PORT ST. LUCIE CITY COUNCIL
AGENDA ITEM REQUEST

COUNCIL ITEM 13C
DATE 5/29/12

Meeting Date: May 29, 2012

Public Hearing ____ Ordinance ____ Resolution ____ Motion _X

Item: #20070008, City Wide Culvert Replacements & Sidewalk Construction, **Amendment 22,** Pipe replacements on Lyngate Drive

Recommended Action:

Approval of Contract 20070008, Amendment 22 for the replacement of the metal culvert pipe on Lyngate Drive for $61,344.60 plus $10.00 for an indemnification fee. The prices are based on contracted prices with Melvin Bush Construction Inc., City contract #20070008. This project requires Federal Davis-Bacon provisions that meet CDBG-R reporting requirements which are part of the City Contract 20070008. The Contractor is being allowed twenty (20) calendar days for the completion of this project.

Vendor/Contractor has indicated that they do have a Drug-Free Workplace Program in place.

Exhibits: Department memo attached [x] yes [ ] no

Copies of the Amendment 22
Copy of Contractor's Proposal #20110252

Summary Explanation/Background Information: The existing metal culverts under Lyngate drive have deteriorated and the Community Development Block Grant (CDBG) will fund the replacement of this pipe with reinforced concrete culverts. All work is to be completed within 20 calendar days.

Purchase (x) is a replacement.

Purchase/project not budgeted. Funds are available and will be addressed in the next budget amendment.

Estimated expenditure: $61,344.50 plus $10.00 indemnification fee.

Department requests expenditure from the following:

Fund	118	CDBG
Cost Center	5900	Fed entitlement
Object Code	534000	Other contractual services
Project	Y1107	Lyngate

Director of OMB concurs with award: DKP

City Manager concurs with award: [illegible]

Submitted by: Patricia Roebling

Date Submitted: May 21, 2012

Title: City Engineer

RECEIVED
MAY 22 2012
City Manager's Office

H:\WORD\Bids-07\20070008-BM\20070008-09 Amd #22.doc

CITY OF PORT ST. LUCIE

Engineering Department

Accredited Agency – American Public Works Association

"A City for All Ages"

MEMORANDUM

To: Cheryl Shanaberger – Deputy Director of OMB (via electronic submittal)

Thru: Roxanne M. Chesser, P.E., Civil Engineer

From: Frank Knott, Project Manager JFK

Date: May 8, 2012

Re: City Wide Culvert Replacements and Sidewalk Construction
Contract Number 20070008, Amendment 22
Melvin Bush Construction, Inc.

Attached, please find our request for Amendment 22 to the contract along with backup information from Melvin Bush Contracting, Inc. for construction services on the pipe replacements on Lyngate Drive. We are requesting authorization by the City Council for the City Manager to execute the Amendment as referenced above and as further described below.

This Amendment to the contract is for the replacement of the existing deteriorated metal culverts under Lyngate Drive with reinforced concrete culverts. This amendment will increase the contract amount by sixty-one thousand, three hundred forty-four dollars and sixty cents ($61,344.60) and adds twenty (20) days to the contract time to complete the additional work.

A comparative quote was obtained from Eagle Enterprises, Inc. totaling $90,597.27. We are requesting this Amendment to the Melvin Bush Contracting, Inc.'s term contract due to the time constraints of the available funds and the savings of $29,252.67.

This project is fully funded through a Community Development Block Grant (CDBG) and the account number associated with this amendment is 118-5900-534000-Y1107. Please schedule this for presentation at the next available City Council meeting. If additional documentation is needed or if you have any questions, please let me know.

Attachments

c: Dave Pollard – Director of OMB
Jesus Merejo – Director Utility Systems
Patricia Roebling, P.E., City Engineer
Kimberly Graham, P.E. –Assistant City Engineer
Sue Walsh – Manager Operations

s:\projects\sidewalks\lyngate\memo to omb amendment 22 - bush.doc

121 S.W. Port St. Lucie Boulevard • Port St. Lucie, FL 34984-5099 • 772/871-5177 • Fax 772/871-5289
TDD Line • 772/344-4222

Contract Amendment #22
Pipe Replacements on Lyngate Drive

Contract #20070008 Amendment # 22 Date:

Contract Title: City Wide Culvert Replacements and Sidewalk Construction
Amendment #22, Pipe replacements on Lyngate Drive

Contractor's Name: Melvin Bush Construction, Inc.

Contract Term:

Amendment Term: To be completed within 20 calendar days

The following modifications to the Terms and Conditions contained in Contract/Agreement #20070008 between Melvin Bush Construction, Inc., dated March 15, 2007 through March 14, 2013 and the City of Port St. Lucie, are hereby incorporated and made a part of that Contract.

1. Scope of Work: Contractor is to furnish all materials, equipment, and labor to perform all work necessary to complete the pipe replacements on Lyngate Drive as per construction plans titled "Lyngate Drive Drainage Improvement" Pages C-1, C-2 & C-3 known as Attachment A.

2. The work is to be performed under this Amendment #22 is based on the project specifications and plans, and the accepted Contractor's proposals. The project will be completed in twenty (20) calendar days.

3. Payment of $61,344.60 which does not include the $10.00 indemnification fee will be paid in full at completion and acceptance of project by City as per the below pay items:

MOBILIZATION	1/LS	2,000.00	2,000.00
MAINTENANCE OF TRAFFIC	1/LS	500.00	500.00
CLEARING & GRUBBING	1/LS	1,000.00	1,000.00
INSTALL 29 X 45 RCP	208/LF	206.00	42,848.00
INSTALL 29 X 45 HEADWALL(TWIN)	1/EA	6,384.00	6,384.00
INSTALL 29 X 45 MES (TWIN)	1/EA	1,600.00	1,600.00
LIGHT TOWERS	2/EA	358.80	717.60
CURB REPLACEMENT	30/LF	20.00	600.00
CONCRETE SIDEWALK 4" THICK	10/SY	53.00	530.00
CONCRETE REMOVAL	10/SY	10.00	100.00
LABOR CREW	5/HRS	341.00	1,705.00
RIP RAP	20/TON	168.00	3,360.00
		TOTAL	61,344.60

IN WITNESS WHEREOF, the parties have executed this contract at Port St. Lucie Florida, the day and year first above written.

CITY OF PORT ST. LUCIE FLORIDA

By: _____
City Manager

ATTEST:

By: _____
City Clerk

By:_____
Authorized Representative of **Melvin Bush Construction Inc.**

State of:_____

County of:_____

Before me personally appeared: _____
(please print)

Personally known _____

or Produced Identification: _____
(type of identification)

Identification No. _____

known to me to be the person described in and who executed the foregoing instrument, and acknowledged to and before me that _____ executed said instrument for the purposes therein expressed.
(she/he)

WITNESS my hand and official seal, this _____ day of _____, 2012.

_____
Notary Signature

Notary Public-State of _____ at Large

My Commission Expires _____.

(*seal*)

PROPOSAL

20110252

MELVIN BUSH CONSTRUCTION, INC.
UNDERGROUND UTILITIES
2748 S.W. CASELLA STREET
PORT ST. LUCIE, FL 34953

Phone (772) 336-0623
Fax (772) 336-0488

TO: CITY OF PORT ST. LUCIE
121 SW PORT ST. LUCIE BLVD
PORT ST. LUCIE FL 34984

PHONE	DATE
(772) 871-5177	5/02/2012

JOB NAME / LOCATION
CITY OF PORT ST. LUCIE
LYNGATE DRIVE CULVERT REPLACEMENT
DRAINAGE IMPROVEMENTS

JOB NUMBER	JOB PHONE
LYNGATE DRIVE CULVERT	

We hereby submit specifications and estimates for:

> CITY OF PORT ST. LUCIE
> LYNGATE DRIVE CULVERT REPLACEMENT
> DRAINAGE IMPROVEMENTS

MOBILIZATION	1/LS	2,000.00	2,000.00
MAINTENANCE OF TRAFFIC	1/LS	500.00	500.00
CLEARING & GRUBBING	1/LS	1,000.00	1,000.00
INSTALL 29 X 45 RCP	208/LF	206.00	42,848.00
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CONCRETE SIDEWALK 4" THICK	10/SY	53.00	530.00
CONCRETE REMOVAL	10/SY	10.00	100.00
LABOR CREW	5/HRS	341.00	1,705.00
RIP RAP	20/TON	168.00	3,360.00
		TOTAL	61,344.60
	10% CONTINGENCY		6,134.46
			67,479.06

We Propose hereby to furnish material and labor -- complete in accordance with the above specifications, for the sum of:
Sixty Seven Thousand Four Hundred Seventy Nine and 06/100 Dollars dollars ($ 67,479.06).

Payment to be made as follows:

All material is guaranteed to be as specified. All work to be completed in a professional manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents or delays beyond our control. Owner to carry fire, tornado, and other necessary insurance. Our workers are fully covered by Worker's Compensation insurance.

Authorized Signature _____

Note: This proposal may be withdrawn by us if not accepted within _____ days.

Acceptance of Proposal — The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature _____

Signature _____

Date of Acceptance: _____

PRODUCT 13128G USE WITH 771C ENVELOPE Deluxe For Business 1-800-225-6380 or www.nebs.com PRINTED IN U.S.A. AA

REMOVE EXISTING HEADWALL AND CONST. MITERED END SECTION INVERT TO BE BASED ON 12" CLEAR COVER OVER EXISTING FM WITH A MAXIMUM ELEVATION OF 4.87. CONTRACTOR TO VERIFY FINAL ELEVATION THROUGH AS-BUILTS

SAW CUT & TRENCH REPAIR PAVEMENT THICKNESS SHALL BE 2.5"

APPROX. FM EL: 3.00' PRECAUTIONARY CONST. MEASURES NEED TO BE TAKEN WHILE WORKING WITHIN THE LIMITS OF THE EXIST. FM. THE CITY OF PORT ST. LUCIE UTILITIES WILL NEED TO BE NOTIFIED BEFORE WORK BEGINS WITHIN THE LIMITS OF THE EXISTING FM.

REMOVE EXISTING STORM PIPES CONST. 104 LF OF (2) 24"x34" ERCP AT LEVEL GRADE

LYNGATE DRIVE
(150' RIGHT-OF-WAY)

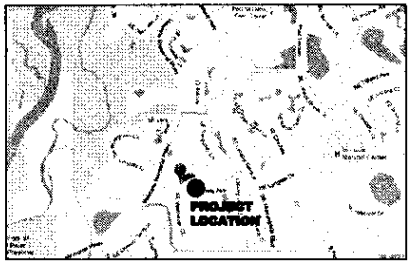
EXISTING EDGE OF PAVEMENT

EXIST. 18" CMP

EXIST. HEADWALL

EXISTING SWALE

REMOVE EXISTING HEADWALL AND CONST. PROPOSED HEADWALL INVERT TO BE BASED ON 12" CLEAR COVER OVER EXISTING FM WITH A MAXIMUM ELEVATION OF 4.87. CONTRACTOR TO VERIFY FINAL ELEVATION THROUGH AS-BUILTS



LEGEND

EXISTING STORM MANHOLE
EXISTING SANITARY MANHOLE
EXISTING WATER VALVE
EXISTING RIGHT-OF-WAY LINE
EXISTING SWALE
EXISTING WATER MAIN
EXISTING GRAVITY SEWER
EXISTING FORCE MAIN
EXISTING EDGE OF PAVEMENT
EXISTING WHEELCHAIR

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

811 KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

THE INFORMATION, CONTAINED WITH THIS DRAWING AND ATTACHED DOCUMENTS, IS AN INSTRUMENT OF SERVICE IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. ANY REUSE OF AND OPINIONS RELIANCE ON THIS INSTRUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN INC. SHALL BE AT OWNER'S SOLE RISK AND WITHOUT LIABILITY TO KIMLEY-HORN INC.

CRECH & ASSOCIATES, INC.
CIVIL ENGINEERS
OFFICE: 1600 S. DIXIE HWY., STE. 200 BOCA RATON, FL. 33432 (561) 391-5992
OFFICE: 1600 S. DIXIE HWY., STE. 200 BOCA RATON, FL.
WWW.CRECHANDASSOCIATES.COM

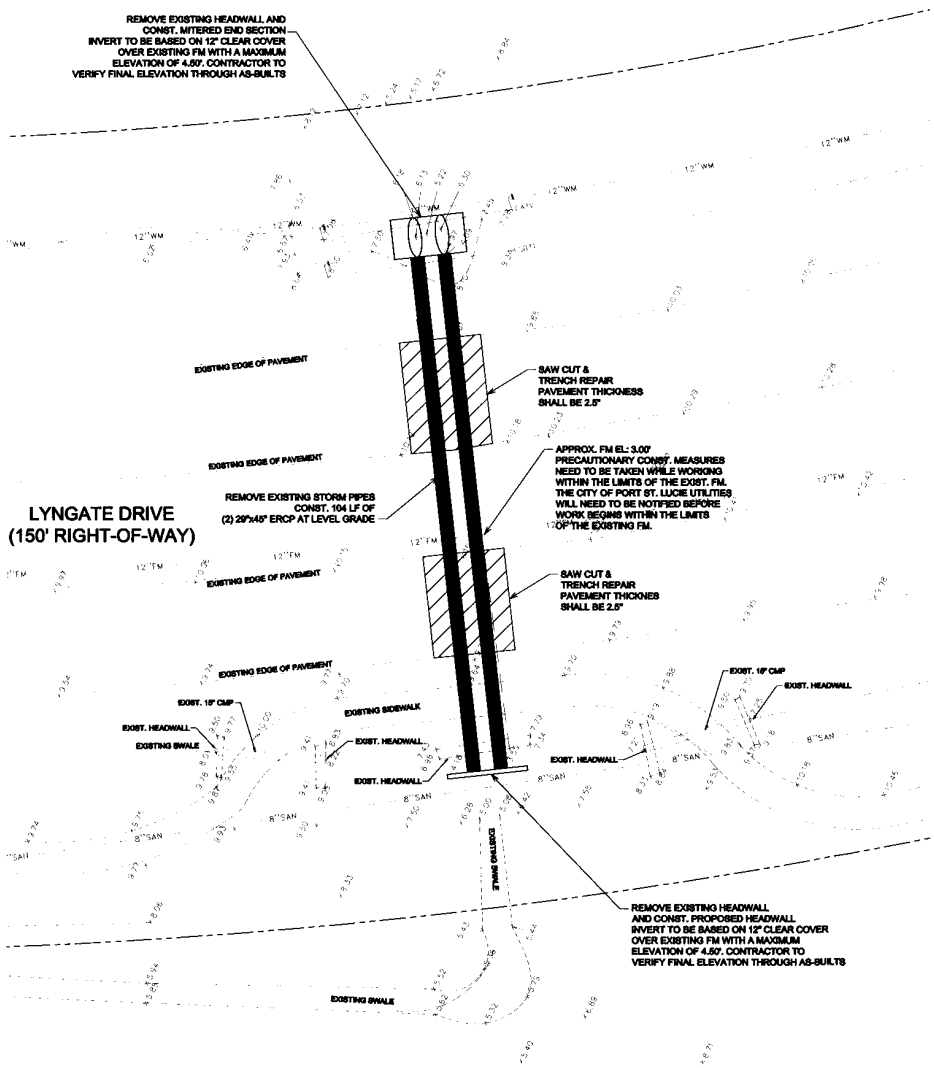
DATE	BY	REVISIONS
6/27/2012	SLB	CONST. - RIS
5/4/2012	MR	CITY OF PSL COORDINATION - RIS

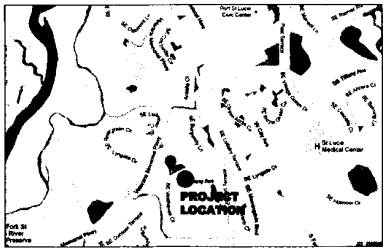
LYNGATE DRIVE
DRAINAGE IMPROVEMENTS
SITE PLAN
CITY OF PORT ST. LUCIE FLORIDA

DRAWN BY:	S.L.B.
CHECKED BY:	J.G.M.
DATE:	APRIL 2012
SCALE:	1" = 10'

SHEET C1

PROJECT No. 11004.04





LEGEND

- EXISTING STORM MANHOLE
- EXISTING SEWER MANHOLE
- EXISTING WATER VALVE
- EXISTING RIGHT-OF-WAY LINE
- EXISTING SWALE
- 6"WM — EXISTING WATER MAIN
- 8"SAN — EXISTING GRAVITY SEWER
- 12"FM — EXISTING FORCE MAIN
- EXISTING EDGE OF PAVEMENT
- EXISTING SIDEWALK

GRAPHIC SCALE

10' 0 5' 10' 20'

(IN FEET)
1 inch = 10 FT.

811 KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG
Dial 811 to Dig Safely
www.callsunshine.com

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY CREECH ENGINEERS, INC SHALL BE WITHOUT LIABILITY TO CREECH ENGINEERS, INC.

Q:\engineering_projects\2011\11004.04_City of PSL_Lyngate Sidewalk\11004.04_Site Plan.dwg Lyngate Culvert — Site Plan gridpro May 15,2012-12:32pm

CREECH ENGINEERS INC
CIVIL • WATER • ENVIRONMENTAL
OFFICES ALSO IN PORT ST. LUCIE, MELBOURNE AND TALLAHASSEE FL.
BOARD OF PROFESSIONAL ENGINEERS, CERTIFICATE OF AUTHORIZATION NUMBER FOR PROFESSIONAL ENGINEERING AND MAPPING SERVICES SERVICES IS: C-2656

DATE	BY	REVISIONS
04/29/2012	SLS	90% FT – 60%
05/15/2012	CRR	CITY OF PSL COORDINATION – 90%

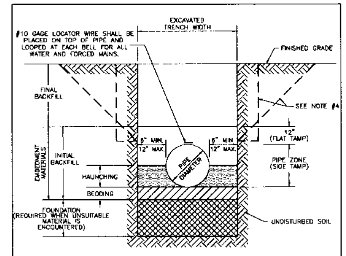
LYNGATE DRIVE DRAINAGE IMPROVEMENTS
SITE PLAN

CITY OF PORT ST. LUCIE FLORIDA

DRAWN BY:	S.L.S.
CHECKED BY:	J.O.A.
DATE:	APRIL 2012
SCALE:	1" = 10'

SHEET C1

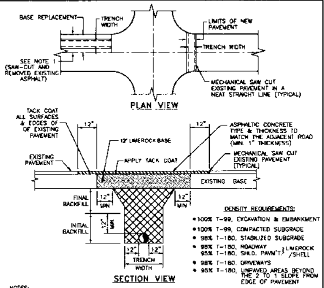
PROJECT No. 11004.04



NOTES:

1. FOR TRENCHES REQUIRING SHEETING, SHORING, STAY BRACING, TRENCH JACKS OR TRENCH BOX, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SUPPORTS.
2. IF THE MAXIMUM TRENCH WIDTH MUST BE EXCEEDED, THE AREA OUTSIDE OF THE MAXIMUM EMBEDMENT SHALL BE COMPACTED TO FINAL BACKFILL REQUIREMENTS. IF THE PIPE IS INSTALLED IN A COMPACTED EMBANKMENT, THE EMBANKMENT SHALL BE IN PLACE AND COMPACTED TO 12" MIN. COVER BEFORE INSTALLATION OF UTILITY.
3. IF BEDDING IS REQUIRED TO BRING TRENCH BOTTOM UP TO GRADE AND PROVIDE UNIFORM AND ADEQUATE LONGITUDINAL SUPPORT UNDER THE PIPE, THEN A MINIMUM COMPACTED DEPTH OF 4 TO 6 INCHES OF SELECT EMBEDMENT MATERIAL IS REQUIRED.
4. THE CONTRACTOR SHALL COMPLY WITH REQUIREMENTS OF THE FLORIDA TRENCH SAFETY ACT.
5. ALL UTILITY EXCAVATING, BACKFILLING AND COMPACTING SHALL BE IN ACCORDANCE WITH SECTION 02220 OF THE CITY OF PORT ST. LUCIE UTILITY SYSTEMS DEPARTMENT TECHNICAL SPECIFICATIONS AND CONSTRUCTION STANDARDS, LATEST EDITION.

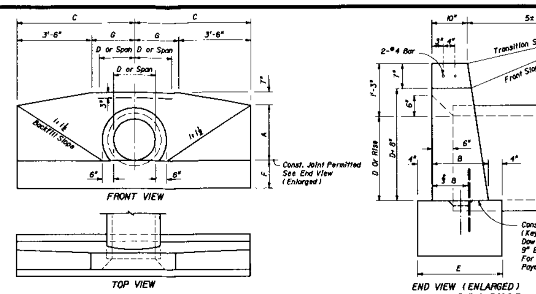
TYPICAL TRENCH DETAIL
N.T.S.



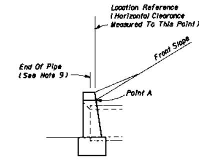
NOTES:

1. PAVEMENT RESTORATIONS FOR LONGITUDINAL CUTS IN ALL STREETS SHALL BE FULL LANE WIDTH, WITH FULL LANE WIDTH RESURFACING FOR EACH LANE WITHIN THE LIMITS OF THE CUT.
2. WHEN AN ARTERIAL OR MAJOR COLLECTOR STREET IS OPEN CUT WITHIN THE LIMITS OF THE ROADWAY INTERSECTION, THE ENTIRE INTERSECTION SHALL BE OVERLAID WITH ASPHALTIC CONCRETE.
3. WHEN STREETS OTHER THAN ARTERIALS OR MAJOR COLLECTORS ARE OPEN CUT MORE THAN TWO TIMES AT THE INTERSECTION, THE ENTIRE INTERSECTION SHALL BE OVERLAID WITH ASPHALTIC CONCRETE. TWO OPEN CUTS OR LESS AT THE INTERSECTION WILL REQUIRE OVERLAYING WITH ASPHALT ONLY IN THE OPEN CUT AREA.
4. THE CONTRACTOR SHALL BE REQUIRED TO DOCUMENT ALL PAVEMENT MARKINGS PRIOR TO OVERLAY. THE CONTRACTOR SHALL THEN PLACE NEW PAVEMENT MARKINGS AT THE SAME LOCATIONS. PAVEMENT MARKINGS SHALL BE IN ACCORDANCE TO F.D.O.T. SECTION 711.
5. ALL UTILITY EXCAVATING, BACKFILLING AND COMPACTING SHALL BE IN ACCORDANCE WITH SECTION 02220 OF THE CITY OF PORT ST. LUCIE UTILITY SYSTEMS DEPARTMENT TECHNICAL SPECIFICATIONS AND CONSTRUCTION STANDARDS, LATEST EDITION.

ROAD CUT PAVEMENT RESTORATION DETAIL
N.T.S.

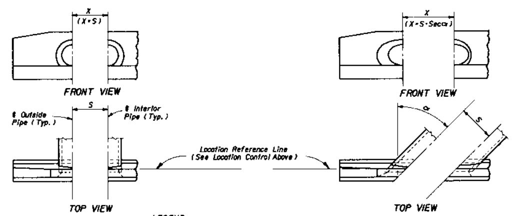


ENDWALL DIMENSION (EXCLUSIVE OF MULTIPLE PIPE SPACING)
N.T.S.



1. Position is set by the intersection of the front slope and Point A where this intersection falls outside the clear zone.
2. Where the front slope and Point A intersects inside the clear zone, the endwall is positioned so the location reference point is at the clear zone limit. The front slope is transitioned to the endwall as shown in Index No. 280.

STANDARD LOCATION CONTROL
N.T.S.



LEGEND
- α Pipe Skew
- S Center To Center Pipe Spacing
- X Centerline To Centerline Dimension At Face Of Headwall

ENDWALL POSITIONS FOR SINGLE & MULTIPLE PIPE & SPACING FOR MULTIPLE PIPE
N.T.S.

GENERAL NOTES

1. Endwall dimensions, locations and positions are for round and elliptical concrete pipe and for round and pipe-arch corrugated metal pipe. Round concrete pipe shown.
2. Front slope and ditch transitions shall be in accordance with Index No. 280.
3. Endwalls may be cast in place or precast concrete. Reinforcing steel shall be Grades 40 or 60. Additional reinforcement necessary for handling precast units shall be determined by the Contractor or the supplier. Cost of reinforcement shall be included in the contract unit price for concrete. (endwalls).
4. All exposed corners and edges of concrete are to be chamfered ¾".
5. Concrete meeting the requirements of ASTM C478 (4000 psi) may be used in lieu of Class I concrete in precast items manufactured in plants which are under the Standard Operating Procedures for the inspection of precast drainage products.
6. On outfall ditches with side slopes flatter than 1:1½ provide 20' transitions from the endwall to the flatter side slopes, right of way permitting.
7. For sodding around endwalls see Index No. 281.
8. Payment for concrete quantities for endwalls skewed to the pipe shall be made on the following basis:

Endwall Skew To Pipe	Use Tabulated Value
0° to 5°	0°
6° to 15°	15°
16° to 30°	30°
31° or over	45°

9. Pipe length plan quantities shall be based on the pipe end locations shown in the standard location control end view, or lengths based on special endwall locations called for in the plans.
10. Payment for pipe in pipe culverts shall be based on plan quantities, adjusted for endwall locations subsequently established by the Engineer.
11. Endwalls to be paid for under the contract unit price for Class I Concrete (Endwalls), CY.

DATA AND ESTIMATED QUANTITIES FOR ONE ENDWALL

ROUND CONCRETE AND CORRUGATED METAL PIPE

D	Opening Area (SF) 1	2	3	4	A	B	C	E	F	G	S	X 0°	X 15°	X 30°	X 45°	Single 0° Concrete	Single 0° Metal
15"	1.23	2.46	3.69	4.92	1'-11"	1'-2"	4'-0"	1'-10"	1'-2"	0'-6"	2'-7"	2'-7"	2'-8"	3'-0"	3'-8"	1.23	1.24
18"	1.77	3.54	5.31	7.08	2'-2"	1'-3"	4'-6"	1'-11"	1'-3"	1'-0"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.56	1.59
21"	2.41	4.82	7.23	9.64	2'-5"	1'-4"	5'-0"	2'-0"	1'-4"	1'-6"	3'-2"	3'-2"	3'-3"	3'-8"	4'-6"	1.97	
24"	3.14	6.28	9.42	12.56	2'-8"	1'-4"	5'-6"	2'-0"	1'-4"	2'-0"	3'-5"	3'-5"	3'-8"	3'-11"	4'-10"	2.24	2.29
27"	3.98	7.96	11.94	15.92	2'-11"	1'-5"	6'-0"	2'-1"	1'-5"	2'-6"	3'-10"	3'-10"	4'-0"	4'-5"	5'-5"	2.73	
30"	4.91	9.82	14.73	19.64	3'-2"	1'-6"	6'-6"	2'-2"	1'-6"	3'-0"	4'-3"	4'-3"	4'-5"	4'-11"	6'-0"	3.28	3.34
36"	7.07	14.14	21.21	28.28	3'-8"	1'-8"	7'-6"	2'-4"	1'-8"	4'-0"	5'-1"	5'-1"	5'-3"	5'-10"	7'-2"	4.53	4.64
42"	9.62	19.24	28.86	38.48	4'-2"	1'-10"	8'-6"	2'-6"	2'-0"	5'-0"	6'-0"	6'-0"	6'-3"	6'-11"	8'-6"	6.33	6.49
48"	12.57	25.14	37.71	50.28	4'-8"	2'-1"	9'-6"	2'-9"	2'-0"	6'-0"	6'-9"	6'-9"	7'-0"	7'-10"	9'-7"	8.15	8.38
54"	15.90	31.80	47.70	63.60	5'-2"	2'-6"	10'-6"	3'-2"	2'-3"	7'-0"	7'-8"	7'-8"	7'-11"	8'-10"	10'-10"	11.71	11.77

Class I Concrete (CY) — Number And Type Of Pipe And Skew Angle Of Pipe (continued)

D	Double Concrete 0°	15°	30°	45°	Double Metal 0°	15°	30°	45°	Triple Concrete 0°	15°	30°	45°	Triple Metal 0°	15°	30°	45°	Quadruple Concrete 0°	15°	30°	45°	Quadruple Metal 0°	15°	30°	45°	D
15"	1.58	1.60	1.65	1.74	1.62	1.63	1.68	1.78	1.94	1.96	2.05	2.23	1.99	2.02	2.11	2.30	2.30	2.34	2.47	2.74	2.37	2.41	2.75	2.84	15"
18"	1.99	2.01	2.06	2.17	2.04	2.06	2.11	2.23	2.43	2.46	2.58	2.79	2.51	2.54	2.65	2.89	2.86	2.91	3.06	3.40	2.96	3.01	3.17	3.53	18"
21"																									21"
24"	2.82	2.84	2.91	3.06	2.91	2.93	3.01	3.17	3.39	3.43	3.57	3.87	3.52	3.56	3.71	4.03	3.97	4.03	4.24	4.69	4.14	4.20	4.43	4.91	24"
27"																									27"
30"	4.13	4.16	4.26	4.48	4.28	4.31	4.43	4.67	4.98	5.04	5.25	5.69	5.20	5.27	5.49	5.97	5.84	5.93	6.24	6.91	6.13	6.23	6.56	7.29	30"
36"	5.73	5.77	5.92	6.23	5.96	6.00	6.15	6.49	6.92	7.00	7.29	7.91	7.25	7.34	7.65	8.33	8.13	8.26	8.69	9.62	8.57	8.71	9.18	10.20	36"
42"	8.11	8.17	8.39	8.85	8.43	8.50	8.73	9.23	9.90	10.02	10.45	11.38	10.38	10.52	10.98	11.99	11.69	11.87	12.51	13.89	12.32	12.52	13.22	14.73	42"
48"	10.40	10.48	10.75	11.33	10.85	10.94	11.23	11.87	12.64	12.80	13.34	14.50	13.34	13.51	14.11	15.39	14.89	15.13	15.93	17.68	15.82	16.08	16.97	18.90	48"
54"	15.23	15.35	15.78	16.69	15.35	15.48	15.90	16.83	18.77	19.02	19.86	21.69	18.93	19.18	20.04	21.89	22.29	22.66	23.93	26.67	22.51	22.89	24.17	26.96	54"

CORRUGATED METAL PIPE ARCH

Span	Rise	Opening Area (SF) 1	2	3	4	A	B	C	E	F	G	S	X 0°	X 15°	X 30°	X 45°
17"	13"	1.1	2.2	3.3	4.4	1'-9"	1'-2"	3'-10"	1'-10"	1'-2"	0'-4"	2'-6"	2'-6"	2'-7"	2'-11"	3'-6"
21"	15"	1.6	3.2	4.8	6.4	1'-11"	1'-2"	4'-3"	1'-10"	1'-2"	0'-9"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"
28"	20"	2.8	5.6	8.4	11.2	2'-4"	1'-3"	5'-2"	1'-11"	1'-3"	1'-8"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"
35"	24"	4.3	8.6	12.9	17.2	2'-8"	1'-4"	5'-11½"	2'-0"	1'-4"	2'-5½"	4'-0"	4'-0"	4'-2"	4'-7"	5'-8"
42"	29"	5.9	11.8	17.7	23.6	3'-1"	1'-5"	6'-10½"	2'-1"	1'-5"	3'-4½"	4'-9"	4'-9"	4'-11"	5'-6"	6'-9"
49"	33"	8.4	16.8	25.2	33.6	3'-5"	1'-6"	7'-8"	2'-2"	1'-6"	4'-2"	5'-6"	5'-6"	5'-8"	6'-4"	7'-9"
57"	38"	10.6	21.2	31.8	42.4	3'-10"	1'-7"	8'-7½"	2'-3"	1'-7"	5'-1½"	6'-4"	6'-4"	6'-7"	7'-4"	8'-11"
64"	43"	13.2	26.4	39.6	52.8	4'-3"	1'-8"	9'-6½"	2'-4"	1'-8"	6'-0½"	7'-1"	7'-1"	7'-4"	8'-2"	10'-0"
71"	47"	16.9	33.8	50.7	67.6	4'-7"	1'-10"	10'-4"	2'-6"	2'-0"	6'-10"	7'-10"	7'-10"	8'-1"	9'-1"	11'-1"

Class I Concrete (CY) — Number Of Pipe And Skew Angle Of Pipe

Span	Single 0°	Double 0°	15°	30°	45°	Triple 0°	15°	30°	45°	Quadruple 0°	15°	30°	45°	Span	Rise	Approx. Equiv. Round Pipe
17"	1.16	1.47	1.48	1.52	1.60	1.78	1.80	1.88	2.04	2.09	2.12	2.23	2.48	17"	13"	15"
21"	1.33	1.68	1.70	1.75	1.84	2.04	2.08	2.15	2.33	2.40	2.44	2.57	2.84	21"	15"	18"
28"	1.78	2.31	2.33	2.38	2.53	2.83	2.87	2.99	3.26	3.36	3.42	3.60	4.01	28"	20"	24"
35"	2.34	3.03	3.05	3.14	3.32	3.72	3.77	3.93	4.29	4.40	4.47	4.72	5.25	35"	24"	30"
42"	3.13	4.06	4.09	4.20	4.45	4.99	5.06	5.28	5.76	5.93	6.03	6.36	7.09	42"	29"	36"
49"	3.83	5.00	5.04	5.18	5.49	6.18	6.24	6.52	7.12	7.32	7.44	7.86	8.76	49"	33"	42"
57"	4.87	6.31	6.36	6.53	6.91	7.74	7.84	8.18	8.93	9.16	9.33	9.85	10.96	57"	38"	48"
64"	5.88	7.64	7.70	7.91	8.37	9.40	9.52	9.94	10.86	11.15	11.33	11.97	13.33	64"	43"	54"
71"	7.80	10.15	10.23	10.51	11.12	12.49	12.65	13.22	14.43	14.85	15.10	15.94	17.77	71"	47"	60"

CONCRETE ELLIPTICAL PIPE

Rise	Span	Opening Area (SF) 1	2	3	4	A	B	C	E	F	G	S	X 0°	X 15°	X 30°	X 45°
12"	18"	1.3	2.6	3.9	5.2	1'-8"	1'-2"	3'-9"	1'-10"	1'-2"	0'-3"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"
14"	23"	1.8	3.6	5.4	7.2	1'-10"	1'-3"	4'-6½"	1'-11"	1'-3"	0'-9½"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"
19"	30"	3.3	6.6	9.9	13.2	2'-3"	1'-4"	5'-4½"	2'-0"	1'-4"	1'-7½"	4'-2"	4'-2"	4'-4"	4'-10"	5'-11"
24"	38"	5.1	10.2	15.3	20.4	2'-8"	1'-5"	6'-3"	2'-1"	1'-5"	2'-8"	5'-2"	5'-2"	5'-4"	6'-0"	7'-4"
29"	45"	7.4	14.8	22.2	29.6	3'-1"	1'-6"	7'-0"	2'-2"	1'-6"	3'-6"	6'-0"	6'-0"	6'-3"	6'-11"	8'-6"
34"	53"	10.2	20.4	30.6	40.8	3'-6"	1'-7"	7'-11½"	2'-3"	1'-7"	4'-5½"	7'-1"	7'-1"	7'-4"	8'-2"	10'-0"
38"	60"	12.9	25.8	38.7	51.6	3'-10"	1'-8"	8'-9"	2'-4"	1'-8"	5'-3"	7'-11"	7'-11"	8'-2"	9'-2"	11'-2"
43"	68"	16.6	33.2	49.8	66.4	4'-3"	1'-10"	9'-8½"	2'-6"	1'-10"	6'-6½"	8'-10"	8'-10"	9'-2"	10'-2"	12'-6"
48"	76"	20.5	41.0	61.5	82.0	4'-8"	2'-1"	10'-8"	2'-9"	2'-0"	7'-2"	9'-9"	9'-9"	10'-1"	11'-3"	13'-9"
53"	83"	24.8	49.6	74.4	99.2	5'-1"	2'-6"	11'-7"	3'-2"	2'-6"	8'-1"	10'-7"	10'-7"	10'-11"	12'-3"	15'-0"
58"	91"	29.5	59.0	88.5	118.0	5'-6"	2'-10"	12'-6½"	3'-6"	2'-10"	9'-0½"	11'-4"	11'-4"	11'-9"	13'-1"	16'-0"

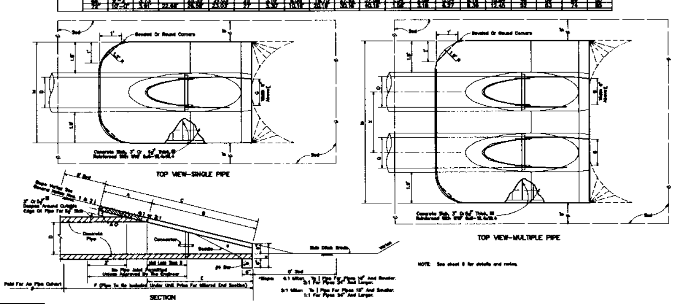
Class I Concrete (CY) — Number Of Pipe And Skew Angle Of Pipe

Rise	Single 0°	Double 0°	15°	30°	45°	Triple 0°	15°	30°	45°	Quadruple 0°	15°	30°	45°	Rise	Span	Approx. Equiv. Round Pipe
12"	1.09	1.45	1.46	1.51	1.60	1.80	1.82	1.91	2.09	2.16	2.20	2.33	2.60	12"	18"	15"
14"	1.36	1.82	1.84	1.89	2.01	2.28	2.32	2.43	2.68	2.75	2.80	2.97	3.33	14"	23"	18"
19"	1.89	2.55	2.57	2.66	2.85	3.22	3.27	3.43	3.77	3.88	3.95	4.19	4.70	19"	30"	24"
24"	2.64	3.55	3.58	3.69	3.93	4.46	4.54	4.77	5.24	5.39	5.49	5.82	6.53	24"	38"	30"
29"	3.32	4.48	4.52	4.66	4.96	5.64	5.72	6.00	6.60	6.80	6.92	7.34	8.24	29"	45"	36"
34"	4.24	5.76	5.81	6.00	6.39	7.29	7.40	7.76	8.55	8.81	8.97	9.52	10.70	34"	53"	42"
38"	5.22	7.16	7.23	7.46	7.96	9.10	9.24	9.70	10.71	11.05	11.25	11.95	13.46	38"	60"	48"
43"	6.63	9.01	9.09	9.38	10.00	11.39	11.56	12.13	13.36	13.77	14.02	14.88	16.73	43"	68"	54"
48"	8.66	11.74	11.85	12.22	13.02	14.82	15.04	15.77	17.37	17.91	18.23	19.34	21.74	48"	76"	60"
53"	12.50	16.96	16.98	17.67	18.85	21.47	21.78	22.86	25.18	25.91	26.41	28.08	31.58	53"	83"	66"
58"	16.46	22.28	22.46	23.18	24.66	28.05	28.46	29.85	32.85	33.85	34.46	36.56	41.05	58"	91"	72"

Note: Use the guidelines of General Note No. 8 for selecting tabular quantities.

DIMENSIONS AND QUANTITIES

	D	X	A	B	C	E	F	G	M Single Pipe	M Double Pipe	M Triple Pipe	M Quad. Pipe	N	5½" Concrete Slab (CY) Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Sodding (SQ. YDS.) Single Pipe	Double Pipe	Triple	Quad.
2:1 Slope	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4:1 Slope	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



TYPICAL MITERED END SECTION DETAIL
N.T.S.

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BOARD OF PROFESSIONAL ENGINEERS, CERTIFICATE OF AUTHORIZATION NUMBER 3136
PROFESSIONAL SURVEYORS AND MAPPERS, AMENDED CERTIFICATE NO. LB-0006705

DATE	BY	REVISIONS
04/25/2012	S.L.S.	DRAFT - 60%
05/15/2012	GRR	CITY OF PSL COORDINATION - 90%

LYNGATE DRIVE
DRAINAGE IMPROVEMENTS
DETAILS
CITY OF PORT ST. LUCIE FLORIDA

DRAWN BY:	S.L.S.
CHECKED BY:	J.D.N.
DATE:	APRIL 2012
SCALE:	N.T.S.

SHEET C2
PROJECT No. 11004.04

G:\engineering_projects\2011\11004.00 City of PSL Lyngate Sidewalk\11004.04_Site Plan.dwg Lyngate Culvert - Specifications gripple May 15,2012-12:34pm

PAVING AND DRAINAGE

GENERAL:

IT IS INTENDED THAT THE FLORIDA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", LATEST EDITION AND "ROADWAY AND TRAFFIC DESIGN STANDARDS", LATEST EDITION, BE USED WHERE APPLICABLE FOR VARIOUS WORK, AND THAT WHERE SUCH WORDING THEREIN REFERS TO THE STATE OF FLORIDA AND ITS DEPARTMENT OF TRANSPORTATION AND PERSONNEL, SUCH WORDING IS INTENDED TO BE REPLACED WITH THAT WORDING WHICH WOULD PROVIDE PROPER TERMINOLOGY, THEREBY MAKING SUCH "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" AND "ROADWAY AND TRAFFIC DESIGN STANDARDS" AS THE "STANDARD SPECIFICATIONS" FOR THIS PROJECT.

IF WITHIN THAT PARTICULAR SECTION ANOTHER SECTION, ARTICLE OR PARAGRAPH IS REFERRED TO, IT SHALL BE A PART OF THE "STANDARD SPECIFICATIONS" ALSO.

ALL WORK SHALL BE DONE IN A WORKMANLIKE MANNER AND SHALL CONFORM WITH ALL APPLICABLE CITY, COUNTY, STATE AND FEDERAL REGULATIONS AND/OR CODES. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND LICENSES REQUIRED TO BEGIN WORK.

GENERAL NOTES:

1. THE CONTRACTOR SHALL GIVE THE ENGINEER 24 HOURS NOTICE PRIOR TO REQUESTING REQUIRED CONSTRUCTION OBSERVATIONS AND SHALL SUPPLY ALL EQUIPMENT NECESSARY TO PROPERLY TEST AND INSPECT THE COMPLETED WORK.

2. THE CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS FOR A PERIOD OF ONE YEAR FROM THE DATE OF PROJECT ACCEPTANCE, DURING WHICH TIME ALL FAULTY CONSTRUCTION AND/OR MATERIALS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING ABOVE-GROUND, UNDERGROUND, AND ON THE SURFACE STRUCTURES AND UTILITIES AGAINST THE CONSTRUCTION OPERATION THAT MAY CAUSE DAMAGE TO SAID FACILITY.

4. THE LOCATIONS AND SIZES OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR HIS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND SIZE OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

5. THE CONTRACTOR SHALL GIVE ADEQUATE NOTIFICATION TO ALL AFFECTED UTILITY OWNERS FOR REMOVAL, RELOCATION AND ALTERATION OF THEIR EXISTING FACILITIES.

6. STREET OR HIGHWAY RESTORATION WORK IS TO BE DONE AS PER THE LOCAL OR STATE AGENCY HAVING JURISDICTION.

7. THE CONTRACTOR SHALL COMPLY WITH ALL RULES AND REGULATIONS OF THE STATE, COUNTY AND CITY AUTHORITIES REGARDING CLOSING OR RESTRICTING THE USE OF PUBLIC STREETS OR HIGHWAYS.

8. TRAFFIC CONTROL ON ALL CITY, COUNTY AND STATE HIGHWAY RIGHTS-OF-WAY SHALL MEET THE REQUIREMENTS OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (U.S. DOT/FHA) AND THE REQUIREMENTS OF THE STATE AND ANY LOCAL AGENCY HAVING JURISDICTION.

9. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY WHEN A CONFLICT BETWEEN THE DRAWINGS AND ACTUAL CONDITIONS IS DISCOVERED DURING THE COURSE OF CONSTRUCTION.

10. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE SITE PRIOR TO BIDDING THE WORK AND TO PERFORM SUCH TESTS, STUDIES AND SURVEYS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO ACTUAL SURFACE AND SUBSURFACE CONDITIONS EXISTING AT THE SITE. ACTUAL CONDITIONS THAT DIFFER FROM THOSE SHOWN ON DRAWINGS SHALL NOT CONSTITUTE A BASIS FOR ADDITIONAL PAYMENT.

11. ALL ELEVATIONS REFER TO N.A.V.D. 1988 DATUM, UNLESS OTHERWISE NOTED.

12. ALL CONSTRUCTION DEWATERING (WELL POINTS, SUMPS ETC.) WILL REQUIRE A DEWATERING PERMIT FROM THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT. THIS SHALL BE OBTAINED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

13. ANY CHANGES DUE TO FIELD CONDITIONS OR ANY OTHER DEVIATIONS FROM THE APPROVED DRAWINGS MUST BE APPROVED BY THE ENGINEER AND THE GOVERNING AUTHORITY HAVING JURISDICTION PRIOR TO BEING CONSTRUCTED.

14. THE CONTRACTOR SHALL NOTIFY ALL UTILITY OWNERS HAVING FACILITIES IN THE AREA WITHIN AND ADJACENT TO THE PROPOSED CONSTRUCTION AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO BEGINNING CONSTRUCTION.

15. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES:
ONE (1) SET OF "APPROVED" CONSTRUCTION DRAWINGS,
ONE (1) COPY OF ALL CONTRACT DOCUMENTS AND,
ONE (1) COPY OF ALL APPLICABLE LOCAL, STATE AND FEDERAL PERMITS REQUIRED FOR CONSTRUCTION.

16. THE CONTRACTOR SHALL PROVIDE A QUALIFIED SUPERINTENDENT TO REMAIN AT THE JOB SITE AT ALL TIMES WHEN WORK IS BEING PERFORMED. THE SUPERINTENDENT SHALL BE PRESENT AT ALL SCHEDULED CONSTRUCTION OBSERVATION MEETINGS.

SEDIMENTATION AND EROSION CONTROL:

PRIOR TO AND DURING CONSTRUCTION, THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN ALL SEDIMENTATION AND EROSION CONTROL MEASURES REQUIRED TO RETAIN SEDIMENT ON SITE AND TO PREVENT VIOLATIONS OF STATE WATER QUALITY STANDARDS. SEDIMENTATION AND EROSION CONTROL FEATURES MAY INCLUDE, BUT ARE NOT LIMITED TO, SILT FENCES, SILTATION BARRIERS, GEOTEXTILE FILTER BARRIERS, BAILED HAY OR STRAW BARRIERS, TURBIDITY SCREENS AND SEDIMENTATION BASINS. CONSTRUCTION AND MAINTENANCE OF SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH SECTION 104 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL SEDIMENTATION AND EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER. IF A SEDIMENTATION AND EROSION CONTROL PLAN IS NOT INCLUDED IN THE APPROVED CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PREPARE A SITE SPECIFIC SEDIMENTATION AND EROSION CONTROL PLAN IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND BEST MANAGEMENT PRACTICES. THIS PLAN SHALL BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING CONSTRUCTION.

STORMWATER RETENTION/DETENTION FACILITIES SHALL BE EXCAVATED AND ROUGH GRADED PRIOR TO BUILDING CONSTRUCTION OR CONSTRUCTION OF IMPERVIOUS SURFACES WITHIN THE AREA SERVED BY THOSE RETENTION/DETENTION FACILITIES. ADEQUATE MEASURES SHALL BE TAKEN TO PREVENT EROSION PRIOR TO FINAL GRADING AND STABILIZATION OF THE RETENTION/DETENTION FACILITIES.

STABILIZATION MEASURES, INCLUDING BUT NOT LIMITED TO, SODDING OR SEEDING AND MULCHING, SHALL BE INITIATED FOR SEDIMENTATION AND EROSION CONTROL ON ALL DISTURBED AREAS AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN SEVEN (7) DAYS AFTER CONSTRUCTION ACTIVITY HAS CEASED.

THE CONTRACTOR SHALL INSPECT ALL SEDIMENTATION AND EROSION CONTROL MEASURES DAILY DURING CONSTRUCTION. ANY DEFICIENCIES SHALL BE IMMEDIATELY CORRECTED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTING ANY OFF SITE WATER QUALITY IMPACTS OR OTHER ADVERSE IMPACTS DUE TO SEDIMENTATION AND EROSION FROM THE PROJECT SITE DURING CONSTRUCTION.

EXCAVATION:

THE CONTRACTOR SHALL PERFORM ALL EXCAVATION NECESSARY TO ACCOMPLISH THE CONSTRUCTION INDICATED ON THE DRAWINGS. EXCAVATION SHALL BE UNCLASSIFIED REGARDLESS OF MATERIAL ENCOUNTERED. ALL EXCAVATED MATERIAL NOT REQUIRED FOR FILL OR EMBANKMENT, SHALL BE DEPOSITED ON THE SITE, AS DIRECTED BY THE OWNER, OR HIS REPRESENTATIVE. THE CONTRACTOR SHALL DO ALL SHORING NECESSARY TO PERFORM AND PROTECT THE EXCAVATION, AND AS NECESSARY FOR THE SAFETY OF THE WORKERS AND ANY EXISTING FACILITIES IN ACCORDANCE WITH THE STATE OF FLORIDA "TRENCH SAFETY ACT". WHEREVER EXCAVATIONS ARE MADE BELOW THE GRADES INDICATED ON THE DRAWINGS, CLEAN FIRM MATERIAL APPROVED BY THE ENGINEER SHALL BE USED TO RESTORE THE AREA TO THE PROPER GRADE, AND SHALL BE COMPACTED IN ACCORDANCE WITH THE REQUIREMENTS FOR COMPACTION INCLUDED IN THESE SPECIFICATIONS.

UNSUITABLE MATERIAL:

WHERE MUCK, ROCK, CLAY, ORGANIC MATERIAL OR OTHER DELETERIOUS MATERIAL WITHIN THE LIMITS OF CONSTRUCTION IS, IN THE OPINION OF THE ENGINEER, UNSUITABLE IN ITS ORIGINAL POSITION, THE CONTRACTOR SHALL EXCAVATE SUCH MATERIAL, AND BACKFILL THE EXCAVATED AREA WITH SUITABLE MATERIAL, WHICH SHALL BE COMPACTED AND SHAPED TO CONFORM TO THE REQUIRED SECTION. BACKFILL MATERIAL AND COMPACTION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS INCLUDED IN THESE SPECIFICATIONS.

BACKFILL:

ALL BACKFILL MATERIAL SHALL BE CLEAN, UNIFORM, FREE DRAINING SOIL AND FREE OF LUMBER, TRASH OR OTHER DEBRIS, AND SHALL BE THOROUGHLY COMPACTED IN LAYERS NOT TO EXCEED TWELVE INCHES (12"), AND BROUGHT TO AN ELEVATION ABOVE THE FINISHED GRADE, SUFFICIENT TO ALLOW FOR SETTLEMENT. PRIOR TO PLACING BACKFILL, THE AREAS AROUND STRUCTURES UPON WHICH THE BACKFILL IS TO BE PLACED, SHALL BE CLEANED OF ALL TRASH AND DEBRIS OF ANY NATURE. SHEETING AND BRACING ALLOWED TO BE LEFT IN PLACE SHALL BE CUT OFF A MINIMUM OF 2.5 FEET BELOW FINISHED GRADE. COMPACTION FOR EACH LIFT SHALL BE EQUAL TO 100% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99.

GRADING:

THE CONTRACTOR SHALL PERFORM ALL NECESSARY GRADING TO ACHIEVE THE FINISHED GRADING AS PER THE DRAWINGS. ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH THESE SPECIFICATIONS.

COMPACTION:

ALL AREAS TO BE COMPACTED SHALL BE MOISTENED AND COMPACTED BY TAMPING OR USE OF VIBRATORY ROLLERS, VIBRATORY PLATE COMPACTORS OR ANY OTHER METHOD APPROVED BY THE ENGINEER IN ORDER TO OBTAIN THE REQUIRED DENSITY. WHERE USE OF VIBRATORY EQUIPMENT MAY AFFECT ADJACENT STRUCTURES, COMPACTION SHALL BE PERFORMED USING OTHER EQUIPMENT THAT WILL SATISFY THE DENSITY REQUIREMENTS WITHOUT DAMAGING EXISTING STRUCTURES. THE CONTRACTOR SHALL INSPECT ALL COMPACTED AREAS PRIOR TO FURTHER CONSTRUCTION OPERATIONS, TO ENSURE THAT SATISFACTORY COMPACTION HAS BEEN OBTAINED. ALL EMBANKMENT, INCLUDING BACKFILL AND EMBANKMENT ADJACENT TO STRUCTURES, SHALL BE COMPACTED TO A DENSITY OF NOT LESS THAN 100 PERCENT (100%) OF THE MAXIMUM DENSITY, AS DETERMINED BY AASHTO T-99.

THE CONTRACTOR SHALL PAY PARTICULAR ATTENTION TO COMPACTION IN AREAS AROUND STRUCTURES AND OTHER FEATURES WHERE ACCESS BY SELF PROPELLED VIBRATORY COMPACTORS MAY BE DIFFICULT.

BACKFILL AND COMPACTION WITHIN PIPE TRENCHES SHALL BE IN ACCORDANCE WITH THE TYPICAL TRENCH DETAIL SHOWN ON THE DRAWINGS. FOR NON-FLEXIBLE PIPE MATERIALS, ALL BACKFILL SHALL BE COMPACTED TO NOT LESS THAN 100 PERCENT (100%) OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99. FOR FLEXIBLE PIPE MATERIALS, ALL BACKFILL SHALL BE COMPACTED TO NOT LESS THAN 95 PERCENT (95%) OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99.

IF IN THE ENGINEER'S OPINION, DENSITY TESTS ARE REQUIRED, SUCH TESTS SHALL BE MADE AS DIRECTED BY THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR. THE CONTRACTOR SHALL INSTRUCT THE TESTING LABORATORY TO FORWARD COPIES OF ALL TEST REPORTS TO THE ENGINEER.

STABILIZED SUBGRADE:

STABILIZED SUBGRADE SHALL BE CONSTRUCTED TO THE LIMEROCK BEARING RATIO AS PER THE DRAWINGS FOR THE DEPTH AND LIMITS SHOWN ON THE PLAN, AND IN ACCORDANCE WITH SECTION 160 OF THE STANDARD SPECIFICATIONS FOR TYPE C STABILIZATION. THE STABILIZED SUBGRADE SHALL BE CONSTRUCTED TO A LIMEROCK BEARING RATIO (LBR) OF NOT LESS THAN 40 AND SHALL BE COMPACTED TO NOT LESS THAN 98% OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180.

ROCK BASE:

ROCK BASE SHALL BE CONSTRUCTED OF EITHER LIMEROCK MATERIAL IN ACCORDANCE WITH SECTION 911 OR CEMENTED COQUINA SHELL MATERIAL IN ACCORDANCE WITH SECTION 915 OF THE "STANDARD SPECIFICATIONS".

LIMEROCK BASE SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 200 AND CEMENTED COQUINA SHELL BASE SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 250 OF THE "STANDARD SPECIFICATIONS". CONTRACTOR SHALL PROVIDE ROCK PIT CERTIFICATION FOR CEMENTED COQUINA SHELL MATERIAL. ROCK BASE SHALL BE CONSTRUCTED TO THE DEPTH AND LIMITS AS SHOWN ON THE DRAWINGS. THE ROCK BASE MATERIAL SHALL HAVE A LIMEROCK BEARING RATIO (LBR) OF NOT LESS THAN 100. THE ROCK BASE SHALL BE COMPACTED TO NOT LESS THAN 98% OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180. A PRIME COAT AND SAND SEAL SHALL BE APPLIED TO THE ROCK BASE AFTER CONSTRUCTION INSPECTION AND APPROVAL BY THE ENGINEER.

PRIME AND TACK COAT:

A BITUMINOUS PRIME COAT SHALL BE APPLIED TO THE ROCK BASE. PRIME COAT SHALL BE CUT BACK ASPHALT GRADE RC-70 OR RC-250 APPLIED AT A RATE OF NOT LESS THAN 0.10 GALLONS PER SQUARE YARD. THE PRIME COAT SHALL BE COVERED WITH SAND FREE FROM ANY APPRECIABLE AMOUNT OF SILT, CLAY, TRASH OR ORGANIC MATTER. A TACK COAT, WHERE SPECIFIED ON THE DRAWINGS, SHALL BE EMULSIFIED ASPHALT GRADES RS-1 AND RS-2 APPLIED AT A RATE OF BETWEEN 0.02 AND 0.08 GALLONS PER SQUARE YARD.

CONSTRUCTION OF THE PRIME AND TACK COATS SHALL BE IN ACCORDANCE WITH SECTION 300 OF THE "STANDARD SPECIFICATIONS". BITUMINOUS MATERIALS FOR THE PRIME AND TACK COATS SHALL BE IN ACCORDANCE WITH SECTION 916 OF THE "STANDARD SPECIFICATIONS".

ASPHALTIC CONCRETE SURFACE COURSE (A.C.S.C.):

THE A.C.S.C. SHALL BE CONSTRUCTED FOR THE DEPTH AND LIMITS SHOWN ON THE DRAWINGS, IN ACCORDANCE WITH SECTIONS 320 AND 330 OF THE "STANDARD SPECIFICATIONS". A.C.S.C. SHALL HAVE A MARSHALL STABILITY OF NOT LESS THAN 1,500 LBS. BITUMINOUS MATERIAL SHALL BE ASPHALT CEMENT VISCOSITY GRADE AC-20 IN ACCORDANCE WITH SECTION 916 OF THE "STANDARD SPECIFICATIONS".

TESTING:

THE OWNER SHALL PROVIDE THE SPECS AND SCOPE OF SERVICES FOR AN APPROVED INDEPENDENT TESTING LABORATORY TO CONDUCT ALL REQUIRED TESTS ON TRENCHES, SUBGRADE, BASE AND SURFACE COURSE MATERIALS. THE ENGINEER SHALL BE PRESENT FOR ALL TESTING. THE CONTRACTOR SHALL GIVE THE ENGINEER AT LEAST TWENTY-FOUR (24) HOURS NOTICE PRIOR TO ANY SCHEDULED TESTING. TEST RESULTS MUST BE SUBMITTED TO THE ENGINEER PRIOR TO FINAL CERTIFICATION OR ANY REQUEST FOR PAYMENT ON THE ABOVE ITEMS.

IF ANY TEST INDICATES THAT THE WORK DOES NOT MEET THE SPECIFICATIONS, THE SUBSTANDARD AREA SHALL BE REWORKED OR CORRECTED AND RETESTED, AT THE CONTRACTOR'S EXPENSE, UNTIL THE PROVISIONS OF THESE SPECIFICATIONS ARE MET. ALL FAILING TESTS SHALL BE PAID FOR BY THE CONTRACTOR.

CONCRETE:

UNLESS OTHERWISE SPECIFIED OR INDICATED, ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 3000 PSI. ALL WORK SHALL COMPLY WITH THE CURRENT EDITION OF THE AMERICAN CONCRETE INSTITUTE (ACI) BUILDING CODE AND APPLICABLE BUILDING CODES HAVING JURISDICTION IN THE AREA.

CONCRETE CURB:

CONCRETE CURB, CURB AND GUTTER, VALLEY GUTTER AND HEADER CURB SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 520 OF THE STANDARD SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED OR INDICATED, ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 3000 PSI.

JOINTING:

GENERAL

JOINTS MAY BE FORMED IN THE PLASTIC CONCRETE OR SAWED AFTER THE CONCRETE HAS HARDENED AND SHALL BE TO A DEPTH OF 1/4 THE THICKNESS OF PAVEMENT. FORMED JOINTS MAY BE CONSTRUCTED BY DEPRESSING AN APPROVED TOOL INTO THE PLASTIC MATERIAL. SAWING OF JOINTS SHALL BEGIN AS SOON AS THE PAVEMENT HAS HARDENED SUFFICIENTLY TO PERMIT SAWING WITHOUT EXCESSIVE RAVELING AND BEFORE UNCONTROLLED CRACKING OCCURS.

CONSTRUCTION JOINTS

ALL LONGITUDINAL JOINTS MAY BE CONSTRUCTION JOINTS AT THE CONTRACTOR'S OPTION. TRANSVERSE CONSTRUCTION JOINTS SHALL BE INSTALLED WHENEVER THE PLACING OF CONCRETE IS SUSPENDED A SUFFICIENT LENGTH OF TIME THAT THE CONCRETE MAY BEGIN TO HARDEN.

DRAINAGE SPECIFICATIONS:

GENERAL

STORM SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 430 AND RELATED SECTIONS OF THE "STANDARD SPECIFICATIONS" OF THE FLORIDA DEPARTMENT OF TRANSPORTATION.

STORM INLETS AND MANHOLES SHALL BE CONSTRUCTED IN GENERAL ACCORDANCE WITH SECTION 425 OF THE "STANDARD SPECIFICATIONS". ALL REINFORCING STEEL TO BE ASTM A 615-72 GRADE 40 PVP - 40,000 PSI, AND SHALL BE HANDLED AND PLACED IN ACCORDANCE WITH ACI 315-71.

ALL INLETS, MANHOLES, AND PIPE SHALL BE PROTECTED DURING CONSTRUCTION TO PREVENT SILTATION IN THE DRAINAGE SYSTEM BY USE OF TEMPORARY PLUGS, PLYWOOD OR PLASTIC COVERS OR USE OF GEOTEXTILE FILTER FABRIC. THE ENTIRE DRAINAGE SYSTEM SHALL BE CLEANED OF ALL DEBRIS PRIOR TO FINAL INSPECTION AND CERTIFICATION.

PRECAST INLETS AND MANHOLES:

ALL STORM DRAINAGE INLETS AND MANHOLES SHALL BE PRECAST REINFORCED CONCRETE IN ACCORDANCE WITH SECTION 425 OF THE "STANDARD SPECIFICATIONS" AND THE DETAILS SHOWN ON THE DRAWINGS. TYPE II PORTLAND CEMENT SHALL BE USED IN THE CONCRETE MIX. CONCRETE FOR PRECAST STRUCTURES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 4000 PSI.

MANUFACTURER'S SHOP DRAWINGS FOR PRECAST DRAINAGE INLETS AND MANHOLES SHALL BE REVIEWED BY THE ENGINEER. THE CONTRACTOR SHALL ALLOW THE ENGINEER A MINIMUM OF FIVE (5) WORKING DAYS FOR REVIEW OF SHOP DRAWINGS. CULVERT PIPES

REINFORCED CONCRETE PIPE (RCP) SHALL BE IN ACCORDANCE WITH SECTION 941 OF THE "STANDARD SPECIFICATIONS".

THE CONTRACTOR SHALL COMPLETELY WRAP ALL PIPE JOINTS AND ALL PIPE CONNECTIONS INTO STRUCTURES WITH GEOTEXTILE FILTER FABRIC. FILTER FABRIC TO BE SECURED AROUND PIPE WITH BANDS SUITABLE FOR THE PIPE MATERIAL USED.

DISTURBED AREAS:

ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE SODDED AS SPECIFIED BELOW.

SODDING

THE CONTRACTOR SHALL, AFTER FINAL GRADING AND CLEANUP, ESTABLISH A STAND OF GRASS BY FURNISHING AND PLACING SOD IN ACCORDANCE WITH SECTION 575 OF THE STANDARD SPECIFICATIONS. THE CONTRACTOR SHALL WATER THE SODDED AREA TO MAINTAIN MOISTURE LEVELS FOR OPTIMUM GROWTH TO ASSURE A HEALTHY STAND OF GRASS. SOD SHALL BE BAHIA GRASS SOD UNLESS OTHERWISE SPECIFIED.

RECORD DRAWINGS:

THE CONTRACTOR SHALL MAINTAIN RECORD DRAWINGS ON THE PROJECT SITE AT ALL TIMES WHICH SHALL BE ANNOTATED BY THE CONTRACTOR DEPICTING ANY CHANGES MADE IN THE FIELD WHICH DIFFER FROM THE APPROVED CONSTRUCTION DRAWINGS. THE RECORD DRAWINGS SHALL BE AT THE SAME SCALE AS THE APPROVED CONSTRUCTION DRAWINGS AND SHALL ACCURATELY DEPICT THE HORIZONTAL AND VERTICAL LOCATION OF ALL FACILITIES INCLUDING BUT NOT LIMITED TO:

A. CULVERTS INCLUDING PIPE INVERTS
B. INLETS, MANHOLES, AND OTHER STRUCTURES INCLUDING DIMENSIONS, TOP, BOTTOM AND PIPE INVERT ELEVATIONS
C. PAVEMENT FINISH GRADES
D. PIPE AND UTILITY CROSSINGS INCLUDING ELEVATIONS AND HORIZONTAL AND VERTICAL CLEARANCE BETWEEN FACILITIES.

THE RECORD DRAWINGS SHALL BE PREPARED AND CERTIFIED BY A SURVEYOR AND MAPPER LICENSED BY THE STATE OF FLORIDA.

CONSTRUCTION OBSERVATION:

MINIMUM CONSTRUCTION OBSERVATION CHECKPOINTS

I. DRAINAGE
A. DURING LAYING OF PIPE AND PRIOR TO BACKFILLING PIPE TRENCHES.
B. COMPLETION OF ALL DRAINAGE STRUCTURES AND PIPE LAYING (PRIOR TO BACKFILL).
C. CONSTRUCTION AND STABILIZATION OF SWALES.
D. SEEDING AND MULCHING OR SODDING WHERE EROSION IS EVIDENT OR WHERE DRAWINGS SO IDENTIFY.

II. UTILITIES
A. ALL PIPE LAYING PRIOR TO BACKFILL
B. RESTORATION
C. INSPECTOR MUST SEE ALL CONFLICT CROSSINGS IF NOT PIPE WILL BE DUG UP SO SEPARATION MAY BE SEEN.

III. CONCRETE
A. COMPLETION OF FORMING FOR PAVEMENT, CURBING, SIDEWALK, RETAINING WALLS AND ALL OTHER CONCRETE STRUCTURES PRIOR TO PLACEMENT OF CONCRETE.

IV. PAVEMENT
A. LINE AND GRADE
B. SUB-GRADE (PRIOR TO ADDING BASE MATERIAL)
C. BASE (PRIOR TO PRIMING AND SAND SEAL)
D. BASE (AFTER PRIMING, SAND SEAL AND BEFORE PLACING ASPHALT)
E. ASPHALT OR CONCRETE (WHILE PAVING IS IN PROGRESS)

V. TESTING
A. SUB-GRADE
B. BASE
C. SURFACE COURSE
D. COMPACTION

VI. FINAL PROJECT OBSERVATION
THE ENGINEER SHALL BE NOTIFIED AT LEAST 24 HOURS PRIOR TO ANY SCHEDULED FIELD OBSERVATIONS.

CLEAN-UP:

THE CONTRACTOR MUST PROVIDE CLEAN-UP OF EXCESS CONSTRUCTION MATERIAL UPON COMPLETION OF THE PROJECT. THE SITE MUST BE LEFT IN A NEAT, CLEAN, GRADED CONDITION.

811 KNOW WHAT'S BELOW. ALWAYS CALL BEFORE YOU DIG

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BOARD OF PROFESSIONAL ENGINEERS, CERTIFICATE OF AUTHORIZATION NUMBER 9139
PROFESSIONAL SURVEYORS AND MAPPERS, AMENDED CERTIFICATE NO. LB-0006708

DATE	BY	REVISIONS
04/25/2012	S.L.S.	DRAFT - 60%
05/15/2012	GRR	CITY OF PSL COORDINATION - 90%

LYNGATE DRIVE
DRAINAGE IMPROVEMENTS
SPECIFICATIONS
CITY OF PORT ST. LUCIE FLORIDA

DRAWN BY:	S.L.S.
CHECKED BY:	J.O.N.
DATE:	APRIL 2012
SCALE:	N.T.S.

SHEET C3
PROJECT No. 11004.04