

Bidding Requirements, Contract Forms and Conditions of the Contract
ADDENDUM
Section 00900

ADDENDUM No. 2

Date March 6, 2014

City of Austin

Project Name REBID FACILITIES AND FORCE MAIN SERVICES INDEFINITE DELIVERY/INDEFINITE QUANTITY

C.I.P. No. 9084.001

This Addendum forms a part of Contract and clarifies, corrects or modifies original Bid Documents, dated February 24, 2014 . Acknowledge receipt of this addendum in space provided on bid form. Failure to do so may subject bidder to disqualification.

A. Project Manual Revisions:

- 1) Delete "Table of Contents" in its entirety, and replace with the attached "Table of Contents".
- 2) Delete Section 00300U, "Unit Price Bid Form" in its entirety, and replace with the attached Section 00300U, "Unit Price Bid Form".
- 3) Delete Section 00400, "Statement of Bidders Experience" in its entirety, and replace with the attached Section 00400, "Statement of Bidders Experience".
- 4) Delete Section 01020, "Allowances" in its entirety, and replace with the attached Section 01020, "Allowances".
- 5) Delete Section S01521, "Sanitary Facilities Modifications and Rehab" in its entirety, and replace with the attached Section S01521, "Sanitary Facilities Modifications and Rehab".
- 6) Add attached Section S05520, "Aluminum Handrails".
- 7) Delete Section S15500, "Valves" in its entirety, and replace with the attached Section S15500, "Valves".

B. Drawing Revisions: None

This addendum consists of 111 pages.

Chris Wolter

Approved by OWNER

Chris Wolter

3/5/2014

Approved by ENGINEER/ARCHITECT



END

**Document
Number**

Title

VOLUME 1

INTRODUCTORY INFORMATION

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BIDDING REQUIREMENTS, CONTRACT FORMS, & CONDITIONS OF THE CONTRACT

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00220 05/06/11 Geotechnical Data

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00405 09/25/05 Certificate of Non-Suspension or Debarment
00410 05/06/11 Statement of Bidder's Safety Experience
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00820 03/12/12 Modifications to Bidding Requirements and Contract Forms
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01730 05/23/12 Operations and Maintenance Data
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130S 09/26/12 Borrow
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201S 08/20/07 Subgrade Preparation
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315S 09/26/12 Milling Asphaltic Concrete Pavement and Non-P.C. Concrete Base
340S 09/26/12 Hot Mix Asphaltic Concrete Pavement
360S 09/26/12 Concrete Pavement
402S 11/13/07 Controlled Low Strength Material
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505S 02/24/10 Concrete Encasement and Encasement Pipe
506 03/15/11 Manholes
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509S 09/26/12 Excavation Safety systems
510 01/02/13 Pipe
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641S	06/21/07 Stabilized Construction Entrance
642S	09/01/11 Silt Fence
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430S-3	09/29/99 Curb Expansion Joint Dowel Detail
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503S-5W	09/23/10 Watertight Manhole Ring and 813 MM (32") Cover
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506S-14	08/31/11 Control or Mini Manhole
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510S-1	02/17/00 Concrete Trench Cap
510S-3	08/19/02 Typical Trench with Paved Surface
510S-5	03/13/06 Typical Trench with Unfinished Surface
510-6	02/11/86 Concrete Thrust Blocking
511S-7	03/09/04 Typical Gate Valve 100 mm – 600 mm (4" – 24")
511S-9A	08/31/11 Drain Valve Assembly
511S-10	12/23/02 Debris Cap Installation
511-11	09/16/88 Valve Box Casting C-3 Lid
511S-12	04/05/99 Valve Box Casting C-7 Lid
511S-13A	08/31/11 Water Valve Box Adjustment to Grade w/Full Depth Concrete
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511S-13C	10/19/09 Water Valve Box Concrete Pad in Unpaved Areas
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520S-1A	08/31/11 Modified Water and Wastewater Service Connection Detail
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520S-4	06/01/10 Wastewater Cleanout Adjustment to Grade in Driveways

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639S-1	08/24/10 Rock Berm
641S-1	05/23/00 Stabilized Construction Entrance
642S-1	09/01/11 Silt Fence
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804S-2	03/13/06 Collector / Residential Street Flagging Operations
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1100S-7	09/14/05 Street Repair Requirements Within Intersections
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SP504S	10/01/10 Adjusting Structures
SP505S	11/22/10 Encasement and Encasement Pipe
SP509S	07/11/12 Excavation Safety Systems
SP510	11/05/10 Pipe
SP511S	11/04/10 Water Valves
SP602S	05/16/13 Sodding for Erosion Control
SP609S	05/16/13 Native Grassland and Seeding and Planting for Erosion Control
SP610S	10/16/09 Preservation of Trees and Other Vegetation
SP700S	07/05/12 Mobilization
SP803S	12/12/12 Barricades, Signs, and Traffic Handling

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S01521	02/25/13 Sanitary Facility Modifications and Rehab
S01540	01/22/13 By-Pass Pumping
S01650	02/02/12 Submersible Startup
S01757	05/23/12 Disinfection
S02251	09/11/12 Demolition Salvage
S02500	02/02/12 Access Road
S02554	02/25/13 Line Relay and Spot Repair
S02555	07/05/12 Emergency Repairs
S02615	07/05/12 Temporary Waterline Stop
S02800	02/02/12 Site Requirements
S02805	02/02/12 Chain Link Security Fence
S02820	02/02/12 Decorative Security Fence
S03300	04/06/12 Lift Station Cast In Place Concrete

Document Number	Title
S05520	02/20/14 Aluminum Handrails
S09900	02/02/12 Lift Station Painting and Coatings
S10435	02/02/12 Lift Station Sign
S10522	02/02/12 Fire Extinguishers
S10800	04/26/95 Equipment INFOR Tagging
S11305	02/02/12 Submersible Non-clog Sewage Pumps
S11306	02/02/12 Submersible Grinder Sewage Pumps
S11312	10/18/12 Progressive Cavity Pump
S13035	02/02/12 Lift Station Valve Vaults
S13040	02/02/12 Lift Station Flow Meter Vaults
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S13219	02/02/12 Submersible Polymer Wet Well
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S16012	02/02/12 Identifications
S16020	02/02/12 Utilities
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S16060	02/02/12 Acceptance Testing and Calibration
S16110	02/02/12 Raceways, Fittings, and Supports
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S16943	02/02/12 Temperature Transmitter RTD
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S16952	02/02/12 Submersible Specified Item Summary
17000	08/13/12 General Control System Requirements
17320	08/13/12 MAS Radio Subsystem
17410	08/13/12 Panels and Enclosures
17420	08/13/12 Remote Terminal Unit Requirements
17500	08/13/12 Instrumentation and Control Equipment
17900	08/13/12 Instrument List
17920	08/13/12 Remote Terminal Unit I/O List

Special Details/Figures:

503S-6W	04/14/10	Watertight Manhole Ring and 813 mm (32") Cover
503S-7W	04/14/10	Cleanout Ring and Cover
510S-3 MOD	05/05/08	Modified Typical Trench with Paved Surface Using CLSM (Flowable Fill)
520S-4A	04/14/10	Wastewater Cleanout Casting (Unpaved Location)
520S-6 MOD	05/08/08	Modified Wastewater Deep Service Connection

VOL. 3 10/09/00 **MBE/WBE Procurement Program Package****END**

Bidding Requirements, Contract Forms and Conditions of the Contract
Unit Price Bid Form
Section 00300U

The undersigned, in compliance with the Invitation for Bids for construction of the following
Rebid Facilities & Force Main Services Indefinite Delivery/Indefinite Quantity

Locati Various locations inside the City of Austin and Extraterritorial Jurisdiction

ID#: 9084.001

IFB#: 6100 CLMC 464A

for the City of Austin, Texas, having examined the Project Manual, Drawings and Addenda, the site of the proposed Work and being familiar with all of the conditions surrounding construction of the proposed Project, having conducted all inquiries, tests and investigations deemed necessary and proper; hereby proposes to furnish all labor, permits, material, machinery, tools, supplies and equipment, and incidentals, and to perform all Work required for construction of the Project in accordance with the Project Manual, Drawings and Addenda within the time indicated for the following prices of:

Note: The Bidder will enter the line item subtotal in the "Amount" column below, which is the product of the estimated "Quantity" multiplied by the "Unit Price". Any mathematical errors will be corrected for the purpose of determining the correct Amount to be entered in the Bid Form. The Amounts, including any corrected Amounts, will then be totaled to determine the actual amount of the Bid.

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
1	130S-A	100	CY	CLASS A (SELECT BORROW)	\$ _____	\$ _____
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2	130S-T	75	CY	CLASS C (TOPSOIL)	\$ _____	\$ _____
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3	132S-A	170	CY	EMBANKMENT	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
4	201S	600	SY	SUBGRADE PREPARATION	\$ _____	\$ _____
5	210S-A	100	CY	FLEXIBLE BASE	\$ _____	\$ _____
6	315S-A	75	SY	SURFACE MILLING	\$ _____	\$ _____
7	340S-A1	200	Tons	HOT MIX ASPHALTIC CONCRETE PAVEMENT, TYPE B	\$ _____	\$ _____
8	340S-A2	200	Tons	HOT MIX ASPHALTIC CONCRETE PAVEMENT, TYPE C	\$ _____	\$ _____
9	340S-A3	200	Tons	HOT MIX ASPHALTIC CONCRETE PAVEMENT, TYPE D	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
10	360S-A	50	SY	6" CONCRETE PAVEMENT	\$ _____	\$ _____
11	360S-AH	50	SY	6" CONCRETE PAVEMENT (HIGH EARLY STRENGTH)	\$ _____	\$ _____
12	403S-CY	15	CY	STRUCTURE OR STRUCTURAL COMPONENT	\$ _____	\$ _____
13	430S-A	200	LF	P.C. CONCRETE CURB AND GUTTER	\$ _____	\$ _____
14	430S-F	150	LF	P.C. CONCRETE LAYDOWN CURB	\$ _____	\$ _____
15	432SR-4	250	SF	RECONSTRUCT CONCRETE SIDEWALKS TO 4" THICKNESS, INCLUDING REMOVAL OF EXISTING SIDEWALK	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
16	433S-B	500	SF	FLARED TYPE I P.C. CONCRETE DRIVEWAY	\$ _____	\$ _____
17	506S-EDM48	10	VF	EXTRA DEPTH OF MANHOLE, 48" DIA.	\$ _____	\$ _____
18	506S-EDM60	10	VF	EXTRA DEPTH OF MANHOLE, 60" DIA.	\$ _____	\$ _____
19	506S-EDM72	5	VF	EXTRA DEPTH OF MANHOLE, 72" DIA.	\$ _____	\$ _____
20	506S-M1 48	1	EA	STANDARD PRECAST MANHOLE W/CIP BASE, 48" DIA.	\$ _____	\$ _____
21	506S-M1 60	1	EA	STANDARD PRECAST MANHOLE W/CIP BASE, 60" DIA.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
22	506S-M1 72	1	EA	STANDARD PRECAST MANHOLE W/CIP BASE, 72" DIA.	\$ _____	\$ _____
23	506S-M48	2	EA	STANDARD PRE-CAST MANHOLE W/PRE-CAST BASE, 48" DIA.	\$ _____	\$ _____
24	506S-M60	2	EA	STANDARD PRE-CAST MANHOLE W/PRE-CAST BASE, 60" DIA.	\$ _____	\$ _____
25	506S-M72	2	EA	STANDARD PRE-CAST MANHOLE W/PRE-CAST BASE, 72" DIA.	\$ _____	\$ _____
26	510 KW	4	Ton	DUCTILE IRON FITTINGS	\$ _____	\$ _____
27	511S-B	3	EA	FIRE HYDRANTS (SEE STANDARD NO. 511S-17)	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
28	511S-D	3	EA	DRAIN VALVE ASSEMBLIES (SEE STANDARD NO. 511S-9A)	\$ _____	\$ _____
29	511S-F-01	3	EA	AUTOMATIC COMBINATION AIR/VACUUM RELEASE VALVE ASSEMBLY, 1" DIA.	\$ _____	\$ _____
30	511S-F-02	3	EA	AUTOMATIC COMBINATION AIR/VACUUM RELEASE VALVE ASSEMBLY, 2" DIA.	\$ _____	\$ _____
31	604S-C	150	SY	NATIVE SEEDING FOR EROSION CONTROL METHOD, 2" MULCH PER SQUARE YARD	\$ _____	\$ _____
32	605S-A	100	SY	SOIL RETENTION BLANKET CLASS 1; TYPE B	\$ _____	\$ _____
33	610S-A	500	LF	PROTECTIVE FENCING TYPE A CHAIN LINK FENCE (TYPICAL APPLICATION-HIGH DAMAGE POTENTIAL)	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
34	610S-B	500	LF	PROTECTIVE FENCING TYPE B WOOD FENCE (TYPICAL APPLICATION-HIGH DAMAGE POTENTIAL)	\$ _____	\$ _____
35	610S-C	500	LF	PROTECTIVE FENCING TYPE C OTHER MATERIALS (LIMITED APPLICATION-MINIMAL DAMAGE POTENTIAL)	\$ _____	\$ _____
36	610S-D	20	EA	TREE WELL (TREE PROTECTION)	\$ _____	\$ _____
37	610S-R	15	EA	REMOVAL OF EXISTING TREES	\$ _____	\$ _____
38	628S-A	100	LF	SEDIMENT CONTAINMENT DIKES WITH HAY BALES	\$ _____	\$ _____
39	628S-B	400	LF	SEDIMENT CONTAINMENT DIKES, WITH FILTER FABRIC	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
40	628S-D	30	EA	FILTER CURB INLET PROTECTION (EXISTING INLET)	\$ _____	\$ _____
41	639S	18	LF	ROCK BERM	\$ _____	\$ _____
42	641S	8	EA	STABILIZED CONSTRUCTION ENTRANCE	\$ _____	\$ _____
43	642S	1150	LF	SILT FENCE FOR EROSION CONTROL	\$ _____	\$ _____
44	701S-BS	5	EA	CHAIN LINK PEDESTRIAN SINGLE SWING GATE, 8 FT. X 3 FT.	\$ _____	\$ _____
45	701S-CD	3	EA	CHAIN LINK VEHICULAR DOUBLE SWING GATE, 8 FT. X 13 FT.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
46	701S-CS	3	EA	CHAIN LINK VEHICULAR SINGLE SWING GATE, 8 FT. X 10 FT.	\$ _____	\$ _____
47	701S-H	400	LF	SECURITY FENCE, 8 FT. HIGH, CHAIN LINK TYPE	\$ _____	\$ _____
48	701S-MS	400	LF	MOWING STRIP	\$ _____	\$ _____
49	702S-A	400	LF	REMOVING AND RELOCATING EXISTING 8 FT. HIGH CHAIN LINK FENCE	\$ _____	\$ _____
50	703	250	LF	SAFETY FENCING	\$ _____	\$ _____
51	802S-BC.I.P.	8	EA	C.I.P. PROJECT SIGN	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
52	SP402S-A-F	100	CY	CONTROLLED LOW STRENGTH MATERIAL, FAST SETTING, PER CUBIC YARD	\$ _____	\$ _____
53	SP402S-A-N	100	CY	CONTROLLED LOW STRENGTH MATERIAL, NORMAL SETTING, PER CUBIC YARD	\$ _____	\$ _____
54	SP505S-A	100	CY	CONCRETE ENCASUREMENT (CLASS D), ALL PIPE SIZES, COMPLETE IN PLACE	\$ _____	\$ _____
55	SP509S-1	4000	LF	TRENCH EXCAVATION SAFETY PROTECTIVE SYSTEMS (ALL DEPTHS)	\$ _____	\$ _____
56	SP510-AW-02" DIA.	100	LF	2" DIA HDPE TYPE PIPE, ALL DEPTHS, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
57	SP510-AW-03" DIA.	50	LF	3" DIA HDPE TYPE PIPE, ALL DEPTHS, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
58	SP510-AW-12" DIA.	50	LF	12" DIA HDPE TYPE PIPE, ALL DEPTHS, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
59	SP510-FWW	150	CY	CONCRETE TRENCH CAP, ALL SIZES, COMPLETE AND IN PLACE	\$ _____	\$ _____
60	SP510-JW-12x6	2	EA	WET CONNECTION, 12" DIA. X 6" DIA., COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
61	SP510-JW-6x6	4	EA	WET CONNECTION, 6" DIA. X 6" DIA., COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
62	SP510-PP-24	50	LF	24" DIA. CSC TYPE PIPE, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
63	SP510-PRDI-06	100	LF	6" DIA. DI TYPE PIPE, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
64	SP510-PRDI-12	50	LF	12" DIA. DI TYPE PIPE, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
65	SP510-PRDI-24	50	LF	24" DIA. DI TYPE PIPE, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
66	SP510-PRWS-24	50	LF	24" DIA. WELDED STEEL TYPE PIPE, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
67	SP511S-A-6" DIA.	4	EA	VALVES, RESILIENT SEATED GV, 6" DIA., COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
68	SP511S-A-12" DIA.	3	EA	VALVES, RESILIENT SEATED GV, 12" DIA., COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
69	SP511-C1	2	EA	PROVIDE AND INSTALL A 4" BACKFLOW PREVENTER ON EXISTING 4" STEEL PIPE, INCLUDING FITTINGS, WALL SUPPORTS, INSULATION, TESTED AND CERTIFIED. ALL WORK ABOVE GRADE. COMPLETE AND IN PLACE	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
70	SP511-C2	2	EA	PROVIDE AND INSTALL A 6" BACKFLOW PREVENTER ON EXISTING 6" STEEL PIPE, INCLUDING FITTINGS, WALL SUPPORTS, INSULATION, TESTED AND CERTIFIED. ALL WORK ABOVE GRADE. COMPLETE AND IN PLACE	\$ _____	\$ _____
71	SP511-C3	6	EA	REMOVE EXISTING AND INSTALL A 1" PRV. COMPLETE AND IN PLACE.	\$ _____	\$ _____
72	SP511-C4	6	EA	REMOVE EXISTING AND INSTALL AN 2" PRV. COMPLETE AND IN PLACE.	\$ _____	\$ _____
73	SP511-C5	4	EA	REMOVE EXISTING AND INSTALL AN 3" PRV. COMPLETE AND IN PLACE.	\$ _____	\$ _____
74	SP511-C6	1	EA	REMOVE EXISTING AND INSTALL AN 8" PRV. COMPLETE AND IN PLACE.	\$ _____	\$ _____
75	SP511S-J-4" DIA.	1	EA	PERMANENT INSERT ABLE VALVE, 4" DIA, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
76	SP511S-J-6" DIA.	1	EA	PERMANENT INSERT ABLE VALVE, 6" DIA, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY	\$ _____	\$ _____
77	SP511S-J-8" DIA.	1	EA	PERMANENT INSERT ABLE VALVE, 8" DIA, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY	\$ _____	\$ _____
78	SP511S-J-12" DIA.	1	EA	PERMANENT INSERT ABLE VALVE, 12" DIA., COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY	\$ _____	\$ _____
79	SP511S-J-16" DIA.	1	EA	PERMANENT INSERT ABLE VALVE, 16" DIA., COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY	\$ _____	\$ _____
80	SP511S-K	10	EA	FIELD INSPECTION AND MEASUREMENT.	\$ _____	\$ _____
81	SP511S-L-24" DIA.	1	EA	VALVES, RESILIENT SEATED GV, 24" DIA., COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
82	SP511S-L-48" DIA.	1	EA	VALVES, RESILIENT SEATED GV, 48" DIA., COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY	\$ _____	\$ _____
83	SP602S-D	1000	SY	GRASS SODDING, WATERING PAID FOR SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____
84	SP609S-E1	500	SY	WATERING OF SOD OR SEEDED AREA, PER WATERING EVENT, PER WATERING LOCATION, FOR AREAS 1 SQUARE YARD TO 50 SQUARE YARDS, COMPLETE AND IN PLACE	\$ _____	\$ _____
85	SP609S-E2	500	SY	WATERING OF SOD OR SEEDED AREA, PER WATERING EVENT, PER WATERING LOCATION, FOR AREAS 50.1 SQUARE YARD TO 200 SQUARE YARDS, COMPLETE AND IN PLACE	\$ _____	\$ _____
86	SP609S-E3	500	SY	WATERING OF SOD OR SEEDED AREA, PER WATERING EVENT, PER WATERING LOCATION, FOR AREAS 200.1 SQUARE YARDS AND GREATER, COMPLETE AND IN PLACE.	\$ _____	\$ _____
87	SP610S-1	20	EA	CERTIFIED ARBORIST TO ATTEND SITE SPECIFIC PRECON. AND PREPARE TREE LIST, COMPLETE AND IN PLACE	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
88	SP610S-2	40	HR	TREE AND ROOT PRUNING UNDER THE SUPERVISION OF A CERTIFIED ARBORIST, INCLUDING CHIPPING AND REMOVAL, COMPLETE AND IN PLACE	\$ _____	\$ _____
89	SP-803S-S-CD	20	CD	SINGLE LANE CLOSURE, PER EACH 24 HOUR CALENDAR DAY	\$ _____	\$ _____
90	SP-803S-S-WD	20	WD	SINGLE LANE CLOSURE, PER EACH 24 HOUR WORKING DAY.	\$ _____	\$ _____
91	SP-803S-S-MO	2	MO	SINGLE LANE CLOSURE, PER EACH MONTH.	\$ _____	\$ _____
92	SP-803S-D-CD	20	CD	DOUBLE LANE CLOSURE, PER EACH 24 HOUR CALENDAR DAY.	\$ _____	\$ _____
93	SP-803S-D-WD	20	WD	DOUBLE LANE CLOSURE, PER EACH 24 HOUR WORKING DAY.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
94	SP-803S-D-MO	2	MO	DOUBLE LANE CLOSURE, PER EACH MONTH	\$ _____	\$ _____
95	S01521-1	2	EA	REMOVE AND REPLACE 8 FT. I.D. WET WELL TOP SLAB	\$ _____	\$ _____
96	S01521-2	2	EA	REMOVE AND REPLACE 10 FT. I.D. WET WELL TOP SLAB	\$ _____	\$ _____
97	S01521-3	2	EA	DEMOLISH & REPLACE 19 FT. x 19 FT SQUARE X 12-INCH THICK REINFORCED CONCRETE WET WELL TOP SLAB WITH ALUMINUM HATCHES AND EMBEDDED ANCILLARY ITEMS	\$ _____	\$ _____
98	S01521-4	2	EA	PROVIDE AND INSTALL 500 GALLON FUEL TANK	\$ _____	\$ _____
99	S01521-5	20	SY	PLACE 4" SLAB AS SITE PAVING.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
100	S01521-6	12	VF	EXTEND 10 FT. DIA. WET WELL HEIGHT TO AT LEAST 6" ABOVE GRADE.	\$ _____	\$ _____
101	S01521-7	1	EA	PROVIDE AND INSTALL ONE 285 GPM AT 87 FT. TDH WASTEWATER PUMP, COMPLETE AND IN PLACE.	\$ _____	\$ _____
102	S01521-8	1	EA	PROVIDE AND INSTALL ONE 720 GPM AT 72 FT. TDH WASTEWATER PUMP, COMPLETE AND IN PLACE.	\$ _____	\$ _____
103	S01521-9	1	EA	PROVIDE AND INSTALL ONE 470 GPM AT 36 FT. TDH WASTEWATER PUMP, COMPLETE AND IN PLACE.	\$ _____	\$ _____
104	S01521-10	1	EA	PROVIDE AND INSTALL ONE 8" PROGRESSIVE CAVITY PUMP, 20 HP, 300 GPM, 50 PSI, COMPLETE AND IN PLACE.	\$ _____	\$ _____
105	S01521-11	1	EA	PROVIDE AND INSTALL ONE 12" PROGRESSIVE CAVITY PUMPS, 20 HP, 300 GPM, 50 PSI, COMPLETE AND IN PLACE.	\$ _____	\$ _____
106	S01521-12	2	EA	PROVIDE AND INSTALL A PUMP AROUND VAULT, COMPLETE AND IN PLACE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
107	S01521-13	4	EA	PROVIDE AND INSTALL A 4 FT. DIA. FLOW METER VAULT, COMPLETE AND IN PLACE.	\$ _____	\$ _____
108	S01521-14	2	EA	INSTALLATION OF A 6 TO 12" PUMP AROUND ARRANGEMENT, COMPLETE AND IN PLACE.	\$ _____	\$ _____
109	S01521-15	2	EA	CLEAN, REPAIR, AND REHABILITATE THE EXISTING 8 FT. DIA. WET WELL UP TO 20 FT. DEEP.	\$ _____	\$ _____
110	S01521-16	2	EA	CLEAN, REPAIR, AND REHABILITATE THE EXISTING 10 FT. DIA. WET WELL UP TO 20 FT. DEEP.	\$ _____	\$ _____
111	S01521-17	4	EA	REMOVE AND REPLACE EXISTING 72" SLUICE GATE, COMPLETE AND IN PLACE.	\$ _____	\$ _____
112	S01521-18	2	EA	PROVIDE AND INSTALL 6" CHECK VALVE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
113	S01521-19	2	EA	PROVIDE AND INSTALL 8" CHECK VALVE.	\$ _____	\$ _____
114	S01521-20	2	EA	PROVIDE AND INSTALL 10" CHECK VALVE.	\$ _____	\$ _____
115	S01521-21	2	EA	PROVIDE AND INSTALL 12" CHECK VALVE.	\$ _____	\$ _____
116	S01521-22	2	EA	REMOVE AND REPLACE EXISTING 18" ACTUATED BALL VALVE.	\$ _____	\$ _____
117	S01521-23	4	EA	REMOVE AND REPLACE EXISTING 30" ACTUATED BALL VALVE.	\$ _____	\$ _____
118	S01521-24	2	EA	REMOVE AND REPLACE 20" LUBRICATED PLUG VALVE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
119	S01521-25	2	EA	REMOVE AND REPLACE 16" LUBRICATED PLUG VALVE.	\$ _____	\$ _____
120	S01521-26	2	EA	REMOVE AND REPLACE 12" LUBRICATED PLUG VALVE.	\$ _____	\$ _____
121	S01521-27	2	EA	REMOVE AND REPLACE 12" D.I. PLUG VALVE.	\$ _____	\$ _____
122	S01521-28	8	EA	PROVIDE AND INSTALL 6" RESILIENT SEATED GATE VALVE.	\$ _____	\$ _____
123	S01521-29	8	EA	PROVIDE AND INSTALL 8" RESILIENT SEATED GATE VALVE.	\$ _____	\$ _____
124	S01521-30	4	EA	PROVIDE AND INSTALL 10" RESILIENT SEATED GATE VALVE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
125	S01521-31	1	EA	6' X 10' PRECAST CONCRETE ELECTRICAL ENCLOSURE COMPLETE & IN PLACE FOR 220/3PH PUMP CONTROLS.	\$ _____	\$ _____
126	S01521-32	3	EA	6' X 10' PRECAST CONCRETE ELECTRICAL ENCLOSURE COMPLETE & IN PLACE FOR 440/3PH PUMP CONTROLS.	\$ _____	\$ _____
127	S01521-33	200	LF	ELECTRICAL DUCT BANK.	\$ _____	\$ _____
128	S01521-34	400	LF	FURNISH AND INSTALL #14 THROUGH #12 TYPE XHHW WIRE.	\$ _____	\$ _____
129	S01521-35	400	LF	FURNISH AND INSTALL #10 THROUGH #6 TYPE XHHW WIRE.	\$ _____	\$ _____
130	S01521-36	400	LF	FURNISH AND INSTALL #4 THROUGH #1 TYPE XHHW WIRE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
131	S01521-37	400	LF	FURNISH AND INSTALL #1/0 THROUGH #4/0 TYPE XHHW WIRE.	\$ _____	\$ _____
132	S01521-38	400	LF	FURNISH AND INSTALL BUNDLED OR UNBUNDLED, JACKETED, SHIELDED, ELECTRICALLY INSOLATED, TWISTED PAIR OR MULTI-PAIR/TRIAD CABLES.	\$ _____	\$ _____
133	S01521-39	5	EA	FURNISH AND INSTALL 30"X30"X12" NEMA 4X 316 SS JUNCTION BOX, UNI-STRUT, AND GUTTER.	\$ _____	\$ _____
134	S01521-40	10	EA	FURNISH AND INSTALL 12"X12"X6" NEMA 4X 316 SS JUNCTION BOX, UNI-STRUT, AND GUTTER.	\$ _____	\$ _____
135	S01521-41	10	EA	FURNISH AND INSTALL 1-POLE 20A CIRCUIT BREAKER.	\$ _____	\$ _____
136	S01521-42	10	EA	FURNISH AND INSTALL 2-POLE 20A CIRCUIT BREAKER.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
137	S01521-43	10	EA	FURNISH AND INSTALL 3-POLE 30A CIRCUIT BREAKER.	\$ _____	\$ _____
138	S01521-44	5	EA	FURNISH AND INSTALL 3-POLE 60A CIRCUIT BREAKER.	\$ _____	\$ _____
139	S01521-45	5	EA	FURNISH AND INSTALL 24"X36"X24" CONCRETE IN-GROUND PULL BOX.	\$ _____	\$ _____
140	S01521-46	5	EA	FURNISH AND INSTALL 15 KVA 208/480/277 DELTA WYE TRANSFORMER WITH WEATHER SHIELD.	\$ _____	\$ _____
141	S01521-47	3	EA	FURNISH AND INSTALL 125A, 12- CIRCUIT NEMA 4X PANEL BOARD.	\$ _____	\$ _____
142	S01521-48	200	LF	FURNISH AND INSTALL ABOVE GROUND 1" GALVANIZED CONDUIT.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
143	S01521-49	100	LF	FURNISH AND INSTALL ABOVE GROUND 2" GALVANIZED CONDUIT.	\$ _____	\$ _____
144	S01521-50	300	LF	FURNISH AND INSTALL CONCRETE ELECTRICAL DUCTBANK WITH 2-1" SCH 80 PVC CONDUITS.	\$ _____	\$ _____
145	S01521-51	300	LF	FURNISH AND INSTALL CONCRETE ELECTRICAL DUCTBANK WITH 2-2" SCH 80 PVC CONDUITS.	\$ _____	\$ _____
146	S01521-52	200	LF	FURNISH AND INSTALL CONCRETE ELECTRICAL DUCTBANK WITH 4-2" SCH 80 PVC CONDUITS.	\$ _____	\$ _____
147	S01521-53	200	LF	FURNISH AND INSTALL CONCRETE ELECTRICAL DUCTBANK WITH 2-4" SCH 80 PVC CONDUITS.	\$ _____	\$ _____
148	S01521-54	5	EA	FURNISH AND INSTALL 18"X18"X12" GROUND BOX.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
149	S01521-55	10	EA	FURNISH AND INSTALL 3/4"X10" COPPER CLAD GROUND ROD	\$ _____	\$ _____
150	S01521-56	10	EA	FURNISH AND INSTALL CONCRETE LIGHT FOUNDATION (FOR UP TO 20-FOOT TALL).	\$ _____	\$ _____
151	S01521-57	10	EA	FURNISH AND INSTALL 20-FOOT 6-1/2 INCH DIAMETER GALVANIZED STEEL STREET LIGHT (UP TO 20-FOOT TALL).	\$ _____	\$ _____
152	S01521-58	10	EA	FURNISH AND INSTALL 250-WATT, 120V, STREET LIGHT WITH PHOTOVOLTAIC CELL ON 20-FOOT TALL	\$ _____	\$ _____
153	S01540-BP18	20	CD	BY-PASS PUMPING FOR LINES 15" TO 18" DIA.	\$ _____	\$ _____
154	S01540-BP24	10	CD	BY-PASS PUMPING FOR LINES 20" TO 24" DIA.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
155	S01540-BP36	7	CD	BY-PASS PUMPING FOR LINES 30" TO 36" DIA.	\$ _____	\$ _____
156	S01540-BP48	6	CD	BY-PASS PUMPING FOR LINES 42" TO 48" DIA.	\$ _____	\$ _____
157	S01540-BP54	4	CD	BY-PASS PUMPING FOR LINES 54" DIA.	\$ _____	\$ _____
158	S02251	8	Ton	DEMOLITION AND REMOVAL OF EXCESS AND/OR UNUSED PIPING AND EQUIPMENT INCLUDING EXISTING PUMPS, VALVES, FITTINGS, CONDUIT, ETC. THAT MAY BE IN THE WAY OF INSTALLING THE PROPOSED PIPING AND EQUIPMENT. OWNER RETAINS RIGHT TO CLAIM ANY ITEM. COMPLETE AND IN PLACE.	\$ _____	\$ _____
159	S02554-1	500	LF	COST FOR EXCAVATION OF NEW TRENCH IN ROCK FOR DEPTHS OF 0 - 10 FT.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
160	S02554-2	325	LF	COST FOR EXCAVATION OF NEW TRENCH IN ROCK FOR DEPTHS OF 10.1 - 16 FT.	\$ _____	\$ _____
161	S02554-3	8	Day	POTHOLING FOR INVESTIGATION OF UNKNOWN UTILITIES, NO PIPE OR MANHOLE INSTALLED, INCLUDING EXCAVATION, AND BACKFILL, ALL SUBSURFACE CONDITIONS DEPTHS OF 0 - 6 FT.	\$ _____	\$ _____
162	S02554-4	4	Day	POTHOLING FOR INVESTIGATION, NO PIPE OR MANHOLE INSTALLED, INCLUDING EXCAVATION, AND BACKFILL, ALL SUBSURFACE CONDITIONS DEPTHS OF 6.1 - 10 FT.	\$ _____	\$ _____
163	S02554-5	3	Day	POTHOLING FOR INVESTIGATION, NO PIPE OR MANHOLE INSTALLED, INCLUDING EXCAVATION, AND BACKFILL, ALL SUBSURFACE CONDITIONS DEPTHS OF 10.1 - 14 FT.	\$ _____	\$ _____
164	S02554-6	5	EA	REPAIR/REBUILD EXISTING MANHOLE BENCH AND/OR INVERT, FLOW CONTROL, BYPASS PUMPING AND/OR PLUGGING/BLOCKING TO BE SUBSIDIARY TO THIS PAY ITEM.	\$ _____	\$ _____
165	S02554-7	10	EA	INSTALLATION OF 6" DIA. SDR 26 PVC, 2-WAY CLEANOUT, ALL DEPTHS, COMPLETE AND IN PLACE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
166	S02554-8	50	EA	INSTALLATION OF CAST IRON CLEANOUT FRAME AND COVER IN GRASSED AREAS IN ACCORDANCE WITH SPECIAL DETAIL 520S- 4A.	\$ _____	\$ _____
167	S02554-9	10	EA	INSTALLATION OF CAST IRON CLEANOUT FRAME AND COVER IN DRIVEWAYS PER STANDARD DETAIL 520S-4, COMPLETE AND IN PLACE.	\$ _____	\$ _____
168	S02554-10	4	EA	ABANDON EXISTING LINES BY CUTTING AND PLUGGING, DEPTH 0 TO 8 FT. ALL SIZES, COMPLETE AND IN PLACE.	\$ _____	\$ _____
169	S02554-11	4	EA	ABANDON EXISTING LINES BY CUTTING AND PLUGGING, DEPTH 8 TO 16 FT., ALL SIZES, COMPLETE AND IN PLACE.	\$ _____	\$ _____
170	S02554-12	10	CY	GROUTING OF ABANDONED LINES, MIN. PAYMENT WILL BE 2 CY.	\$ _____	\$ _____
171	S02554-13	4	EA	REMOVE EXISTING AND INSTALL NEW 1" COMBINATION AIR RELEASE / VACUUM RELIEF VALVE IN EXISTING VAULT. NO MOBILIZATION PAID WITH THIS ITEM. VALVE MUST BE ON SPL NO. WW-462.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
172	S02554-14	4	EA	REMOVE EXISTING AND INSTALL NEW 2" COMBINATION AIR RELEASE / VACUUM RELIEF VALVE IN EXISTING VAULT. NO MOBILIZATION PAID WITH THIS ITEM. VALVE MUST BE ON SPL NO. WW-462.	\$ _____	\$ _____
173	S02554-15	4	EA	REMOVE EXISTING AND INSTALL NEW 3" COMBINATION AIR RELEASE / VACUUM RELIEF VALVE IN EXISTING VAULT. NO MOBILIZATION PAID WITH THIS ITEM. VALVE MUST BE ON SPL NO. WW-462.	\$ _____	\$ _____
174	S02554-16	150	LF	DIA: 6" D.I. EPOXY LINED, MJ FORCE MAIN, SPL WW-534, COMPLETE AND IN PLACE, WITH EXCAVATION, BACKFILL, AND TRENCH SAFETY SYSTEM PAID SEPARATELY.	\$ _____	\$ _____
175	S02554-17	150	LF	DIA: 8" D.I. EPOXY LINED, MJ FORCE MAIN, SPL WW-534, COMPLETE AND IN PLACE, WITH EXCAVATION, BACKFILL, AND TRENCH SAFETY SYSTEM PAID SEPARATELY.	\$ _____	\$ _____
176	S02554-18	150	LF	DIA: 10" D.I. EPOXY LINED, MJ FORCE MAIN, SPL WW-534, COMPLETE AND IN PLACE, WITH EXCAVATION, BACKFILL, AND TRENCH SAFETY SYSTEM PAID SEPARATELY.	\$ _____	\$ _____
177	S02554-19	150	LF	DIA: 12" D.I. EPOXY LINED, MJ FORCE MAIN, SPL WW-534, COMPLETE AND IN PLACE, WITH EXCAVATION, BACKFILL, AND TRENCH SAFETY SYSTEM PAID SEPARATELY.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
178	S02554-20	150	LF	DIA: 14" D.I. EPOXY LINED, MJ FORCE MAIN, SPL WW-534, COMPLETE AND IN PLACE, WITH EXCAVATION, BACKFILL, AND TRENCH SAFETY SYSTEM PAID SEPARATELY.	\$ _____	\$ _____
179	S02554-21	200	LF	DIA: 16" D.I. EPOXY LINED, MJ FORCE MAIN, SPL WW-534, COMPLETE AND IN PLACE, WITH EXCAVATION, BACKFILL, AND TRENCH SAFETY SYSTEM PAID SEPARATELY.	\$ _____	\$ _____
180	S02554-22	50	LF	DIA: 18" D.I. EPOXY LINED, MJ FORCE MAIN, SPL WW-534, COMPLETE AND IN PLACE, WITH EXCAVATION, BACKFILL, AND TRENCH SAFETY SYSTEM PAID SEPARATELY.	\$ _____	\$ _____
181	S02554-23	50	LF	DIA: 24" D.I. EPOXY LINED, MJ FORCE MAIN, SPL WW-534, COMPLETE AND IN PLACE, WITH EXCAVATION, BACKFILL, AND TRENCH SAFETY SYSTEM PAID SEPARATELY.	\$ _____	\$ _____
182	S02554-24	400	LF	6" DIA. SDR 26 PVC PIPE MATERIAL, INSTALLATION. EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____
183	S02554-25	700	LF	8" DIA. SDR 26 PVC PIPE MATERIAL, INSTALLATION. EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
184	S02554-26	300	LF	10" DIA. SDR 26 PVC PIPE MATERIAL, INSTALLATION. EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____
185	S02554-27	600	LF	12" DIA. SDR 26 PVC PIPE MATERIAL, INSTALLATION. EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____
186	S02554-28	75	LF	15" DIA. SDR 26 PVC PIPE MATERIAL, INSTALLATION. EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____
187	S02554-29	75	LF	18" DIA. SDR 26 PVC PIPE MATERIAL, INSTALLATION. EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____
188	S02554-30	75	LF	21" DIA. SDR 26 PVC PIPE MATERIAL, INSTALLATION. EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____
189	S02554-31	75	LF	24" DIA. SDR 26 PVC PIPE MATERIAL, INSTALLATION. EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY, COMPLETE AND IN PLACE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
190	S02554-32	2500	LF	LINE TRENCH EXCAVATION OF EXISTING PIPE FOR DEPTHS OF 0 - 10 FT., INCLUDING REMOVAL AND DISPOSAL OF EXISTING PIPE.	\$ _____	\$ _____
191	S02554-33	1500	LF	LINE TRENCH EXCAVATION OF EXISTING PIPE FOR DEPTHS OF 10.1 - 16 FT., INCLUDING REMOVAL AND DISPOSAL OF EXISTING PIPE.	\$ _____	\$ _____
192	S02554-34	2500	LF	LINE BACKFILL WITH MATERIAL EXCAVATED FROM TRENCH FOR DEPTHS OF 0 - 10 FT.	\$ _____	\$ _____
193	S02554-35	1500	LF	LINE BACKFILL WITH MATERIAL EXCAVATED FROM TRENCH FOR DEPTHS OF 10.1 - 16 FT.	\$ _____	\$ _____
194	S02554-36	2	LF	EXCAVATION, CONSTRUCTION, MAINTENANCE AND REMOVAL OF AN 18 FT. DIA. TEMPORARY SHAFT UP TO 14 FT. BELOW GRADE, COMPLETE IN PLACE.	\$ _____	\$ _____
195	S02554-37	2	LF	REMOVE EXISTING 4 FT. DIA. PRECAST CONCRETE WETWELL ACCESS MANHOLE AND REPLACE WITH A 6 FT. DIA. FRP RISER, WITH ALUMINUM HALLADAY SERIES R1R ACCESS DOOR INCLUDES TEMPORARY SHORING TO PROTECT AN ADJACENT FOUNDATION, COMPLETE AND IN PLACE.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
196	S02615-4" DIA.	2	EA	4" TEMPORARY WATERLINE STOP, INSTALLATION AND REMOVAL, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
197	S02615-6" DIA.	2	EA	6" TEMPORARY WATERLINE STOP, INSTALLATION AND REMOVAL, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
198	S02615-8" DIA.	2	EA	8" TEMPORARY WATERLINE STOP, INSTALLATION AND REMOVAL, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
199	S02615-12" DIA.	2	EA	12" TEMPORARY WATERLINE STOP, INSTALLATION AND REMOVAL, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
200	S02615-16" DIA.	1	EA	16" TEMPORARY WATERLINE STOP, INSTALLATION AND REMOVAL, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____
201	S02615-20" DIA.	1	EA	20" TEMPORARY WATERLINE STOP, INSTALLATION AND REMOVAL, COMPLETE AND IN PLACE, EXCAVATION AND BACKFILL WILL BE PAID SEPARATELY.	\$ _____	\$ _____

No.	Bid Item	Quantity	Unit	Item Description	Unit Price	Amount
202	S05520	500	LF	FURNISH AND INSTALL ALUMINUM HANDRAIL, COMPLETE AND IN PLACE.	\$ _____	\$ _____
203	S15121-2	4	EA	FURNISH AND INSTALL A 2" PRESSURE REDUCING VALVE (PRV).	\$ _____	\$ _____
204	S15121-3	5	EA	FURNISH AND INSTALL A 3" PRESSURE REDUCING VALVE (PRV).	\$ _____	\$ _____
205	S15121-8	3	EA	FURNISH AND INSTALL A 8" PRESSURE REDUCING VALVE (PRV).	\$ _____	\$ _____
SCADA SERVICES ALLOWANCE:					\$80,000	
MOBILIZATION ALLOWANCE:					\$350,000	
TOTAL BID INCLUDING ALLOWANCE					\$ _____	

In the event of a mathematical error, the correct product, determined by using the "Unit Price" and "Quantity", and the correct sum, determined by totaling the correct line item Amounts, will prevail over the amount entered by the Bidder. The unit prices shown above will be the unit prices used to tabulate the Bid and used in the Contract, if awarded by the City.

Notes:

- For a more detailed explanation of Bid allowances, see Section 1020.

Optional Information on Bid Prices Submitted by Computer Printout

In lieu of handwritten unit prices in figures in ink on the Bid forms above, Bidders, at their option, may submit an original computer printout sheet bearing certification by, and signature for, the Bidding firm. The unit prices shown on acceptable printouts will be the unit prices used to tabulate the Bid and used in the Contract if awarded by the City. As a minimum, computer printouts must contain all information and in the format shown on the attached page: "Example of Bid Prices Submitted by Computer Printout" form.

If a computer printout is used, the Bidder must still execute that portion of the unit price Bid form which acknowledges the Bid Guaranty, Time of Completion, Liquidated Damages, and all addenda that may have been issued.

Bids with unit prices by computer printout may be rejected, if:

1. The computer printout does not include the required certification, set forth in the attached "Example".
2. The computer printout is not signed in the name of the firm to whom the Project Manual was issued.
3. The computer printout is non-responsive or otherwise omits required Bid items or includes items not shown on the Bid forms in the Project Manual.
4. The other required Bid documents issued by the City are not fully executed as provided above.
5. The signed Section 00300U is not returned with the signed computer printout.

If the Bid submitted by the Bidder contains both the form furnished by the City, completed according to the instructions, and also a computer printout, completed according to the instructions, unit prices of only one will be considered. In this situation, the unit Bid prices shown on the computer printout will be used to determine the Bid.

BID GUARANTY: A Bid guaranty must be enclosed with this Bid, as required in Section 00020 or Section 00020S, in the amount of not less than five percent (5%) of the total Bid. Following the Bid opening, submitted Bids may not be withdrawn for a period of **90 Calendar Days**. Award of Contract will occur within this period, unless mutually agreed between the parties. The Bid guaranty may become the property of the OWNER, or the OWNER may pursue any other action allowed by law, if:

- Bidder withdraws a submitted Bid within the period stated above;
- Bidder fails to submit the required post Bid information within the period specified in Section 00020S or 00100, or any mutually agreed extension of that period;
- or Bidder fails to execute the Contract and furnish the prescribed documentation (bonds, insurance, etc.) needed to complete execution of the Contract within five **5 Calendar days** after notice of award, or any mutually agreed extension of that period.

TIME OF COMPLETION: The undersigned Bidder agrees to commence work on the date specified in the written "Notice to Proceed" to be issued by the OWNER and to complete construction of the improvements, as required by the Project Manual, Drawings and Addenda for the Work. The Work shall occur in various locations across the City and will be assigned through issuance of Work Orders. The Contract time will be for an initial **365, Calendar Day** duration or until all funds are exhausted, with an option for two (2) twelve (12) month Contract extensions. Extensions of the Contract are at the mutual agreement of both the OWNER and the CONTRACTOR. If the CONTRACTOR chooses not to renew, a hold over period of up to 120 Calendar Days may be implemented by the OWNER to allow for re-bidding. The OWNER reserves the right not to offer an extension.

Work under this Contract will be issued as individual Work Orders, as defined within Supplemental General Conditions, Section 00810. The scope of work for each individual Work Order will vary based on the needs at the location(s) the work will occur. In addition, Work to be performed is generally outlined herein in the Summary of Work, Section 01010. Work duration and definitions of Substantial and/or Final completion will be specific to each Work Order. The OWNER will consult the CONTRACTOR on each Work Order assignment, but OWNER will have ultimate discretion on NTP, duration, Substantial, and Final completion. Failure by the CONTRACTOR to satisfy the Substantial/Final completion requirements of any Work Order may be cause to stop issuance of further Work Orders. The CONTRACTOR shall note that there may be multiple individual Work Orders active at any given time.

The CONTRACTOR agrees to commence Work on a given project proposal within **14 Calendar Days** after being given Work Order for planned Work, unless the CONTRACTOR and OWNER agree otherwise, and agrees to diligently execute the WORK. The CONTRACTOR is required to meet within **2 Calendar Days** of this notification. The OWNER may require site visits with the CONTRACTOR to confirm quantities provided by the City and ask for additional clarification. After the quantities are confirmed, and any drawings or new specifications forwarded to the CONTRACTOR, the CONTRACTOR will submit a price and confirm the estimated time of completion within **7 Calendar Days**. The price submitted for each Work Order including a OWNER agreed contingency will be the maximum price allowed for CONTRACTOR to bill unless otherwise agreed by OWNER. Once the City's designated agent has reviewed and approved the proposal, a Work Order Notice-To-Proceed will be issued to the CONTRACTOR.

The Notice-To-Proceed will identify the authorized amount, Substantial completion date, and Final completion date. If time of completion cannot be agreed upon or the OWNER would like to proceed using the "Cost of Work" method as described in the General Condition Section 00700 to issue the Work Order using Time and Materials, CONTRACTOR will proceed with the Work Assignment and within **5 Calendar Days** submit a detailed schedule outlining the work items and time of completion for OWNER'S review. After the completion of any work using "Cost of Work" method the CONTRACTOR will turn in a detailed invoice unit item invoice detailing the work completed in OWNER approved sufficient detail. Mobilization must begin upon the date specified in the Notice-To-Proceed on the initial contract and within **2 Calendar Days** of all subsequent Work Order Notice-To-Proceeds. The CONTRACTOR agrees to commence productive work immediately on emergency projects and to work continuously unto the emergency is resolved. Time is of the essence and all Work shall be completed within the time duration stated in each Work Order.

Work contained within individual Work Orders will vary based on the scope of Work. The undersigned Bidder agrees to commence work within the **Calendar Days** after written notice as specified in each Work Order. An individual Work Order may define a Substantial completion and Final completion date, after which liquidated damages will be assessed until Substantial completion is achieved, in accordance with the Bid Form, Section 00300U. If a Substantial completion date is defined, Final completion shall be achieved within a maximum of **30 Calendar Days** after substantial completion of the Work indicated in the Work Order.

The Bidder further agrees that should the Bidder fail to **substantially complete the Work or finally complete the Work** for the entire Project within the number of days indicated in the Bid or

as subsequently adjusted or as defined for each Work Order as defined by the applicable Work Order, Bidder shall pay the liquidated damages for each consecutive day thereafter as provided below; unless the OWNER elects to pursue any other action allowed by law.

WAIVER OF ATTORNEY FEES: In submitting its bid, in consideration for the waiver of its right to attorney's fees by the OWNER, the Bidder knowingly and intentionally agrees to and shall waive the right to attorney's fees under Section 271.153 of the Texas Local Government Code in any administrative proceeding, alternative dispute resolution proceeding, or litigation arising out of or connected to any Contract awarded pursuant to this solicitation process.

LIQUIDATED DAMAGES: The Bidder understands and agrees that Contact Time is of the essence. The Bidder and OWNER further agree that the OWNER's actual damages for delay caused by failure to timely complete the Project are difficult, if not impossible to measure. However, with respect to the additional administrative and consultant costs to be incurred by OWNER, the reasonable estimate of such damages has been calculated and agreed to by OWNER and Bidder. Therefore, the Bidder and the OWNER agree that for each and every **Calendar Day** the work or any portion thereof, as designated in a Work Order or Emergency on-call, remains incomplete after the **Substantial and Final** completion date as established by the above paragraph, "Time of Completion" payment will be due to the OWNER in the amount of **\$300** dollars per **Calendar Day** for the Work within each Work Order, as liquidated damages, not as a penalty, but for delay damages to the OWNER. Such amount shall be deducted by the OWNER from any Contract payment due. In the event of a default or breach by the CONTRACTOR and demand is made upon the surety to complete the project, in accordance with the Contract Documents, the surety shall be liable for liquidated damages pursuant to the Contract Documents in the same manner as the CONTRACTOR would have been.

In addition, the CONTRACTOR will be required to have someone available at all times during the Contract to provide emergency on-call services as required by Special Specification 02555, Emergency Repairs, including response times. If, in the opinion of the OWNER's Representative, appropriate effort or progress has not been made by the CONTRACTOR to respond and mobilize to the Emergency Repair, the OWNER may terminate the contract.

OWNER reserves the right to reject any or all Bids and to waive any minor informality in any Bid or solicitation procedure (a minor informality is one that does not affect the competitiveness of the Bids).

The undersigned acknowledges receipt of the following addenda:

- Addendum No. 1 dated _____ Received _____
- Addendum No. 2 dated _____ Received _____
- Addendum No. 3 dated _____ Received _____
- Addendum No. 4 dated _____ Received _____
- Addendum No. 5 dated _____ Received _____

Secretary, *if Bidder is a Corporation

Bidder

(Seal)

Authorized Signature

Title

Date

Address

Telephone Number / FAX Number

Email Address for Person Signing Bid

Email Address for Bidder's Primary Contact Person

* Copy of Corporate Resolution and minutes with certificate of officer of Bidder as to authority of signatory to bind Bidder is to be signed and dated no earlier than one week before Bid date, and attached to this document.

EXAMPLE: BID PRICES SUBMITTED BY COMPUTER PRINTOUT

Project Name:
CIP ID #:
IFB #:

Bid Item #	Bid Item Description	Unit	Qty	Unit Bid Price	Total Amount
Total Bid:					

(YOUR FIRM'S NAME) certifies that the unit prices shown on this completed computer printout for all of the bid items and the alternates contained in this proposal are the unit prices intended and that its Bid will be tabulated using these unit prices and no other information from this printout. (YOUR FIRM'S NAME) acknowledges and agrees that the total bid amount shown will be read as its total bid. *In the event of a mathematical error*, the correct product, determined by using the "Unit Price" and "Quantity", and the correct sum, determined by totaling the correct line item Amounts, will prevail over the amount entered by the Bidder.

Signed: _____

Title: _____

Date: _____

End

Bidding Requirements, Contract Forms and Conditions of the Contract
STATEMENT OF BIDDERS EXPERIENCE
Section 00400

Project Name: Rebid Facilities & Force Main Services Indefinite Delivery/Indefinite Quantity

IFB Number: 6100 CLCM 464A

CIP ID Number: 9084.001

Bidder must complete all Attachments to Section 00400 clearly and comprehensively. If necessary, responses may be continued on separately attached sheets.

To be considered a responsive bidder, Bidder must complete and submit Attachments A, B, C, and D with its Bid in accordance with Article 7, Section 00100. The Bidder agrees that, in addition to determining the apparent low Bid, the Owner will consider the responsibility of the Bidders in awarding a Contract for this Project. In addition, the three (3) apparent low Bidders may also be required to submit Attachments E through J within three (3) days of notification from the OWNER. If none of the three (3) apparent low Bidders are deemed responsible, the OWNER may notify the next three (3) lowest apparent Bidders, who will be required to submit Attachments E through J for review, and so on, until a Contract is awarded. Any information in Attachments A through J that indicates the Bidder or a "Subcontractor" is not responsible or that might negatively impact a Bidder's ability to complete the Work within the Contract Time and for the Contract Price may result in the Bid being rejected.

The Bidder is responsible for the accuracy and completeness of all of the information provided by the Bidder or a proposed Subcontractor in response to this Invitation for Bids.

BID SUBMITTALS

ATTACHMENT A – BIDDER'S INFORMATION

ATTACHMENT B – EXPERIENCE REQUIREMENTS (GENERAL CONTRACTOR)

ATTACHMENT C – PROJECT MANAGER AND SUPERINTENDENT EXPERIENCE

ATTACHMENT D – BIDDER'S AUTHENTICATION

POST-BID SUBMITTALS

ATTACHMENT E – EXPERIENCE REQUIREMENTS (SPECIFIC CONSTRUCTION OR TECHNICAL EXPERIENCE)

ATTACHMENT F – AVAILABLE EQUIPMENT

ATTACHMENT G – AVAILABLE WORKFORCE

ATTACHMENT H – CURRENT PROJECTS

ATTACHMENT I – COMPLETED PROJECTS

ATTACHMENT J – BIDDER'S AUTHENTICATION

ATTACHMENT A
BIDDER'S INFORMATION

(Complete and submit with the Bid)

IFB Number: CLCM 464A _____

CIP ID Number: 9084.001 _____

A. Name of Bidder: _____

B. Bidder's Permanent Address: _____

C. Bidder's Phone No.: () _____ - _____

D. Number of years in business under current company name: ____

(Note: Bidder must have been in existence for a minimum of one (1) year under its current company name. Changes in company name during the experience period are acceptable, if the continuity of the company can be demonstrated. Attach separate documentation, if applicable.)

If Bidder answers "YES" for any of questions E through H, Bidder must attach separate sheets with a brief description or explanation of the answer and provide pertinent contact information (parties' names, addresses and telephone numbers).

E. Has the Bidder ever defaulted on a contract?

YES (___) NO (___)

F. Are there currently any pending judgments, claims, or lawsuits against the Bidder?

YES (___) NO (___)

G. Does Bidder currently have any pending claims, judgments or lawsuits against any prior client?

YES (___) NO (___)

H. Is the Bidder or its principals involved in any bankruptcy or reorganization proceedings?

YES (___) NO (___)

ATTACHMENT B
EXPERIENCE REQUIREMENTS (GENERAL CONTRACTOR)

(Complete and submit with the Bid)

IFB Number: CLMC 464A_____

CIP ID Number: 9084.001_____

GENERAL CONTRACTOR EXPERIENCE

Bidder must list and describe Bidder's (not proposed subcontractors') construction experience as a general contractor for a minimum of three (3) successfully completed projects of comparable scope and complexity to the Work described in the Contract Documents. Bidders should refer to the 1.2 Description of Work section in contract document 01010 Summary of Work to determine what is reasonably comparable. Decisions on "comparability" are at the complete discretion of the OWNER.

Bidder must have completed the projects within the past five (5) years.

PROJECT NO. 1:

Name of Project: _____

Location: _____

OWNER's Name and Address: _____

OWNER's Contact Person (Print): _____

Phone/Fax No.: _____ / _____

Initial Contract Price: _____

Final Contract Price: _____

Contract Start Date: _____ (*Date of Notice To Proceed*)

Contract Time: _____ () *Calendar Days* () *Working Days*

Contract Substantial Completion Date: _____

Actual Substantial Completion Date: _____

If contract time extensions were added to the contract as a result of Bidder's responsibilities, provide a short explanation of each.

Project Description and why it is comparable to this Contract:

PROJECT NO. 2:

Name of Project: _____

Location: _____

OWNER's Name and Address: _____

OWNER's Contact Person (Print): _____

Phone/Fax No.: _____ / _____

Initial Contract Price: _____

Final Contract Price: _____

Contract Start Date: _____ (*Date of Notice To Proceed*)

Contract Time: _____ () *Calendar Days* () *Working Days*

Contract Substantial Completion Date: _____

Actual Substantial Completion Date: _____

If contract time extensions were added to the contract as a result of Bidder's responsibilities, provide a short explanation of each.

Project Description and why it is comparable to this Contract:

PROJECT NO. 3:

Name of Project: _____

Location: _____

OWNER's Name and Address: _____

OWNER's Contact Person (Print): _____

Phone/Fax No.: _____ / _____

Initial Contract Price: _____

Final Contract Price: _____

Contract Start Date: _____ (*Date of Notice To Proceed*)

Contract Time: _____ () *Calendar Days* () *Working Days*

Contract Substantial Completion Date: _____

Actual Substantial Completion Date: _____

If contract time extensions were added to the contract as a result of Bidder's responsibilities, provide a short explanation of each.

Project Description and why it is comparable to this Contract:

ATTACHMENT C
PROJECT MANAGER & SUPERINTENDENT EXPERIENCE

(Complete and submit with the Bid)

IFB Number: CLMC 464A _____

CIP ID Number: 9084.001 _____

Bidder must attach resumes for the Project Manager and Superintendent who will be assigned to this project. The resumes must demonstrate that these individuals have worked on at least three (3) similar, successfully completed projects in the capacity of Project Manager or Superintendent, or other responsible supervisory capacity, as applicable, during the last 10 years.

Project Manager (name): _____

Superintendent (name): _____

(Insert Resumes & Experience)

ATTACHMENT D

(Complete and submit with the Bid)

IFB Number: CLMC 464A _____

CIP ID Number: 9084.001 _____

AUTHENTICATION

THE STATE OF TEXAS

COUNTY OF TRAVIS

I certify that the responses and information in Attachments A, B, and C are true and correct to the best of my personal knowledge and belief and that I have made no willful misrepresentations in this Section, nor have I withheld any relevant information in my statements and answers to questions. I am aware that the information given may be investigated and I hereby give my full permission for any such investigation and I fully acknowledge that any misrepresentations or omissions in my responses and information may cause my bid to be rejected.

Bidder's full name and entity status:

Signature, Authorized Representative of Bidder

Title

_____, 20

Date

ATTACHMENT E**SPECIFIC CONSTRUCTION EXPERIENCE (GENERAL CONTRACTOR OR SUBCONTRACTOR PERFORMING THE WORK)**

Bidder must provide the following project history information for each Construction Experience requirement listed below. OWNER may in its reasonable discretion deem the provided experience information insufficient and reject the Bid.

For each Construction Experience item listed below, list and describe the applicable Construction Experience for a minimum of three (3) successfully completed projects of comparable size, scope, and complexity to the Work described for this project. Comparability requirements may be spread among the three (3) projects per item submitted, e.g. One Project may demonstrate comparable size, another Project may demonstrate comparable scope and another may demonstrate comparable complexity. Decisions on "comparability" are at the complete discretion of the OWNER.

The Work must have been performed within the past five (5) years.

Bidder must provide all requested information in a complete, clear, and accurate manner. If necessary, additional information may be provided on separate attached sheets. Failure to provide any requested information may cause the Bid to be rejected by OWNER as non-responsive.

If the Bidder proposes to fulfill any specific construction experience requirement with subcontracted resources, the applicable Subcontractor must be included in the Bidder's Original MBE/WBE Compliance Plan. Failure to include subcontractors on the MBE/WBE Compliance Plan may render your bid non-responsive.

SPECIFIC CONSTRUCTION EXPERIENCE ITEMS REQUIRED:

1. Water or Wastewater facility project experience including the installation of large rotating mechanical equipment (I.E Motors > 500HP).
2. Welding experience on welded steel pipe (I.E. AWWA C200) and/or steel cylinder pipe (I.E. AWWA C301 and/or C303)
3. Emergency lift station repair
4. Provide information to demonstrate that Contractor/Subcontractor has the following minimum experience as an Electrical Contractor in the municipal industry - water treatment plants, wastewater treatment plants, water pump stations and wastewater lift stations for the last five (5) years specifically in furnishing, installing and calibrating the following: 1) medium voltage and low voltage electrical distribution systems including electrical design services, electrical planning services, electrical startup & trouble shooting services and electrical testing services, 2) grounding systems, 3) emergency power systems, 4) lighting systems, 5) instrumentation & control systems. Provide information on completed projects similar in size, scope and complexity that incorporate each of the five (5) categories stated above.
5. Provide information to demonstrate that Contractor/Subcontractor has the following minimum experience as a Process Control and Instrumentation System (PCIS) Supplier in the municipal water and wastewater market:

Have been in business under the same ownership/management for several years, designing, building PLC-based control panels, and maintaining approximately five thousand (5,000) square feet of environmentally controlled space dedicated to the production, assembly and check-out of custom control panels. Organization must be able to provide a certified UL-508 control panel facility; maintain a permanent, fully staffed and equipped service facility for the project, and capable of providing on-site response within twenty four (24) hours; providing a licensed radio communication system and high speed radio communication system. Provide information on completed projects similar in size, scope and complexity that fit each of the categories in the table below.

CATEGORY Note: A single project may be used for more than one (1) Category	Minimum No. of Projects to be provided	PROJECT NAME
Category 1: Procurement, Installation, configuration and start-up for MODBUS communication protocol to the proposed power monitors and motor management relays (GE Multilin)	2	Project 5.1.A: Project 5.1.B:
Category 2: Configuration, and Start-up for Schneider Quantum PLC based control system.	2	Project 5.2.A: Project 5.2.B:
Category 3: Installing, programming, configuring and starting of Modicon Quantum and/or M349PLCs	3	Project 5.3.A: Project 5.3.B: Project 5.3.C:
Category 4: Installation, configuration and start-up for radio communication systems	2	Project 5.4.A: Project 5.4.B:
Category 5: Installation, configuration and start-up for pressure, temperature, and flow transmitters	3	Project 5.5.A: Project 5.5.B: Project 5.5.C:

The Bidder shall complete and duplicate the following specific Construction Experience Form as required to provide the requested documentation for a minimum of three (3) successfully completed projects for each of the above specific Construction Experience requirements.

CONSTRUCTION EXPERIENCE DOCUMENTATION FORM

EXPERIENCE ITEM NUMBER: _____

Project Number: _____

Does Bidder plan to self perform this work? YES (____) NO (____)

If "NO", provide the following Subcontractor information:

Company Name: _____

Permanent Address: _____

Phone Number: _____

Number of years Subcontractor has been in business under current company name: _____

Name of Project: _____

Location: _____

OWNER's Name: _____

OWNER's Address: _____

OWNER's Contact Person (Print): _____

Phone/Fax No.: _____ / _____

Initial Contract Price: _____

Final Contract Price: _____

Contract Start Date: _____ (*Date of Notice To Proceed*)

Contract Time: _____ () *Calendar Days* () *Working Days*

Contract Substantial Completion Date: _____

Actual Substantial Completion Date: _____

If contract time extensions were added to the contract as a result of Bidder's responsibilities, provide a short explanation of each.

Project Description and why it is comparable to the size, scope, and/or complexity for this item:

ATTACHMENT F

AVAILABLE EQUIPMENT LIST

(To be returned within three (3) days of notification)

Name of Bidder: _____

IFB Number: CLMC 464A _____

CIP ID Number: 9084.001 _____

Provide a list of equipment that is available to the CONTRACTOR or its Subcontractor(s) and is specifically intended to be used on the Work under this Contract. Also indicate whether the equipment is owned or will be leased by the CONTRACTOR and/or Subcontractor(s).

<u>EQUIPMENT</u>	<u>OWNED OR LEASED</u>	<u>COMMITTED TO ANOTHER PROJECT?</u>	<u>AVAILABLE / RELEASE DATE</u>
		(Yes / No)	

Use additional pages, as necessary

**ATTACHMENT G
AVAILABLE WORKFORCE**

(To be returned within three (3) days of notification)

Name of Bidder: _____

IFB Number: CLMC 464A _____

CIP ID Number: 9084.001 _____

Provide a list of the available workforce for the various disciplines and crafts required for the Work on this Project, including the number of work crews, and number and worker classification for each equipment operator, mechanic, and laborer for that portion of the Work that Bidder will actually perform.

Number of Anticipated Work Crews: _____

<u>DISCIPLINE OR CRAFT</u>	<u>NO. OF EMPLOYEES</u>	<u>COMMITTED TO ANOTHER PROJECT?</u> (Yes / No)	<u>AVAILABLE / RELEASE DATE</u>
----------------------------	-------------------------	--	---------------------------------

Professional (specify)

Superintendent

Technical (specify)

Skilled Workers (specify)

Semiskilled Workers (specify)

Equipment Operators (list)

Other

Other

Use additional pages, as necessary

ATTACHMENT H

CURRENT PROJECT LISTING (INCLUDING ALL CITY OF AUSTIN PROJECTS)

(To be returned within three (3) days of notification)

Name of Bidder: _____

IFB Number: CLMC 464A _____

CIP ID Number: 9084.001 _____

Provide a list of all current projects, including *all City of Austin projects*. Include the following for all jobs that Bidder is currently committed to or has currently underway: brief statement regarding the job type; estimated project duration; project contact; and project description.

Name of Project: _____ Location: _____

Type of Job: _____ City of Austin Job? Yes / No

Project Start Date: _____ Estimated Completion Date: _____

Project Contact: _____

Brief Description: _____

Name of Project: _____ Location: _____

Type of Job: _____ City of Austin Job? Yes / No

Project Start Date: _____ Estimated Completion Date: _____

Project Contact: _____

Brief Description: _____

Name of Project: _____ Location: _____

Type of Job: _____ City of Austin Job? Yes / No

Project Start Date: _____ Estimated Completion Date: _____

Project Contact: _____

Brief Description: _____

Name of Project: _____ Location: _____

Type of Job: _____ City of Austin Job? Yes / No

Project Start Date: _____ Estimated Completion Date: _____

Project Contact: _____

Brief Description: _____

Use additional pages, as necessary

ATTACHMENT I

COMPLETED PROJECTS (INCLUDING ALL CITY OF AUSTIN PROJECTS)

(To be returned within three (3) days of notification)

Name of Bidder: _____

IFB Number: **CLMC 464A** _____

CIP ID Number: **9084.001** _____

Provide a list of all completed projects, including all City of Austin projects that Bidder has completed in the past five (5) years by calendar year (or life of company if less than five (5) years). Include the following: a brief statement regarding the job type, the estimated project duration, project contact, and project description.

Calendar Year of _____

Name of Project: _____ Location: _____

Type of Job: _____ City of Austin Job? Yes / No

Project Duration: _____ Project Contact: _____

Brief Description: _____

Name of Project: _____ Location: _____

Type of Job: _____ City of Austin Job? Yes / No

Project Duration: _____ Project Contact: _____

Brief Description: _____

Name of Project: _____ Location: _____

Type of Job: _____ City of Austin Job? Yes / No

Project Duration: _____ Project Contact: _____

Brief Description: _____

Name of Project: _____ Location: _____

Type of Job: _____ City of Austin Job? Yes / No

Project Duration: _____ Project Contact: _____

Brief Description: _____

Use additional pages as necessary to achieve a representative listing covering 5 years

**ATTACHMENT J
BIDDERS AUTHENTICATION**

(To be returned within three (3) days of notification)

Name of Bidder: _____

IFB Number: CLM 464A _____

CIP ID Number: 9084.001 _____

THE STATE OF TEXAS

COUNTY OF TRAVIS

I certify that my responses and the information provided in Attachments E-I are true and correct to the best of my personal knowledge and belief and that I have made no willful misrepresentations in this Section, nor have I withheld any relevant information in my statements and answers to questions. I am aware that any information given by me in this Section may be investigated and I hereby give my full permission for any such investigation and I fully acknowledge that any misrepresentations or omissions in my responses and information may cause my bid to be rejected.

Bidder's full name and entity status:

Signature, Authorized Representative of Bidder

Title

Date

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Documents related to this section will include Special Provision SP700S, Mobilization, 17000 Series Special Specifications, the construction drawings and general provisions of the Contract, including the General Conditions, Section 00700, Supplemental General Conditions, Section 00810, and other Division 1 requirements.

1.2 SUMMARY

This section includes administrative and procedural requirements governing allowances. Site mobilizations for personnel, equipment and materials are specified herein by the use of allowances. Technical services associated with Supervisory Control and Data Acquisition (SCADA) to be determined on an as needed basis and as specified are also included via the use of an allowance.

USE OF ALLOWANCES:

- Allowances are for discretionary use as directed for the OWNER's purposes.
- The SCADA Services allowance shall allow for the hiring of a competent firm, with the OWNER's approval, to perform these services. Due to the criticality of these systems, the firm doing these services must have direct experience in programming and configuration of this particular SCADA system. The selected firms shall be specifically approved by OWNER. The CONTRACTOR must submit information related to the personnel selected to provide services for review and approval by the OWNER.
- It is understood that the CONTRACTOR has included in the Contract Price all allowance so named in the Contract Documents and shall cause the work so covered to be performed for such sums as may be acceptable to OWNER.
- CONTRACTOR agrees that the allowance include the cost to CONTRACTOR (less any applicable trade discounts) or material and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and CONTRACTOR's costs for unloading and handling of the site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowances have been included in the allowances, and will be paid per contract provisions.
- CONTRACTOR must furnish work and items in accordance with Specification Section 01300, "Submittals"
- CONTRACTOR must submit invoices to indicate actual quantity of services delivered to the site for use in the fulfillment of each allowance.
- At project closeout, credit unused amounts remaining in the allowance to the remaining balance of the contract for OWNER's discretionary use.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

A. Mobilization

A mobilization allowance is being established by the Owner to allow comparison of bid prices for the Work. The Contractor will be paid for mobilization of personnel, equipment and materials at the Work site from this allowance. Typically, only one mobilization will be paid per Work Order. Refer to Special Provision SP700S, Mobilization, for additional information and pay structure.

Mobilization Allowance: \$350,000

B. SCADA Services

A SCADA Services allowance for technical services shall be provided and charged for the following service categories at the rates to be provide by the Contractor following the issuance of the Notice to Proceed:

Scheduled Service (Services schedule two (2) weeks in advance; i.e. Annual Calibrations, Monthly Services, Misc. Projects, Training, etc.);

Hourly rate for straight time plus expenses to be provided

Hourly rate for overtime plus expenses to be provided

Emergency (Demand) On-Site Service (Services required within one (1) day of notice);

Hourly rate for straight time plus expenses to be provided

Hourly rate for overtime plus expenses to be provided

Telephone/Dial up Support (Services performed off site with the use of telephone, or PCAnywhere Support);

Hourly rate for straight time to be provided

Hourly rate for overtime to be provided

Scheduled Services may include complete system checkouts including computers, networks and equipment, software, PLC's and RTU's testing. Upgrades of SCADA software application programs to the latest version. Planned SCADA infrastructure improvements, etc.

Demand service calls consist of a telephone call back to the customer within one (1) hour of page or message. Emergency on-site services consist of technical assistance being on-site within twenty four (24) hours of call. Communication between the technician and customer will remain open during this time period. Upon an emergency service call, a minimum of four (4) hours will be charged.

Labor rates shall include all payroll taxes, benefits, hand tools, overhead and profit. Straight time rates apply for all hours worked during the normal eight (8) hour day, Monday through Friday. Overtime rates shall apply for all hours worked in excess of the normal eight (8) hour day and all day Saturday and Sunday.

Other Rates:

Other rates that may be charged on a "Time and Material" basis to address specific project needs and as identified and agreed upon in the scope of work. If applicable, these descriptions and rates shall be annotated in the quote for review and approval by the City of Austin prior to any work commencing.

PROFESSION/TRADE	STRAIGHT TIME HOURLY RATE	OVERTIME HOURLY RATE
Electrical/Control Sys. Engineer	<u>to be provided</u>	<u>to be provided</u>
Sr. I&C Technician	<u>to be provided</u>	<u>to be provided</u>
I&C Technician	<u>to be provided</u>	<u>to be provided</u>
Masters Electrician	<u>to be provided</u>	<u>to be provided</u>
Journeyman	<u>to be provided</u>	<u>to be provided</u>
E I&C Installer	<u>to be provided</u>	<u>to be provided</u>
Panel Assembler	<u>to be provided</u>	<u>to be provided</u>

An allowance of \$80,000 has been included in the base bid price for these services. The Bidder shall provide rates indicated as "to be provided" for the proposed straight time and overtime hourly rates for each category indicated above. These rates will be utilized to charge against the allowance included in the contract.

SCADA Services Allowance: \$80,000

PART 4 - MEASUREMENT AND PAYMENT:

- The CONTRACTOR will be paid for mobilization of personnel, equipment and materials at the WORK site. Typically, only one mobilization will be paid per Work Order. Refer to Special Provision SP700S, Mobilization, for additional information and pay structure.
- Measurement and payment for work performed under the SCADA Services Services shall be shown as a dedicated item with a short description in the associated Work Order invoice.

END

SANITARY FACILITIES MODIFICATIONS AND REHAB SECTION S01521

PART 1 GENERAL

1.01 SUMMARY

The construction activities included under this contract may include any construction necessary for the operation, maintenance, modifications, and rehabilitation of the Water or Wastewater distribution, collection or treatment system. These construction activities may include, but are not limited to:

- A.** Demolish, remove, replacement and disposal of numerous water and wastewater system components to improve the performance, expand the capacity, lengthen the useful life or make it possible to put that component back in service.

1.02 Definitions

- A. This is not used in this specification.**

1.03 References

This specification references other parts of this manual including those listed below, but not limited to, which are a part hereof by reference and shall be the latest edition and revision thereof.

- A.** City Standard Specifications
- B.** City Standards
- C.** AWU Standard Products List
- D.** S11305 and related Sections
- E.** S11312 and related Sections
- F.** S13040 and related Sections
- G.** S13215 and related Sections
- H.** S15104 and related Sections
- I.** S15500 and related Sections
- J.** S16010 and related sections
- K.** S16110 and related sections

PART 2 PRODUCTS

SANITARY FACILITIES MODIFICATIONS AND REHAB SECTION S01521

2.01 Materials

All materials use on this Contract must comply with City of Austin Standard Specifications and Standard Product Lists or receive specific approval by the Owner.

- A.** Materials must comply with all related sections of this manual.

2.02 Submittals

- A.** Contractor must submit shop drawings, material and product data for each product, and material used unless specifically excluded from submittals.
- B.** All submittals must be received and approved by the Engineer prior to commencing work.
- C.** Contractor needs to follow items A and B if there are any changes from the approved submittals.

PART 3 EXECUTION

3.01 GENERAL

- A.** Contractor must follow all the construction methods and sequencing as they are listed in the specific specifications referenced for the work related to that item.
- B.** Refer to Section 01010, Summary of Work for General Sequence of Work and other requirements.
- C.** The Contractor is required to take pre and post construction photos. This Work is to be subsidiary of the all pay items unless specifically waived by the Owners Rep. on site at the time of construction.
- D.** The Contractor must perform a preliminary site visit to each project site within a Work Order. The Contractor must field verify the flow line elevations, grades, and levels of the work specified on each project site within a Work Order prior to mobilization. This Work is to be subsidiary of the pipe pay items. The Contractor must notify the Owner's Representative in writing of anything that would prevent or alter the Work specified on the issued Work Order.
- E.** The Contractor must submit to the Owner Representative a tree list similar to the one provided in this contract documents for each tree size 8" caliper, except in parkland where requirement is 3" caliper, or greater located within the limits of construction for each project site within a Work Order prior to mobilization
- F.** Spot Repair
Contractor must use pipe and adapters from the appropriate Standard Products List for spot repairs.
- G.** By-Pass Pumping
 - 1. Install and operate by-pass pumping equipment as required to maintain sewage flow and to prevent backup or overflow. Contractor must comply with Special Specification 01540 - By-Pass Pumping.

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2. Under no circumstances will discharge of raw sewage on private property, public right-of-way, streets, into lake, streams, storm sewers be allowed.

H. Dewatering Excavation

Reference to Item 510.3.8, Contractor must submit a dewatering method to the Owner Representative and General Permit Coordinator-WPDRD for approval prior to construction.

- I.** All sidewalk and driveway repair between sidewalk must be completed replaced with concrete within twenty-four (24) hours of installation of wastewater work, typically a service. Cold mix asphalt must be used for the time period that the concrete is not in-place.
- J.** Staging areas will not be identified for these projects. If the contractor procures a staging area in private property, the contractor must obtain a signed Right of Entry form and the AWU will submit a plan revision to the General Permit. All costs associated with the use and restoration of a Contractor obtained staging area will be borne directly by the Contractor. The storage of material including pipe, manholes, bedding, spoils, cold mix, etc. is prohibited in the ROW. The overnight parking or storage of an excavator, loader, shoring, portable toilet, traffic control devices, etc in the ROW may be granted or prohibited by the ROW Management office on a case by case basis. Contractor shall be prepared to remove all equipment on a daily basis.
- K.** All pavement, curb, sidewalk and driveway repair must be initiated within three (3) weeks of last installation of wastewater work (service or main), weather permitting. At locations where adjacent wastewater segments are re-laid, the restoration may be required on each work order. The Owner may choose to not issue next Work Order to the Contractor until the restoration is completed.
- L.** The health and safety of the contractor's employees is the responsibility of the Contractor; however, basic sanitation procedures are included in this section. The contractor must provide a portable toilet at each construction location. Hand washing facilities with soap and water and sanitizing gel must be available for employee usage. Employees working in direct contact with sewage must have adequate personal protective equipment; including, waterproof work gloves, and rubber boots. Ear plugs or ear muffs must be available. When cutting concrete and asphalt, dust must be controlled.

3.02 – 3.10 (Not Used)

3.11 Measurement and Payment

A. Measurement

Products, Materials, and Services listed and/or references in this section shall be measured per the units listed in Section 00300 Bid Form.

1. Demolish, remove, and disposal of the existing 8 ft. I.D. wet well top slab, and replace with new reinforced concrete slab, complete and in place with all ancillary embedded items used in standard submersible pump lift station, Complete and in place.

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2. Demolish, remove, and disposal of existing 10 ft. I.D. wet well top slab, and replace with new reinforced concrete slab, complete and in place with all ancillary embedded items used in standard submersible pump lift station. Ancillary items include conduit openings for power and control wiring, wire and chain support hooks, and Flygt safety hatch or equal. Complete and in place.
3. Demolish, remove, and disposal of existing 19 ft. square wet well top slab, and replace with new 12 inch reinforced concrete slab, complete and in place with all ancillary embedded items used in standard submersible three pump lift station. If precast provide appropriate lifting hardware and added reinforcement. Minimum reinforcement is thirty nine #9 rebar each way equally spaced each way with 3 inch bottom cover arranged to clear hatches and #6 at 18" each way top rebar with 8 #6 rebar added around each opening. Ancillary items include conduit openings for power and control wiring, wire and chain support hooks, and Flygt safety hatch or equal. Complete and in place.
4. Provide and install 500 gallon composite steel rectangular fuel tank installed on an 8 inch reinforced slab on grade, ConVault or equal, with integral secondary containment and ancillary equipment. Complete and in place.
5. Prepare subgrade and place 4 inch site paving with No 4, 60 grade rebar, at 18 inches each way, complete and in place, with expansion joints at every existing corner, and 1/4 inch fiberboard adjacent to all obstructions, Complete and in place.
6. Provide and install an ASTM C 478 pipe 10 foot diameter set on end to extend the wall height of an existing wetwell, with sealed joint top and bottom and coated on the outside with coal tar epoxy per Section 09900 and on the inside with 80 mil thickness of coating from SPL 511. Complete and in place.
7. Provide and Install one wastewater pump KSB D80-315 or equal with impeller trimmed for the required flow and head, complete with rails, bracing, Flygt or equal hatch, and other ancillary items, as listed in Section 11305, to make a complete and operable unit (20 HP min., 25 hp max., 1800 rpm max., 285 gpm at 87 ft. TDH). Complete and in place.
8. Provide and Install one wastewater pump KSB KRT D 150-400 or equal with impeller trimmed for the required flow and head, complete with rails, bracing, Flygt or equal hatch, and other ancillary items, as listed in Section 11305, to make a complete and operable unit (32 HP min., 40 HP max., 1800 rpm max., 720 gpm at 72 ft. TDH). Complete and in place.
9. Provide and Install one wastewater pump KSB KRT D100-316 or equal with impeller trimmed for the required flow and head, complete with rails, bracing, Flygt or equal hatch, and other ancillary items, as listed in Section 11305, to make a complete and operable unit (10 HP min., 15 hp max., 1800 rpm max., 470 gpm at 36 ft. TDH). Complete and in place.
10. Provide and install one 8 inch progressive cavity pump, 20 hp, 300 gpm, 50 psi each, as described in Section 11312, to replace existing pumps. Remove existing pumps, place a new 4-inch concrete housekeeping pad, replace 8-inch check valve and plug valve and modify piping for inlet and

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outlet connections. Use existing electrical and connect to new pumps. Check Valve and Plug Valve paid separately. Complete and in place.

11. Provide and install one 12 inch progressive cavity pumps, 20 hp, 300 gpm, 50 psi each, as described in Section 11312, to replace existing pumps. Remove existing pumps, place new 4-inch concrete housekeeping pad, replace 12-inch check valve and plug valve and modify piping for inlet and outlet connections. Use existing electrical and connect to new pumps. Check Valve and Plug Valve paid separately. Complete and in place.
12. Provide and install a pump around vault and piping modifications complete and in place installed on an existing 6 inch force main, including a concrete vault equal to a flow meter vault, 2 - 6" gate valves, a wye fitting, 6x4 reducer, 4" connection nozzle, and concrete lid with 32 inch removable manhole cover. Complete and in place.
13. Provide and install a 4 ft. diameter flow meter vault complete and in place on an existing 6 inch to 12 inch force main up to 6 feet deep, complete with 32 inch minimum lid on cover. Conduit and flow meter or pump around pipe fittings provided and installed separately. Complete and in place.
14. Installation of a pump around arrangement complete and in place installed on an existing 6 inch to 12 inch force main using DIP components furnished by other units, in an existing vault or a vault provided separately. Complete and in place.
15. Clean, Repair, and Rehabilitate the existing 8 ft. diameter wet well up to 20 feet deep, grout fill level including miscellaneous repairs, removal of unused pipes and replacement of 2 inch sump pump discharge pipe exposed end fitting and embedded wall pipe as required. Preparation and coating with SPL WW-511 product shall include all exposed concrete areas. Complete and in place.
16. Clean, Repair, and Rehabilitate the existing 10 ft. diameter wet well up to 20 feet deep, grout fill level including miscellaneous repairs, removal of unused pipes and replacement of 2 inch sump pump discharge pipe exposed end fitting and embedded wall pipe as required. Preparation and coating with SPL WW-511 product shall include all exposed concrete areas. Complete and in place.
17. Remove existing 72 inch Rodney Hunt cast iron sluice gate and replace with Fontaine, Model 204, Series 20 or equal 304L stainless steel Slide Gate, mounted on the existing wall thimbles, complete and in place with a geared 40 lb. hand crank operator in an existing wastewater treatment structure. Complete and in place.
18. Provide and install 6" flange x flange check valve, Val-matic Surgebuster or equal in an existing confined entry vault below grade with external indicator and short backflow plunger. Complete and in place.
19. Provide and install 8" flange x flange check valve, Val-matic Surgebuster or equal in an existing confined entry vault below grade with external indicator and short backflow plunger. Complete and in place.

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20. Provide and install 10" flange x flange check valve, Val-matic Surgebuster or equal in an existing confined entry vault below grade with external indicator and short backflow plunger. Complete and in place.
21. Provide and install 12" flange x flange check valve, Val-matic Surgebuster or equal in an existing confined entry vault below grade with external indicator and short backflow plunger. Complete and in place.
22. Remove and replace existing 18 inch actuated ballcentric valve and flow meters and replace with 18 inch FL X FL actuated Pinch Valve, Red Valve series 5200E or approved equal, with electrically actuation capable of modulation with external stroke adjustment and spool piece as required. Reconnect existing electrical power for manual operation, updating the modulation controls are separate. Complete and in place.
23. Remove existing 30 inch actuated cone valve and actuator. Replace with 30 inch FL X FL metal seated ball valve with electrical actuator capable of providing an operating stroke of up to 7 minutes. Reconnect existing electrical power. Complete and in place.
24. Remove and replace 20 inch, FL X FL, lubricated plug valve, on a basin drain, with lubrication in the wheel up to 13 ft. deep, complete and in place with 2 ft. mow strip all around at an operating wastewater treatment plant. Complete and in place.
25. Remove and replace 16 inch, FL X FL, lubricated plug valve, on a basin drain, with lubrication in the wheel up to 13 ft. deep, complete and in place with 2 ft. mow strip all around at an operating wastewater treatment plant.
26. Remove and replace 12 inch, FL X FL, lubricated plug valve, on a basin drain, with lubrication in the wheel up to 13 ft. deep, complete and in place with 2 ft. mow strip all around at an operating wastewater treatment plant. Complete and in place.
27. Remove and replace 12 inch, FL X FL, D.I. plug valve, on an existing basin drain line, with wheel operator in a vault approximately 13 ft. deep, complete and in place at an operating wastewater treatment plant. Complete and in place.
28. Provide and install 6 inch resilient seated flange x flange gate valve in an existing confined entry vault below grade. Complete and in place.
29. Provide and install 8 inch resilient seated flange x flange gate valve in an existing confined entry vault below grade. Complete and in place.
30. Provide and install 10 inch resilient seated flange x flange gate valve in an existing confined entry vault below grade. Complete and in place.
31. Electrical Enclosure complete and in place with 6' x 10' Lonestar or equal precast building, concrete base, meter, disconnects, breakers, pump controls, pump control cabinet, SCADA equipment, conduits, lighting, switches, exhaust fan, manual transfer switch, and other miscellaneous items required for a 220/3ph standard AWU Pump Control Cabinet enclosure. Complete and in place.
32. Electrical Enclosure complete and in place with 6' x 10' Lonestar or equal precast building, concrete base, meter, disconnects, breakers, pump controls, pump control cabinet, SCADA equipment, conduits, lighting, switches, exhaust fan, manual transfer switch, and other miscellaneous

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items required for a 440/3ph standard AWU Pump Control Cabinet enclosure. Complete and in place.

33. Electrical Duct Bank complete and in place with at least 3 each, 2 inch conduits up to 6 total conduits, as required. Complete in Place.
34. Furnish and Install #14 Type XHHW through #12 wire in conduit with all terminations, tags, and other appurtenances, labor and materials, Complete in Place, between structures. (Shorter lengths paid at 15 LF minimum)
35. Furnish and Install #10 Type XHHW through #6 wire in conduit with all terminations, tags, and other appurtenances, labor and materials, Complete in Place, between structures. (Shorter lengths paid at 15 LF minimum)
36. Furnish and Install #4 Type XHHW through #1 wire in conduit with all terminations, tags, and other appurtenances, labor and materials, Complete in Place, between structures. (Shorter lengths paid at 15 LF minimum)
37. Furnish and Install #1/0 through #4/0 Type XHHW wire in conduit with all terminations, tags, and other appurtenances, labor and materials, Complete in Place, between structures. (Shorter lengths paid at 15 LF minimum)
38. Furnish and Install bundled or unbundled, jacketed, shielded, electrically insulated, twisted pair or multi-pair/triad cables consisting of the required number of conductors instrumentation cable in conduits with all terminations, tags, and other appurtenances, Complete in Place, between structures. (Shorter lengths paid at 15 LF minimum)
39. Furnish and Install 30"x30"x12" NEMA 4X 316 SS Junction Box, uni-strut mounted w/ quarter-turn latches, standard size gutter 5 feet or less, Complete in Place.
40. Furnish and Install 12"x12"x6" NEMA 4X 316 SS Junction Box, uni-strut mounted w/ quarter-turn latches, standard size gutter 5 feet or less, Complete in Place.
41. Furnish and Install 1-Pole 20A Circuit Breaker, mounted to CMU wall, Complete in Place.
42. Furnish and Install 2-Pole 20A Circuit Breaker in existing space, Complete in Place. Paid per Each.
43. Furnish and Install 3-Pole 30A Circuit Breaker in existing space, Complete in Place. Paid per Each.
44. Furnish and Install 3-Pole 60A Circuit Breaker in existing space, Complete in Place. Paid per Each.
45. Furnish and Install 24"x36"x24" Concrete In-Ground Pull Box in existing space, Complete in Place. Paid per Each.

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46. Furnish and Install 15 KVA 208/480/277 Delta Wye Transformer with Weather Shield, Complete in Place.
47. Furnish and Install 125A 12-circuit NEMA 4X Panel Board, Complete in Place.
48. Furnish and Install above ground 1" galvanized conduit, Complete in Place.
49. Furnish and Install above ground 2" galvanized conduit, Complete in Place.
50. Furnish and Install Concrete Electrical Ductbank with 2 - 1" Schedule 80 PVC conduits with #4 longitudinal rebar and #3 stirrups, with red concrete (12 lbs/CY dye) and 24-inch minimum cover over top of concrete, Complete in Place.
51. Furnish and Install Concrete Electrical Ductbank with 2 - 2" Schedule 80 PVC conduits with #4 longitudinal rebar and #3 stirrups, with red concrete (12 lbs/CY dye) and 24-inch minimum cover over top of concrete, Complete in Place.
52. Furnish and Install Concrete Electrical Ductbank with 4 - 2" Schedule 80 PVC conduits with #4 longitudinal rebar and #3 stirrups, with red concrete (12 lbs/CY dye) and 24-inch minimum cover over top of concrete, Complete in Place.
53. Furnish and Install Concrete Electrical Ductbank with 2 - 4" Schedule 80 PVC conduits with #4 longitudinal rebar and #3 stirrups, with red concrete (12 lbs/CY dye) and 24-inch minimum cover over top of concrete, Complete in Place.
54. Furnish and Install 18"x18"x12" Ground Box, Complete in Place.
55. Furnish and Install ¾" x 10" Copper Clad Steel Ground Rod with Clamp. Complete in Place.
56. Furnish and Install Concrete Street Light Foundation (up to 20 feet tall), 100 MPH wind design, Complete and In Place.
57. Furnish and Install 20 feet tall Tapered Galvanized Pole for Site Lighting, 6.5-inch diameter measured at base, with oversized gasketed handhole and cover, 100 MPH wind design, Complete and In Place.
58. Furnish and Install a 250-Watt, 120V, High Pressure Sodium Light with Photo Cell on Pole (up to 20 feet tall), Complete and In Place.

B. Payment

1. Payment for the work performed and materials furnished as described by this item and measured as described above will be made at the unit price bid, when include as a contract pay item. Unit prices must be full compensation for furnishing all labor, equipment, time, materials and incidentals necessary to complete the work.
2. Payment, when included as a contract pay item, will be made in accordance with the items in the bid form and will be made under one of the following:

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- PAY ITEM No. S01521-1** Remove and replace 8 ft. I.D. wet well top slab, Paid per Each.
- PAY ITEM No. S01521-2** Remove and replace 10 ft. I.D. wet well top slab, Paid per Each.
- PAY ITEM No. S01521-3** Demolish and Replace 19 ft. x 19 ft. Square x 12-inch thick reinforced concrete wet well top slab with aluminum hatches and embedded ancillary items, Paid per Each.
- PAY ITEM No. S01521-4** Provide and Install 500 gallon fuel tank, Paid per Each.
- PAY ITEM No. S01521-5** Place 4 inch slab as site paving, Paid per Square Yard.
- PAY ITEM No. S01521-6** Extend 10 foot diameter wet well height to at least 6" above grade, Paid per Linear Foot (Vertically), (6 foot minimum for payment).
- PAY ITEM No. S01521-7** Provide and Install one 285 gpm at 87 ft. TDH wastewater pump, Complete and in place. Paid per Each.
- PAY ITEM No. S01521-8** Provide and Install one 720 gpm at 72 ft. TDH wastewater pump, Complete and in place. Paid per Each.
- PAY ITEM No. S01521-9** Provide and Install one 470 gpm at 36 ft. TDH wastewater pump, Complete and in place. Paid per Each.
- PAY ITEM No. S01521-10** Provide and install one 8 inch progressive cavity pump, 20 hp, 300 gpm, 50 psi, Complete and in place. Paid per Each.
- PAY ITEM No. S01521-11** Provide and install one 12 inch progressive cavity pump, 20 hp, 300 gpm, 50 psi, Complete and in place. Paid per Each.
- PAY ITEM No. S01521-12** Provide and install a pump around vault, Complete and in place. Paid per Each.

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- PAY ITEM No. S01521-13** Provide and install a 4 ft. diameter flow meter vault, Complete and in place. Paid per each.
- PAY ITEM No. S01521-14** Installation of a 6 to 12 inch pump around arrangement, Complete and in place. Paid per Each.
- PAY ITEM No. S01521-15** Clean, Repair, and Rehabilitate the existing 8 ft. diameter wet well up to 20 feet deep. Paid per Each.
- PAY ITEM No. S01521-16** Clean, Repair, and Rehabilitate the existing 10 ft. diameter wet well up to 20 feet deep. Paid per Each.
- PAY ITEM No. S01521-17** Remove and replace existing 72 inch sluice gate, Complete and in place. Paid per Each.
- PAY ITEM No. S01521-18** Provide and install 6" check valve. Paid per Each.
- PAY ITEM No. S01521-19** Provide and install 8" check valve. Paid per Each.
- PAY ITEM No. S01521-20** Provide and install 10" check valve. Paid per Each.
- PAY ITEM No. S01521-21** Provide and install 12" check valve. Paid per Each.
- PAY ITEM No. S01521-22** Remove and replace existing 18 inch actuated ball valve. Paid per Each.
- PAY ITEM No. S01521-23** Remove 30 inch cone valve and replace with 30 inch metal seated ball valve. Paid per Each.
- PAY ITEM No. S01521-24** Remove and replace 20 inch lubricated plug valve. Paid per Each.
- PAY ITEM No. S01521-25** Remove and replace 16 inch lubricated plug valve. Paid per Each.
- PAY ITEM No. S01521-26** Remove and replace 12 inch lubricated plug valve. Paid per Each.
- PAY ITEM No. S01521-27** Remove and replace 12 inch D.I. plug Valve. Paid per Each.
- PAY ITEM No. S01521-28** Provide and install 6 inch resilient seated gate valve. Paid per Each.
- PAY ITEM No. S01521-29** Provide and install 8 inch resilient seated gate valve. Paid per Each.

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- PAY ITEM No. S01521-30** Provide and install 10 inch resilient seated gate valve. Paid per Each.
- PAY ITEM No. S01521-31** 6'x10' Precast Concrete Electrical Enclosure complete and in place for 220/3ph pump controls. Paid per Each.
- PAY ITEM No. S01521-32** 6'x10' Precast Concrete Electrical Enclosure complete and in place for 440/3ph pump controls. Paid per Each.
- PAY ITEM No. S01521-33** Electrical Duct Bank. Paid per Linear Foot.
- PAY ITEM No. S01521-34** Furnish and Install #14 through #12 Type XHHW wire. Paid per Linear Foot.
- PAY ITEM No. S01521-35** Furnish and Install #10 through #6 Type XHHW wire. Paid per Linear Foot.
- PAY ITEM No. S01521-36** Furnish and Install #4 through #1 Type XHHW wire. Paid per Linear Foot.
- PAY ITEM No. S01521-37** Furnish and Install #1/0 through #4/0 Type XHHW wire. Paid per Linear Foot.
- PAY ITEM No. S01521-38** Furnish and Install bundled or unbundled, jacketed, shielded, electrically insulated, twisted pair or multi-pair/triad cables. Paid per Linear Foot.
- PAY ITEM No. S01521-39** Furnish and Install 30"x30x12" NEMA 4X 316 SS Junction Box, Uni-strut, and gutter. Paid per Each.
- PAY ITEM No. S01521-40** Furnish and Install 12"x12x6" NEMA 4X 316 SS Junction Box, Uni-strut, and gutter. Paid per Each.
- PAY ITEM No. S01521-41** Furnish and Install 1-Pole 20A Circuit Breaker. Paid per Each.
- PAY ITEM No. S01521-42** Furnish and Install 2-Pole 20A Circuit Breaker. Paid per Each.
- PAY ITEM No. S01521-43** Furnish and Install 3-Pole 30A Circuit Breaker. Paid per Each.

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- PAY ITEM No. S01521-44** Furnish and Install 3-Pole 60A Circuit Breaker. Paid per Each.
- PAY ITEM No. S01521-45** Furnish and Install 24"x36"x24" Concrete In-Ground Pull Box. Paid per Each.
- PAY ITEM No. S01521-46** Furnish and Install 15 KVA 208/480/277 Delta Wye Transformer with Weather Shield. Paid Per Each
- PAY ITEM No. S01521-47** Furnish and Install 125A 12-circuit NEMA 4X Panel Board. Paid Per Each.
- PAY ITEM No. S01521-48** Furnish and Install Above Ground 1" Galvanized Conduit. Paid per Linear Foot.
- PAY ITEM No. S01521-49** Furnish and Install Above Ground 2" Galvanized Conduit. Paid per Linear Foot.
- PAY ITEM No. S01521-50** Furnish and Install Concrete Electrical Ductbank with 2 – 1" Schedule 80 PVC Conduits. Paid per Linear Foot.
- PAY ITEM No. S01521-51** Furnish and Install Concrete Electrical Ductbank with 2 – 2" Schedule 80 PVC Conduits. Paid per Linear Foot.
- PAY ITEM No. S01521-52** Furnish and Install Concrete Electrical Ductbank with 4 – 2" Schedule 80 PVC Conduits. Paid per Linear Foot.
- PAY ITEM No. S01521-53** Furnish and Install Concrete Electrical Ductbank with 2 – 4" Schedule 80 PVC Conduits. Paid per Linear Foot.
- PAY ITEM No. S01521-54** Furnish and Install 18"x18x12" Ground Box. Paid per Each.
- PAY ITEM No. S01521-55** Furnish and Install ¾" x 10" Copper Clad Steel Ground Rod. Paid Per Each.
- PAY ITEM No. S01521-56** Furnish and Install Concrete Street Light Foundation (up to 20 feet tall). Paid Per Each.
- PAY ITEM No. S01521-57** Furnish and Install 20-foot tall 6-1/2" Diameter Galvanized Street Light Foundation (up to 20 feet tall). Paid Per Each.

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PAY ITEM No. S01521-58 Furnish and Install 250-Watt Street Light -1/2" Diameter
Galvanized Street Light Foundation (up to 20 feet tall).
Paid Per Each.

End of Section

ALUMINUM HANDRAILS SECTION S05520

PART 1 GENERAL

1.01 SUMMARY

This Section includes the fabrication, furnishing, and installation of aluminum handrails, complete in place, at locations shown on PLANS.

1.02 RELATED REQUIREMENTS

- A.** The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
- B.** It is the CONTRACTOR's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals and entities performing or furnishing any of CONTRACTOR's Work.

1.03 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only.

- A.** Aluminum Association (AA)
 - 1. ASD-1 - Aluminum Standards and Data
 - 2. DAF-45 - Designation System for Aluminum Finishes
 - 3. SAA-46 - Standards for Anodized Architectural Aluminum
- B.** American Society for Testing And Materials (ASTM)
 - 1. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service
 - 2. ASTM B429 - Standard Specification for Aluminum All Extruded Structural Pipe and Tube
 - 3. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- C.** American Welding Society (AWS)
 - 1. AWS D1.2 - Structural Welding Code Aluminum
- D.** Occupational Safety and Health Administration (OSHA)
 - 1. 29 CFR 1910 - OSHA Regulation Safety and Health Standards for General Industry
- E.** International Conference of Building Officials (ICBO)
 - 1. IBC - International Building Code

1.04 DEFINITIONS

Plans use the terms handrail and guardrail interchangeably to refer to the railing system defined by this Specification and standard detail drawings.

1.05 (NOT USED)

1.06 SUBMITTALS

Submit the following in accordance with Specification Section 01300, "Submittals".

ALUMINUM HANDRAILS SECTION S05520

- A.** Product data for materials used.
- B.** Complete shop drawings showing handrail locations, railings, posts, splice locations and expansion joint locations. Also include manufacturer's details for connections, anchorage, splices, expansion joints, gates and other pertinent data.
- C.** Design calculations showing that the material meets or exceeds the allowable working stress under the applied loading conditions. Test reports may be used to complement the design calculations. Design calculations to be sealed by a Professional Engineer licensed in the State of Texas.
- D.** Field layout of fabricated sections to ensure proper fit during erection, after fabrication and finishing, and prior to shipment.
- E.** Certificate of Conformance as required in Paragraph 1.07 – Quality Assurance.

1.07 QUALITY ASSURANCE

- A.** All design computations and detailed drawings are to be prepared by or under the direct supervision of a Professional Engineer licensed in the State of Texas. Provide a certificate signed and sealed by same engineer stating that the computations and drawings are in conformance with specified design criteria.
- B.** Provide handrail system complying with International Building Code and OSHA Regulations.

1.08 DELIVERY, STORAGE AND HANDLING

- A.** Deliver handrail to jobsite with sufficient protection to ensure arrival in acceptable and undamaged condition.
- B.** Store handrails on level supports above ground, not in contact with dissimilar metals. Protect to prevent damage and exposure from elements until erected. Replace or repair damaged sections at no additional cost to OWNER.

PART 2 PRODUCTS

2.01 MANUFACTURER(S)

- A.** Manufacturer: Products of the following manufacturers, provided they comply with requirements of the Contract Documents, will be among those considered acceptable, or an approved equal.
 - 1. Hollaender Railing Systems (Interna-Rail);
 - 2. Thompson Fabrication Co. (TUFrail); and
 - 3. Alumaguard Corp. (Alumarail).

2.02 MATERIALS AND/OR EQUIPMENT

- A.** General
 - 1. Handrail shall be the product of a company normally engaged in the manufacture of pipe railing.

ALUMINUM HANDRAILS SECTION S05520

2. Handrail shall conform to requirements of OSHA 1910.23 and applicable building code. Local building code in Austin, TX is the International Building Code.
3. Handrail and posts to be fabricated from 1½-inch nominal diameter 6063-T6 or 6061-T6 aluminum pipe, Schedule 40 minimum conforming to ASTM B429. Exposed aluminum surface to be 0.7-mil thick clear anodized finish, per Aluminum Association Designation M10-C22-A41..
4. Handrail to be 42 inches high; stair handrail to be 34 inches high, unless otherwise noted on PLANS. Centerlines of posts and handrails to be in same plane. Locate intermediate rails as shown on PLANS.
5. Unless shown otherwise in PLANS, post spacing not to exceed 5 feet for horizontal handrail and 4 feet for stair handrail (measured horizontally). The manufacturer must reduce the post spacing and/or add dowels, as required to meet the loading requirements.
6. Provide a 4-inch-high extruded aluminum toe plate that attaches to the posts with clamps that will allow for horizontal expansion and contraction between posts. Toe plate to have not more than 1/4-inch clearance above floor level, and provided on all walkways and stair landings. Provide notch in toe plate at post as required to maintain specified clearance.
7. Handrail system, which consists of two horizontal rail members, posts, connections and anchorages, shall be designed to withstand a 200-pound concentrated load applied at any point and in any direction or a 50 lb./ft. uniform load applied in any direction. Concentrated and uniform loads need not be assumed to act concurrently. The posts and associated floor flange anchorage shall be designed to withstand a 200-pound concentrated load applied at the top rail.
8. Provide expansion joint splices in all rails of handrail and toe board at not greater than 20 feet spacing and at expansion joints in concrete structure. Minimum projection of expansion splice inside adjacent pipe shall be 1½”.
9. Splices and expansion joints in the railing system components shall be located within 8 inches of posts or other railing system supports.
10. Provide 1/4-inch weep holes at low points in all handrails and posts to prevent trapping of moisture.
11. Removable handrail to have vertical pipe supports fastened as shown on PLANS. Unless otherwise indicated, fabricate removable handrail in unit sections not exceeding 10 feet long with at least three vertical supports, including one at each end.
12. Handrails attached to load-bearing walls to be mounted with aluminum or stainless steel brackets. Fasten each bracket with a minimum 3/8-inch diameter Type 316 stainless steel expansion bolt set into the wall and tapped into bracket. Bracket to have a 3-inch projection from wall and be uniformly spaced approximately 4 feet with the end brackets not more than 12 inches from the ends of the handrails.
13. Posts and rails to be continuous throughout their sectional lengths. Curved members to be formed to true radii, free from dye marks or surface abrasions. Furnish handrail in shop fabricated sections,

ALUMINUM HANDRAILS SECTION S05520

complete with accessories, including gates, hardware, closure caps for rail terminations, base trim, and anchorages.

14. Posts shall not interrupt the continuation of the top rail at any point along the railing, including corners and end terminations (OSHA 1910.23). The top surface of the top railing shall be smooth and shall not be interrupted by a projecting fitting.
15. Aluminum surfaces in contact with concrete, grout or dissimilar metals will be protected with a Mylar isolator, bituminous paint or other approved material.
16. Handrail system posts are to be anchored to concrete structures with Type 316 stainless steel bolts. Bolts and floor flange shall be designed to resist a 200-pound load applied horizontally to the top rail. Bolt manufacturer's published shear and pullout values shall be reduced for spacing and edge distance conditions as shown on plans.
17. Safety Chains: Construct safety chains of stainless steel, straight link type, 3/16-inch diameter, with at least twelve links per foot, and with boat type snap hooks on each end. Provide S.S. 3/8-inch bolt with 3/4 -inch eye diameter for attachment of chain, anchored as indicated. Supply a minimum of two chains or as noted on PLANS, 4 inches longer than the anchorage spacing, for each guarded area. Locate safety chain where indicated.

B. Nonwelded Aluminum Handrails

1. Fittings to be extruded or cast aluminum, 6063 Aluminum Alloy with a minimum 0.4-mil thick clear anodized finish per Aluminum Association Designation M43C22A4I.
2. The handrail shall be made of pipes joined together with component fittings. Components that are glued or pop-riveted at the joints will not be acceptable. All components must be mechanically fastened with stainless steel hardware.
3. Fitting shall be an internal double-prong expandable fitting that is activated by a stainless steel or aluminum set screw. The fitting shall be externally connected to the pipe by means of an anodized aluminum tubular rivet nut, and stainless steel socket head cap screw. All fittings, elbows, wall returns, and caps to be flush-type. Exposed fasteners to be set flush or recessed. All fasteners to be Type 316 stainless steel.
4. Unless otherwise noted on PLANS, all handrails to be nonwelded aluminum.

C. Welded Aluminum Handrail

1. Handrail and posts to be joined by welding only if indicated on PLANS. Welding to consist of flush-type weld fittings or coping of pipe ends to conform with adjoining pipe and welding. Welds to be ground smooth and flush.
2. Elbows, capped terminations, and wall returns to be formed by flush fittings. Secure rails terminating against masonry or concrete with flanged fittings and anchor bolts.

2.03 FABRICATION

Furnish railings in shop-fabricated sections, complete with accessories, including gates, plated hardware, closure caps for rail termination, base trim, and anchorages.

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2.04 (NOT USED)

PART 3 EXECUTION

3.01 – 3.02 (NOT USED)

3.03 ERECTION/INSTALLATION/APPLICATION AND/OR CONSTRUCTION

- A. Handrail to be installed by fabricator in strict compliance with fabricator's instructions. Install handrail plumb and within a tolerance of 1/4-inch maximum deviation either side of the longitudinal centerline. Cuts to be clean and straight, free from burrs and nicks.
- B. Posts embedded in concrete to be set in sleeves with quick-setting non-shrink grout.
- C. Install removable and permanent handrail units with bolted floor type flanges.
- D. Use of shims, washers, wedges, or similar devices are not allowed when plumbing or aligning handrail.

3.04 MEASUREMENT AND PAYMENT

A. Measurement

Products, Materials, and Services listed and/or references in this section shall be measured per the units listed in Section 00300 Bid Form.

1. Furnish and install aluminum handrail consisting of a top and middle rail, nominal height of hand rail to be 3'-6" to 4'-6", and with support posts at approximately 6' spacing Complete and in place and including all fasteners, kick-plates, surface preparation, and mounting hardware, Measured by Linear Foot.

B. Payment

1. Payment for the work performed and materials furnished as described by this item and measured as described above will be made at the unit price bid, when include as a contract pay item. Unit prices must be full compensation for furnishing all labor, equipment, time, materials and incidentals necessary to complete the work.
2. Payment, when included as a contract pay item, will be made in accordance with the items in the bid form and will be made under one of the following:

PAY ITEM No. S05520 Furnish and install aluminum handrail, Complete and in place,
Paid per Linear Foot.

**ALUMINUM HANDRAILS
SECTION S05520**

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

Furnish and install valves as shown on PLANS and as specified herein.

1.02 RELATED REQUIREMENTS

- A. PLANS indicate sizes, working pressures, type operator, and operating conditions for sizing operators.
- B. Related work as called for on PLANS or specified in this or other TECHNICAL SPECIFICATION sections.

1.03 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B16.1 Cast Iron Pipe Flanges and Flanged Fittings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A126	Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
ASTM A276	Standard Specification for Stainless Steel Bars and Shapes
ASTM A351	Standard Specification for Castings Austenitic, Austenitic-Ferritic (Duplex), for Pressure Containing Parts
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A582	Standard Specification for Free-Machining Stainless Steel Bars
ASTM D429	Standard Test Methods for Rubber Property – Adhesion to Rigid Substrates
ASTM D1784	Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D2000	Standard Classification System for Rubber Products in Automotive Applications
AWWA C500	Metal-Seated Gate Valves for Water Supply Service

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AWWA C504	Rubber-Seated Butterfly Valves
AWWA C508	Swing-Seated Butterfly Valves
AWWA C509	Resilient-Seated Gate Valves for Water Supply Service
AWWA C511	Reduced-Pressure Principle Backflow-Prevention Assembly
AWWA C540	Power-Actuating Devices for Valves and Sluice Gates
AWWA C550	Protective Epoxy Interior Coatings for Valves and Hydrants
AWWA C606	Grooved and Shouldered Joints
AWWA C110/A21.1	Ductile-Iron and Gray-Iron Fittings

AMERICAN SOCIETY OF SANITARY ENGINEERS (ASSE)

ASSE Std 1011	Performance Requirements for Hose Connection Vacuum Breakers
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MANUFACTURERS STANDARDIZATION SAFETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-81	Stainless Steel, Bonnetless, Flanged Knife Gate Valves
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1.04 1.05 (NOT USED)

1.06 SUBMITTALS

1. Furnish in accordance with Specifications Section 01300, "Submittals" and Section 01730 "Operation and Maintenance Data".
 1. Shop Drawings. In addition to the items specified in Section 01300, "Submittals", furnish the following:
 - a. Product data sheets for make and model.
 - b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
 - c. Power and control wiring diagrams, including terminals and numbers.
 - d. Complete motor nameplate data.
 - e. Sizing calculations for open-close/throttle and modulating.
 2. Operation and Maintenance Manuals.

3. Certifications:
 - a. Certificate of Compliance for:
 1. Electric operators; full compliance with AWWA C540.
 2. Valves; full compliance with AWWA and ASTM standards specified for the valve furnished.
 - b. Tests and inspection data.
 - c. Manufacturer's Certificate of Proper Installation.

1.07 Quality Assurance

- A. Standardization: All like equipment to be obtained from single manufacturer.
- B. System Coordination: CONTRACTOR is responsible for all details necessary to properly install, adjust, and place in operation working systems.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, unload and store products on site in manner that prevents damage. Use special care to prevent damage from temperature and condensation.
- B. Flanges to be protected by wooden blank flange protectors, strongly built and securely bolted thereto, or otherwise attached.

1.09 – 1.11 (NOT USED)

PART 2 – PRODUCTS

2.01 GENERAL

- A. Valve to include operator, actuator, hand wheel, chain wheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and accessories for a complete operation.
- B. Valve to be suitable for intended service. Renewable part not to be of a lower quality than specified.
- C. Valve same size as adjoining pipe.
- D. Valve ends to suit adjacent piping.
- E. Size operator to operator valve for the full range of working pressures indicated on applicable schedules.
- F. Valve to open by turning counterclockwise.
- G. Factory mount operator, actuator, and accessories.

2.02 SCHEDULE

- A. Requirements relative to this Section are shown on Valve Schedule located in the Drawings.

2.03 FACTORY FINISHING

- A. Epoxy Lining and Coating:
 - 1. Use where specified for individual valves described herein.
 - 2. In accordance with AWWA C550 unless otherwise specified.
 - 3. Either two part liquid material or heat-activated (fusion) material except only heat-activated material if specified as "fusion" or "fusion bonded" epoxy.
 - 4. Minimum 7 mil dry film thickness except where limited by valve operating tolerances.
- B. Exposed Valves: In accordance with Section 09900, Painting and Protective Coatings
- C. Buried Valves: In accordance with Section 09900, Painting and Protective Coatings.

2.04 VALVES

- A. Gate Vales:
 - 1. Type V100 Gate Valve, 3-Inch and Smaller: All-bronze, union bonnet, single solid wedge gate, nonrising stem, rated 125-pound SWP, 200-pound WOG.
 - a. Manufacturers and Products:
 - 1) Stockham; B-103, threaded end, union bonnet.
 - 2) Crane; 426, threaded end, union bonnet.
 - 3) Stockham; B-104, soldered end. (Plumbing Service Only.)
 - 4) Crane; 1324, soldered end. (Plumbing Service Only.)
 - 2. Type V108 Gate Valve, 2-Inch and Larger: Iron body, bronze mounted, flanged ends, solid wedge gate, nonrising bronze stem, rated 125-pound SWP, 200-pound WOG.
 - a. Manufacturer and Products:
 - 1) Stockham; Figure G612.
 - 2) Walworth; W719F.
 - 3) Crane; Figure No. 461.
 - 3. Type V110 Gate Valve, 2-Inch and Larger: Iron body, bronze mounted, flanged ends, solid wedge gate, outside screw and yoke, rated 125-pound SWP, 200-pound WOG.
 - a. Manufacturer and Products:
 - 1) Stockham; Figure G623.
 - 2) Walworth; W719F.
 - 3) Crane; Figure No. 465-1/2.
 - 4. Type V120 Gate Valve, 3-inch to 48-Inch, Double Disc Gate Valve, Iron body, Bronze mounted:
 - a. AWWA C500

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- b. Iron body, bronze mounted, flanged ends, double disc gate, nonrising bronze stem.
 - c. Bonnet: Bolted.
 - d. Body-seat Rings: Grade a bronze, replaceable.
 - e. Disc-spreading Device: Bronze.
 - f. Stem Seal: Stuffing box or chevron V-packing.
 - g. Roller and Tracks: Equip valves in vertical pipes 16-inch and larger with horizontal stem with bronze roller, tracks and scrapers.
 - h. Face Tracks (Slides): Equip valves in vertical pipes 16-inch and larger with face tracks to provide reliable operation in vertical pipe configuration. As an alternate to face tracks, a resilient seated gate valve, (AWWA C509) is acceptable provided that the valve manufacturer certifies in writing that the valve will provide smooth reliable operation in a vertical pipe with the specified working pressure applied at the top of the disc.
 - i. Fully enclosed gear cases, unless noted otherwise.
 - j. Manufacturers and Products
 - 1) Ludlow Rensselaer
 - 2) M&H Valve
 - 3) Clow
5. Type V124 Gate Valve, 16-Inch and Larger, AWWA C500 Valves for Buried Water Service:
- a. Ductile or Cast iron body, bronze mounted cast iron discs, replaceable bronze seat rings, flanged ends, bolted bonnets, double disc gate, nonrising bronze stem, rated for 150 psi, working water pressure, 125 psi ANSI B16.1 drilling.
 - b. Operator:
 - 1) Wrench nuts or Pedestal Operator per Valve Schedule.
 - 2) Steel Bevel or Spur gear with bronze pinion shaft and bronze bearings.
 - 3) Grease packed gear case enclosing gears and stuffing box.
 - 4) Bypass Valve.
 - 5) Bronze Roller tracks and Scrappers for valves with horizontal stems.
 - c. Manufacturer and Products:
 - 1) Mueller Co.; A-2330
 - 2) M&H Valve; Style 67
 - 3) Clow Corp; List 14
 - 4) Kennedy Valve Div; AWWA 200-W
 - 5) US Pipe & Foundry Co.; 16-36 Metropolitan
 - 6) American R/D Valve Co., 50 Line
6. Type V130 Resilient Seated Gate Valve, 3-Inch to 20-Inch:
- a. Iron body, resilient seat, bronze mounted, flanged ends, nonrising stem in accordance with AWWA C509, rated 200 psi cold water, full port, fusion epoxy-coated inside and outside.
 - b. Coating to meet requirements of AWWA C550.
 - c. Manufacturer and Products:
 - 1) Clow; R/W (4"-12")

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- 2) Mueller Co.; Series A-2360
 - 3) U.S. Pipe & Foundry Co.; Metroseal 250 (4"-16")
 - 4) American Flow Control; AFC-2500 Series (4"-12")
 - 5) American Avk Co.; (4"-24")
 - 6) Kennedy Valve; (4"-12")
 - 7) M&H Valve; (3"-12")
7. Type V132 Resilient Seated Gate Valve, 3-Inch to 20-Inch, for Buried Service:
- a. Iron body, resilient seat, bronze mounted, mechanical joint ends, nonrising stem in accordance with AWWA C509, rated 200 psi cold water, full port, fusion epoxy-coated inside and outside.
 - b. Coating in accordance with AWWA C550.
 - c. Manufacturer and Products:
 - 1) Clow; R/W (4"-12")
 - 2) Mueller Co.; Series A-2360
 - 3) U.S. Pipe & Foundry Co.; Metroseal 250 (4"-16")
 - 4) American Flow Control; AFC-2500 Series (4"-12")
 - 5) American Avk Co.; (4"-24")
 - 6) Kennedy Valve; (4"-12")
 - 7) M&H Valve; (2"-12"), Style 4067 or 4068
8. Type V150 Knife Gate Valve, 24-Inch and Smaller:
- a. Bonnetless wafer body type, outside stem and yoke, rated for 150 psi cold water, ANSI B16.1 flanged ends, self-cleaning, nonclogging, with round port, resilient neoprene seat, drip-tight shutoff.
 - b. Wetted metal parts and stem, Type 316 stainless steel, yoke sleeve bronze, gate finish ground both sides with a sharp knife edge.
 - c. Packing system leak-tight seal round the gate, valve superstructure and yoke designed for full peripheral access to gland bolts when valve is equipped with manual or power actuator.
 - d. In compliance with MSS SP-81.
 - e. Manufacturers and Products:
 - 1) DeZurik; (2"-36" Stainless) Series KGL, KCB, or GKU.
 - 2) Rovalve; Model S17.
- B. Globe Valves:
1. Type V200 Globe Valve, 3-Inch and Smaller:
 - a. All-bronze, union bonnet, inside screw, rising stem, TFE disc, rated 150-pound SWP, 300-pound WPG.
 - b. Manufacturers and Products:
 - 1) Stockham; B-22T, threaded end.
 - 2) Crane Co.; 7TF, Threaded end.
 2. Type V201 Angel Pattern Valve, 2-Inch and Smaller:
 - a. All-bronze, threaded ends, union bonnet, inside screw, rising stem, TFE disc, rated 150-pound SWP, 300-pound WOG.
 - b. Manufacturers and Products:
 - 1) Stockham; B-222T.
 - 2) Crane Co.; 17TF.

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3. Type V207 Glove Valve, 2 1/2 -Inch and Larger:
 - a. Iron body, bronze mounted, flanged ends, bronze seat, outside screw and yoke, bolted bonnet, rated 125-pound SWP, 200-pound WOG.
 - b. Manufacturers and Products:
 - 1) Stockham; G-512
 - 2) Milwaukee; F2981A.
 4. Type V209 Needle Disc Type Globe Valve, 1/8-Inch to 3/4-inch:
 - a. Threaded or union bonnet, rising stem, bronze body and stem, rated 200-pound SWP, 400-pound WOG.
 - b. Manufacturers and Products:
 - 1) Crane Cat.; No. 88.
 - 2) Stockham; B-64.
 5. Type V235 Angle Type Hose Valve, 3/4-Inch:
 - a. 3/4-inch NPT female inlet, 3/4-inch male hose thread outlet, heavy rough brass body rated 125 psi, lockshield bonnet, removable handle, atmospheric vacuum breaker conforming to ASSE Standard 1011 and IAPMO code.
 - b. Manufacturers and Products:
 - 1) Acorn; 8126, surface pipe mount valve, bent nose without flange.
 - 2) Acorn; 8121, surface mount through wall valve, bent nose with flange.
 - 3) Acorn; 8131, pipe and pedestal mounted valve located above 6-inch, straightnose.
 - 4) Acorn; 8136, pedestal mounted valve located lower than 6-inch, inverted nose.
 6. Type V236 Angle Pattern Hose Valve, 1-Inch to 3-Inch:
 - a. All-bronze, threaded ends, inside screw, rising stem, TFE disc, outlet of cast brass NHT by NPT, male by male, nipple adapter with hexagonal wrench feature, rated 300 WOG.
 - b. Manufacturers and Products:
 - 1) Stockham; Figure B-22T.
 - 2) Crane Co.; Cat No. 7TF.
 - 3) Stockham; Figure B-222T.
 - 4) Crane Co.; Cat. No 17TF
 - 5) James Jones Co.; J-300 Series, angle fire hydrant valve with NPT inlet and National Hose thread outlet.
 - 6) Nibco; Kennedy Figure 936, angle fire hydrant, valve with NPT inlet and National Hose thread outlet.
- C. Ball Valves:
1. Type V304 Ball Valve, 2-Inch and Smaller, for General Water and Air Service:
 - a. All-bronze, three-piece body type, threaded ends, full bore ports, Teflon seat, blowout-proof stem, hand lever operator, rated 150 psi SWP, 400-pound WOG minimum.

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- b. Manufacturers and Products:
 - 1) Apollo; 82-100-01 Series.
 - 2) Nibco, Inc.; T-595-Y.
- 2. Type V307 Stainless Steel Ball Valve, 2-Inch and Smaller:
 - a. ASTM A276 GR 316 or ASTM A351 GR CF8M stainless steel body, standard port Type 316 stainless steel ball, three-piece type, threaded ends, rated 1,000-pound WOG, with seat, body seal, and stem packing reinforced TFE, lever operator.
 - b. Manufacturers and Products:
 - 1) Nibco; T-595-S6R66
 - 2) Apollo; 86A Series.
 - 3) Whitey; "60" Series.
- 3. Type V310 Stainless Steel Ball Valve, 3-inch and Smaller;
 - a. Body, stem and ball Type 316 stainless steel; Teflon seats and seals, Type 304 stainless steel lever with vinyl covering, full port, 2-piece body design, female NPT connections, rated 1,000 psi WOG.
 - b. Manufacturers:
 - 1) Apollo.
 - 2) Nibco.
 - 3) Or equal.
- 4. Type V320 Ball Valve, 6-inch and larger;
 - a. AWWA C507 - Standard for Ball Valves 6-in. through 48-in (resilient seated) with cast iron, ductile iron, or cast steel bodies, flanged ends, suitable for velocities up to 35 fps, temperatures up to 125 degrees F, and design pressures to 250 psi. The balls shall be of cast iron, ductile iron, or cast steel, shaft-mounted, with tight shut-off, single or double seat, and full bore. The valves shall be metal-seated, with stainless steel, forged steel, or monel shafts or trunnions, and not less than one thrust bearing. The valves shall see a minimum differential pressure of 30 psi.
 - b. Manufacturers:
 - 1) Apco/Willamette
 - 2) GA Industries, Inc.
 - 3) Henry Pratt Company
- 5. Type V330 PVC Ball Valve, 2-Inch and Smaller:
 - a. Rated 150 psi at 73F, with ASTM D1784, Type I, Grade 1 polyvinyl chloride body, ball, and stem, end entry, double union design, solventweld socket ends, elastomer seat, Viton or Teflon O-ring stem seals, to block flow in both directions.
 - b. Manufacturers and Products:
 - 1) Nibco; True-Bloc.
 - 2) ASAHI America; Type 21 replaces (Duo-Bloc) (1/2"-6").
- 6. Type V331 PVC Ball Valve, 3 and 4-Inch:
 - a. Rated 150 psi at 73°F, with ASTM D1784, Type 1, Grade 1 polyvinyl chloride full port body, Teflon seat, Viton O-ring stem, face and

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carrier seals, end entry design with dual union, solvent-weld socket ends, or single union ball valve with flanged ends drilled to ANSI B16.1.

- b. Manufacturers and Products:
 - 1) Nibco; True-Bloc True Union.
 - 2) Chemtrol; TrueBloc True Union.
 - 3) Georg Fischer.
 - 4) ASAHI America; Type 21 (1/2"-6").

7. Type V332 Petcock Ball Valve, ¼ inch

- a. Rated at 400 psi WOG (non-shock) and design for use in wastewater as an isolation valve on pressure testing taps. Valves shall be constructed of stainless steel and bronze with a glass reinforced seat, stainless steel ball and stem, adjustable stem packing gland. Operation of the valve will be one quarter turn open and closed with vinyl insulators on heavy duty handles.
- b. Manufactures and Products:
 - 1) Watts
 - 2) Or approved equal.

D. Plug Valves:

1. Type V406 Eccentric Plug Valve, 4-Inch to 48-Inch

- a. Non-lubricated type rated 150 psig CWP, drip-tight shutoff with pressure from either direction, cast iron body with flanged ends in accordance with AWWA C606 for rigid joints, mechanical joints where shown, plug cast iron with round or rectangular port of no less than 80 percent of connecting pipe area and coated with Buna-N or Hycar, stainless steel seats, stem bearing self-lubricating stainless steel or reinforced Teflon, stem seal multiple V-rings, U-cups or O-rings of nitrile rubber, grit seal on stem.
- b. Operator: Totally enclosed, geared, manual with hand wheel, 2-inch nut, chain wheel or electric operator.
- c. Manufacturers and Products:
 - 1) DeZurik; Style PEC Series 100.
 - 2) Clow; F-5400 Series (24"only).
 - 3) Milliken.

2. Type V407 Inverted Tapered Plug Valve, 4-Inch to 30-Inch:

- a. Cast Iron, Lubricated taper plug, top entry, short pattern, ANSI B16.1 flanged ends, threaded gland, wrench operator.
- b. Manufacturers and Products:
 - 1) Serck Audco Valves (1/2"-12").
 - 2) Nordstrom; Figure 50169.

3. Type V409 Inverted Tapered Plug Valve, 1-Inch to 4-Inch:

- a. Cast Iron, Lubricated taper plug, top entry, short pattern, ANSI B16.1 flanged ends, threaded gland, wrench operator.
- b. Manufacturers and Products:
 - 1) Serck Audco Valves (1/2"-12").
 - 2) Nordstrom; Super 114 or 115.

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4. Type V410 Three-Way, Non-lubricated, Tapered Plug Valve, 3-Inch to 16-Inch:
 - a. Cast Iron body with Hycar-coated plug, Buna-Vee packing or O-ring seals, stainless steel bearings, and nickel- or epoxy-coated seat, rated 125 psi CWP minimum, flanged to ANSI B16.1.
 - b. Valve Operator: Gear type $\geq 6''$; Lever type $< 6''$
 - c. Manufacturers and Products:
 - 1) DeZurik; Style PTW.
 - 2) Milliken; Multiport.

- E. Butterfly Valves:
 1. General: Specified as AWWA C504 to be in compliance with AWWA C504 and following requirements:
 - a. Suitable for throttling operations and infrequent operation after periods of inactivity.
 - b. Elastomeric seats bonded or vulcanized to body shall have adhesive integrity of bond between seat and body assured by testing with minimum 75-pound pull in accordance with ASTM D429, Method B.
 - c. Bubble-tight with rated pressure applied from either side.
 - d. No travel stops for the disc on interior of the body.
 - e. Self-adjusting V-type or O-ring shaft seals.
 - f. Isolate metal-to-metal thrust bearing surfaces from flow stream.
 - g. Buried valves shall be designed for buried service.
 - h. Manufacturers and Products:
 - 1) DeZurik
 - 2) Pratt.

 2. Type V500 Butterfly Valve, 3-Inch to 72-Inch:
 - a. Flanged end, short body type.
 - b. AWWA C504, Class 150B.

 3. Type V502 Butterfly Valve, 3-Inch to 20-Inch
 - a. Water Type.
 - b. AWWA C504, Class 150B

 4. Type V504 Butterfly Valve, 4-Inch to 48-Inch:
 - a. Mechanical joint end type AWWA C504.
 - b. Class 150.

 5. Type V510 Lug Butterfly Valve, 2-Inch to 24-Inch, for Low Pressure Air Service.
 - a. Cast iron or ductile iron body, aluminum bronze or ductile iron discs, Type 18-8 stainless steel one-piece stem, self-lubricating sleeve type bearing, Viton replaceable resilient seat, self-adjusting packing, suitable for temperatures up to 250°F, bubble-tight at 50 psi differential pressure, valve body to fit between ANSI B16.1 flanges.
 - b. Manufacturers and Products:
 - 1) Pratt/Keystone; Model AR2.
 - 2) Centerline; RS.

6. Type V520 Wafer Butterfly valve, 1-inch to 12-inch, for chlorine solution service:
 - a. PVDF body and disc, viton liner and Type 403 stainless steel stem, suitable for temperatures up to 300°F, valve body to fit between ANSI B16.1 flanges.
 - b. Manufacturers and Products:
 - 1) ASAHI/America.
 - 2) Georg Fischer; Type 367, 2½" to 8".

- F. Check and Flap Valve:
 1. Type V600 Check Valve, 2-Inch and Smaller:
 - a. All-bronze, threaded ends and caps, swing type replaceable Buna-N disc, rated 125-pound steam working pressure (SWP), 200-pound water, oil, gas (WOG) pressure.
 - b. Manufacturers and Products:
 - 1) Stockham; Figure 320B.
 - 2) Milwaukee; Figure 510.

 2. Type V604 Check Valve, 2 ½-Inch to 12-Inch:
 - a. Flanged end, cast iron body, bronze mounted swing type, solid bronze hinges, stainless steel hinge shaft, rated 125-pound SWG, 200-pound WOG.
 - b. Manufacturers and Products:
 - 1) Stockham; G-931; List 37, Clearway check valve.
 - 2) Crane Co.; Cat. No 373.

 3. Type V606 Check Valve, 2 ½-Inch to 12-Inch:
 - a. Flanged end, cast iron body, bronze mounted swing type, solid bronze hinges, stainless steel hinge shaft, outside lever and weight, rated 125-pound SWP, 200-pound WOG.
 - b. Manufacturers and Products:
 - 1) Stockham; G-931.
 - 2) Crane Co.; Cat. No 383.

 4. Type V608 Swing Check Valve, 2-Inch to 36-Inch:
 - a. AWWA C508, flanged end, cast iron body, bronze mounted valve, solid bronze hinges, stainless steel hinge shaft.
 - b. Valve, 2-inch through 12-inch rated 175-pound and 14-inch through 36-inch rated 150-pound cold water, non-shock. Valve fitted with adjustable outside lever and weight. Increasing-pattern body valve may be used where increased outlet piping size is shown.
 - c. Manufacturers and Products:
 - 1) M&H Valve; Style 59, 159, or 259.
 - 2) American-Darling; No. 50 Line.

 5. Type V609 Swing Check Valve, 24-Inch through 30-Inch:
 - a. AWWA C508, flanged end, valve body and valve disc of cast iron. Valve body seat shall be bronze or stainless steel locked in place with stainless steel lock screws and designed to allow replacement of the

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- seat in the field without special tools required. The disc seat shall be Buna-N rubber and designed to be replaceable. Disc arm shall be steel and hinge shaft of Type 304 stainless steel or ASTM A582 T303 stainless steel, bronze sleeve bearings at hinge shaft. The hinge shaft shall be provided with shaft packing and gland cover. All bolts, nuts and screw sets shall be Type 316 or 18-8 stainless steel.
- b. Rated for 150 psi work pressure and hydrostatically tested to 1½ times the working pressure.
 - c. Valve shall be designed for a horizontal installation and provided with outside adjustable levers and weights. Provide oil controlled damping device securely attached on each side of the valve, or single oil controlled damping device at the bottom of the valve. The damping devices shall be adjustable.
 - d. Manufacturers and Products:
 - 1) APCO Valve and Primer Corporation.
 - 2) G.A. Industries Inc.
6. Type V610 Flexible Swing Check Valve, 2-Inch through 48-Inch:
- a. AWWA C508, flanged end, and valve body of cast iron. Valve body shall be full body type equal to nominal pipe diameter cross section. The disc shall be one piece construction Buna-N rubber and designed to be replaceable with an integral O-ring type sealing surface. All bolts, nuts and screw sets shall be Type 316 or 18-8 stainless steel.
 - b. Rated for 150 psi work pressure and hydrostatically tested to 1½ times the working pressure.
 - c. Valve shall be designed for a horizontal installation and provided with outside position indicator.
 - d. Screw type backflow actuator shall be provided for each valve. A short type shall be provided unless noted otherwise.
 - e. A mechanical position indicator shall be provided with each valve.
 - f. An open closed positions switch shall be provided when shown on the plans.
 - g. A hydraulic cushion shall be provided when shown on the plans.
 - h. Manufacturers and Products:
 - 1) Val-matic Surgebuster VM-7200-S.
 - 2) Swing-Flex (Allowed for specific applications)
 - 3) Mueller (Allowed when Backflow actuator is not required)
7. Type V612 Double Disc Swing Check Valve, 2-Inch to 12-Inch (CONFIRM SIZE; other valve for Blowers):
- a. Wafer Style, spring loaded, cast or ductile iron body, aluminum-bronze or ductile iron doors, resilient seats, stainless steel hinge pin, stop pin spring
 - b. Valve, 2-inch through 12-inch rated 200-pound cold water and valve 14-inch through 54-inch rated 150-pound cold water.
 - c. Manufacturers and Products:
 - 1) Stockham; 970.
 - 2) APCO; Series 9000.

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8. Type V630 PVC Ball Check Valve, 4-Inch and Smaller:
 - a. ASTM D1784, Type I, Grade 1 Polyvinyl chloride body, single or dual union socket weld ends, rated 150 psi at 73°F, and Viton seat and seal.
 - b. Manufacturers and Products:
 - 1) NIBCO Chemtrol.

8. Type V642 Reduced-Pressure Principle Backflow Prevention Assembly, ¾-Inch to 10-Inch:¾-Inch to 10-Inch:
 - a. Two resilient seated check valves with an independent relief valve between the valves, two non-rising stem resilient-seated isolation valves, test cocks, in accordance with AWWA C511, rated 175 psi maximum working pressure, meets requirements of USC Foundation for Cross-Connection Control and Hydraulic Research.
 - b. Manufacturers and Products:
 - 1) FEBCO; Model 860.
 - 2) Cla-Val; Model RP-2/RP-4.
 - 3) Watts; Series 009/909 (1/4"-2").

9. Type V650 Pump Control Check Valve-Type I:
 - a. The Pump Control Check Valve with Electric Motor Actuator shall function to minimize surges associated with the normal starting and stopping of pumps. The valve shall slowly open after the pump has come up to speed and pressure at pump start. A normal pump shutdown shall be initiated by the valve slowly closing against the running pump, turning off the pump only after the valve has completely closed. The valve operator will receive open/close input signals from the pump control system. The valve shall quickly close independently of the actuator upon flow reversal resulting from power outage, pump or pump motor failure or other sudden stoppages of pumping, by means of an integral "stop-check" feature, thereby preventing flow reversal through the pump.
 - b. Materials:
 - 1) The valve body shall be the in-line wye pattern of ductile iron conforming to ASTM A536 Grade 65-45-12 with integral flanges faced and drilled to ANSI B16.1 Class 150. The valve shall be inherently self-cleaning with a net flow area of no less than the area of its nominal pipe size. The body shall have a replaceable Type 316 stainless steel seat and a seat inspection port.
 - 2) The valve disc shall be ductile iron or steel with a renewable resilient seat ring of ultra-high molecular weight polyethylene (UHMWPE) or other suitable resilient material, retained by a stainless steel follower ring with stainless steel screws. The valve stem shall be stainless steel and guided by a long bronze bearing in the valve cover and sealed where it passes through the cover by the means of a replaceable pressure actuated seal.
 - c. Manufacturer:
 - 1) The valve shall be the "Electric Check" Pump control Valve as manufactured by G.A. Industries, Inc., Cranberry Township, PA.

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- d. The electric motor actuator shall be Type 1 Multi-Turn per the OPERATORS paragraph of this Section.

10. Type V650 Pump Control Check Valve-Type I:

- a. Automatic Control check valve shall have a single disc "offset" pivoted above centerline of the valve. The "offset" disc shall be partially balanced and capable of closing with minimal backflow for bubble tight shut-off and no slam closure on power failure. The valve should have full flow area designed to operate as a pump control valve with positive shut-off throttling and check valve functions. The valve shall be controlled through a lost motion type of gear arrangement mounted on the side of the valve, and totally enclosed in a lubricated gearbox. The valve operating as a check valve or throttling valve shall be hydraulically controlled through an oil dashpot connected to the lost motion gearing. The open and close speeds, when used as throttle or flow sensitive check valve, shall be independently adjustable to cause the valve to open and to close at a rate compatible with the installation, without slamming and with minimal surge pressure rise. The valve must be fail-safe in the event of electrical power failure; the valve disc shall close hydraulically, energized by flow reversal in the line. The time of disc closure shall be adjustable from 3 seconds to 5 minutes by means of a Cam Operated Timing Valve permitting instant 1st Stage closure to any degree and a hydraulic dashpot for 2nd Stage and 3rd Stage Final closure.

The valve shall be electrically operated through the gear arrangement to open against the down stream pressure to permit reversal flow, if necessary.

- b. Materials:

- 1) The valve body shall be Globe Style through the disc section of cast iron conforming to ASTM A126-B with integral flanges faced and drilled to ANSI B16.1 Class 150 (ANSI/AWWA C110/A21.10). The seat must be hand replaceable in the field, without need for machining or need to remove complete valve from the line. The seat material shall be precision molded Buna-N, reinforced with heavy steel insert. The seat must be interchangeable.
- 2) The valve disc shall be ductile iron ASTM A536. The valve shaft shall be one-piece stainless steel 17-4PH material, extending completely through the valve disc and gear box.

- c. Manufacturer:

- 1) The valve shall be the APCO Series 8000 Automatic Control check valve, as manufactured by Valve & Primer Corporation, Schaumburg, IL.

- d. The electric motor actuator shall be Type 1 Multi-Turn per the OPERATORS paragraph of this Section.

11. Type V690 Flap Gate:

- a. Cast iron body, bronze mounted, flanged frame type, dual pivot-point hinge arms, hinge arms bronze, hinge pins Type 304 stainless

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steel, seat bronze and impacted into grooves in body and cover flap, lubrication fittings for each pivot, Type 316 stainless steel anchor bolts or cast iron wall thimble.

- b. Shop coat embedded surfaces of thimble as specified in Section 09900, "Painting and Protective Coatings" for submerged surfaces.
- c. Manufacturers and Products:
 - 1) Rodney Hunt Co.; Series FV-AC or FV-AR, Orange, MA.
 - 2) Waterman Industries, Inc.; Model F-20 or F-25.

12. Type V692 Flap Valve, 4-Inch to 16-Inch:

- a. Flanged frame, iron body, fully bronze mounted with bronze hinge pin and seat.
- b. Manufacturers and Products:
 - 1) Waterman; PF-25.
 - 2) Clow; No. F-3012.

G. Self-Contained Automatic Valves:

1. Type V710 Pressure-Reducing Valve, 2½-Inch and Smaller:

- a. Direct Diaphragm operated, spring controlled, bronze body.
- b. Size/Rating: as shown in the Valve Schedule.
- c. Manufacturers and Products:
 - 1) Fisher; Type 75A.
 - 2) Watts; Series 223.

2. Type V711 Pressure-Reducing Valve, 2-Inch and Smaller:

- a. Direct Diaphragm, spring controlled, cast iron body, spring case, composition set and diaphragm, stainless steel valve stem.
- b. Size/Rating: as shown in the Valve Schedule.
- c. Manufacturers and Products: Fisher; 95 Series

3. Type V720 Surge Relief Valves:

- a. The surge relief valve shall function to prevent high pressure surges in the pipeline. When the pipeline is under normal operating pressure, the valve shall be closed tightly. If the pipeline pressure rises above the set point of the relief valve, the valve shall open quickly to dissipate the overpressure. Once the overpressure condition has been dissipated, the relief valve shall close at a controlled rate of speed.
- b. The valve shall be of wye (globe) body pattern. The valve disc shall be held in the closed position due to the action of externally mounted springs when the pipeline is under normal working pressure. If the pipeline pressure, acting on the valve disc, overcomes the spring force, the valve will open. The pipeline pressure at which the valve opens (i.e. relief set point) shall be adjustable by varying the spring tension. The valve shall remain open as long as the line pressure exceeds the relief set point. When pipeline pressure drops below the relief set point, the spring force shall close the valve. The rate of closure shall be adjustable by the action of an oil-hydraulic cylinder and flow control valve.

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- c. Materials:
 - 1) Valve body shall be ASTM A126 Class B cast iron with integral flanges faced and drilled to ANSI B16.1 Class 125 or 250, as noted on the Valve Schedule.
 - a) Class 125 flanged valve body shall be rated for pressure to 250 psi.
 - b) Class 250 flanged valve body shall be rated for pressures to 400 psi up to 12" and 300 psi in larger sizes.
 - 2) The valve body shall have a removable clean out port and a replaceable stainless steel seat. Overlaid, plated or welded seats are not acceptable. A heavy cast iron disc shall contain a renewable resilient seat for drop-tight shutoff, retained by a stainless steel follower ring. The disc shall be attached to a stainless shaft extending through bronze bushings in the valve cover and sealed by means of a lantern ring packing with a break to atmosphere.
 - 3) The valve's set pressure shall be determined by the adjustment of compression spring(s) housed in steel enclosure(s). Exposed springs or springs that appear to be in tension are not acceptable.
 - 4) The valve shall be fully capable of operating in any position without the use of springs. There shall be no stems, stem guides or spikes within the waterway. The flow area through the valve shall be no less than the area of its nominal pipe size.
 - 5) Valve shall be hydraulically cushioned and it's closing speed controlled by the adjustment of a needle valve in such a manner to positively prevent any slam.
 - 6) The valve shall be completely serviceable in the line incorporating one flanged cover through which all internal parts are accessible.
 - d. The valve shall be a G.A. Industries, Fig. 626-D, or APCO Series 3000.
- 2. Type V740 Air and Vacuum Valve, ½-inch through 16-Inch;
 - a. ½-inch through 3-inch NPT inlets and outlets, 4-inch and larger ANSI B16.1 flanged inlet with plain outlet and protective hoods.
 - b. Rated 150 psi working pressure, cast iron, ductile iron, or semi-steel body, cover with stainless steel float and trim.
 - c. Manufacturers and Products:
 - 1) APCO Valve and Primer Corp.; Series 140 or 150.
 - 2) Val-Matic Valve; Series 100.
 - 3. Type V741 Air Release valve, 1-inch through 2-Inch:
 - a. NPT or flanged inlet and outlets, funnel shaped lower body. Suitable for raw water, sewer and reclaimed water service.
 - b. Rated 150 psi working pressure, corrosion resistant composite plastic body.
 - c. Internal metal parts shall be stainless steel
 - d. Manufacturers and Products:
 - 1) A.R.I. series S-021

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4. Type V742 Air Release and Vacuum Valve, 1-inch through 2-Inch:
 - a. NPT or flanged inlet and outlets, funnel shaped lower body. Suitable for raw water or sewer service, automatically exhausts the air during the filling of a system and allows air to re-enter during draining or when vacuum occurs.
 - b. Rated 150 psi working pressure, corrosion resistant composite plastic body.
 - c. Internal metal parts shall be stainless steel
 - d. Manufacturers and Products:
 - 1) A.R.I. series D-021

5. Type V750 Sewage Air and Vacuum Valve, 2-Inch to 14-Inch:
 - a. Suitable for sewer service, automatically exhausts the air during the filling of a system and allows air to re-enter during draining or when vacuum occurs.
 - b. Rated 150 psi working pressure and built with a standard elongated body, and have a cast iron, ductile iron, or semi-steel body, covers with stainless steel float and trim.
 - c. Sewage air and vacuum valve to be fitted with blow off valve, quick disconnect couplings, and a minimum 6 feet of hose to permit back-flushing after installation without dismantling valve.
 - d. Manufacturers and Products:
 - 1) APCO Valve and Primer Corp.
 - 2) Val-Matic Valve (2"-8" only).

6. Type V751 Sewage Air and Vacuum Valve, 3-Inch to 142Inch:
 - a. Suitable for sewer service, automatically exhausts the air during the filling of the pump discharge header and allows air to re-enter during a surge condition when vacuum occurs.
 - b. Rated 150 psi working pressure and built with a standard elongated body, and have cast iron, ductile iron, or semi-steel body and covers.
 - c. Sewage air and vacuum valve to be fitted with a 2-inch air release valve.
 - d. Manufacturers and Products:
 - 1) G.A. Industries Inc., Figure 993.
 - 2) APCO Valve and Primer Corporation.

7. Type V752 Sewage Air Release Valve, 2-Inch to 4-Inch:
 - a. Suitable for sewer service, automatically exhausts entrained air that accumulates in a system.
 - b. Rated 105 psi working pressure and built with a standard elongated body, and have cast iron, ductile iron, or semi-steel body, covers with stainless steel float and trim.
 - c. Sewage air release valve fitted with blow off valve, quick disconnect coupling, and 6 feet of hose to permit back flushing without dismantling valve.
 - d. Manufacturers and Products:
 - 1) APCO Valve and Primer Corp.
 - 2) Val-Matic Valve.

- H. Miscellaneous Valves:
1. Type V903 diaphragm valve, ½-Inch to 6-Inch:
 - a. Weir type with PVC Type 1, Grade 1 body, PTFE diaphragm with PVDF gas barrier and EPDM backing cushion flanged ends, hand wheel operator, position indicator, adjustable travel stop, clear molded acrylic stem cap.
 - b. Manufacturers and Products:
 - 1) ASAHI/AMERICA, Diaphragm valve, Type 14 or 15.
 - 2) ITT Engineered Valves, Dia-Flo.
 - 3) Georg Fischer, Type 317.
 2. Type V904 Pinch Valve:
 - a. Body, ductile iron.
 - b. Sleeve: provide elastomer compatible with application.
 - c. Operator: as scheduled on PLANS.
 - d. Control: electrically actuated capable of modulation with external stroke adjustment.
 - e. Size: As shown on PLANS.
 - f. End Connection: Flanged, unless otherwise noted.
 - g. Operator: As scheduled on PLANS.
 - h. Manufacturers and Products:
 - 1) Red Valve Company, Series 5200E or equal.
 3. Type V915 Mud Valve:
 - a. Body, disc, extensions, stem, bolts, nuts, and guide brackets of stainless steel. Seals of Neoprene ASTM D2000, Grade 2BC510.
 - b. Size: As scheduled on PLANS.
 - c. End Connection: flanged, unless otherwise noted.
 - d. Operator: As scheduled on PLANS.
 - e. Manufacturers and Products:
 - 1) Fontaine, Series 85 or equal.
 - 2) Troy Valve (4"-12")
 4. Type V916 Mud Valve:
 - a. Body and Disk: Cast iron.
 - 1) Stem, Stem nut, Seat Ring, and Disk Ring: Bronze.
 - 2) Extension Stem: Steel.
 - 3) Stem Guides: Cast iron or steel with bronze sleeves.
 - b. Type: Rising or non-rising stem, as scheduled.
 - c. End Connection: Flanged, unless otherwise noted.
 - d. Operator: As scheduled on PLANS.
 - e. Coating: Per Specification for submerged service.
 - f. Manufacturers:
 - 1) Clow.
 - 2) Waterman.
 - 3) Troy Valve.
 5. Type V920 Hydrostatic Relief Valve:
 - a. Type: Floor.

- b. Body: Cast iron.
 - 1) Cover: Rubber covered cast iron.
 - c. Furnish with internal grate.
 - d. Size: 4-inch
 - e. Operating Head: Approximately 9 inches of water.
 - f. Manufacturers:
 - 1) Clow.
 - 2) Troy Valve.
6. Type V921 Hydrostatic Relief Valve:
- a. Type: Wall type.
 - b. Body and Seat: Cast iron. Bronze mounted.
 - 1) Seat shall be soft, composition rubber.
 - c. Size: 4-inch
 - d. Operating Head: Approximately 9 inches of water.
 - e. Manufacturers:
 - 1) Clow.
 - 2) Troy Valve.
7. Type V925 Sampling Valve:
- a. Iron body type, stainless steel piston that extends to the inner surface of the vessel or pipe, sealed by two compressible replaceable Teflon rings, one above the discharge port and the other below the discharge port.
 - b. Manufacturer and Product:
 - 1) Strahman Sampling Valve.
8. Type V940 Solenoid Valve, 3-Inch and Smaller:
- a. Two-way internal pilot operated diaphragm type, brass body, resilient seat suitable for air or water, solenoid coil molded epoxy, NEMA insulation Class F, 120 volts AC, 60-hz, unless otherwise indicated. Solenoid enclosure NEMA 250, Type 4 unless otherwise indicated. Size and normal position as indicated.
 - b. Minimum operating pressure differential no greater than 5 psig, maximum operating pressure differential not less than 125 psig.
 - c. Manufacturers and Products:
 - 1) ASCO.
 - 2) Skinner; 1/8"-2".

2.05 OPERATORS

A. Manual Operator:

1. General:

- a. Operator force not to exceed 40 pound under any operating condition, including initial breakaway. Gear reduction operator shall be provided when the required force would otherwise exceed 40 pounds without gear reduction.
- b. Operator self-locking type or equipped with self-locking device.
- c. Position indicator on quarter-turn valves.

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- d. Worm and gear operators one-piece design worm-gears of gear bronze material. Worm hardened alloy steel with thread ground and polished. Traveling nut type operators threaded steel reach rods with internally threaded bronze or ductile iron nut.
2. Exposed Operator:
 - a. Galvanized and painted hand wheels.
 - b. Lever operators allowed on quarter-turn valves 8-inch and smaller.
 - c. Cranks on gear type operators.
 - d. Chain wheel operator with tiebacks, extension stem, floor stands, and other accessories to permit operation from normal operation level.
 - e. Valve handles to take a padlock, and wheels a chain and padlock.
- B. Buried Operator:
1. Buried service operators on valves larger than 2½-inch shall have a 2-inch AWWA operating nut. Buried operators on valves 2-inch and smaller shall have cross handle for operation by forked key. Enclose moving parts of valve and operator in housing to prevent contact with the soil.
 2. Design buried service operators for quarter-turn valves to withstand 450 foot-pounds of input torque at a FULLY OPEN or FULLY CLOSED positions, grease packed and gasketed to withstand a submersion in water to 10 psi.
 3. Buried valves shall have extension stems, bonnets, and valve boxes.
- C. Electric Valve and Gate Actuators:
1. General:
 - a. See the Schedules on the PLANS for information on individual valves and gates. Schedule indicates valve size, type, closing speed, and references to the applicable control schematics.
 - b. Single Manufacturer: All electric valve actuators to be manufactured by the same Manufacturer. Contractor to coordinate among all supplies of various equipment to ensure consistency within a given construction contract. However, unit responsibility to be maintained for each individual valve and gate including coordination of design, assembly, testing and installation.
 - c. All materials to be suitable for the environment in which the valve is to be installed. Where called for in the PLANS, motors and electrical enclosures shall be suitable for a Class I, Division 2, Group D location. All actuators shall be minimum NEMA 4X and suitable for wet and corrosive environments.
 - d. Comply with AWWA C540.
 - e. Provide units consisting of 480V, three-phase electric motor, gearbox, limit switches, torque switches, manual override hand wheel with declutching lever, and mechanical position indicator.
 - f. Provide Quarter turn or multi-turn units equipped with gearing and mounting hardware as required by the associated valve or gate.
 - g. Sized by the valve or gate supplier and factory mounted. Sized to produce at least 1½ times the operating torque required. Stall torque of motor shall not exceed the torque capacity of the valve.

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- h. The actuator motor and all electrical enclosures shall be NEMA 4X, as a minimum. A separately sealed terminal compartment shall be provided to segregate the electronic and electrical components in the actuator from the incoming conduit.
- i. Manufacturers (Reference single manufacturer requirement above):
 - 1) Limitorques
 - 2) E.I.M.
 - 3) No Equal

2. Motors:

- a. Motors shall be specifically designed for valve or gate actuator service and shall be rated for high starting torque, low-starting current, full voltage starting, totally enclosed, non-ventilated construction.
- b. Motor is to be rated for continuous duty operation. Fifteen minute duty cycle motors are not acceptable.
- c. Motor insulation for 480V motors shall be NEMA Class F, as a minimum at 50 degree F ambient temperature
- d. With a line voltage ranging between 10 percent above to 10 percent below the rated voltage, the motor to develop full rated torque continuously without causing the thermal contact protective devices imbedded in the motor windings to trip or the starter overloads to drop-out.
- e. All bearings to be of the ball type and thrust bearings to be provided where necessary. All bearings to be provided with suitable seals to confine the lubricant and prevent the entrance of dirt and dust.
- f. Motor conduit connections to be watertight and rated for temporary submergence. Motor construction to incorporate the use of stator and rotor as independent components from the valve or gate operation such that the failure of either item does not require actuator disassembly or gearing replacement.
- g. Modulating valves are required for some applications. Provide motor that is rated for modulation duty for up to 1200 cycles per hour.

3. Gearing and Limit/Torque Switches

- a. All gearing shall be of metal construction. The actuator to be a single or double reduction unit consisting of spur or helical gears and worm-gearing. The spur or helical gears to be of hardened alloy steel and the worm-gear to be alloy bronze. All gearing to be accurately cut with hobbing machines. Final output reduction worm gearing to conform to the requirements of AWWA C540. Actuator output speed changes to be mechanically possible by simple removing the motor and changing the exposed or helical gear set ration without further disassembly of the electric actuator.
- b. Ball or roller bearing to be used throughout.
- c. Actuators shall be oil or grease lubricated. Permanently lubricated devices are not acceptable. Lubrication shall be suitable for installation at any angle and in ambient temperatures of minus 20°F to plus 140°F.

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- d. The drive shall include a lost motion device with hammer blow effect to allow the motor to reach full speed before engaging the valve load.
 - e. Dry contact limit switches (gear limit switches, torque switches, or any and all other position switches) shall be rated minimum 2-amp at 120V AC. Provide the minimum number of dry contact limit switches called for on the control schematic shown on the PLANS. The state/development of each contact, throughout the travel limits of the valve, shall be as called for and/or demonstrated on the control schematic shown on the PLANS.
 - f. Actuators shall be equipped with automatic double-acting torque switches. Torque switches shall operate during the complete valve cycle to protect the valve and actuator from excessive loads caused by obstructions in either direction of travel.
 - g. Actuators shall be equipped with hand wheels for manual operation and shall include an automatic clutch to positively disengage the hand wheel at any time the drive motor control is energized. Hand wheel operator shall be designed in such a way that failure of the motorized gearing shall not prevent hand operation of the valves or gates.
 - h. Actuators shall include a mechanical indicator that will provide continuous visual indication of valve position.
4. Starters and Controls:
- a. General Description: Unless noted otherwise on PLANS (refer to following paragraph), full voltage reversing starter, overloads, circuit breakers, control power transformers, pilot devices, selector switches, pushbuttons, related interconnect wiring, etc., shall be an integral part of the actuator assembly and shall be provided with the actuator. Control voltage shall be 120V AC.
 - b. The PLANS show several actuators where the starter, overloads, feeder breaker assembly, pilot lights, pilot devices, selector switches, pushbuttons, etc., are mounted remote from the actuator assembly.
 - c. Every effort has been made to reference a relevant control schematic for each gate/valve actuator on the PLAN schedules. However the contractor is responsible for verifying that the equipment furnished accommodates the controls configuration as defined on all electrical and instrumentation drawings, prior to bidding the project.
 - d. Modulating Valves or Gates: The PLANS require several valves that modulate in response to a 4-20 mA signal and provide a 4-20 mA position indication. For these valves or gates, provide feedback potentiometer and integral electronic positioner/comparator circuit to maintain valve position, AC motor with reversing starter, and controller capable of 1200 starts per hour and Duty cycle limit timer and adjustable band width to reduce actuator hunting. They are to operate with the following control description:
 - 1) The actuator shall include a HAND/OFF/AUTO switch or pushbutton and an OPEN/STOP/CLOSE switch or pushbutton.
 - 2) In the HAND position, the actuator shall be controlled by the OPEN/STOP/CLOSE switch. Motor shall drive the valve to fully

OPEN or CLOSED position when the pushbutton is momentarily depressed. Motor shall stop in mid-travel when the stop button is depressed.

- 3) In the AUTO position, the actuator shall position the valve in response to a 4-20 mA DC signal with 4 mA corresponding to FULLY CLOSED and 20 mA to FULL OPEN.
- 4) HAND/OFF/AUTO and OPEN/STOP/CLOSE devices shall be integral with the actuator unless otherwise indicated.
- 5) Dry contact for remote indication of the AUTO status of the selector switch.
- 6) Actuators shall include an integral position transmitter producing a 4-20 mA DC signal to continuously indicate the valve position. 4 mA shall correspond to the FULLY CLOSED position. The transmitter shall be capable of driving an external Load impedance of zero to 500 ohms.
- 7) Double-acting limit switches to field adjusted to trip at any point between FULLY OPENED or FULLY CLOSED.
- 8) Double-acting torque switches to protect valve from excessive loads at any point between FULLY OPENED or FULLY CLOSED.

2.06 ACCESSORIES

- A. Tagging: Provide per Section 10800 "Equipment Tagging Procedure" and Section 16205, "Wire Tagging".
- B. Limit Switches for Manual Valves:
 1. Provide for the manual valves as listed on Valve Scheduled in Drawings.
 2. Factory installed limit switches to be installed on the valve by valve manufacturer.
 3. Provide two Single Pull Double Throw (SPDT) switches one for the valves fully OPEN and one for fully CLOSED. Switches shall be actuated by a position indication.
 4. Valve shall also be provided with local position indication.
 5. Limit switches shall be provided standard with NEMA 4X enclosure. Where Class I, Group C and D, Division I and II areas are indicated on the schedule provide suitable enclosures.
 6. Limit switches shall be valve manufacturer standard.
- C. Extension Bonnet for Valve Operator: Complete with stem and accessories for valve and operator.
 1. Manufacturers and Products:
 - a. Pratt.
 - b. or approved equal.
- D. Floor Stand and Extension Stem:
 1. Non-rising, indicating type.
 2. Complete with stem, coupling hand wheel, stem guide brackets, and yoke attachment.
 3. Stem Guide: Space such that stem L/R ratio does not exceed 200.

4. Anchor Bolts: Type 304 SST.
5. Manufacturers and Products:
 - a. Clow; Figure F-5515
 - b. Mueller, Figure A-26426.

- E. Floor Box and Stem:
 1. Plain type, for support of non-rising type stem.
 2. Complete with stem, operating nut, and stem guide brackets.
 3. Stem Guide: Space such that stem L/R ratio does not exceed 200.
 4. Anchor Bolts: Type 304 SST.
 5. Manufacturers and Products:
 - a. Neenah Foundry; R 7506.
 - b. Clow; No. F5690.

- F. Chain Wheel and Guide:
 1. Hand wheel direct-mount type.
 2. Complete with chain.
 3. Galvanized or cadmium-plated.
 4. Manufacturers and Products:
 - a. Clow Corp.; Figure F-5680.
 - b. Walworth Co.; Figure 804.
 - c. DeZurik Corp.; Series W or LWG.

- G. Cast Iron Valve Box: Provide per details on Drawings.

PART 3– EXECUTION

3.01 INSTALLATION

- A. Flange Ends:
 1. Flanged valve bolt holes shall straddle vertical centerline of pipe.
 2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.
 3. Orient all bolts and nuts in same direction to provide an orderly installation.
 4. Provide threaded bolts or threaded rod of size, length and materials as recommended by the valve manufacturer where required to connect flange piping or fittings to valve. Threaded rods or studs shall be installed in the valve before connecting the valve to pipe or fitting where they are required to install the valve. (Example: Bolts on the inside of a 90-bend when bolted to a plug valve.)

- B. Threaded Ends:
 1. Clean threads by wire brushing or swabbing.
 2. Apply joint compound.

- C. Valve Orientation:
 1. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above finished floor, unless otherwise shown.

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2. Install operating stem on horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above finish floor, unless otherwise shown.
 3. Orient butterfly valve shaft so that unbalanced flows or eddies are equally divided to each half of the disc, i.e., shaft is in the plane of rotation of the eddy.
 4. If no plug valve seat position is shown, locate as follows:
 - a. Horizontal Flow: the flow shall produce an "unseating" pressure, and the plug shall open into the top half of valve.
 - b. Vertical Flow: Install seat in the highest portion of the valve.
- D. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.
- E. Extension Stem for Operator: Where the depth of the valve is such that its centerline is more than 3 feet below grade, furnish an operating extension stem with 2-inch operating nut to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover.
- F. Torque Tube: Where operator for quarter-turn valve is located on floor stand, furnish extension stem torque tube of a type properly sized for 125% maximum torque capacity of the valve.
- G. Floor Box and Stem: Steel extension stem length shall locate operating nut in the floor box.
- H. Chain Wheel and Guide: Install chain wheel and guide assemblies or chain lever assemblies on manually operated valves over 6 feet 9 inches above finished floor. Where chains hang in normally traveled areas, use appropriate "L" type-tie back anchors.

3.02 TESTS AND INSPECTION

- A. Valve may be either tested while testing pipelines, or as a separate step.
- B. Test that valves open and close smoothly with operating pressure on one side and atmospheric on the other, in both directions for two-way valve and applications.
- C. Inspect air and vacuum valves as pipe is being filled to verify venting and seating is fully functional.
- D. Count and record number of turns to open and close valve; account for any discrepancies with manufacturer's data.
- E. Set, verify, and record set pressures for all relief and regulating valves.
- F. Automatic valve to be tested in conjunction with control system testing.
- G. Test hydrostatic relief valve seating; record leakage. Adjust and retest to maximum leakage of 0.1 gpm per foot of seat periphery unless a lesser amount is shown on the plans.

3.03 MANUFACTURER'S FIELD SERVICES

- A. Provide manufacturer's field services as listed below and to satisfy any requirements of the equipment that contains one of the valves specified in this section.
- B. Manufacturer's Services and Certificate of Proper Installation: Provide Manufacturer's Services and Manufacturer's Certificate of Proper Installation. Manufacturer's representation shall provide supervision of equipment installations, field inspection of equipment before startup and the executed copies Manufacturers Services and Certificate of Proper Installation.
- C. Provide a minimum of ½ person-day and 1 trip for CONTRACTOR assistance for installation assistance, startup assistance, functional and/or performance testing, and completion of Manufacturer's Certificate of Proper Installation.
- D. Provide a minimum of ½ person-day and 1 trip for OWNER training at OWNER's request and the OWNER's Schedule.
- E. The person days and trips provided by the manufacturer shall be provided for each valve type and operator that requires routine maintenance beyond scheduled exercising of the unit.

3.04 -3.10 (NOT USED)

3.11 MEASUREMENT AND PAYMENT

No separate measurement or payment for work performed under this Section. Include cost of same in Contract price bid for work of which this is a component part Unless Valve is specifically listed as a bid item on the Bid Form 00300.

END OF SECTION