



# InRoads XM

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# InRoads Release Update

- InRoads XM Family of Products
  - Released December, 2006
  - SP1 released in May, 2007
  - **SP2 target date is December, 2007**





# InRoads Release Update

- PowerSurvey for InRoads XM
  - Released in April, 2007
  - InRoads version decoupled from the comprehensive Bentley PowerSurvey installation

Product	Download CD	Version	Date	FileSize
<input type="checkbox"/> <a href="#">Bentley PowerSurvey XM for InRoads Users</a>	▼ ●	08.09.00.51	4/18/2007	298.69 MB
Dependencies				
<input type="checkbox"/> <a href="#">MicroStation V8 XM Edition Software Prerequisite Pack</a>	▼ ●	08.09.03.09	1/24/2007	123.92 MB



# InRoads Release Update

- MicroStation EC for InRoads XM
  - Released in March, 2007
  - InRoads version decoupled from the comprehensive MicroStation Civil Extension installation

Product	Download CD	Version	Date	FileSize
<input type="checkbox"/> <a href="#">MicroStation Civil Extension XM for InRoads Users</a>	▼ ●	08.09.00.51	3/21/2007	110.63 MB
Dependencies				
<input type="checkbox"/> <a href="#">MicroStation V8 2004 Edition</a>	▼ ●	08.05.02.35	6/16/2005	221.35 MB
<input type="checkbox"/> <a href="#">MicroStation V8 XM Edition</a>	▼ ●	08.09.03.48	11/30/2006	176.49 MB
<input type="checkbox"/> <a href="#">MicroStation V8 XM Edition Software Prerequisite Pack</a>	▼ ●	08.09.03.09	1/24/2007	123.92 MB



# Continued Investment InRoads SP1

**What's New or Changed in Bentley InRoads XM Edition**  
08.09.01.42  
Adds to 08.09.00.51

**New**

**General Enhancements**

- Added support for AutoCAD 2007 and AutoCAD 2008.
- The Explorer will now sort the date / time as a data / time sort instead of an ASCII sort.

**File**

- Added support for ProjectWise XM with MicroStation 2004 Edition
- Project Defaults - Added integration with ProjectWise for all default directory paths.
- Text Import Wizard - Added enhancements.
- Save As > Project > Options - Added an option to save only the file name without the path information.
- Import > Survey Data - You are now able to set the Files of Type to the data collector type and then multi-select the files to be imported.
- Translators > Import SRV - Removed the Append/Rename option and added a check box to Skip Duplicates in a File.

**Surface**

- View Surface > Annotate Features - Slope arrows can be placed to show the direction of features in plan.
- Design Surface > Drape Surface - Added a toggle to control whether the original graphicFeature is deleted when draping.
- Design Surface - Added preferences to the Set Elevation and Drape Surface commands.
- Edit Surface > Delete Triangles - Added the removal of displayed triangles.

**Geometry**

- Added tooltips for Cogo Points.
- View Geometry - Added the Annotate Graphics command which annotates MicroStation elements according to geometry styles.
- View Geometry > View Horizontal Annotation > Tabling - Added an option for tabling to have all elements of a figure numbered sequentially, no matter the type of element.
- View Geometry > View Horizontal Annotation > Display All Horizontals plus for Rail, All Turnouts and All Rails, Joints and Distance Keepers.
- View Geometry > Curve Set Annotation - Added the ability to annotate deflection angle for multiple closed alignments that contain only PIs.
- View Geometry > Curve Set Annotation - Added a toggle to drop station equation names.
- View Geometry > View Vertical - Added functionality to View Vertical Annotation to distinguish between a PVI and POVB / POVE.



# InRoads XM SP1

- Initial release allowed support for ...
  - MicroStation XM with ProjectWise XM or
  - MicroStation 2004 with ProjectWise 2004 or
- SP1 adds support for ...
  - MicroStation 2004 with ProjectWise XM
  - AutoCAD 2007 and 2008



# InRoads XM SP2

- SP2 will contain...
  - Survey Enhancements
  - Small number of minor fixes
  - **And we always come away from this conference with ideas, suggestions and other items from YOU that need to be addressed.**



## “Peaceful Coexistence”

- Mike’s definition: The ability for multiple versions of InRoads to reside on the same machine and work peacefully without interfering with the other version(s).
- Bottom line: The ability for you to begin moving to the next version of InRoads and keep using the previous version for your “projects in the pipeline”.





# InRoads 8.5 SP7

- Continue our “Peaceful Coexistence” effort
- Added support for ProjectWise XM
  - Stay on MicroStation 2004 and InRoads 8.5
- Allows for incremental XM deployment
  - Move up to ProjectWise XM first
  - Then move to MicroStation XM and InRoads XM
- Released April 24<sup>th</sup>, 2007
- Complete details in the README

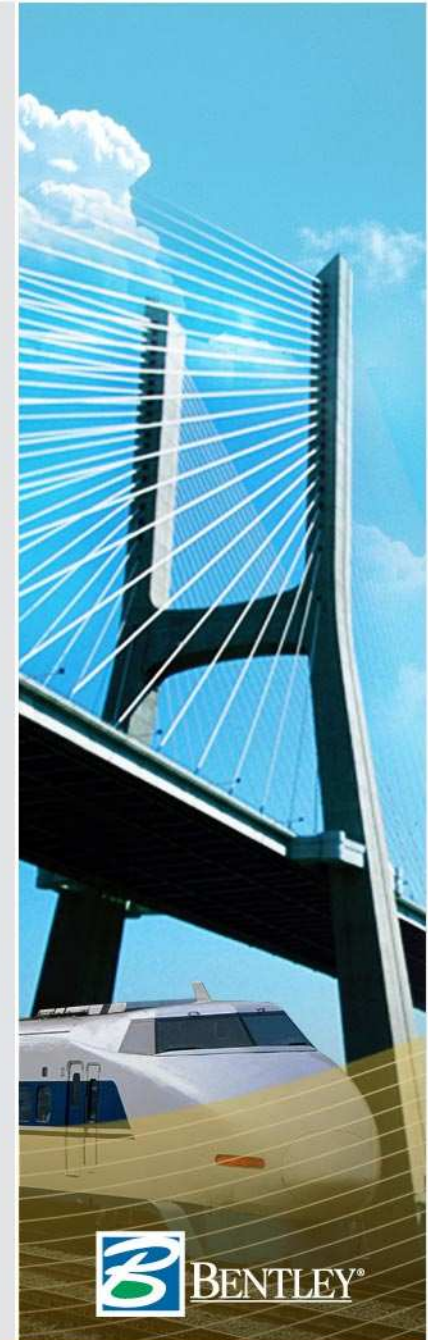


# InRoads Family of Products

- “Peaceful Coexistence”

- Multiple InRoads Versions
  - » InRoads 8.5 – February 2004
  - » InRoads 8.7 – June 2005
  - » InRoads 8.8 – June 2006
  - » InRoads 8.9 – December 2006

	InRoads			
	8.5	8.7	8.8	8.9
MicroStation 2004	X	X	X	X
ProjectWise 2004	X	X	X	X
MicroStation XM				X
ProjectWise XM	X			X



# Improved ProjectWise Integration in SP1

**Set Project Defaults**

Configuration Name: QM for BE

Default Preferences

Preferences (\*.xin): C:\QM for BE\civil.xin

Turnouts (\*.txt):

Drainage Structures (\*.dat):

Rainfall Data (\*.idf):

Bridge Sections (\*.txt):

Drafting Notes (\*.dft):

Pay Items (\*.mdb): C:\QM for BE\QM.mdb

Default Directory Paths

ProjectWise Directory: pw:\PW\M\CIVIL\PW\M\CIVIL\Documents\Florie.Rose\data\

Project Default Directory: C:\Documents and Settings\Mike.Wilson\My Documents\QM for BE\

Report Directory: C:\Documents and Settings\Mike.Wilson\My Documents\QM for BE\

Projects (\*.rwk): pw:\PW\M\CIVIL\PW\M\CIVIL\Documents\Mike Wilson\InRoads XM\XS\'

Surfaces (\*.dtm): pw:\PW\M\CIVIL\PW\M\CIVIL\Documents\Mike Wilson\InRoads XM\XS\dtm\

Geometry Projects (\*.alg): pw:\PW\M\CIVIL\PW\M\CIVIL\Documents\Mike Wilson\InRoads XM\XS\alg\

Template Libraries (\*.itl):

Roadway Design (\*.ird):

Survey Data (\*.fwd):

Drainage (\*.sdb):

Style Sheet (\*.xsl):

Quantity Manager (\*.mdb): C:\Documents and Settings\Mike.Wilson\My Documents\QM for BE\

Default Grid Factor

Grid Factor: 1.0000

Export

Active Only

**Select Folder**

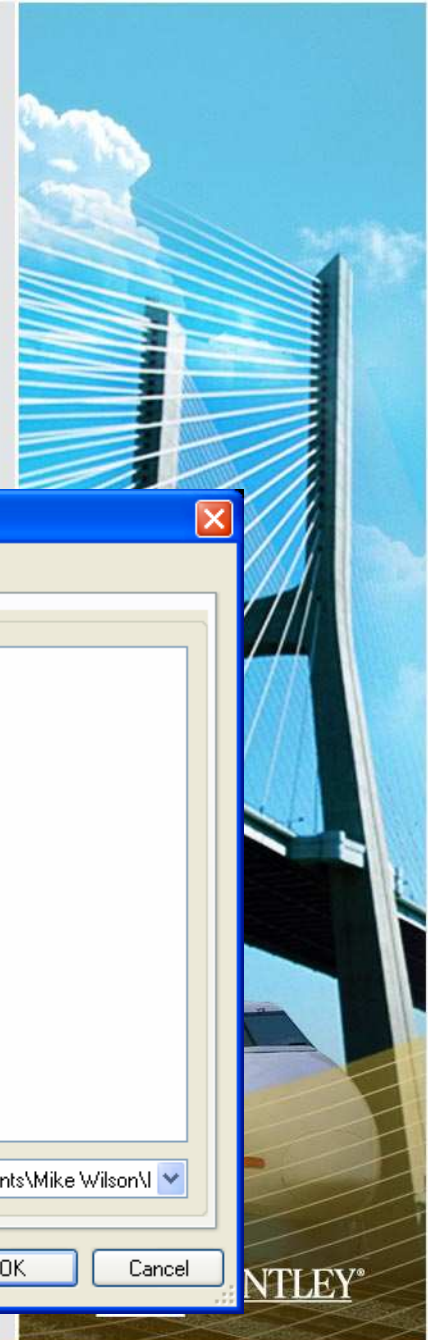
Select

Folders

- Barry.Mathews
- David.Croom
- Dawn.Clark
- Florie.Rose
- Jason.Smithey
- Jeff.Hannan
- Keep Out Jason and Kevin
- kelly
- Kevin.McDonald
- Mike Wilson
  - InRoads XM
    - XS
      - alg
      - dtm
- Mike.Cavanaugh
- Tim.Langham

pw:\PW\M\CIVIL\PW\M\CIVIL\Documents\Mike Wilson\I

OK Cancel





# Create Template

- Continued enhancements for productivity and workflow

*Better component and point navigation*

*Delete specific constraint*

*Delete constraints from all points*

*Improved Documentation Link*

*Improved Library navigation*

*Sorted Point Name List*

*Point names added to Display Template*

*Convert Point to Null Point*

*Unmerge Component Point*

*Constraints match dynamic key-in*

*Parametric label for Project to Surface constraint*

*Added Angle-Distance constraint*

*And More...*





# Roadway Designer

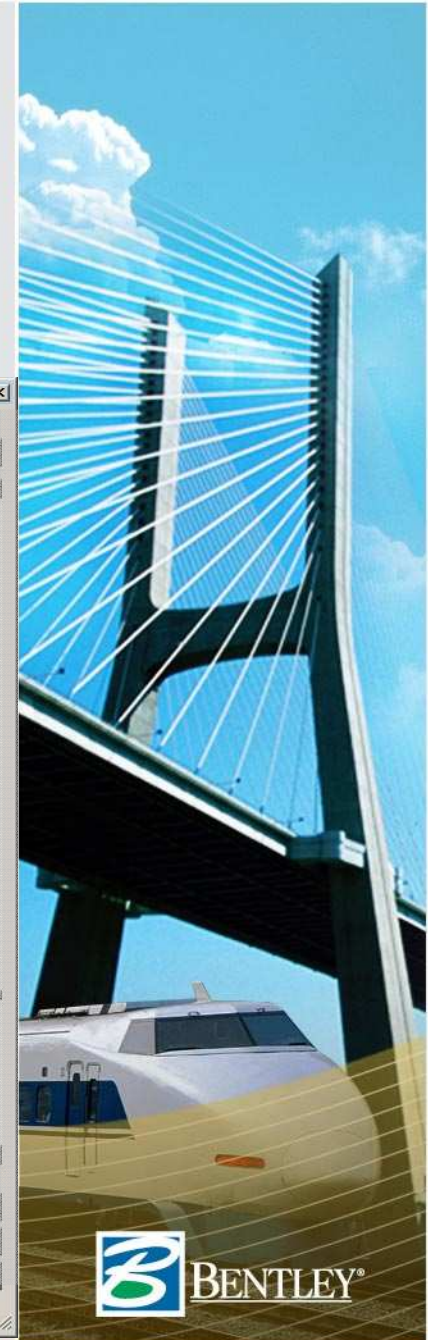
- Again, continued enhancements!!

**Including:**

- Triangulated Surface shown in XS
- Tracking shown in XS
- Better Reporting
- Multi Corridor "Clip None" option
- Import/Export of parametric Labels
- Re-enter to last active corridor
- Improved Superelevation editing tools
- Edit/Delete super sections
- Exterior boundaries added to Alternate Surfaces
- Display of Horizontal Cardinal Points in Plan

Corridor: Main  
Active Surface: original  
Station: 11+505.00  
Interval: 5.00  
Template: Main 4-lane

Display Superelevation  
Process All  
Process Visible Range



# Quantities Enhancements

## Quantities from Graphic Elements

- Pay Items can be assigned to graphic elements.
- Graphic elements are quantified like features.
- Names can be associated with graphic elements.
- An element's measurement can be overridden.

## Automated Sheet Quantities

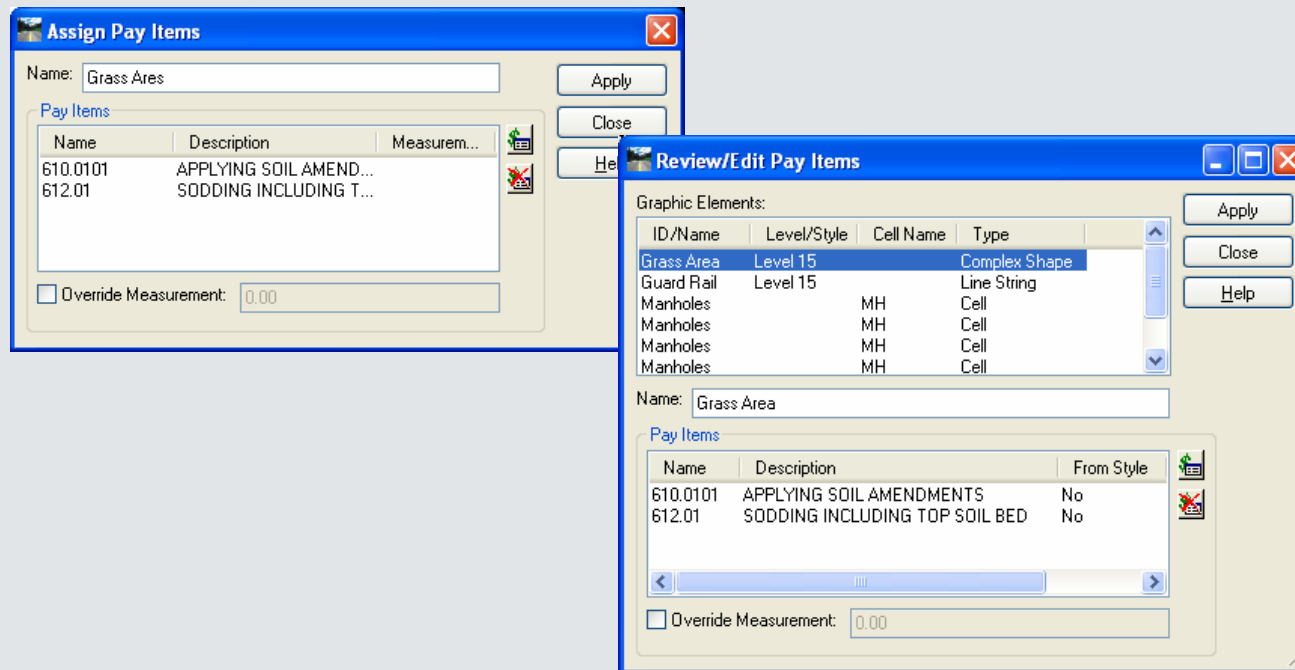
- New *Sheet* mode produces quantities by sheet.
- Sheet mode takes VDF files as input.





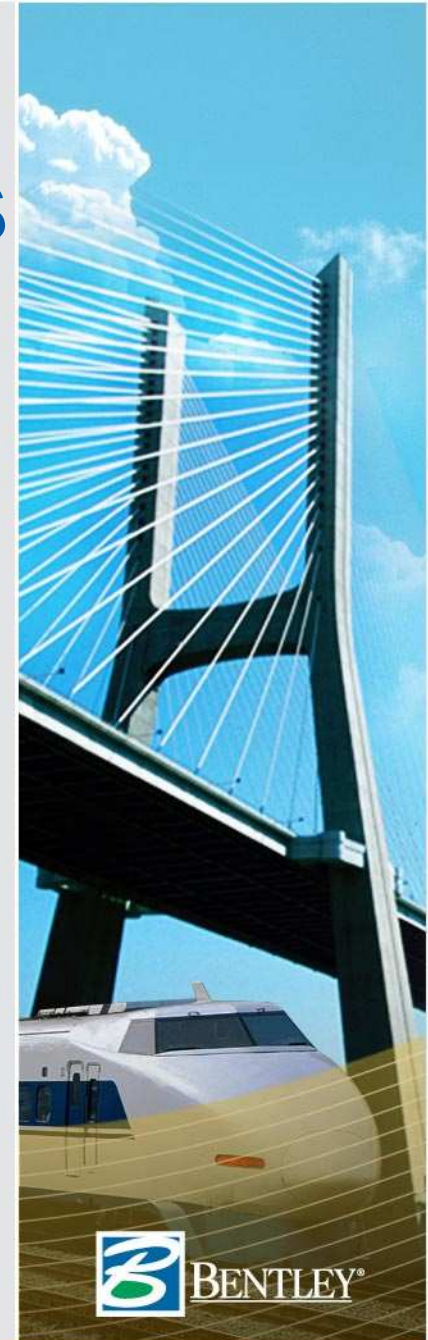
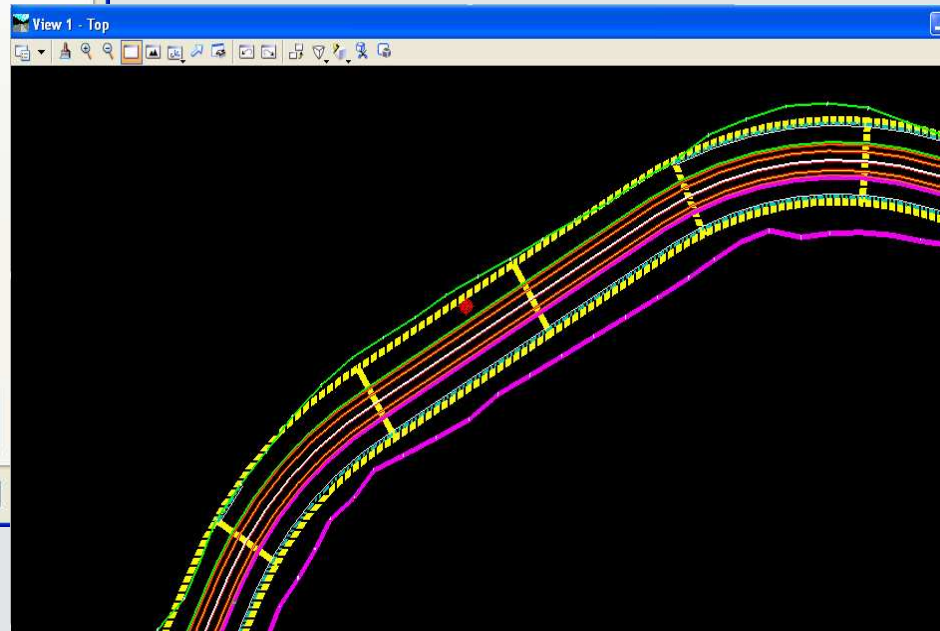
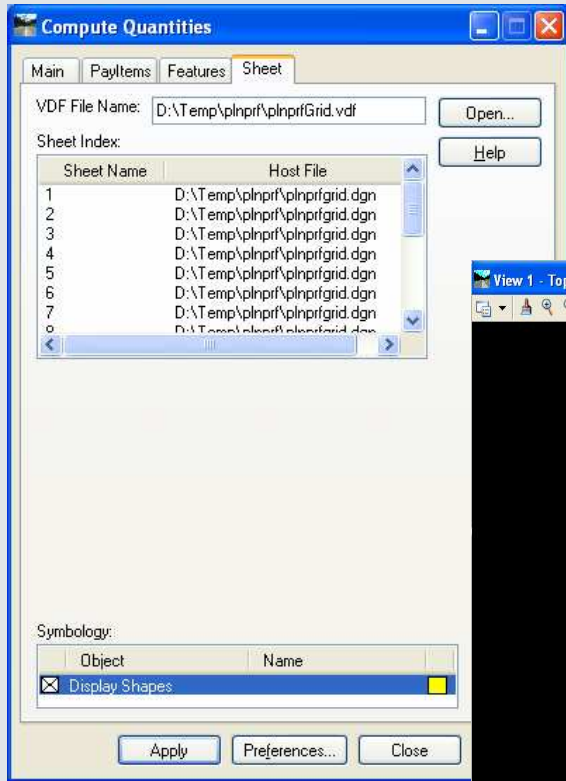
# New Pay Item Commands

*Assign Pay Items* and *Review/Edit Pay Items* provide the ability to assign and manage pay items on graphic elements and DTM features.



# Automated Sheet Quantities

Sheet names and boundaries are extracted from the selected VDF file.



# Quantity Manager

Sheet quantities are separated by sheet.

Quantities from graphic elements report Element Id, DGN Filename, and other MicroStation specific information.

Payitem	Run Name	Boundary	Net Value	Measurement Basis	Measurement Value	Computed Value	Rounded Value
604.5	By Sheet	Sheet : 1	1.000	Each	1.000	1.000	1.000
604.5	By Sheet	Sheet : 2	1.000	Each	1.000	1.000	1.000
604.5	By Sheet	Sheet : 4	1.000	Each	1.000	1.000	1.000
604.5	By Sheet	Sheet : 5	1.000	Each	1.000	1.000	1.000
604.5	By Sheet	Sheet : 6	1.000	Each	1.000	1.000	1.000

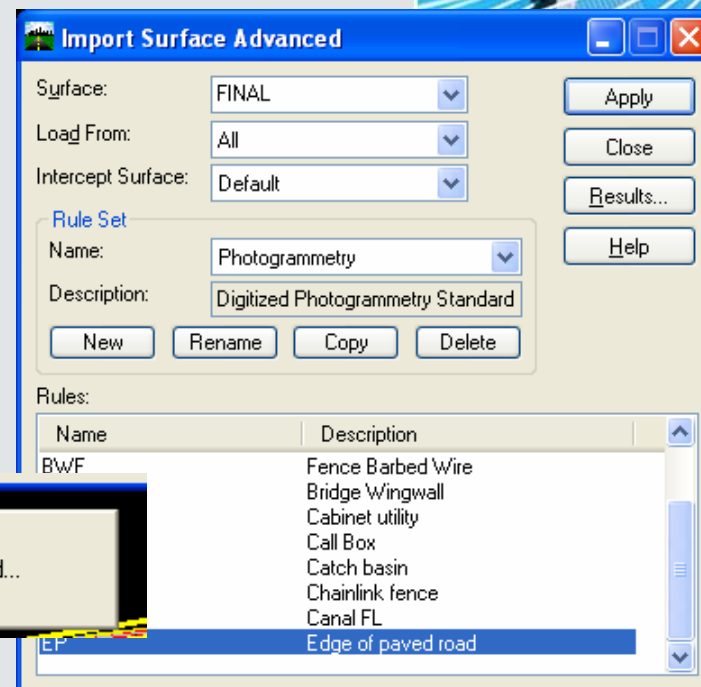
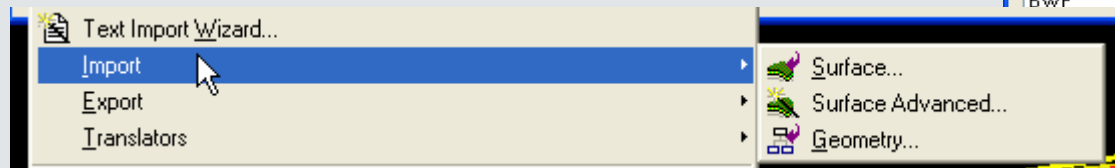
Name	Type	Native Id	Document	Begin X	Begin Y	Begin Stati...	Begin Reg...	Format
Manholes	Cell	23283	D:\Temp\p\InprfModelCenterline.dgn	11,737.440	11,800.804	100.000	1	1+00.00





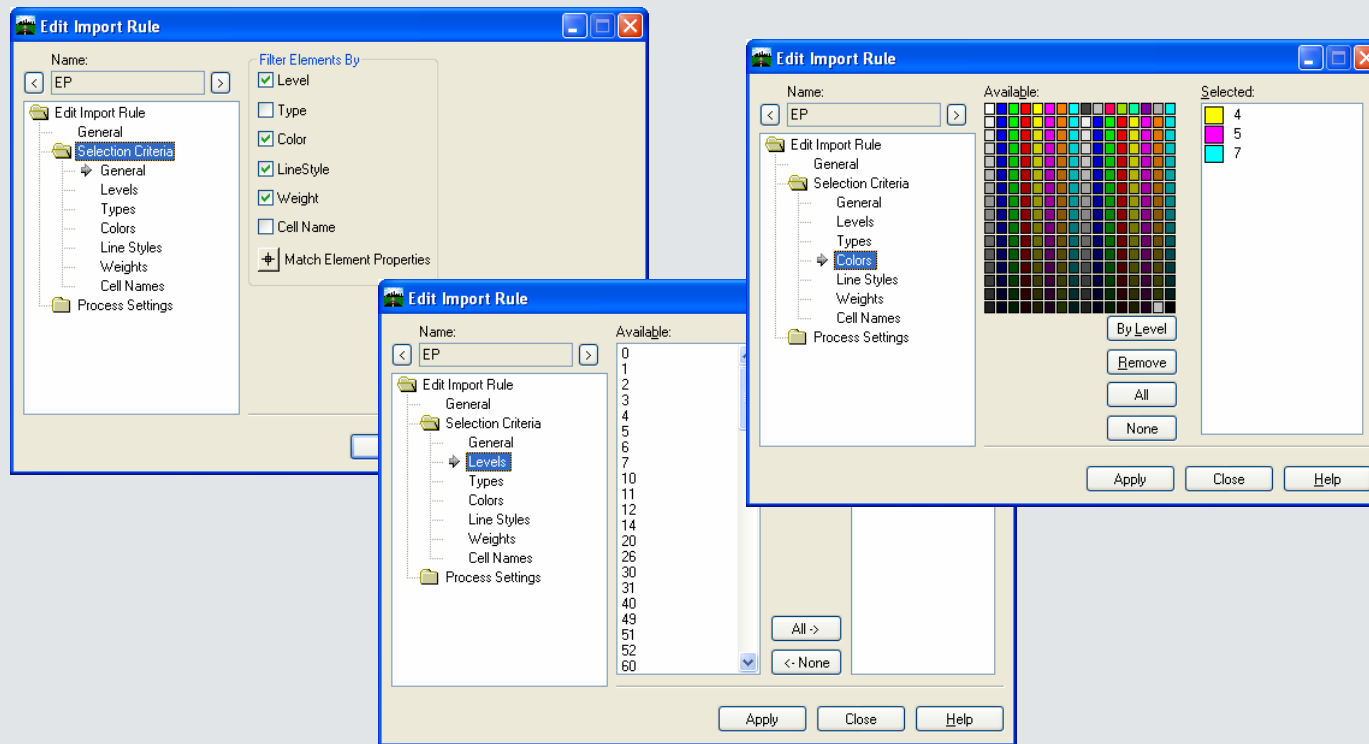
# Importing Data

- Import -> Surface Advanced
  - The tool for photogrammetry data
  - Bulk imports graphic surface data
  - Reusable standards stored as Rule Sets
  - This is an additional command. We did not remove the current Import Graphics command.



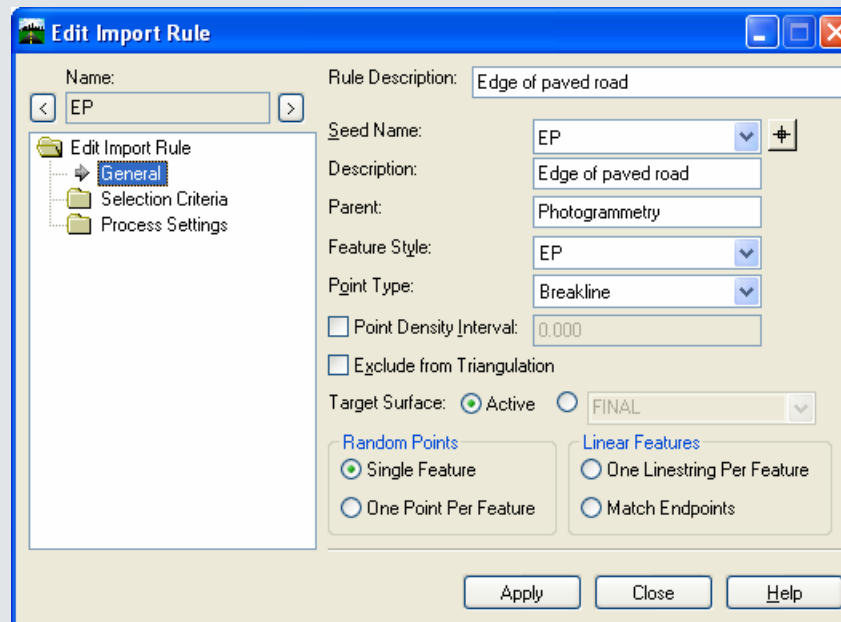
# Importing Data

- Import -> Surface Advanced
  - User definable rules filter elements by graphic properties (type, level, color, weight, style).



# Importing Data

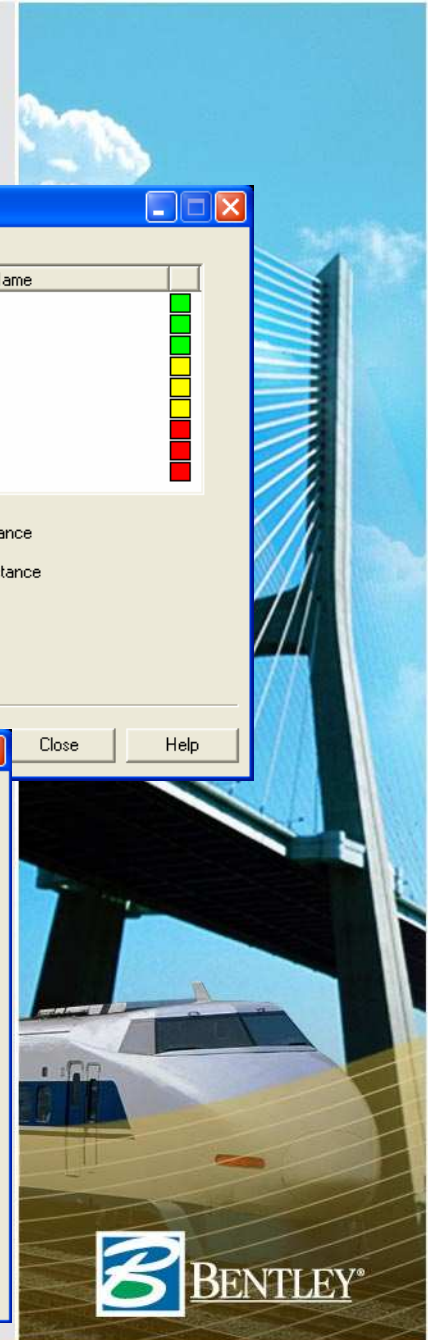
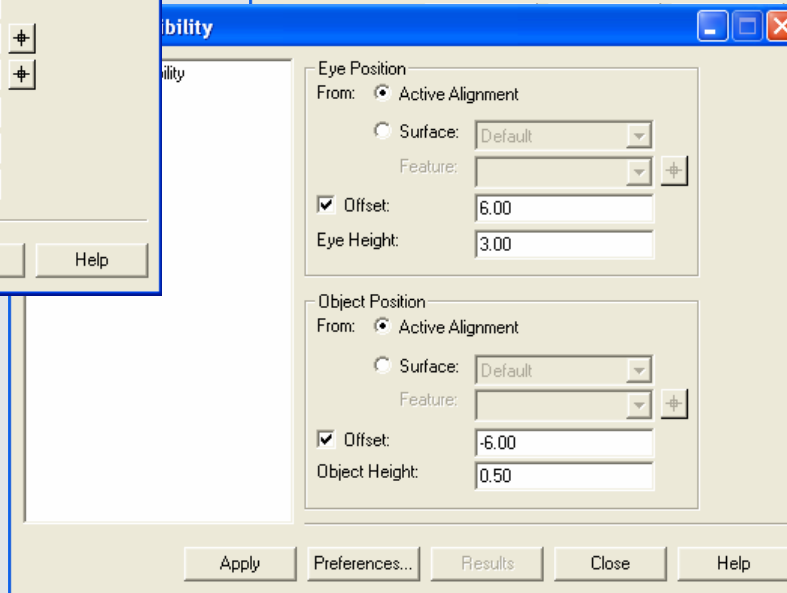
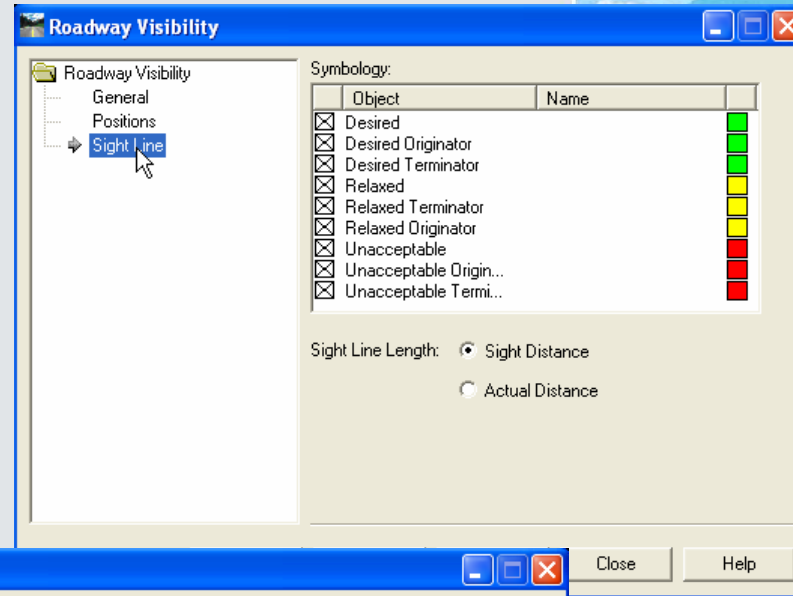
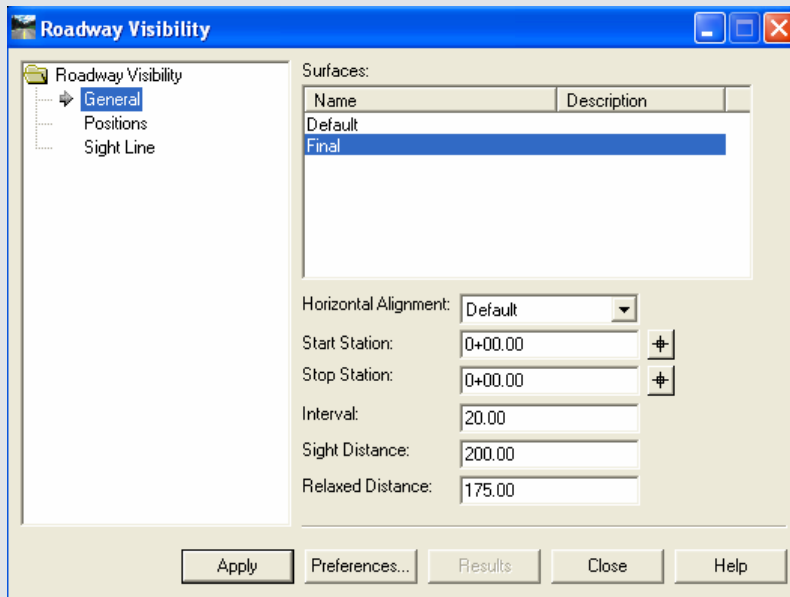
- Import -> Surface Advanced
  - Rules determine the feature properties of imported elements. (Name, Type, Style, etc.)



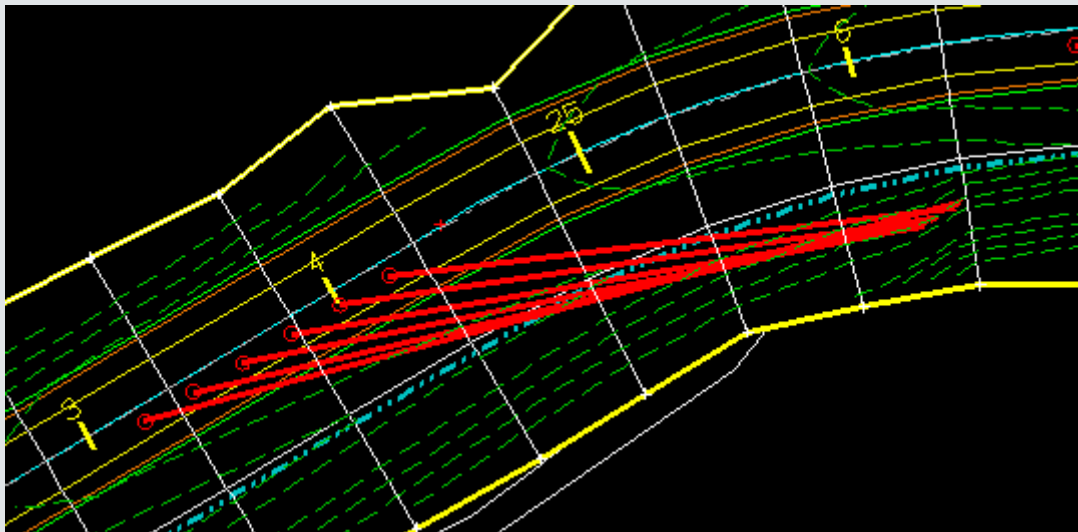
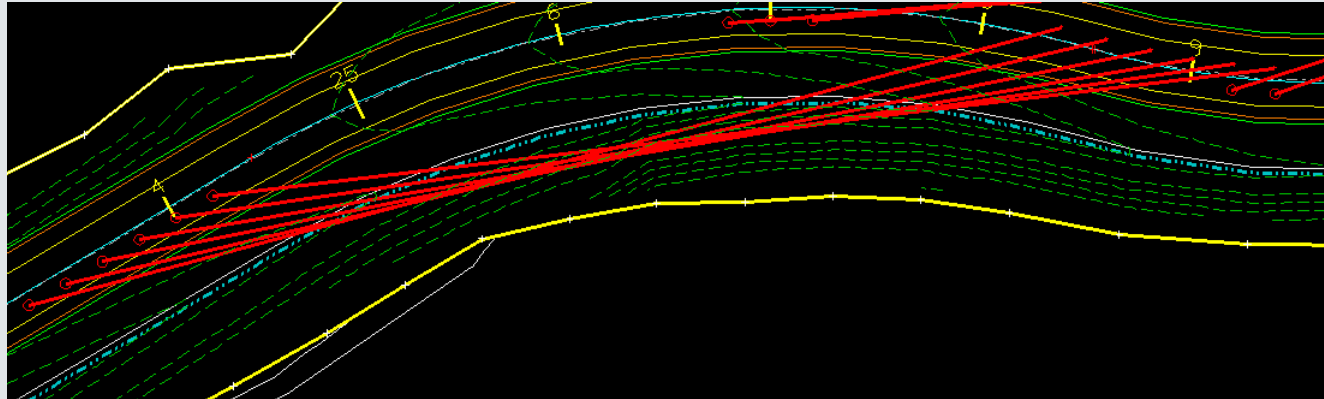


# Roadway Visibility

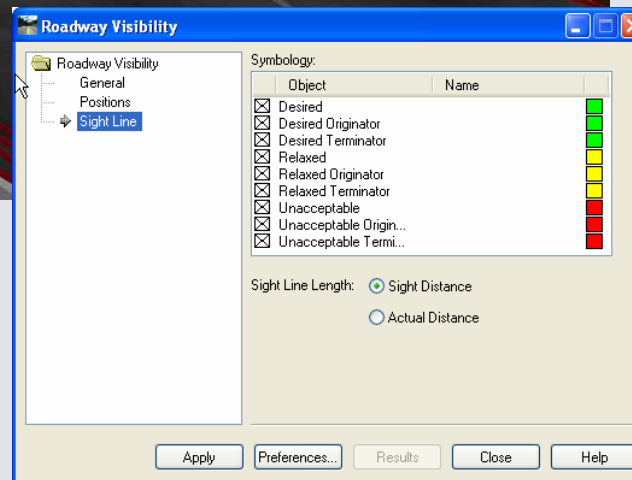
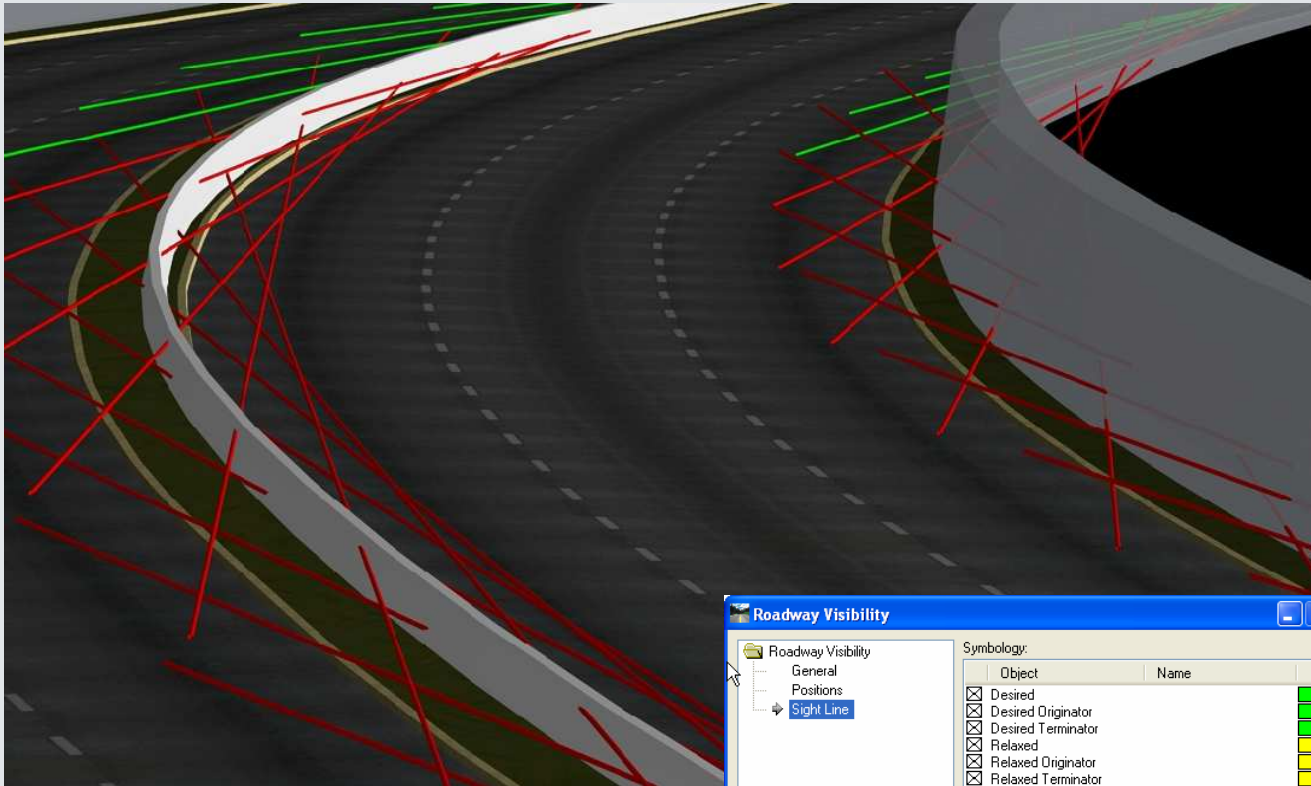
What can I see?



# Roadway Visibility



# Roadway Visibility





# Surface Visibility

New tools for visibility analysis of DTMs.

Three modes of operation:

## Surface Points

Displays all DTM points and distinguishes those that are visible from those that are not visible; from a given eye position.

## Surface Regions

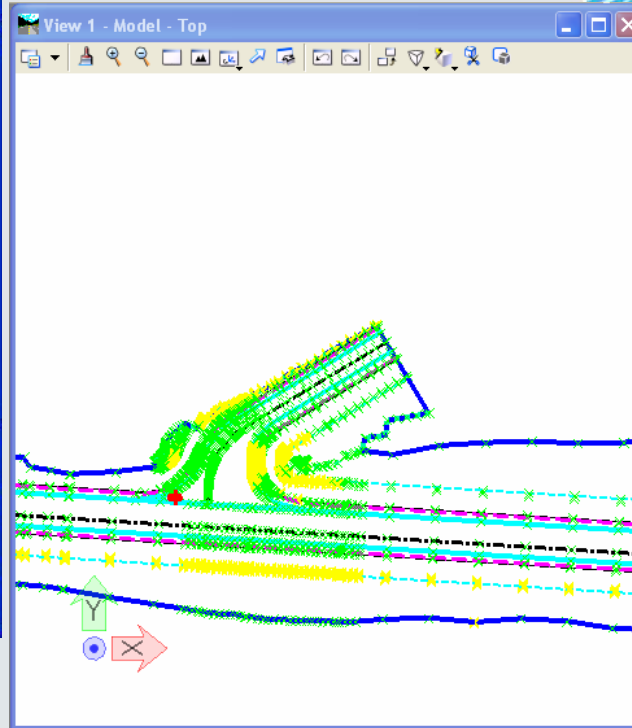
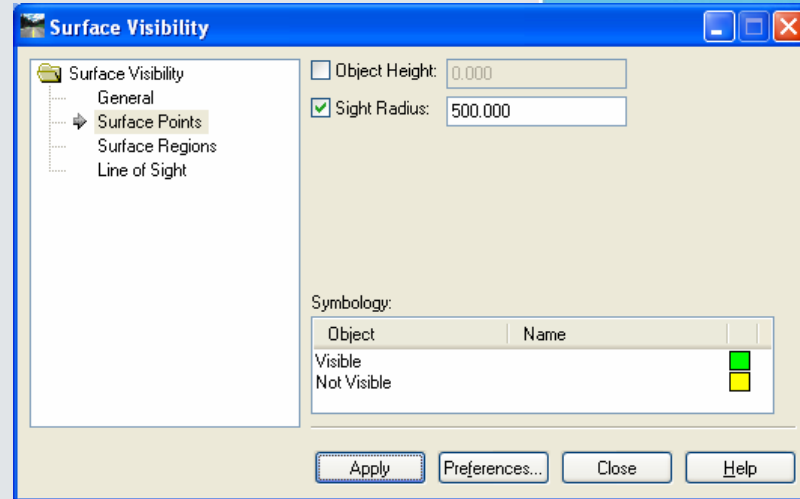
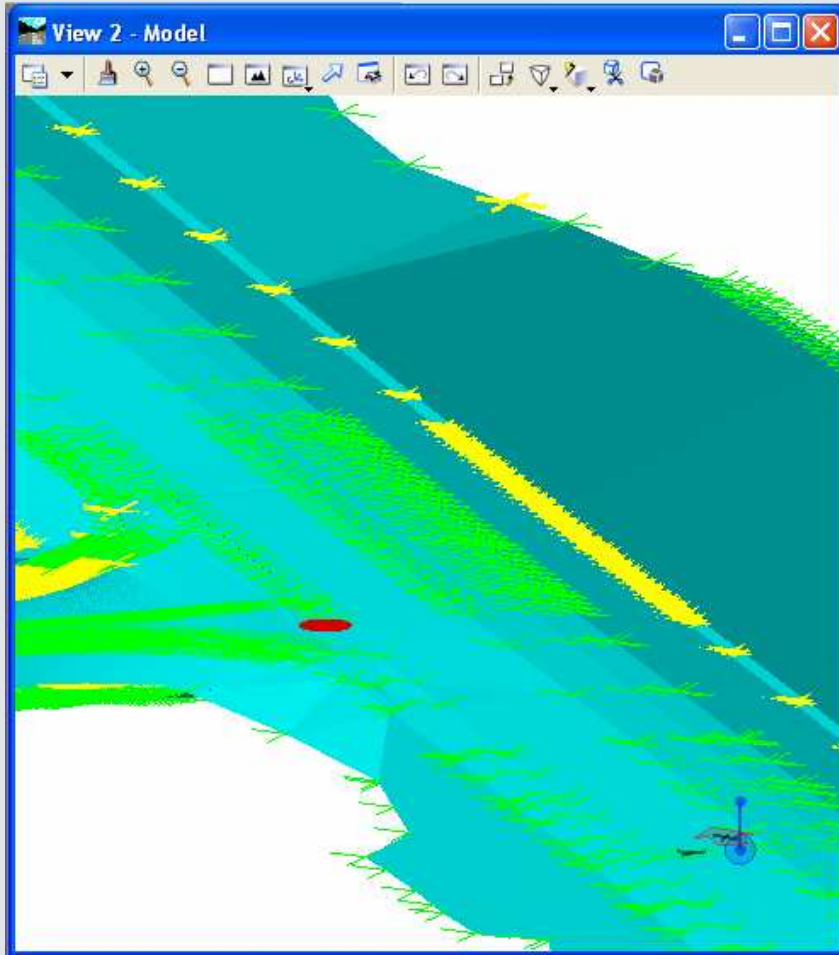
Generates and drapes lines of sight that radiate outward from an eye position. Distinguishes between visible and not visible portions of the lines of sight.

## Line of Sight

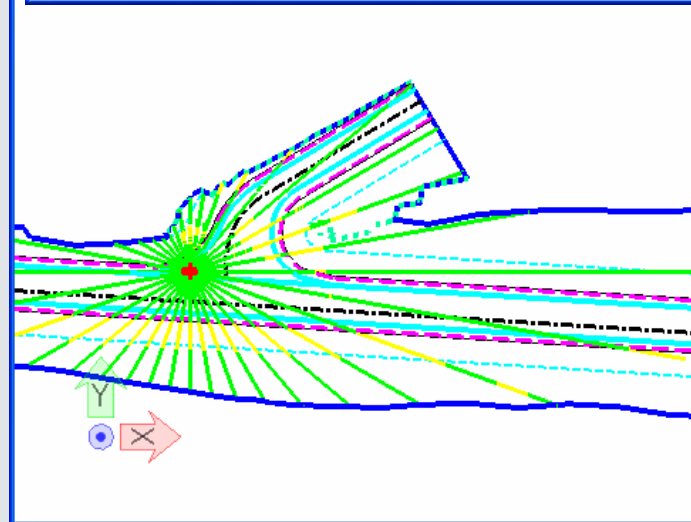
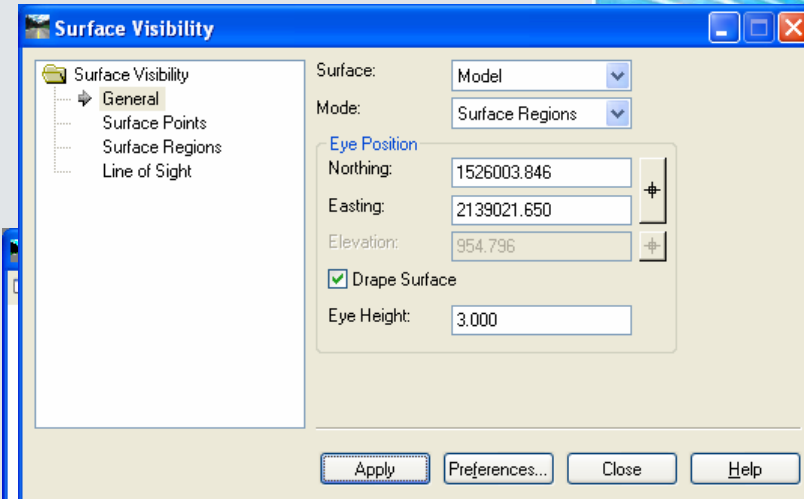
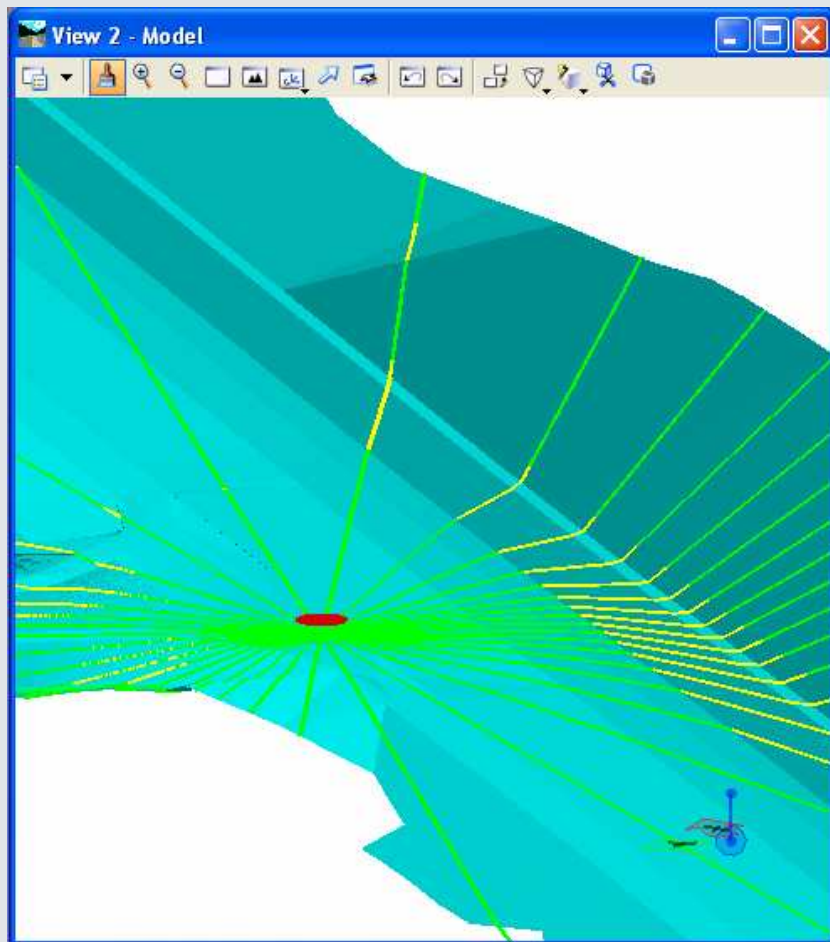
Determines if an object position is visible from an eye position. Then distinguishes between portions of the line of sight that are above ground and below ground.



# Surface Points

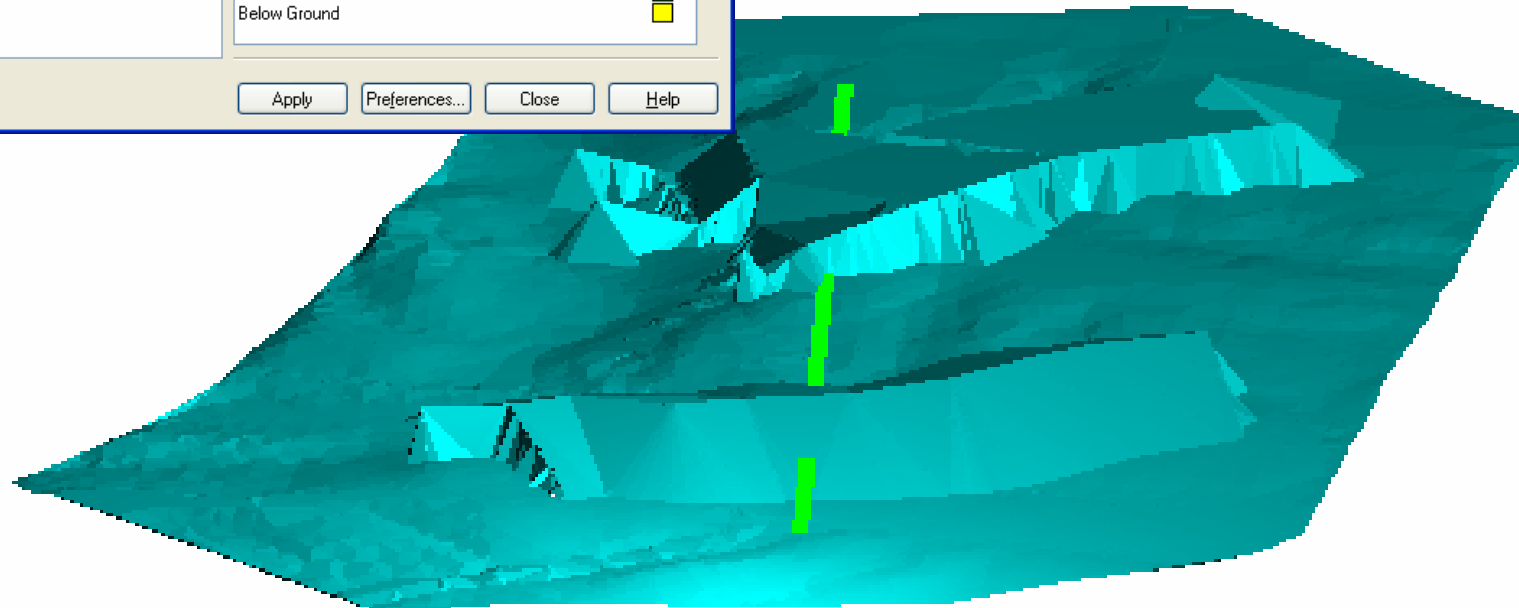
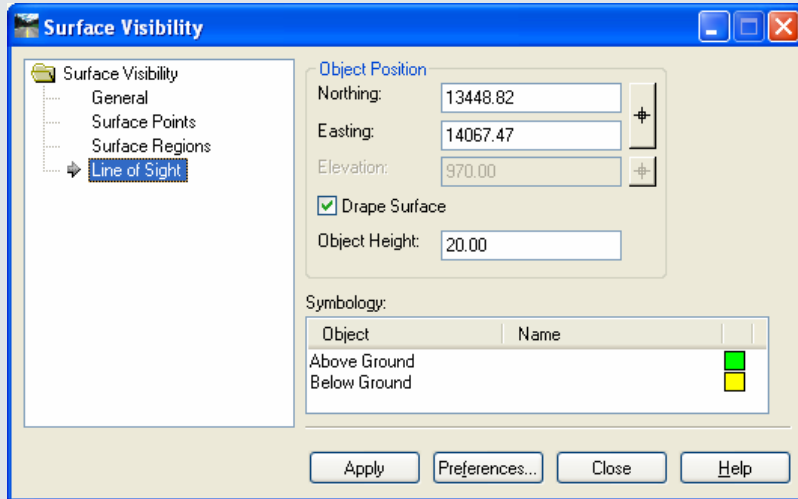


# Surface Regions



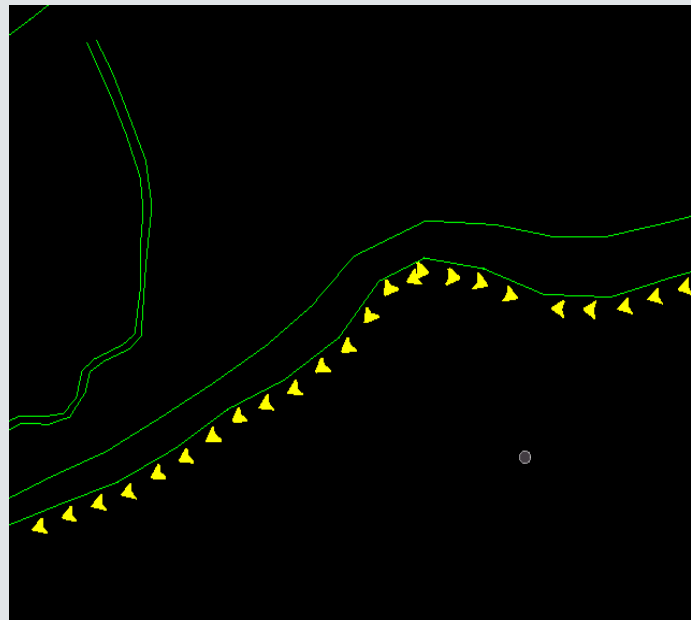
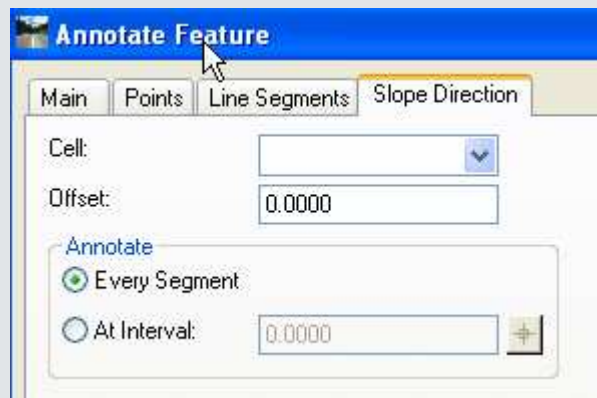


# Line of Sight



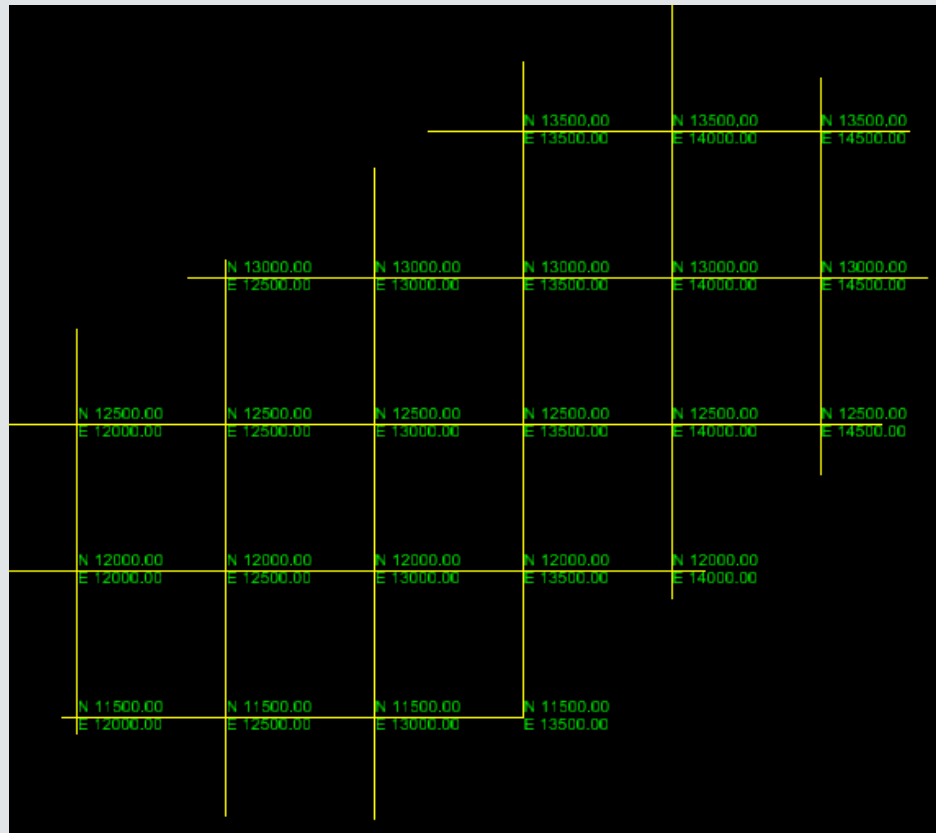
# Annotate Slope Direction

- This command allows the user to place flow arrowheads on a feature at a certain interval and offset.
- It places the cells oriented along the feature to show the slope (flow) of the feature.



# Place Coordinate Grid

- Places coordinates and grid-lines at user specified intervals.
- Part of the drafting tools.



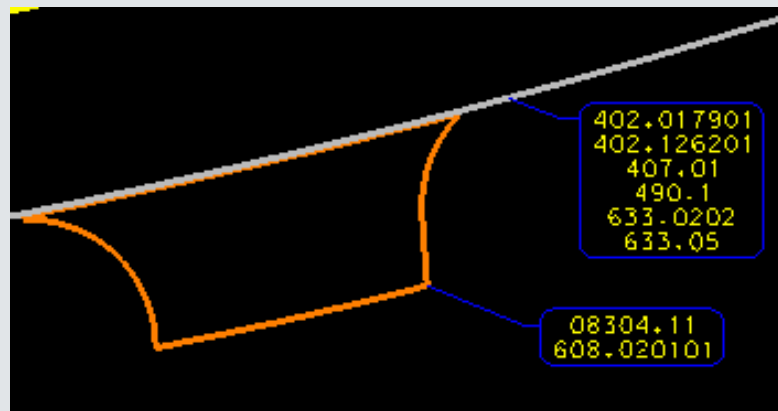


# Quantities in Drafting Notes

- Added keywords for pay item name, code, description, and unit.
- Also added keywords for pay item block and end block so multiple pay items on a single feature can be annotated.

Pay Items

Name	Description	Fr
402.017901 50mm average	TRUE & LEVELING F9, SUPERPAVE HMA, 70 SERIES COMPACTION	No
402.126201 40mm	12.5MM F2 SUPERPAVE HMA, 60 SERIES COMPACTION	No
407.01 Milled Surfaces	TACK COAT	No
490.1	PRODUCTION COLD MILLING BITUMINOUS CONCRETE	No
633.0202	CLEANING EXISTING PAVEMENT AND/OR SHOULDERS	No



# ProjectWise Title block Integration with Cross Sections

- Two methods:
  - Tagged attributes can be placed directly within border cell
  - Title block cell can be attached by InRoads when using reference file as border

```
NAME: demo.dgn
DESCRIPTION: demo
SIZE: 11X17
DRAWN BY: JS
APPROVED BY: MC
ALIGNMENT: demo_ha1
DATE: 3/27/2007
STATION RANGE: 0+00 TO 8+00
VERTICAL SCALE: 10.00
HORIZONTAL SCALE: 20.00
SHEET NAME: A
SHEET: 1
TOTAL SHEETS: 6
```



**Cell Library: [ infra.cel ]**

Use Shared Cells     Display All Cells In Path    Display: Wireframe

Name	Description	Type	Where
wB	WASHBORED	Grph	Lbry
wL	WATER LEVEL	Grph	Lbry
wL2	WATER LVL DATE LEFT	Grph	Lbry
wOOD	WOOD SYMBOL	Grph	Lbry
WSJ	WIDELY SPACED JOINTS	Grph	Lbry
wWF	WELDED WIRE FABRIC ...	Grph	Lbry
XSSHEET		Grph	Lbry
ZCL	ZONES OF CORE LOSS	Grph	Lbry

Active Cells

Placement	XSSHEET	Point	Element	Edit...	Delete
Terminator	NONE	Pattern	NONE	Create...	Share

```

NAME: name
DESCRIPTION: description
SIZE: size
DRAWN BY: drawnby
APPROVED BY: approvedby
ALIGNMENT: alignment
DATE: date
STATION RANGE: station range
VERTICAL SCALE: vertical scale
HORIZONTAL SCALE: horizontal scale
SHEET NAME: sheet name
SHEET: sheet number
TOTAL SHEETS: total sheets
    
```

**demo.dgn**

General | Security | Attributes | More Attributes | File Properties | Audit Trail | Workspace | Components

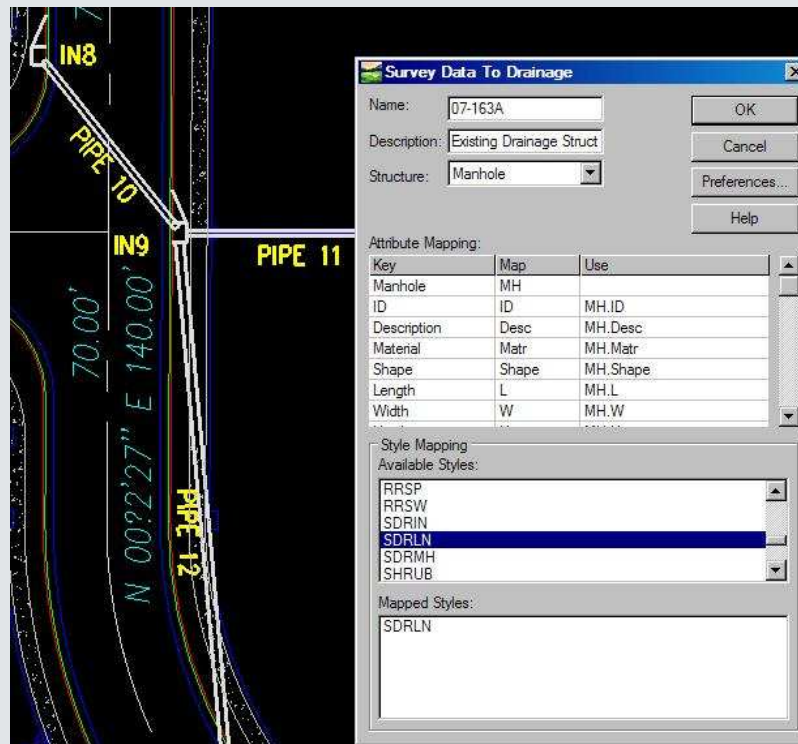
approvedby	MC
drawnby	JS





# Survey to Drainage

- Move your attributed survey data to a functioning Storm & Sanitary database
  - Supports manholes, pipes, culverts, inlets
  - Supports utilities
  - Channels, curved pipes, multiple junctions, areas, and pumps are not supported



# Annotate ALL inverts at structures for plan...

Structure Type: Inlets

Precision	Location
2	Center
-	Center
2	Center
2	Center
2	Center
2	Center
2	Center

0.12

Position Inside

Annotate All Inverts at Structures

Display Invert Direction Labels

Label Location: After Suffix

INO  
10.00' Curb Opening  
Rim: 949.29  
Invert In: 943.24 (N)  
Invert In: 942.75 (E)  
Invert In: 943.39 (S)  
Invert Out: 943.00 (W)



# ...and for profile.

**Annotate Drainage Profile**

Structure Type: **Inlets** Set List: **ALT#1** [Apply] [Close] [Preferences...] [Preview] [Help]

Show	Attribute	Prefix	Suffix	Position	Order	Precision	Location
X	Elevation	Rim:		3	0	2	Center
X	ID			4	0	-	Center
X	InvertIn	Invert I...		2	0	2	Center
X	InvertOut	Invert ...		1	0	2	Center

Position Inside

Annotate All Inverts at Structures

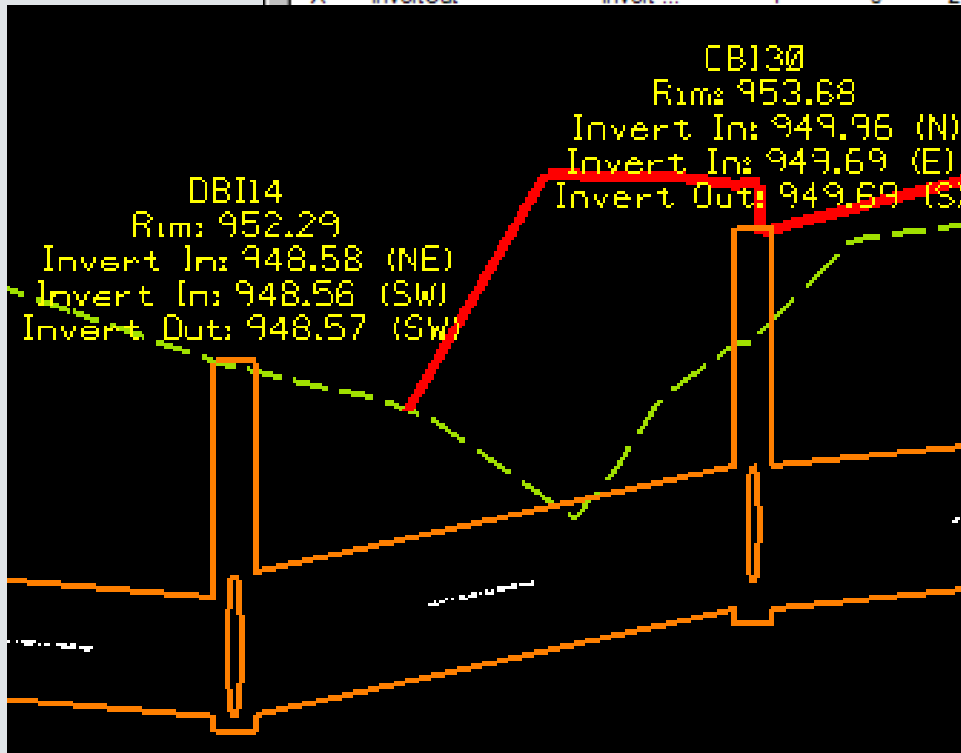
Display Invert Direction Labels

Label Location: **Before Prefix**

Offset Annotation

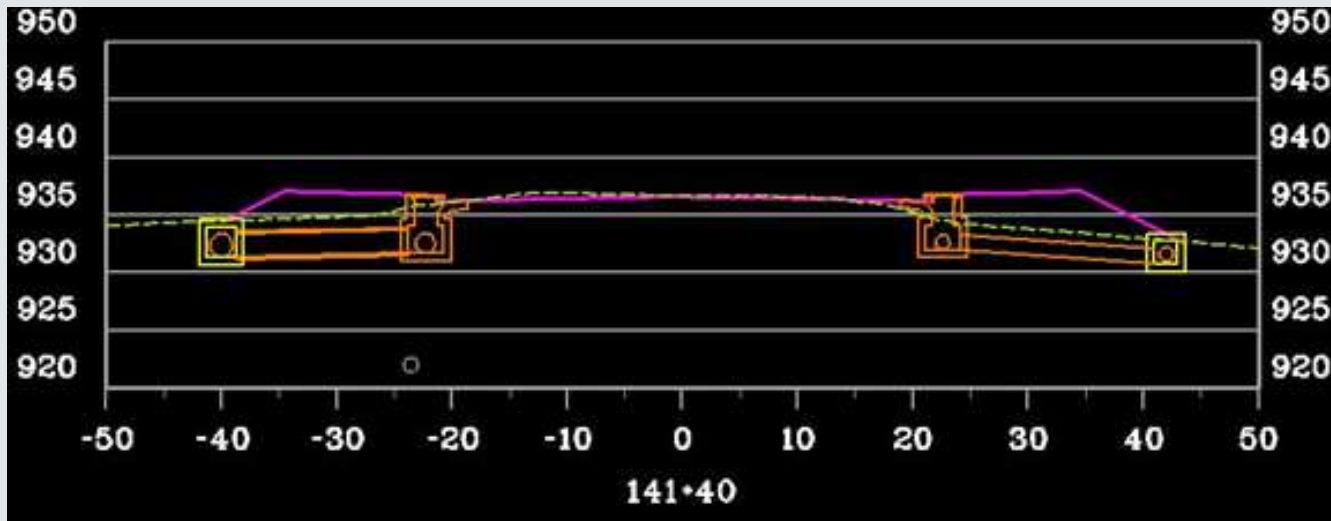
Offset:

Height:

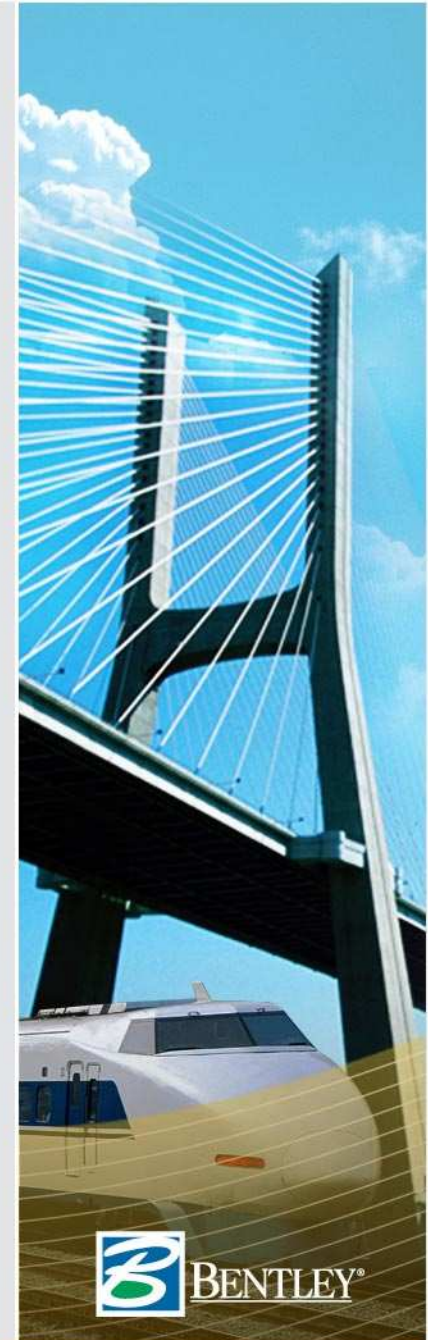




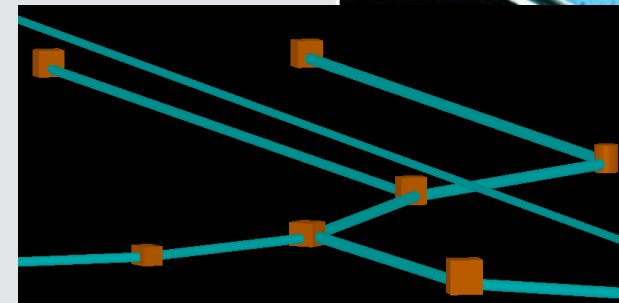
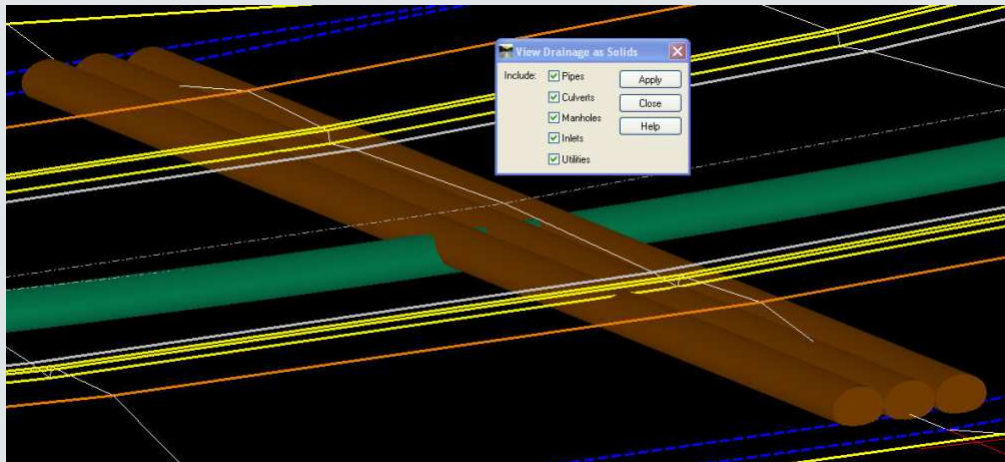
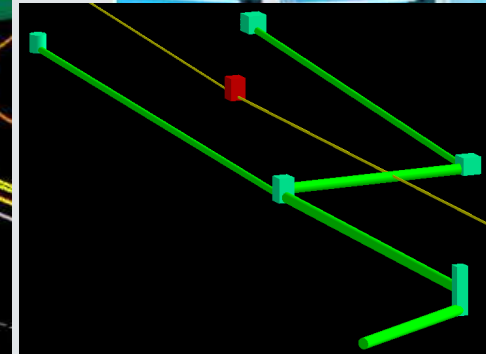
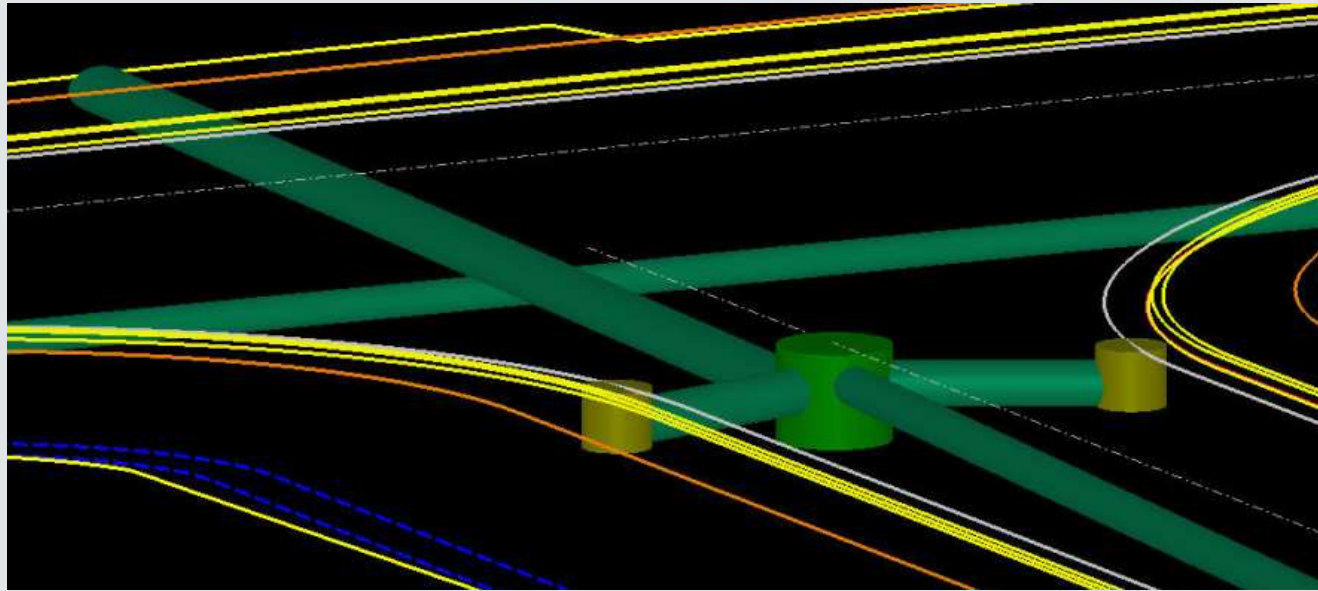
# Drainage Cross Sections



Inlet: CBI35  
Inlet Class: CBI TyA  
Rim: 936.73  
Throat: 936.10  
Special Inlet Req'd  
Inlet Station: 141+39.98  
Offset: 21.63

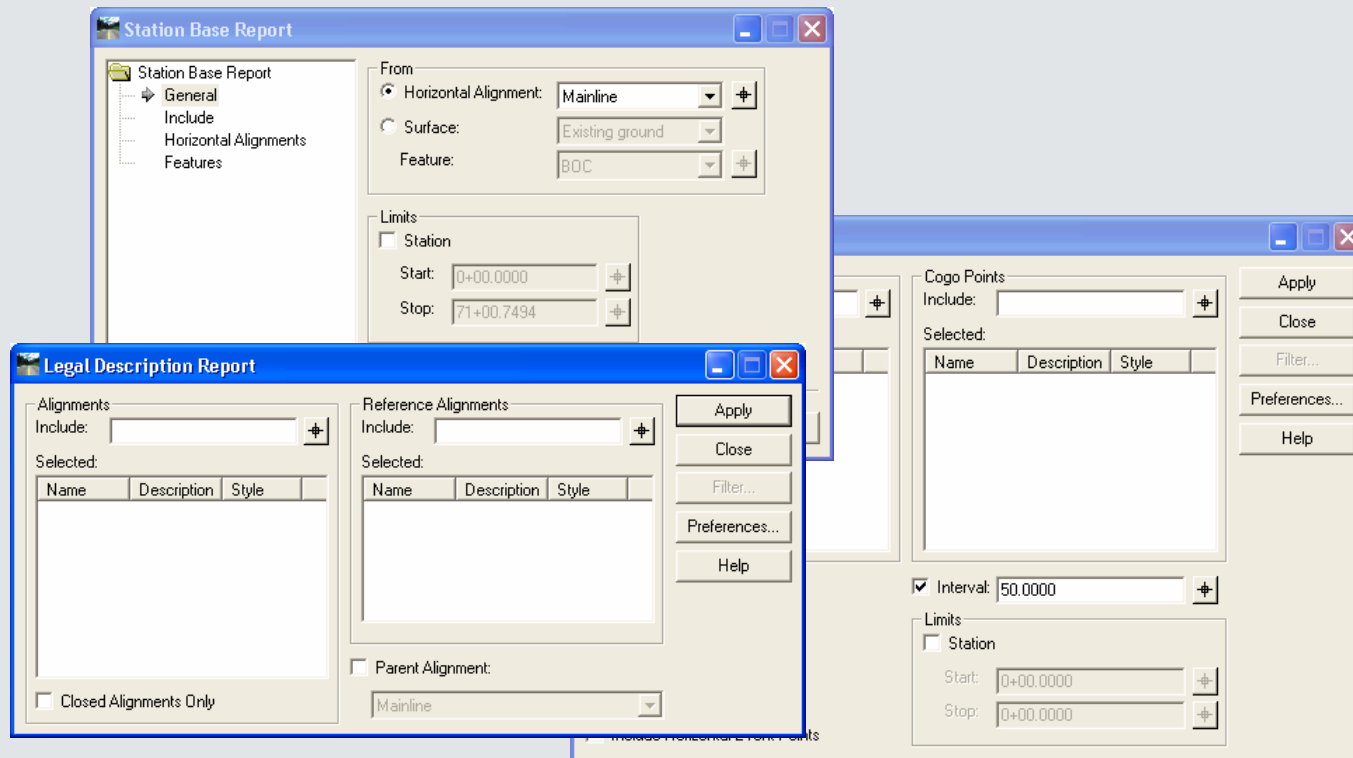


# Solids for S&S Networks in SP1



# XML Reporting

- Reorganized into multiple commands
- Fewer steps
- XML file is transient





## XML Reporting

- **InRoads Survey** data now supports XML
- Style sheet help
  - » Help is available with each style sheet
  - » Right click over the style sheet in the **Report Browser**
  - » User created style sheets can use the same mechanism as Bentley developed style sheets.
  - » Additional delivered style sheets
- Documented XML Schema in `\program files\Bentley\InRoads Group V8.9\XML Data\Schemas\Documentation\InRoadsSchema.chm`



Bentley InRoads Report Browser - C:\DOCUME~1\RICHA~1.BRA\LOCALS~1\Temp\RPT10B.xml

File Tools Help

D:\program files\Bentley\InRoads Group\V8.8\XM

- Bridge
- Cant
- Clearance
- Custom
- DataCollection
- Evaluation
- Geometry
  - Area.xml
  - ControlLineData.xml
  - FigureNameDescription.xml
  - HorizontalAlignmentAndEvents.xml
  - HorizontalAlignmentCurveSetReview.x
  - HorizontalAlignmentData.xml
  - HorizontalAlignmentLengths.xml
  - HorizontalAlignmentReview.xml
  - HorizontalAlignmentReviewASCII.xml
  - HorizontalAlignmentSuperelevationRev
  - HorizontalAndVerticalAlignmentReview
  - HorizontalElementsTable.xml
  - HorizontalElementsXYZ.xml
  - HorizontalEvents.xml
  - ICSAuditTrail.xml
  - ListCoordinates.xml
  - ListCoordinatesS
  - LocateDirection
  - ProfileStationElev.
  - ProfileStationElev.
  - ProjectAlignmentL
  - ProjectAlignmentL
  - SettingOutTable.x
  - SlewDiagram.xml
  - SlewDiagramLeg
  - Traverse.xml
  - TraversePoints.xs
  - VerticalAlignmentC
  - VerticalAlignmentF
  - VerticalAlignmentF
  - VerticalAlignmentS

Style Sheet Help

Set As Default Surfaces

Set As Default Geometry

Set As Default Station and Offset

Set As Default Clearance

Set As Default Stakeout

Set As Default Legal Description

Set As Default Turnouts

Set As Default Horizontal Slew

Set As Default Vertical Slew

Set As Default Horizontal Annotation Tabling

Set As Default Light Rail Manufacturing

Set As Default Bridge

Set As Default Cross Section

Set As Default End Area Volume

Set As Default Triangle Volume

Set As Default Survey

Set As Default Roadway Design

Set As Default Superelevation

Set As Default Template Library

Element	Point Type	Point Number	Station	Northing	Easting	Radius	Length	Delta / Theta	Rotation Direction	K	P
<b>Alignment Name:</b>		Mainline									
<b>Description:</b>											
<b>Style:</b>		designroad_a									
Tangent	POB		0+00.0000	1357222.8293	1957785.6665						
Tangent	TS										
Clothoid	TS										
Clothoid	SPI								Right	99.9852	1.1109
Clothoid	SC										
Arc	SC										
Arc	PI								Right		
Arc	CC										
Arc	CS										
Compound Clothoid	CS										
Compound Clothoid	SPI										
Compound Clothoid	SC										
	SC										
	PI										
	CC										
	CS										
	CS										
	SPI										
	ST										
ST			30+40.5714	13							
PC			42+93.8886	13							
PC			42+93.8886	13							
PI			46+96.7450	13							
CC				13							
PT			50+00.7727	13							

Style Sheet Help

Notes

You must include at least one horizontal alignment in the *Include* field on the *Tools > XML Reports > Geometry* command to get results from this report.

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Style Sheet Help

Notes

You must include at least one horizontal alignment or one Cogo point on the *Main* tab of the *Geometry > View Geometry > Horizontal Annotation* command.

You must select *Assigned* or *Active* in the *Apply Style* group and the selected style, whether it is the assigned style or the active, must have the *Allow Tabling* option toggled on for the element type you wish to table. For example, if you wish to table spirals, select the *Tools > Style Manager* command and find your style. Select the *Edit* button and navigate to the *Geometry Feature > Spirals > Alternate* leaf and toggle on the *Allow Tabling* option. Do this for each element type in each feature style that you plan to table.

You must select either *Basic Element Information* or *All Element Information* on the *Tabling* tab of the *Geometry > View Geometry > Horizontal Annotation* command to get results from this report.

Tips

You can place the results of your report into your MicroStation design file by highlighting the text you wish to copy in the *Report Browser*, keying in CTRL+C, and then keying in CTRL+V in your design file.

# Design to Construction

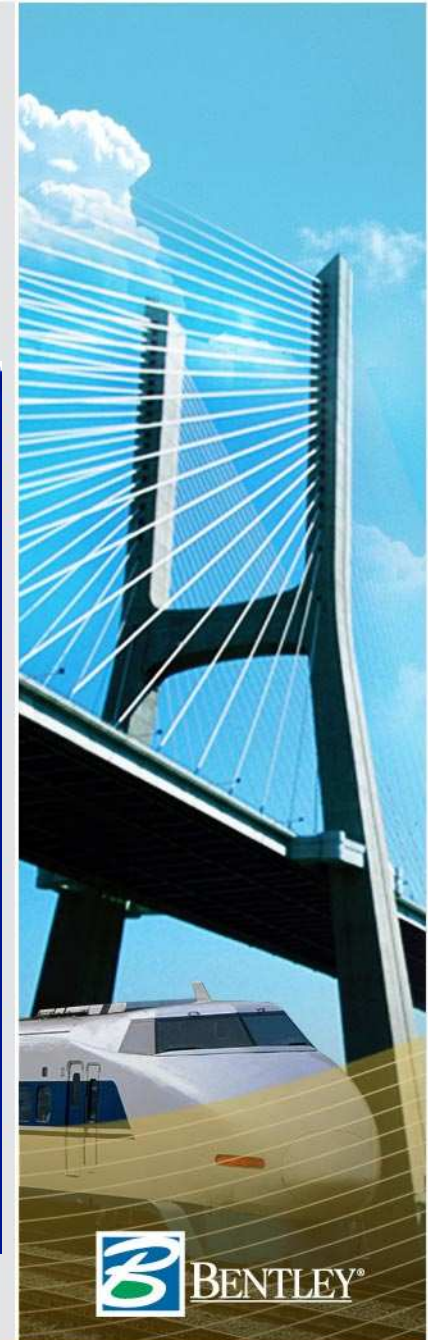
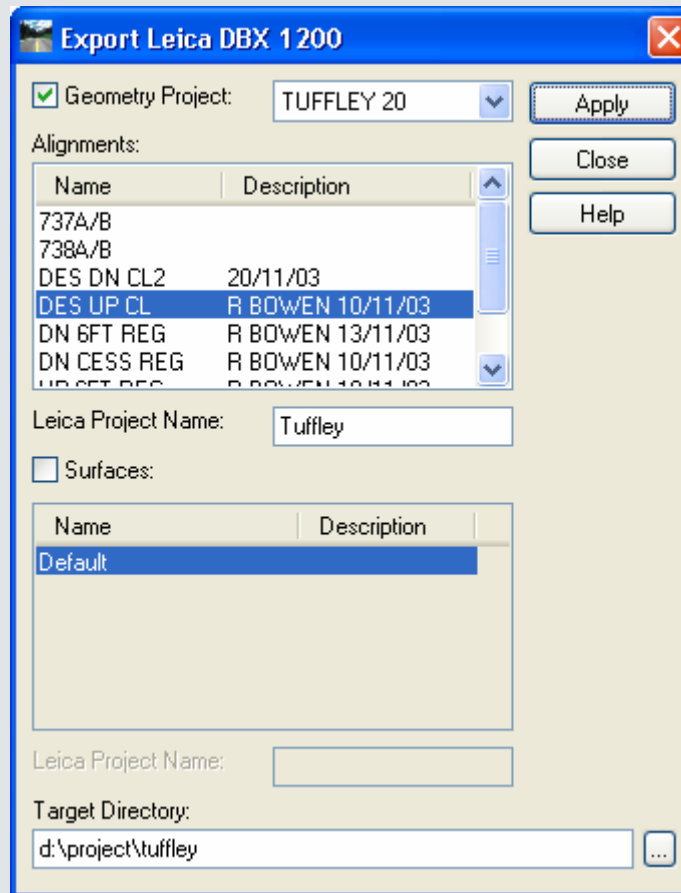
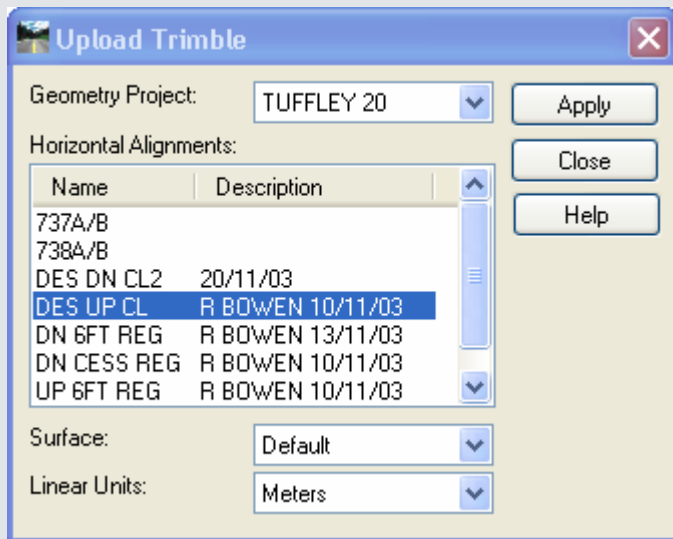
- In the delivery directory look for the *Exporting InRoads Data for Construction.pdf* document.
- It defines steps for exporting design data to either field instruments or machine control equipment.





# Design to the Field

- Trimble
- Leica



**Thank You!**

