Exhibit "A"

City of Sunrise
Finance and Administrative Services
Purchasing Office
Phone: 954-572-2274
Fax: 954-578-4809

July 29, 2025

Via E-mail

Margaret Gachelin, CEO
JMP Group, LLC
3350 SW 148th Ave, Ste 110
Miramar, FL 33027
E-mail address: margaret@jmpregroup.com
Vendor No. 7254

Re: NOTICE OF AWARD

Sewer Rehabilitation & Maintenance and Infiltration and Inflow Reduction Program

Solicitation No:	**BID 25-37-03-MS**		
Resolution No:	**25-110**	**Commission Approval:**	**Tuesday, July 8, 2025**
Munis Contract No:	2025000297	**Agenda Reference No:**	**C25161**

Dear Contractor:

This notice is to advise you that the Sunrise City Commission approved the award of the above referenced bid to your firm as follows:

Secondary Vendor for Group B - Manhole Rehabilitation

Pricing is as follows: See Bid Response attached herein.

	Start Date:	**End Date:**
Original Contract Period:	9/1/2025	8/31/2027
Renewal Options:		
First Renewal Period:	9/1/2027	8/31/2028
Second Renewal Period:	9/1/2028	8/31/2029

Please email a copy of your Certificate of Insurance per Bid document requirements.

When all the required documents have been returned by your firm and reviewed by the City, the Procurement Manager will issue you a Purchase Order. Should you have any questions, do not hesitate to contact me.

Sincerely,

Maria Salvatierra, CPPO
Procurement Specialist
Direct No: (954) 572-2484
Fax No: (954) 578-4809
E-mail address: MSalvatierra@sunrisefl.gov

SCHEDULE "A"
CITY OF SUNRISE
BID SHEET & CERTIFICATION

GROUP B

MANHOLE REPAIRS

COMPANY NAME				JMP Group LLC	
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE BID	TOTAL
B1	Realign, grout and seal manhole casting (in street)	10	EA	$1,200.00	$12,000.00
B2	Realign, grout and seal manhole casting (in rear-yard easement)	10	EA	$1,000.00	$10,000.00
B3	Install manhole chimney seal	10	EA	$400.00	$4,000.00
B4	Seal visible infiltration through manhole walls, bench, and invert (brick manhole)	10	EA	$350.00	$3,500.00
B5	Seal visible infiltration through manhole walls, bench, and invert (concrete manhole)	10	EA	$350.00	$3,500.00
B6	Repair manhole bench and invert	10	EA	$600.00	$6,000.00
B7	Replace manhole bench and invert	5	EA	$700.00	$3,500.00
B8	Replace manhole frame and cover	20	EA	$1,000.00	$20,000.00
B9	Install cementitious manhole liner for precast manhole	160	V.F.	$140.00	$22,400.00
B10	Install cementitious manhole liner for brick manhole	160	V.F.	$140.00	$22,400.00
B11	Install cementitious manhole liner with polymeric overlay for precast manhole	80	V.F.	$320.00	$25,600.00
B12	Install cementitious manhole liner with polymeric overlay for brick manhole	80	V.F.	$320.00	$25,600.00
B13	Install urethane seal	30	EA	$200.00	$6,000.00
B14	Install new standard precast concrete 48-inch-diameter sewer manhole (up to 4 feet in depth)	1	EA	$4,000.00	$4,000.00
B15	Install new standard precast concrete 48-inch-diameter sewer manhole (4 to 6 feet in depth)	1	EA	$5,500.00	$5,500.00
B16	Install new standard percase concrete 48-inch-diameter sewer manhole (6 to 8 feet in depth)	1	EA	$7,000.00	$7,000.00

B17	Install new standard precast concrete 48-inch-diameter sewer manhole (8 to 10 feet in depth)	1	EA	$8,000.00	$8,000.00
B18	Install new standard precast concrete 48-inch diameter sewer manhole (10 to 12 feet in depth)	1	EA	$10,000.00	$10,000.00
B19	Install new standard precast concrete 48-inch-diameter sewer manhole (12 to 16 feet in depth)	1	EA	$12,000.00	$12,000.00
B20	Install new drop connection precast concrete 48-inch-diameter sewer manhole (additional cost)	3	EA	$750.00	$2,250.00
B21	Install new drop connection cast-in-place concrete 48-inch-diameter sewer manhole (additional cost)	30	V.F.	$100.00	$3,000.00
B22	Work in rear-yard easement (items B3 through B8)	20	EA	$50.00	$1,000.00
B23	Work in rea-yard easement (items B9 through B12)	30	EA	$100.00	$3,000.00
B24	Work in rear-yard easement (items B14 through B19)	3	EA	$100.00	$300.00
B25	Bypass pumping (6-inch through 10-inch sewer)	10	SET-UP	$500.00	$5,000.00
B26	Bypass pumping (12-inch and 15-inch sewer)	2	SET-UP	$1,000.00	$2,000.00
B27	Bypass pumping (18-inch and 21-inch sewer)	2	SET-UP	$1,000.00	$2,000.00
B28	Bypass pumping (24-inch sewer) (1-inch thick)	2	SET-UP	$1,500.00	$3,000.00
B29	Asphalt roadway replacement	100	S.Y.	$50.00	$5,000.00
B30	Asphalt pavement overlay (1 inch thick)	300	S.Y.	$50.00	$15,000.00
B31	Concrete sidewalk replacement	10	S.Y.	$75.00	$750.00
B32	Concrete curb and gutter replacement	20	L.F.	$50.00	$1,000.00
B33	Asphalt driveway replacement	200	S.F.	$10.00	$2,000.00
B34	Concrete driveway replacement	200	S.F.	$10.00	$2,000.00
B35	Replace concrete slabs and/or aprons	20	S.Y.	$100.00	$2,000.00

B36	Sod replacement	700	S.F.	$1.00	$700.00
B37	Maintenance of traffic - residential street	40	SET-UP	$1.00	$40.00
B38	Maintenance of traffic - FDOT or City arterial roadway	10	SET-UP	$1,000.00	$10,000.00
B39	Expedited mobilization	2	EA	$2,000.00	$4,000.00
B40	Remove Existing Coating/Liner (6 feet -8 feet diameter)	30	VF	$200.00	$6,000.00
B41	Remove Existing Coating/Liner (8 feet -10 feet diameter)	20	VF	$300.00	$6,000.00
B42	Remove Existing Coating/Liner (10 feet -12 feet diameter)	20	VF	$300.00	$6,000.00
TOTAL BID FOR GROUP "B" - ITEMS B1 THROUGH B42 INCLUSIVE:					**$293,040.00**

NAME OF BIDDER: _____ JMP Group LLC

If applicable, would you extend the prices bid herein to other municipalities? Award of bid is not contingent upon concurrence with this offer to other municipalities.
Yes:__X___ No:_____

ADDENDUM RECEIPT: Bidder shall acknowledge below the receipt of any and all addenda, if any, by listing the Addenda No. and date of issuance.

ADDENDUM NO: 1 /DATE 4/9/2025 ADDENDUM NO: 2 /DATE 4/15/2025
ADDENDUM NO: 3 /DATE 4/16/2025 ADDENDUM NO:_____/DATE_____

I, the undersigned hereby agree to furnish the items and / or services described in this Invitation for Bid. I certify that I have read the entire document, including the Specifications, Requirements, Terms & Conditions and Schedules, and agree to furnish the items and services under the requirements of the Bid.

I also certify that this Bid is submitted without prior understanding, agreement, or connection with any corporation, firm or person submitting a Request for Submittal for the same materials, services, and supplies and is in all respects fair and without collusion or fraud.
The Respondent certifies by his/her signature that the person signing this Certification is authorized to bind the firm by their signature.

Company Name: _____JMP Group LLC_____

Address____3350 SW 148th Ave. Ste. 110_____

City ___Miramar_____ State ___FL_____ Zip 33027

Phone#__786-383-5710_____ Fax#_____ E-Mail _margaret@jmpregroup.com_

Signature: __Margaret Gachelin_____Title ___CEO_____

Printed Name: ___Margaret Gachelin_____

FEID or Social Security No._81-0690629_____

SOCIAL SECURITY NUMBER COLLECTION DISCLOSURE STATEMENT
Please be advised that pursuant to Section 119.071(5) (a) 2.a., Florida Statutes, the City of Sunrise ("City") discloses that the City requests your social security number for the purpose of payroll eligibility verification, processing employment benefits, income reporting, tax reporting, background checks on employee applicants, advisory board applicants and other City program volunteers. Social security numbers are also used as a unique numeric identifier and may be used for search purposes.

GROUP B

MANHOLE REPAIRS

COMPANY NAME				IMR Development dba Jennings Engineering and Construction		JMP Group LLC		Envirowaste Services Group, Inc.		National Water Main Cleaning		Vortex Services, LLC		Insituform Technologies, LLC	
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL
B1	Realign, grout and seal manhole casting (in street)	10	EA	$1,200.00	$12,000.00	$1,200.00	$12,000.00	$1,050.00	$10,500.00	$2,500.00	$25,000.00	$1,475.00	$14,750.00	$1,250.00	$12,500.00
B2	Realign, grout and seal manhole casting (in rear-yard easement)	10	EA	$1,800.00	$18,000.00	$1,000.00	$10,000.00	$650.00	$6,500.00	$2,100.00	$21,000.00	$913.00	$9,130.00	$1,400.00	$14,000.00
B3	Install manhole chimney seal	10	EA	$450.00	$4,500.00	$400.00	$4,000.00	$550.00	$5,500.00	$226.71	$2,267.10	$1,315.00	$13,150.00	$1,500.00	$15,000.00
B4	Seal visible infiltration through manhole walls, bench, and invert (brick manhole)	10	EA	$350.00	$3,500.00	$350.00	$3,500.00	$350.00	$3,500.00	$550.00	$5,500.00	$1,135.00	$11,350.00	$750.00	$7,500.00
B5	Seal visible infiltration through manhole walls, bench, and invert (concrete manhole)	10	EA	$350.00	$3,500.00	$350.00	$3,500.00	$275.00	$2,750.00	$550.00	$5,500.00	$945.00	$9,450.00	$500.00	$5,000.00
B6	Repair manhole bench and invert	10	EA	$400.00	$4,000.00	$600.00	$6,000.00	$375.00	$3,750.00	$309.40	$3,094.00	$630.00	$6,300.00	$500.00	$5,000.00
B7	Replace manhole bench and invert	5	EA	$900.00	$4,500.00	$700.00	$3,500.00	$675.00	$3,375.00	$700.00	$3,500.00	$801.00	$4,005.00	$750.00	$3,750.00
B8	Replace manhole frame and cover	20	EA	$1,000.00	$20,000.00	$1,000.00	$20,000.00	$1,825.00	$36,500.00	$3,100.00	$62,000.00	$2,970.00	$59,400.00	$1,500.00	$30,000.00
B9	Install cementitious manhole liner for precast manhole	160	V.F.	$190.00	$30,400.00	$140.00	$22,400.00	$225.00	$36,000.00	$320.00	$51,200.00	$375.00	$60,000.00	$250.00	$40,000.00
B10	Install cementitious manhole liner for brick manhole	160	V.F.	$190.00	$30,400.00	$140.00	$22,400.00	$275.00	$44,000.00	$320.00	$51,200.00	$375.00	$60,000.00	$275.00	$44,000.00
B11	Install cementitious manhole liner with polymeric overlay for precast manhole	80	V.F.	$260.00	$20,800.00	$320.00	$25,600.00	$275.00	$22,000.00	$335.00	$26,800.00	$798.00	$63,840.00	$425.00	$34,000.00
B12	Install cementitious manhole liner with polymeric overlay for brick manhole	80	V.F.	$260.00	$20,800.00	$320.00	$25,600.00	$315.00	$25,200.00	$335.00	$26,800.00	$798.00	$63,840.00	$475.00	$38,000.00
B13	Install urethane seal	30	EA	$200.00	$6,000.00	$200.00	$6,000.00	$450.00	$13,500.00	$200.00	$6,000.00	$1,110.00	$33,300.00	$750.00	$22,500.00
B14	Install new standard precast concrete 48-inch-diameter sewer manhole (up to 4 feet in depth)	1	EA	$3,000.00	$3,000.00	$4,000.00	$4,000.00	$3,275.00	$3,275.00	$26,000.00	$26,000.00	$4,600.00	$4,600.00	$22,500.00	$22,500.00
B15	Install new standard precast concrete 48-inch-diameter sewer manhole (4 to 6 feet in depth)	1	EA	$4,500.00	$4,500.00	$5,500.00	$5,500.00	$4,125.00	$4,125.00	$31,000.00	$31,000.00	$5,790.00	$5,790.00	$25,000.00	$25,000.00
B16	Install new standard percase concrete 48-inch-diameter sewer manhole (6 to 8 feet in depth)	1	EA	$5,000.00	$5,000.00	$7,000.00	$7,000.00	$7,750.00	$7,750.00	$34,000.00	$34,000.00	$10,880.00	$10,880.00	$30,000.00	$30,000.00
B17	Install new standard precast concrete 48-inch-diameter sewer manhole (8 to 10 feet in depth)	1	EA	$7,000.00	$7,000.00	$8,000.00	$8,000.00	$10,975.00	$10,975.00	$39,500.00	$39,500.00	$15,410.00	$15,410.00	$33,000.00	$33,000.00
B18	Install new standard precast concrete 48-inch diameter sewer manhole (10 to 12 feet in depth)	1	EA	$9,000.00	$9,000.00	$10,000.00	$10,000.00	$15,750.00	$15,750.00	$48,000.00	$48,000.00	$22,120.00	$22,120.00	$40,000.00	$40,000.00
B19	Install new standard precast concrete 48-inch-diameter sewer manhole (12 to 16 feet in depth)	1	EA	$10,500.00	$10,500.00	$12,000.00	$12,000.00	$18,975.00	$18,975.00	$53,800.00	$53,800.00	$26,640.00	$26,640.00	$49,000.00	$49,000.00
B20	Install new drop connection precast concrete 48-inch-diameter sewer manhole (additional cost)	3	EA	$500.00	$1,500.00	$750.00	$2,250.00	$3,125.00	$9,375.00	$2,200.00	$6,600.00	$4,275.00	$12,825.00	$4,500.00	$13,500.00
B21	Install new drop connection cast-in-place concrete 48-inch-diameter sewer manhole (additional cost)	30	V.F.	$100.00	$3,000.00	$100.00	$3,000.00	$425.00	$12,750.00	$60.00	$1,800.00	$580.00	$17,400.00	$6,500.00	$195,000.00
B22	Work in rear-yard easement (items B3 through B8)	20	EA	$200.00	$4,000.00	$50.00	$1,000.00	$500.00	$10,000.00	$250.00	$5,000.00	$685.00	$13,700.00	$0.01	$0.20
B23	Work in rea-yard easement (items B9 through B12)	30	EA	$10.00	$300.00	$100.00	$3,000.00	$1,000.00	$30,000.00	$350.00	$10,500.00	$1,350.00	$40,500.00	$0.01	$0.30
B24	Work in rear-yard easement (items B14 through B19)	3	EA	$10.00	$30.00	$100.00	$300.00	$1,000.00	$3,000.00	$927.45	$2,782.35	$1,400.00	$4,200.00	$5,000.00	$15,000.00

GROUP B

MANHOLE REPAIRS

COMPANY NAME				IMR Development dba Jennings Engineering and Construction		JMP Group LLC		Envirowaste Services Group, Inc.		National Water Main Cleaning		Vortex Services, LLC		Insituform Technologies, LLC	
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL	UNIT PRICE BID	TOTAL
B25	Bypass pumping (6-inch through 10-inch sewer)	10	SET-UP	$100.00	$1,000.00	$500.00	$5,000.00	$2,500.00	$25,000.00	$337.00	$3,370.00	$500.00	$5,000.00	$15,000.00	$150,000.00
B26	Bypass pumping (12-inch and 15-inch sewer)	2	SET-UP	$300.00	$600.00	$1,000.00	$2,000.00	$4,500.00	$9,000.00	$500.00	$1,000.00	$750.00	$1,500.00	$25,000.00	$50,000.00
B27	Bypass pumping (18-inch and 21-inch sewer)	2	SET-UP	$300.00	$600.00	$1,000.00	$2,000.00	$6,000.00	$12,000.00	$1,200.00	$2,400.00	$3,200.00	$6,400.00	$25,000.00	$50,000.00
B28	Bypass pumping (24-inch sewer) (1-inch thick)	2	SET-UP	$300.00	$600.00	$1,500.00	$3,000.00	$8,750.00	$17,500.00	$1,500.00	$3,000.00	$5,900.00	$11,800.00	$30,000.00	$60,000.00
B29	Asphalt roadway replacement	100	S.Y.	$30.00	$3,000.00	$50.00	$5,000.00	$55.00	$5,500.00	$28.00	$2,800.00	$80.00	$8,000.00	$150.00	$15,000.00
B30	Asphalt pavement overlay (1 inch thick)	300	S.Y.	$20.00	$6,000.00	$50.00	$15,000.00	$22.00	$6,600.00	$400.00	$120,000.00	$33.00	$9,900.00	$165.00	$49,500.00
B31	Concrete sidewalk replacement	10	S.Y.	$75.00	$750.00	$75.00	$750.00	$85.00	$850.00	$18.00	$180.00	$130.00	$1,300.00	$165.00	$1,650.00
B32	Concrete curb and gutter replacement	20	L.F.	$20.00	$400.00	$50.00	$1,000.00	$45.00	$900.00	$22.00	$440.00	$65.00	$1,300.00	$135.00	$2,700.00
B33	Asphalt driveway replacement	200	S.F.	$2.00	$400.00	$10.00	$2,000.00	$11.50	$2,300.00	$8.00	$1,600.00	$16.00	$3,200.00	$25.00	$5,000.00
B34	Concrete driveway replacement	200	S.F.	$5.00	$1,000.00	$10.00	$2,000.00	$15.00	$3,000.00	$18.00	$3,600.00	$21.00	$4,200.00	$33.00	$6,600.00
B35	Replace concrete slabs and/or aprons	20	S.Y.	$70.00	$1,400.00	$100.00	$2,000.00	$135.00	$2,700.00	$22.00	$440.00	$190.00	$3,800.00	$37.00	$740.00
B36	Sod replacement	700	S.F.	$1.00	$700.00	$1.00	$700.00	$1.25	$875.00	$3.00	$2,100.00	$3.00	$2,100.00	$3.50	$2,450.00
B37	Maintenance of traffic - residential street	40	SET-UP	$1.00	$40.00	$1.00	$40.00	$750.00	$30,000.00	$1.00	$40.00	$800.00	$32,000.00	$5,000.00	$200,000.00
B38	Maintenance of traffic - FDOT or City arterial roadway	10	SET-UP	$500.00	$5,000.00	$1,000.00	$10,000.00	$2,000.00	$20,000.00	$225.00	$2,250.00	$2,500.00	$25,000.00	$25,000.00	$250,000.00
B39	Expedited mobilization	2	EA	$1,000.00	$2,000.00	$2,000.00	$4,000.00	$1,500.00	$3,000.00	$5,000.00	$10,000.00	$5,000.00	$10,000.00	$15,000.00	$30,000.00
B40	Remove Existing Coating/Liner (6 feet -8 feet diameter)	30	VF	$0.00	$0.00	$200.00	$6,000.00	$450.00	$13,500.00	$75.00	$2,250.00	$280.00	$8,400.00	$200.00	$6,000.00
B41	Remove Existing Coating/Liner (8 feet -10 feet diameter)	20	VF	$0.00	$0.00	$300.00	$6,000.00	$550.00	$11,000.00	$100.00	$2,000.00	$280.00	$5,600.00	$250.00	$5,000.00
B42	Remove Existing Coating/Liner (10 feet -12 feet diameter)	20	VF	$0.00	$0.00	$300.00	$6,000.00	$600.00	$12,000.00	$100.00	$2,000.00	$280.00	$5,600.00	$300.00	$6,000.00
TOTAL BID FOR GROUP "B" - ITEMS B1 THROUGH B42 INCLUSIVE:					**$249,720.00**		**$293,040.00**		**$514,775.00**		**$708,313.45**		**$727,680.00**		**$1,584,890.50**

B40-B42 are at no cost to City

INVITATION FOR BID

PURCHASING DIVISION
Mailing Address:
10770 West Oakland Park Blvd.
Sunrise, Florida 33351

Bid Data

Bid Number:	BID 25-37-03-MS
Service or Commodity Title:	Sewer Rehabilitation & Maintenance and Infiltration and Inflow Reduction Program
Purchasing Agent:	Maria Salvatierra, MBA, CPPO, NIGP-CPP, Procurement Specialist
Phone:	(954) 572- 2484
Fax:	(954) 578-4809
Email:	ALLPur@sunrisefl.gov
Email Subject:	BID 25-37-03-MS

Deadline for Questions

Day/Date:	Monday, April 7, 2025
Time:	12:00 pm
Location:	City Hall – First Floor City Commission Chambers 10770 West Oakland Park Blvd. Sunrise, FL 33351

Bid Opening

Day/Date:	Thursday, April 17, 2025
Time:	2:00 p.m.
Physical Location:	City Hall First Floor Everglades Room 10770 West Oakland Park Blvd. Sunrise, FL 33351

Bid Contents

Section 1: Specifications/Scope of Work
Section 2: Attachments
Section 3: Instructions to Bidders
Section 4: Terms and General Conditions

Section 5: Bid Submission Check List
Section 6: Bid Submission Package

Bid packages and specifications are no longer available directly from the City of Sunrise Purchasing Division. The City is now using **Onvia DemandStar** for the posting and distribution of all City Bids, RFPs, RFQs, RLIs and Quotations. This Bid may be obtained at www.demandstar.com. The City is not responsible for the accuracy of other means of distribution. Alteration of the content of this document shall result in disqualification.

NOTE: If not submitting a bid, fill out and return the "Statement of No Bid" Form of this document.

SPECIAL ACCOMMODATION:
If a person decides to appeal any decision made by the board, agency, or commission with respect to any matter considered at such meeting or hearing, he or she will need a record of the proceedings, and that, for such purpose, he or she may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is based F.S.S. 286.0105. The City does not tolerate discrimination in any of its programs, services or activities; and will not exclude participation in, deny the benefits of, or subject to discrimination anyone on the grounds of real or perceived race, color, national origin, sex, gender identity, sexual orientation, age, disability/handicap, religion, family or income status.

In compliance with the ADA and F.S.S. 286.26, any individual with a disability requesting a reasonable accommodation in order to participate in a public meeting should contact the City's ADA Coordinator at least 48 hours in advance of the scheduled meeting. Requests can be directed via e-mail to hr@sunrisefl.gov or via telephone to (954) 838-4522; Florida Relay: 711; Florida Relay (TIY/VCO): 1-800-955-8771; Florida Relay (Voice): 1-800-955-8770. Every reasonable effort will be made to allow for meeting participation.

SEWER REHABILITATION & MAINTENANCE AND INFILTRATION & INFLOW REDUCTION PROGRAM

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Section 6: Bid Submission Package

TECHNICAL SPECIFICATIONS

DIVISION 1- GENERAL REQUIREMENTS

01010 Summary of Work ..... 01010-01 to 01010-07
01025 Measurement and Payment ..... 01025-01 to 01025-19
01090 Reference Standards ..... 01090-01 to 01090-03
01300 Submittals ..... 01300-01 to 01300-06
01400 Quality Control ..... 01400-01 to 01400-05
01510 Temporary Utilities ..... 01510-01 to 01510-03
01530 Protection of Existing Facilities ..... 01530-0l to 01530-05
01550 Site Access and Storage ..... 01550-01 to 01550-02
01560 Temporary Environmental Controls ..... 01560-01 to 01560-04
01570 Traffic Regulations and Maintenance of Traffic ..... 01570-01 to 01570-01
01600 Materials ..... 01600-01 to 01600-03
01700 Project Closeout ..... 01700-01 to 01700-03

DIVISION 2 - SITEWORK

02222 Excavation and Backfill for Utilities ..... 02222-01 to 02222-10
02500 Surface Restoration .....02500-01 to 02500-04
02510 Asphaltic Concrete Pavement ..... 02510-01 to 02510-07
02512 Concrete Pavement, Curb and Sidewalk..... 02512-01 to 02512-05
02580 Pavement Marking and Traffic Signs ..... 02580-01 to 02580
0302750 Wastewater Flow Control .....02750-01 to 02750-03
02751 Preparatory Cleaning and Root Removal... ..... 02751-01 to 02751-04
02752 Television Survey ..... 02752-01 to 02752-05
02753 Manhole Rehabilitation.....:..... 02753-01 to 02753-13
02754 Sanitary Sewer Manholes ..... 02754-01 to 02754-10
02757 Point Repair of Sanitary Sewers ..... 02757-01 to 02757-04
02759 Replacement of Sanitary Service Lateral and Cleanout...02759-01 to 02759-05
02760 Television Survey for Service Laterals ..... 02760-01 to 02760-05
02763 Chemical Grouting..... 02763-01 to 02763-06

02764 Cured-In-Place Sectional Pipe Lining ..... . 02764-01 to 02764-05
02765 Cured-In-Place Pipe Lining ..... .02765-01 to 02765-13
02766 Fold-and-Form Pipe Lining ..... 02766-01 to 02766-11
02770 Cured-in-Place Main/Lateral Connection Repair System ..... 02770-01 to 02770-06

DIVISION 3- CONCRETE

03305 Concrete and Grout..... 03305-01 to 03305-18

DIVISION 4- MASONRY-(Not Used)

DIVISION 5-METALS- (Not Used)

DIVISION 6- WOOD AND PLASTICS - (Not Used)

DIVISION 7-THERMAL AND MOISTURE PROTECTION- (Not Used)

DIVISION 8-DOORS AND WINDOWS – (Not Used)

DIVISION 9-FINISHES – (Not Used)

DIVISION 10-SPECIALITIES- (Not Used)

DIVISION 11- EQUIPMENT – (Not Used)

DIVISION 12- FURNISHINGS – (Not Used)

DIVISION 13- SPECIAL CONSTRUCTION – (Not Used)

DIVISION 14- CONVEYING SYSTEMS – (Not Used)

DIVISION 15- MECHANICAL

15000Piping, General ..... 15000-01 to 15000-07
15006 Ductile Iron Pipe .. .. 15006-01 to 15006-04
15008 PVC Non-Pressure Pipe..... 15008-01to15008-06
15019Miscellaneous Piping...:.:.....15019-01 to15019-04

33310 Smoke Testing..... 33310-01 to 33310-11

DIVISION 16-ELECTRICAL- (Not Used)

APPENDICES

1. Shop Drawing Submittals and Approved Utility Product List
2. General Water and Sanitary Sewer Details and Notes
3. Standard Sanitary Sewer Details and Notes

SECTION 1 – SPECIFICATIONS

1.1 SCOPE

The City is requesting submittals from qualified contractors for the Sewer Rehabilitation & Maintenance and Infiltration & Inflow Reduction Program. The Work consists of, but is not limited to, furnishing all tools, equipment, materials, supplies, manufactured articles, and for furnishing all transportation and services, including fuel, power, water, and essential communications, and for the performance of all labor, work necessary for performing sanitary sewer repairs, and/or other operations, in accordance with the Bid Documents. The work will occur within the City of Sunrise Utilities service area and will be performed on an as needed basis utilizing work orders.

The principal features of the Work to be performed under this Contract include the following sewer system rehabilitation "Groups", which include, but are not limited to, the primary tasks listed below:

Group "A"-Excavated Point Repairs: Excavated point repairs, cleanout installation, bypass pumping, surface restoration, and television survey.

Group "B"-Manhole Rehabilitation: Replacing manhole frames and covers and performing other miscellaneous manhole repairs, installing cementitious and epoxy manhole liners, replacing entire manholes, and bypass pumping.

Group "C"-Mainline and Lateral Lining: Cured-in-place pipelining for gravity mains, cured-in-place pipelining for laterals, chemical grouting of mainline joints and mainline/lateral connections, and associated work such as cleaning and preparation, television survey, lateral reinstatement, cleanout installation, and bypass pumping; fold and form lining. NASSCO MACP Manhole Inspections, Level 1 and Level 2.

Group "D" - Smoke Testing: Smoke Testing of lift station basin areas to identify sources of direct stormwater runoff ("direct inflow") to the sanitary sewer system, and potential illicit discharges into the system.

The Contractor shall perform all of the Work required, implied or reasonably inferable from, this Contract. The Contractor further declares that he has examined and is· familiar with the provisions of Section 489.113(3), Florida ·statutes, and knowingly and specifically waives any rights he may have thereunder, and further agrees to be bound by the City's Policies, Procedures, Standard Details and Specifications for Water Distribution and

Sewage Collection Systems, including but not limited to the requirement that all underground water and wastewater system work required herein shall be performed by a Contractor holding one of the following licenses pursuant to this section:

1. State of Florida Certified Underground Utility & Excavation Contractor
2. BC Certificate of Competency -General Engineered Construction
3. BC Certificate of Competency IA-Primary Pipelines

The Contractor agrees to comply with the City of Sunrise permitting requirements, including all licensing requirements associated with the Community Development Department -Engineering Division. The Contractor shall perform all of the Work required, implied or reasonably inferable from, this Contract.

1.2 MINIMUM QUALIFICATIONS

The vendor shall have a valid State of Florida General Contractor's License or Underground Utility Contractor's License and shall have successfully completed at least five (5) projects of similar size, type, and complexity in the State of Florida within the last five (5) years. Where bidder proposes to subcontract any of the specialty tasks, submittals shall be made for qualified subcontractors as specified in the bid documents. The City shall be the sole and final judge in determining if the Contractor meets the Qualification Requirement.

1.3 AGREEMENT BETWEEN CITY OF SUNRISE AND CONTRACTOR

The terms and conditions of this bid document, bid price and Award Letter will form the Agreement/Contract between the City of Sunrise and awarded contractor. Bidder, Vendor and Contractor are terms used interchangeably throughout the bidding documents.

1.4 GENERAL ORDERS FOR INSTALLATION

Refer to Section 7, Technical Specifications, for work orders. The City shall transmit to Contractor a written notice to proceed with installations at given locations. Contractor shall then proceed with the work. The City reserves the right to direct the order in which work at various locations are to be installed.

All such orders shall be confirmed on the work order, indicating the location of the work set forth, and be executed in duplicate by the City

Representative and the Contractor.

1.5 SETUP AND CONNECTIONS

If applicable, all equipment is to be set up, connected to utilities, checked and demonstrated at no charge to the City. The Contractor shall be responsible for all transportation, off-loading, handling, storage and installation of any City furnished Contractor installed material and equipment.

1.6 AUTHORIZED MANUFACTURER'S INSTALLATIONS

Installation of any manufacturer's proprietary systems, products or equipment, specified or approved for this contract, shall be performed by duly authorized and approved manufacturer's representatives, dealers, applicators or installers if same is a condition of special, standard or implied manufacturer's warranty. Certification of said authorization shall be submitted to the City upon request.

1.7 UTILITY CONNECTIONS

If applicable, the Contractor shall provide for and make all final connections to required utilities, including but not limited to, electrical power, fire alarm, sprinkler systems, HVAC systems and plumbing systems. State or County licensed contractors, electricians and plumbers shall be required to perform the Work where final connections are to be made.

1.8 TESTING

The Contractor shall be responsible for all tests and testing required by this contract unless otherwise specified. All testing shall be done in the presence of a representative of the City. The Contractor shall also be responsible for tests involving any City furnished equipment. The City reserves the right to test all materials, products, installations and equipment.

All equipment shall be started, tested, adjusted and placed in satisfactory operating condition by the Contractor prior to final payment, and the Contractor shall furnish a letter addressed to the City advising that the completed Work has been installed in accordance with the plans and specifications of this Invitation for Bid and that all items are in proper operating condition.

1.9 CITY'S RIGHT TO STOP WORK

If the Contractor persistently fails or refuses to perform the Work in accordance with the contract documents, the City shall have the right, but not an obligation, to order the Contractor to stop the Work, or any described portion thereof, until the cause for stoppage has been corrected, no longer exists, or the City orders that the Work be resumed. In such event, the Contractor shall immediately obey such order. A stop work directive provided under this paragraph shall not entitle the Contractor to an extension of the completion date.

1.10 CITY'S RIGHT TO PERFORM WORK

If the Contractor's Work is stopped by the City, or if the Contractor persistently fails or refuses to perform the Work in accordance with the contract documents, and the Contractor fails within Three (3) working days of such stoppage, failure, or refusal, to provide adequate assurance to the City that the cause of such stoppage, failure, or refusal will be eliminated or corrected, then the City may, without prejudice to any other rights or remedies the City may have against the Contractor, proceed to carry out the subject Work. In such a situation, an appropriate Change Order shall be issued deducting from the contract price the cost of correcting the subject deficiencies, plus compensation for the City's Consultant's additional services and expenses necessitated thereby, if any. If the unpaid portion of the contract price is insufficient to cover the amount due the City, the Contractor shall pay the difference to the City.

1.11 COMPLETION

Completion time to request for installation and/or repairs without limitation of any other

provision of this Contract, the Contractor agrees that routine work to be performed will be undertaken and completed within twenty (20) working days after the Contractor’s receipt of the order therefore, except as may be expressly provided by such order or in any writing accompanying the same.

1.12 CODE REQUIREMENTS

The Contractor and their subcontractors on these services shall be familiar

with the all applicable Federal, State, County, City and Local Laws, Regulations or Codes and be governed accordingly as they will apply to these services and the actions or operations of those engaged in the work or concerning materials used. The Contractor shall ask for and receive any required inspections. The Contractor shall comply with the Florida Trench Safety Act, as applicable.

SECTION 2 - ATTACHMENTS

As listed below as appendices to the Technical Specifications, Section 7 of this document.

Appendix 1 - Shop Drawing Submittals and Approved Utility Product List
Appendix 2 - General Water and Sanitary Sewer Details and Notes
Appendix 3 - Standard Sanitary Sewer Details and Notes

SECTION 3 - INSTRUCTIONS TO BIDDERS

BIDDERS: TO INSURE ACCEPTANCE OF THE BID, THE FOLLOWING INSTRUCTIONS MUST BE ADHERED TO:

This Request for Bid is to supply and furnish all equipment, labor and material necessary for the Sewer Rehabilitation & Maintenance and Infiltration & Inflow Reduction Program. After receipt of an offer and acceptance by the City Commission, commodities or services will be provided as indicated below:

- ☐ A fixed purchase order for delivery of a commodity or service to a specified place at one time.
- ☐ A fixed purchase order for delivery or performance of a service on a scheduled basis.
- ☒ An award letter notifying the Bidder of acceptance of their Bid by the City Commission specifying duration of the Contract with extension periods if any, and the method of ordering.

(Note: Throughout this Invitation to Bid, all items preceded by a box (☐) are only applicable if the box is marked with an X.)

3.1 HOW TO SUBMIT A BID

Contractor's solicitation response must be submitted electronically through Demandstar, the City's designated electronic bidding system. It is solely the Contractors' responsibility to assure its response is submitted and received in Demandstar by the date and time specified in the solicitation. The City will not consider responses received by any other means. The official time for electronic submittals is the Demandstar server. All parties will, without reservation accept the official time. Any bid may be rejected for noncompliance to requirements after a full review by the Purchasing Office. Any request for an extension of time necessitated by an unforeseen emergency should be made prior to the Bid Opening and directed to the Purchasing Manager/Designee, City of Sunrise (954) 572-2274.

FAXED BIDS WILL NOT BE ACCEPTED

3.2 THE BID PACKAGE

The bid package consists of Specifications, Additional Requirements, Attachments, Instructions to the Bidders, Terms and General Conditions, and the following Schedules:

Schedule "A" - Bid Sheet & Certification
Schedule "B" - Non-Collusion Affidavit
Schedule "C" - Bidder's Drug Free Statement
Schedule "D" - Bidder's Qualification Statement
Schedule "E" - Warranty Information Form (If Applicable)
Schedule "F" - Insurance & License Requirements
Schedule "G"- Statement of No Bid
Schedule "H" – Affidavit of Compliance with Foreign Entity Laws (If Applicable)
Schedule "I" – List of Supervisory Personnel
Schedule "J" – Trench Safety Form
Schedule "K" – List of Subcontractors
Schedule "L" – Certification of Opportunity to subcontractors

Schedule “M” – Public Construction Bond
Schedule “N” – Final Receipt and Release

3.3 INQUIRIES, ADDENDA AND MODIFICATIONS

The Bidder must direct any inquiries on the specifications, additional requirements, attachments, terms and general conditions or instructions, in writing, either via U.S. Mail, Email or Fax, to the individual named on Page 1 at the Purchasing Division, City of Sunrise, 10770 West Oakland Park Blvd, Sunrise, Florida, 33351, Fax No. (954) 578-4809. All inquiries must be received by the Purchasing Division no later than 12:00 p.m. ten (10) calendar days prior to the Bid opening**.**

Any addenda or other modifications to the Documents will be made in writing, and issued by the City, prior to the time and date of Bid Opening. Such written addenda or modifications shall be part of the Documents and shall be binding upon each Bidder. No verbal addenda or modifications shall be allowed nor shall any Bidder rely upon any verbal addenda or modifications in preparing or submitting its bid.

3.4 EXECUTION OF BID

Bid must contain an original signature of an authorized representative of the company in the space provided. Failure to sign the bid shall invalidate it, and it will not be accepted. All bids must be completed in ink or typewritten. No erasures are permitted. If a correction is necessary, the bidder should draw a single line through the entered figure and enter the corrected figure above it. Corrections should be initialed by the person signing the bid, or a duly authorized representative of the firm submitting bid. Any illegible entries, pencil bids or corrections not initialed may not be accepted. Only corrections that show the clear intent of the bidder, in the sole discretion of the City of Sunrise, will be accepted.

3.5 NO BID

If not submitting a bid, respond by returning the "STATEMENT OF NO BID" Schedule G of this Invitation for Bid. Repeated failure to respond without sufficient justification may be cause from removal of a Bidder's name from future solicitations.

3.6 PRE-BID CONFERENCE

☒ Not applicable for this bid.

☐ Attendance at the Pre-Bid Conference is mandatory. This information session presents an opportunity for the Bidders to clarify any concerns regarding bid requirements. The time and place is given on Page 1 of the Invitation for Bid.

☐ Attendance at Pre-Bid Conference is optional. This information session presents an opportunity for the Bidders to clarify any concerns regarding bid requirements. The time and place is given on Page 1 of the Invitation for Bid.

3.7 PRICES BID

List both the unit price and the extended total, if applicable. Prices must be stated in the units specified on the Bid Sheet. In case of a discrepancy in computing the amount of the bid between the unit price bid and the extended total, the unit price will govern. When bids are awarded on the basis of Lump Sum, if there is a discrepancy between the written and numeric amount, the written amount prevails.

3.8 F.O.B. POINT

All bid prices shall be F.O.B. destination freight prepaid and delivered by Vendor to the City's specified location(s).

3.9 BID VALIDITY

All bids shall remain valid for ninety (90) days after the time of bid opening. After this time period the Bidder may request the Bid be withdrawn.

3.10 DELIVERY / COMPLETION TIME / RESPONSE TIME

☒ See Technical Specifications section.

☐ Delivery shall be _____calendar days after receipt of purchase order. If specified delivery cannot be met, show number of days required to make delivery after receipt of Purchase Order in space provided on the Bid Sheet. Delivery time may become a basis for making an award. Delivery shall be within the normal working hours of the user, Monday through Friday, excluding City holidays.

☐ Completion time for all services rendered shall be no later than_____.

☐ Response time shall be _____calendar days or hours from time of request after receipt of purchase order. If specified response time cannot be met, show number of days required to respond after receipt of Purchase Order or release order in space provided on the Bid Sheet. Response time may become a basis for making an award. Response shall be within the normal working hours of the user, Monday through Friday, excluding City holidays.

The delivery of the goods and /or services within the time specified is of the essence in this procurement. The City shall have the right to cancel any or all items(s) without obligation if delivery is not made on or before the time(s) specified. In the event Vendor fails to make timely shipment, City shall have the right to purchase elsewhere and unless they delay was caused by unforeseen circumstances beyond Vendor's control, Vendor shall reimburse City for any additional charges incurred.

3.11 SAMPLES

☒ Not applicable to this bid.

☐ Samples of items, when required, must be furnished by Bidder free of charge to the City, and if not destroyed, upon written request will be returned at the Bidder's expense. Each individual sample must be labeled with Bidder's name, manufacturer's brand name, bid item number and be delivered by them within five (5) calendar days after the bid opening unless the schedule indicates a different time or unless submission is required before the bid opening. If samples are required subsequent to the bid opening, they should be delivered within five (5) calendar days of the request. Failure of Bidder to either deliver required sample(s) or to clearly identify samples as indicated may be reason for rejection of the bid. Unless otherwise indicated, samples should be delivered to the purchasing agent named on Page 1 of the Invitation for Bid.

3.12 WARRANTIES / GUARANTEES

Vendor warrants that the materials, goods, services and/or workmanship furnished and/or delivered pursuant to the Purchase Order shall:

Conform in all respects to the description, drawings and specifications contained in this Bid

Be merchantable and fit for the ordinary purpose for which such goods are used or intended to be used

Be new and unused, of good quality and free from defects whether latent or patent in material or workmanship

Be free from any security interests, liens or encumbrances. Vendor warrants that it has good and marketable title to the goods delivered

There is no infringement upon or violation of any copyrights or patent rights

Minimum warranty shall be one (1) year minimum. The Bidder shall furnish with the bid all pertinent warranty data as it relates to the items bid upon. If requested, the Bidder is to complete Schedule "E".

3.13 ESTIMATED QUANTITIES

☐ Not applicable to this bid.

☒ Estimated quantities represent a reasonable approximation of the number of units of each type or number of hours of item the City expects to purchase during a twelve (12) month period. Note: The estimated quantities do not constitute a guaranteed minimum order.

3.14 ADDITIONAL QUANTITIES/BALANCE OF LINE

☐ Not applicable to this bid.

☒ The City reserves the right to buy additional quantities, if required, at the unit price quoted herein.

☐ Bidder must indicate in the space provided on the Bid Sheet the percentage (%) off their written price list for the balance of their line.

3.15 COMPLIANCE WITH LAWS

The Bidder and the Services must comply with all applicable federal, state, and local laws, codes, ordinances, rules, and regulations including, without limitation, American with Disabilities Act, 42 U.S.C. § 12101, Section 504 of the Rehabilitation Act of 1973, and any related federal, state, or local laws, rules, and regulations. Lack of knowledge on the part of the Bidder shall in no way relieve them from responsibility. The Bidder shall comply with all laws, ordinances and governmental rules, regulations and orders now or at any time during the term of this Contract. Bidder agrees to provide to the City all necessary certifications required by any federal, state, and local laws, ordinances, codes, rules and regulations. The Bidder's obligations under this section shall survive termination, cancellation or expiration of this Contract.

3.16 BRAND NAMES / APPROVED EQUALS

☒ Not applicable to this bid.

☐ Whenever a material, article or piece of equipment is identified in the bid package, including drawings, plans, specifications and reference to manufacturers' or Bidders' name, trade name, catalog number, or otherwise, it is intended merely to establish a standard unless it is followed by words indicating that no substitution is permitted because of form, fit, function or quality. Any material, article or equipment of other manufacturers and Bidders which will perform or serve the requirements of the general design will be considered equally acceptable provided the material article or equipment so proposed is, equal in substance, quality and function. However, if a product other than the specified is bid, it is the Bidder's responsibility to name such a product within their bid and to prove to the City that said product is equal to that specified and to submit brochures, samples and/or specifications in detail on item(s) bid. However, the City shall be the sole judge as to whether or not the submitted product is equal in substance, quality and function, and its decision shall be final. If the bidder does not indicate an alternate is being bid and identify the alternate, the Vendor must deliver the specified item identified in the Bid.

3.17 PAST PROBLEMS ON PRIOR CONTRACTS / LITIGATION

The Bidder shall disclose any pending or anticipated litigation between the Bidder and any other party or parties that might affect the performance of this Contract. Such litigation must be indicated on Schedule D. When the Bidder or a proposed sub-Contractor has previously worked for the City and has received complaints from the City or has been involved in disputes with the City about the work, the Bidder should submit with their bid an explanation of what, if anything, the Bidder has done or will do to avoid similar problems in the future. This explanation must deal specifically with the problems involved on the prior Contract and any organizational, operational or other changes which have been or will be implemented. If, in the sole judgment of the City, the Bidder has failed to provide an adequate plan to ensure that the Contractual dispute previously experienced by the City will not recur, the City reserves the right to reject the bid submitted by that Bidder.

3.18 BASIS OF AWARD

The City reserves the right to reject any and all bids, to waive any irregularity in bids received, to accept any item or group of items, unless qualified by the Bidder. The City reserves the right before recommending any award to inspect the Bidders' facilities or take any other action necessary to determine a Bidder's ability to perform in accordance with the specification, terms and conditions of the Invitation for Bid.

Award will be made:

☐ On a Total Bid basis to the lowest responsive and responsible Bidder. In the event no Bidder bids all items, the City may award on an item by item basis.

☐ On an item-by-item basis to the lowest responsive and responsible Bidder.

☒ On an all or none total per group basis to the lowest responsive and responsible Bidder. In the event no Bidder bids all items, the City may award on an item by item basis. All items within a group must be bid. A Contractor may bid on one or more, or all of the work categories designated as Groups A, B, C, D. The City may

award to the lowest three (3) responsive and responsible Bidders per group, if needed. It is the intent of the City to place orders with the lowest priced responsive and responsible Bidder per group for the desired services, Primary Vendor. The City reserves the right to place orders with the second lowest priced responsive and responsible Bidder per group, Secondary Vendor, and the third lowest priced responsive and responsible Bidder per group, Tertiary Vendor, in ascending order of evaluated cost, in the case of immediate need, emergencies, performance issues or if product availability is affected. The Awarded Bid will become the Master Agreement.

- ☐ To all responsive and responsible Bidders. It is the intent of the City to place orders with the lowest priced responsive and responsible Bidder for the desired product. The City reserves the right to place orders with other Bidders in ascending order of evaluated cost, in the case of immediate need or if product availability is affected.

- ☐ *OTHER*

In accordance with City of Sunrise Code Section 5-171, a *qualified bidder, responsible bidder, qualified offeror,* or *responsible offeror* means a person, firm or entity which is fully capable of meeting all requirements of the solicitation and subsequent contract. The qualified bidder, responsible bidder, qualified offeror, or responsible offeror must possess the full capability in all respects to perform fully the contract requirements, including but not limited to the financial resources, technical ability, business judgment, experience, qualifications, facilities, equipment, integrity, capacity and reliability, and must have the integrity and reliability which will assure good faith performance as determined by the city.

In accordance with City of Sunrise Code Section 5-171, a *responsive bid* or *responsive proposal* means a bid or proposal submitted by a responsive, and responsible or qualified, bidder or offeror which conforms in all material respects to the invitation to bid or request for proposals.

In accordance with City of Sunrise Code Section 5-171, a *responsive bidder* or *responsive offeror* means a person, firm or entity who has submitted a bid or proposal which conforms in all material respects to the invitation to bid or request for proposals.

The City may not request documentation of or consider a bidder's social, political or ideological interest when determining if the bidder is a responsible bidder. The City may not give preference to a bidder based on the bidder's social, political, or ideological interests.

In the event the successful bid is terminated or cancelled for any reason, the City reserves the right to make an award to the next lowest responsive and responsible Bidder, or re-bid the entire Contract or any part thereof, whichever is in the best interest of the City.

3.19 COST LIABILITY

The Bidder shall bear all costs associated with submitting the Bid, including preparation, site

visitation or any travel connected with submittal of the Bid.

3.20 CONTENTS OF BID / PUBLIC RECORDS

Any material submitted in response to this Bid will become a public record pursuant to Chapter 119, Florida Statutes. No claim of confidentiality or trade secret will be honored unless a specific exemption from the public records law exists and the Florida or Federal statute identifying the exemption is identified in the Bid. An incorrectly claimed exemption does not disqualify the firm, only the exemption claimed.

3.21 INVESTIGATIONS OF CONDITIONS AFFECTING OPERATIONS

Before submitting a Bid, each Bidder shall make all investigations and examinations necessary to ascertain conditions and requirements of the Bid. Failure to make investigations and examinations shall not relieve the successful Bidder from the obligation to comply in every detail with all provisions and requirements of the Bid nor shall it be a basis for any claim whatsoever for alteration in any term of or payment required by the Purchase Order or any subsequent Contract.

3.22 CONE OF SILENCE

This solicitation falls under Section 2-1 of the Code of Ordinances of the City of Sunrise, Florida, known as the Cone of Silence. After a Bid is opened, a person as defined in Section 2-1 may not seek information or clarification or in any way contact any official or employee of the City concerning this Bid with the exception of the City Attorney, the Procurement Manager or the contact person specifically designated in this Bid. A copy of any written communication shall be filed with the Purchasing Office and shall be made available to the public upon request. A violation of the Cone of Silence renders any award voidable at the sole discretion of the City Commission and may subject the Contractor to debarment in accordance with Section 2-1. Nothing in Section 2-1 prevents a Contractor or Contractor's representative from taking part in a public meeting concerning the Bid.

3.23 E-VERIFY – EMPLOYMENT ELIGIBILITY

By *submitting a response to this solicitation, you are obligated to comply with the provisions of Section 448.095, Fla. Stat., "Employment Eligibility*." Further, by your [registration as a vendor/response to this solicitation/entering into a contract] you affirm and represent that you are registered with the E-Verify system and are using same, and will continue to use same as required by Section 448.095, Fla. Stat. Compliance with Section 448.095 *includes, but is not limited to, utilization of the E-Verify System to verify the work authorization status of all newly hired employees, and requiring all subcontractors to provide an affidavit attesting that the subcontractor does not employ, contract with, or subcontract with, an unauthorized alien. Failure to comply will lead to termination* ***[as a vendor, disqualifying you for award of this solicitation, entering into a contract and/or, cancellation of an active contract],*** *or if your subcontractor knowingly violates the statute, the subcontract must be terminated immediately. Any challenge to termination under this provision must be filed in the Circuit Court no later than 20 calendar days after the date of termination. If terminated for a violation of the statute by the Vendor/*Contractor*, the Vendor/Contractor may not be allowed to do business with the City or* be *awarded a solicitation or contract for a period of 1 year after the date of termination. All costs incurred to initiate and sustain the aforementioned programs shall be the responsibility of the Vendor/*Contractor.

SECTION 4 - TERMS AND GENERAL CONDITIONS

4.1 INDEMNIFICATION

To the fullest extent permitted by law, Contractor shall indemnify and hold harmless City, its officers and employees, from liabilities, damages, losses and costs, including, but not limited to, reasonable attorneys' fees, to the extent caused by the negligence, recklessness or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of this Contract. This indemnification shall survive the term of this Contract.

4.2 INSURANCE REQUIREMENTS

Contractor agrees at its sole expense to maintain on a primary basis, non-contributory basis during the life of this Contract the following insurance coverages, limits, including endorsements described herein. The requirements contained herein, as well as City's review or acceptance of insurance maintained by Contractor is not intended to and shall not in any manner limit or qualify the liabilities or obligations assumed by Contractor under the Contract. Any coverage maintained by the City shall apply excess of, or contingent upon the absence of, insurance required or maintained by Contractor.

Commercial General Liability. Contractor agrees to maintain Commercial General Liability at a limit of liability not less than $1,000,000 Each Occurrence, $2,000,000 Annual Aggregate. Contractor agrees its coverage shall not contain any restrictive endorsement(s) excluding or limiting Product/Completed Operations, Independent Contractors, Broad Form Property Damage, X-C-U Coverage, Contractual Liability or Separation of Insureds.

Additional Insured Endorsement. Contractor agrees to endorse the City as an Additional Insured on the Commercial General Liability with the following, or similar endorsement providing equal or broader Additional Insured coverage, the CG 20 26 07 04, or CG 20 26 04 13, Additional Insured – Designated Person or Organization endorsement; or the CG 20 10 07 04, or CG 20 10 04 13, Additional Insured – Owners, Lessees, or Contractors endorsement, including the additional endorsement of GC 20 37 07 04, or GC 20 04 13, Additional Insured – Owners, Lessees, or Contractors Completed Operations. The name of the organization endorsed as Additional Insured for all endorsements shall read "City of Sunrise".

Business Automobile Liability. Contractor agrees to maintain Business Automobile Liability at a limit of liability not less than $1,000,000 Each Occurrence. Coverage shall include liability for Owned, Non-Owned & Hired automobiles. In the event Contractor does not own automobiles, Contractor agrees to maintain coverage for Hired & Non-Owned Auto Liability, which may be satisfied by way of endorsement to the Commercial General Liability policy or separate Business Auto Liability policy.

Worker's Compensation Insurance & Employers Liability. Contractor agrees to maintain Worker's Compensation & Employers Liability Insurance. Elective exemptions or coverage afforded through an employee leasing arrangement will NOT satisfy the contractual requirement.

Pollution Legal and Remediation Liability. Contractor agrees to maintain Third-Party Pollution Legal and Remediation Liability at a limit of liability not less than $1,000,000 Each Occurrence $2,000,000 Annual Aggregate. The Contractor agrees the policy shall include a minimum three (3) year discovery (tail) reporting period, and a retroactive date that equals or precedes the effective date of the Contract, or the performance of Work hereunder. In the event the policy is cancelled, non-renewed, switched to an occurrence form, retroactive date advanced, or any other event triggering the right to purchase a supplemental extended

reporting period (SERP) during the life of this Contractor, Contractor agrees to purchase a SERP with a minimum reporting period not less than two (2) years. The requirement to purchase a SERP shall not relieve Contractor of the obligation to provide replacement coverage. The Contractor agrees the Self-Insured-Retention shall not exceed $25,000. This coverage may be provided on a Per-Project Basis. The Third-Party Pollution Legal and Remediation Liability shall be endorsed to include City as an Additional Insured.

Waiver of Subrogation. Contractor agrees by entering into this Contract to a Waiver of Subrogation for each required policy herein. When required by the insurer, or should a policy condition not permit Contractor to enter into a pre-loss agreement to waive subrogation without an endorsement, then Contractor agrees to notify the insurer and request the policy be endorsed with a Waiver of Transfer of Rights of Recovery Against Others, or its equivalent. This Waiver of Subrogation requirement shall not apply to any policy, which includes a condition specifically prohibiting such an endorsement, or voids coverage should Contractor enter into such an agreement on a pre-loss basis.

Certificate(s) of Insurance. Contractor agrees to provide City a Certificate of Insurance evidencing that all coverages, limits and endorsements required herein are maintained and in full force and effect, and Certificates of Insurance shall provide a minimum thirty (30) day endeavor to notify, when a manuscript notice endorsement is available by Contractor's insurer. If the Contractor receives a non-renewal or cancellation notice from an insurance carrier affording coverage required herein, or receives notice that coverage no longer complies with the insurance requirements herein, Contractor agrees to notify the City by fax or email within five (5) business days with a copy of the non-renewal or cancellation notice, or written specifics as to which coverage is no longer in compliance. The Certificate Holder(s) address shall read:

Original to:
City of Sunrise
Attn: Procurement Manager
Purchasing Office
10770 West Oakland Park Blvd.
Sunrise, Florida 33351
purchasing@sunrisefl.gov
Fax (954) 752-2278

Copy to:

City of Sunrise
Attn: Risk Manager Office
Risk Management Division
10770 W. Oakland Park Blvd.
Sunrise, FL 33351
riskmanagement@sunrisefl.gov

Umbrella or Excess Liability. Contractor agrees to maintain either a Commercial Umbrella or Excess Liability at a limit of liability not less than $2,000,000 Each Occurrence $2,000,000 Aggregate. The Contractor agrees to endorse the City as an "Additional Insured" on the Commercial Umbrella/Excess Liability, unless the Certificate of Insurance states the Commercial Umbrella/Excess Liability provides coverage on a pure/true follow-form basis, or the City is automatically defined as an Additional Protected Person.

Right to Revise or Reject. City reserves the right, but not the obligation, to revise any insurance requirement, not limited to limits, coverages and endorsements, or to reject any insurance policies which fail to meet the criteria stated herein. Additionally, City reserves the right, but not the obligation, to review and reject any insurer providing coverage due to its poor financial condition or failure to operate legally.

4.3 PATENTS AND ROYALTIES

The Bidder, without exception, shall indemnify and save harmless the City of Sunrise and its employees from liability of any kind including cost and expenses for or on account of any copyrighted, patented or unpatented invention, process or article of manufacture lot

any article used in the performance of the Contract, including its use by the Purchaser. If the Bidder uses any design, device or materials covered by letters, patent or copyright, it is mutually agreed. And understood without exception that the bid prices shall include all royalties or cost arising from the use of such design, device or materials in any way involved in the work.

4.4 INITIAL CONTRACT PERIOD AND CONTRACT RENEWAL

- Not applicable to this bid.

The initial contract period shall be for **two (2) years**, commencing on the date of award. In addition, the City reserves the right to renew the contract for **two (2) additional one (1) year** periods, providing all terms conditions and specifications remain the same, both parties agree to the extension, and such extension is approved by the City, contingent upon budget approval.

4.5 CONTRACT CONTINUITY / TRANSITIONAL PERIOD

In the event the services are scheduled to end either by Contract expiration or by termination by the City of Sunrise (at the City's discretion), the Bidder shall continue the services, if requested by the City, until new services can be completely operational. At no time shall this transitional period extend more than one hundred eighty (180) days beyond the expiration date of the existing Contract. The Bidder will be reimbursed for this service at the rate in effect when this transitional period clause is invoked by the City.

4.6 CONTRACTS OVERLAPPING FISCAL YEARS:

The City's fiscal year begins October 1 and ends September 30 of the following calendar year. When a Contract's terms extends beyond the fiscal year in which the Contract commences, the City will issue a new Purchase Order to cover its needs for the balance of the fiscal year and a new purchase order will be issued to correspond with the remaining months of the Contract that extends into the next fiscal year. Issuance of a new Purchase Order shall be subject to the availability of budgeted funds.

4.7 TERMINATION FOR GOVERNMENTAL NON-APPROPRIATIONS

City is a bona fide governmental entity of the State of Florida with City's fiscal year ending on September 30 of each calendar year. If City does not appropriate sufficient funds to purchase the quantities required under this Agreement for any of the City’s fiscal years subsequent to the one in which the Agreement is executed and entered into, then this Agreement shall be terminated effective upon expiration of the fiscal year in which sufficient funds to continue satisfaction of City’s obligation under this Agreement were last appropriated by City and City shall not, in this sole event be obligated to make any further purchases beyond said fiscal year.

4.8 TERMINATION FOR CAUSE

This Agreement may be terminated by either party upon three (3) calendar days written notice to the other party, should such other party fail substantially to perform in accordance with its material terms through no fault of the party initiating the termination. In the event the Contractor abandons this Agreement or causes it to be terminated by the CITY, the Contractor shall indemnify the CITY against any loss pertaining to this termination. In the event that the Contractor is terminated by the CITY for cause and it is subsequently

determined by a court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a termination for convenience under Section 4.9 and the provisions of Section 4.9 shall govern.

4.9 TERMINATION FOR CONVENIENCE

A Contract resulting from this Bid may be terminated by the City without cause upon thirty (30) days written notice to the Vendor. In the event of such a termination without cause, the Vendor shall be compensated for all services performed to the City's satisfaction, together with reimbursable expenses incurred. In such event, the Vendor shall promptly submit to the City its invoice for final payment and reimbursement under the terms of this Contract.

4.10 TERMS RELATING TO PRICE

Unless otherwise noted by the City, all prices shall be firm through the period of the Contract or purchase order and shall not be subject to increase. In the event of a manufacturer's or Vendor's price decrease during the Contract period, the City shall receive the full benefit of such price reduction on any undelivered goods or services on an existing purchase order and on any subsequent order placed during the Contract period. The Director of Purchasing must be notified in writing of any price reduction within five (5) days of the effective date. Failure to report price reductions may result in cancellation of Contract for cause, pursuant to these Terms and Conditions.

☐ In the event of a manufacturer's price increase during the Contract period, the Vendor shall submit proof from the manufacturer of said increase, and the City may accept the price increase at the time of Contract renewal, or terminate or re-bid the Contract, in whole, or in part, whichever is in the best interest of the City.

☒The cost of all services as bid herein shall remain firm for the first **two (2) years** of the Contract. Costs for subsequent years and any extension term years shall be subject to an adjustment only if increases occur in the industry. However, unless very unusual and significant changes have occurred in the industry, such increases shall not exceed 5% per year or, the latest yearly percentage increase in the All Urban Consumers Price Index (CPI-U) (National) as published by the Bureau of Labor Statistics, U.S. Dept of Labor whichever is less. The yearly increase, or decrease in the CPI shall be that latest index published and available ninety (90) days prior to the end of the Contract year then in effect compared to the index for the same month one year prior. Any requested cost increase shall be fully documented and submitted to the City at least sixty (60) days prior to the Contract anniversary date. Any approved cost adjustments shall become effective upon the anniversary date of the Contract. In the event the CPI or industry costs decline, the City shall have the right to receive, from the Vendor, a reasonable reduction in costs that reflect such cost changes in the industry.

The City may, after examination, refuse to accept the adjusted costs if they are not properly documented, increases are considered to be excessive, or decreases are considered to be insufficient. In the event the City does not wish to accept the adjusted costs and the matter cannot be resolved to the satisfaction of the City, the Contract may be cancelled by the City upon giving thirty (30) days written notice to the Vendor.

4.11 SELLING, TRANSFERRING OR ASSIGNING RESPONSIBILITIES

The Vendor shall not sell, transfer or assign the performance required by this bid without the prior written consent of the City. Any Award issued pursuant to this bid and the monies which may become due hereunder are not assignable, unless the prior written approval of the City is obtained.

4.12 PAYMENT/BILLING INSTRUCTIONS

Payment will be made by the City after the items or services awarded have been, received, inspected, found to comply with award specifications, are free of damage or defect and are properly invoiced.

Invoices, unless otherwise indicated, must show Purchase Order Number and shall be submitted in duplicate to:

CITY OF SUNRISE,
Finance Department
10770 West Oakland Park Blvd.
Sunrise, FL 33351

The City shall pay Contractor for work performed in accordance with §218.70, et seq., Florida Statutes, the Local Government Prompt Payment Act, after receipt of Contractor's proper invoice. To be deemed proper, each invoice must comply with all statutory terms and all requirements specified by the City in its contract and / or purchase order. If a payment request or invoice does not meet the contract / agreement / purchase order requirements, the City will reject the payment request or invoice as specified in accordance with §218.70, et seq., Florida Statutes. The rejection will be written and will specify the deficiency and the action necessary to make the payment request or invoice proper.
The City is exempt from Federal and State Taxes for tangible personal property. The City will provide an exemption certificate to the Vendor upon request. The Vendor is not exempt from paying sales tax to the suppliers for materials to fulfill Contractual obligations with the City, nor is Vendor authorized to use the City's tax exemption Number in securing such materials.

4.13 PUBLIC ENTITY CRIMES

Please be informed that pursuant to Section 287.133(2)(a), Florida Statutes, "A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity" in excess of the threshold amount provided in s. 287.017 for CATEGORY TWO for a period of 36 months following the date of being placed on the convicted vendor list." The submission of a bid shall constitute an affirmative representation of the Contractor to the City that the Contractor is aware of the Statute and in full compliance thereof.

4.14 COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ACT

If applicable, Vendor certifies that all material, equipment, etc. contained in the bid meets all O.S.H.A. requirements. Bidder further certifies that if he/she is the successful Bidder, and the material, equipment, etc., delivered is subsequently found to be deficient in any O.S.H.A. requirement in effect on date of delivery, all costs necessary to bring the material, equipment, etc., into compliance with the aforementioned requirements shall be borne by Vendor.

4.15 SAFETY DATA SHEETS (SDS)

In compliance with federal standards and regulations listed under OSHA 29 CFR 1910.1200 Hazard Communication Standard with adopted Globally Harmonized System of Classification and Labeling of Chemicals when applicable, any item delivered from a Contract resulting from this bid must be accompanied by a Safety Data Sheet (SDS), if applicable. The SDS must contain the following information: 1. Product identifier used on the label and any other common names or synonyms by which the substance is known. 2. Hazard Identification and the appropriate warning information associated with those hazards. 3. Composition/Information on Ingredients in the product. 4. First-Aid Measures for initial care to individuals who have been exposed to the chemical. 5. Fire-Fighting Measures for fighting a fire caused by the chemical. 6. Accidental Release Measures with recommendations on appropriate spill, leak, or release response. 7. Handling and Storage for safe practice and conditions. 8. Exposure Controls/Personal Protection indicating exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure. 9. Physical and Chemical Properties of the substance or mixture. 10. Stability and Reactivity information of the chemical. 11. Toxicological Information identifying health effects and toxicology of the chemical.

4.16 STORAGE, REMOVAL AND DISPOSAL OF SOLID WASTE / CONSTRUCTION DEBRIS:

☐ Not applicable to this bid.

☒ The Bidder must comply with Section 12-11 of the City Code, which reads as follows:

Sec. 12-11. - Construction sites.
All solid waste, including but not limited to construction and demolition waste , on construction sites shall be placed in a collection container on site while awaiting removal and disposal.

Mechanical containers for construction and demolition waste shall be obtained from the contractor and the name of the owner shall be clearly indicated on such containers. Only solid waste haulers that possess a franchise from the city may remove and dispose of solid waste from within the city.

4.17 NO DAMAGES FOR DELAY

The CONTRACTOR shall not be entitled to any claim for damages including, but not limited to, loss of profits, loss of use, home office overhead expenses, equipment rental and similar costs, on account of delays in the progress of the Project from any cause whatsoever including an act or neglect of the CITY, adverse weather conditions, and act of God, strike, war or national disaster or emergency, unusual

delay in deliveries, unusual delay in procuring permits, differing site conditions, unavoidable casualties or other causes beyond the CONTRACTOR'S control, or by delay authorized by the CITY, or by other causes which the CONTRACTOR determines may justify delay. The CONTRACTOR'S sole recovery and sole remedy for any such delay shall be a reasonable extension of time and a revision to the Project Schedule as determined by the CITY. However, additional costs to the CONTRACTOR or delays in the CONTRACTOR'S performance caused by improperly timed activities shall not be the basis for granting a time extension. If the CONTRACTOR wishes to make a claim for an increase in time of performance, written notice of such claim shall be made to the CITY within ten (10) working days after the occurrence of the event, or the first appearance of the condition giving rise to such claim. The CITY'S representative shall determine whether or not the CONTRACTOR is entitled to a time extension for the delay. The failure of the CONTRACTOR to give such notice shall constitute a waiver of any claim under this section.

4.18 GOVERNING LAW AND VENUE

The Contract shall be governed by the laws of the State of Florida. Except as set forth in the indemnification section of the Contract should the Parties be involved in legal action arising under, or connected to this Contract, each party will be responsible for their own attorneys' fees and costs. The venue for any litigation will be Broward County, Florida. Both Parties hereby agree to waive a jury trial, and will proceed to a trial by judge if necessary.

4.19 DISCRIMINATORY VENDOR LIST

Pursuant to Section 287.134, Florida Statutes, an entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity. By execution of this Contract, Contractor represents that it has not been placed on the discriminatory vendor list as provided in Section 287.134, Florida Statutes.

4.20 SCRUTINIZED COMPANY

Pursuant to Section 287.135, Florida Statutes, Contractor certifies that it is not on the Scrutinized Companies that Boycott Israel List created pursuant to Section 215.4725, Florida Statutes and that it is not engaged in a boycott of Israel.

Pursuant to Section 287.135, Florida Statutes, in the event the Contract is for one million dollars or more, Contractor certifies that it is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Terrorism Sectors List created pursuant to Section 215.473, Florida Statutes; and Contractor further certifies that it is not engaged in business operations in Cuba or Syria.

Pursuant to Section 287.135, Florida Statutes, City may, at the option of the City Commission, terminate this Contract if Contractor is found to have submitted a false certification as provided under subsection 287.135(5), Florida Statutes; has been placed

on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel; has been placed on the Scrutinized Companies with Activities in Sudan List; has been placed on the Scrutinized Companies with Activities in the Iran List created pursuant to Section 215.473, Florida Statutes; or has been engaged in business operations in Cuba or Syria.

4.21 PUBLIC RECORDS LAW

The CONTRACTOR shall comply with all applicable requirements contained in the Florida Public Records Law (Chapter 119, Florida Statutes), including but not limited to any applicable provisions in Section 119.0701, Florida Statutes. To the extent that the CONTRACTOR and this Contract are subject to the requirements in Section 119.0701, Florida Statutes, the CONTRACTOR shall: (a) keep and maintain public records required by the City to perform the services provided hereunder; (b) upon request from the City's custodian of public records, provide the City with a copy of the requested records or allow public records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes, or as otherwise provided by law; (c) ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed, except as authorized by law for the duration of the term of this Contract and following completion of this Contract if the CONTRACTOR does not transfer the records to the City; and (d) upon completion of the Contract, transfer, at no cost, to the City all public records in the possession of the CONTRACTOR or keep and maintain public records required by the City to perform the service. If the CONTRACTOR transfers all public records to the City upon completion of the Contract, the CONTRACTOR shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the CONTRACTOR keeps and maintains public records upon completion of the Contract, the CONTRACTOR shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the City, upon request from the City's custodian of public records, in a format that is compatible with the information technology systems of the City. If the CONTRACTOR fails to comply with the requirements in this Section 4.19, the City may enforce these provisions in accordance with the terms of this Contract. If the CONTRACTOR fails to provide the public records to the City within a reasonable time, it may be subject to penalties under Section 119.10, Florida Statutes.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS AGREEMENT, THE CONTRACTOR SHOULD CONTACT THE CITY'S CUSTODIAN OF PUBLIC RECORDS: THE CITY CLERK, FELICIA M. BRAVO, BY TELEPHONE (954/746-3333), e-mail (CityClerk@sunrisefl.gov), or mail (City of Sunrise, Office of the City Clerk, 10770 West Oakland Park Boulevard, Sunrise, Florida 33351).

4.22 NONDISCRIMINATION

The Contractor warrants and represents that all of its employees are treated equally during employment without regard to race, color, national origin, sex, gender identity, sexual orientation, age, disability/handicap, religion, family or income status.

4.23 ELECTRONIC RECORD KEEPING

Bidder certifies their services and products meet all recordkeeping requirements of the State of Florida, including but not limited to those in Chapter 119, Florida Statutes and Rule 1B-26.003(6)(g), Florida Administrative Code.

4.24 COMPLIANCE WITH LAWS

Bidder and the Services must comply with all applicable federal, state, and local laws, codes, ordinances, rules, and regulations including, without limitation, American with Disabilities Act, 42 U.S.C. § 12101, Section 504 of the Rehabilitation Act of 1973, and any related federal, state, or local laws, rules, and regulations.

4.25 E-VERIFY – EMPLOYMENT ELIGIBILITY

4.25.1 Contractor warrants and represents that it complies with Section 448.095, Florida Statutes, as may be amended. Contractor (1) has registered with and uses the E-Verify System (E-Verify.gov), to electronically verify the work authorization status of all newly hired employees; and (2) has verified that all of the Contractor's subcontractors performing the duties and obligations of this Contract are registered with and use the E-Verify System to electronically verify the employment eligibility of all newly hired workers.

4.25.2 Contractor shall obtain from each of its subcontractors an affidavit stating that the subcontractor does not employ, contract with, or subcontract with an Unauthorized Alien, as that term is defined in Section 448.095(1)(k), Florida Statutes, as may be amended. Contractor shall maintain a copy of any such affidavit from a subcontractor for, at a minimum, the duration of the subcontract and any extension thereof. This provision shall not supersede any provision of this Contract which requires a longer retention period.

4.25.3 City shall terminate this Contract if it has a good faith belief that Contractor has knowingly violated Section 448.09(1), Florida Statutes, as may be amended. If City has a good faith belief that Contractor's subcontractor has knowingly violated Section 448.09(1), Florida Statutes, as may be amended, City shall notify Contractor to terminate its contract with the subcontractor and Contractor shall immediately terminate its contract with the subcontractor.

4.25.4 If City terminates this Contract pursuant to the subsection 4.25.3 above, Contractor shall be barred from being awarded a future contract by City for a period of one (1) year from the date on which this Contract was terminated. In the event of such Contract termination, Contractor shall also be liable for any additional costs incurred by City as a result of the

termination.

4.26 FOREIGN GIFTS AND CONTRACTS

Pursuant to Fla. Stat. §286.101(3), where the amount of the grant or contract is 100,000.00 or more, [Contractor/Consultant/Grant Applicant] shall disclose any current or prior interest of, any contract with, or any grant or gift received from a country of foreign concern with a value of $50,000 or more that was received or in force during the previous five (5) years. Definitions, disclosure requirements and exceptions are found in Fla. Stat. §268.101. [Contractor/Consultant/Grant Applicant] represents and warrants it has complied with Fla. Stat. §286.101, it has properly disclosed such interests, contracts, grants or gifts to City before execution of this [Contract/Agreement], and it will remain in compliance with Fla. Stat. §286.101 for the duration of this [Contract/Agreement].

4.27 OUT OF STATE VENDORS

Pursuant to Fla. Stat. §607.1503, a foreign corporation should register with the State of Florida to transact business in the State of Florida. A link to the Florida Division of Corporations' website has been provided for convenience
https://dos.myflorida.com/sunbiz/

4.28 PROHIBITED TELECOMMUNICATIONS EQUIPMENT

[Contractor/Consultant/Vendor] represents and certifies that it and all its subcontractors do not use any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system, as such terms are used in 48 CFR §§ 52.204-24 through 52.204-26. [Contractor/Consultant/Vendor] represents and certifies that it and all its subcontractors shall not provide or use such covered telecommunications equipment, system, or services during the term of this [Contract/Agreement/Purchase Order].

4.29 ANTITRUST VIOLATIONS

The [Contractor/Consultant/Vendor] has a continuous duty to disclose to the City if it or any of its affiliates (as defined by Section 287.137(1)(a), Florida Statutes) are placed on the Antitrust Violator Vendor List. A person or an affiliate who has been placed on the antitrust violator vendor list following a conviction or being held civilly liable for an antitrust violation may not submit a bid, proposal, or reply for any new contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply for a new contract with a public entity for the construction or repair of a public building or public work; may not submit a bid, proposal, or reply on new leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a new contract with a public entity; and may not transact new business with a public entity. By entering this [Contract/Agreement/Purchase Order], [Contractor/Consultant/Vendor] certifies that neither it nor its affiliate(s) are on the antitrust violator vendor list at the time of

entering this [Agreement/Contract/Purchase Order]. False certification under this paragraph or being subsequently added to that list will result in termination of this [Contract/Agreement /Purchase Order], at the option of the City consistent with Section 287.137, Fla. Stat. as amended.

4.30 ENTITIES OF FOREIGN CONCERN

The provisions of this section apply only if Contractor or any Subcontractor will have access to an individual's personal identifying information under this Agreement. Contractor represents and certifies: (i) Contractor is not owned by the government of a foreign country of concern; (ii) the government of a foreign country of concern does not have a controlling interest in Contractor; and (iii) Contractor is not organized under the laws of and does not have its principal place of business in a foreign country of concern. On or before the Effective Date, Contractor and any Subcontractor that will have access to personal identifying information shall submit to City under Section 23, Notices, executed Exhibit "H" Affidavit of Compliance with Foreign Entity Laws, under penalty of perjury, to the City attesting that the entity does not meet any of the criteria in Section 287.138(2), Florida Statutes. Compliance with the requirements of this section is included in the requirements of a proper invoice for purposes of Section 2. Terms used in this section that are not otherwise defined in this Agreement shall have the meanings ascribed to such terms in Section 287.138, Florida Statutes.

SECTION 5 – SPECIAL CONDITIONS

5.1 CONTACT

The City's representative/liaison during the performance of this contract shall be Stanley Edwards, Director of Field Operations, telephone number (954) 888-6021 or designee. The Contractor's representative/liaison during the performance of this contract shall be the authorized agent signing the Bid.

5.2 PAYMENTS

The Contractor will bill the City monthly partial payments up to the amount of Ninety percent (90%) of the value of the items and/or partial services received, installed and accepted toward the completion of the work defined herein at the rates listed in Schedule “A”. Submit invoices to:

City of Sunrise
Attn: Accounts Payable Dept. 10770 W. Oakland Park Blvd. Sunrise, FL 33351

Invoices received from the Contractor pursuant to this contract will be reviewed and approved by the City's representative, indicating that services have been rendered in conformity with the contract and then will be sent to the Finance Department for payment. Invoices will generally be paid within thirty (30) days following the City representative's approval.

Final Invoice: In order for both parties herein to close their books and records, the Contractor will clearly state "final invoice" on the Contractor's final/last billing to the City. This certifies that all services have been properly performed and all charges and costs have been invoiced to the City. Since this account will thereupon be closed, any and other further charges, if not properly included on this final invoice, or which are in excess of the not to exceed amount, are waived by the Contractor.

5.3 ACCESS AND AUDITS

The Contractor shall maintain adequate records related to all charges, expenses, and costs incurred in estimating and performing the work for at least three (3) years after completion of this contract. The City shall have access to such books, records, and documents as required in this section for the purpose of inspection or audit during normal business hours, at the Contractor's place of business.

5.4 PUBLIC CONSTRUCTION BOND

The City may, at its sole discretion, require the successful Contractor(s) to supply a Public Construction Bond equal to 100% of the project value, for projects over $100,000. If the

City determines that a Public Construction Bond is required, the original bond shall be submitted prior to commencement of work and/or the delivery of any materials. Not all projects will require a bond; however, failure to provide a Public Construction Bond for projects when required shall preclude the Contractor(s) from performing any work on that project regardless of any approved authorized task. The Contractor's failure to produce a Public Construction Bond on projects when required may be considered failure to perform under the contract.

Each bond shall set forth a penal sum in an amount not less than One Hundred percent (100%) of the work order amount. Each bond furnished by the successful Contractor shall incorporate by reference the terms of said work order as fully as though they were set forth verbatim in such bonds. In the event the awarded Bid amount is adjusted by a Change Order executed by the Contractor, the penal sum of the Public Construction Bond shall be deemed increased by like amount. The Public Construction Bond furnished by the Contractor shall be in a form acceptable by the City and shall be executed by a surety, or sureties, reasonably suitable to the City.
Public Construction Bonds will only be returned upon the Contractor's written request after one (1) year from the date of final completion of the project and shall be addressed to the Office of the City Clerk, 4th Floor, 10770 W. Oakland Park Blvd, Sunrise, FL 33351

5.5 INDEPENDENT CONTRACTOR

The Contractor is an independent Contractor under this Contract. Services provided by the Contractor shall be performed by employees of the Contractor who are subject to supervision by the Contractor, and who shall not be deemed officers, employees, or agents of the City. Personnel policies, tax responsibilities, purchasing policies and other similar administrative procedures applicable to persons providing Services under this Contract shall be those of the Contractor.

5.6 AUTHORITY TO PRACTICE

The Contractor hereby represents and warrants that it has and will continue to maintain all licenses and approvals required to conduct its business, and that it will at all times conduct its Services and business activities in a reputable manner. Proof of such licenses and approvals shall be submitted to the City's Representative upon request.

5.7 SEVERABILITY

If any term or provision of this Contract or the application thereof to any person or circumstances shall, to any extent, be held invalid or unenforceable, the remainder of this Contract, or the application of such terms or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected, and every other term and provision of this Contract shall be deemed valid and enforceable to the extent permitted by law.

5.8 SUCCESSORS AND ASSIGNS

The City and Contractor bind themselves, their successors, assigns and legal Representatives to the other party hereto and to successors, assigns and legal Representatives of such other party in respect to covenants, agreements and obligations contained in this Contract. The Contractor shall not assign this Contract without written consent of the City.

5.9 SUBCONTRACTING

The City reserves the right to accept the use of a subcontractor, or to reject the selection of a particular subcontractor and to inspect all facilities of any subcontractor in order to make a determination as to the capability of the subcontractor to perform properly under this Contract. If a subcontractor fails to perform or make progress, as required by this Contract, and it is necessary to replace the subcontractor to complete the work in a timely fashion, the Consultant shall promptly do so, subject to acceptance of the new subcontractor by the City.

5.10 CONFLICT OF INTEREST

The Contractor represents that it presently has no interest and shall acquire no interest, either direct or indirect, which would conflict in any manner with the performance or Services required hereunder, as provided for in Section 112.311, Florida Statutes. The Contractor further represents that no person having any interest shall be employed for said performance. Contractor shall ensure that it and its subcontractors comply with Chapter 10, Article II, of the City Code, which contains the City of Sunrise Code of Ethics.

5.11 CONTINGENT FEES

The Contractor warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the Contractor to solicit or secure this Contract and that it has not paid or agreed to pay any person, company, corporation, individual, or firm, other than a bona fide employee working solely for the Contractor, any fee, commission, percentage, gift, or any other consideration contingent upon or resulting from the award or making of this Contract.

5.12 MODIFICATIONS OF WORK

If the City requires miscellaneous additional work or materials not delineated in the City's competitive procurement but within the general Scope of Work, the Contractor shall submit a detailed written proposal to the authorized City Representative. The Contractor's proposal shall not include more than 5% overhead and 10% profit on the subtotal of the additional work. Proposals from Subcontractors must adhere to the same limits for overhead and profit.

The City reserves the right to make changes in the Scope of Work, including alterations, reductions therein or additions thereto. Upon receipt by the Contractor of the City's notification of a contemplated change, the Contractor shall, in writing: (1) provide a detailed estimate for the increase or decrease in cost due to the contemplated change, (2) notify the City of any estimated change in the completion date, and (3) advise the City if the contemplated change shall affect the Contractor's ability to meet the completion dates or schedules of this Contract. The parties agree to negotiate in good faith changes in the Scope of Services that may occur.If the City so instructs in writing, the Contractor shall suspend work on that portion of the Scope of Work affected by a contemplated change, pending the City's decision to proceed with the change.

If the City elects to make the change, the City shall initiate a Contract Amendment and the Contractor shall not commence work on any such change until such written amendment is signed by the Contractor and approved and executed by the appropriate City personnel.

5.13 NOTICE

All written notices required in this Contract shall be sent by overnight mail or by certified mail, return receipt requested, to the following addresses:

To City:
Procurement Manager City of Sunrise
10770 W. Oakland Park Blvd.
Sunrise, FL 33351
cc: City Attorneys' Office City of Sunrise
10770 W. Oakland Park Blvd. Sunrise, FL 33351

To Contractor:
Mailing Address on Certification Form

5.14 ENTIRETY OF CONTRACT

The City and the Contractor agree that this Contract sets forth the entire agreement between the parties, and that there are no promises or understandings other than those stated herein. None of the provisions, terms and conditions contained in this Contract may be added to, modified, superseded or otherwise altered, except by written instrument executed by the parties hereto with the same formality as this Contract/Agreement.

5.15 SAFETY AND PROTECTION OF PROPERTY

The Contractor shall take all reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to, its employees on the Work and all other persons who may be affected thereby; the Work and materials and equipment to

be incorporated therein; and all other property at the site or adjacent thereto including, but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss, and shall give all notices required by same; this requirement includes, but is not limited to, the United States Occupational Safety and Health Act and the Florida Trench Safety Act, Fla. Stat. § 553.60.

5.16 BARRICADES

The Contractor shall provide all barricades and/or protective safety devices and shall take all necessary precautions to protect all personnel and property. The Contractor shall remove said barricades and/ or safety devices from City property at the completion of the project.

5.17 PERMITS AND FEES

The Contractor shall procure and pay for all permits and licenses, charges and fees and give all notices necessary and incidental to the due and lawful prosecution of the work. The cost of all permits, fees, etc. shall be included in price bid except where noted in the specifications and requirements. City Permit Fees shall be waived, except re-inspection fees. Refer to Schedule “I” for a link to fees.

5.18 EMERGENCIES

In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the City or the City's authorized representative, is obligated to immediately act to prevent threatened damage, injury, or loss. The Contractor shall give the City's authorized representative(s) written documentation within three (3) days from the inception of said emergency if the Contractor believes that any significant changes in the Work or variations from the contract documents have been caused thereby. If the City's authorized representative determines that a change in the contract documents is required because of action taken by the Contractor in response to such an emergency, a Change Order will be issued to document the consequences of such action.

5.19 WARRANTY/GUARANTEE

Unless otherwise required by the specifications, the Contractor shall furnish a one (1) year warranty on all equipment, furnishings, and installation provided hereunder against defect in material and/or workmanship. The warranty shall become effective on the Date of Substantial Completion and acceptance by the City or as otherwise required by law. Should any defect in materials or workmanship, excepting ordinary wear and tear appear during the above stated warranty period, the Contractor, upon written notice from the City, shall immediately repair or replace same at no cost to the City. The Contractor will not be liable under the above warranty for any defects or damages resulting from unforeseeable causes

beyond the control and without fault or negligence if the Contractor, such as misuse or neglect by the City, acts of God, fires, floods and hurricanes.

5.20 SECURITY

All personnel shall report to the Security Guard or Operator on duty at any each site for check-in upon arrival at any Utility location. Photo identification of person, their purpose of visit and contact person at Utilities who will accompany while on City property shall be required for entry. Upon leaving the premises, all personnel shall be required to check out with the Security Guard or Operator on duty. Contractor shall be responsible for complying with these procedures. The Contractor shall be required to complete and return the attached SECURITY PROCEDURE FORM, Attachment “3”.

5.21 TIME AND LIQUIDATED DAMAGES

This section is to be used on applicable work orders, determined by the City. The City shall notify the Contractor in writing of the date on which the Work shall begin ("the Notice to Proceed Date"). The Contractor shall commence site activities on the Notice to Proceed Date, and the Work shall be carried on regularly and without interruption. The Contractor shall achieve Substantial Completion of the Work no later than calendar days after the Notice to Proceed Date. The number of calendar days from the Notice to Proceed Date, through the date set forth for Substantial Completion, shall constitute the "Contract Time." The Contractor shall furthermore achieve Final Completion of the Work no later than one (1) calendar days after date of Substantial Completion.

The Contractor shall pay the City the sum of Dollars ($ .00) per day for each and every calendar day of unexcused delay in achieving Substantial Completion beyond the date set forth herein for Substantial Completion of the Work. Further, the Contractor shall pay the City sum of Dollars ($ .00) per day for each and every calendar day of unexcused delay in achieving Final Completion of the work beyond the number of days set forth in the work order.

Any sums due and payable hereunder by the Contractor shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the City, estimated at or before the time of executing this Contract. When the City reasonably believes that Substantial Completion will be inexcusably delayed, the City shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount then believed by the City to be adequate to recover liquidated damages applicable to such delays.

5.22 SUBSTANTIAL COMPLETION

"Substantial Completion" shall mean that stage in the progression of the Work when the Work is sufficiently complete in accordance with this Contract that the City can enjoy beneficial use or occupancy of the Work and can utilize the Work for its intended purpose.

A condition precedent for the achievement of Substantial Completion is the receipt by the City of any and all Certificates of Occupancy or other authorizations required for occupancy by any governmental or regulatory authority.

5.23 TIME IS OF THE ESSENCE

All limitations of time set forth in the Contract Documents are of the essence of this Contract.

5.25 LICENSES

All Contractors are to submit with their Invitation For Bid a copy of all licenses required to construct the Project along with such other information as the City may require to verify that the Contractor is responsible and capable of completing the work.

5.26 CONTRACTOR QUALIFICATIONS

The Contractor, including their subcontractors and material suppliers, performing or supplying this Work shall be reputable firms regularly engaged in this type of work with skilled workers and equipment capable of making a first-class installation in accordance with acceptable standards and practices.

A purchase order will only be issued to a Contractor qualified by experience and deemed acceptable to the City.
A list of all projects similar in size and scope completed during the last three years shall be submitted by the Contractor with this Invitation for Bid. The list shall include location of project, dates of contracts, names and addresses of owners, contact person and telephone number.

All Contractors, firms, subcontractors, etc. performing work under this contract must meet the criteria on section 1 of bid document. Certified copies of such licenses, registrations and/or certifications shall be filed with the City prior to the Commencement of the Work.

5.27 ADDITIONAL PRICING

The items on the Bid Form are common items needed and are being used as a means to determine the two (2) lowest responsive and responsible bidders. When those items are required, the Unit Prices shall govern.

When testing or repairs services require pricing not specified in the Items of Bid, each Contractor shall submit a detailed written proposal with a total cost, broken down for labor and material. The authorized City Representative will evaluate the proposals, determine if the pricing is fair and reasonable and will issue a Purchase Order to the successful Contractor.

5.28 COMMENCEMENT DATE AND TIME OF COMPLETION

On or after the award of the Contract, the City shall notify the Contractor of the date on which the Work shall commence "the Commencement Date". For non-emergencies, the Contractor shall receive no less than two (2) working days' notice of the Commencement Date. In cases of emergency, the City will notify the Contractor prior to submission of proposals, and the Contractor shall respond in the time requested. The Contractor shall commence work on the Commencement Date, and the Work shall be carried on regularly and without interruption, and the Contractor shall achieve Completion of the Work no later than the number of calendar days specified in the Contractor's proposal that has been accepted and approved by the City.

5.29 MATERIALS, INSTALLATION AND PERFORMANCE

The Contractor shall be responsible for the provision, installation and performance of all equipment, materials, services, etc. offered in their Bid. The Contractor is in no way relieved of the responsibility for the performance of all equipment furnished or of assuring the timely delivery of materials, equipment, etc. even though it is not of their own manufacture. Unless otherwise specified, material storage shall be on site and within the defined area of the Work and within the Contractor's area of responsibility.

5.30 AUTHORIZED MANUFACTURER'S INSTALLATIONS

Installation of any manufacturer's proprietary systems, products or equipment, specified or approved for this project, shall be performed by duly authorized and approved manufacturer's representatives, dealers, applicators or installers if same is a condition of special, standard or implied manufacturer's warranty. Certification of said authorization shall be submitted to the City upon request.

5.31 SUBCONTRACTING

Each Contractor shall submit, on the form provided herein, a list of subcontractors to be used on the Project with their bid. Within Thirty (30) days after receipt of such list the City shall state in writing any objections it may have to any proposed subcontractor.

The Prime Contractor shall not subcontract the Work or portions of the Work in excess of 75% of the Contract amount. Reciprocally, at least 25% of the Work shall be performed by the Prime Contractor's own on-payroll forces.

The successful Contractor shall not enter into a subcontract with any proposed subcontractor with reference to whom the City has made timely objection. After submittal of the list of subcontractors, no variance in subcontractors will be allowed without prior written acceptance and authorization by the City.

The Contractor shall have a competent superintendent, supervisor, or foreman on the job when any work is being performed. Subcontractors shall NOT be used in these capacities. No subcontract or sub-trade work shall be done without a project superintendent, supervisor or foreman AND a competent trades supervisor on the job.

No subcontractors, suppliers or superintendents shall be used after reasonable objection

5.32 CHANGES IN THE WORK

Changes in the work consist of additions, revisions, deletions or any combination thereof without invalidating this Contract, by written Change Order to the Purchase Order. The awarded Bid price and/or specified completion time may only be changed by a properly executed written Change Order.

If the Contractor encounters unforeseen conditions, the Contractor shall inform the City and its authorized City representative(s) of the situation within Seventy-Two (72) consecutive hours and suggest solutions to resolve the situation. Further, the Contractor must give the City and its authorized representative(s) an opportunity to observe said unforeseen conditions prior to commencement of any changes. The Contractor shall quantify their response by informing the City and its authorized representative(s) of any additional costs and/or additional time required for the added or changed Work.

5.33 AS SPECIFIED

A purchase order will be issued to the successful Contractor with the understanding that all items delivered and installed must meet the specifications herein. Items delivered and/or installed not as specified will be returned at no expense to the City, and the Contractor will be required to deliver and install the items per the specifications.

5.34 CITY'S RIGHT TO STOP WORK

If the Contractor persistently fails or refuses to perform the Work in accordance with the contract documents, the City shall have the right, but not an obligation, to order the Contractor to stop the Work, or any described portion thereof, until the cause for stoppage has been corrected, no longer exists, or the City orders that the Work be resumed. In such event, the Contractor shall immediately obey such order. A stop work directive provided under this paragraph shall not entitle the Contractor to an extension of the completion date.

5.35 CITY'S RIGHT TO PERFORM WORK

If the Contractor's Work is stopped by the City, or if the Contractor persistently fails or refuses to perform the Work in accordance with the contract documents, and the Contractor fails within Three (3) working days of such stoppage, failure, or refusal, to provide adequate assurance to the City that the cause of such stoppage, failure, or refusal will be eliminated or corrected, then the City may, without prejudice to any other rights or remedies the City

may have against the Contractor, proceed to carry out the subject Work. In such a situation, an appropriate Change Order shall be issued deducting from the contract price the cost of correcting the subject deficiencies, plus compensation for the City's Consultant's additional services and expenses necessitated thereby, if any. If the unpaid portion of the contract price is insufficient to cover the amount due the City, the Contractor shall pay the difference to the City.

5.36 FINAL PAYMENT

The "Final Payment" will not be processed until the entire project has been accepted by the CITY and all of the requirements in Article 1.3 "Final Submittals", section 01700 of the Technical Specifications, have been satisfied.

5.37 INVESTIGATIONS OF CONDITIONS AFFECTING OPERATIONS

Before submitting a Bid, each Bidder shall make all investigations and examinations necessary to ascertain conditions and requirements of the Bid. Failure to make investigations and examinations shall not relieve the successful Bidder from the obligation to comply in every detail with all provisions and requirements of the Bid nor shall it be a basis for any claim whatsoever for alteration in any term of or payment required by the Purchase Order or any subsequent Contract.

5.38 SELLING, TRANSFERRING OR ASSIGNING RESPONSIBILITIES

Vendor shall not sell, transfer or assign the performance required by this bid without the prior written consent of the City. Any Award issued pursuant to this bid and the monies which may become due hereunder are not assignable, unless the prior written approval of the City is obtained.

SECTION 6 - BID SUBMISSION CHECK LIST

COMPANY NAME: (Please Print):_____
Phone: Fax: Email:

BEFORE SUBMITTING YOUR BID, MAKE SURE YOU...

_____ 1. Carefully read the SPECIFICATIONS.

_____ 2. Properly fill out the BID SHEET and CERTIFICATION PAGE (Schedule "A").

_____ 3. Fill out and sign the NON-COLLUSION AFFIDAVIT (Schedule "B") and have it properly notarized.

_____ 4. Sign the VENDOR DRUG FREE STATEMENT (Schedule "C").

_____ 5. Fill out the VENDOR QUALIFICATION STATEMENT (Schedule “D"), if required.

_____ 6. Include WARRANTY INFORMATION FORM AND EXHIBITS (Schedule "E"), if required.

_____ 7. CHECK THE INSURANCE and LICENSE requirements to be sure you comply, and submit PROOF of INSURANCES or LICENSES, if required, with your Bid (Schedule “F”).

_____ 8. Complete STATEMENT OF NO BID (Schedule “G”), if applicable.

_____ 9. Submit Electronically.

_____10. Include a Bid Bond, if applicable.

_____11. Make sure your BID is submitted prior to the deadline. Late Bids will not be accepted.

FAILURE TO PROVIDE THE REQUESTED SCHEDULES MAY RESULT IN YOUR BID BEING DEEMED NON-RESPONSIVE.
THIS PAGE AND THE FOLLOWING PAGES ARE TO BE RETURNED WITH YOUR BID.
THIS SHOULD BE THE FIRST PAGE OF YOUR BID.

SCHEDULE "A"
CITY OF SUNRISE
BID SHEET & CERTIFICATION

Schedule A – Bid Sheet is available online at Demandstar.com. Fill out and upload signed form in Excell format.

If applicable, would you extend the prices bid herein to other municipalities? Award of bid is not contingent upon concurrence with this offer to other municipalities. Yes: _____ No: _____

ADDENDUM RECEIPT

Bidder shall acknowledge below the receipt of any and all addenda, if any, by listing the Addenda No. and date of issuance.

ADDENDUM NO: _____/DATE_____ADDENDUM NO: _____/DATE_____

ADDENDUM NO: _____/DATE_____ADDENDUM NO: _____/DATE_____

_____ _____

Vendor Name Name of Authorized Person

SCHEDULE "A"
(Continued)

I, the undersigned hereby agree to furnish the items and / or services described in this Invitation for Bid. I certify that I have read the entire document, including the Specifications, Requirements, Terms & Conditions and Schedules, and agree to furnish the items and services under the requirements of the Bid.

I also certify that this Bid is submitted without prior understanding, agreement, or connection with any corporation, firm or person submitting a Request for Submittal for the same materials, services, and supplies and is in all respects fair and without collusion or fraud.

The Respondent certifies by his/her signature that the person signing this Certification is authorized to bind the firm by their signature.

Company Name:
_____

Address_____

City _____ State _____ Zip

Phone#_____ Fax#_____ E-Mail _____

Signature: _____Title _____

Printed Name: _____

FEID or Social Security No._____

SOCIAL SECURITY NUMBER COLLECTION DISCLOSURE STATEMENT

Please be advised that pursuant to Section 119.071(5) (a) 2.a., Florida Statutes, the City of Sunrise ("City") discloses that the City requests your social security number for the purpose of payroll eligibility verification, processing employment benefits, income reporting, tax reporting, background checks on employee applicants, advisory board applicants and other City program volunteers. Social security numbers are also used as a unique numeric identifier and may be used for search purposes.

SCHEDULE "B"
CITY OF SUNRISE
NON-COLLUSION AFFIDAVIT

This affidavit is to be filled in, executed and notarized by the Bidder. If the bid is made by a Corporation, then it should be executed by its Chief Officer. This document MUST be submitted with the bid.

STATE OF)
) SS
COUNTY OF)
_____, being first duly sworn, deposes and says that
(*Type or print name of person who is signing below)*

1. He/she is the _____(*Owner, Partner, Officer, Representative or Agent)* of the Bidder that has submitted the attached Bid.

2. He/she is fully informed with respect to the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid.

3. Said Bid is made without any connection or common interest in the profits with any other persons making a Bid for the said commodities/services. Said Bid is on our part in all respects fair and without collusion or fraud. No head of any department, any employee or any officer of the City of Sunrise is directly or indirectly interested therein. If any relatives are employed by the City, indicate name and relationship below.
4. Under penalty of perjury, I certify that the information presented in this Affidavit is true and accurate. The undersigned further understands that providing false representations herein constitutes an act of fraud. False, misleading or incomplete information may result in disqualification from submitting bids, and/or referral to criminal law enforcement. The information provided is subject to verification by the City of Sunrise.
5. I understand that Florida Statutes Chapter 817 provides that willful false statements or misrepresentation is a misdemeanor of the first degree punishable by fines or imprisonment provided under Florida Statutes §775.082 or 775.83. I further understand that any willful misstatement of information will be grounds for disqualification. I certify, under oath, that the information provided is true and correct.

Name: _____ Relationship: _____
Name: _____ Relationship: _____

Company Name: _____

Bidder's Authorized Signature: _____

STATE OF FLORIDA
COUNTY OF BROWARD

Sworn to (or affirmed) and subscribed before me by means of ☐ physical presence or ☐ online notarization, this _____ day of_____, 20___, by _____, as _____ (title) of _____(Company).

_____
Signature of Notary Public – State of Florida (SEAL)

_____
Print, type or stamp commissioned name of Notary Public

Personally Known OR Produced Identification
Type of Identification Produced _____

SCHEDULE "C"

CITY OF SUNRISE
BIDDER'S DRUG - FREE WORKPLACE CERTIFICATION

Preference may be given to Vendors submitting a certification with their bid/Bid certifying they have a drug-free workplace in accordance with Section 287.087, Florida Statutes. This requirement affects all public entities of the State and becomes effective January 1, 1991. The special condition is as follows:
IDENTICAL SUBMISSIONS - Preference may be given to businesses with drug-free workplace programs. Whenever two or more bids, Bids or replies which are equal with respect to price, quality, and service are received by the State or by any political subdivision for the procurement of commodities or Contractual services, a bid received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie bids will be followed if none of the tied Vendors have a drug-free workplace program. In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.

3. Give each employee engaged in providing the commodities or Contractual services that are under bid a copy of the statement specified in subsection (1).

4. In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or Contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction.

5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.

6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section. As the person authorized to sign the statement, I certify that this Vendor complies fully with the above requirements.

I hereby certify that the company submitting this Bid has established a Drug Free work place program in accordance with State Statute 287.087

_____
VENDOR'S SIGNATURE

_____
COMPANY'S NAME

SCHEDULE "D"

CITY OF SUNRISE
BIDDER'S QUALIFICATION STATEMENT

The Undersigned certified under penalty of perjury that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO: City of Sunrise

ADDRESS: 10770 West Oakland Park Boulevard
Sunrise, Florida 33351

Check One:
□ Corporation □ Partnership
□ Individual □ Joint Venture
□ Other (specify)

COMPANY NAME: _____

COMPANY ADDRESS:_____
(Street Suite No.)
_____
(City State Zip Code)

PRINCIPAL'S NAME: _____
(Please Print)

CONTACT PERSON'S NAME: _____
(Please Print)

PHONE NUMBER: _____
FAX NUMBER: _____
E-MAIL ADDRESS:_____
F.E.I.D. NUMBER: _____
DUNS NUMBER: _____

SOCIAL SECURITY NUMBER COLLECTION DISCLOSURE STATEMENT
Please be advised that pursuant to Section 119.071(5)(a)2.a., Florida Statutes the City of Sunrise ("City") discloses that the City requests your social security number for the purpose of payroll eligibility verification, processing employment benefits, income reporting, tax reporting, background checks on employee applicants, advisory board applicants and other City program volunteers. Social security numbers are also used as a unique numeric identifier and may be used for search purposes.

Type of Work:
- ☐ General Construction
- ☐ Water, Sewer & Drainage Underground
- ☐ Water & Sewer Plant
- ☐ Paving & Roadwork
- ☐ Park & Recreation
- ☐ Demolition

1. ORGANIZATION

1.1 How many years has your organization been in business as a Contractor?

1.2 How many years has your organization been in business under its present business name?

1.2.1 Under what other or former names has your organization operated:

1.3 If your organization is a corporation, answer the following and submit a copy of your current year filing of Corporate Annual Report Form COR 620.

1.3.1 Date of Incorporation:

1.3.2 State of Incorporation:

1.3.3 President's Name:

1.3.4 Vice-President's Name:

1.3.5 Secretary's Name:

1.3.6 Treasurer's Name:

1.4 If your organization is a partnership, answer the following:

1.4.1 Date of Organization:

1.4.2 Type of Partnership (if applicable):

1.4.3 Name(s) of the General Partner(s):

1.5 If your organization is individually owned, answer the following:

1.5.1 Date of Organization:

1.5.2 Name of Owner:

1.6 If the form of your organization is other than those listed above, describe it and name the principals. (Use a separate sheet of paper.)

1.7 List your total number of employees and itemize them by job classification. (Use a separate sheet of paper.)

1.8 Provide resumes of key employees and job superintendents.

2. LICENSING

2.1 Attach current copies of the following for all trades your firm is legally qualified to perform:

- State License for qualifying individual(s) or Broward County Certificate of Competency and State Registration
- Broward County Local Business Tax Receipts.

2.2 List jurisdictions in which your organizations partnership or trade name is filed.

3. EXPERIENCE

3.1 List the categories of work that your organization normally performs with its own forces:

3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)

	Yes	No	
3.2.1	□	□	Has your organization ever failed to complete any work awarded to it?

3.2.2 □ □ Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or on its officers?

3.2.3 □ □ Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

3.3 Within the last five years has any officer or principal of your organization ever been an officer or principal of another organization when it has failed to complete a construction contract? (If the answer is yes, please attach details.)

3.4 On a separate sheet, list major construction projects your organization has in progress and under contract, giving name of project, owner, owner's representative name, current telephone number and job title, architect, contract amount, percent complete and scheduled completion date.

3.4.1 State total worth of work in progress and under contract.

3.4.2 List each change order (including dollar amounts) and time extensions for each project.

3.5 On a separate sheet, list the major projects your organization has completed in the past two (2) years, giving the name of project, owner, owner's project representative's name, current telephone number and job title, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

4. REFERENCES

(Include name, job title, and telephone number of contact person)
4.1 Business Trade References (Minimum 3):

4.2 Bank References (Minimum 3):

4.3 Other Governmental Agencies where you have been pre-qualified. Indicate trades and dollar amounts:

5. PREVAILING WAGE/FRINGE BENEFITS

DAVIS BACON ACT IS NOT APPLICABLE TO THIS BID.

6. CODE OF ETHICS

Enclosed is a copy of the City of Sunrise Code of Ethics. THE CONTRACTOR, BY SIGNING AND SUBMITTING THIS STATEMENT, HEREBY AGREES TO ABIDE BY ALL THE CONDITIONS OF THIS CODE AND TO ENSURE THAT ALL ITS SUBCONTRACTORS WILL ABIDE AS WELL.

7. DUMPING (If the answer to any of the questions below is yes, please attach details.)

	Yes	No	
7.1	□	□	Has your organization ever been fined for illegal dumping?
7.2	□	□	Are there any judgments, claims, or suits pending or outstanding against your organization or office for any violation dealing with contamination or illegal dumping?

8.

STATE OF FLORIDA
COUNTY OF BROWARD

Sworn to (or affirmed) and subscribed before me by means of ☐ physical presence or ☐ online notarization, this _____ day of_____, 20___, by _____, as _____ (title) of _____(Company).

_____
Signature of Notary Public – State of Florida (SEAL)

_____
Print, type or stamp commissioned name of Notary Public

Personally Known OR Produced Identification

Type of Identification Produced _____

SCHEDULE "D"
(Continued)
REFERENCES:

List all pertinent government agencies and private firm(s) with whom you have done business within the past three (3) years:

Agency/Firm Name: _____
Address: _____
_____
City/State/Zip Code: _____
Phone: _____
Fax: _____
Contact: _____
E-Mail: _____

Agency/Firm Name: _____
Address: _____
_____
City/State/Zip Code: _____
Phone: _____
Fax: _____
Contact: _____
E-Mail: _____

Agency/Firm Name: _____
Address: _____
_____
City/State/Zip Code: _____
Phone: _____
Fax: _____
Contact: _____
E-Mail: _____

Agency/Firm Name: _____
Address: _____
_____
City/State/Zip Code: _____
Phone: _____
Fax: _____
Contact: _____
E-Mail: _____

Agency/Firm Name: _____
Address: _____
_____
City/State/Zip Code: _____
Phone: _____
Fax: _____
Contact: _____
E-Mail: _____

Agency/Firm Name: _____
Address: _____
_____
City/State/Zip Code: _____
Phone: _____
Fax: _____
Contact: _____
E-Mail: _____

YOUR COMPANY NAME _____
ADDRESS _____
_____
PHONE: _____FAX:_____
EMAIL: _____

SCHEDULE "E"

CITY OF SUNRISE
WARRANTY INFORMATION FORM

ALL BLANKS SHOULD BE FILLED IN AND SUBMITTED WITH BID
MINIMUM WARRANTY SHALL BE AS SPECIFIED HEREIN

MAKE AND MODEL OF ITEM PROPOSED:

_____
_____
_____

DOES WARRANTY APPLY TO ENTIRE PACKAGE OR ONLY TO SPECIFIC PARTS? (State Explicitly)

_____
_____
_____

DOES WARRANTY INCLUDE LABOR FOR REPLACEMENT OF DEFECTIVE PARTS?
_____YES_____NO

WARRANTY PERIOD FOR PARTS
REPLACEMENT_____

WHO WILL PROVIDE LABOR, AND WHERE, IN THE EVENT OF FAILURE WITHIN WARRANTY PERIOD?_____
_____
_____

TELEPHONE:_____ FAX: _____
EMAIL: _____

NEAREST SOURCE TO THE CITY OF SUNRISE FOR PARTS AND SERVICE AFTER WARRANTY PERIOD:

_____
_____
TELEPHONE: _____FAX:_____
EMAIL: _____
A COPY OF COMPLETE WARRANTY STATEMENT IS SUBMITTED HEREWITH:
_____YES _____NO
NAME OF BIDDER: _____

SIGNATURE AND TITLE: _____
TELEPHONE: _____ FAX: _____

DATE: _____

SCHEDULE "F"

CITY OF SUNRISE
PROOF OF INSURANCE, REQUIRED LICENSES AND CERTIFICATIONS

ATTENTION BIDDER:

ATTACH TO SCHEDULE "F":

1. PROOF OF INSURANCE AS SPECIFIED HEREIN
2. COPIES OF LICENSES, IF APPLICABLE
3. IRS FORM W-9,
4. PROOF OF REGISTRATION WITH E-VERIFY

NOTE: Only the successful Bidder shall be required to provide a Certificate of Insurance naming the City of Sunrise as additional insured.

SCHEDULE "G"

CITY OF SUNRISE
STATEMENT OF NO BID

NOTE: If you do not intend to bid on this solicitation, please return this form immediately. Failure to return this form may result in your name being removed from the list of qualified Bidders for the City of Sunrise. Please indicate bid name and number on the outside of the envelope. Thank you.

MAIL TO: CITY OF SUNRISE
10770 W. OAKLAND PARK BLVD.
SUNRISE, FL 33351
ATTN: CITY CLERK'S OFFICE

We, the undersigned have declined to bid for the following reason:

_____ Specification too "tight," i.e., geared toward one brand or manufacturer only (explain below).

_____ Insufficient time to respond to the Invitation for Bid.

_____ We do not offer this product or an equivalent.

_____ Our product schedule would not permit us to perform.

_____ Unable to meet specifications.

_____ Unable to meet Bond requirements.

_____ Specification unclear (explain below).

_____ Other (specify below).

REMARKS:
_____

_____

COMPANY NAME: _____

SIGNATURE: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE NUMBER: _____

FAX NUMBER: _____

E MAIL: _____

SCHEDULE "H"

CITY OF SUNRISE
AFFIDAVIT OF COMPLIANCE WITH FOREIGN ENTITY LAWS

The undersigned, on behalf of the entity listed below ("Entity"), hereby attests under penalty of perjury as follows:

1. Entity is not owned by the government of a foreign country of concern as defined in Section 287.138, Florida Statutes. (Source: § 287.138(2)(a), Florida Statutes)

2. The government of a foreign country of concern does not have a controlling interest in Entity. (Source: § 287.138(2)(b), Florida Statutes)

3. Entity is not organized under the laws of, and does not have a principal place of business in, a foreign country of concern. (Source: § 287.138(2)(c), Florida Statutes)

4. Entity is not owned or controlled by the government of a foreign country of concern, as defined in Section 692.201, Florida Statutes. (Source: § 288.007(2), Florida Statutes)

5. Entity is not a partnership, association, corporation, organization, or other combination of persons organized under the laws of or having its principal place of business in a foreign country of concern, as defined in Section 692.201, Florida Statutes, or a subsidiary of such entity. (Source: § 288.007(2), Florida Statutes)

6. Entity is not a foreign principal, as defined in Section 692.201, Florida Statutes. (Source: § 692.202(5)(a)(1), Florida Statutes)

7. Entity is in compliance with all applicable requirements of Sections 692.202, 692.203, and 692.204, Florida Statutes.

8. (*Only applicable if purchasing real property*) Entity is not a foreign principal prohibited from purchasing the subject real property. Entity is either (a) not a person or entity described in Section 692.204(1)(a), Florida Statutes, or (b) authorized under Section 692.204(2), Florida Statutes, to purchase the subject property. Entity is in compliance with the requirements of Section 692.204, Florida Statutes. (Source: §§ 692.203(6)(a), 692.204(6)(a), Florida Statutes)

9. The undersigned is authorized to execute this affidavit on behalf of Entity.

Date: _____, 20___ Signed: _____

Entity: _____ Name: _____

Title: _____

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me, by means of ☐ physical presence or ☐ online notarization, this ____ day of _____, 20____, by _____, as _____ for _____, who is personally known to me or who has produced _____ as identification.

Notary Public Signature: _____ State of Florida at Large (Seal)

Print Name: _____ My commission expires: _____

SCHEDULE "I"

CITY OF SUNRISE
LIST OF SUPERVISORY PERSONNEL TO BE DIRECTLY INVOLVED WITH THE PROJECT AND SPECIALTY TECHNICIANS

SCHEDULE "J"
CITY OF SUNRISE
TRENCH SAFETY FORM

THIS FORM MUST BE COMPLETED AND SIGNED BY THE CONTRACTOR. FAILURE TO COMPLETE THIS FORM MAY RESULT IN THE BID BEING DECLARED NON-RESPONSIVE.

Contractor acknowledges that the Florida Trench Safety Act, Florida State Statutes Section
553.60 to 553.64 et. seq., which became effective October 1, 1990, shall be in effect during the period of construction of the project. The Contractor, by signing and submitting the bid, assures that the Contractor will perform trench excavations in accordance with applicable trench safety standards. The Contractor further identifies the following separate item of cost of compliance with the applicable trench safety standards as well as the method of compliance:
Method of Compliance

_____

_____

_____

Amount: Total $

_____

Contractor acknowledges that this amount is included in the applicable items of the Proposal and in the Grand Total Bid Price.

The Contractor is, and the Owner and Engineer are not, responsible to review and assess all safety precautions, programs and costs, and the means, methods, techniques or technique adequacy, reasonableness of cost, sequences and procedures of any safety precaution, including, but not limited to, compliance with any and all requirements of Florida Statutes Section
553.60 to 553.64 et. seq. cited as the "Trench Safety Act". Contractor is, responsible to determine any safety or safety related standards that apply to the project.

_____
Authorized Contractor Signature

_____
Printed Name

_____
Title Date

END OF DOCUMENT

SCHEDULE "K"
CITY OF SUNRISE
LIST OF SUBCONTRACTORS

For any major trades, all Contractors must provide the following information: the individual's or company's name, address and phone number and submit the information on this page with their Invitation for Bid. Failure to do so may result in your Bid being deemed non-responsive. (Attach additional pages, if required).

1. TRADE:(%)____ _____

_____
Company Name/Phone Number

_____
Address

2. TRADE: (%) _ _____

_____
Company Name/Phone Number

_____
Address

3. TRADE: (%)_ _____

_____
Company Name/Phone Number

_____
Address

4. TRADE: _____

_____
Company Name/Phone Number

_____
Address

CONTRACTOR'S COMPANY NAME: _____

AUTHORIZED SIGNATURE:_____

SCHEDULE "L"
CITY OF SUNRISE
CERTIFICATION OF OPPORTUNITY TO SUBCONTRACTORS

TO THE CITY OF SUNRISE:

I_____,(Contractor), hereby certifies that as Contractor for a Project identified as_____, it has provided the opportunity to all potential Sub-Contractors and potential suppliers of goods and/or services to review the entire bid package which includes terms, conditions, plans, specifications, addenda and any other documents contained in the bid package

_____
Contractor

By:_____

Date: _____

_____
Attest

_____
Attest

SCHEDULE "M"
CITY OF SUNRISE
PUBLIC CONSTRUCTION BOND

Use Standard Form if required

SCHEDULE "N"
CITY OF SUNRISE
FINAL RECEIPT AND RELEASE

Project: Sewer Rehabilitation & Maintenance and Infiltration & Inflow Reduction Program ("the Project")
COMES NOW,_____, the Contractor on the above referenced Project, who herein acknowledges receipt of final payment for any and all work performed, and any and all labor, materials, equipment, or supplies furnished, under its contract with the City of Sunrise, Florida (the "City"), the same being dated the day of_____, 20__ . The undersigned does further acknowledge that said Final Payment includes payment for any and all change orders, claims, extras, damages, or liabilities, of every kind and nature, arising out of, or relating to, the performance by the undersigned of the aforesaid contract. The Contractor does herein release and forever discharge and acquit the City from any and all claims, damages, or liabilities, of every kind and nature, arising out of or relating to, the performance of the aforesaid contract. The Contractor expressly represents and warrants that it has paid in full all subcontractors, laborers, materialmen, suppliers, and others who furnished labor, materials, supplies, equipment, or work on the Project.

The undersigned acknowledges and represents that the City is, or has, made final payment to the undersigned in reliance upon the truth and accuracy of the statements, representations, and warranties contained herein.

CONTRACTOR
BY:_____

Sworn to and subscribed before
me this _____day of _____,20__.

LOCAL PREFERENCE FORM 0300-M

Pursuant to City of Sunrise Code of Ordinances Sec. 5-171:

Local contractor means a contractor and/or subcontractor who has a valid business tax receipt issued by Broward County and associated municipality, if applicable, with a physical address located within the limits of Broward County from which the contractor and/or subcontractor operates or performs on a day-to-day basis business that is a substantial component of the goods or services being offered to the city. Residential addresses and post office boxes shall not be considered a valid physical address.

Qualified construction project means a construction project with an estimated construction value of one million dollars ($1,000,000.00) or more, excluding the owners' allowance. Qualified construction projects exclude projects funded in whole or in part by a federal or state grant, or projects with other funding source restrictions.

Pursuant to City of Sunrise Code of Ordinances Sec. 5-179, (a):

For a qualified construction project, the bid shall include a minimum requirement that twenty (20) percent of the work be performed by local contractors. The bid shall include a certification from the responsible bidder attesting to the satisfaction of the minimum requirement for local contractors. In addition, the contractor shall be required to attest to the continued satisfaction of the minimum requirement for local contractors prior to receiving final payment. Upon determination by the procurement manager that the contractor has failed to comply with this subsection, the contractor shall be immediately suspended from bidding on any bids, quotes, or requests for proposals until one year following final payment on the qualified construction project where compliance was not achieved.

LOCAL PREFERENCE MINIMUM REQUIREMENT CERTIFICATION

I, _____, (Contractor), hereby certify that as contractor for a qualified construction project identified as_____, the bid submitted on _____, Bid No._____, includes a minimum of twenty (20) percent of the work being performed by local contractors.

_____
Name of Contractor

By: _____

Title: _____

STATE OF FLORIDA
COUNTY OF BROWARD

Sworn to (or affirmed) and subscribed before me by means of ☐ physical presence or ☐ online notarization, this _____ day of_____, 20___, by _____, as _____ (title) of _____(Company).

_____
Signature of Notary Public – State of Florida (SEAL)

_____
Print, type or stamp commissioned name of Notary Public

Personally Known OR Produced Identification

Type of Identification Produced _____

LOCAL PREFERENCE FORM 0600-D

Pursuant to City of Sunrise Code of Ordinances Sec. 5-171:

Local contractor means a contractor and/or subcontractor who has a valid business tax receipt issued by Broward County and associated municipality, if applicable, with a physical address located within the limits of Broward County from which the contractor and/or subcontractor operates or performs on a day-to-day basis business that is a substantial component of the goods or services being offered to the city. Residential addresses and post office boxes shall not be considered a valid physical address.

Qualified construction project means a construction project with an estimated construction value of one million dollars ($1,000,000.00) or more, excluding the owners' allowance. Qualified construction projects exclude projects funded in whole or in part by a federal or state grant, or projects with other funding source restrictions.

Pursuant to City of Sunrise Code of Ordinances Sec. 5-179, (a):

For a qualified construction project, the bid shall include a minimum requirement that twenty (20) percent of the work be performed by local contractors. The bid shall include a certification from the responsible bidder attesting to the satisfaction of the minimum requirement for local contractors. In addition, the contractor shall be required to attest to the continued satisfaction of the minimum requirement for local contractors prior to receiving final payment. Upon determination by the procurement manager that the contractor has failed to comply with this subsection, the contractor shall be immediately suspended from bidding on any bids, quotes, or requests for proposals until one year following final payment on the qualified construction project where compliance was not achieved.

LOCAL PREFERENCE CONTINUED SATISFACTION OF MINIMUM REQUIREMENT CERTIFICATION

I, _____, (Contractor), hereby certify that as contractor for a qualified construction project identified as_____, the bid submitted on _____, Bid No._____, continues to include a minimum of twenty (20) percent of the work being performed by local contractors.

_____
Name of Contractor

By: _____

Title: _____

STATE OF FLORIDA
COUNTY OF BROWARD

Sworn to (or affirmed) and subscribed before me by means of ☐ physical presence or ☐ online notarization, this _____ day of_____, 20___, by _____, as _____ (title) of _____(Company).

_____
Signature of Notary Public – State of Florida (SEAL)

_____
Print, type or stamp commissioned name of Notary Public

Personally Known OR Produced Identification

Type of Identification Produced _____

SECTION 7 – TECHNICAL SPECIFICATIONS

SEWER REHABILITATION & MAINTENANCE AND INFILTRATION & INFLOW REDUCTION PROGRAM

TECHNICAL SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS

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SECTION 01010 - SUMMARY OF WORK

PART 1 -- GENERAL

1.1 GENERAL

A. The Work to be performed as needed under this Contract shall consist of furnishing all tools, equipment, materials, supplies, and manufactured articles and for furnishing all transportation and services, including fuel, power, water, and essential communications, and for the performance of all labor, work, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all work, materials, and services not expressly shown or called for in the Contract Documents which may be necessary for the complete and proper construction of the Work in good faith shall be performed, furnished, and installed by the CONTRACTOR as though originally so specified or shown, at no increase in cost to the CITY.

B. The term “CITY” as used throughout these contract documents shall mean the actual CITY or a third-party representative who may be designated by the CITY to take responsibility for various functions under this contract.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project consists of furnishing all labor, materials and equipment for performing sanitary sewer repairs.

B. In order to obtain representative unit prices for sewer system rehabilitation technologies and construction services, three groups have been developed. Interested Contractors are requested to submit price proposals for one or more of those groups which they are qualified to perform. Interested Contractors are not required to bid every group but must bid all items within any group they elect to bid. Each group will be awarded, as a separate contract, to the lowest responsible bidder for that specific group.

1. *Group "A"* - Excavated Point Repairs: Point repairs, cleanout installation, bypass pumping, surface restoration, and TV survey.

2. *Group "B"* - Manhole Rehabilitation: Replacing manhole frames and covers and performing other miscellaneous manhole repairs, installing cementitious and epoxy manhole liners, replacing entire manholes, and bypass pumping.

3. *Group "C"* – Mainline and Lateral Lining: Cured-in-place pipelining for gravity mains, cured-in-place pipelining for laterals, chemical grouting of mainline joints and mainline/lateral connections, and associated work such as cleaning and preparation, lateral reinstatement, cleanout installation, bypass pumping, traffic control, and TV survey. Fold-and-form lining that complies with the specifications will be accepted for 8-inch and 10-inch gravity main pipe diameters. NASSCO MACP M*a*nhole Inspections, Level 1 and Level 2.

4. *Group “D”* – Smoke Testing: Smoke testing of lift station basin areas to identify sources of direct stormwater runoff (“direct inflow”) to the sanitary sewer system, and potential illicit discharges into the system.

C. The quantities stated in the Bid Forms are approximate only and are intended to serve as a basis for the comparison of bids and to fix the approximate amount of the cost of the Project. The CITY does not expressly or impliedly agree that the actual amount of the work to be done in the performance of the contract will correspond with the quantities in the Bid Forms; the amount of work to be done may be more or less than the said quantities and may be increased or decreased by the CITY as circumstances may require. The increase or decrease of any quantity shall not be regarded as grounds for an increase in the unit price or in the time allowed for the completion of the work, except as provided in the Contract Documents.

D. Prior to construction, the CONTRACTOR shall identify existing utilities. The CONTRACTOR will be responsible for the coordination of his work with the associated utility owner and permitting agencies having jurisdiction over the specific locations to be verified.

E. Repairs shall be continuously generated under individual work orders during the contract period as the results of the ongoing sewer system evaluation survey become available. Groups of work orders of the Project will be issued to the CONTRACTOR in the order in which the CITY wishes the lines repaired. The CONTRACTOR shall view the available video inspection tapes to familiarize himself with pipe's condition. The groups shall be worked upon and completed in the order they are issued, and the work of a given group of work orders shall be completed, prior to beginning the work of a subsequent group of work orders, unless otherwise specifically permitted by the CITY. The CITY and CONTRACTOR shall agree on a schedule for the completion of each group of work orders prior to initiation of the work.

F. Upon receipt of any work order, the CONTRACTOR shall evaluate the work site and determine whether any foreseeable item of expense is not covered by a pay item under this contract. If the CONTRACTOR determines that any foreseeable item of expense is not covered by a pay item under this contract, the CONTRACTOR shall notify the CITY of this fact prior to initiation of the associated work and shall await authorization to proceed. If an unforeseeable item of expense is encountered following the initiation of work, CONTRACTOR shall similarly notify the CITY of this fact prior to initiation of the associated work and shall await authorization to proceed. In the event that no such prior notifications are made and no such prior authorizations are received, the CONTRACTOR will not be paid for the expense(s) in question. No after-the-fact change orders will be considered or approved.

G. The Work also includes providing temporary sanitary sewer service of service laterals, bypass pumping or plugging, if needed, and other appurtenant and miscellaneous items and work for a completed project.

H. Work shall be performed to ensure minimal traffic disruption, with at least one lane maintained open at all times, as well as minimal sewer down time, with work to be coordinated with affected residents and utility personnel. Whenever the property owners' use of the sanitary sewer must be interrupted by the Work, the CONTRACTOR shall notify the residents well in advance of the interruption. This notification shall be accomplished with door hanger notification cards to be placed at the addresses of affected customers. Property owners shall be informed when service interruption will take place and the

approximate duration. This notice shall be provided a minimum of 24 hours in advance of commencement of service interruption, unless otherwise specified. The CONTRACTOR shall make every effort to minimize inconvenience to the public and property owners.

I. The CONTRACTOR shall perform all work in strict accordance with all applicable OSHA Standards. Particular attention is drawn to those safety requirements involving man entry in confined spaces. Prior to entering manholes and other confined spaces, the atmosphere shall be evaluated by the CONTRACTOR to determine the presence of toxic, flammable or explosive vapors or lack of oxygen in accordance with local, state, or federal safety regulations. CONTRACTOR shall follow all procedures outlined by OSHA's Confined Space Entryrequirements.

J. It is the intent of the CITY to select and retain Contractors to perform wastewater collection system rehabilitation services. The Contractors will be selected based upon qualifications, cost, technologies and their ability to perform the required services during the stipulated contract period.

K. The CONTRACTOR shall warrant to the CITY that the equipment used on this Contract where covered by patents or license agreements is furnished in accordance with such agreements and that the prices included herein cover all applicable royalties and fees in accordance with such license agreements. The CONTRACTOR shall defend, indemnify and hold the CITY harmless from and against any and all costs, loss, damage or expense arising out of or in any way connected with any claim of infringement of patent, trademark or violation of license agreement.

L. As the results of the ongoing sewer system evaluation survey become available, specific collection system rehabilitation work orders will be developed for the technologies and remedial construction services in this proposal. The CITY reserves the right to select the technology and scope of work for each work order. Contractor unit prices established under this selection process will determine the total cost of each work order.

1.3 WORK BY OTHERS

A. The CONTRACTOR's attention is directed to the fact that work may be conducted at the sites by other Contractors during the performance of the Work under this Contract. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference with the Work of such other Contractors and shall cooperate fully with such Contractors to provide continued safe access to their respective portions of the sites, as required to perform their respective contracts.

B. When two or more contracts are being executed at one time on the same or adjacent land in such manner that Work on one contract may interfere with that on another, the CITY shall determine the sequence and order of the Work. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the CITY to the CONTRACTOR so desiring, to the extent, amount, in the manner, and at the times permitted. No such decision as to the method or time of conducting the Work or the use of territory shall be made the basis of any claim for delay or damage.

C. Interference with Work on Utilities: The CONTRACTOR shall cooperate fully with all utility forces of the CITY or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the Work, and shall schedule the Work so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.4 FIELD LAYOUT OFWORK

A. All work under this Contract shall be constructed in accordance with the requirements of each work order or as directed by the CITY. Information provided concerning existing ground, structures and appurtenances is believed to be reasonably correct but not warranted to be absolute and therefore is presented only as an approximation. Any error or apparent discrepancy in the data shown or omissions of data required for accurately accomplishing the work shall be referred immediately to the CITY for interpretation or correction.

B. All survey work for construction control purposes shall be performed by a Florida-licensed surveyor at the CONTRACTOR's expense. The CONTRACTOR shall establish all base lines for the location of the principal component parts of the work together with bench marks and batter boards adjacent to the work. Based upon the information provided, the CONTRACTOR shall develop and make all detail surveys necessary for construction. The CITY will furnish information and location of existing bench marks.

C. The CONTRACTOR shall have the responsibility to carefully preserve the bench marks, reference points and stakes. In case of destruction thereof by the CONTRACTOR or resulting from his negligence, he shall be held liable for any expense and damage resulting there from and shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such bench marks, reference points and stakes.

D. Existing or new control points, property markers, and monuments that will be established or are destroyed during the normal causes of construction shall be re-established by the CONTRACTOR; and all reference ties recorded therefore shall be furnished to the CITY. All computations necessary to establish the exact position of the work shall be made and preserved by the CONTRACTOR.

E. The CITY may check all or any portion of the work, and the CONTRACTOR shall afford all necessary assistance to the CITY in carrying out such checks. Any necessary corrections to the work shall be performed immediately by the CONTRACTOR.

1.5 CONTRACTOR USE OF PROJECTSITE

A. The CONTRACTOR's use of the project site shall be limited to its construction operations, including on-site storage of materials, on-site fabrication facilities, and field offices as applicable. Off-site storage of materials, if required, shall be arranged for by the CONTRACTOR and a copy of an agreement for use of other property shall be furnished to the CITY.

1.6 CITY USE OF THEPROJECT SITE

A. The CITY may utilize all or part of the existing facilities during the entire period of construction for the conduct of the CITY's normal operations. The CONTRACTOR shall cooperate with the CITY to minimize interference with the CONTRACTOR's operations and to facilitate the CITY's operations.

1.7 PARTIAL UTILIZATION OF THEWORK BY CITY

A. The CONTRACTOR is hereby advised that the CITY may accept the responsibility for the maintenance and protection of a specific portion of the project if utilized prior to completion.

However, the CONTRACTOR shall retain full responsibility for satisfactory operation of the total project.

1.8 PROJECT MEETINGS

A. Preconstruction Conference: Prior to the commencement of Work at the site, a preconstruction conference will be held at a mutually agreed time and place which shall be attended by the CONTRACTOR, its superintendent, and its subcontractors as appropriate. Other attendees will be:

1. Representatives of CITY.

2. Governmental representatives as appropriate.

3. Others as requested by CONTRACTOR or CITY.

4. Unless previously submitted to the CITY, the CONTRACTOR shall bring to the conference one copy each of the following:

a. Preliminary schedule.

b. Preliminary procurement schedule of major equipment and materials and items requiring long lead time.

c. Preliminary Shop Drawing / Sample / Substitute or "Or Equal" submittal schedule.

d. Schedule of Payment Items (lump sum price breakdown) for progress payment purposes.

e. Traffic Maintenance Plan

5. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established.

6. The agenda will include:

   a. CONTRACTOR's tentative schedules.

   b. Transmittal, review, and distribution of CONTRACTOR's submittals.

   c. Processing applications for payment.

   d. Maintaining record documents.

   e. Critical work sequencing.

   f. Field decisions and Change Orders.

   g. Use of project site, office and storage areas, security, housekeeping, the CITY's needs.

   h. Major equipment deliveries and priorities.

   i. CONTRACTOR's assignments for safety and first aid.

7. The CITY will preside at the preconstruction conference and will arrangefor keeping the minutes and distributing the minutes to all persons in attendance.

B. Progress Meetings: The CITY will schedule monthly progress meetings. The CONTRACTOR and CITY, and all subcontractors active on the site shall be represented at each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.

C. The CITY will preside at the meetings and provide for keeping and distribution of the minutes. The purpose of the meetings will be to review the progress of the Work, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.

D. The CONTRACTOR shall attend meetings held to coordinate work between other contracts that may be on-going on the project site. The General Superintendent, Job Superintendent, and/or other key representatives of each prime Contractor shall attend these conferences.

1.9 SITE CONDITIONS

A. The CONTRACTOR acknowledges that he has investigated prior to bidding and satisfied himself as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, tides, water tables or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the Work. The

B. CONTRACTOR further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, or any contiguous site, as well as from information presented by any Drawings and Specifications made a part of this Contract, or any other information made available to him prior to receipt of Bids. Any failure by the CONTRACTOR to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The CITY assumes no responsibility for any conclusions or interpretations made by the CONTRACTOR on the basis of the information made available by the CITY.

1.10 CONTRACTOR shall also take 4" x 6" color photographs and video tapes to document pre-existing above-ground conditions and shall provide the CITY with a set of photographs, negatives and video tapes. These photographs and tapes may be used for purposes of restoration documentation. Digital photographs supplied on a CD are also acceptable.

1.11 DIFFERING SITE CONDITIONS

A. The CONTRACTOR shall promptly and before such conditions are disturbed, notify the CITY in writing of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for this contract. The CITY will promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the CONTRACTOR's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly.

B. No claim of the CONTRACTOR under this clause shall be allowed unless the CONTRACTOR has given the notice required in Paragraph A.

C. No claim by the CONTRACTOR for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

PART 2 -- PRODUCTS - (Not Used)

PART 3 -- EXECUTION - (Not Used)

- END OF SECTION -

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SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 -- GENERAL

1.1 SCOPE OFWORK

A. Payments to the CONTRACTOR shall be made on the basis of the Bid Forms as full and complete payment for furnishing all materials, labor, tools and equipment, and for performing all operations necessary to complete the work included in the Contract Documents. Such compensation shall also include payments for any loss or damages arising directly or indirectly from the work, or from any discrepancies between the actual quantities of work and those shown in the Contract Documents.

B. The prices stated in the Bid Forms include all costs and expenses for labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the details and specified herein. The Basis of Payment for an item at the price shown in the Bid Forms shall be in accordance with its description of the item in this Section and as related to the work specified. Unit prices will be applied to the actual quantities furnished and installed in conformance with the Contract Documents. The items listed below, refer to and are the same pay items listed in the Bid Forms. They constitute all of the pay items for the completion of the work. No direct or separate payment will be made for providing miscellaneous temporary or accessory works, services, field offices, layout surveys, job signs, sanitary requirements, testing, safety devices, approval and record drawings, water supplies, power, underground utility locating, site preparation, removal of waste, site cleanup, watchmen, bonds, insurance, mobilization and demobilization (except where indicated otherwise), and any other requirements of the General Conditions and Bidding and Contract Requirements. Compensation for all such services, equipment and materials shall be included in the prices stipulated for the unit pay items listed herein.

C. The CONTRACTOR's attention is called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. Should the CONTRACTOR feel that the cost for any item of work has not been established in the Bid Forms or this Section, the cost for that Work shall be included in some other applicable Bid Item, so that the Proposal for the project reflects the total price for completing the work in its entirety. It is intended that all work required to complete this Contract will be included in the various items as described herein.

D. In the event of any conflict among sections of these contract documents, the order of precedence shall be as follows: The CITY's *Shop Drawing Submittals and Approved Utility Product List* (reference Appendix 1); the CITY's *Standard Details and Notes* (reference Appendices 2 and 3); this section (Section 01025, Measurement and Payment); the remaining sections of these Technical Specifications; and, the CITY'S front-end documents.

E. In the event that repairs to laterals, mains, manholes, force mains, utilities, or any other public or private property are required due to damage caused by the CONTRACTOR's operations, the CONTRACTOR shall provide and employ all necessary labor, equipment, and materials, at no additional cost, to complete such repairs in accordance with applicable provisions of these specifications. This shall include but not be limited to materials for repair, if required, including pipe, fittings and miscellaneous, pipe bedding, and materials for surface restoration; transportation and handling costs delivered to the work site; any bypass

pumping; providing provisional sewers to maintain service; complying with the State of Florida Trench Safety Act, including shoring; removal, transportation and disposal of existing sewer excavation; supporting and protecting existing utilities as required; dewatering; sheeting and shoring, if necessary; furnishing and installing replacement pipe, fittings and repair couplings; unloading material and placing it in the trench; cutting pipe; furnishing and installing joint materials including lubricant; making all connections within the lines to existing sewers, laterals and structures; placing and compacting bedding and backfill; furnishing and installing additional suitable backfill material, if required; furnishing all materials and equipment required to clean and test the sewer; cleaning and testing the sewer; temporary paving installation and removal; permanent paving replacement; replacement of pavement markings as existed before repair; replacing utilities, catch basins, manholes, trees, grass, shrubs, mail boxes, sprinkler systems, concrete or rock bed driveways, sidewalk and all other similar items, to original locations and to equal or better than original conditions; obtaining and paying for any necessary permits; satisfying all requirements of the permits, and all other appurtenant and miscellaneous items and work including final cleanup

F. The CITY will not provide any space or place to store materials for this project. No payment will be made for stored materials.

G. The CITY will not provide for disposal of any solids resulting from sewer cleaning. The CONTRACTOR shall obtain permits and make arrangements as required to properly dispose of solids. All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of by the CONTRACTOR in a legal and sanitary manner as approved by appropriate authorities, at the CONTRACTOR's cost. Where applicable, the CITY will waive permit fees for CONTRACTOR.

H. Whenever “Limits of Construction” is referred to, the limit of construction shall be within an area 7.5 feet each side of the centerline of the pipe and no more than five feet beyond the end of the new pipe installed.

1.2 CONTRACT DURATION

A. As specified in the Instructions to Bidders.

1.3 PERFORMANCE AND PAYMENT BONDS

A. As specified in the Instructions to Bidders.

1.4 MEASUREMENT

A. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the CITY unless otherwise specified. The CITY will witness all field measurements.

B. When depths are indicated in the bid items, they shall be measured vertically from the existing grade at excavation point, paved or unpaved, to the pipe invert.

C. The quantities stated in the Bid Forms are approximate only and are intended to serve as a basis for the comparison of bids and to fix the approximate amount of the cost of the Project. The CITY does not expressly or impliedly agree that the actual amount of the work to be done in the performance of the contract will correspond with the quantities in the Bid Forms; the amount of work to be done may be more or less than the said quantities and may be

increased or decreased by the CITY as circumstances may require. The increase or decrease of any quantity shall not be regarded as grounds for an increase in the unit price or in the time allowed for the completion of the work, except as provided in the Contract Documents.

I. Payment items for cleaning and televising of mains and laterals will apply when sewer is cleaned and televised for inspection only, or when a sewer repair is not performed due to changed field conditions revealed by the pre-repair video inspection. Cleaning and television inspection performed to prepare for a repair or to document a completed repair are not considered separate pay items. Costs for such cleaning and TV inspection shall be included in the contract unit cost for each particular repair. Lateral inspection shall be performed using a camera launched from the main unless conditions within the sewer require lateral inspection from the cleanout. Reference Table 01025-1 for the television inspection requirements pertaining to each type of repair.

J. For Group C, the CITY may request inspection for the purpose of locating or confirming defects in sewer mains and laterals for subsequent repair under this Contract. Where such mains and laterals are subsequently assigned to the Contractor for lining during this Contract, the initial inspection cost shall be deducted from the lining cost.

1.5 GROUP "A" (EXCAVATED POINT REPAIRS) PAYMENT ITEMS

A. Items A1 to A10 – Point repairs of gravity mains and laterals

1. This work, of whatever nature, will be measured and paid for at the unit price per each as delineated by pipe size and depth brackets as named in the Bid Forms. Payment of the unit price per each shall provide full compensation for all necessary and required work including, but not limited to pre- and post-construction television inspection and sonde locate if required*;* excavation; removal, transportation, and disposal of existing pipe regardless of type; removal, transportation and disposal of material generated by cleaning and preparation; transportation and handling costs; furnishing and installing all materials including pipe (a minimum of 6 feet and a maximum of 20 feet), pipe joint material including lubricant, pipe bedding, repair sleeves, flexible banded couplings and adapters, rigid sleeves with compression joints, embedment materials, wyes or tees and the reconnection of service laterals; flow isolation; backfill; compaction; complying with the State of Florida Trench Safety Act; supporting and protecting existing utilities as required; dewatering; sheeting and shoring, if necessary; cutting pipe; making all connections within the lines to existing sewers and structures; testing; cleanup; final cleanup; all labor, materials and equipment required to provide a complete and acceptable pipe installation, including all appurtenances, in accordance with the Contract Documents, the manufacturer's specifications and compliance with all applicable regulatory requirements; and all incidentals related to point repairs to achieve a repaired segment of sewer gravity main or lateral complete in place, tested, and ready for use. Multiple payments can be made under this item if the repair exceeds 20 feet.

2. Surface restoration will be paid for separately.

B. Item A11 – Install lateral connection to lined main (open trench)

1. This item of work will be measured and paid at the unit price per each lateral reinstated and shall include, but not be limited to, furnishing all labor, equipment, and

material necessary to install lateral connections to lined mains (Fernco flexible tap saddle, LMT Saddle from LMK Technologies, or approved equal) in accordance with the manufacturer's recommendations, complete and in place.

2. The starting point for this item of work will the performance of a point repair (one of Items A1 to A10) to expose the main, to provide an open trench with the sewer main located and exposed, as well as subsequent backfill and compaction.

C. Items A12 to A47 – Items in common

1. Reference Part 1.08 of this section.

1.6 GROUP "B" (MANHOLE REPAIRS AND REPLACEMENTS) PAYMENT ITEMS

A. Items B1 to B2 – Realign, grout and seal manhole casting

1. This item of work will be measured and paid for at the unit price per each manhole, regardless of size of frame and type of surface features which must be restored. Realignment may be horizontal, vertical, or both. Payment of the unit price per each will provide complete compensation for lifting, removing, cleaning and recoating the cast iron frame; removing and replacing the mortar bedding on the top of the manhole wall; reseating the frame in its correct position; patching as required; surface restoration; cleanup; labor, tools and equipment; and all incidentals as necessary to attain a water-tight junction between manhole wall and cast-iron frame.

B. Item B3 – Install manhole chimney seal

1. This item of work will be measured and paid for at the unit price per each internal rubber seal installed. Payment of the unit price per each will provide complete compensation for furnishing and installing manhole chimney seals, labor, tools, equipment and incidentals necessary for a complete in place, acceptable installation, with no leakage through or around the seal.

C. Items B4 to B5 – Seal visible infiltration through manhole walls, bench and invert

1. This item of work will be measured and paid for at the unit price per each manhole, regardless of depth or size (or number and flow rate of visible leaks encountered). Payment shall be made per unit price per each for sealing or patching all visible leaks by injecting chemical grout; including dewatering (or other means acceptable to the CITY) to relieve hydrostatic pressure outside the manhole.

D. Item B6 – Repair manhole bench and invert

1. This item of work will be measured and paid at the unit price of manhole invert repaired. Payment of the unit price will provide compensation for cleaning and patching the manhole bench and flow channels; isolation of the manhole by plugging entering lines; testing labor, tools and equipment; and all incidentals and materials needed to restore the manhole bench and invert.

E. Item B7 – Replace manhole bench and invert

1. This item of work will be measured and paid at the unit price per each of manhole invert replaced. Payment of the unit price will provide compensation for cleaning; furnishing labor, equipment, and all materials or combination of materials and applying them; isolation of the manhole by plugging entering lines; removal and re-installing flow channel and benches; testing labor, tools and equipment; and all incidentals necessary to obtain a watertight, sealed manhole bench and invert.

F. Item B8 – Replace manhole frame and cover

1. This item of work will be measured and paid for at the unit price per each, regardless of size. Payment of the unit price per each will provide compensation for furnishing and installing the new frame and cover; salvaging and transporting to the location designated by the CITY of all replaced cast iron materials; cutting, removal and replacement of surface materials as necessary; cleanup; labor, tools and equipment; and all incidentals necessary to obtain a new watertight cast iron cover, complete in place.

G. Items B9 to B12 – Cementitious manhole liner or cementitious manhole liner with spray on polymeric overlay

1. This item of work will be measured and paid at the unit price per vertical foot of manhole wall. Measurement will be made from the bench, at its highest point, to the bottom of the frame. The work includes the sewer inverts. Payment of the unit price per vertical foot will provide compensation for cleaning of the wall; furnishing and supplying of all materials or combination of materials making up the cementitious lining or cementitious lining and polymeric overlay and applying them; manufacturer's representative's presence or assistance if required; isolation of the manhole by plugging entering lines; testing labor, tools and equipment; and all incidentals necessary to obtain a watertight, sealed manhole wall and bench complete.

H. Item B13 – Install urethane seal

1. This item of work will be measured and paid for at the unit price per each urethane seal installed. Payment of the unit price per each will provide complete compensation for cleaning of the wall and surface preparation, furnishing and installing all materials, and providing all labor, tools, equipment and incidentals necessary for a complete in place, acceptable installation.

I. Items B14 to B21 – Manhole replacement

1. This item of work will be measured and paid for at the unit price per each precast manhole installed, with or without outside drop connections, and depth brackets as named in the Proposal Bid Form. Payment of the unit price per each will provide complete compensation for all necessary and required excavation; removal, transportation, and disposal of existing structure; removal, transportation and disposal of material generated by cleaning and preparation; transportation and handling costs; cutting pipe(s); furnishing and installing all materials, including pipe,

pipe joint material, repair sleeves, manhole base, wall sections, cone, chimney, frame and cover, and embedment materials; isolation of reaches of sewers by plugging; excavation; backfill; compaction; complying with the State of Florida Trench Safety Act; supporting and protecting existing utilities as required; dewatering; sheeting and shoring, if necessary; cleanup; connection of all existing piping to new manholes; final cleanup; testing; all labor, materials and equipment required to provide a complete and acceptable installation, including all appurtenances, in accordance with the Contract Documents, the manufacturer's specifications and compliance with all applicable regulatory requirements; and all incidentals related to new manhole construction complete in place, tested, and ready for use.

2. Items B20 and B21 will be paid, in addition to one of Items B14 through B19, where manholes with external drop connections are specified. Item B20 is intended to cover the additional cost of the pre-cast portion, and Item B21 is intended to cover the additional cost of the cast-in-place portion.

3. Surface restoration will be paid for separately.

J. Items B22 to B39 – Items in common

1. Reference Part 1.08 of this section.

K. Item B40 – Remove Existing Liner/Coating

1. This item shall be measured and paid for per vertical linear foot, measured above the manhole bench, for all work to remove the existing manhole liner, including chipping, power washing, sandblasting to prepare surfaces for replacement liner.

1.7 GROUP "C" (MAINLINE PIPELINING) PAYMENT ITEMS

A. Items C1 to C16 – Install mainline liner

1. This work will be measured and paid at the unit price per linear foot of liner as delineated by the pipe size and depth brackets named in the Bid Forms. Measurement shall be made based on the horizontal projection of the centerline of the permanently installed liner between manholes, measured to the nearest foot from the inside wall of manhole to inside wall of manhole for each section lined. Each unit price bid shall include, but not be limited to, all necessary or required resident notification, sewer pipe cleaning and preparation of the existing sewer, including

blocking or plugging incoming lines; removal, transportation and disposal of material generated by cleaning and preparation; pre-lining and post-lining television surveys; chemical joint sealing if necessary; pipe lining; the cost of obtaining a water meter from the CITY; cleaning; sample collection; grouting to eliminate infiltration at service connections and liner ends; cleanup; documentation and reporting; and all labor, materials and equipment required to provide a complete and acceptable liner installation.

2. Where post-installation thickness measurements and/or physical property testing is performed, payment for installed liner will be made as itemized below:

   a. Full payment – If thickness, flexural strength, and flexural modulus of elasticity of installed liner are all 95 percent or more of specified values, full payment will be made accordingly.

   b. Adjusted payment for 90 to 95 percent of specified values – If thickness, flexural strength, or flexural modulus of elasticity of installed liner are between 90 and 95 percent of specified values, payment will be made based on an Adjusted Unit Price, which shall equal the Unit Price bid, multiplied by a Value Factor calculated as follows:

      Value Factor = * thickness x * flexural strength x * flexural modulus of elasticity

      * Insert actual measured or test result expressed as a fraction of the specified value. Maximum allowable is 1.

   c. Adjusted payment for 85 to 90 percent of specified values – If thickness, flexural strength, or flexural modulus of elasticity of installed liner are between 85 and 90 percent of specified values, payment will be made at one half the Unit Price. Values below 85 percent may result in rejection of the liner.

3. Reinstatement of service lateral connections will be paid for separately.

B. Items C17 to C18 – Install liner end seals

1. This work will be measured and paid at the unit price per each pair of end seals as delineated by the pipe size brackets named in the Bid Forms.

2. Each unit price bid shall include, but not be limited to, all necessary or required labor and expense to procure and install end seals in conjunction with a mainline liner installation. End seals must form a 360-degree seal between the host pipe and the newly installed liner. Acceptable end seals are Insignia End Seals by LMK Enterprises, or approved equal.

C. Items C19 to C20 – CIP liner cure temperature monitoring and reporting

1. This work will be measured and paid at the unit price per linear foot of liner as delineated by the pipe size brackets named in the Bid Forms. Measurement shall be made based on the horizontal projection of the centerline of the permanently installed liner between manholes, measured to the nearest foot from the inside wall of manhole to inside wall of manhole for each section lined.

2. Each unit price bid shall include, but not be limited to, all necessary or required labor and expense to procure temperature sensors along with necessary computer software and hardware; install temperature sensors between the host pipe and liner in the bottom of the host pipe at intervals no greater than 20-feet for pipe sizes up to 15-inches in diameter and no greater than 10-feet for pipe sizes 18-inches and larger; test the temperature monitoring system's proper functioning prior to installing the liner in the host pipe; monitor the temperatures inside the tube wall of the installed liner to verify proper curing using a computer and associated software with a tamper-proof database which can record the temperatures at this interface throughout the processing of the liner; and deliver to the CITY (via certified report or secure website access) an output report that identifies each sensor by its station in the reach and shows the maximum temperature achieved during the processing of the CIPP and the time sustained at or above the Manufacturer's required curing temperature at each sensor.

D. Item C21 – Lateral Reinstatement

1. This item of work will be measured and paid at the unit price per each lateral reinstated and shall include, but not be limited to, blocking or plugging incoming line(s); removal, transportation and disposal of material generated by cleaning and preparation; television surveys, furnishing the equipment necessary to internally cut out the liner to at least 95 percent of the circumference of the lateral, cutting out the coupon; wire-brushing the cut to remove jagged edges; recovering all waste material from the sewer; service pipe cleaning; sealing the lateral connection to the liner including the first joint of the lateral connection; grouting the annular space; performing all repairs required due to damage caused by the CONTRACTOR, and all appurtenant and miscellaneous items and work.

2. If the CONTRACTOR damages the host pipe during lateral reinstatement, the CONTRACTOR shall repair the host pipe to the satisfaction of the CITY at no additional cost.

3. If grouting of the annular space at the reinstated lateral results in residual grout in greater than 50 percent the circumference of the lateral, or if in the judgment of the CITY excessive grout presents a risk of blockage, such grout shall be removed at no additional cost.

E. Item C22 – Recut lateral insufficiently reinstated by others

1. This item of work will be measured and paid at the unit price per each lateral recut and shall include, but not be limited to, blocking or plugging incoming line; removal, transportation and disposal of material generated by cleaning and preparation; pre- and post-television surveys, furnishing the equipment necessary to internally cut out the liner to at least 95 percent of the area of the lateral, cutting out the coupon; wire-brushing the cut to remove jagged edges; recovering all waste material from the

sewer; service pipe cleaning; performing all repairs required due to damage caused by the CONTRACTOR, and all appurtenant and miscellaneous items and work.

2. If the CONTRACTOR damages the host pipe during lateral reinstatement, the CONTRACTOR shall repair the host pipe to the satisfaction of the CITY at no additional cost.

F. Item C23 – Grout annular space following recut of lateral insufficiently reinstated by others

1. This item of work will be measured and paid at the unit price per each recut lateral grouted and shall include, but not be limited to, blocking or plugging incoming line; removal, transportation and disposal of material generated by cleaning and

preparation; pre- and post-television surveys, furnishing the equipment necessary; recovering all waste material from the sewer; service pipe cleaning; sealing the lateral connection to the liner including the first joint of the lateral connection; grouting the annular space; performing all repairs required due to damage caused by the CONTRACTOR, and all appurtenant and miscellaneous items and work. If grouting of the annular space at the reinstated lateral results in residual grout in greater than 50 percent the area of the lateral, or if in the judgment of the CITY excessive grout presents a risk of blockage, such grout shall be removed at no additional cost.

G. Item C24 – Protruding service connection removal by internal means

1. The CITY may request that the CONTRACTOR remove protruding service connections where needed, typically to allow completion of inspection or as a prelude to lining. The CONTRACTOR shall use robotic techniques. The use of equipment that may damage the existing service connection will not be allowed. The CONTRACTOR shall not perform this work prior to receiving written authorization from the CITY.

2. Measurement shall be per protruding service connection removed.

3. Payment shall be at the unit price bid, per each protruding service connection removed, provided in the Bid Forms and shall include full compensation for accessing the site, wastewater flow control, performing the protruding service connection removal, and all else incidental thereto for which separate payment is not provided under other items in the Bid Forms.

H. Items C25 to C31 – Items in common.

1. Reference Part 1.08 of this section.

I. Items C32 to C35 – Install cured-in-place sectional pipe liners

1. Items with Bid form units of “EA” will be measured and paid at the unit price per each cured-in-place sectional pipe liner installed up to 6 feet, as delineated by the pipe size brackets named in the Bid Form. Each unit price bid shall provide full compensation for all work including, but not limited to, furnishing and installing section of epoxy impregnated fiberglass liner; pipe cleaning; television inspections; all labor, materials and equipment specified or not which will provide a complete and acceptable liner installation.

2. Items with Bid Form units of “L.F.” will be paid for in addition to the price paid under corresponding Items with Bid Form units of “EA” as applicable, at the unit price bid per linear foot of liner installed beyond 6 feet and up to 9 feet. This item will be full compensation for all additional costs associated with work of installing sectional liner beyond 6 feet. Any sectional liner extending beyond 9 feet and up to 12 feet shall be paid for as the less costly of two single liners with Bid Form units of “EA” or one single liner with units of “EA” plus the appropriate cost in units of “L.F.” for the additional footage.

J. Items C36 to C39 – Install T-liner in various-sized mains with 4-inch to 6-inch laterals

1. Items with Bid form units of “EA” will be measured and paid at the unit price per each as delineated by the pipe size and depth brackets named in the Bid Form, and shall include up to 25 feet of lateral. Each unit price bid shall include, but not be limited to, all necessary or required labor, equipment, tools, and materials for sewer pipe cleaning and preparation of the existing sewer, including blocking or plugging incoming lines; removal, transportation and disposal of material generated by cleaning and preparation; television surveys; pipe liner; cleaning; testing; cleanup; documentation and reporting; and all labor, materials and equipment required to provide a complete and acceptable liner installation.

2. Items with Bid Form units of “L.F.” will be measured and paid for at the unit price per foot of sewer laterals lined beyond 25 feet of lateral, in addition to the corresponding item with Bid Form units of “EA”. This item will be full compensation for all additional costs associated with work of installing liner beyond 25 feet.

K. Items C40 to C43 – Install mainline/lateral connection repair system in various-sized mains with 4-inch to 6-inch laterals

1. Items with Bid form units of “EA” will be measured and paid at the unit price per each as delineated by the pipe size and depth brackets named in the Bid Form, and shall include up to 25 feet of lateral. Each unit price bid shall include, but not be limited to, all necessary or required labor, equipment, tools, and materials for sewer pipe cleaning and preparation of the existing sewer, including blocking or plugging incoming lines; removal, transportation and disposal of material generated by cleaning and preparation; television surveys; pipe liner; cleaning; testing; cleanup;

2. documentation and reporting; and all labor, materials and equipment required to provide a complete and acceptable liner installation.

3. Items with Bid Form units of "L.F." will be measured and paid for at the unit price per foot of sewer laterals lined beyond 25 feet of lateral, in addition to the corresponding item with Bid Form units of "EA". This item will be full compensation for all additional costs associated with work of installing liner beyond 25 feet.

4. The intent of these Items is to allow the CITY to evaluate mainline/lateral connection repair systems that may reasonably be considered as "Substitutes" or "Or- Equals", as defined in the *Standard General Conditions of the Construction Contract* (Engineers Joint Contract Documents Committee, 2002), to the "T- Liner" as manufactured by LMK Technologies, Incorporated (reference Items C36 to C39).

5. While the CITY reserves the right to decide on the use of T-Liner versus an alternate mainline/lateral connection repair system for any particular installation, in general the intent is to use T-Liner for installations deeper than six feet, and alternate mainline/lateral connection repair systems for more shallow applications.

L. Item C44 – Transitional liner (6-inch to 4-inch)

1. This item of work will be measured and paid for at the unit price per each, as defined in the Bid Form. Payment of the unit price per each will provide complete compensation for furnishing materials and all labor, tools, equipment and incidentals, to provide as directed by the CITY, a transitional liner (6-inch to 4-inch), as part of a T-liner or mainline/lateral connection repair system, complete in place. Payment for this item, when authorized by the CITY, shall be in addition to a T-liner or mainline/lateral connection repair system.

2. Item C45 – Lateral grouting (if required in preparation for a T-liner or mainline/lateral connection repair system installation). This item of work will be measured and paid at the unit price per each lateral grouting performed, with the advance concurrence of the CITY, in association with the performance of a T-liner or mainline/lateral connection repair system installation. Payment of the unit price per each will provide complete compensation for furnishing materials and all labor, tools and equipment and incidentals, to chemically grout leaking laterals prior to the installation of a T-liner or mainline/lateral connection repair system, complete in place. Payment for this item, when authorized by the CITY, shall be in addition to a T-liner or mainline/lateral connection repair system.

M. Items C46 to C54 – Items in common.

1. Reference Part 1.08 of this section.

N. Items C55 to C57 – Testing sewer joints

1. This item of work will be measured and paid for at the unit price per each joint of pipe tested as delineated by the pipe size brackets named in the Bid Form. Each unit price bid shall include all work including but not limited to setups, flow isolation, testing, maintenance, transportation, labor, materials, reporting and documentation, and any other costs associated with pipe joint testing.

O. Items C58 to C60 – Sealing sewer joints

1. These items of work will be measured and paid for at the unit price per each joint of pipe sealed as delineated by the pipe size brackets named in the Bid Form. Each unit price bid shall include all work including, but not limited to, setups, flow isolation, sealing, post-grouting test to verify a seal has been achieved, maintenance, transportation, traffic control, labor, materials, reporting and documentation, and any other costs associated with pipe joint sealing. A minimum of eight (8) joints shall be sealed per segment.

P. Item C61 – Chemical grout for sealing sewer joints

1. This item of work will be measured and paid for at the unit price per gallon of grout used to seal sewer joints regardless of pipe size. The price shall include all setups, maintenance, transportation, labor, materials and any other costs associated with chemical grouting of sewer joints. Chemical grout for sealing sewer laterals will not be paid for by this item. This item shall include for traffic cones and flagmen for traffic control on local residential streets with minimal traffic conditions. There shall be no additional payment for traffic control on local streets (Item C67) except at the sole discretion of the City.

Q. Item C62 – Sealing 6-inch Lateral Joints with Chemical Grout

1. This item of work will be measured and paid for at the unit price per each lateral pipe sealed at the mainline entrance and for a distance of 30 inches up the lateral, including a pressure test and TV inspection of the completed work, removal of excess grout to provide a 100% diameter lateral, provision of a video and written record of the sealed joints to the CITY, and maintenance of wastewater flow and removal of excess sealing material. The price bid shall include all setups, maintenance, transportation, labor, materials and any other costs associated with chemical grouting of the lateral joints. Chemical grout will not be paid for separately and shall be included in the unit price bid for this item.

R. Items C63 to C77 – Items in common.

1. Reference Part 1.08 of this section

S. Items C78 to C79 – MACP Manhole Inspections, Level 1 and Level 2

1. These items will be paid per vertical foot each manhole inspection performed in accordance with the NAASCO MACP (Manhole Assessment and Certification Program) manhole inspection.

2. Level 1 inspection gathers basic condition assessment information to evaluate general condition of a manhole, without manned entry, and completing a form.

3. Level 2 inspection gathers detailed information to fully document all existing defects, determine condition of manhole, and provide specific information to recommend or specify corrective actions.

4. Level 1 inspection includes completing a Manhole Inspection Header Form and a Manhole Component Observation Form. Level 2 includes in addition the completing the Manhole Component Defect Form, using valid PACP and MACP defect codes.

5. See sample forms at the back of this section.

T. Items C80 to C89 – Install Fold and Form Lining

1. This work will be measured and paid at the unit price per linear foot of liner as delineated by the pipe size and depth brackets named in the Bid Forms. Measurement shall be made based on the horizonal projection of the centerline of the permanently installed liner between manholes, measured to the nearest foot from the inside wall of manhole to inside wall of manhole for each section lined. Each unit price bid shall include, but not be limited to, all necessary or required resident notification, sewer pipe cleaning and preparation of the existing sewer, including blocking or plugging incoming lines; removal, transportation and disposal of material generated by cleaning and preparation; pre-lining and post-lining television surveys; chemical joint sealing if necessary; pipelining; the cost of obtaining a water meter from the CITY; cleaning; sample collection; grouting to eliminate infiltration at service connections and liner ends; cleanup; documentation and reporting; and all labor, materials and equipment required to provide a complete and acceptable liner installation.

2. Where post-installation thickness measurements and/or physical property testing are performed, payment for installed liner will be made as itemized below:

   a. Full payment – If thickness, flexural strength, and flexural modulus of elasticity of installed liner are all 95 percent or more of specified values, full payment will be made accordingly.

   b. Adjusted payment for 90 to 95 percent of specified values – If thickness, flexural strength, or flexural modulus of elasticity of installed liner are between 90 and 95 percent of specified values, payment will be made based on an Adjusted Unit Price, which shall equal the Unit Price bid, multiplied by a Value Factor calculated as follows:

      Value Factor = * thickness x * flexural strength x * flexural modulus of elasticity

      * Insert actual measured or test result expressed as a fraction of the specified value. Maximum allowable is 1.

   c. Adjusted payment for 85 to 90 percent of specified values – If thickness, flexural strength, or flexural modulus of elasticity of installed liner are between 85 and 90

percent of specified values, payment will be made at one half the Unit Price. Values below 85 percent may result in rejection of the liner.

3. Reinstatement of service lateral connections will be paid for separately.

1.8 ITEMS IN COMMON – Items A12 – A47

A. Sewer main cleaning and TV inspection

1. This item will be paid for at the unit price bid per foot of sewer cleaned and televised for inspection only, when a sewer repair is not performed due to change of field conditions revealed by the pre-repair video inspection, or as directed by the CITY. The unit price shall provide full compensation for all work required to perform television inspection of sanitary sewer including, but not limited to, furnishing all labor, equipment and material for cleaning, flow isolation, TV inspection, and all incidentals related to sewer inspection. The products shall be acceptable to the CITY or otherwise the CONTRACTOR shall re-televise the sewer line to the satisfaction of the CITY. Sewer main cleaning shall include drop connections.

2. Cleaning and TV inspection performed to prepare for a repair or to document a completed repair are not considered separate pay items. Costs for such cleaning and TV inspection shall be included in the contract unit cost for each particular repair. Reference Table 01025-1 at the back of this section for the television inspection requirements pertaining to each type of repair.

3. This item shall include for traffic cones and flagmen for traffic control on local streets. There shall be no additional payment for traffic control on local streets (Item C67) except at the discretion of the City.

4. Cleaning under this item shall include the flow channels at the bottom of the manhole, and the manhole benches.

B. Sewer lateral cleaning and TV inspection

1. Items with Bid form units of “EA” will be measured and paid at the unit price per each named in the Bid Form and shall include up to 30 feet of lateral.

2. Items with Bid form units of “L.F.” will be measured and paid for at the unit price per foot of sewer lateral cleaned and inspected beyond 30 feet of lateral, in addition to the corresponding item with Bid Form units of “EA”.

3. Payment for sewer lateral cleaning and inspection will be made when a sewer lateral is cleaned and televised for inspection only, when a sewer repair is not performed due to a change of field conditions revealed by the pre-repair video inspection, or as directed by the CITY. The unit price shall provide full compensation for all work required to perform television inspection of sanitary sewer service laterals including, but not limited to, furnishing all labor, equipment, tools and material for cleaning, flow isolation, TV inspection, and all incidentals related to sewer inspection. The products shall be acceptable to the CITY or otherwise the CONTRACTOR shall re-televise the sewer line to the satisfaction of the CITY.

4. Lateral inspection shall be performed using a camera launched from the main unless conditions within the sewer require lateral inspection from the cleanout.

5. Cleaning and TV inspection performed to prepare for a repair or to document a completed repair are not considered separate pay items. Costs for such cleaning and TV inspection shall be included in the contract unit cost for each particular repair. Reference Table 01025-1 for the television inspection requirements pertaining to each type of repair.

C. Mechanical root or grease removal

1. Removal of grease or roots involving the use of special equipment will be considered special cleaning and will be measured and paid per linear foot additionally to cleaning, depending on the pipeline diameter and the type of cleaning, as shown on the Schedule of Prices. The unit price shall provide full compensation for all work required to perform such cleaning including, but not limited to, furnishing all labor, equipment and material for cleaning, flow isolation, pre- and post-cleaning TV inspection, and all incidentals. The products shall be acceptable to the CITY or otherwise the CONTRACTOR shall re-clean and re-televise the sewer line to the satisfaction of the CITY. Measurement shall be to the nearest foot from the inside wall of manhole to inside wall of manhole for each section cleaned.

2. Special cleaning not authorized in writing by the CITY shall be considered part of the cleaning operation and shall not be considered a separate pay item.

3. Sewer line or manhole cleaning is not a separate bid item. The prices for all cleaning of sewers and manholes; verification of adequate cleaning by pulling double squeegees; hoses; nozzles; water; labor; materials and/or any other work required to clean the sewers to a degree acceptable for television inspection and subsequent repairs shall be included in the bid item in which the rehabilitation occurs.

D. Mechanical tuberculation/concrete removal

1. Removal of tuberculation in cast iron pipe, or concrete in pipe, involving the use of special equipment will be considered special cleaning and will be measured and paid per linear foot additionally to cleaning, depending on the pipeline diameter and the type of cleaning, as shown on the Schedule of Prices. The unit price shall provide full compensation for all work required to perform such cleaning including, but not limited to, furnishing all labor, equipment and material for cleaning, flow isolation, pre- and post-cleaning TV inspection, and all incidentals. The products shall be acceptable to the CITY or otherwise the CONTRACTOR shall re-clean and re- televise the sewer line to the satisfaction of the CITY. Measurement shall be to the nearest foot from the inside wall of manhole to inside wall of manhole for each section cleaned.

2. Special cleaning not authorized in writing by the CITY shall be considered part of the cleaning operation and shall not be considered a separate pay item.

3. Sewer line or manhole cleaning is not a separate bid item. The prices for all cleaning of sewers and manholes; verification of adequate cleaning by pulling double squeegees; hoses; nozzles; water; labor; materials and/or any other work required to clean the sewers to a degree acceptable for television inspection and subsequent repairs shall be included in the bid item in which the rehabilitation occurs.

E. Exploratory excavation

1. This item shall include vacuum excavation services for locating utilities 0 to 5 feet in depth below ground or pavement surface, including excavation, backfill, asphalt/concrete removal and disposal, compaction, surface restoration, primary locating services and appurtenances.

2. Payment will be made at the contract unit cost for each pothole including survey.

3. For exploratory excavations greater than 5 feet in depth, payment will be made at the contract unit cost for each vertical foot below 5 feet excavated. This item shall be paid in addition to the contract unit cost for the first 5 feet of depth.

F. Bypass pumping

1. These items shall provide full compensation for bypass pumping operations required for sewer repair work. The CONTRACTOR shall attempt to perform the sewer work without bypass pumping. However, if, in the opinion of the CITY bypass pumping is necessary, it will be identified as a payment item. The pay item is a charge per setup for all bypass pumping operations during a sewer repair, including services, regardless of the number of pumps required or distance of bypass. A setup is defined as the placement of pumps, piping, and any ancillary items to bypass flow. Bypass Pumping shall be bid on the basis of sewer size which is bypassed. Should it be necessary to bypass lateral piping smaller than 6 inches, the CITY may apply the 6-inch bypass pay item. Multiple payments can be made under this item if the bypass operation exceeds one day in duration.

2. These items shall include, but not limited to pumps, piping; gasoline/diesel fuel; maintenance; transportation and storage; temporary bypass and service piping; labor; materials and/or any other costs associated with bypass pumping.

3. Plugging or blocking a sewer line shall be included in the appropriate bid item for which the flow must be stopped and shall be considered incidental work, and no additional payment shall be considered.

G. Cleanout installation

1. This item of work will be measured and paid for at the unit price per each. Payment of the unit price per each will provide complete compensation for furnishing materials and all labor, tools, equipment and incidentals, to locate utilities; locate lateral; excavate; install a cleanout riser with cover and plug at the property line; backfill; compact; and restore surface in grass, asphalt, or concrete as applicable, complete in place.

2. For cleanout installations greater than 5 feet in depth, payment will be made at the contract unit cost for each vertical foot below 5 feet excavated. This item shall be paid in addition to the contract unit cost for the first 5 feet of depth.

H. Cleanout installation (open trench)

1. This item of work will be measured and paid for at the unit price per each. Payment of the unit price per each will provide complete compensation for furnishing materials and all labor, tools, equipment and incidentals, to install a cleanout riser with cover and plug at the property line, complete in place, beginning and ending with an open trench.

2. The starting point for this item of work will the performance of a point repair (one of Items A1 to A10) to expose the lateral, to provide an open trench with the sewer lateral located and exposed, as well as subsequent backfill and compaction.

I. Asphalt Roadway Replacement

1. The unit price bid for this item shall provide full compensation for all work including, but not limited to furnishing all labor, equipment and material required for cutting, removing, protecting and replacing all existing asphalt paving and subgrade removed or damaged under this Contract, lime rock base, prime coat, tack coat, asphalt, and compaction.

2. Payment will only be made if this item is encountered within the "Limits of Construction" as previously described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.

3. Payment for Asphalt Roadway Replacement will be made once and shall include both temporary and permanent Asphalt Roadway Replacement and will be made per square yard, based on base and asphalt thickness dimensions as required, installed and accepted.

J. Pavement Overlay

1. Item for construction pavement repairs (1-inch-thick asphaltic concrete wearing surface overlay) will be paid for at the unit price bid times the number of square yards of overlay installed where directed by the CITY, and the price bid shall provide full compensation for all work including, but not limited to, furnishing all materials, labor and equipment for a complete installation. Pavement overlay will be in addition to the asphalt concrete pavement restoration.

K. Concrete Sidewalk Replacement

1. The unit price bid for Concrete Sidewalk Replacement shall provide full compensation for all work including, but not limited to, furnishing of all labor, equipment and material required for cutting, removing, protecting and replacing all existing concrete sidewalks removed or damaged under this Contract, concrete, formwork, reinforcing, placing, finishing and curing.

2. Payment will only be made if this item is encountered within the "Limits of Construction" as previously described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.

L. Concrete Curb and Gutter Replacement

1. The unit price bid for Concrete Curb and Gutter Replacement shall provide full compensation for all work including, but not limited to furnishing all labor, equipment and material required for cutting, removing, replacing all existing concrete curbs and gutters removed or damaged under this Contract, concrete, formwork, reinforcing, placing, finishing and curing.

2. Payment will only be made if this item is encountered within the "Limits of Construction" as previously described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.

M. Asphalt Driveway Replacement

1. The unit price for Asphalt Driveway Replacement shall provide full compensation for all work including, but not limited to, furnishing of all labor, equipment and material required for cutting, removing, protecting and replacing all existing asphalt driveways removed or damaged under this Contract; lime rock base, prime coat, tack coat, asphalt and compaction.

2. Payment will only be made if this item is encountered within the "Limits of Construction" as previously described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.

N. Concrete Driveway Replacement

1. The unit price for Concrete Driveway Replacement shall provide full compensation for all work including, but not limited to, furnishing of all labor, equipment and material required for cutting, removing, protecting and replacing all existing concrete driveways removed or damaged under this Contract, concrete, formwork, reinforcing, placing, finishing and curing.

2. Payment will only be made if this item is encountered within the "Limits of Construction" as previously described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.

O. Replace Concrete Slabs and/or Aprons

1. The unit price for Concrete Slab and/or Apron Replacement shall provide full compensation for all work including, but not limited to, furnishing of all labor, equipment and material required for cutting, removing, protecting and replacing all existing concrete removed or damaged under this Contract, concrete, formwork, reinforcing, placing, finishing and curing.

2. Payment will only be made if this item is encountered within the "Limits of Construction" as previously described herein. All other replacement due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.

P. Sod Replacement

1. Sod replacement will be paid for at the unit price bid and shall provide full compensation for all work including, but not limited to, furnishing all labor, equipment and material required for replacing sod removed or damaged under this Contract.

2. Payment will only be made if this item is encountered within the "Limits of Construction" as previously described herein. All other replacements due to removal or damage as a result of the CONTRACTOR's operation shall be at the CONTRACTOR's expense.

Q. Installation in Rear-Year Easement

1. Payment shall be at the unit price bid, per easement work authorization performed, provided in the Bid Forms and shall include full compensation for all additional labor, materials, equipment and incidentals required to perform work away from vehicular traveled ways, if so, requested by the CITY, in association with any other work under this contract. This item will be paid in addition to the price paid under the corresponding work item and will only be paid when the area where work must necessarily be performed is in the easement area and presents restrictions to vehicular access from roads, alleys, driveways, or other features suitable for access by the installation vehicles. This item shall be full compensation for all additional costs associated with working in an easement area.

2. When the CONTRACTOR judges that this item is applicable, the CONTRACTOR shall obtain the CITY's concurrence on such judgment in advance of performing the work.

3. Where multiple repairs are performed in a single mainline, as in the case of joint testing/sealing and lateral or sectional lining, a single easement access charge shall apply.

R. Traffic Control

1. The CONTRACTOR shall advise the CITY in advance as to the traffic control measures deemed necessary for each Work Authorization.

2. When the CITY agrees in advance as to the measures required, such measures shall be compensated on a site-specific basis using the pay items provided.

3. The pay item is a charge per setup for all traffic control operations during sewer work. A setup is defined as the placement of cones, barricades, arrow boards, flagmen, and any ancillary items to ensure traffic safety. Multiple payments can be made under this item if the traffic control operation exceeds one day in duration.

4. The Contractor is advised that at locations of local residential streets with minimal traffic conditions only requiring cones for traffic control there shall be no charge for MOT setup, except at the discretion of the City.

S. Expedited Mobilization

1. Payment shall be at the unit price bid, per mobilization performed, provided in the Bid Forms and shall include full compensation for all additional labor, materials, equipment

and incidentals required to complete an expedited mobilization, if so requested by the CITY, in association with any other work under this contract. Payment shall be per mobilization performed, where CONTRACTOR shall mobilize and actively initiate the repair work within 24 hours of the CITY's request.

2. The CONTRACTOR is not required to accomplish an expedited mobilization but cannot otherwise earn the associated payment.

T. Time-and-materials Items for Work Not Covered by other Pay Items

1. When field conditions require work for which there are no pay items in the contract, the CITY may request the CONTRACTOR to provide a Not-to-Exceed estimate for such work using the unit prices bid for labor, equipment, materials, and services (reference A47-1 through A47-26) and estimated amounts for items not listed on the bid form that must be rented or purchased.

2. Upon completion of work, the CONTRACTOR shall bill the CITY using unit prices bid for labor, equipment, materials, and services based on actual quantities used; and actual cost for items not listed on the bid form with an allowable fifteen (15) percent markup. Copies of invoices for such items not listed on the bid form shall be submitted with the CONTRACTOR's invoice for payment. In cases where the Contractor manufactures his own parts, he will charge the CITY a price no higher than he charges his most favored customer. The CITY reserves the right to request cost verification for parts, materials, or permit fees. The CITY also reserves the right to purchase and supply pipe, fittings, equipment, or other items or material directly for use by the CONTRACTOR at no cost to the CITY.

3. Should the CONTRACTOR elect to subcontract any portion of an individual project, the CONTRACTOR must first check with the CITY to identify if any CITY contracts can be utilized for required services. If not available, the CONTRACTOR shall obtain a minimum of three quotes and the cost shall be the lowest of the provided quotes, subject to approval of the CITY.

4. Subcontractor may not charge labor or equipment rates higher than the CONTRACTOR and any purchased items or materials provided by the subcontractors shall also be subject to the specified allowable markup. The CONTRACTOR will not be reimbursed for hourly rates charged by its subcontractors that are higher than the hourly rates bid by the CONTRACTOR. Invoices and documentation must be provided with copies of subcontractor's invoices pursuant to the same requirements specified for the CONTRACTOR.

1.9 GROUP "D" (SMOKE TESTING) PAYMENT ITEMS

A. Items D1 – Mobilization and Demobilization

1. This item shall be paid per lump sum (LS) for mobilization and demobilization for smoke testing each lift station basin area. Payment shall be inclusive of preparatory work for smoke testing and close out activities at the end of testing operations.

B. Items D2 – Maintenance of Traffic (MOT)

1. This item shall be paid per lump sum (LS) for traffic control for smoke testing operations at each lift station basin area, and includes but is not limited to use of traffic cones, flashers, barricades, and other traffic control devices, for the protection of the travelling public, pedestrians, contractor's equipment and personnel, etc. This item also includes preparation and permitting of MOT plans (by a certified preparer) where required in accordance with City of Sunrise, country, State or Federal regulations.

C. Items D3 – Smoke Testing

1. This item shall be paid per linear foot (LF) for all labor, materials, and equipment necessary for smoke testing of assigned lift station basins. This item shall also include preparation and distribution of door hangers for adequate notification of residents.

D. Items D4 – Replace Cleanout Cap and Collar

1. This item shall be paid per each (EA) cap and collar, for all labor, materials, and equipment necessary for minor cleanout repairs, limited to replacement of missing or broken caps and collars, located at or adjacent to the property/easement line. Private side cleanouts are excluded from this item.

E. Items D5 – Final Reports

1. This item shall be paid for each (EA) report for all labor, equipment, materials, and supervision necessary to complete a report for each basin area. The report shall provide the Owner with a record of work completed and observations made during smoke testing, in accordance with the contract specifications, including spreadsheets, maps, and electronic files.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

Manhole Component Observation Section

Cover

45. Type (2)	46. Shape (2)	47. Size (2)	48. Center Cover Size
49. Size Width (2)	50. Cover Material (2)	51. Hole Diameter (Vent) (2)	52. Hole Number (2)
53. Bearing Surface Diameter (2)	54. Bearing Surface Width (2)	55. Cover/Frame Fit (2)	56. Cover Condition (1

Cover Insert

57. Insert Type (2)	58. Cover Insert Condition (2)

Cover Adjustment Ring

59. Ring Type (1, 2)	60. Ring Material (2)	61. Ring Condition (1 ,2)	62. Ring Height

Frame

63. Frame Material (2)	64. Bearing Surface Width (2)	65. Bearing Surface Depth (2)	66. Clear Opening Diam (2)
67. Clear Opening Width (2)	68. Frame Condition (1 ,2)	69. Seal Condition (2)	70. Offset Distance (2)
71. seal Inflow (2)		72. Frame Depth	

Chimney

73. Chimney Present (2)	74. First Material (2)	75. Second Material		76. Chimney 1/1
77. Clear Opening	78. Chimney Depth (2)	79. Lining Interior	80. Lining Exterior	81. Chimney Condition (I)

Cone

82. Type (2)	83. Material (2)	84. Depth (2)
85. Lining Interior	86. Lining Exterior	87. Cone Condition (1)

Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2)	91. Depth (2)
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (I)	

Bench

95. Bench Present (2)	96. Bench Material (2)	97. Bench Lining	98. Bench Condition (1)

Channel

99. Channel Installed (2)	1 00. Channel Material (2)	101 .Type (2)	102. Exposure (2)	103.Channel Condition(I)

Steps

104. Number (2)	105. Material (2)

Component Information

Additional

106. Additional Component Information

Pipe

Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	1 1 0. Direction (2)	Ill. Material (2)	1 1 2. Shape (2)	1 13. Height (Diam) (2)	1 1 4. Width (2)	1 1 5. Cond (2)	1 16. Seal Cond (2)	1 17. Pipe Type (2)	1 18. Struct ID	119. Comment

1=Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required

Header Section

General Information

I. Surveyed By (1 ,2)	2. Certificate Number (1 ,2)	3. Reviewed By	4. Reviewer Certificate No.
5. Owner	6. Customer	7. PIO Number	8. Work Order
9. Media Label	10. Project	1 1. Date (1,2)	12. Time
13. Sheet Number (I ,2)	14. Weather	15. Pre-Cleaning (2)	16. Date Cleaned
17. Purpose of Survey (I ,2)	18. Inspection Level (1 ,2)	19. Inspection Status (I ,2)	20. Consequence of Failure

Location

21. Drainage Area	22. MH/Access Point No. (I ,2)	23. Street (1	24. City (1,2)
25. Location Code (2)	26. Surface Type (2)	27. Inflow Potential from Runoff	28. Location Details

Manhole

29. MH Use (2)	30. Access Type (I ,2)	31. Year Constructed	32. Year Renewed	33. Evidence of Surcharge (2)

Measurements

34. Rim to Invert (2)	35. Rim to Grade (2)	36. Grade to Invert (2)	37. Rim to Grade Exposed
38. Northing'	39. Easting*	40. Elevation"	41. Coordinate System •
42. Vertical Datum"		43. GPS Accuracy	
44. Additional Information			

Red font fields = Mandatory, Black font fields = Optional

'Entry required if Northing, Easting or Coordinate System data is recorded. "Entry required if Elevation or Vertical Datum data is recorded. Sketch

ManholeComponentDefectSection

1. Surveyed By (1,2)	5. Owner	11. Date (1,2) YYYYMMDD	13. Sheet Number (1,2)	22. MH/Access Point No. (1,2)

Depth (feet) (meter)	Video Ref	Component	Code	Continuous Defect	Value			Joint	Step	Circumferential Location		Img Ref	Remarks
			Group/ Descriptor/ Modifier		Dimension		%			At/ From	To		
					1st	2nd							

Table 01025-1. Pre-Repair and Post-Repair Video Inspection Requirements

		Work Assignment												
		A	B	C	D	E	F	G	H	I	J	K		
	Required Action	Inspect Main	Inspect Lateral	Install Lateral Liner	Install Full Liner	Install Sectional Liner	Install T-	Install Main/Lateral Connection Interface Seal	Perform Chemical Grouting (mains and main/lateral connections)	Perform Chemical Grouting (laterals)	Perform Excavated Point-Repair (mains and main/lateral connections)	Perform Excavated Point-Repair (laterals)	Notes
1	Televise main from upstream manhole to downstream manhole (pan designated lateral(s) from main for C, F, G, H, and J).	●		●	●	●	●	●	●				
2	Televise lateral (lateral camera launched from main).		●	●			●			●			(i)
3	Submit television inspection video and log to Owner to allow Owner to (1) confirm contractor is in the correct location, (2) confirm the repair has not already been completed, (3) confirm possible changed conditions do not require an alternative repair approach, (4) identify conditions that may affect quality of repair, and (5) verify pre-repair conditions for comparison in the event that the contractor damages the pipe during the repair.			●	●	●	●	●	●	●			(ii), (iii)
4	Upon Owner's approval, perform repair.			●	●	●	●	●	●	●	●	●	(ii)
5	Televise entire main.				●								(iv)
6	Televise main from upstream manhole to repair(s) and televise repair(s) and at least one pipe length beyond repair(s). Televise lateral to show lateral repair (lateral camera			●		●	●	●	●		●		
7	launched from main).			●			●			●		●	(i)
8	Submit pre-repair and post-repair television inspection video and log to Owner with pay request.	●	●										
9				●	●	●	●	●	●	●	●	●	(ii), (v)

Notes

(i) Continuous video of the main from the upstream manhole must precede lateral launching and lateral video to allow verification that camera is in the correct lateral. Pan designated laterals from main before launching.

(ii) Engineer may act as Owner's representative if so directed by Owner.

(iii) If Owner cancels original repair following review of pre-repair video, contractor will be paid separately for the pre-repair video inspection. Otherwise, pre-repair video inspection is included in the repair price along with post-repair video inspection. W here a contractor performs video for purposes of inspection only, and Owner assigns a repair to that contractor within 90 days of receipt of such video, this initial video inspection will be considered to be pre-repair video inspection and the contractor will not be paid separately for the initial video inspection.

(iv) Televise liner ends following full liner installation.

(v) If multiple repairs are being performed in the same line by one or more contractors, Owner may direct one contractor to provide pre-repair video and/or post-repair video a single time on behalf of all repairs and/or contractors. In this or any other case where the Owner allows any video inspection to not be performed, contractor(s) shall issue a credit to the Owner for video inspection not performed in the amount of the pay item used for video inspection only.

(vi) Required Action No. 3, or others, may be omitted on a case by case basis at the Owner's discretion and with the Owner's advance approval.

(vii) Lateral location is included in the repair price.

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SECTION 01090 - REFERENCE STANDARDS

PART 1 -- GENERAL

1.1 GENERAL

A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date of the opening of bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein shall be waived because of any provision of, or omission from, said standards or requirements.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the specifications, all work specified herein shall conform to or exceed the requirements of all applicable codes and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications nor the applicable codes.

B. References herein to "Florida Building Code" shall mean the locally applicable edition of the South Florida Building Code. The latest edition of the code as approved and used by the local agency as of the date of award, as adopted by the agency having jurisdiction, shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, Drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the CITY for clarification and directions prior to ordering or providing any materials or labor. The CONTRACTOR shall bid the most stringent requirements.

D. Applicable Standard Specifications: The CONTRACTOR shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and Specifications listed herein.

E. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

F. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

1.3 ABBREVIATIONS ANDACRONYMS

A. Wherever in these specifications references are made to the standards, specifications, or other published data of the various national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these specifications, the following acronyms or abbreviations which may appear in these specifications shall have the meanings indicated herein.

AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of the State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGMA	American Gear Manufacturer's Association
AHGDA	American Hot Dip Galvanizers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APHA	American Public Health Association
APWA	American Public Works Association
ASA	Acoustical Society of America
ASAE	American Society of Agriculture Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASMM	Architectural Sheet Metal Manual
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturer's Association
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FS	Federal Specifications
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association

ISA	Instrument Society of America
ISO	International Organization for Standardization
MBMA	Metal Building Manufacturer's Association
MTI	Marine Testing Institute
NAAM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
NASSCO	National Association of Sewer Service Companies
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NRCA	National Roofing Contractors Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
SFBC	South Florida Building Code
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
SFW MD	South Florida Water Management District
UL	Underwriters Laboratories, Inc.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not used)

-END OF SECTION-

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SECTION 01300 - SUBMITTALS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. This section specifies the means of all submittals, although the CITY's *Shop Drawing Submittals and Approved Utility Product List* (reference Appendix 1) takes precedence in the event of any conflict. All submittals shall be submitted to the CITY. A general summary of the types of submittals and the number of copies required is as follows:

Copies to CITY	Type of Submittal
4	Qualification documentation
3	Construction schedules
3	Schedule of payment items
3	Progress estimates
4	Shop drawings
2	Product samples
2	Certificates of compliance
2	Warranties

B. Qualification documentation specified throughout these contract documents shall be submitted as required. The CITY reserves the right to require the submittal of additional documentation to evaluate the technical suitability of proposed products as well as a bidder's qualifications and ability to satisfactorily perform the work outlined in these contract documents.

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal with a form acceptable to the CITY, clearly identifying the project and the CONTRACTOR, the enclosed material and other pertinent information specified in other parts of this section. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

B. Revise and resubmit submittals as required, identify all changes made since previous submittals. Resubmittals shall be noted as such.

C. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.3 CONSTRUCTION SCHEDULE

A. The construction schedule shall be prepared for each group of work orders in the form of a horizontal bar chart showing in detail the proposed sequence of the work and identifying construction activities for each major component, structure or facility. The schedule shall be time scaled, identifying the first day of each week, with the estimated date of starting and completion of each stage of the work in order to complete the project within the Contract time. Three copies of the schedule shall be submitted within ten calendar days after the date of the Notice to Proceed.

B. The construction schedule shall be revised to reflect comments by the CITY and updated monthly, depicting progress to the last day of the month. Three copies shall be submitted with each request for monthly progress payments.

C. Changes to the schedule shall be accompanied by a letter of explanation with appropriate reference and revision date on the schedule.

D. The following additional requirements shall apply to the schedule.

1. The CONTRACTOR shall provide notification to the CITY bye-mail a minimum of 24 hours in advance of any schedule change.

2. Toward the close of each working day, the CONTRACTOR shall deliver notification to the CITY as to the location at which the next day of work will be conducted.

3. At the completion of each task order, the CONTRACTOR shall notify the CITY of such fact.

1.4 SCHEDULE OF PAYMENT ITEMS

A. The CONTRACTOR shall submit a Schedule of Payment Items for review within ten calendar days after the date of the Notice to Proceed. The schedule shall contain the installed value of the component parts of Work for the purpose of making progress payments during the construction period.

B. The schedule shall be given in sufficient detail for the proper identification of Work accomplished. Each item shall include its proportional share of all costs including the CONTRACTOR's overhead, contingencies and profit. The sum of all scheduled items shall equal the total value of the Contract.

C. No payment will be made for materials stored on the project site.

D. The CONTRACTOR shall expand or modify the above schedule as required by the CITY's initial or subsequent reviews.

1.5 PROGRESS ESTIMATES

A. Progress estimates shall be submitted in accordance with the General Conditions and shall be accompanied by the revised Construction Schedule.

1.6 SHOP DRAWINGS

A. General: The CONTRACTOR shall submit for review shop drawings for concrete reinforcement, structural details, materials fabricated especially for this Contract, and materials for which such Drawings are specified or specifically requested by the CITY.

B. Shop drawings shall show the principal dimensions, weight, structural and operating features, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the Drawings.

C. When so specified, or if considered by the CITY to be acceptable, the manufacturer's specifications, catalog data, descriptive matter, illustrations, etc., may be submitted for review in place of shop drawings. In such case, the requirements shall be as specified for shop drawings, insofar as applicable.

D. The CONTRACTOR shall be responsible for the prompt submittal of all shop drawings so that there shall be no delay to the Work due to the absence of such Drawings. The CITY will review the shop drawings within 14 calendar days of receipt of such Drawings. Reviewed shop drawings will be returned to the CONTRACTOR by regular mail, posted no later than 14 days after receipt.

E. Time delays caused by rejection of submittals are not cause for extra charges to the CITY or time extensions.

F. Requirements: All shop drawings shall be submitted to the CITY through the CONTRACTOR. The CONTRACTOR is responsible for obtaining shop drawings from his subcontractors and returning reviewed Drawings to them. All shop drawings shall be prepared on standard size, 24-inch by 36-inch sheets, or smaller. All Drawings shall be clearly marked with the name of the project, CITY, CONTRACTOR, Bid Package number, and structure to which the drawing applies. Drawings shall be suitably numbered and stamped by the CONTRACTOR. Each shipment of Drawings shall be accompanied by a letter of transmittal giving a list of the drawing numbers and the names mentioned above.

G. Product Data: Where manufacturer's publications in the form of catalogs, brochures, illustrations, or other data sheets are submitted in lieu of prepared shop drawings, such submission shall specifically indicate the particular item offered. Identification of such items and relative pertinent information shall be made with indelible ink. Submissions showing only general information will not be accepted.

H. Product data shall include materials of construction, dimensions, performance characteristics and capacities, and other relevant details.

I. Sample Warranties: When warranties are called for, a sample of the warranty shall be submitted with the shop drawings. The sample warranty shall be the same form that will be used for the actual warranty.

J. Work Prior to Review: No material or equipment shall be purchased, fabricated especially for this Contract, or delivered to the project site until the required shop drawings have been

submitted, processed and marked either "FURNISH AS SUBMITTED" or "FURNISH AS CORRECTED". All materials and Work involved in the construction shall be as represented by said Drawings.

K. The CONTRACTOR shall not proceed with any portion of the Work for which the design and details are dependent upon the design and details of equipment for which submittal review has not been completed.

L. CONTRACTOR's Review: Only submittals which have been checked and corrected should be submitted to the CONTRACTOR by his subcontractors and vendors. Prior to submitting shop drawings to the CITY, the CONTRACTOR shall check thoroughly all such Drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. Drawings which are correct shall be marked with the date, checker's name and indications of the CONTRACTOR's approval, and then shall be submitted to the CITY; other Drawings submitted to the CITY will be returned to the CONTRACTOR unreviewed.

M. CONTRACTOR's Responsibility: The review of shop drawings will be general and shall not relieve the CONTRACTOR of the responsibility for details of design, dimensions, etc., necessary for proper fitting and construction of the Work required by the Contract and for achieving the specified performance.

N. CONTRACTOR's Modifications: For submissions containing departures from the Contract Documents, the CONTRACTOR shall include proper explanation in his letter of transmittal. Should the CONTRACTOR submit for review equipment that requires modifications to the structures, piping, layout, etc. detailed on the Drawings, he shall also submit for review details of the proposed modifications. If such equipment and modifications are accepted, the CONTRACTOR, at no additional cost to the CITY, shall do all Work necessary to make such modifications.

O. Substitutions: Whenever a particular brand or make of material, equipment, or other item is specified, or is indicated on the Drawings, it is for the purpose of establishing a standard of quality, design, and type desired and to supplement the detailed specifications. Any other brand or make which, in the opinion of the CITY, is equivalent to that specified or indicated may be offered as a substitute subject to the following provisions:

1. CONTRACTOR shall submit for each proposed substitution sufficient details, complete descriptive literature, and performance data together with samples of the materials, where feasible, to enable the CITY to determine if the proposed substitution is equal.

2. CONTRACTOR shall submit certified tests, where applicable, by an independent laboratory attesting that the proposed substitution is equal.

3. CONTRACTOR shall submit a list of installations where the proposed substitution is equal.

4. Where the acceptance of a substitution requires revision or redesign of any part of the Work, all such revision and redesign, and all new Drawings and details required therefore, shall be provided by the CONTRACTOR at his own cost and expense, and shall be subject to review of the CITY.

5. In all cases the CITY shall be the sole judge as to whether a proposed substitution is to be accepted. The CONTRACTOR shall abide by the CITY's decision when proposed substitute items are judged to be unacceptable and shall in such instances furnish the item, or substitute, as specified. No substitute items shall be used in the Work without written acceptance of the CITY.

6. Acceptance of any proposed substitution shall in no way release the CONTRACTOR from any of the provisions of the Contract Documents.

P. Complete Submittals: Each submittal shall be complete in all aspects incorporating all information and data required to evaluate the products' compliance with the Contract Documents. Partial or incomplete submissions shall be returned to the CONTRACTOR without review.

Q. Shop Drawing Distribution: The CONTRACTOR shall submit all shop drawings to the CITY for review. Shop drawings will be reviewed, stamped and distributed with the appropriate box checked either "FURNISH AS SUBMITTED", "FURNISH AS CORRECTED" or "REVISE AND RESUBMIT". The distribution of processed shop drawings will be as follows:

1. Drawings Marked "FURNISH AS SUBMITTED" or "FURNISH AS CORRECTED"

   1 copy returned to the CONTRACTOR
   1 copy remain at the CITY's office
   1 copy remains with the shop drawing reviewer
   1 copy for the CITY's field representative

2. Drawings Marked "REVISE AND RESUBMIT"

   1 copy returned to the CONTRACTOR
   1 copy remain at the CITY's office
   1 copy remains with the shop drawing reviewer
   1 copy will be discarded, unless picked up by the CONTRACTOR

R. If the CONTRACTOR requires additional copies of returned shop drawings, he shall include extra Drawings in his original submittal. The CITY will process the Drawings and return them to the CONTRACTOR.

1.7 PRODUCT SAMPLES

A. CONTRACTOR shall furnish for review all product samples as required by the Contract Documents or requested by the CITY to determine compliance with the specifications.

B. Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, range of color, finish or texture and shall be properly labeled to show complete project identification, the nature of the material, trade name of manufacturer and location of the Work where the material represented by the sample will be used.

C. Samples shall be checked by the CONTRACTOR for conformance to the Contract Documents before being submitted to the CITY and shall bear the CONTRACTOR’s stamp certifying that they have been so checked. Transportation charges on samples submitted to the CITY shall be prepaid by the CONTRACTOR.

D. CITY's review will be for compliance with the Contract Documents, and his comments will be transmitted to the CONTRACTOR with reasonable promptness.

E. Acceptable samples will establish the standards by which the completed Work will be judged.

1.8 CERTIFICATES OFCOMPLIANCE

A. Copies of certificates of compliance and test reports shall be submitted for requested items to the CITY prior to request for payment.

1.9 WARRANTIES

A. Original warranties, called for in the Contract Documents, shall be submitted to the CITY. When warranties are required for an item, warranty shall be submitted prior to request for payment of that item.

B. When warranties are requested, a sample of the warranty to be provided shall be submitted with, and considered part of, the shop drawings.

C. The CONTRACTOR shall warrant to the CITY that all material and labor used in the construction are covered by his warrantee for a minimum of a one-year period or as otherwise specified upon approval and acceptance by the CITY. The CONTRACTOR shall replace or repair defects at no cost to the CITY during the warrantee period. No visible or potential leakage shall be allowed during the warrantee period.

PART 2 -- PRODUCTS - (Not Used)

PART 3 -- EXECUTION - (Not Used)

- END OF SECTION -

SECTION 01400 - QUALITY CONTROL

PART 1 -- GENERAL

1.1 QUALITYASSURANCE

A. Quality: All materials shall be new and correctly designed, and shall conform to the requirements of Section 01090, "Reference Standards" and Section 01600, "Materials". They shall be standard first-grade quality produced by expert workmen and be intended for the use for which they are offered. Materials which, in the opinion of the CITY, are inferior or of a lower grade than indicated, specified or required will not be acceptable.

B. Source Limitations: To the greatest extent possible for each unit of Work, the CONTRACTOR shall provide products, materials, or equipment of a singular generic kind from a single source.

C. Compatibility of Options: Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, the CONTRACTOR shall select an option which is compatible with other products and materials already selected. Compatibility is a basic general requirement of product/material selections.

1.2 PRODUCT EVALUATION

A. The CITY will employ and pay for the services of an independent testing laboratory for specified testing as specified by the CITY.

B. The work or actions of the testing laboratory shall in no way relieve the CONTRACTOR of his obligations under the Contract. The laboratory testing work will include such inspections and testing required by the Contract Documents, existing laws, codes, ordinances, etc. The testing laboratory will have no authority to change the requirements of the Contract Documents, nor perform, accept or approve any of the CONTRACTOR's Work.

C. The CONTRACTOR shall allow the CITY ample time and opportunity for evaluation and testing materials to be used in the Work. The CONTRACTOR shall advise the CITY promptly upon placing orders for materials so that arrangements may be made, if desired, for evaluation before shipment from the place of manufacture. The CONTRACTOR shall at all times furnish the CITY and his representatives, facilities including labor, and allow proper time for evaluation and testing materials, and workmanship. The CONTRACTOR must anticipate that possible delays may occur in the execution of its work due to the necessity of materials being inspected and accepted for use. The CONTRACTOR shall furnish, at his own expense, all samples of materials required by the CITY for testing, and shall make his own arrangements for providing water, electric power, or fuel for the various evaluation and tests of structures and materials.

D. The CITY will bear the cost of all tests, evaluation, or investigations undertaken by the order of the CITY for the purpose of determining conformance with the Contract Documents if such tests, evaluation, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the CITY as a result of such tests, evaluation, or investigations, the CONTRACTOR shall bear the full cost of any additional tests, evaluations and

investigations, which are ordered by the CITY to ascertain subsequent conformance with the Contract Documents.

1.3 EVALUATION AT PLACE OFMANUFACTURE

A. Unless otherwise specified, all products and materials shall be subject to evaluation by the CITY at the place of manufacture.

B. The presence of the CITY at the place of manufacture, however, shall not relieve the CONTRACTOR of the responsibility for furnishing products, materials, and equipment, which comply with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the CITY.

1.4 SAMPLING AND TESTING

A. Unless otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered; however, the CITY reserves the right to use any generally-accepted system of sampling and testing which, in the opinion of the CITY will insure the CITY that the quality of the workmanship is in full accord with the Contract Documents.

B. Any waiver by the CITY of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a warranty of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such warranty is accompanied by a performance bond to assure execution of any necessary corrective or remedial Work, shall not be construed as a waiver of any requirements of the Contract Documents.

C. Notwithstanding the existence of such waiver, the CITY reserves the right to make independent investigations and tests and failure of any portion of the Work to meet any of the requirements of the Contract Documents, shall be reasonable cause for the CITY to require the removal or correction and reconstruction of any such work in accordance with the General Conditions.

D. In addition to any other evaluation, observation or quality assurance provisions that may be specified, the CITY shall have the right to independently select, test, and analyze, at the expense of the CITY, additional test specimens or any or all of the materials to be used. Results of such tests and analyses shall be considered along with the tests or analyses made by the CONTRACTOR to determine compliance with the applicable specifications for the materials so tested or analyzed; provided, however, that where testing or investigation by the CITY reveals failure to meet the requirements of the Contract Documents, all costs of such independent inspection and investigation, and all costs of removal, correction, and reconstruction or repair of any such Work shall be borne by the Contractor.

1.5 SITE INVESTIGATION ANDCONTROL

A. The CONTRACTOR shall verify all dimensions in the field and shall check field conditions continuously during construction. The CONTRACTOR shall be solely responsible for any inaccuracies built into the Work due to its failure to comply with this requirement.

B. The CONTRACTOR shall inspect related and appurtenant Work and shall report in writing to the CITY any conditions which will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the CONTRACTOR at its sole cost and expense.

1.6 RIGHT OF REJECTION

A. The CITY shall have the right, at all times and places, to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of the Contract Documents, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Work at the site. If the CITY, through an oversight or otherwise, has accepted materials or Work which is defective or which is contrary to the Contract Documents, such materials, no matter in what stage or condition of manufacture, delivery, or erection, may be subsequently rejected by the CITY.

B. The CONTRACTOR shall promptly remove rejected articles or materials from the site of the Work after notification of rejection. All costs of removal and replacement of rejected articles or materials as specified herein shall be borne by the CONTRACTOR.

1.7 WATERTIGHTNESS OFSTRUCTURES

A. It is the intent of these specifications that all concrete work, sealing work around built-in items and penetrations be performed as required to ensure that groundwater and/or rainwater will not leak into any repaired collection line, service lateral, or manhole.

B. The required water tightness shall be achieved by quality construction and proper sealing of all pipes and manholes.

C. The CONTRACTOR shall provide at its own expense all labor, material, temporary bulkheads, pumps, water, measuring devices, etc., necessary to perform the required tests.

1.8 HYDRAULIC UPLIFT ONSTRUCTURES

A. The CONTRACTOR shall be completely responsible for any pipelines or manholes that may become buoyant during the construction operations due to the groundwater or floods and before the structure is put into operation. Should there be any possibility of buoyancy of a structure, the CONTRACTOR shall take the necessary steps to prevent its buoyancy. Damage to any structures due to floating or flooding shall be repaired or the structures replaced at the CONTRACTOR's expense.

1.9 CUTTING AND PATCHING

A. The CONTRACTOR shall perform all cutting and patching of the Work that may be required to make its several parts come together properly and fit it to receive or be received by such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and shall only cut or alter work with the written consent of the CITY and of the other Contractors whose work will be affected.

1.10 REMOVAL OF EXISTINGPIPELINES

A. General: The scope of work requires the CONTRACTOR to interface with existing piping which will be removed as part of the work. Prior to beginning any work associated with existing facilities to be removed, the CONTRACTOR shall inform the CITY of his intent so that all arrangements can be made with the CITY for disconnecting or isolating pipelines (where possible) from service to the extent possible. The CONTRACTOR shall not proceed without written authorization from the CITY.

B. Pipelines: The CONTRACTOR shall remove existing pipelines or segments of existing pipelines shown to be replaced as part of the contract work. Piping indicated as being replaced with new piping, shall be excavated and removed using methods which will not disturb adjacent piping or other facilities. After piping has been removed and new piping installed, the CONTRACTOR shall backfill the evacuated area in accordance with requirements set forth in other sections of these specifications.

C. Where new piping is to be connected to existing piping, the existing piping shall be cut square and the ends properly prepared for the connection. Any damage to the lining and coating of the existing piping shall be repaired by the CONTRACTOR.

D. Disposal of Debris: All debris, materials, piping, and miscellaneous waste products from the work shall be removed from the project as soon as possible. They shall be disposed of in accordance with applicable federal, state, and local regulations. The CONTRACTOR is responsible for determining these regulations and shall bear all costs or retain any profit associated with disposal of these items.

1.11 OBSERVATION OF THEWORK

A. The Work shall be conducted under the general observation of the CITY and shall be subject to observation by representatives of the CITY acting on behalf of the CITY to ensure strict compliance with the requirements of the Contract Documents. Such observation may include mill, plant, shop or field observation, as required. The CITY shall be permitted access to all parts of the Work, including plants where materials are manufactured or fabricated.

B. The presence of the CITY or any observer, however, shall not relieve the CONTRACTOR of the responsibility for the proper execution of the Work in accordance with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the CITY or any observer.

C. All materials and articles furnished by the CONTRACTOR shall be subject to rigid inspection, and no materials or articles shall be used in the Work until they have been inspected and accepted by the CITY or its representative. No Work shall be backfilled, buried, cast in concrete, hidden or otherwise covered until it has been inspected by the CITY or its authorized representative. Any Work so covered in the absence of inspection shall be subject to uncovering. Where un-inspected Work cannot be uncovered, such as in concrete cast over reinforcing steel, all such Work shall be subject to demolition, removal, and reconstruction under proper inspection, and no additional payment will be allowed therefore.

1.12 TIME OF OBSERVATION ANDTESTS

A. Samples and test specimens required under these Specifications shall be furnished and prepared for testing in ample time for the completion of the necessary tests and analyses before said articles or materials are to be used. The CONTRACTOR shall furnish and prepare all required test specimens within the scope of the Contract. Except as otherwise provided in the Contract Documents, performance of the required tests will be by the CITY, and all costs therefore will be borne by the CITY at no cost to the CONTRACTOR, except that the costs of any test which shows unsatisfactory results shall be borne by the CONTRACTOR. Whenever the CONTRACTOR is ready to backfill, bury, cast in concrete, hide, or otherwise cover any Work under the Contract, the CITY shall be notified not less than twenty-four hours in advance to request inspection before beginning any such Work of covering. Failure of the CONTRACTOR to notify the CITY at least twenty-four hours in advance of any such inspections shall be reasonable cause for the CITY to order a sufficient delay in the CONTRACTOR's schedule to allow time for such inspections and any remedial or corrective Work required, and all costs of such delays, including its effect upon other portions of the Work, shall be borne by the CONTRACTOR.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

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SECTION 01510 - TEMPORARY UTILITIES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. It shall be the CONTRACTOR's responsibility to provide equipment that is adequate for the performance of the Work under this Contract within the time specified. All equipment shall be kept in satisfactory operating condition, shall be capable of safely and efficiently performing the required Work, and shall be subject to inspection and review by the CITY's representative at any time within the duration of the Contract. All Work hereunder shall conform to the applicable requirements of the OSHA Standards for Construction.

B. The CONTRACTOR shall provide for utilities and services for its own operations. The CONTRACTOR shall furnish, install and maintain all temporary utilities during the contract period including removal upon completion of the Work.

1.2 POWER AND LIGHTING

A. Power: The CONTRACTOR shall provide all necessary power required for its operations under the Contract, and shall provide and maintain all temporary power lines required to perform the Work in a safe and satisfactory manner.

B. Construction Lighting: All Work conducted at night or under conditions of deficient daylight shall be suitably lighted to insure proper Work and to afford adequate facilities for inspection and safe working conditions. Temporary lighting shall be maintained during nonworking periods if the area is subject to access by the public.

C. Electrical Connections: All temporary connections for electricity shall be subject to review by the CITY and the power company representative, and shall be removed in like manner at the CONTRACTOR's expense prior to final acceptance of the Work.

D. Separation of Circuits: Unless otherwise permitted by the CITY circuits separate from lighting circuits shall be used for all power purposes.

E. Construction Wiring: All wiring for temporary electric light and power shall be properly installed and maintained and shall be securely fastened in place. All electrical facilities shall conform to the requirements of Subpart K of the OSHA Safety and Health Standards for Construction.

1.3 WATER SUPPLY

A. General: The CONTRACTOR shall supply, and pay for all costs for all water used for construction, flushing and testing. The CONTRACTOR shall provide and maintain all meters, piping, fittings, adapters, and valving required.

B. Potable Water: All drinking water on the site during construction shall be furnished by the CONTRACTOR and shall be bottled water or water furnished in suitable dispensers. Notices shall be posted conspicuously throughout the site warning the CONTRACTOR's personnel that piped water may be contaminated.

C. Water Connections: The CONTRACTOR shall not make connection to, or draw water from, any fire hydrant or pipeline without first obtaining permission of the authority having jurisdiction over the use of said fire hydrant or pipeline and from the agency owning the affected water system. For each such connection made, the CONTRACTOR shall first attach to the fire hydrant or pipeline a valve and a meter, if required by the said authority, of a size and type acceptable to said authority and agency.

D. Removal of Water Connections: Before final acceptance of the Work on the project, all temporary connections and piping installed by the CONTRACTOR shall be entirely removed, and all affected improvements shall be restored to their original condition, or better, to the satisfaction of the CITY and to the agency owning the affected utility.

E. Fire Protection: The construction, and all other parts of the Work shall be adequately protected against damage by fire. Hose connections and hose, water casks, chemical equipment, or other sufficient means shall be provided for fighting fires in the temporary structures and other portions of the Work, and responsible persons shall be designated and instructed in the operation of such fire apparatus so as to prevent or minimize the hazard of fire. The CONTRACTOR's fire protection program shall conform to the requirements of Subpart F of the OSHA Standards for Construction.

1.4 SANITATION

A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.

B. Such facilities shall be made available when the first employees arrive on the Work, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required.

C. The CONTRACTOR shall maintain the sanitary facilities in a satisfactory and sanitary condition at all time and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of theWork, on the lands of the CITY, or an adjacent property.

D. The CITY shall have the right to inspect any building or other facility erected, maintained, or used by the CONTRACTOR, to determine whether or not the sanitary regulations have been complied with.

E. Sanitary and Other Organic Wastes: The CONTRACTOR shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations shall be disposed of away from the site in a manner satisfactory to the CITY and in accordance with all laws and regulations pertaining thereto.

1.5 TEMPORARY VENTILATION

A. The CONTRACTOR shall provide and maintain adequate ventilation for a safe working environment. In addition, forced air ventilation shall be provided for the curing of installed materials, humidity control and the prevention of hazardous accumulations of dust, gases or vapors.

PART 2 -- PRODUCTS - (Not Used)

PART 3 -- EXECUTION - (Not Used)

- END OF SECTION -

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SECTION 01530 - PROTECTION OF EXISTING FACILITIES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

B. The CONTRACTOR shall verify the exact locations and depths of all utilities shown and the CONTRACTOR shall make exploratory excavations of all utilities that may interfere with the Work. All such exploratory excavations shall be performed as soon as practicable after award of Contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the CONTRACTOR's Work. When such exploratory excavations show the utility location as shown to be in error, the CONTRACTOR shall so notify the CITY.

C. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

1.2 RIGHTS-OF-WAY

A. The CONTRACTOR shall not do any Work that would affect any oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line; any fence; or any other structure, nor shall the CONTRACTOR enter upon any rights-of-way involved until notified that the CITY has secured authority therefore from the proper party. After authority has been obtained, the CONTRACTOR shall give said party due notice of its intention to begin Work, and shall give said party convenient access and every opportunity for removing, shoring, supporting, or otherwise protecting such pipeline, transmission line, ditch, fence, or structure, and for replacing same. When two or more contracts are being executed at one time on the same or adjacent land in such manner that Work on one contract may interfere with that on another, the CITY shall determine the sequence and order of the Work. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the CITY to the CONTRACTOR so desiring, to the extent, amount, in the manner, and at the times permitted. No such decision as to the method or time of conducting the Work or the use of territory shall be made the basis of any claim for delay or damage.

1.3 PROTECTION OF STREET OR ROADWAY MARKERS

A. The CONTRACTOR shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced for easy and accurate restoration. It shall be the CONTRACTOR's responsibility to notify the proper representatives of the CITY of the time and location that Work will be done. Such notification shall be sufficiently in advance of construction so that there will be no delay due to waiting for survey points to be satisfactorily referenced for restoration. All survey markers or points disturbed by the CONTRACTOR without proper authorization by the CITY, will be

accurately restored by the CITY at the CONTRACTOR's expense after all street or roadway resurfacing has been completed.

1.4 RESTORATION OF FACILITIES

A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement owner. All pavements which are subject to partial removal shall be neatly saw cut in straight lines. Within five working days of the pipe installation, temporary restoration shall be completed. All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific restoration requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit.

B. Temporary Restoration: Temporary restoration includes repair to all driveways, sidewalks and roadways. They shall be swept clean and be maintained free of dirt and dust. All areas disturbed by the construction activities shall be restored to proper grade, cleaned up, including the removal of debris, trash, and deleterious materials. All construction materials, supplies, or equipment, including piles of debris shall be removed from the area. All temporarily restored areas shall be maintained by the CONTRACTOR. These areas shall be kept clean and neat, free of dust and dirt, until final restoration operations are completed. The CONTRACTOR is responsible to utilize dust abatement operations in the temporarily restored areas as required, to the satisfaction of the CITY.

C. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.

D. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement, unless otherwise directed by the CITY.

E. Temporary Restoration of Sidewalks or Private Driveways: Wherever sidewalks or private driveways have been removed for purposes of construction, the CONTRACTOR shall place suitable temporary sidewalks or driveways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the CONTRACTOR shall maintain said temporary sidewalks or driveways until the final restoration thereof has been made.

F. Final Restoration: Final restoration shall include the completion of all required pavement replacement of roadways, driveways, curbs, gutters, sidewalks and other existing improvements disturbed by the construction: final grading, placement of sod, installation or

replacement of any trees or shrubs, repair of irrigation systems, pavement marking, etc., all complete and finished, acceptable to the CITY.

1.5 EXISTING UTILITIES ANDIMPROVEMENTS

A. General: The CONTRACTOR shall protect all underground utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

B. Utilities to be Moved: In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the CONTRACTOR, be notified by the CITY to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the CITY a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

C. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown, the CONTRACTOR shall remove and temporarily replace or relocate such utility or improvement in a manner satisfactory to the CITY and the OWNER of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

D. CITY's Right of Access: The right is reserved to the CITY and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this Contract.

E. Underground Utilities Shown or Indicated: Existing utility lines that are shown or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the CONTRACTOR.

F. Underground Utilities Not Shown or Indicated: In the event that the CONTRACTOR damages any existing utility lines that are not shown or the locations of which are not made known to the CONTRACTOR prior to excavation, a written report thereof shall be made immediately to the CITY. If directed by the CITY, repairs shall be made by the CONTRACTOR under the provisions for changes and extra Work contained in the General Conditions.

G. All costs of locating, repairing damage not due to failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the Work which was interrupted or idled by removal or relocation

of such utility facilities, and which was necessarily idled during such Work will be paid for as extra Work in accordance with the provisions of the General Conditions. Compensation shall not include CONTRACTOR's costs for the coordination of his activities with the utility company affected. CONTRACTOR shall schedule his work in such a manner that he is not delayed by the utilities companies relocating or supporting their facilities. No compensation will be paid the CONTRACTOR for any loss of time or delay.

H. Approval of Repairs: All repairs to a damaged improvement are subject to inspection and approval by an authorized representative of the improvement owner before being concealed by backfill or other Work.

I. Maintaining in Service: All oil and gasoline pipelines, power, and telephone or other communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the CITY are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The CONTRACTOR shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

J. The CONTRACTOR shall be solely and directly responsible to the CITY and operators of such properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions or claims of any character brought because of any injuries or damage which may result from the construction operations under this Contract.

K. Neither the CITY nor its officers or agents shall be responsible to the CONTRACTOR for damages as a result of the CONTRACTOR’s failure to protect utilities encountered in the work.

L. In the event of interruption to domestic water, sewer, storm drain or other utility services as a result of accidental breakage due to construction operations, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is granted.

1.6 TREESWITHIN STREET RIGHTS-OF-WAY AND PROJECT LIMITS

A. General: The CONTRACTOR shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim, relocate or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or CITY. All existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the CONTRACTOR or a certified tree company under permit from the jurisdictional agency or CITY and to the satisfaction of said agency and/or the CITY. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.

B. Trimming: Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.

C. Replacement: The CONTRACTOR shall immediately notify the jurisdictional agency and/or the CITY if any tree is damaged by the CONTRACTOR's operations. If, in the opinion of said agency or the CITY, the damage is such that replacement is necessary, the CONTRACTOR shall replace the tree at his own expense. The tree shall be of a like size and variety as the tree damaged, or, if of a smaller size, the CONTRACTOR shall pay to the owner of said tree compensatory payment acceptable to the tree owner, subject to the approval of the jurisdictional agency or CITY.

1.7 NOTIFICATION BY THE CONTRACTOR

A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way the CONTRACTOR shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than three days nor more than seven days prior to excavation, so that a representative of said owners or agencies can be present during such Work if they so desire. The CONTRACTOR shall also notify Sunshine State One-Call of Florida, Inc. at 1-800-432-4770 at least two days, but no more than fourteen days prior to such excavation.

B. The CONTRACTOR shall prepare a written notice to property owners adjacent to the project work site notifying them of the schedule of work affecting them and anticipated inconveniences they may expect. The notice shall meet the approval of the CITY and be delivered to property owners at least 72 hours prior to construction adjacent to their property.

PART 2 -- PRODUCTS - (Not Used)

PART 3 -- EXECUTION - (Not Used)

- END OF SECTION -

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SECTION 01550 - SITE ACCESS AND STORAGE

PART 1 -- GENERAL

1.1 SITE ACCESS

A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the Work. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

1.2 TEMPORARY CROSSINGS

A. Street Use: Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the Work hereunder, and he shall so conduct his operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleys, ways, or parking areas. No street shall be closed to the public without first obtaining permission of the CITY and proper governmental authority. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise provided or shown. Toe boards shall be provided to retain excavated material if required by the CITY or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, sewer inlets, and other drainage facilities.

B. Traffic Control: For the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of the "Manual of Uniform Traffic Control Devices, Part VI - Traffic Controls for Street and Highway Construction and Maintenance Operations," published by U.S. Department of transportation, Federal Highway Administration (ANSI D6.1).

C. The CONTRACTOR shall take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.

D. The CONTRACTOR shall remove traffic control devices when no longer needed, repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.

E. Temporary Street Closure: If closure of any street is required during construction, a formal application for a street closure shall be made to the authority having jurisdiction at least 30 days prior to the required street closure in order to determine necessary sign and detour requirements.

F. Temporary Driveway Closure: The CONTRACTOR shall notify the CITY or occupant (if not owner-occupied) of the closure of the driveways to be closed more than one eight-hour work day, at least three working days prior to the closure. The CONTRACTOR shall minimize the inconvenience and minimize the time period that the driveways will be closed. The CONTRACTOR shall fully explain to the owner/occupant how long the work will take and when closure is to start.

G. Temporary Bridges: Wherever necessary or required for the convenience of the public or individual residents at street or highway crossings, private driveways, or elsewhere, the CONTRACTOR shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the CONTRACTOR shall secure the written consent of the individuals and authorities concerned to omit such temporary bridges or steel plates, which written consent shall be delivered to the CITY prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the CONTRACTOR shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

1.3 STORAGE

A. The CONTRACTOR shall store his equipment and materials at the CONTRACTOR's base of operations in accordance with the manufacturer's recommendations and as indicated by the CITY. No storage facility is provided by the CITY.

B. Responsibility for protection and safekeeping of equipment and materials will be solely that of the CONTRACTOR, and no claim shall be made against the CITY by reason of any act of an employee or trespasser. Should an occasion arise necessitating access to an area occupied by stored equipment and/or materials, the CONTRACTOR shall immediately move them.

C. Upon completion of the Contract, the CONTRACTOR shall remove from the storage areas all of their equipment, temporary fencing, surplus materials, rubbish, etc., and restore the area to its original or better conditions.

D. The CONTRACTOR's storage shall be limited to on-site storage only. Off-site storage of materials, if required, shall be arranged for by the CONTRACTOR and a copy of an agreement for use of other property shall be furnished to the CITY.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01560 - TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 -- GENERAL

1.1 EXPLOSIVES ANDBLASTING

A. The use of explosives on the Work will not be permitted.

1.2 DUST ABATEMENT

A. The CONTRACTOR shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The CONTRACTOR shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until the CONTRACTOR is relieved of further responsibility by the CITY. No separate payment will be allowed for dust abatement measures and all costs thereof shall be included in the CONTRACTOR's bid price.

1.3 RUBBISH CONTROL

A. During the progress of the Work, the CONTRACTOR shall keep the site of the Work and other areas used in a neat and clean condition, and free from any accumulation of rubbish. The CONTRACTOR shall dispose of all rubbish and waste materials of any nature occurring at the Work site, and shall establish regular intervals of collection and disposal of such materials and waste. The CONTRACTOR shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.4 SANITATION

A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.

B. Such facilities shall be made available when the first employees arrive on the Work, shall be properly secluded from public observation, and shall be constructed and maintained in suitable numbers and at such points and in such manner as may be required.

C. The CONTRACTOR shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of theWork, on the lands of the CITY, or an adjacent property.

D. The CITY shall have the right to inspect any building or other facility erected, maintained, or used by the CONTRACTOR, to determine whether or not the sanitary regulations have been complied with.

E. Sanitary and Other Organic Wastes: The CONTRACTOR shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations shall be disposed of away from the site in a manner satisfactory to the CITY and in accordance with all laws and regulations pertaining thereto.

1.5 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, paint, fuel, solvent or reactant of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. The handling, storage, use and disposal of all such chemicals and disposal of residues shall be in strict accordance with all applicable rules and regulations of Federal, State and local jurisdictional agencies and the printed instructions of the manufacturer and all regulatory requirements. Copies of antidote literature shall be kept at the storage site and at the CONTRACTOR's job site office. A supply of antidotes shall be kept at the CONTRACTOR's office.

1.6 NOISE CONTROL

A. Noise resulting from the CONTRACTOR's work shall not exceed the noise levels and other requirements stated in local ordinances. The CONTRACTOR shall be responsible for curtailing noise resulting from his operation. He shall, upon written notification from the CITY or the noise control officers, make any repairs, replacements, adjustments, additions and furnish mufflers when necessary to fulfill requirements.

1.7 EROSION ABATEMENT AND WATER POLLUTION

A. It is imperative that any CONTRACTOR dewatering operation should not contaminate or disturb the environment of the properties adjacent to the work. The CONTRACTOR shall, therefore, schedule and control his operations to confine all runoff water from disturbed surfaces, water from dewatering operations that becomes contaminated with lime silt, muck and other deleterious matter, fuels, oils, bitumens, calcium chloride, chemicals and other polluting materials.

B. The CONTRACTOR shall construct temporary silting basin(s) of adequate size and provide all necessary temporary materials, operations and controls including, but not limited to, filters, coagulants, screens, and other means necessary to attain the required discharge water quality.

C. The CONTRACTOR shall be responsible for providing, operating and maintaining materials and equipment used for conveying the clear water to the point of discharge. All pollution prevention procedures, materials, equipment and related items shall be operated and maintained until such time as the dewatering operation is discontinued. Upon the removal of the materials, equipment and related items, the CONTRACTOR shall restore the area to the condition prior to its commencing work.

1.8 PRECAUTIONS DURING ADVERSE WEATHER

A. During adverse weather, and against the possibility thereof, the CONTRACTOR shall take all necessary precautions so that the work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and

building paper shelters, or other acceptable means. The CONTRACTOR shall be responsible for all changes caused by adverse weather.

B. The CITY may suspend construction operations at any time when, in his judgment, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather conditions may be, in any season.

1.9 HURRICANE AND STORMWARNINGS

A. During such periods of time as are designated by the United States Weather Bureau as being a hurricane alert, watch or warning, the CONTRACTOR shall perform all precautions as necessary to safeguard the work and property, including the removal of all small equipment and materials from the site, lashing all other equipment and materials to each other and to rigid construction, and any other safety measures as indicated below.

B. The CONTRACTOR shall submit to the CITY, for review and approval, a Plan of Action describing the procedures to be followed by the CONTRACTOR in the event of a Hurricane Alert, Watch, or Warning.

C. Upon Notification of a Hurricane Alert:

1. Upon issuance of a Hurricane Alert by the Mayor or City Manager, all CONTRACTORS performing work within the right-of-way of a designated evacuation route shall immediately secure their work, backfill all excavations within the right-of-way and suitably prepare the roadway surface for full traffic flow. This work shall be completed within 24 hours of the issuance of the alert. Work shall not recommence until the “All Clear” is issued by the Mayor or City Manager.

2. CONTRACTORs performing at all other locations shall remove all unnecessary debris, materials, and equipment from the job site. The CONTRACTOR shall also keep his crew on standby on weekends and holidays during the Hurricane Alert period.

D. Upon Notification of a Hurricane Watch:

1. CONTRACTORs shall implement their approved Plan of Action to protect the project and the public.

E. Upon Notification of a Hurricane Warning

1. CONTRACTORs shall implement their approved Plan of Action to protect the project and the public.

2. For work within the public right-of-way, the CONTRACTOR will be notified by the CITY to suspend his construction operations. The CONTRACTOR will backfill all open trenches, remove all construction equipment and materials from the right-of-way and secure operations pending further notice.

1.10 PERIODIC CLEANUP AND BASIC SITE RESTORATION

A. During construction, the CONTRACTOR shall regularly remove from the site all accumulated debris and surplus materials of any kind which results from its operations. Unused

equipment and tools shall be stored at the CONTRACTOR's yard or base of operations for the project.

B. The CONTRACTOR shall perform the cleanup work on a regular basis and as frequently as ordered by the CITY. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore, such work shall also be accomplished, when ordered by the CITY, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.

C. Upon failure of the CONTRACTOR to perform periodic clean-up and basic restoration of the site to the CITY's satisfaction, the CITY may, upon 5 days prior written notice to the CONTRACTOR, employ such labor and equipment as it deems necessary for the purpose, and all costs resulting therefrom shall be charged to the CONTRACTOR and deducted from amounts of money that it may be due.

D. The CONTRACTOR's storage shall be limited to on-site storage only. Off-site storage of materials, if required, shall be arranged for by the CONTRACTOR and a copy of an agreement for use of other property shall be furnished to the CITY.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01570 - TRAFFIC REGULATIONS AND MAINTENANCE OF TRAFFIC

PART 1 -- GENERAL

1.01 TRAFFIC CONTROL

A. CONTRACTOR shall obey all traffic laws and comply with all the requirements, rules and regulations of the Florida State Department of Transportation, the County, and other local authorities having jurisdiction, to maintain adequate warning signs, lights, barriers, etc., for the protection of traffic on public roadways.

B. The CONTRACTOR shall maintain traffic and protect the public from all damage to persons and property within the Contract Limits, in accordance with the Contract Documents and all applicable state, county and local regulations. He shall conduct his operations so as to maintain and protect access, for vehicular and pedestrian traffic, to and from all properties and business establishments adjoining or adjacent to those streets affected by his operations, and to subject the public to a minimum of delay and inconvenience. Suitable signs, barricades, railing, etc., shall be erected and the work outlined by adequate lighting at night. Danger lights shall be provided as required. Watchmen and flagmen shall be provided as may be necessary for the protection of traffic.

C. Maintenance of Traffic Plans (M.O.T.): When required for specific repairs, the CONTRACTOR shall immediately prepare and submit Maintenance of Traffic (M.O.T.) Plans for approval by authorities having jurisdiction. The traffic maintenance plan must meet the requirements of such authorities. Said M.O.T. Plans shall be in written form with sketches or drawings as necessary and shall comply with the State of Florida Department of Transportation standards for M.O.T. in construction areas. The Plans shall be submitted as soon as possible and not later than two weeks prior to any applicable construction work. A copy of the approval shall be provided to the CITY.

D. The CONTRACTOR shall maintain one copy of the approved M.O.T. plan at the construction site for inspection. The CITY reserves the right to observe the M.O.T. plan in use and to make any changes as field conditions warrant. Any changes shall supersede the plan and be done at the CONTRACTOR's expense.

E. The CONTRACTOR and his personnel are cautioned against parking vehicles in the business zones for any extended period of time. If necessary, the CONTRACTOR shall obtain offsite parking areas for his personnel.

F. All dirt spilled from the CONTRACTOR's trucks on existing pavements shall be removed by the CONTRACTOR whenever in the opinion of the CITY the accumulation is sufficient to cause the formation of mud, dust, interference with traffic or create a traffic hazard.

G. The CONTRACTOR shall comply with all traffic regulations and perform maintenance of traffic as part of his site operation. No separate payment item shall be made.

PART 2 -- PRODUCTS - (Not Used)

PART 3 -- EXECUTION - (Not Used)

- END OF SECTION -

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SECTION 01600 - MATERIALS

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The word "Products", as used herein, is defined to include purchased items for incorporation into the Work, regardless of whether specifically purchased for the project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of Work. Definitions in this paragraph are not intended to negate the meaning of other terms used in Contract Documents, including "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction", and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

B. All equipment, materials, instruments or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents.

1.2 QUALITYASSURANCE

A. All materials and equipment shall conform to Section 01400, "Quality Control".

1.3 PRODUCT DELIVERY-STORAGE-HANDLING

A. The CONTRACTOR shall deliver, handle, and store products in accordance with supplier's written recommendations and as directed by the CITY, and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, the CONTRACTOR shall provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.

B. Equipment and materials to be incorporated in the Work shall be delivered sufficiently in advance of their installation and use to prevent delay in the execution of the Work, and they shall be delivered as nearly as feasible in the order required for executing the Work.

C. The CONTRACTOR shall protect all equipment and materials from deterioration and damage. The equipment and materials shall be handled and stored by the manufacturer, fabricator supplier and CONTRACTOR before, during, and after shipment to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, damage or theft of any kind whatsoever. Any equipment exhibiting any of the above, shall be removed and replaced at the CONTRACTOR's expense for both labor and materials.

D. Products shall be transported by methods to avoid product damage and shall be delivered in undamaged condition in supplier's unopened containers or packaging, dry.

E. The CONTRACTOR shall provide equipment and personnel to handle products and materials by methods to prevent soiling and damage.

F. The CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.4 STORAGE AND PROTECTION

A. General: Products shall be stored in accordance with supplier's written instructions, with seals and labels intact and legible. Sensitive products shall be stored in weather-tight enclosures and temperature and humidity ranges shall be maintained within tolerances required by supplier's written instructions.

B. For exterior storage of fabricated products, they shall be placed on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering; ventilation shall be provided to avoid condensation.

C. Loose granular materials shall be stored on solid surfaces in a well-drained area and shall be prevented from mixing with foreign matter.

D. Storage shall be arranged to provide access for maintenance of stored items and for inspection. The CONTRACTOR shall periodically inspect to assure products are undamaged and are maintained under required conditions. The CONTRACTOR shall maintain a log of inspections and shall make said log available to the CITY on request.

E. The CONTRACTOR shall verify that storage facilities comply with supplier's product storage requirements and verify that supplier-required environmental conditions are maintained continually.

F. The CONTRACTOR shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes is acceptable under requirements of Contract Documents.

G. Fire Protection: The CONTRACTOR shall take all necessary precautions to prevent fires at or adjacent to the Work, including its own buildings and trailers. Adequate fire extinguisher and hose line stations shall be provided throughout the work area.

1.5 FASTENERS

A. All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by the CONTRACTOR in accordance herewith. Bolts shall have suitable washers and, where so required, their nuts shall be hexagonal.

B. All anchor bolts and other types of anchors embedded, drilled, inserted or driven in concrete, including nuts, washers, plates, and bolt sleeves, shall be Type 316 stainless steel unless otherwise specifically specified as another material.

C. Unless otherwise specified, stud, tap, and machine bolts shall be of the best quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used.

1.6 SALVAGED AND EXCAVATEDMATERIALS

A. In the absence of special provisions in other Sections of the Specifications, salvage materials, equipment or supplies that occur are the property of the CITY and shall be cleaned and stored as directed by the CITY.

B. All materials, including excavated materials needed for backfilling operation, shall be stored on site. Where additional area is needed for stockpiling, off-site storage of any materials shall be arranged for by the CONTRACTOR and a copy of an agreement for use of other property shall be furnished to the CITY.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

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SECTION 01700 - PROJECT CLOSEOUT

PART 1 -- GENERAL

1.1 FINAL CLEANUP

A. The CONTRACTOR shall promptly remove from the vicinity of the completed Work, all rubbish, unused materials, concrete forms, construction equipment, temporary structures and facilities, construction signs, tools, scaffolding, materials, supplies and equipment which may have been used in the performance of the work. The CONTRACTOR shall broom clean paved surfaces and rake clean other surfaces of grounds. Final acceptance of the Work by the CITY will be withheld until the CONTRACTOR has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

B. The CONTRACTOR shall thoroughly clean all materials, equipment and structures; all marred surfaces shall be touched up to match adjacent surfaces.

C. The CONTRACTOR shall remove spatter, grease, stains, fingerprints, dirt, dust, labels, tags, packing materials and other foreign items or substances from interior and exterior surfaces, equipment, signs and lettering.

D. The CONTRACTOR shall remove paint, clean and restore all equipment and material nameplates, labels and other identification markings.

E. The CONTRACTOR shall maintain cleaning until project, or portion thereof, is accepted by the CITY.

F. The CONTRACTOR shall:

1. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

2. Use each type of cleaning material on only those surfaces recommended by the cleaning material manufacturer.

3. Use only materials which will not create hazards to health or property.

1.2 CLOSEOUT TIMETABLE

A. The CONTRACTOR shall establish dates for testing, acceptance periods, and on-site instructional periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow the CITY and its authorized representatives sufficient time to schedule attendance at such activities.

1.3 FINAL SUBMITTALS

A. Before the final acceptance of the project, the CONTRACTOR shall submit to the CITY certain records, certifications, etc., which are specified elsewhere in the Contract Documents. Missing, incomplete or unacceptable items, as determined by the CITY, shall constitute grounds for withholding final payment to the CONTRACTOR. A partial list of such

items appear below, but it shall be the CONTRACTOR's responsibility to submit any other items which are required in the Contract Documents:

1. Written test results of project components.

2. Written warranties, where required.

3. Certificates of inspection and acceptance by local governing agencies having jurisdiction.

4. Video recordings and logs of all lines televised.

5. Pre-construction photos.

6. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

1.4 PUNCH LISTS

A. Final cleaning shall be scheduled upon completion of the project.

B. The CITY will make his final inspection whenever the CONTRACTOR has notified the CITY that the work is ready for the inspection. Any work not found acceptable and requiring cleaning, repair and/or replacement will be noted on the "Punch" list. Work that has been inspected and accepted by the CITY shall be maintained by the CONTRACTOR, until final acceptance of the entire project.

C. Whenever the CONTRACTOR has completed the items on the punch list, he shall again notify the CITY that it is ready for final inspection. This procedure will continue until the entire project is accepted by the CITY. The "Final Payment" will not be processed until the entire project has been accepted by the CITY and all of the requirements in previous Article 1.03 "Final Submittals" have been satisfied.

1.5 TOUCH-UP AND REPAIR

A. The CONTRACTOR shall touch-up and repair damage to all existing facilities and surfaces. If in the opinion of the CITY the touch-up work is not satisfactory, the CONTRACTOR shall repeat the item.

1.6 MAINTENANCE ANDWARRANTY

A. The CONTRACTOR shall comply with all maintenance and warranty requirements of the Contract Documents.

B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the CONTRACTOR shall have obtained a statement in writing from the affected private CITY or public agency releasing the CITY from further responsibility in connection with such repair or resurfacing.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

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DIVISION 2
SITE WORK

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SECTION 02222 - EXCAVATION AND BACKFILL FOR UTILITIES

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Excavate, grade and backfill as required for the site underground piping systems, as directed or as shown on the Drawings and specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Piping

1.3 SUBMITTALS

A. General: Submit information and samples to the CITY for review as specified herein in accordance with the Section entitled "Submittals".

B. Dewatering: The CONTRACTOR shall submit to the CITY its proposed methods of handling trench water and the locations at which the water will be disposed of. Methods shall be acceptable to the CITY before starting the excavation.

C. Bedding and Backfill Materials: The CONTRACTOR shall notify the CITY of the off-site sources of bedding and backfill materials, and submit to the CITY a representative sample weighing approximately 25 lbs.

D. Sheeting System: Drawings of any proposed sheeting system and design computations shall be submitted to the CITY; however, the review of these Drawings shall in no way relieve the CONTRACTOR of the responsibility to provide a safe and satisfactory sheeting and shoring system. Sheeting and shoring shall be designed by the CONTRACTOR, and the proposed design shall be sealed by a Professional Engineer registered in the State of Florida. If the CITY is of the opinion that at any point sufficient or proper supports have not been provided, it may direct the CONTRACTOR to install additional supports at the CONTRACTOR's expense.

1.4 JOB CONDITIONS

A. The CITY will not assume responsibility for variations of sub-soil quality or conditions. The CONTRACTOR shall examine the site or undertake its own subsurface investigation to identify all conditions that may affect its work.

1.5 QUALITY CONTROL

A. An independent testing laboratory may be retained by the CITY to do appropriate testing as described in Section entitled "Quality Control". In this event, the CONTRACTOR shall schedule its Work so as to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of its progress.

1.6 GROUNDWATER

A. The CONTRACTOR shall be responsible for anticipating groundwater conditions and shall provide positive control measures as required. Such measures shall ensure stability of excavations, groundwater pressure control, prevention of tanks, pipes, and other structures from being lifted by hydrostatic pressures, and avoiding the disturbance of subgrade bearing materials.

1.7 TRENCH SAFETY ACT COMPLIANCE

A. The CONTRACTOR by signing and executing the contract is, in writing, assuring that it will perform any trench excavation in accordance with the Florida Trench Safety Act, Section 553.60 et. seq. The CONTRACTOR further identified the separate item(s) of cost of compliance with the applicable trench safety standards as well as the method of compliance as noted in the "Bid Forms" Section of the Contract front-end documents.

B. The CONTRACTOR acknowledges that this cost is included in the applicable items of the Proposal and Contract and in the Grand Total Bid and Contract Price.

C. The CONTRACTOR is, and the CITY is not, responsible to review or assess the CONTRACTOR's safety precautions, programs or costs, or the means, methods, techniques or technique adequacy, reasonableness of cost, sequences or procedures of any safety precaution, program or cost, including but not limited to, compliance with any and all requirements of Florida Statute Section 553.60 et. seq. cited as the "Trench Safety Act". The CONTRACTOR is, and the CITY is not, responsible to determine if any safety or safety related standards apply to the project, including but not limited to, the "Trench Safety Act".

1.8 PROTECTION OF PROPERTY AND STRUCTURES

A. The CONTRACTOR shall, at its own expense, sustain in place and protect from direct or indirect injury, all pipes, poles, conduits, walls, buildings, and all other structures, utilities, and property in the vicinity of its Work. Such sustaining shall be done by the CONTRACTOR. The CONTRACTOR shall take all risks attending the presence or proximity of pipes, poles, conduits, walls, buildings, and all other structures, utilities, and its Work. It shall be responsible for all damage, and assume all expenses, for direct or indirect injury and damage, caused by its Work, to any such pipe, structures, etc., or to any person or property, by reason of injury to them, whether or not such structures, etc., are identified in advance by the CITY.

B. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Barricades with flashing lights shall also be placed along excavation from sunset each day to sunrise of the next day until such excavation is entirely refilled, compacted, and paved. All excavations shall be barricaded where required to meet OSHA, local and Federal Code requirements, in such a manner to prevent persons from falling or walking into any excavation within the site fenced property limits.

PART 2 -- PRODUCTS

2.1 MATERIALS

A. General: Materials shall be furnished as required from on-site excavations or from acceptable off-site sources as required. The CONTRACTOR shall notify the CITY of the sources of each material at least ten calendar days prior to the anticipated use of the materials.

2.2 BEDDING

A. Pipe Bedding: In general, clean sandy excavated materials, that is free from organics, clay and construction debris, can be used as pipe bedding when construction is in a dry condition and when the bedding is not sided by muck. Pipe bedding material shall be able to pass through a 3/4-inch sieve. Separation of suitable material for pipe bedding from other material shall be made during the excavation.

B. Sand shall be used for all copper and other service lines.

C. In the case of a “dry” installation, sand shall be used for PVC and ductile iron pipe where the bottom of the trench is located in the limestone zone.

D. In the case of a “wet” installation, pearock shall be used for PVC and ductile iron pipe where the bottom of the trench is located in the limestone zone.

E. Precast concrete items shall use crushed stone.

2.3 PEAROCK

A. Pearock shall consist of hard, durable particles of proper size and gradation, and shall be free from organic material, wood, trash, sand, loam, clay, excess fines, and other deleterious materials. Pearock shall conform to the requirements of ASTM C 33, Size Number 8, graded within the following limits:

Sieve Size	Percent Finer by Weight
1/2 inch	100
3/8 inch	85 to 100
No. 4	10 to 30
No. 8	0 to 10
No. 16	0 to 5

2.4 CRUSHED STONE (3/4-INCH ROCK)

A. Crushed stone shall consist of hard, durable, subangular particles of proper size and gradation, and shall be free from organic material, wood, trash, sand, loam, clay, excess

fines, and other deleterious materials. Crushed stone shall conform to the requirements of ASTM C 33, Size Number 57, graded within the following limits:

Sieve Size	Percent Finer by Weight
1 1/2 inch	100
1 inch	95 to 100
1/2-inch	25 to 60
No. 4	0 to 10
No. 8	0 to 5

PART 3 -- EXECUTION

3.1 EXCAVATION

A. The CONTRACTOR shall perform all excavation of every description and of whatever substance encountered, to the dimensions, grades and depths shown on the Drawings, or as directed. All excavations shall be made by open cut and in accordance with the Trench Safety Act. All existing utilities such as pipes, poles and structures shall be carefully located, supported and protected from injury; in case of damage, they shall be restored at the CONTRACTOR's expense.

B. Pipe trenches shall be excavated to a width within the limits of the top of the pipe and the trench bottom so as to provide a clearance on each side of the pipe barrel, measured to the face of the excavation, or sheeting if used, of not less than eight inches (8"), nor more than twelve inches (12"). For pipe over eighteen inches (18") in nominal size, this maximum twelve inches (12") clearance may be increased to eighteen inches (18"). All pipe trenches shall be excavated to a level six inches (6") below the outside bottom of the proposed pipe barrel unless otherwise directed by the CITY. Properly sloped or shored per OSHA requirements (Federal Register Part II, Department of Labor, OSHA 29CFR 1910; Permit required, confined spaces for General Industry, Final Rule) and job site conditions, and the Trench Safety Act (Trench Safety Act, House Bill 3183 Law of Oct. 1, 1990). Excavation depths in other types of materials and conditions shall be made as hereinafter specified.

C. In areas where trench widths are not limited by right-of-way and/or easement widths, property line restrictions, existing adjacent improvements, including pavements, structures and other utilities, and maintenance of traffic, the trench sides may be sloped to a stable angle of repose of the excavated material but only from a point one foot above the crown of the pipe. A substantially and safely constructed movable shield, "box" or "mule" may be used in place of sheeting when the trench is opened immediately ahead of the shield and closed immediately behind the shield as pipe laying proceeds inside the shield.

D. Ladders or steps shall be provided for and used by Workmen to enter and leave trenches, in accordance with OSHA requirements.

E. Excavation for appurtenances shall be sufficient to provide a clearance between their outer surfaces and the face of the excavation or sheeting, if used, of not less than 12 inches. Manhole excavations shall be carried to sufficient depth to permit their construction on the undisturbed bottom of the excavation.

F. Excavated unsuitable material shall be removed from the site and disposed of by the CONTRACTOR. Materials removed from the trenches shall be stored and in such a manner that will not interfere unduly with any on-site operations, traffic on public roadways and sidewalks and shall not be placed on private property. In congested areas, such materials as cannot be stored adjacent to the trench or used immediately as backfill shall be removed to other convenient places of storage acceptable to the CITY at the CONTRACTOR's expense.

G. Excavated material that is suitable for use as backfill shall be used in areas where sufficient material is not available from the excavation. Suitable material in excess of backfill requirements shall be either used on the site as directed by the CITY or disposed of the CONTRACTOR.

H. Barriers shall be placed at excavations in accordance with OSHA requirements.

I. Exploratory Excavation: Exploratory excavation shall mean obtaining the horizontal and vertical position of a subsurface facility using approved methods.

1. The CONTRACTOR shall provide these services as requested in writing by the CITY to aid in (1) the design of projects, and (2) to facilitate orderly construction of municipal utilities, etc.

2. The CONTRACTOR shall provide all equipment, personnel, and supplies required to perform its locating services. The CONTRACTOR shall determine which equipment, personnel, and supplies are required to perform its locating services.

3. When available, the CONTRACTOR shall secure all plans, plates, maps, or other records of subsurface facilities from their owners.

4. The CONTRACTOR shall obtain all necessary permits from CITY, County, or other municipal jurisdictions to allow the CONTRACTOR to work in existing streets, roads, and rights of way for the purpose of marking, measuring, excavating, and recording the location of existing underground utilities. The CONTRACTOR shall not be responsible, however, to obtain permits for boring, digging, or other excavating work that is not to be performed by the CONTRACTOR pursuant to this Contract.

5. The CONTRACTOR shall comply with applicable underground utility damage prevention laws.

6. The CONTRACTOR shall coordinate with utility company inspectors as required.

7. The CONTRACTOR shall excavate test holes to expose the utility to be measured in such a manner to ensure the safety of the excavation and the integrity of the utility to be measured. The maximum size opening within the roadway shall not exceed one (1) square foot.

8. Primary Locating Information: Horizontal location referenced to physical structures using a minimum of three swing ties. Depth from paving to top of utility measured in inches. Appropriate data to be shown on test hole sketch. Outside diameter of pipe or width of duct banks and configuration of non- encased multi-conduit systems. Utility structure material composition, when reasonably ascertainable. Paving thickness and type, and where applicable, the general soil type, site conditions, and depths of any notable horizon changes.

3.2 SHEETING AND BRACING

A. The CONTRACTOR shall furnish, place and maintain sheeting and bracing to support sides of the excavation as necessary to provide safe Working conditions in accordance with OSHA requirements, and to protect pipes, structures and other Work from possible damage. Where wood sheeting or certain designs of steel sheeting are used, the sheeting shall be cut off at a level of 2 feet above the top of the installed pipe and that portion below the level shall be left in place. If interlocking steel sheeting is used, it may be removed providing removal can be accomplished without disturbing the bedding, pipe or alignment of the pipe. Any damage to the pipe bedding, pipe or alignment of the constructed utility caused by the removal of sheeting shall be cause for rejection of the affected portion of the Work. The CITY may permit sheeting to be left in place at the request and expense of the CONTRACTOR.

B. If the CITY is of the opinion that at any point sufficient or proper supports, have not be provided, it may order additional supports put in at the CONTRACTOR's expense. The CONTRACTOR shall be responsible for the adequacy of all sheeting used and for all damage resulting from sheeting and bracing failure or from placing, maintaining and removing it.

3.3 REMOVAL OF WATER

A. General: When practical, it is a requirement of these specifications that excavation shall be free from water before pipe or structures are installed. When not practical, work shall be done as specified by the CITY.

B. The CONTRACTOR shall provide pumps, and other appurtenant equipment necessary to remove and maintain water at such a level as to permit construction in a dry condition. The CONTRACTOR shall continue dewatering operations until backfilling has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench or so that it is above the water table. If at any point during the dewatering operation it is determined that fine material is being removed from the excavation sidewalls, the dewatering operation shall be stopped if acceptable to the CITY. If any of the subgrade or underlying material is disturbed by movement of groundwater, surface water, or any other reason, it shall be replaced at the CONTRACTOR's expense with crushed stone or gravel.

C. The CONTRACTOR shall use dewatering systems that include automatic starting devices, and standby pumps that will ensure continuous dewatering in the event of an outage of one or more pumps.

D. Disposal: Water from the trenches and excavation shall be disposed of in such a manner as will not cause injury to public health, to public or private property, to the Work completed or in progress, to the surface of the streets, cause any interference with the use of the same by the public, or cause pollution of any waterway or stream. The CONTRACTOR shall submit its proposed methods of handling trench water and locations at which the water will be disposed of to the CITY for review and shall receive acceptance before starting the excavation. Disposal to any surface water body will require silt screens to prevent any degradation in the water body. The CONTRACTOR shall have responsibility for acquiring all necessary permits for disposal.

E. All dewatering shall be in accordance with CITY discharge requirements.

3.4 TRENCH STABILIZATION

A. No claim for extras, or additional payment will be considered for cost incurred in the stabilization of trench bottoms that are rendered soft or unstable as a result of construction methods, such as improper or inadequate sheeting, dewatering or other causes. In no event shall pipe be installed when such conditions exist and the CONTRACTOR shall correct such conditions so as to provide proper bedding or foundations for the proposed installation at no additional cost to the CITY before placing the pipe or structures. Refer to Trench Safety Act as previously referenced.

3.5 PIPE BEDDING

A. Pipe trenches shall be excavated as described in Article 3.01. The resulting excavation shall be backfilled with acceptable pipe bedding material, up to the level of the centerline of the proposed pipe barrel. This backfill shall be tamped and compacted to provide a proper bedding for the pipe and shall then be shaped to receive the pipe. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.

B. Any excavation below the levels required for installation of the pipe bedding shall be backfilled with acceptable bedding material, tamped, compacted and shaped to provide proper support for the proposed pipe, at the CONTRACTOR's expense.

3.6 BACKFILL

A. Backfilling of utility trenches will not be allowed until the work has been inspected by the CITY and the CITY indicates that backfilling may proceed. Any work which is covered up or concealed without the knowledge and consent of the CITY may be required to be uncovered or exposed at no cost to the CITY.

B. Backfill material shall be non-cohesive and non-plastic, free of all debris, lumps, clods, wood, broken paving or any organic or unstable material. Backfill material placed within one foot (1.0') of the lines shall not contain any stones or rocks larger than two inches (2")

in diameter and no stones or rocks larger than six inches (6”) in diameter will be permitted in any backfill.

C. If a sufficient quantity of suitable backfill material is not available from the trench excavation, or other trench excavations within the site of the work, the CITY shall order the Contractor to provide additional material suitable for this purpose. The additional material shall be installed as specified herein.

D. Pipeline trenches shall be backfilled to a level minimum of twelve (12”) inches above the top of the pipe with select backfill (selected backfill) obtained from the excavation. Backfilling shall proceed to a depth of thirty inches (30”) over the pipe. Such material shall be placed in 6-inch layers, each compacted to the densities specified in Article 3.07. Only hand operated mechanical compacting equipment shall be used within six inches of the installed pipe, or if acceptable to the CITY, by using excess water and passing a concrete vibrator between the pipe and the side of the trench.

E. After the initial portion of backfill has been placed as specified above, and after all excess water has completely drained from the trench, backfilling of the remainder of the trench may proceed. The remainder of the backfill shall be selected material obtained from the excavation and shall be placed in horizontal layers, the depth of which shall not exceed the ability of the compaction equipment employed, and in no event shall exceed a depth of (9”) inches. Each layer shall be moistened, tamped, puddled, rolled or compacted to the densities specified in Article 3.07.

F. Manholes and Vaults: Any excavation below the levels required for the proper construction of manholes or vaults shall be filled with crushed rock or limestone.

3.7 COMPACTION AND DENSITIES

A. Backfill shall be compacted to 100 percent of maximum density of the material.

B. Testing: Laboratory and field density tests, which in the opinion of the CITY are necessary to establish compliance with the compaction requirements of these Specifications, shall be ordered by the CITY. The CONTRACTOR shall coordinate and cooperate with the testing laboratory. The testing program will be implemented by the CITY establishing depths and locations of tests. Modifications to the program will be made as job conditions change.

C. Trench backfill which does not comply with the specified densities, as indicated by such tests, shall be reworked and recompacted until the required compaction is secured, at no additional cost to the CITY. The costs for retesting such Work shall be paid for by the CONTRACTOR.

3.8 ADDITIONAL EXCAVATION AND BACKFILL

A. Where organic material, such as roots, muck, or other vegetable matter, or other material which, in the opinion of the CITY, will result in unsatisfactory foundation conditions, is encountered below the level of the proposed pipe bedding material, it shall be removed to a depth of two feet below the outside bottom of the pipe or to a greater

depths as directed by the CITY and removed from the site. Sheeting shall be installed if necessary to maintain pipe trenches within the limits identified by the CITY. The resulting excavation shall be backfilled with suitable backfill material, placed in 12-inch layers, tamped and compacted up to the level of the bottom of the proposed pipe bedding material. Sufficient compaction of this material shall be performed to protect the proposed pipe against settlement. Construction shall then proceed in accordance with the provisions of Article 3.05 "Pipe Bedding".

B. Additional excavation (more than two feet below the pipe) as indicated on the trench detail shall be performed only when ordered by the CITY. Where organic or other material is encountered in the excavation, the CONTRACTOR shall bring the condition to the attention of the CITY and obtain his determination as to whether or not the material will require removal, prior to preparing the pipe bedding. The excavation of material up to a depth of two feet below the outside pipe bottom shall be considered as incidental items of construction and the Work shall be done at the CONTRACTOR's expense. Where ordered by the CITY, the additional excavation, backfill and additional sheeting, if required, shall be paid in accordance with the CITY's Change Order procedure.

3.9 FINE GRADING

A. After piping trenches backfilled, the disturbed areas of the site shall be fine graded. Any lumber, undesirable materials and rocks larger than the 3-inch size shall be removed from the surface. The completed surface shall be to the preconstruction elevation unless otherwise directed by the CITY. Minor adjustments to line and grade may be required as the work progresses in order to satisfy field conditions.

3.10 ALTERNATE METHOD OF CONSTRUCTION

A. Use of This Method: A combination of conditions in the substrate, water table, or method of disposal may be encountered during the course of the work which makes dewatering impossible, or only possible through the use of unusual methods, the cost of which is excessive. When such conditions are encountered, but only after all reasonable means (pumps, well points, etc.) to dewater the excavation have been employed without success, the CONTRACTOR, may request to employ the following Alternate Method of Construction. The concurrence of the CITY shall be obtained in writing and shall limit the use of the alternate method of construction to such specific portions of the Work as the CITY shall determine.

B. The requirements set forth in other sections of these Specifications shall establish the required standards of construction quality for this work. Use of the alternate method of construction described hereinafter shall in no way be construed as relieving the CONTRACTOR of the work. No additional payment will be made to the CONTRACTOR for excavation, backfill, sheeting or any cost incurred for Work or materials, or any other costs incurred as a result of the use of this alternate method of construction. The prices established in the Proposal shall be for full payment for the various items of work.

C. Subject to all the requirements stated herein, including written acceptance of the CITY, construction will be permitted in accordance with the following specifications. All

requirements of these Specifications shall apply to this construction unless otherwise specifically modified herein.

D. Removal of Water: The installation of pipe and appurtenances under water will be permitted and the requirements of Article 3.03 will be waived.

E. Excavation shall be performed in accordance with Article 3.01.

F. Pipe Bedding: Pipe bedding shall be placed from 6 inches below the outside bottom of the proposed pipe barrel up to the centerline of the pipe barrel. The bedding material shall be pearock as specified in Article 2.03 "Pearock". Lime rock screenings, sand or other fine organic material shall not be used.

G. The bedding material shall be placed and then be shaped to receive the pipe at the intended elevation. Bedding shall be provided under the branch of all fittings to furnish adequate support and bearing under the fitting.

H. Backfill: After the pipe is installed, backfilling shall proceed in accordance with the provisions of Article 3.06 "Backfill" and 3.07 "Compaction and Densities". Select backfill material shall be used to backfill around the pipe and to a level one foot above the crown of the pipe. Under no circumstances will material other than select backfill or specified pipe bedding material be considered satisfactory for this purpose.

I. If the Alternate Method of Construction is used, all backfill material, including specified pipe bedding material, shall be carefully lifted into the trench and not released to fall freely therein until the bucket or container is at or just above water level. Under no circumstances will backfill material be dumped or pushed into the trenches containing water. Below existing water level, the backfill material shall be carefully rammed into place in uniform layers, of equal depth on each side of the pipe, up to the water level. Above the water level, backfill material shall be placed and compacted for normal backfill as previously specified.

- END OF SECTION -

SECTION 02500 - SURFACE RESTORATION

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. Items specified in this Section include repairs to landscaped and grassed areas that maybe damaged by CONTRACTOR activities.

1.2 SUBMITTALS

A. The CONTRACTOR shall submit submittals for review in accordance with the CITY's *Shop Drawing Submittals and Approved Utility Product List* (reference Appendix 1) and the Section entitled "Submittals".

1.3 DEFINITIONS

A. The phrase "DOT Specifications" shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The DOT Specifications are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.

1.4 PROTECTION OF EXISTING IMPROVEMENTS

A. The CONTRACTOR shall be responsible for the protection of all pavements and other improvements within the work area. All damage to such improvements, as a result of the CONTRACTOR's operations, beyond the limits of the work of pavement replacement shall be repaired by the CONTRACTOR at his expense.

1.5 WARRANTY

A. The CONTRACTOR shall warranty all trees, ground cover or shrubs planted or replanted under this Contract for a period of one year beyond acceptance of the project. In the event that any new tree, plant or shrub dies within the warranty period, the CONTRACTOR shall be responsible for replacement in kind, and the warranty period shall start over from the beginning. In the event that a transplanted (reused) tree dies within the warranty period, the CONTRACTOR shall be responsible for replacement in kind, except that the maximum height of any new tree shall be eight feet as measured from the ground surface, once planted, to the top of the tree.

PART 2 -- PRODUCTS

2.1 SOD

A. Sod shall be Floratam Sod in irrigated areas and Bahia in non-irrigated areas.

2.2 REPLACEMENT TREES, GROUND COVER AND SHRUBS

A. Replacement trees, ground cover and shrubs shall be of the same type and size and sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall have healthy, well developed root systems and shall be free of disease and insect pests, eggs or larvae.

2.3 MULCH

A. Mulch shall be windproof shredded eucalyptus, mulch shall be clean, fresh, free of branches and other foreign matter. Mulch shall be used around all shrubs, ground covers and tree trunks, and placed to a minimum depth of 2 inches extending from the tree trunk outward two feet.

PART 3 -- EXECUTION

3.1 GRADING AND SODDING

A. The CONTRACTOR shall regrade the work areas disturbed by his construction activities to the existing grade prior to commencement of construction.

B. Sod shall be placed on all grassed areas disturbed by construction activities, unless otherwise indicated on the Drawings. Sodding shall be in accordance with Sections 575 - Sodding and 981 – Grassing and Sodding Materials of the DOT Specifications.

C. Maintenance: Sufficient watering shall be done by the CONTRACTOR to maintain adequate moisture for optimum development of the sodded areas. Sodded areas shall receive no less than 1.5 inches of water per week, until acceptance of the work by the CITY. The CONTRACTOR shall warranty all sod for 30 days or until acceptance of the work by the CITY, whichever is sooner.

D. Repairs to Lawn Areas Disturbed by CONTRACTOR's Operations: Lawn areas damaged by CONTRACTOR's operations shall be repaired at once by proper sod bed preparation, fertilization and resodding, in accordance with these specifications. Regardless of the condition of the lawn area (weed content etc.) prior to the CONTRACTOR working in the area, all repairs shall be made with sod.

3.2 TREES, GROUND COVER AND SHRUBS

A. Excavation and Plant Holes: Plant hole excavations shall be roughly cylindrical in shape, with the side approximately vertical. Plants shall be centered in the hole. Bottoms of the holes shall be loosened at least six inches deeper than the required depth of excavation.

B. Holes for balled and burlapped plants shall be large enough to allow at least eight inches of backfill around the earth ball. For root balls over 18 inches in diameter, this dimension shall be increased to 12 inches. Where excess material has been excavated

from the plant hole, the excavated material shall be disposed of as and where directed by the CITY.

C. Setting of Plants: When lowered into the hole, the plant shall rest on a prepared hole bottom such that the roots are level with, or slightly above, the level of their previous growth and so oriented such as to present the best appearance. The CONTRACTOR, when setting plants in holes, shall make allowances for any anticipated setting of plants.

D. Palms of the sabal species may be set deeper than the depth of their original growth, provided that the specified clear trunk height is attained.

E. The backfill shall be made with planting mixture and shall be firmly rodded and watered-in, so that no air pockets remain. The quantity of water applied immediately upon planting shall be sufficient to thoroughly moisten all of the backfilled earth. Plants shall be kept in a moistened condition for the duration of the Contract.

F. Staking and Guying: Plants shall be staked in accordance with the following provisions:

1. Small Trees: For trees and shrubs of less than one-inch caliper, the size of stakes and the method of tying shall be such as to rigidly support the staked plant against damage caused by wind action or other effects. Trees larger than one-inch and smaller than one-and one-half inch caliper shall be staked with a two-inch stake, set at least 24 inches in the ground and extending to the crown of the plant. The plant shall be firmly fastened to the stake with two strands of 14-gauge soft wire, enclosed in rubber hose, or other approved covering. The wire shall then be nailed or stapled to the stake to prevent slippage.

2. Medium Trees: All trees, other than palm trees, larger than one-and one-half inch caliper and smaller than two-and one-half-inch caliper shall be staked with two or more, two-inch by two-inch stakes, eight feet long, set two feet in the ground. The tree shall be midway between the stakes and held firmly in place by two strands of 12-gauge wire, applied as specified above for single stakes. The wires shall be tightened and kept tight by twisting.

3. Large Trees: All trees, other than palm trees, larger than two-and one-half-inch caliper, shall be braced with three or more two-inch by four-inch wood braces, toenailed to cleats which are securely banded at two points to the palm, at a point at least six feet above the ground. The trunk shall be padded with five layers of burlap under the cleats. Braces shall be approximately equidistantly spaced and secured underground with two-inch by four-inch by 24-inch stake pads. In firm rock soils, Number 4 steel reinforcing rods or one-half inch pipe is acceptable.

4. Palm Trees: Palm trees shall be braced with three or more two-inch by four-inch wood braces, toenailed to cleats which are securely banded at two points to the palm, at a point at least six feet above the ground. The trunk shall be padded with five layers of burlap under the cleats. Braces shall be approximately equidistantly spaced and secured underground with two-inch by four-inch by 24-

inch stake pads. In firm rock soils, Number 4 steel reinforcing rods or one-half inch pipe is acceptable.

G. Pruning: All broken or damaged roots shall be cut off smoothly, and the tops of all trees shall be pruned in a manner complying with standard horticultural practice. At the time pruning is completed, all remaining wood shall be alive. All cut surfaces of one inch or more in diameter, above the ground, shall be treated with an approved commercial tree paint.

H. Maintenance: Maintenance shall begin immediately after each plant is planted and shall continue until all work under this Contract has been completed and accepted by the CITY. Plants shall be watered, mulched, weeded, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected. Settled plants shall be reset to proper grade position, planting saucer restored and dead material removed. Guys shall be tightened and repaired.

I. Defective work shall be corrected within 21 days after it becomes apparent. Upon completion of planting, the CONTRACTOR shall remove excess soil and debris, and repair any damage to structures, etc., resulting from planting operations.

3.3 BACKFILL

A. The top surfaces of the backfill shall be restored to the original or planned conditions or better. Trenches shall be carefully examined upon the completion of backfilling and surface irregularities that are dangerous or obstructive to traffic shall be removed. Paved sections shall conform in grade with adjacent areas and shall be of at least equal quality. Design mixes for flexible pavements shall be subject to approval by the CITY or Broward County Engineering Department as applicable but shall adhere to the Florida Department of Transportation rules and regulations and standards and/or other government agencies. All damaged or undermined areas of existing pavement, not previously removed, shall be removed and restored to original condition or in the specified manner.

B. Equipment or traffic shall not travel over loose rock fragments, or other hard material, lying on sections of pavement which shall not be removed. For traffic control and safety barricades may be required. Removal, replacement and restoration of areas of pavement shall be as indicated on Drawings and in conformance with the details as approved by the City.

- END OF SECTION -

SECTION 02510 - ASPHALTIC CONCRETE PAVEMENT

PART 1 -- GENERAL

1.1 SCOPE

A. Construct asphaltic concrete pavement in accordance with the lines, grades and typical sections to restore surface to original condition or better, specified herein and as required for a complete installation.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. DOT Specifications: The phrase, "DOT Specification", shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The DOT Specifications, are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.

DOT 160	Stabilizing
DOT 200	Limerock Base
DOT 300	Prime and Tack Coats for Base Courses
DOT 320	Hot Bituminous Mixtures - Plant Methods and Equipment
DOT 330	Hot Bituminous Mixtures - General Construction Requirements
DOT 331	Type S Asphaltic Concrete
DOT 337	Asphaltic Concrete Friction Courses
DOT 902	Fine Aggregate
DOT 911	Lime rock Material for Base and Stabilized
Base DOT 916	Bituminous Materials

1.3 SUBMITTALS

A. The CONTRACTOR shall submit his proposed formula for the asphaltic concrete paving for review in accordance with the Section entitled "Submittals".

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Lime rock Base: The lime rock base shall consist of either one or two courses of Miami Oolite lime rock conforming to DOT Sections 200 and911.

B. Prime Coat: The material used for the prime coat shall be cut-back Asphalt Grade RC-70 conforming to DOT Sections 300 and 916 for prime to be used on Miami Oolite formation lime rock.

C. Tack Coat: The material used for the tack coat shall be Emulsified Asphalt Grade RS-2 conforming to DOT Sections 300 and916.

D. Asphaltic Concrete: The materials and construction of the asphaltic concrete patch and surface courses shall be Type S-III and S-I Asphaltic Concrete conforming to DOT Sections 330, 331, 337 and 916. Final wearing surface shall be Type S-III.

E. Reclaimed asphalt shall not be used.

PART 3 -- EXECUTION

3.1 PAVEMENT REMOVAL ANDREPLACEMENT

A. General: All existing utility castings, including valves boxes, junction boxes, manholes, handholes, pull boxes, inlets and similar structures in the areas of trench restoration and pavement replacement shall be adjusted by the CONTRACTOR to bring them flush with the surface of the finished work, at no additional cost to the CITY.

B. The CONTRACTOR shall be responsible for the protection from damage from his construction operations, all pavements, including all lime rock base courses and asphaltic surface courses, within the work area. Any base course or surface course, damaged as a result of the CONTRACTOR's operation, shall be restored in accordance with the applicable requirements of these Contract Documents, to the satisfaction of the CITY, and to the satisfaction of the governing authority having jurisdiction over the work area at no additional cost to the CITY. In order to protect himself from being held liable for any existing damaged pavement, including detour routes, the CONTRACTOR is advised to notify, in writing, the authority having jurisdiction over the street where such defective pavement exists prior to proceeding with any work in the vicinity. A copy of all such notices shall be forwarded to the CITY.

C. Wherever the line of the nominal repaving for trenches extends to within two feet of the edge of the existing paving, the CONTRACTOR shall repave to this edge.

D. Permanent pavement repair shall be in accordance with the details shown on the Drawings or as directed by the CITY, with edges straight and parallel and patches rectangular in plan. Any paving replacement required beyond the limits shown in the details, and as called for in the Specifications, shall be at the CONTRACTOR's expense.

E. Pavement markings removed or obliterated by the CONTRACTOR's operations shall be promptly replaced in kind by him at his expense, to the satisfaction of the authority having jurisdiction over the work area.

F. Asphaltic concrete mixtures shall be obtained only from plants which comply with the requirements of DOT Section 320 as applicable, using materials specified herein, and producing the specified mixture. General construction requirements for all hot bituminous mixtures specified herein shall conform to DOT Section 330, as applicable.

G. No mixture shall be spread when the air temperature is less than 40 degrees F, nor when the spreading cannot be finished and compacted during daylight hours.

H. Any mixture caught in transit by a sudden rain may be laid at the CONTRACTOR's risk, if the base is in suitable condition. Under no circumstances shall asphalt material be placed while rain is falling or when there is water on the area to be covered.

I. Traffic Loops: Traffic loops removed or damaged during construction, or rendered inoperative because of cutting the traffic loop home run, shall be replaced. New traffic loops shall be provided; splicing will not be allowed.

J. Temporary Paving: Prior to commencing excavation, the asphalt surface shall be sawcut within the limits of the allowable trench width. Temporary paving will be required along the entire route where the original paved surface is removed. Temporary paving shall be placed as soon as possible after the trench has been backfilled and compacted per the Specifications. The trench should be backfilled and compacted up to a level 1 inch below the existing pavement surface, and a temporary, cold mixed sand/asphalt pavement shall be constructed up to the level of the existing pavement surface. The liquid asphalt shall be Grade RC-70, conforming to the requirements of DOT Section 916-2. The sand shall conform to the requirements of DOT Section 902 for fine aggregate.

K. The cold mix is to be installed one block at a time, not crossing any intersections, or to a maximum of 1,200 feet. Work in said 1,200 feet shall be completed before the CONTRACTOR may move forward with his excavation work. Backfill, compaction and temporary paving is to keep pace with the pipe installation.

L. The temporary pavement shall be maintained by the CONTRACTOR in a condition satisfactory to the CITY until its removal. Removal shall include any surplus backfill material. The removed temporary pavement and surplus backfill material shall be properly disposed of by the CONTRACTOR, at his expense.

M. No payment shall be made for temporary paving work. The cost for such work shall be considered incidental to pipeline construction and included in the bid prices for the respective pipe payment items.

N. Sand seal on the lime rock base course will not be permitted in lieu of temporary paving.

3.2 PAVING

A. General: The CONTRACTOR shall remove the temporary pavement and any surplus backfill and shall replace it with the specified compacted lime rock base course to the extent required by the Contract Documents. Additionally, when a pipeline is installed in a lane parallel to the roadway, restoration shall be for the width of one full traffic lane.

B. Replacement of temporary pavement with the permanent pavement shall be made within 30 days. This work shall be completed in sections compatible with specified traffic maintenance procedures.

C. All paving work shall be completed according to the Contract Documents and DOT Standards. Where the two are not in agreement, the more stringent requirement shall prevail.

D. Subgrade: The backfill previously placed and compacted shall be excavated to the required depth below the existing road surface, and the existing paving shall be cut back to a width of one full lane, using an abrasive disc saw to trim the edges to straight and true lines. Roadway base material shall be compacted to a minimum of 100% of maximum dry density, as determined by AASHTO T-180 (Modified Proctor Test). Subgrade material under paved areas shall be compacted to a minimum of 100% of maximum dry density. Shoulder areas and swale areas beyond shoulders shall be compacted to a minimum of 95% of maximum dry density, all as determined by AASHTO T-99-C (Standard Proctor Test).

E. Density tests shall be taken at each 6" lift of base rock and each 8" lift of compacted fill or backfill, according to the following schedule, prior to the placement of succeeding lifts.

F. For any road crossing in which the road is cut and restored one lane at a time, one density test shall be taken in each lane at each lift.

G. For any road crossing in which the road is cut and restored two lanes at a time, densities shall be tested in one lane per lift, alternating lanes with each lift.

H. For any road crossing in which the road is cut and restored three lanes at a time, densities shall be tested in two locations per lift, staggering locations with each successive lift.

I. Cuts in roads shall not be left open overnight unless permission has been obtained, and a specific set of procedures has been accepted, on a case-by-case basis from the CITY. Trenches shall be backfilled and a temporary asphalt applied to make a smooth level patch. The trenches shall then be excavated the next day and permanent backfill and pavement installed in accordance with these standards. The only exceptions will be in cases where the facility installed must be tested before the roads are restored. In these cases, the permanent restoration must be performed on the day of testing or the next day.

J. In cases where the installation parallels the roadway and damages the pavement, the density tests shall be made every 100 linear feet at each lift, with test locations staggered at 25 feet each lift.

K. After spreading of the base material is completed, the entire surface shall be scarified and shaped so as to produce the exact grade and cross section after compaction. For double course base, this scarifying shall extend to a depth sufficient to penetrate slightly the surface of the first course.

L. When the material does not have the proper moisture content to ensure the required density, wetting or drying shall be required. If the material is deficient in moisture, water will be added and uniformly mixed in by disking the base course to its full depth. If the material contains an excess of moisture, it shall be allowed to dry before being compacted. Wetting and drying operations shall involve manipulation of the entire width and depth of the base as a unit. As soon as proper conditions of moisture are attained, the material shall be compacted to an average density not less than 98 percent maximum density as determined in more than one course, the density shall be obtained in each lift of the base.

M. During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density determinations on the finished base.

N. Unless otherwise directed by the CITY, the surface shall be "hand-planed" with a blade grader immediately prior to the application of the prime coat to remove the thin glaze or cemented surface and to allow free penetration of the prime material. The materials planed from the base shall be removed from the base area.

O. If cracks or checks appear in the base, either before or after priming, which in the opinion of the CITY, would impair the structural efficiency of the base course, the CONTRACTOR shall remove such cracks or checks by re-scarifying, reshaping, adding base material where necessary and recompacting, at no additional cost to the CITY.

P. Mixing Base and Subgrade: If at any time the subgrade material shall become mixed with the base course material, the CONTRACTOR shall, reshape and compact the subgrade and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.

Q. Prime Coat: After the lime rock base course has been properly prepared and is clean, dry and ready to receive the wearing surface, a prime coat shall be uniformly applied at a rate of
0.15 gallon per square yard, immediately followed by the asphaltic concrete. The work shall be performed in accordance with Section 300 of the DOT Specifications. The prime coat shall be applied to the entire lime rock base course uniformly, and shall thoroughly coat all surfaces. Care shall be taken to apply the prime coat and bond the edges of surrounding pavement. The prime coat shall not advance ahead of the paving by more than 300 feet in business or residential areas, unless otherwise authorized by the CITY. All work associated with prime coats shall comply with DOT Section 300.

R. Permanent Asphaltic Concrete Patch: The spreading, compacting and jointing of the permanent asphaltic concrete patch shall be in accordance with DOT Sections 330 and 331 to the thickness indicated on the Drawings.

S. Where the width of the repair permits, the material shall be placed by means of an acceptable mechanical spreader and finisher. The mixture shall be compacted to true grade and cross section by means of a tandem roller weighing not less than eight tons. The compacted asphaltic concrete mixture shall not be, in any case, less than one inch in thickness. Rolling shall proceed as closely behind the spreader as possible, and all material shall be completely compacted the same day it is placed.

T. Tack Coat: After the asphaltic concrete patch has been properly prepared and is clean, dry and ready to receive the asphaltic concrete overlay, a tack coat shall be uniformly applied at a rate of 0.10 gallon per square yard, immediately followed by the asphaltic concrete overlay. The tack coat shall be applied to the entire asphaltic concrete patch uniformly, and shall thoroughly coat all surfaces. Care shall be taken to apply the tack coat and bond the edges of surrounding pavement. The tack coat shall not advance ahead of the paving by more than 300 feet in business or residential areas, unless otherwise authorized by the CITY. All work associated with tack coats shall comply with DOT Section 300.

3.3 OVERLAYS

A. Overlays shall consist of a machine-laid asphaltic concrete wearing surface overlay which shall be nominal one-inch thick asphaltic concrete meeting the material requirements of the previously specified pavement repairs.

B. In general, the overlay will be applied in a full lane width or widths, after the permanent paving repairs over the trench have been made.

C. All longitudinal and transverse asphalt replacement overlay wearing surfaces shall butt into adjacent existing asphalt wearing surfaces in full lane asphalt restoration. The finish elevation of the new full lane overlay shall meet existing elevations adjacent to the new work.

D. The existing asphaltic concrete surface shall be saw cut for its full depth or 1-inch minimum, and then stripped back for at least 2 feet into the area to be overlaid to a second cut which shall also be in clean, straight lines. The second, or interior, cut edge shall be rolled with a tandem roller weighing not less than 8 tons before the overlay is applied. The stripped area shall be used to provide a smooth transition between the overlay and the existing pavement. Before placing the overlay, all cut edges and the stripped area shall be tack coated with emulsified asphalt as specified herein below.

E. If the CONTRACTOR requests in writing to "feather" the longitudinal edge, and if written permission is granted to "feather" the asphalt by the CITY, a sanded mix of 70-30 type shall be used. "Feathering" shall begin 18 inches from the tapered edge.

F. Prior to installing a full lane width overlay over existing asphalt, the trench and shoulders over the pipe shall be sawcut and filled with asphalt to the required depth and terminating flush with the existing adjacent asphalt in accordance with the municipality having jurisdiction over the work. The overlay shall be installed as detailed above.

G. When a minor amount of asphalt surface will remain, generally with large pipe installations after the pipe is installed and the required longitudinal saw cutting the asphalt, the CONTRACTOR may request permission to remove all the asphalt in the lane, at his expense, by saw cutting the asphalt adjacent to the existing lane, then placing the overlay flush with the adjacent asphalt. This would require that the previously specified pavement repairs finish elevation be lowered 1 inch to allow for the overlay.

H. Before the overlay is applied, existing surfaces shall be swept clean of dirt and debris, using a power-driven broom if warranted by the size of the location to be overlaid as determined by the CITY. Pavement edges shall be cleared of all encroaching vegetation, loose sand, rock and all other foreign matter. When the existing surface is thoroughly clean, a tack coat of Emulsified Asphalt shall be applied at the rate of approximately 0.10 gallon per square yard, immediately followed by the asphaltic concrete overlay. The tack coat shall not advance ahead of the paving by more than 300 feet in business or residential areas, unless otherwise acceptable to the CITY.

I. Machine-laid overlay shall be placed by means of an approved mechanical spreader and finisher, and the mixture shall be compacted to true grade and cross section by means of a tandem roller weighing not less than 8 tons.

J. The compacted overlay shall be thicker as required to produce a smooth, uniform surface, free of any irregularities, but shall not be less than one inch in thickness. Existing depressed areas in the asphalt collecting water after a rainfall shall be corrected before placing the asphalt overlay. Rolling shall proceed as close behind the spreading of the asphalt as possible, and all materials shall be completely compacted the same day it is placed.

3.4 PAVEMENT REPAIR

A. All damage to pavement as a result of work under this Contract shall be repaired in a manner satisfactory to the CITY and at no additional cost to the CITY. The repair shall include the preparation of the subgrade, the placing and compacting of the lime rock base, the priming of the base, the placing and maintaining of the surface treatment, all as specified herein.

B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage. The edge of the pavement to be left in place shall be cut to a true edge with a saw or other method acceptable to the CITY so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities.

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SECTION 02512 – PAVEMENT, CURB AND SIDEWALKS

PART 1 -- GENERAL

1.1 SCOPE

A. Damaged concrete pavement, curbs and sidewalks, and other improvements shall be reconstructed as new to existing lines and grades and dimensions. Where pavement, curbs, and sidewalks are partially damaged on private property, the CONTRACTOR shall fully reconstruct the structure in-kind to provide an entirely new structure.

1.2 SUBMITTALS

A. Shop drawings for reinforcing, joint material and mix designs shall be submitted for review in accordance with the Section entitled “Submittals”.

PART 2 -- PRODUCTS

2.1 CONCRETE

A. Concrete shall be Class B as specified in Division 3, unless noted or specified otherwise.

2.2 REINFORCING AND WELDED WIRE FABRIC

A. Joint reinforcing and welded wire fabric shall conform to the requirements of Division 3.

2.3 PREFORMED JOINT FILLER

A. Preformed joint filler shall be sponge rubber or cork and conform to the requirements of AASHTO Designated M153, Type I or II.

2.4 CURING COMPOUND

A. Curing Compound shall conform to the requirements of AASHTO M148, Type I.

PART 3 -- EXECUTION

3.1 SUBGRADE CONDITION

A. The finished subgrade shall be maintained in a smooth, compact condition and any areas which are disturbed prior to placing of the concrete shall be restored at no additional cost to the CITY.

B. The subgrade shall be moist at the time the concrete is placed. Water shall be uniformly applied ahead of the paving operations as directed by the CITY. If the CONTRACTOR does not maintain the subgrade in the required moist condition, a

polyethylene sheet vapor barrier will be required between the subgrade and the concrete.

C. The subgrade shall be accurately trimmed to the required elevation with a 1/4-inch tolerance. High areas shall be trimmed to proper elevation. Low areas may be filled with suitable material and compacted to the specified density or filled with concrete integrally with the placing of the pavement.

D. Boulders, rocks or obstructions larger than 1-inch diameter shall be removed to a minimum depth of 6-inches below finished subgrade. The subgrade shall be compacted at optimum moisture content to 98 percent of maximum dry density in accordance with ASTM D1557 method D.

3.2 SETTING FORMS

A. The forms shall be accurately set to line and grade and such that they rest firmly, throughout their entire length upon the compacted subgrade surface. Forms shall be joined neatly and tightly and braced to test the pressure of the concrete and the finishing operations. The alignment and grade of all forms shall be approved before and immediately prior to the placing of concrete.

3.3 MIXING CONCRETE

A. Concrete shall be mixed in accordance with Division 3.

3.4 PLACING CONCRETE

A. The concrete shall be distributed on the subgrade to such depth, that, when it is consolidated and finished, the slab thickness required by the Drawings will be obtained at all points and the surface will at no point be below the grade specified for the finished surface, after application of the allowable tolerance. The concrete shall be deposited on the subgrade in a manner which will require as little re-handling as possible.

B. Fabric reinforcement shall be placed at mid slab depth, and the fabric shall be maintained at this location during the placing and finishing operations.

C. Concrete shall be thoroughly consolidated against and along the faces of all forms, by means of hand-operated, spud-type vibrators. Vibration at any one location shall not continue so long as to produce puddling or the accumulation of excessive grout on the surface. In no case shall the vibrator be operated longer than 15 seconds in any one location.

3.5 STRIKING-OFF, CONSOLIDATING AND FINISHING CONCRETE

A. Immediately after the placing, the concrete shall be struck off, consolidated and finished, to produce a finished pavement conforming to the cross section, width and surface sequence of operations shall be as follows: strike-off; vibratory consolidation; screening; floating; removal of laitance; straight-edging; and final surface finish.

3.6 STRAIGHT-EDGING AND SURFACE CORRECTIONS

A. After floating has been completed and the excess water removed, but while the concrete is still in a plastic state, the surface of the concrete shall be tested for trueness with an accurate 10 foot straight-edge. The straight-edge shall be furnished by the CONTRACTOR. The straight-edge shall be held in successive positions parallel to the road center line, in contact with the surface, and the whole area tested from one side of the slab to the other as necessary. Any depressions shall be immediately filled with freshly mixed concrete and struck-off; consolidated and refinished. High areas shall be cut down and refinished. Straight-edge testing and surface correction shall continue until the entire surface appears to conform to the required grade and cross section.

3.7 FINAL FINISH

A. As soon as the water sheen has disappeared from the surface of the pavement and just before the concrete becomes non-plastic, a light broom finish shall be given to the surface.

3.8 EDGING

A. After the final finish has been applied, but before the concrete has become non-plastic, the edges of the pavement along each side of the strip being placed, on each side of construction joints and along any structure extending into the pavement, shall be carefully rounded to a 1/4-inch radius except as otherwise indicated. A well-defined and continuous radius shall be produced and a smoother, dense mortar finish obtained. All concrete shall be completely removed from the top of the joint filler.

B. All joints shall be checked with a straight-edge before the concrete has become non-plastic and, if one side of the joint is higher than the other or the entire joint is higher or lower than the adjacent slabs, corrections shall be made as necessary.

3.9 JOINTS

A. Construction Joints: Construction joints shall be located as directed by the CITY.

B. Expansion Joints around Structures: Expansion joints shall be formed by placing premolded expansion joint material about all structures and features projecting through, into or against the pavement. Unless otherwise indicated, such joints shall be 1/2 inch in width. Expansion joints shall be sealed with a joint sealer. Sealant application procedures shall be as recommended by the manufacturer.

C. Transverse Expansion Joints: Open type transverse expansion joints shall be provided at all sidewalk returns and at 50 feet intervals and wherever indicated on the Drawings. Open type joints shall be formed by staking a 1/4-inch-thick metal bulkhead in place and placing concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, the bulkhead shall be removed. After the sidewalk has been finished over the joint, the slot shall be opened and edged with a tool having a 1/2-inch radius. Transverse expansion joints shall be cleaned and filled with joint filler strips 1/4-inch-thick conforming to the requirements of AASHTO M-153 and sealed with a joint sealer. Sealant application procedures shall be as recommended by the manufacturer.

D. Scored Joints: Scored joints shall be either formed or sawed at 5-foot intervals and shall extend to a depth of at least one fourth of the sidewalk slab thickness.

3.10 CURING

A. After the finishing operations have been completed and as soon as the concrete has hardened sufficiently that marring of the surface will not occur, the entire surface and the edges of the newly placed concrete shall be covered and cured with membrane curing compound.

B. Curing compound shall be uniformly applied to the surfaces to be cured, in a single coat, continuous film, at the rate of one gallon to not more than 200 square feet, by a mechanical sprayer.

C. Curing compound shall not be applied during periods of rainfall. Curing compound shall not be applied to the inside faces of joints to be sealed. Should the film become damaged from any cause within the required curing period, the damaged portions shall be repaired immediately with additional compound. Upon removal of side forms the sides of the slabs exposed shall immediately be coated to provide a curing treatment equal to that provided for the surface.

3.11 SIDEWALK CONSTRUCTION

A. The CONTRACTOR shall furnish a template and shall thoroughly check the subgrade prior to depositing concrete. Sidewalks shall be given a light broom finish.

3.12 CURBS

A. Curbs shall be constructed in uniform sections ten feet in length except where shorter sections are necessary for closures or arcs. The sections shall be separated by sheet metal templates set perpendicular to the face and tip of the curve and not less than 2 inches longer than the depth of the curb. The templates shall be held firmly during the placing of the concrete and shall be allowed to remain in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.

B. After the concrete has sufficiently set for a minimum of 12 hours, the CONTRACTOR shall remove the forms and backfill the spaces on each side. The earth shall be compacted in satisfactory manner without damage to the concrete work. Minor defects shall be filled with a mortar composed of one-part Portland cement and two parts fine aggregate.

3.13 PAVEMENT CURB AND SIDEWALK REPAIR

A. All damage to pavement, curb or sidewalk as a result of work under this Contract shall be repaired in a manner satisfactory to the CITY and at no additional cost to the CITY. The repair shall include all work as specified herein.

B. The width of all repairs shall extend at least 12 inches beyond the limit of the damage. The edge of the pavement curb or sidewalk to be left in place shall be cut to a true edge with a saw or other approved method so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities.

- END OF SECTION -

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SECTION 02580 - PAVEMENT MARKING AND SIGNS

PART 1 -- GENERAL

1.1 SCOPE

A. This Section consists of reflective pavement markers, traffic stripes and markings and traffic signs as specified herein, and as required for a complete installation.

1.2 SUBMITTALS

A. The CONTRACTOR shall submit Shop Drawings and other information to the CITY for review in accordance with the Section entitled “Submittals”.

1.3 QUALITY CONTROL

A. The phrase “DOT Specifications” shall refer to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction. The DOT Specifications, are referred to herein and are hereby made a part of this Contract to the extent of such references, and shall be as binding upon the Contract as though reproduced herein in their entirety.

1.4 CERTIFICATION

A. The CONTRACTOR shall furnish the manufacturer’s certification that all signs furnished conform to these specifications and shall replace or repair at his expense all signs that fail to meet this requirement.

PART 2 -- PRODUCTS

2.1 PAVEMENT MARKING

A. CONTRACTOR shall replace any existing reflective pavement markers, traffic stripes and markings damaged during construction.

B. Paint for traffic stripes and markings shall be in conformance with DOT specification “Thermoplastic Traffic Stripes and Markings Paint” 711-12. The colors of the paint shall be yellow or white as existed before the repair.

C. Reflective pavement markers shall be in conformance with DOT specification Section 706-2.

2.2 TRAFFIC SIGNS

A. General: CONTRACTOR shall replace signs damaged during construction. Traffic regulating signs shall conform to the colors, dimensions and requirements of the Manual on Uniform Traffic Control Devices (ANSI).

B. Sign Panels and Support Members: Sign panels and support members shall conform to Aluminum Association Alloy 6061-T6.

C. Bolts: Bolts shall conform to Aluminum Association Alloy 2024-T4 with an anodic coating 0.0002-inches thick minimum and chromate sealed.

D. Nuts: Nuts shall conform to Aluminum Association Alloy 6269-T9.

E. Reflective Sheeting: Reflective sheeting shall conform to DOT Type A requirements.

F. Construction Warning Signs: The CONTRACTOR shall install traffic and warning signs during construction in accordance with OSHA, DOT and County requirements.

PART 3 -- EXECUTION

3.1 PAVEMENT MARKING

A. The surface which is to be painted shall be cleaned, by compressed air or other effective means, immediately before the start of painting, and shall be clean and dry when the paint is applied. Any vegetation or soil shall be removed from the pavement before edge striping is begun.

B. The traffic stripe shall be of the specified width, with clean, true edges and without sharp breaks in the alignment. A uniform coating of paint shall be obtained and the finished stripe shall contain no light spots or paint skips. Any stripes which do not have a uniform, satisfactory appearance, both day and night, shall be corrected.

C. All newly painted stripes, including edge stripes, shall be protected until the paint is sufficiently dry to permit vehicles to cross the stripe without damage from the tires. While the center line stripes are being painted, all traffic shall be routed away from the painting operations and the newly painted stripe. When necessary, a pilot car shall be used to protect the painting operations from traffic interference.

D. Any portions of the stripes damaged by passing traffic or from other cause shall be repainted at the CONTRACTOR's expense.

1. Thermoplastic Traffic Stripes and Markings: Thermoplastic pavement markings, including stripes, pavement messages, stop bars, directional arrows, reflective pavement markers and other miscellaneous items, will be replaced as existed before the repair was made. The thermoplastic compound shall be as specified in Section 711 of the D.O.T. Specifications. The thermoplastic compound shall be extruded or sprayed onto the pavement surface in a molten state by mechanical means, with surface application of glass spheres, when required, and upon cooling to ambient pavement temperature shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation.

E. The portion of the pavement surface or thermoplastic marking to which the marker is attached by the adhesive shall be cleaned of dirt, curing compound, grease, oil,

moisture, lose or unsound pavement and any other material which would adversely affect the adhesive. Reflective markers shall be installed in such a manner that the reflective face of the marker is perpendicular to a line parallel to the roadway centerline. No markers shall be installed over longitudinal or transverse joints of the pavement surface. The adhesive shall be spread on the bonding surface (not the marker) so that
100 percent of the bonding area of the marker will be covered. The adhesive application shall be of sufficient thickness so that when the marker is pressed into the adhesive, excess adhesive shall be forced out around the entire perimeter of the marker. All excessive adhesive shall be removed from in front of the reflective faces, if any adhesive or foreign matter adheres to the reflective face of the marker, the marker shall be replaced. The CITY shall determine the minimum time necessary to cure the adhesive for sufficient set to bear traffic.

F. Reflective pavement markings shall be placed at locations of fire hydrants and watermain valves as required by CITY standards.

3.2 SIGN FABRICATION

A. Preparation of sign blanks and fabrication of reflectorized faces shall conform to the applicable requirements of DOT Section 700-4 and 700-5.

3.3 INSTALLATION

A. Sign and supports shall be erected in conformance to DOT requirements and as specified herein.

B. All damaged signs and reflective pavement markers and traffic stripes and markings shall be replaced in conformance with this Section and DOT requirements.

- END OF SECTION -

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SECTION 02750 - WASTEWATER FLOW CONTROL

PART 1 -- GENERAL

1.1 SCOPE OFWORK

A. The work specified in this Section includes all labor, materials, accessories, equipment and tools for performing all operations required to bypass pump sewage around a manhole or sewer section in which work is to be performed. The CONTRACTOR shall be prepared to bypass pump sewage as a part of his operations.

B. The work specified in this Section also includes all labor, materials, accessories, equipment and tools for performing all operations required to bypass pump sewage around a section of force main in which work is to be performed, or around a manhole into which a force main discharges if work is to be performed in the manhole. The CONTRACTOR shall be prepared to bypass pump sewage as a part of his operations.

C. The CONTRACTOR shall provide all pumps, piping, and other equipment to accomplish this task; perform all construction; obtain all permits; pay all costs; and perform complete restoration of all existing facilities to equal or better condition to the satisfaction of the CITY.

1.2 GENERAL

A. When sewer line flows at the upstream manhole of the line being repaired are above the maximum allowable requirements for television survey, or do not allow the proper sewer or manhole repair, the flows shall be reduced to the levels indicated by one of the following methods: manual operation of pumping stations by CITY forces, by the CONTRACTOR plugging/blocking of the flows, or by the CONTRACTOR pumping/bypassing of the flows as acceptable to the CITY.

B. In some applications, the wastewater flow may be plugged and contained within the capacity of the collection system. This shall only be done when it has been determined the system can accommodate the surcharging without any adverse impact.

C. For the initial television survey, before and after any repair with the exception of joint testing and sealing, the sewer line shall be blocked completely. No flow, except infiltration/inflow, will be allowed through the respective sewer line being televised on the pre-repair television survey, and the post-repair television survey.

D. For all other television surveys, including warranty surveys and joint testing and sealing operations, the depth of flow within the sewer shall not exceed that shown below for the respective pipe sizes as measured in the manhole.

1. Maximum Depth of Flow – Warranty Television Survey

6" - 10" Pipe	20% of pipe diameter
12" - 24" Pipe	25% of pipe diameter
Above24" Pipe	30% of pipe diameter

2. Maximum Depth of Flow – Joint Testing/Sealing

6"- 12" Pipe ..... 25% of pipe diameter

15" - 24" Pipe..... 30% of pipe diameter

Above24" Pipe..... 35% of pipe diameter

E. When sewer line flows upstream of the manhole or pipe section being repaired, in the opinion of the CITY, are too excessive to plug while the rehabilitation is being performed, the CONTRACTOR shall submit a written plan and pump/bypass the flow as acceptable to the CITY.

F. When flows of sewage through a force main being repaired, or discharging by gravity or force main to a manhole being repaired, are in the opinion of the CITY too excessive to plug or stop while the rehabilitation is being performed, the CONTRACTOR shall submit a written plan and pump/bypass the flow as acceptable to the CITY.

1.3 SUBMITTALS

A. The CONTRACTOR shall submit complete, detailed plans for this aspect of the work to the CITY for review.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION

3.1 PLUGGING AND BLOCKING

A. A sewer line plug shall be inserted into the line at a manhole upstream from the section being surveyed or repaired. The plug shall be so designed that all or any portion of the operation flows can be released. During the survey portion of the operation, flows shall be shut off or reduced to within the maximum flow limits specified. During repairs, the flows shall be shut off or pumped / bypassed, as acceptable to the CITY. After the work tasks have been completed, flows shall be restored to normal.

3.2 PUMPING AND BYPASSING

A. When pumping/bypassing is required, as determined by the CITY, the CONTRACTOR will supply the necessary pumps, conduits and other equipment to divert the flow of sewage around the manhole or pipe section in which work is to be performed. The bypass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during periods of rain storms. The CONTRACTOR will be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system. A "setup" consists of the necessary pumps, conduits and other equipment to divert the flow of sewage around a manhole or pipe section, from the start to finish of work performed in the manhole or pipe section.

B. Pumps and equipment shall be continuously monitored by a maintenance person capable of starting, stopping, refueling and maintaining these pumps during the rehabilitation. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum.

C. In the case of bypassing force main flows, whether such flows normally discharge into a manhole being repaired or pass through a force main being repaired, the CONTRACTOR shall propose a bypass method for review and approval by the CITY.

3.3 FLOW CONTROL PRECAUTIONS

A. Surcharging Sewers. Where the raw sewage flow is blocked or plugged as part of the CONTRACTOR'S operations, all precautions must be taken to protect the public health. No septic conditions shall be allowed due to CONTRACTOR's operations. The sewer lines shall also be protected from damage. The following occurrences shall not be allowed:

1. No sewage shall be allowed to back up into any homes or buildings.

2. No sewage shall overflow any manholes, cleanouts or any other access to the sewers.

3. Users upstream of the repair area shall be able to use all their water and sewer utilities without interruption.

B. If any of the above unallowable conditions occur or are expected to occur, the CONTRACTOR shall bypass pump to alleviate one or all of the conditions. Additionally, the CONTRACTOR is required to observe the conditions upstream of the plug and be prepared to immediately start bypass pumping, if needed. It is CONTRACTOR's responsibility to pay for all damage claims.

C. Pumps. Any sump pumps, bypass pumps, trash pumps or any other type pump which pulls sewage/water or any type of material out of the manhole or sewer shall discharge this material into another manhole, or appropriate vehicle or container acceptable to the CITY. Under no circumstances shall this material be discharged, stored or deposited on the ground, swale, road or open environment.

D. Traffic Control. The CONTRACTOR shall take appropriate steps to ensure that all pumps, piping and hoses that carry raw sewage are protected from traffic. Traffic control shall be performed in accordance with Section 01570 - Traffic Regulation and Maintenance of Traffic.

E. Sewage Spills. In the event, during any form of "Sewage Flow Control", that raw sewage is spilled, discharged, leaked or otherwise deposited in the open environment, due to the CONTRACTOR's work, the CONTRACTOR is responsible for any cleanup of solids and disinfection of the area affected. This work will be performed at the CONTRACTOR's expense with no additional cost to the CITY. The CONTRACTOR is also responsible for notifying the sewer system maintenance personnel and complying with any and all regulatory requirements in regards to the size spill with no additional cost to the CITY.

- END OF SECTION -

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SECTION 02751 - PREPARATORY CLEANING AND ROOT REMOVAL

PART 1 -- GENERAL

1.1 SCOPE

A. This Section covers the preparatory cleaning of sewer lines and manholes as needed prior to the internal survey of the sewer lines by closed-circuit television. It also covers the preparatory cleaning and root removal of sewer lines and the cleaning of manholes prior to rehabilitation. The CONTRACTOR shall furnish all necessary material, labor, equipment and services required for cleaning the specific sewer lines.

1.2 GENERAL

A. Sewer Line Cleaning. The intent of sewer line cleaning is to remove foreign materials from the lines and restore the sewer to a minimum of 95% of the original carrying capacity or as required for proper seating of internal pipe joint sealing packers or performance of other specified work. It is recognized that there are some conditions such as broken pipe and major blockages that prevent cleaning from being accomplished or where additional damage would result if cleaning were attempted or continued. Should such conditions be encountered, the CONTRACTOR will not be required to clean those specific sewer sections. If, in the course of normal cleaning operations, damage does result from preexisting and unforeseen conditions such as broken pipe, the CONTRACTOR will not be held responsible.

B. Manhole Cleaning General. All concrete and masonry surfaces must be cleaned prior to repair. Grease, laitance, loose bricks, mortar, unsound concrete, and other materials must be completely removed. Water blasting (minimum 1,200 psi) utilizing proper nozzles shall be the primary method of cleaning; however, other methods such as wet or dry sandblasting, acid wash, concrete cleaners, degreasers or mechanical means may be required to properly clean the surface. Surfaces on which these methods are used shall be thoroughly rinsed, scrubbed, and neutralized to remove cleaning agents and their reactant products.

1.3 HYDRAULIC CLEANING EQUIPMENT

A. Hydraulically Propelled Equipment. The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to insure removal of grease. If sewer cleaning balls or other equipment which cannot be collapsed is used, special precautions to prevent flooding of the sewers and public or private property shall be taken.

B. High-Velocity Jet (Hydro cleaning) Equipment. All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.

C. Mechanically Powered Equipment: Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat-treated steel. To insure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION

3.1 GENERAL

A. The designated sewer sections shall be cleaned using hydraulically propelled, high-velocity jet, or mechanically powered equipment. The equipment shall dislodge, transport and remove all sludge, mud, sand, gravel, rocks, bricks, grease, roots, sticks, and all other debris from the interior of the sewer pipe and manholes. The equipment and methods selected shall be based on the conditions of lines and manholes at the time the work commences and shall be satisfactory to the CITY. If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be set up on the other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, the cleaning effort shall be stopped and sufficient inspection performed so that the CITY can be notified of the reason for inability to continue.

3.2 CLEANING PRECAUTIONS

A. During all cleaning and preparation operations all necessary precautions shall be taken to protect the sewer from damage. During these operations, precautions shall also be taken to ensure that no damage is caused to public or private property adjacent to or served by the sewer or its branches.

B. Satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard the flow in the sewer line are used, precautions shall be taken to ensure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. When possible, the flow of sewage in the sewer shall be utilized to provide the necessary pressure for hydraulic cleaning devices. When additional water from fire hydrants is necessary to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily. The CONTRACTOR shall employ operational hydrant meters to be obtained from the CITY, and shall obtain water only from the CITY's hydrants. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant.

3.3 MATERIAL REMOVAL

A. All sludge, dirt, sand, rocks, grease, roots, and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section, which could cause line stoppages, accumulations of sand in wet wells, or damage pumping equipment, shall not be permitted.

B. Under no circumstances shall sludge or other debris removed during these operations be dumped or spilled into the streets, ditches, storm drains or other sanitary sewers. The CONTRACTOR shall remove from the site and properly dispose of all solids or semi-solids recovered during the cleaning operation. The CONTRACTOR shall obtain permits and make arrangements as required to properly dispose of solids.

C. The CONTRACTOR is advised that he shall not dispose of this material by legal or illegal dumping on private or public property, by sale to others, or any means other than those given above.

D. The CONTRACTOR shall keep his haul route and work area(s) neat and clean and reasonably free of odor, and shall bear all responsibility for the cleanup of any spill which occurs during the transport of cleaning/surface preparation by-products and the cleanup of any such material which is authorized by or pursuant to this Contract and in accord with applicable law and regulations. The CONTRACTOR shall immediately cleanup any such spill, or waste. If the CONTRACTOR fails to cleanup such spill, or waste immediately, the CITY shall have the right to cleanup or arrange for its cleanup and may charge to the CONTRACTOR all costs, including administrative costs and overhead, incurred by the CITY in connection with such cleanup. The CITY may also charge to the CONTRACTOR any costs incurred or penalties imposed on the CITY as a result of any spill, dump or discard. Under no circumstances is this material to be discharged into the waterways or any place other than that authorized by the appropriate authority. The term "CONTRACTOR" as used in this section shall include the CONTRACTOR's subcontractors and other Contractors.

E. The general requirements for vehicles hauling such waste materials are as follows: Transport vehicles must be of type(s) approved for this application by the political jurisdictions involved. General requirements are that the vehicles have watertight bodies, that they be properly equipped and fitted with seals and covers to prohibit material spillage or drainage, and that they be cleaned as often as is necessary to prevent deposit of material on roadways. Vehicles must be loaded within legal weight limits and operated safely within all traffic and speed regulations.

F. The routes used by the CONTRACTOR for the conveyance of this material on a regular basis shall be subject to approval by the governing authority having jurisdiction over such routes.

3.4 DISPOSAL OFMATERIALS

A. All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of by the CONTRACTOR in a legal and sanitary manner as approved by appropriate authorities, at the CONTRACTOR's cost. Copies of records of all disposal shall be furnished to the CITY, indicating disposal site, date, amount and a brief description of material disposed. All materials shall be removed from the site no less often than at the end of each workday. Under no circumstances will the CONTRACTOR be allowed to accumulate debris, etc., on the site of work beyond the stated time, except in totally enclosed containers and as acceptable to the CITY.

3.5 ROOT REMOVAL

A. Roots shall be removed in the designated sections and manholes where root intrusion is indicated on the work order. Special attention should be exercised during the cleaning operation to assure almost complete removal of roots from the joints. Any roots which could

prevent the traveling of a packer or could prevent the proper application of chemical sealants, or could prevent the proper seating and application of cured-in-place, fold-and-formed or sectional cured-in-place liners, shall be removed. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners.

3.6 ACCEPTANCE OF CLEANING OPERATION

A. Acceptance of sewer line cleaning shall be made upon the successful completion of the television survey and shall be to the satisfaction of the CITY. Liner installation shall not be initiated until the CITY has reviewed the post-cleaning television survey tapes and has accepted the cleaning. If television survey shows the cleaning to be unsatisfactory, the CONTRACTOR shall be required to reclean and reinspect the sewer line until the cleaning is shown to be satisfactory. In areas where television survey is not performed, the CITY may require the CONTRACTOR to pull a double squeegee (with each squeegee the same diameter as the sewer) through each manhole section as evidence of adequate cleaning. If internal sealing is to follow the television survey, particular attention should be given to the adequacy of the cleaning to ensure that proper seating of the sealing packer can be achieved.

B. In the event that special cleaning involving the mechanical removal of roots, grease, and/or tuberculation has been authorized, acceptance of sewer line cleaning shall be made upon the successful completion of the post-cleaning television survey and shall be to the satisfaction of the CITY. Liner installation shall not be initiated until the CITY has reviewed the post-cleaning television survey tapes and has accepted the cleaning.

C. In addition, on all those lines which have sags or dips, to an extent that the television camera lens becomes submerged for three (3) or more feet during the television inspection, the CONTRACTOR shall pull double squeegee and/or sponges through the line in order to remove the water from those dips or sags, or draft the water by means of high-velocity jet cleaners. Water removal shall be performed until the television camera lens will no longer be submerged. This requirement may be waived by the CITY if the water in which the camera lens is submerged, is clear enough to allow the identification of pipe defects, cracks, holes and location of service taps.

- END OF SECTION -

SECTION 02752 - TELEVISION SURVEY

PART 1 -- GENERAL

1.1 SCOPE

A. The work consists of furnishing all labor, materials, accessories, equipment, tools, transportation, services and technical competence for performing all operations required to execute the internal closed-circuit television survey to inspect the entire barrel of sewers up to 30 inches in diameter.

B. The survey shall show all defects and determine the amount of infiltration entering the sewer system.

C. Work scope shall also include manhole inspections (Level 1 and Level 2) and submittal of reports, in accordance with NAASC MACP guidelines.

1.2 GENERAL

A. After cleaning as specified in Section 02751- Preparatory Cleaning (including special cleaning involving the mechanical removal of roots, grease, and/or tuberculation where authorized), and before and after rehabilitation work, the pipe sections shall be visually surveyed by means of closed-circuit television in the presence of the CITY. The survey shall be performed one manhole-to-manhole section at a time and the flow in the section being surveyed shall be suitably controlled as described in Section 02750 - Wastewater Flow Control.

B. Pre- and post-construction survey video on CD-ROM shall be delivered to the CITY on a “one line per CD-ROM” basis, accompanied with the corresponding work order, and pre- and post-TV log, for each sewer line surveyed. The video on CD-ROM shall be direct from a live video source into a video file, format MPEG1, and of good quality for viewing. Video tapes shall not be accepted.

C. The television equipment operator shall be certified under the NASSCO (National Association of Sewer Service Companies) PACP (Pipeline Assessment and Certification Program).

1.3 EQUIPMENT

A. The television camera used for the survey shall be one specifically designed and constructed for such survey and shall be of the pan and tilt type. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 700-line resolution color video picture. The CONTRACTOR shall maintain camera in clear focus at all times. Picture quality and definition shall be to the satisfaction of the CITY; and if unsatisfactory, equipment shall be removed and replaced with adequate equipment at no additional cost to the CITY.

B. The video camera shall include a title feature capable of showing on the tape the following information:

1. City and State

2. Date/Time

3. CONTRACTOR's Name

4. Line Size, Material, and Depth

5. Manhole Identification (both manholes)

6. On-going Footage Counter

1.4 SUBMITTALS

A. The CONTRACTOR's submittals shall include description of the software to be used and a sample of the video titles to be used, along with a sample of the television survey log to be used.

PART 2 -- PRODUCTS

All inspection information and data (including video) written to digital media (CD-ROM).

PART 3 -- EXECUTION

3.1 PRECONSTRUCTION SURVEY

A. Procedure

1. Prior to any repair work, the entire sewer line (from manhole to manhole) shall be televised. The camera shall be placed at the center of the manhole and videotaping shall commence prior to entering the pipe. The CONTRACTOR shall show the inside of the manhole walls and the pipe connection to the wall at both the upstream and downstream manhole.

2. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case shall the television camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, powered rewinds and tractors or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If the camera is being pulled through the sewer line by a hydraulic cleaning unit hose the cleaning nozzle shall be located a minimum of eight (8) feet away from the camera to allow a clear, unobstructed view. Jet nozzle shall be used in front of the camera while televising through a dip to draft out water. If, during the survey operation, the television camera will not pass through the entire manhole section, the CONTRACTOR shall set up his equipment so that the survey can be performed from the opposite manhole.

3. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being surveyed to insure good communications between members of the crew.

4. Measurement for location of defects shall be above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Measurement meters shall be accurate to tenths of a foot over the length of the section being surveyed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, electronic distance meter or other suitable device. Manhole numbers and linear footage shall be shown on screen during taping.

5. Movement of the television camera shall be temporarily halted for a minimum of ten seconds at each visible point source of infiltration and/or inflow until the leakage rate from that source is quantified. The camera shall be stopped at all service connections and the service lateral shall be inspected with the pan and tilt camera. The camera shall also be stopped at active service connections where flow is discharging. If the discharge persists, the property involved shall be checked to determine whether or not the discharge is sewage. If no flows are being discharged from the building, it shall be considered that the observed flow is infiltration/inflow.

B. Field Documentation

1. Television Inspection Forms (Survey Logs). Printed and electronically stored location records shall be kept by the CONTRACTOR and will clearly show the location in relation to an adjacent manhole of each infiltration point observed during survey. Upstream footage at face of manhole (0) and downstream footage at face of manhole (e.g., 250) shall be shown on the log. The television inspection forms to be utilized by the CONTRACTOR shall be those mandated by NASSCO's PACP. Both the "Header" and "Details" information of the form shall be entered as indicated in the PACP standards. The survey logs shall include, but not be limited to the following information:

   a. Correct pipe segment/manhole numbers

   b. Correct address of manhole location

   c. Pipe size, length and material

   d. Manhole depth (upstream and downstream)

   e. Lift station service area number

   f. CD number and index

   g. Footage locations, descriptions and estimated leak rates for visible point sources of infiltration inflow

   h. Footage locations and descriptions of structural defects such as obstructions, any remaining root intrusion, offset joints, cracked pipe, fractured pipe, holes, collapses, sags, protruding service connections and/or blockages in the pipe.

   The terminology to be used shall follow NASSCO's PACP standards. All information will be recorded, and a copy of such electronic records and a hard copy will be supplied to the CITY.

2. Photographs. Digital photographs of the television picture of problems shall be taken by the CONTRACTOR upon the request of the CITY.

3. Video Recordings. The purpose of video (CD-ROM) recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. CD-ROM recording playback shall be at the same speed that it was recorded. Slow motion or stop motion playback features shall be supplied by the CONTRACTOR. Once recorded, the CD-ROM becomes property of the CITY. The CONTRACTOR shall have all CD-ROM and necessary playback equipment readily accessible for review by the CITY during the Project.

   The observation terminology utilized during audio narration shall be consistent with NASSCO's PACP standards. The television inspection shall be video recorded on high quality CD-W. The CD shall be clearly labeled with the lift station number and individual manhole numbers clearly listed. The CDs are to be furnished to the CITY with a printed hard copy (Survey Logs) and electronic data inspection report.

   Video CDs displaying poor video quality will be deemed unacceptable and no payments will be made until lines are re-televised and a new CD is submitted. Poor video quality refers to, but is not limited to, the following: grease or debris on the lens, camera under water, picture too dark, excessive camera speed through the line, lines improperly cleaned, poor/no audio, etc.

4. Audio. All CD-ROM shall have audio record. As a preamble, at the beginning of the CD-ROM, the CONTRACTOR shall state the following: "*(Contractor's Name) is performing a pre/post TV survey for Job No._____(provided by the CITY), City of Sunrise*". State date, time, operator's name, area, upstream manhole number to downstream manhole number, pipe size and material, upstream manhole depth, and TV survey will be from up- to downstream, or down- to upstream. The CONTRACTOR shall verbally state the station and position of all laterals and defects. At the end of each line, state: "End of line", upstream manhole number to downstream manhole number, and total linear footage.

3.2 POST CONSTRUCTIONSURVEY

A. Procedure

1. The same procedures shall be used as indicated in Section 3.01 PRECONSTRUCTION SURVEY.

2. In addition, the CONTRACTOR shall stop camera at all point repairs, sectional repairs, and reinstated laterals, and inspect entire repaired pipe section.

3. The CONTRACTOR shall invert the white foreground to black as needed in the line section with light background.

4. In the case of a post-liner survey, the CONTRACTOR shall fully televise both ends of the liner at the manhole so that the fit of the liner to the host pipe can be evaluated. At the conclusion of a television survey for a given liner, the CONTRACTOR shall physically turn the camera around to film the liner end, so that the camera is facing back in the direction it just traversed, to ensure an adequate and complete picture.

5. The post-liner television survey shall be done within 2 weeks of liner installation.

B. Documentation

1. The same documentation shall be provided as indicated in Section 3.01 PRECONSTRUCTION SURVEY.

- END OF SECTION -

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SECTION 02753 - MANHOLE REHABILITATION

PART 1 -- GENERAL

1.1 SCOPE

A. Work orders will include the various manhole repairs specified in this Section. Manhole rehabilitation shall be accomplished by the application of materials that will improve the overall structural condition of the manhole. The intent of this portion of the work is to provide for aspects of sewer manhole rehabilitation and sealing using various procedures either singularly or in combination, including type of repair, methods of repair, materials and equipment as required for each manhole scheduled for rehabilitation.

1. Manhole Preparation: These work items include cleaning the manhole, sealing walls and patching the interior surfaces.

2. Manhole Repairs - Critical Leak Areas: These work items include repairing leaks in the wall to base areas, pipe penetrations and manhole joints.

3. Manhole Liners: These work items include installation of cementitious liners and cementitious/polymeric liners.

4. Frame and Cover Repairs: These work items include the repair of frame and cover leaks, realigning and grouting frame, and frame and cover replacement.

1.2 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings and other information as specified in accordance with Section 01300, "Submittals".

B. With the bid, the following submittals are required.

1. Name, business address and telephone number of the Manhole Rehabilitation CONTRACTOR.

2. The name of the manhole lining product suppliers and a list of materials to be furnished, as well as CONTRACTOR's experience with the specified manhole lining products (number of years installing the products, number of manholes lined with the products, and list of references going back five years including customer names, addresses, telephone numbers, and number of manholes). Where the CONTRACTOR proposes to utilize a sub-contractor to apply a manhole lining product, submit all required information for the sub-contractor as well.

3. Five years of previous related experience, as documented by verifiable references, shall be required to be qualified in bidding this project. The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be an approved installer of the manhole lining systems as certified and licensed by the manufacturers.

4. The CITY reserves the right to approve or disapprove the Contractor, based on the submitted qualifications.

C. Prior to contract award, the following submittals are required.

1. Name(s) of all supervisory personnel to be directly involved with Manhole Rehabilitation for this project. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the CITY.

2. A certified statement from the manufacturer that the CONTRACTOR is a certified and/or licensed installer of the manhole lining products. CONTRACTOR shall initiate and enforce quality control procedures consistent with the manufacturer's recommendations. Applicators shall be completely trained and specialized in all aspects of manhole rehabilitation including grouting/sealing for active leak repair, surface preparation and wastewater corrosion materials applications. National Association of Sewer Service Companies.

3. Written descriptions of the manufacturer-recommended procedures for surface preparation, installation, curing, and testing of the specified manhole repair and lining products; construction method(s) and equipment to be used; and locations required for equipment and material access.

4. Where CONTRACTOR is proposing use of an alternate product “equal” to those specified, such use shall be subject to CITY review and approval. The product must meet the CITY’s new product evaluation criteria or have been previously tested by the Miami-Dade Water and Sewer Department and approved for use in that particular condition.

1.3 WARRANTY

A. All manhole lining installed shall be warranted by the CONTRACTOR for a period of two years from the date of final acceptance. During this period, all defects discovered in the lining, as determined by the CITY, shall be repaired or replaced in a satisfactory manner by the CONTRACTOR at no cost to the CITY.

B. Six months before the end of the two-year warranty period, the CONTRACTOR shall undertake spot checks in conjunction with the City. Ten percent (10%) of the manholes shall be selected for inspection, however no less than three (3) per basin area. If fifty percent (50%) or more of these manholes are defective, then an additional ten percent (10%) of manholes will be selected for inspection. The process continues and if applicable, all manholes are inspected. Defects shall be repaired by the CONTRACTOR at no cost to the City.

CONTRACTOR shall allow for returning to spot check manholes in the line items for rehab work; i.e. unit costs shall be inclusive of this effort.

1.4 DELIVERY, STORAGE ANDHANDLING

A. Care shall be taken in shipping, handling and placing to avoid damaging the lining products. Any lining product or material damaged in shipment shall be replaced as directed by the CITY.

B. Any lining product showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work site.

C. While stored, the lining products shall be adequately packaged and protected. The lining products shall be stored in a manner as recommended by the manufacturer.

1.5 SITE CONDITIONS

A. Applicator shall conform to all local, state, and federal regulations including those set forth by OSHA, the EPA, and other applicable authorities.

B. Confined space entry, flow bypass, or maintenance of traffic plans shall be prepared by the CONTRACTOR as required to perform the specified work.

PART 2 -- PRODUCTS

2.1 MANHOLE FRAMES ANDCOVERS

A. All manhole frame and cover material and installation requirements shall be as indicated in these documents.

B. Replacement of manhole frames and covers shall be pursuant to requirements outlined in Section 02754.

2.2 RUBBER SEALS

A. The manhole frame-chimney joint area of manholes and the precast manhole barrel joints shall be sealed with internal flexible rubber seals as manufactured by Cretex Specialty Products, or equal.

B. Internal rubber seals used for sealing the joints between the manhole frame and chimney or corbel/cone section, shall consist of the following components:

1. Rubber Sleeve and Extension: The flexible rubber sleeve extensions and wedge strips shall be extruded from a high-grade rubber compound conforming to the applicable requirements of ASTM C 923, with a hardness (durometer) of 48±5.

a. The sleeve shall be double pleated with a minimum unexpanded vertical height of 8 inches, a minimum thickness of 3/16 inches and shall be capable of a vertical expansion when installed of not less than 2 inches. The top and bottom section of the sleeve shall contain an integrally formed expansion band recess and multiple sealing fins.

b. The extension, if required, shall have a minimum thickness of 3/16 inches. The top section of the extension shall be shaped to fit into the bottom band recess of the sleeve under the bottom chimney seal band. The bottom section of the extension shall contain an integrally formed expansion band recess and multiple sealing fins matching that of the rubber sleeve.

c. Any splice used to fabricate the sleeve and extension shall be hot vulcanized and have a strength such that the sleeve shall withstand a 180-degree bend with no visible separation.

d. The continuous wedge strip used to adapt the rubber sleeve to sloping surfaces shall have the slope differential needed to provide a vertical band recess surface, be shaped to fit into the band recess and have an integral band restraint. The length of the wedge strip shall be such that, when its ends are butted together, it will cover the entire inside circumference of that band recess needing slope adjustment.

2. Expansion Bands: The expansion bands used to compress the sleeve against the manhole shall be 16-gauge stainless steel conforming to ASTM A 240, Type 316, with a minimum width of 1 3/4 inches. The expansion mechanism shall have the capacity to develop the pressures necessary to make a watertight seal and shall have a minimum adjustment range of 2 diameter inches. Studs and nuts used for this mechanism shall be stainless steel conforming to ASTM F 593 and 594, Type 316.

2.3 PREPATORY INFILTRATION CONTROL PRODUCTS

A. Infiltration Control/Plugging Material

1. Prior to installing the manhole lining system, active infiltration shall be controlled according to the specifications of the lining manufacturer. Infiltration control materials shall be rapid-setting, high early strength, hand applied cementitious material for stopping infiltrating water and making repairs to concrete, brick or other masonry constructed manholes. The material shall be non-shrinking, non-metallic and non-corrosive. It shall be formulated at the factory and supplied in the factory sealed and labeled pre-measured containers. The material shall be compatible with the lining material to be used.

2. Product shall be Permacast-Plug as manufactured by Action Products Marketing Corp., Strong-Plug by Strong Company, Preco-Plug by Fosroc Inc., or equal.

B. Chemical Grouting Material

1. Chemical Grouts may be used for stopping very active infiltration and shall be mixed per manufacturer's recommendations and as specified in Section 02763-Chemical Grouting. The chemical grout shall be an extremely low viscosity acrylamide resin with gel times from 5 seconds to several hours. Product shall be AV-100 Chemical Grout as manufactured by Avanti International, or equal. The chemical grout shall be compatible with the lining material to be used.

C. Patching Material

1. Voids in the existing manhole walls or damaged inverts shall be repaired prior to installing the manhole lining system. The patching material shall be a rapid setting, high early strength, corrosion resistant hand mixed and hand applied cementitious material intended for filling voids and repairing inverts in concrete, brick or other masonry constructed manholes. It shall be formulated in the factory and supplied in

factory sealed and labeled pre-measured containers. The material shall be compatible with the lining material to be used.

2. Product shall be Permacast-Patch as manufactured by Action Products Marketing Corp., Strong-Seal QSR by Strong Company, Preco-Patch by Fosroc Inc., or equal.

2.4 CEMENTITIOUS AND EPOXY MANHOLE LINERS

A. Cementitious manhole liner

1. The mortar used for manhole rehabilitation shall be a blend of portland cement, micro silica, thermoplastic fiber, densifiers, admixtures, and other modifiers that produces a high strength, low shrinkage, and low permeability mortar for the rehabilitation of deteriorated concrete structures; produces excellent adhesion to properly prepared existing concrete or brick surfaces; restores structural integrity; seals rough, deteriorated surfaces and resist external hydrostatic water pressure; and, is suitable for permanent water immersion service. Mortar shall be applied at a minimum thickness of ¾inches.

2. The product shall be Mainstay ML-72, GML, Raven, or IET Crete.

B. Epoxy manhole liner

1. The epoxy coating shall be designed for use in applications where corrosion is anticipated or known to be aggressive; be compatible with the above specified mortar material; have a composition of 100 percent solids; be of gloss white color; and provide a high level of adhesive strength and resistance to abrasion. The coating shall be applied at a minimum thickness of 100 mils.

2. The product shall be Mainstay DS-5, GML, Raven, or IET Crete.

2.1 AROMATIC URETHANESEALANT

A. The flexible sealant shall be a two component, aliphatic, chemically curing, urethane sealant. The sealant shall be designed for flexibility from ground movement and extended water immersion when applied to the inside wall of the adjustment ring area. Manhole seal shall be designed to prevent leakage of water into the manhole through the frame joint area and the area the manhole cone, including all extensions to the chimney area. Extension shall include, but is not limited to lifting rings, brick and/or block material that may have been used to achieve grade. The material shall not corrode in municipal sewer environments.

B. The sealant shall be Ring Seal as manufactured by The Rain Stopper, Flex-Seal Utility Sealant as manufactured by Sealing Systems, Inc., or equal.

C. A primer coat of 2-3 mils thickness shall be applied to the prepared surface.

D. The flexible sealant shall be applied on primed surfaces at a thickness of 100 mils or as specified by the CITY. The overlap of the bottom portion of casting and the top of the lowest adjustment ring should be 3 inches or greater.

PART 3 -- EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall perform all work in strict accordance with all applicable OSHA Standards. Particular attention is drawn to those safety requirements involving man entry in confined spaces.

B. Flow Control: Flow control, as specified in Section 02750, "Wastewater Flow Control" shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the manhole under repair.

C. Prior to beginning work, the City will visually review the manhole and confirm the repair procedure indicated on the Work Order.

D. The CONTRACTOR shall notify all property owners who discharge sewage directly to the manhole being repaired that their service will be discontinued while the lining is being placed, cured and active pipe and service connections reopened. The CONTRACTOR shall notify individual property owners at least 72 hours in advance, giving the date, start time and estimated completion time for the work being conducted. This notification shall be coordinated with the distribution of the door hangers. The CONTRACTOR shall reopen all of the existing active pipe connections in each sewer manhole following the repair.

3.2 PREPARATION

A. General:

1. The CONTRACTOR is responsible for properly preparing the existing manhole for lining prior to the installation of the lining system, including stopping all leaks, patching voids, removing steps/rungs, cleaning, and removing debris.

2. The casting and adjusting area of the manhole shall be sandblasted to remove any loose material and rust.

3. The casting and adjusting area of the manhole shall be sandblasted to remove any loose material and rust.

4. Prior to cleaning the manhole, a ¼-inch mesh screen shall be installed at the manhole outlet to catch debris. The CONTRACTOR shall clean all accumulations of debris, such as dirt and grease, loose mortar, bricks and concrete, and dispose of properly.

5. The manhole surface shall be clean, structurally sound and free from oil, grease, loose mortar, paints, protective coatings, efflorescence, laitance and airing compounds. The condition of the manhole may require the use of an environmentally safe degreasing compound; if so, the surface shall be thoroughly rinsed to eliminate any residue.

6. All existing manhole rungs/steps shall be removed and the void patched or cut off and ground smooth.

7. When a cementitious liner or cementitious/epoxy liner is called for in the Work Order, manhole interior shall be high-pressure (4,000 psi) water cleaned and blasted to remove all deteriorated concrete and other loose material. As a minimum, 4 inches of the manhole cover frame area shall also be cleaned by blasting. After the cleaning process, the concrete structure shall be washed with a 5-10 percent solution of muriatic acid. The structure shall be cleaned again with high pressure water to remove acid residual and any loose material. The CONTRACTOR shall make provisions during blasting operations to contain all blasting abrasive material. No blasting abrasive shall be allowed into the sanitary sewer lines.

B. Sealing of Manhole Walls:

1. After the completion of the cleaning operation, manhole wall leaks shall be sealed by the following methods:

   a. Plugging using the infiltration control material specified in Article 2.03, and/or

   b. Patching using the material specified in Article 2.03, and/or

   c. Chemical Grout Sealing using material specified in Article 2.03.

      i. Equipment: The basic equipment shall consist of chemical pumps, chemical containers, injection fittings, hoses, valves, and all necessary equipment and tools required to seal manholes. The chemical injection pumps shall be equipped with pressure meters that will provide for monitoring pressure during the injection of the chemical sealants. When necessary, liquid bypass lines equipped with pressure-regulating bypass valves will be incorporated into the pumping system.

      ii. Sealing Procedures: At each point of leakage within the manhole structure, a hole shall be carefully drilled from within the manhole and shall extend through the entire manhole wall. In cases where there are multiple leaks around the circumference of the manhole, fewer holes may be drilled, providing all leakage is stopped from these holes. Grout ports or sealant injection devices shall be placed in these previously drilled holes in such a way as to provide a watertight seal between the holes and the injection device. A hose, or hoses, shall be attached to the injection device from an injection pump. Chemical sealing materials as specified shall then be pumped through the hose until material refusal is recorded on the pressure gage mounted on the pumping unit or a predetermined quantity of sealant has been injected. Care shall be taken during the pumping operation to ensure that excessive pressures do not develop and cause damage to the manhole structure. Upon completion of the injection, the ports shall be removed and the remaining holes filled with mortar and troweled flush with the surface of the manhole walls or other surfaces.

iii. The mortar used shall be a non-shrink patching mortar.

2. All materials shall be mixed and applied in accordance with the manufacturer's written instruction. Leaks may be temporarily channeled through "bleed" pipes which are removed and plugged during the final repairs. The manhole sealing repair shall be acceptable to the CITY before additional work proceeds.

C. Patching: Loose material shall be removed from the area to be patched or repointed exposing a sound subbase. Holes or voids around steps, joints or pipes, spalled areas and cavities caused by missing or broken brick shall be patched and missing mortar repointed using a non-shrink patching mortar specified in Article 2.03. Cracks not subject to movement and greater than 1/16 inch in width shall be routed out to a minimum width and depth of 0.5 inches and patched with non-shrink patching mortar.

3.1 MANHOLE LINERS

A. Cementitious Liner (Spray or Spin Applied): On those manholes identified by the CITY, the CONTRACTOR shall install the cementitious liner to the wall and bench surfaces of brick or concrete, using the following procedure:

1. Preparatory Repair:

a. Leakage around pipe entering manhole shall be sealed.

b. Any service line repairs shall be made using a quick-setting patching mix per manufacturer's recommendations.

2. Mixing: If ambient temperatures are excessive, precautions shall be taken to keep the mix temperature at time of application within limits specified by the manufacturer.

a. Should the reconstruction process require application thickness greater than 1-inch, a base coat shall be used to build the substrate to within 1-inch of the finished dimension. For each bag of products, use the amount of water required per manufacturer's recommendation following mixing procedures as noted on product bag and using the manufacturer-approved equipment for mixing and application.

b. Application thickness shall not exceed the manufacturer's instructions. Prepared mix shall be discharged into a hopper and mixing shall continue to occur in such a manner as to allow spraying continuously without interruption until each application is complete.

1. Application:

a. The surface, prior to spraying base coat applications, shall be clean and free of all foreign material and shall be damp without noticeable free water droplets or running water, but totally saturated, just prior to application of each coat. Materials shall be spray applied from the bottom of the wall to the top, to within 1-inch of the original substrate dimension using as many passes as necessary. The surface is to be rough troweled after each pass. The light troweling is performed to assure that material penetrates the voids and sets the bond.

b. A final application is applied after the base coat applications have begun to take an initial set (disappearance of surface sheen). Again, application shall be from the bottom up. The surface is then troweled to a smooth finish being careful not to over finish or over trowel so as to bring additional water to the surface and weaken it. A brush finish is then applied to the troweled finish or topcoat surface. Manufacturers' recommendations shall be followed whenever more than 24 hours have elapsed between applications.

Bench and Invert Application: The bench shall be sprayed with materialsmixed per specifications and spray applied in such a manner that a gradual slope is produced from the walls to invert. The wall / bench intersection shall be rounded to a uniform radius the full circumference of the intersection.
Through the use of flow-through plugs, the CONTRACTOR shall isolate the channel invert, clean and inspect the invert. If the invert has active infiltration, signs of infiltration, cracks or deterioration, the invert shall be sprayed with the materials specified.

d. Where the manhole to be rehabilitated is subject to vehicular traffic, the cementitious lining shall be installed to no closer than 1 inch below the bottom of the manhole frame so as to avoid transfer of impact loads to the new liner. Where the manhole to be rehabilitated is not subject to vehicular loads, the cementitious liner shall be continuous up to the manhole frame.

2. Curing: Caution should be taken to minimize exposure of applied product to sunlight and air movement. If application of additional coat is to be longer than 15 minutes, the manhole shall be covered. At no time should the finished product be exposed to sunlight or air movement for longer than 15 minutes before placing the manhole cover. If the ambient humidity level is below 70 percent, it shall be necessary to keep finished product damp for the first seventy-two hours.

a. Curing Time: The final application shall have a minimum of eight hours cure time before subjected to active flow, or greater if recommended by the manufacturer.

b. Traffic: Traffic shall not be allowed over manholes for twenty-four hours after reconstruction is complete.

3. Frame-Joint Area Sealing System: A minimum of 7 days after the cementitious liner has been installed, where indicated by the CITY, the CONTRACTOR shall install the aromatic urethane internal manhole sealing system through the frame joint area. As a minimum, 4 vertical inches shall be applied on the frame, and 6 vertical inches on the cone area. Any material left on the frame from the application of the cementitious liner shall be wire-brushed prior to sealant application. Ring Seal or equal may require the proper mixing of agents, as recommended by the manufacturer's instructions. Ensure casting and structure are clean and dry prior to applying Adhesive Primer. Brush the adhesive primer onto the casting and structure surfaces where the mastic is intended to adhere. After allowing for proper drying of adhesive primer to occur, sealant may be applied by brush as evenly as possible over the chimney area, that includes the frame joint area and the area of the manhole cone, including all extension to the chimney area.

4. Testing: Six 2-inch cubes shall be cast each day or from every 50 bags of product used. The test specimen shall be properly labeled and given to the CITY for compression strength testing as described in ASTM C 109.

5. Warranty: The manufacturer shall warrant that the products are produced in conformity with its standard specifications or formulations within recognized tolerances, free of adulteration or contamination, and that the product will perform in accordance with representations in the manufacturer's literature and technical data sheets when properly applied in strict conformance with the printed instructions on container and prescribed in technical data instructions and when applied to a properly prepared surface.

B. Cementitious/Polymeric Liners

1. Those manholes identified by the CITY shall be coated with an extremely low shrinkage cementitious repair product to waterproof and enhance the structural integrity of the manhole and then polymeric topcoat for corrosion protection after the manhole has been properly prepared.

2. The material used shall be designed, manufactured, and intended for sewer manhole rehabilitation and the specific application in which they are used.

3. The selected product or system must bear the manufacturer′s certification that it will fulfill the requirements described herein when applied in accordance with the manufacturer's recommendations. The materials shall be delivered to the job site in original unopened packages and clearly labeled with the manufacturer′s identification and printed instructions. All material shall be stored and handled in accordance with the recommendations of the manufacturer.

4. Preparatory Repair

a. Any bench, invert or service line repairs shall be made at this time using the quick setting patching material per manufacturer′s recommendations.

b. Invert repairs shall be performed on all inverts with visible damage or infiltration. After blocking flow through the manhole and thoroughly cleaning the invert, the quick setting patch material shall be applied to the invert at a minimum thickness of 1 inch, extending out into the bench sufficiently to tie into the monolithic liner to be spray applied. The finished invert shall be smooth and free of ridges. The flow may be re-established in the manhole within thirty minutes after placement of the material.

5. Cementitious Liner Application

a. The CONTRACTOR shall furnish and place the cementitious base coat in each manhole as and where directed by the CITY. The installation and curing of the base coat shall be in complete accordance with the manufacturers' specifications.

i. Prior to placing the base coat, the CITY and the CONTRACTOR must inspect and approve the surface preparation work. The CONTRACTOR shall notify the CITY when the manholes are ready for inspection. The CONTRACTOR is responsible for ensuring proper installation conditions including surface preparation, temperature and moisture.

ii. All bottom and horizontal surfaces shall have the base coat material applied to the required thickness by hand troweling or spray-on methods. All cementitious linings shall be troweled smoothly after application.

iii. All side vertical surfaces shall have the cementitious base coat applied to the required thickness in one pass or application. Non-vertical surfaces may be completed in multiple passes to prevent sloughing of material.

iv. Temperature limitations must be handled as appropriate and as approved by the manufacturer.

b. Where the manhole to be rehabilitated is subject to vehicular traffic, the cementitious lining shall be installed to no closer than 1 inch below the bottom of the manhole frame so as to avoid transfer of impact loads to the new liner. Where the manhole to be rehabilitated is not subject to vehicular loads, the cementitious liner shall be continuous up to the manhole frame.

6. Polymeric Topcoat Application

a. The Contractor shall furnish and place polymeric lining as a topcoat over the previously installed cementitious base coat in each manhole as and where directed by the CITY. The installation and curing of the polymeric lining topcoat shall be in complete accordance with the applicable provisions of the manufacturers' specifications.

i. Prior to placing the topcoat, the CITY and the CONTRACTOR must inspect and approve the base coat. The CONTRACTOR shall notify the CITY when the manholes are ready for inspection. The Contractor is responsible for ensuring proper installation conditions including base coat conditions, temperature and moisture.

ii. All surfaces shall have the monolithic polymeric lining applied by a spray-on method or by hand troweled applications in multiple passes to gradually build up to the required thickness.

iii. CONTRACTOR shall regularly perform and record polymeric coating thickness readings with a wet film thickness gauge to ensure uniform thickness during application.

iv. Temperature limitations must be handled as appropriate and as approved by the manufacturer.

7. Product Testing

a. Four, 2-inch cubes shall be cast each day or from every pallet of product used. The test specimens shall be properly labeled and given to the CITY for compression strength testing as described in ASTM C 109.

3.2 FRAME AND COVER REPAIRS AND REPLACEMENT

A. Work Orders will identify one of the following repairs:

4. Realign, Grout, and Seal Manhole Casting (Frame): Remove the frame by excavating as necessary, lifting off the frame, thoroughly cleaning its bottom bearing surface, coating it with asphalt paint similar to the original coating, removing the old mortar from the top of the wall and replacing it with a 2-inch (nominal) layer of new mortar consisting of one part of Portland cement to three parts of clean, washed sand, mixed with an adequate amount of water and carefully resealing the frame in its correct position. Realignment may be horizontal or vertical. Where vertical realignment is required, grade rings as described in Section 02754 may be required in order to raise the manhole frame and cover to the existing grade elevation. A minimum of 7 days after the manhole casting has been realigned and grouted, where so indicated by the CITY, the CONTRACTOR shall install an aromatic urethane internal manhole sealing system through the frame-joint-area.

5. Replace Manhole Ring and Cover and Install Seal: Where identified by the CITY, cast iron rings and covers shall be replaced by the CONTRACTOR. The CONTRACTOR shall remove and replace the entire assembly with a new frame and cover. The frame shall be set on the manhole wall as described in Paragraph 1 entitled "Realign, Grout, and Seal Manhole Casting (Frame)" above. A minimum of 7 days after the manhole casting has been realigned and grouted, where so indicated by the CITY, the CONTRACTOR shall install an aromatic urethane internal manhole sealing system through the frame-joint-area.

3.3 RUBBER CHIMNEY SEAL

A. Where so indicated by the CITY, a flexible rubber chimney sleeve shall be installed in manhole frame and chimney joint area with stainless steel expansion band to compress the sleeve and seal the chimney area between casting ring and manhole wall, or HDPE manhole liner.

3.4 INVERT REPLACEMENT

A. The CONTRACTOR shall remove existing channel and benches to the base of the manhole, then rebuild channel by reshaping channel invert and building new slope of shelves or benches. Work shall include aligning inflow and outflow ports in such a manner to prevent the deposition of solids at the transition point. All inverts shall follow the grades of the pipe entering the manholes. Changes in direction of the sewer and entering branch or branches shall have a true curve of as large a radius as the size of the manhole will permit, but will be shaped to allow easy entrance of maintenance equipment including buckets, TV camera, etc.

3.5 TESTING

A. After the specified rehabilitation work has been completed, the manholes shall be visually reviewed and tested in accordance with manufacturer's testing procedures by the CONTRACTOR in the presence of the CITY and found to be acceptable. The manhole environment shall be properly vented prior to testing to ensure hazardous conditions do not exist.

4. Visual Review:

a. All rehabilitated manholes shall be visually reviewed for water tightness against leakage of water into the manhole. All visible leaks and defects observed during the review shall be repaired to the CITY's satisfaction at no additional cost to the CITY. There shall be no visible infiltration.

b. All pipe connections shall be open and clear.

c. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delamination or other types of defects in the lining.

d. The polymeric lining topcoat shall provide a continuous monolithic surfacing with uniform thickness throughout the manhole interior and be free of pinholes, slumps and drips.

5. Exfiltration Testing:

a. Incoming and outgoing sewer and service lines shall be plugged, the plugs restrained, and the manhole filled with water to the top of the manhole frame. A soaking period of up to one hour will be allowed if the bypassing of the sewage is not required or has been provided for. At the end of this optional soaking period, the manhole shall be refilled with water and the test begun. The time shall then be recorded and after a period of not less than one hour has passed, the manhole again refilled, the amount required being carefully measured. The maximum allowable rate of exfiltration is 0.1 gallon per hour per vertical foot of depth of the manhole.

b. Exfiltration testing shall be done on up to 10 percent of the manholes, or on one manhole, if less than 10 are being repaired, as chosen by the CITY, where each of the following type of repairs (sealing) has been performed:

i. Cementitious liner.

ii. Cementitious liner with polymeric coating.

c. Manholes that fail the exfiltration test shall be reworked and retested by the Contractor at no additional compensation and additional manholes will be retested at the Contractor's expense. Any manholes that are visually leaking, are unacceptable, or fail the test shall be reworked and retested.

6. Testing and Verification of Liners:

a. The CITY's inspector shall verify the thickness of cementitious liners and polymeric coatings with a wet gauge. Any area found to be less than the minimum prescribed thickness shall immediately receive the additional material needed. The resultant lined manhole wall shall be leak-free, smooth and free of honeycomb or areas of segregated aggregate.

b. Polymeric coatings shall be tested at 10,000 volts with a holiday detector for pinholes and holidays. Any defects shall be promptly repaired and re-tested.

All repair procedures shall follow the manufacturer's recommended procedures. Inspection and testing shall be performed by the Certified Applicator in the presence of the CITY at no additional cost to the CITY.

B. Field acceptance of the polymeric manhole lining system shall be based on the CITY 's evaluation of the appropriate installation of the base coat and topcoat per field inspections and on observation of the measurements of the wet film thickness. Acceptance shall also be based on the CITY 's evaluation of the curing test data and final testing.

C. If any defective lining is discovered after it has been installed, it shall be repaired or replaced in a satisfactory manner within a 72-hour period and at no additional cost to the CITY. This requirement shall apply for the entire warranty period.

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SECTION 02754 - SANITARY SEWER MANHOLES

PART 1 -- GENERAL

1.1 SCOPE

A. The work specified in this Section includes all labor, materials, accessories, equipment and tools necessary to install and test precast concrete manholes, with or without outside drop connections. Manholes shall be located on existing sewer line segments or at the intersection ("T") of existing sewer lines. Work in this section also includes frame adjustment, connections to existing manholes, and connections to existing sewer.

1.2 REFERENCES

A. American Society for Testing and Materials/Latest Edition

1. ASTM A-48 - Specification for Gray Iron Casting

2. ASTM C-62 - Specification for Sewer and Manhole Brick

3. ASTM C-139 - Specification for Concrete Masonry Units for Construction

4. ASTM C-443 - Specification for Joints for Circular Concrete, Sewer and Culvert

5. ASTM C-478 - Specification for Pre-Cast Reinforced Concrete Manhole Sections

6. ASTM C-923 - Specification for Resilient Connections Between Reinforced Concrete Manhole Structures and Pipes

7. ASTM C-1244 - Air Testing

1.3 SUBMITTALS

A. The CONTRACTOR shall submit Shop Drawings and other information for review in accordance with the CITY requirements, including dimensions; elevations; dewatering, sheeting and bracing plans; cement type; concrete strength; reinforcement; lifting hooks; joint material; openings; castings; and other applicable information.

B. Qualification

1. The Qualifications of the Manhole Installation Contractor shall be submitted prior to contract award. These qualifications shall include detailed description of the following:

a. Name, business address and telephone number of the Manhole Installation CONTRACTOR.

b. Name(s) of all supervisory personnel to be directly involved with Manhole Installation for this project.

c. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and

that the supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the CITY.

d. The CONTRACTOR shall provide his references of previous project lists going back five years including his customers' name, address, and telephone number.

e. Five years of previous related experience shall be required to be qualified in bidding this project.

1.4 UPLIFT

A. All precast concrete manholes placed below grade shall have adequate safety factors against uplift (excluding weight of soil and associated skin friction) as follows:

	Water Elevation	Safety Factor
1. High water level (H.W.L) -	3.0 feet NGVD	1.5
2. 100-year flood -	7.0 feet NGVD	1.2

PART 2 -- PRODUCTS

2.1 FRAMES AND COVERS

A. All workmanship and materials shall be of the highest quality. The manhole ring and cover shall be the product of a manufacturer actively engaged in research, development, and manufacturing of watertight manhole rings and covers.

B. Castings for frames and covers for manholes shall be composed of best quality, tough, gray iron, free from cold shuts, blow holes, and other imperfections, and shall meet the requirements of ASTM A-48 for Class No. 30, designed for AASHTO Highway Loading Class H-20.

C. All bearing surfaces shall be machined to fit true and shall be watertight. No plugging or filling will be allowed.

D. The combined weight of the frame and cover shall not be less than 370 pounds and cover shall weigh a minimum of 130pounds.

E. Frame and cover shall be set to grade. Lid adapters or adjustment rings shall not be used on new construction.

F. Frames and covers shall be as per the CITY Standards. It shall be U.S. Foundry 420G with raised letters that state "City of Sunrise" and "Sanitary Sewer".

G. All manholes to have polyethylene inserts as manufactured by Knutson or equal with a minimum thickness of 1/8" or greater.

H. All precast manholes shall bear the stamp of a certified testing laboratory, signed and dated, certifying that they meet the requirements of ASTM C478 for concrete strength, steel

reinforcement area and placement, and appearance when manufactured. Manholes must be inspected by the City prior to installation.

2.2 PRECAST MANHOLES

A. Precast concrete manholes or sections (hereinafter referred to as "precast sections") shall be furnished with water stops, sleeves and openings as noted on the Drawings. Box out for wall pipes shall conform accurately to the sizes and elevations of the adjoining pipes. Splices shall have a minimum overlap of 24 bar diameters. Minimum cover over reinforcing steel shall be 3”. Precast sections shall be watertight and conform to the requirements of ASTM C-478 with reinforcement of ASTM A 615, Grade 60 bars and the following modifications there to:

1. Minimum wall thickness shall be eight inches (8").

2. Minimum inside diameter of base sections shall be forty-eight inches (48").

3. Lifting holes through the structures shall be permitted; however, holes shall be plugged with non-shrink grout or other methods approved by the CITY.

4. Manhole sections shall be joined with a round compression ring of neoprene material set in annular spaces cast into the spigot and of a bell spigot type joint. The ring shall be uniformly compressed between the positioned sections so as to form a watertight joint. After the sections are assembled, the remaining space in the joint shall be pointed up and filled with a dense cement mortar and finished so as to make a smooth, continuous surface inside and outside the wall sections.

5. Deep manholes (7 feet or deeper) may substitute an eight inch (8") precast reinforced concrete slab on the top in lieu of the cone section. Top slabs shall have a twenty-four-inch (24") diameter access hole centered in the slab. Slabs, if used, shall terminate at such elevations as will permit laying up a minimum of two (2) courses of clay brick under the manhole frame to make allowance for future street grade adjustments.

6. All concrete used in manhole construction shall use Type II cement. All concrete shall have not less than 4,000 psi compressive strength at 28 days.

7. Precast manhole cones, if used, shall terminate at such elevations as will permit laying up a minimum of two (2) courses and maximum of (5) courses of clay brick under the manhole frame to make allowance for future street adjustment.

2.3 REINFORCED CONCRETE BASES

A. Pre-cast reinforced concrete bases shall normally be used in lieu of cast-in-place concrete bases.

B. The precast reinforced base shall be a minimum of eight inches (8”) thick and be cast monolithically with the bottom section of manhole walls.

C. Bottom section walls shall be monolithically cast with the base section to a minimum height of three feet (3’) from the bottom of the base slab.

D. Pre-poured flow lines in base are generally not accepted and will be approved only after inspection of a completed example.

2.4 MANHOLE LINER

A. The CONTRACTOR shall submit a shop drawing for type of manhole structure used on the project. The shop drawing shall detail the precast structure and show the concrete protective liner placement on the interior surfaces, across joints, at pipe connections, and at the adjustment area between manhole and casting. Shop drawing submittals shall be in accordance with the requirements of the CITY and shall be submitted and approved by the Contractor, and CITY, prior to fabrication.

2.5 PRE-CAST CONCRETE GRADERINGS

A. Grade rings shall be pre-cast; reinforced concrete in solid rings a minimum of 8” wide from 1” to 4” thick.

B. Pre-cast concrete (grade) rings shall be manufactured in accordance with ASTM C-478.

C. Rings shall have dimensions matching inside diameter of cone or flat top sections and be of adequate outside diameter to support full manhole frame.

D. Field molding of grade rings is prohibited.

E. The adjusting rings and castings of each manhole shall be sealed with an external rubber sealing sleeve as manufactured by Infi-Shield Inc. or approved equal. The seal shall be made of a neoprene and EPDM rubber and have a minimum thickness of 60 mils. The sleeve shall be sealed to the top of the cone of the manhole and over the top of the casting with a non-hardening butyl rubber mastic.

2.6 GASKETS AND FINISH

A. Sections shall be joined with a mastic compound set into the annular space cast into the spigot ends of bell and spigot type joints to form a watertight seal. Sealing compound shall be of either bituminous or butyl rubber. Material shall be in strip or rope form, supplied with a two-piece cover to preclude adhesion until use. Approved sealing compounds:

1. Ramnek

2. Lockstop

3. Equal with approved submittals.

B. Finish for outside of new concrete manhole sections shall be in accordance with City of Sunrise Standards.

C. Manhole concrete surfaces shall be painted as described below. The coats shall be applied in accordance with the manufacturer’s specifications. The coats shall have contrasting colors so as to be easily verified by the inspector.

Application	Manufacturer	No.	System	Color	Thickness
Spray – 1 coat	Madewell	Mainstay ML-72	Cement Mortar	Dark Grey	¾ inches
Finish – 1 coat	Madewell	Mainstay DS-5	Epoxy Coating	White	100 mils

**or equal*

2.7 PIPE OPENINGS

A. Where directed by the CITY, the CONTRACTOR shall place openings for future extensions. The openings shall be closed with masonry units and waterproof mortar in such a manner to maintain a waterproof closure but allow future removal without damage to the manhole.

B. Adapter couplings are required on all pipe connections to the structure, sized for respective pipes.

C. Pipe opening shall be fitted with seals cast integrally with manhole section, sized to fit pipe specified, and set at correct elevation and location, or,

D. Pipe openings shall be pre-cast four inches (4”) larger than the pipe with a keyway all around the opening.

2.8 PIPE-TO-MANHOLE SLEEVE

A. Sewer pipe shall be connected to new manhole by using a flexible manhole sleeve in accordance with CITY standards (Appendix 1).

2.9 BRICK FOR MANHOLECONSTRUCTION:

A. Brick for manhole construction shall be dense, hard burned, common clay brick conforming to ASTM C62, except that brick absorption shall be between five (5) and twenty-five (25) grams of water absorbed in one minute by dried brick, set flat face down, in one eighth inch (1/8”) of water. All brick shall be thoroughly wet before laying up and shall be laid with a shove joint in full mortar beds and shall be thoroughly slushed up with mortar at every course.

PART 3 -- EXECUTION

3.1 PREPARATION

A. Traffic Control. The CONTRACTOR is required to obtain all permits, use appropriate traffic regulating devices, notify all appropriate governmental agencies and conform to all the requirements listed in Section 01570 - Traffic Regulation and Maintenance of Traffic.

B. Flow Control. Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the manhole under construction.

1. Plugging and Blocking of Flow. A sewer line plug shall be inserted into the line at a manhole upstream from the section to be inspected. The plug shall be so designed that all or any portion of the sewage flows can be released. During the inspection, testing and replacement portion of the construction, flows shall be shut off or substantially reduced as indicated by the CITY. The upstream manholes shall be constantly monitored for degree of surcharging. After the testing, inspection or repair is complete, flows shall be restored to normal level. See Section 02750 - Wastewater Flow Control for additional information.

2. Pumping and Bypassing of Flow. Wherever lines are blocked off and the possibility of backing up the sewage and causing harm to public and private property is foreseen, it shall be the CONTRACTOR's responsibility to bypass flow from manhole to manhole.

3. Bypassing shall be accomplished using sewer plugs with pump connections, by pumping down surcharged manholes, or by other methods acceptable to the CITY. All bypassed flow must be discharged to a sanitary sewer. Bypassed flow shall not be allowed to enter any storm line, drainage ditch or street gutter. See Section 02750 - Wastewater Flow Control for additional information.

4. During a bypass operation, the pump shall be manned continuously. The CONTRACTOR shall maintain the pump and bypass equipment and shall be responsible for any damages to public or private property due to the malfunction of same.

3.2 EXCAVATION AND BACKFILL

A. The CONTRACTOR shall excavate, backfill, and compact in accordance with Section 02222 - Excavation and Backfill for Utilities. Under no circumstances shall the CONTRACTOR be allowed to remove concrete or asphalt without prior cutting. The saw cutting shall be deep enough to produce an even, straight cut.

3.3 DEWATERING, SHEETING AND BRACING

A. The CONTRACTOR shall dewater, sheet and/or brace all excavations in accordance with Section 02222 - Excavation and Backfill for Utilities. Well points, pumps, sheeting, bracing and/or sock drain shall be used to provide a safe, dry, open hole for all repairs or replacements specified herein.

3.4 NEW MANHOLE CONSTRUCTION

A. General:

1. At the locations indicated by the CITY, the CONTRACTOR shall excavate and locate the existing piping in order to obtain the relative elevations of existing sanitary sewer pipes with respect to ground surface elevation. Excavation shall be non-disruptive and non-destructive soil extraction. After all measurements have been obtained, the excavated hole shall be backfilled and the surface shall be restored to its original condition. Excavation and measurements shall be witnessed by the CITY. Inside measurement shall be used when replacing existing manholes.

2. The sewer pipe connections shall be cut to 2 to 3 feet outside the existing manhole exterior wall. Proper dewatering sheeting and bracing of the hole is critical; no manhole shall be allowed to be installed in an unsafe or wet hole.

3. Service laterals will not be permitted through manhole walls.

4. Steps or ladders will be omitted unless specifically requested by the CITY.

B. Requirements: The CONTRACTOR shall excavate an additional 18 inches below the base of the manhole and fill with "Crushed Stone" as defined in Section 02222 - Excavation and Backfill for Utilities and shown in the Drawings. The CONTRACTOR shall also use this crushed stone for bedding of all the sewer connections. No excavated fill shall be allowed in the hole until all connections are complete and proper bedding requirements have been met.

C. Bases

1. Cast-in-Place

a. Base shall be to the design and dimensions indicated on the Drawings.

b. Set pre-cast wall section into fresh concrete for integral joint.

c. When using wall sections that contain no integral pipe seals, use the length of pipe which extends five (5) feet minimum from outside of base dimension. Place the approved water stop on pipe at center point of wall thickness.

d. Flow channels shall be formed directly in the concrete of the manhole base and shall be smooth and accurately shaped to a semi-circular bottom conforming to the inside of the adjacent sewer sections. Changes in the direction of the sewer and entering branches shall have a true curve of as large a radius as the size of the manhole will permit. Channels shall be so conformed as to allow the unrestricted entry of television cameras into the sewer line.

e. Complete concrete placement around pipe openings, working well into water stop. Finish flush on outside.

f. All slopes (benches) outside flow channels shall be sloped gradually toward inverts.

2. Pre-Cast

a. Flow channels shall be placed after pipe placement.

b. Flow channels, same size as pipe, may be constructed directly with the pre-cast base at time of manufacture. Submit manufacturer's product data to CITY for approval before placing order.

D. Setting Precast Sections

1. Precast reinforced concrete sections shall be set so as to be vertical and with sections in true alignment. A flexible, watertight gasket such as "Ram-Nek" or approved equal shall be used between sections. After the sections are assembled,

the remaining space in the joint shall be pointed up and filled with a dense cement mortar and finished so as to make a smooth, continuous surface inside and outside the wall sections.

2. Sewer pipe connections for manholes shall be resilient, waterproof connections designed in accordance with ASTM C 923 "Resilient Connectors between Reinforced Concrete Manhole Structures and Pipes" and conforming to CITY standards. When the pipe is installed in the resilient manhole connector, the pipe shall be capable of a 20-degree minimum deflection in any direction.

3. All holes in sections, used for their handling, shall be thoroughly plugged with mortar. All seams, keyways, and pipe connections shall be thoroughly plugged with brick and mortar inside and out as needed. The mortar shall be hammered into the holes until it is dense, and an excess of paste appears on the surface; then finished smooth and flush with the adjoining surfaces.

4. The Invert Elevations that were surveyed by the CONTRACTOR prior to manhole construction shall be used to install the inverts in the new manhole. The inverts shall be resurveyed and submitted to the CITY for as-built purposes.

5. The invert channels shall be smooth and accurately shaped to a semicircular bottom conforming to the inside of the adjacent sewer section. Steep slopes outside the inverted channels shall be avoided. Changes in the size and grade shall be made gradually and evenly. Changes in the direction of the sewer or entering branch shall be a smooth curve with radius as long as practicable.

E. Frames and covers

1. Install pre-cast concrete grade rings, minimum of 4” and total maximum of 12”, set in two (2) strips of modified polymer sealant/adhesive compound on each sealing face.

2. Set manhole frame to proper elevation and to cross-section slope where required. Set in two strips of sealing compound and cover with a bed of Portland cement and silica sand. Set the frame in cement bedding and bring mortar up over frame. Recheck elevation due to possible sealant compression.

3. Contractor shall be responsible to see that all such items as mentioned under this Section are adjusted to the new paving elevation to provide a smooth even transition from pavement to manhole cover.

F. Backfill: The backfill shall be compacted; road subgrade (if in paved area) shall be replaced with acceptable material and compacted as specified in Section 02500 - Surface Restoration. Prior to backfilling, ensure that all concrete cradles and encasements are dry; all spalls, scars, etc. are repaired; and all coatings have been applied.

3.5 DISPOSAL

A. All excavated material such as pipe sections, concrete, debris or any other items excavated shall become property of the CONTRACTOR. The CONTRACTOR shall take full responsibility for proper disposal and include the cost in the appropriate bid items.

3.6 SURFACE RESTORATION

A. All surface restoration shall be in accordance with Section 02500 - Surface Restoration. Pavement, concrete, sod or any other surface items shall be replaced in equal or better condition than prior to repair.

3.7 TESTING

A. After construction or replacement work at each manhole has been completed and the materials used have been allowed to cure, it shall be observed for excess infiltration by the CONTRACTOR in the presence of the CITY. The maximum allowable rate of infiltration is 0.0 gallon per hour per vertical foot of depth of the manhole. THERE SHALL BE NO VISIBLE INFILTRATION. All manholes must meet this requirement before acceptance by the CITY.

3.8 COVER ADJUSTMENT

A. Adjustment of existing (old) work requiring raising shall be performed in accordance with Sub-Section 3.04 herein.

B. Rises in excess of twelve (12) inches shall be made by removing the top section of the manhole and inserting pre-cast sections required to meet the required elevation.

C. When elevation changes require removal of an existing manhole section(s), the CITY shall be consulted in advance of the work to determine the best method to accomplish the work. The CITY will inspect all work.

D. Methods and materials for lowering manhole frames shall comply with Sub-Sections 3.04 and 3.08.

3.9 CONNECTIONS TO EXISTINGMANHOLE

A. Contractor shall cut an opening (core-bore) in the existing manhole to a size to allow the pipe with a water stop attached plus one (1) inch clearance on all sides. Cut out existing concrete channel fill, allowing room to form satisfactory new flow channel.

B. Coupling Adapters (Boots) shall be installed sized for the opening and the pipe diameter.

C. Place length of pipe to provide joint at five (5) feet minimum from outside of manhole wall or base. Center water stops in wall, fill opening with waterproof non-shrink grout material and form new flow channel. Second joint shall be five (5) feet ahead/back. Encase to first joint with Type II concrete.

3.10 CONNECTIONS TO EXISTING SEWERS

A. For proposed sewers of a diameter equal to the existing sewer, a new manhole shall be constructed over the existing sewer to the proper invert elevation.

B. Existing sewer service shall be maintained during base and flow channel work.

C. When broken or damaged pipe results from this operation, replace with new pipe to meet current standards. Saw any piping to be removed to preclude cracking or irregular edges caused by breaking out with a hammer or using other methods.

D. When replacing pipe, use pipe length to have a joint at five (5) feet minimum from manhole wall or base. Cradle and doghouse pipe to first joint with Class A concrete.

E. For proposed sewers of eight (8) inch diameter or less, a direct connection to an existing sewer may be permitted by using a cutting-in saddle or wye. This method would generally apply to single family dwelling units. For industrial, commercial, or multifamily residences, the CITY may require that a manhole be constructed on the property to be served and overran existing sewer should one exist. All connections to existing sewers are subject to review by the CITY on an individual basis.

F. Proposed sewers of a diameter larger than the existing sewer to which it is to be connected will not be normally permitted without providing additional capacity to the existing sewer.

3.11 DROP MANHOLES

A. Outside drop connections will be required when the vertical distance between pipe inverts exceeds two feet (2'). Drop connections, where required, shall be cast monolithically with the manhole elements in accordance with CITY standards.

B. Pre-cast manhole sections shall have openings with integrally cast pipe seals to fit design elevations for new installations.

C. When using "doghouse" sections or connecting to existing manholes refer to Sub-Section 3.09 for construction details of pipe through wall section.

D. Connection configuration to manhole shall be made in accordance with Standard Details.

3.12 PLANNED PIPEOPENINGS

A. When future pipe connections have been planned for manholes, they shall be plugged to preclude exfiltration and infiltration.

B. With integral pipe seals, place a pipe stopper/plug of the size required, properly secured, for any thrust caused by testing, etc.

- END OF SECTION –

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SECTION 02757 - POINT REPAIR OF SANITARY SEWERS

PART 1 -- GENERAL

1.1 SCOPE

A. The work specified in this Section includes repairs to sections or segments of existing sanitary sewers, mains or service lines, which require excavation from the surface to accurately locate structural defects and/or sources of infiltration or inflow and to eliminate them by making necessary repairs.

1.2 GENERAL

A. Reference is made to Division 15, “Mechanical”. Methods, procedures and requirements are similar when sections of existing pipe have been crushed, cracked, or settled, or have holes in them and are to be replaced with new pipe. Generally, point repairs are made at specific locations and involve relatively short lengths of sewer or fittings which are to be repaired or replaced. "Isolation" of affected reaches of sewer by plugging and/or bypass pumping, if required, shall be performed as specified in Section 02750 - Wastewater Flow Control.

B. Locations where point repairs are to be made will be made available to the CONTRACTOR through Work Orders and will be based on previously performed tests and television surveys. It is understood that the exact location of pipe leaks and failures cannot always be determined before the pipe is exposed because of test limitations.

C. It is also understood that the testing and closed-circuit television surveys performed by others prior to the commencement of this project cannot always determine the precise cause of leakage or failure. The CONTRACTOR may be required to perform additional work to locate, examine and evaluate the source before repairs are made.

D. After the designated repairs have been made, the CONTRACTOR will test them as described in this Section of these Specifications. The costs of testing will be borne by the CONTRACTOR. If a repaired joint or section should prove to be defective, the CONTRACTOR shall re-perform the work at no additional cost to the CITY and shall also be responsible for the costs of any retesting required by the CITY.

E. Where work is to be performed on private property, the CONTRACTOR shall consult with the CITY who will make arrangements and schedules with the property owners before the CONTRACTOR performs the work.

F. Excavation, backfill, exploratory excavation, sheeting and shoring, dewatering, conflicts with other utilities, and miscellaneous work shall conform to the requirements of Section 02222 - Excavation and Backfill for Utilities.

1.3 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings in accordance with CITY standards.

1.4 QUALIFICATIONS

A. The Qualifications of the CONTRACTOR shall be submitted prior to contract award. These Qualifications shall include detailed descriptions of the following:

1. Name, business address and telephone number of the CONTRACTOR.

2. Name(s) of all supervisory personnel to be directly involved with this project.

3. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the CITY.

4. The CONTRACTOR shall provide his references of previous project lists going back five years including his customers' names, addresses, and telephone numbers.

5. To be qualified, the CONTRACTOR shall have a minimum of five years previous experience in the work required in this section.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Pipe materials are specified in Division 15, "Mechanical".

PART 3 -- EXECUTION

3.1 PROCEDURES

A. The point repair procedures shall be as follows:

1. Site preparation shall be performed as described in Division 2. When the repairs are to be made on sewers or facilities lying under paved surfaces, those surfaces shall be removed to the limits specified for point repairs of the particular size pipe involved (trench width plus two feet for concrete surfaces) unless otherwise acceptable to the CITY.

2. The CONTRACTOR shall excavate and backfill in accordance with Section 02222 - Excavation and Backfill for Utilities. Under no circumstances shall the CONTRACTOR be allowed to remove concrete or asphalt without prior cutting. The saw cutting shall be deep enough to produce an even, straight cut.

3. Dewater, sheet and or brace all excavations in accordance with Section 02222 - Excavation and Backfill for Utilities. Well points, pumps, sheeting, bracing and/or sock drain shall be used to provide a safe, dry, open hole for all repairs or replacements specified herein.

4. Excavate down to the pipe, completely exposing the pipe up to the next undamaged section of pipe on each side.

5. Locate the leak to be repaired.

6. After the leak or failure is located and exposed, the CITY will identify the method of rehabilitation. One or a combination of the following methods shall be used:

   a. Remove and replace section(s) of pipe or fitting. Remove section(s) of defective pipe or fitting by cutting on each side along lines perpendicular to longitudinal axis of pipe so as to leave "spigot ends" to be connected to replacement pipe. Cut or fabricate replacement section. Make connections using stainless steel shear rings as manufactured by Fernco or approved equal. Bedding or embedding shall be placed and compacted. Reconnect to service line if required. As a minimum, a total of six (6) feet of piping shall be replaced by the CONTRACTOR.

      In the case of point repairs performed on service laterals, the CONTRACTOR shall:

      i. Determine the exact location of the repair by means of television inspection with an electronic locating device (sonde).

      ii. If roots are encountered inside the lateral being repaired, a minimum of 16 feet of lateral shall be replaced.

      iii. If the pipe being replaced reaches the private property line, a cleanout shall be installed at that location in both back yard and front yard easements.

      iv. Where the CITY has indicated a fused-on saddle, sewer service connections shall be joined to the fold-and-formed pipe by means of an electrofusion sewer saddle as manufactured by Central Plastics Company, or approved equal. The installation of the saddle shall be done in accordance with the manufacturer's recommended procedures. The outlet shall be gasketed, sized for ASTM D 3034 SDR 35 PVC pipe. The CONTRACTOR must receive training by the manufacturer before installing saddles.

   b. Cement-stabilized sand shall be used to supplement the embedment or backfill when accepted by the CITY. This shall consist of two sacks of cement per cubic yard of sand thoroughly mixed. Only a sufficient amount of water shall be added to assure setting-up of the cement. These mixes shall be made before placing in the trench and only enough shall be prepared to allow placing, shaping and tamping before an initial set has taken place. Cement-stabilized sand shall be used for repairs in FDOT paved right of ways.

7. The adequacy of point repairs in sewer mains shall be demonstrated by the CONTRACTOR by testing. For service lines, visual review and acceptance by the CITY will be deemed sufficient. Testing of the mains shall be performed while dewatering is continued and before backfilling.

a. Exfiltration-Testing: Water, colored with a bright-colored dye acceptable for usage in testing, is introduced into the pipe so as to impose a 2-foot static head over the top of the pipe at the point of repair when the pipe in the lower manhole is plugged. Observations shall then be made by the CITY to determine if leakage of the colored water occurs at the repair point. Care shall be taken, when this method is used, that:

i. Not more than 4-feet of static head are induced on the main at the lower end of the reach, and

ii. No back-up problems are caused in service lines.

8. Complete placement and compaction of backfill.

9. Restore surface features to at least as good condition as existed before construction began, including roadways, driveways and walks.

3.2 TELEVISION SURVEY

A. Television survey, including Preconstruction Survey and Post Construction Survey as indicated in Section 02752 - Television Survey, is required for all point repairs of sanitary sewers.

- END OF SECTION -

SECTION 02759 - REPLACEMENT OF SANITARY SERVICE LATERAL AND CLEANOUT

PART 1 -- GENERAL

1.1 SCOPE

A. This Section consists of removing existing sewer service pipe between mainline and the property line, and furnishing, installing, testing and placing in operation new sewer service piping, complete in its place, with fittings, and other appurtenances required for a complete installation.

1.2 GENERAL INFORMATION AND DESCRIPTION

A. The pipe and fittings covered by these specifications shall be furnished by fully qualified manufacturers experienced in the fabrication, casting and manufacture of the pipe materials specified herein. The pipe and fittings shall be designed, fabricated and installed in accordance with the best practice of the trade and the standards specified herein.

i. The material and installation practices for sewer service lateral shall, at a minimum, adhere to the requirements of ASTM F2561-11 – Standard Practice for Rehabilitation of a Sewer Service Lateral and its Connection to the Main Using a One-Piece Main and Lateral Cured-in-Place Liner; the liner assembly shall meet the ASTM F1216 and ASTM D5813 requirements.

ii. The installer(s) of the CONTRACTOR and/or subcontractor must document 10,000 linear feet of lateral liner installation in the State of Florida, 4,000 mainline/lateral connections in the State of Florida, 25 single stack or double-wye lateral installations, and 500 lateral transitions with 100 installations occurring within the State of Florida. Additionally, the installer must have successfully installed at least 250,000 linear feet of the mainline product(s) preferred by the City in wastewater collections systems in the State of Florida.

B. Portions or reaches of existing sanitary sewer service lines shall be replaced as specified in this Section. The CITY may authorize additional pipes to be removed and replaced as construction proceeds and defective sections of pipe are discovered by direct visual observation.

C. Replacement pipe to the property line including cleanout as per CITY'S minimum standards shall be the same size and shall be laid between the mainline pipe and the existing service pipe which shall remain in place acceptable to the CITY unless decided otherwise by the CITY. It is the CONTRACTOR's complete responsibility to set controls as necessary to attain true line and grade for the replacement pipe.

D. When replacing sewer service lines from adjacent buildings or residences to the run of a collector main, the CONTRACTOR shall set a time schedule for the period of service interruption in writing and obtain acceptance of it from the CITY. The CONTRACTOR shall then notify the appropriate tenants at least 24 hours in advance of the pending interruption and inform them of its time frame. Temporary pumping or other measures will be required if the period of interruption of service occurs before 8:00 a.m. or after 5:00 p.m. The

importance of avoiding extended periods of public inconvenience cannot be overemphasized.

1.3 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings in accordance with CITY standards.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Pipe materials are specified in Division 15 - Mechanical.

PART 3 -- EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall furnish all labor, tools, materials, and equipment necessary for installation and jointing of the pipe. All piping shall be installed in accordance with the Contract Documents in a neat workmanlike manner and shall be set for accurate line and elevation. All piping shall be thoroughly cleaned before installation, and care shall be taken to keep the piping clean throughout the installation.

3.2 PREPARATION

A. Traffic Control. The CONTRACTOR is required to obtain all permits, use appropriate traffic regulating devices, notify all appropriate governmental agencies and conform to all the requirements specified in Section 01570 - Traffic Regulations and Maintenance of Traffic.

B. Flow Control. Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the sewer under repair or replacement.

1. Plugging and Blocking of Flow. A sewer line plug shall be inserted into the main-line when the service pipe is disconnected. The plug shall be so designed that all or any portion of the sewage flows cannot be released. During the survey, testing and replacement portion of the construction, flows shall be shut off or substantially reduced as acceptable to the CITY. After the testing, survey or repair is complete, service shall be restored to normal level. See Section 02750 - Wastewater Flow Control for additional information.

2. Pumping and Bypassing of Flow. Wherever lines are blocked off and the possibility of backing up the sewage and causing harm to public and private property is foreseen, it shall be the CONTRACTOR's responsibility to bypass flow from the disconnected lateral to a down-stream manhole.

3. Bypassing shall be accomplished using sewer plugs with pump connections or by other methods acceptable to the CITY. All bypassed flow must be discharged to a sanitary sewer. Bypassed flow shall not be allowed to enter any storm line, drainage ditch or street gutter. See Section 02750 - Wastewater Flow Control for additional information.

4. During a bypass operation, the pump shall be manned continuously. The CONTRACTOR shall maintain the pump and bypass equipment and shall be responsible for any damages to public or private property due to the malfunction of same.

3.3 EXCAVATION AND BACKFILL

A. The CONTRACTOR shall excavate and backfill in accordance with Section 02222 - Excavation and Backfill for Utilities. Under no circumstances shall the CONTRACTOR be allowed to remove concrete or asphalt without prior cutting. The saw cutting shall be deep enough to produce an even, straight cut.

3.4 DEWATERING, SHEETING AND BRACING

A. The CONTRACTOR shall dewater, sheet and or brace all excavations in accordance with Section 02222 - Excavation and Backfill for Utilities. Well points, pumps, sheeting, bracing and/or sock drain shall be used to provide a safe, dry, open hole for all repairs or replacements specified herein.

3.5 SHIPPING, HANDLING AND STORAGE

A. Special care in handling shall be exercised during delivery, distribution and storage of pipes to avoid damage and setting up stresses. The damaged pipe will be rejected and shall be replaced at no additional cost to the CITY. Pipe and fittings stored prior to use shall be stored in such a manner as to keep the interior free from dirt and foreign matters.

B. No pipes shall be dropped from cars or trucks to the ground. All pipes shall be carefully lowered to the ground by mechanical means. In shipping, pipe and fittings shall be blocked in such manner as to prevent damage to casting or lining. Any broken or chipped lining shall be carefully patched. Where it is impossible to repair broken or damaged linings in pipe because of its size, the pipe shall be rejected as unfit for use.

3.6 REMOVAL AND REPLACEMENT OF SEWER LATERAL PIPE AND CLEANOUT

A. Lateral sewers shall be installed in accordance with all the applicable requirements for pipe installation. Branch fittings shall be installed in the main line sewer as they are constructed, in the locations and configuration of the original laterals or as designated by the CITY.

B. The existing laterals shall be hand excavated to a joint, saw cut, clean and square and the appropriate adapter installed to connect the replacement laterals. Care shall be taken to maintain the slopes of the existing laterals. The laterals shall be removed and replaced from the main line to the private property line, or to a point along the existing lateral as determined by the CITY to be in acceptable condition.

C. The CONTRACTOR shall not excavate trenches for laterals on both sides of the street at the same time unless written permission has been secured in advance to close the street.

D. Placement of bedding / cover materials in the trench shall be the same for laterals as provided in Section 02222 - Excavation and Backfill for Utilities.

E. PVC clean-outs to have screw type access plug. Long radius wye connections and fittings shall be used in order to access clean-out operations.

F. Clean-outs located in pavement or concrete driveways shall have a cast iron cap with brass plug and have a 12” x 12” x 6” concrete collar in accordance with the City’s standard detail.

G. After the limits of a particular portion of the existing sewer which is to be removed and replaced have been established on the ground, operations shall progress generally as follows:

1. Carefully remove or protect surface features in work area. Excavate to completely expose the existing pipe, taking adequate precautions not to disturb any other existing underground facilities and handling excavated materials as described in other Sections of the Specifications.

2. That section or reach of pipe to be replaced shall be isolated by plugging and/or by-pass pumping as described in other Sections of these Specifications, or by any other method proposed by the CONTRACTOR and acceptable by the CITY.

3. Remove and dispose of the existing pipe and concrete encasement, if any. This shall be phased and coordinated with its replacement so as to minimize public inconvenience.

4. The trench bottom shall be over excavated a minimum of 8-inches and new embedment material to go beneath the pipe placed and shaped so as to form uniform support for the pipe barrel.

5. Pipe shall be installed in accordance with the manufacturer’s recommendations and to the grade and slope as its existing conditions. Pipe shall be installed and jointed, normally beginning at its low or outlet end and proceeding upstream, with the bell ends facing upstream toward the direction of flow. Replace cleanout. Make connections to new sewer main and cleanouts, and to existing pipe remaining in place. Complete embedment or encasement and place compacted backfill as necessary to avoid flotation if water should enter the trench.

6. Perform leakage test. When this has been successfully completed and acceptable to the CITY, remove temporary plugs and reconnect wyes or tees to service lines.

7. Complete placement and compaction of backfill.

8. Restore surface features to at least as good condition as existed before construction began, including roadways, driveways and walks.

3.7 PIPE-TO-PIPE CONNECTIONS

A. Pipe-to-pipe connections shall be made by using stainless steel shear rings as manufactured by Fernco, or approved equal.

B. Lateral connections to mains that are lined shall be made directly to the liner using the Lined Main Tap™ (LMT™) by LMK Technologies or approved equal.

3.8 TELEVISION SURVEY

A. Television survey, including Preconstruction Survey and Post Construction Survey, as indicated in Section 02760 - Service Lateral Television Survey, is required for all replacement of sanitary sewer lateral pipe.

3.9 SANITARY MARKER

A. 3M Scotch Marker #1253 (Green) shall be installed at clean-out for electronic locating.

3.10 ADAPTERS

A. Donut type adapters shall be manufactured from virgin PVC. Material shall conform to applicable sections of ASTM Specifications C443, C425, C594, C564 and D1869

- END OF SECTION -

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SECTION 02760 - SERVICE LATERAL TELEVISION SURVEY

PART 1 -- GENERAL

1.1 SCOPE

A. The work consists of furnishing all labor, materials, accessories, equipment, tools, transportation, services and technical competence for performing all operations required to execute the internal closed-circuit television survey to inspect service laterals.

B. The survey shall show all defects and determine the amount of infiltration entering the service laterals.

1.2 GENERAL

A. After cleaning as specified in Section 02751 – Preparatory Cleaning (including special cleaning involving the mechanical removal of roots, grease, and/or tuberculation where authorized), and before and after repair/replacement work, the lateral shall be visually surveyed by means of closed-circuit television in the presence of the CITY. The survey shall be performed one lateral at a time.

B. Pre- and post-construction survey video on CD-ROM shall be delivered to the CITY on CD-ROM, accompanied with the corresponding work orders, and pre- and post-TV logs, for sewer laterals surveyed. The video on CD-ROM shall be direct from a live video source into a video file, format MPEG1, and of good quality for viewing. The recording of multiple laterals on a single CD is acceptable.

C. The television equipment operator shall be certified under the NASSCO (National Association of Sewer Service Companies) Pipeline Assessment & Certification Program (PACP)/Lateral Assessment & Certification Program (LACP).

1.3 EQUIPMENT

A. The television camera used for the lateral survey shall be one specifically designed and constructed for such survey. A Sonde locating device shall be attached to the camera. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 700-line resolution color video picture. The CONTRACTOR shall maintain camera in clear focus at all times. Picture quality and definition shall be to the satisfaction of the CITY; and if unsatisfactory, equipment shall be removed and replaced with adequate equipment at no additional cost to the CITY. The lateral camera shall have a pan-and-tilt capability.

B. The camera system shall be able to inspect 3-, 4-, and 6-inch lateral connections up to 100 feet from the sewer mainline. The launcher shall be mounted on a tread tractor that moves through main sewers and positions the inspection camera launcher opposite the lateral line connection.

C. The camera system shall have mini black and white or color, fixed position, “positioning” camera to observe and place the mini color, push, “inspection” camera at the lateral. The

inspection camera shall be attached to a 100-foot long push cable with a fiberglass rod core for cable rigidity. The camera head shall point forward while traveling through the sewer mainline.

D. The camera used from a main shall be able to be launched from the main and travel up the lateral towards the residence, up to 100 feet. The camera system shall be able to inspect 3-, 4-, and 6-inch lateral connections. The camera used from a cleanout shall be able to be launched from the cleanout and travel down to the sewer mainline, up to 100 feet. The camera system shall be able to inspect 3-, 4-, and 6-inch lateral connections.

E. The video camera shall include a title feature capable of showing on the tape the following information:

1. City and State

2. Date/Time

3. CONTRACTOR's Name

4. Pipe Size (Diameter) and Material

5. Upstream Manhole Number & Distance to Lateral

6. Ongoing Footage Counter

F. A Sonde shall be provided for locating unmarked sewer laterals and cleanouts. A sonde is a transmitter tied on a line and moved through a sewer or duct. A receiver on the surface follows its movement, documenting the line location. The pipe position is then marked on the ground. The sonde is pushed farther into the pipe, the receiver relocates the sonde, and the pipe position is marked again. This process is repeated until the desired section of the pipe is traced. It is pulled out on completion of the locating. The sonde will be launched from the main or inserted into the lateral through a sewer cleanout. The sonde may also be attached to the lateral television camera.

1.4 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings and other information in accordance with CITY standards. The CONTRACTOR's submittals shall include description of the software to be used and a sample of the video titles to be used, along with a sample of the television survey log to be used.

1.5 QUALIFICATIONS

A. The Qualifications of the CONTRACTOR shall be submitted prior to contract award. These Qualifications shall include detailed descriptions of the following:

1. Name, business address and telephone number of the CONTRACTOR.

2. Name(s) of all supervisory personnel to be directly involved with this project.

3. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the

supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the CITY.

4. Specialty technicians shall be certified by the equipment manufacturer and/or its authorized representative. Certifications shall be submitted to the CITY.

5. The CONTRACTOR shall provide his references of previous project lists going back five years including his customers' names, addresses, and telephone numbers.

6. To be qualified, the CONTRACTOR shall have a minimum of five years previous experience in the work required in this section.

PART 2 -- PRODUCTS

All inspection information and data (including video) written to digital media (CD-ROM).

PART 3 -- EXECUTION

3.1 PRE-CONSTRUCTION SURVEY

A. Procedure

1. Prior to any repair work, the entire service lateral (from mainline to property line / cleanout, whichever is farther from the mainline) shall be televised.

2. Measurement for location of defects shall be above ground by means of a meter device. Measurement meters shall be accurate to tenths of a foot over the length of the section being surveyed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device. Linear footage shall be shown on screen during recording.

3. Movement of the television camera shall be temporarily halted for a minimum of ten seconds at each visible point of flow until the source and flow rate from that point are determined.

4. The inspection shall be performed from either the main sewer or the cleanout with proper specified equipment. If the CONTRACTOR chooses to perform the inspection from the cleanout and the cleanout is either inaccessible or does not exist, he shall install a cleanout to facilitate the inspection. All costs of material, equipment, labor, and other costs due to unspecified field conditions shall be borne by the CONTRACTOR. Payment for cleanout installation shall be made by the CITY as indicated in Section 01025, Measurement and Payment.

5. Above ground horizontal location of lateral shall be marked every five (5) feet utilizing surveyor's paint on an asphalt or concrete surface and surveyor's flags in grass. Approximate depth of laterals at these locations shall be recorded on the TV logs. Location of buried cleanouts, or location for the purposes of installing a new cleanout shall be marked by two measured distances to permanent recoverable objects. The CONTRACTOR shall furnish a schematic of these locations with sufficient detail to be able to relocate from above ground, at a later date.

B. Field Documentation

1. Television Survey Logs. Location of the lateral by indicating the upstream manhole number, distance from the upstream manhole, lateral connection to the main line (left, center or right), and address of the customer serviced by the lateral, shall be noted on the television survey log. Printed and electrically stored location records shall be kept by the CONTRACTOR and will clearly show the location, in relation to the clean out or the mainline of each infiltration point observed during survey. Footage shall be shown on the log. In addition, other points of significance such as unusual conditions, roots, broken pipe, presence of scale and corrosion, and other discernible features will be recorded, and a copy of such records will be supplied to the CITY. The CONTRACTOR shall measure the depth of the upstream and downstream manholes. Measurements shall be from the invert of the pipe to the top of the manhole rim and shall be recorded on the survey log.

2. Photographs. Digital photographs of the television picture of problems shall be taken by the CONTRACTOR upon the request of the CITY.

3. Video Recordings. The purpose of video (CD-ROM) recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. CD-ROM recording playback shall be at the same speed that it was recorded. Slow motion or stop motion playback features shall be supplied by the CONTRACTOR. Once recorded, the CD-ROM becomes the property of the CITY. The CONTRACTOR shall have all CD-ROM and necessary playback equipment readily accessible for review by the CITY during the Project.

4. Audio. All CD-ROM shall have audio record. As a preamble, at the beginning of the CD-ROM, the CONTRACTOR shall state the following: "*(Contractor's Name) is performing a pre/post TV survey for Job No._____(provided by the CITY), City of Sunrise*". State date, time, operator's name, area, pipe size and material, upstream manhole number and depth. The CONTRACTOR shall verbally state the position of the lateral with respect to the upstream manhole and describe defects. At the end of each line, state: "End of line" and total linear footage.

3.2 POST CONSTRUCTIONSURVEY

A. Procedure

1. The same procedures shall be used as indicated in Section 3.01 PRECONSTRUCTION SURVEY.

2. In addition, the CONTRACTOR shall stop the camera at all points of repairs and inspect entire repaired pipe sections.

3. The CONTRACTOR shall invert the white foreground to black as needed in the line section with light background.

4. In the case of a post-liner survey, the CONTRACTOR shall fully televise both ends of the liner so that the fit of the liner to the host pipe can be evaluated.

5. The post-liner television survey shall be done within 2 weeks of liner installation.

B. Documentation

1. The same documentation shall be provided as indicated in Section 3.01 PRECONSTRUCTION SURVEY.

- END OF SECTION -

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SECTION 02763 - CHEMICAL GROUTING

PART 1 -- GENERAL

1.1 SCOPE

A. The work specified in this Section includes all labor, materials, accessories, equipment and tools necessary for chemical grouting, sealing, and air testing sanitary sewer pipe joints, pursuant to ASTMF2304-03.

1.2 GENERAL

A. Root Removal

1. When so directed by the CITY, prior to performing chemical grouting, the CONTRACTOR shall remove roots and clean the sewer in accordance with Section 02751 - Preparatory Cleaning and Root Removal.

B. Leak Testing

1. Sewer line joint testing shall be accomplished by applying air pressure to each sewer joint and monitoring the pressure in the void over a one-minute period. The intent of joint testing is to identify defective joints prior to the joint sealing process and check the effectiveness of the seal.

2. Testing cannot be performed and shall not be required on cracked, structurally unsound, or broken pipe, severely corroded or out-of-round pipe, or on visibly leaking joints.

3. **Testing shall be required following sealing but is to be performed prior to sealing only if specifically authorized by the CITY**.

C. Leak Sealing

1. Sources, or possible sources, of infiltration within the sewer system, are to be sealed to eliminate infiltration. A minimum of eight (8) joints shall be sealed per segment.

2. The application of the sealing grout within the pipe shall be by means of remote-controlled equipment designed to be positioned at the specific joint or crack to be sealed and to apply the grout under sufficient pressure for the grout to pass through the opening and fill voids outside the pipe as well as the opening in the pipe wall. Control of the device and review of the results shall be by operating the closed-circuit television camera and vehicle-mounted monitor conforming to the requirements of Section 02752 - Television Survey. The method of sealing used shall not damage the pipe or change pipe alignment, and the original cross-sectional area shall not be permanently reduced or changed.

1.3 QUALIFICATIONS

A. The Qualifications of the Grouting CONTRACTOR shall be submitted prior to contract award. These Qualifications shall include detailed descriptions of the following:

1. Name, business address and telephone number of the CONTRACTOR.

2. Name(s) of all supervisory personnel to be directly involved with Grouting for this project.

3. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the CITY.

4. Specialty technicians shall be certified by the equipment manufacturer and/or its authorized representative. Certifications shall be submitted to the CITY.

5. The CONTRACTOR shall provide his references of previous project lists going back five years including his customers' names, addresses, and telephone numbers.

6. To be qualified, the CONTRACTOR shall have a minimum of five years' previous experience in grouting.

PART 2 -- PRODUCTS

2.01 CHEMICAL JOINT SEALINGMATERIALS

A. Chemical joint sealing materials used on this project shall be AV-118 Duriflex, or AV-100 plus activators, initiators and inhibitors recommended by the manufacturer, Avanti International, Houston, Texas or an approved equal.

B. In those lines which had root removal performed, a chemical root inhibitor shall be added to the grout prior to sealing the joints. CONTRACTOR shall submit the chemical to be used for CITY's approval prior to utilization.

PART 3 -- EXECUTION

3.1 LEAK TESTING EQUIPMENT

A. The basic equipment used shall consist of a television camera, joint testing device such as a packer, and test monitoring equipment. In combination, the equipment shall be constructed in such a way as to provide means for introducing a test medium under pressure, into the void area created by the expanding ends of the joint testing device. The testing equipment also have the means for regulating the flow rate of the test medium into the void area in conjunction with the means for continuously measuring the actual static pressure of the test medium at and within the void area only. The packer device shall be constructed in such a manner as to allow some flow to pass through its center annulus.

B. Void pressure data shall be transmitted electrically and without the use of the test medium or hoses. All test monitoring shall be above ground and, in a location, to allow for simultaneous continued observation of the television monitor and test monitoring equipment by the CONTRACTOR. The CITY shall witness the testing operation.

3.2 CONTROL TEST PROCEDURES

A. Prior to and during the joint testing phases of the work, the CONTRACTOR shall perform Control, Intermediate, and Final testing in accordance with the latest edition of ASTMF2304.

3.3 JOINT TESTING PROCEDURE

A. Sewer line joints shall be individually tested at a test pressure equal to ½ psi per vertical foot of pipe depth, but in no case exceeding a pressure of 10 psi and in accordance with the following procedures:

1. The packer or testing device shall be positioned within the line in such a manner as to straddle the joint to be tested.

2. The packer ends or testing device ends shall be expanded so as to isolate the joint from the remainder of the line and create a void area between the packer or testing device and the pipe joint. The ends of the testing device shall be expanded against the pipe with sufficient inflation pressure to contain the test medium within the void without leakage past the expanded end.

3. The test medium shall be introduced into the void area until a pressure or flow rate equal or greater than the required test pressure is observed with the void pressure monitoring equipment.

a. Air Test – After the void pressure is observed to be equal to or greater than the required test pressure, the airflow shall be stopped and the air test supply line vented. The operator will observe this void pressure for a period of 15 s, if the pressure is maintained, with a pressure drop of less than 1 psi (7 kPa), then the joint will be considered as having passed the test. If the pressure shows additional decay during the recommended time period, it will be considered as having failed and shall be sealed as described herein. Upon completion of the sealing, the joint will be retested at the established test criteria (post-test).

b. Water Test – A liquid (water) shall be introduced into the void area until a pressure equal to or greater than the required test pressure is observed with the void pressure monitoring equipment. If the required test pressure cannot be developed (due to joint leakage), the joint will have failed the test and shall be sealed as specified. The flow rate of the test liquid shall then be regulated to a rate at which the void pressure is observed to be the required test pressure for a period of 30 seconds. A reading of the test liquid flow meter shall then be taken. If the flow rate exceeds ¼ gallon per minute (due to joint leakage), the joint will have failed the test and shall be sealed as specified.

4. The test medium shall be air or liquid.

3.4 TEST RECORDS

A. During the joint testing procedure, complete records shall be kept, to include the following data:

1. Identification of the manhole section tested.

2. Type of pipe.

3. Diameter of pipe.

4. Length of pipe sections between joints.

5. Depth of pipe to surface.

6. Test pressure used and duration of test.

7. Statement indicating the pass/fail test results for each joint tested, Location (stationing) of each joint tested and location of any joints not tested with an explanation for not testing.

B. In the case of a "passing" joint, a single pressure reading may be recorded. In the case of a "failing" joint requiring grout, three pressures shall be recorded: the initial "failing" pressure; the zero pressure after grout has been injected and the packer deflated; and the final pressure after the grout has been injected and the packer re-inflated.

3.5 JOINT SEALING EQUIPMENT

A. The basic equipment shall consist of a closed-circuit television system, necessary chemical sealant containers, pumps, regulators, valves, hoses, etc., and joint sealing packers for the various sizes of sewer pipes. The packer shall be a cylindrical case of a size less than pipe size, with the cables at either end used to pull it through the line. The packer device shall be constructed in such a manner as to allow a restricted amount of sewage to flow at all times. Generally, the equipment shall be capable of performing the specified operations in lines where flows do not exceed the maximum line flows as specified in Section 02750 - Wastewater Flow Control. When the packer is inflated, two widely spaced annular bladders shall be formed, each having an elongated shape and producing an annular void around the center portion of the packer.

B. Before starting the work, a performance test demonstration verifying the accuracy and repeatability of the void pressure meter and fluid pumping equipment should be performed. If these test demonstrations fail to show that the readings are accurate, $\pm$0.5 psi (3 kPa) for void pressure repeatability, and $\pm$0.1 gallons (0.4 L) of chemical pumped into a measured container, the CONTRACTOR shall be required to make the required repair or adjustments to the equipment and gages and retest until the results are satisfactory to the CITY's representative. The test demonstration may be required at each work shift during the sealing operation.

3.6 JOINT SEALING PROCEDURE

A. In the preparation and application of the sealing grout, the recommendations of the manufacturer of the grout materials shall be followed. Before joint sealing, chemical grout

gel times should be measured and recorded. Gel times should also be measured and recorded whenever a new batch is made and at the end of the shift. These gel times measurements are a very effective and meaningful quality assurance procedure.

B. Joint sealing shall be accomplished by forcing chemical sealing materials into or through infiltration points by a system of pumps, hoses, and sealing packers. Jetting or driving pipes from the surface that could damage or cause undermining of the pipelines, will not be allowed. Excavating the pipe, which would disrupt traffic, undermine adjacent utilities and structures, will not be allowed. The packer shall be positioned over the area of infiltration by means of a metering device and the closed-circuit television in the line. It is important that the procedure used by the CONTRACTOR for positioning the packer be accurate to avoid over-pulling the packer and thus not effectively sealing the point of infiltration. The packer sleeves shall then be expanded using precisely controlled pressures. The pneumatically expanded sleeve or elements shall seal against the inside periphery of the pipe to form a void area at the point of infiltration, now completely isolated from the remainder of the pipeline. Into this isolated area, sealant materials shall be pumped through the hose system at controlled pressures, which are in excess of groundwater pressures. The pumping, metering, and packer device shall be integrated so that the proportions and quantities of materials can be regulated in accordance with the type and size of the leak being sealed.

C. The grout must be injected beyond the joint interface into the soil surrounding the pipe joint.

D. A color additive (dye) should be added to the grout so that a visual residual layer of grout rings the joint providing confirmation the packer was located over the joint and the void was filled during the sealing operation.

E. No joint shall be considered sealed unless, while under continual pressure, an attempt is made to pump grout to “refusal” (up to ½ gallon per inch diameter pipe size). This is to ensure that sufficient chemical has been dispersed into the soil surrounding the joint and that a temporary seal has not been made by applying a minimum amount of chemical grout to the void and the joint area inside the pipe. When chemical grout cannot be pumped to “refusal” within a volume less than or equal to ½-gal per inch diameter pipe size due to latent physical conditions, no additional work shall be undertaken until authorization to proceed has been given by the CITY.

F. Upon completing the sealing of each individual joint, the packer shall be deflated; moved at least one packer length in either direction, and then repositioned over the joint; with the void pressure meter reading zero pressure, then re-inflated and tested as specified in subsection 3.03 - Joint Testing Procedure. Should the void pressure meter not read zero, the CONTRACTOR shall clean his equipment of residual grout material or make the necessary equipment repairs to provide for an accurate void pressure reading. Joints that fail to meet the specified test criteria shall be resealed and retested until the test criteria can be met in order to receive payment.

G. All testing shall be performed by the CONTRACTOR in the presence of the CITY. It shall be the responsibility of the CONTRACTOR to completely seal every leak authorized for sealing to the extent determined by the CITY. If, in the CITY's opinion, it is not necessary to continue with a particular leak, the crew shall move to the next joint or leak. The CONTRACTOR shall remove any small excess sealing grout inside the sewer line. CONTRACTOR shall operate his equipment with care and shall be responsible for any damage to the sewer system or other facilities caused by his operations and shall repair such damage at his expense and without delay as instructed by the CITY.

3.7 JOINT SEALING RECORDS

A. Included in the records for joint sealing shall be:

1. The test pressure before (where specifically requested) and after sealing and the duration of the test.

2. The volume of grout material used to seal each joint.

3. The volume of grout placed per section.

4. The gel set time used.

5. The barrel test results.

6. The grouting material used including additives and their respective quantities.

3.8 LATERAL SEALING PROCEDURE

A. The following shall apply to the sealing of all reinstated laterals after the main has been lined.

1. The total batch shall be no more than 50 gallons. That means reducing the water in each tank by 5 gallons. This will increase the strength of the “gel” by increasing the solids to 12 percent.

2. The “gel” time shall be 10 seconds longer than the time required by the pumps to fill the inside packer void and at no time shall the “gel” time be less than 20 seconds.

3.9 TELEVISION SURVEY

A. Television survey, consisting of a continuous video that shows both pre- and post-grouting conditions and operations, is required for all grouted lines.

3.10 WARRANTY

A. All chemical grouting work described herein shall be warranted against faulty workmanship and/or materials for a period of 3 years after the completion of the work.

i. Six months before the end of the warranty period, the CONTRACTOR shall undertake spot checks in conjunction with the City of locations that were chemically grouted. Ten percent (10%) of such locations will be selected for inspection. If fifty percent (50%) of these fails, then an additional ten percent (10%) will be selected for inspection. The process continues and if applicable all grouted areas will be inspected. The process continues and applicable all grouted areas will be inspected. The CONTRACTOR will be reimbursed for inspection work at the contract unit rate for cleaning and TV inspection. Defects will be repaired by the contractor at no cost to the City.

- END OF SECTION -

SECTION 02764 - CURED-IN-PLACE SECTIONAL PIPE LINING

PART 1 -- GENERAL

1.1 SCOPE

A. The work specified in this section consists of rehabilitating existing sanitary sewer pipe by installing a resin impregnated fiberglass/polyester felt tube into an existing pipe to restore its structural and hydraulic integrity.

1.2 GENERAL

A. The finished sectional pipe liner in place shall be fabricated from materials which, when installed, will be chemically resistant to withstand internal exposure to domestic sewage.

1.3 SUBMITTALS

A. The Contractor shall submit shop drawings and other information to the CITY for review in accordance with CITY standards. Included shall be design calculations for the work.

1.4 QUALIFICATIONS

A. The Qualifications of the CONTRACTOR shall be submitted prior to contract award. These Qualifications shall include detailed descriptions of the following:

1. Name, business address and telephone number of the CONTRACTOR.

2. Name(s) of all supervisory personnel to be directly involved with this project.

3. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the CITY.

4. Specialty technicians shall be certified by the equipment manufacturer and/or its authorized representative. Certifications shall be submitted to the CITY.

5. The CONTRACTOR shall provide references of previous project lists going back four years including customer names and an Owner contact name, phone number, project number, and project name. The list must include the number of sectional liners installed.

6. To be acceptable, a minimum of 400 sectional liner installations must be documented.

7. To be acceptable, the installer must have had a minimum of two (2) years' active experience in the commercial installation of the product.

PART 2 -- PRODUCTS

2.1 GENERAL

A. The finished liner shall be fabricated from material as specified in this section which when cured will be chemically resistant to the corrosive effects of the raw sewage and hydrogen sulfide. The cured-in-place sectional pipe shall be the New Life System as manufactured by Stephen's Technologies, Inc. or approved equal.

B. Sectional liner ends shall be sealed to prevent infiltration using Insignia™ O-Rings by LMK Technologies or approved equal.

2.2 LINER SIZING

A. The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit to be repaired as specified by the CITY.

B. The length and number of liners shall be that deemed necessary by the CITY to effectively carry out the repairs. The CONTRACTOR shall verify the lengths in the field before cutting the liner to length. In general, the minimum length shall be 6 feet for 8- to 12-inch diameter pipe and cover a minimum of 6 inches on either side of the pipe joint.

C. For 15- to 21-inch diameter pipe, a longer sectional liner may be required.

2.3 LINER MATERIAL

A. The lining material shall be a fiberglass matting material and fully impregnated with an epoxy resin as specified.

B. The mixed components of the epoxy resin shall have the following properties:

Item		Criteria
1.	Solids Content	100% by weight
2.	Pot Life	90 minutes at 70 degrees F
3.	Shelf Life	at least 1 year (sealed)
4.	Viscosity	18,000 cps (average at 70 degrees F)
5.	Density	12 pounds per gallon (max.)

C. The cured epoxy resin material shall have the following properties:

Item	Test Value	Reference Standard
Flexural Strength	5,000 psi	ASTM D 790
Flexural Modulus	400,000 psi	ASTM D 790

2.4 LINER DESIGN

A. The minimum required structural CIPP wall thickness shall be based on the physical properties described above and in accordance with the design equations in the appendix of

ASTM F 1216, and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design	50 %
Ovality*	2 %
Groundwater Depth = Pipe Depth (above invert) *	ft.
Soil Depth (above crown) *	ft.
Soil Modulus	700 psi
Soil Density	120 pcf
Live Load	One H20 passing truck
Design Condition	Fully deteriorated
**Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.*	

B. The lining manufacturer shall submit to the CITY for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. A safety factor of 2 shall be applied in the design calculation. The host pipe shall be considered fully deteriorated if unlined, and partially deteriorated if lined. The liner shall be designed to withstand a live load equivalent to one H-20 passing truck plus all pertinent dead loads, hydrostatic pressure and grout pressure (if any). For design purposes, the water table shall be considered at grade elevation. The liner shall be designed in accordance with ASTM F 1216. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. The modulus of soil reaction shall be 700, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.

C. Liner shall be neither accepted nor installed until design calculations are acceptable to the CITY.

PART 3 -- EXECUTION

3.1 CLEANING SEWER LINES

A. Prior to any lining of a pipe so designated, it shall be the responsibility of the CONTRACTOR to remove internal deposits from the pipeline in accordance with Section 02751 - Preparatory Cleaning and Root Removal.

3.2 TELEVISION SURVEY

A. A television survey shall be performed in accordance with Section 02752 - Television Survey, including Preconstruction and Post Construction Surveys.

B. The interior of the pipeline shall be carefully surveyed to determine the locations and extent of any structural failures. The location of any conditions which may prevent proper installation of lining materials into the pipelines shall be noted so that these conditions can be corrected. A video tape and suitable log shall be kept and turned over to the CITY.

3.3 FLOW BYPASSING

A. The CONTRACTOR, when required, shall provide for the transfer of flow, through or around a section or sections of pipe that are to be repaired. The proposed bypassing system shall be acceptable in advance by the CITY. The acceptance of the bypassing system in advance by the CITY shall in no way relieve the CONTRACTOR of his responsibility and/or public liability. The flow bypassing shall be done in accordance with Section 02750 - Wastewater Flow Control.

Note: If the repair can be made in a few hours, bypass pumping may not be required. The placement carriage shall be equipped with a bypass section to allow flow once liner is pressed into place.

3.4 LINE OBSTRUCTIONS

A. It shall be the responsibility of the CONTRACTOR to clear the line of obstruction. If the survey reveals an obstruction that cannot be removed by conventional cleaning equipment, the CONTRACTOR shall make a point repair excavation in accordance with Section 02757 - Point Repair of Sanitary Sewers, to uncover and remove or repair the obstruction. Such excavation shall be accepted in writing by the CITY prior to the commencement of the work.

3.5 LINER INSTALLATION

A. Prior to liner installation, all active severe leaks which may affect the success of liner installation shall be stopped using chemical grout. The CONTRACTOR shall impregnate the liner with the 100 percent solids epoxy. Drop cloths, tarpaulins, and etc. shall be used to prevent epoxy material from contacting the adjacent ground. Place the liner on the placement carriage and maneuver carriage and liner into position with the use of a video camera. Force the liner against the inside wall of the damaged host pipe allowing epoxy resin to permeate into any cracks in the host pipe. Allow lines to cure in accordance with the manufacturer's recommendations. Heat may be introduced to speed up curing time. Retract the placement carriage and remove from pipe.

B. After the sectional liner has been cured in place, the CONTRACTOR shall reconnect the service connections. Cutting of the liner pipe shall be done from the interior of the pipeline using a robotic cutter. Where holes are cut through the liner, they shall be neat and smooth in order to prevent blockage at the service connections. Cut-in service connections shall be opened to a minimum of 95 percent of the flow capacity of the building sewer. Cuts shall be wire-brushed to remove jagged edges. All coupons shall be recovered at the downstream manhole and removed. All reinstated service lateral connections (between the liner and the existing pipe) shall be grouted. The reinstatement of the service connections shall be a separate pay item.

3.6 ACCEPTANCE

A. The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, and the like. There shall be no visible infiltration through the liner or from behind the liner.

3.7 CLEANUP

A. After the liner installation has been completed and accepted, the CONTRACTOR shall clean up the entire project area and return the ground cover to grade. All excess material and debris not incorporated into the permanent installation shall be disposed of by the CONTRACTOR.

3.8 WARRANTY

A. The liner shall be certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for two years from the date of acceptance. During the warranty period, any defects which affect the integrity or strength of the liner shall be repaired at the CONTRACTOR's expense in a manner mutually agreed by the CITY and the CONTRACTOR.

   i. Six months before the end of the warranty period, the CONTRACTOR shall undertake spot checks in conjunction with the City of sectionally lined locations. Ten percent (10%) of lined areas per basin area will be selected for inspection. If fifty percent (50%) of these fails, then an additional ten percent (10%) will be selected for inspection. The process continues and if applicable, all sectionally lined locations shall be inspected. The CONTRACTOR will be reimbursed for inspection work at the contract unit rate for cleaning and TV inspection. Defects will be repaired by the CONTRACTOR at no cost to the City.

- END OF SECTION -

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SECTION 02765 - CURED-IN-PLACE PIPE LINING

PART 1 -- GENERAL

1.1 SCOPE

A. It is the intent of this specification to provide for the reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube which is formed to the original conduit and cured to produce a continuous and tight fitting Cured-In-Place Pipe (CIPP).

B. The work specified in this Section includes all labor, materials, accessories, equipment and tools necessary to install and test CIPP lining in main lines.

1.2 GENERAL

A. This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), and ASTM D790 (Test methods for flexural properties of unreinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

1.3 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings and other information to the CITY for review in accordance with CITY standards and Section 01300, "Submittals".

B. With the bid, the following submittals are required.

1. Documentation as outlined herein under the section titled, PRODUCT AND INSTALLER ACCEPTABILITY, including installation references of projects that are similar in size and scope to this project. The submittal shall include, at a minimum, the client contacts' name, phone number, and the diameter and footage of pipe rehabilitated. Documentation for product and installation experience must be satisfactory to the CITY.

C. After the contract award, the following submittals are required.

1. Detailed design calculations as specified herein under the section titled, MATERIALS FOR MAIN LINES.

2. Various test results as specified herein under the section titled, TESTING REQUIREMENTS.

3. Documentation as specified herein under the sections titled WET OUT AND CURE REPORT and TELEVISION SURVEY.

1.4 PRODUCT AND INSTALLERACCEPTABILITY

A. Since sewer products are intended to have a 50-year design life, and in order to minimize the CITY'S risk, only proven products and installers with substantial successful long-term track records will be approved.

B. Products and installers seeking approval must document an ability to meet all of the following criteria to be deemed commercially acceptable:

1. For a product to be considered commercially proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater collection system installations in the U.S. must be documented to the satisfaction of the CITY to assure commercial viability. In addition, at least 250,000 linear feet of the product shall have been in successful service within the State of Florida for a minimum of five years.

2. For an installer to be considered as commercially proven, the installer must satisfy all insurance, financial, and bonding requirements of the CITY, and must have had at least 5 (five) years' active experience in the commercial installation of the product. For sewer mains, the installer as a firm must have successfully installed at least 250,000 feet of the product in wastewater collection systems in Florida. Acceptable documentation of these minimum installations must be submitted to the CITY.

3. The CONTRACTOR must be approved by the product manufacturer to install the proposed lining materials.

4. The CONTRACTOR's superintendent must demonstrate at least 3 years of experience in this geographic area with the systems being bid on or the CONTRACTOR shall provide the services of an authorized manufacturer's representative for the duration of the project.

5. Sewer rehabilitation products submitted for approval must provide third party test results supporting the long-term performance, structural strength, and chemical resistance of the product and such data shall be satisfactory to the CITY. Test samples shall be prepared so as to simulate installation methods and trauma of the product. No product will be approved without independent third-party testing verification.

PART 2 -- PRODUCTS

2.1 MATERIALS FOR MAINLINES

A. The sewn tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, Section 5. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge breaks and missing sections of the existing pipe, and stretch to fit irregular pipe sections. The new jointless pipe-within-a-pipe must fit tightly against the old pipe wall and consolidate all disconnected sections into a single continuous conduit.

B. The wet-out tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the Design thickness.

C. The tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe with minimal shrinkage, in such a way as to minimize water migration (tracking) between the liner and the host pipe. Allowance should be made for circumferential stretching during inversion, and longitudinal stretching during pull in. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.

D. The minimum tube length shall be that deemed necessary by the CONTRACTOR to effectively span the distance between the access points and to facilitate a good, "non-tracking" seal. The CONTRACTOR shall verify the lengths in the field before cutting the liner to length and otherwise preparing it for installation.

E. The outside layer of the tube (before wet out) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wet out) procedure.

F. The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

G. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

H. Seams in the tube shall be stronger than the unseamed felt.

I. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes must be manufactured in the USA.

J. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that, when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the Design of the CIPP for this project. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.

K. The finished pipe in place shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage. Resin shall be in contact with the original mainline and the impermeable membrane shall be on the interior to be exposed to the wastewater flow. All constituent materials will be suitable for service in the environment intended. The final product will not deteriorate, corrode or lose structural strength that will reduce the projected product life. In industrial areas a liner system using epoxy vinyl ester resin shall be utilized and a polyester resin may be used in non-industrial areas. The CITY shall determine the type of appropriate resin to be utilized for each line segment.

L. The CIPP shall be designed as per ASTM F1216, Appendix X1. The CIPP design shall assume no bonding to the original pipe wall. The structural performance of the finished pipe must be adequate to accommodate all anticipated loads throughout its design life.

M. The CIPP must have a minimum design life of fifty (50) years. The minimum design life may be documented by submitting life estimates by national and/or international authorities or

specifying agencies. Otherwise, long-term testing and long-term in-service results (minimum ten (10) years) may be used, with the results extrapolated to fifty (50) years.

N. The CONTRACTOR must have performed long-term testing for flexural creep of the CIPP pipe material installed by his company. Such testing results are to be used to determine the long-term, time-depending flexural modulus to be utilized in the product design. This is a performance test of the materials (tube and resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Values in excess of 50% will not be applied unless substantiated by qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in design.

O. The minimum required structural CIPP wall thickness shall be based on the physical and structural properties described herein and in accordance with the design equations in the appendix of ASTM F 1216, and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design *(as determined by Long-Term tests described in paragraph 2.02.B)*	50 %
Ovality*	2 %
Water Table = Grade Elevation	ft.
Soil Depth (above crown) *	ft.
Soil Modulus	700 psi
Soil Density	120 pcf
Live Load	One H20 passing truck
Design Condition	Fully deteriorated
**Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.*	

P. The lining manufacturer shall submit to the CITY for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. The modulus of soil reaction shall be 700, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.

Q. As part of the design calculation submittal, the lining manufacturer shall submit descriptions of sampling, preparation, curing, and testing procedures; liner repair methods and materials; and a typical schedule for "wet out" of the liner together with a typical insertion and curing schedule.

R. As part of the design calculation submittal, the lining manufacturer shall submit a tabulation of time versus temperature. This tabulation shall show the lengths of time that exposed portions of the liner will endure without self-initiated cure or other deterioration beginning. This tabulation shall be at five-degree Fahrenheit increments ranging from 70 degrees F to 100 degrees F. The manufacturer shall also submit his analysis of the progressive effects of

such "pre-cure" on the insertion and cured properties of the liner. This information shall be submitted in a timely fashion prior to the preconstruction conference so that the CITY may set procedures for dealing with such an instance caused by construction delays.

S. The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If separation of the layers occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

T. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

U. Liner shall be neither accepted nor installed until design calculations are acceptable to the CITY. Liner shall be as manufactured by Insituform Technologies, Inc., or approved equal.

2.2 STRUCTURAL REQUIREMENTS FOR MAIN LINES

A. Since the pipe strength is related to the uniformity and density of the pipe wall, only resin vacuum impregnation will be allowed. Resin impregnation without vacuum entraps air and creates voids which weaken the pipe wall. If reinforcing materials (fiberglass, etc.) are used, the reinforcing material must be fully encapsulated within the resin to assure that the reinforcement is not exposed, either to the inside of the pipe or at the interface of the CIPP and the existing pipe.

B. The design for the CIPP wall thickness will be based on the following strengths, unless otherwise submitted to and approved by the CITY. Strengths in excess of these values will require documentation consisting of test results for recent installations in which 100 percent of samples tested exceeded the values claimed (minimum 3 projects with minimum 5 samples per project).

Property	Test Method	Cured Composite per ASTM F1216
Flexural Modulus of Elasticity	ASTM D-790	250,000 psi
Flexural Stress	ASTM D-790	4,500 psi

2.3 TESTING REQUIREMENTS

A. Chemical Resistance - The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical testing requirements.

B. Hydraulic Capacity - Overall, the hydraulic profile shall be maintained as large as possible. The CIPP shall provide at least 100 percent of the flow capacity of the original pipe before rehabilitation. In lieu of actual measurements, calculated capacities may be derived using commonly accepted equations and values of the Manning flow coefficients (designated "n" coefficients). The original pipe material and condition at the time of reconstruction will

determine the Manning coefficient used in the host pipe.

C. CIPP Field Samples - When requested by the CITY, the CONTRACTOR shall submit test results from field installations in the USA of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified herein have been achieved in previous field applications.

D. Prior to any liner installation, the CONTRACTOR shall submit technical data sheets showing the physical and chemical properties and infrared spectrum analysis per ASTM E1252 (chemical fingerprint) of the proposed resin system as modified for the cured-in-place process. Additionally, copies of the certificates of analysis for resin used on the project must be made available to the CITY upon request. The CONTRACTOR shall test each lot of resin used by conducting infrared spectrum analyses on field samples. These analyses shall be conducted at the CONTRACTOR's expense.

E. The CONTRACTOR shall provide resin samples as directed by the CITY during the duration of the project and infrared spectrographic chemical fingerprints shall be run and compared to the submitted fingerprint to verify the resin used is the resin submitted for use on this project. These analyses shall be conducted at the CITY's expense.

F. In the case of liner installation performed under this contract, CIPP samples shall be prepared and physical properties tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed.

1. The CONTRACTOR shall submit a method to the CITY, for approval, to obtain representative samples from the installed liners. These samples will be tested by the CITY, at the CITY's expense, to verify compliance with the installed material specifications. The CONTRACTOR shall produce these test samples when so directed by the CITY. The CITY reserves the right to request samples from as many as 10 percent of the liners installed, unless a pattern of failure occurs. In this case, the CONTRACTOR will be requested to provide a greater quantity of samples, up to 25 percent, at no additional cost, and the CONTRACTOR shall bear all costs of this additional testing. Liners which do not pass these material tests will be accepted at reduced payment or rejected pursuant to Section 01025.

2. The cost for sample collection shall be included in the bid price for rehabilitation.

3. Test specimens shall be marked in indelible ink with the appropriate lateral or main section, work order number, date of installation, and orientation to the top of the pipe (direction of up) so the results can be correlated to the field work performed. All test results shall use this designated labeling as a reference.

4. The extraction and labeling of test specimens shall be done in the presence of the CITY. The CITY and CONTRACTOR shall, upon completion of sample extraction and labeling, both sign a chain-of-custody form that shall subsequently accompany the sample at all times and shall ultimately be received and signed at the testing laboratory. Test reports shall include a copy of the chain-of-custody form with all signatures to ensure that reported test results are for the correct sample.

5. The flexural properties must meet or exceed the values specified herein.

6. Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743.

7. Visual inspection of the CIPP shall be by closed-circuit television.

G. When directed in advance by the CITY for specific installations, the CONTRACTOR shall implement more extensive monitoring of temperatures inside the liner to verify proper curing.

1. Temperature sensors shall be placed between the host pipe and the liner in the bottom of the host pipe (invert) throughout the reach to record the heating and cooling that takes place on the outside of the liner during processing. The sensors shall be spaced apart at intervals no greater than 20 feet for pipe sizes up to 15-inches in diameter, and no greater than 10-feet for pipe sizes 18-inches and larger. Additionally, sensors shall be strategically placed at points where a significant heat sink is likely to be anticipated. The monitoring of these sensors shall be by a computer which can record the temperatures at this interface throughout the processing of the cured-in-place liner utilizing a tamper-proof database. The proposed temperature sensor monitoring system and related software shall be as manufactured by ZIA Systems (www.ziasystems.com) or approved equal.

2. Prior to installing the liner in the host pipe, the temperature monitoring system's proper functioning shall be confirmed by hooking it up to the computer and seeing that the sensors are reporting their ambient temperatures. No more than two sensors in sequence can be found faulty during this test. If three or more sensors in sequence are discovered faulty, a new sensor array shall be pulled into the host pipe replacing the previously installed array, and the new array shall be again tested for its proper functioning.

3. Curing of the resin system shall be in accordance with the directions and established procedures of the cured-in-place product manufacturer with respect to the temperatures achieved and the duration of holding the liner at those temperatures. If any sensor or sensors along the reach indicate that there is a localized issue with respect to achieving proper curing per the written installation procedure, the CONTRACTOR shall address the issue immediately using previously established protocols for such an event.

4. The sensor array's database shall have an output report that identifies each sensor by its station in the reach and shows the maximum temperature achieved during the processing of the cured-in-place liner and the time sustained at or above the Manufacturer's required curing temperature at each sensor. The CONTRACTOR shall deliver to the CITY a certified copy of the curing report output from the temperature monitoring system used in the control of the curing process or shall provide the CITY with access to the website where the secure report can be obtained.

PART 3 -- EXECUTION

3.1 CLEANING/SURFACEPREPARATION

A. It shall be the responsibility of the CONTRACTOR to clean the pipeline with a high-pressure water jet and to remove all internal debris out of the pipeline in accordance with Section 02751, "Cleaning and Root Removal".

3.2 SEWER REPAIRS

A. Any protruding pieces of concrete, dropped joints or broken pipe shall be subjected to point repairs so that the pipe is left in a clean smooth condition in all respects ready for lining, unless otherwise jointly determined by the CONTRACTOR and the CITY that the defect will not compromise the integrity of the liner.

B. If conditions such as broken pipe and major blockages are found that will prevent proper cleaning, or where additional damage would result if cleaning is attempted or continued, the CONTRACTOR shall advise the CITY so that point repair(s) may be authorized prior to completion of cleaning.

3.3 JOINT, CRACK, ANNULAR SPACE, AND LINER END CHEMICAL SEALING

A. Prior to cured-in-place liner installation, all active leaks of a magnitude to compromise the integrity of the liner shall be stopped using chemical grout, at no additional cost to the CITY.

B. Materials used on this Project shall have the following properties: react quickly to form a permanent watertight seal; resultant seal shall be flexible and immune to the effects of wet/dry cycles; non-biodegradable and immune to the effects of acids, alkalis, and organics in sewage; component packaging and mixing compatible with field conditions and worker safety; excess sealant left inside pipe shall be readily removable; and, be compatible with the CIPP liner resin system utilized. The chemical sealing materials shall be acrylic resin type and shall be furnished with activators, initiators, inhibitors and any other materials recommended by the manufacturer for a complete grout system. Sealing grout shall be furnished in liquid form in standard manufacturer's containers. The sealing grout shall be AV- 100 manufactured by Avanti International or approved equal.

C. The CONTRACTOR shall modify his equipment as necessary to seal the leaks, however both his equipment and sealing method must meet with the approval of the CITY prior to use. Extreme caution shall be utilized during leak sealing (pressure) operations in order to avoid damaging already weakened sewer pipes. If any damage occurs, it shall be repaired at the CONTRACTOR’s cost and to the satisfaction of the CITY. Excessive pumping of grout which might plug a service lateral shall be avoided. Any service laterals blocked by the grouting operation shall be cleared immediately by the CONTRACTOR.

3.4 FLOW CONTROL

A. Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the sewer under repair. See Section 02750, "Wastewater Flow Control" for additional information.

3.5 LINER INSTALLATION FOR MAINLINES

A. The pre-lining video of the prepared pipe shall be reviewed and be acceptable to the CITY for cleanliness and smoothness before the CONTRACTOR begins to line the pipe.

B. The CONTRACTOR shall present to the CITY, for review, a description of his methods for avoiding liner stoppage due to conflict and friction with such points as the manhole entrance and the bend into the pipe entrance. He shall also present plans for dealing with a liner stopped by snagging within the pipe. This information shall be rendered to the CITY in a timely fashion prior to the preconstruction conference.

C. The CONTRACTOR shall immediately notify the CITY of any construction delays taking place during the insertion operation. Such delays shall possibly require sampling and testing by an independent laboratory of portions of the cured liner at the CITY's discretion. The cost of such a test shall be borne by the CONTRACTOR, and no extra compensation will be allowed.

Any failure of sample tests or a lack of immediate notification of delay shall be automatic cause for rejection of that part of the work at the CITY's discretion.

D. The CONTRACTOR shall designate a location where the tube will be impregnated with resin prior to installation. The CONTRACTOR shall allow the CITY to inspect the materials and the "wet out" procedure.

E. The CONTRACTOR shall submit construction schedules for advance approval by the CITY. At no time will any service lateral remain inoperative for more than an 8-hour period. Any service that will be out of service for more than 8 hours will be temporarily bypassed into a mainline sanitary sewer, at the CONTRACTOR's expense.

F. The materials and processes must be reasonably available for pre-installation, installation and post-installation inspections. Areas which require inspection include, but are not limited to, the following:

1. Product materials should exhibit sufficient transparency to visually verify the quality of resin impregnation.

2. Temperature sensing devices, such as thermocouples, shall be located between the existing pipe and the CIPP to ensure the quality of the cure of the wall laminate.

G. After the inversion is complete, the CONTRACTOR shall supply a suitable heat source and water recirculation equipment to circulate heated water throughout the pipeline. The equipment shall be capable of delivering hot water throughout the pipeline to uniformly raise the water temperature to a level required to effectively cure the resin. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gage shall be placed between the tube and the host pipe at the termination end at or near the bottom to determine the temperatures during cure. Water temperature in the pipe during the cure period shall be as recommended by the resin manufacturer.

H. Initial cure shall be deemed complete when the exposed portions of the tube appear to be hard, and sound and the temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer and may require continuous recirculation of the water to maintain the temperature. The CONTRACTOR shall have on hand at all times, for use by his personnel and the CITY, a digital thermometer or other means of accurately and quickly checking the temperature of exposed portions of the liner.

I. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with modifications as listed herein.

J. Resin Impregnation: The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction. After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube. If the Installer uses an alternate method of resin impregnation, the method must produce the same results. Any alternate resin impregnation method must be proven.

K. Tube Insertion: The wet-out tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch should be utilized, and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

L. Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.

M. Curing shall be accomplished by utilizing hot water under hydrostatic pressure in accordance with the manufacturer's recommended cure schedule.

N. Cool down: The CONTRACTOR shall cool the hardened pipe to a temperature below 100 F before relieving the hydrostatic head. Cool down may be accomplished by the introduction of cool water into the inversion standpipe to replace water being pumped out of the manhole. Care should be taken in release of static head so that vacuum will not be developed that could damage the newly installed liner.

O. Finish: The new pipe shall be cut off in the manhole at a suitable location. The finished product shall be continuous over the length of pipe reconstructed and be free from dry spots, delamination and lifts. A watertight seal shall be made at the inside manhole wall using extra polyester fiber felt and epoxy resin, or another method if approved by the CITY. Pipe entries and exists shall be smooth, free of irregularities, and watertight. No visible leaks shall be present, and the CONTRACTOR shall be responsible for grouting to remove leaks or filling voids between the host pipe and the liner. During the warranty period, any defects which will affect the integrity or strength of the product shall be repaired at the CONTRACTOR's expense, in a manner mutually agreed upon by the CITY and the CONTRACTOR.

3.6 REINSTATEMENT OF SERVICE LATERALS, BRANCH CONNECTIONS, AND DROP MANHOLE CONNECTIONS

A. After the pipe has been cured in place, the CONTRACTOR shall reconnect the existing service connections. This shall be done from the interior of the pipeline without excavation using a robotic cutter. Where holes are cut through the liner, they shall be neat and smooth in order to prevent blockage at the service connections. Cut-in service connections shall be opened to a minimum of 95 percent of the flow capacity of the building sewer. Cuts shall be wire-brushed to remove jagged edges. All coupons shall be recovered at the downstream manhole and removed. The CONTRACTOR shall stop all visible leaks, including at service connections as required. All reinstated service lateral connections (between the liner and the existing pipe) shall be grouted. The reinstatement of the service connections shall be a separate pay item.

B. It is the intent of these specifications that service laterals be reopened without excavation, utilizing a remote-controlled cutting device, monitored by a video TV camera. The CONTRACTOR shall certify he has a minimum of 2 complete working cutters plus spare key components on the site before each liner installation. No additional payment will be made for excavations for the purpose of reopening connections and the CONTRACTOR will be responsible for all costs and liability associated with such excavation and restoration work.

C. Unless otherwise directed by the CITY, all laterals will be reinstated. The CITY will provide specific direction concerning any laterals that will be abandoned and will therefore not require reinstatement. The CONTRACTOR shall abandon a lateral by not reinstating the lateral only with the written consent of the CITY.

D. The language in this section applies equally to branch connections and drop manhole connections.

3.7 ACCEPTANCE

A. The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, and the like. No pinholes, cracks, thin spots, dry spots, or other defects in the liner will be permitted. There shall be no visible infiltration through the liner or from behind the liner at manholes and service connections. Cut ins and attachments at service connections shall be neat and smooth.

B. Ridges or wrinkles in the installed liner shall be accepted or rejected at the sole discretion of the CITY. If, in the opinion of the CITY, such defects could cause structural weakening of the liner, impede the progress of a camera during internal television inspection, or encourage solids deposition and potential interruptions to flow, such defects shall be corrected at the CONTRACTOR’s expense in a manner acceptable to the CITY.

3.8 WET OUT AND CURE REPORT

A. The CONTRACTOR shall submit "wet out" and "cure" reports documenting the specific details of the liner's vacuum impregnation and saturation with resin and the CIPP installation of the liner. A copy of all "wet out" and "cure" records shall be made available to the CITY upon request and shall be turned over to the CITY on a weekly basis and prior to request for payment. If the "wet out" and "cure" reports are not presented prior to a payment request for

a repair work order, payment for the work will not be made and the request will be rejected. At a minimum, this report shall include, in addition, CONTRACTOR and Contract identification:

1.

2.

3. Line identification and location

4. Wet out date

5. Sample identification(s) and technician

6. Installation (in sewer) date

7. Host sewer pipe inside diameter

8. Liner thickness

9. Liner length

10. Liner and resin batch numbers

11. Resin type

12. Wet out length

13. Quantity of resin and catalyst utilized

14. Wet out technicians

15. Time wet out started and completed

16. Applicable remarks

17. Boiler and liner heating fluid pressure and temperature versus time log during cure period

18. Cool down report

3.9 CLEANUP

A. After the liner installation has been completed and accepted, the CONTRACTOR shall clean up the entire project area and return the ground cover to the original or better condition. All excess material and debris not incorporated into the permanent installation shall be disposed of by the CONTRACTOR.

3.10 TELEVISION SURVEY

A. A television survey, including Preconstruction Survey and Post Construction Survey, as indicated in Section 02752 "Television Survey", is required for all cured-in-place lining, and shall be completed within 2 weeks of liner installation.

3.11 PUBLIC NOTIFICATION

A. The CONTRACTOR shall make every effort to maintain service usage throughout the duration of the project. In the event that a service connection will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the CONTRACTOR to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The CONTRACTOR shall also provide the following:

1. Whether or not an interruption in service is expected, written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the CONTRACTOR the home or business can call to discuss the project or any problems which could arise.

2. Personal contact with any home or business which cannot be reconnected within the time stated in the written notice.

3.12 WARRANTY

A. The CONTRACTOR shall warrant all work and materials installed for two years from the date of final acceptance. The date of final acceptance shall be the date that final payment is made to the CONTRACTOR. During the warranty period, any defects which affect the integrity or strength of the pipe shall be repaired at the CONTRACTOR's expense in a manner mutually agreed by the CITY and the CONTRACTOR.

B. Six months before the end of the warranty period, the CONTRACTOR will be required to perform spot checks at locations provided by the City for inspecting the sewer lining. CONTRACTOR will be reimbursed for inspection at the contract unit rates for sewer main cleaning and TV inspection, and any defects shall be repaired by the CONTRACTOR at no cost to the City.

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SECTION 02766 – FOLD-AND-FORM PIPE LINING

PART 1 -- GENERAL

1.1 SCOPE

A. The work consists of furnishing all design, labor, materials, equipment and transportation necessary to install and test a polyethylene (PE) or polyvinyl chloride (PVC) fold-and-form pipe (FFP) liner. The purpose of the liner is to eliminate infiltration into the sanitary sewer system and structurally upgrade the sewer line section. The FFP liner shall withstand long term external loading specific to the site. The finished pipe in place shall be fabricated from materials which, when installed, will be watertight and chemically resistant to withstand internal exposure to domestic sewage and sewage gases.

B. As becomes applicable to this specific Contract, the work shall include the preparation of the construction site, including cleaning, flushing, and video taping of existing piping; verification of size, length, and materials for pipes to be relined; hauling; unloading; distributing and installation; testing of all pipe, fittings, scaffolding, piping, valves, boilers, etc. and other accessories as required for the proper installation; flow control bypass pumping; grouting, pipelining, and protection of existing conditions during installation work; protection of the site during the life of the Contract, including providing of necessary watchmen, warning lights, barricades, traffic control, dust control and maintenance of detours, as needed; re-establishment of service to all laterals; videotaping of the completed liner installation; and finally the cleanup of the work site, including maintenance of surfaces such as paving, sodding and graveling, as needed, if damaged.

C. Even though the product has been approved by the CITY, the material supplier and CONTRACTOR shall be responsible for the product meeting all written claims published in submitted literature. The product shall not be subject to long-term cracking, deformation or contraction or expansion resulting in breakage of end seals or lateral connection seals. The CONTRACTOR shall be responsible for providing a liner thickness designed for the specific site conditions meeting the requirements for a long-term external loading of 50 years.

D. Where reference is made to any standard, the revision in effect at the time of bid opening shall apply.

1.2 RELATED WORK

A. The work of this section relies on the work of other sections of the specifications, such as those involving cleaning, televising, and wastewater flow control, to the extent required for proper performance of work.

1.3 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings and other information to the CITY for review in accordance with CITY standards.

B. With the bid, the following submittals are required.

1. The Manufacturer’s shop drawings, catalog cut sheets, technical data satisfying Section 2 of this specification, installation requirements and recommended methods,

recommended repair methods, detailed drawings and procedures for terminating the lining in manholes, testing procedures, quality control procedures, and shipping and storage requirements. Upon approval by the CITY, the manufacturer's recommendations shall become the basis for acceptance or rejection of actual methods of installation used in the work.

2. A certified statement from the manufacturer that the CONTRACTOR is a certified and/or licensed installer of the liner.

3. Documentation as outlined herein under the section titled, PRODUCT AND INSTALLER ACCEPTABILITY, including installation references of projects that are similar in size and scope to this project. The following submittals shall be included and documentation for product and installation experience must be satisfactory to the CITY.

   a. The CONTRACTOR'S number of years of experience in installing FFP and the total number of linear feet installed nationally and in Florida.

   b. A list of Florida municipal clients that the CONTRACTOR has performed this type of work for including contact names, phone numbers, diameter and linear footage of pipe rehabilitated, the name of the FFP lining manufacturer and supplier, and a description of the actual work performed. Provide a sufficient number of references to total 75,000 feet or more of lining work to date.

   c. A detailed resume of the Field Superintendent who will direct the work. The field superintendent shall have at least two (2) years' field experience in trenchless pipeline rehabilitation and shall be on the job full-time during any and all steps of the pipe installation.

C. After the contract award, the following submittals are required.

1. Detailed design calculations as specified herein under the section titled, DESIGN CRITERIA. Included shall be design calculations for the work indicating the liner SDR proposed for lines of different depths. No liner shall be accepted or installed until design calculations are approved by the CITY.

2. Prior to each shipment of FFP, certified test reports that the FFP for this Contract was manufactured and tested in accordance with all ASTM Standards specified and referenced herein.

1.4 PRODUCT AND INSTALLERACCEPTABILITY

A. Since sewer products are intended to have a 50-year design life, and in order to minimize the CITY'S risk, only proven products and installers with substantial successful long-term track records will be approved.

B. Products and installers seeking approval must document an ability to meet all of the following criteria to be deemed commercially acceptable:

1. For a Product to be considered commercially proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater collection

system installations in the U.S. must be documented to the satisfaction of the CITY to assure commercial viability. In addition, at least 250,000 linear feet of the product shall have been in successful service within the State of Florida for a minimum of five years.

2. For an Installer to be considered as commercially proven, the installer must satisfy all insurance, financial, and bonding requirements of the CITY, must have had at least 5 (five) years active experience in the commercial installation of the product, and shall be certified and/or licensed as an installer by the FFP lining manufacturer. In addition, the installer as a firm must have successfully installed at least 250,000 feet of the product in wastewater collection systems in Florida. Acceptable documentation of these minimum installations must be submitted to the CITY.

3. The proposed Superintendent shall have successfully installed a minimum of 70,000 feet of the proposed liner as supported by verifiable references.

4. Sewer rehabilitation products submitted for approval must provide third party test results supporting the long-term performance and structural strength of the product and such data shall be satisfactory to the CITY. Test samples shall be prepared so as to simulate installation methods and service stresses affecting the product. No product will be approved without independent third-party testing verification.

5. The CITY reserves the right to approve or disapprove the CONTRACTOR, and/or manufacturer, based on the submitted qualifications and a follow-up interview.

1.5 DELIVERY, STORAGE ANDHANDLING

A. Care shall be taken in shipping, handling and laying to avoid damaging the FFP. Any FFP damaged in shipment shall be replaced as directed by the CITY.

B. Any FFP showing a split or tear, or which has received a blow that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work.

C. While stored, FFP shall be adequately supported and protected. FFP shall be stored in a manner as recommended by the manufacturer.

D. The CONTRACTOR shall not permit any materials to be brought onto the job site prior to obtaining approval from the CITY. No pipe shall be lined up without prior notification to the CITY. Each liner shall be subject to inspection by the CITY immediately before it is installed and liner judged to be defective may be rejected.

PART 2 -- PRODUCTS

2.1 GENERAL

A. The FFP shall be fabricated to a size that will tightly fit the sewer being rehabilitated after being installed and formed and will neatly fit the internal circumference of the sewer to be lined. Allowance for longitudinal and circumferential expansion shall be taken into account by the CONTRACTOR and manufacturer when sizing and installing the liner. The dimensions, including existing pipe diameters, shall be verified by the CONTRACTOR prior to fabrication or installation. The formation of ribs or folds resulting from the FFP liner being

too large for existing pipes may not be accepted and may require removal by the CONTRACTOR.

B. The length of the liner shall be that deemed necessary by the CONTRACTOR to effectively carry out the insertion and seal the liner at the inlet and outlet of the manholes, so as to form a continuous pipe from manhole to manhole, unless otherwise specified. The length shall be verified in the field by the CONTRACTOR prior to the fabrication or installation.

C. The minimum thickness for the pipe shall be as verified by design calculations prepared by a professional engineer for each specific pipe location.

D. At the time of manufacture, each lot of liner shall be inspected for defects and tested in accordance with ASTM D-2837 and D-1693. At the time of delivery, the liner shall be homogeneous throughout, uniform in color, free of cracks, scratches, holes, foreign materials, blisters, or deleterious faults. For testing purposes, a production lot shall consist of all liners having the same marking number. It shall include any and all items produced during any given work shift and must be so identified as opposed to previous or ensuing production.

E. Liner shall be marked at 5-foot intervals or less with a coded number which identifies the manufacturer, SDR, diameter, material, date, and shift on which the liner was extruded. At the end of the production shift during which a production lot has been extruded, the marking code on the liner shall be changed to indicate that said time intervals have elapsed and then a new production shift has begun.

F. The Engineer may at any time direct the manufacturer to obtain compound samples and prepare test specimens in accordance with ASTM D-4703. These specimens shall comply with the minimum property values shown below with the applicable ASTM requirements.

G. The FFP lining shall be provided by a single manufacturer. The supplier shall be responsible for the provisions of all test requirements specified herein as applicable. In addition, all FFP to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by the CITY. The CONTRACTOR shall require the manufacturer's cooperation in these inspections. The cost of plant inspection will be the responsibility of the CITY.

H. Inspections of the FFP may also be made by the CITY after delivery. The FFP shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample FFP may have been accepted as satisfactory at the place of manufacture. FFP rejected after delivery shall be marked for identification and shall be removed from the job at once.

2.2 DESIGN CRITERIA

A. The required structural wall thickness shall be based on the physical properties specified herein and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design	50 %
Ovality*	2 %
Groundwater Depth*	Pipe depth (above invert)
Soil Depth*	Pipe depth (above crown)
Soil Modulus	700 psi
Soil Density	120 pcf
Live Load	One H20 passing truck
Design Condition	Fully deteriorated
**Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.*	

B. The lining manufacturer shall submit to the CITY for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. A safety factor of 2 shall be applied in the design calculation. The host pipe shall be considered fully deteriorated. The liner shall be designed to withstand a live load equivalent to one H-20 passing truck plus all pertinent dead loads, hydrostatic pressure and grout pressure (if any). For design purposes, the water table shall be considered at grade elevation. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. The modulus of soil reaction shall be 700, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.

C. Minimum SDR for PVC liner shall be 35.

D. Minimum SDR for polyethylene liner shall be 32.5.

E. Liner shall be neither accepted nor installed until design calculations are acceptable to the CITY.

2.3 PVC LINER MATERIAL

A. Unless otherwise specified, the CONTRACTOR shall furnish a PVC pipe that meets testing requirements in ASTM Test Procedures D-638 and D-790 and meets the finished expanded physical strengths specified herein and ASTM F-1504 Standard Specifications for Folded PVC Pipe for Existing Sewer and Conduit Rehabilitation.

B. The PVC compound used for the folded pipe shall conform to ASTM D-1784 classification 12334-B or 12344-B and as further defined in ASTM F-1504. Compounds that have different cell classifications because one or more properties are superior to those specified are also acceptable.

C. The expanded pipe shall conform to the minimum structural standards as listed below:

Physical Characteristics	Test Procedure	Minimum Value
Tensile Strength	ASTM D-638	6,000 psi
Flexural Strength	ASTM D-790	9,000 psi
Flexural Modulus	ASTM D-790	340,000 psi
Coefficient of Thermal Expansion	ASTM D-696	0.00003 in/in °F

D. Liner shall be Miller EX PVC Liner or approved equal.

2.4 POLYETHYLENE LINERMATERIAL

A. Deformed polyethylene pipe introduced into sanitary sewers in order to rehabilitate the existing pipeline system without excavation, shall comply with ASTM D 3350, F 714, F 1606-95, and F 1533-97. This method applies to the rehabilitation of 8-inch through 12-inch diameter pipe in terms of material and installation. Installation of the FFP liner shall be in accordance with ASTM F-1606.

B. Pipe shall be made from polyethylene resins complying with ASTM D 3350, cell classification: PE345434 D for High Density. It shall be Type 3, Grade 4, Class D, according to ASTM D 1248. UV stabilizer may be substituted with color pigment with UV stabilizer.

C. The expanded pipe shall conform to the minimum structural standards as listed below:

Physical Characteristics	Test Procedure	Minimum Value
Tensile Strength (break)	ASTM D-638	4,500 psi
Tensile Strength (yield)	ASTM D-638	3,000 psi
Impact Strength	ASTM D-256A	3.0 ft-lb/in
Flexural Modulus	ASTM D-790	110,000-160,000 psi

D. Liner shall be U-Liner or approved equal.

PART 3 -- EXECUTION

3.1 EXISTING CONDITIONS

A. Prior to all work, the CONTRACTOR shall carefully inspect the area for existing conditions. The CONTRACTOR shall notify the CITY of any existing conditions that would prevent the installation of the liner or potentially impair the performance of the liner.

B. The CONTRACTOR shall verify the actual diameters, lengths, and materials of the pipes to be relined prior to ordering pipe materials and commencing installation.

C. In the event of a discrepancy, the CONTRACTOR shall immediately notify the CITY. No work shall be performed in an area of discrepancy until it has been fully resolved by the CITY.

D. The CONTRACTOR shall be responsible for notifying the CITY after completing a site inspection. If any plants, trees, or shrubs need to be removed to complete the work, the CITY will authorize or provide for the removal of items located within a utility easement.

3.2 FLOW CONTROL

A. Flow control shall be exercised as required to ensure that no flowing sewage comes into contact with sections of the sewer under repair.

B. A sewer line plug shall be inserted into the sewer upstream from the section to be repaired. The plug shall be so designed that all or any portion of the sewage flows can be released. During the review, testing and installation portion of the operation, flows shall be shut off in order to properly install the FFP lining. The upstream manholes shall be constantly monitored for degree of surcharging. After the installation is complete, flows shall be restored to normal levels.

C. Wherever lines are blocked off and the possibility of backing up the sewage and causing harm to public and private property is foreseen, it shall be the CONTRACTOR's responsibility to bypass flow from manhole to manhole.

D. Bypassing shall be accomplished using sewer plugs with pump connections, by pumping down surcharged manholes, or by other methods acceptable to the CITY. All bypassed flow must be discharged to a sanitary sewer. Bypassed flow shall not be allowed to enter any storm line, drainage ditch or street gutter.

E. During a bypass operation, the pump shall be manned continuously; the CONTRACTOR shall maintain the pump and bypass equipment and shall be responsible for any damages to public or private property due to the malfunction of the same.

F. See Section 02750, "Wastewater Flow Control" for additional information.

3.3 INSTALLATION

A. The CONTRACTOR shall conform with all work safety requirements of pertinent regulatory agencies and shall secure the site for the working conditions in compliance with the same. The CONTRACTOR shall erect such signs and other devices as are necessary for the safety of the work site. The CONTRACTOR shall also perform all of the Work in accordance with applicable OSHA standards. The CONTRACTOR shall abide by all local and state traffic control regulations.

B. The CONTRACTOR shall clean each length of pipe to be lined and shall properly dispose of any resulting material.

C. The CONTRACTOR shall conduct a color videotaped television inspection of each length of pipe after it is cleaned for the purpose of determining if existing conditions are suitable for the use of the proposed lining process and to document the location of all service lateral connections and point repair locations. The condition shall be approved by the CITY prior to the insertion of the liner.

D. It shall be the responsibility of the CONTRACTOR to clear the line of obstructions or collapsed pipe that will prevent installation of the liner. If inspection reveals an obstruction that cannot be removed by conventional pipe cleaning equipment, then the CONTRACTOR shall make a repair using appropriate methods as approved by the CITY. Such repair work shall be approved in writing by the CITY prior to the commencement of the work and shall be

considered as a separate pay item. Cleaning and root removal prior to lining shall not be considered a separate pay item.

E. Prior to lining the main sewer, all service connections protruding into the sewer to be lined shall be internally cut or ground down with a robotic cutter so as to be flush with the pipe to be lined. The robotic cutter shall be monitored by closed circuit television equipment to verify proper cutting. Removal of protruding service connections shall be approved in writing by the CITY and shall be considered a separate pay item.

F. Prior to lining the CONTRACTOR shall apply, internal to the pipeline, a chemical sealant at joints and cracks as required, at no additional cost to the CITY.

G. Prior to beginning the insertion of the liner, the CONTRACTOR shall confirm that he is satisfied that the lines are adequately cleaned. This confirmation shall serve as evidence of his acceptance of the condition of the piping and the suitability of liner insertion within the host pipe. The CONTRACTOR is advised that insufficient cleaning and preparation prior to lining could result in the installed liner being rejected by the CITY.

H. The installation of the FFP shall be in complete accordance with the applicable provisions herein and the manufacturers' specifications.

I. The new pipe shall be inserted into the existing pipe through existing manholes, without modification of manholes. There shall be no excavation of the roadway to install "receiving" or "sending" pits, unless approved by the CITY. Care shall be taken not to damage the deformed pipe during installation. Appropriate sleeves and rollers shall be used to protect the liner.

J. The CONTRACTOR shall supply a suitable heat source to thoroughly heat the full length of pipe to be inserted, as recommended by the pipe manufacturer. After the FFP is heated both internally and externally, the CONTRACTOR shall pull the FFP through the host pipe without exceeding pulling tensions recommended by the manufacturer, but at a sufficient rate to ensure that the entire section of pipe is hot while being installed. After the insertion is completed, the CONTRACTOR shall supply a suitable heat source to uniformly raise the temperature to effect forming of the FFP to the existing pipe wall, as recommended by the pipe manufacturer. The heat for processing shall be monitored and regulated as recommended by the pipe manufacturer. The new pipe shall be expanded until pressed tightly against the existing pipe wall. End seals as recommended by the pipe manufacturer shall be installed at each end prior to expansion of the FFP. The new pipe shall be expanded until pressed tightly against the existing pipe wall and held in that position for the required period. After the pipe has been fully expanded and held in that position for the required period, the pipe shall be cooled in accordance with the manufacturer's recommendations. If the pipe fails to form, the CONTRACTOR shall remove the failed pipe and replace it with a new pipe, without additional cost to the CITY.

K. Temperatures and pressures shall be monitored and recorded throughout the installation process to ensure that each phase of the process is achieved at the manufacturer's recommended temperature and pressure levels. Copies of these records shall be given to the CITY at the completion of each installation.

L. The beginning and end of the new FFP at manhole connections shall be sealed to the rehabilitated pipeline. The sealing material shall be compatible with the FFP and shall provide a watertight seal.

M. The CONTRACTOR shall fully reopen all of the existing active service connections in each length of sewer following lining. The service connections shall be reopened from inside the sewer by means of a closed-circuit television camera controlled cutting device appropriate for the FFP lining and the rehabilitated sewer pipe. Where holes are cut through the liner, they shall be neat and smooth in order to prevent blockage at the service connections. Cut-in service connections shall be opened to a minimum of 95 percent of the flow capacity of the building sewer. Cuts shall be wire-brushed to remove jagged edges. All coupons shall be recovered at the downstream manhole and removed. The CONTRACTOR shall stop all visible leaks, including at service connections as required. All reinstated service lateral connections (between the liner and the existing pipe) shall be grouted, along with the first joint of the lateral. All openings shall be clean and neatly cut and shall be flush with the lateral pipe. They shall be cut by experienced operators so that no blind attempts or holes are made in the liner pipe. Location shall be verified carefully with earlier tapes for accuracy, especially where dimples are not defined or clearly ascertained. The bottom of the openings shall be flush with the bottom of the lateral pipe to remove any lip that could catch debris. It shall be properly aligned and be concentric to the existing connection. Excess, wrong holes, or trial cuts shall not be made and must be repaired at no extra cost to the full satisfaction of the CITY. All of the liner penetrations or openings shall be watertight. The CONTRACTOR shall provide all necessary television monitoring and cutting equipment. All service connections shall be grouted using a material as recommended by the lining manufacturer, at no additional cost to the CITY.

N. Where the CITY has indicated a fused-on saddle, cut-in service connections shall be initially opened to a minimum of 50 percent of the flow capacity of the building sewer. Full opening (95 to 100%) shall be made when a sewer saddle is fused electrically to the liner for the purposes of installing the sewer service.

O. The CONTRACTOR shall reconnect all service connections to the liner pipe including those from unoccupied, abandoned or vacant lots, unless directed otherwise. The CONTRACTOR shall be responsible for restoring/correcting, without any delay, all missed or faulty reconnections, as well as for any damage caused to buildings for not reconnecting the services soon enough or for giving notice to the building occupants.

P. The liner shall be allowed to "relax" completely to achieve its final length and shape prior to cutting the liner at each manhole and prior to reopening service connections.

Q. When requested by the CITY, the CONTRACTOR shall provide to the CITY a specimen of installed and reformed liner (a minimum of 12 inches in length from an end cut) from each selected run of pipe. The CONTRACTOR shall label the coupon specimen with the appropriate manhole numbers, using indelible marker, to identify the liner section from which the specimen was collected. The specimen will be tested by an approved laboratory at the discretion of the CITY, for measuring liner thickness and flexural and tensile properties to verify the requirements specified previously. All expenses for the testing of these specimens will be paid by the CITY. The cost of retests made necessary by the failure of the samples of specimens to meet the specified requirements shall be paid for by the CONTRACTOR.

R. For every segment of liner installed, the CONTRACTOR shall document the work using written logs and video in accordance with Section 02752. The documentation shall be submitted to the CITY prior to requesting payment.

S. The CONTRACTOR shall maintain a schedule of values that details the units of work completed each week. This document shall also communicate cumulative work completed

and remaining work. This document shall be submitted on a periodic basis as preferred by the CITY, along with pipe samples, test reports, and other pertinent information

T. Upon acceptance of the work, the CONTRACTOR shall restore or replace all removed or damaged paving, curbing, sidewalks, gutters, shrubbery, fences, sod or other disturbed surfaces or structures in a condition equal to that before the work began, to the satisfaction of the CITY, and shall furnish all labor and material incidental to such work at no additional cost to the CITY.

U. Surplus pipes, tools, and temporary structures shall be removed by the CONTRACTOR. All dirt, rubbish and pipe material from the operation shall be legally disposed of by the CONTRACTOR at no additional cost to the CITY.

3.4 FINAL TESTING ANDACCEPTANCE

A. Following installation of the FFP, reopening the service connections, and sealing service connections and liner ends, the CONTRACTOR shall conduct a second color video television inspection of the completed work. If this post-construction survey is performed after sewage has been allowed to flow through the installed liner, the entire pipe length shall be cleaned again in accordance with Section 02751 "Preparatory Cleaning and Root Removal" prior to performing the post-construction survey. The video shall allow the CITY to verify that there is no visible infiltration through the liner at service connections or manholes. One copy of these tapes shall be submitted to the CITY for review and approval. Payment will not be made for any FFP lining until the CITY has reviewed and approved these tapes. The CONTRACTOR shall submit the tapes a minimum of 10 days in advance of any payment request to provide the CITY ample time to review the tapes. Tapes shall be submitted along with the other documentation required.

B. There shall be no folds, kinks, splits, cracks, wrinkles, ridges, lifts, delamination, pits, bulges, pinholes, crazing, foreign inclusions, infiltration, or other type defects in the FFP lining. Defective lining will be removed and pipe re-lined at no additional cost to the CITY. If during the removal process, the pipe is damaged, CONTRACTOR will perform point repairs as required at the CONTRACTOR’s own expense. The finished liner shall be continuous over the entire length of run between two manholes and free of all visual and material defects except those resulting from pre-lined conditions (such conditions shall be brought to the attention of the CITY prior to lining). The surface shall be smooth and free of waviness throughout the pipe.

C. Any defects which may in the foreseeable future or warranty period affect the integrity or strength of the new FFP liner shall be repaired at the CONTRACTOR's expense. Any ribs resulting in the cross-sectional area of the pipe shall be removed or the pipe replaced in its entirety unless approved otherwise by the CITY.

D. Maintenance of flow capacity of existing pipes is essential. Rehabilitated pipes shall have minimum or no change in capacity. An increase in flow capacity following rehabilitation is preferred, and in no case shall the flow capacity of rehabilitated pipes be reduced.

E. Acceptance of FFP lining shall be based on the CITY's evaluation of the installation, review of the certified test data for the installed pipe, and review of the videotapes and other documentation.

F. Groundwater infiltration into the FFP lining shall be zero.

G. All service connections shall be open, clear and watertight.

3.5 PUBLIC NOTIFICATION

A. The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:

1. Whether or not an interruption in service is expected, written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor the home or business can call to discuss the project or any problems which could arise.

2. Personal contact with any home or business which cannot be reconnected within the time stated in the written notice.

3.6 WARRANTY

A. The liner shall be certified by the manufacturer as to specified material properties for this particular job. The manufacturer and contractor warrant the liner to be free from defects in workmanship and materials for a period of two years from the date of final acceptance. Any visible infiltration or unacceptable conditions, as determined by the CITY, shall be corrected by the CONTRACTOR as part of the warranty in a manner approved by the CITY at no cost to the CITY. The warranty does not alleviate the CONTRACTOR or supplier of implied or other written warranties for long-term product quality. The CITY may conduct an independent television inspection, at its own expense, of the lining work prior to completion of the warranty period.

B. The CONTRACTOR warrants his work to be sealed tight at each end of the liner and also at each service connection.

C. Six months before the end of the warranty period, the contractor will be required to perform spot checks at locations provided by the City for inspecting the sewer lining. CONTRACTOR will be reimbursed for inspection at the contract unit rates for sewer main cleaning and TV inspection, and any defects shall be repaired by the CONTRACTOR at no cost to the City.

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SECTION 02770 - CURED-IN-PLACE MAINLINE/LATERAL CONNECTION REPAIR SYSTEM

PART 1 -- GENERAL

1.1 SCOPE

A. The work specified in this section consists of providing for the reconstruction of a particular mainline section and the adjacent lateral sewer pipe without excavation while providing a structural one-piece leak free connection at the interface of the main line and lateral pipelines.

1.2 GENERAL

A. The reconstruction will be accomplished using a non-woven fabric tube of particular length and a thermoset resin with physical and chemical properties appropriate for the application. The lateral tube within a translucent inversion bladder is vacuum impregnated with the resin then placed inside a protective carrying device. The mainline liner that is physically attached to the lateral tube is affixed around a rigid launching device. The launching device and protective carrying device are winched into the existing sewer. When the launching device is properly positioned at the lateral connection, the mainline liner is inflated and the resin saturated tube is inverted up through the lateral pipe, using air or water pressure, by the action of the inversion bladder. Once the tube/resin composite is cured, the inversion bladder and launching/carrying devices are removed. The cured-in-place mainline/lateral connection repair system shall be “T-Liner” as manufactured by LMK Technologies, Incorporated. “Substitutes” and “Or-Equals”, as defined in the *Standard General Conditions of the Construction Contract* (Engineers Joint Contract Documents Committee, 2002), will be considered for approval at the CITY’s sole discretion.

B. The material and installation practices for sewer service lateral shall, at a minimum, adhere to the requirements of ASTM F2561-11 – Standard Practice for Rehabilitation of a Sewer Service Lateral and its Connection to the Main using a One-piece Main and Lateral Cured-in-Place Liner; the liner assembly shall meet the ASTM F1216 and ASTM D5813 requirements.

1.3 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings, samples of materials, and other information to the CITY for review in accordance with CITY standards. Included shall be design calculations for the work.

1.4 QUALIFICATIONS

A. The Qualifications of the CONTRACTOR shall be submitted prior to contract award. These Qualifications shall include detailed descriptions of the following:

1. Name, business address and telephone number of the CONTRACTOR.

2. Name(s) of all supervisory personnel to be directly involved with this project.

3. The CONTRACTOR shall sign and date the information provided and certify that to the extent of his knowledge, the information is true and accurate, and that the

supervisory personnel will be directly involved with and used on this project. Substitutions of personnel and/or methods will not be allowed without written authorization of the CITY.

4. Specialty technicians shall be certified by the equipment manufacturer and/or its authorized representative. Certifications shall be submitted to the CITY.

5. The CONTRACTOR shall provide references of previous project lists going back four years including customer names and a City contact name, phone number, project number, and project name. The list must include the number of main/lateral connections rehabilitated as well as the number and type of main/lateral connection repair systems installed.

6. The installer(s) of the CONTRACTOR and/or subcontractor must document 10,000 linear feet of lateral liner installation of the State of Florida, 4,000 mainline/lateral connections in the State of Florida, 25 single stack or double-wye lateral installations, and 500 lateral transitions with 100 of them occurring in the State of Florida. Additionally, the installer must have successfully installed 250,000 linear feet of the mainline product(s) preferred by the City in wastewater collection systems in the State of Florida.

7. To be acceptable, the installer must have had a minimum of two (2) years' active experience in the commercial installation of the product.

PART 2 -- PRODUCTS

2.1 GENERAL

A. The finished liner shall be fabricated from material as specified in this section which when cured will be resistant to the corrosive effects of the raw sewage and hydrogen sulfide.

2.2 LINER SIZING

A. The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit to be repaired as specified by the CITY.

2.3 LINER MATERIAL

A. The liner shall be one piece and will consist of a lateral portion and the mainline portion with one or more layers of flexible needled felt or an equivalent non-woven material. The liner will be continuous in length and the wall thickness shall be uniform. No overlapping sections shall be allowed in the circumference or the length of the lateral liner. The tube will be capable of conforming to offset joints, bells, and disfigured pipe sections. The mainline liner will be flat with one end overlapping the second end and sized accordingly to create a circular lining equal to the diameter of the mainline pipe. The resin will be polyester or vinyl ester with proper catalysts as designed for the specific application. The cured-in-place pipe shall provide a smooth bore interior. Each installation shall have a design report documenting the design criteria for a deteriorated pipe section, relative to the hydrostatic pressures, depth of soil cover, and type of soil. The mainline sectional liner shall be a full-circle, minimum 16-inch long CIPP liner, integrally manufactured to the lateral liner providing a seamless connection between the mainline pipe-liner and the lateral liner. Installation will be accomplished remotely using air or water for inversion and curing. The cured pipe repair

system shall be watertight and shall conform to the existing pipe and eliminate any leakage or connection to the outside of the host pipe/service.

B. The composite of the materials above will, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing Methods.

Item	Test Value	Reference Standard
Flexural Strength	4,500 psi	ASTM D 790
Flexural Modulus	250,000 psi	ASTM D 790

2.4 LINER DESIGN

A. The minimum required structural CIPP wall thickness shall be based on the physical properties described above and in accordance with the design equations in the appendix of ASTM F 1216, and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design	50 %
Ovality*	2 %
Groundwater Depth = Pipe Depth (above invert) *	ft.
Soil Depth (above crown) *	ft.
Soil Modulus	700 psi
Soil Density	120 pcf
Live Load	One H20 passing truck
Design Condition (lateral pipe)	Fully deteriorated
Design Condition (lined main pipe)	Partially deteriorated
Design Condition (unlined main pipe)	Fully deteriorated
**Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.*	

B. The lining manufacturer shall submit to the CITY for review complete design calculations for the liner, signed and sealed by a Professional Engineer registered in the State of Florida and certified by the manufacturer as to the compliance of his materials to the values used in the calculations. A safety factor of 2 shall be applied in the design calculation. The lateral host pipe shall be considered fully deteriorated, and the main host pipe shall be considered fully or partially deteriorated based on whether it is unlined or lined, respectively. The liner shall be designed to withstand a live load equivalent to one H-20 passing truck plus all pertinent dead loads, hydrostatic pressure and grout pressure (if any). For design purposes, the water table shall be considered at grade elevation. The liner shall be designed in accordance with ASTM F 1216. The buckling analysis shall account for the combination of dead load, live load, hydrostatic pressure and grout pressure (if any). The liner side support shall be considered as if provided by soil pressure against the liner. The existing pipe shall not be considered as providing any structural support. The modulus of soil reaction shall be 700, corresponding to a moderate degree of compaction of bedding and a fine-grained soil as shown in AWWA Manual M45, Fiberglass Pipe Design.

C. Liner shall be neither accepted nor installed until design calculations are acceptable to the CITY.

PART 3 -- EXECUTION

3.1 CLEANING SEWER LINES

A. Prior to any lining of a pipe so designated, it shall be the responsibility of the CONTRACTOR to remove internal deposits from the pipeline in accordance with Section 02751 - Preparatory Cleaning and Root Removal. Both the main line and lateral line shall be cleaned.

3.2 TELEVISION SURVEY

A. A television survey shall be performed in accordance with Section 02752 - Television Survey, including Pre-Construction and Post-Construction Surveys. Both the main line and lateral line shall be televised.

B. The interior of the main and lateral pipelines shall be carefully surveyed to determine the locations and extent of any structural failures. The location of any conditions which may prevent proper installation of lining materials into the pipelines shall be noted so that these conditions can be corrected. A video tape and suitable log shall be kept and turned over to the CITY.

3.3 FLOW BYPASSING

A. The CONTRACTOR, when required, shall provide for the transfer of flow, through or around section or sections of pipe that are to be repaired. The proposed bypassing system shall be acceptable in advance by the CITY. The acceptance of the bypassing system in advance by the CITY shall in no way relieve the CONTRACTOR of his responsibility and/or public liability. The flow bypassing shall be done in accordance with Section 02750 - Wastewater Flow Control.

Note: If the repair can be made in a few hours, bypass pumping may not be required. The placement carriage shall be equipped with a bypass section to allow flow once liner is pressed into place.

3.4 LINE OBSTRUCTIONS

A. It shall be the responsibility of the CONTRACTOR to clear the line of obstruction. If the survey reveals an obstruction that cannot be removed by conventional cleaning equipment, the CITY shall authorize or otherwise arrange for a point repair excavation in accordance with Section 02757 - Point Repair of Sanitary Sewers to uncover and remove or repair the obstruction. Such excavation by the CONTRACTOR shall be authorized in writing by the CITY prior to the commencement of the work.

3.5 LINER INSTALLATION

A. The tube shall be inspected for tears and frayed sections. The tube, in good condition, will be vacuum impregnated with the resin. The resin will be introduced into the tube creating a slug of resin at the beginning of the tube. A calibration roller will assist the resin slug to move throughout the tube. All air in the tube shall be removed by vacuum allowing the resin to thoroughly impregnate the tube. All resin shall be contained to ensure no public property or persons are exposed to the liquid resin. The mainline liner will be saturated upon a wet-out platform. The resin impregnated sample (wick) shall be retained by the installer to provide verification of the curing process taking place in the host pipe.

B. The saturated tube along with the inversion bladder will be inserted into the carrying device. The mainline liner will be affixed on the launching device. Both the launching and carrying device shall be pulled into the pipe using a cable winch. The pull is complete when the open port of the launching device is aligned with the interface of the service connection and mainline pipe. The resin saturated lateral tube is completely protected during the pull. No resin shall be lost by contact with manhole walls or the pipe during the pull. The resin saturated mainline liner is supported upon the rigid launcher that is elevated above the pipe invert by means of a rotating skid system. The mainline liner should not be contaminated or diluted by exposure to dirt, debris, or water during the pull.

C. The installer shall document the placement of the liner by internal video inspection.

D. The mainline liner shall be expanded against the mainline pipe and lateral tube inverted out of the launcher/carrying device by controlled air or water pressure. The installer shall be capable of viewing the lateral liner by contacting the lateral pipe. The mainline liner and the lateral tube shall be held tightly in place against the wall of the host pipe by controlled pressure until the cure is complete. Resin shall be in contact with the original mainline and lateral pipes and coatings shall be on the interior to be exposed to the wastewater flow.

E. When the curing process is complete, the pressure will be released. The inversion bladder and launching device shall be removed from the host pipe with the winch. No barriers, coatings, or any material other than the cured tube/resin composite, specifically designed for desirable physical and chemical resistance properties, shall be left in the host pipe. Any materials used in the installation other than the cured tube/resin composite shall be removed from the pipe by the installer.

3.6 ACCEPTANCE ANDTESTING

A. The finished liner shall be continuous over the entire length of the installation. The liner shall be free from visual defects, damage, deflection, holes, delamination, uncured resin, and the like. There shall be no visible infiltration through the liner or from behind the liner.

B. The CITY may elect to direct the CONTRACTOR to verify a non-leaking main/lateral connection repair system by means of an air test in accordance with the specifications herein. Testing shall be performed at the CITY's discretion but at a frequency not to exceed one test for every ten Liners installed. The CONTRACTOR shall provide all necessary resources to perform the test. The cost for the test shall be included in the Liner installation cost, and no separate payment shall be made.

1. A test plug shall be placed adjacent to the upstream and downstream ends of the mainline liner and at the uppermost end of the lateral tube. Air-pressure not less than 4 PSI shall be introduced through the test plug. The void area between the three plugs shall be pressurized at 4 PSI, held for 2 minutes and during this time the pressure shall not drop below 3PSI.

2. If an installed cured in-place liner fails the specified air test, the following corrective measures shall be taken.

    a. The cured in-place liner shall be re-inspected by use of a closed-circuit television camera in an attempt to identify the defect.

b. Any repairs made shall consist of materials that are structural and meet or exceed the same criteria as the cured-in-the-place liner is required to meet in a domestic sewer collection system. Such materials shall have a minimum life expectancy of 50 years in accordance with ASTM F-1216 (most recent version) Appendix X1 Design Considerations and Appendix X2 Chemical-Resistance Test.

c. Once the defect has been corrected, the renewed main/lateral connection repair system shall be re-tested in accordance with the air test procedure as described above.

d. Any corrective measures shall be performed at the CONTRACTOR's expense.

3. If any of the air tests fail, the CITY at its option may require the CONTRACTOR to test an additional lateral at no additional charge to the CITY. If a second air test shall fail, the CITY at its option may require the CONTRACTOR to test additional or all of the installed cured in-place main/lateral connection repair systems at no additional charge to the CITY.

3.7 CLEANUP

A. After the liner installation has been completed and accepted, the CONTRACTOR shall clean up the entire project area and return the ground cover to grade. All excess material and debris not incorporated into the permanent installation shall be disposed of by the CONTRACTOR.

3.8 WARRANTY

A. The main/lateral connection repair system shall be certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for two years from the date of acceptance. During the warranty period, any defects which affect the integrity, strength, or satisfactory performance of the pipe shall be repaired at the CONTRACTOR's expense in a manner mutually agreed by the CITY and the CONTRACTOR.

B. Six months before the end of the warranty period, the CONTRACTOR shall undertake spot checks in conjunction with the City. Ten percent (10%) of locations per basin area will be selected for inspection. If fifty percent (50%) of these fails, then an additional ten percent (10%) will be selected for inspection. The process continues and if applicable all mainline/lateral connection repair locations will be inspected. The CONTRACTOR will be reimbursed for inspection work at the contract unit rate for cleaning and TV inspection. Defects will be repaired by the CONTRACTOR at no cost to the City.

-END OF SECTION-

DIVISION 3
CONCRETE

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SECTION 03305 - CONCRETE AND GROUT

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall furnish all materials for concrete in accordance with the provisions of this Section and shall form, mix, place, cure, repair, finish, and do all other work as required to produce finished concrete, all in accordance with the requirements of the Contract Documents

B. The following types of concrete shall be covered in this Section:

1. Structural Concrete: Concrete to be used in all cases except where noted otherwise in the Contract Documents.

2. Sitework Concrete: Concrete to be used for curbs, gutters, catch basins, sidewalks, fence and guard post embedment, underground duct bank encasement and all other concrete appurtenant to electrical facilities unless otherwise shown or noted on the Drawings.

C. The following types of grout are covered in this Section:

1. Non-Shrink Grout: This type of grout shall be used wherever grout or cementitious grout is called for in the Contract Documents, unless another type is specifically referenced.

2. Epoxy Grout: This type of grout shall be used whenever epoxy grout is called for.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Codes: Without limiting the generality of other requirements of these specifications, all work specified herein shall conform to or exceed the requirements of the South Florida Building Code and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of this Section.

B. Commercial Standards:

ACI 301	Specifications for Structural Concrete for Buildings.
ACI 315	Manual of Standard Practice for Detailing Reinforced Concrete Structures.
ACI 318	Building Code Requirements of Reinforced Concrete.
ACI 347	Recommended Practice for Concrete Formwork.
ASTM A 185	Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.

ASTM A 615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
ASTM C 31	Test Methods for Making and Curing Concrete Test Specimens in the Field.
ASTM C 33	Specification for Concrete Aggregates.
ASTM C 39	Test Method for Compressive Strength of Cylindrical Concrete Specimens.
ASTM C 94	Specification for Ready-Mixed Concrete.
ASTM C 143	Test Method for Slump of Portland Cement Concrete.
ASTM C 150	Specification for Portland Cement.
ASTM C 260	Specification for Air-Entraining Admixtures for Concrete.
ASTM C 309	Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
ASTM C 494	Specification for Chemical Admixtures for Concrete.
ASTM C 579	Test Methods for Compressive Strength of Chemical Resistant Mortars and Monolithic Surfacings.
ASTM C 827	Test Method for Early Volume Change of Cementitious Mixtures.
ASTM D 1751	Specification for Preformed Expansion Joint Fillers for Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
CRD C 621	
CRSI	Manual of Standard Practice.

1.03 SUBMITTALS

A. General: The CONTRACTOR shall submit shop drawings and other information to the CITY in accordance with the CITY requirements and as needed by the CITY representative.

B. Mix Designs: The CONTRACTOR shall submit shop drawings for review for proposed concrete mix designs which shall show the proportions and gradations of all materials proposed for each class and type of concrete specified herein. The mix design shall be checked by an independent testing laboratory acceptable to the CITY. All costs related to such checking shall be borne by the CONTRACTOR.

C. Grout: The CONTRACTOR shall submit shop drawings for all types of grout for use in this Project.

D. Accessories: The CONTRACTOR shall submit shop drawings for all types of concrete accessories to be used for this project including, but not limited to, form ties, water stops, joint materials and curing agents.

E. Delivery Tickets: Where ready-mix concrete is used, the CONTRACTOR shall submit delivery tickets at the time of delivery of each load of concrete. Each certificate shall show the State certified equipment used for measuring and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, and the amounts of water in the aggregate and added at the batching plant as well as the amount of water allowed to be added at the site for the specific design mix. Each certificate shall, in addition, state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to when the batch was dispatched, when it left the plant, when it arrived at the job, the time that unloading began, and the time that unloading was finished.

F. Reinforcing Steel: The CONTRACTOR shall submit shop drawings of shop bending diagrams, placing lists, and Drawings of all reinforcing steel prior to fabrication.

1.04 QUALITYASSURANCE

A. Tests on component materials and for compressive strength of concrete will be performed as specified herein. Test for determining slump will be in accordance with the requirements of ASTM C 143.

B. The cost of all laboratory tests on cement, aggregates, and concrete, will be borne by the CITY. However, the CONTRACTOR shall be charged for the cost of any additional tests and investigation on work performed which does not meet the specifications.

C. Concrete for testing shall be supplied by the CONTRACTOR at no cost to the CITY, and the CONTRACTOR shall provide assistance to the CITY in obtaining samples. The CONTRACTOR shall dispose of and clean up all excess material.

D. Field Compression Tests: Compression test specimens shall be taken during construction from the first placement of each class of concrete specified herein and at intervals thereafter as selected by the CITY to ensure continued compliance with these specifications. At least one set of test specimens shall be made for each 50 yards of concrete placed. Each set of test specimens shall be a minimum of 4 cylinders.

E. Compression test specimens for concrete shall be made in accordance with ASTM C31.Specimens shall be 6-inch diameter by 12-inch-high cylinders.

F. Compression tests shall be performed in accordance with ASTM C 39. One test cylinder will be tested in 7 days and 2 at 28 days. The remaining cylinder will be held to verify test results, if needed.

G. Evaluation and Acceptance of Concrete: Evaluation and acceptance of the compressive strength of concrete shall be according to the requirements of ACI 318, Chapter 5, "Concrete Quality", and as specified herein. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for all subsequent batches of the type of concrete affected. All concrete which fails to meet the ACI requirements and these Specifications, is subject to removal and replacement at the cost of the CONTRACTOR.

H. Construction Tolerances: The CONTRACTOR shall set and maintain concrete forms and perform finishing operations so as to ensure that the completed work is within the tolerances specified herein. Surface defects and irregularities are defined as finishes and are to be distinguished from tolerances. Tolerance is the specified permissible variation from lines, grades, or dimensions shown. Where tolerances are not stated in the Specifications, permissible deviations will be in accordance with ACI 347.

PART 2 -- PRODUCTS

2.1 FORMWORK

A. Form Materials: Except as otherwise expressly accepted by the CITY, all lumber for use as forms, shoring, or bracing shall be new material. Materials for concrete forms shall conform to the following requirements:

1. Form materials shall be metal, wood, plywood, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade shown.

2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine plywood manufactured especially for concrete formwork and shall conform to the requirements of PS 1 for Concrete Forms, Class 1, and shall be edge sealed. Wood forms for surfaces to be painted shall be Medium Density Overlaid Plywood, MDO Exterior Grade.

B. Unless otherwise shown, exterior corners in concrete members shall be provided with 3/4-inch chamfers or tooled to a 1/2-inch radius. Re-entrant corners in concrete members shall not have fillets unless otherwise shown.

C. Form Ties: Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to ensure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 1 1/2 inches; and all such fasteners shall be such as to leave holes of regular shape for reaming. Form Ties shall be Burke Penta-Tie System by The Burke Company, or equal.

2.2 CONCRETE MATERIALS

A. Materials shall be delivered, stored, and handled so as to prevent damage by water or breakage. Only one brand of cement shall be used. Cement reclaimed from cleaning bags or leaking containers shall not be used. All cement shall be used in the sequence of receipt of shipments.

B. All materials furnished for the work shall comply with the requirements of ACI 301, as applicable.

C. Storage of materials shall conform to the requirements of ACI 301.

D. Materials for concrete shall conform to the following requirements:

1. Cement shall be standard brand Portland cement conforming to ASTM C 150 Type II.

2. Water shall be potable, clean, and free from objectionable quantities of silty organic matter, alkali, salts and other impurities.

3. Aggregates shall be obtained from pits acceptable to the CITY, shall be nonreactive, and shall conform to the SFBC and ASTM C 33. The maximum size of coarse aggregate shall be as specified herein.

4. Ready-mix concrete shall conform to the requirements of ASTM C 94.

5. Air-entraining Admixture meeting the requirements of ASTM C 260 shall be used. Sufficient air-entraining agent shall be used to provide a total air content of 3 to 5 percent. The CITY reserves the right, at any time, to sample and test the air-entraining agent received on the job by the CONTRACTOR. The air-entraining agent shall be added to the batch in a portion of the mixing water. The solution shall be batched by means of a mechanical batcher capable of accurate measurement.

6. Water reducing and retarding admixtures shall be added to control the set, effect water reduction. The addition of the admixture shall be separate from the air entraining admixture and as recommended by the manufacturer. The admixture shall be completely compatible with and be manufactured by the same manufacturer as the air entraining admixture. The addition of the admixture shall be completed within one minute after addition of water to the cement has been completed, or prior to the beginning of the last three quarters of the required mixing, whichever occurs first. Water reducing and set retarding admixtures shall be in conformance with ASTM C 494, Type D.

2.3 CURING MATERIALS

A. Materials for curing concrete conform to ASTM C 309 and shall be Burke Spartan, Cote Cure-Seal Hardner (with red fugitive dye) as manufactured by the Burke Company, MB 429 as manufactured by Master Builders, or equal. The curing compound shall contain a fugitive dye so that areas of application will be readily distinguishable.

B. Polyethylene sheet for use as a concrete curing blanket shall be white and have a nominal thickness of 6 mils.

2.4 JOINT MATERIALS

A. Materials for joints in concrete above grade nonhydraulic structures shall conform to the following requirements:

1. Preformed joint filler shall be a non-extruding, resilient, bituminous type conforming to the requirements of ASTM D 1751.

2. Elastomeric joint sealer shall be a single component, pour grade, polyurethane sealant meeting FS TT-S-230A, Type 1. Materials shall attain Shore A Hardness of 40-45.

3. Mastic joint sealer shall be a material that does not contain evaporating solvents; that will tenaciously adhere to concrete surfaces; that will remain permanently resilient and pliable; that will not be affected by continuous presence of water and will not in any way contaminate potable water; and that will effectively seal the joints against moisture inflation even when the joints are subject to movement due to expansion and contraction. The sealer shall be composed of special asphalts or similar materials blended with lubricating and plasticizing agents to form a tough, durable master substance containing no volatile oils or lubricants and shall be capable of meeting the test requirements set forth hereinafter, if testing is required by the CITY.

2.5 REINFORCING STEEL

A. General: All reinforcing steel for all reinforced concrete construction shall conform to the following requirements:

1. Bar reinforcement shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel Reinforcement with supplementary. Requirement S-1, and shall be manufactured in the United States.

2. Welded wire fabric reinforcement shall conform to the requirements of ASTM A185. All welded wire fabric reinforcement shall be galvanized.

B. Accessories: Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers, and other devices to position reinforcement during concrete placement. Slab bolsters shall have gray plastic-coated legs.

C. Concrete blocks (dobies), used to support and position reinforcement steel, shall have the same or higher comprehensive strength as specified for the concrete in which it is located. Where the concrete blocks are used on concrete surfaces exposed to view, the color and texture of the concrete blocks shall match that required for the finished surface. Wire ties shall be embedded in concrete block bar supports.

2.6 CONCRETE DESIGNREQUIREMENTS

A. General: Concrete shall be composed of cement, admixtures, aggregates and water. These materials shall be of the quantities specified. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage and, where deposited in forms, to have good consolidation properties and maximum smoothness of surface. The aggregate gradations shall be formulated to provide fresh concrete that will not promote rock pockets around reinforcing steel or embedded items. The proportions shall be changed whenever necessary or desirable to meet the required results at no additional cost to the CITY. All changes shall be subject to review by the CITY.

B. The CONTRACTOR is cautioned that the limiting parameters specified below are not design mixes. Additional cement or water reducing agent may be required to achieve workability demanded by the CONTRACTOR's construction methods. The CONTRACTOR is responsible for any costs associated with furnishing concrete with the required workability.

C. Water-Cement Ratio and Compressive Strength: The minimum compressive strength and cement content shall be not less than specified as follows:

Type of work	Min. 28-Day Compressive Strength (psi)	Max. Size Aggregate (in.)	Min. Cement per cu yd (sacks)	Max. W/C Ratio (by wt.)
Structural Concrete:				
All reinforced concrete unless noted otherwise below.	4,000 (Class A)	1	6	0.45
Sitework Concrete:				
Concrete fill, pavement, curbs and sidewalks.	3,000 (Class B)	1	5.5	0.5

Note: One sack of cement equals 94 lbs.

D. Consistency: The consistency of the concrete in successive batches shall be determined by slump tests in accordance with ASTM C 143. The slumps shall be as follows:

Application	Slump	Variation
Footings and Slabs	3"	± 1/2" to -1"
Mortar or grout for construction joints	8"	± 1 1/2"
All Other Applications	3"	± 1"

2.7 READY-MIXED CONCRETE

A. Ready-mixed concrete shall conform to meeting the requirements as to materials, batching, mixing, transporting, and placing as specified herein and in accordance with ASTM C 94.

B. Ready-mixed concrete shall be delivered to the site of the work, and discharge shall be completed within one- and one-half hour after the addition of the cement to the aggregates or before the drum has been revolved 250 revolutions, whichever is first. In hot weather, or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 degrees F or above, the time between the introduction of the cement to the aggregates and discharge shall not exceed 60 minutes.

2.8 NONSHRINK GROUT

A. Non-shrink grout shall be a prepackaged, inorganic, non-gas liberating, nonmetallic, cement-based grout requiring only the addition of water. The manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout specified herein shall be that recommended by the manufacturer for the particular application.

B. Non-shrink grouts shall have a minimum 28-day compressive strength of 5,000 psi and shall meet the requirements of CRD C621.

2.9 EPOXYGROUT

A. Epoxy grout shall be a pourable, non-shrink, 100 percent solids system. The epoxy grout system shall have three components: resin, hardener, and specially blended aggregate, all pre-measured and pre-packaged. The resin component shall not contain any non-reactive diluents. Resins contained butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Manufacturers' instructions shall be printed on each container in which the materials are packaged.

B. The chemical formulation of the epoxy grout shall be that recommended by the manufacturer for the particular application.

C. The mixed epoxy grout system shall have a minimum working life of 45 minutes at 75 degrees F.

D. The epoxy grout shall develop a compressive strength of 5000 psi in 24 hours and 10,000 psi in seven days when tested in accordance with ASTM C 579, Method B. There shall be no shrinkage (0.0 percent) and a maximum 4.0 percent expansion when tested in accordance with ASTM C 827.

2.10 BONDING COMPOUND

A. For bonding freshly mixed, plastic concrete to hardened concrete, Sikadur 32 Hi-Mod Epoxy Adhesive, as manufactured by Sika Corporation; Concresive Liquid (LPL), as manufactured by Master Builders; Burk Epoxy MV as manufactured by The Burk Company; or approved equal shall be used.

PART 3 -- EXECUTION

3.1 GENERAL FORMW ORK REQUIREMENTS

A. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. The CONTRACTOR shall assume full responsibility for the adequate design of all forms, and any forms which are unsafe or inadequate in any respect shall promptly be removed and replaced at the CONTRACTOR's expense. All design, construction, maintenance, preparation, and removal of forms shall be in accordance with the SFBC, ACI 347 and the requirements specified herein.

B. All forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete.

3.2 FORMWORKCONSTRUCTION

A. Vertical Surfaces: All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is called for by the CITY.

B. Construction Joints: Concrete construction joints will not be permitted at locations other than those shown or specified, except as may be acceptable to the CITY. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location, and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete.

C. Form Ties: Wire ties for holding forms will not be permitted. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete members. The use of snap-ties which cause spilling of the concrete upon form stripping or tie removal will not be permitted. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste. Where metal rods extending through the concrete are used to support or to strengthen forms, the rods shall remain embedded and shall terminate not less than 1 inch back from the formed face or faces of the concrete.

3.3 REUSE OF FORMS

A. Forms may be reused only if in good condition and only if acceptable to the CITY. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on all exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view.

3.4 REMOVAL OF FORMS

A. Careful procedures for the removal of forms shall be strictly followed, and this work shall be done with care so as to avoid injury to the concrete. No heavy loading on green concrete will be permitted. Members which must support their own weight shall not have their forms removed until they have attained at least 75 percent of the 28-day strength of the concrete as specified herein. Forms for all vertical walls and columns shall remain in place at least 2 days after the concrete has been placed. Forms for all parts of the Work not specifically mentioned herein shall remain in place for periods of time as determined by the CITY.

3.5 FABRICATION OF REINFORCING STEEL

A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings, and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.

B. Bending or Straightening: Reinforcement shall not be straightened or rebent in a manner which will injure the material. Bars with kinks or bends not shown shall not be used. All bars shall be bent cold, unless otherwise permitted by the CITY. No bars partially embedded in concrete shall be field bent except as shown or specifically permitted by the CITY.

3.6 PLACING REINFORCING STEEL

A. Reinforcing steel shall be accurately positioned as shown on the Drawings and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous. All concrete blocks used to support reinforcing steel shall be tied to the steel with wire ties which are embedded in the blocks. For concrete over formwork, the CONTRACTOR shall furnish concrete, metal, plastic, or other acceptable bar chairs and spacers.

B. The portions of all accessories in contact with the formwork shall be made of concrete, plastic, or steel coated with a 1/8-inch minimum thickness of plastic which extends at least 1/2 inch from the concrete surface. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

D. Bars additional to those shown which may be found necessary or desirable by the CONTRACTOR for the purpose of securing reinforcement in position shall be provided by the CONTRACTOR at its own expense.

E. Reinforcement placing tolerances shall be within the limits specified in ACI 318, unless otherwise directed by the CITY.

F. Welded wire fabric reinforcement placed over horizontal forms shall be supported on slab bolsters having gray, plastic-coated standard type legs as specified herein. Slab bolsters shall be spaced not less than 30 inches on centers, shall extend continuously across the entire width of the reinforcing mat, and shall support the reinforcing mat in the plane shown.

G. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than 3 feet on centers in any direction. The construction practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

3.7 SPLICING

A. Reinforcement bar splices shall only be used at locations shown. When it is necessary to splice reinforcement at points other than where shown, the character of the splice shall be as acceptable to the CITY.

B. Lap length for reinforcement bars shall be in a Class C Splice in accordance with ACI 318, unless otherwise shown. Laps of welded wire fabric shall be in accordance with the ACI 318.

3.8 CLEANING AND PROTECTION OF REINFORCING STEEL

A. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

B. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed. Where there is a delay in depositing concrete, reinforcing shall be re-inspected and, if necessary, recleaned.

3.9 PREPARATION OF SURFACES FOR CONCRETING

A. General: No concrete shall be placed until the reinforcement steel and formwork have been erected in a manner acceptable to the CITY. The CONTRACTOR shall notify the CITY not less than two working days prior to concrete placement, allowing for inspection and any corrective measures which are required. Earth surfaces shall be thoroughly wet by sprinkling, prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

B. Joints in Concrete: Concrete surfaces upon or against which concrete is to be placed, where the placement of the old concrete has been stopped or interrupted so that, as determined by the CITY, the new concrete cannot be incorporated integrally with that previously placed, are defined as construction joints. The surfaces of horizontal joints shall be given a compacted, roughened surface for good bond. Except where the Drawings call for joint surfaces to be coated, the joint surfaces shall be cleaned of all laitance, lose or defective concrete, and foreign material. Such cleaning shall be accomplished by sandblasting, followed by thorough washing. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

C. Existing concrete surfaces upon or against which concrete is to be placed shall be given a roughened surface for good bond. Joint surfaces shall be cleaned of all laitance, lose or defective concrete, and foreign material. Such cleaning shall be accomplished by hydro blasting. All pools of water shall be removed from the surface of construction joints before the new concrete is placed.

D. Placing Interruptions: When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means that will secure proper union with subsequent work, provided that construction joints shall be made only where acceptable to the CITY.

E. Embedded Items: No concrete shall be placed until all formwork, installation of parts to -be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the CITY at least 4 hours before placement of concrete. All surfaces of forms and embedded items that have become encrusted with dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.

F. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms where shown on the Drawings or by shop drawings and shall be acceptable to the CITY before any concrete is placed. Accuracy of placement is the responsibility of the CONTRACTOR.

G. Casting Against Old Concrete: Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), the surface of the old concrete shall be thoroughly cleaned and roughened by hydro-blasting (exposing aggregate) prior to the

application of an epoxy bonding agent. Application shall be according to the bonding agent manufacturer's instructions and recommendations.

H. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the work. No concrete shall be deposited under water nor shall the CONTRACTOR allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the review of the CITY.

I. Openings for pipes, inserts for pipe hangers and brackets, and the setting of anchors shall, where practicable, be provided for during the placing of concrete.

J. Corrosion Protection: Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2 inches clearance between said items, and any part of the concrete reinforcement will not be permitted.

K. Cleaning: The surfaces of all metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar, and other foreign substances immediately before the concrete is placed.

3.10 MIXING, HANDLING, TRANSPORTING, AND PLACING

A. General: Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 301 and the requirements of this Section.

B. Mixing: Mixing of concrete shall conform to the requirements of Chapter 7 of ACI 301.

C. Re-tempering: Re-tempering of concrete or mortar which has partially hardened will not be permitted.

D. Non-Conforming Work or Materials: Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the Work. Concrete which is not placed in accordance with these Specifications, or which is of inferior quality, shall be removed and replaced by and at the expense of the CONTRACTOR.

E. Unauthorized Placement: No concrete shall be placed except in the presence of duly authorized representative of the CITY. The CONTRACTOR shall notify the CITY in writing at least 24 hours in advance of placement of any concrete.

F. Placement in Slabs: Concrete placed in sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the pour. As the work progresses, the concrete shall be vibrated and carefully worked around the slab reinforcement, and the surface of the slab shall be screened in an up-slope direction.

G. Placement in W all Forms: Concrete shall not be dropped through reinforcement steel or into any deep form, whether reinforcement is present or not, causing separation of the coarse aggregate from the mortar on account of repeatedly hitting rods or the sides of the form as it

falls, nor shall concrete be placed in any form in such a manner as to leave accumulation of mortar on the form surfaces above the placed concrete. In such cases, some means such as the use of hoppers and, if necessary, vertical ducts of canvas, rubber, or metal shall be used for placing concrete in the forms in a manner that it may reach the place of final deposit without separation. In no case shall the free fall of concrete exceed 4 feet below the ends of ducts, chutes, or buggies. Concrete shall be uniformly distributed during the process of depositing, and in no case after depositing shall any portion be displaced in the forms more than 6 feet in horizontal direction. Concrete in forms shall be deposited in uniform horizontal layers not deeper than 2 feet; and care shall be taken to avoid inclined layers or inclined construction joints where such are required for sloping members. Each layer shall be placed while the previous layer is still soft. The rate of placing concrete in forms shall not exceed 5 feet of vertical rise per hour.

H. The surface of the concrete -shall be level whenever a run of concrete is stopped. To insure a level, straight joint on the exposed surface of walls, a wood strip at least 3/4-inch-thick shall be tacked to the forms on these surfaces. The concrete shall be carded about 1/2 inch above the underside of the strip. About one hour after the concrete is placed, the strip shall be removed and any irregularities in the edge formed by the strip shall be leveled with a trowel and all laitance shall be removed.

I. Conveyor Belts and Chutes: All end of chutes, hopper gates and all other points of concrete discharge throughout the CONTRACTOR's conveying, hoisting and placing system shall be so designed and arranged that concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyor belts, if used, shall be of the type acceptable to the CITY. Chutes longer than 50 feet will not be permitted. Minimum slopes of chutes shall be such that concrete of the specified consistency will readily flow in them. If a conveyor belt is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. All conveyor belts and chutes shall be covered. Sufficient illumination shall be provided in the interior of all forms so that the concrete, at the places of deposit, is visible from the deck or runway.

J. Temperature of Concrete: The temperature of concrete, when it is being placed, shall not be more than 90 degrees F nor less than 40 degrees F in moderate weather, and not less than 50 degrees F in whether during which the mean daily temperature drops below 40 degrees F. Concrete ingredients shall not be heated to a temperature higher than that necessarily to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90 degrees F, the CONTRACTOR shall employ effective means, such as precooling of aggregates and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete, as it is placed below 90 degrees F. The CONTRACTOR shall be entitled to no additional compensation on account of the foregoing requirements.

3.11 PUMPING OFCONCRETE

A. If the pumped concrete does not produce satisfactory end results, the CONTRACTOR shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

B. The minimum diameter of the hose (conduits) shall be 4 inches.

C. Minimum compressive strength, cement content, and maximum size of aggregates shall be as specified herein. Gradation of coarse aggregates shall conform to ASTM C 33 and shall be as close to the middle range as possible. Gradation of fine aggregate shall conform to ASTM C 33, with 15 to 30 percent passing the number 50 screen and 5 to 1 0 percent passing the number 1 00 screen. The fineness modulus of sand shall not be over 3.00.

3.12 TAMPING AND VIBRATING

A. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense homogeneous mass, filling all comers and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement. Vibrators shall be high speed power vibrators (8,000 or 10,000 rpm) of an immersion type in sufficient number and with (at least one) standby units as required.

B. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly as specified. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the results herein specified with 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall be kept from contact with the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.13 FINISHING CONCRETESURFACES

A. General: Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing, or roughness of any kind, and shall present a finished, smooth, continuous hard surface. Allowable deviations from plumb or level and from the alignment, profiles, and dimensions shown on the Drawings are defined as tolerances and are specified herein. These tolerances are to be distinguished from irregularities in finish as described herein. Aluminum finishing tools shall not be used.

B. Formed Surfaces: No treatment is required after form removal except for curing, repair of defective concrete, and treatment of surface defects. Where architectural finish is required, it shall be as specified or as shown on the Drawings.

C. Unformed Surfaces: After proper and adequate vibration and tamping, all unformed top surfaces of slabs, floors, walls, and curbs shall be brought to a uniform surface with suitable tools. The classes of finish specified for unformed concrete surfaces are designated as follows:

1. Finish U1: Sufficient leveling and screening to produce an even, uniform surface with irregular surface not to exceed 3/8 inch. No further special finish is required.

2. Finish U2: After sufficient stiffening of the screened concrete, surfaces shall be float finished with wood or metal floats or with a finished machine using flat blades. Excessive floating of surfaces while the concrete surface to absorb excess moisture will not be permitted. Floating shall be the minimum necessary to produce asurface

that is free from screed marks and is uniform in texture. Surface irregularities shall not exceed 1/4 inch. Joints and edges shall be tooled where shown on the Drawings or as determined by the CITY.

3. Finish U3: After the floated surface (as specified for Finish U2) has hardened sufficiently to prevent excess of fine material from being drawn to the surface, steel troweling shall be performed with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense, uniform surface free from blemishes, ripples and trowel marks. The finish shall be smooth and free of all irregularities.

4. Finish U4: Steel trowel finish (as specified for Finish U3) without local depressions or high points. In addition, the surface shall be given a light hair broom finish with brooming perpendicular to drainage unless otherwise shown. The resulting surface shall be rough enough to provide a nonskid finish.

D. Uniformed surfaces shall be finished according the following schedule:

UNIFIRMED SURFACE FINISH SCHEDULE

Area	Finish
Grade slabs and foundations to be covered with concrete or fill material	U1
Floors to be covered with topping grout	U2
Slabs to be covered with built-up roofing	U2
Slabs	U4

3.14 CURING ANDDAMP PROOFING

A. All concrete shall be cured for not less than 14 days after placing, in accordance with the methods specified herein for the different parts of the work, and described in detail in the following paragraphs.

FINISH SCHEDULE

Surface to be Cured or Damp proofed	Method
Unstripped forms	1
Construction joints between footings and walls, and between floor slab and columns	2
Encasement concrete and thrust blocks	3
All concrete surfaces not specifically provided for elsewhere in this Paragraph	4

B. Method 1: Wooden forms shall be wetted immediately after concrete has been placed and shall be kept wet with water until removed. If steel forms are used, the exposed concrete surfaces shall be kept continuously wet until the forms are removed. If forms are removed

within 14 days of placing the concrete, curing shall be continued in accordance with Method 4.

C. Method 2: The surface shall be covered with burlap mats which shall be kept wet with water for the duration of the curing period, until the concrete in the walls has been placed. No curing compound shall be applied to surfaces cured under Method 2.

D. Method 3: The surface shall be covered with moist earth not less than 4 hours, nor more than 24 hours, after the concrete is placed. Earthwork operations that may damage the concrete shall not begin until at least 7 days after placement of concrete.

E. Method 4: The surface shall be sprayed with a liquid curing compound. It shall be applied in accordance with the manufacturers printed instructions at a maximum coverage rate of 200 square feet per gallon and in such a manner as to cover the surface with a uniform film which will seal thoroughly.

F. Care shall be exercised to avoid damage to the seal during the curing period. Should the seal be damaged or broken before the expiration of the curing period, the break shall be repaired immediately by the application of additional curing compound over the damaged portion.

G. Wherever curing compound may have been applied by mistake to faces against which concrete subsequently is to be placed and to which it is to adhere, said compound shall be entirely removed by hydro blasting just prior to the placing of new concrete.

H. Curing compound shall be applied as soon as the concrete has hardened enough to prevent marring on uniformed surfaces, and within 2 hours after removal of forms from contact with formed surfaces. Repairs required to be made to formed surfaces shall be made within the said 2-hour period; provided, however, any such repairs which cannot be made within the said 2-hour period shall be delayed until after the curing compound has been applied. When repairs are to be made to an area on which curing compound has been applied, the area involved shall first be wet-sandblasted to remove the curing compound, following which repairs shall be made as provided herein.

3.15 PROTECTION

A. The CONTRACTOR shall protect all concrete against injury until final acceptance by the CITY. Fresh concrete shall be protected from damage due to rain. The CONTRACTOR shall provide such protection while the concrete is still plastic and whenever such precipitation is imminent or occurring.

3.16 TREATMENT OF SURFACEDEFECTS

A. As soon as forms are removed, all exposed surfaces shall be carefully examined, and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to secure a smooth, uniform, and continuous surface. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the CITY. In no case will extensive patching of honeycombed concrete be permitted. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall have them repaired as specified herein. Concrete containing extensive voids, holes, honeycombing, or similar depression defects, shall be completely removed and replaced. All repairs and

replacements herein specified shall be promptly executed by the CONTRACTOR at its own expense.

B. Defective surfaces to be repaired shall be cut back from the true line a minimum depth of 1/2 inch over the entire area. Feathered edges will not be permitted. Where chipping or cutting tools are not required in order to deepen the area properly, the surface shall be prepared for bonding by the removal of all laitance or soft material, and not less than 1/32-inch depth of the surface film from all hard portions, by means of an efficient sandblast. After cutting and sandblasting, the surface shall be wetted sufficiently in advance of shooting with shotcrete or with cement mortar so that while the repair material is being applied, the surfaces under repair will remain moist, but not so wet as to overcome the suction upon which a good bond depends. The material used for repair proposed shall consist of a mixture of one sack of cement to 3 cubic feet of sand. For exposed walls, the cement shall contain such a proportion of Atlas white Portland cement as is required to make the color of the patch match the color of the surrounding concrete.

C. Holes left by tie-rod cones shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. These holes then shall be repaired in an approved manner with dry-packed cement grout. Holes left by form-tying devices having a rectangular cross-section, and other imperfections having a depth greater than their least surface dimension, shall not be reamed, but shall be repaired in an approved manner with dry-packed cement grout.

D. All repairs shall be built up and shaped in such a manner that the completed work will conform to the requirements of this Section, using approved methods which will not disturb the bond, cause sagging, or cause horizontal fractures. Surfaces of said repairs shall receive the same kind and amount of curing treatment as required for the concrete in the repaired section.

3.17 CARE AND REPAIR OFCONCRETE

A. The CONTRACTOR shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the CITY. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with the acceptable concrete at the CONTRACTOR's expense.

3.18 GROUT INSTALLATION

A. All surface preparation, curing, and protection of cement grout shall be as specified herein. The finish of the grout surface shall match that of the adjacent concrete.

B. The CONTRACTOR through the manufacturer of non-shrink grout and epoxy grout shall provide on-site technical assistance upon request, at no additional cost to the CITY.

C. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

D. Grout shall be placed in such a manner, for the consistency necessary for each application, so as to assure that the space to be grouted is completely filled.

- END OF SECTION -

DIVISION 15
MECHANICAL

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SECTION 15000 - PIPING, GENERAL

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall furnish and install all piping systems shown and specified, in accordance with the requirements of the Contract Documents. Each system shall be complete with all necessary fittings, supports, anchors, expansion joints, flexible connectors, valves, accessories, lining and coating, testing, excavation, backfill and encasement, to provide a functional installation.

1.2 RELATEDWORK SPECIFIED ELSEWHERE

A. Excavation and backfill for utilities.

B. Pipeline testing and disinfection.

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS ***(REFER TO CITY OF SUNRISE PRODUCT LIST FOR ADDITIONAL INFORMATION)***

A. Commercial Standards:

ANSI/ASME B1.20.1	Pipe Threads, General Purpose (inch).
ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 125.
ANSI B16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and other Special Alloys.
ANSI/AWWAL115/A21.15	Flanged Ductile Iron Pipe with Threaded Flanges. Steel Pipe Flanges for Water Works Service, Sizes 4 in. through 144 in.
ANSI/AWS D1.1	Structural Welding Code.
ASTM A 307	Specification for Carbon Steel Externally Threaded Standard Fasteners.
ASTM D 2000	Classification System for Rubber Products in Automotive Applications.

1.4 SUBMITTALS

A. The CONTRACTOR shall submit complete shop drawings and certificates, test reports, affidavits of compliance, of all piping systems, in accordance with the CITY requirements and as needed by the CITY representative.

B. Each shop drawing submittal shall be complete in all aspects, incorporating all information and data listed herein and all additional information required to evaluate the proposed piping

material's compliance with the Contract Documents. Partial or incomplete submissions will be returned to the CONTRACTOR without review.

C. Data to be submitted shall include, but not be limited to:

- Catalog Data consisting of specifications, service, pipe size, working pressure, wall thickness, lining, coating, illustrations and a parts schedule that identifies the materials to be used for the various piping components and accessories. The illustrations shall be in sufficient detail to serve as a guide for assembly and disassembly.

- Weight of all component parts.

- Design calculations where specified.

D. Certifications: Prior to installation, the CONTRACTOR shall furnish an Affidavit of Compliance certified by the pipe manufacturer that the pipe, fittings and specials furnished under this Contract comply with all applicable provisions of AWWA and these specifications. No pipe or fittings will be accepted for use in the Work on this project until the affidavits have been submitted and accepted CITY requirements and as needed by the CITY representative.

E. All expenses incurred in making samples for certification of tests shall be borne by the CONTRACTOR.

1.5 QUALITYASSURANCE

A. General: All pipes shall be subject to review at the place of manufacture. During the manufacture of the pipe, the CITY shall be given access to all areas where manufacturing is in progress and shall be permitted to make all inspections necessary to confirm compliance with the Specifications.

B. Tests: Except where otherwise specified, all materials used in the manufacture of the pipe shall be tested in accordance with the applicable Specifications and Standards.

C. Welding Requirements: All welding procedures used to fabricate pipe shall be prequalified under the provisions of ANSI/AWS D1.1. Welding procedures shall be required for, but not necessarily limited to, longitudinal and girth or spiral welds for pipe cylinders, spigot and bell ring attachments, reinforcing plates and ring flange welds, and plates for lug connections.

1.6 MANUFACTURERS SERVICE REPRESENTATIVE

A. Where the assistance of a manufacturer's service representative is advisable, in order to obtain correct pipe joints, supports, or special connections, the CONTRACTOR shall furnish such assistance at no additional cost to the CITY.

1.7 SHIPPING, HANDLING ANDSTORAGE

A. Special care in handling shall be exercised during delivery, distribution and storage of pipes to avoid damage and setting up stresses. The damaged pipe will be rejected and shall be replaced at the CONTRACTOR's expense. Pipe and specials stored prior to use shall be stored in such a manner as to keep the interior free from dirt and foreign matter.

B. No pipes shall be dropped from cars or trucks to the ground. All pipes shall be carefully lowered to the ground by mechanical means. In shipping, pipe and fittings shall be blocked in such manner as to prevent damage to castings or lining. Any broken or chipped lining shall be carefully patched. Where it is impossible to repair broken or damaged linings in pipe because of its size, the pipe shall be rejected as unfit for use.

C. All mechanical joint pipes shall be laid with 1/8-inch space between the spigot and shoulder of pocket.

1.8 CLEANUP

A. After completion of the work, all remaining pipe cuttings, joining and wrapping materials, and other scattered debris, shall be removed from the site. The entire piping system shall be handed over in a clean and functional condition.

PART 2 -- PRODUCTS

2.1 GENERAL

A. All pipes, fittings, and appurtenances shall be installed in accordance with the requirements of the applicable Sections of Division 2 and furnished as specified herein.

B. Pressure Rating: All ductile iron pipe and fittings conveying or transmitting raw sewage shall be designed for a minimum working pressure of 150 PSI. Additional requirements to be followed as specified in section 15006.

2.2 PIPE FLANGES

A. Flanges: Where the design pressure is 125 psi or less, flanges shall conform to either ANSI/AWWA C115/A21.15 Class D or ANSI B16.1 125-lb class. W here the design pressure is greater than 150 psi, up to a maximum of 250 psi, flanges shall conform to either ANSI/AWWA C115/21.15 or ANSI B16.1 250-lb class. Flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe, unless otherwise shown. Attachment of the flanges to the pipe shall conform to the applicable requirements of ANSI/AWWA 115/21.15. Flanges for miscellaneous small pipes shall be in accordance with the standards specified for these pipes.

B. Flange Coating: All machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.

C. Flange Bolts: If studs are required, they shall be in accordance with ASTM A 307, Grade B, with heavy hex nuts. Machine bolts shall normally be used on all flanged connections and shall be in accordance with ASTM A 307, Grade A, with hex nuts. If studs are required, they shall extend through the nuts a minimum of 1/4-inch.

D. Flange Gaskets: Gaskets for flanged joints shall be of materials as specified in piping sections. Blind flanges shall have gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange. Ring gaskets shall not be permitted.

2.3 SLEEVE-TYPE COUPLINGS

A. Construction: Sleeve-type couplings shall be provided where shown, and shall be of similar material as the pipe, without pipe stop, and shall be of sizes to fit the pipe and fittings shown. The middle ring shall be not less than 1/4 inch in thickness and shall be either 5 or 7 inches long for standard steel couplings, and 16 inches long for long-sleeve couplings. The followers shall be single-piece contoured mill section welded and cold-expanded as required for the middle rings. They shall be of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket.

B. Pipe Preparation: The ends of the pipe, where specified or shown, shall be prepared for sleeve-type couplings. Plain ends for use with couplings shall be smooth and round for a distance of 12 inches from the ends of the pipe, with outside diameter not more than 1/64 inch smaller than the nominal outside diameter of the pipe. The middle ring shall be tested by cold-expanding a minimum of one percent beyond the yield point, to proof-test the weld to the strength of the parent metal. The weld of the middle ring shall be subjected to an air test for porosity.

C. Gaskets: Gaskets for sleeve-type couplings shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. The rubber in the gasket shall meet the following specifications:

1. Color - Jet Black.

2. Surface –Non-blooming.

3. Durometer Hardness - 74 $\pm$ 5.

4. Tensile Strength - 1000 psi Minimum.

5. Elongation - 175 percent Minimum.

D. The gaskets shall be immune to attack by the material which is being transported. All gaskets shall meet the requirements of ASTM D 2000, AA709Z, meeting Suffix B13 Grade 3, except as noted above.

E. Insulating Couplings: Where insulating couplings are required, both ends of the coupling shall have a wedge-shaped gasket which assembles over a rubber sleeve of an insulating compound in order to obtain insulation of all coupling metal parts from the pipe.

F. Restrained Joints: Where harnesses are required for sleeve-type couplings, they shall be in accordance with the requirements of the appropriate reference standard, or as shown.

2.4 PIPE THREADS

A. All pipe threads shall be in accordance with ANSI/ASME B1.20.

PART 3 -- EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall furnish all labor, tools, materials, and equipment necessary for installation and jointing of the pipe. All piping shall be installed in accordance with the Drawings in a neat workmanlike manner and shall be set for accurate line and elevation. All piping shall be thoroughly cleaned before installation, and care shall be taken to keep the piping clean throughout the installation.

B. Piping shall be attached to valves, etc., in accordance with the respective manufacturers' recommendations.

3.2 LAYING PIPE

A. Horizontal and vertical separation between new utilities and existing utilities shall be maintained according to the FAC Rule 62-555.314 and as specified in this document.

B. Proper and suitable tools and appliances for the safe convenient handling and laying of pipe shall be used and shall, in general, agree with manufacturer's recommendations. At the time of laying, the pipe shall be examined carefully for defects, and should any pipe be discovered to be defective after being laid, it shall be removed and replaced with sound pipe by the CONTRACTOR at his expense.

C. The CONTRACTOR shall perform all earthwork including excavation, backfill, bedding, compaction, sheeting, shoring and bracing, dewatering and grading in accordance with Division 2 "Sitework."

D. Upon satisfactory excavation of the pipe trench and completion of the pipe bedding, a continuous trough for the pipe barrel and recesses for the pipe bells, or couplings, shall be excavated by hand digging. When the pipe is laid in the prepared trench, true to line and grade, the pipe barrel shall receive continuous, uniform support and no pressure shall be exerted on the pipe joints from the trench bottom.

E. Pipe shall be installed in accordance with the manufacturer's recommendation. Before being lowered into the trench, the pipes and accessories shall be carefully examined, and the interior of the pipes shall be thoroughly cleaned of all foreign matters. At the close of each workday and during suspension of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other foreign material from entering the pipe.

F. Lines shall be laid straight, and depth of cover shall be maintained uniform with respect to finish grade, whether grading is completed or proposed at time of pipe installation. Where a grade or slope is shown on the Drawings, the CONTRACTOR shall use laser-based surveying instruments to maintain alignment and grade. At least one elevation shot shall be taken on each length of pipe and recorded. No abrupt changes in direction or grade will be allowed.

G. After the pipe has been laid, reviewed, and found satisfactory, sufficient backfill shall be placed along the pipe barrel to hold the pipe securely in place during the conduction of the hydrostatic test. No backfill shall be placed over the joints until the hydrostatic test is

satisfactorily completed, leaving it exposed to view for the detection of visible leaks. Upon satisfactory completion of the hydrostatic test, backfilling of the trench shall be completed.

H. All underground piping shall be properly restrained at all fittings where the pipeline changes direction, changes size, or ends, using restrained joint pipe.

I. Mechanical joints shall be made up using annealed high strength cast iron bolts and rubber gaskets having either plain or duck tips as recommended by the manufacturer. All types of mechanical joint pipes shall be laid and jointed in full conformance with the manufacturer's recommendations, which shall be submitted to the CITY for review and approval before work is begun. Torque wrenches set as specified in AWWA Standard C111, shall be used; or spanner type wrenches may be used with the permission of the CITY.

J. Push-on joints shall be made in strict, complete compliance with the manufacturer's recommendations. Lubricant, if required, shall be an inert, non-toxic, water-soluble compound incapable of harboring, supporting, or culturing bacterial life. Manufacturer's recommendations shall be submitted to the CITY for review and approval before work is begun.

3.3 FLANGED JOINTS

A. Flanged joints shall be made up with full face gaskets as specified in the piping paragraphs. Flange faces shall have a uniform bearing on the gaskets. Flanges shall be drawn together uniformly until the joint is tight. No washers shall be permitted for the bolt and nut assemblies. The length of the bolts shall be uniform and in accordance with the standards specified herein. The bolt's maximum projection beyond the end of the nut shall be 0.25 inch nor shall the bolt fall short of the end of the nut.

3.4 THREADED JOINTS

A. All threads shall be clean, machine cut and all pipes shall be reamed before erection. Taps and dies shall be cleaned, sharpened and in good condition. All threaded joints shall be made tight with Teflon tape.

B. After having been set up, a joint shall not be backed off unless the joint is broken, the threads cleaned, and new tape is applied.

3.5 THRUST RESTRAINT

A. Restrained joints shall be located at valves, changes in direction of piping, and major branch connections.

B. On all piping, where sleeve type couplings and flanged adapters are located near fittings or valves, tie rods shall span across the coupling as specified herein to restrain movements of the pipe along its axial direction. Such restraints can be deleted if both ends of the pipe are anchored in a concrete structure with no fitting or valve occurring within the span length, in the suction piping to a pump where the coupling is between the pump and valve, or when the water pressure measured at the crown of the pipe is less than five feet.

C. All sleeve type couplings shall be harnessed except where noted specifically on the Drawings. The harnessing shall be as shown on the Drawings or as specified herein.

D. All buried tie rods and associated hardware shall be 316 stainless steel.

E. In general, all valves and fittings shall be restrained in an acceptable manner such that the unbalanced force developed at them shall be supported independent of the piping system.

3.6 TESTING

A. Field testing of pipelines shall conform to the CITY standards.

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SECTION 15006 - DUCTILE IRON PIPE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. In accordance with current CITY Standards, the CONTRACTOR shall furnish and install ductile iron pipe and all appurtenant Work, complete in place, all in accordance with the requirements of the Contract Documents. All pipe and fittings shall be push-on or restrained joint pipe.

1.2 RELATEDWORK SPECIFIED ELSEWHERE

A. Piping, General.

B. Pipeline Testing and Disinfection

1.3 REFERENCED SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards:

ANSI/AWWA C110/A21.10	Ductile-Iron and Gray-Iron Fittings3-inchthrough 48-inches For Water and Other Liquids
ANSI/AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
ANSI/AWWA C151/A21.51	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or other Liquids
ANSI/AWWA C600	Installation of Ductile-Iron Water Mains and Appurtenances
SSPC - PA2	Measurement of Dry Paint Thickness with Magnetic Gages

1.4 SUBMITTALS

A. Shop Drawings: The CONTRACTOR shall submit Shop Drawings of pipe and fittings in accordance with the requirements in Sections 15000, "Piping, General".

B. When requested by the CITY, the pipe manufacturer shall furnish evidence in the form of affidavits, certified laboratory reports and other data as may be required that the material being used in the manufacturer of the seal or gasket is in strict accordance with the material supplier's recommendations

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PART 2 -- PRODUCTS

2.1 GENERAL

A. All ductile iron pipes shall conform to the requirements of ANSI/AWWA Standard C151/A21.51. The wall thickness and outside diameter of the pipe shall conform to Table 50.15. Special thickness classes of Ductile Iron Pipe Thickness shall be as follows:

2.2 PIPE LINING

A. General: Ductile Iron Pipe and fittings shall be lined with Protector 401 Ceramic Epoxy or approved equal. Cement mortared linings are not appropriate for this application.

2.3 EXTERIOR COATING

B. An asphaltic coating shall be applied to the exterior of all ductile iron pipe and fittings intended for buried service and shall conform to ANSI A21.51

2.4 PVC PIPE SLEEVE

A. PVC pipe sleeves shall be provided for all ductile iron pipe crossings under sewer and storm drainpipes. The PVC pressure pipe shall conform to the requirements of AWWA C905. The PVC sleeve shall extend 10 feet on either side of the sewer and/or storm drainpipe that the ductile iron pipeline crosses under. The ductile iron pipe shall be installed with casing spacers inside the PVC pipe sleeve and provided with a bulkhead at either end of the sleeve.

B. The annular space between the ductile iron water main pipe and the PVC sleeve shall be filled with clean sand, having 100 percent passing a standard No. 30 sieve.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. Unless otherwise directed, ductile iron pipe shall be laid with the bell ends in the direction of laying.

B. Thrust restrained and mechanical joints shall be made in accordance with the manufacturer's standards except as otherwise specified herein. Joints between mechanical joint pipe and/or fittings shall be made in accordance with ANSI/AWWA Standard C600, except that deflection at joints shall not exceed one-half of the manufacturer's recommended allowable deflection, or one-half of the allowable deflection specified in ANSI/AWWA C600, whichever is the lesser amount.

C. Before laying thrust restrained and mechanical joint pipe and fittings, all lumps, blisters and excess bituminous coating shall be removed from the bell and spigot ends. The outside of each spigot and the inside of each bell shall be wire brushed and wiped clean and dry. The entire gasket groove area shall be free of bumps or any foreign matter which might displace the gasket. The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom at any time. Vegetable soap lubricant shall be applied in accordance with the pipe manufacturer's recommendations, to aid in making the joint. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Deflections shall only be made after the joint has been assembled.

D. Prior to making up flanged joints in ductile iron pipe and fittings, the back of each flange under the bolt heads and the face of each flange shall have all lumps, blisters and excess bituminous coating removed and shall be wire brushed and wiped clean and dry. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to ensure that bolt stresses are evenly distributed.

E. Bolts and nuts in thrust restrained, mechanical and flanged joints shall be tightened in accordance with the recommendations of the pipe manufacturer for a leak-free joint. The mechanics shall exercise caution to prevent overstress. Torque wrenches shall be used until, in the opinion of the CITY, the mechanics have become accustomed to the proper amount of pressure to apply on standard wrenches.

F. Cutting of the ductile iron pipe for inserting valves, fittings, etc., shall be done by the CONTRACTOR in a neat and workmanlike manner without damage to the pipe, the lining, or the coating. After cutting the pipe, the plain end shall be beveled with a heavy file or grinder to remove all sharp edges.

G. Areas of loose or damaged lining associated with field cutting shall be repaired or replaced as recommended by the pipe manufacturer and required by the CITY. Repair methods shall be as recommended by the manufacturer and shall be submitted to the CITY for review.

H. Any work within the pipe shall be performed with care to prevent damage to the lining. No cable, lifting arms or other devices shall be inserted into the pipe. All lifting, pulling or pushing mechanisms shall be applied to the exterior of the pipe barrel.

I. Homing the pipe shall be accomplished by the use of a hydraulic or mechanical pulling device, unless otherwise accepted by the CITY. No pipe shall be driven or struck in order to seat it home.

J. Cleaning methods shall be acceptable to the CITY, and must be sufficient to remove silt, rocks, or other debris which may have entered the pipeline during its installation.

K. The CONTRACTOR shall furnish the necessary sand, equipment, and hoses for filling the annular space in the PVC sleeve with sand. Sand shall be conveyed by air through a hose and deposited by air pressure in its final position. The sand shall be free of lumps to flow unimpeded and to completely fill all voids. In general, sand backfills will be considered complete when no more sand can be forced into the annular space between the bulkheads. The CONTRACTOR shall protect the interior surface of the PVC sleeve from damage.

- END OF SECTION -

SECTION 15008 - PVC NON-PRESSURE PIPE

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall furnish and install all 6- to 15-inch underground PVC non-pressure pipe for gravity sewer replacement and all appurtenant work, complete in place, all in accordance with the requirements of the Contract Documents.

1.2 RELATEDWORK SPECIFIED ELSEWHERE

A. Excavation and Backfill for Utilities.

B. Television Survey.

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

ASTM D 1784	Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
ASTM D 2241	Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series).
ASTM D 2321	Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.
ASTM D 3034	(SDR 35) Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings. PVC non- pressure pipe shall conform to ASTM D3034 (SDR 35).PVC sewer conflict pipe shall be DR series 18.

1.4 SUBMITTALS

A. Samples: The CONTRACTOR shall submit to the CITY for review, samples of all the materials proposed for use on the Work. The samples shall be clearly marked to show the manufacturer's name and product identification and shall be submitted along with the manufacturer's technical data and application instructions. All sample submittals shall conform to the requirements for "Samples" in Section 01300, "Submittals".

B. Shop Drawings: The CONTRACTOR shall submit shop drawings and laying diagrams of all Pipe, joints, bends, special fittings, and piping appurtenances in accordance with CITY Standards.

C. Certificates: The CONTRACTOR shall provide manufacturer's certificates for all materials indicating conformance to the Contract Documents and with the supplier’s material’s recommendations.

1.5 QUALITYASSURANCE

A. Testing: All materials testing will be based upon applicable ASTM Test Methods and AWWA Standards referenced herein for the materials specified.

B. Certificates: Manufacturer's notarized certificates of compliance shall be furnished by the CONTRACTOR.

C. The pipe shall be subjected to the specified hydrostatic strength tests, flexure tests, and crushing tests. The crushing tests shall be made on samples taken from the center of full-length sections of pipe.

D. When requested by the City, the pipe manufacturer shall furnish evidence in the form of affidavits, certified laboratory reports and other data as may be required that the material being used in the manufacturer of the seal or gasket is in strict accordance with the material supplier's recommendations.

E. Ultraviolet degradation or sun-bleached pipe will be cause for rejection by the CITY. All cost for removal and replaced shall be borne by the Contractor.

1.6 CLEANUP

A. Upon completion of backfilling and grading over trenches, the CONTRACTOR shall remove all excess materials and equipment from the site.

PART 2 -- PRODUCTS

2.1 GENERAL

A. All PVC pipes shall be continuously and permanently marked with the manufacturer's name, pipe size, and pressure rating in psi.

B. The CONTRACTOR shall also require the manufacturer to mark the date of extrusion on the pipe. This dating shall be done in conjunction with records to be held by the manufacturer for 2 years, covering quality control tests, raw material batch number, and other information deemed necessary by the manufacturer.

2.2 PIPE

A. All PVC pipes shall be joined by Compression joints unless otherwise shown or specified, and shall conform to the following requirements:

1. Polyvinylchloride pipe (PVC) shall conform to the requirements of ASTM D 3034, Class SDR 35. PVC sewer conflict pipe shall be DR series 18. Material for PVC pipes shall conform to the requirements of ASTM D 1784 for Class 12454-B or 12454-C as defined therein.

2. Flexible rubber rings for compression type joints for PVC pipe and fittings shall conform to the requirements of ASTM D 1869.

2.3 FITTINGS

A. PVC fittings shall be of monolithic construction and of the type specified by the manufacturer of the pipe being used. No solvent welds will be permitted.

B. All fittings for the PVC pipe shall conform to the requirements of ASTM D 2241. The ring groove and gasket ring shall be compatible with PVC pipe ends. The flanged fittings shall be compatible with cast-iron or ductile iron pipe fittings.

C. The strength class of the fittings shall be not less than the strength class of any adjoining pipe.

D. Donut type adapters shall be manufactured from virgin PVC. Material shall conform to applicable sections of ASTM Specifications C443, C425, C594, C564 and D1869.

2.4 BEDDING MATERIAL

A. Unless otherwise specified or shown, all material used for pipe bedding shall conform to the requirements for "Embedment materials" as specified in ASTM D 2321.

2.5 PVC CLEANOUTS

A. PVC cleanouts shall have screw type access plug. Long radius wye connections and fittings shall be used in order to access cleanout operations. Tee connections shall not be acceptable.

B. Clean-outs located in pavement or concrete driveways shall have a cast iron cap with brass plug and have a 12” x 12” x 6” concrete collar in accordance with the CITY’s standard detail.

C. 3M Scotch Marker #1253 (Green) shall be installed at clean-out for electronic locating.

PART 3 -- EXECUTION

3.1 GENERAL

A. All laying, jointing, testing for defects and for leakage shall be performed in the presence of the CITY, and shall be subject to his approval before acceptance. All material found during the progress to have defects will be rejected and the CONTRACTOR shall promptly remove such defective materials from the site of the Work.

B. Installation shall conform to the requirements of ASTM D 2321 and to the supplementary requirements or modifications specified herein. Wherever the provisions of this Section and the requirements of ASTM D 2321 are in conflict, the more stringent provision shall apply.

3.2 TRENCHING AND BACKFILL

A. Trench excavation and backfill shall conform to the requirements of the Section entitled "Excavation and Backfill for Utilities", and as specified herein.

B. Unless otherwise specified or shown, the maximum width of trenches shall be as specified in said ASTM D 2321.

C. The minimum depth of cover over the top of the pipe shall be 36 inches unless otherwise shown.

3.3 LAYING PIPE

A. The pipe shall be installed in accordance with the requirements of ASTM D 2321 and as specified herein and shown and the sections shall be closely jointed to form a smooth flow line. Immediately before placing each section of pipe in final position for joining, the bedding for the pipe shall be checked for firmness and uniformity of surface.

B. The jointing of the pipe on the job shall be done in strict accordance with the pipe manufacturer's instructions and shall be done entirely in the trench unless otherwise directed by the CITY.

C. Proper implements, tools, and facilities as recommended by the pipe manufacturer's standard printed installation instructions shall be provided and used by the CONTRACTOR for safe and efficient execution of the Work. All pipe, fittings, valves, and accessories shall be carefully lowered into the trench by means of backhoe, ropes, or other suitable equipment in such a manner as to prevent damage to pipe and fittings. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

D. Cutting and machining of the pipe shall be accomplished in accordance with the pipe manufacturer's standard procedures for this operation. Pipe shall not be cut with a cold chisel, standard iron pipe cutter, nor any other method that may fracture the pipe or will produce ragged, uneven edges.

E. The pipe and accessories shall be inspected for defects prior to lowering into the trench. Any defective, damaged or unsound pipe shall be repaired or replaced. All foreign matter or dirt shall be removed from the interior of the pipe before lowering into position in the trench. Pipe shall be kept clean during and after laying. All openings in the pipeline shall be closed with water tight expandable type sewer plugs or PVC test plugs at the end of each day's operation or whenever the pipe openings are left unattended. The use of burlap, wood, or other similar temporary plugs will not be permitted.

F. Adequate protection and maintenance of all underground and surface utility structures, drains, sewers, and other obstructions encountered in the progress of the Work shall be furnished by the CONTRACTOR.

G. Where the grade or alignment of the pipe is obstructed by existing utility structures such as conduits, ducts, pipes, branch connections to main sewers, or main drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the CONTRACTOR in cooperation with CITYs of such utility structures.

3.4 HANDLING

A. Handling of the PVC pipe shall be done with care to ensure that the pipe is not damaged in any manner during storage, transit, loading, unloading, and installation.

B. Pipe shall be inspected both prior to and after installation in the ditch and all defective lengths shall be rejected and immediately removed from the working area.

3.5 FIELD JOINTING

A. Each pipe compression type joint shall be joined with a lock-in rubber ring and a ring groove that is designed to resist displacement during pipe insertion.

B. The ring and the ring seat inside the bell shall be wiped clean before the gasket is inserted. At this time a thin film of lubricant shall be applied to the exposed surface of the ring and to the outside of the clean pipe end. Lubricant other than that furnished with the pipe shall not be used. The end of the pipe shall be then forced into the ring to complete the joint.

C. The pipe shall not be deflected either vertically or horizontally in excess of the printed recommendations of the manufacturer of the coupling.

D. When pipe laying is not in progress, the open ends of the pipe shall be closed to prevent trench water from entering pipe. Adequate backfill shall be deposited on pipe to prevent floating of pipe. Any pipe which has floated shall be removed from the trench, cleaned, and re-laid in an acceptable manner. No pipe shall be laid when, in the opinion of the CITY, the trench conditions or weather are unsuitable for such Work.

3.6 INSTALLATION OF BENDS, TEES, AND REDUCERS

A. Cast-iron and PVC fittings shall be installed Utilizing standard installation procedures. Fittings shall be lowered into a trench by means of rope, cable, chain, or other acceptable means without damage to the fittings. Cable, rope, or other devices used for lowering fitting into trench, shall be attached around exterior of fitting for handling. Under no circumstances shall the cable, rope or other device be attached through the fitting's interior for handling. Fittings shall be carefully connected to pipe or other facility, and joints shall be checked to insure a sound and proper joint.

3.7 PIPE-TO-PIPE CONNECTIONS

A. Pipe-to-pipe connections shall be made by using flexible banded, sheer reinforced couplings or adapter couplings, each with compression joints, in compliance with ASTM C425.

3.8 PIPE-TO-PIPE MANHOLECONNECTIONS

A. When a sound pipe stub-out exists at a manhole to which connection is to be made, a pipe-to-pipe connection shall be made as described above. If a stub-out is not present or is faulty, an opening shall be cut in the manhole wall and the connection made. The connection shall consist of a pipe stub-out with elastomeric water stop grouted into the opening with non-shrink grout. A flexible band coupling, as shown on the details for new manholes, shall join the pipe stub-out to the replacement pipe. The invert or floor inside the manhole shall be cut and reshaped as necessary.

3.9 GRAVITY SEWER SERVICELATERALS

A. Lateral sewers shall be installed in accordance with all the applicable requirements for pipe installation. Branch fittings shall be installed in the main line sewer as they are constructed, in the locations and configuration of the original laterals or as designated by the CITY.

B. The existing laterals shall be hand excavated to a joint, saw cut, clean and square and the appropriate adapter installed to connect the replacement laterals. Care shall be taken to

maintain the slopes of the existing laterals. The laterals shall be removed and replaced from the main line to a point along the existing lateral as determined by the CITY to be in acceptable condition.

C. The CONTRACTOR shall not excavate trenches for laterals on both sides of the street at the same time unless written permission has been secured in advance to close the street.

D. Placement of bedding / cover materials in the trench shall be the same for laterals as provided in Section 02222 - Excavation and Backfill for Utilities.

3.10 TESTING

A. Field testing of gravity sewer pipes shall conform to the CITY requirements.

- END OF SECTION -

SECTION 15019 - MISCELLANEOUS PIPING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The Contractor shall furnish and install all exposed and buried mill piping as shown and specified, complete, including polyethylene tubing, copper tubing, solvent-welded PVC pipe, fittings, gaskets, bolts, insulating connections, and such other specialties as required for a complete and operable piping system in accordance with the requirements of the Contract Documents.

1.2 RELATEDWORK SPECIFIED ELSEWHERE

A. Excavation and Backfill for Utilities

B. Piping, General.

C. Pipeline Testing and Disinfection

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards:

ANSI/ASME B1.20 1	Pipe Threads, General Purpose(inch)
ASTM B 62	Specification for Composition Bronze or Ounce Metal Castings
ASTM B 584	Specification for Copper Alloy Sand Castings for General Applications
ASTM D 2000	Classification System for Rubber Products in Automotive Applications
ASTM D-1248	Polyethylene Plastics Molding and Extrusion Materials
AWWA C 901	Polyethylene (PE) Pressure Pipe and tubing, ½″ through 3″ for Water Service

1.4 SUBMITTALS

A. For the materials and equipment items supplied under the provisions of this Section, the Contractor shall submit copies of the manufacturer's product specifications and performance details according to the requirements of Section entitled "Submittals."

1.5 QUALITYASSURANCE

A. Tests: Except where otherwise specified, all material used in the manufacture of the pipe shall be tested in accordance with the applicable Specifications and Standards.

B. Certificates: Manufacturer's notarized certificates of compliance shall be furnished by the Contractor.

C. The pipe shall be subjected to the specified hydrostatic strength tests, flexure tests, and crushing tests. The crushing tests shall be made on samples taken from the center of full-length sections of pipe.

1.6 CLEANUP

A. In addition to the requirements of Section entitled "Project Closeout", the Contractor, upon completion of backfilling and grading over trenches shall remove all excess materials and equipment from the site.

PART 2 -- PRODUCTS

2.1 COPPER TUBING

A. Copper tubing shall conform to the requirements of ASTM B 88 and shall be Type K, soft temper for buried tubing and hard-drawn for above-ground application. Fittings shall be soldered or sweated on and shall be of wrought copper to ANSI B16.22. Soldered joints shall contain 95-percent tin and 5-percent antimony. No solders or fluxes containing more than 0.2 percent of lead shall be used.

2.2 PVC (POLYVINYL CHLORIDE) PRESSURE PIPE, SOLVENT-WELDED

A. PVC pipe shall be made from all new rigid un plasticized polyvinyl chloride and shall be Normal Impact Class 12454-B, Schedule 80 to conform to ASTM D 1785, unless otherwise shown. Schedule 40 PVC pipe shall be used for piping sleeves under pavement, as shown on the drawings. Elbows and tees shall be of the same material as the pipe. Unless otherwise shown, joint design shall be for solvent-welded construction.

2.3 COMPRESSIONS COUPLINGS

A. Compression couplings shall be provided for connections of the new service connection piping at the corporation stop, angle key meter valve branch assembly, pipe joints, and the service meter. The compression couplings shall be of similar material to the meter or pipe and shall be of the sizes to fit the pipe and fittings. The compression coupling shall have stainless steel clamps or set screws, pack joint nut with a beveled gasket and a gap for adjustability. Compression couplings shall be Pack Joint Couplings as manufactured by Ford Meter Box Company or equal. Meter couplings shall be model C38-23-2.5, as manufactured by Ford Meter Box Company, or equal.

2.4 PIPE THREADS

A. All pipe threads shall be in accordance with ANSI/ASME B1.20.

2.5 POLYETHYLENE TUBING

A. The polyethylene compound from which the tubing is made shall be an ethylene hexene copolymer and shall comply with the applicable requirements as specified in ASTM D3350 providing a cell classification of 355434C and simultaneously be as specified in ASTM D1248 for Type 111 Category 5, Grade P34, Class C. PE3408 very high molecular weight, high density polyethylene plastic material.

B. Polyethylene tubing shall have a working pressure at 200 PSI at 73.4 degrees F.

C. All tubing furnished under these specifications shall conform to the following standards:

1. AWWA C-901, ASTM D2239, ASTM D2737, ASTM D3350, ASTM D1248, ASTM F1248, ASTM D1693, ASTM D2837, and ASTM D3140.

D. Tubing dimensions and tolerances shall conform to the following requirements:

1. Polyethylene tubing surfaces shall be mirror smooth and shall be free from bumps and irregularities. Materials must be completely homogenous and uniform in appearance.

E. Tubing dimensions and tolerances shall correspond with the values listed in AWWA C901 with a dimension ratio (DR) of 9.

F. Tubing shall be fully labeled at intervals of not more than 5 feet with brand name and manufacturer, the nominal size, PE 3408, the word “Tubing” and DR9, PC200, AWWA C901, and the seal, or mark, of the testing agency.

2.6 HIGH DENSITY POLYETHYLENEPIPE

A. General: High density polyethylene pipe shall be used for sewer replacement by pipe bursting.

B. The materials of the replacement pipe shall be PE 3408 High Density Polyethylene (HDPE) pipe and conform to requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) based on outside diameter, ASTM D1248, ASTM D3350 - Cell Classification PE 345434C. Sizes of the insertions to be used shall be such to increase to or renew as indicated on the Drawings. All pipes shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used. The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters, or other deleterious faults. The minimum wall thickness of the polyethylene pipe shall have SDR 17 for gravity sewer installation and SDR 11 for force main installation, or as directed otherwise by the ENGINEER.

C. The replacement pipe shall be 1100 Series Driscopipe, SDR17 with 100 psi pressure rating for gravity sewer, and 1000 Series Driscopipe, SDR 11 with 160 psi pressure rating for force main, or equal.

D. The inside diameter of the replacement pipe for gravity sewer shall be color coded and equivalent to the soft white Driscopipe Opticore pipe, or equal.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. Couplings: Pipe couplings shall be installed in strict accordance with the manufacturer's printed recommendations, using the correct style coupling and gasket for any given application.

B. Plastic Pipe: PVC pipe joints shall be solvent-welded in accordance with the manufacturer's instructions. Expansion joints or pipe bends shall be provided to absorb pipe expansion over a temperature range of 100 degrees F, unless otherwise shown. Care shall be taken to provide sufficient support, anchors, and guides, to avoid stress on the piping. The Contractor shall obtain the services of the pipe supplier, to instruct the pipe fitters in the correct way of making solvent welded joints. Only clean, fresh solvents shall be used at any time.

- END OF SECTION -

SECTION 33310 – SMOKE TESTING

PART 1 -- GENERAL

1.1 SCOPE

A. Work orders shall include the furnishing of all labor, materials, equipment, tools, and services required to perform and complete all work necessary to document, by means of smoke testing and digitally recorded CCTV inspection, all identifiable sources of inflow and infiltration (I&I) to the CITY's sanitary sewer system from prohibited connections and defective pipes.

1.1 REQUIREMENTS

A. The CONTRACTOR shall test the gravity sanitary sewer system using high-capacity blower(s). The smoke blower will be suitable for the anticipated testing and generate non-toxic smoke. The CONTRACTOR personnel will visually identify and document each defect location. CONTRACTOR shall provide safety equipment suitable for the anticipated field and traffic conditions. Digital camera(s) will be used for documentation of observations. All inspections shall be recorded on standard smoke testing paper forms or entered into an electronic database.

B. The nature of the smoke testing inspections shall be to confirm system connectivity, identify gravity sewer system defects, cross-connections between storm and sanitary sewer, location of potential building traps visualized by sewer vents with no smoke and to provide a permanent record of the defects including type, location, and severity. Inspections will be performed by introducing non-toxic smoke into the sanitary sewer pipes using a high-capacity blower (or approved equal depending on the project goals), observing smoke exiting vent stacks and at defect locations, and documenting the defects

1.2 PERSONNEL QUALIFICATIONS

A. The field crew will be of sufficient size to properly operate the smoke generation machine and provide full coverage of the area to visually locate smoke discharged from defects. This must include personnel for traffic control.

B. The employees performing the smoke testing under the provisions of these specifications shall be properly trained and thoroughly experienced in the use of the tools, equipment, materials and procedures.

C. The CONTRACTOR shall provide a list of all employees that will conduct field work to the CITY. The list must include full names, copies of each employee's driver's license and show the employees individual qualifications to perform the work. Each employee shall wear or have on them a photo ID identifying him/her by name, company name and contact information. Clothing and vehicles identifying the company is also required. All job supervisors will have business cards with contact information to provide to residents if requested.

D. The CONTRACTOR shall take appropriate action to ensure that his/her employees are polite to the public in all aspects of the work and that immediate assistance is provided to property owners if needed.

E. Although it is not anticipated that employees will enter the manholes, if that should become necessary (for placement or retrieval of plugs, or any other reason) the employees must observe approved Confined Space Entry protocols. Only employees with documented training in Confined Space Entry may be permitted to participate in that activity.

1.3 REQUIRED SUBMITTALS

A. Documentation of smoke products, including MSDS, manufacturer's recommendation for applications, storage and handling.

B. Documentation of dye products, including MSDS.

C. Documentation of smoke testing equipment for both mainlines and laterals.

D. Draft Schedule showing which segments will be done in each week.

E. Initial draft of Initial Notification Letter to be distributed prior to commencing work, which will inform affected residents of what will be done during the test and how to prepare for it (the City Communications office will work with the CONTRACTOR to produce an approved final draft).

F. Draft Door Hanger for smoke testing.

G. List of proposed employees and copies of any relevant certifications (i.e. NASSCO).

H. Typical Traffic Control Plans.

I. Proposed field logs and reports.

J. Proposed configuration of digital database.

K. Monthly update of the digital database (electronically conveyed).

1.4 REQUIRED SUBMITTALS

A. Due to the need to coordinate closely with the residents who will be affected by this work, maintaining a reliable Schedule is critically important. Prior to beginning of work, the CONTRACTOR shall submit to the CITY a proposed Schedule showing the dates for specific neighborhoods. The Notice to Proceed shall not be issued until the Schedule has been received, reviewed and accepted by the CITY. Development and maintenance of the Schedule are the responsibility of the CONTRACTOR. In addition, the CONTRACTOR shall provide a two (2) week look ahead schedule to the CITY by Friday of every week showing in detail the location of work and any other relevant project activities during that period. Failure of the CONTRACTOR to comply with the requirements of this section shall be grounds for determination of the CITY

that work shall not proceed until a reasonable Schedule or Revised Schedule is submitted and accepted by the CITY, and the CONTRACTOR is in compliance.

1.6. PROJECT MEETING

A. Prior to the issuance of the Notice to Proceed, one or more meetings of the CONTRACTOR's representative(s) and the CITY will be held to discuss in detail certain procedural aspects of the work including, at least.

1. Administrative procedures for transmittals, approvals, change orders, and similar items.
2. Review of the method of application for payment, progress payments, retention, and final payment.
3. Review of emergency procedures.
4. Review of traffic control procedures and general safety procedures
5. Development of the project schedule.
6. Notifications to residents affected by the project, and communications with the CITY's emergency service providers and Public Works crews;
7. Review of the documentation to be generated during the course of the project (field records and digital database)
8. Basis for determination that follow-up on-site smoke testing or dye testing is needed.

1.7 CONTRACTOR'S USE OF PUBLIC PREMISES

A. Overnight storage of materials or parking of CONTRACTOR's vehicles on CITY streets will only be allowed in an area specified in writing by the CITY. All spillage or mud tracking or tracking of other materials on streets, gutters and driveways shall be removed or cleared immediately.

B. The CONTRACTOR shall not allow the locations of the work to become littered with trash or waste material. The CITY shall have the right to determine what is or is not waste material or rubbish and shall have the right to determine the place and manner of disposal.

C. The CONTRACTOR shall provide portable toilet facilities and a personnel wash area for his/her forces.

1.8 ACCESS TO PRIVATE PROPERTIES

A. If the CONTRACTOR's crew is unable to enter a property for any reason, the CITY will attempt to arrange for entry. This may require the CONTRACTOR to schedule a subsequent trip to that site.

B. The CONTRACTOR's crew shall treat residents with courtesy and respect and shall politely answer brief, simple questions, but they should refer the residents to the emergency telephone number and the CITY's website for more information.

1.9 PRESERVATION AND RESTORATION OF PROPERTY

A. The CONTRACTOR must attempt to avoid causing damage to landscaping and private improvements overlying public facilities and private laterals being worked on. If a manhole or cleanout within or at the edge of an easement needs to be cleared, the CONTRACTOR will make reasonable efforts to restore the surrounding landscaping and improvements upon completion of the work, except that manholes or cleanouts shall not be covered or concealed. If a public manhole or cleanout has been covered by paving or hardscape materials it shall not be disturbed until the CITY has been notified.

B. Full compensation for protecting and repairing property as specified herein and all payments for the protection, repair or restoration of existing improvements and utilities shall be considered as included in the price paid for other items of work and no additional compensation will be allowed thereof.

C. The CONTRACTOR shall minimize disruption, noise and dust nuisance arising from their operations.

1.10 NOTIFICATION

A. CONTRACTOR shall notify the CITY a minimum of 48 hours prior to the startup of smoke testing work or re-startup following delays due to weather. The CONTRACTOR will provide the CITY the location for the next day's work at the end of each day. Daily notification to the City of where the contractor is working, is required. No payment will be made for work performed without proper notification. Refer to section 3.1.A.5 for daily notification requirements.

B. The CONTRACTOR shall provide an emergency phone number for the public to use, which will reach a live person during scheduled working hours. That live person must be able to reach the primary contact person for the CONTRACTOR. For after hours, have a voicemail service that will provide next working day return call.

C. The CONTRACTOR shall work with the CITY to develop a Notification Letter to all residents in subject neighborhoods, explaining how the inspection process will affect them, including the requirement for residents to allow CITY workers onto their private properties, and containing answers to commonly asked questions. It shall include the emergency phone number, prominently displayed, as well as reference to the CITY's web page for this project. It shall also inform residents who may not be directly affected, but who may observe the harmless smoke.

D. The CONTRACTOR shall provide a preliminary draft, based on experience in similar communities, which the CITY will review and revise as deemed appropriate.

E. The Door Hangers shall be at least 3½" wide and 8½" high standard letter size (8 1/2 "x 11" and shall use eye-catching colors to attract attention. They shall be placed on the front entry door and at least one garage door of each residence. If unable to enter a property, the door hanger shall be affixed securely and prominently to the driveway gate.

F. The proposed door hanger shall be presented to the CITY for approval before the Notice to Proceed will be issued.

G. The CONTRACTOR and the CITY shall collaboratively maintain a list of residences with particular sensitivities, such as bedridden patients and house-confined invalids, day-sleepers, persons with respiratory problems, households with vulnerable pets, and any other situations that require special treatment, and it shall be updated daily as residents notify the CITY or the CONTRACTOR of their special needs. Before conducting a smoke test on a residence on this list, CONTRACTOR shall take whatever additional precautions are necessary to accommodate the inhabitants.

PART 2 -- EQUIPMENT

2.1 BLOWERS

A. The CONTRACTOR shall provide a portable blower designed and built specifically for the use of smoke testing. The blower shall be self-contained and capable of producing a minimum of 4,500 cubic feet of air per minute. Blowers with less cfm may be approved by the CITY provided it is demonstrated that sufficient pressure is generated for the testing. If inadequate pressure is being generated, then additional blowers (dual blowers) or larger blowers may be required. Adequate pressure is being provided when smoke is exiting the vent stacks as a plume or, where no vent stacks are present, smoke is exiting the upstream/downstream manhole casting/vent hole/pick hole, etc. In general, the larger the pipeline diameter being tested, the higher the smoke blower capacity (cfm) required.

B. The base of the blower shall have appropriate adapters and seals to make a good connection to the manhole without excessive loss of smoke.

2.2 SMOKE PRODUCTION

A. Smoke fluid, smoke candles, or approved equal, shall produce continuous smoke that can be controlled by the testing crew for the duration of the test. The smoke generated shall be white to gray in color, leave no residue, and shall be non-toxic, non-staining and non-explosive.

B. Sufficient smoke volume shall be generated to completely fill the sewer main, and laterals being investigated and to clearly identify any points of release in addition to roof vents.

2.3 OTHER EQUIPMENT

A. In addition to the blower, the CONTRACTOR shall provide all other equipment, tools, and incidentals required to perform smoke testing as required by these specifications including, but not limited to, sewer line stoppers, sandbags, cameras, confined space entry equipment, and traffic control equipment.

PART 3 -- EXECUTION

3.1 WORK PROGRESS

A. The work shall generally progress as follows:

1. The CONTRACTOR shall apply for and obtain work permits for all work to be performed in State and/or County Highways if applicable. All required insurances, traffic control measures, and other terms of the permit shall be provided to the satisfaction of the City.

2. The CITY will provide the CONTRACTOR with the procedure that should be followed regarding notification of fire department, police department, emergency personnel, etc.

3. The CONTRACTOR shall have the CITY review required submittals including, but not limited to, the field inspection forms and database deliverable. Work shall not proceed until CITY accepts all submittals.

4. A WORK SCHEDULE shall be submitted to the CITY for review and approval. No field testing or notification may proceed until the schedule has been approved by the CITY. After approval of the WORK SCHEDULE, the CONTRACTOR shall not make any revisions or modifications to it without the CITY's written approval.

5. Daily Notifications

   a. The CONTRACTOR shall notify, by hand delivery of approved door hangers to each address, all residences and businesses in the study area. All notification door hangers shall be approved by the CITY before printing and distribution. The CONTRACTOR shall place door hangers on all residences and business 2-7 days prior to smoke testing at those specific addresses. Notification shall be an ongoing process throughout the project and shall be limited to the area provided in the look-ahead schedule. Door hangers shall not be placed for areas which will not be tested within 7 days. If smoke testing is delayed for more than 7 days due to rain, etc., the area shall be re-notified. Logs will be maintained to document notification of hospitals, nursing homes, schools, high rise buildings, etc. The logs will include the facility name, notification date, time and individual notified. Notification of sensitive locations such as hospitals, nursing homes, day care, schools and the like must be done again immediately prior to testing.

   b. The CONTRACTOR shall check with all residents who expressed special concerns or special needs/notification prior to testing.

   c. Notification of Emergency Services and dispatch centers will be completed each morning prior to testing that day. CITY will provide the required contact information for notifications by the CONTRACTOR.

6. Testing crews shall inspect all connected lines and surface areas along the mainline section being tested. In addition to examining the landscaping between the lateral tie-in and the

structure it serves, the features to be inspected include but are not limited to abandoned and supposedly disconnected sewer laterals, cleanouts, manholes, driveway drains, patio and area drains, foundation drains, retaining wall drains, barbecue and exterior wet bar sinks, roof gutters, at-grade rain-leader connections, downspouts piped underground, street gutters, and storm drain inlets.

7. It shall be the CONTRACTOR's responsibility to keep adequate records of all notifications and to produce them upon CITY's request. Failure to comply with this requirement may be cause to suspend the CONTRACTOR's operations until compliance is achieved.

8. Perform the smoke testing. It is recommended that smoke testing be conducted during hours of relatively low flows.

9. Prepare and provide the smoke testing data documents.

3.2 WORK SCHEDULE

A. Upon award of the Contract, and prior to commencing any work, the CONTRACTOR shall provide a complete WORK SCHEDULE to the CITY for review and approval. The Work Schedule shall be typed and indicate the planned progress for the proposed work.

B. The WORK SCHEDULE shall consist of a study area map showing the anticipated area(s) to be tested each day, week or month (depending on project size and duration).

C. Acceptable Periods of Work:

1. Work hours must be approved by the CITY. However, the CONTRACTOR shall not typically commence testing before 8:00 a.m. local time and shall terminate testing no later than 5:00 p.m. each day. If the CONTRACTOR wishes to test before 8:00 a.m. or after 5:00 p.m. local time in commercial areas or high traffic areas, such testing shall be shown on the submitted WORK SCHEDULE and is subject to the CITY's approval.

2. Smoke testing shall not be performed on weekends or on holidays without the prior approval of the CITY.

D. CONTRACTOR shall not perform smoke testing on days that, in the opinion of the CITY, will hinder the results of the test. (For example, when heavy rains, or excessively saturated soil conditions would interfere with the effectiveness of the testing). CONTRACTOR may provide soil moisture or segment re-testing data as evidence that soil conditions are favorable for smoke testing.

3.3 PERFORMING THE TESTS

A. PROCEDURES:

1. Safety

a. The CONTRACTOR and his personnel shall be aware of and follow all Federal, State, and Local safety laws and regulations.

b. No entry into any part of the collection system shall be permitted until the CONTRACTOR has demonstrated that on-site personnel has been trained in applicable confined space safety procedures and has the equipment on-site to allow those procedures to be followed.

c. The CONTRACTOR shall minimize the physical entry of personnel into the sanitary sewer facilities. If required, manhole entry shall be in accordance with Federal, State, and local regulations for confined space entry and other regulations that may apply. The CONTRACTOR shall provide all safety equipment required for manhole entry operations, including harnesses, ventilation equipment, etc.

d. Traffic Control. The area of work shall, at all times, be protected by means of an adequate number of cones, barricades, flags, or by other means necessary to properly and safely protect both vehicular and pedestrian traffic.

e. Any condition deemed to be unsafe by the CONTRACTOR shall be reported to the CITY. It is further understood that the CONTRACTOR shall not be required to work where, in the opinion of the CONTRACTOR, conditions would not be safe for the public, company personnel, equipment and/or other.

2 Confirm that adequate conditions (soil moisture, existence of catchment hoods, proper notifications, residents requiring assistance or notification, any preliminary procedures that may be necessary prior to conducting test, etc.) exist which will allow for desired results.

3 Unless otherwise approved by the CITY, the sections of sewer subject to testing shall typically.

a. Consist of a central manhole, where the blower will be positioned, and an upstream and downstream manhole and the sewer pipe between them. With three (3) manholes and two pipe sections, lengths should not exceed 1000 feet. The blower capacity and/or number of blowers necessary will be determined by the adequacy of pressure as observed at the vent stack or downstream/upstream manholes. (Refer to Section 2.1).

b. Upon approval of the CITY, longer sections may be tested provided good pressure, as evidenced by smoke plume, is observed at the vent stacks.

4. The walk through for locating defects will not begin until smoke is highly visible with a smoke plume emanating from the plumbing vents of houses at the end of the setup

location (maximum 500 ft. radius) from the smoke testing machine. A locate flag will be placed at the location of the defect. Walkers shall traverse not only on the sidewalk but between all homes and in back yards looking for illegal connections including patio, pool drains, roof drain connections and buildings where vent stacks do not exhibit smoke.

5. Defects must be located and documented as approved by the CITY. Typical methods to locate and re-locate defects in order of accuracy include:

   a. Triangulate the defect with respect to the distance from two fixed objects (house corners, power poles, fire hydrant, etc.) and record on a location sketch

   b. Sub-meter GPS coordinates

   c. The distance from the upstream manhole to a point perpendicular to the defect is measured and the distance left/right to the defect is then measured.

6. Flow Control - It is the intent of this specification that the smoke testing be accomplished without the need for bypass pumping. The CONTRACTOR shall provide temporary plugs, sandbags, or flow barriers as required to contain an adequate volume of smoke within the section of sewer being tested. The CONTRACTOR shall monitor the resulting surcharged sewer at the manhole upstream of the tested section of sewer and prevent overflow conditions from occurring by removing the flow barriers or removing sewage by vacuum trucks.

7. All smoke testing information shall conform to the most recent version of the NASSCO (National Association of Sewer Service Companies) smoke testing codes and database structure.

8. Data will be accurately and neatly recorded on field worksheets as provided by the CITY.

9. For each sewer main tested, the CONTRACTOR shall prepare a field log identifying each point of smoke exfiltration from:

   a. Roof gutters
   b. Sewer cleanouts
   c. Leakage in house laterals
   d. Patio or area drains
   e. Storm drains cross connections
   f. Manholes
   g. Sewer vents (lack of smoke)
   h. Any other source not stated above

10. For each smoke defect, provide:

    a. A unique reference ID, address that will correlate among the Field Log, the Site Sketch, the photograph and the digital database.
    b. Dimensioned to permanent benchmarks
    c. The manhole segment being tested, identified by the CITY's convention of "upstream manhole", downstream manhole" (i.e. SSMH6K3_SSMH6K4)

d. The geographic location of the release.
e. The type of release, based on a limited set of types
f. The severity of the release, based on a range of three levels.

g. A brief description of the release, particularly indicating if it is evidently a prohibited connection.
h. The approximate length and size of each lateral, determined by the cleanouts found.

11. A photograph of all leaks using a digital camera shall be included in the filed log. Photographs of smoke evidence shall have a location indicated in the photograph using a defect flag where possible. All photographs shall be clearly cross-referenced to the typed and/or computer-generated log indicating the location of the dark. Once the defect has been flagged the Smoke Testing CONTRACTOR will snap a digital picture (delivered in minimum 640 x 480 resolution) showing the smoke exiting from the defect, flag and physical features at or near the defect. Photographs should include a sufficient field of view so that drainage patterns can be discerned.

12. The CITY may authorize QA/QC testing of specific line segments previously tested to determine the quality of testing performed and/or establish if soil conditions are sufficiently dry to continue smoke testing into new areas. Any re-testing will follow the same procedures.

13. The CONTRACTOR shall deliver project data in the NASSCO (National Association of Sewer Service Companies) format approved by the CITY. Deliverables will include:

    a. Maps of study area with corrections noted.
    b. Summary of work quantities completed.
    c. Summary of defect findings.
    d. Completed field forms and sketches that document the testing and findings using the NASSCO smoke testing codes.
    e. NASSCO database. All data codes and definitions shall conform to the NASSCO smoke testing requirements.

14. Digital Database – The CONTRACTOR's digital database shall provide separate records for each sewer main segment and for each property. For presentation to the CITY, placement of the data shall be in Microsoft Excel spreadsheet format. Field notes, photographs and videos shall be entered into the CONTRACTOR's digital database daily and shall be available for the CITY to review within 24 hours of any request. The updated database shall be conveyed to the CITY for review with each Application for Payment. The digital database and filed files shall be conveyed to the CITY on a portable external hard drive, formatted to be readable on computer with Microsoft Windows operating systems.

15. Final Report – CONTRACTOR shall submit a Draft Report to the CITY for review upon completion of the project. The report shall include samples of marked-up Plot plans, photographs, narrative notes from testing and samples of paper reports generated during video inspections which will be referred to the digital database. Upon receiving the CITY's

review and comments, the CONTRACTOR shall edit or revise the data delivery and/or electronic report as necessary and resubmit a copy of the final report (one hard copy and the electronic database) to the CITY.

- END OF SECTION

Appendix 1
Shop Drawing Submittals and Approved Utility Product List

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CITY OF SUNRISE
Community Development - Engineering Division
1601 NW 136 Ave., Bldg. A Sunrise, FL 33323 P: 954.746.3270 F: 954.746.3287

SHOP DRAWING SUBMITTALS & APPROVED UTILITY PRODUCT LIST

The Underground Utility Contractor shall submit the following items separately for approval by the City prior to the scheduling of the Preconstruction Meeting. The submittal package(s) shall be submitted to the attention of the Plans Processing Technician, Kathy Crisci.

1. **Five** (5) sets of the following attached "City of Sunrise Approved Product List" pages 1 through 14 to be submitted for the materials on each project. ***The First page shall bear the signature of the Underground Contractor and Engineer of Record. The subsequent pages shall bear the initials of the Underground Contractor and Engineer of Record on bottom right corner of every page. One (1) set must bear the original signature and initials; the remaining four (4) sets can be copies. Only one single brand name will be circled in every block of items that will be installed on the project. Do not circle multiple brand names under any single item. Circle "Not Applicable" if that block item is not going to be used. If only water distribution materials are going to be used submit Pages 1 through 8. If only sanitary sewer materials are going to be used submit Page 1 and Pages 9 through 14. If only a water service is going to be installed submit Page 1 and Pages 7 and 8.*** For all items not listed on the "City of Sunrise Approved Products List", the Contractor shall submit **five** (5) sets of standard shop drawings or manufacturer's catalogs with the model number or type of the item circled or otherwise designated. The City shall have the right to reject any product not listed within the "City of Sunrise Approved Product List". *The submittals shall bear the signed approval of the Underground Utility Contractor and the Engineer of Record. One (1) set must have an original signature.*

2. **Five** (5) complete sets of detailed sanitary sewer shop drawings for all sanitary manholes shall be ***submitted bearing the stamped approval and initials/signature of the Underground Utility Contractor and the Engineer of Record on every sheet. One (1) set must have an original - original stamp and initials/signatures.***

3. **Five** (5) complete detailed wet well shop drawings and a complete set of the lift station pump sizes and electrical shop drawings are also required as applicable and shall be ***submitted bearing the stamped approval and initials/signature of the Underground Utility Contractor and the Engineer of Record on every sheet. One (1) set must have an original - original stamp and initials/signatures.***

4. **Five** (5) complete sets of detailed drainage shop drawings for all drainage pipe, pollution baffles, filter fabric, catch basins, storm manholes, control structures and headwalls, including castings shall be ***submitted bearing the stamped approval and initials/signature of the Underground Utility Contractor and the Engineer of Record on every sheet. One (1) set must have an original - original stamp and initials/signatures.***

Each of the above listed items shall be submitted separately for approval and must be accompanied by a letter of transmittal indicating the contents of the package, project name, project location, contact person and contact information (email, phone, address, company, etc.). The separate packages can be included on one transmittal.

No water, sewer, or drainage construction permits will be issued by the City of Sunrise until the shop drawings and product list for all items have been approved by the Community Development Department, Engineering Division and a Preconstruction Meeting has been held.

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CITY OF SUNRISE
Community Development - Engineering Division
1601 NW 136 Ave., Bldg. A Sunrise, FL 33323 P: 954.746.3270 F: 954.746.3287

APPROVED PRODUCTS LIST
FOR
WATER DISTRIBUTION/SANITARY SEWER UTILITY CONSTRUCTION

Effective November 2011

ALL ITEMS TO BE MANUFACTURED IN THE UNITED STATES

Project Name: _____

Concurrence of Underground Utility Contractor:

_____
Signature Date

_____
Print Name

_____
Company

Concurrence of the Engineer:

_____
Signature Date

_____
Print Name

_____
Firm

By signature above, the Underground Utility Contractor for referenced project agrees to adhere to the following product specifications. It is understood that the Engineering Division of the Community Development Department will reject construction not in accordance with this document.

Basis: The following products and specifications have been found to be acceptable and/or desirable in their respective groups. Shop drawings need not be submitted for approval if the contractor uses products on this list. Any substitutions or changes for these products must be submitted to the City of Sunrise, Community Development Department, Engineering Division for approval prior to their use. For all items not listed on the "City of Sunrise Approved Products List", the Contractor shall submit **five** (5) sets of standard shop drawings or manufacturer's catalogs with the model number or type of the item circled or otherwise designated. The City shall have the right to reject any product not listed within the "City of Sunrise Approved Product List". *One (1) set of the submittals shall bear the original signed approval of the Underground Utility Contractor and the Engineer of Record, the remaining four (4) sets can be a copy.*

WATER DISTRIBUTIONSECTION

WATER DISTRIBUTION PVC PIPE

Brand Name	Model Type	Specifications and Requirements
J-M Pipe	Push-On Pipe	PVC shall conform to ANSI/AWWA C900-07: • Class 305 DR14 for 4″ and 6″ • Class 235 DR18 for 8″ through 12″ • PVC 14″ and up shall conform to ANSI/AWWA C905 DR25 Pipe shall be blue in color
Diamond		
North American (NAPCO)		
National Pipe & Plastics		
Not Applicable		

WATER DISTRIBUTION DUCTILEPIPE

Brand Name	Model Type	Specifications and Requirements
American Cast Iron Co.	Push-on Pipe	Conforms to ANSI/AWWA C.150/A21.50 and C151/A21.51 with Interior Cement lining and seal coating ANSI/AWWA C104/A21.4 and Exterior Asphaltic Coating • Class 52 or better for 4″ and 6″ • Pressure class 350 for 8″ through 24″ • Pressure class 250 for 30″ through 64″ • Class 50 or higher for 8″ and up Pipe shall be color coded per FAC62-555.320
U.S. Pipe		
McWane/Clow		
Griffin Pipe		
Not Applicable		

WATER DISTRIBUTION LOCATION WIRE AND TAPE

Brand Name	Model Type	Specifications and Requirements
Any Manufacturer	Blue coated wire	Wire shall be 14 gauge multiple stranded
	Location tape	2″ wide for water main installation
Not Applicable		

WATER DISTRIBUTION PIPEFITTINGS

Brand Name	Model Type	Specifications and Requirements
American Cast Iron Pipe	Full Body	Mechanical joint full body ductile per ANSI/AWWA C110/A21.10, cement lined and seal coated per ANSI/AWWA C104/A21.4
Tyler/Union/McWane		
Star Pipe Products		
U.S. Pipe		
Not Applicable		

WATER DISTRIBUTION PIPE RESTRAINTS – Fittings & Valves

Brand Name	Model Type	Specifications and Requirements
Ebba Iron	DIP – Megalug – 1100 Series	For DIP @ MJ connections – Fittings and Valves
	PVC – Megalug 2000 PV Series	For PVC @ MJ connections – Fittings and Valves
Sigma	DIP – One-Lok D-SLDE (Domestic)	For DIP @ MJ connections – Fittings and Valves
	PVC – One-Lok D-SLCE (Domestic)	For PVC @ MJ connections – Fittings and Valves
Star Pipe Products	DIP-Stargrip series 3000 (Domestic)	For DIP @ MJ connections – Fittings and Valves
	PVC-Stargrip series 4000 (Domestic)	For PVC @ MJ connections – Fittings and Valves
Tyler Union	DIP – TufGrip – 1000 Series (Domestic)	For DIP @ MJ connections – Fittings and Valves
	PVC- TufGrip – 2000 Series (Domestic)	For PVC @ MJ connections – Fittings and Valves
Not Applicable		

WATER DISTRIBUTION PIPE RESTRAINTS – Bell & 2nd MJ Restraint

Brand Name	Model Type	Specifications and Requirements
Ebba Iron	Series 1500TD	For bell and second MJ restraint
Star Pipe Products	1100 Series (Domestic	
Ford/Uniflange	Series 1390-CU	
Not Applicable		

WATER DISTRIBUTION PIPE RESTRAINTS – Restraining Gaskets

Brand Name	Model Type	Specifications and Requirements
U.S. Pipe/McWane	Field LOC gasket	To be used for ductile pipe through a casing only
American Cast Iron Pipe	Fast grip gasket	
Griffin Pipe Products	Talon RJ gasket	
Not Applicable		

WATER DISTRIBUTION TAPPING SLEEVES – Mechanical Joint

Brand Name	Model Type	Specifications and Requirements
American Flow Control	2800 series	Mechanical joint tapping sleeve for the tapping of Cast Iron, Ductile and C-900 PVC pipe
Mueller	H615	
Tyler/Union/McWane	MJ Cast Iron 5-149-CI	
Not Applicable		

WATER DISTRIBUTION TAPPING SLEEVES – Stainless Steel

Brand Name	Model Type	Specifications and Requirements
Mueller	H-304SS	Full Stainless Steel with wrap around gasket for the tapping of Asbestos Cement and Class 160-200 SDR 26-21 PVC (SCH 40 OD) pipe
JCM Industries	JCM 432	
Smith-Blair	664-665	
Ford Meter Box Co.	FTSS Series	
Not Applicable		

WATER DISTRIBUTION TAPPING SLEEVES – Epoxy Coated

Brand Name	Model Type	Specifications and Requirements
JCM Industries	JCM 412	Epoxy coated with stainless steel bolts to be pre-approved by City Engineering Inspector for use
Smith-Blair	622	
Not Applicable		

WATER DISTRIBUTION TAPPINGVALVES

Brand Name	Model Type	Specifications and Requirements
American Flow Control	2500 series	Conforms to ANSI/AWWA C509 or C515 Flange by mechanical joint with centering ring and stainless-steel flange accessories – resilient wedge
Clow/McWane	F-6114	
Mueller	T2360	
Not Applicable		

WATER DISTRIBUTION BUTTERFLY VALVES

Brand Name	Model Type	Specifications and Requirements
Mueller	Lineseal III	Conforms to ANSI/ASTM C504
Pratt	Groundhog	
Dezurik	BAW	
Clow/M&H Valve/McWane	4500 Series	
Not Applicable		

WATER DISTRIBUTION GATE VALVES

Brand Name	Model Type	Specifications and Requirements
American Flow Products	2500 series	Mechanical joint; conforms to ANSI/AWWA C509 or C515 Resilient seat or resilient wedge non-rising stem
Mueller	A-2360	
M&H/McWane	Style 4067	
Kennedy Valve/McWane	Ken-seal-FW	
Clow/McWane	F-6100 resilient wedge	
Not Applicable		

WATER DISTRIBUTION AIR RELEASEVALVES

Brand Name	Model Type	Specifications and Requirements
Val-matic	45	Stainless steel trim AWWA C-512 Meeting application and type of main
Crispin	PL-20A	
DeZurik/Apco	200-A	
Empire/Golden-Anderson	920	
Not Applicable		

WATER DISTRIBUTION VALVE BOX ANDCOVER

Brand Name	Model Type	Specifications and Requirements
Tyler/Union/McWane	6850 Series 461-S Type	Screw Type with Cast iron cover marked "WATER"
Bingham Taylor	4905 Series	
Not Applicable		

WATER DISTRIBUTION CAST IRON BLOW OFF BOX

Brand Name	Model Type	Specifications and Requirements
U.S. Foundry	USF #7630	Raised "W" on lid
Not Applicable		

FIRE HYDRANTS

Brand Name	Model Type	Specifications and Requirements
Mueller	Centurion #A-423	Breakaway traffic type with 5-1/4" minimum main valve opening. Factory yellow. Bury to suit. No drain vents or plugs. No extensions will be allowed.
American Flow Control	B84B 5-1/4"	
Clow/McWane	Medallion F-2545	
Kennedy Valve/McWane	Guardian K-81-A	
American Flow Control	B84B 6"	If required by project specifications
Not Applicable		

WATER DISTRIBUTION BRASS IDTAGS

Brand Name	Model Type	Specifications and Requirements
Wager Company	Bronze ID Disk	Permanent tags required at the valve box and fittings
Not Applicable		

WATER DISTRIBUTION CASING SPACERS AND END SEALS

Brand Name	Model Type	Specifications and Requirements
Cascade	Style CCS Style CCES	Casing spacers to be stainless steel for pipe to be positioned in center of casing. End seals to be neoprene with stainless steel bands.
PSI	Spacer S12G-2 End Seal Model "S"	
Not Applicable		

SERVICE SADDLE

Brand Name	Model Type	Specifications and Requirements
Ford Meter Box Co.	202B	Bronze saddle with brass bales Iron pipe thread
Mueller	BR2B Series	
AY McDonald	#3826	
Not Applicable		

CORPORATION STOPS

Brand Name	Model Type	Specifications and Requirements
Ford Meter Box Co.	FB1100-I.P.	Brass ball valve type - conforms to ANSI/AWWA C800 Iron pipe threads by PJ/110 Compression
Mueller	B25028-I.P.	
AY McDonald	4704B-22-I.P.	
Not Applicable		

WATER SERVICE LINE POLYETHYLENE TUBING

Brand Name	Model Type	Specifications and Requirements
Performance Pipe/Chevron Phillips	Driscoplex 5100 Black with blue stripes and blue writing	P.E. 3408/4710-DR-9 AWWA C-901 ASTM D2737
Endot	Endopure- Blue with white or black writing	
Vanguard	Bruiser HDPE –Blue with white or black	
Charter Plastics	Blue Ice-Blue with white or black writing	
Not Applicable		

WATER SERVICE CASING PIPE

Brand Name	Model Type	Specifications and Requirements
Charlotte	Schedule 40 PVC Pipe	ASTM D1785/D2665
National Pipe and Plastics		
North American Pipe		
J-M Pipe		
Not Applicable		

CURB STOPS

Brand Name	Model Type	Specifications and Requirements
AY McDonald	4602B-22 IP	Lock wing angle ball valve type Brass - conforms to ANSI/AWWA C800
Mueller	300 Series	
Ford Meter Box Co.	BA-43 Series BFA-43 Series	
Not Applicable		

BRANCH VALVE ASSEMBLIES

Brand Name	Model Type	Specifications and Requirements
Mueller	H-15363	1 ½" compression X M.I.P. with lock wing angle ball curb stops
AY McDonald	O9U2EW	
Ford Meter Box Co.	UVB43-62W	
Not Applicable		

SERVICE FITTINGS, COUPLINGS, CLAMPS & HARDWARE

Brand Name	Model Type	Specifications and Requirements
Mueller	110 Conductive	Compression couplings for Polyethylene tubing. Not allowed to be used to extend tubing lengths.
Ford Meter Co.	C14; C84; C44	
AY McDonald	4753-22,4754-22 and 4758-22	
Not Applicable		

WATER METERS LARGER THAN 2-INCH (Meter size and type will be noted on plans)

Brand Name	Model Type	Specifications and Requirements
Neptune	HP Turbine	Turbine meters over 2" in size
Sensus	OMNI C-2	Compound meters over 2" in size
Not Applicable		

Note: City to supply meters and meter boxes for meters 2-inch in size and smaller.

SANITARY SEWER SECTION

GRAVITY SANITARY SEWER PVC PIPE (Circle appropriate brand & specifications)

Brand Name	Model Type	Specifications and Requirements
J-M Pipe North American (NAPCO) National Pipe & Plastics Diamond	Push-on Pipe	PVC Pipe shall conform to: • ASTM D3034 SDR 26 for 4" through 15" • ASTM F679 PS115 for 18" through 48" Heavy Wall Pipe Pipe shall be green in color
J-M Pipe North American (NAPCO) National Pipe & Plastics Diamond	Push-on Pipe	PVC Pipe shall conform to: • ANSI/AWWA C900-07: Class 235 DR18 for 4" through 12" • PVC 14" and up shall conform to ANSI/AWWA C905 DR25 Pipe shall be green in color
Not Applicable		

SANITARY SEWER FORCE MAIN PVC PIPE

Brand Name	Model Type	Specifications and Requirements
J-M Pipe North American (NAPCO) National Pipe & Plastics Diamond	Push-on Pipe	PVC shall conform to ANSI/AWWA C900-07: • Class 305 DR14 for 4" through 12" Pipe shall be green in color
Not Applicable		

GRAVITY SANITARY SEWER AND FORCE MAIN DUCTILE PIPE

Brand Name	Model Type	Specifications and Requirements
American Cast Iron Pipe McWane/Clow U.S. Pipe Griffin Pipe	Push-on Pipe	Conforms to ASTM A716/A746 Ceramic Epoxy Lined – Protecto 401 (40 mils); asphalt coated on the outside • Pressure Class 350 for 4" through 24" **OR** • Class 50 or higher for 4" through 24" Pipe shall be green stripped
Not Applicable		

GRAVITY SANITARY SEWER PVC PIPE FITTINGS (Circle appropriate brand & specs)

Brand Name	Model Type	Specifications and Requirements
Multi Fittings Plastic Trends Harco	Push - on	PVC Pipe shall conform to: • ASTM D3034 SDR 26 for 4" through 15" • ASTM F679 PS115 for 18" through 48" Heavy Wall
Multi Fittings Plastic Trends Harco	Push - on	PVC Pipe shall conform to: • C900 DR18 for 4" through 12" • C905 DR25 for 14" and up Non-pressure (gravity sewer only)
Not Applicable		

SANITARY SEWER DUCTILE PIPEFITTINGS

Brand Name	Model Type	Specifications and Requirements
U.S. Pipe American Cast Iron Pipe Star Pipe Products Tyler/Union Foundry/McWane	Full body	Mechanical joint full body ductile per ANSI/AWWA C110/A21.10, Conforms to ASTM A716/A746 Ceramic Epoxy Lined – Protecto 401 (40 mils); asphalt coated on the outside
Not Applicable		

SANITARY SEWER FORCE MAIN PIPE RESTRAINTS – Fittings & Valves

Brand Name	Model Type	Specifications and Requirements
Ebba Iron	DIP – Megalug – 1100 Series	For DIP @ MJ connections – Fittings and Valves
	PVC – Megalug 2000 PV Series	For PVC @ MJ connections – Fittings and Valves
Sigma	DIP – One-Lok D-SLDE (Domestic)	For DIP @ MJ connections – Fittings and Valves
	PVC – One-Lok D-SLCE (Domestic)	For PVC @ MJ connections – Fittings and Valves
Star Pipe Products	DIP-Stargrip series 3000 (Domestic)	For DIP @ MJ connections – Fittings and Valves
	PVC-Stargrip series 4000 (Domestic)	For PVC @ MJ connections – Fittings and Valves
Tyler Union	DIP – TufGrip – 1000 Series (Domestic)	For DIP @ MJ connections – Fittings and Valves
	PVC- TufGrip – 2000 Series (Domestic)	For PVC @ MJ connections – Fittings and Valves
Not Applicable		

SANITARY SEWER FORCE MAIN PIPE RESTRAINTS – Bell & 2nd MJ Restraint

Brand Name	Model Type	Specifications and Requirements
Ebba Iron	Series 1500TD	For bell and second MJ restraint
Star Pipe Products	1100 Series (Domestic)	
Ford/Uniflange	Series 1390-CU	
Not Applicable		

SANITARY SEWER FORCE MAIN PIPE RESTRAINTS – Restraining Gaskets

Brand Name	Model Type	Specifications and Requirements
U.S. Pipe/McWane	Field LOC gasket	To be used for ductile pipe through a casing only
American Cast Iron Pipe	Fast grip gasket	
Griffin Pipe Products	Talon RJ gasket	
Not Applicable		

SANITARY SEWER FORCE MAIN TAPPING SLEEVES – Mechanical Joint

Brand Name	Model Type	Specifications and Requirements
American Flow Control	2800 series	Mechanical joint tapping sleeve for the tapping of Cast Iron, Ductile and C-900 PVC pipe
Mueller	H615	
Tyler/Union/McWane	MJ Cast Iron 5-149-CI	
Not Applicable		

SANITARY SEWER FORCE MAIN TAPPING SLEEVES – Stainless Steel

Brand Name	Model Type	Specifications and Requirements
Mueller	H-304SS	Full Stainless Steel with wrap around gasket for the tapping of Asbestos Cement and Class 160-200 SDR 26-21 PVC (SCH 40 OD) pipe
JCM Industries	JCM 432	
Smith-Blair	665	
Not Applicable		

SANITARY SEWER FORCE MAIN TAPPING SLEEVES – Epoxy Coated

Brand Name	Model Type	Specifications and Requirements
JCM Industries	JCM 412	Epoxy coated with stainless steel bolts to be pre-approved by City Engineering Inspector for use
Smith-Blair	622	
Not Applicable		

SANITARY SEWER FORCE MAIN TAPPING VALVES

Brand Name	Model Type	Specifications and Requirements
American Flow Control	2500 series	Conforms to ANSI/AWWA C509 or C515 Flange by mechanical joint with centering ring and Stainless-Steel flange accessories – resilient wedge
Clow/McWane	F-6114	
Mueller	T2360	
Not Applicable		

SANITARY SEWER FORCE MAIN GATE VALVES

Brand Name	Model Type	Specifications and Requirements
American Flow Products	2500 series	Mechanical joint; conforms to ANSI/AWWA C509 or C515 Resilient seat or resilient wedge non-rising stem
Mueller	A-2360	
M&H/McWane	Style 4067	
Kennedy Valve/McWane	Ken-seal-FW	
Clow/McWane	F-6100 resilient wedge	
Not Applicable		

SANITARY SEWER FORCE MAIN AIR RELEASE VALVES

Brand Name	Model Type	Specifications and Requirements
Val-matic	48	Stainless steel trim AWWA C-512 Meeting application and type of main
Crispin	SL-20(sewer)	
DeZurik/Apco	400	
Empire/Golden-Anderson	925	
Not Applicable		

SANITARY FORCE MAIN VALVE BOX AND COVER

Brand Name	Model Type	Specifications and Requirements
Tyler/Union/McWane	6850 Series 461-S Type	Screw Type with Cast iron cover marked "SEWER"
Bingham Taylor	4905 Series	
Not Applicable		

SANITARY SEWER FORCE MAIN BRASS ID TAGS

Brand Name	Model Type	Specifications and Requirements
Wager Company	Bronze ID Disk	Permanent tags required at the valve box and fittings
Not Applicable		

SANITARY SEWER PVC MANHOLE ADAPTORS

Brand Name	Model Type	Specifications and Requirements
Harco	PVC Sewer Adapter	Grouted repair coupling for connecting to existing manholes only
Not Applicable		

SANITARY SEWER CAST IN PLACE FLEXIBLE MANHOLE BOOTS

Brand Name	Model Type	Specifications and Requirements
Chardon Rubber Co./Wabtec Rubber Products	Lock Joint flexible Manhole Sleeve CP-Series	Manhole boot supplied by precast company with stainless steel bands
A-LOK Products	Z-LOK F208-8	
Not Applicable		

SANITARY SEWER MANHOLE RING ANDCOVER

Brand Name	Model Type	Specifications and Requirements
U.S. Foundry	420-SU	Raised letters "SANITARY SEWER" & "CITY OF SUNRISE"
U.S. Foundry	420-C	Raised letters "SANITARY SEWER" Only for Manholes not Maintained by the City of Sunrise (Private)
Not Applicable		

SANITARY SEWER CLEAN OUT BOX INASPHALT

Brand Name	Model Type	Specifications and Requirements
U.S. Foundry	7635	Raised "S" on lid
Not Applicable		

SANITARY SEWER FORCE MAIN CASING SPACERS AND END SEALS

Brand Name	Model Type	Specifications and Requirements
Cascade	Style CCS Style CCES	Casing spacers to be stainless steel for pipe to be positioned in center of casing. End seals to be neoprene with stainless steel bands.
PSI	Spacer S12G-2 End Seal Model "S"	
Not Applicable		

SANITARY SEWER PRECAST INTERIOR MANHOLE & LIFT STATION COATING

Brand Name	Model Type	Specifications and Requirements
Madewell Products Corp.	Mainstay Composite Liner	ML-72(Half inch application) DS-5 (100 mil application)
Not Applicable		

SANITARY SEWER FORCE MAIN LOCATION WIRE AND TAPE

Brand Name	Model Type	Specifications and Requirements
Any Manufacturer	Green coated wire	Wire shall be 14 gauge multiple stranded
	Location tape	2" wide for force main installation
Not Applicable		

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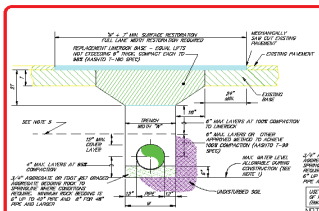
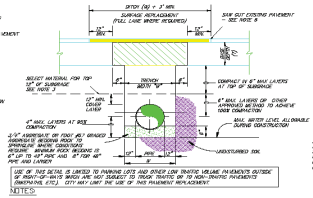
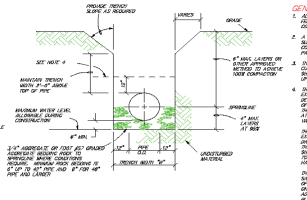
Appendix 2
General Water and Sanitary Sewer Details and Notes







TRENCH CONSTRUCTION NOTES

1. WHERE SOIL CONDITIONS CANNOT BE MAINTAINED AS SHOWN ABOVE, THE CONTRACTOR SHALL PROVIDE HIS ALTERNATE PLAN FOR TRENCH CONSTRUCTION TO THE ENGINEER OF RECORD AND THE CITY FOR APPROVAL.
2. SHEETING REQUIREMENTS WILL BE DETERMINED IN THE FIELD. SEE PROJECT SPECIFICATIONS.
3. COMPACTION PERCENTAGES REFER TO AASHTO T-99 STANDARD PROCTOR.
4. MECHANICAL COMPACTION NOT ALLOWED BELOW 12" ABOVE THE PIPE.
5. PVC AND HDPE PIPE TO HAVE ROCK BACKFILL TO PIPE SPRINGLINE AND SAND OR AGGREGATE BEDDING AND/OR ENVELOPE AS REQUIRED IN AREAS WHERE TRENCH BACKFILL IS NOT SUITABLE DUE TO ROCK, OVERLONG TO BE MIN. 12 INCHES AROUND THE PIPE.
6. MAINTAIN TRENCH WALL PER OSHA REQUIREMENTS AND STATE OF FLORIDA TRENCH SAFETY ACT.

TRENCH CONSTRUCTION DETAIL
SCALE: NONE

GENERAL NOTES FOR WATER AND SEWER

1. ALL APPLICABLE PERMITS MUST BE OBTAINED AND ALL APPLICABLE FEES AND CHARGES MUST BE PAID PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. A PRE-CONSTRUCTION MEETING SHALL BE HELD WITH THE CITY OF SUNRISE PLANNING & DEVELOPMENT DEPT., ATTENDED BY THE CONTRACTOR, THE DEPUTY ENGINEER, AND OTHER INTERESTED PARTIES PRIOR TO ISSUANCE OF ANY CONSTRUCTION PERMITS.
3. THE CONTRACTOR SHALL MAINTAIN AT ALL TIMES ON THE SITE A CURRENT SET OF APPROVED CONSTRUCTION PLANS. NO PLANS SHALL BE MADE AVAILABLE TO THE CITY ENGINEER OR HIS DESIGNEE UPON REQUEST.
4. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THE APPROVED PLANS. APPROVAL OF DEVELOPMENT PLANS BY THE CITY IN NO WAY REFLECTS VERIFICATION OF THE ACCURACY OF THOSE PLANS OR FIXTURES DEPICTED THEREON. THE DEVELOPER'S ENGINEER SHALL BRING TO THE ATTENTION OF THE CITY ENGINEER ANY DISCREPANCY IN, OR VARIATION FROM, THE APPROVED PLANS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF EXISTING AND NEWLY INSTALLED UTILITIES AND IMPROVEMENTS FROM DAMAGE, DISRUPTION OF SERVICE, OR DESTRUCTION AT ALL TIMES THROUGHOUT THE DURATION OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING SUCH MEASURES AS NECESSARY TO PROTECT THE PUBLIC FROM ANY HAZARDS OR NUISANCE OF THOSE TERMINUS UTILITIES TO THE WORK SITE.
6. THE CONTRACTOR SHALL TAKE THE NECESSARY PRECAUTIONS TO SAFEGUARD ALL EXISTING STRUCTURES AND UTILITIES. THE LOCATION OF EXISTING UTILITIES SHOWN ON THESE PLANS ARE APPROXIMATE ONLY AND ARE BASED ON SURVEY AND AS-BUILT INFORMATION. ADDITIONAL UTILITIES MAY EXIST WHICH ARE NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND NOTIFYING ALL UTILITIES PRIOR TO BEGINNING CONSTRUCTION. ANY AND ALL CONFLICTS WITH EXISTING UTILITIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER. ALL UTILITY CONSTRUCTION SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED.
7. THE CONTRACTOR SHALL OBTAIN THE CITY OF SUNRISE ENGINEERING DIVISION'S APPROVAL PRIOR TO CUTTING OR CONNECTING TO ANY EXISTING CONSTRUCTION AND/OR CONNECTING TO A CITY FACILITY.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING LOCATIONS OF ALL UTILITIES, AND NOTIFICATIONS OF SUNSHINE ONE CALL 1-800-432-4770 48 HOURS IN ADVANCE OF CONSTRUCTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SCHEDULING OF ALL WORK AND SHALL NOTIFY THE CITY ENGINEER AND INSPECTOR OF THE DEVELOPER'S ENGINEER OF THE CITY ENGINEER, AND AS CALLED FOR IN THE PLANS AND SPECIFICATIONS.
10. CONSTRUCTION SHALL BE CARRIED OUT IN STRICT COMPLIANCE WITH THOSE STANDARDS ADOPTED BY THE CITY OF SUNRISE. IN THOSE CASES WHERE NO SPECIFIC STANDARD HAS BEEN ADOPTED BY THE CITY, THE MOST APPLICABLE STANDARDS AND SPECIFICATIONS OF THE CITY OF SUNRISE ENGINEERING DIVISION WILL EARLY OUT.
11. THE DEVELOPER'S ENGINEER SHALL BRING DIFFERENT INTERESTING CONDITIONS TO THE ATTENTION OF THE CITY ENGINEER AND SHALL NOTIFY THE CITY'S ENGINEERING INSPECTOR AND ALL PERSONNEL, BACTERIOLOGICAL AND INFILTRATION/EXFILTRATION TESTS.
12. SANITARY SEWERS AND FORCE MAINS SHOULD CROSS UNDER WATER MAINS WHENEVER POSSIBLE. SANITARY SEWERS AND FORCE MAINS CROSSING WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE CROWN OF THE LOWER PIPE AND THE INVERT OF THE UPPER PIPE WHENEVER POSSIBLE.

WHERE SANITARY SEWERS OR FORCE MAINS MUST CROSS A WATERMAIN WITH LESS THAN 18 INCHES VERTICAL CLEARANCE, BOTH THE SEWER AND THE WATER MAIN SHALL BE CONSTRUCTED OF PRESSURE RATED PIPE AND THE SEWER SHALL BE LAID TO PROVIDE A SUFFICIENT LENGTH OF 20' MUST BE LAID TO PROVIDE A MINIMUM SEPARATION OF 10 FEET BETWEEN ANY TWO JOINTS. ALL JOINTS ON THE WATER MAIN WITHIN 10 FEET OF THE CROSSING MUST BE MECHANICALLY RESTRAINED. A MINIMUM SERVICE CLEARANCE OF 12 INCHES MUST BE MAINTAINED AT ALL CROSSINGS.

ALL CROSSINGS SHALL BE ARRANGED SO THAT THE SEWER PIPE AND WATER MAIN JOINTS WILL BE EQUIDISTANT FROM THE POINT OF CROSSING (PIPES SUPPORTED ON THE CROSSING).

WHERE A NEW PIPE CONFLICTS WITH AN EXISTING PIPE WITH LESS THAN 18 INCHES VERTICAL CLEARANCE, THE PIPE SHALL BE ARRANGED TO MEET THE CROSSING REQUIREMENTS ABOVE.

13. A MINIMUM OF 10-FOOT HORIZONTAL SEPARATION SHALL BE MAINTAINED BETWEEN SEWER MAINS AND WATER MAINS WHENEVER POSSIBLE. DEVIATIONS MAY BE GIVEN ON AN INDIVIDUAL BASIS UPON APPROVAL.

IN CASES WHERE IT IS NOT POSSIBLE TO MAINTAIN A 10 FOOT HORIZONTAL SEPARATION, THE WATER MAIN MUST BE LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER OR FORCE MAIN AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.

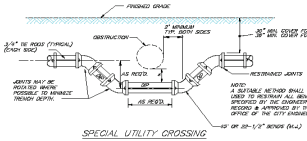
WHERE IT IS NOT POSSIBLE TO MAINTAIN A VERTICAL DISTANCE OF 18 INCHES BETWEEN A WATER MAIN AND A SEWER OR FORCE MAIN CROSSING, BOTH THE WATER MAIN AND THE SEWER OR FORCE MAIN SHALL BE CONSTRUCTED OF CAST IRON WITH A MINIMUM VERTICAL SEPARATION OF 6 INCHES. THE WATER MAIN SHALL BE LOCATED SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER OR FORCE MAIN AS FINE APART AS POSSIBLE. FOR WATER MAINS CROSSING SEWER OR FORCE MAIN (EXTENDED JOINTS)

13. NO DEVIATION FROM APPROVED PLANS SHALL BE PERMITTED WITHOUT THE WRITTEN CONSENT OF THE CITY ENGINEER.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THOSE PLANS WITH ANY PAVING AND DRAINAGE PLANS IN THIS AREA.
15. THE FOLLOWING DOCUMENTS ARE TO BE IN THE FILE AT THE OFFICE OF THE CITY ENGINEER PRIOR TO THE CONNECTION OF THE FIRST METER:

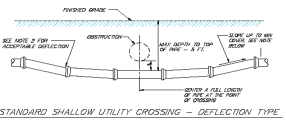
A. FINAL ENGINEERING PLANS APPROVED BY THE CITY OF SUNRISE COMMUNITY DEVELOPMENT DEPARTMENT
B. LETTERS OF ACCEPTANCE FROM
- SUNRISE UTILITIES DEPARTMENT
- BROWARD COUNTY DEP. – WASTEWATER COLLECTION SECTION / FLORIDA DEPT. OF ENVIRONMENTAL PROTECTION (FDEP)

C. COPIES OF BACTERIOLOGICAL REPORTS STAMPED BY THE HEALTH DEPARTMENT
D. CERTIFICATION OF ENGINEER OF RECORD
E. LETTER FROM DEVELOPER STATING ACTUAL COST OF CONSTRUCTION
F. LETTER FROM DEVELOPER STATING THAT NO LIENS HAVE BEEN FILED RELATING TO INSTALLATION OF UTILITIES
G. BILL OF SALE ASSIGNED FOR SYSTEM
H. DEPICT OF EASEMENT OR LETTER STATING THAT EASEMENTS ARE ON THE PLAT
I. LETTER FROM DEVELOPER COMMITTING TO RETENTION OF APPROPRIATE DOCUMENTS WITHIN 90 DAYS
J. ADDRESS PLAN OF PROJECT
K. FIVE (5) SIGNED AND SEALED COPIES OF ASBUILTS CERTIFIED BY A LAND SURVEYOR AND ENGINEER REGISTERED IN THE STATE OF FLORIDA, AND ONE COPY OF AS-BUILTS ON 3.5" DISKETTE IN AUTOCAD (RELEASE 12 OR HIGHER)
L. FINAL INSPECTION VERIFICATION BY CITY OF SUNRISE ENGINEERING INSPECTOR
M. TEMPORARY METER REMOVAL LETTER

16. ALL INSTALLATIONS WITHIN BROWARD COUNTY RIGHT-OF-WAY SHALL BE IN CONFORMITY WITH THE BROWARD COUNTY ENGINEERING DIVISION "MINIMUM STANDARDS"



SPECIAL UTILITY CROSSING



STANDARD SHALLOW UTILITY CROSSING – DEFLECTION TYPE

NOTES:
1. THE DEFLECTION TYPE CROSSING SHALL BE USED WHENEVER POSSIBLE ONLY UNDER SPECIFIC ORDERS BY THE ENGINEER SHALL THE FITTING TYPE CROSSING BE ALLOWED.
2. CONSTRUCT STANDARDS CROSSING USING 78# OR MANUFACTURER'S MAXIMUM JOINT DEFLECTION (WHL).
3. CHAT TIE RODS WITH 2 BITUMINOUS COATING (2 COATS MIN.) AFTER INSTALLATION WHEN TIE RODS ARE USED FOR PIPE RESTRAINT.
4. CITY OF SUNRISE ENGINEERING INSPECTOR SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF ALL DEFLECTION OPERATIONS.
5. NO WATER OR SEWER FORCE MAINS OF ANY SIZE PVC OR DIP PIPE THAT CROSS OTHER UTILITIES AND WILL NOT MAINTAIN * 18" MIN. CLEARANCE SHALL BE ALLOWED. ALL PIPE WITH LESS THAN 18" DEFLECTION EITHER WAY FROM PERPENDICULAR SHALL HAVE RESTRAINED MEGALUGS AND RESTRAINED WITH DIMENSIONS PRIOR TO ALL JOINTS. PIPE RESTRAINTS ARE REQUIRED TO TOP 45 DEGREE BENDS.

FIELD INSPECTION BY CITY'S ENGINEERING INSPECTOR IS REQUIRED PRIOR TO INSTALLATION

* 18" MIN. CLEARANCE REQUIRED FOR WATER AND SEWER MAIN CROSSING. 12" MIN. CLEARANCE REQUIRED FOR OTHER TYPE UTILITIES CROSSING. ENCASEMENT IN CONCRETE IS NOT PERMITTED

UTILITY CROSSINGS
SCALE: NONE

Thrust Restraint

1. All bends, tees, crosses, reducers, and dead ends shall be restrained through an 18' length (min.) of mechanical joint restrained pipe. Restrained joints on bends, tees, crosses and reducers shall be accomplished with MEGALUGS and all thread rods. Any line terminated as a construction phase that is to have future extension, shall have a plugged valve at the end and restrained with MEGALUG and all thread rods.
2. All bends, tees, crosses, reducers and dead ends for 16" diameter pipe and larger shall have mechanical joints with MEGALUGS and all thread rods or approved equal for restraint in lieu of thrust blocks.
3. The following table shall serve as a general guide only. It is the Engineer of Record's responsibility to correctly design the minimum thrust restraint for the pipe considering the existing soil composition and other testing conditions. The minimum test pressure shall be 150 psi with a 2.5 safety factor.

Cut Thrust Conditions
150 PSI
Vertical Offset Bends
Vertical Tees or Cross Reducers

Pipe Diameter	45° Elbow Horizontal or Vertical up	22-1/2° Elbow Horizontal or Vertical up	11-1/4° Elbow Horizontal or Vertical up	Dead Ends
4"	2L	1L	1L	3L
6"	3L	1L	1L	4L
8"	4L	2L	1L	5L
10"	5L	2L	1L	6L
12"	6L	3L	1L	8L
16"	8L	4L	2L	11L

** L = ONE PIPE LENGTH (20 FEET)

811
SUNSHINE STATE ONE CALL OF FLORIDA, INC.
1-800-432-4770
SUNSHINE STATE 1 CALL
UNDERGROUND UTILITIES
NOTIFICATION CENTER

Designed By:
Drawn By:
Checked By:

SYMBOL	NO.	DATE	REVISIONS	BY
	7	3/7/06	HEALTH DEPT. UPDATES	SD
	6	6/15/98	UPDATED SEE TO SPEC. REVISIONS	JF

CITY OF SUNRISE

APPROVED BY:
_____ DATE: _____
BENJAMIN E. ENGINEER NO.
STATE OF FLORIDA

GENERAL WATER AND SANITARY SEWER DETAILS AND NOTES

SCALE: NONE
NOT TO SCALE

PROJECT NUMBER

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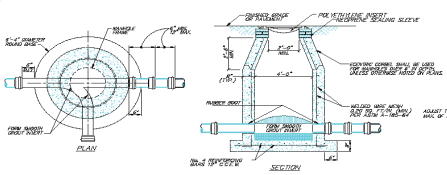
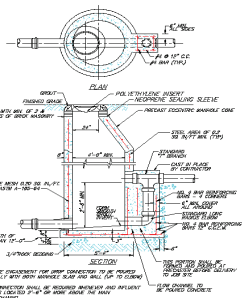
Appendix 3
Standard Sanitary Sewer Details and Notes



NOTES:
1. MANHOLE FRAME AND COVER SHALL BE U.S.F. No. 4220UL COVER SHALL HAVE RAISED LETTERS "SANITARY SEWER" AND "CITY OF SUNRISE".
2. PRECAST MANHOLE SHALL CONFORM TO ASTM SPEC. C-478, LATEST REVISION.
3. MIN. OF 2 OR MAX. 5 COURSES OF 8" BRICK TO ADJUST MANHOLE FRAME TO FINISHED GRADE.
4. ALL OUTSIDE SURFACES OF MANHOLES SHALL BE FULLY COATED WITH A MIN. OF 8 MILS OF KOPPER'S COAL TAR EPOXY AS FOLLOWS:
   ALL INTERIOR SURFACES OF MANHOLES SHALL HAVE MANOTUF COATING AS FOLLOWS:
   - 1-2" MIN. SPRAY APPLICATION OF MANOTUF 46-72, MORNEGLO CEMENT MORTAR OR APPROVED EQUAL
   - A MIN. APPLICATION OF 100 MIL SPRAY APPLICATION OF MANOTUF 120-G, ULTRA HIGH BUILD EPOXY COATING OR APPROVED EQUAL
5. ALL CONCRETE USED IN MANHOLE CONSTRUCTION SHALL HAVE TYPE II CEMENT
6. STEPS, SHALL BE GRADE 40 PER ASTM A-615.
7. BASE SHALL BE POURED MONOLITHICALLY WITH MANHOLE WALL.
8. MINIMUM COVER FOR REINFORCING STEEL SHALL BE 2".
9. IF LIFTING PINS ARE USED, HOLES SHALL BE COMPLETELY FILLED WITH NON-SHRINK GROUT.

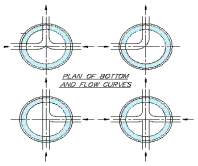
SHALLOW MANHOLE

SCALE: NONE



TYPE "A" DROP MANHOLE (OVER 2'-6")

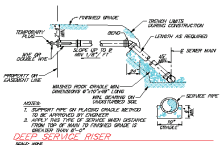
SCALE: NONE



NOTES:
1. INVERT CHANNELS TO BE CONSTRUCTED FOR SMOOTH FLOW WITH NO OBSTRUCTIONS.
2. SPILLWAYS SHALL BE CONSTRUCTED BETWEEN INVERTS WITH DIFFERENT INVERT ELEVATIONS AS SHOWN ON THE PLANS OR DETAILS.
3. CHANNELS FOR FUTURE CONNECTIONS (STUBS) SHALL BE CONSTRUCTED, FILLED WITH SAND AND COVERED WITH 1" ISOPLYTE.
4. A MIN. DROP OF 0.10' AND MAX. OF 1.0' BETWEEN ALL INFLUENT PIPES AND THE EFFLUENT PIPE SHALL BE PROVIDED.

INVERT CHANNEL FLOW DIRECTIONS

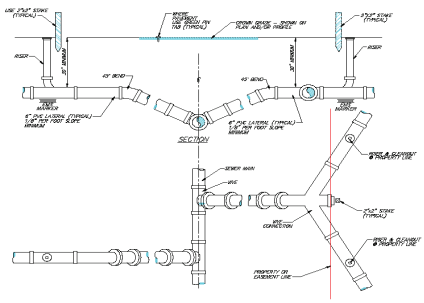
SCALE: NONE



NOTES:
1. SUPPORT PIPE ON FLOOR ENABLE BRICKS TO BE APPROVED BY ENGINEER
2. APPLY SAME TYPE OF SERVICE WHEN DISTANCE FROM MAIN TO FINISHED GRADE IS GREATER THAN 8'-0"

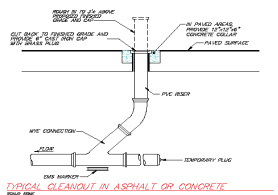
DEEP SERVICE RISER

SCALE: NONE



TYPICAL SERVICE CONNECTION

SCALE: NONE



TYPICAL CLEANOUT IN ASPHALT OR CONCRETE

SCALE: NONE

SANITARY SEWER SYSTEM NOTES

1. THE UTILITY PROVIDING SEWER SERVICE TO THIS PROJECT IS THE CITY OF SUNRISE, FLORIDA.
2. PRECAST CONCRETE MANHOLES SHALL CONFORM TO THE REQUIREMENTS OF ASTM C-478 AND ALL PRECAST MANHOLES SHALL BE MANUFACTURED BY A PRECAST CONCRETE MANUFACTURING LABORATORY, TESTED AND RATED, CERTIFYING THAT MEET THE REQUIREMENTS OF ASTM C-478 FOR CONCRETE STRENGTH, SIZES, WATERTIGHTNESS, AREA AND PLACEMENT, AND APPEARANCE. WHEN REQUESTED, THE MANHOLE MUST BE INSPECTED BY THE CITY BEFORE DELIVERING.
3. MINIMUM WALL AND BASE THICKNESS FOR PRECAST MANHOLES SHALL BE 8 INCHES. BASE SECTIONS SHALL BE MONOLITHIC.
4. CONCRETE FOR PRECAST MANHOLES OR CAST IN PLACE MANHOLES SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH AT 28 DAYS. CEMENT SHALL BE TYPE II ASTM DESIGNATION.
5. REINFORCING STEEL FOR MANHOLES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-615, GRADE 60 DEFORMED BARS. SPLICES SHALL HAVE A MINIMUM LAP OF 24 BAR DIAMETERS. MANHOLE COVER RIVER REINFORCING STEEL SHALL BE 2 INCHES. GRADE 60 STEEL SHALL BE USED FOR THE TOP AND BOTTOM SLABS.
6. ALL OPENINGS IN PRECAST MANHOLES SHALL BE CAST AT THE TIME OF MANUFACTURE.
7. PRECAST MANHOLE SHOP DRAWINGS SHALL BE SUBMITTED TO THE CITY OF SUNRISE AND TO THE DEVELOPER'S ENGINEER AND APPROVED PRIOR TO FABRICATION.
8. ALL OUTSIDE SURFACES OF MANHOLES, METHODS AND VALVE PITS, SHALL BE FULLY COATED WITH A MIN. OF 8 MILS OF KOPPER'S COAL TAR EPOXY AS FOLLOWS:
   ALL INTERIOR SURFACES OF MANHOLES, METHODS AND VALVE PITS SHALL HAVE MANOTUF COATING AS FOLLOWS:
   - 1-2" MIN. SPRAY APPLICATION OF MANOTUF 46-72 MORNEGLO CEMENT MORTAR OR APPROVED EQUAL
   - A MIN. APPLICATION OF 100 MIL SPRAY APPLICATION OF MANOTUF 120-G, ULTRA HIGH BUILD EPOXY COATING OR APPROVED EQUAL
9. ALL MANHOLES SHALL BE SET FLUSH TO LINE AND GRADE AND SHALL HAVE A STEP ARRANGEMENT (PEGGED SLIMLINE), WHICH SHALL PROVIDE UNIFORM SPACING UNDER THE BASE.
10. MANHOLE SECTIONS SHALL BE JOINTED WITH A RUBBER COMPOUND GASKET CONFORMING TO ASTM C-443. MANHOLE JOINTS SHALL BE FILLED WITH CEMENT MORTAR AND TROWELED SO AS TO PRODUCE A SMOOTH CONTINUOUS SURFACE INSIDE AND OUTSIDE THE WALL. EXTERNAL JOINTS SHALL BE WRAPPED WITH A 12" WIDE STRIP OF FILTER FABRIC BONDED WITH A BITUMINOUS SUBSTR., AS MANufactured by EXTERNSEAL INC. OR APPROVED EQUAL.
11. ALL CONCRETE AND MORTAR USED IN MANHOLE CONSTRUCTION SHALL HAVE TYPE II CEMENT.
12. ALL SPACES AROUND PIPES ENTERING OR LEAVING MANHOLES SHALL BE FILLED WITH NON-SHRINK MORTAR (NON-METALLIC OR BOSSIC, NON-SHRINKING).
13. SANITARY MANHOLES AND LIDS SHALL BE CAPABLE OF WITHSTANDING AASHTO H-20 LOADINGS. THE WORD "SANITARY" SHALL BE CAST INTO ALL SANITARY SEWERS LIDS.
14. ALL GRAVITY SEWER PIPE SHALL BE PVC OR DUCTILE IRON. PVC PIPE SHALL CONFORM TO ASTM D-3034, SDR 26, LATEST REVISION, WITH MAXIMUM 13 FOOT LENGTHS AND PUSH-ON RUBBER GASKET JOINTS. DUCTILE IRON GRAVITY PIPE SHALL CONFORM TO THE SAME SPECIFICATIONS AS DUCTILE IRON PIPE (DIP) FORCE MAIN.
15. THE MINIMUM DESIGN SLOPES FOR GRAVITY SEWERS AS FOLLOWS:

FOR PVC:	8" – 0.33%	10" – 0.24%	12" – 0.19%
FOR DIP:	8" – 0.33%	10" – 0.26%	12" – 0.22%

16. THE CONTRACTOR SHALL TEST THE COMPLETED SEWER LINE TO DETERMINE ALIGNMENT AND TIGHTNESS OF THE JOINTS. TESTING SHALL BE LIMITED AND MUST HAVE A FULL CIRCLE OF LIGHT. INFILTRATION AND EXFILTRATION TESTING SHALL BE CONDUCTING LEAKAGE SHALL NOT EXCEED 100 GALLONS PER INCH DIAMETER PER MILE PER DAY.
17. CLEAN OUT SHALL BE INSTALLED AT MAXIMUM 75 FOOT INTERVALS ON ALL SEWER SERVICES EXISTING 75 FEET N LENGTH.
18. ALL FORCE MAIN PIPE SHALL BE EPOXY-LINED DUCTILE IRON PIPE (DIP) CLASS 350 PER ANSI A21.51 (AWWA C151) AND SHALL BE MANufactured IN THE CITY LIMITS OF SUNRISE, FLORIDA. ALL PIPE 4 INCHES AND LARGER SHALL BE CLASS 50 OR BETTER. FOUR (4) AND SIX (6) INCH DIAMETER DUCTILE IRON PIPE SHALL BE CLASS 51 OR SECTION ALL PIPE SHALL CONFORM TO THE REQUIREMENTS OF ANSI/AWWA C104/A21.4-80 AND SHALL BE LINED WITH AMERON'S AMERCOAT 400 ANSI/AWWA C104/A21.4-80.
19. ALL FITTINGS FOR FORCE MAINS SHALL BE CAST EPOXY OR DUCTILE IRON CONFORMING TO THE REQUIREMENTS OF ANSI/AWWA C110/A21.10-80.
20. ALL DUCTILE AND IRON (DIP) FORCEMAINS SHALL BE INSTALLED WITH A MINIMUM SLOPE EQUAL TO 2" IN 100 FEET.
21. WHEN PVC IS USED FOR FORCE MAINS, A 14-GAUGE SOLID STRAND COPPER WIRE SHALL BE INSTALLED WITH THE PIPE FOR TRACING. ALL PVC C-900 PURVEYANCE SHALL BE INSTALLED WITH A MINIMUM COVER OVER "A".
22. INSTALLATION AND TESTING OF FORCE MAINS SHALL BE DONE IN ASSURANCE WITH THE CITY OF SUNRISE SPECIFICATIONS.
23. CONNECTING TO THE EXISTING SYSTEM: ALL CONNECTIONS TO EXISTING MANHOLES SHALL BE MADE AFTER INSPECTION BY THE COMMUNITY DEVELOPMENT DEPT. – ENGINEERING INSPECTORS.

FORCE MAIN VALVES SEPARATING THE MAINS BEING INSTALLED FROM THE EXISTING MAINS SHALL BE OPERATED BY OR UNDER THE DIRECTION OF THE UTILITIES DEPARTMENT REPRESENTATIVE ONLY.

48 HOURS BEFORE DIGGING
APPROVED ● PALM BEACH ● BROWARD RIVER
ST LUCIE ● MARTIN COUNTIES
CALL TOLL FREE
1-800-432-4770
SUNSHINE STATE 1 CALL
OF FLORIDA, INC.
UNDERGROUND UTILITIES
NOTIFICATION CENTER

Designed By:					
Drawn By:					
Checked By:					
	2	3/7/03	HEALTH DEPT. UPDATES		JS
	1	2/16/98	UPDATES DUE TO SPEC. REVISIONS		JF
STNDNL	NO.	DATE	REVISIONS		BY

CITY OF SUNRISE

APPROVED BY: _____ DATE: _____
REGISTERED ENGINEER NO.
STATE OF FLORIDA

STANDARD SANITARY SEWER DETAILS AND NOTES

SHEET NO. 8

NOT TO SCALE

PROJECT NUMBER

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CITY CLERK
CITY OF SUNRISE
2025 JUL 10 AM 11:31

SUNRISE, FLORIDA

RESOLUTION NO. 25-110

A RESOLUTION OF THE CITY OF SUNRISE, FLORIDA, TO AWARD BID NO. 25-37-03-MS "SEWER REHABILITATION & MAINTENANCE AND INFILTRATION AND INFLOW REDUCTION PROGRAM" TO ENVIROWASTE SERVICES GROUP, INC. AS PRIMARY VENDOR FOR GROUP A, PRIMARY VENDOR FOR GROUP C, AND SECONDARY VENDOR FOR GROUP D; INSITUFORM TECHNOLOGIES, LLC AS SECONDARY VENDOR FOR GROUP A AND SECONDARY VENDOR FOR GROUP C; IMR DEVELOPMENT CORP AS PRIMARY VENDOR FOR GROUP B; JMP GROUP LLC AS SECONDARY VENDOR FOR GROUP B; AND USSI, LLC AS PRIMARY VENDOR FOR GROUP D; AND PROVIDING AN EFFECTIVE DATE.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF SUNRISE, FLORIDA:

Section 1. The award of Bid No. 25-37-03-MS "Sewer Rehabilitation & Maintenance and Infiltration & Inflow Reduction Program" to Envirowaste Services Group, Inc. as primary vendor for Group A, primary vendor for Group C, and secondary vendor for Group D; Insituform Technologies, LLC as secondary vendor for Group A and secondary vendor for Group C; IMR Development Corp as primary vendor for Group B; JMP Group LLC as secondary vendor for Group B; and USSI, LLC as primary vendor for Group D is hereby approved in an amount not to exceed the FY 2024-2025 approved budgeted funds, with subsequent years' expenditures subject to budget approval.

Section 2. The Procurement Manager or designee is hereby authorized to issue Purchase Orders or take other action necessary in connection with this award.

Section 3. The Procurement Manager or designee is hereby authorized to extend or renew the award, in accordance with the terms of the bid.

Section 4. Effective Date. This Resolution shall be effective immediately upon its passage.

PASSED AND ADOPTED this 8TH DAY of JULY, 2025.

Mayor Michael J. Ryan

Authentication:

~~Felicia M. Bravo~~ Lina M. Zapata
Deputy City Clerk

MOTION: KERCH
SECOND: SCUOTTO

CLARKE: YEA
GUZMAN: YEA
KERCH: YEA
SCUOTTO: YEA
RYAN: YEA

Approved by the City Attorney
as to Form and Legal Sufficiency

Thomas P. Moss