

Addendum #2 to Construction Documents
FY11 Security Enhancements for GRC Lewis Field
Main Gate Area, Phase 3
Project #10231
August 29, 2011

Answers to Submitted Questions:

1. *Q: On drawing E001 and E104, the devices related to the Security System are indicated as 'GFE'. The CCTV Specification, 28 23 23 00 10 appears to be furnished under the scope of this contract and appears to be interfaced with the Security System that is 'GFE'. Is provision of the components, programming and interface of the CCTV system into the Security System to be included in the Electrical Scope or 'GFE' along with the Security System?*

A: The CCTV Specification 28.23.23.00.10 should be deleted in its entirety. All CCTV components (such as cameras, housings, mounting accessories, power supplies, interface modules, and network switch), programming, and interface work will be performed by others. All CCTV associated conduit, with pull strings, shall be furnished and installed by the Contractor.

2. *Q: In light of the fact that the proposed Addendum has not been received, will we be able to get an extended RFI due date for this project? Many subs and contractors will not have thoroughly reviewed the drawings until August 24th or so. This would still give NASA time to answer additional questions that may arrive at this date and get it back to the contractors in time to include in their bids for 09/07/11?*

A: RFI due date was extended to 8/22/11 as described in Amendment 02 posted 8/18/11.

3. *Q: Bid due time: According to Northeast Blueprint, the bid due time on 09/07/11 is 5:00pm. According to the specifications the bid due time is 09/07/11 1:00pm. Please confirm the correct time.*

A: The bid due time is 9/7/11 at 1:00pm.

4. *Q: Will purchasing of Building Permits from the city be required? Will there be any city inspectors requiring inspections of the site?*

A: City Building Permits will not be required. City inspectors will not be requiring inspections of the site.

5. *Q: Will a sign in sheet from the PreBid walkthrough be issued?*

A: This document was posted on 8/12/11.

6. *Q: Is the 500 MM headwall on C 105 a half height of full height headwall? The detail given is for a full height headwall but does not show the requirements for the 500 MM.*

A: Change the pipe size from 500 mm (20 in) to 600 mm (24 in) for all instances 500 mm pipe is referenced on C105. Use half height head wall as specified on ODOT STD drawing HW 2.1 (attached). Contractor shall make all the necessary changes to all referenced details to allow for the use of the 600 mm pipe size instead of the 500 mm. Contractor shall also install a new headwall for outfall 16 to allow for the detention basin.

7. *Q: Since the Overflow Manhole detail is for a doghouse style is the flexible watertight connection required? Being a doghouse means it will only have the flexible watertight connection on the doghouse side.*

A: The flexible watertight connections are only for the precast portions of the manhole. It is only expected to be water tight at new connections; the actual dog house portion will require the use of grout to seal all joints per the specifications.

8. *Q: Is rebar required in the heavy duty trench drain? Can the trench drain be precast in sections?*

A: The trench drain structural requirements shall follow ODOT 706.13. The trench drain can be precast.

9. *Q: Is the Sanitary sewer Pipe VCP as stated on C107 or PVC as stated in Section 33-30-00 on Page 5?*

A: VCP is only required for the sanitary line to the temporary holding tank as shown on C107.

10. *Q: Is 1069 ODOT approved Recycled 304 material allowed to be used for the ODOT 304 Base under the Pavement?*

A: No, limestone only for all stone applications.

11. *Q: What are the requirements for the joints in the concrete pavement in regards to spacing, dowels and tie bars?*

A: Follow the details on C507. All joints shall be installed per ODOT STD drawings BP 2.1 and 2.2 which indicate spacing of both types of baskets and joints every 4.6 M (15 ft) and expansion joints every 300 ft or as directed by COTR. Disregard spacing note for pavement on sheet C502.

12. *Q: In Section 32 13 13.06 on Page 11 under 3.5 Paving it states that fixed form construction is required. It mentions slip form paving under 3.5.5 Slip Form Paving. Is slip form paving allowed? If fixed forms are required what is the maximum allowable distance between forms?*

A: Contractor must follow the standard pavement widths and sections as provided in the plans. Contractor must also follow the joint spacing per standard ODOT drawings provided in the plan set. See questions 11 and 13.

13. *Q: Note A on Sheet C-502 states contraction joints will be located every 3m. Is this dimension used for longitudinal and transverse contraction joints? Is there a different dimension for longitudinal verses transverse joints?*

A: See question 11. Expansion joints will be at 300 ft intervals and contraction and transverse joints every 15 ft.

14. *Q: May a ODOT Type 6 curb be used in-place of the Integral Type 2A curb?*

A: Yes.

15. *Q: Addendum #1 states in general note #27 that the contractor is suppose to use the stockpile of soil on the project. What is the quantity of this pile? The bidders need to know this quantity for calculation the earthwork costs. If there is too much material on the project will the contractor be responsible to haul this pile away? Will the owner makes allowance too lose this material on the project?*

A: It is to be assumed the soil pile plus the soil generated by the SARF site will balance the site. The contractor will be responsible for any hauling and disposal of topsoil and debris generated.

16. *Q: With the available dirt adjacent to the project site, is there enough fill material available to bring the site to its final grade? We assume that additional fill will not need to be brought in from another source.*

A: See question 15. The soil will come from GRC from either the stockpile adjacent to site or from the West Area at GRC which is located on the corner of Cryogenic Road and West Area Road. The contractor will be responsible for the transportation and moving of these soils.

17. *Q: We could not locate a specification section for 2400 volt primary switch "B4A3BPDS" as shown on drawings E103, E501, and E801 all dated 7/8/11.*

A: See Drawing E-001 for make, model #. Apply salient features.

18. *Q: We could not locate a specification section for 208 volt secondary circuit breaker "B4A3BSDS" as shown on drawings E103, E501, and E801 all dated 7/8/11.*

A: See Drawing E-001 for make, model #. Apply salient features.

19. *Q: Panelboard specification section 26 05 00.00 98 page 5, paragraph 2.8 "Circuit Breakers" notes "circuit breaker interrupting rating shall be not less than those indicated and in no event less than 22,000 ampers root-mean-square (rms) symmetrical at 208 volts". However, schedules for panelboards "PTR0102, PTR0103, and PTR0104" all indicate*

interrupting capacity as 10,000 amps rms. Please advise if these panelboards/circuit breakers are to be 22,000 or 10,000 amps interrupting capacity.

A: 22K AIC.

20. *Q: Drawing E-801 dated 7/8/11. Panelboard "PTR0101" shows integral 1200/5 CT's which feed a remote [PAC4200]. We are not able to locate a specification nor details for [PAC4200]. Please provide details of [PAC4200] if this item is to be part of the bid package.*

A: The electrical meter scope shall be as follows:

- Furnish and install a Siemens PAC Series Metering Unit. Meter shall be PAC4200 Series Meter. Module shall be Modbus RTU.
- Furnish and install current transformer (CT) on each of the phase conductors and on the neutral conductor at the incoming line of the switchboard/power panel. The current transformer shall be a solid core, round metering grade, 600V with 0.3 accuracy and 5A at the secondary side. Furnish and install wirings to connect these CTs to the Siemens PAC Series Metering Unit. Furnish and install wirings from switchboard/power panel to the 2A circuit breaker in the Siemens PAC Series Metering Unit.
- Furnish and install Modbus RS-485 Siemens H-F-1.5TSP24LC-CMP from the Siemens PAC Series Metering Unit to the PXXM Modular Siemens Field Level Controller (see attached Siemens Metering Diagram).
- All wiring shall be in EMT conduit.
- Provide programming necessary to enable monitoring of this meter from the EMCS computer at Building 12.

21. *Q: Please refer to contract drawing E-601 dated 7/8/11 concerning the Nema 12 Duplex/Alternating Pump Control Panel. Please advise the Horsepower ratings of Pump 1 and Pump 2. Please advise if integral overload relays are required. Please advise if an integral over current protective device (circuit breaker or fusible switch) is required. If so, please advise ampere rating.*

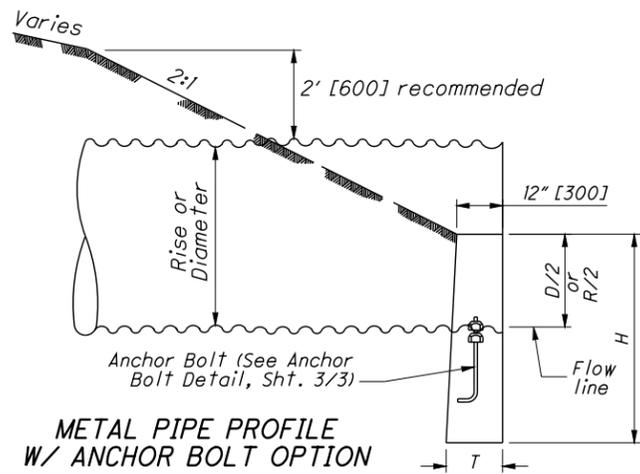
A: Typical for pumps P-1A, 1&2, P-1B, 1&2 and P-2, 1&2. – See drawing M-701 for horsepower ratings.

22. *Q: Please refer to contract drawings E-801 and E-601 both dated 7/8/11 concerning panelboard PTR0101. Drawing E-601 shows PTR0101 fed by 3-600mcm cable per phase. However, drawing E-801 schedule shows PTR0101 feeder as 1200A Busway. Please advise if the feeder to PTR0101 is to be by cable or busway. If it is busway then a specification would be required.*

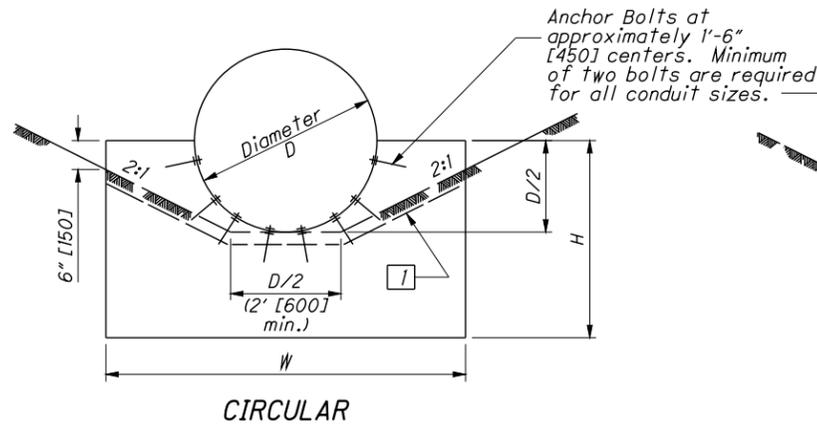
A: Drawing E-801 shows 3-1/C-600 kcmil cables "per phase". This will pertain to each phase (3) plus the neutral.

Additional Clarifications/Requirements

23. It has been found that the existing grading is difficult to read on the civil drawing C-102 that was included in the bid package. Please see the attached re-printed version of C-102 where the existing grading is darker and more legible. Please also find the AutoCAD version of C-102 for use in performing earthwork calculations.
24. **Video Intercom Riser Diagram:** This diagram shown on drawing E-503 shall be modified as follows:
- a. The diagram shall be expanded to interconnect the two additional Room 109 intercom master stations into the system with 1" conduits (with pull string) and associated junction boxes. See drawing E-104 for master station locations.
 - b. Each of the three intercom master stations will have two door release pushbuttons: one for Door 108 and one for Door 112.
 - c. The Contractor shall run conduits from the Door 108 pushbuttons on/near the three intercom master stations to the 12"x12"x4" junction box over Door 108, and conduits from the Door 112 pushbuttons on/near the three intercom master stations to the 12"x12"x4" junction box over Door 112.
25. **Access Control System Masking Reader:** The Contractor shall supply the conduit and wire between the masking reader/keypad backbox and the 12"x12"x4" junction box over Door 107B inside Mail Room 107.
26. **Access Control Riser Diagram:** This diagram shown on drawing E-503 shall be modified as follows:
- a. There shall be five (5) separate circuits on the ACS Riser.
 - b. The PIR detectors shall be included on the ACS Riser.
 - c. The Riser shall be circuited as follows:
 - Circuit 1: Door 128, Door 122A, and Door 112
 - Circuit 2: Door 101, Door 105, Door 102
 - Circuit 3: Door 107A, Room 107 NE PIR, Door 107C, Door 107B, Room 107 SW PIR
 - Circuit 4: Door 131E, Door 131D, Room 109 PIR, Door 131C, Door 131B, Door 131A, Door 108
 - Circuit 5: Door 129, Door 130A, Door 111, , Room 110 PIR
27. **Security Video Camera Riser Diagram:** This diagram shown on drawing E-503 shall be modified as follows:
- a. The loading dock cameras are part of the Security CCTV system. These 2 cameras shall be added to the Security Riser. The contractor is responsible for providing the camera related conduit back to the owner provided equipment rack. Conduits are not required between these 2 cameras and the Receiving workstation.
 - b. The Receiving 109 and the Shipping 110 PTZ cameras are part of the Security CCTV system. These 2 cameras should be added to the Security Riser. The contractor is responsible for providing the camera related conduit back to the owner provided equipment rack.

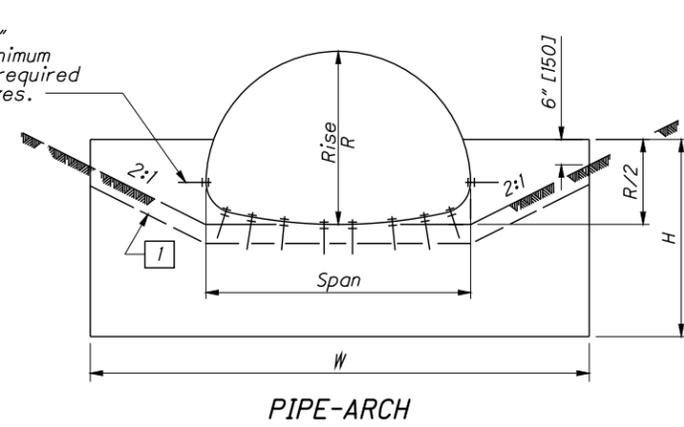


METAL PIPE PROFILE
W/ ANCHOR BOLT OPTION



CIRCULAR

METAL PIPE END TREATMENT "A" W/ ANCHOR BOLT OPTION

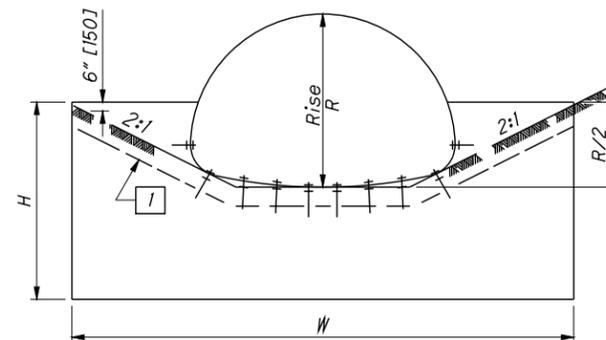
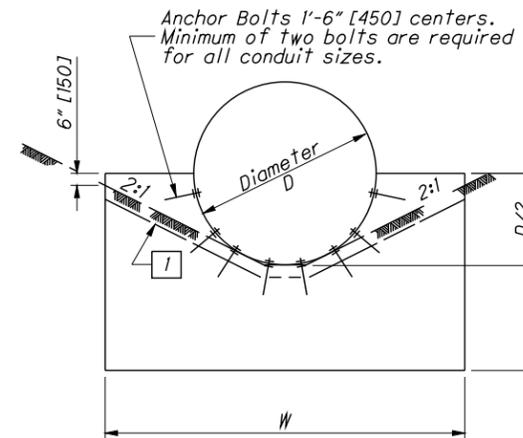


PIPE-ARCH

CAST-IN-PLACE HW FOR CORRUGATED METAL PIPE & PLASTIC PIPE (English)

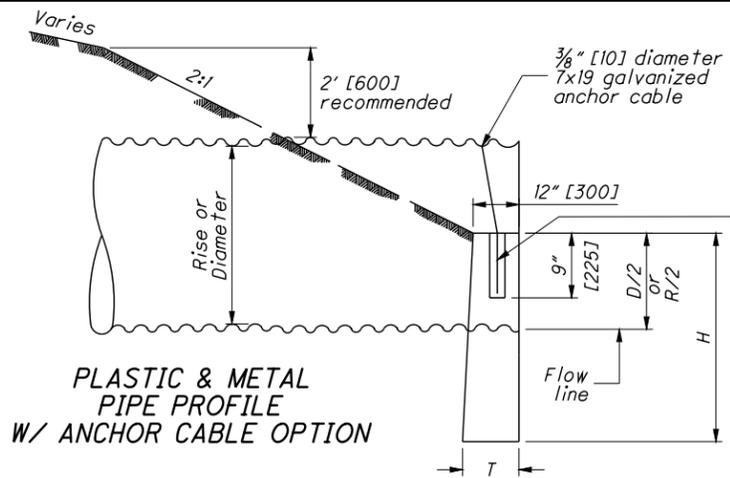
CIRCULAR					PIPE ARCH					PIPE ARCH						
D	W	H	T	CONC. cu. yds.	SPAN	RISE	W	H	T	CONC. cu. yds.	SPAN	RISE	W	H	T	CONC. cu. yds.
2.67"x1/2" Corrugations																
12"	2'-0"	3'-0"	12"	0.21							*81"	59"	12'-4"	5'-5"	15"	2.14
15"	2'-6"	3'-2"	12"	0.27	17"	13"	3'-0"	3'-0"	12"	0.31	87"	63"	13'-0"	5'-7"	17"	2.50
18"	3'-0"	3'-3"	12"	0.33	21"	15"	3'-6"	3'-0"	12"	0.35	95"	67"	14'-0"	5'-9"	20"	3.14
21"	3'-6"	3'-4"	12"	0.39	24"	18"	4'-0"	3'-2"	12"	0.43	103"	71"	15'-0"	5'-11"	22"	3.54
24"	4'-0"	3'-6"	12"	0.46	28"	20"	4'-6"	3'-3"	12"	0.48	112"	75"	16'-0"	6'-1"	24"	3.96
27"	4'-6"	3'-8"	12"	0.53	35"	24"	5'-6"	3'-5"	12"	0.61	117"	79"	17'-9"	6'-3"	25"	4.89
30"	5'-0"	3'-9"	12"	0.60	42"	29"	6'-6"	3'-7"	12"	0.73	128"	83"	18'-0"	6'-5"	26"	5.01
33"	5'-6"	3'-10"	12"	0.68	49"	33"	7'-8"	3'-9"	12"	0.90	137"	87"	19'-0"	6'-7"	27"	5.45
36"	6'-0"	4'-0"	12"	0.76	57"	38"	9'-0"	4'-0"	12"	1.10	142"	91"	20'-9"	6'-9"	27"	6.31
39"	6'-6"	4'-2"	12"	0.84	64"	43"	10'-0"	4'-4"	12"	1.31						
42"	7'-0"	4'-3"	12"	0.92	71"	47"	11'-0"	4'-8"	12"	1.54	6"x2" Corrugations (18" Corner Radius)					
48"	8'-0"	4'-6"	12"	1.10	*77"	52"	11'-8"	5'-3"	12"	1.84	*6'-1"	4'-7"	11'-8"	5'-7"	12"	1.89
54"	9'-3"	4'-9"	12"	1.33	*83"	57"	12'-4"	5'-5"	15"	2.46	*6'-4"	4'-9"	12'-0"	5'-8"	14"	2.12
60"	10'-6"	5'-6"	12"	1.78	6"x2" Corrugations (31" Corner Radius)					*6'-9"	4'-11"	12'-4"	5'-9"	15"	2.42	
66"	11'-9"	5'-9"	12"	2.06							*7'-0"	5'-1"	12'-8"	5'-10"	16"	2.44
72"	13'-0"	6'-0"	12"	2.37	13'-3"	9'-4"	23'-11"	7'-11"	32"	9.63	7'-3"	5'-3"	12'-11"	5'-11"	17"	2.69
78"	14'-3"	6'-3"	14"	2.94	13'-6"	9'-6"	24'-9"	8'-0"	32"	10.12	7'-8"	5'-5"	13'-2"	6'-0"	18"	2.77
84"	15'-6"	6'-6"	14"	3.30	14'-0"	9'-8"	24'-10"	8'-1"	33"	10.33	7'-11"	5'-7"	14'-0"	6'-1"	20"	3.15
90"	16'-9"	6'-9"	16"	4.00	14'-2"	9'-10"	25'-9"	8'-2"	33"	10.87	8'-2"	5'-9"	14'-8"	6'-2"	21"	3.45
96"	18'-0"	7'-0"	16"	4.40	14'-5"	10'-0"	26'-7"	8'-3"	33"	11.39	8'-7"	5'-11"	15'-0"	6'-3"	22"	3.75
102"	19'-3"	7'-3"	18"	5.28	14'-11"	10'-2"	26'-9"	8'-4"	34"	11.68	8'-10"	6'-1"	15'-10"	6'-4"	23"	4.15
108"	20'-6"	7'-6"	20"	6.21	15'-4"	10'-4"	26'-11"	8'-5"	34"	11.96	9'-4"	6'-3"	16'-0"	6'-5"	24"	4.65
114"	21'-9"	7'-9"	22"	7.25	15'-7"	10'-6"	27'-9"	8'-6"	34"	12.51	9'-6"	6'-5"	16'-10"	6'-6"	26"	4.93
120"	23'-0"	8'-0"	24"	8.38	15'-10"	10'-8"	28'-7"	8'-7"	35"	13.06	9'-9"	6'-7"	17'-9"	6'-7"	27"	5.41
*126"	23'-0"	8'-3"	26"	8.64	16'-3"	10'-10"	28'-8"	8'-8"	35"	13.34	10'-3"	6'-9"	17'-10"	6'-8"	27"	5.45
132"	23'-0"	8'-6"	28"	9.23	16'-6"	11'-0"	29'-7"	8'-9"	35"	13.94	10'-8"	6'-11"	17'-11"	6'-9"	27"	5.59
138"	24'-1"	8'-9"	30"	10.50	17'-0"	11'-2"	29'-8"	8'-10"	36"	14.24	10'-11"	7'-1"	18'-10"	6'-10"	28"	5.97
144"	25'-2"	9'-0"	32"	11.89	17'-2"	11'-4"	30'-7"	8'-11"	36"	14.84	11'-5"	7'-3"	18'-11"	6'-11"	28"	6.12
150"	26'-4"	9'-3"	34"	13.38	17'-5"	11'-6"	31'-5"	9'-0"	36"	15.42	11'-7"	7'-5"	19'-9"	7'-0"	28"	6.52
156"	27'-5"	9'-6"	36"	15.01	17'-11"	11'-8"	31'-7"	9'-1"	37"	15.83	11'-10"	7'-7"	20'-9"	7'-1"	29"	6.94
162"	28'-7"	9'-9"	38"	16.75	18'-1"	11'-10"	32'-5"	9'-2"	37"	16.43	12'-4"	7'-9"	20'-10"	7'-2"	29"	7.12
168"	29'-8"	10'-0"	40"	18.61	18'-7"	12'-0"	32'-6"	9'-3"	37"	16.78	12'-6"	7'-11"	21'-8"	7'-3"	29"	7.53
174"	30'-9"	10'-3"	42"	20.28	18'-9"	12'-2"	33'-4"	9'-4"	38"	17.43	12'-8"	8'-1"	22'-7"	7'-4"	30"	7.95
180"	31'-11"	10'-6"	43"	21.87	19'-3"	12'-4"	33'-5"	9'-5"	38"	17.78	12'-10"	8'-4"	23'-7"	7'-5"	30"	8.48
186"	33'-0"	10'-9"	44"	23.54	19'-6"	12'-6"	34'-5"	9'-6"	38"	18.49	13'-5"	8'-5"	23'-7"	7'-6"	30"	8.63
192"	34'-2"	11'-0"	45"	25.30	19'-8"	12'-8"	35'-3"	9'-7"	39"	19.19	13'-11"	8'-7"	23'-7"	7'-7"	31"	8.81
198"	35'-3"	11'-3"	46"	27.12	19'-11"	12'-10"	36'-3"	9'-8"	39"	19.95	14'-1"	8'-9"	25'-1"	7'-8"	31"	9.29
204"	36'-4"	11'-6"	47"	29.15	20'-5"	13'-0"	36'-3"	9'-9"	39"	20.30	14'-3"	8'-11"	25'-6"	7'-9"	31"	9.78
210"	37'-6"	11'-9"	48"	31.03	20'-7"	13'-2"	37'-2"	9'-10"	40"	21.05	14'-10"	9'-1"	25'-6"	7'-10"	32"	10.25
216"	38'-7"	12'-0"	49"	33.43	3"x1" Corrugations					15'-4"	9'-3"	25'-6"	7'-11"	32"	10.25	
222"	39'-9"	12'-3"	50"	36.26	40"	31"	6'-6"	3'-7"	12"	0.70	15'-6"	9'-5"	26'-5"	8'-0"	32"	10.74
228"	40'-10"	12'-6"	51"	37.52	46"	36"	7'-8"	3'-9"	12"	0.85	15'-8"	9'-7"	27'-5"	8'-1"	33"	11.28
234"	42'-0"	12'-9"	52"	39.86	53"	41"	9'-0"	4'-0"	12"	1.06	15'-10"	9'-10"	28'-5"	8'-2"	33"	12.00
240"	43'-1"	13'-0"	53"	42.28	60"	46"	10'-0"	4'-4"	12"	1.27	16'-5"	9'-11"	28'-5"	8'-3"	33"	12.09
246"	44'-2"	13'-3"	54"	44.83	66"	51"	11'-0"	4'-8"	12"	1.54	16'-7"	10'-1"	29'-4"	8'-4"	34"	12.64
252"	45'-4"	13'-6"	55"	47.44	*73"	55"	11'-8"	5'-3"	12"	1.81	--	--	--	--	--	--

* Channel configuration for pipe sizes between end treatment "A" and end treatment "B" is determined by 2:1 slopes passing through a point 6" [150] below the top and at each side of the headwall. For end treatment "B", 2:1 slopes are tangent to pipe.



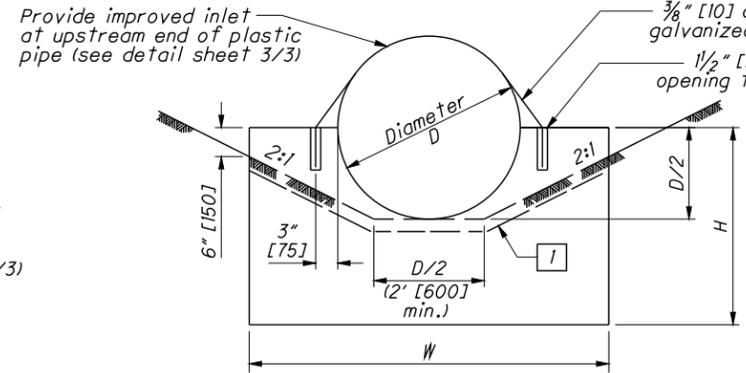
METAL PIPE END TREATMENT "B"
W/ ANCHOR BOLT OPTION

See Sht. 2/3 for
Metric Pipe Table

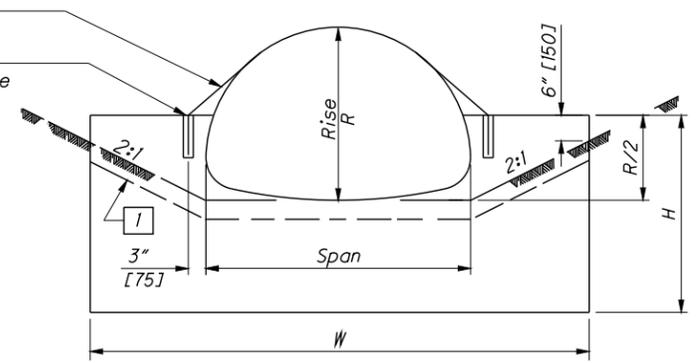


PLASTIC & METAL PIPE PROFILE W/ ANCHOR CABLE OPTION

Furnish hook w/ min. 4" hook length (see anchor cable detail sheet 3/3)



CIRCULAR PLASTIC & METAL PIPE END TREATMENT "A" W/ ANCHOR CABLE OPTION

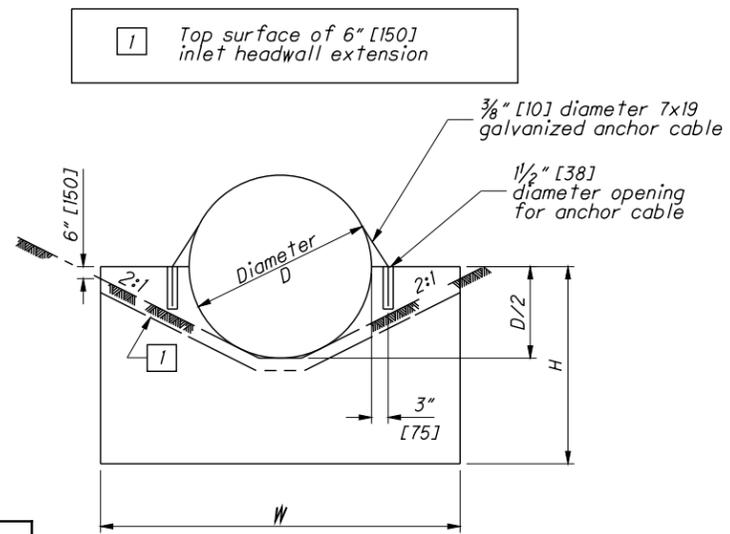


METAL PIPE-ARCH

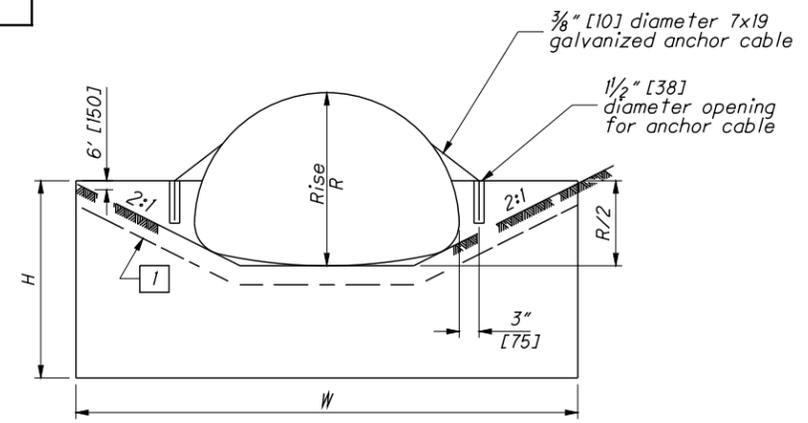
CAST-IN-PLACE HW FOR CORRUGATED METAL PIPE & PLASTIC PIPE (Metric)

CIRCULAR		PIPE ARCH									PIPE ARCH					
D	W	H	T	CONC. m ³	SPAN	RISE	W	H	T	CONC. m ³	SPAN	RISE	W	H	T	CONC. m ³
68x13 mm Corrugations																
300	600	925	300	0.16							*2025	1475	3750	1650	375	1.64
375	750	975	300	0.21	425	325	925	925	300	0.24	2175	1575	3950	1700	425	1.91
450	925	1000	300	0.25	525	375	1075	925	300	0.27	2450	1675	4275	1750	500	2.40
525	1075	1025	300	0.30	600	450	1225	975	300	0.33	2575	1775	4575	1800	550	2.71
600	1225	1075	300	0.35	700	500	1375	1000	300	0.37	2800	1875	4875	1850	600	3.03
675	1375	1125	300	0.41	875	600	1675	1050	300	0.47	2925	1975	5400	1900	625	3.74
750	1525	1150	300	0.46	1050	725	1975	1100	300	0.56	3200	2075	5475	1950	650	3.83
825	1675	1175	300	0.52	1225	825	2325	1150	300	0.69	3425	2175	5800	2000	675	4.17
900	1825	1225	300	0.58	1425	950	2750	1225	300	0.84	3550	2275	6325	2050	675	4.82
975	1975	1275	300	0.64	1600	1075	3050	1325	300	1.00						
1050	2125	1300	300	0.70	1775	1175	3350	1425	300	1.18						
150x50 mm Corrugations (450 mm Corner Radius)																
1200	2450	1375	300	0.84	*1925	1300	3550	1600	300	1.41	*1825	1375	3550	1700	300	1.45
1350	2825	1450	300	1.02	*2075	1425	3750	1650	375	1.88	*1900	1425	3650	1725	350	1.62
1500	3200	1675	300	1.36							*2025	1475	3750	1750	375	1.85
1650	3575	1750	300	1.57							*2100	1525	3850	1775	400	1.87
150x50 mm Corrugations (775 mm Corner Radius)																
1800	3950	1825	300	1.81	3975	2800	7300	2425	825	7.36	2175	1575	3925	1800	425	2.06
1950	4350	1900	350	2.25	4050	2850	7550	2450	825	7.74	2300	1625	4025	1825	450	2.12
2100	4725	1975	350	2.52	4200	2900	7575	2475	850	7.90	2375	1675	4275	1850	500	2.41
2250	5100	2050	400	3.06	4250	2950	7850	2500	850	8.31	2450	1725	4475	1875	525	2.64
2400	5475	2125	400	3.36	4325	3000	8100	2525	850	8.71	2575	1775	4575	1900	550	2.87
2550	5875	2200	450	4.04	4475	3050	8150	2550	875	8.93	2650	1825	4825	1925	575	3.17
2700	6250	2275	500	4.75	4600	3100	8200	2575	875	9.14	2800	1875	4875	1950	600	3.56
2850	6625	2350	550	5.54	4675	3150	8450	2600	875	9.56	2850	1925	5125	1975	650	3.77
3000	7000	2450	600	6.41	4750	3200	8700	2625	900	9.99	2925	1975	5400	2000	675	4.14
*3150	7000	2525	650	6.61	4875	3250	8750	2650	900	10.20	3075	2025	5425	2025	675	4.17
3300	7000	2600	700	7.06	4950	3300	9025	2675	900	10.66	3200	2075	5450	2050	675	4.27
3450	7350	2675	750	8.03	5100	3350	9050	2700	925	10.89	3275	2125	5750	2075	700	4.56
3600	7675	2750	825	9.09	5150	3400	9325	2725	925	11.35	3425	2175	5775	2100	700	4.68
3750	8025	2825	875	10.23	5225	3450	9575	2750	925	11.79	3475	2225	6025	2125	700	4.98
3900	8350	2900	925	11.48	5375	3500	9625	2775	950	12.10	3550	2275	6325	2150	725	5.31
4050	8700	2975	975	12.81	5425	3550	9875	2800	950	12.56	3700	2325	6350	2175	725	5.44
4200	9050	3050	1025	14.23	5575	3600	9900	2825	950	12.83	3750	2375	6600	2200	725	5.76
4350	9375	3125	1075	15.51	5625	3650	10150	2850	975	13.33	3800	2425	6875	2225	750	6.08
4500	9725	3200	1100	16.72	5775	3700	10175	2875	975	13.59	3850	2500	7200	2250	750	6.48
4650	10050	3275	1125	18.00	5850	3750	10500	2900	975	14.14	4025	2525	7200	2275	750	6.60
4800	10425	3350	1150	19.34	5900	3800	10750	2925	1000	14.67	4175	2575	7200	2300	775	6.74
4950	10750	3425	1175	20.73	5975	3850	11050	2950	1000	15.25	4225	2625	7650	2325	775	7.10
5100	11075	3500	1200	22.29	6125	3900	11050	2975	1000	15.52	4275	2675	7775	2350	775	7.48
5250	11425	3575	1225	23.72	6175	3950	11325	3000	1025	16.09	4450	2725	7775	2400	825	7.84
75x25 mm Corrugations																
5400	11750	3650	1250	25.56							4600	2775	7775	2425	825	7.84
5550	12125	3725	1275	27.72	1000	775	1975	1100	300	0.54	4650	2825	8050	2450	825	8.21
5700	12450	3800	1300	28.69	1150	900	2325	1150	300	0.65	4700	2875	8350	2475	850	8.62
5850	12800	3875	1325	30.48	1325	1025	2750	1225	300	0.81	4750	2950	8650	2500	850	9.17
6000	13125	3950	1350	32.33	1500	1150	3050	1325	300	0.97	4925	2975	8650	2525	850	9.24
6150	13450	4050	1375	34.27	1650	1275	3350	1425	300	1.18	4975	3025	8950	2550	875	9.66
6300	13825	4125	1400	36.27	*1825	1375	3550	1600	300	1.38	--	--	--	--	--	--

* Channel configuration for pipe sizes between end treatment "A" and end treatment "B" is determined by 2:1 slopes passing through a point 6" [150] below the top and at each side of the headwall. For end treatment "B", 2:1 slopes are tangent to pipe.



See Sht. 1/3 for English Pipe Table



METAL PIPE END TREATMENT "B" W/ ANCHOR CABLE OPTION

Cut galvanized anchor cable to length required.

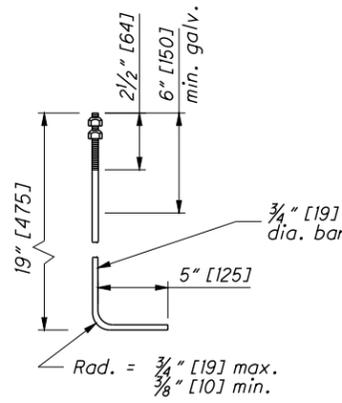
Wrap galvanized anchor cable one time completely around the circumference of the conduit.

Form or drill 1/2" [38] diameter openings for anchor cable at locations shown. Alternatively, place anchor cable in wet concrete at the dimensions shown above to secure conduit to headwall. A minimum 4" hook length at the ends of the anchor cable are required as shown on sheet 3.

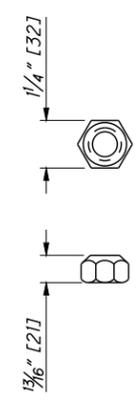
Fill any openings made for anchor cables with grout after anchor cables are placed.

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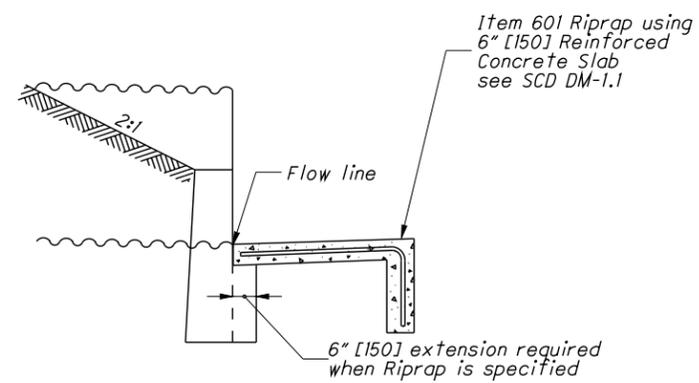
STATE OF OHIO DEPARTMENT OF TRANSPORTATION
 REVISIONS 7/30/07
 ALL METRIC DIMENSIONS (IN BRACKETS) ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
 OFFICE OF STRUCTURAL ENGINEERING
 STANDARD HYDRAULIC CONSTRUCTION DRAWING
 HALF-HEIGHT HEADWALLS FOR CORRUGATED METAL PIPE AND PLASTIC PIPE
 SCD NUMBER HW-2.1
 STATE HYDRAULIC ENGINEER J. Stains
 2 / 3



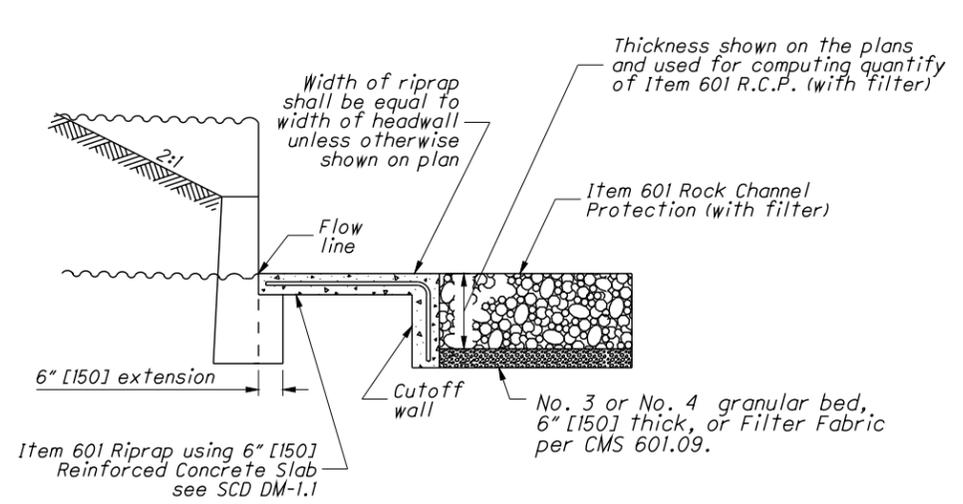
ANCHOR BOLT



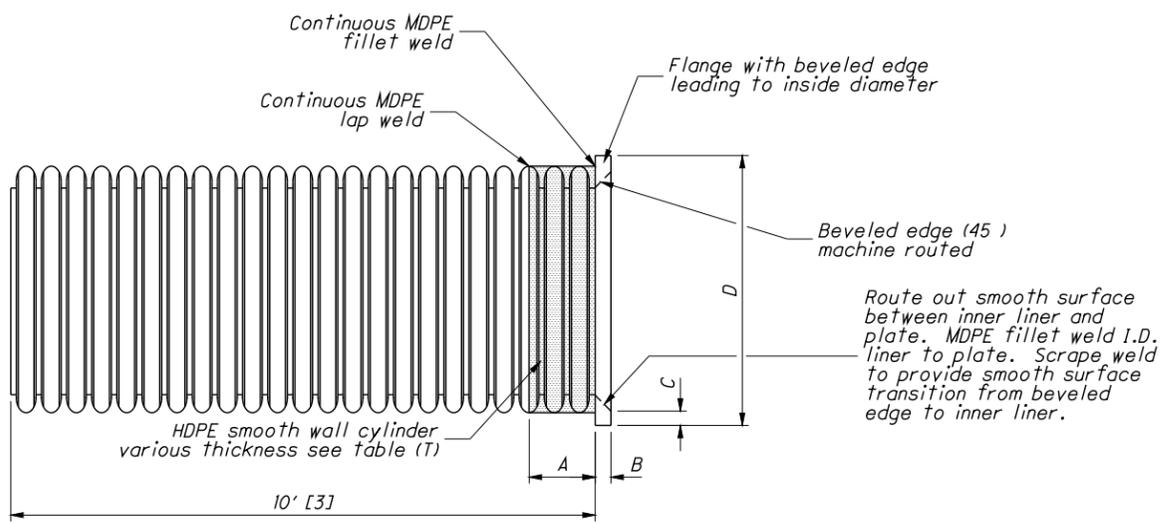
NUT
(ASTM A 325 and A 153)



**INLET CHANNEL PROTECTION
DETAIL**

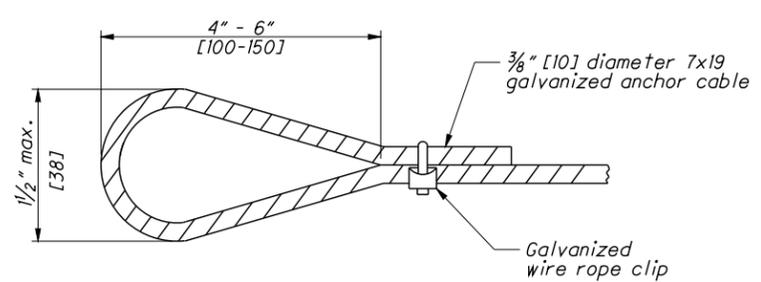


**OUTLET CHANNEL PROTECTION
DETAIL**



HDPE IMPROVED INLET

PIPE SIZE	A	B	C	D	T
12 in. [300]	6.00 in. [152]	0.50 in. [13]	1.00 in. [25]	15.15 in. [385]	0.13 in. [3]
15 in. [375]	6.00 in. [152]	0.63 in. [16]	1.26 in. [32]	18.73 in. [476]	0.19 in. [5]
18 in. [450]	6.00 in. [152]	0.75 in. [19]	1.50 in. [38]	22.57 in. [573]	0.25 in. [6]
24 in. [600]	8.00 in. [203]	1.00 in. [25]	2.00 in. [51]	30.08 in. [764]	0.25 in. [6]
30 in. [750]	8.00 in. [203]	1.25 in. [32]	2.50 in. [64]	37.50 in. [953]	0.38 in. [10]
36 in. [900]	10.00 in. [254]	1.50 in. [38]	3.00 in. [76]	45.00 in. [1143]	0.38 in. [10]
42 in. [1050]	10.00 in. [254]	1.75 in. [44]	3.50 in. [89]	51.90 in. [1318]	0.38 in. [10]
48 in. [1200]	10.00 in. [254]	2.00 in. [51]	4.00 in. [102]	59.60 in. [1514]	0.38 in. [10]
60 in. [1500]	12.00 in. [305]	2.50 in. [64]	5.00 in. [127]	74.50 in. [1892]	0.38 in. [10]



**ANCHOR CABLE
DETAIL**

NOTES

GENERAL: Provide a riprap reinforced concrete slab according to SCD DM-1.1 if the pipe is depressed or is specified in the plan. Payment for the slab shall be made per square yard of **Item 601 Riprap using 6" Reinforced Concrete Slab** and shall include the cost of the cutoff wall.

This drawing is for cast-in-place half-height concrete headwalls. When furnishing precast half-height headwalls, conform to pre-approved designs on file with the Office of Materials Management. Precast half-height headwalls are only approved for round conduits with a maximum conduit diameter of 78" [1950]. When precast headwalls are furnished, provide openings for the anchor cable as shown and fill with grout after placement of the anchor cable. If anchor bolts are to be used with a precast headwall, fill the anchor cable openings with grout.

CONCRETE: Headwall concrete should be Class C. Concrete quantities are based on headwalls without the 6" [150] extension under the channel protection.

ANCHOR BOLTS: Bolts (as detailed) for anchoring both ends of metal pipe shall meet ASTM A 307. The top 6" [150] min. of the bolt shall be galvanized according to ASTM A 153. Cost of anchors shall be included in the price bid per Foot [Meter] of Item 603.

Headwall dimensions are based on end treatment "A" for pipe sizes up to and including 120" [3000], 71"x47" [1775x1175], and 66"x51" [1660x1275], and on end treatment "B" for sizes over and including 132" [3300], 13'-3"x9'-4" [3975x2800], and 7'-3"x5'-3" [2175x1575].

PLASTIC PIPE: Plastic pipe may not be available in all the sizes specified on this drawing.

ANCHOR CABLE: Anchor cable (as detailed) for anchoring both ends of metal or plastic pipe shall meet ASTM A 603. Wire rope clip shall be galvanized according to ASTM A 153. Cost of anchor cable and wire rope clip shall be included in the unit price bid per foot [meter] of Item 603.

IMPROVED INLET FOR HDPE PIPE: Furnish improved inlet at upstream end of culverts using plastic pipe.

The smooth cap and flange materials shall be HDPE according to ASTM D 3350 345464C.

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STATE OF OHIO DEPARTMENT OF TRANSPORTATION
 ROADWAY HYDRAULIC ENGINEER
 J. Stains
 STATE HYDRAULIC ENGINEER
 REVISIONS
 7/30/07
 ALL METRIC DIMENSIONS (IN BRACKETS []) ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
 OFFICE OF STRUCTURAL ENGINEERING
 STANDARD HYDRAULIC CONSTRUCTION DRAWING
 HALF-HEIGHT HEADWALLS FOR CORRUGATED METAL PIPE AND PLASTIC PIPE
 SCD NUMBER
 HW-2.1
 3 / 3

DRAWING SPECIFIC NOTES:

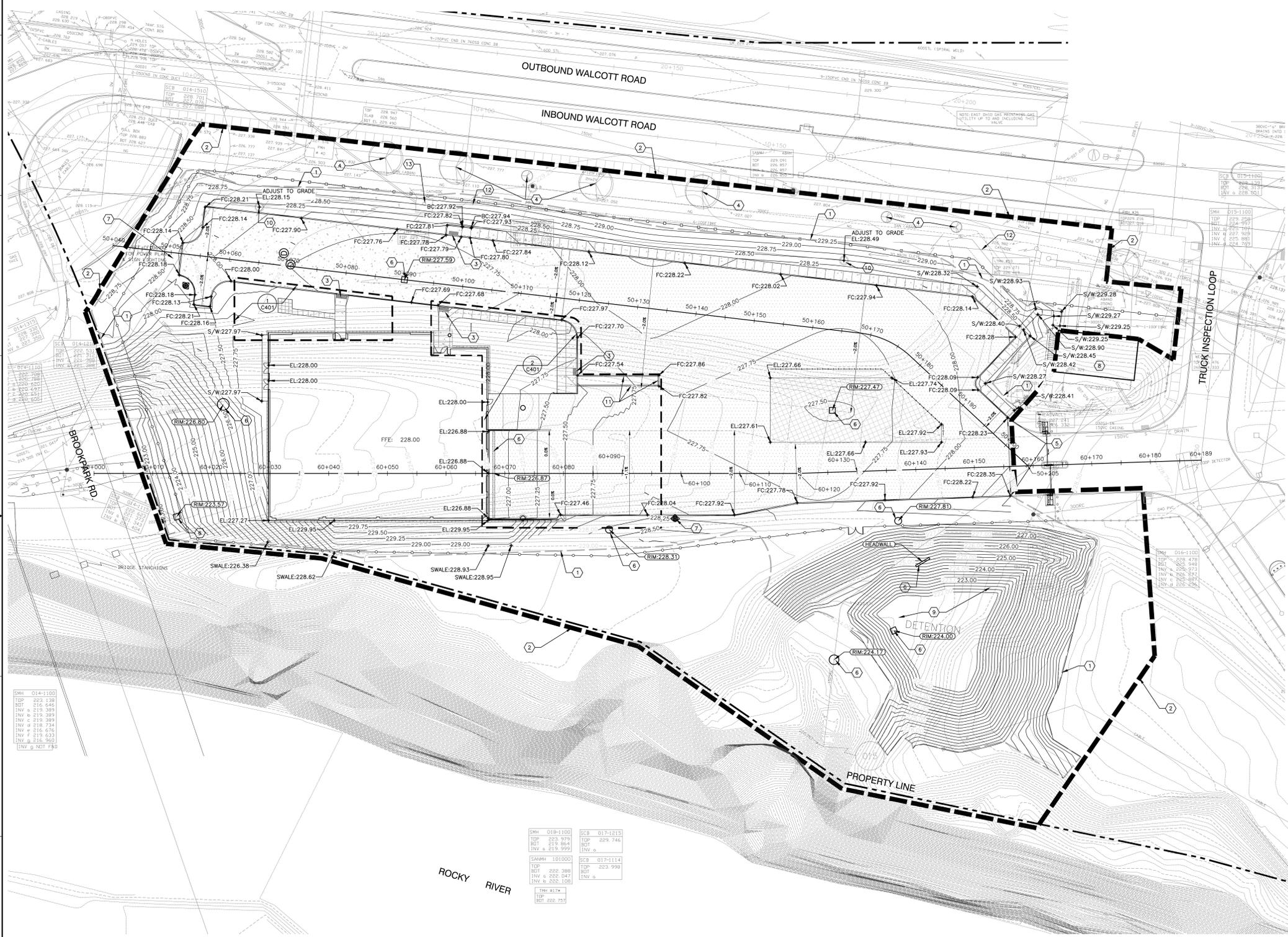
- A. ALL STONE USED SHALL BE LIMESTONE UNLESS APPROVED BY NASA.
- B. CONTRACTOR TO PROOF ROLL ALL EARTHWORK PRIOR TO BUILDING OR PAVEMENT INSTALLATION. NASA TO WITNESS AND APPROVE.
- C. ALL SIDEWALKS TO HAVE 2% MAXIMUM CROSS SLOPE.

DRAWING NOTES:

- 1. LIMITS OF GRADING.
- 2. PHASE 3 LIMITS OF WORK / BOUNDARY FOR LEED CERTIFICATION.
- 3. ACCESSIBLE CURB RAMP. REFER TO C-103.
- 4. EXISTING TREES TO REMAIN. REFER TO C-503 FOR TREE PROTECTION AREA REQUIREMENTS. GRADING IS NOT PERMITTED WITHIN THE DRIP-LINE OF TREE CANOPY.
- 5. MEET FLUSH WITH EXISTING PAVEMENT.
- 6. DRAINAGE STRUCTURE. REFER TO C-105.
- 7. PROPOSED FIRE HYDRANT. REFER TO C-108.
- 8. EXISTING GAS METER HOUSE.
- 9. PROPOSED AREA OF DETENTION. REFER TO C-105 FOR DRAINAGE STRUCTURE INFORMATION.
- 10. EXISTING SANITARY FORCE MAIN MANHOLE. PROTECT FROM DAMAGE.
- 11. FLUSH CURB. REFER TO C-103.
- 12. CONTRACTOR TO VERIFY DEPTH OF EXISTING TELEPHONE DUCTBANK (FROM TELEPHONE MH 54 TO S3) PRIOR TO MASS SITE EXCAVATION AND INSTALLING UTILITIES. CONTRACTOR WILL BE RESPONSIBLE FOR ADJUSTING GRADES FOR COVER AND UTILITY DEPTHS WITH NASA APPROVAL.
- 13. GRADE TO MEET EXISTING T.M.H. 3:1 MAXIMUM OR AS DIRECTED BY NASA.

GENERAL NOTES:

- 1. SEE DRAWING 0152-COF10231-G-001 FOR DRAWING INDEX.
- 2. THE CONTRACTOR SHALL INSTALL CONSTRUCTION FENCING PER DETAIL 6/C-502. CONSTRUCTION FENCE SHALL BE INSTALLED PRIOR TO START OF FIELD WORK IN EACH SEGMENT AND REMOVED AT COMPLETION OF EACH CONSTRUCTION SEQUENCE. FENCING SHALL ENCLOSE ALL LIMITS OF WORK PLUS RELATED UNDERGROUND UTILITY RUNS PLUS REQUIRED WORKSPACE.
- 3. THE CONTRACTOR IS RESPONSIBLE FOR VISITING THE PROJECT SITE AND BECOMING FAMILIAR WITH EXISTING CONDITIONS. CHECKING AND VERIFYING GIVEN DIMENSIONS AND ELEVATIONS AS NECESSARY. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY DISCREPANCIES TO THE NASA CONSTRUCTION MANAGER. ALL PROJECT SURVEY INFORMATION IS BASED ON THE MOST RECENT VERSION OF THE NASA GRC UNDERGROUND RECORD DRAWINGS AND SITE SURVEY CONDUCTED NOVEMBER 2005. ALL KNOWN UTILITIES HAVE BEEN IDENTIFIED.
- 4. THE CONTRACTOR SHALL KEEP THE PROJECT SITE, AND ADJACENT PAVEMENT AND SURFACES CLEAN AT ALL TIMES. THE CONTRACTOR SHALL PROVIDE METAL CONTAINERS FOR WASTE AND SCRAP MATERIALS. THE CONTRACTOR SHALL REMOVE THE CONTAINERS FROM THE PROJECT SITE WHEN FULL AND IS RESPONSIBLE FOR FINAL CLEANING OF THE PROJECT SITE. THE CONTRACTOR SHALL REMOVE ALL TOOLS, SURPLUS MATERIALS AND DEBRIS FROM THE PROJECT SITE AT THE COMPLETION OF THIS PROJECT.
- 5. THE CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACTIVITIES WITH THE NASA CONSTRUCTION MANAGER SO PORTABLE EQUIPMENT AND DEBRIS CAN BE MOVED. ACCESS TO BUILDINGS CAN BE PROVIDED, AND INTERFERENCE WITH OTHER NASA OPERATIONS CAN BE KEPT TO A MINIMUM.
- 6. COORDINATES ARE REFERENCED TO THE NASA GRC METRIC GRID COORDINATE SYSTEM.
- 7. PIPE AND MANHOLE DIAMETERS ARE INDICATED BY WHOLE NUMBERS IN MILLIMETERS. STATIONS, INVERTS, ELEVATIONS, AND LENGTHS ARE INDICATED IN METERS. SPOT ELEVATIONS ARE TOP OF PIPE OR TOP OF DUCT UNLESS OTHERWISE INDICATED.
- 8. EXISTING UTILITY LOCATIONS, DIMENSIONS, AND ELEVATIONS SHOWN ON THE PLAN AND PROFILES ARE APPROXIMATE.
- 9. THE CONTRACTOR SHALL LOCATE AND PROTECT ALL UTILITIES DURING CONSTRUCTION. CONSTRUCTION LAYOUT AND STAKING SHALL BE PERFORMED BY A PROFESSIONAL SURVEYOR REGISTERED IN THE STATE OF OHIO.
- 10. RED-LINED AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE NASA CONSTRUCTION MANAGER AT THE COMPLETION OF THE JOB. RED-LINED AS-BUILT DRAWINGS SHALL DOCUMENT EACH AND EVERY DEVIATION FROM THE CONSTRUCTION DRAWINGS. DEVIATIONS INCLUDE CHANGES IN LOCATION, ELEVATION, ALIGNMENTS, MATERIALS, AND CONFIGURATION. LOCATIONS OF ANY UNCHARTERED UTILITY OR UNANTICIPATED CONDITION SHALL BE CAREFULLY AND COMPLETELY DOCUMENTED. RED-LINED AS-BUILT DRAWINGS SHALL BE MAINTAINED ON THE PROJECT SITE AND BE AVAILABLE FOR REVIEW BY THE NASA CONSTRUCTION MANAGER, SURVEYOR, AND THE NASA QUALITY ASSURANCE TECHNICIAN.
- 11. CONTRACTOR SHALL NOTIFY THE NASA CONSTRUCTION MANAGER AT LEAST 48 HOURS PRIOR TO REMOVING, ABANDONING, OR INSTALLING BULKHEADS AS PART OF TAKING ANY EXISTING SEWER OUT OF PERMANENT SERVICE. NOTIFICATION IS NECESSARY TO INSURE THAT NO ACTIVE UTILITY IS TAKEN OUT OF SERVICE.
- 12. UNLESS OTHERWISE NOTED ON THE PLANS OR SPECIFICATIONS, ALL WORK PERFORMED, AND MATERIALS SUPPLIED SHALL BE COMPLETED IN ACCORDANCE WITH THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS, DATED 2010.
- 13. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY STORMWATER POLLUTION PREVENTION CONTROL MEASURES TO PREVENT SEDIMENT AND SPILLS FROM ENTERING THE STORM SEWER SYSTEM AND ULTIMATELY THE ROCKY RIVER. THE CONTRACTOR SHALL PROTECT ALL INLET BASINS THAT MAY RECEIVE SEDIMENT OF SPILLS. CONTRACTOR SHALL ADHERE TO AND APPLY ALL DETAILS OF THE EROSION AND SEDIMENTATION PLAN AND THE DETAILS ON DRAWINGS C-106, C-503, AND C-504.
- 14. THE CONTRACTOR SHALL INSURE THAT NO DIRECT DISCHARGE FROM A CONCRETE TRUCK IS PERMITTED TO DISCHARGE INTO ANY SEWER SYSTEM. NASA HAS MADE PROVISION FOR DISCHARGE FROM CONCRETE TRUCKS. ALL CONCRETE TRUCKS MUST GO TO SOUTH AREA, ADJACENT TO BUILDING 215 AND DISCHARGE INTO THE DEDICATED CONCRETE WASHOUT CONTAINER AT THAT LOCATION.
- 15. SEE FAR CLAUSE 52.211-6 FOR ITEMS IDENTIFIED BY BRAND NAME.
- 16. A NOTICE OF INTENT (NOI) MUST BE SUBMITTED TO THE OHIO EPA FOR NPDES PERMIT 45 DAYS PRIOR TO THE START OF CLEARING OR GRADING OPERATION.
- 17. ALL CONSTRUCTION ACTIVITIES MUST COMPLY WITH CUYAHOGA COUNTY SOIL AND WATER CONSERVATION DISTRICT REGULATIONS.
- 18. ALL EROSION AND SEDIMENT CONTROL PRACTICES MUST MEET THE STANDARDS AND SPECIFICATIONS OF THE OHIO RAINWATER AND LAND DEVELOPMENT HANDBOOK (2006). OTHER EROSION CONTROL ITEMS MAY BE NECESSARY DUE TO ENVIRONMENTAL CONDITIONS.
- 19. REGULAR INSPECTION AND MAINTENANCE MUST BE PROVIDED FOR ALL EROSION AND SEDIMENT CONTROL PRACTICES.
- 20. PERMANENT RECORDS OF MAINTENANCE AND INSPECTIONS MUST BE KEPT THROUGHOUT THE CONSTRUCTION PERIOD. INSPECTIONS MUST BE MADE A MINIMUM OF ONCE EVERY 7 DAYS AND IMMEDIATELY AFTER STORM EVENTS GREATER THAN 0.5 INCHES OF RAIN IN A 24 HOUR PERIOD.
- 21. ADJUST / RECONSTRUCT ALL EXISTING UTILITIES TO PROPOSED SURFACE. ALL UTILITIES MUST CONFORM TO NASA STANDARD DETAILS.
- 22. THIS PROJECT SHALL BE DEVELOPED FOR USBC SILVER CERTIFICATION, IN ACCORDANCE WITH LEED-NC VERSION 2.2. SEE SPECIFICATION 01 33 29 FOR CONTRACTOR'S RESPONSIBILITIES.
- 23. CONTRACTOR TO REMOVE ALL OBSTRUCTIONS, UTILITIES, PAVEMENT IN ORDER TO CONSTRUCT NEW BUILDING, NEW PAVEMENT, AND NEW UTILITY SERVICE. ALL UTILITY SERVICES TO BE REMOVED SHALL BE VERIFIED WITH NASA PRIOR TO REMOVAL.
- 24. ALL UTILITIES NOT REMOVED SHALL BE PROTECTED FROM DAMAGE.
- 25. CONTRACTOR SHALL COORDINATE AND MARK ALL UTILITIES INSTALLED IN THIS PROJECT. ANY DAMAGE TO NEW UTILITIES WILL BE REPAIRED AT NO ADDITIONAL COST TO GOVERNMENT.
- 26. CONTRACTOR TO HIRE PROFESSIONAL GEOTECHNICAL ENGINEER TO WITNESS AND TEST ALL EARTHWORK ACTIVITIES.



LEGEND:

BLD	BUILDING
FFE	FINISH FLOOR ELEVATION
FC	FACE OF CURB
EL	SURFACE ELEVATION
S/W	SIDEWALK
B/C	BACK OF CURB
---	EXISTING MAJOR CONTOURS
---	EXISTING MINOR CONTOURS
---	PROPOSED MAJOR CONTOURS
---	PROPOSED MINOR CONTOURS
---	GRADING LIMITS
---	LIMITS OF WORK / LEED BOUNDARY
---	NASA PROPERTY LINE
---	CRASH RESISTANT CHAIN LINK FENCE
---	STANDARD CHAIN LINK FENCE
---	ORNAMENTAL STEEL FENCE
---	EXISTING CHAIN LINK FENCE TO REMAIN
---	HEAVY DUTY CONCRETE PAVING
---	MEDIUM DUTY CONCRETE WALKS
---	PERMEABLE CONCRETE PAVING

SMH 014-1100
 TDP 202.138
 BOT 216.642
 INV 219.389
 INV 219.389
 INV 216.734
 INV 216.676
 INV 216.633
 INV 216.960
 INV g NOT FND

SMH 018-1100
 TDP 223.979
 BOT 219.864
 INV 219.999

SMH 017-1215
 TDP 229.746
 BOT
 INV 0

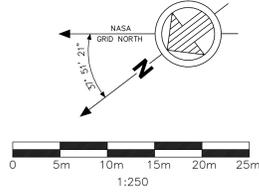
SMH 017-1114
 TDP 223.998
 BOT 222.847
 INV 222.108

SMH 017-1114
 TDP 223.998
 BOT
 INV 0

SMH 017-1114
 TDP 223.998
 BOT
 INV 0

1 GRADING PLAN

Scale: 1:250



CHG	NUM	DESCRIPTION	APP/DATE
REVISIONS			
CAD DRAWING - DO NOT REVISE MANUALLY			

FD BUILDING SOLUTIONS FOR RESEARCH		DR:	DES:
		D/ENG:	PROJ. MGR:
CONTRACTOR:	RELEASE STATUS:	RELEASE APPROVAL:	DATE:
TASK ORDER:	RELEASE APPROVAL:	RELEASE APPROVAL:	DATE:
DESIGN:	DESIGN:	DESIGN:	DATE:
APPROVAL:	APPROVAL:	APPROVAL:	DATE:

CONTRACTOR:	RELEASE STATUS:	RELEASE APPROVAL:	DATE:
TASK ORDER:	RELEASE APPROVAL:	RELEASE APPROVAL:	DATE:
DESIGN:	DESIGN:	DESIGN:	DATE:
APPROVAL:	APPROVAL:	APPROVAL:	DATE:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION JOHN H. GLENN RESEARCH CENTER LEWIS FIELD CLEVELAND, OHIO			
Security Enhancement for GRC Lewis Field Main Gate Area, Phase 3			
Civil Grading Plan Phase 3			
SIZE:	BLDG/SYS:	PROJECT ID:	DISC TYP/SEQ
CE TOPO	COF10231	C	102
AREA:	UNITS: METRIC	SOFTWARE: AUTOCAD	SHEET 01 OF 01
SCALE: 1:250	OFFICIAL DATE: 07/08/2011	REVISION:	VER

DO NOT REMOVE THIS NOTICE. PROPERTY SURVEY DOCUMENT. WHEN NO LONGER NEEDED.