



Extracting Design Quantities using InRoads

Thomas Taylor, Bentley



InRoads Quantity solution

- Cross Section End Area Volumes
 - Earthwork and Component volumes
 - XML reporting output
- DTM quantities
 - Feature based computation
- MicroStation plan graphic quantities
 - Assign pay items
- Quantity Manager
 - For reporting and cost estimating



Cross Section End Area Volumes

- Computes closed component volumes based on material (style).
- Standard End Area Volume earthwork.
- Unsuitable Materials computed by several methods.
- Volume exceptions, additions and forced balance.
- XML report output
 - Used in Mass Haul diagram
 - Direct entry into Quantity Manager for cost estimating



End Area Volume Demonstration



DTM Quantities

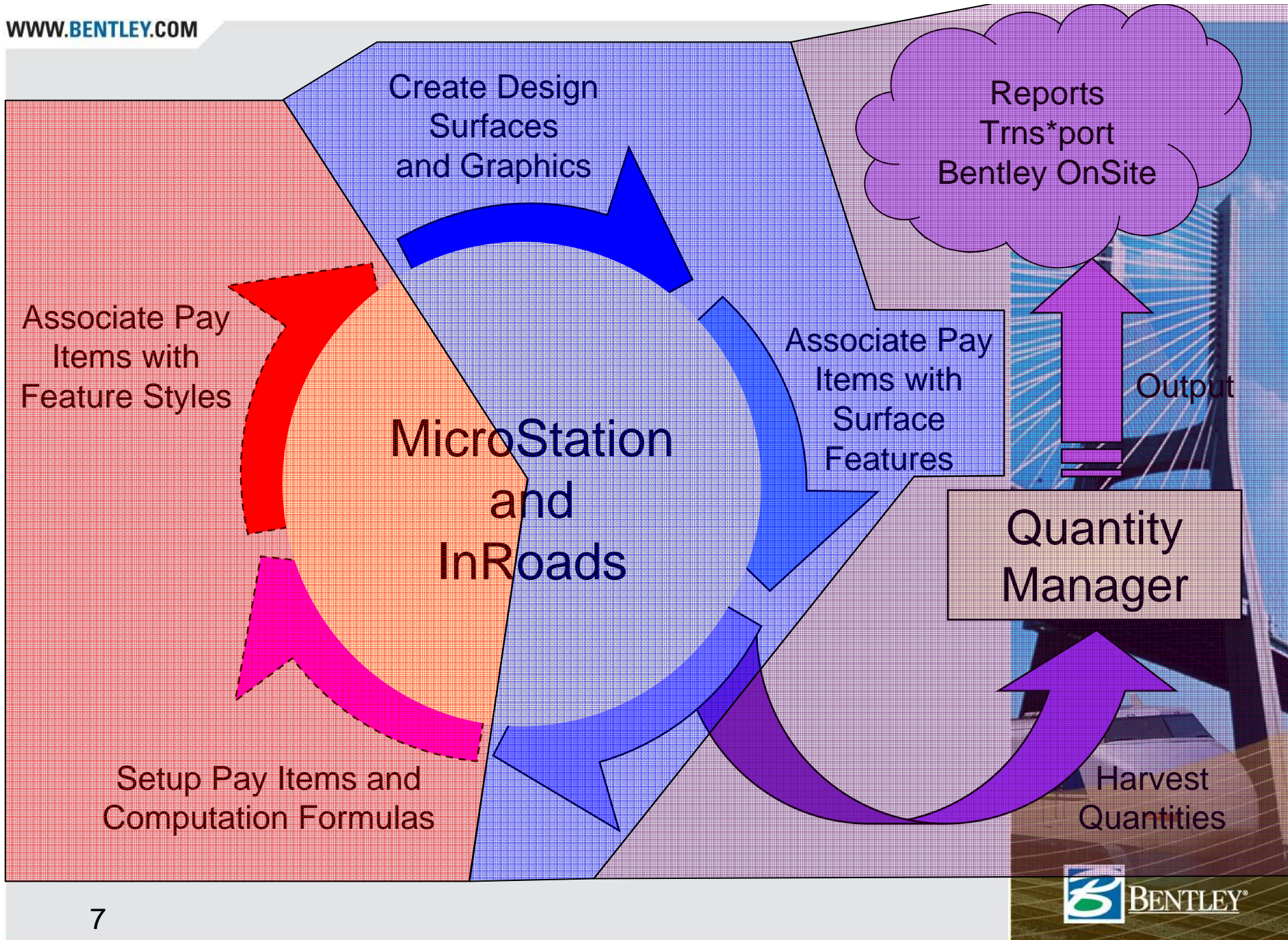
- InRoads quantities are defined by a Pay Item database.
 - Uses a formula manager to perform computation.
- The Pay Items are associated with Styles in the XIN.
- The quantities are computed from features in the DTM.
- The quantities output to the Quantity Manager.



What is Quantity Extraction?

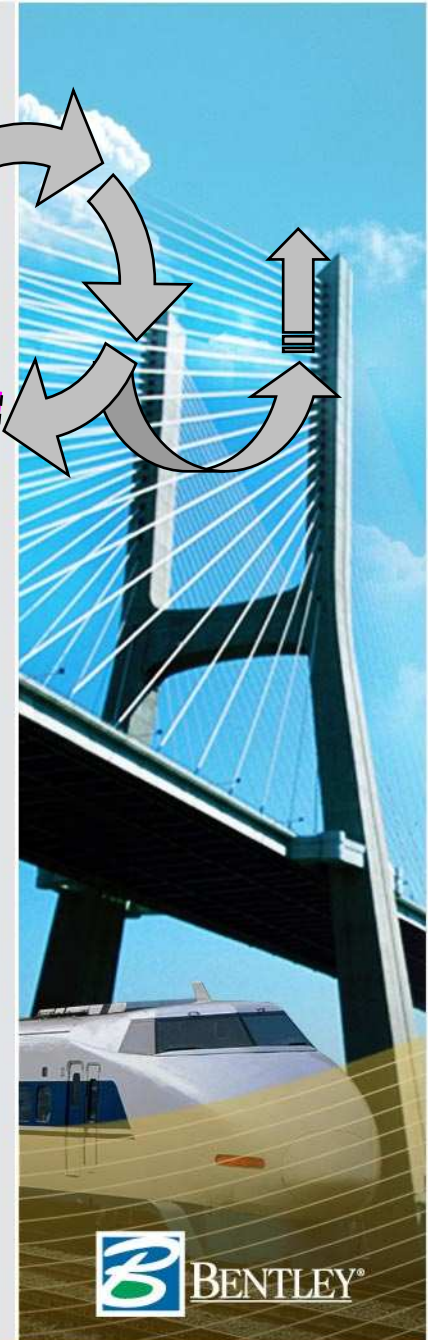
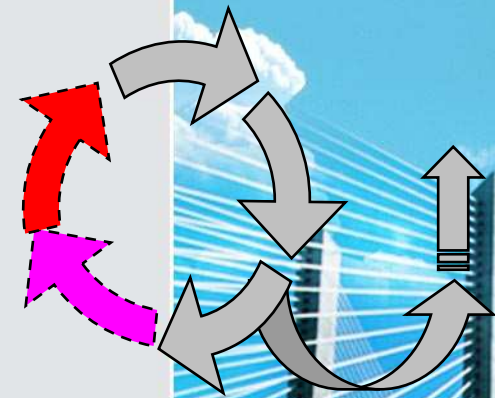
A workflow
using InRoads tools
to associate design quantities
with Pay Item numbers
and extract those quantities
from InRoads surfaces
and MicroStation graphics
to output the quantities.





Quantity Extraction Setup Workflow

- Setup Quantity Formulas
Quantities > Quantity Formula Manager
- Setup Pay Items
Quantities > Pay Item Manager
- Add Pay Items to Feature Styles
(Optional)
Tools > Style Manager



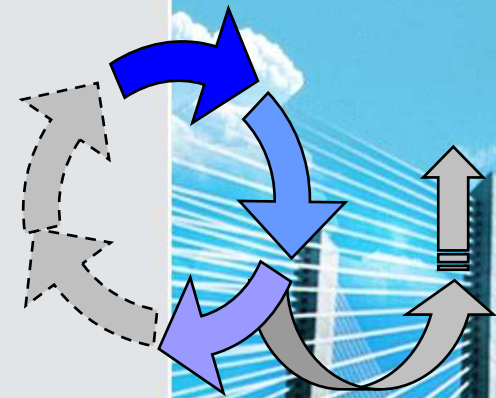
Pay Items on Feature Styles

- Limited to 1 Pay Item per style
- 1:1 relationship
 - Need a feature style for each type of construction element such as type of curb or guardrail.
- Cannot be modified once associated with a design feature



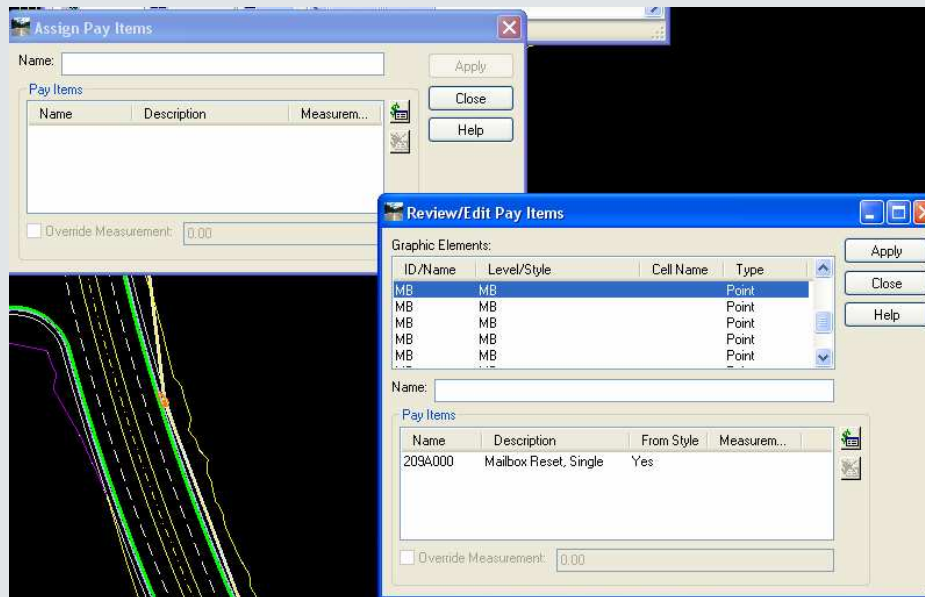
Quantity Extraction Design Workflow

- Associate Pay Items with Design
 - Automatic through Feature Styles
 - Quantities > Assign Pay Items
 - Quantities > Shapes Tool
 - Surfaces > Feature > Feature Properties



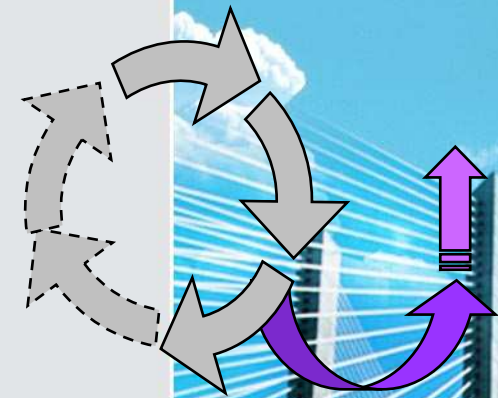
Graphic Quantities

- New for XM V8.9 service pack 1
- Provides direct assignment of Pay Items to MicroStation elements.
- Uses Compute Quantities command along with DTM feature quantities



Quantity Extraction Output Workflow

- Harvest Quantities
 - Quantities > Compute Quantities
- Review and Report Quantities
 - Quantities > Pay Item Manager



Compute Quantities Demonstration

The screenshot displays the Bentley software interface with three primary dialog boxes overlaid on a project view. The background shows a horizontal axis with a red line and a yellow marker, and a vertical axis with a red line and a yellow marker. A yellow box highlights a value of 3400.00 on the horizontal axis.

Pay Item Manager

Name	Code	Description
530A000	530A000	15" Roadway Pipe (Class 3 R.C.)
530A001	530A001	18" Roadway Pipe (Class 3 R.C.)
530A002	530A002	24" Roadway Pipe (Class 3 R.C.)
530A003	530A003	30" Roadway Pipe (Class 3 R.C.)
530A004	530A004	36" Roadway Pipe (Class 3 R.C.)
530A005	530A005	42" Roadway Pipe (Class 3 R.C.)
530A006	530A006	48" Roadway Pipe (Class 3 R.C.)

Quantity Formula Manager

Pay Item Database: C:\Conference and Training Data\2007DUC\F14-Extracting Design Quantities Using

Name	Description
Acre	Acres
Cubic Yard	Cubic Yards (thick)
Each	Per Unit
Each (S1 or S3 inlet units)	Computes inlet units
Each (Ty M MH units)	computes manhole units
Each-Pavement markers	Calc markers from striping
Foundation backfill	Pipe backfill (diameter)
Gallon (tack coat)	Tack Coat quantity
Linear Feet	Linear Feet
Mile	Mile
Mile Broken Line Striping	Mile
Pound	Pound
Roadbed Processing	Rdwd Sta (lanes)
Set	Set
Square Foot	Square Foot
Square Yard	Square Yard
Square Yard (width)	Square Yard key-in width
...	...

Output

Database: D:\8.5\Quantities\ALDOT\database output\all.mdb

Mode: Create Append

Phase: Preliminary

Run: [Empty field]

Deduction Tolerance: 3.00

Sheet Number: [Empty field]

Purge

Symbology: Highlight Elements



Quantity Manager

Quantity Manager - C:\UTTC2004\WS207\Data\All.mdb

Project Edit View Insert Tools Help

Phase: ALL PHASES

Payitem Tree | Payitem Table

- root
 - 201-209 CLEARING, GRUBBING AND REMOVAL
 - 210-214 EXCAVATION AND BACKFILL
 - 301-315 BASE COURSE AND AGGREGATE MATER
 - 327 ASPHALT BASE
 - 401-405 BITUMINOUS TREATMENT, SLURRY SEA
 - 411-429 ASPHALT PAVING, LEVELING, BINDER AN
 - 530-538 DRAINAGE PIPE
 - 530A001 18" Roadway Pipe (Class 3 R.C.)
 - 530A002 24" Roadway Pipe (Class 3 R.C.)
 - 530A003 30" Roadway Pipe (Class 3 R.C.)
 - 590-603 MOBILIZATION, RW MARKERS AND FIEL
 - 618 CONCRETE SIDEWALK AND DRIVEWAY
 - 619 PIPE END TREATMENTS
 - 620-622 MINOR STRUCTUR CONC., JUNCTION B
 - 623-629 CURB AND GUTTER, MEDIAN SAFETY BA
 - 634-637 FENCES AND GATES
 - 650-659 TOPSOIL SEEDING AND EROSION CONT
 - 701-708 STRIPING, MARKERS AND DELINEATORS
 - 612-617 MASONRY AND FIBER FLUMES

Payitem	Minimum ...	Maximum ...	Phase	Chain	Net Value
530A001	800	800.017	60% Plan Re...	Centerline (C...	
530A001	400	400	60% Plan Re...	Centerline (C...	
530A001	402	598	60% Plan Re...	Centerline (C...	
530A001	600	600	60% Plan Re...	Centerline (C...	
530A001	602	798	60% Plan Re...	Centerline (C...	
530A001	802	873	60% Plan Re...	Centerline (C...	
530A001	1,799.961	1,800	60% Plan Re...	Centerline (C...	
530A001	1,402.041	1,577.518	60% Plan Re...	Centerline (C...	
530A001	1,202.04	1,397.96	60% Plan Re...	Centerline (C...	
530A001	1,002	1,197.96	60% Plan Re...	Centerline (C...	
530A001	1,641.662	1,798	60% Plan Re...	Centerline (C...	
530A001	1,802	1,940.596	60% Plan Re...	Centerline (C...	
530A001	1,945.595	1,998	60% Plan Re...	Centerline (C...	
530A001	1,943.958	1,969.266	60% Plan Re...	Centerline (C...	

Payer Participation
 Funding Participation
 Funding Rules

Elements
 Adhoc Attributes

Type	Name	Length	Begin Station	End Station	Radi
Line	Pipe4	67.001	799.999124371...	800.015763826832	



Conclusion

- InRoads does quantities!



Questions?

