

Earth Works and Harvesting Quantities with InRoads V8*i*:

Lisa Whitson Transportation and Local Infrastructure Professional

Services, Bentley Systems USA



Topics

•Generating quantities in Design & Computation Manager (D&C Manager)

- Exporting quantities to Quantity Manager
- •Setting project preferences in Quantity Manager
- Importing pay items and funding from AASHTO Trns*port into Quantity Manager
- Adding manual quantities
- •Creating reports of quantities
- •Exporting quantities to AASHTO Trns*port



Workflow Philosophy

•Design project using elements displayed Pay Item configured in Style Manager.

•Tag those MicroStation elements that are to be quantified with an adhoc attribute defining the chain.

- •Check quantities as the project progresses to ensure accuracy.
- •Create shapes for odd area quantities.
- •Export CAD quantities to Quantity Manager and add manual quantities.
- •Generate reports in Quantity Manager and export quantities to Trns*port.



Quantity Manager Workflow

- Quantities from design files
 - -Create
 - -Update
 - -Delete
- Non-graphic quantities (manually calculated)
 - -Add adhocs
- Create reports
- Export to Trns*port





Computing Quantities in QM

- Quantities from:
 - Alignment
 - Graphical Element
 - Pay Item
 - Feature
 - Sheet

Compute	Quantities	X
Main Pay	tems Features Sheet	
Alignment:	Default	
Mode:	All	Help
- Include Pay Items:	All Selected	
Features:	Al Selected	
Graphic El	ements:	
Output Database:		
Mode:	O Create O Append	
Phase:	Design -	
Run:		
Deduct	ion Tolerance: 5.00	
Sheet 1	Number:	
Purge		
Symbology:		
Object	Name	
Highligh	nt Elements	
	Apply Preferences Cla	ose





Overview of Quantity Manager

- •Direct interface.
- •Application for managing all quantities.
- •Organizes quantities by pay items, stations, units of measure, etc.
- •Provides for special rounding and lump sum items.
- •Supports CAD quantities as well as non-graphic quantities.
- •Interfaces with Trns*port.
- •Custom report capabilities in PDF, HTML and CSV formats.
- •Cost estimates & cost comparisons.



Accessing Quantity Manager

Start InRoads or if in MicroStation select Applications > InRoads Group.

Select Quantity manager from the InRoads Group Menu

If the database was created in Quantity Manager select Open and choose the previously created database. If not select New, to create a new database.

Note: The project specific pay items database can be added to the project defaults.

Also QM interfaces with SQL Server and Oracle too!



Quantity Manager Interface

🚇 Quantity Manager - C:\Projects\QM\workshop.mdb

Project Edit View Insert Tools Help

🗅 😅 😰 🖽 🗮 🔚 🎼 🖙 🏤 🐂 Phase: ALL PHASES

-											_
Payitem Tree Payitem Table	Category	Payitem	Phase	Chain	NetValue	Remarks	Description	Extended	Computati	Measurem	N
a root	root\Roadwa	0520 2 4	DesignEstim	BL817	97.000				[ELEMENT_L	Linear	~
🖃 🥘 Roadway Design	root\Roadwa	0520 2 4	DesignEstim	BL817	30.000				[ELEMENT_L	Linear	
🖃 🔄 Plan Features	root\Roadwa	0520 2 4	DesignEstim	BL817	7.000				[ELEMENT_L	Linear	
🖃 🚞 Curb & Gutter, Curb, Gutter	root\Roadwa	0520 2 4	DesignEstim	BL817	7.000				[ELEMENT_L	Linear	
🔜 0520 2 4 Concrete Curb (Type D)	root\Roadwa	0520 2 4	DesignEstim	BL817	6.000				[ELEMENT_L	Linear	
🧰 0520-3 Concrete Valley Gutter	root\Roadwa	0520 2 4	DesignEstim	BL817	6.000				[ELEMENT_L	Linear	
🔜 0520 1 10 Concrete Curb and Gutte	root\Roadwa	0520 2 4	DesignEstim	BL817	403.000				[ELEMENT_L	Linear	
🔜 0520 1 7 Concrete Curb and Gutter	root\Roadwa	0520 2 4	DesignEstim	BL817	403.000				[ELEMENT_L	Linear	
🗄 🧰 Handrail Pipe	root\Roadwa	0520 2 4	DesignEstim	BL817	302.000				[ELEMENT_L	Linear	
🗉 🧰 Concrete Traffic Separators	root\Roadwa	0520 2 4	DesignEstim	BL817	302.000				[ELEMENT_L	Linear	
🖃 🛅 Quantity Features	root\Roadwa	0520 2 4	DesignEstim	BL817	184.000				[ELEMENT_L	Linear	
🗉 🧰 Base	root\Roadwa	0520 2 4	DesignEstim	BL817	184.000				[ELEMENT_L	Linear	
🗉 🧰 Pavt Removal Clearing&Grubbing	root\Roadwa	0520 2 4	DesignEstim	BI 817	13.000				IELEMENT I	Linear	<u> </u>
🗄 🧰 Grass (Computations Only)	<										
🗉 🧰 Sidewalk	🕞 Elemen	s 🗿 Adhas	Attributor	Poyor Portic	ination	unding Portic	ination 😐 E	unding Puloc]		
표 🧰 Asphaltic Concrete	<u>A</u> Element	Aunoc	Aunoutes 🗤 📢	p rayerranuc	ipation 🗤 🖓 r	unung Fantu T		unung Rules			
·	Name	Туре	Radius	Delta	Length	Direction	Native Id	Document	Extents	Begin X	Be
	83721 (Line)						83721	C:\Projects\Q	Complete		
			·			·			·	·	
<	<										>
						,					_

~



Customizing the User Interface

The Quantity Manager interface can be customized to show specific quantity information in various display formats. This allows the user to easily review and sort their quantities.

View formats:

- -Tree view
- -Table view
- -Horizontally tiled panes
- -Adjustable windows and sashes
- -Show/Hide/Adjust/Move columns
- -Sort-able columns
- -View quantities by phase



Customizing the User Interface

📲 Quantity Manager - C:\Projects\2280791\roadway\2280791.mdb

Project Edi	roject Edit View Insert Tools Help														
D 🖻	🗅 🖙 😰 🖪 🖶 🔚 🖬 🏤 🐂 Phase : DesignEstimate 🔽														
Payitem Tre	e Payitem Ta	able			Payitem	ו	Phase	Chain	Boundary	Net V	Compute	ed Roun	d Formatt	ed	Fort
Pavitem 🔺	Description	Total Net	Unit		0334 11	3	DesignEstimate	BL10ST		20.320	20	.323 20	320 26+80.00		28+2
	Classics & C	F 007	011K		0334 11	3	DesignEstimate	BL10ST		20.320	20	.323 20	.320 26+80.00		28+2
0110 1 1	Cleaning & G	0.007	AL C	<u>-</u>	0334 11	3	DesignEstimate	BL817		19.820	19	.817 19	820 85+25.22		85+4
0110 4	Removal or	4,653.200	51 CV		0334 1 1	3	DesignEstimate	BL817		35.690	35	.688 35	.690 127+00.0	з	127+
0285703	Optional Bas	49,760.100	51 CV		0334 11	3	DesignEstimate	BL817		142.410	142	.406 142	410 110+80.0	C	116+
0285715	Optional Bas	3,366.800	51		0334 1 1	3	DesignEstimate	BL817		9.650	9	.654 9	650 92+19.74		94+3
0334 1 13	Superpave A	3,196.380	TN		0334 1 1	3	DesignEstimate	BL817		11.120	11	.120 11	120 128+03.3	C	130+
0545 4 4	Asphaltic Co	369.330			0334 11	3	DesignEstimate	BL817		83.380	83	.381 83	.380 127+00.0	C	130+
0515 1 1	Steel	644.700 50.900			0334 11	3	Desig 💦 🎒	Payitem: (0334 11	3-Com	puted	Quantit	y: 328.72	:05	127+
0520 1 7	Concrete Cur	06.800			0334 1 1	3	1Sesig 🦽	-			-		-		123+
0520 1 10	Concrete Cur	57,339.400			0334 11	3	Desig 🎛 I	nsert							121+
0520 2 4	Concrete Cur	5,522.000			0334 11	3	Desig 🛛 💕 [Edit							116+
0520 5	Trans L (4) wide)	515.700			0334 1 1	3	Desig 🔬								110+
0520 5 11	Type I (4' Wide)	405.400			0334 1.1	3	Desia 🏼 🍼 l	Delete							100+
0522 1	Concrete Sid	2,551.400	51 CV		<		aqa 📃	ly Fundina R	ule					_	>
0522 2	Concrete Sid	204.800	51			P Po									
0710 23 61	6" Solid Fraπ	0.110	NIVI		—	🗩 Fa		Customize V	iew					iie	35
0711 11111	6" Solid Fraπ	0.360								,	N N	πος Αιποι	nes		
0711 11112	8" Solid Fraπ	0.435			Name		Туре	Radius	Delta	Length	i Di	rection	Native Id	Do	cum
0711 11121	6" Solid Fraff	1,774.000			18974 (C	om	Line String		·		37.000		18974	C:\F	² roje 📈
0711 11123	12" Solid Fra	2,982.000			18974 (C	om	Line			-	85.917	106.598	18974	C:\F	² roje
0/11 11125	24" Solid Fra	838.000			18974 (C	om	Arc	3.000	-152.0	36	7.963	196.598	18974	C:\F	roje
0711 11211	6" Solid Fraff	1.491			18974 (C	om	Arc	80.000	23.8	54 :	33.306	221.729	18974	C:\F	roje
0711 11222	8" Solid Fraπ	336.000			18974 (C	om	Arc	3.000	48.7	19	2.551	65.583	18974	C:\F	roje
0/11 11224	18" Solid Fra	340.000			18974 (C	om	Line				58.780	286.864	18974	C:\F	roje
0713101160	UNLY Pave	56.000	EA		18974 (C	om	Line				36.922	16.398	18974	C:\F	roje
0/13102160	UNLY Pave	56.000	EA		18974 (C	om	Line				25.397	106.742	18974	C:\F	roje
0/13103160	UNLY Pave	56.000	EA		18974 (C	om	Line				1.960	106.864	18974	C:\F	roje
0/15/34/1	Lighting Pol	59.000	EA	*	40074.00		A	44.500	000		22.020	400.004	40074	CAL	· · · · · ·
			1												2



Primary Functions of Quantity Manager

- Develop Cost estimates and cost comparisons

 Support CAD and non-graphic quantities.
 - -Organize quantities by pay item, station, and/or element information.
 - -Assign Funding/Payer Parameters
 - -Round quantities and designate lump sum items.
 - –Allow manual entry of quantities and modifications to quantities.
- •Import Trns*port pay items & funding sources.
- •Export quantities to Trns*port.
- Create quantity reports



Funding

- Funding is defined by payers (the funding source) and the funding rule (the list of payers and their corresponding participating percentages).
- The Funding dialogs are accessed from *Funding* > *Payerand Funding* > *Rule.*





Creating Payers

🕮 Payers					
Payer		Description			
DEFAULT PAYER	ર				
Select Pays	ers				
Payer	Description				
NPART	Non Participating				
PART	Participating				
Import					

- Funding is defined by payers (the funding source) and the funding rule (the list of payers and their corresponding participating percentages).
- The Funding dialogs are accessed from *Funding* > *Payerand Funding* > *Rule.*



Creating a Funding Rule

- Assign percent of participation to existing payers. Note: The total participation for a rule should add up to 100%. If the total participation doesn't add up to 100% it will warn, but allow the definition of the rule.
- Assign station range of influence if applicable, per payer.
- A default funding rule can be applied to each phase.



Creating a Funding Rule

Funding Properties							X
Name: Default r	ule	Descrip	otion:	funding b	y city and state		
Funding Default rule DEFAULT FUNDING	Payer NPART City DEFAULT PART State Station Rat	PAY	Desc Non Miam Partic Floric	cription Participatin ni cipating da	ng 	%	0 20 0 80
	Ch Begin Stat End Stat	ain: ion: ion:			Region:		>
						Upda	te

 Click on the new icon and define the name of the rule, then assign the payer participation and any station restrictions.

Note: If the same payer participation is needed outside the station range, an additional funding rule must be created.



Funding Computation by Payer







Funding Computation by Payer Based on a Station Range





Phases

Phase is a way to group quantities. A phase has a default funding rule applied.

- Example phases:
 - -DesignEstimate
- •When the quantities are imported into Trns*port they must be assigned the phase name DesignEstimate.
 - -Preliminary
 - -Construction Final
 - -Bid Estimate...
- •Total quantities of different phases may be compared.
- •Reports are generated based on phases.



Phases



The phase used is automatically defined in Quantity Manager.

Phases can be defined in QM by selecting *Project* > *New Phase* or...



Item	Description	Quantity	Unit	Export	
0520 2 4	Concrete Curb (Type D)	5522.0000	LF	K	
0285715	Optional Base (Base Group 15)	3966.7000	SY	1	
0110 4	Removal of Existing Pavement	4653.2000	SY	1	
Sodding	Sodding (Contractor's Option)	8314.2000	SY	2	
0522 2	Concrete Sidewalk, 6" Thick	204.8000	SY	1	
0285703	Optional Base (Base Group 03)	49760	SY	1	
0522 1	Concrete Sidewalk, 4" Thick	2551.3000	SY	1	
0520 3	Concrete Valley Gutter	519.7000	LF	2	-
0000 4 40		07000		_	-



Phases Properties



The phase properties defines the funding rule that is automatically applied to the quantities grouped in that particular phase.

Note: The phase assigned to a quantity can be changed later if necessary.



Boundary

 In addition to grouping quantities by phases, quantities can be grouped by a boundary.

•This is normally defined when computing quantities. Whenever sheet, by fence, by station range, by view, or by boundary element is used as the "extents" this boundary information is passed to Quantity

Manager.

📲 Quan	itity M	nanage	97 - C:			
Project	Edit	View	Inser			
n o	Select All		SelectAll			
	U	Unselect All				
Payitem	D	Delete				
Categor	R	Rename				
root \ Roa	Pł	hase				
root \ Roa		laco				
root \ Roa	Fi	Funding 🕨 🕨				
root \ Roa	B	oundar	/			
root \ Roa						

Boundary Properties		
Туре	Name	
Sheet	1	
Sheet	2	~
Sheet	3	
Sheet	4	
Sheet	5	
Sheet	6	
Sheet	7	
Sheet	8	
Sheet	9	



Boundary

Project Edit View InsertTools and E	Phase : DesignEsti	ilameh (De	sktop (226	0791_a.m	db						
Payitem Tree Payitem Table	Phase	Category	Payitem	Chain	NetValue	Remarks	Desce				
Tront	DesignEstim	tooffFinadiva	0224 1 12	BL10ST	20.320	0					
P. Boadway Design	DesignEstim	tootReadva	0034 1 13	BL10ST	20.020	5					
E Plan Features	DesignEstim	poofficadva.	0334 1 13	81,817	19.025	2					
E - Quantity Features	DesignEntim.	montheadvia.	0334 1 13	0L017	35,690)					
Base Pavt Removal Clearing&Grubbing	ST Graphi	PI Graphic Viewer									
Grass (Computations Only) Grass (Computations Only)	SVG Docur	nent					Q,				
Asphattic Concrete Ac Friction Course Superpave Asphattic Conc Os34 313 Superpave Asphattic	Cone	~			IF Window Ce IF Zoom To Se	nter					

Manually Entered
 PavementMarking
 Hiptway Lighting

The user can review quantities graphically by activating the Graphic viewer from the tools menu.



Steps to Manually Enter Quantities

- 1. Create a category (if needed).
- 2.Create the pay item (this should be selected from the pay items imported from Trns*port.
- 3.Add the quantities to the pay item.
 - 1. Define the general properties.
 - 2. Define the location properties.
 - 3.Add adhocs if needed.



Categories Entered Manually

All Pay Items reside under a Category. The user can create a new category by right clicking on a folder in the pay item view or by selecting Category from the Insert menu.





Importing Pay Items from a CSV File

📲 Quantity Manager - C:\Projects\2280791	\roadway\2280791.mdb
Project Edit View Insert Tools Help	
D New	Phase : DesignEstimate
Close	Payitem Phase Chain Boundary
New Phase	
Import 🔸	Payitems From aecXML Infrastructure v33 Document
Export •	Unit Cost 🕨 From CSV (Comma Delimited) Document
Merge Database	
Properties	

•Select *File > Import >Pay Items >From CSV*

Payitem	CSV Document	p\Pay items 052402.csv	
	Search Mask 🕇		
	To: Payitem Field	From: CSV Field	Default
V	Payitem Name	ITEM	
N	Description	LONG DESCRIPTION	
	Unit	UNIT	LF
	Unit Cost		0.0
	Lump Sum		False
	Quantity		0.0



Adding Quantities to a Pay Item

- Select
 Quantities >
 Pay Item
 Manager
 Manager<
- Double click

 on the Pay
 Item you want
 to edit

🚔 Edit Pay Item	
Pay Item Name: S 620A000	
Pay Item Code: 620A000	
Description: Minor Structure	Concrete
Unit Name: Cubic Yard	Пер
Quantity Calculation Formula: Cubic Yard	Deduct from Pay Item Pay Items:
Variables:	Pay Item Deduction
Name Value thck 0.25	
Value: 0.00	Value: 0.00
Measurement Mode:	Apply Quantity Factor: 0.00
Slope	Apply Rounding Factor: 0.00
	Round Up



Quantity General Properties

The required information to tell Quantity Manager what type of quantity it is and how it is to be reported must be entered.

Measurement basis	Each/Linear/Area (Linear)
Measurement value	Count/Length/Area (L=23.5)
Computed quantity	Q = L*w/9 = 10.44 SY
Rounded quantity	Q = 11 SY (if rounding = 1)
Deduction quantity	
Net quantity	net Q = rounded Q – deduction Q



Quantity Properties

- •Select the elements to be quantified
- Select the output database

Compute Compute	🚰 Compute Quantities		
Main Payl	tems Features Sheet		
Alignment:	Hemfield Road 🗸		
Mode:	All	Help	
Include -			
Features:			
Graphic Ele	ements: All Selection Set		
Output Database:			
Mode:	Oreate Oreate Oreate		
Phase:	Design 👻		
Run:			
Deduction Tolerance: 5.00			
Sheet Number:			
Purge			
Symbology:			
Object Name			
Apply Preferences Close			



Quantity Manager – Summary Overview





Demo

• Lets peek under the hood of quantity manager!

