  | Select to use the point number as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox. |
| <i>From the point code</i>  | Select to use the point code as the pit name.<br>NOTE<br>You may manually edit the pit name in the <i>Pit name</i> editbox.   |

## Compute obstructions

MAGNET Office allows you to specify obstructions along a given pipe reach at certain depths and to specify the clearances required. All obstruction points created in the survey view must be given heights and be joined into a string.

An obstruction is created as a string in the survey view, with the node points defining the level of the obstruction in or above the ground surface. The string is saved and named and set as a service.

Other networks such as Drainage networks are automatically identified as an obstruction if the other network crosses a sewer line. Drainage network pipe sizes are extracted directly from Drainage Design.



To configure this option:

1. Tick the *Compute Obstructions* checkbox.
2. Click **Set Obstructions**.

The *Select Obstructions* dialog is displayed.

3. Select the required service strings from the *Valid Service String* list and click >>.
4. The selected strings are displayed in the *Selected Obstructions* list. If needed to remove a string, select it and click <<.
5. Click **OK**.

## Calcs tab

| Calcs group   |  |
|---|--|
|  Compute Pipe Design | Compute Pipe Design icon<br>Click it to compute the design of the pipes. |
|  Edit Pipe Design    | Edit Pipe Design icon<br>Click it to edit the existing pipe design.      |

### Compute Pipe Design icon

The **Compute Pipe Design** icon of the Sewer design view allows you to compute the pipe design of current sewer network.

To compute the design:

1. At the *Calcs* tab of the Sewer design view, click the **Compute Pipe Design** icon.  
The *Pipe Design* dialog is displayed.
2. If needed, tick the *Clear locked flag* checkbox, to unlock all locked pits and pipes.
3. If needed, tick the *Use BCIL* checkbox to include the BCIL data to the design.
4. In the *Smoothing of pipe-ends at pits* group box, define the smoothing usage by selecting the appropriate radiobutton.
5. Click **OK**.

The design is computed. The *Sewer Design* dialog, opened at the *Pipe Design* tab is displayed.

### Edit Pipe Design icon

The **Edit Pipe Design** icon of the Sewer design view allows you to edit the design of the particular pipe.

To edit a pipe design:

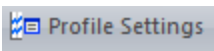
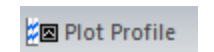
1. At the *Calcs* tab of the Sewer design view, click the **Edit Pipe Design** icon.  
The *Sewer Design* dialog, opened at the *Pipe Design* tab is displayed.
2. Click **Select Pipe** and select the required pipe from the list.  
The selected pipe is displayed in the preview area with its pits and BCIL points.
3. If needed, tick the *Update This Pipe Only* checkbox, to apply any changes.
4. Review the parameters. If needed, change the design. See table below for details.
5. If needed, tick the *Lock* checkbox to lock the properties of the pit, so they cannot be changed by any function in the Sewer design view.
6. When finished, do one of the following:
  - Click **Select Pipe** to select another pipe from the list.
  - Click **Next Pipe** to proceed to the next pipe in the flow.
  - Click **Prev Pipe** to proceed to the previous pipe in the flow.
  - Click **OK** to close the dialog.



**Buttons of the *Pipe Design* tab of the *Sewer Design* dialog**

| Button                  | Description   |
|-------------------------|---|
| <b>Set Diameter</b>     | Click it to change the diameter of the pipe to another size from the pipe class list.   |
| <b>Set USlope</b>       | Click it to set upstream invert to a level based on the slope from the downstream invert.   |
| <b>Set DSlope</b>       | Click it to set downstream invert to a level based on the slope from the upstream invert.   |
| <b>Set All U/S Inv</b>  | Click it to re-calculate the invert levels back upstream from the current pit or the outlet. Set either the outfall from a pit invert level or a known outfall level                  |
| <b>Move Parallel</b>    | Click it to move the pipe, resetting the upstream and downstream invert levels by a relative value, prefixed with a '+' or '-' sign. Click <b>Repeat</b> to repeat the last movement. |
| <b>Move U/S Inv</b>     | Click it to specify a new level for the upstream invert or change the level by a relative value. Click <b>Repeat</b> to repeat the last movement.                                     |
| <b>Move D/S Inv</b>     | Click it to specify a new level for the downstream invert or change the level by a relative value. Click <b>Repeat</b> to repeat the last movement.                                   |
| <b>Restore U/S Inv</b>  | Click it to reposition the upstream invert using the design constraints in your data.   |
| <b>Restore D/S Inv</b>  | Click it to reposition the downstream invert using the design constraints in your data.   |
| <b>Restore Both Inv</b> | Click it to reposition both the upstream and downstream invert using the design constraints in your data.   |
| <b>Select Pipe</b>      | Click it to select a pipe from the list.  |
| <b>Next Pipe</b>        | Click it to proceed to the next pipe in the flow.   |
| <b>Prev Pipe</b>        | Click it to proceed to the previous pipe in the flow.   |

## Plot tab

| Plot group  |   |
|---|---|
|  | Profile Settings icon<br>Click it to configure profile plotting parameters. |
|  | <u>Plot Profile icon</u><br>Click it to plot a profile as a drawing.        |

### Profile Settings icon

The **Profile Settings** icon of the Sewer design view allows you to customize all of the parameters necessary to create a profile drawing.

To configure a profile plotting:

1. At the *Plot* tab of the Sewer design view, click the **Profile Settings** icon.  
The **Plot Profile** dialog is displayed.
2. Configure the parameters as you need. Fields are described in the table below.
3. Click **OK**.





#### Fields of the *Plot Profile* dialog

| Filed                        | Description  |
|------------------------------|--|
| <i>Sewer Line</i>            | Defines the sewer line for plotting.   |
| <i>U/S Pit</i>               | Defines the upstream pit from which you wish to start the profile plot.                            |
| <i>D/S Pit</i>               | Defines the last downstream pit of the pipe line.  |
| <i>Plot Format File</i>      | Click << to define the format file.  |
| <i>Title Block</i>           | Click << to define the title block for plotting.   |
| <i>Plot Scale Horizontal</i> | Defines the horizontal scale for the profile plotting.   |
| <i>Plot Scale Vertical</i>   | Defines the vertical scale for the profile plotting.   |
| <i>Plot Origin X</i>         | Defines the X coordinate of the starting position of the plot on the sheet of paper in mm.         |
| <i>Plot Origin Y</i>         | Defines the Y coordinate of the starting position of the plot on the sheet of paper in mm.         |
| <i>Plot Dimension</i>        | Defines the maximum size of the plot in mm. This will be dependent on the size of the title block. |
| <b>Chainage</b>              |  |
| <i>U/S Pit</i>               | Displays the running distance at the upstream pit.   |
| <i>D/S Pit</i>               | Displays the running distance at the downstream pit.   |




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| <b>Filed</b>                    | <b>Description</b>   |
|---------------------------------|--|
| <i>Interval</i>                 | Defines the interval between stations.   |
| <i>Zero Chainage at D/S Pit</i> | Tick to place starting chainage at the downstream pit.   |
| <i>Datum Level</i>              | Defines the datum level. If blank, the minimum datum level is used.  |
| <i>Datum Rounding</i>           | This will round the datum to the nearest multiple of the entered value. (e.g. Enter 1.0 and the datum will be to the nearest meter) This field will have no effect if the datum level is set |
| <i>Plot Annotation</i>          | Defines the annotation which will be used in plot.   |
| <i>Plot Option</i>              | Tick checkboxes for information you want to plot.  |

## Window tab

|  |   |
|--|---|
| <br>New Window        | <p><u>New Window icon</u><br/>Click it to create a new window in the work area.</p>                 |
| <br>Cascade           | <p><u>Cascade icon</u><br/>Click it to cascade windows in the working area.</p>                     |
| <br>Tile Horizontally | <p><u>Tile Horizontally icon</u><br/>Click it to tile windows in the working area horizontally.</p> |
| <br>Tile Vertically   | <p><u>Tile Vertically icon</u><br/>Click it to tile windows in the working area vertically.</p>     |

## Help tab




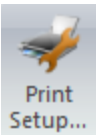

|  |   |
|--|---|
| <br>Help                   | <p><u>Help icon</u><br/>Click it to open product help.</p>                                    |
| <br>About                 | <p><u>About icon</u><br/>Click it to display information about MAGNET Office application.</p> |
| <br>HINT<br>Display Hints | <p><u>Display Hints icon</u><br/>Click it to display product hints.</p>                       |

# Cut/Fill Design View

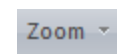

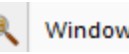
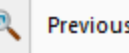
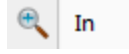
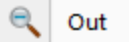

The Cut/Fill Design view allows you to view and plot existing cut/fill color maps.


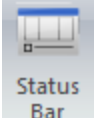
The main view displays the cut/fill map itself. It has its own ribbon, different from the MAGNET Office default ribbon, see descriptions below.

## File tab

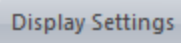
| Standard group  |  |
|---|--|
|    | <u>Open icon</u><br>Click it to open an existing cut/fill map.                         |
|    | <u>Save icon</u><br>Click it to save current cut/fill map.                             |
|    | <u>Close icon</u><br>Click it to close current cut/fill map.                           |
| Print group   |  |
|   | <u>Print Setup icon</u><br>Click it to configure plotting of the current cut/fill map. |
|  | <u>Print icon</u><br>Click it to plot the current cut/fill map.                        |

## View tab



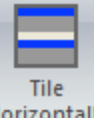

| Navigate group  |  |
|---|--|
|  | <u>Zoom icon</u><br>Click it to see the list of the zoom options.              |
|  | <u>All icon</u><br>Click it to fit all data in the view.                       |
|  | <u>Window icon</u><br>Click it to draw a rectangle area to be fits the screen. |
|  | <u>Previous icon</u><br>Click it to return to the previous view.               |
|  | <u>In icon</u><br>Click it to zoom in the center area of the survey view.      |
|  | <u>Out icon</u><br>Click it to zoom in the center area of the survey view.     |
|  | <u>Pan icon</u><br>Click it to scroll the view                                 |

| <b>View group</b>   |   |
|---|---|
|  <p>Toolbar</p>    | <p><u>Toolbar icon</u></p> <p>Click it to enable/disable toolbar.</p> |
|  <p>Status Bar</p> | <p><u>Status icon</u></p> <p>Click it to enable/disable toolbar.</p>  |



## Settings tab

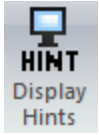
|   |  |
|---|--|
|  | <p><u>Display settings icon</u></p> <p>Click it to configure the layout of the cut/fill map.</p> |
|---|--|

## Window tab

|  |  |
|--|--|
|  <p>New Window</p>          | <p><u>New Window icon</u></p> <p>Click it to create a new window in the work area.</p>                 |
|  <p>Cascade</p>           | <p><u>Cascade icon</u></p> <p>Click it to cascade windows in the working area.</p>                     |
|  <p>Tile Horizontally</p> | <p><u>Tile Horizontally icon</u></p> <p>Click it to tile windows in the working area horizontally.</p> |
|  <p>Tile Vertically</p>   | <p><u>Tile Vertically icon</u></p> <p>Click it to tile windows in the working area vertically.</p>     |

## Help tab

|  |  |
|--|--|
|  <p>Help</p>  | <p><u>Help icon</u></p> <p>Click it to open product help.</p>                                    |
|  <p>About</p> | <p><u>About icon</u></p> <p>Click it to display information about MAGNET Office application.</p> |



Display Hints icon  
Click it to display product hints.

## MAGNET Office Activation

To use full functionality of the MAGNET Office you have to perform online or offline activation. Online activation of the application requires an Internet connection of the computer where the application was installed.

When you first start the application, the **Product Activation** dialog prompts you to select the activation method. Select one of the following radiobuttons:

- *Online* – to perform the online activation. See "Online activation" section on the facing page for details.
- *Network* – to perform activation within your network. See "Network activation" section on page 859 for details.
- *Offline* – to perform the offline activation. See "Offline activation" section on page 860 for details.

Also you may close the dialog to postpone the activation and run the application in demo mode.



## Online activation

At the **Online activation** page you may activate the MAGNET Office by using your Enterprise account; also you may change or reset your enterprise password.

To perform an online activation:

1. At the **Activation type** page, select the *Online* radiobutton and click **Next**.

The **Mange account** page is displayed.

2. Select the *Logon with MAGNET Enterprise account* radiobutton and click **Next**.

The **Enterprise logon** page is displayed.

### NOTE

An e-mail which you have received from Topcon, when your company's account administrator adds you into the user list, contains only a temporary password. The temporary password does not allow you to establish the connection with MAGNET Enterprise. Please follow the recommendation from the e-mail to update your password.

3. Specify you login (e-mail) and password in the respective fields.
4. Click **Next**.

The **Online activation** page is displayed.

5. In the *Serial number* field, specify your serial number.
6. From the *Device-id* drop-down list, select the device to which your serial number will be assigned. You may select one of the following:
  - An identification number of the computer. In this case, the serial number ties to the computer and operation system (OS) of this computer. If the OS is reinstalled, the system identical number changes and activation is disabled.
  - An identification number of the computer's network card. In this case, the serial number ties to the network adapter. A reinstallation of the OS does not affect the application activation.
  - An identification number of the external USB flash drive. The type of the given driver must be approved by Topcon Company to use in MAGNET activation procedure. In this case, the serial number ties to the external USB flash drive. You can use the given serial number and the given USB flash drive for activation of the application on any computer.

### NOTE

The application is activated only if the USB flash drive is plugged to the USB port. Removing of the USB flash drive will disable the activation. You may re-plug the USB flash drive and any time – the activation will be restored after the next launch.

7. Click **Next**.

The **License agreement** page is displayed.

8. Carefully read the End User License Agreement.
9. Tick the *I have read, understand and agree with license* checkbox.
10. Click **Next**.

The application checks the entered serial number. If the number is correct, the MAGNET Office is activated and the table, listing available modules is displayed.

If you do not have an Enterprise account, contact your Administrator to obtain it. Only Administrators may create accounts. If you are going to work in a team of the Company, you should not create an account yourself – the Administrators are unable to add account, created by user to the Company account.

To change a password:

1. Select the *Change password* radiobutton.
2. Click **Next**.  
The ***Change Password*** page is displayed.
3. In the *Login (email)* editbox, type your Enterprise login.
4. In the *Old password* editbox, type your current password.
5. In the *New password* editbox, type your new password.
6. In the *Confirm New* editbox, re-type your new password.
7. Click **Next**.

To reset a password:

1. Select the *Forgot password* radiobutton.
2. Click **Next**.  
The ***Reset password*** page is displayed.
3. In the *Login (email)* editbox, type your Enterprise login.
4. Click **Next**.

Topcon will send you a temporary password to your e-mail address.

The confirmation message is displayed.

5. Click **OK**.  
The ***Change Password*** page is displayed.
6. In the *Login (email)* editbox, type your Enterprise login.
7. In the *Old password* editbox, type temporary password from the e-mail.
8. In the *New password* editbox, type your new password.
9. In the *Confirm New* editbox, re-type your new password.
10. Click **Next**.

## Network activation

When the several users from one company simultaneously work with MAGNET Office, Topcon recommend performing the software activation via network activation. This way supposes:

- the users computers are joined in a local subnet
- a server is organized.

This server (a computer) has to be located on the same subnet. The special software is installed on the server computer for the coordination the use of a licensed application by multiple computers.

Before running MAGNET Office, all users have not activated MAGNET Office on the computers. After running the software, the user selects the network activation. During activation the software sends a request for a license across the network to the license server. The server will grant license authorization to the requester after verifying licensing conditions for the given product.

To perform network activation:

1. Select the *Network* radiobutton.
2. Click **Next**.

The *Network Server Setup* page is displayed.

3. In the *Server* field, specify the license server.
4. In the *Port* field, specify the port for connection.
5. From the *Product name* drop-down list, select the required product.
6. Click **Next**.

The *License agreement* page is displayed.

7. Carefully read the End User License Agreement.
8. Tick the *I have read, understand and agree with license* checkbox.
9. Click **Next**.

The application sends request to the license server. If the license is granted, the MAGNET Office is activated and the table, listing available modules is displayed.

## Offline activation

You must have the activation code to perform the offline activation. Contact your Administrator to obtain it.

To perform offline activation:

1. At the **Activation type** page, select the *Offline* radiobutton.
2. Click **Next**.

The **Offline activation** page is displayed.

3. In the *Serial number* field, specify your serial number.
4. From the *Device-id* drop-down list, select the device to which your serial number will be assigned. You may select one of the following:
  - An identification number of the computer. In this case, the serial number ties to the computer and operation system (OS) of this computer. If the OS is reinstalled, the system identical number changes and activation is disabled.
  - An identification number of the computer's network card. In this case, the serial number ties to the network adapter. A reinstallation of the OS does not affect the application activation.
  - An identification number of the external USB flash drive. The type of the given driver must be approved by Topcon company to use in MAGNET activation procedure. In this case, the serial number ties to the external USB flash drive. You can use the given serial number and the given USB flash drive for activation of the application on any computer.

### NOTE

The application is activated only if the USB flash drive is plugged to the USB port. Removing of the USB flash drive will disable the activation. You may re-plug the USB flash drive and any time – the activation will be restored after the next launch.

5. Specify the activation code. Do one of the following:
    - Select the *Use activation code* radiobutton and specify the code in the appropriate editbox.
    - Select the *Import activation code from file* radiobutton and click Browse to define the license (\*.lic) file, containing and activation code.
  6. Click **Next**.
- The **License agreement** page is displayed.
7. Carefully read the End User License Agreement.
  8. Tick the *I have read, understand and agree with license* checkbox.
  9. Click **Next**.

The application is activated and the table, listing available modules is displayed.