



**Arizona  
Department of Transportation**

**WORKBOOK**

for

**Construction Office Quantities  
English Units**

a training course developed  
for the

**ARIZONA DEPARTMENT OF TRANSPORTATION**  
Phoenix, Arizona

Last Revised May 21, 2010

**WORKBOOK**

for

# **Construction Office Quantities**

**English Units**

a training course developed  
for the

**ARIZONA DEPARTMENT OF TRANSPORTATION**  
Phoenix, Arizona

Last Revised May 21, 2010

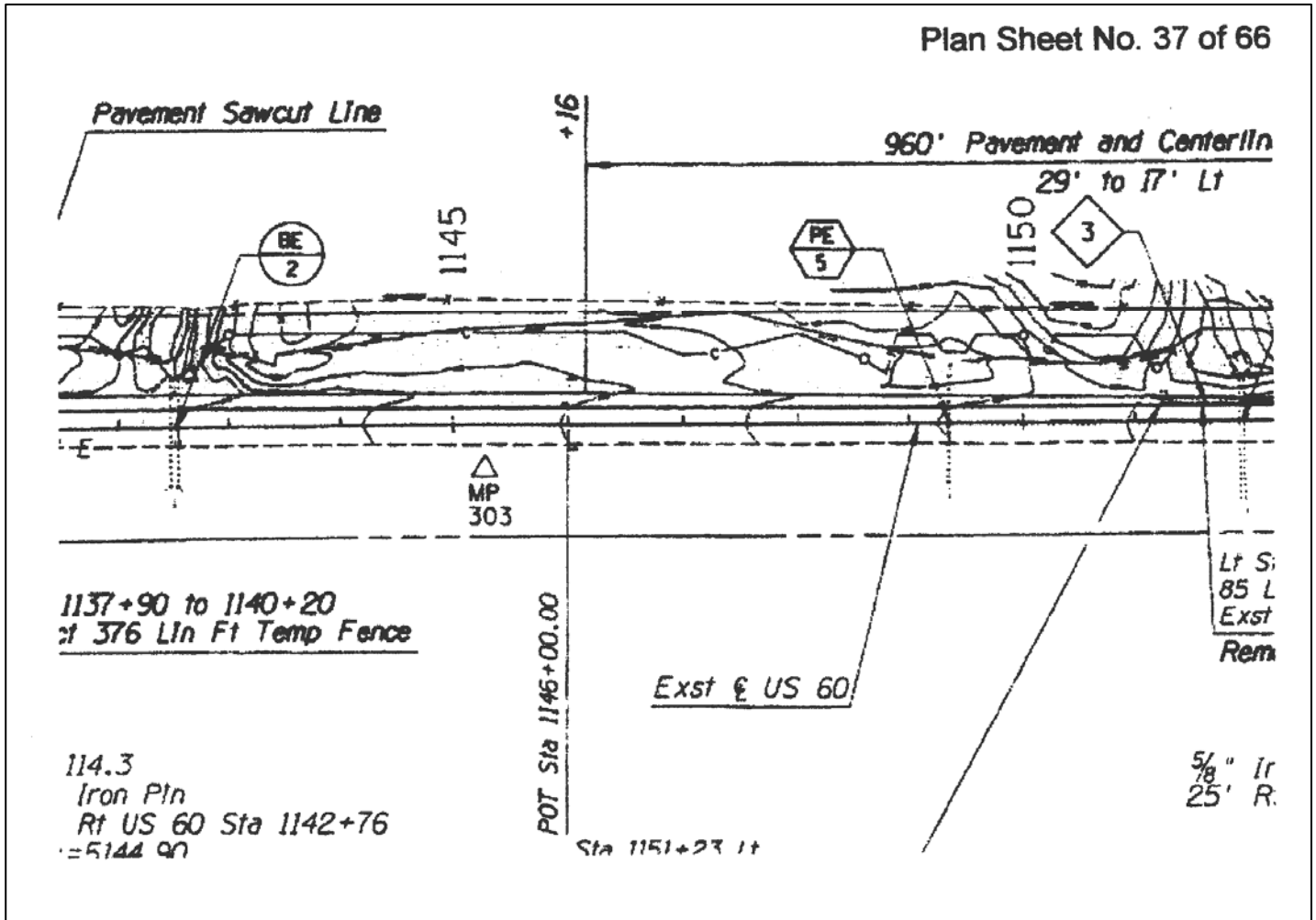
# Learner Objectives

After completing this course on Construction Office Quantities, the learners will be able to:

1. Reference objects to English stations.
2. Tabulate plan quantities. Then, compare them to the Bidding Schedule and resolve any differences for the following items:
  - Removal of obstructions
  - Earthwork
  - Base courses
  - Pipe culverts
  - Fencing
  - Barriers
  - Riprap
3. Break a bid item down into sub-items.

Construction Office Quantities

- How are the labeled stations indicated on the centerline?
- How far apart are the Station labels?
- The distance between intermediate tick marks is \_\_\_\_\_ feet.



- Estimate the Station on the centerline for Box Extension 2.
- Estimate the Station of Milepost 303.
- Estimate the Station on the centerline for Pip Extension 5.

**Construction Office Quantities**

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<b>Job:</b> Climbing Lanes MP 302.30-mp 313.26	<b>Page</b> _____ of _____
<b>Project No:</b> STP-026-1(47)P	<b>By:</b> _____ <b>Chkd:</b> _____
<b>Item:</b> 2020019	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>REMOVAL OF EMBANKMENT CURB</b>	

Plan Sheet	Location	Units
37 of 66		
37 of 66		
37 of 66		
38 of 66		
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Station, offset direction, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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<b>Item:</b> 2020053	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>REMOVE (INLET &amp; SPILLWAY)</b>	

Plan Sheet	Location	Units
37 of 66		
37 of 66		
38 of 66		
39 of 66		
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Station, offset direction, and quantity for each location.
- Total and compare to the Bid Tab Quantity.



**Construction Office Quantities**

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<b>Item:</b> 2030301	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>ROADWAY EXCAVATION)</b>	

Plan Sheet	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Enter the Plan Sheet Number, Station, and quantity for each location
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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<b>Item:</b> 2030401	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>DRAINAGE EXCAVATION</b>	

Plan Sheet	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Enter the Plan Sheet Number, Station, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

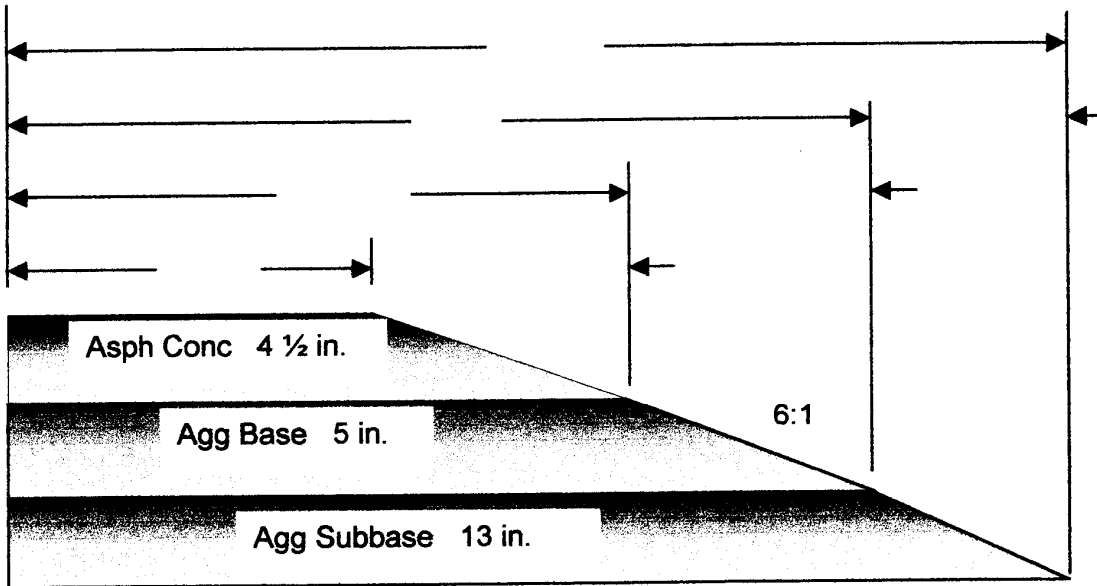
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<b>Item:</b> 9130051	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>RIPRAP (DUMPED)(D50=6")</b>	

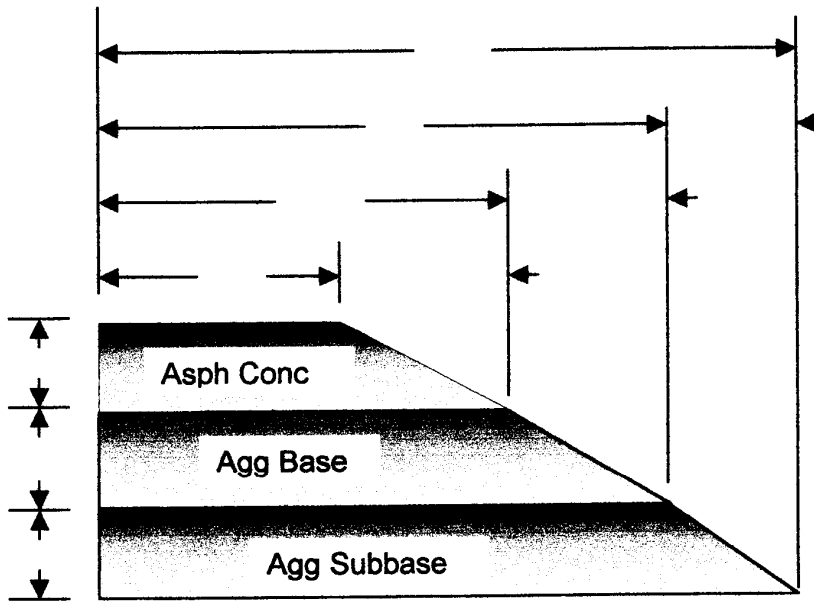
Plan Sheet	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Enter the Plan Sheet Number, Station, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

### Typical Section Pavement Structural Section No. 1

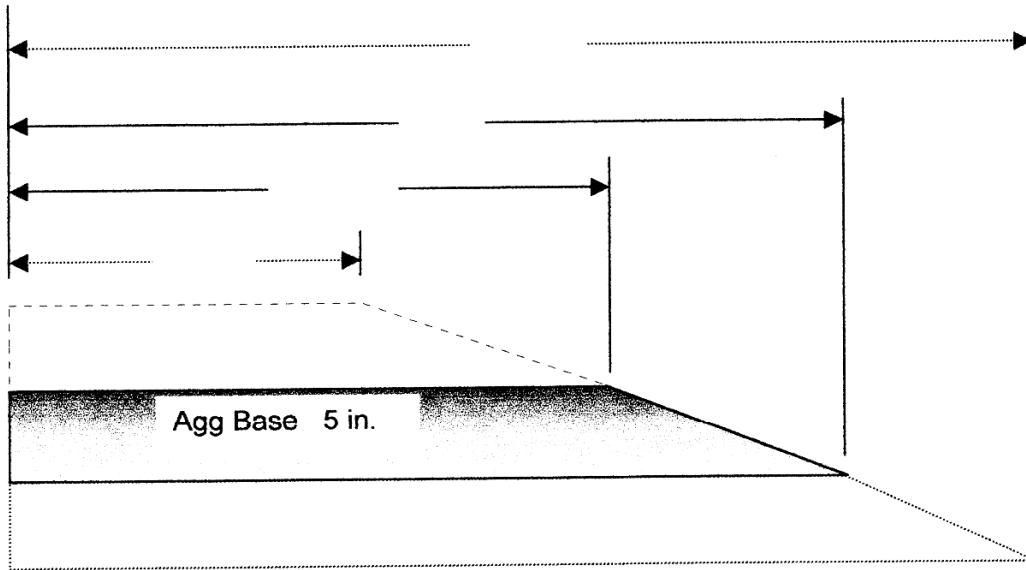


Maximum Width



Minimum Width

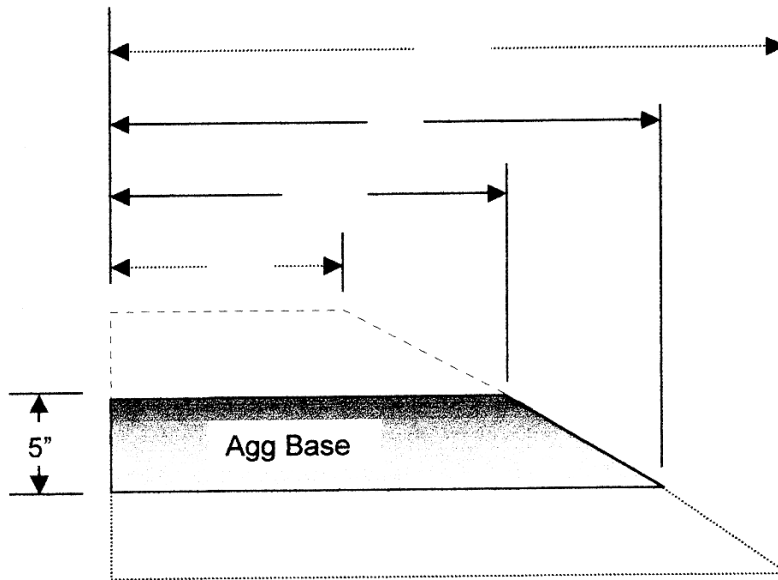
Typical Section  
Aggregate Base, Class 2



Maximum Width

$$\text{Area} = (\text{Base1} + \text{Base2}) / 2 (\text{depth} / 12)$$

$$= ( \quad + \quad ) / 2 ( \quad ) =$$

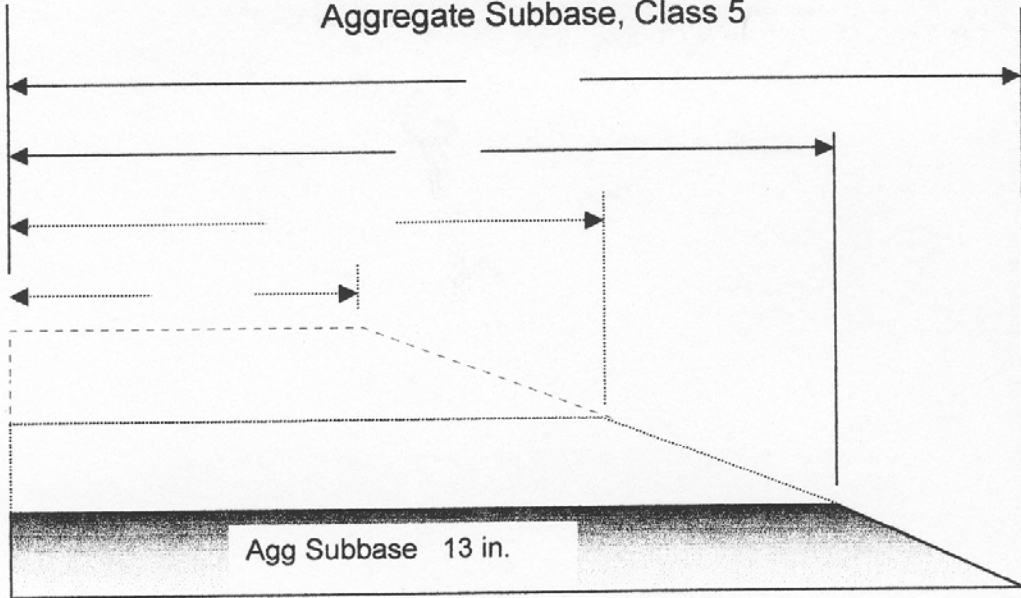


Minimum Width

$$\text{Area} = (\text{Base1} + \text{Base2}) / 2 (\text{depth} / 12)$$

$$= ( \quad + \quad ) / 2 ( \quad ) =$$

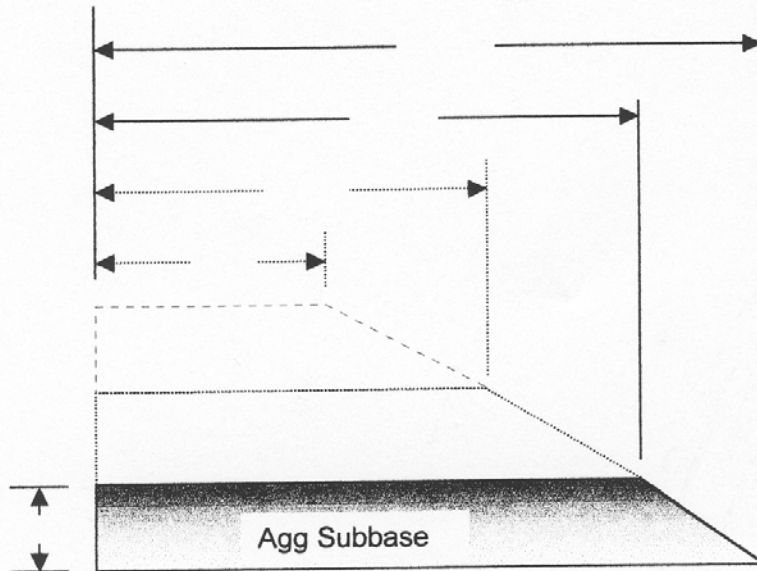
Typical Section  
Aggregate Subbase, Class 5



Maximum Width

$$\text{Area} = (\text{Base1} + \text{Base2}) / 2 (\text{depth} / 12)$$

$$= ( \quad + \quad ) / 2 ( \quad ) =$$



Minimum Width

$$\text{Area} = (\text{Base1} + \text{Base2}) / 2 (\text{depth} / 12)$$

$$= ( \quad + \quad ) / 2 ( \quad ) =$$

**Job:** Climbing Lanes MP 302.30-mp 313.26      **Page** \_\_\_\_\_ of \_\_\_\_\_  
**Project No:** STP-026-1(47)P      **By:** \_\_\_\_\_      **Chkd:** \_\_\_\_\_  
**Item:** 3030022      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**AGGREGATE BASE, CLASS 2**

Plan Sheet	Location	Length	End Area sq ft	Volume cu yd
37 of 66	Lt Sta 1109+73		1.875	
	(1.875+6.875)/2 (960/27)	960		<b>155.56</b>
	Lt Sta 1118+25		6.875	
				<b>710.67</b>
	Lt Sta 1146+16			
				<b>155.56</b>
	Lt Sta 1155+76			
40 of 66	Rt Sta 93+97			
	Rt Sta			
	Rt Sta			
	Rt Sta 145+00			

Given an example of the volume computations for Aggregate Base, Class 2 for one of the six climbing lanes:

- Determine the dimensions from the plans.
- Compute the volume for the selected climbing lane.

**Job:** Climbing Lanes MP 302.30-mp 313.26      **Page** \_\_\_\_\_ of \_\_\_\_\_  
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**Item:** 3030025      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**AGGREGATE SUBBASE, CLASS 5**

Plan Sheet	Location	Length	End Area sq ft	Volume cu yd
37 of 66	Lt Sta 1109+73		9.75	
<i>taper</i>	$(9.75+22.75)/2$ (960/27)	960		<b>577.78</b>
	Lt Sta 1118+25		22.75	
<i>full width</i>				<b>2351.68</b>
	Lt Sta 1146+16		22.75	
<i>taper</i>				<b>577.78</b>
	Lt Sta 1155+76		9.75	
40 of 66	Rt Sta 93+97			
	Rt Sta			
	Rt Sta			
	Rt Sta 145+00			

Given an example of the volume computations for Aggregate Base, Class 2 for one of the six climbing lanes:

- Determine the dimensions from the plans.
- Compute the volume for the selected climbing lane.

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**Item:** 3060001      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**GEOGRID BASE REINFORMENT**

<b>Plan Sheet</b>	<b>Location</b>	<b>Length (feet)</b>	<b>Width (feet)</b>	<b>Area Sq Yds</b>
41 of 66	Rt Sta 194+28		6	
		300		<b>400</b>
	Rt Sta 197+28		18	
		4260		<b>8520</b>
	Rt Sta 239+88		18	
		720		<b>960</b>
	Rt Sta 247+08		6	
41 & 42	Lt Sta 216+00			
	Lt Sta			
	Lt Sta			
	Lt Sta			
			<b>TOTAL</b>	

**306-4 Method of Measurement**

Geogrid base reinforcement will be measured by the square yard in-place. Measurement will be to the nearest square yard. No allowance will be made for materials in laps.

Instructions:

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Station, length, width, and area of each location.
- Total and compare to the Bid Tab Quantity.





**Construction Office Quantities**

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<b>Job:</b> Climbing Lanes MP 302.30-mp 313.26	<b>Page</b> _____ of _____
<b>Project No:</b> STP-026-1(47)P	<b>By:</b> _____ <b>Chkd:</b> _____
<b>Item:</b> 5010035	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>PIPE, CORRUGATED METAL, 48”</b>	

Plan Ref No.	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Sheet Number, Station, and quantity for each location.
- Total and compare to the Bid Tab Quantity.



**Construction Office Quantities**

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**Job:** Climbing Lanes MP 302.30-mp 313.26      **Page** \_\_\_\_\_ of \_\_\_\_\_  
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**Item:** 5014030      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**FLARED END SECTION, 30" (C-13.25)**

Plan Ref No.	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Sheet Number, Station, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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**Item:** 5014036      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**FLARED END SECTION, 36" (C-13.25)**

Plan Ref No.	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Sheet Number, Station, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

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<b>Item:</b> 9030011	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>BARBED WIRE FENCE, TYPE 1</b>	

Plan Sheet No.	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Station, offset, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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**Job:** Climbing Lanes MP 302.30-mp 313.26                      **Page** \_\_\_\_\_ of \_\_\_\_\_  
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**Item:** 9031003                      **Bid Tab Quantity:** \_\_\_\_\_                      **Date:** \_\_\_\_\_

**TEMPORARY FENCE (Type 4)(Woven Wire)(Modified)**

Plan Sheet No.	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Station and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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<b>Item:</b> 9130052	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>RIPRAP (DUMPED)(D50=9")</b>	

Plan Sheet	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Sheet Number, Station and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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**Item:** 9050001      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**GUARD RAIL, W-BEAM, SINGLE FACE**

Plan Ref No.	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Reference Number, Station, Lt or Rt, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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**Job:** Climbing Lanes MP 302.30-mp 313.26      **Page** \_\_\_\_\_ of \_\_\_\_\_  
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**Item:** 2020071      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**REMOVE GUARD RAIL**

Plan Ref No.	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Reference Number, Station, Lt or Rt, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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**Job:** Climbing Lanes MP 302.30-mp 313.26      **Page** \_\_\_\_\_ of \_\_\_\_\_  
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**Item:** 9050018      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**GUARD RAIL, TERMINAL (SRT-350 OR FLEAT-350)**

Plan Ref No.	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Reference Number, Station, Lt or Rt, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Job:** Climbing Lanes MP 302.30-mp 313.26      **Page** \_\_\_\_\_ of \_\_\_\_\_  
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**Item:** 9160001      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**EMBANKMENT CURB**

Plan Sheet	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Sheet Number, Station, Lt or Rt, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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**Item:** 9170001      **Bid Tab Quantity:** \_\_\_\_\_      **Date:** \_\_\_\_\_

**EMBANKMENT SPILLWAY (C-4.10)**

Plan Sheet	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Sheet Number, Station, Lt or Rt, and quantity for each location.
- Total and compare to the Bid Tab Quantity.

**Construction Office Quantities**

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<b>Job:</b> Climbing Lanes MP 302.30-mp 313.26	<b>Page</b> _____ of _____
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<b>Item:</b> 9170021	<b>Bid Tab Quantity:</b> _____ <b>Date:</b> _____
<b>INLET (C-4.10)(Single)</b>	

Plan Sheet	Location	Units
TOTAL		

- Enter the Bid Tab Quantity and Unit of Measure.
- Record the Plan Sheet Number, Station, Lt or Rt, and quantity for each location.
- Total and compare to the Bid Tab Quantity.