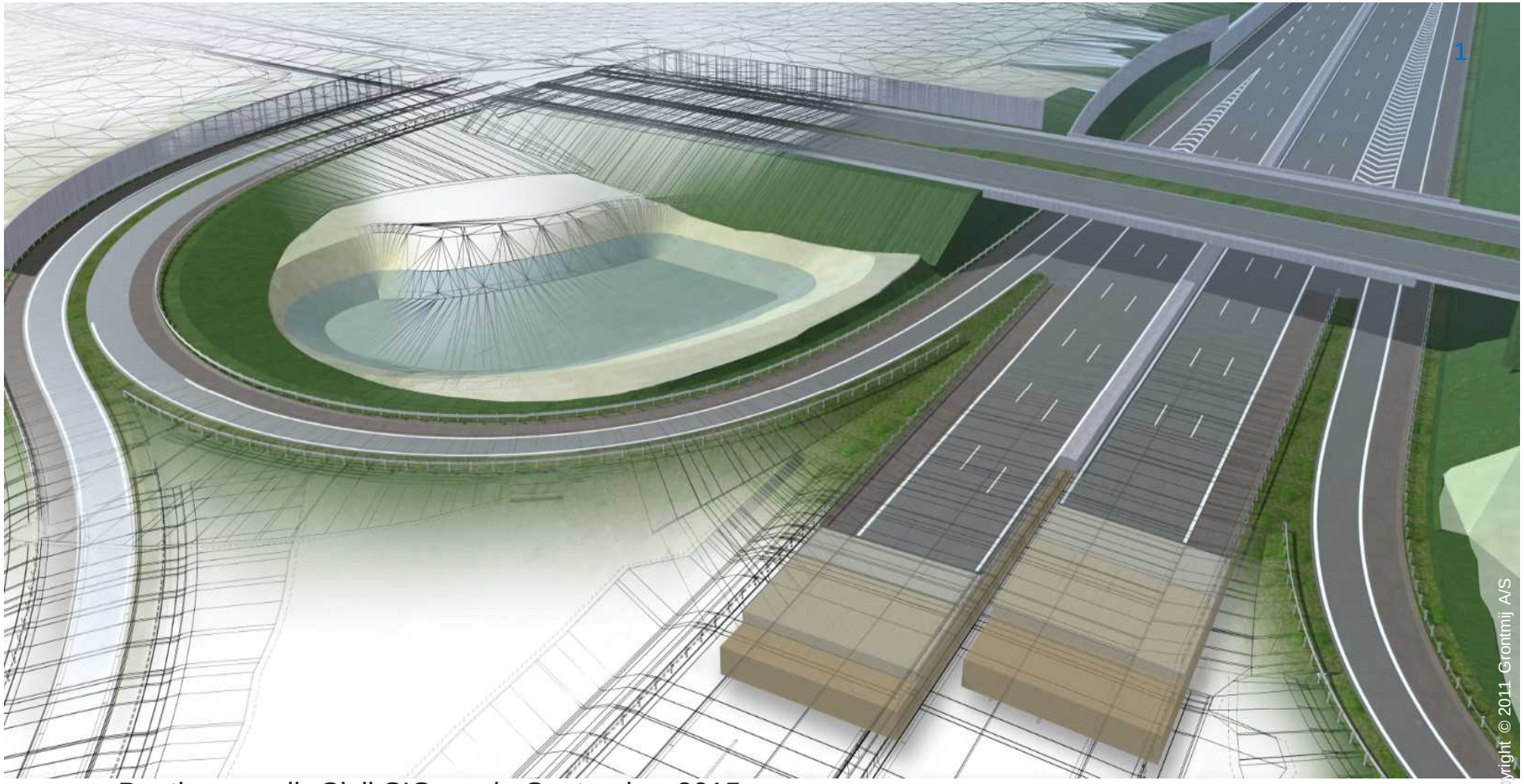
Extracting Project Quantities with InRoads



Bentleyuser.dk Civil SIG møde September 2015

Michael Jepsen - mij@grontmij.dk

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planning connecting
respecting
the future

Extracting Project Quantities with InRoads

Two Major Components:

InRoads Quantity Extractor

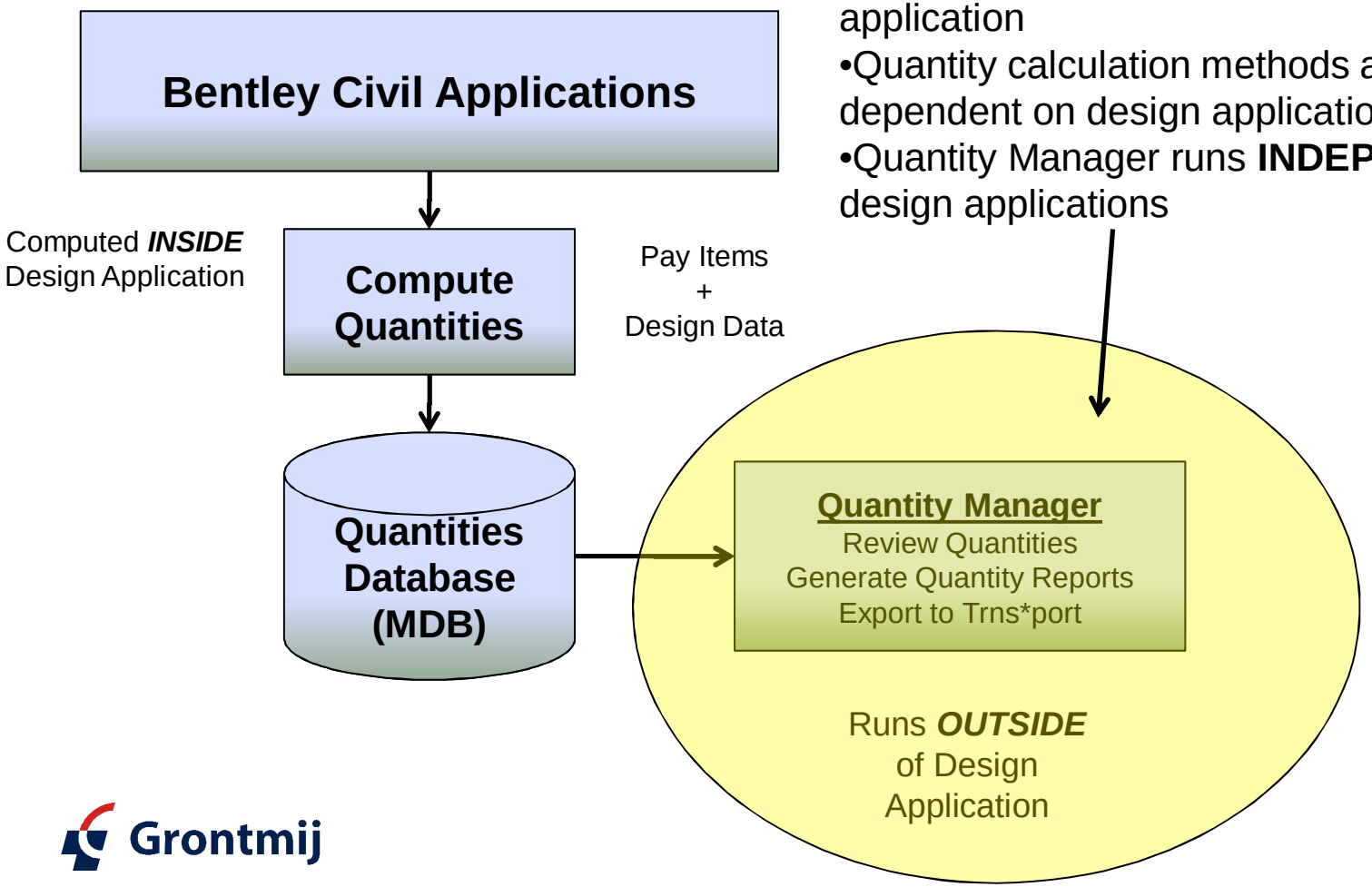
- Computes quantities from DTM data
- Exports those quantities to Quantity Manager

Quantity Manager

- Manages quantities (reporting, estimating, etc.)
- Standalone
- Database application

Extracting Project Quantities with InRoads

- Quantity Manager is a standalone application
- Quantity calculation methods are dependent on design application
- Quantity Manager runs **INDEPENDENT** of design applications



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Extracting Project Quantities with InRoads

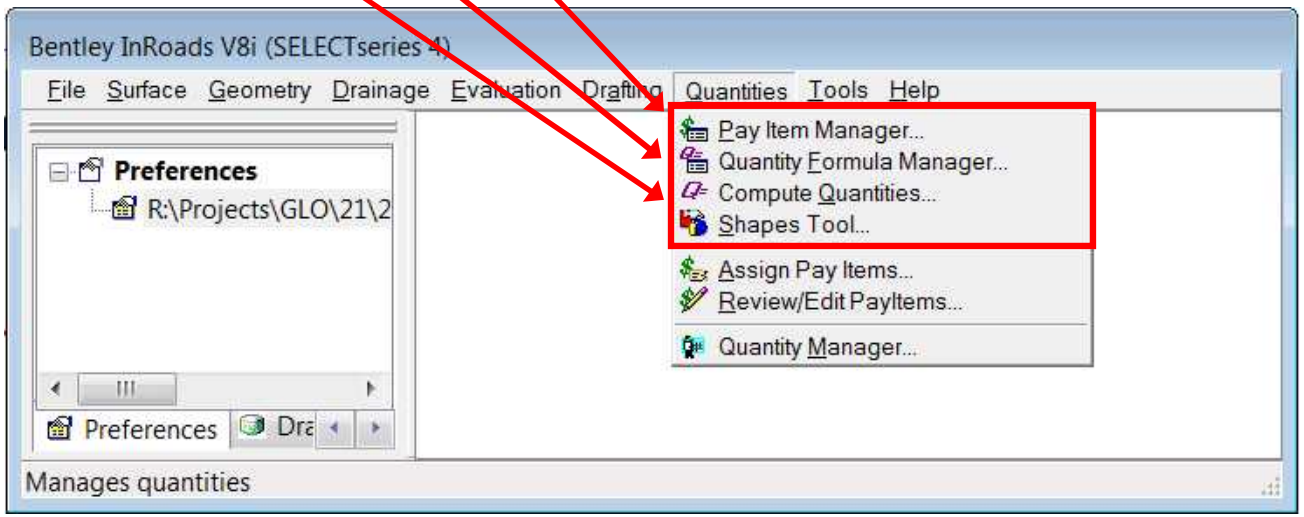
InRoads Quantity Extractor

Pay Item Database

Pay Item Manager

Quantity Formula Manager

Compute Quantities



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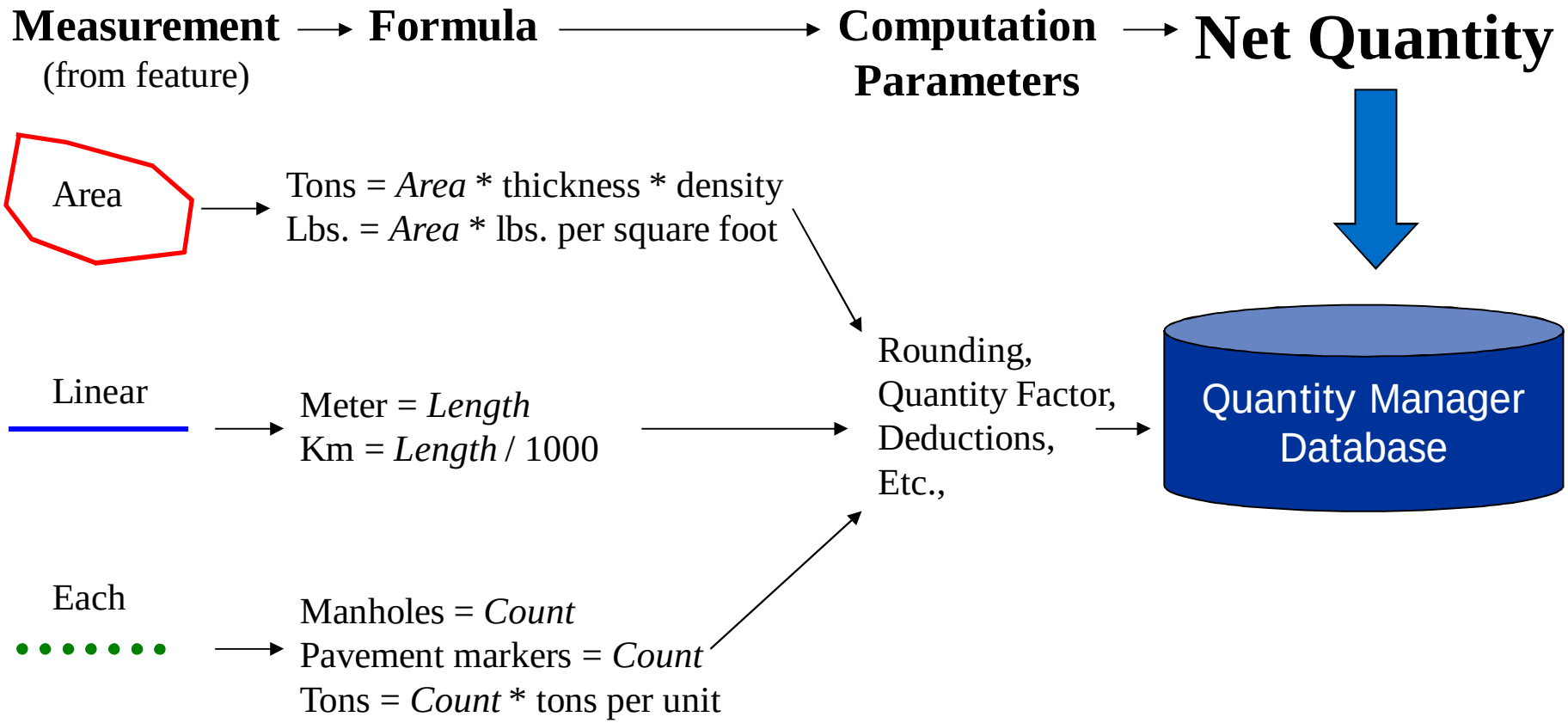
Extracting Project Quantities with InRoads

InRoads Quantity Extractor



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Extracting Project Quantities with InRoads

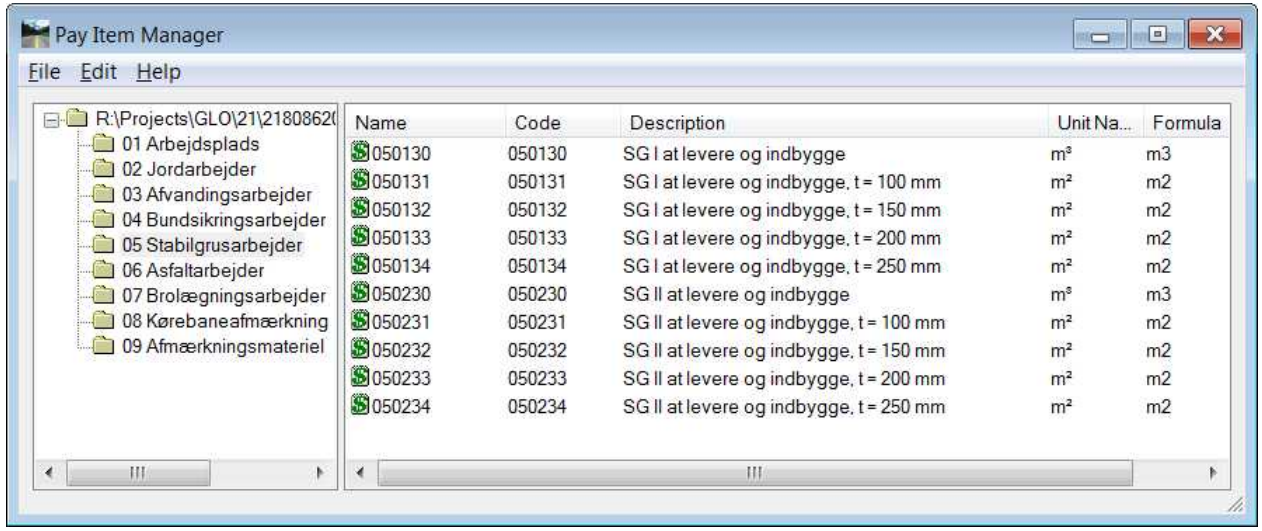
Pay Item Manager

Manages Pay Item databases

- Open
- Create
- Close

Manages Pay Items

- Organizes pay items by category
- Create
- Edit
- Copy
- Delete



Windows Look and Feel

- Drag and drop
- Right click
- Popup menus

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Extracting Project Quantities with InRoads

Pay Item

We know what it is, but what is it in InRoads?

- Assigned to features
  - Feature style
  - Feature properties
  - Assigns pay items to graphic elements and surface features
- Defines computation of pay items
  - Formula, rounding, deductions, etc.
- Stored in the InRoads Pay Item database

Extracting Project Quantities with InRoads

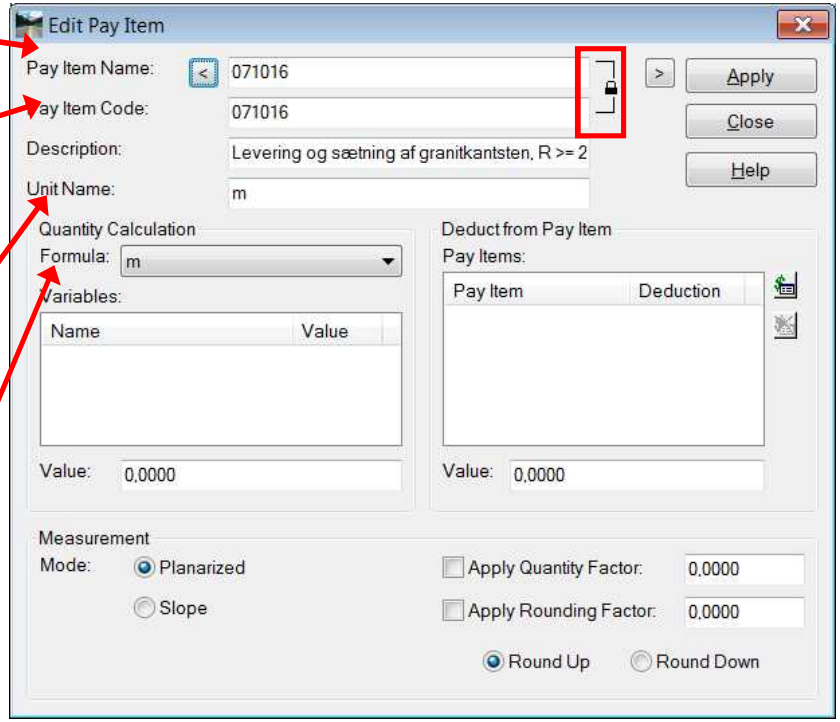
Pay Item

Pay Item Name
- Assigned to Style or Feature

Pay Item Code
- Locked to name by default
- Sent to QM database
- Appears on reports

Unit Name
- TN, SY, FT, etc.
- Sent to QM database
- Appears on reports

Formula
- From Quantity Formulas
- Assign variable substitutions



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Extracting Project Quantities with InRoads

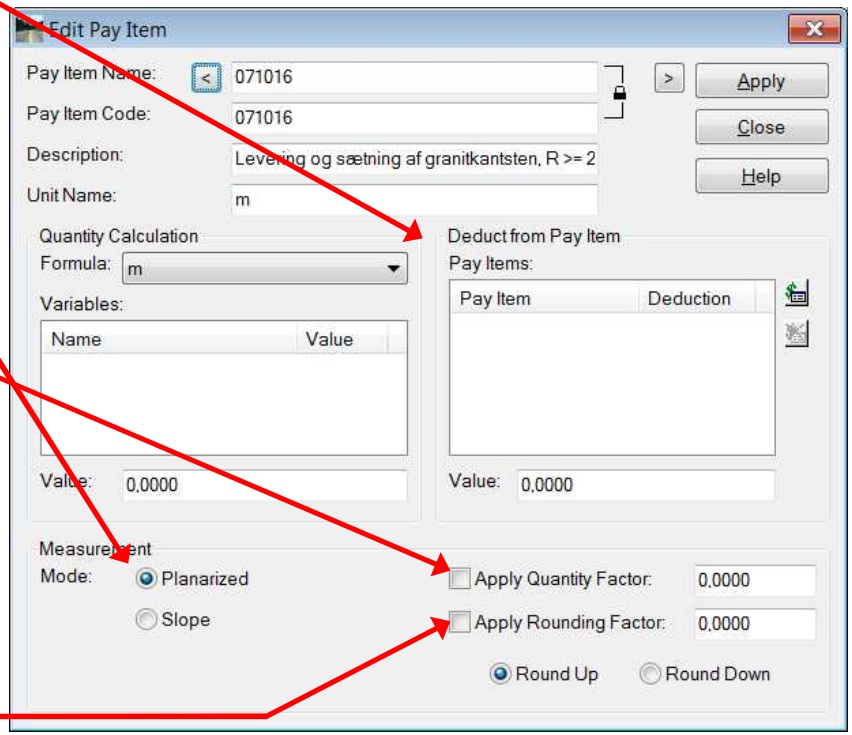
Pay Item

Deductions
- Corrects for coincident items
- Ex. Inlets / Curb & Gutter
- Enter pay items to be deducted

Measurement
- Planar
- Slope

Quantity Factor
- Applied to computed value
- Ex. 1 Margin of error
- Ex. 2 Paint stripe/skip

Rounding Factor
- Round to any decimal place
- Round up or down



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Extracting Project Quantities with InRoads

Quantity Formula

What is it?

- Converts the geometric measurement of a feature to a quantity.

Examples

- Metric Tons = {AREA} x thickness x weight
- Liters = {LENGTH} x width x liters per square meter
- Cubic Meters = {EACH} x cubic meters per unit

Associated with features via pay items

Stored in the InRoads Pay Item database

Extracting Project Quantities with InRoads

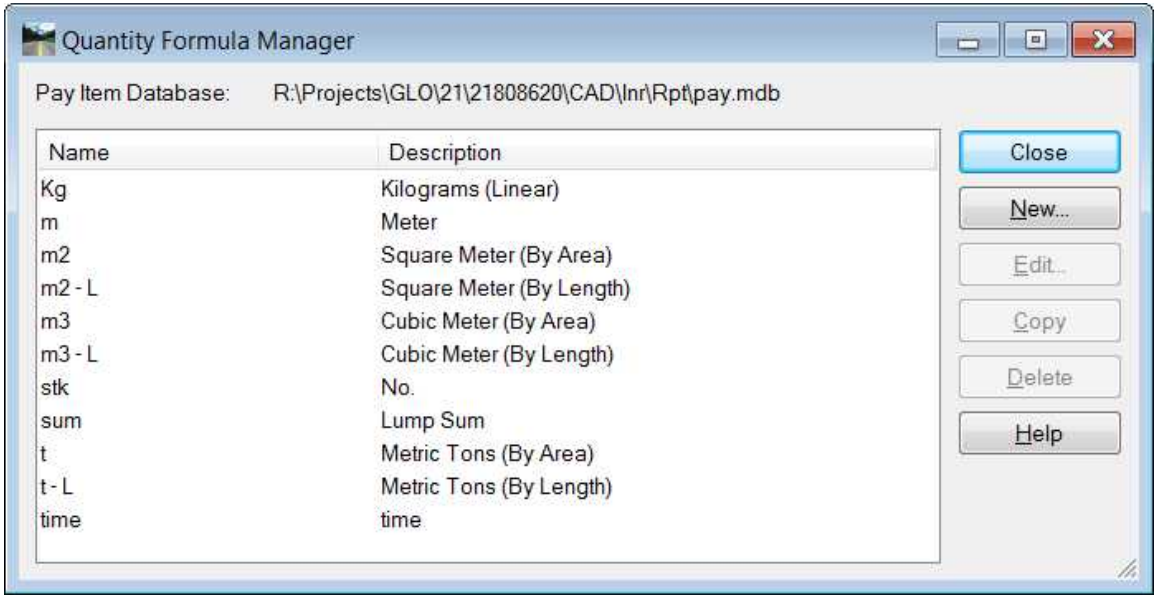
Quantity Formula Manager

Manages Formulas

- Create
- Edit
- Delete

Default set delivered

Customizable



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Extracting Project Quantities with InRoads

Quantity Formula

Measurement Basis

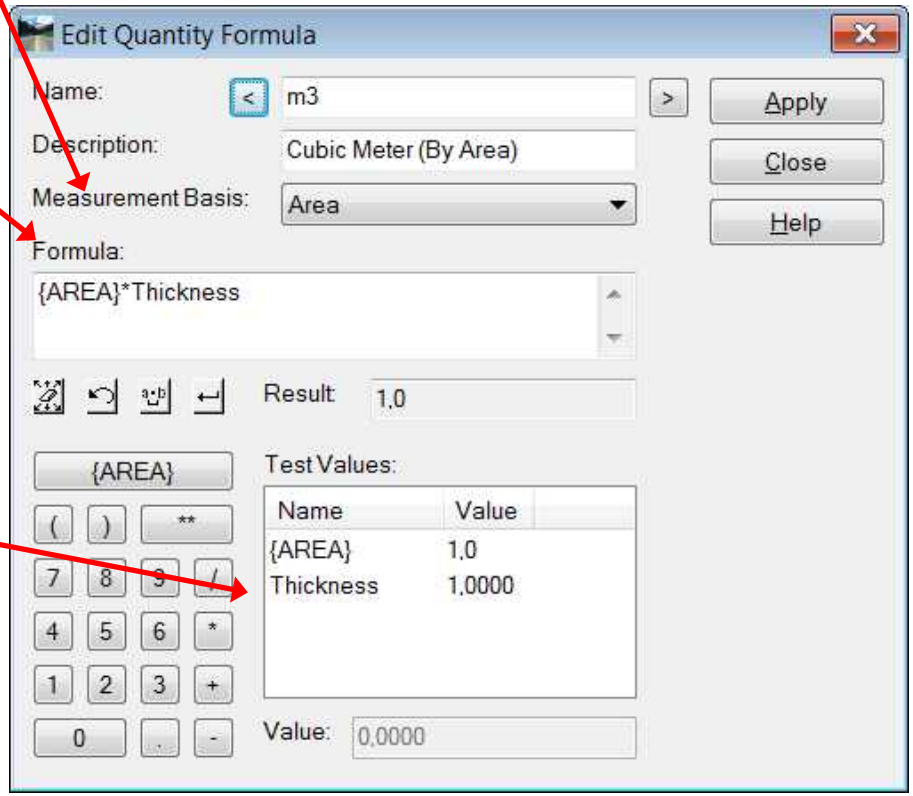
- Each – count feature or points
- Linear – length of feature
- Area – area of closed feature

Formula

- Measurement Tag
  - {EACH}, {LINEAR}, {AREA}
- Unlimited Variables
- Unlimited Constants
- Math operators

Test Values

- Variable substitutions for testing formula
- Tag and variables are parsed out automatically



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Extracting Project Quantities with InRoads

Associating Pay Items with InRoads Features

Methods

1. Assign pay items to feature styles
2. Assign pay items to features
3. Assigns pay items to graphic elements and surface features

Multiple pay items per feature

- Assign multiple pay items to the feature
- Feature styles can contain only one pay item

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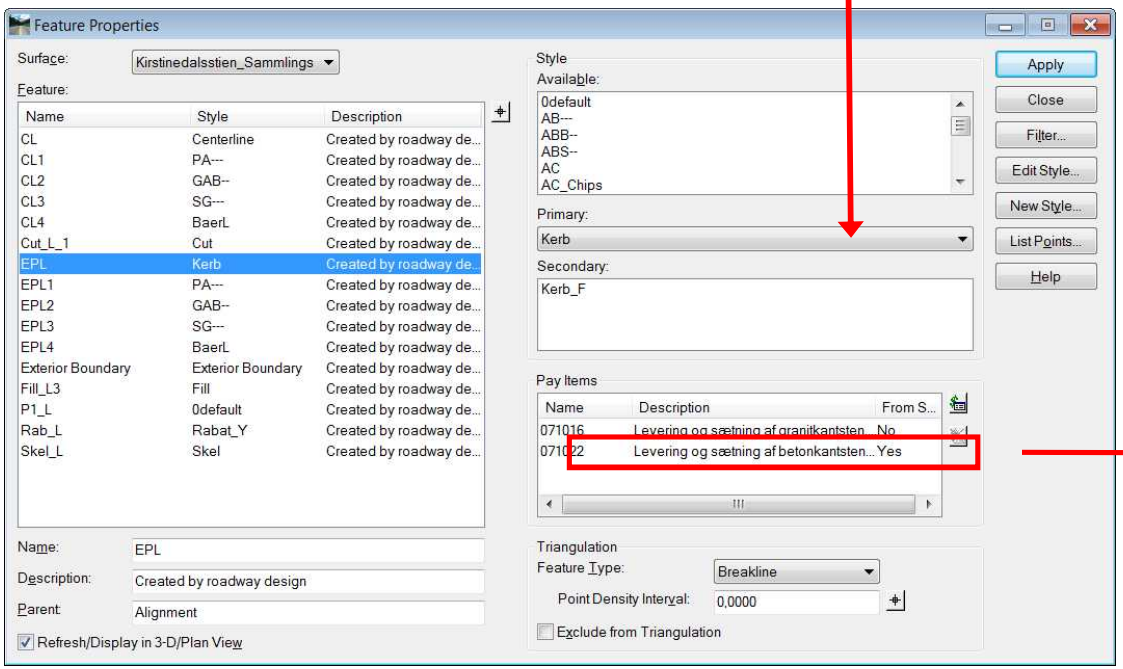
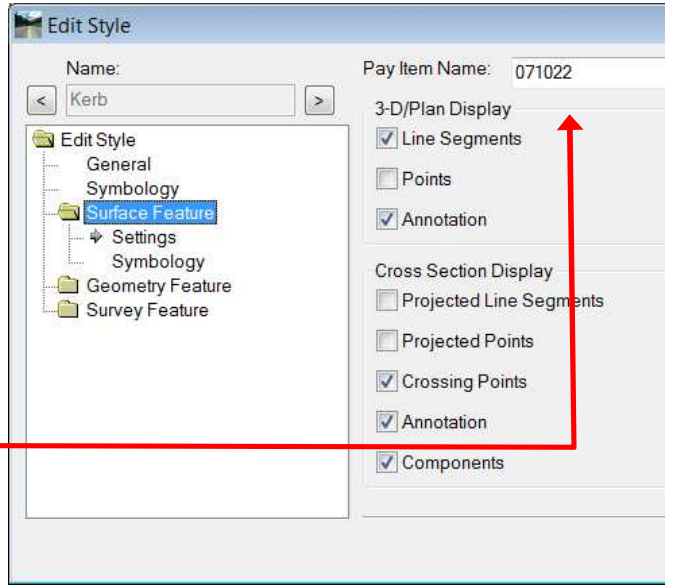
Extracting Project Quantities with InRoads

Associating Pay Items with InRoads Features

Feature Properties

Feature Style





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Extracting Project Quantities with InRoads

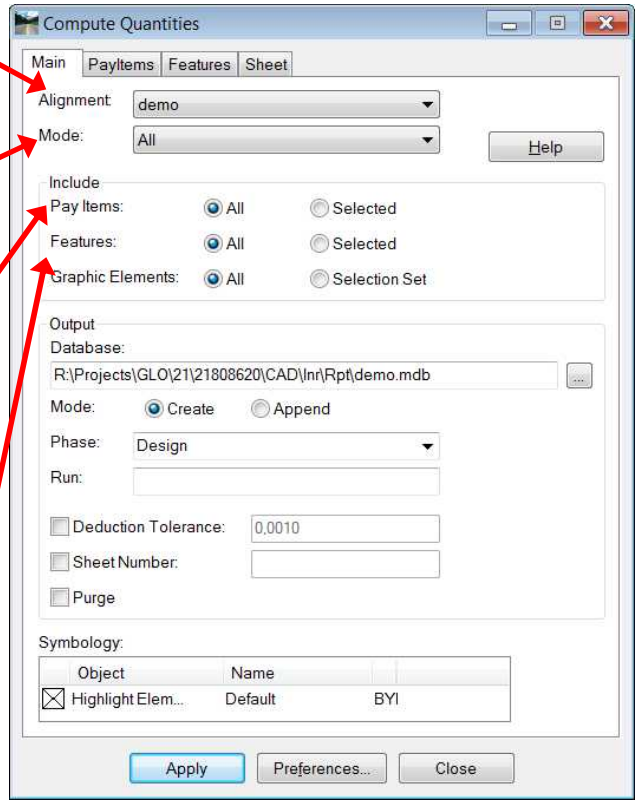
Compute Quantities

Control Alignment
- Controls the range
- Used to compute station/offset locations

Mode
- All – everything within the station range.
- Fence - inside, clip, void, etc.

Include Pay Items
- All – process all pay items in the pay item manager
- Selected – ignore pay items not selected on the pay items tab

Include Features and Graphic elements
- All – process all features in all loaded DTMs
- Selected – ignore features not selected on the features tab



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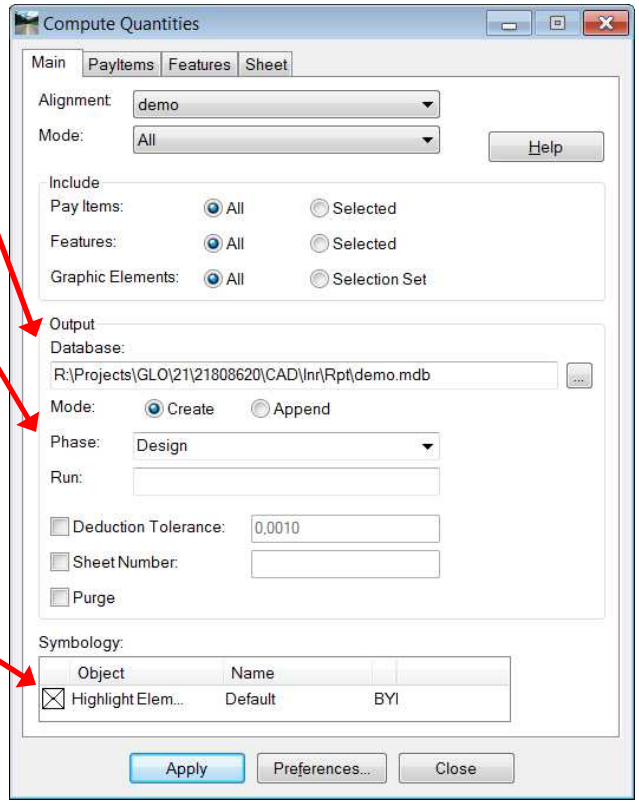
Extracting Project Quantities with InRoads

Compute Quantities

Output
- Quantities Database
- Create new, or append to existing

Phase
- Preliminary
- Design
- Final
- Other – editable combo box accepts key-ins

Highlight Elements
- Features are displayed with the selected symbology as they are quantified.



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Extracting Project Quantities with InRoads

Quantity Manager

- Database application for managing quantities
- Plan quantities
- Earthwork
- Non-graphic quantities
- Funding Partitions
- XML based, customized reports
- Cost estimating
- Cost comparisons

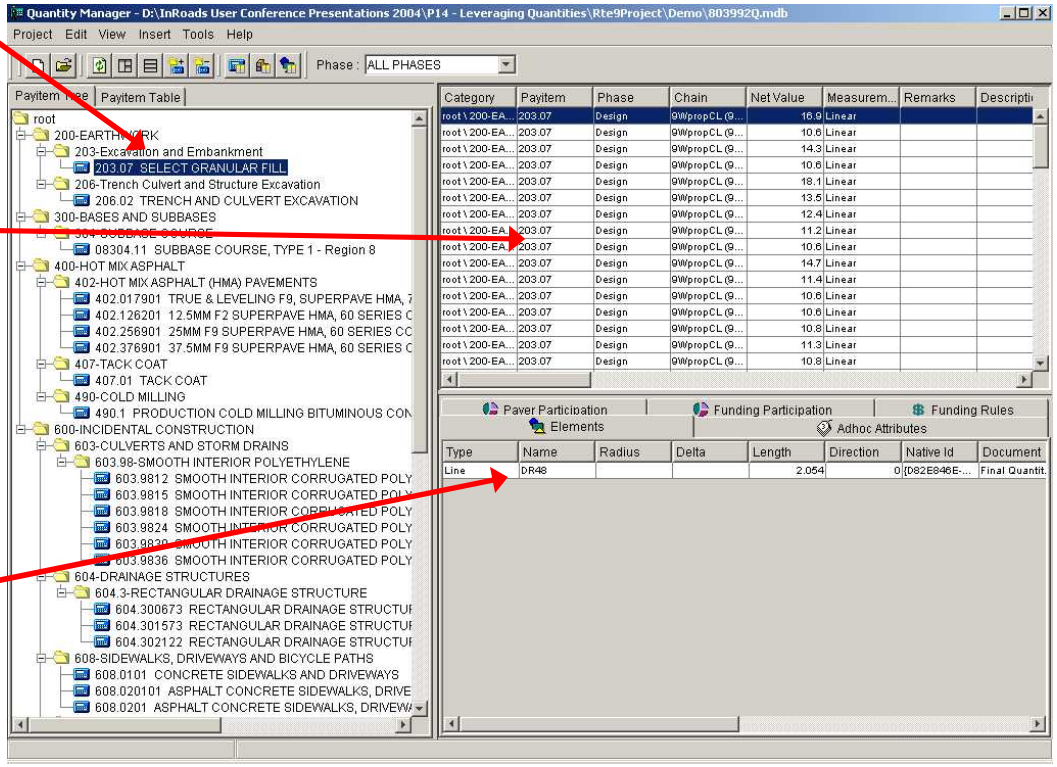
Extracting Project Quantities with InRoads

Quantity Manager Interface

Pay Items
- Unit Name
- Unit Cost

Quantities
- Quantity
- Measurement basis
- Station location
- Etc.

Elements
- Begin/End X,Y
- Station Location
- Etc.



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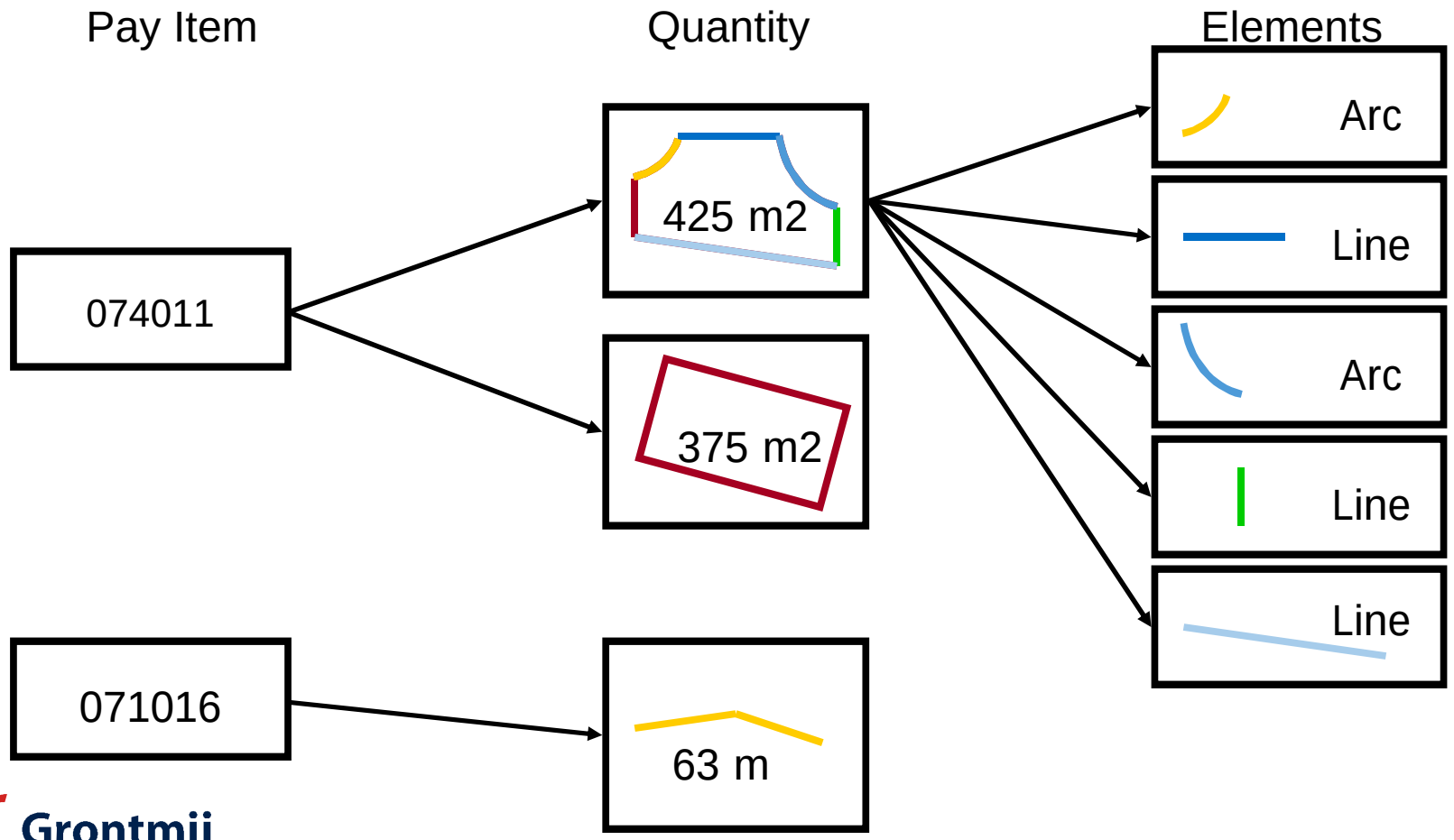
Extracting Project Quantities with InRoads

Database Table Relationships



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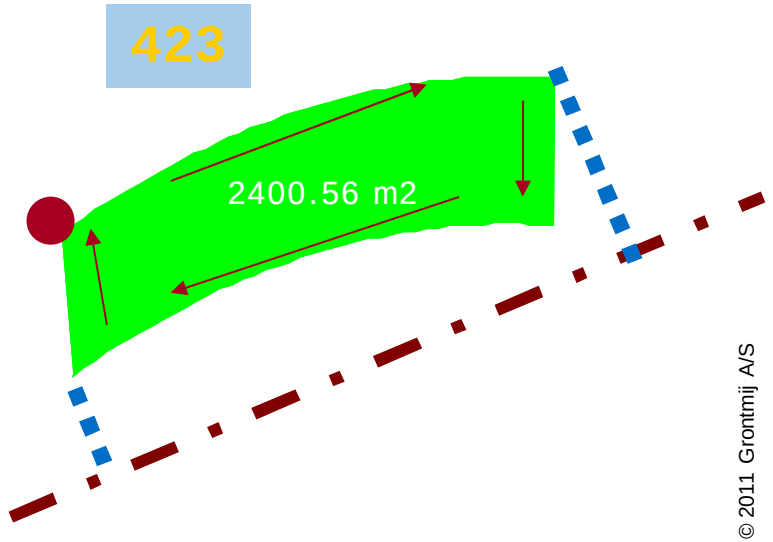
Extracting Project Quantities with InRoads

Quantity Contents

"Itemized" quantity list
- Measurement
- Parameters
- Quantity (unrounded & rounded)

Element location information
- Begin / End x, y, station, offset
- Minimum / Maximum x, y, station, offset

Feature information
- Surface Name
- Feature Name



Extracting Project Quantities with InRoads

How to get data into Quantity Manager

Run InRoads quantity extractor

- Plan view quantities
- Clearing & grubbing, asphalt, guard rail, seeding, etc

Enter manually through the interface

- Mobilization, Human Resources, Equipment, etc

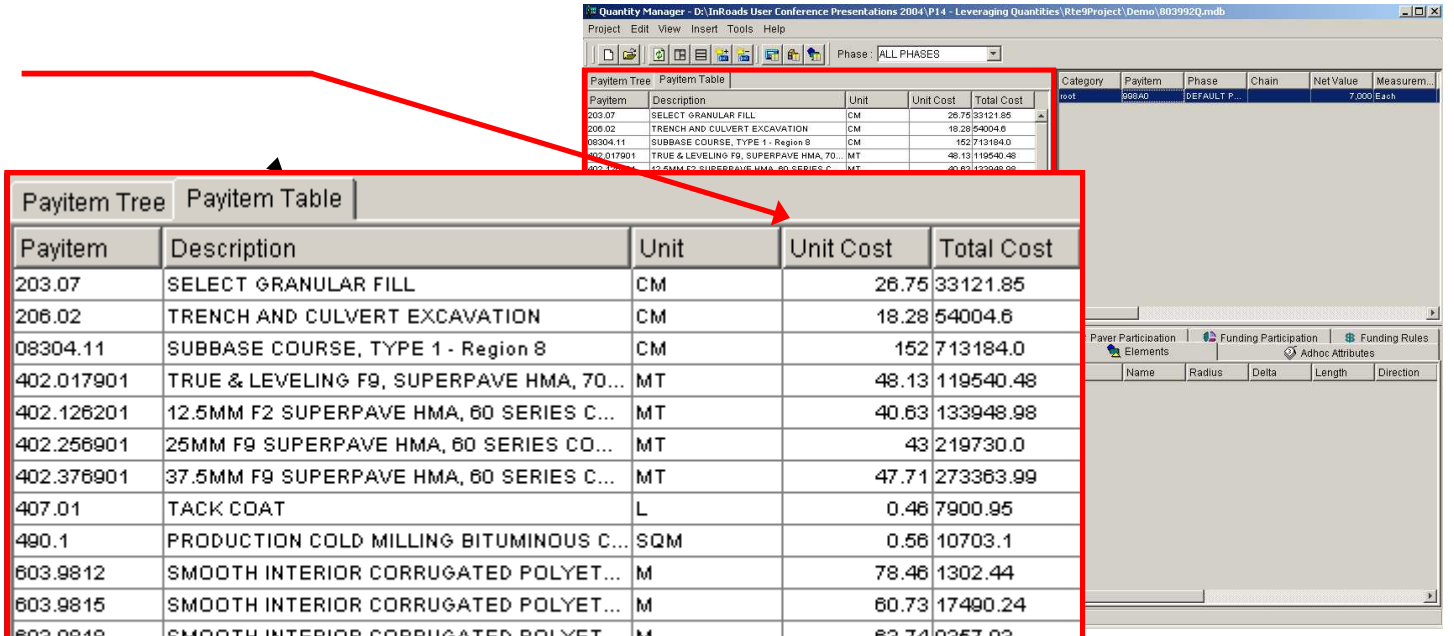
Import from CSV

- Pay item data
- Quantity data

Extracting Project Quantities with InRoads

Cost Estimating

Unit Cost



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Extracting Project Quantities with InRoads

Funding Partitions

Multiple payers

- Federal
- State
- County
- City

Apply funding rules to quantities

- By selection
- By station range

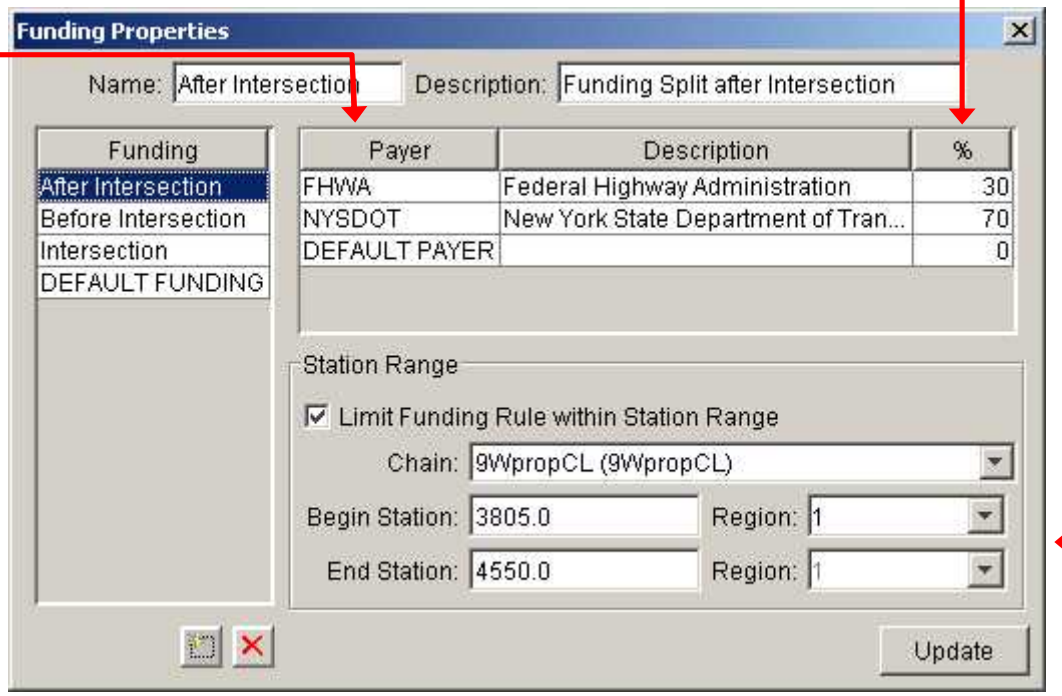
Extracting Project Quantities with InRoads

Funding Rules

Station Range

Contribution %

Payers



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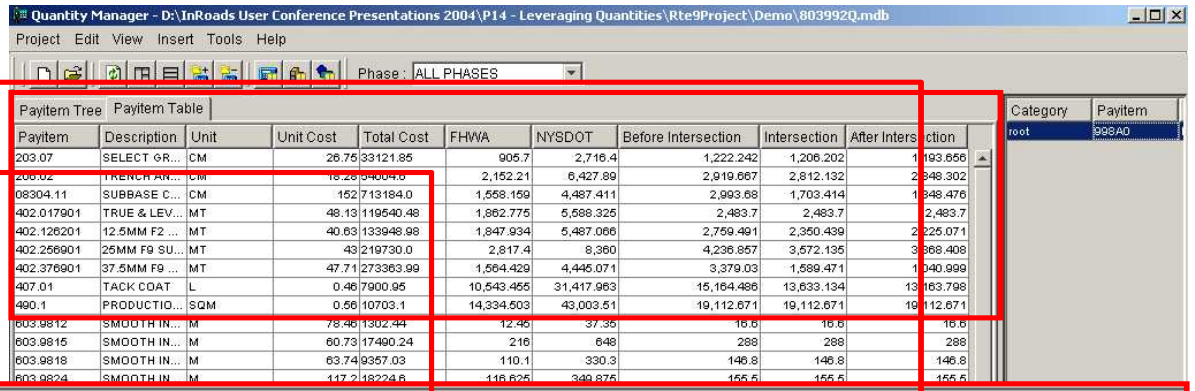
Extracting Project Quantities with InRoads

Funding Review

Cost per rule

Cost per payer



Payitem Tree | Payitem Table

Payitem	Description	Unit	Unit Cost	Total Cost	FHWA	NYSDOT	Before Intersection	Intersection	After Intersection
203.07	SELECT GR...	CM	26.75	33121.85	905.7	2,716.4	1,222.242	1,206.202	1,193.656
206.02	TRENCH AN...	CM	18.28	54004.6	2,152.21	6,427.89	2,919.667	2,812.132	2,848.302
08304.11	SUBBASE C...	CM	152	713184.0	1,558.159	4,487.411	2,993.68	1,703.414	1,348.476
402.017901	TRUE & LEV...	MT	48.13	119540.48	1,862.775	5,588.325	2,483.7	2,483.7	2,483.7
402.126201	12.5MM F2 ...	MT	40.63	133948.98	1,847.934	5,487.066	2,759.491	2,350.439	2,225.071
402.256901	25MM F9 SU...	MT	43	219730.0	2,817.4	8,360	4,236.857	3,572.135	3,368.408
402.376901	37.5MM F9 ...	MT	47.71	273363.99	1,564.429	4,445.071	3,379.03	1,589.471	1,040.999
407.01	TACK COAT	L	0.46	7900.95	10,543.455	31,417.963	15,164.486	13,633.134	13,163.798
490.1	PRODUCTIO...	SQM	0.56	10703.1	14,334.503	43,003.51	19,112.671	19,112.671	19,112.671
603.9812	SMOOTH IN...	M	78.46	1302.44	12.45	37.35	16.6	16.6	16.6
603.9815	SMOOTH IN...	M	60.73	17490.24	216	648	288	288	288
603.9818	SMOOTH IN...	M	63.74	9357.03	110.1	330.3	146.8	146.8	146.8
603.9824	SMOOTH IN...	M	117.2	18224.6	116.625	349.875	155.5	155.5	155.5
603.9830	SMOOTH IN...	M	117.83	35042.64	198.834	595.766	280.549	263.637	250.414

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Extracting Project Quantities with InRoads

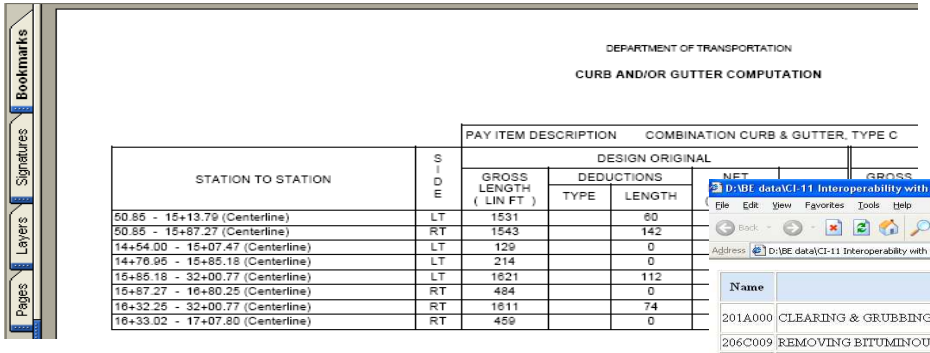
Custom Reports

User defined Report styles offer robust reporting capability
Quantity data is streamed in XML format through style sheets
The user defines the following:

- Granularity of data
  - By pay item
  - By quantity
  - By funding rules
  - Etc.
- Output format
  - PDF (Adobe)
  - HTML (web page)
  - CSV (comma separated values)
  - TXT
- XSL file used to process the report

Extracting Project Quantities with InRoads

Custom Reports



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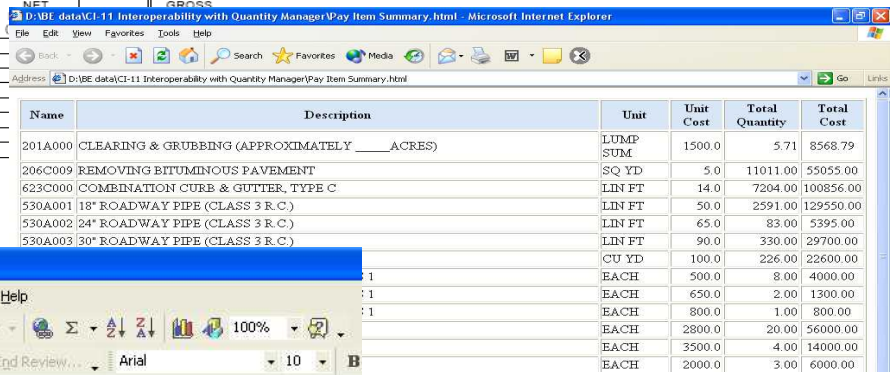

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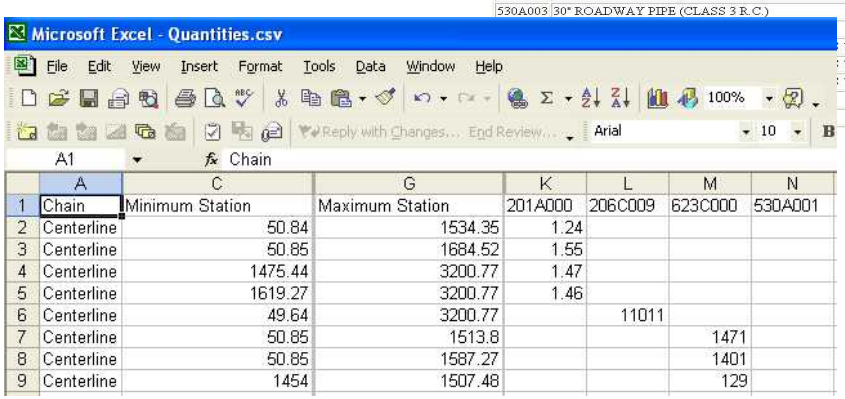

Excel

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