



ADDENDUM NO. 3

Solicitation No: Invitation To Bid (ITB) No. 2019-00016

Solicitation Title: Davis Road Sidewalks (CR 82/CS 755/Davis Rd@ 1 Loc) P.I.#0010731

ATTENTION ALL POTENTIAL BIDDERS:
MUST ADDENDUM. READ CAREFULLY AND FOLLOW ALL INSTRUCTIONS.

- This addendum forms a part of the contract documents, modifies the original bidding documents and shall be as binding as if contained therein.
- Return Addendum with Bid Submittal. Failure to do so may subject the Bidder to disqualification.
- Return Completed Revised Bid Pricing Sheets with Bid Submittal.

TO ALL PROSPECTIVE BIDDERS, PLEASE NOTE THE FOLLOWING CHANGES AND CLARIFICATIONS:

Words in ~~striketrough~~ type are deletions from existing text. Words in **bold, underlined** type are additions to existing text.

1. The ITB Due Date ~~has not~~ changed. The ITB Due Date is **2:00 EDT p.m. on Tuesday, July 2, 2019.**
2. The “Bid Form” sheets have been revised. Please delete the previous ~~“Bid Form” sheets on page 31 and 32 of the bid documents.~~ The revised **“Bid Form Addendum No. 3”** is attached.

The “Bid Form” was revised as follows:

- a. **Added GDOT Item Numbers 630-0010, 630-0200, & 630-0300 to the bid items list along with their respective descriptions and quantities.**
- b. **Revised the description of GDOT Item Number 630-0600 to read "Modular Block Retaining Wall Precast Coping".**

3. **Add "Section 630 - Segmental Concrete Retaining Wall System" to the Special Provisions Applicable to the Project.**
4. The following Construction Drawings have been revised.
 - a. **Replace Sheet 02-01 with the attached Sheet 02-01.**
 - **Sheet revised to remove sheet 9031L from the index.**
 - b. **Replace Sheet 03-01 with the attached Sheet 03-01.**
 - **Revision notes added.**
 - c. **Replace Sheet 06-01 with the attached Sheet 06-01.**
 - **Revised the Retaining Walls quantity chart to add GDOT Item Numbers 630-0010, 630-0200, & 630-0300.**
 - d. **Replace Sheet 31-01 with the attached Sheet 31-01.**
 - **Note revised to reference "Section 630 - Segmental Concrete Retaining Wall System".**
 - e. ~~Delete Sheet 9031L from the Construction Plans.~~
 - ~~Sheet is no longer applicable to the plans.~~

I. ADDITIONS / CLARIFICATIONS / CORRECTIONS

The following written question(s) and/or requests for clarification were received by the Contracts and Procurement Department prior to the deadline submission of questions and are hereby provided and answered below:

Q1. Where the contractor can find the specifications for the Modular Block Retaining Wall System? GADOT don't specify it. Per GADOT-630.1, "the specification will be included elsewhere in the contract". The bidders should have that information to estimate the price, and you could have a fair price.

A1. The following drawings and GA Standard 9031L have been deleted:

~~sheet 02-01 from the construction drawings~~
~~sheet 03-01 from the construction drawings~~
~~sheet 06-01 from the construction drawings~~
~~sheet 31-01 from the construction drawings~~
~~sheet 9031L from the construction drawings~~



City of Stockbridge Purchasing Division

City of Stockbridge City Hall
4640 North Henry Boulevard
Stockbridge, Ga 30281

Please see **Revised Drawings for sheet 2-01, 3-01, 6-01 and 31-01 with a revision date of 6/24/2019.**

The City of Stockbridge’s website and the State of Georgia Registry is the official location for the posting of all solicitation addenda and contract award results. It is the obligation of each Prospective Provider to frequently monitor the City’s website in order to obtain complete and timely information. The City’s website is located at <https://www.cityofstockbridge.com/default.aspx>

All other terms, conditions, and specifications of the solicitation remain unchanged.

Name of Company / Firm / Organization

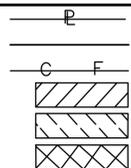
Printed Name of Authorized Rep. / Title

Signature of Authorized Representative / Date

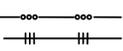
INDEX OF SHEETS

SHEET NO.	DRAWING NO.	DESCRIPTION	REVISION DATE
1	01-01	COVER SHEET	
2	02-01	INDEX SHEET	
3	03-01	REVISION SUMMARY	
4	04-01	GENERAL NOTES	
5	05-01	TYPICAL SECTIONS	
6	06-01	SUMMARY OF QUANTITIES	
7	07-01	QUANTITIES FROM AMENDMENT	
8	08-01	QUANTITIES FROM CONSTRUCTION	
9 - 15	SECTION 13	MAINLINE ROADWAY PLANS	
16 - 18	SECTION 15	PLAN PROFILE SHEETS	
19	17-01	DRIVEWAY PROFILES	
20	22-01	DRAINAGE PROFILES	
21	31-01	WALL PROFILES	
22	40-01	CONSTRUCTION DETAILS	
23	A-1	DRIVEWAYS WITH TAPERED ENTRANCES CONCRETE VALLEY GUTTER	JUL 21, 2011
24	A-2	6" OR 8" CONCRETE VALLEY GUTTER	FEB 21, 2003
25	A-3	CURB CUT (WHEEL CHAIR) RAMPS	JUN 18, 2009
26	A-4	DETECTABLE WARNING SURFACE	JUN 18, 2009
27	1019A	STANDARD DROP INLETS	AUGUST 1999
28	1019A-P	STANDARD PRECAST DROP INLETS	AUGUST 1982
30	9031U	JUNCTION BOXES	JULY 1985
31	T1	DETAILS OF SIGN PLATES	JAN 2000
32	T3A	TYPE 7, 8, AND 9 SQUARE TUBE POST INSTALLATION DETAIL	JULY 2002
33 - 39	SECTION 44	UTILITY RELOC., SIGNAGE, & STRIPING PLANS	
40	50-01	EROSION CONTROL COVER SHEET	
41 - 44	SECTION 51	EROSION CONTROL NOTES	
45	52-0001	EROSION CONTROL LEGEND	MARCH 2, 2017
46	52-0002	EROSION CONTROL LEGEND	NOV 28, 2018
47	52-0003	EROSION CONTROL LEGEND	MARCH 2, 2017
48	52-0004	EROSION CONTROL LEGEND	MARCH 2, 2017
49	52-0005	EROSION CONTROL LEGEND	MARCH 2, 2017
50	52-0006	EROSION CONTROL LEGEND	NOV 28, 2018
51	52-0007	EROSION CONTROL LEGEND	MARCH 2, 2017
52	53-01	DRAINAGE MAP	
53 - 73	SECTION 54	ES & PC PLAN SHEETS	
74	55-01	WATERSHED MAP	
75 - 76	SECTION 56	EROSION CONTROL DETAILS	

PROPERTY AND EXISTING R/W LINE
 REQUIRED R/W LINE
 CONSTRUCTION LIMITS
 EASEMENT FOR CONSTR
 & MAINTENANCE OF SLOPES
 EASEMENT FOR CONSTR OF SLOPES
 EASEMENT FOR CONSTR OF DRIVES



BEGIN LIMIT OF ACCESS.....BLA
 END LIMIT OF ACCESS.....ELA
 LIMIT OF ACCESS
 REQ'D R/W & LIMIT OF ACCESS



FALCON DESIGN
 ENGINEERING PLANNING SURVEYING
 215 CORPORATE CENTER DRIVE, SUITE 200
 STOCKBRIDGE, GEORGIA 30281
 PL (770) 389-8666 • FAX (770) 389-8666
 VISIT US ON OUR WEBSITE: www.fdc-llc.com

GEORGIA REGISTERED PROFESSIONAL ENGINEER
 No. 043430
 JAMES L. JOHNSON
 6/24/2019

SCALE

REVISION DATES
6-24-19

CITY OF STOCKBRIDGE
 HENRY COUNTY, GEORGIA
 INDEX SHEET
 DAVIS ROAD
 DRAWING No. 02-01

SUMMARY OF QUANTITIES: DAVIS ROAD

STATION, SIDE, & LOCATION	SUMMARY OF DRIVEWAY QUANTITIES						ITEM # 610-1890 REMOVE SIDE DRAINS		
	ITEM# 402-3113 12.5 mm SUPERPAVE TON	ITEM# 310-5060 6" G.A.B. SY	ITEM # 441-0014 6" DWY CONC. SY	ITEM # 550-2180 18" RCP SIDEDRAINS LF	ITEM # 550-3418 S.E.S. STD. 1121 EA	AREA SQ FT	SIZE	TYPE	LENGTH
13+74.05 RT. PARCEL 1	2.9	48.8	22.3			238			
14+34.89 RT. PARCEL 1		27.3	27.3						
15+42.51 RT. PARCEL 2		39.1	39.1						
23+36.08 RT. PARCEL 5		23.0	23.0						
24+94.97 RT. PARCEL 6	3.9	62.8	27.8			316			
25+45.33 RT. PARCEL 7		31.8	31.8						
27+17.90 RT. PARCEL 8		22.7	22.7	58	2		15 RCP		22
27+47.31 RT. PARCEL 7		24.0	24.0				15 RCP		30
28+69.86 RT. PARCEL 9		26.1	26.1						
44+99.63 RT. PARCEL 11		65.3	65.3						
TOTAL	7	371	309	58	2	554			52

ITEM	AREA ACRES	FERTILIZERS			ITEM # 163-0240 MULCH TON
		ITEM # 700-7000 AGRIC. LIME TON	ITEM # 700-8000 MIXED GRADE TON	ITEM # 700-8100 NITROGEN CONTENT LB	
ITEM # 700-6910 PERMANENT GRASSING	1.33	4	0.8	112	
ITEM # 163-0232 TEMPORARY GRASSING	1.33				5.4
TOTAL	2.66	4.0	0.80	112	5.4

SIDEWALK		
ITEM	UNIT	TOTAL
ITEM # 441-0104 4 IN SIDEWALK	SY	1680
ITEM # 610-2815 REMOVE SIDEWALK	SY	38

SAWCUT QUANTITIES		
ITEM	UNIT	TOTAL
ITEM # 444-2000 EXISTING ASPHALT	LF	978

ROW MARKERS		
ITEM	UNIT	QTY
ITEM # 634-1200 RIGHT OF WAY MARKERS	EA	4

GRADING COMPLETE		
ITEM	UNIT	TOTAL
ITEM # 210-0100 LUMP SUM		

TEMPORARY EROSION CONTROL		
ITEM	UNIT	TOTAL
ITEM # 171-0030 TEMPORARY SILT FENCE TYPE C	LF	3931
ITEM # 165-0030 MAINTENANCE OF TEMPORARY SILT FENCE TYPE C	LF	1966

UTILITY QUANTITIES		
ITEM	UNIT	QTY
ITEM # 611-8050 ADJUST SAN. MANHOLE TO GRADE	EA	1
ITEM # 611-8120 ADJUST WATER METER BOX TO GRADE	EA	3
ITEM # 611-8140 ADJUST WATER VALVE TO GRADE	EA	3
ITEM # 670-2002 VALVE MARKER	EA	1
UTILITY ITEMS WILL BE INSTALLED AND PAID FOR BY THEIR RESPECTIVE COMPANIES		

HANDRAIL	
ITEM	LENGTH, LF
ITEM # 515-1002 FERROUS METAL HANDRAIL, TWO PIPE - STA 35+48.39 - 38+07.97	262
TOTAL	262

WATER QUALITY		
ITEM	UNIT	TOTAL
ITEM # 167-1000 WATER QUALITY MONITORING AND SAMPLING	EA	20
ITEM # 167-1500 WATER QUALITY INSPECTIONS	MO	6

DRAINAGE SUMMARY		
LOCATION	ITEM # 668-2100 DROP INLET, GP1 GA. STD. 1019-A TYPE-E EACH	ITEM # 550-1180 STORM DRAIN PIPE 18" RCP LIN. FT.
A-1, STA 29+77 RT.	1	131
A-2, STA 28+45 RT.	1	147
A-3, STA 26+97 RT.	1	244
A-4, STA 24+53 RT.	1	
TOTAL	4	522

TRENCH DRAINS	
LOCATION	ITEM # 668-6112 TRENCH DRAIN, 12 IN LIN. FT.
12+20 RT.	15
TOTAL	15

HIGHWAY SIGN QUANTITIES					
DESCRIPTION	STATION	SIGN	UNIT	QTY	ITEM # 636-2070
					GALV. STEEL POST, TP 7
HIGHWAY SIGNS, TP 1 MATL. REFL SHEETING, TP 11	17+36 RT	R1-1 (36")	SF	9	11 LF
	32+84 RT	R1-1 (36")	SF	9	11 LF
	48+12 RT	R1-1 (36")	SF	9	11 LF
	48+70 RT	R1-1 (36")	SF	9	11 LF

REMOVE HWY SIGN		
ITEM	UNIT	QTY
ITEM # 610-6515	EA	1
STA 15+09.67	EA	1
STA 30+31.88	EA	1
STA 48+84.82	EA	1

RESET HWY SIGN		
ITEM	UNIT	QTY
ITEM # 611-5360	EA	1
STA 15+09.67	EA	1
STA 30+31.88	EA	1

TRAFFIC CONTROL	
ITEM	LUMP SUM
ITEM # 150-1000	
LUMP SUM	

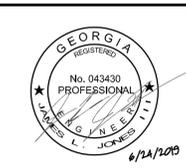
STRIPING QUANTITIES		
ITEM	UNIT	QTY
ITEM # 653-1704 THERMOPLASTIC SOLID TRAFFIC STRIPE, 24 IN, WHITE	LF	57
ITEM # 656-0050 REMOVE EXISTING SOLID TRAFFIC STRIPE, 5 IN, THERMOPLASTIC	LF	40
ITEM # 656-0240 REMOVE EXISTING SOLID TRAFFIC STRIPE, 24 IN, THERMOPLASTIC	LF	38
ITEM # 653-6004 THERMOPLASTIC TRAF STRIPING, WHITE	SY	55

FENCING QUANTITIES		
ITEM	UNIT	QTY
ITEM # 610-0300 REM FENCE	LF	225
ITEM # 610-0301 REM GATE	EA	1
ITEM # 611-4996 RESET GATE	EA	1
ITEM # 643-0103 FIELD FENCE BARBED WIRE, 3 STRANDS	LF	220
ITEM # 610-0209 REMOVE CHAIN LINK FENCE, 4 FT	LF	52
ITEM # 610-5788 REMOVE CHAIN LINK GATE	EA	1
ITEM # 611-5004 RESET CHAIN LINK FENCE GATE	EA	1
ITEM # 611-5010 RESET CHAIN LINK FENCE, 4 FT	LF	52

CURBING		
ITEM	UNIT	TOTAL
ITEM # 310-5120 12" G.A.B.	SY	272
ITEM # 441-6012 6 IN X 24 IN, TP 2 CURB AND GUTTER	LF	978

PROPERTY AND EXISTING R/W LINE
 REQUIRED R/W LINE
 CONSTRUCTION LIMITS
 EASEMENT FOR CONSTR
 & MAINTENANCE OF SLOPES
 EASEMENT FOR CONSTR OF SLOPES
 EASEMENT FOR CONSTR OF DRIVES

BEGIN LIMIT OF ACCESS.....BLA
 END LIMIT OF ACCESS.....ELA
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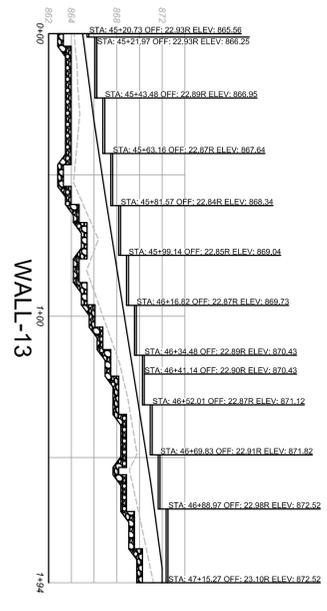
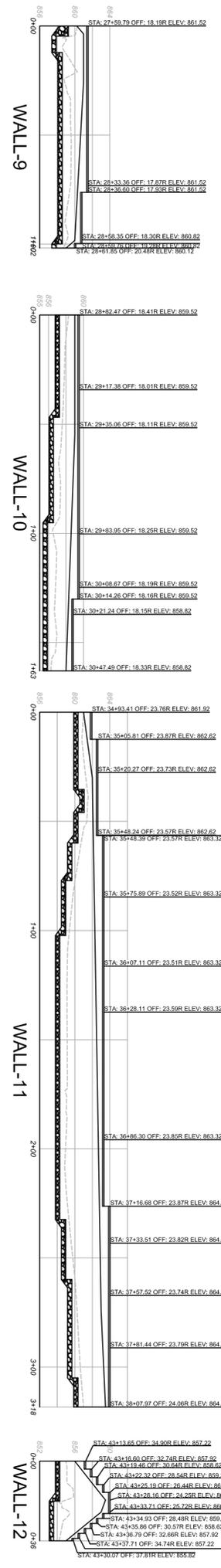
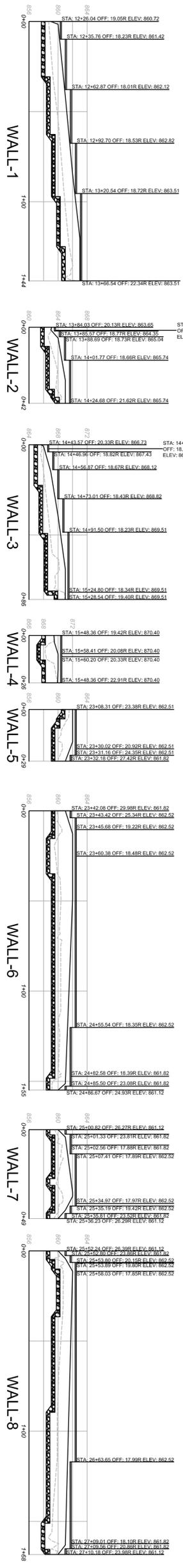
SCALE	REVISION DATES
	6-24-19

CITY OF STOCKBRIDGE
HENRY COUNTY, GEORGIA

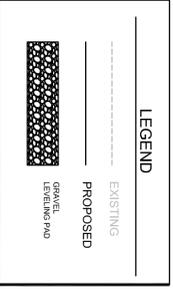
SUMMARY OF QUANTITIES

DAVIS ROAD

DRAWING No.	06-01
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NOTE:
 ALL WALLS TO BE CONSTRUCTED FOLLOWING CURRENT GDOT STANDARDS AND SECTION 630 - SEGMENTAL CONCRETE RETAINING WALL SYSTEM OF THE CONTRACT SPECIFICATIONS.



SCALE
 HORIZ: 1" = 30'
 VERT: 1" = 10'

PROPERTY AND EXISTING R/W LINE
 REQUIRED R/W LINE
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 EASEMENT FOR CONSTR OF SLOPES
 EASEMENT FOR CONSTR OF DRIVES

BEGIN LIMIT OF ACCESS.....BLA
 END LIMIT OF ACCESS.....ELA
 LIMIT OF ACCESS
 REQ'D R/W & LIMIT OF ACCESS

ENGINEERING PLANNING SURVEYING
 215 COMMERCIAL CENTER DRIVE, SUITE 200
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FALCON DESIGN

REVISION DATES
 6-24-19

CITY OF STOCKBRIDGE
 HENRY COUNTY, GEORGIA

WALL PROFILES

DAVIS ROAD SIDEWALKS

DRAWING No. 31-01



City of Stockbridge Purchasing Division

City of Stockbridge City Hall
 4640 North Henry Boulevard
 Stockbridge, Ga 30281

**Addendum No. 3
 BID FORM**

The Bidder declares that he/she understands that the quantities shown for the unit price items are subject to either increase or decrease, and that should the quantities of any of the items of work be increased, the Bidder proposes to do the additional work at the unit prices stated herein; and should the quantities be decreased, the Bidder also understands that payment will be made on the basis of actual quantities at the unit price bid and will make no claim for anticipated profits for any decrease in quantities; and that actual quantities will be determined upon completion of work, at which time adjustments will be made to the contract amount by direct increase or decrease.

BASE BID

Section ROADWAY ITEMS (TE Funding Eligible)						
Item Number	GDOT Item Number	Item Description	Units	Quantity	Unit Price	Total Price
1	150-1000	TRAFFIC CONTROL	LS	LS		
2	210-0100	GRADING COMPLETE	LS	LS		
3	310-5060	GR AGGR BASE CRS, 6 INCH, INCL MATL	SY	371		
4	310-5120	GR AGGR BASE CRS, 12 INCH, INCL MATL	SY	272		
5	402-3113	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 1 OR 2, INCL BITM MATL & H LIME	TN	7		
6	441-0014	DRIVEWAY CONCRETE, 6 IN TK	SY	309		
7	441-0104	CONC SIDEWALK, 4 IN	SY	1680		
8	441-6012	CONC CURB & GUTTER, 6 IN X 24 IN, TP 2	LF	978		
9	444-2000	SAWCUT EXISTING ASPHALT	LF	978		
10	515-1002	FERROUS METAL HANDRAIL, TWO PIPE	LF	262		
11	610-0209	REMOVE CHAIN LINK FENCE, 4 FT	LF	52		
12	610-0300	REM FENCE -	LF	225		
13	610-0301	REM GATE -	EA	1		
14	610-2815	REM CONC SIDEWALK	SY	38		
15	610-5788	REMOVE CHAIN LINK GATE	EA	1		
16	610-6515	REM HWY SIGN, STD	EA	3		
17	611-4996	RESET GATE -	EA	1		
18	611-5004	RESET CHAIN LINK FENCE GATE	EA	1		
19	611-5010	RESET CHAIN LINK FENCE, 4 FT	LF	52		
20	611-5360	RESET HWY SIGN	EA	2		
21	630-0010	SEGMENTAL CONCRETE FACING UNITS	SF	3665		
22	630-0200	MODULAR BLOCK RETAINING WALL BACKFILL MATERIAL	CY	303		
23	630-0300	CONCRETE LEVELING PAD	LF	1514		
24	630-0600	MODULAR BLOCK RETAINING WALL PRECAST COPING	LF	1514		
25	634-1200	RIGHT OF WAY MARKERS	EA	4		
26	636-1036	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 11	SF	36		
27	636-2070	GALV STEEL POST, TP 7	LF	44		
28	643-0103	FIELD FENCE BARBED WIRE, 3	LF	220		



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		STRANDS				
29	653-1704	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	LF	57		
30	653-6004	THERMOPLASTIC TRAF STRIPING, WHITE	SY	55		
31	656-0050	REMOVE EXIST SOLID TRAF STRIPE, 5 IN, THERMOPLASTIC	LF	40		
32	656-0240	REMOVE EXIST SOLID TRAF STRIPE, 24 IN, THERMOPLASTIC	LF	38		
Section EROSION CONTROL ITEMS (TE Funding Eligible)						
33	163-0232	TEMPORARY GRASSING	AC	1.33		
34	163-0240	MULCH	TN	5.4		
35	165-0030	MAINTENANCE OF SILT FENCE, TP C	LF	1966		
36	167-1000	WATER QUALITY MONITORING AND SAMPLING	MO	6		
37	167-1500	WATER QUALITY INSPECTIONS	EA	20		
38	171-0030	TEMPORARY SILT FENCE, TP C	LF	3931		
39	700-6910	PERMANENT GRASSING	AC	1.33		
40	700-7000	AGRICULTURAL LIME	TN	4		
41	700-8000	FERTILIZER MIXED GRADE	TN	0.8		
42	700-8100	FERTILIZER NITROGEN CONTENT	LB	112		
Section DRAINAGE ITEMS (TE Funding Eligible)						
43	550-1180	STORM DRAIN PIPE, 18 IN, H 1-10	LF	522		
44	550-2180	SIDE DRAIN PIPE, 18 IN, H 1-10	LF	58		
45	668-6112	TRENCH DRAIN, 12 IN	LF	15		
46	550-3418	SAFETY END SECTION 18 IN, SIDE DRAIN, 4:1 SLOPE	EA	2		
47	610-1890	REM SIDE DRAIN PIPE	LF	52		
48	668-2100	DROP INLET, GP 1	EA	4		
					Total	

Note:

All areas of the bid form must be filled in with a dollar figure. If it is the intent of the vendor to perform or provide any services or commodities referenced at no cost to the city, then \$0.00 (zero) dollars should be referenced in the appropriate field. Do not use “n/a”, “—”, or any other symbols or attached conditions to the bid price submittal.

Failure to use the City’s bid form and provide all costs as requested in this solicitation may deem your bid non-responsive. Conditions shall not be attached to the bid price proposal. Any items not listed are incidental to the work. Award will be based on lowest responsive responsible total cost base bid.

The Bidder furthermore agrees that, in the case of a failure on his part to execute the Contract Agreement and Bonds within ten days after receipt of conformed contract documents for execution, the Bid Bond accompanying his bid and the monies payable thereon shall be paid into the funds of the Owner as liquidated damages for such failure.

Enclosed is a Bid Bond in the approved form, in the sum of _____ Dollars (\$) _____) according to the conditions of Instructions to Bidders and provisions thereof.

Addendum No. 3
SECTION 630 -
SEGMENTAL CONCRETE
RETAINING WALL SYSTEM

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Concrete segmental retaining wall units
- B. Geosynthetic reinforcement
- C. Leveling pad base
- D. Drainage aggregate
- E. Reinforced backfill
- F. Drainage pipe
- G. Prefabricated drainage composite
- H. Geotextile filter
- I. Impervious materials
- J. Construction adhesive

1.02 REFERENCES

- A. American Association of State Highway Transportation Officials (AASHTO)
 - 1. AASHTO M288 Geotextile Specification for Highway Applications
 - 2. AASHTO Standard Specifications for Highway Bridges
- B. American Society for Testing and Materials (ASTM)
 - 1. ASTM C140 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
 - 2. ASTM C1262 Standard Test Method for Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units
 - 3. ASTM C1372 Standard Specification for Segmental Retaining Wall Units
 - 4. ASTM D448 Standard Classification for Sizes of Aggregate for Road and Bridge Construction
 - 5. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 12,400 ft-lbf/f³
 - 6. ASTM D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method
 - 7. ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 - 8. ASTM D2922 Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

9. ASTM D3034 Standard Specification for Type PSM Poly PVC Sewer Pipe and Fittings
 10. ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 12. ASTM D4491 Standard Test Method for Water Permeability of Geotextiles by the Permittivity Method
 13. ASTM D4595 Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
 14. ASTM D4873 Standard Guide for Identification, Storage and Handling of Geosynthetics
 15. ASTM D5084 Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
 16. ASTM D5262 Standard Test Method for Evaluating the Unconfined Tension Creep Behavior of Geosynthetics
 17. ASTM D5321 Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method
 18. ASTM D5818 Standard Practice for Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage
 19. ASTM D6637 Standard Test Method for Determining Tensile Properties of Geogrids by the Single- or Multi-Rib Tensile Method
 20. ASTM D6638 Standard Test Method for Determining Connection Strength Between Geosynthetic Reinforcement and Segmental Concrete Units
 21. ASTM D6916 Standard Test Method for Determining the Shear Strength Between Segmental Concrete Units
 22. ASTM D6706 Standard Test Method for Measuring Geosynthetic Pullout Resistance in Soil
 23. ASTM F405 Standard Specification for Corrugated Polyethylene (PE) Tubings and Fittings
 24. ASTM G51 Standard Test Method for Measuring pH of Soil for Use in Corrosion Testing
- C. Federal Highway Administration
1. Elias, V., Christopher, B., and Berg, R., “Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines,” Federal Highway Administration Report No. FHWA-NHI-00-043, March 2001.
 2. Elias, V., Christopher, B., and Berg, R., “Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes,” Federal Highway Administration Report No. FHWA-NHI-00-044, March 2001.
- D. National Concrete Masonry Association (NCMA)
1. NCMA *Design Manual for Segmental Retaining Walls*, Second Edition, Second Printing (1997) or *Design Manual for Segmental Retaining Walls*, Third Edition (2010).

1.03 DEFINITIONS

- A. Concrete Segmental Retaining Wall (SRW) Units: Dry-stacked masonry units used as the retaining wall fascia.
- B. Reinforced Backfill: Soil which is used as fill behind the SRW unit, and within the reinforced soil mass.
- C. Drainage Aggregate: Material used within, between, and directly behind the concrete retaining wall units.
- D. Geotextile Filter: Material used for separation and filtration of dissimilar soil types.
- E. Foundation Soil: Soil mass supporting the leveling pad and reinforced soil zone of the retaining wall system.
- F. Geosynthetic Reinforcement: Polymeric material designed specifically to reinforce the soil mass.
- G. Prefabricated Drainage Composite: three-dimensional geosynthetic drainage medium encapsulated in a geotextile filter, used to transport water.
- H. Impervious Materials: Clay soil or low permeability geosynthetic used to prevent water percolation into the drainage zone and reinforced backfill behind the wall.
- I. Global Stability: The general mass movement of a soil reinforced segmental retaining wall structure and adjacent soil mass.
- J. Project Geotechnical Engineer: A registered engineer who provides site observations, recommendations for foundation support, and verifies soil shear strength parameters.

1.04 SUBMITTALS

- A. Submit the following in accordance with Section 01300:
 - 1. Product Data: Material description and installation instructions for each manufactured product specified.
 - 2. Shop Drawings: Retaining wall system design, including wall elevation views, geosynthetic reinforcement layout, pertinent details, and drainage provisions. The shop drawings shall be signed by a registered professional engineer licensed in the state of wall installation.
 - 3. Design Calculations: Engineering design calculations prepared in accordance with the NCMA *Design Manual for Segmental Retaining Walls*, or the AASHTO *Standard Specifications for Highway Bridges*, Section 5.8 (whichever is applicable). Analysis of global stability must be addressed and incorporated into the shop drawings.
 - 4. Samples
 - a. Furnish one unit in the color and face pattern specified, if requested.
 - b. Furnish 12-inch square or larger piece of the geosynthetic reinforcement specified.
 - 5. Test Reports: Independent laboratory reports stating moisture absorption and compressive strength properties of the concrete retaining wall units meet the Project Specifications when tested in accordance with ASTM C140, Sections 6, 8 and 9.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Concrete Retaining Wall Units and Accessories: Deliver, store, and handle materials in accordance with manufacturer's recommendations, in such a manner as

to prevent damage. Check the materials upon delivery to assure that proper material has been received. Store above ground on wood pallets or blocking. Remove damaged or otherwise unsuitable material, when so determined, from the site.

1. Exposed faces of concrete wall units shall be free of chips, cracks, stains, and other imperfections detracting from their appearance, when viewed from a distance of 10 feet.
 2. Prevent mud, wet cement, adhesives and similar materials that may harm appearance of units, from coming in contact with system components.
- B. Geosynthetics including geosynthetic reinforcement, geotextile filter, prefabricated drainage composite shall be delivered, stored, and handled in accordance with ASTM D4873.

1.06 EXTRA MATERIALS

- A. Furnish Owner with 10 replacement units identical to those installed on the Project for use as attic stock. Materials to be delivered to the Owner as directed.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Concrete Retaining Wall Units: "Anchor™ Diamond Pro Retaining Wall Units" as manufactured under license from Anchor Wall Systems, or Owner approved equivalent.
1. Physical Requirements
 - a. Meet requirements of ASTM C1372, except the maximum water absorption shall be limited to 7 percent, and unit height dimensions shall not vary more than plus or minus 1/16 inch from that specified in the ASTM reference, not including textured face.
 - b. Unit Face Area: Not less than 0.67 square feet.
 - c. Color: Selected by the Owner from manufacturer's full range of standard colors.
 - d. Face Pattern Geometry: Straight Face.
 - e. Texture: Split-Rock Face.
 - f. Include an integral concrete shear connection flange/locator.
- B. Geosynthetic Reinforcement: Polyester fiber geogrid or geotextile, or polypropylene woven geotextile, as shown on the Drawings.
- C. Leveling Pad Base
1. Concrete Base: Nonreinforced lean concrete base.
 - a. Compressive Strength: 3,000 psi (minimum).
 - b. Base Thickness: At least 2 inches
 2. Aggregate Base: Crushed stone or granular fill meeting the following gradation as determined in accordance with ASTM D448:

<u>Sieve Size</u>	<u>Percent Passing</u>
1 inch	100
No. 4	35 to 70
No. 40	10 to 35
No. 200	3 to 10

- a. Base Thickness: 6 inches (minimum compacted thickness).
- D. Drainage Aggregate: Clean crushed stone or granular fill meeting the following gradation as determined in accordance with ASTM D448:
- | <u>Sieve Size</u> | <u>Percent Passing</u> |
|-------------------|------------------------|
| 1 inch | 100 |
| 3/4 inch | 75 to 100 |
| No. 4 | 0 to 60 |
| No. 40 | 0 to 50 |
| No. 200 | 0 to 5 |
- E. Backfill: Soil free of organics and debris and consisting of either GP, GW, SP, SW, or SM type, classified in accordance with ASTM D2487 and the USCS classification system.
- 1. Soils classified as SC, ML and CL are considered suitable soils for segmental retaining walls with a total height of less than 10 feet unless the Plasticity Index (PI) is 20 or more.
 - 2. Maximum particle size for backfill is 4 inches.
 - 3. Unsuitable soils are organic soils and those soils classified as CH, OH, MH, OL, or PT.
- F. Impervious Material: Clayey soil or other similar material which will prevent percolation into the drainage zone behind the wall.
- G. Drainage Pipe: Perforated or slotted PVC or corrugated HDPE pipe manufactured in accordance with D3034 and/or ASTM F405. The pipe may be covered with a geotextile filter fabric to function as a filter.
- H. Construction Adhesive: Exterior grade adhesive as recommended by the retaining wall unit manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which the retaining wall system is to be erected, and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Promptly notify the wall design engineer of site conditions which may affect wall performance, soil conditions observed other than those assumed, or other conditions that may require a reevaluation of the wall design.
- C. Verify the location of existing structures and utilities prior to excavation.

3.02 PREPARATION

- A. Ensure surrounding structures are protected from the effects of wall excavation.
- B. Excavation support, if required, is the responsibility of the Contractor, including the stability of the excavation and its influence on adjacent properties and structures.

3.03 EXCAVATION

- A. Excavate to the lines and grades shown on the Drawings. Over-excavation not approved by the Engineer will not be paid for by the Owner. Replacement of these soils with compacted fill and/or wall system components will be required at the Contractor's expense. Use care in excavating to prevent disturbance of the base beyond the lines shown.

3.04 FOUNDATION PREPARATION

- A. Excavate foundation soil as required for footing or base dimension shown on the Drawings, or as directed by the Project geotechnical engineer.
- B. The Project geotechnical engineer will examine foundation soil to ensure that the actual foundation soil strength meets or exceeds that indicated on the Drawings. Remove soil not meeting the required strength. Oversize resulting space sufficiently from the front of the block to the back of the reinforcement, and backfill with suitable compacted backfill soils.
- C. The Project geotechnical engineer will determine if the foundation soils will require special treatment or correction to control total and differential settlement.
- D. Fill over-excavated areas with suitable compacted backfill, as recommended by the Project geotechnical engineer.

3.05 BASE COURSE PREPARATION

- A. Place base materials to the depths and widths shown on the Drawings, upon undisturbed soils, or foundation soils prepared in accordance with Article 3.04.
 - 1. Extend the leveling pad laterally at least 6 inches in front and behind the lowermost concrete retaining wall unit.
 - 2. Provide a concrete leveling pad as specified in Subparagraph 2.01.C.1.
 - 3. The Contractor may at their option, provide aggregate base compacted to 6 inches thick (minimum), in lieu of the concrete leveling pad.
 - 4. Where a reinforced footing is required by local code official, place footing below frost depth.
- B. Compact/finish base material to provide a level, hard surface on which to place the first course of units.
- C. Prepare base materials to ensure complete contact with retaining wall units. Gaps are not allowed.

3.06 ERECTION

- A. General: Erect units in accordance with manufacturer's instructions and recommendations, and as specified herein.
- B. Place first course of concrete wall units on the prepared base material. Check units for level and alignment. Maintain the same elevation at the top of each unit within each section of the base course.
- C. Ensure that foundation units are in full contact with natural or compacted soil base.
- D. Place concrete wall units side-by-side for full length of wall alignment. Alignment may be done by using a string line measured from the back of the block. Gaps are not allowed between the foundation concrete wall units.
- E. Place 12 inches (minimum) of drainage aggregate between, and directly behind, the concrete wall units. Fill voids in retaining wall units with drainage aggregate. Provide a drainage zone behind the wall units to within 9 inches of the final grade. Cap the backfill and drainage aggregate zone with 9 inches of impervious material.

- F. Install drainage pipe at the lowest elevation possible, to maintain gravity flow of water to outside of the reinforced zone. Slope the main collection drainage pipe, located just behind the concrete retaining wall units, 2 percent (minimum) to provide gravity flow to the daylighted areas. Daylight the main collection drainage pipe through the face of the wall, and/or to an appropriate location away from the wall system at each low point or at 50-foot (maximum) intervals along the wall. Alternately, the drainage pipe can be connected to a storm sewer system at 50-foot (maximum) intervals.
- G. Remove excess fill from top of units and install next course. Ensure drainage aggregate and backfill are compacted before installation of next course.
- H. Check each course for level and alignment. Adjust units as necessary to maintain level and alignment prior to proceeding with each additional course.
- I. Install each succeeding course. Backfill as each course is completed. Pull the units forward until the locating surface of the unit contacts the locating surface of the units in the preceding course. Interlock wall segments that meet at corners by overlapping successive courses. Attach concrete retaining wall units at exterior corners with adhesive specified.
- J. Install geosynthetic reinforcement in accordance with geosynthetic manufacturer's recommendations and the shop drawings.
 - 1. Orient geosynthetic reinforcement with the highest-strength axis perpendicular to the wall face.
 - 2. Prior to geosynthetic reinforcement placement, place the backfill and compact to the elevation of the top of the wall units at the elevation of the geosynthetic reinforcement.
 - 3. Place geosynthetic reinforcement at the elevations and to the lengths shown on the Drawings.
 - 4. Lay geosynthetic reinforcement horizontally on top of the concrete retaining wall units and the compacted backfill soils. Place the geosynthetic reinforcement within one inch of the face of the concrete retaining wall units. Place the next course of concrete retaining wall units on top of the geosynthetic reinforcement.
 - 5. The geosynthetic reinforcement shall be in tension and free from wrinkles prior to placement of the backfill soils. Pull geosynthetic reinforcement hand-taut and secure in place with staples, stakes, or by hand-tensioning until the geosynthetic reinforcement is covered by 6 inches of loose fill.
 - 6. The geosynthetic reinforcements shall be continuous throughout their embedment lengths. Splices in the geosynthetic reinforcement strength direction are not allowed.
 - 7. Do not operate tracked construction equipment directly on the geosynthetic reinforcement. At least 6 inches of compacted backfill soil is required prior to operation of tracked vehicles over the geosynthetic reinforcement. Keep turning of tracked construction equipment to a minimum.
 - 8. Rubber-tired equipment may pass over the geosynthetic reinforcement at speeds of less than 5 miles per hour. Turning of rubber-tired equipment is not allowed on the geosynthetic reinforcement.

3.07 BACKFILL PLACEMENT

- A. Place reinforced backfill, spread and compact in a manner that will minimize slack in the reinforcement.
- B. Place fill within the reinforced zone and compact in lifts not exceeding 6 to 8 inches

(loose thickness) where hand-operated compaction equipment is used, and not exceeding 12 inches (loose thickness) where heavy, self-propelled compaction equipment is used.

1. Only lightweight hand-operated compaction equipment is allowed within 4 feet of the back of the retaining wall units. If the specified compaction cannot be achieved within 4 feet of the back of the retaining wall units, replace the reinforced soil in this zone with drainage aggregate material.
- C. Compaction testing shall be done in accordance with ASTM D1556 or ASTM D2922.
- D. Minimum Compaction Requirements for Fill Placed in the Reinforced Zone
 1. The minimum compaction requirement shall be determined by the project geotechnical engineer testing the compaction. At no time shall the soil compaction requirements be less than 95 percent of the soil's standard Proctor maximum dry density (ASTM D698) for the entire wall height
 2. Utility Trench Backfill: Compact utility trench backfill in or below the reinforced soil zone to 98 percent of the soil's standard Proctor maximum dry density (ASTM D698), or as recommended by the independent geotechnical testing firm. If the height from the utility to finish grade is higher than 30 feet, increase compaction to 100 percent of the standard Proctor density.
 - a. Utilities must be properly designed to withstand all forces from the retaining wall units, reinforced soil mass, and surcharge loads, if any.
 3. Moisture Content: Within 2 percentage points of the optimum moisture content for all wall heights.
 4. These specifications may be changed based on recommendations by the Project geotechnical engineer.
 - a. If changes are required, the Contract Sum will be adjusted by written Change Order.
- E. At the end of each day's operation, slope the last level of compacted backfill away from the interior face of the wall to direct surface water runoff away from the wall face.
 1. The General Contractor is responsible for ensuring that the finished site drainage is directed away from the retaining wall system.
 2. In addition, the General Contractor is responsible for ensuring that surface water runoff from adjacent construction areas is not allowed to enter the retaining wall area of the construction site.
- F. Refer to Article 3.10 for compaction testing.

3.08 CAP UNIT INSTALLATION

- A. Apply adhesive to the top surface of the unit below and place the cap unit into desired position.
- B. Cut cap units as necessary to obtain the proper fit.
- C. Backfill and compact to top of cap unit.

3.09 SITE CONSTRUCTION TOLERANCES

- A. Site Construction Tolerances
 1. Vertical Alignment: Plus or minus 1-1/2 inches over any 10-foot distance, with a maximum differential of 3 inches over the length of the wall.
 2. Horizontal Location Control from Grading Plan
 - a. Straight Lines: Plus or minus 1-1/2 inches over any 10-foot distance.
 - b. Corner and Radius Locations: Plus or minus 12 inches.
 - c. Curves and Serpentine Radii: Plus or minus 2 feet.

3. Immediate Post Construction Wall Batter: Within 2 degrees of the design batter of the concrete retaining wall units.
4. Bulging: Plus or minus 1-1/4 inches over any 10-foot distance.

3.10 FIELD QUALITY CONTROL

- A. Installer is responsible for quality control of installation of system components.
- B. The Owner or General Contractor, at their expense, will retain a qualified professional to perform quality assurance checks of the installer's work.
- C. Correct work which does not meet these specifications or the requirements shown on the Drawings at the installer's expense.
- D. Perform compaction testing of the reinforced backfill placed and compacted in the reinforced backfill zone.
 1. Testing Frequency
 - a. One test for every 2 feet vertical of fill placed and compacted, for every 50 lineal feet of retaining wall.
 - b. Vary compaction test locations to cover the entire area of the reinforced soil zone, including the area compacted by the hand-operated compaction equipment.

3.11 ADJUSTING AND CLEANING

- A. Replace damaged units with new units as the work progresses.
- B. Remove debris caused by wall construction and leave adjacent paved areas broom clean.

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Excavation

Excavation, including removing unstable material and shoring for construction of the segmental concrete retaining wall, will not be measured and paid for separately.

B. Concrete Segmental Retaining Wall (SRW) Units

The SRW units, complete in place and accepted, are measured for payment by the square foot of completed wall facade. This will exclude the area of the coping course and the aggregate/concrete leveling pad. The area of drains through the wall are not deducted.

C. Soil Reinforcing Devices

The reinforcing strips, backfill stabilizing mesh, or backfill stabilizing geogrid will not be measured and paid for separately. The price for these items should be included in the contract unit price for backfill.

D. Backfill

The reinforced backfill used in the concrete segmental retaining wall volume is measured for payment by the cubic yard and as shown on the wall plans. The limits of the concrete segmental retaining wall volume are as follows:

1. The width shall be the length of the reinforcing devices plus 12 in (300 mm). Where reinforcing device length changes, the volume width change will occur midway between reinforcing device layers.
2. The height shall extend from the top of the leveling pad to at least 6 in (150 mm) or to a maximum of 3 ft (1 m) above the uppermost reinforcing device layer. The uppermost reinforcing device layer may be attached to the wall.
3. The length shall extend for the entire length of the wall.
4. Backfill material required by construction procedures to extend beyond the concrete segmental retaining wall volume is incidental and is included in the price bid for Contract items.
5. If the concrete segmental retaining wall volume increases from undercut ordered by the Engineer and requires reinforced backfill to provide stability, as determined by the Engineer, this will be measured and paid for at the Contract Unit Price bid per cubic yard (meter) for backfill. Backfill for undercut areas that do not require materials of grades higher than common excavation soils will not be measured or paid for separately.

E. Concrete Leveling Pads

Concrete leveling pads are measured by the linear foot. This includes steps shown on the plans.

F. Coping

Coping on the concrete segmental retaining wall, complete in place and accepted, will be designated on the Plans and paid for at the Contract Unit Price bid per linear foot.

4.02 PAYMENT

When concrete segmental retaining walls are built to Plan dimensions, the Plan quantity will be the pay quantity. When Plan dimensions are revised at the Engineer's direction, concrete segmental retaining wall will be paid for using the revised Plan quantities. Payment is full compensation for fabricating, transporting, and erecting material according to the Plans and Specifications. Separate measurement or payment is not made for tools, superintendence, labor, fasteners, coatings, joint materials (including but not limited to SBR or elastomeric pads, polyether foam, and filter fabric), site preparation, filler concrete, or other incidentals for performing the work. Payment will be made under:

Item No. 630	Segmental Concrete Facing Units	Per square foot
Item No. 630	Modular Block Retaining Wall Backfill Material	Per cubic yard
Item No. 630	Concrete Leveling Pad	Per linear foot
Item No. 630	Modular Block Retaining Wall Precast Coping	Per linear foot

END OF SECTION