Change Order

PROJECT:	WTP Generator 3 Emergency Repl	**DATE OF ISSUANCE:**	November 13, 2024
OWNER:	Village of Wellington	**CHANGE ORDER NO:**	001
CONTRACTOR:	Wharton-Smith, Inc.	**OWNER'S PROJECT NO:**	CUT22004 PO230881
ENGINEER:	N/A	**NOTICE TO PROCEED:**	September 25, 2023

You are directed to make the following changes in the Contract Documents.

Description: Construct the repair of a plant electrical service as shown in the drawings Utilities WTP Wiring and Raceway Plans, G-1, E-1 to E-9 by and Technical Specifications by Hillers Electrical Engineers.

1. Deduct $150,000 from the Generator 3 project contingency. These funds will be unencumbered from the Wharton-Smith Contract. Remaining project contingency/allowances is currently $267,544.56, after this CO this will reduce to $117,544.56.
2. Increase the contract value by $221,173.54 as outlined in Wharton's Smith's proposal for the M1 Scrubber Electrical Service Repair (Rev1) dated October 24, 2024.

Attachments:

1. OCOR 04 M1 Scrubber Electrical Service Repair Proposal by Wharton-Smith.

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIME
Original Contract Price $2,940,600.00	**Original Contract Time** 691 days to Substantial August 16, 2025 cal days/date
Net Change from Previous Change Orders $0.00	**Net Change from Previous Change Orders** 0 cal days
Contract Price prior to this Change Order $2,940,600.00	**Contract Time Prior to this Change Order** 0 days to Substantial August 16, 2025 cal days/date
Net INCREASE of this Change Order $71,173.54	**Net increase of this Change Order** 0 cal days
Contract Price with all approved Change Orders $3,011,773.54	**Contract Time with all approved Change Orders** 0 days to Substantial August 16, 2025 cal days/date

APPROVED:	**APPROVED:**	**APPROVED:**
by_____	by_____	by_____
Assistant Village Manager	Utility Director	Contractor

Wharton-Smith, Inc.
CONSTRUCTION GROUP

October 24, 2024

Anjuli Panse, PE
Village of Wellington
1100 Wellington Trace
Wellington, FL 33414

Re: OCOR 04 – M1 Scrubber Electrical Service Repair REV1
Village of Wellington WTP Generator 3 Installation

Dear Ms. Panse:

We have developed Proposal Summary No. 04 for performing electrical service repairs on the existing M1 degasifier and scrubber system as shown in the Drawings and Specifications provided by Hillers Electrical Engineering, dated August 2024. Included in the proposal is the cost of furnishing all necessary materials, labor, equipment, tools, supervision, and subcontractor costs required for the specified scope of work.

Attached to this letter you will find our detailed Proposal Summary for the amount of ***$221,173.54*** with all associated back-up documentation.

Clarifications to this proposal are as follows:

- A change order will be provided by the Village under this project for the additional scope provided in the OCOR.
- The work being completed under this OCOR is contingent upon completion of work under CUT21005(4) – Chemical System Improvements Phase II. It is noted that several structures, equipment, etc. are shown as existing in the above referenced drawings but have yet to be installed. Additional time will be requested as needed for the additional scope of work in this proposal.
- WSI assumes all existing equipment to remain is in good working order. Any equipment not modified by WSI that experiences operational issues during the course of the work is not the responsibility of WSI or its subcontractors.
- The material cost of all new wire was removed from Loveland's proposal. An allowance of $35,000.00 is being included to cover the material cost of the wire at the time of purchase, as requested by the Village.
    - Subcontractor OH&P and CMAR fee to be billed under this allowance. If total cost for material, including OH&P and CMAR fee, exceeds $35,000.00, a separate change order request will be submitted.
- Items noted on Loveland's material takeoff as galvanized is a labeling error created during estimating. No galvanized fittings will be installed under this project.

Please do not hesitate to call if you should have any questions or wish to discuss this matter further.

Sincerely,
Wharton-Smith, Inc.

Savanna Bogue

Digitally signed by Savanna Bogue
DN: C=US, E=sbogue@whartonsmith.com, O="Wharton-Smith, Inc.", OU=Project Engineer, CN=Savanna Bogue
Date: 2024.10.24 17:21:14-04'00'

Savanna Bogue
Senior Project Engineer
CC: File 22-050/C-05D1./CCOR 04

Wharton-Smith, Inc.
CONSTRUCTION GROUP

CHANGE ORDER COST PROPOSAL NO. 04

Revision 01

The Village of Wellington

PROPOSAL SUMMARY

10/24/2024

#		DESCRIPTION						NOTES
1		Proposal includes cost to perform electrical service repairs to the existing M1 scrubber and degas tower.						
2								
3								
4								
5								
6								
7								
8								
9								
10		The duration for the additional work outlined in this proposal is 0 calendar days.						
11		The Contract Time Extension due to this Change Order is 0 calendar days.						
12		**MATERIALS**					**TOTAL**	
13		From Page 2					$ 2,500.00	
14			Tax	7.00%	$ -		$ 2,500.00	
15			Markup	9.0%	$ 225.00		$ 2,725.00	
16							**$ 2,725.00**	
17								
18		**LABOR**	**HRS**			**AVG $ / HR**	**TOTAL**	
19		From Page 3	32				$ 1,680.00	
20			Markup	9.0%	$ 151.20		$ 1,831.20	
21							**$ 1,831.20**	
22								
23		**TOOLS & EQUIPMENT**					**TOTAL**	
24		From Page 4					$ -	
25			Tax	7.00%	$ -		$ -	
26			Markup	9.0%	$ -		$ -	
27							**$ -**	
28								
29		**SUBCONTRACTS**					**TOTAL**	
30		From Page 5: Loveland Subcontract					$ 166,621.41	
31		From Page 5: Wire Allowance					$ 35,000.00	9% markup included
32								
33								
34			Subtotal				$ 166,621.41	
35			Markup	9.0%	$ 14,995.93		$ 181,617.34	
36							**$ 216,617.34**	
37								
38		**OTHER**	**QTY**			**REFERENCE**	**TOTAL**	
39		Extended Overhead		Days * Cost Per Day		$ -	$ -	
40		Additional Insurance		M + L + T&E + S		$ 221,173.54		
41		Additional Bond		M + L + T&E + S		$ 221,173.54		
42				Subtotal			$ -	
43				Markup	9.0%	$ -	$ -	
44							**$ -**	
45								
46		**FINAL QUOTE TOTAL**					**TOTAL**	
47							$ 221,173.54	
48								
49						**$**	**221,173.54**	

Wharton-Smith, Inc.
CONSTRUCTION GROUP

CHANGE ORDER COST PROPOSAL NO. 04

Revision 01

The Village of Wellington

MATERIAL ESTIMATE

#		MATERIALS	INV	QTY	UNIT	UNIT RATE	TOTAL	NOTES
1		Concrete Materials for Equip. Pad					$ 2,500.00	
2							$ -	
3							$ -	
4							$ -	
5							$ -	
6							$ -	
7							$ -	
8							$ -	
9							$ -	
10							$ -	
11							$ -	
12							$ -	
13							$ -	
14							$ -	
15							$ -	
16							$ -	
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29							$ -	
30							$ -	
31							$ -	
32							$ -	
33							$ -	
34							$ -	
35							$ -	
36							$ -	
37							$ -	
38		MATERIAL SUBTOTAL					TOTAL	
39							$ 2,500.00	
40						$	2,500.00	

Wharton-Smith, Inc.
CONSTRUCTION GROUP

CHANGE ORDER COST PROPOSAL NO. 04

Revision 01

The Village of Wellington

LABOR ESTIMATE

#		LABOR	HRS		RATE		COST			NOTES
			ST	OT	ST	OT	ST	OT	TOTAL	
1		Superintendent	0		$ 98.00	$ 147.00	$ -	$ -	$ -	
4		Craft Foreman	16		$ 60.00	$ 90.00	$ 960.00	$ -	$ 960.00	
5		Operator	0		$ 45.00	$ 67.50	$ -	$ -	$ -	
6		Rodbuster	0		$ 45.00	$ 67.50	$ -	$ -	$ -	
7		Carpenter	0		$ 45.00	$ 67.50	$ -	$ -	$ -	
8		Pipefitter	0		$ 45.00	$ 67.50	$ -	$ -	$ -	
9		Plumber	0		$ 45.00	$ 67.50	$ -	$ -	$ -	
10		Finisher	0		$ 45.00	$ 67.50	$ -	$ -	$ -	
11		Laborer	16		$ 45.00	$ 67.50	$ 720.00	$ -	$ 720.00	
12						$ -	$ -	$ -	$ -	
13						$ -	$ -	$ -	$ -	
14						$ -	$ -	$ -	$ -	
15						$ -	$ -	$ -	$ -	
16						$ -	$ -	$ -	$ -	
17						$ -	$ -	$ -	$ -	
18						$ -	$ -	$ -	$ -	
19						$ -	$ -	$ -	$ -	
20						$ -	$ -	$ -	$ -	
21			32.0	0.0			$ 1,680.00	$ -		
22			**32.0**						**$ 1,680.00**	
23										

24		ADJUSTMENTS	%	HRS		RATE / HR	TOTAL	
25		Material Handling	7.0%	2.24		$ 35.00	$ 78.40	
26		Testing & Cleaning	2.5%	0.8		$ 35.00	$ 28.00	
27		Warranty & Punchlist	1.5%	0.48		$ 35.00	$ 16.80	
28				**0**			**$ -**	
29								

30		PROJECT MANAGEMENT	HRS		RATE / HR	TOTAL	
31		Field Engineer	0.00		$ 65.00	$ -	
32		Project Engineer			$ 65.00	$ -	
33		Safety Coordinator	0		$ 95.00	$ -	
34			**0.0**			**$ -**	
35							

36		LABOR SUBTOTAL				HRS	AVG $ / HR	TOTAL	
37		Manhours	32.0	0.0	0.0	32.0	$ 52.50	$ 1,680.00	
38						**32.0**			
39							**$**	**1,680.00**	
40									

Wharton-Smith, Inc.
CONSTRUCTION GROUP

CHANGE ORDER COST PROPOSAL NO. 04

Revision 01

The Village of Wellington

EQUIPMENT ESTIMATE

#		TOOLS	DESCRIPTION	REF		RATE	TOTAL	
1		Small Tools	4% Labor Cost	$ 1,680		4%		
2		Consumables	$1.00 / Labor Hr	32.0		$ 1.00		
3							$ -	
4							**$ -**	
5								
6		**EQUIPMENT**	**DESCRIPTION**	**QTY**	**UNIT**	**RATE**	**TOTAL**	
7					Day		$ -	
8					Day		$ -	
9					Day		$ -	
10					Day		$ -	
11					Day		$ -	
12							$ -	
13								
14		**RENTALS**	**DESCRIPTION**	**QTY**	**UNIT**	**RATE**	**TOTAL**	
					Week		$ -	
15					Week		$ -	
16					Week		$ -	
17					Week		$ -	
18							$ -	
19							$ -	
20							$ -	
21							$ -	
22							$ -	
23							$ -	
24							$ -	
25								
26		**FUEL**	**DESCRIPTION**		**Rate**	**REF**	**TOTAL**	
27		Equipment Fuel	12% Fueled Equipment Cost		12%	$ -	$ -	
28							**$ -**	
29								
30								
31		**EQUIPMENT SUBTOTAL**					**TOTAL**	
32							$ -	
33								
34						**$**	**-**	

Wharton-Smith, Inc.
CONSTRUCTION GROUP

CHANGE ORDER COST PROPOSAL NO. 04

Revision 01

The Village of Wellington

SUBCONTRACT ESTIMATE

#		SUBCONTRACTOR	SCOPE	INV	TOTAL	NOTES
1		Loveland Electric	Scrubber electrical service repairs		$ 166,621.41	
2		Loveland Electric	Wire purchase allowance		$ 35,000.00	
3						
4						
5						
6						
7						
8						
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35						
36						
37						
38		SUBCONTRACT SUBTOTAL			TOTAL	
39					$ 201,621.41	
40				$	201,621.41	

Labor Breakdown				Hours															
	Quantity	Unit	Duration (Days)	Project Manager	Asst. Project Manager	Project Engineer	Superintendant	Asst. Superintendant	Surveyor	Craft Foreman	Operator	Rodbuster	Carpenter	Pipefitter	Plumber	Finisher	Laborer		Totals
Form, reinforce, and place concrete equipment pad	1.0	LS	2.0							16.0							16.0		32.0
																			0.0
																			0.0
																			0.0
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				0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	0.0	**32.0**

Electric

1344 S. Killian Dr.
Lake Park, FL 33403
561-882-0401 Fax 561-882-0555

TO: Wharton Smith

DATE: 9/24/2024 **NO:** 2

JOB: M1 Degasifier Scrubbers

JOB NO:

ATTN: Savana Bogue (561)532-7870

We have received and reviewed your proposed change request M1 Scrubber Electrical Sevice Repair
Pertaining to The repair and replacement of conduit & wire associated with the M1 Degasifier Scrubbers per plans and specification dated August, 2024 by Hillers Electrical Engineering, Inc..

We propose to furnish all material, labor and supervision for the execution of the electrical work covered by this change for the lump sum of: ~~$198,272~~ $166,621.41

In order to incorporate this change, we estimate that we will require additional time for completion and have based our proposal upon receiving TBD calendar days extension.

This proposal is firm for acceptance within ~~15~~ 60 days. We cannot proceed with the work covered by this proposed change until we receive written approval, which must be within the above time limit to prevent additional costs.

60 days from 10/2/24

Exceptions taken are: Concrete by others, existing equipment and systems to remain / reuse shall be in good condition and adequate for utilization.

This proposal is based solely on the usual cost elements such as labor, material and normal markups and does not include any amount for additional changes in the sequence of work, delays, disruption, rescheduling, extended overhead, overtime, acceleration and/or impact costs and the right is expressly reserved to make claim for any and all of these and related items of cost prior to any final settlement of this contract. The issuance of a change order is acknowledgement and acceptance of all terms and conditions of this written proposal and may not be altered in any way unless agreed to in writing.

LOVELAND ELECTRIC II, LLC

David Urquhart
Project Manager

LOVELAND ELECTRIC II, LLC.

M1 SCRUBBER ELECTRICAL SERVICE REPAIR

Change Order Estimate Sheet

			LABOR			
1	ESTIMATED MAN HOURS	**930.7**	HRS X RATE	**$85.00**		$79,109.50
2	SUPERVISION					$18,195.19
3	PROJECT MANAGER					$5,537.67
4	TOTAL LABOR					[redacted]
			MATERIAL			
5	TAKEOFF		$45,262.31			
6	MISC OTHER		$0.00			
7	SUBTOTAL MATERIAL		$45,262.31			
8	FREIGHT / DELIVERY		$452.62			
9	SALES TAX		$2,971.47			
10	TOTAL MATERIAL		~~$48,686.40~~	$21,910.49		
			EXPENSES			
11	SUBCONTRACTOR COST				$0.00	
12	SMALL TOOLS				$3,085.27	
13	RENTED EQUIPMENT				$10,400.00	
14	JOB EXPENSES				$4,950.42	
15	INSURANCE				$1,699.64	
16	BOND				$0.00	
17	TOTAL EXPENSES				[redacted]	
			OVERHEAD & PROFIT			
18	OVERHEAD				10.00%	~~$17,166.41~~ $14,488.82
19	PROFIT				5.00%	~~$8,441.52~~ $7,244.41
20			**ESTIMATE**			~~$198,272.02~~ $166,621.41

Subtracted wire cost w/ 6.5% tax

Revised OH&P and total with wire cost subtracted

HIGHLIGHTED ITEMS ARE INCLUDED WITHIN WIRE ALLOWANCE

Description	Quantity	Net Price	Price Unit	Total Material	Labor	Labor Unit	Total Hours
1 1/4" ELBOW 90 DEG - RMC ~~- GALV~~	4	$ 5,271.00	C	$ 210.84	57.00	C	2.3
1 1/2" ELBOW 90 DEG - RMC ~~- GALV~~	2	$ 6,414.80	C	$ 128.30	72.00	C	1.4
1/2" TYPE C STD CONDUIT BODY W/ CVR & GSKT - RMC - MALL	4	$ 40.73	E	$ 162.92	0.63	E	2.5
1" LOCKNUT - STEEL	4	$ 1.47	E	$ 5.88	46.50	C	1.9
1" BUSHING - PLASTIC	4	$ 81.28	C	$ 3.25	3.90	C	0.2
3/4" BUSHING GRDG INSUL 150 DEG - STEEL	4	$ 1,611.23	C	$ 64.45	4.20	C	0.2
1" BUSHING GRDG INSUL 150 DEG - STEEL	4	$ 1,699.36	C	$ 67.97	5.40	C	0.2
~~1" MEASURE CUT & THREAD LABOR - RMC - GALV~~	~~14~~	~~$ -~~	~~C~~	~~$ -~~	~~33.75~~	~~C~~	~~4.7~~
~~1 1/4" MEASURE CUT & THREAD LABOR - RMC - GALV~~	~~12~~	~~$ -~~	~~C~~	~~$ -~~	~~36.90~~	~~C~~	~~4.4~~
~~1 1/2" MEASURE CUT & THREAD LABOR - RMC - GALV~~	~~6~~	~~$ -~~	~~C~~	~~$ -~~	~~42.90~~	~~C~~	~~2.6~~
1" CONDUIT - RMC - ALUM	130	$ 554.68	C	$ 721.08	11.30	C	14.7
1 1/4" CONDUIT - RMC - ALUM	171	$ 726.12	C	$ 1,241.67	12.10	C	20.7
1 1/2" CONDUIT - RMC - ALUM	40	$ 897.57	C	$ 359.03	13.10	C	5.2
3" CONDUIT - RMC - ALUM	20	$ 2,491.02	C	$ 498.20	22.50	C	4.5
4" CONDUIT - RMC - ALUM	20	$ 3,539.84	C	$ 707.97	35.60	C	7.1
1" COUPLING - RMC - ALUM	6	$ 2,815.40	C	$ 168.92	0.00	C	0.0
1 1/4" COUPLING - RMC - ALUM	4	$ 3,441.20	C	$ 137.65	0.00	C	0.0
1 1/2" COUPLING - RMC - ALUM	2	$ 3,976.00	C	$ 79.52	0.00	C	0.0
1" ELBOW 90 DEG - RMC - ALUM	6	$ 8,390.20	C	$ 503.41	34.50	C	2.1
3 x CLOSE NIPPLE - RMC - ALUM	1	$ 7,023.79	C	$ 70.24	90.00	C	0.9
1" CONN THRD HUB INSUL W/ GRD LUG - RMC - ALUM	6	$ 2,679.95	C	$ 160.80	48.75	C	2.9
1 1/4" CONN THRD HUB INSUL W/ GRD LUG - RMC - ALUM	4	$ 3,289.54	C	$ 131.58	56.40	C	2.3
1 1/2" CONN THRD HUB INSUL W/ GRD LUG - RMC - ALUM	2	$ 3,563.84	C	$ 71.28	67.50	C	1.4
3" CONN THRD HUB INSUL W/ GRD LUG - RMC - ALUM	6	$ 9,331.73	C	$ 559.90	105.00	C	6.3
1" 3-PC UNION (ERICKSON) COUPLING - RMC - ALUM	6	$11,826.14	C	$ 709.57	75.00	C	4.5
1 1/4" 3-PC UNION (ERICKSON) COUPLING - RMC - ALUM	4	$21,405.92	C	$ 856.24	90.00	C	3.6
1 1/2" 3-PC UNION (ERICKSON) COUPLING - RMC - ALUM	2	$24,229.00	C	$ 484.58	105.00	C	2.1
1" TYPE LB STD CONDUIT BODY W/ CVR & GSKT - RMC - ALUM	10	$ 35.56	E	$ 355.60	0.90	E	9.0
1 1/2" TYPE LB STD CONDUIT BODY W/ CVR & GSKT - RMC - ALUM	2	$ 68.66	E	$ 137.32	1.41	E	2.8
1 1/4" TYPE LL STD CONDUIT BODY W/ CVR & GSKT - RMC - ALUM	6	$ 56.39	E	$ 338.34	1.13	E	6.8
4" 2-PC STRUT CLAMP - S/S	4	$ 485.52	C	$ 19.42	25.50	C	1.0
BITUMASTIC (GAL)	1	$ 28.00	E	$ 28.00	5.00	E	5.0
3" MEASURE CUT & THREAD LABOR - RMC - ALUM	8	$ -	C	$ -	81.00	C	6.5
1 1/4" FIELD BEND NO CUT LABOR - RMC - ALUM	40	$ -	E	$ -	0.68	E	27.2
1 1/4" FIELD BEND W/ CUT & THREAD LABOR - RMC - ALUM	8	$ -	E	$ -	0.81	E	6.5
3/4" FLEX - LIQUIDTIGHT METALLIC - GRAY	24	$ 583.80	C	$ 140.11	7.43	C	1.8
1" FLEX - LIQUIDTIGHT METALLIC - GRAY	8	$ 879.20	C	$ 70.34	8.85	C	0.7
3/4 STR L/T CONN	12	$ 12.03	E	$ 144.36	25.50	C	3.1
1IN STR L/T CONN	2	$ 17.78	E	$ 35.56	25.50	C	0.5
1IN 90D L/T CONN	2	$ 40.40	E	$ 80.80	25.50	C	0.5
1" CONDUIT - PVC40	16	$ 221.86	C	$ 35.50	9.19	C	1.5
Labor Adjustment for PVC Trench (NECA)	200	$ -	C	$ -	0.50	C	1.0
1" CONDUIT - PVC40 IN TRENCH	200	$ 221.86	C	$ 443.72	6.70	C	13.4
1" ELBOW 90 DEG - PVC40	4	$ 539.98	C	$ 21.60	33.00	C	1.3
1" COUPLING - PVC	8	$ 134.62	C	$ 10.77	0.00	C	0.0
1" ADAPTER MALE - PVC	4	$ 207.20	C	$ 8.29	18.00	C	0.7
PVC CEMENT STANDARD (1-QUART)	3	$ 48.71	E	$ 146.13	1.50	E	4.5
1" 2-PC STRUT CLAMP - S/S	26	$ 204.40	C	$ 53.14	8.40	C	2.2
1 1/4" 2-PC STRUT CLAMP - S/S	57	$ 226.80	C	$ 129.28	9.90	C	5.6
1 1/2" 2-PC STRUT CLAMP - S/S	8	$ 268.80	C	$ 21.50	11.10	C	0.9

[redacted]

COMPRESSION LUG - CU W/ 1- 13/32" HOLE - #4/0 CU WIRE	2	$ 2,338.49	C	$ 46.77	45.00	C	0.9
WIRE CONN RED (#16 TO #10)	8	$ 24.05	C	$ 1.92	10.50	C	0.8
WIRE CONN BLU (#12 TO # 6)	8	$ 88.82	C	$ 7.11	15.00	C	1.2
WIRE MARKER	176	$ 175.00	C	$ 308.00	1.50	C	2.6
CONDUIT MEASURING TAPE	1386	$ 61.82	M	$ 85.68	4.50	M	6.2
WIRE PULLING LUBRICANT (QUART)	5	$ 18.80	E	$ 94.00	3.00	E	15.0
DUCT SEAL (1-LB)	21	$ 8.41	E	$ 176.61	0.45	E	9.5
24x 24x 8" J-BOX - S/S BACKPLATE	2	$ 1,410.29	E	$ 2,820.58	4.60	E	9.2
[redacted]							
#4/0 WIRE CROSS SPLICE (200g)	2	$ 30.80	E	$ 61.60	1.47	E	2.9
200g PACKET WELDING POWDER	2	$ 34.73	E	$ 69.46	0.00	E	0.0
1 5/8D 316SS CHANNEL	215	$ 1,155.00	C	$ 2,483.25	21.00	C	45.2
1/2"-13 SS SPRING NUT	8	$ 245.00	C	$ 19.60	9.00	C	0.7
1 5/8x 1 5/8x 14G OR 12G END CAP PLASTIC	186	$ 883.62	C	$ 1,643.53	6.00	C	11.2
1/2x 3 SLEEVE ANCHOR W/ HEX NUT - 1 1/2" MIN DEPTH - S/S	182	$ 399.00	C	$ 726.18	24.00	C	43.7
1/2-13x 1 BOLT HEX HEAD - S/S	8	$ 98.28	C	$ 7.86	7.50	C	0.6
1/2x 1 1/2 FENDER WASHER - S/S	8	$ 72.80	C	$ 5.82	1.50	C	0.1
(LS) LEVEL SWITCH	2	$ -	E	$ -	1.00	E	2.0
(SV) SOLENOID VALVE	2	$ -	E	$ -	1.00	E	2.0
#10/3C + GRD MOTOR TERM TO 600V	2	$ -	E	$ -	1.08	E	2.2
# 6/3C + GRD MOTOR TERM TO 600V	2	$ -	E	$ -	1.68	E	3.4
#10 WIRE POWER TERM	12	$ -	E	$ -	0.17	E	2.0
# 8 WIRE POWER TERM	4	$ -	E	$ -	0.21	E	0.8
# 6 WIRE POWER TERM	12	$ -	E	$ -	0.26	E	3.1
#4/0 WIRE POWER TERM	2	$ -	E	$ -	0.65	E	1.3
#14 WIRE CONTROL TERM	152	$ -	E	$ -	0.12	E	18.2
EXCAVATION (CUBIC YARD)	28	$ -	E	$ -	3.00	E	84.0
BACKFILL (CUBIC YARD)	25	$ -	E	$ -	2.00	E	50.0
CONCRETE SACK MIX 60LB	8	$ 11.20	E	$ 89.60	0.50	E	4.0
Demolition	88	$ -	E	$ -	1.00	E	88.0
Modification of conduit - welded cap	2	$ 175.00	E	$ 350.00	2.00	E	4.0
Racking Wire Support - Non Metalic	2	$ 259.00	E	$ 518.00	2.50	E	5.0
Rework Existing Wiring and Controls	1	$ 280.00	E	$ 280.00	8.00	E	8.0
Totals				**$ 45,262.31**			**930.7**

Wire cost = $25,141.70
w/ 6.5% tax: $26,775.91
w/ 10% OH & 5% Profit: $30,926.18

WORK CHANGE PROPOSAL REQUEST

Project Name: **WTP Generator 3 Replacement**

To: Wharton- Smith, Inc.

Via email

Proposal Request No: 2

Date: 9/3/2024

Work Description: Scrubber Electrical Service Repair

Attachments: **Village of Wellington Utlities WTP M1 Wiring and Raceway Replacement Plans, G-1, E-1 to E-9 and Technical Specifications by Hillers Electrical Engineering**

Please submit an itemized proposed for the changes in Contract Sum and Contract Time for proposed modifications to the Contractor documents described herein. THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE, OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

Requested by the Owner:

Anjuli Panse, P.E. - Utility Director	9/3/2024
Printed Name and Title	**Date**

THE VILLAGE OF WELLINGTON

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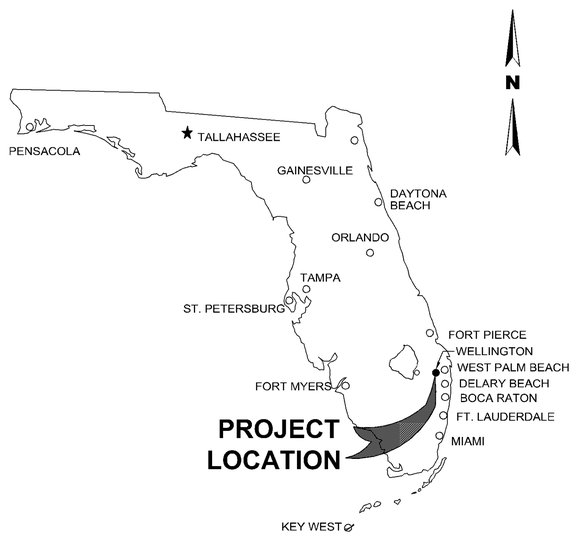
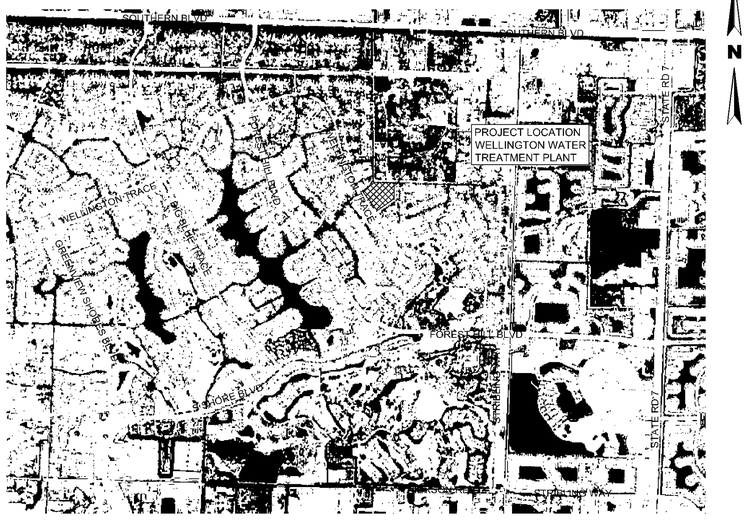
ALL EXISTING UTILITIES SHOWN ON THESE PLANS ARE TO BE CONSIDERED APPROXIMATE & SHOULD BE VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF WORK OPERATIONS

VILLAGE OF WELLINGTON UTILITIES WTP M1 WIRING AND RACEWAY REPLACEMENT



VICINITY MAP
NTS



VICINITY MAP
NTS

SHEET LIST

PROJECT LOCATION

WELLINGTON WATER TREATMENT PLANT
1100 WELLINGTON TRACE
WELLINGTON FL 33414

VILLAGE COUNCIL & ADMINISTRATORS

MICHAEL J. NAPOLEONE	MAYOR
JOHN T. McGOVERN	VICE MAYOR
TANYA SISKIND	COUNCILWOMAN
MARIA S. ANTUNA	COUNCILWOMAN
AMANDA SILVESTRI	COUNCILWOMAN
JAMES BARNES	VILLAGE MANAGER
ED DE LA VEGA	ASST. VILLAGE MANGER
ANJULI PANSE, P.E.	UTILITY DIRECTOR

DRAWING G-1

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4686 FAX
LICENSE NO: EB 0006877

BRANDON K. HAAS
No. 85334

HEE PROJECT No. WL33
PROJECT No. PO 240517
AUGUST 2024

SYMBOL / DESCRIPTION

SYMBOL	DESCRIPTION
	CONNECTION POINT TO EQUIPMENT SPECIFIED, FURNISHED AND INSTALLED UNDER OTHER DIVISIONS. RACEWAY, CONDUCTOR AND CONNECTION IN DIVISION 16 COORDINATE FINAL CONNECTION WITH EQUIPMENT SUPPLIER.
1"C,2#12,1#12G 1"C,1-25/C TYPE 1	INDICATES RACEWAY AND CIRCUIT CONDUCTORS. FIRST NUMBER IS RACEWAY SIZE. THE FOLLOWING NUMBERS ARE THE CONDUCTOR QUANTITIES,SIZES, AND TYPES
25MCC1	MAJOR ELECTRICAL COMPONENT OR DEVICE - NAME OR IDENTIFYING SYMBOL AS SHOWN.
	PANELBOARD
10	WOUND-ROTOR MOTOR, HORSEPOWER INDICATED
5	MOTOR, SQUIRREL CAGE INDUCTION - HORSEPOWER INDICATED
30A	NONFUSED DISCONNECT SWITCH, SIZE INDICATED, 3 POLE UNLESS INDICATED OTHERWISE, NEMA 1 ENCLOSURE, 4XSS = WEATHERPROOF (NEMA 4X 316SS)
40F 60A	FUSED DISCONNECT SWITCH, SIZE INDICATED (60/40, 60 = SWITCH RATING: 40 = FUSE RATING) 3 POLE UNLESS INDICATED OTHERWISE, NEMA 1 ENCLOSURE, WP = WEATHERPROOF (NEMA 4X)
	OVERLOAD RELAY HEATER
1	MAGNETIC STARTER WITH NEMA SIZE INDICATED
100 MCP	CIRCUIT BREAKER, MAGNETIC, TRIP SHOWN, 3 POLE UNLESS INDICATED OTHERWISE
400	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE UNLESS INDICATED OTHERWISE.
400 400	CIRCUIT BREAKER WITH CURRENT LIMITING FUSES, TRIP AND FUSE RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
400 225	FUSED SWITCH, SWITCH AND FUSE CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
100	SWITCH - CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
XXX YYY	LOW VOLTAGE DRAWOUT CIRCUIT BREAKER, XXX = TRIP RATING, YYY = FRAME RATING
P/C-XXX	YARD CONDUIT, XXX IS CONDUIT NO. P=POWER CONDUIT C=CONTROL CONDUIT S=SIGNAL CONDUIT
	UNDERGROUND OR EMBEDDED CONDUIT
	EXPOSED CONDUIT
G	GROUND WIRE, #4/0 BARE TINNED COPPER UNLESS OTHERWISE NOTED
	GROUND ROD
	FUSE
	GROUND
120V or 120/240V 15 KVA 1 PH	TRANSFORMER, VOLTAGES, PHASE AND RATING INDICATED AS APPLICABLE

LINE WEIGHTS

NEW

EXISTING

DEMOLITION

NOTE:
THIS IS A STANDARD LEGEND SHEET. SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET AND NOT BE UTILIZED ON PROJECT.

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
A	AMMETER, AMPERE, AMBER
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AL	ALUMINUM
ALT	ALTERNATE
AM	AUTO-MANUAL
AS ATS	AMMETER SWITCH, AUTOMATIC TRANSFER SWITCH
BRKR	BREAKER
C	CONDUIT, CONTACTOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CMP	CENTRAL MONITORING PNL
EG	EQUIPMENT GROUND
EMH	ELECTRICAL MAHHOLE
EPB	ELECTRICAL PULL BOX
DISC	DISCONNECT
G	GREEN, GROUND
GALV	GALVANIZED
GFI	GROUND FAULT INTERRUPTER
GEN	GENERATOR
GND	GROUND
HH	HANDHOLE
I & C	INSTRUMENTATION AND CONTROL
JB	JUNCTION BOX
K	KEY INTERLOCK
KW	KILOWATT
LT FLEX	LIQUID TIGHT FLEX CONDUIT
LTMC	LIQUID TIGHT METALLIC CONDUIT
LTG	LIGHTING
LP	LIGHTING PANEL
MANUF	MANUFACTURER
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MIN	MINIMUM
N	NEUTRAL
NEMA	NATIONAL ELECTRIC MANUFACTURERS ASSOCIATION
NP	NAMEPLATE
NTS	NOT TO SCALE
P	POLE
PB	PULL BOX
PE	PHOTOCELL
PH	PHASE
PNL	PANELBOARD
PR	PAIR
PVC	POLYVINYL CHLORIDE CONDUIT
RCPT	RECEPTACLE
SPB	SIGNAL PULL BOX
SS	STAINLESS STEEL
SYM	SYMMETRICAL
TJB	TERMINAL JUNCTION BOX
TS	THERMAL SWITCH
TSP	TWISTED SHIELDED PAIR
TYP	TYPICAL
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF
XFMR	TRANSFORMER

GENERAL NOTES AND SPECIFICATIONS:

1. THE SCOPE OF WORK SHALL BE AS DESCRIBED IN 16010, THE DRAWINGS, SPECIFICATIONS AND INCLUDE ALL MATERIALS AND LABOR REQUIRED TO REPLACE AND PLACE BACK INTO SERVICE WIRE AND CONDUIT SYSTEMS ASSOCAITED WITH THE M1 SCRUBBER BLOWERS AND RECIRCULATION PUMPS. PROVIDE ALL LABOR AND MATERIALS REQUIRED FOR A COMPLETE AND WORKING SYSTEM IN PLACE AS SHOWN IN THE DRAWINGS AND DESCRIBED IN THE SPECIFICATIONS.
2. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR TO INSTALL THE ELECTRICAL SYSTEMS AS INDICATED ON THE DRAWINGS. ITEMS NOT SHOWN BUT OBVIOUSLY NECESSARY FOR COMPLETION OF THE WORK SHALL BE INCLUDED.
3. THE INSTALLATION SHALL BE IN ACCORDANCE WITH THE 2020 NATIONAL ELECTRICAL CODE (NFPA 70), ELECTRICAL SAFETY IN THE WORKPLACE (NFPA 70E, LATEST EDITION), LOCAL CODES, VILLAGE CODES, ALL PALM BEACH COUNTY CODES AND 2023 FLORIDA BUILDING CODE INCLUDING PALM BEACH COUNTY AMENDMENTS
4. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, INSPECTIONS AND APPROVALS AND TO INCLUDE ALL FEES AS PART OF THE BID IF NOT OTHERWISE NOTED.
5. THE CONTRACTOR SHALL COORDINATE WORK WITH THE ENGINEER AND OWNER.
6. ALL EQUIPMENT AND MATERIAL SHALL BE UNUSED AND U.L. LISTED. ALL REFERENCES TO A PARTICULAR MANUFACTURER ARE GIVEN ON AN "APPROVED EQUAL" BASIS.
7. THE CONTRACTOR IS RESPONSIBLE TO TEST ALL SYSTEMS INSTALLED OR MODIFIED UNDER THIS PROJECT AND REPAIR OR REPLACE ALL DEFECTIVE WORK TO THE SATISFACTION OF THE ENGINEER AND OWNER.
8. ALL CONDUCTORS SHALL BE COPPER. NO ALUMINUM ALLOWED UNLESS SPECIFICALLY INDICATED ON DRAWINGS.
9. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL ELECTRICAL & CONTROL EQUIPMENT AND MATERIAL.
10. ALL CONTROL PANELS SHALL BE CONSTRUCTED BY A UL 508A APPROVED PANEL VENDOR AND SHALL BEAR A UL 508A LABEL ON THE PANEL.
11. THE DRAWINGS ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF CONDUIT RUNS. THESE ARE TO BE COORDINATED WITH THE OTHER TRADES SO THAT CONFLICTS ARE AVOIDED PRIOR TO INSTALLATIONS.
12. ALL LOCATIONS OF EQUIPMENT, PANELS ETC. ARE SHOWN FOR ILLUSTRATION PURPOSES. CONTRACTOR SHALL VERIFY AND COORDINATE EXACT LOCATION AND SIZE WITH ALL SUBCONTRACTORS AND EQUIPMENT SUPPLIERS PRIOR TO ANY INSTALLATION AND THEN INSTALL AS SUCH WITH CORRESPONDING CONDUIT STUB-UPS.
13. SEE OTHER DISCIPLINE DRAWINGS FOR COORDINATION OF ALL DRAWINGS. ANY CONFLICTS SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION AND MOVEMENT OF CONDUITS OR OTHER ELECTRICAL EQUIPMENT SHALL BE ACCOMPLISHED WITHOUT ANY ADDITIONAL COST FOR THE OWNER.
14. LOCATIONS OF MANHOLES, HANDHOLES AND PULL BOXES ARE APPROXIMATE. CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH EXISTING AND NEW PIPING OR CONDUIT AND ADJUST ACCORDINGLY.
15. NOT ALL CONDUITS SHOWN ON RISER AND ONE-LINE DIAGRAMS ARE SHOWN ON BUILDING LAYOUTS. CONTRACTOR SHALL SUPPLY ALL CONDUITS AND CABLES AS SHOWN ON RISER, ONE-LINE DIAGRAMS, PLAN VIEW DRAWINGS, SCHEMATIC DRAWINGS AND DETAILS.
16. ALL CIRCUITS SHALL BE IDENTIFIED IN JUNCTION BOXES, PULL BOXES, CONTROL PANELS, PANELBOARDS, LIGHTING POLES, CONTROLLERS AND SERVICE POINTS. IDENTIFICATION SHALL MATCH PANELBOARD SCHEDULES.
17. EXPOSED RUNS OF CONDUITS SHALL BE INSTALLED WITH RUNS PARALLEL OR PERPENDICULAR TO WALLS, STRUCTURAL MEMBERS OR INTERSECTIONS OF VERTICAL PLANES AND CEILINGS, WITH RIGHT ANGLE TURNS CONSISTING OF SYMMETRICAL BENDS OR PULL BOXES AS INDICATED ON THE DRAWINGS. BENDS AND OFFSETS SHALL BE AVOIDED WHERE POSSIBLE.
18. INSTRUMENTATION IS LOW VOLTAGE SIGNALS SUCH AS 4-20MA, TELEPHONE COMMUNICATION, FIRE ALARM COMMUNICATION. POWER CONDUIT SHALL ONLY CROSS INSTRUMENTATION CONDUIT PERPENDICULARLY AT RIGHT ANGLES WITH 6" SEPARATION.
19. CONDUCTOR PULLING TENSIONS SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION. CONTRACTOR SHALL INSTALL PULL BOXES TO MEET MANUFACTURER'S REQUIREMENTS.
20. MINIMUM DISTANCE ALLOWED BETWEEN POWER CONDUITS AND INSTRUMENTATION CONDUITS SHALL BE:

VOLTAGE	DISTANCE
480V	2 FT
120V	1 FT

21. ALL EXCAVATIONS FOR CONDUITS, HANDHOLES, MANHOLES AND PULLBOXES NEAR EXISTING PIPING, CONDUIT AND EQUIPMENT SHALL BE HAND EXCAVATED AND COORDINATED WITH THE OWNER.
22. ALL YARD UNDERGROUND CONDUITS SHALL BE 24" BELOW FINISHED GRADE UNLESS OTHERWISE NOTED.
23. COLORED WARNING TAPE 6" WIDE SHALL BE INSTALLED 8" BELOW FINISHED GRADE DIRECTLY ABOVE ALL UNDERGROUND YARD CONDUITS ACCORDING TO THE FOLLOWING SCHEDULE:
    POWER: RED
    ALL OTHER CONDUITS: GREEN
24. CONTRACTOR SHALL RESTORE SIDEWALKS, ROADWAYS, SOD AND SPRINKLER SYSTEM PIPING TO MATCH EXISTING, AFTER THE COMPLETION OF THE CONDUIT AND PULL BOX INSTALLATION.
25. GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH NEC, ARTICLE 250. GROUNDING AND BONDING CONNECTIONS SHALL NOT BE PAINTED. ALL GROUNDING CONNECTIONS SHALL BE EXOTHERMIC UNLESS SPECIFICALLY INDICATED OTHERWISE.
26. AN EQUIPMENT GROUND WIRE SIZED PER NEC SHALL BE PULLED IN ALL ELECTRICAL CONDUITS, POWER AND CONTROL, WHETHER OR NOT INDICATED ON THE PLANS. RACEWAYS SHALL NOT BE USED AS GROUNDING/BONDING PATHS.
27. ALL ENCLOSURES, TJB, WIREWAY, PULL BOXES ETC. SHALL CONTAIN A GROUNDING BUS. CONNECT ALL RACEWAY BONDS TO THIS BUS VIA GROUNDING BUSHING AND EXTEND BONDING JUMPER FROM THIS BUS TO THE ENCLOSURE.
28. CONTRACTOR SHALL CORE DRILL EXISTING CONCRETE WALLS, FLOORS, MANHOLES, HANDHOLES AND PULL BOXES FOR CONDUIT PENETRATIONS. SEAL PENETRATIONS WITH NON-SHRINK GROUT OR APPROPRIATE FIRE RATED DEVICES WHERE APPLICABLE. PAINT TO MATCH EXISTING TO SATISFACTION OF OWNER.
29. ALL CONDUITS PENETRATING RATED FIRE WALLS OR RATED FIRE FLOORS SHALL BE INSTALLED WITH U.L. APPROVED DEVICES TO MAINTAIN THE FIRE RATING OF THE WALL OR FLOOR PENETRATED.
30. PROVIDE CONDUIT DUCT SEAL AT ALL CONDUIT ENDS.
31. FOR EXPOSED CONDUITS TRANSITIONING TO UNDERGROUND AND SCHEDULED FOR DEMOLITON, CUT 1' BELOW GRADE AND CAP. FINISH AREA TO MATCH EXISTING.
32. ALL SPARE CONDUITS SHALL BE SEALED WITH A CAP AT BOTH ENDS AND A PULL STRING INSTALLED WITH IDENTIFICATION ON BOTH ENDS.
33. FLEXIBLE CONDUITS SHALL BE USED TO TERMINATE ALL MOTORS AND OTHER VIBRATING EQUIPMENT AND SHALL BE BETWEEN 18" AND 3' IN LENGTH.
34. TYPEWRITTEN AND LAMINATED PANEL SCHEDULES SHALL BE INSTALLED IN EACH PANELBOARD, AND TYPEWRITTEN TERMINAL BLOCK SCHEDULES IN EACH CONTROL CABINET.
35. ALL MATERIAL IN DESIGNATED CORROSIVE AREAS SHALL BE NEMA 4X 316 STAINLESS STEEL.
36. ALL REFERENCES TO SS OR STAINLESS STEEL SHALL BE CONSTRUED AS MEANING OF 316 STAINLESS STEEL, UNLESS OTHERWISE NOTED.
37. BRANCH AND FEEDER CONDUCTORS ARE SIZED FOR MAXIMUM VOLTAGE DROP OF 5 PERCENT COMBINED AT DESIGN LOAD PER THE FLORIDA BUILDING CODE ENERGY CONSERVATION CHAPTER.
38. CONTRACTOR SHALL PROVIDE TO THE OWNER RECORD DRAWINGS DEPICTING THE COMPLETED INSTALLATION AS INSTALLED INCLUDING A SINGLE LINE DIAGRAM OF THE BUILDING ELECTRICAL DISTRIBUTION AND FLOOR PLANS INDICATING THE LOCATION AND AREA SERVED BY ALL INSTALLED DISTRIBUTIONS PER THE FLORIDA BUILDING CODE ENERGY CONSERVATION CHAPTER.
39. CONTRACTOR SHALL PROVIDE TO THE OWNER OPERATING AND MAINTENANCE MANUALS (O&M MANUALS) FOR ALL EQUIPMENT PER THE FLORIDA BUILDING CODE ENERGY CONSERVATION CHAPTER. THE MANUALS SHALL INCLUDE:
    39.1. SUBMITTAL DATA STATING EQUIPMENT RATING AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE.
    39.2. O&M MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED.
    39.3. NAMES AND ADDRESSES OF AT LEAST ONE QUALIFIED SERVICE AGENCY.
40. ALL ELECTRICAL EQUIPMENT SHALL BE PERMANENTLY IDENTIFIED AND SIGNED PER THE REQUIREMENTS OF THE NEC AND THE FLORIDA BUILDING CODE. CONTRACTOR SHALL FURNISH AND INSTALL ALL REQUIRED IDENTIFICATION AND SIGNAGE.

FINAL DESIGN

NO.	DATE	BY	REVISION

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FL 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877

THE VILLAGE OF WELLINGTON
UTILITIES DEPARTMENT
12300 FOREST HILL BLVD.
WELLINGTON, FL 33414
(561) 791-4000

VILLAGE OF WELLINGTON UTILITIES
WTP M1 SCRUBBER
WIRING AND RACEWAY REPLACEMENT

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

ELECTRICAL LEGEND, SYMBOLS, GENERAL NOTES AND SPECIFICATIONS

DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E-1
SHEET 2 OF 10

PLOT DATE: 2024/08/13 3:47:21 PM BY: BHAAS
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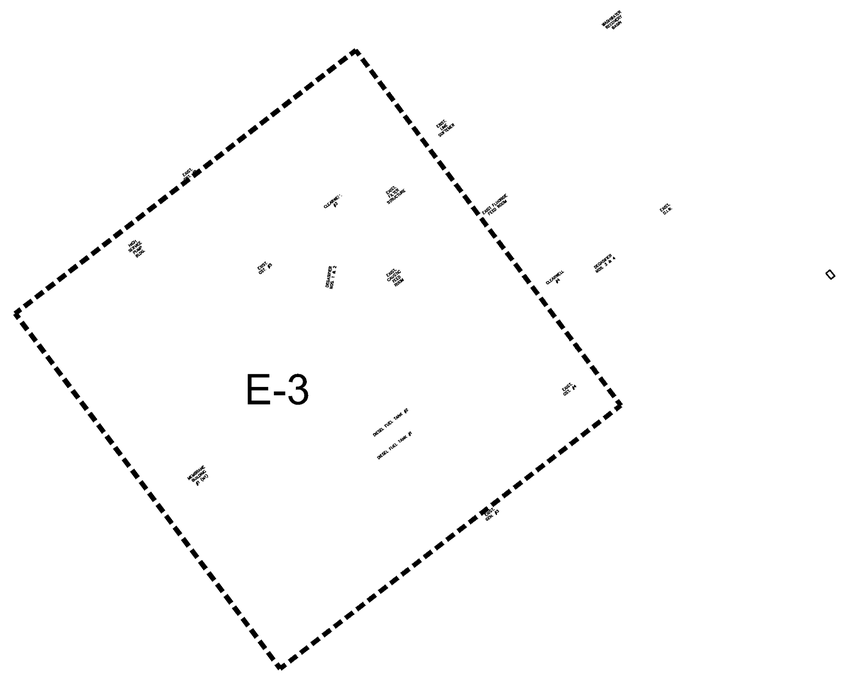
GENERAL NOTES:

1. COORDINATE WITH VILLAGE FOR CONTRACTOR STAGING AREA, WHERE REQUIRED.
2. RESTORE SIDEWALK, PAVEMENT AND SODDING TO MATCH EXISTING AFTER UNDERGROUND CONDUIT INSTALLATION.
3. ALL EXCAVATIONS FOR UNDERGROUND SHALL BE HAND EXCAVATED NEAR UTILITY CROSSINGS. COORDINATE WITH VILLAGE BEFORE EXCAVATIONS.

N



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OVERALL ELECTRICAL SITE PLAN
SCALE: 1" = 60'-0"

1"=60'-0"

60 30 0 60'

FINAL DESIGN

NO.	DATE	BY	REVISION

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
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VILLAGE OF WELLINGTON UTILITIES
WTP M1 SCRUBBER
WIRING AND RACEWAY REPLACEMENT

VERIFY SCALES
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0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

OVERALL ELECTRICAL SITE PLAN

DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E-2
SHEET 3 OF 10

PLOT DATE: 2024/08/13 4:47:37 PM BY: BHAAS
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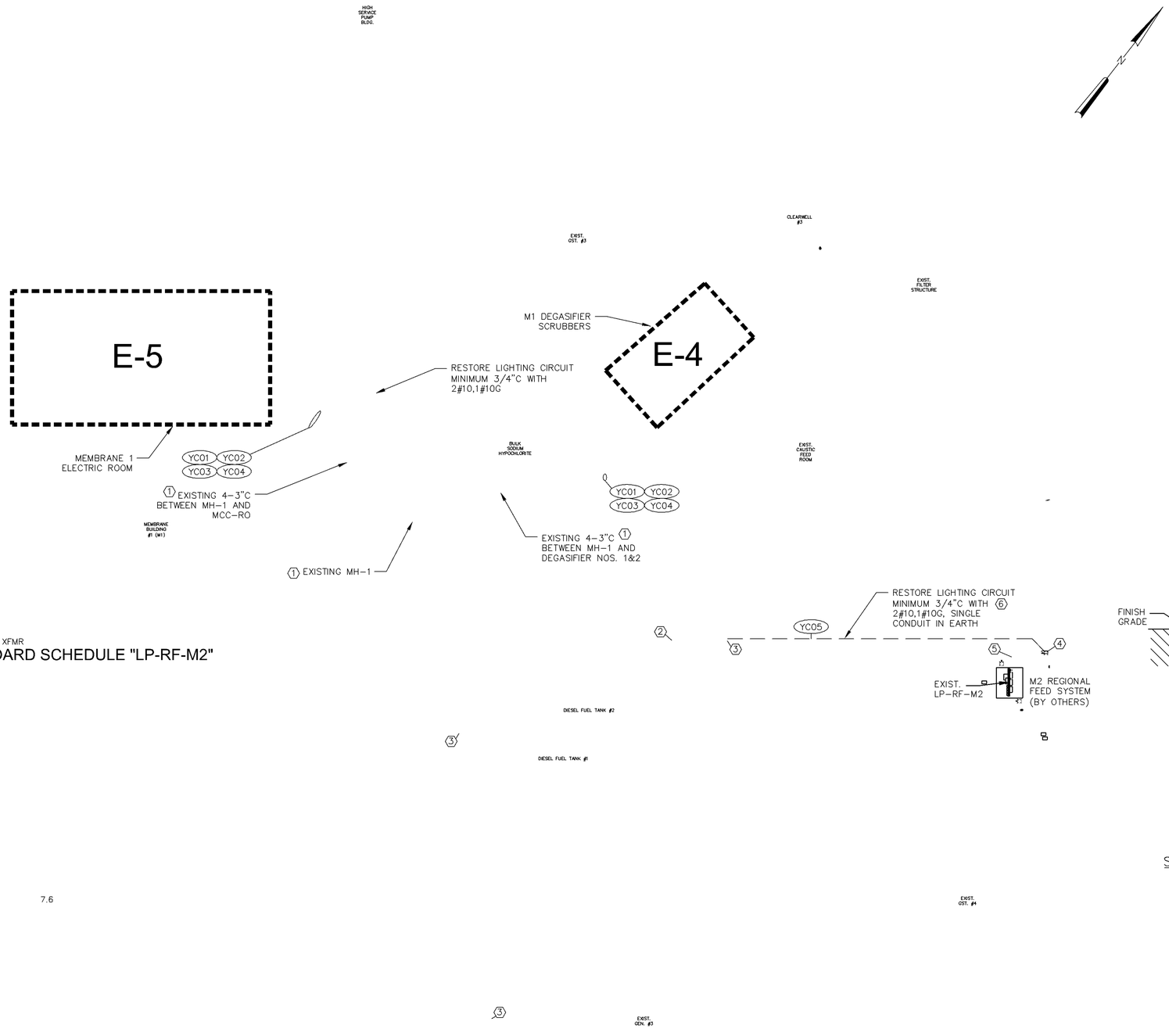
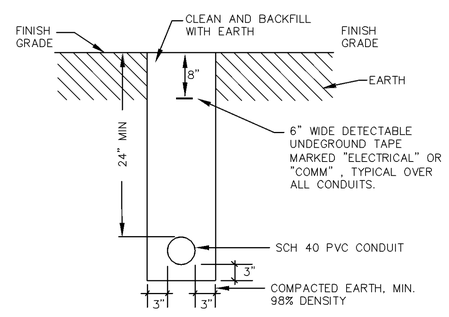


OVERALL ELECTRICAL SITE PLAN
SCALE: 1" = 20'-0"



SINGLE CONDUIT IN EARTH
NOT TO SCALE

GENERAL NOTES:

1. CONDUIT ROUTINGS ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY. CONTRACTOR SHALL FIELD DETERMINE ACTUAL ROUTING, WALL PENETRATION, ETC. WITH EXISTING CONDITIONS AND ADJUST ACCORDINGLY.
2. CONTRACTOR SHALL UTILIZE EXISTING MANHOLES AS SHOWN.
3. ALL NEW CABLES IN EXISTING MANHOLES SHALL BE NEATLY BUNDLED, IDENTIFIED AND RACKED ON NEW CABLE RACKS WITH UL APPROVED MEANS AND MATERIALS. FURNISH AND INSTALL NEW RACKS AND RACK MOUNTING HARDWARE. RACKS SHALL BE CONSTRUCTED OF FRP AND UL LISTED. INSTALLER PER MANUFACTURER'S INSTRUCTIONS. METALLIC RACKS ARE DISALLOWED.
4. RESTORE SIDEWALK, PAVEMENT AND SODDING TO MATCH EXISTING AFTER UNDERGROUND CONDUIT INSTALLATION.
5. ALL EXCAVATIONS FOR UNDERGROUND SHALL BE HAND EXCAVATED NEAR UTILITY CROSSINGS. COORDINATE WITH VILLAGE BEFORE EXCAVATIONS.

KEYED NOTES:

1. INSTALL NEW WIRES IN EXISTING UNDERGROUND CONDUITS UTILIZING EXISTING MH-1. REFER TO RISER DIAGRAM AND ONE-LINE DIAGRAM DRAWING E-6 FOR ADDITIONAL INFORMATION.
2. INTERCEPT EXISTING DISCONNECTED LIGHTING CIRCUIT INSIDE OF THE JUNCTION BOX AND EXTEND TO NEW LIGHT FIXTURE(S). FIELD ROUTE DIRECT BURIED CONDUITS AND PROVIDE PULL POINTS AS NECESSARY. REFER TO PLAN FOR FIXTURE LOCATIONS.
3. EXISTING LIGHT FIXTURE POWERED VIA LIGHTING TRANSFORMER AT SCRUBBER STRUCTURE SHALL BE RESTORED.
4. FIELD LOCATE LIGHTING JUNCTION BOX ON EXTERIOR OF CLEARWELL 2 AND EXTEND THE LIGHTING CIRCUIT TO THE STREET LIGHTS. REFER TO PANEL SCHEDULE THIS SHEET.
5. FIELD VERIFY AND UTILIZE EXISTING UNDERGROUND CONDUIT TO RESTORE LIGHTING CIRCUIT.
6. FIELD ROUTE DIRECT BURIED CONDUIT FOR RESTORING LIGHT FIXTURE. ADJUST TO AVOID OBSTACLES.

FINAL DESIGN

1"=20'-0" 20 10 0 20'

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0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

ENLARGED ELECTRICAL SITE PLAN

DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E-3
SHEET 4 OF 10

PLOT DATE: 2024/08/13 4:47:48 PM BY: BHAAS
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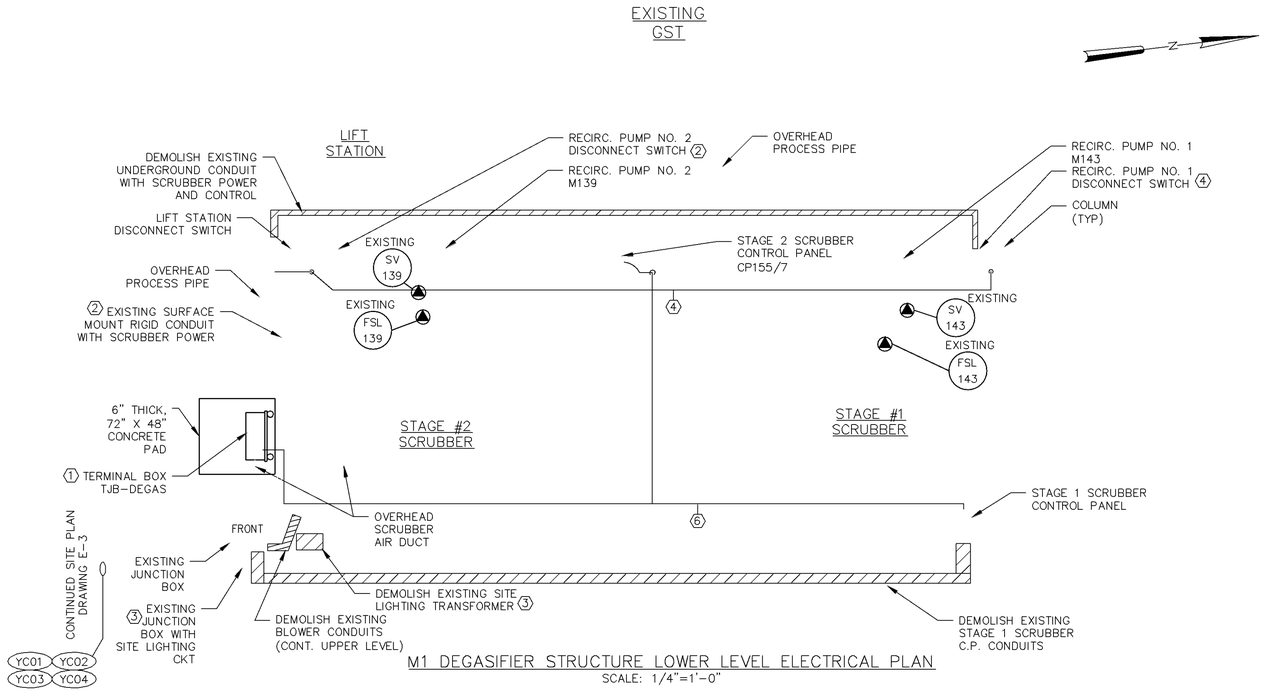

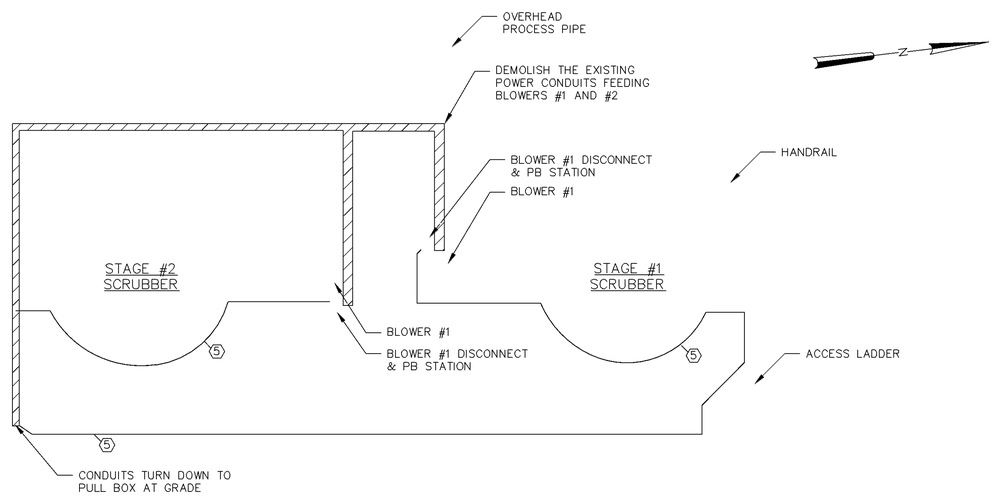

M1 DEGASIFIER STRUCTURE UPPER LEVEL ELECTRICAL PLAN
SCALE: 1/4"=1'-0" VIEW APPROX. 30' AFG

GENERAL NOTES:

1. REFER TO DRAWING E-1 FOR GENERAL NOTES THAT APPLY TO ALL PLAN VIEW DRAWINGS.
2. COMBINING OF NEUTRAL CONDUCTORS SHALL NOT BE ALLOWED. ALL CONDUCTORS LEAVING A CIRCUIT BREAKER IN A PANELBOARD SHALL CARRY A SEPARATE NEUTRAL CONDUCTOR IDENTICAL IN SIZE.
3. NOT ALL CONDUIT/CABLES ARE SHOWN ON PLAN FOR CLARITY. PROVIDE COMPLETE WORKING RACEWAY SYSTEM IN ACCORDANCE WITH THE CONDUITS AND CABLES SHOWN IN ONE LINE DIAGRAMS AND RISER DIAGRAMS.
4. REFER TO ONE LINE DIAGRAMS DRAWING E-6 FOR POWER WIRE, CONDUIT AND DISCONNECT INFORMATION.
5. REFER TO RISER DIAGRAM DRAWINGS E-6 FOR CONTROL AND SIGNAL WIRE AND CONDUIT INFORMATION.
6. ALL EXPOSED CONDUITS SHALL BE RIGID ALUMINUM.
7. PRIOR TO INSTALLING CONDUIT, CONTRACTOR SHALL DEVELOP A SCALED CONDUIT ROUTING PLAN AND SUBMIT TO VILLAGE FOR APPROVAL.
8. LOCATION OF EQUIPMENT IS APPROXIMATE AND PROVIDED FROM AVAILABLE RECORD DRAWINGS, CONTRACTOR SHALL COORDINATE WITH EXISTING CONDITIONS AND MAKE ALL NECESSARY ADJUSTMENTS AT NO ADDITIONAL COST.
9. CONCRETE PAD SIZES ARE NOMINAL. ADJUST CONCRETE EQUIPMENT PAD SIZES AS REQUIRED TO ACCOMMODATE ELECTRICAL AND INSTRUMENTATION EQUIPMENT AT NO ADDITIONAL COST.
10. SUPPORT ALL CONDUITS IN ACCORDANCE WITH THE NEC. CONDUITS SHALL BE ROUTED AS TO NOT CREATE NEW OBSTACLES OR TRIP HAZARDS.
11. ANY UNUSED OPENINGS IN ENCLOSURES WHERE WORK HAS BEEN PERFORMED UNDER THIS CONTRACT SHALL BE SEALED WITH KNOCK OUT SEALS MATCHING ENCLOSURE RATING.
12. ALL CONDUITS WHERE WORK HAS BEEN PERFORMED UNDER THIS CONTRACT SHALL HAVE DUCT SEAL INSTALLED. ALL CONDUITS ENTERING BUILDINGS OR PASSING THRU WALLS WHERE A CHANGE OF ENVIRONMENT OCCURS SHALL HAVE PULLBOX OR CONDULET PLACED TO INSTALL DUCT SEAL WITHIN 12" OF PENETRATION.
13. ALL CONDUCTORS INSTALLED UNDER THIS CONTRACT SHALL BE LABELED.
14. NO CONDUIT SHALL ENTER AN OUTDOOR ENCLOSURE FROM THE TOP.
15. CONTRACTOR SHALL SEQUENCE CONSTRUCTION SUCH THAT NEW TERMINAL JUNCTION BOX, CONDUITS, AND WIRING ARE IN PLACE UTILIZING SPARE CONDUITS PRIOR TO SCHEDULING EQUIPMENT TO BE TAKEN OUT OF SERVICE TO MINIMIZE OUTAGE DURATION. AFTER NEW POWER AND CONTROL WIRING INSTALLED, OLD WIRING SHALL BE DEMOLISHED FROM EXISTING CONDUIT AND RACEWAY REUSED FOR NEXT PIECE OF EQUIPMENT.

KEYED NOTES:

(1) FIELD LOCATE EXISTING 4-3" SPARE CONDUITS AND EXTEND TO NEW TERMINAL JUNCTION BOX. INSTALL NEW WIRE AND RECONNECT EXISTING MOTORS AND CONTROLS TO EXISTING MOTOR CONTROL CENTER.

(2) INTERCEPT EXISTING EXPOSED RECIRCULATION PUMP CONDUITS AND RE-ROUTE TO NEW TERMINAL JUNCTION BOX.

(3) FIELD VERIFY AND DEMOLISH EXISTING STEP DOWN TRANSFORMER USED FOR ROAD LIGHTS AND RECONNECT ORPHANIZED LIGHT CIRCUIT TO NEAREST ACTIVE FIXTURE WITH 3/4"C, PVC SCHEDULE 80 DIRECT BURIED WITH MINIMUM 2#10, 1#10G. ALLOW FOR 50 FEET OF UNDERGROUND CONDUIT TO RESTORE LIGHT. ADJUST AS NECESSARY TO RESTORE STREET LIGHT FOR A WORKING SYSTEM COMPLETE IN PLACE.

(4) FIELD ROUTE NEW OVERHEAD CONDUITS FROM JUNCTION BOX TO RECIRC. PUMP, UTILIZING COLUMNS, CEILING AND BEAMS TO SUPPORT. CONDUITS SHALL BE ROUTED ON EAST SIDE OF WEST COLUMNS. ADJUST ROUTE TO AVOID CONFLICT.

(5) FIELD ROUTE NEW OVERHEAD CONDUITS FROM JUNCTION BOX TO BLOWERS, UTILIZING COLUMNS, CEILING AND BEAMS TO SUPPORT. CONDUITS SHALL BE ROUTED BETWEEN SCRUBBER VESSELS AND EAST COLUMNS. TRANSITION TO TOP DECK AT LOCATION APPROVED BY VILLAGE AND ROUTE TO BLOWER MOTOR DISCONNECTS WITHOUT CREATING TRIP HAZARD. MOUNT CONDUITS TO 316SS 1-5/8" UNISTRUT CHANNEL MOUNTED TO DECK. PROVIDE ALL PULL POINTS FOR NEC COMPLIANCE. ADJUST ROUTE TO AVOID CONFLICTS.

(6) FIELD ROUTE NEW OVERHEAD CONDUITS FROM JUNCTION BOX TO STAGE 1 SCRUBBER CONTROL PANEL, UTILIZING COLUMNS, CEILING AND BEAMS TO SUPPORT. CONDUITS SHALL BE ROUTED ON EAST SIDE OF WEST COLUMNS. ADJUST ROUTE TO AVOID CONFLICT.

1/8"=1'-0" 8 6 4 2 0 8'

1/4"=1'-0" 1 0 1 2 3 7'

FINAL DESIGN

NO.	DATE	BY	REVISION

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FL 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877

THE VILLAGE OF WELLINGTON
UTILITIES DEPARTMENT
12300 FOREST HILL BLVD,
WELLINGTON, FL 33414
(561) 791-4000

VILLAGE OF WELLINGTON UTILITIES
WTP M1 SCRUBBER
WIRING AND RACEWAY REPLACEMENT

VERIFY SCALES
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0 1"
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ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

M1 DEGASIFIER MODIFIED ELECTRICAL PLAN

DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E-4
SHEET 5 OF 10

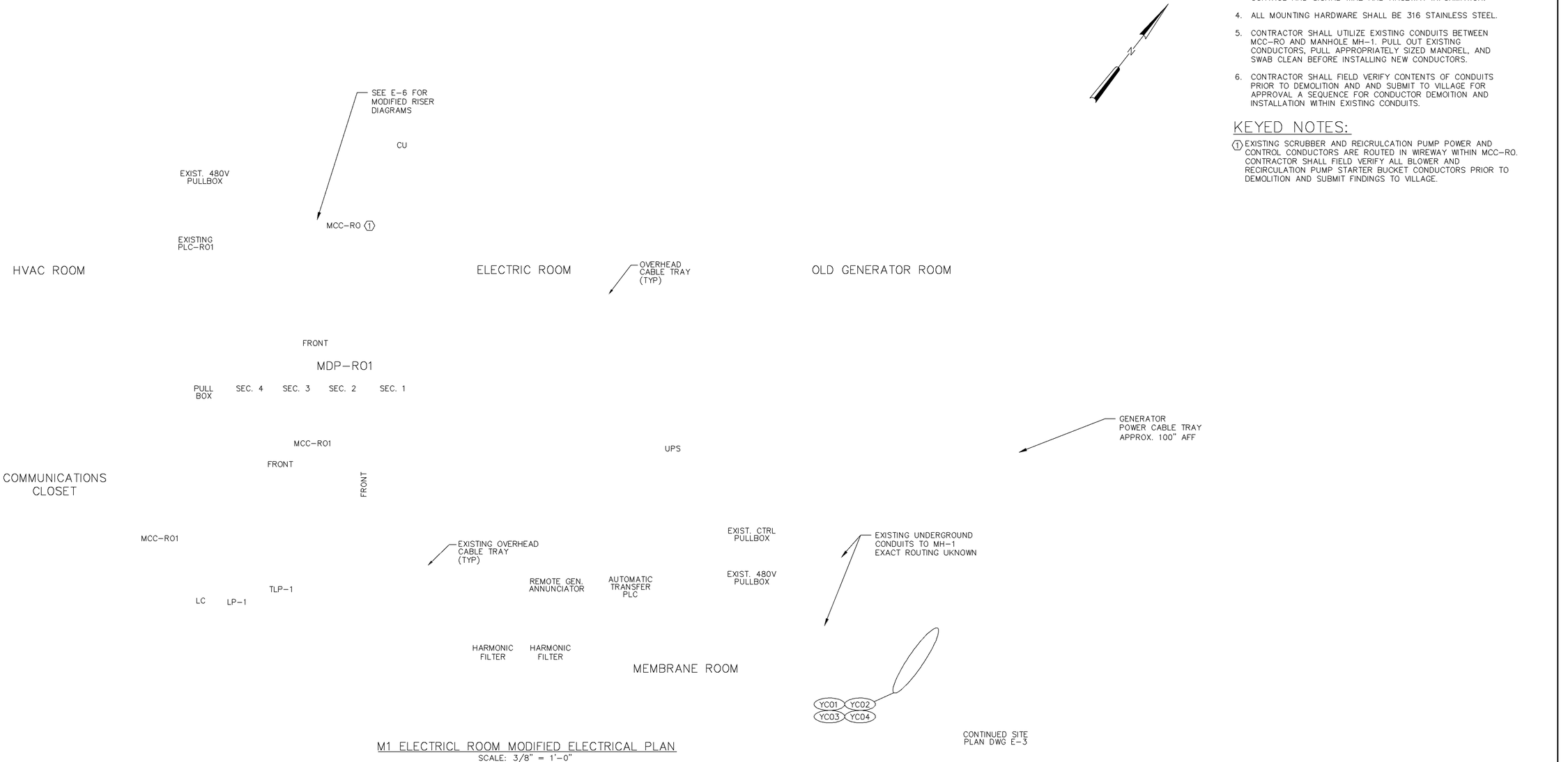
PLOT DATE: 2024/08/13 4:47:52 PM BY: BHAAS
File: E:\PROJECTS\WL\WL33 WTP DEGASIFIER BLOWER CONDUIT REPLACEMENT\DRAWINGS\ELECTRICAL\WL33-E04 Saved By BHAAS Save Date: 2024/08/13 10:10 AM

GENERAL NOTES:

1. REFER TO DRAWING E-1 FOR GENERAL NOTES THAT APPLY TO ALL PLAN VIEW DRAWINGS.
2. REFER TO MODIFIED ONE-LINE DIAGRAMS DRAWING E-6 FOR POWER WIRE AND RACEWAY INFORMATION.
3. REFER TO MODIFIED RISER DIAGRAMS DRAWING E-6 FOR CONTROL AND SIGNAL WIRE AND RACEWAY INFORMATION.
4. ALL MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL.
5. CONTRACTOR SHALL UTILIZE EXISTING CONDUITS BETWEEN MCC-RO AND MANHOLE MH-1. PULL OUT EXISTING CONDUCTORS, PULL APPROPRIATELY SIZED MANDREL, AND SWAB CLEAN BEFORE INSTALLING NEW CONDUCTORS.
6. CONTRACTOR SHALL FIELD VERIFY CONTENTS OF CONDUITS PRIOR TO DEMOLITION AND AND SUBMIT TO VILLAGE FOR APPROVAL A SEQUENCE FOR CONDUCTOR DEMOITION AND INSTALLATION WITHIN EXISTING CONDUITS.

KEYED NOTES:

(1) EXISTING SCRUBBER AND REICRULCATION PUMP POWER AND CONTROL CONDUCTORS ARE ROUTED IN WIREWAY WITHIN MCC-RO. CONTRACTOR SHALL FIELD VERIFY ALL BLOWER AND RECIRCULATION PUMP STARTER BUCKET CONDUCTORS PRIOR TO DEMOLITION AND SUBMIT FINDINGS TO VILLAGE.



M1 ELECTRICL ROOM MODIFIED ELECTRICAL PLAN
SCALE: 3/8" = 1'-0"

3/8"=1'-0"

FINAL DESIGN

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23257 STATE ROAD 7, SUITE 100
BOCA RATON, FL 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877

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UTILITIES DEPARTMENT
12300 FOREST HILL BLVD,
WELLINGTON, FL 33414
(561) 791-4000

VILLAGE OF WELLINGTON UTILITIES
WTP M1 SCRUBBER
WIRING AND RACEWAY REPLACEMENT

VERIFY SCALES
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ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

MEMBRANE BUILDING 1 MODIFIED ELECTRICAL PLAN

DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E-5
SHEET 6 OF 10

PLOT DATE: 2024/08/13 4:47:50 PM BY: BHAAS
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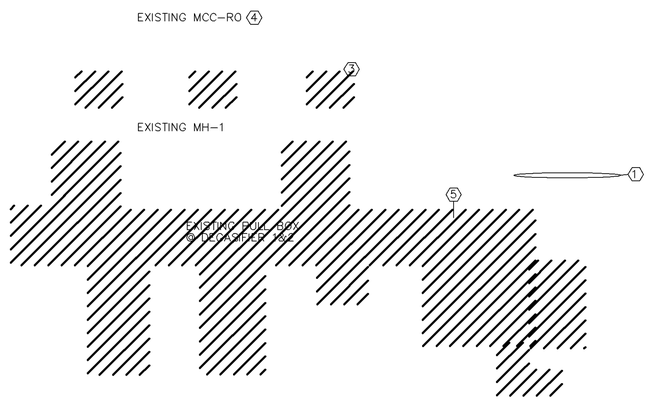
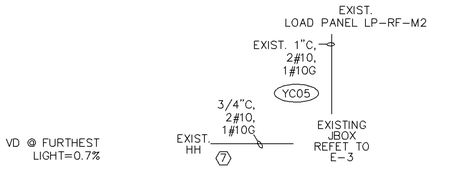


DEGASIFIER 1&2 PARTIAL DEMOLITION RISER PLAN

NOT TO SCALE



LP-RF-M2 MODIFIED RISER

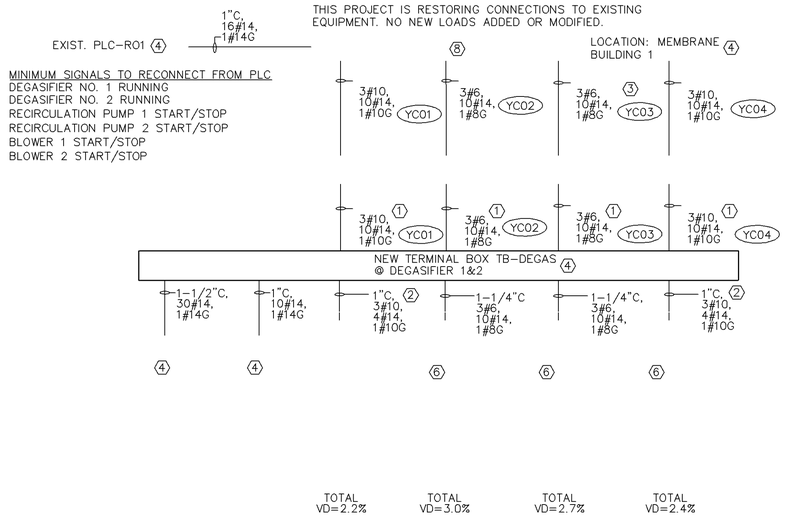
NOT TO SCALE

GENERAL NOTES:

1. REFER TO DRAWING E-1 FOR GENERAL NOTES THAT APPLY TO ALL PLAN VIEW DRAWINGS.
2. PRIOR TO PULLING NEW WIRES IN EXISTING CONDUITS, PULL APPROPRIATELY SIZED MANDREL AND SWAB CLEAN. FURNISH AND INSTALL NEW WIRING FROM TJB TO MOTOR DSICONNECT AND TERMINATE EACH END.
3. CONTRACTOR SHALL SEQUENCE CONSTRUCTION SUCH THAT NEW TERMINAL JUNCTION BOX, CONDUITS, AND WIRING ARE IN PLACE UTILIZING SPARE CONDUITS PRIOR TO SCHEDULING EQUIPMENT TO BE TAKEN OUT OF SERVICE TO MINIMIZE OUTAGE DURATION TO THE GREATEST EXTENT POSSIBLE. AFTER NEW POWER AND CONTROL WIRING INSTALLED, OLD WIRING SHALL BE DEMOLISHED FROM EXISTING CONDUIT AND RACEWAY AND MAY BE REUSED FOR NEXT PIECE OF EQUIPMENT.
4. AT THE END OF THE PROJECT, CONTRACTOR SHALL SUBMIT AN AS-BUILT PDF SCHEMATIC DIAGRAM FOR EACH OF THE 4 MOTOR CONTROLS SHOWING ALL INTERCONNECTING FIELD WIRING AND FIELD DEVICES INCLUDING SELECTOR SWITCHES.

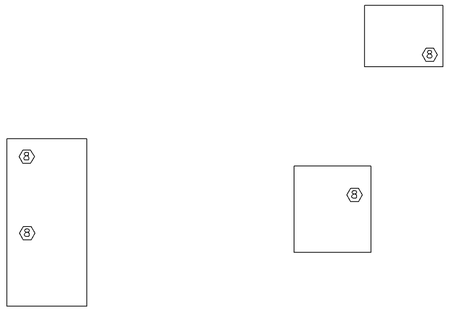
KEYED NOTES:

1. FIELD LOCATE EXISTING SPARE CONDUITS AND EXTEND TO NEW TERMINAL JUNCTION BOX. INSTALL NEW WIRE AND RECONNECT EXISTING MOTORS AND CONTROLS TO EXISTING MOTOR CONTROL CENTER.
2. INTERCEPT EXISTING EXPOSED RECIRCULATION PUMP CONDUITS AND RE-ROUTE TO NEW TERMINAL JUNCTION BOX.
3. EXISTING CONDUIT CONTAINS ABANDONED 5KV CONDUCTORS BETWEEN MH-1 AND MCC-RO. DEMOLITION EXTENTS ARE TO BE FROM MCC-RO TO MH-1. LEAVE ADEQUATE SLACK TO ATTACH PULLING APPARATUS FOR REMOVAL IN FUTURE. FIELD VERIFY WITH VILLAGE PRIOR TO CUTTING.
4. CONTRACTOR SHALL FIELD VERIFY THE EXISTING TERMINATIONS IN THE SCRUBBER CONTROL PANELS, MCC-RO AND PLC-RO1 AND ASSOCIATED FIELD WIRING. CONTRACTOR SHALL UTILIZE NEW WIRING TO RE-INTERFACE THE EXISTING CONTROL PANEL WITH EXISTING STARTER BUCKETS IN MCC-RO AND PLC-RO1 AS SHOWN HEREIN. THE TERMINAL JUNCTION BOX SHALL SERVE AS THE HUB FOR ALL CONNECTIONS BEFORE THEY ARE ROUTED TO MCC-RO.
5. DEMOLISH THE PULL BOX IF IT IS RENDERED OBSOLETE.
6. FIELD VERIFY AND SPLICE WITH EXISTING MOTOR SPACE HEATER CONDUCTORS IN DISCONNECT SWITCH. REMAINING CABLES SHALL BE COILED AND LABELED SPARE
7. INTERCEPT EXISTING LIGHTING CIRCUIT CONDUCTORS IN HAND HOLE, SPLICE WITH UL APPROVED WATERPROOF SPLICE KIT, AND EXTEND TO NEW LOAD PANEL VIA EXISTING JOX.
8. REFER TO TYPICAL MOTOR SCHEMATIC ON DRAWING E-7 FOR STARTER CONTROL WIRING INFORMATION. CONTRACTOR SHALL MODIFY EACH STARTER CONTROL WIRING AS DEPICTED IN THE SCHEMATIC FOR A COMPLETE WORKING SYSTME IN PLACE.



DEGASIFIER 1&2 PARTIAL RISER PLAN

NOT TO SCALE



MCC-RO ELEVATION

NOT TO SCALE

FINAL DESIGN

NO.	DATE	BY	REVISION

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23257 STATE ROAD 7, SUITE 100
BOCA RATON, FL 33428
(561) 451-9165
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LICENSE NO: EB 0006877

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UTILITIES DEPARTMENT
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(561) 791-4000

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VERIFY SCALES
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ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

MODIFIED RISER DIAGRAMS

DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E-6
SHEET 7 OF 10

PLOT DATE: 2024/08/13 3:47:57 PM BY: BHAAS
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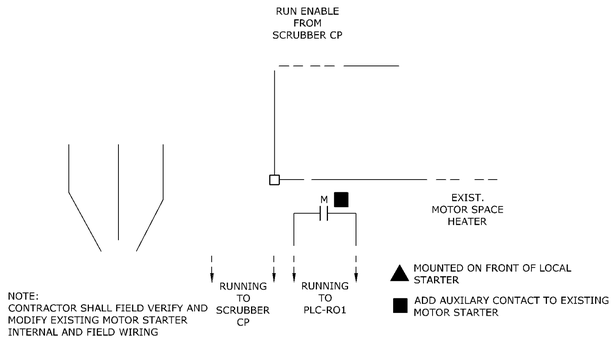
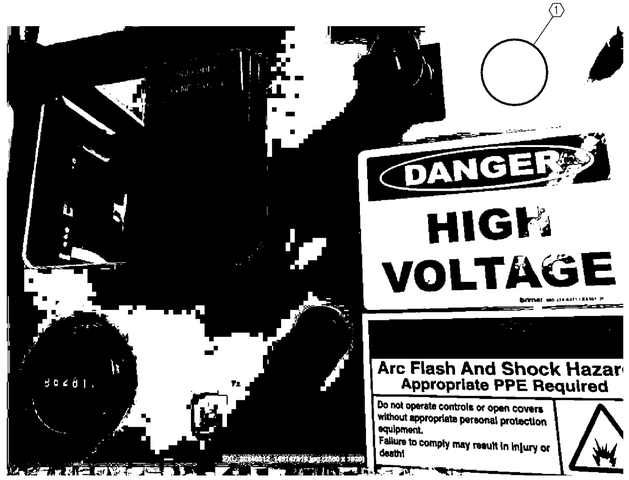


NOTE:
CONTRACTOR SHALL FIELD VERIFY AND MODIFY EXISTING MOTOR STARTER INTERNAL AND FIELD WIRING

TYPICAL MOTOR STARTER SCHEMATIC

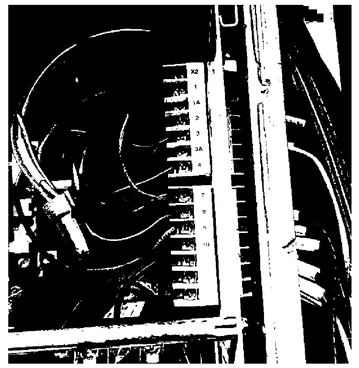
NOT TO SCALE

TYPICAL FOR BLOWER 1, BLOWER 2, RECIRC. PUMP 1 AND RECIRC PUMP 2
FIELD WIRING VARIES, CONTRACTOR TO FIELD VERIFY AND ADJUST ACCORDINGLY.



TYPICAL MOTOR STARTER BUCKET, FRONT VIEW

NOT TO SCALE



TYPICAL MOTOR STARTER FIELD TERMINALS ②

NOT TO SCALE

KEYED NOTES:

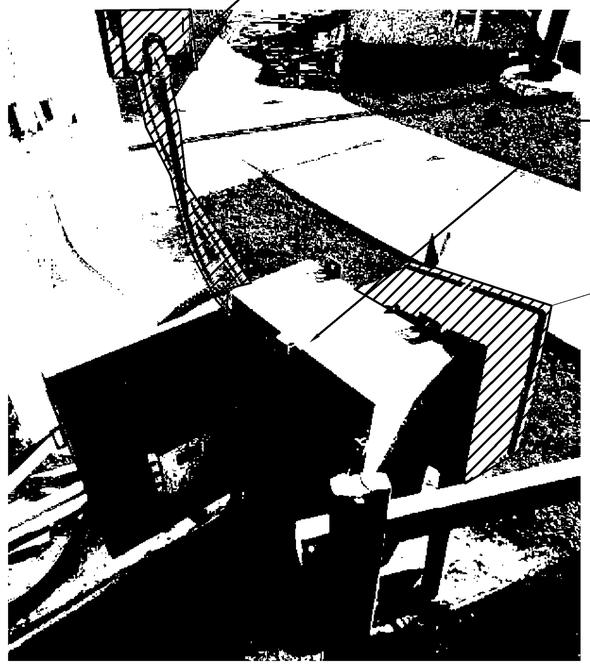
① FOR THE SECOND PAIR OF BLOWER AND RECIRCULATION PUMP WIRING REPLACEMENTS, FURNISH AND INSTALL TEMPORARY HOA SELECTOR SWITCH WITH LABEL TO REPLACE FUNCTIONALITY OF THE EXISTING DURING DEMOLITION OF THE EXISTING POWER CONTROL WIRING. CONTRACTOR SHALL FIELD VERIFY ALL CONNECTIONS AT THE STARTER BUCKET BEFORE MODIFICATION AND SUBMIT FINDINGS TO OWNER. AFTER THE NEW WIRING IS IN PLACE, AND INTEGRATED WITH THE EXISTING HOA SELECTOR SWITCH, REMOVE THE TEMPORARY SWITCH AND INSTALL A HOLE COVER.

② CONTRACTOR SHALL FIELD VERIFY EXISTING FIELD DEVICE CIRCUITS AND REPLACE ALL ACTIVE CIRCUITS WITH NEW WIRING AS SHOWN HEREIN.

③ AFTER ALL CIRCUITS ARE MIGRATED TO NEW WIRING AND LIGHT POLES ARE FUNCTIONAL, DEMOLISH THE PVC JUNCTION BOX IF IT IS OBSOLETE.

④ EXISTING SCHEMATIC PROVIDED FOR INFORMATIONAL PURPOSES. CONTRACTOR SHALL FIELD VERIFY AND ADJUST ACCORDINGLY.

⑤ FIELD VERIFY AND CONNECT NEW WIRING BETWEEN EXISTING HOA SWITCH, PILOT DEVICES, MCC–RO STARTER BUCKETS AND PLC–RO1. TO THE GREATEST EXTENT, MAKE ALL CONNECTIONS BETWEEN FIELD DEVICES INSIDE OF THE NEW TERMINAL JUNCTION BOX LOCATED ADJACENT TO SCRUBBER STRUCTURE AND PROVIDE TYPE WRITTEN TERMINAL BLOCK SCHEDULE.

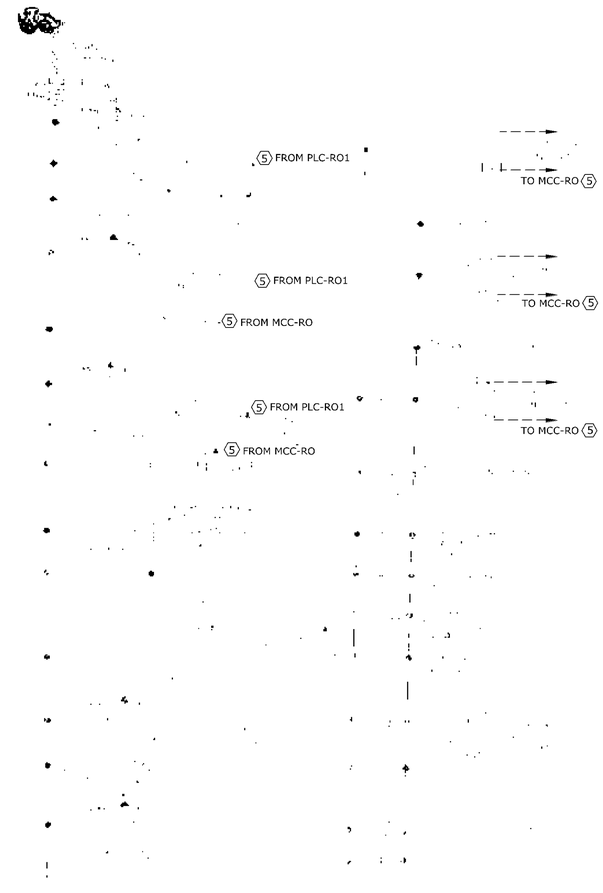


EXISTING PULL BOX AT SCRUBBER STRUCTURE

NOT TO SCALE

STAGE 2 SCRUBBER PARTIAL CONTROL PANEL SCHEMATIC ④

NOT TO SCALE



STAGE 1 SCRUBBER PARTIAL CONTROL PANEL SCHEMATIC ④

NOT TO SCALE

FINAL DESIGN

NO.	DATE	BY	REVISION

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23257 STATE ROAD 7, SUITE 100
BOCA RATON, FL 33428
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WELLINGTON, FL 33414
(561) 791–4000

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WTP M1 SCRUBBER
WIRING AND RACEWAY REPLACEMENT

VERIFY SCALES
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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

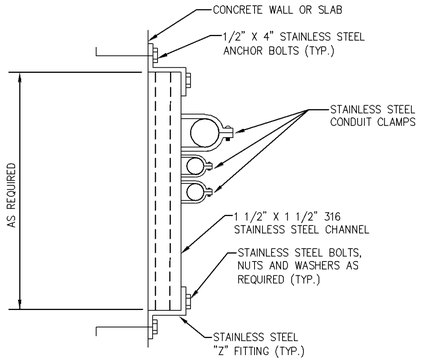
ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

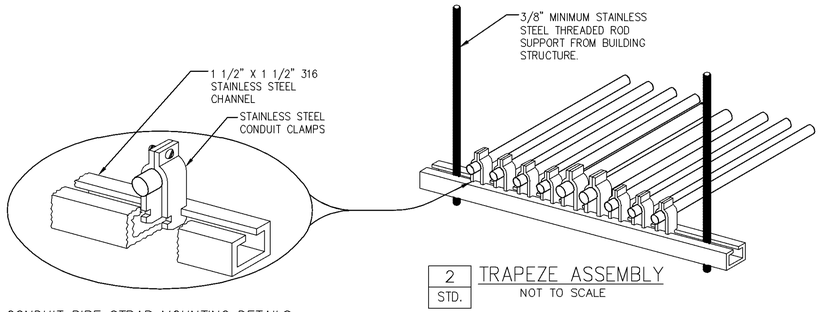
SCHEMATIC DIAGRAMS AND PHOTOGRAPHS

DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E–7
SHEET 8 OF 10

PLOT DATE: 2024/08/13 4:47:58 PM BY: BHAAS
FILE: V:\PROJECTS\WL33\E-WTP M1SCRUBBER BLOWER CONDUIT REPLACEMENT\DRAWINGS\ELECTRICAL\WL33-E07 Saved By: BHAAS Save Date: 2024/08/13 4:46 PM

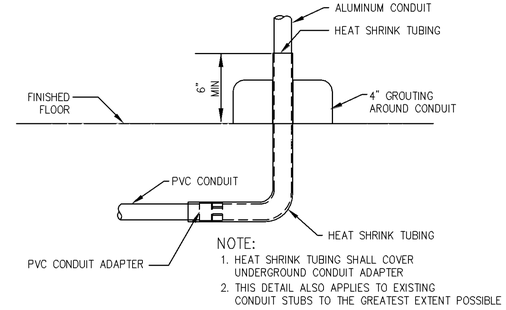


1 STD. CONDUIT SUPPORT
NOT TO SCALE

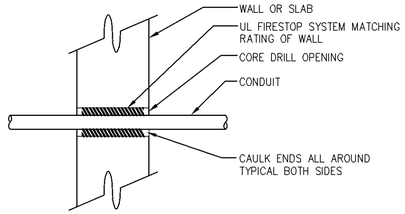


CONDUIT PIPE STRAP MOUNTING DETAILS

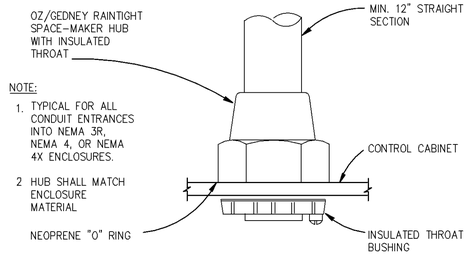
2 STD. TRAPEZE ASSEMBLY
NOT TO SCALE



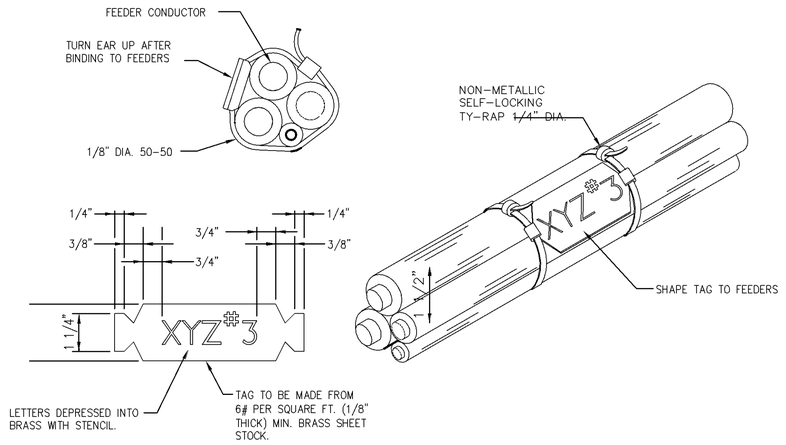
3 STD. CONDUIT FLOOR ENTRANCE GROUT DETAIL
NOT TO SCALE



4 STD. CONDUIT PENETRATION AT WALL OR SLAB
NOT TO SCALE



4 STD. CONDUIT HUB
NOT TO SCALE



5 STD. FEEDER CABLE TAG DETAIL
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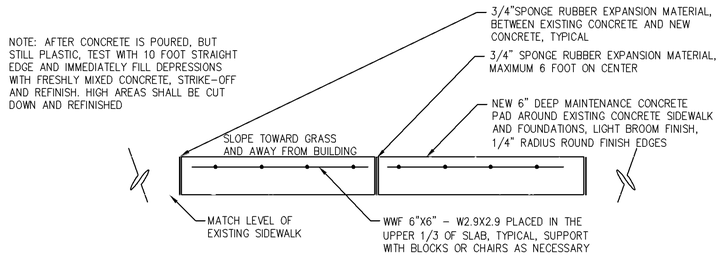
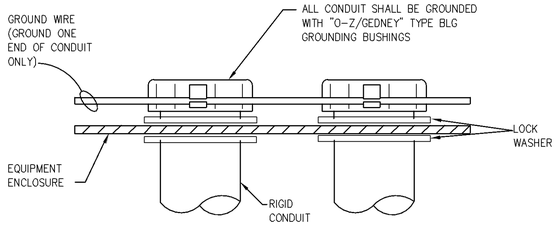


6 STD. MAINTENANCE CONCRETE PAD
NOT TO SCALE



7 STD. CONDUIT GROUNDING
NOT TO SCALE

FINAL DESIGN

NO.	DATE	BY	REVISION

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FL 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877

THE VILLAGE OF WELLINGTON
UTILITIES DEPARTMENT
12300 FOREST HILL BLVD,
WELLINGTON, FL 33414
(561) 791-4000

VILLAGE OF WELLINGTON UTILITIES
WTP M1 SCRUBBER
WIRING AND RACEWAY REPLACEMENT

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

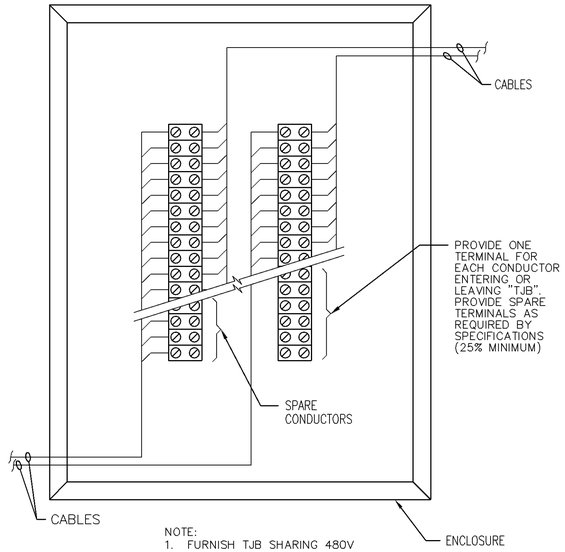
ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

ELECTRICAL STANDARD DETAILS – 1 OF 2

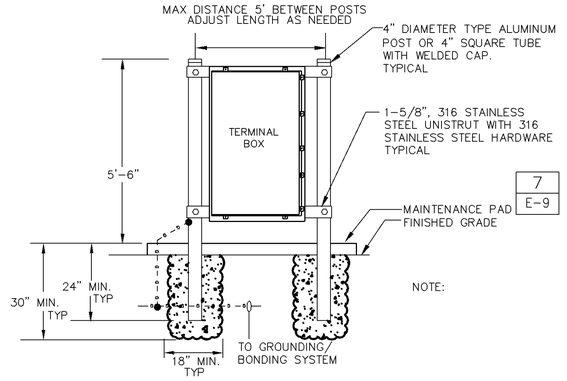
DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E-8
SHEET 9 OF 10

PLOT DATE: 2024/08/13 4:48:00 PM BY: BHAAS
File: E:\PROJECTS\WL33 WTP RECLASSIFIED BLDNGS' CONDUIT REPLACEMENT\DRAWINGS\ELECTRICAL\WL33-E08 Saved by USER: Save Date: 2024/07/30 5:58 PM



NOTE:
1. FURNISH TJB SHARING 480V POWER AND 120V CONTROLS WITH AN APPROVED PHYSICAL BARRIER SEPARATING THE TWO.
2. 480V TERMINALS SHALL BE SQUARE D 9080 LBA SERIES WITH FINGER SAFE PROTECTIVE COVERS, OR APPROVED EQUAL.

8 STD. TERMINAL JUNCTION BOX (TJB) DETAIL
NOT TO SCALE



9 STD. ELECTRICAL EQUIPMENT RACK
NOT TO SCALE

FINAL DESIGN

NO.	DATE	BY	REVISION

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FL 33428
(561) 451-9165
(561) 451-4886 FAX
LICENSE NO: EB 0006877

THE VILLAGE OF WELLINGTON
UTILITIES DEPARTMENT
12300 FOREST HILL BLVD,
WELLINGTON, FL 33414
(561) 791-4000

VILLAGE OF WELLINGTON UTILITIES
WTP M1 SCRUBBER
WIRING AND RACEWAY REPLACEMENT

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

ENGINEER: BKH
DRAWN: RSC
DESIGNED: RSC
CHECKED: MEL
SCALE: AS NOTED

BRANDON K. HAAS NO 85334

ELECTRICAL STANDARD DETAILS – 2 OF 2

DATE: AUGUST 2024
HEE NO.: WL33
PROJECT NO.:PO 240517
DRAWING: E-9
SHEET 10 OF 10

PLOT DATE: 2024/08/13 4:48:02 PM BY: BHAAS
File: E:\PROJECTS\WL\WL33 WTP M1 SCRUBBER ROOMS CONDUIT REPLACEMENT\DRAWINGS\ELECTRICAL\WL33-E09 Saved By: USER Save Date: 2024/07/30 5:58 PM

VILLAGE OF WELLINGTON UTILITIES

Contract Documents for the Construction of:

WTP M1 Scrubber Wiring and Raceway Replacement

Technical Specifications

Final Design

August 2024

HILLERS ELECTRICAL ENGINEERING, INC.
23257 STATE ROAD 7, SUITE 100
BOCA RATON, FLORIDA 33428
(561) 451-9165
(561) 451-4886 Fax
WWW.HILLERSEE.COM

VILLAGE OF WELLINGTON UTILITIES

WTP M1 SCRUBBER WIRING AND RACEWAY REPLACEMENT

PALM BEACH COUNTY, FLORIDA

PROJECT ID#: PO 240517

TECHNICAL SPECIFICATIONS

PROFESSIONAL ENGINEER – RESPONSIBLE CHARGE CERTIFICATIONS

DIVISION 1: GENERAL REQUIREMENTS

DIVISION 16: ELECTRICAL

BRANDON K HAAS State of Florida, Professional Engineer, License No. 85334

This item has been digitally signed and sealed by BRANDON K HAAS on the date indicated here.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

VILLAGE OF WELLINGTON UTILITIES

WTP M1 Scrubber Wiring and Raceway Replacement
Final Design

SPECIFICATION SECTIONS:		RESPONSIBLE ENGINEER
Division 1 – General Requirements		
01010	Summary of Work	Brandon Haas
01025	Measurement and Payment	Brandon Haas
01040	Coordination	Brandon Haas
01070	Abbreviation	Brandon Haas
01090	Reference Standards	Brandon Haas
01152	Application for Payment	Brandon Haas
01153	Change Order Procedure	Brandon Haas
01200	Project Meetings	Brandon Haas
01300	Submittals	Brandon Haas
01400	Quality Control	Brandon Haas
01510	Temporary Utilities	Brandon Haas
01520	Maintenance of Utility Operations During Construction	Brandon Haas
01530	Protection of Existing Facilities	Brandon Haas
01540	Demolition and Removal of Existing Structures and Equipment	Brandon Haas
01541	Field Engineering	Brandon Haas
01550	Site Access and Storage	Brandon Haas
01560	Temporary Environmental Controls	Brandon Haas
01600	Materials and Equipment	Brandon Haas
01660	Equipment Testing and Startup	Brandon Haas
01700	Project Closeout	Brandon Haas
01720	Project Record Drawings	Brandon Haas
01730	Operation and Maintenance Manuals	Brandon Haas
Division 16 – Electrical		
16010	Basic Electrical Requirements	Brandon Haas
16050	Basic Electrical Materials and Methods	Brandon Haas
16110	Raceways	Brandon Haas
16120	Conductors	Brandon Haas
16450	Grounding	Brandon Haas
16950	Electrical Testing	Brandon Haas

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 -- GENERAL

1.01 THE REQUIREMENT

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

B. The work for this project is located at:

   a. Village of Wellington Water Treatment Plant at 1100 Wellington Trace, Wellington, FL 33414.

C. The Contractor shall perform all work required for such construction in accordance with the Contract Documents and subject to the terms and conditions of the Contract, complete and ready for use.

D. The principal features of the Work to be performed under this Contract shall include but not be limited to:

   1. Furnish and install new exposed raceways, interconnecting conductors, junction boxes, integration with existing motor control center MCC-RO as described in the Contract Documents, including all material, labor, and all appurtenances required for complete working system in place.

   2. Repair concrete pavement and asphalt pavement as described in the Contract Documents complete in place. Repair/replace damaged sod in areas disturbed by construction.

   3. Furnish and install all new grounding/bonding systems as described in the Contract Documents complete in place.

   4. Provide temporary power and construction sequencing for maintaining power to treatment facilities during power interruptions resulting from the Work of this Contract.

   5. Furnishing and installation of all material, labor, and equipment for demolition, disposal, maintenance of operations during construction, construction, interconnections to existing plant facilities, startup and testing of the new facilities, site restoration, operation and maintenance manuals, record documents, facility staff training, spare parts, test equipment and all other appurtenant and miscellaneous

work required for completion of the Work in accordance with the Contract Documents.

E. The explanation of the Work in this Section is made for explanation and guidance purposes. The omission of reference to any required work by the Contractor to comply with Federal, State, or local regulatory agencies or requirements specifically identified in the Drawings or Specifications shall not alter the intent of the Bid Form, nor shall it relieve the Contractor of the necessity of furnishing such work as part of the Contract.

F. Contractor shall be responsible for putting in place all safety measures and procedures required by all applicable local, state, and federal regulations.

G. The Contractor shall refer to Section 01520 entitled "Maintenance of Utility Operations During Construction" for information regarding construction sequencing, critical events, and construction constraints.

H. Wherever the Contract Documents address a third party, i.e., subcontractor, manufacturer, etc., it is to be considered as the Contractor through the third party.

I. Wherever a reference to number of days is noted, it shall be construed to mean calendar days.

J. Quality Control

1. Contractor shall develop and maintain a program, acceptable to the Village, to ensure that all work required under this Contract strictly conforms to all requirements of the Contract Documents. Contractor shall be responsible for and supervise the Work of all subcontractors, providing instructions to each when their work does not conform to the requirements of the Quality Control Program and the Contract Documents.

2. The Contractor shall perform all work in accordance with current approved Federal, State, and Local Laws, Regulations, Codes, Ordinances, Orders, and other legal requirements of Public Authorities which bear on the performance and safety of the Work.

3. All of the Contractor's work place procedures and conditions shall meet applicable OSHA standards.

K. Compilation of Manufacturer's Warranties and Certifications

1. Contractor shall provide and compile all documentation and pertinent information regarding all project warranties into compilation notebook(s). The warranties shall be collated in a series of notebooks that shall be indexed by equipment number, unit processes and/or other organizational method as directed by Village.

2. The notebooks shall include a summary table, which shall document the commencement and expiration dates of all project warranties. The warranties shall be accompanied by the manufacturer's certifications letters and affidavits as required per each individual specification Section. The certification letters shall be provided in the same divider as the warranty information.

L. Superintendent and Proficiency of Resources

1. Designate a working duly authorized superintendent whose prime responsibility shall be managing and coordinating this Contract. The superintendent shall provide constant and personal attention to the Work, full time, from start to completion of the Contract. The superintendent shall oversee the construction of the Work in accordance with the Contract Documents. The superintendent shall be competent, be available full time and at all times during working hours, be able to communicate technically, and have the authority to act on behalf of the Contractor. The superintendent shall have at least ten years of experience on similar contracts and shall be approved by the Village. Contractor shall submit the proposed superintendent's resume for review. The Superintendent once approved by the Village shall not be replaced without prior consent by the Village.

2. The Contractor shall provide a Project Manager to oversee proper performance of the Work. The Project Manager shall attend all meetings and have the authority to make decisions on behalf of the General Contractor. The Project Manager shall be on attendance at the site at a minimum of once a day to evaluate the construction and to prepare a daily report. At a minimum, the Project Manager shall be responsible for coordination, document handling, submittal review and processing, quality control, and project scheduling.

3. At all times, employ labor and equipment, which shall be sufficient to safely prosecute the several classes of Work to full completion in the manner and time specified. All workers must have sufficient skill and experience to properly and satisfactory perform the Work and to operate the equipment involved. The Village shall have the ability to have the Contractor remove from the project any person deemed by the Village to be incompetent or unfit to perform the work.

M. Entrance Gate Security

1. The Water Treatment Plant and Water Reclamation Facility Water Reclamation Facility maintains a perimeter chain link fences and security gates. Contractor shall coordinate the entrance of Contractor's staff, subcontractors, vendors, suppliers and deliveries and shall follow all Village security procedures pertaining to the plant and plant site access.

1.02 CONTRACT DOCUMENTS

A. The Work to be done is shown on the Drawings entitled *Village of Wellington Utilities WTP M1 Scrubber Wiring and Raceway Replacement*. The numbers and titles of all Drawings appear on the index sheets of the Drawings. All drawings so enumerated shall be considered an integral part of the Contract Documents as defined herein.

B. Certain Document Sections refer to Divisions of the Contract Specifications. Sections are each individually numbered portions of the Specifications (numerically) such as 08110, 13182, 15206, etc. The term Division is used as a convenience term meaning all Sections within a numerical grouping. For example, Division 16 would thus include Sections 16000 through 16999 and would mean all electrical specifications.

1.03 GENERAL ARRANGEMENT

A. Drawings indicate the extent and general arrangement of the Work. If any departures from the Drawings are deemed necessary (by the Contractor) to accommodate the materials and equipment Contractor proposes to furnish, details of such departures and reasons therefore shall be submitted as soon as practicable to the Village for approval. No such departures shall be made without the prior written approval of the Village. Approved changes shall be made without additional cost to the Village for this work or related work under other Contracts of the Project.

B. The specific equipment proposed for use by the Contractor on the project may require changes in structures, auxiliary equipment, piping, electrical, mechanical, controls or other work to provide a complete satisfactory operating installation. The Contractor shall submit to the Village, for approval, all necessary Drawings and details showing such changes to verify conformance with the overall project structural and architectural requirements and overall project operating performance. The Bid Price shall include all costs in connection with the preparation of new drawings and details and all changes to construction work to accommodate the proposed equipment, including increases in the costs of other Contracts.

1.04 WORK BY OTHERS

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

B. Contractor's attention is also directed to the fact that the site for the Work and adjacent areas are part of the Village's ongoing operating water treatment facility and related works. Therefore, there will be work, services, maintenance, repair, and replacement done at the site and adjacent areas by the Village's employees. The Village may also have other work performed at the site, or adjacent areas, by contractors that may be employed to do the Work referred to in 1.04 A. above. Contractor shall conduct its operations so as to cause a minimum of interference with the Work of Village's employees, and such other contractors. Contractor shall cooperate fully with Village employees, and other contractors to provide continued safe access to the site and adjacent areas and coordinate construction and start up activities as required by Village and as required by contracts with other contractors with whom Village has entered into.

1.05 CONSTRUCTION PERMITS, EASEMENTS AND ENCROACHMENTS

A. The Contractor shall obtain, keep current and pay all fees for any necessary construction permits from those authorities, agencies, or municipalities having jurisdiction over land areas, utilities, or structures which are located within the Contract limits, and which will be occupied, encountered, used, or temporarily interrupted by the Contractor's operations unless otherwise stated. Record copies of all permits shall be furnished to the Village.

B. When construction permits are accompanied by regulations or requirements issued by a particular authority, agency or municipality, it shall be the Contractor's responsibility to

become familiar and comply with such regulations or requirements as they apply to his operations on this Project.

C. Permits required for this project include, but may not be limited to:

1. Village of Wellington Building Department: Contractor shall be responsible for obtaining all applicable Village Building Department permits for the Work under this contract.

D. All permits and associated fees required for this project shall be paid by the Contractor.

1.06 ADDITIONAL ENGINEERING SERVICES

A. In the event that the Engineer is required to provide additional engineering services as a result of substitution of materials or equipment which are not "or equal" by the Contractor, or changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or if the Engineer is required to examine and evaluate any changes proposed by the Contractor for the convenience of the Contractor, then the Engineer's charges in connection with such additional services shall be charged to the Contractor by the Village.

B. Structural design shown on the Contract Drawings is based upon typical weights for major items of equipment as indicated on the Contract Drawings and specified. If the equipment furnished differs from that specified in the Contract Documents such that actual weight exceeds the weight of specified equipment, the Contractor shall assume the responsibility for all costs of redesign and for any construction changes required to accommodate the equipment furnished, including the Engineer's expenses in connection therewith, provided that the original weight assumptions were correct.

C. In the event that the Engineer is required to provide additional engineering services as a result of Contractor's errors, omissions, or failure to conform to the requirements of the Contract Documents, or if the Engineer is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, then the Engineer's charges in connection with such additional services shall be charged to the Contractor by the Village and shall be deducted from monies due the Contractor.

1.07 ADDITIONAL EXPENSES

A. In the event the Work of this Contract is not completed within the time set forth in the Contract or within the time to which such completion may have been extended in accordance with the Contract Documents, the additional engineering or inspection charges incurred by the Village may be charged to the Contractor and deducted from the monies due the Contractor. Extra work or supplemental Contract work added to the original Contract, as well as extenuating circumstances beyond the control of the Contractor, will be given due consideration by the Village before assessing engineering and inspection charges against the Contractor.

B. Charges for additional Village's expenses shall be independent of any liquidated damages assessed in accordance with the Contract.

1.08 TIME OF WORK

A. Unless otherwise specifically permitted, the normal time of work under this Contract is limited to eight (8) hours per day, Monday through Friday. Work beyond these hours or on Village holidays will result in additional expense to the Village. Any expenses and/or damages, including the cost of the Engineer's onsite personnel, arising from the Contractor's operations beyond the hours and days specified above shall be borne by the Contractor. This provision does not apply to shut down operations required by construction sequencing and constraints to maintain the existing facilities in operation.

B. The normal time of work for this Contract is limited to 40 hours per week and shall generally be between the hours of 7:00 a.m. and 4:00 p.m., Monday through Friday. The Contractor may elect to work beyond these hours or on holidays or weekends provided that all costs incurred by the Village for additional engineering shall be borne by the Contractor. The Village shall deduct the cost of additional engineering costs and overtime from monies due the Contractor. When the Contractor plans to perform any work activities outside the normal working hours or on holidays, Contractor shall provide written notice to the Village 48 hours in advance. Such notice shall include a description of the work activities being performed. Work activities requiring shutdowns shall not be scheduled during this time.

C. If it shall become imperative to perform work at night, the Village shall be informed in writing a reasonable time in advance of the beginning of such work (minimum of 10 days, except in an emergency situation as determined by the Contractor). Temporary lighting and all other necessary facilities for performing and inspecting the Work shall be provided and maintained by the Contractor.

D. Unless otherwise specifically permitted, all work that would be subject to damage shall be stopped during inclement, stormy weather. Only such work as will not suffer injury to workmanship or materials will be permitted. Contractor shall carefully protect his work against damage or injury from the weather.

1.09 SURVEYS AND LAYOUT

A. All Work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings or as directed by the Village. Elevation of existing ground and appurtenances are believed to be reasonably correct but are not guaranteed to be absolute and therefore are presented only as an approximation. Any error or apparent discrepancy in the data shown or omissions of data required for accurately accomplishing the stake out survey shall be referred immediately to the Village for interpretation or correction.

B. All survey work for construction control purposes shall be made by the Contractor at his expense. The Contractor shall provide a Florida Licensed Surveyor as Chief of Party, competently qualified men, all necessary instruments, stakes, and other material to perform the Work.

C. Contractor shall establish all baselines for the location of the principal component parts of the Work together with a suitable number of bench marks and batter boards adjacent to the Work. Based upon the information provided by the Contract Drawings, the Contractor shall develop and make all detail surveys necessary for construction, including slope stakes, batter boards, stakes for all working points, lines, and elevations.

D. Contractor shall have the responsibility to carefully preserve the bench marks, reference points and stakes, and in the case of destruction thereof by the Contractor or resulting from his negligence, the Contractor shall be charged with the resulting expense and damage and shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such bench marks, reference points and stakes. Contractor shall provide a signed and sealed affidavit by his surveyor stating that they have verified all benchmarks.

E. Existing or new control points, property markers and monuments that will be or are destroyed during the normal causes of construction shall be reestablished by the Contractor and all reference ties recorded therefore shall be furnished to the Village. All computations necessary to establish the exact position of the Work shall be made and preserved by the Contractor.

F. The Village may check all, or any, portion of the work and the Contractor shall afford all necessary assistance to the Village in carrying out such checks. Any necessary corrections to the work shall be immediately made by the Contractor. Such checking by the Village shall not relieve the Contractor of any responsibilities for the accuracy or completeness of his work.

G. At completion of the Work, the Contractor shall furnish Record Drawings indicating the final layout of all structures, roads, existing benchmarks, etc. The Record Drawings shall indicate all critical elevations of piping, structures, finish grades, etc. and shall conform to the requirements identified in Section 01720 entitled "Project Record Drawings". Submittal of the Record Drawings shall be made in accordance with Sections 01300 entitled "Submittals", Section 01400 entitled "Quality Control", and Section 01700 entitled "Project Closeout".

1.11 OPENINGS, CHASES, SLEEVES, INSERTS, ETC.

A. The Contractor shall provide all openings, chases, etc., in the Work to fit his own work and that of any other contractors. All such openings or chases shown on the Drawings, or reasonably implied thereby, or as confirmed or modified by shop, setting, or erecting Drawings approved by the Village, shall be provided by the Contractor and/or Subcontractors.

B. Where pipes or conduits are to pass through slabs or walls, or where equipment frames or supports are to be installed as an integral part of an opening, the sleeves, opening forms or frames shall be furnished by the installer of the pipes, conduits, or equipment, but shall be placed by the Subcontractor. Where hanger inserts and similar items are to be installed as an integral part of a slab or wall, they shall be furnished by the installer of the pipe or other equipment requiring the hanger but shall be verified by the Contractor and incorporated into the concrete placement.

C. When requested by the Contractor, the installer of the pipes, conduit, or equipment, including those Subcontractors who require openings or chases in slabs and walls for passage of ducts, mounting of equipment, etc., shall furnish all necessary information, instructions, and materials to effect accurate installation of the required openings, chases, sleeves, frames, inserts, etc. When such items are secured in position, and just prior to construction of the surrounding slab or wall, the Subcontractor for whom the items are installed shall ascertain the proper number, locations, and settings thereof; and the Contractor shall schedule his operations so as to provide a reasonable opportunity and time interval for such inspection.

D. Any costs resulting from correction of defective, ill-timed, or mislocated work, or for subsequent work which becomes necessary because of omitted openings, chases, sleeves, frames, inserts, etc., shall be borne by the Contractor responsible therefor. To this end, no Contractor shall arbitrarily cut, drill, alter, damage, or otherwise endanger the work of another Contractor. The nature and extent of any corrective or additional work shall be subject to the approval of the Village following consultation with the Contractors involved.

1.12 FIRE PROTECTION

A. Contractor shall take all necessary precautions to prevent fires at or adjacent to the Work, buildings, etc., and shall provide adequate facilities for extinguishing fires which do occur. Open fires shall not be permitted.

B. When fire or explosion hazards are created in the vicinity of the Work as a result of the locations of fuel tanks, or similar hazardous utilities or devices, the Contractor shall immediately alert the local Fire Marshall and the Village of such tank or device. The Contractor shall exercise all safety precautions and shall comply with all instructions issued by the Fire Marshal and shall cooperate with the Village of the tank or device to prevent the occurrence of fire or explosion.

1.13 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, or reactant of other classification, must show approval of EPA, PBC Health Department, or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with all applicable rules and regulations.

B. Existing operating raw water supply wells exist on the Water Treatment Plant property; the property is within a wellfield protection zone. No chemicals or diesel fuel shall be permitted to be stored within wellfield protection Zone 1. All storage of chemicals and fuel within wellfield protection Zone 2 shall be provided with approved covered containment.

1.14 FIRST AID FACILITIES AND ACCIDENTS

A. First Aid Facilities

1. The Contractor shall provide at the site such equipment and facilities as are necessary to supply first aid to any of his personnel who may be injured in connection with the Work.

B. Accidents

1. The Contractor shall promptly report, in writing, to the Village all accidents whatsoever out of, or in connection with, the performance of the Work, whether on or adjacent to the site, which cause death, personal injury or property damage, giving full details and statements of witnesses.

2. If death, serious injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Village.

3. If any claim is made by anyone against the Contractor or a Subcontractor on account of any accidents, the Contractor shall promptly report the facts, in writing, to the Village, giving full details of the claim.

1.15 SAFETY AND HEALTH REQUIREMENTS

A. The Contractor shall comply in every respect with all Federal, State and local safety and health regulations. Copies of the Federal Regulations may be obtained from the U.S. Department of Labor, Occupational Safety and Health Administration.

B. The Contractor shall provide all barricades and flashing warning lights or other devices necessary to warn pedestrians and area traffic.

C. Personnel working in contact with sewage flow or surfaces carrying wastewaters or sludges shall be immunized as recommended by the Palm Beach County Health Department and OSHA.

1.16 ULTIMATE DISPOSITION OF CLAIMS BY ONE CONTRACTOR ARISING FROM ALLEGED DAMAGE BY ANOTHER CONTRACTOR

A. During the progress of the Work, other Contractors may be engaged in performing other work or may be awarded other Contracts for additional work on this project. In that event, the Contractor shall coordinate the Work to be done hereunder with the Work of such other Contractors and the Contractor shall fully cooperate with such other Contractors and carefully fit its own work to that provided under other Contracts as may be directed by the Village. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor.

B. If the Village determines that the Contractor is failing to coordinate his work with the Work of the other Contractors as the Village directed, then the Village shall have the right to withhold any payments otherwise due hereunder until the Contractor completely complies with the Village's directions.

C. If the Contractor notifies the Village in writing that another Contractor is failing to coordinate his work with the Work of this Contract as directed, the Village will promptly investigate the charge. If the Village finds it to be true, Village will promptly issue such directions to the other Contractor with respect thereto as the situation may require and issue a response to the Contractor in writing. The Village, nor any of its agents, shall not, however, be liable for any damages suffered by the Contractor by reason of the other Contractor's failure to promptly comply with the directions so issued by the Village, or by reason of another Contractor's default in performance, it being understood that the Village does not guarantee the responsibility or continued efficiency of any Contractor.

D. The Contractor shall indemnify and hold the Village harmless from any and all claims of judgments for damages and from costs and expenses to which the Village may be subjected or which it may suffer or incur by reason of the Contractor's failure to comply with the Village's directions promptly.

E. Should the Contractor sustain any damage through any act or omission of any other Contractor having a Contract with the Village for the performance of work upon the site or of work which may be necessary to be performed for the proper execution of the Work to be performed hereunder, or through any act or omission of a Subcontractor of such Contract, the Contractor shall have no claim against the Village for such damage, but shall have a right to recover such damage from the other Contractor under the provision similar to the following provisions which have been or will be inserted in the Contracts with such other Contractors.

F. Should any other Contractor having or who shall hereafter have a Contract with the Village for the performance of work upon the site sustain any damage through any act or omission of the Contractor hereunder or through any act or omission of any Subcontractor of the Contractor, the Contractor agrees to reimburse such other Contractor for all such damages and to defend at his own expense any suit based upon such claim and if any judgment or claims against the Village shall be allowed, the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and shall indemnify and hold the Village harmless from all such claims.

G. The Village's right to indemnification hereunder shall in no way be diminished, waived, or discharged, by its recourse to assessment of liquidated damages as provided in the Contract, or by the exercise of any other remedy provided for by Contract Documents or by law.

1.17 LIMITS OF WORK AREA

A. The Contractor shall confine his construction operations, accumulated debris and surplus materials within the Contract limits and staging areas shown on the Drawings. Storage of equipment and materials, or erection and use of sheds outside of the Contract limits, if such areas are the property of the Village, shall be used only with the Village's approval. Such storage or temporary structures, even within the Contract's limits, shall be confined to the Village's property and shall not be placed on properties designated as easements or rights-of-way unless specifically permitted elsewhere in the Contract Documents.

B. All tools and equipment that are property of the Village shall not be used by the Contractor.

1.18 WEATHER CONDITIONS

A. No work shall be done when the weather is unsuitable. The Contractor shall take necessary precautions (in the event of impending severe weather, including hurricanes, tropical storms, or major rain/wind storms) to protect all work, materials, or equipment from damage or deterioration due to floods, driving rain, and/or wind. The Village reserves the right, to order that additional protection measures over and beyond those proposed by the Contractor, be taken to safeguard all components of the Project.

B. The mixing and placing of concrete or pavement courses, the laying of masonry, and installation of sewers and water mains shall be stopped during rainstorms, if ordered by the Village; and all freshly placed work shall be protected by canvas or other suitable covering in such manner as to prevent running water from coming in contact with it. Sufficient coverings shall be provided and kept ready at hand for this purpose. The limitations and requirements for mixing and placing concrete or laying of masonry, in cold weather shall be as described elsewhere in these Specifications.

1.19 PERIODIC CLEANUP: BASIC SITE RESTORATION

A. During construction, the Contractor shall regularly remove from the site of the Work all accumulated debris and surplus materials of any kind which result from his operations. Unused equipment and tools shall be stored at the Contractor's yard or base of operations for the Project.

B. When the Work involves installation of sewers, drains, water mains, manholes, underground structures, or other disturbance of existing features in or across streets, rights-of-way, easements, or private property, the Contractor shall (as the work progresses) promptly backfill, compact, grade, and otherwise restore the disturbed area to the basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or functions consistent with the original use of the land. The requirements for temporary paving of streets, walks, and driveways are specified elsewhere. Unsightly mounds of earth, large stones, boulders, and debris shall be removed so that the site presents a neat appearance.

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

D. Upon failure of the Contractor to perform periodic cleanup and basic restoration of the site to the Village's satisfaction, the Village may, upon five days prior written notice to the Contractor, without prejudice to any other rights or remedies of the Village, cause such work for which the Contractor is responsible to be accomplished to the extent deemed necessary by the Village, and all costs resulting therefrom shall be charged to the Contractor and deducted from the amounts of money that may be due him/her.

1.20 USE OF FACILITIES BEFORE COMPLETION

A. The Village reserves the right to enter and use any portion of the constructed facilities before final completion of the whole work to be done under this Contract. However, only those portions of the facilities which have been completed to the Village's satisfaction, as evidenced by his issuing a Certificate of Substantial Completion to the Contractor covering that part of the Work, shall be placed in service.

B. It shall be the Village's responsibility to prevent premature connections to or use of any portion of the installed facilities by private or public parties, persons or groups of persons, before the Village issues his Certificate of Substantial Completion covering that portion of the Work to be placed in service.

C. Consistent with the approved progress schedule, the Contractor shall cooperate with the Village to accelerate completion of those facilities, or portions thereof, which have been designated for early use by the Village.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Payment for the various items in the Schedule of Payment Items, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for furnishing all labor, operations, taxes, materials, commissions, transportation and handling, bonds, permit fees, insurance, overhead and profit, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the Work all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). Such compensation shall also include payment for any loss or damages arising directly or indirectly from the work.

B. The Contractor's attention is called to the fact that the quotations for the various items of work are required to establish the total price for completing the work identified in each bid item in its entirety. Should the Contractor feel that the cost for any item of work has not been established by the Schedule of Payment Items or this Section, it shall include the cost for that work in some other applicable bid item, so that its proposal for the project does reflect its total price for completing the work in its entirety.

1.02 PAYMENT ITEMS

A. The Contractor shall submit a Schedule of Payment Values for review as required per specification Section 01300 – Submittals. The schedule shall contain the installed value of the component parts of work for the purpose of making progress payments during the construction period.

B. The schedule shall be given in sufficient detail for the proper identification of work accomplished. The Schedule of Payment Values shall complement the items of work detailed in the construction progress schedule and the construction network analysis in order to accurately relate construction progress to the requested payment. Each item shall include its proportional share of all costs including the Contractor's overhead, contingencies, and profit. The sum of all scheduled items shall equal the total value of the Contract.

C. If the Contractor anticipates the need for payment for materials stored on the project site or off-site in a bonded warehouse, it shall also submit copies of vendor invoices for each delivered item. When stored materials are off-site, Contractor shall provide photos and documentation necessary to confirm proper storage conditions. Contractor shall also submit a separate list covering the cost of materials, delivered, and unloaded with taxes paid. This list shall also include the installed value of the item with coded reference to the work items in the Schedule of Payment Values. Similar procedures shall be employed for undelivered specifically manufactured equipment and materials as specified herein.

D. The Contractor shall expand or modify the schedule and associated listing of all work items as required by the Village's initial or subsequent reviews to accurately identify, in sufficient detail, the amount and value of the work accomplished.

1.03 SITE MOBILIZATION, BONDS AND INSURANCE – Bid Item No. 1

A. Payment for this item shall be made on a Lump Sum Basis, which price shall be full compensation for all materials, labor, equipment, tools, and all other incidentals necessary to complete this item. The Contractor's price shall include full compensation for mobilization, bonds and insurance, scheduling, pre-construction video, record drawings, preparation, temporary facilities, utilities, security, health and safety provisions and all other activities necessary. The mobilization shall not exceed 3 percent of the sum of Bid Items No. 3 through No. 6.

1.04 PERMITS, LICENSES AND FEE ALLOWANCE – Bid Item No. 2

A. The allowance indicated for this item is to pay for all permits, licenses and other fees required of the Contractor from the various agencies having jurisdiction for construction of the project. The allowance shown on the Schedule of Bid Prices is an estimate of fees required. Payment will be based on the actual permit, license or fee paid directly to agency, documented by paid receipts, specifically excluding any labor, mark-up, overhead and profit, administration and other costs involved in obtaining permits or licenses or paying fees. Fees specifically excluded from this allowance include but are not limited to reinspection fees and expired permit fees.

B. The Village reserves the right to award any, all, or none of the money associated with this allowance.

1.05 INSTALLATION OF M1 SCRUBBER RACEWAY AND WIRING – Bid Item No. 3

A. Payment for all labor, equipment and material for all work necessary and required for the installation of the raceway and wiring replacements and integration with existing MCC at the M1 Scrubbers.

B. All general appurtenances; electrical and instrumentation systems; equipment configuration; equipment; testing; startup services; site investigations; site restoration; construction sequencing requirements; preparation and submittal of shop drawings; and other related work required, but not necessarily defined in other Bid Items, for a complete and operable system in accordance with the Contract Documents.

C. The Village reserves the right to award any, all, or none of the money associated with this bid item.

1.06 OWNER CONTROLLED CONTINGENCY – Bid Item No. 4

A. Included in this allowance is work associated with undefined conditions or conflicts developing from undefined conditions. All work authorized for payment will be authorized in writing by the Village. Amount to be paid per undefined conditions or conflict shall be negotiated or agreed to by both parties.

B. The Village reserves the right to award any, all, or none of the money associated with this allowance.

1.07 CONSIDERATION FOR INDEMNIFICATION – Bid Item No. 5

A. In recognition of the Contractor's indemnification obligations, the Village will pay to the Contractor the specific consideration of ten dollars ($10.00). Payment of said specific consideration shall be made at the time of the payment of the first progress estimate and the Contractor shall acknowledge payment of this consideration by letter to the Village after receipt of the progress payment.

1.08 DEMOBILIZATION – Bid Item No. 6

A. Payment for completing all other work including but not limited to finish grading, demobilization, site cleanup, final restoration - all as per the Contract Drawings. The payment items for demobilization shall not be less than 2 percent of the sum of Bid Items No. 3.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01040

COORDINATION

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall allow the Village or their agents, and other project Contractors or their agents, to enter upon the work for the purpose of constructing, operating, maintaining, removing, repairing, altering, or replacing such pipes, sewers, conduits, manholes, wires, poles, or other structures and appliances which may be required to be installed at or in the work. The Contractor shall cooperate with all aforesaid parties and shall allow reasonable provisions for the prosecution of any other work by the Village, or others, to be done in connection with his/her work, or in connection with normal use of the facilities.

B. Each Contractor shall cooperate fully with the Village and all other Contractors employed on the work, to effect proper coordination and progress to complete the project on schedule and in proper sequence. Insofar as possible, decisions of all kinds required from the Village shall be anticipated by the Contractor to provide ample time for inspection, or the preparation of instructions.

C. Each Contractor shall assume full responsibility for the correlation of all parts of his/her work with that of other Contractors. Each Contractor's superintendent shall correlate all work with other Contractors in the laying out of work. Each Contractor shall lay out his/her own work in accordance with the Drawings, Specifications, and instructions of latest issue and with due regard to the work of other Contractors.

D. Periodic coordinating conferences shall be held in accordance with Section 01200 - Project Meetings, of these Contract Documents.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

– END OF SECTION –

SECTION 01070

ABBREVIATIONS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

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

1.02 ABBREVIATIONS AND ACRONYMS

AAMA	Architectural Aluminum Manufacturer's Association
AASHTO	American Association of the State Highway and Transportation Officials
ACI	American Concrete Institute
ACIFS	American Cast Iron Flange Standards
ACOE	Army Corps of Engineers
ACPA	American Concrete Pipe Association
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGMA	American Gear Manufacturer's Association
AHGDA	American Hot Dip Galvanizers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APHA	American Public Health Association
APWA	American Public Works Association
ASA	Acoustical Society of America

ASAE	American Society of Agriculture Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASMM	Architectural Sheet Metal Manual
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
CEMA	Conveyor Equipment Manufacturer's Association
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
FBC	Florida Building Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FS	Federal Specifications
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Systems and Automation
ISO	International Organization for Standardization
MBMA	Metal Building Manufacturers Association
MMA	Monorail Manufacturers Association
MTI	Marine Testing Institute
NAAM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards

NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Testing
NRCA	National Roofing Contractors Association
NSF	National Science Foundation
OSHA	Occupational Safety and Health Administration
PBC	Palm Beach County
PCA	Portland Cement Association
PCM	Program Construction Manager
PMT	Program Management Team
SFWMD	South Florida Water Management District
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
UL	Underwriters Laboratories, Inc
VOW	Village of Wellington
WRF	Water Reclamation Facility
WTP	Water Treatment Plant

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01090

REFERENCE STANDARDS

PART 1 -- GENERAL

1.01 WORK INCLUDED

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

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

C. Specialists, Assignments: In certain instances, Specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work; also, they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of Contract requirements remains with the Contractor.

1.02 THE REQUIREMENT

A. Wherever reference is made to any published standards, codes, or standard specifications, it shall mean the latest standard code, specification, or tentative specification of the technical society, organization, or body referred to, which is in effect at the date of invitation for Bids.

B. All materials, products, and procedures used or incorporated in the work shall be in strict conformance with applicable codes, regulations, specifications, and standards.

C. A partial listing of codes, regulations, specifications, and standards includes the following:

Air Conditioning and Refrigeration Institute (ARI)

Air Diffusion Council (ADC)

Air Moving and Conditioning Association (AMCA)

The Aluminum Association (AA)

American Architectural Manufacturers Association (AAMA)

American Boiler Manufacturer's Association (ABMA)

American Concrete Institute (ACI)

American Gas Association (AGA)

American Gear Manufacturers Association (AGMA)

American Hot Dip Galvanizers Association (AHDGA)

American Institute of Steel Construction, Inc. (AISC)

American Iron and Steel Institute (AISI)

American National Standards Institute (ANSI)

American Society of Civil Engineers (ASCE)

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)

American Society of Mechanical Engineers (ASME)

American Society for Testing and Materials (ASTM)

American Standards Association (ASA)

American Water Works Association (AWWA)

American Welding Society (AWS)

American Wood-Preserver's Association (AWPA)

Anti-Friction Bearing Manufacturers Association (AFBMA)

Building Officials and Code Administrators (BOCA)

Consumer Product Safety Commission (CPSC)

Factory Mutual (FM)

Federal Specifications

Florida Building Code

Industrial Risks Insurers (IRI)

Instrument Society of America (ISA)

Institute of Electrical and Electronics Engineers (IEEE)

National and Local Fire Codes

Lightning Protection Institute (LPI)

National Electrical Code (NEC)

National Electrical Manufacturer's Association (NEMA)

National Electrical Safety Code (NESC)

National Electrical Testing Association (NETA)

National Fire Protection Association (NFPA)

Regulations and Standards of the Occupational Safety and Health Act (OSHA)

Southern Building Code Congress International, Inc. (SBCCI)

Sheet Metal & Air Conditioning Contractors National Association (SMACCNA)

Standard Building Code

Standard Mechanical Code

Standard Plumbing Code

Uniform Building Code (UBC)

Underwriters Laboratories Inc. (UL)

D. Contractor shall, when required, furnish evidence satisfactory to the Village that materials and methods are in accordance with such standards where so specified.

E. In the event any questions arise as to the application of these standards or codes, copies shall be supplied on-site by the Contractor.

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the specifications, all work specified herein shall conform to or exceed the requirements of all applicable codes.

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

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

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

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

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

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01152

APPLICATION FOR PAYMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Submit Applications for Payment to the Village in accordance with the schedule established by the General Conditions of the Contract Documents.

1.02 FORMAT AND DATA REQUIRED

A. Submit applications on the form required by and provided by the Village, with itemized data typed on 8-1/2-inch X 11-inch white paper continuation sheets.

B. Provide itemized data on continuation sheets:

1. Format, schedules, line items and values (those of the Schedule of Values as accepted by the Village).

1.03 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form provided by Village:

1. Fill in required information, including that for Change Orders executed prior to the cut-off date of the Application.

2. Fill in the summary of dollar values to agree with respective totals indicated on continuation sheets.

3. Execute certification with the signature of a responsible officer of the Contractors firm.

B. Continuation Sheets:

1. Fill in the total list of all scheduled component items of Work, with the item number and scheduled dollar value for each item.

2. Fill in the dollar value in each column for each scheduled line item when Work has been performed or products stored.

a. Round off values to the nearest dollar, or as specified for the Schedule of Values.3. List each Change Order executed prior to the cut-off date of the Application.

a. List by Change Order Number and description, as for an original component item of Work.

1.04 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. The Contractor shall submit suitable information, with a cover letter identifying:

1. Project Name.

2. Application number, date and period of coverage.

3. Detailed list of enclosures.

4. Documentation for Stored Materials and Equipment:

   a. For materials and equipment not incorporated in the Work but suitably stored, submit documentation in accordance with this Section.

   b. Item number and identification as shown on the application.

   c. Description of specific material.

   d. Vendor invoices. Legibly indicate on invoice or bill of sale the specific materials or equipment included in the payment request and corresponding payment item number for each.

   e. Photographs and other documentation required to confirm proper storage conditions

   f. When materials or equipment are stored in a bonded warehouse, Contractor shall provide the following:

      1. Warehouse proof of insurance.

      2. Submit affidavit of delivery to the warehouse (affidavit signed by warehouse operator and Contractor). Affidavit shall specifically indicate the extent and quantity of stored items, condition of stored items and packaging (if items are stored in wrap or crates) as well conditions of storage environment.

B. Submit one (1) copy of data with each original application.

C. Contractor's Daily Reports for the associated payment request.

D. Construction photographs in USB drive documenting the construction progress and as required per Section 01300.

1.05 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in Application form as specified for progress payments.

B. Use continuation sheet for presenting the final statement of accounting.

1.06 SUBMITTAL PROCEDURE

A. Submit Applications for Payment to the Village at the times stipulated.

B. Submit not less than three (3) originals of each Application.

C. When the Village finds the Application to be properly completed and correct, it will be processed for payment.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01153

CHANGE ORDER PROCEDURE

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Promptly implement change order procedure:

1. Provide full written data required to evaluate changes.

2. Maintain detailed records of Work done on time and materials/force account basis.

3. Provide full documentation to the Village on request.

B. Designate in writing the member of the Contractor's organization:

1. Authorized to accept changes in the Work.

2. Responsible for informing others in the Contractor's employ of the authorization of changes in the Work.

C. The Village will designate in writing the person authorized to execute Change Orders.

1.02 RELATED REQUIREMENTS

A. General Conditions of the Contract Documents.

B. Supplementary Conditions of the Contract Documents.

C. Section 01152: Application for Payment

1.03 DEFINITIONS

A. Change Order: See the General Conditions and the Supplementary General Conditions of the Contract Documents.

B. Field Order: See the General Conditions and the Supplementary General Conditions of the Contract Documents.

C. Work Directive Change: See the General Conditions and the Supplementary General Conditions of the Contract Documents.

D. Construction Change Authorization: A written order to the Contractor, signed by the Village, which amends the Contract Documents as described, and authorizes the Contractor to proceed with a change which affects the Contract Price and/or the Contract Time, for inclusion in a subsequent Change Order.

1.04 PRELIMINARY PROCEDURES

A. The Village may initiate changes by submitting a written Proposal Request to the Contractor. Such requests will include the following:

1. Detailed description of the Change, products, and location of the change in the project.

2. Supplementary or revised Drawings and Specifications.

3. The projected time span for making the change, and a specific statement as to whether overtime work is or is not authorized.

4. A specific period of time during which the requested price will be considered valid.

5. Such request is for information only, and is not an instruction to execute the changes, nor to stop Work in progress.

B. The Contractor may initiate changes by submitting a written notice to the Village containing the following:

1. Description of the proposed changes.

2. Statement of the reason for making the changes.

3. Statement of the effect on the Contract Price and the Contract Time.

4. Statement of the effect of the Work on other prime contractors.

5. Documentation supporting any change in Contract Price or Contract Time, as appropriate.

1.05 CONSTRUCTION CHANGE AUTHORIZATIONS AND WORK DIRECTIVES

A. In lieu of a Proposal Request, the Village may issue a construction change authorization or a Work Directive for the Contractor to proceed with a change for subsequent inclusion in the next change order.

B. The Authorization or Directive will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change and will designate the method of determining any change in the Contract Price and any change in the Contract Time.

C. The Village will sign and date the Construction Change Authorization or Work Directive as authorization for the Contractor to proceed with the changes.

D. The Contractor shall sign and date the Construction Change Authorization or Work Directive to indicate agreement with the terms therein.

1.06 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow the Village to evaluate quotation.

B. On request, provide additional data to support time and cost computations for:

1. Labor required.

2. Equipment required.

3. Products required:

a. Recommended sources of purchase and unit costs.

b. Quantities required.

4. Taxes, insurance and bonds.

5. Credit for Work deleted from the Contract, similarly documented.

6. Overhead and Profit.

7. Justification for any change in Contract Time.

C. Support each claim for additional costs, and for Work done on a time-and-material/force account basis, with documentation as required for a lump sum proposal, plus additional information as follows.

1. Name of Village's authorized agent who ordered the Work.

2. The date of the order.

3. Dates and times Work was performed and by whom.

4. Time records, summary of hours worked, and hourly rates paid.

5. Receipts and invoices for:

a. Equipment used, listing dates and times of use.

b. Products used, listing quantities.

D. Document requests for product substitution.

1.07 PREPARATION OF CHANGE ORDERS

A. The Village will prepare each Change Order on the Village's standard form.

B. The Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the changes.

C. Change Order will provide an accounting of the adjustment in the Contract Price and the Contract Time.

1.08 LUMP SUM/FIXED PRICE CHANGE ORDER

A. Content of Change Orders will be based on either:

1. The Village's Proposal Request and the Contractor's responsive Proposal as mutually agreed between the Village and the Contractor.

2. The Contractor's Proposal for a change, as recommended by the Village.

B. The Village will sign and date the Change Order as authorization for the Contractor to proceed with the changes.

C. The Contractor shall sign and date the Change Order to indicate agreement with all of the terms therein.

1.09 UNIT PRICE CHANGE ORDER

A. The content of the Change Orders will be based on either:

1. The Village's definition of the scope of the required changes.

2. The Contractor's Proposal for a change, as recommended by the Village.

3. Survey of completed work.

B. The amounts of the unit prices to be:

1. Those stated in the Agreement of the Contract Documents.

2. Those mutually agreed upon between the Village and the Contractor.

C. When quantities of each of the items affected by the Change Order can be determined prior to the start of the Work:

1. The Contractor will sign and date the Change Order to indicate agreement with the terms therein.

2. At completion of the change, the Village will determine the cost of such Work based on the unit prices and quantities used.

a. The Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Price and/or Contract Time.

3. The Village will sign and date the Change Order to establish the change in Contract Price and/or Contract Time.

4. The Village and the Contractor will sign and date the Change Order to indicate their agreement with the terms therein.

1.10 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER/CONSTRUCTION CHANGE AUTHORIZATION

A. The Village will issue a Construction Change Authorization directing the Contractor proceed with the changes.

B. At completion of the change, the Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this Section.

C. The Village will determine the allowable costs of such Work, as provided in the General Conditions and the Supplementary General Conditions of the Contract Documents.

D. The Village will sign and date the Change Order to establish the change in Contract Price and/or Contract Time.

E. The Village and the Contractor will sign and date the Change Order to indicate their agreement therewith.

1.11 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Periodically revise the Schedule of Values and Application for Payment forms to record each change as a separate item of Work, and to record the adjusted Contract Price.

B. Periodically revise the Construction Schedule to reflect each change in Contract Time:

1. Revise sub-schedule to show changes for other items of Work affected by the change.

C. Upon completion of Work under a Change Order, enter pertinent changes in Record Documents.

PART 2 -- PRODUCT

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01200

PROJECT MEETINGS

PART 1 -- GENERAL

1.01 PRECONSTRUCTION MEETING

A. An in-person preconstruction meeting will be held to acquaint representatives of the Village, and various agencies, with those in responsible charge of the CONTRACTOR'S activities for the project. The meeting will cover such subjects as the following: insurance certificates; permits and licenses; affirmative action employment; construction schedules; cost breakdown (schedule of values); application for payments; material deliveries, storage and payments; shop drawings and submittals; job-site inspection by the Village; safety and emergency action procedures; operations of the existing utilities; field offices, security and other housekeeping procedures; list of subcontractors; liquidated damages; communications; coordinating; and other appropriate matters.

B. The Village will issue Contractor's Notice to Proceed (NTP) at the time of the Preconstruction Meeting.

C. Attendance:

1. Village
2. Engineer
3. Contractor
4. Major subcontractors (if applicable)

D. Minimum Agenda:

1. Tentative construction and submittal schedules
2. Critical work sequencing
3. Designation of responsible personnel
4. Processing of Field Decisions and Change Orders
5. Adequacy of distribution of Contract Documents
6. Submittal of Shop Drawings and samples
7. Procedures for maintaining record documents
8. Use of site and Village's requirements
9. Major equipment deliveries and priorities
10. Safety and first aid procedures
11. Security procedures

12. Housekeeping procedures

13. Processing of Partial Payment Requests

14. General regard for community relations

1.02 PROGRESS MEETINGS

A. A progress meeting shall be held on a once-per-month basis for the purpose of coordinating and expediting the work. The Contractor, as a part of his obligations under the Contract, shall attend in person or by an authorized representative to attend and to act on his behalf. The Village will conduct such meetings and as necessary, with the Contractor's input, issue an agenda.

B. In addition, the Village or Contractor may call for special job site meetings for the purpose of resolving unforeseen problems or conflicts which may impede the construction schedule. The Village will prepare a brief summary report of the decisions or understandings concerning each of the items discussed at the meeting.

C. At monthly progress meetings, the Contractor shall submit to the Village for review a current four (4) week progress schedule. This schedule submission shall include a one-month look ahead schedule and reflect status of the work performed during the preceding month.

C. Attendance:

1. Village

2. Engineer

3. Program Manager

4. Contractor

5. Subcontractors, only with Village's approval or request, as pertinent to the agenda

D. Typical Agenda:

1. Review and approve minutes of previous meetings.

2. Review progress of Work since last meeting.

3. Review of Progress Schedule

a. Contract Times

b. Critical path.

c. Schedules for fabrication and delivery of materials and equipment.

4. Review of four (4) week look ahead.

5. Review and coordination of required inspections and shutdowns.

6. Note and identify problems which impede planned progress.

7. Develop corrective measures and procedures to regain planned schedule.

8. Revise construction schedule as indicated and plan progress during next work period.

9. Maintaining of quality and work standards.

10. Submittals:

    a. Review status of critical submittals.

    b. Review revisions to Schedule of Submittals.

11. Contract Modifications

    a. Requests for interpretation

    b. Written clarifications

    c. Field Orders

    d. Proposal Requests

    e. Change Proposals

    f. Work Change Directives

    g. Change Orders

    h. Claims

12. Applications for progress payments.

13. Problems, conflicts, and observations.

14. Quality standards, testing, and inspections.

15. Coordination between parties.

16. Site management issues, including access, security, maintenance and protection of traffic, maintenance, cleaning, and other Site issues.

17. Safety.

18. Permits.

19. Record documents status.

20. Punch list status, as applicable.

21. Complete other current business.

22. Schedule next progress meeting.

E. Contractor shall bring to each progress meeting adequate copies for all regular attendees each of the following handouts:

a. List of Work accomplished since the previous progress meeting.

b. Up-to-date Construction Progress Schedule.

c. Up-to-date Schedule of Submittals.

d. Detailed "look-ahead" schedule of Work planned through the next five (5) weeks with specific starting and ending dates for each activity, including shutdowns, deliveries of important materials and equipment, and important activities affecting the Village, Project, and Site.

e. When applicable, list of upcoming, planned time off (with dates) for personnel with significant roles on the Project, and the designated contact person in their absence.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01300

SUBMITTALS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. This section specifies the means of all submittals. All submittals, whether their final destination is to the Village, or other representatives of the Village, shall be directed through the Village for review and approval. A general summary of the types of submittals and the number of copies required for review by the Village is as follows:

Copies to Village[1]	**Type of Submittal**
1	List of permits, List of shop drawings, List of submittals
1	General Submittals
1	Plans of Operation
1	Construction Schedule
1	Hurricane Preparedness Plan (Refer to Section 01560 – Temporary Environmental Controls)
1	Progress Schedules
1	Schedule of Payment Items / Schedule of Values
1[3]	Project Record Documents
1	Warranties
1	Certificates of Compliance
1	Permit applications, Permit submittals, Permits and approvals
3[2]	Technical Manuals, O&M Manuals and Spare Parts List
2	Audio Visual Preconstruction Record
2	Construction Photographs (digital media)
1	Application for Payments

Copies to Village	Type of Submittal
1[2]	Progress Schedules and Construction Photographs
1	Consent of Sureties, Partial/Final Release of Liens

*[1] Electronic **searchable and bookmarked** PDF is acceptable.*

[2] Additional copies may be required by Village agencies.

[3] Unless otherwise required in the specific Section where requested.

1.02 SUBMITTAL PROCEDURES

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

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

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

1.03 GENERAL SUBMITTALS

A. Within ten (10) calendar days after the receipt of Notice to Proceed, the Contractor shall submit a list and copies of all permit applications and submittals along with permit numbers and proof of all permit application submittals required to start construction along with an initial Plan of Operation, Preliminary Schedule of Payment Items/Values and project schedule.

B. Within twenty (20) calendar days after the receipt of Notice to Proceed, the Contractor shall submit a shop drawing list and all required shop drawings and samples.

C. Within three (3) calendar days after the Issuance of any Permit application comments, a copy shall be provided to the Village.

D. Within three (3) calendar days after the Issuance of a Permit or a certificate of completion, a copy shall be provided to the Village. The Village will not issue a Notice of Commencement (of Construction) until copies of all required permits have been received.

E. Within sixty (60) calendar days after the receipt of Notice to Proceed, the Contractor shall submit a final Plan of Operation, Schedule of Payment Values and Project Schedule. Village will provide comments or requested revisions to the Schedule of Values and Construction Schedule within 30 calendar days.

F. Within thirty (30) days of the date of the Notice to Proceed, the Contractor shall submit to the Village a Hurricane Preparedness Plan as a part of the overall Emergency

Preparedness Plan for the Village's records. The Hurricane Preparedness Plan shall meet the requirements of Section 01560.

G. Within thirty (30) days of the date of the Notice to Proceed, the Contractor shall submit a Health and Safety Plan to the Village for the Village's records. Contractor is responsible for initiating, maintaining, supervising, and enforcing all safety precautions and programs associated with the work for all employees and other persons and organizations that may be affected. Contractor shall provide a copy of the Health and Safety Plan to the project Inspector for reference.

H. Within seven (7) days of a failed inspection, Contractor shall remedy and call for a re-inspection. Within ten (10) days of construction completion, Contractor shall submit all Project and Permit closeout submittals.

I. Quality Control (QC) Submittals are required for documentary evidence to the Village that the Contractor has satisfied requirements of the Specifications and Contract Documents. QC submittals shall be provided before delivery and unloading for the following types of submittals: manufacturers' installation instructions, manufacturer's, and installers' experience qualifications, ready mix concrete delivery tickets, design calculations, affidavits and manufacturer' certification of compliance with indicated product requirements, laboratory analysis results and factory test reports. QC submittals shall be provided within ten (10) days of the event documented for the following types of submittals: manufacturers' field representative certification of proper installation, field measurement, field test reports, receipt of permit inspection approval, receipt of regulatory approval. The Village shall record the date that the QC submittal was received and review it for compliance with submittal and bid document requirements.

J. Information submittals formalize the flow of information between the Contractor and the Village. The Village shall provide standard forms that include items such as: Request for Clarification, Consent of Surety, Field Order, Change Order Request, Contractor's Certification of Completion, Partial and Final Waiver of Lien.

K. Contractor shall provide monthly updated lists of all subcontractors and material suppliers along with copies of delivery tickets and invoices for materials used on the project.

1.04 PLANS OF OPERATION

A. The Contractor shall submit detailed, written Plans of Operation in accordance with Section 01520. The preliminary Plan of Operation shall be submitted within ten (10) calendar days upon receipt of Notice to Proceed.

1.05 CONSTRUCTION SCHEDULES

A. The scheduling of the Work under the Contract shall be performed by the Contractor in accordance with the requirements of this section and Section 01520 entitled "Maintenance of Utility Operations During Construction". The development of the schedule, the cost loading of the schedule, monthly payment requisitions and project status reporting requirements of the Contract shall employ computerized Critical Path Method (CPM) scheduling. The CPM schedule shall be cost loaded and resource (manpower) loaded based on the schedule of values approved by the Village in accordance with the requirements of this Section. The CPM schedule and all reports shall be prepared with

computer software, specifically Primavera P6 or P3 (P6 compatible). No substitutions will be allowed. Method employed shall be precedence diagramming method (PDM). Where submittals are required hereunder, the Contractor shall submit one (1) electronic copy (PDF) and Primavera P6 electronic file (.xer) of each submittal item.

B. Activity durations shall be in whole Working days. The Workday calendar date correlation shall be based on a 40-hour week with allowance for standard holidays, normal weather, and other special requirements.

C. If the Contractor desires to make changes in his/her method of operating which affect the construction progress schedule and related items, the Contractor shall notify the Village in writing stating what changes are proposed and the reason for the change. If the Village accepts these changes, in writing, the Contractor shall revise and submit, without additional cost to the Village, all of the affected portions of the construction progress schedule, and associated reports. The construction progress schedule and related items shall be adjusted by the Contractor only after prior acceptance, in writing by the Village. Adjustments may consist of changing portions of the activity sequence, activity durations, division of activities, or other adjustments as may be required. The addition of extraneous, nonworking activities and activities which add restraints to the construction progress schedule shall not be accepted.

D. Except where earlier completions are specified, schedule dates which show completion of all Work prior to the contract completion date shall, in no event, be the basis for claim for delay against the Village by the Contractor.

E. Construction progress schedules and related items which contain activities showing negative float or which extend beyond the contract completion date will not be accepted by the Village.

F. Whenever it becomes apparent from the current construction progress schedule and associated reports that delays to the critical path have resulted and the contract completion date will not be met, or when so directed by the Village, the Contractor shall take some or all of the following actions at no additional cost to the Village. They shall submit to the Village for approval, a written statement of the steps they intend to take to remove or arrest the delay to the critical path in the current construction progress schedule.

1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of Work.

2. Increase the number of working hours per shift, shifts per day, working days per week, the amount of construction equipment, or any combination of the foregoing, sufficiently to substantially eliminate the backlog of Work.

3. Reschedule activities to achieve maximum practical concurrency of accomplishment of activities and comply with the revised schedule.

G. If when so requested by the Village, the Contractor should fail to submit a written statement of the steps they intend to take or should fail to take such steps as reviewed and accepted in writing by the Village, the Village may direct the Contractor to increase the level of effort in manpower (trades), equipment and Work schedule (overtime, weekend and holiday Work, etc.) to be employed by the Contractor in order to remove or arrest the delay to the critical path in the current construction progress schedule, and the Contractor shall promptly provide such level of effort at no additional cost to the Village.

H. If the completion of any activity that impacts the finish date for any overall work area, whether or not critical, falls more than 100 percent behind its previously scheduled and accepted duration, the Contractor shall submit for approval a schedule adjustment showing each such activity divided into two activities reflecting completed versus uncompleted Work.

I. Shop drawings which are not approved on the first submittal or within the time scheduled, and equipment which does not pass the specified tests and certifications shall be immediately rescheduled.

J. The contract time will be adjusted only in accordance with the General Conditions and other portions of the Contract Documents as may be applicable. If the Village finds that the Contractor is entitled to any extension of the contract completion date, the Village's determination as to the total number of days extension shall be based upon the current construction progress schedule and on all data relevant to the extension. Such data shall be included in the next updating of the schedule and related items. Actual delays in activities which, according to the construction progress schedule, do not affect any contract completion date will not be the basis for a change therein.

K. From time to time it may be necessary for the contract schedule of completion time to be adjusted by the Village in accordance with the General Conditions and other portions of the Contract Documents as may be applicable. Under such conditions, the Village will direct the Contractor to reschedule the Work or contract completion time to reflect the changed conditions, and the Contractor shall revise the construction progress schedule and related items accordingly, at no additional cost to the Village.

L. Available float time may be used by the Village.

M. Float or slack time within the construction schedule is not for the exclusive use or benefit of either the Village or the Contractor, but is jointly owned, as an expiring project resource available to both parties as needed to meet contract milestones and completion dates. The Village controls the float time and, therefore, without obligation to extend either the overall completion date or any intermediate completion dates the Village may initiate changes that absorb float time only. Village initiated changes that affect the critical path on the network diagram shall be the sole grounds for extending the completion dates. Each change request shall include a change impact schedule indicating the effect of this change on the detailed construction schedule. This schedule shall include a narrative description of the schedule change and a computer-generated schedule comparison of the current schedule and the schedule revised to indicate the additional Work required by the change and its impact on the critical path. Contractor-initiated changes that encroach on the float time may be accomplished only with the Village's concurrence. Such changes, however, shall give way to Village-initiated changes competing for the same float time.

N. To the extent that the construction project schedule, or associated report or any revision thereof shows anything not jointly agreed upon or fails to show anything jointly agreed upon, it shall not be deemed to have been accepted by the Village. Failure to include on a schedule any element of Work required for the performance of this Contract shall not excuse the Contractor from completing all Work required within any applicable completion date, notwithstanding the review of the schedule by the Village.

O. Review and acceptance of the construction progress schedule, and related reports, by the Village is advisory only and shall not relieve the Contractor of the responsibility for accomplishing the Work within the contract completion date. Omissions and errors in the construction progress schedule, and related reports shall not excuse performance less than that required by the Contract and in no way make the Village an insurer of the Contractor's success or liable for time or cost overruns flowing from any shortcomings in the construction progress schedule, and related reports.

P. Monthly progress payment amounts shall be determined from the monthly progress updates of the CPM schedule activities as correlated to the Schedule of Values.

Q. Contractor is responsible for determining the sequence of activities, the time estimates of the detailed construction activities and the means, methods, techniques and procedures to be employed.

R. Detailed network activities shall include: construction activities, the submittal and approval of samples of materials, shop drawings and Plans of Operation, the procurement of materials and equipment, fabrication of materials and equipment and their delivery, installation, and testing, start-up, and training. Schedule, logic, and operating constraints and sequences shall be as listed in Section 01010 "Summary of Work" and Section 01520 entitled "Maintenance of Utility Operations during Construction". Milestones shall be selected by Contractor and Village.

S. Contractor shall consult with Subcontractors (and suppliers) relating to the preparation of the construction plan and Construction Schedule. Subcontractors shall receive copies of the Contractor's Construction Schedule and shall be continually advised of any updates or revisions to the Construction Schedule as the Work progresses. When Contractor submits the Construction Schedule to the Village or makes any proposed updates or revisions to such Schedule, it will be assumed by the Village that Contractor has consulted with and has the concurrence of the Subcontractors. Contractor shall be solely responsible for ensuring that all Subcontractors comply with the requirements of the Construction Schedule for their portions of the Work.

1.06 CPM SCHEDULE SUBMITTALS

A. All schedule submittals including revisions and updates shall include electronic versions in both Primavera P6 and PDF format.

B. Preliminary CPM Schedule Submittals: The Contractor shall submit three (3) short term schedule documents at the Project Kickoff Meeting which shall serve as the Contractor's Preliminary Schedule for the initial 60-day period of the contract time and to identify the manner in which the Contractor intends to complete all Work within the Contract Time. The Contractor shall submit (1) a 60 Day Preliminary Schedule Bar Chart, (2) a Project Overview Bar Chart, and (3) a Preliminary Schedule of Values.

1. 60 Day Preliminary Schedule: During the initial 60 days of the Contract Time, the Contractor shall conduct Contract operations in accordance with the 60-day bar chart Preliminary Schedule. The bar chart so prepared and submitted shall show the accomplishment of the Contractor's early activities (mobilization, permits, submittals of Plans of Operation, submittals necessary for early material and equipment procurement, submittals necessary for long-lead equipment procurement, initial site Work and other submittals and activities required for the first 60 days.

2. Project Overview Bar Chart: The overview bar chart shall indicate the major components of the project Work and the sequence relations between major components and subdivisions of major components. The overview bar chart shall indicate the relationships and time frames in which the various components of the Work will be made substantially complete in order to meet the project milestones and contract completion date.

3. The schedule of values shall be developed with the development of the CPM schedule activities to minimize changes when cost loading the CPM schedule. At the Project Kickoff Meeting, the Contractor shall submit a preliminary Schedule of Values for the major components of the Work correlated to the activities listed on the project overview bar chart (2). The total sum of the schedule of values shall equal the project contract total amount.

C. Preliminary CPM Schedule and Revised Original CPM Schedule Submittals: The Preliminary CPM Schedule shall be submitted at the Project Kickoff Meeting and within ten (10) calendar days from the receipt of purchase order and executed contracts. The Village shall review the Preliminary CPM Schedule within ten (10) days and will schedule the Preliminary CPM Schedule Review Meeting. The Preliminary CPM Schedule Review Meeting shall be attended by the Contractor's project manager, scheduling staff (in-house or consultant), superintendent, and major subcontractors. The Revised Original CPM Schedule shall be submitted within 30 days from the return of the Preliminary CPM Schedule. Both the Preliminary CPM Schedule and Revised Original CPM Schedule submittals shall have identical format, and shall consist of tabular and graphic reports, eight (8) copies, spiral bound, and ordered with table of contents. The following required reports must be included:

1. Four (4) tabular schedule listings: sorted by Activity number, by Early Start, by Total Float, and by Responsibility code; with the following data elements:

    a. Activity number/ID

    b. Activity description

    c. Duration

    d. Early start date

    e. Early finish date

    f. Late start date

    g. Late finish date

h. Free float

i. Total float

j. Criticality

k. Budget amount of activity

l. Responsibility

2. A successor-predecessor report which shall identify the successor and predecessor activities for each activity and ties between schedule activities.

3. A critical path report which shall identify all activities with zero (0) duration.

4. A project bar chart sorted by Activity number.

5. A project bar chart sorted by Early start.

6. A milestone bar chart.

7. A network diagram showing critical path clearly highlighted.

D. Upon acceptance of the Original CPM Schedule, the Early Start and Early Finish dates for all activities shall be fixed as Planned Start and Planned Finish dates, except where Late Start and Late Finish dates are specifically agreed to by Village, for future variance calculations.

E. Following acceptance of the Original CPM Schedule, the Contractor shall monitor the progress of the Work and adjust the schedule each month to reflect actual progress and any changes in planned future activities. Progress shall be evaluated monthly by the Contractor and Village. Not less than seven (7) days prior to submittal of each monthly progress payment estimate, they shall meet at the jobsite and jointly evaluate the status of each activity on which Work has started or is due to start, based on the preceding construction schedule; to show actual progress, to identify those activities started and those completed during the previous period; to show the estimated time required to complete or the percent complete of each activity started but not yet completed; and to reflect any necessary changes to the schedule, network analysis or report to accurately reflect progress. Activities shall not be considered to be complete until they are, in fact, 100 percent complete. Each schedule update must be complete including all information requested in the Original CPM Schedule submittal shown in paragraph C.

1. In addition, each update shall include the following tabular report formats:

a. Completed Tasks (a Current Activities Report)

b. Should have Started Tasks (a Current Activities Report)

c. Tasks in progress (a Current Activities Report)

d. Slipping Tasks (a Current Activities Report)

e. Resource Usage (a Workload Report). This report shall identify any over-allocation of manpower and/or equipment resources and identify measures to correct / alleviate the over-allocation.

f. Itemized list of all changes to the network logic, activity durations, responsibility, or any data elements since the previous submission.

g. Variance report comparing Planned start and finish dates to Actual start and finish dates.

2. Neither the submission nor the updating of the Contractors Revised Original CPM Schedule submittal, nor the submission, updating, change or revision of any other report, curve, schedule or narrative, shall have the effect of amending or modifying or limiting in any way the Contractor's obligations under this Contract. Only a signed, fully executed Change Order can modify these contractual obligations.

3. Upon approval of a Change Order, or upon receipt by the Contractor of authorization to proceed with additional Work, the change shall be reflected in the next submittal of the CPM Schedule by the Contractor. The Contractor shall utilize a sub-network in the schedule depicting the changed Work and its effect on other activities. The sub-network shall be tied to the main network with the appropriate logic so that a true analysis of the critical Path can be made.

4. Monthly schedule updates shall be submitted with the Application for Progress Payment.

F. A three (3) week rolling schedule shall be provided for each weekly meeting showing the items Worked the previous week and those scheduled to be in progress during the next two (2) weeks. The three-week rolling schedule shall use a bar chart format and be accompanied by a tabular report of the activities included. The previous week's schedule shall be indicated as a "target" schedule for comparison.

G. A shop drawing submittal schedule shall be provided.

1.07 SCHEDULE OF PAYMENT VALUES

A. The Contractor shall prepare a preliminary Schedule of Values to correspond with the Project Overview Bar Chart as required under Paragraph 1.06 B.2 for submission at the Project Kickoff Meeting and a Detailed Schedule of Values to correspond with the Revised Original CPM Schedule as required under Section 1.06 C. in conjunction with the Revised Original CPM Schedule submission.

1. Because the ultimate requirement is to develop a detailed schedule of values sufficient to determine appropriate monthly progress payment amounts through cost loading of the CPM Schedule activities, sufficient detailed breakdown shall be provided to meet this requirement. The Village shall be the sole judge of acceptable numbers, details and description of values established. If, in the opinion of the Village, a greater number of Schedule of Value items than proposed by the Contractor is necessary the Contractor shall add the additional items so identified by the Village.

2. A cross-reference list shall be developed in two parts:

   a. List each schedule activity with the respective valued items making up the total cost of the activity.

   b. List each valued item with the respective schedule activity or activities that make up the total cost indicated. In the case where a number of schedule items make up the total cost for a valued item (shown in the schedule of values) the total cost for each scheduled item should be indicated.

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

C. If the Contractor anticipates the need for payment for materials stored on the project site, he/she shall also submit a list covering the cost of materials, delivered and unloaded with taxes paid.

D. The Contractor shall expand or modify the above schedule and materials listing as required by the Village's initial or subsequent reviews.

E. The Contractor's schedule of payment items shall be, at a minimum, categorized by structures (and appurtenances) as follows:

   1. Mobilization

   2. Demolition & Disposal

   3. Piping and Valving

   4. Mechanical Equipment

   5. Electrical High Voltage Components

   6. Electrical Low Voltage Components

   7. Conduit and Wire

   8. Instrumentation and Controls

   9. Demobilization / Project Closeout

1.08 SHOP DRAWINGS

A. The Contractor shall submit a detailed Schedule of Shop Drawing Submittals at the Pre-Construction Conference, organized by Specification Section Number.

B. The Contractor shall submit for review shop drawings for concrete reinforcement, structural details, piping layout and appurtenances, wiring, color selection charts, Contractor Furnished Equipment, materials, and equipment fabricated especially for this Contract, and materials and equipment for which such Drawings are specified or specifically requested by the Village.

C. For Contractor Furnished Equipment shop drawing submittals, the Contractor shall submit a copy of the equipment specification section and all other applicable specification sections governing the Contractor Furnished Equipment. The specification sections shall be complete with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation with the specification Section and denoted deviation number identified.

D. A copy of contract document control diagrams and process and instrumentation diagrams related to the submitted equipment, with addendum updates that apply to the equipment in this section, marked to show specific changes necessary for the equipment proposed in the submittal. If no changes are required, the drawing or drawings shall be marked "No changes required".

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

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

G. The Contractor shall be responsible for the prompt submittal of all shop drawings so that there shall be no delay to the Work due to the absence of such Drawings. The Village will review the shop drawings within 21 calendar days of receipt of such Drawings. The Contractor shall resubmit any shop drawing not approved within 20 days after the shop drawings are returned by the Village.

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

I. Requirements: All shop drawings shall be submitted to the Village through the Contractor. The Contractor is responsible for obtaining shop drawings from his/her subcontractors and returning reviewed Drawings to them. All Drawings shall be clearly marked with the name

of the project, Village, Contractor, and building, equipment, or structure to which the drawing applies. Drawings shall be suitably numbered and stamped by the Contractor. Each shipment of Drawings shall be accompanied by a letter of transmittal giving a list of the drawing numbers and the names mentioned above.

J. All shop drawings shall also be furnished in an electronic file format. All shop drawings shall be in Adobe Portable Document Format (PDF) and be PDF formatted text and graphics.

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

L. Product data shall include materials of construction, dimensions, performance characteristics, capacities, wiring diagrams, piping and controls, etc.

M. Warranties: When warranties are called for, a sample of the warranty shall be submitted with the shop drawings. The sample warranty shall be the same form that will be used for the actual warranty. Actual warranties shall be originals and notarized.

N. Work Prior to Review: No material or equipment shall be purchased, fabricated especially for this Contract, or delivered to the project site until the required shop drawings have been submitted, processed and marked either "FURNISH AS SUBMITTED" or "FURNISH AS CORRECTED". All materials and Work involved in the construction shall be as represented by said Drawings.

O. The Contractor shall not proceed with any portion of the Work (such as the construction of foundations) for which the design and details are dependent upon the design and details of equipment for which submittal review has not been completed.

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

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

R. Contractor's Modifications: For submissions containing departures from the Contract Documents, the Contractor shall include proper explanation in the letter of transmittal. Should the Contractor submit for review equipment that requires modifications to the structures, piping, layout, etc. detailed on the Drawings, Contractor shall also submit for review details of the proposed modifications. If such equipment and modifications are

accepted, the Contractor, at no additional cost to the Village, shall do all Work necessary to make such modifications.

S. "Or Equal" Items: Whenever a particular brand or make of material, equipment, or other item is specified, or is indicated on the Drawings, it is for the purpose of establishing a standard of quality, design, and type desired and to supplement the detailed specifications and unless it is followed by the words "NO SUBSTITUTION", or "SUBSTITUTIONS ARE NOT ALLOWED" any other brand or make which is equivalent to that specified or indicated may be offered as an "or equal" item subject to the following provisions:

1. Contractor shall submit for each proposed "or equal" item sufficient details, complete descriptive literature, and performance data together with samples of the materials, where feasible, to enable the Village to determine if the proposed "or equal" item is equal, in all respects including, but not limited to, quality, performance, ease of maintenance, availability of spare parts, and experience record.

2. Contractor shall submit certified tests, where applicable, by an independent laboratory attesting that the proposed "or equal" item is equal.

3. A list of installations where the proposed "or equal" item is equal. Such listing shall cover a minimum of the previous five years and will furnish project names and contact phone numbers.

4. Where the acceptance of a "or equal" item requires excessive review by the Village revision or redesign of any part of the Work, all such additional review costs, revisions and redesign, and all new Drawings and details required therefore, shall be at the Contractor's expense.

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

6. Acceptance of any proposed "or equal" item shall in no way release the Contractor from any of the provisions of the Contract Documents.

7. Village may require, at Contractor's expense, a special performance guarantee or other surety with respect to any substitute.

T. Complete Submittals: Each submittal shall be complete in all aspects incorporating all information and data required to evaluate the products' compliance with the Contract Documents. Partial or incomplete submissions shall be returned to the Contractor without review.

U. Electronic Data Submittal Format

1. Files shall be electronically searchable based Village established standard file naming convention.

2. Quality and Legibility: Electronic submittal files shall be made from the original and shall be clear and legible. Do not provide scans of faxed copies. Electronic file shall be made at the full size of the original paper documents. All pages shall be properly oriented for reading on a computer screen without rotating.

3. Organization and Content:

   a. Each electronic submittal shall be one electronic file. Do not divide and submit individual submittals into multiple electronic files unless directed by Village.

   b. When submittal is large or contains multiple parts, provide PDF file with bookmark for each section of submittal.

   c. Submittal content shall include Contractor's letter of transmittal and Contractor's review and stamp.

4. Electronic file format: PDF (Portable Document Format): .pdf, Adobe PDF documents; created through electronic conversion rather than optically scanned whenever possible.

V. Shop drawings will be reviewed, stamped and distributed with the appropriate box checked either "FURNISH AS SUBMITTED", "FURNISH AS CORRECTED", "FURNISH AS CORRECTED CONFIRM" or "REVISE AND RESUBMIT".

W. All submissions shall be dated and properly referenced to the specification section and Contract Drawing number. The submittal number shall match the following submittal numbering system (or an equivalent system as approved by the Village):

Submittal Numbering System

1. Package ID: The package number will reflect the CSI (specification) section number as it appears in the specifications.

2. Subgroup ID: The submittal number will include the CSI number followed by two additional codes. The first will define the type of submittal as follows:

   01 Product Data, Specifications, Cut Sheets, Manufacturer's Certification or approval letters.

   02 Shop Drawings

   03 Product samples and mock-ups

   04 Special requirements as required in the contract documents

   05 As-Built Drawings

   06 Warranties

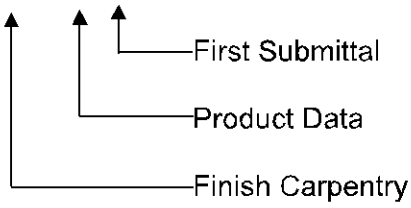
   07 O&M

   08 Spare Parts

The second code will identify individual submittals within that submittal type. The number to the left of the decimal represents the submittal number and the number to the right of the decimal represents the revision number.

Example:

Package	Submittal	Description
03300	03300-01-1.1	Concrete Admixture A, First Submittal
06400	06400-01-1.2	Re-submittal



X. Contractor shall continue to resubmit submittals in part if they are returned "Furnish as Corrected – Confirm" or in full if they are returned "Revise and Resubmit" as required by the Village until submittals are acceptable to the Village. It is understood by the Contractor that Village may charge the Contractor the Engineer's charges for review in the event a submittal is not approved (either "Furnish as Submitted" or "Furnish as Corrected") by the third submittal for a system or piece of equipment. These charges shall be for all costs associated with additional engineering reviews, meetings with the Contractor or manufacturer, etc., commencing with the fourth submittal of a system or type of equipment submitted for a particular Specification Section.

Y. Structural Shop Drawings

1. General: Following are additional requirements for structural shop drawings.

2. Fabricated items: Submit only one (1) reproducible vellum, and two (2) blue/black line prints of all structural shop drawings of fabricated items such as reinforcing, structural steel, aluminum, gratings, floor plates, handrails, stairs, etc. The reproducible copy will be returned to the Contractor for duplication and required further distribution. All proposed changes shall be clearly clouded and flagged for Village's review and acceptance.

3. Coordination and Verification: Prior to submission the Contractor shall coordinate the shop drawings with related trades and verify that the required dimensions or information necessary for construction has been made.

4. Facility shop drawings: For each facility reinforcing or structural steel shop drawings such as rebars for footings, base slab, columns, beams, stairs, etc., shall all be submitted at one time.

5. Concrete Products & Accessories: Submittals of all concrete related products and accessories shall be made all at one time, each properly labeled, and its use identified by Facility/Structure name.

1.09 PROJECT RECORD DRAWINGS

A. Submit Record Drawings in accordance with the requirements of Section 01720 – Project Record Documents.

1.10 WARRANTIES

A. Warranties called for in the Contract Documents shall be originals and submitted to the Village. When warranties are required, they shall be submitted prior to request for payment.

B. When advance copies of warranties are requested, they shall be submitted with, and considered as shop drawings.

C. Warranties and bonds shall be bound within Operation and Maintenance Manuals as specified.

D. The Contractor shall warrant to the Village that all material and labor used in the construction are covered by the Contractor's warranty for a minimum of a one-year period upon approval and acceptance by the Village. The Contractor shall replace or repair defects at no cost to the Village during the warranty period. No visible or potential leakage shall be allowed during the warranty period.

1.11 CERTIFICATES

A. Four (4) copies of certificates of compliance and test reports shall be submitted for requested items to the Village prior to request for final payment.

1.12 PERMITS

A. Permits required to perform the Work shall be obtained by the Contractor and copies submitted to the Village.

B. The permits to be obtained / submitted shall include, at a minimum, the permits listed in Section 01010 – Summary of Work.

C. Copies of Permit Applications, Permit Submittals, Permit Comments and Approved Permits shall be submitted to the Village.

1.13 OPERATION AND MAINTENANCE INSTRUCTIONS (MANUALS)

A. The Contractor shall submit preliminary and final Operations and Maintenance (O&M) Manuals for each item of equipment at or before the time the equipment is delivered to the project site in accordance with Section 01730 of these specifications.

1.14 AUDIO-VISUAL PRECONSTRUCTION RECORD

A. General: Prior to commencing work, the Contractor shall have a continuous color audio-video digital video disc (DVD) recording taken of the entire Project, including all major streets, adjacent work areas, existing manholes, plant site and all other areas that will be disturbed by the Contractor's operations, to serve as a record of preconstruction conditions. No construction shall begin prior to review and acceptance of the discs covering the respective, affected construction area by the Village. The Village shall have the authority to reject all or any portion of the DVD not conforming to the specifications and order that it be redone at no additional charge. The Contractor shall reschedule unacceptable coverage within five days after being notified. The Village shall designate those areas, if any, to be omitted from or added to the audio-video coverage. Recordings shall not be performed more than ninety days prior to construction in any area. All DVDs and written records shall become property of the Village.

B. Services: The Contractor shall engage the services of a professional electrographer. The color DVDs shall be prepared by a responsible commercial firm known to be skilled and regularly engaged in the business of preconstruction color audio-video DVD documentation. The electrographer shall furnish to the Village a list of all equipment to be used for the audio-video recording, i.e., manufacturer's name, model number, specifications, and other pertinent information. Additional information to be furnished by the electrographer is the names and addresses of two references that the electrographer has performed color audio-video recordings for on projects of a similar nature within the last twelve months.

C. Equipment: All equipment, accessories, materials and labor to perform this service shall be furnished by the Contractor.

1. The total HD audio-video system shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume and clarity and be free from distortion and interruptions.

2. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be less than twelve feet. In some instances, audio-video DVD coverage may be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance acceptable to the Village.

D. Recorded Information - Audio: Each disc shall begin with the current date, project name and municipality and be followed by the general location, i.e., process structure, or area, viewing side and direction of progress. The audio track shall consist of an original live recording. The recording shall contain the narrative commentary of the electrographer, recorded simultaneously with his/her fixed elevation video record of the zone of influence of construction.

E. Recorded Information - Video: All video recordings must, by electronic means, display continuously and simultaneously, generated with the actual recording, transparent digital information to include the date and time of recording. The date information shall contain the month, day and year. The time information shall contain the hours, minutes, and

seconds. Additional information shall be displayed periodically. Such information shall include, but not be limited to, project name, process structure or area, and the viewing side. This transparent information shall appear on the extreme upper left hand third of the screen.

F. Conditions for Recording: All recording shall be done during times of good visibility. No recording shall be done during precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recordings and to produce bright, sharp video recordings of those subjects.

G. Disc Coverage: Disc coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio coverage. Such coverage shall include, but not be limited to, existing driveways, sidewalks, curbs, pavement, landscaping, fences, signs and interior and exterior of existing structures affected by the work and the exteriors of structures adjacent to the work, and any other on-site area that will be occupied or impacted by the Contractor or any of his/her subcontractors or suppliers within the area covered.

1.15 CONSTRUCTION PHOTOGRAPHS

A. The Contractor shall furnish construction photographs showing the progress of the Work. Photographs shall be digital in .jpeg format. In addition, a PDF copy of photo shall be submitted with a log indicating the file name, date taken, location/station, short description, direction camera is facing, the project title, and short description of what is in the photograph.

B. The Contractor shall submit the digital aerials and copy of photographs taken during the previous month with the monthly pay requests.

C. The Contractor shall start taking construction progress photos when the Work begins and continuing for as long as the Work is in progress, not less than twelve (12) exposures from each site per month, consisting of different subjects or angles or view at different locations of progress of the work. Prints and digital media shall become the sole property of the Village upon submittal by the Contractor.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

– END OF SECTION –

SECTION 01400

QUALITY CONTROL

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Testing Laboratory Services

1. Payment

a. Laboratory testing and checking required by the Specifications (compaction, grout testing, etc.), to be provided by the Contractor. Contractor shall include the costs for testing in the project bid price. Laboratory testing costs shall be paid by the Contractor.

b. The cost of retesting items that fail to meet the requirements of the Specifications shall be borne by the Contractor. Retesting shall be performed by the testing laboratory retained by the Village.

c. The cost of testing services not specifically required in the Specifications, but requested by the Village, shall be borne by the Village.

d. The cost of materials testing described in the Specifications or as required by reference standards to be provided by the material manufacturer, shall be included in the price bid for that item and shall not be paid by the Village.

2. Tests required by the Village shall not relieve the Contractor from the responsibility of supplying test results and certificates from manufacturers or suppliers to demonstrate conformance with the Specifications.

3. Contractor Responsibilities

a. The Contractor shall plan and conduct operations to permit taking of field samples and test specimens, as required, and to allow adequate time for laboratory tests.

b. Unless otherwise specified, all samples for tests shall be taken by the testing laboratory.

c. The Contractor shall provide the laboratory representative samples in the required quantities to be tested except for those taken by laboratory personnel.

d. Furnish all materials required for testing, except for those tests required to be taken by laboratory personnel.

4. Laboratory Responsibilities

a. Perform specified inspections, sampling, and testing of materials in compliance with the requirement of the Specifications and referenced standards.

b. Promptly notify the Village and Contractor of any irregularities which are observed during the performance of services.

c. Promptly submit 4 copies (two copies to the Village and two copies to the Contractor) of test and inspection results which include the date of test, date of inspection or test, project title, name and signature of tester, type of inspection or test, and results of the test.

5. Significance of Tests

a. Test results shall be binding on both the Contractor and the Village and shall be considered irrefutable evidence of compliance or noncompliance with the Specification requirements, unless supplementary testing shall prove, to the satisfaction of the Village, that the initial samples were not representative of actual conditions.

6. Supplementary and Other Testing

a. Nothing shall restrict the Contractor from conducting tests he/she may require. Should the Contractor at any time request the Village to consider such test results, the test reports shall be certified by an independent testing laboratory acceptable to the Village. Testing of this nature shall be conducted at the Contractor's expense.

1.02 SAMPLING AND TESTING

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

B. Any waiver by the Village of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to

assure execution of any necessary corrective or remedial Work, shall not be construed as a waiver of any requirements of the Contract Documents.

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

1.03 SITE INVESTIGATION AND CONTROL

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

B. The Contractor shall inspect related and appurtenant Work and shall report in writing to the Village any conditions which will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor within the scope of the Contract.

C. The Contractor shall check and familiarize himself with the overall general conditions prevailing along the route of construction and at the construction site.

1.04 DEFECTIVE WORK, EQUIPMENT, OR MATERIALS

A. Any defective or imperfect work, equipment, or materials furnished by the Contractor which is discovered before the final acceptance of the work, as established by the Certificate of Substantial Completion, or during the subsequent guarantee period, shall be removed immediately even though it may have been overlooked by the Village and estimated for payment. Any equipment or materials condemned or rejected by the Village shall be tagged as such and shall be immediately removed from the site. Satisfactory work or materials shall be substituted for that rejected.

B. The Village may order tests of imperfect or damaged work, equipment, or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the Contractor; and the nature, tester, extent, and supervision of the tests will be as determined by the Village. If the results of the tests indicate that the required functional capability of the work, equipment, or material was not impaired, consistent with the final general appearance of same, the work, equipment, or materials may be deemed acceptable. If the results of such tests reveal that the required functional capability of the questionable work, equipment, or materials has been impaired, then such work, equipment, or materials shall be deemed imperfect and shall be replaced. The Contractor may elect to replace the imperfect work, equipment, or material in lieu of performing the tests.

1.05 INSPECTION AND TESTING

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

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

C. The Contractor shall furnish the services of representatives of the manufacturers of certain equipment, as prescribed in other Sections of the Specifications. The Contractor shall also place orders for such equipment on the basis that, after the equipment has been tested prior to final acceptance of the work, the manufacturer will furnish the Village with certified statements that the equipment has been installed properly and is ready to be placed in functional operation. Tests and analyses required of equipment shall be paid for by the Contractor, unless specified otherwise in the Section which covers a particular piece of equipment.

D. Where other tests or analyses are specifically required in other Sections of these Specifications, the cost thereof shall be borne by the party (Village or Contractor) so designated in such Sections. The Village will bear the cost of all tests, inspections, or investigations undertaken by the order of the Village for the purpose of determining conformance with the Contract Documents if such tests, inspection, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the Village as a result of such tests, inspections, or investigations, if overtime or standby costs are incurred due to delays in the scheduled work and associated tests, the Contractor shall bear the full cost thereof or shall reimburse the Village for said cost. In this connection, the cost of any additional tests and investigations, which are ordered by the Village to ascertain subsequent conformance with the Contract Documents, shall be borne by the Contractor.

E. Inspections shall be scheduled for regular working hours only, except for special occasions where service interruptions cannot be scheduled during normal working hours. The Village shall be given a minimum two (2) full working days notification for scheduled inspections, and a minimum of seven (7) full working days notification for service interruptions.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01510

TEMPORARY UTILITIES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall provide temporary telephone, light and power, heating and air conditioning, potable water service and sanitary facilities for their operations and for the construction operations of the other subcontractors of this Project at the site. The temporary services shall be provided for use throughout the construction period.

B. The Contractor shall coordinate and install all temporary services in accordance with the requirements of the utility companies having jurisdiction and as required by applicable codes and regulations.

C. At the completion of the work, or when the temporary services are no longer required, the facilities shall be restored to their original conditions.

D. All costs in connection with the temporary services including, but not limited to, installation, utility company service charges, maintenance, relocation, and removal shall be borne by the Contractor at no additional cost to the Village.

E. Some temporary facilities that may be required may be indicated on the Drawings; however, the Drawings do not necessarily show any or all of the temporary facilities that the Contractor ultimately uses to complete the work.

F. Temporary Light and Power

1. The temporary general lighting and small power requirements shall be serviced by 120/240 V, 1 phase, 3 wire temporary systems furnished and installed by the Contractor. This service shall be furnished complete with step down transformer, main disconnect, overcurrent protection, branch circuit breakers, and wiring as required; including branch circuit breakers and wiring as required for furnishing temporary power to the various connections required by the Contractor, all in accordance with the requirements of the servicing power company and applicable standards and codes. Connection to the plant emergency power system is prohibited. Village shall not be responsible for Contractor loss of power in the event of a power interruption caused by the power company or any other event which may cause an interruption in service to the temporary light and power system. Any Contractor with a need for power other than the 120/240 V, 1 phase, 3 wire shall provide such power at their own expense.

2. The Contractor shall make all necessary arrangements, and pay for all permits, inspections, and other charges for all temporary service installations. All temporary systems shall comply with and meet the approval of the Village and the local authorities having jurisdiction. All temporary electrical systems shall consist of wiring, switches, necessary insulated supports, poles, fixtures, sockets, receptacles, lamps, guards, cutouts, and fuses as required to complete such installations. The Contractor shall furnish lamps and fuses for all temporary systems furnished by him and shall replace broken and burned-out lamps, blown fuses, damaged wiring and

as required to maintain these systems in adequate and safe operating condition. All such temporary light and power system shall be installed without interfering with the work of the other Contractors.

3. When it is necessary during the progress of construction that a temporary electrical facility installed under this Division interferes with construction operations, the Contractor shall relocate the temporary electrical facilities to maintain temporary power as required at no additional cost to the Village. The Contractor shall be responsible at all times for any damage or injury to equipment, materials, or personnel caused by improperly protected or installed temporary installations and equipment.

4. The various Contractors doing the work at the site shall be permitted to connect into the temporary general lighting system small hand tools, such as drills, hammers, and grinders, provided that:

   a. Equipment and tools are suitable for 120 V, single phase, 60 Hz operation and operating input does not exceed 1,500 volt-amperes.

   b. Tools are connected to outlets of the system with only one (1) unit connected to a single outlet.

   c. In case of overloading of circuits, the Contractor will restrict use of equipment and tools as required for correct loading.

5. The Contractor shall keep the temporary general lighting systems energized 15 minutes before the time that the earliest trade starts in the morning and de-energized 15 minutes after the time the latest trade stops. This applies to all weekdays, Monday through Friday, inclusive, which are established as regular working days.

   Any Contractor requiring temporary light and power before or after the hours set forth hereinbefore, or on a Saturday, Sunday, or holiday, shall pay for the additional cost of keeping the system energized and repaired. If more than one Contractor is involved, the charges shall be prorated, such amounts to be determined from the meter readings or other acceptable means previously agreed upon by the Contractors involved. If it is necessary for any Contractor or his/her employees to be in any structure after regular working hours and the temporary general lighting system is not required for illumination, that Contractor shall provide such illumination required by means of flashlights, electric lanterns, or other devices not requiring use of electricity from the temporary general lighting system.

6. Each Contractor requiring additional power and lighting other than that specified herein (including power for temporary heating equipment to be provided by the Contractor) shall furnish his/her own service complete with all fuses, cutouts, wiring and other material and equipment necessary for a complete system between the service point and the additional power consumers and shall install his/her own metering equipment in accordance with the requirements of the servicing power company.

7. The temporary general lighting system shall be installed progressively in structures as the various areas are enclosed or as lighting becomes necessary because of partial enclosure. Lighting intensities shall be not less than 10-foot candles.

8. The Contractor shall provide a separate temporary night lighting circuit for construction security. This system shall be energized at the end of each normal working day and de-energized at the start of each normal working day by the Contractor. The system is to be left energized over Saturdays, Sundays, and all holidays. Lighting intensities shall be not less than 2-foot candles.

9. Electrical welders provided by each trade used in the erection and fabrication of the buildings, structures and equipment shall be provided with an independent grounding cable connected directly to the structure on which the weld is being made rather than adjacent conduit piping, etc.

   Electricians and other tradesmen necessary for the required connections and operation of welding equipment and generator, standby generators and similar equipment shall be furnished by the individual Contractors. All costs for such labor and equipment shall be borne by the individual Contractors.

10. Upon completion of the work, but prior to acceptance by the Village, the Contractor shall remove all temporary services, security lighting systems, temporary general lighting systems and all temporary electrical work from the premises.

G. Temporary Heating and Air Conditioning

1. The Contractor shall provide temporary heating, air conditioning, ventilation coverings and enclosures necessary to properly protect all work and materials against damage by dampness, heat and/or cold, to dry out the work and to facilitate work in all structures.

2. The equipment, fuel, materials, operating personnel, and methods used shall be at all times satisfactory and adequate to maintain critical installation temperatures and ventilation for all work in those areas where the same is required.

3. After any structure is enclosed, the minimum temperature to be maintained is 50 degrees Fahrenheit, unless otherwise specified, where work is being performed.

4. Before and during the application of interior finishing, painting, etc., the Contractor shall provide sufficient heat to maintain a temperature of not less than 65 degrees Fahrenheit or greater than 85 degrees Fahrenheit.

5. Any work damaged by dampness, or insufficient or abnormal heating shall be replaced by the Contractor at no additional cost to the Village.

H. Temporary Sanitary Service

1. Sanitary conveniences, in sufficient numbers, for the use of all persons employed on the work and properly screened from public observation, shall be provided, and maintained at suitable locations by the Contractor, all as prescribed by State Labor Regulations and local ordinances. The contents of same shall be removed and disposed of in a manner consistent with local and state regulations, as the occasion requires. Each Contractor shall rigorously prohibit the committing of nuisances within, on, or about the work. Sanitary facilities shall be removed from the site when no longer required.

I. Temporary Water

1. The Contractor shall provide temporary potable water service for construction purposes, sanitary facilities, fire protection, field offices and for cleaning. The Contractor shall make all arrangements for connections to the potable water at the plant site.

2. The Contractor shall provide backflow preventer device as well as fire hydrant. The backflow preventer shall be tested on an annual basis.

3. Each Contractor shall supply potable water for his/her employees either by portable containers or drinking fountains.

4. An adequate number of hose bibbs, hoses, and watertight barrels shall be provided for the distribution of water.

5. Water service shall be extended by the Contractor and relocated as necessary to meet temporary water requirements.

6. Contractor shall provide signs clearly depicting "Potable" and "Non-potable" water sources. This information shall be communicated to all Contractor's personnel.

J. Confined Spaces

1. The Contractor shall provide and maintain a safe working environment in confined spaces. The Contractor shall follow the applicable requirements of the OSHA Standards for Construction and NIOSH Publications for working in confined spaces.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01520

MAINTENANCE OF UTILITY OPERATIONS DURING CONSTRUCTION

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The existing water treatment facility will be maintained in continuous operation by the Village during the entire construction period of the Contract as hereinafter specified. The intent of this Section is to outline the minimum requirements necessary to provide continuous treatment and flow throughout the construction period. The Contractor shall submit a written Plan of Operation as detailed in this specification. All shutdowns require Village approval.

B. Work under the Contract shall be scheduled and performed in such a manner as to result in the least possible disruption to the operation of the existing treatment facilities.

C. Work shall be scheduled and conducted by the Contractor so as not to impede any treatment process, reduce the quality of the plant treated water or cause odor or other nuisance. The work shall be scheduled to impact the functioning of treatment process operations in the most minimum manner possible. In performing the work shown and specified, the Contractor shall plan and schedule work to meet the plant operation and functional requirements, as well as the constraints and construction requirements as outlined in this Section. No discharge of raw or inadequately treated water shall be allowed. The Contractor shall pay all civil penalties, costs, assessments, etc., associated with any discharge of raw or inadequately treated water associated with the Contractor's work.

D. The Contractor shall be responsible for coordinating the general construction and the schedules of electrical, structural, civil and related trades and for ensuring that permanent or temporary power and controls are available for all existing, proposed, and temporary facilities that are required to be on line at any given time.

E. The Contractor has the option of providing additional temporary facilities that can eliminate a constraint, provided it is done without cost to the Village and provided that all requirements of these Specifications are fulfilled. Work not specifically covered in the following paragraphs may, in general, be done at any time during the contract period, subject to the operating requirements and constraints and construction requirements outlined hereinafter. All references to days in this Section shall be consecutive calendar days.

1.02 RELATED WORK DESCRIBED ELSEWHERE

A. Section 01300 – Submittals

B. Section 01010 – Summary of Work

C. Section 11000 – Equipment, General Provisions

1.03 GENERAL CONSTRAINTS

A. The Contractor shall schedule the Work so that the treatment plant(s) are maintained in continuous operation during the construction period except during approved interruptions. All short-term system or partial systems shutdowns (those amounting to 4 hours or less) shall be approved by the Village. Long-term shutdowns (amounting to greater than 4 hours) shall conform to the requirements hereinafter specified and shall be minimized by the Contractor as much as possible. If in the judgment of the Village, a requested shutdown is not required for the Contractor to perform the Work, the Contractor shall utilize approved alternative methods to accomplish the Work. All shutdowns shall be coordinated with and scheduled at times suitable to the Village. The Contractor shall notify the Village of all requested shutdowns 10 days prior to each planned event.

B. For each shutdown request, the Contractor shall submit a completed Shutdown Request Form along with a task specific Plan of Operation addressing the requirements necessary to complete the work within the requested time frame. The Shutdown Request Form is located at the end of this specification section. The requirements associated with the Contractor's submittal of the Plan of Operation which shall accompany each shutdown request form is identified in Paragraph 1.06 of this specification section.

C. Approved shutdowns shall not begin until all required materials are on hand and ready for installation. Each shutdown period shall commence at a time approved by the Village, in writing. Where required in the Construction Sequence, the Contractor shall proceed with the Work continuously, (24 hours/day, 7 days/week) start to finish, until the Work is completed, and normal operation is restored. The Contractor shall be responsible for, and include in its contract bid amount, all costs associated with necessary work to electrical, controls, utilities or facilities to complete the required connections and/or modifications.

D. The Contractor shall review all bidding documents and shall be responsible to determine all such connections or modifications, and the scope and cost of all temporary measures required to isolate the work area without the need for a shutdown of the affected facility, piping or utility.

E. Any temporary work, facilities, roads, walks, protection of existing structures, piping, blind flanges, valves, equipment, etc. that may be required within the Contractor's work limits to maintain continuous and dependable plant operation shall be furnished by the Contractor.

F. The Village shall have the authority to order Work postponed, stopped or prohibited that would, in his/her opinion, unreasonably result in interrupting the necessary functions of the plant operations.

G. If the Contractor completes all required Work before the specified shutdown period has ended, the Village may immediately place the existing system back into service.

H. If the Contractor impairs performance or operation of the facility as a result of not complying with specified provisions for maintaining operations, then the Contractor shall immediately make all repairs or replacements and do all work necessary to restore the facility operation to the satisfaction of the Village. Such work shall progress continuously to completion on a 24-hours per day, seven work day per week basis.

I. The Contractor shall provide the services of emergency repair crews on call as required.

1.04 GENERAL OPERATING AND CONSTRUCTION REQUIREMENTS

A. At no time shall the Contractor undertake to close off any pipelines, or open valves, or take any other action which would affect the operation of the existing treatment plant.

B. Access to Plant Site, Roadways, and Parking Areas

1. An unobstructed traffic route through the Main Gate shall be maintained at all times for the Village's operations personnel and maintenance equipment. The Contractor shall be responsible for providing access to, and for preparing and maintaining approved parking areas.

2. An unobstructed traffic route around the plant site shall be maintained at all times for the Village's operations personnel and maintenance equipment. Vehicular access to the treatment units and buildings for Village personnel shall be maintained at all times by the Contractor.

3. The Contractor shall provide temporary measures to protect the existing pavement by filling over with earthen material or supplying other measures acceptable to the Village and shall repair any damage to existing paved surfaces that occurs during the construction period. Any areas disturbed along the shoulders of the access road and interior roads and elsewhere inside and outside of the plant shall be repaired, graded, seeded, etc. as necessary to match pre-existing conditions.

4. The Contractor shall not undertake the restoration/construction of new roadway (paved, gravel, or asphalt overlay) shown on the Contract Drawings, until all other work on the plant improvements has been completed.

5. It shall be the responsibility of the Contractor to obtain any permits required from the Florida Department of Transportation and pay all associated fees.

C. Personnel Access: Treatment plant personnel shall have access to all areas which remain in operation throughout the construction period. The Contractor shall locate stored material, dispose of construction debris and trash, provide temporary walkways, provide temporary lighting, and other such work as directed by the Village to maintain personnel access to areas in operation. Access and adequate parking areas for plant personnel must be maintained throughout construction.

D. Plumbing Facilities: Unless otherwise allowed by the Village, sanitary facilities in the existing structures shall be operational at all times for plant operating personnel. All other building plumbing systems such as roof and floor drains, pumping, etc., shall be maintained for all structures.

E. Building Heating, Ventilating and Air Conditioning: Building heating, ventilating and air conditioning for the existing plant structures shall be in service for the entire construction period. Additional temporary heating, ventilation and air conditioning shall be provided as required to maintain facilities under construction adequately heated, vented and air conditioned. The temperatures to be maintained in any areas occupied by plant operating personnel such as offices, lunchrooms, locker rooms, bathrooms, etc., shall be at least 70 degrees and less than 80 degrees Fahrenheit. The temperatures to be maintained in all other interior plant areas, whether new, existing, or temporary, shall be maintained at a minimum of 65 degrees Fahrenheit.

F. Power, Light and Communications Systems: Electric power, lighting service, process control and communications systems shall be maintained in uninterrupted operation in all areas which remain in operation. Individual units may be disconnected as required for replacement, but service shall be available at all times including periods when plant elements are out of service. Shutdown of electrical facilities shall be limited to not more than five (5) hours and work shall be performed between 9:00 pm and 5:00 am. The Village may allow longer outages under conditions determined by the Village. All costs associated with use of temporary services or standby engine generators shall be paid by the Contractor. The Electrical subcontractor shall coordinate shutdowns required with the Contractor to minimize the total number of shutdowns required to complete construction. Village's phone service to and within the plant shall be maintained in continuous operation during construction.

G. Draining Process Pipes and Conduits: The contents of all pipes and conduits to be removed, replaced or relocated (or dewatered for a specific purpose) shall be transferred to a suitable facility in a manner approved by the Village through hoses or piping, or by using pumps if hydraulic conditions so require them. The Contractor shall provide the pumps, piping and hoses at no additional cost to the Village. No uncontrolled spillage of a pipe or conduit shall be permitted. Any spillage, other than potable water, shall be immediately washed down and flushed into the appropriate process flow train.

H. Potable Water System: Potable water service shall be maintained in continuous service at all times during construction except for short term interruptions required for tie-ins. Shutdown of the potable water system shall be fully planned and coordinated with the Plant Superintendent and shall be limited to not more than two (2) hours unless noted otherwise. Existing fire hydrants within the plant site shall be operational at all times, unless otherwise approved by the Village.

I. Sump Pumps and Sumps: All existing sumps shall be maintained in an operable condition with either existing pumps or temporary pumps. Interim piping, power and controls shall be provided as required by the staged construction sequence.

J. At no time shall the Contractor of Subcontractors access or utilize any of the Village's facilities.

1.05 OVERALL SEQUENCE OF CONSTRUCTION

A. Work under the Contract shall be scheduled and performed in such a manner as to result in the least possible disruption to the operation of the existing treatment facilities. Process control modifications shall not be made without first obtaining written permission from the Village a minimum of ten days prior to the event.

B. Critical events in the sequence of construction are specified herein. The outline sequence of construction does not include all items necessary to complete the work, but is intended to identify the sequence of critical events necessary to minimize disruption to the on-going treatment plant process and to ensure compliance with discharge requirements. It shall be understood by the Contractor that the critical events identified are not all inclusive and that additional items of work not shown may be required. The sequence of construction is a precedence requirement and does not attempt to schedule the Contractor's work. It is intended only to indicate which activities must precede other activities in order to minimize interferences and disruptions.

C. The sequences as listed herein provide one method of performing the work without disrupting operation of the existing facilities. The Contractor may choose to construct the work within these constraints using an alternate method of sequencing. Any alternate methods for sequencing the work shall be submitted in detail with the written Plans of Operation required herein.

D. A listing of the minimum phasing and sequencing of the work is provided below:

1. Phase I - Submittals and Preparation for Mobilization

    a. Plan for staging area, temporary fencing and field office, obtain permits, develop and submit construction schedule, schedule of values, emergency preparedness plan/hurricane action plan, plans of operations, shop drawing schedule, begin shop drawing submittals, setup staging area and mobilize for work.

    b. Submit plans for field office (if required), utility plans for field office and fence plan for staging areas. Obtain all permits for these items prior to installation. See Section 01510 – "Temporary Utilities" and Section 01550 – "Site Access and Storage" for additional information.

    c. Perform field investigation/locates of all existing utilities may be impacted by the work.

    d. Shop Drawing approvals.

    e. Complete all preconstruction requirements.

    f. Contractor shall coordinate construction activities with the Village.

2. Phase II – Portable Emergency Generator Connection Box installation.

    a. Install junction boxes, raceway, conductors, electrical equipment racks, exposed conduits and grounding improvements.

    b. Transfer loads to new wire and raceway systems one-by-one.

    c. Repeat until all loads are transferred, tested and satisfactorily demonstrated to the Village.

    d. Restore surfaces disturbed during construction.

3. Phase III – Project Closeout

    a. Complete remaining work items.

    b. Complete remaining specified manufacturer training of Village personnel.

    c. Obtain Substantial Completion of project.

    d. Commence warranty period

    e. Complete final punch list items.

    f. Demobilize and perform site clean-up.

g. Complete project closeout in accordance with Section 01700 – Project Closeout.

h. Obtain Final Completion of the project.

4. Other Construction Constraints: Contractor shall comply with the following constraints during construction and utilize constraints in determining a sequence of construction:

a. Plant operation shall be minimally affected by transferring scrubbed loads to new wire and raceway systems. Coordinate with Village to ensure personnel are mobilized as necessary to supervise building functions that will require oversight as a result of the work performed by the Contractor.

b. The M1 Degasifier is a two-stage chemical scrubber system. The Contractor may transfer loads associated with one scrubber vessel (e.g. 1 blower and 1 recirculation pump) at a given time. Work shall be complete and satisfactorily demonstrated to Village prior to moving onto next scrubber vessel. The requirement is to perform as much work as possible to minimize downtime.

c. Interruption to facility operations, including disconnecting power, shall be performed during non-work hours, 9:00 PM to 5 AM, or during a time frame approved by the Village. The Contractor shall be permitted to remove power from the facility during non-work hours for the purpose of connecting temporary power or performing specified work. The maximum duration of power outage permitted will be 4 hours, unless otherwise noted or as approved in writing by the Village.

1.06 PLAN OF OPERATION

A. The Contractor shall submit a detailed written Plan of Operation with each Shutdown Request Form to the Village for their review and approval. All work pertaining to each specific shutdown request shall be conducted in accordance with the approved Plan of Operation, unless agreed to in writing between the Contractor, and Village. The written Plan of Operation shall address the following items:

1. Step-by-step detailed sequence for performing the work.

2. Anticipated duration of each activity.

3. Documentation on all temporary flow diversion equipment to be utilized by the Contractor, including tapping saddles, line stops, temporary bypass pumps and piping.

4. Plan and/or schematic drawings to clearly identify work to be performed. Sequence steps shall be identified on drawings using a keynote legend or similar means.

5. A detailed plan for tie-ins or shutdowns. The plan shall list all potential problems and remedies along with spare parts and materials that must be on hand to repair any potential problems.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

Note: *"Notice of Plant Impact form" on the page following "End of Section" is part of this specification section*

– END OF SECTION –

Date
Project # and Name

Village Of Wellington
ATTN: Utility Director or Project Manager
12300 Forest Hill Boulevard
Wellington, FL 33414

NOTICE OF PLANT IMPACT

In accordance with Section 01035 and 01520 of the Contract Documents, all shutdowns of facilities shall be approved by the Village. All shutdowns must be fully coordinated at least 24 hours before the scheduled shutdown. This form serves as the written notification that must be submitted by the Contractor to the Village 10 days in advance of the proposed work. Shorter notification periods will be considered on a case-by-case basis.

This letter serves as notice of an upcoming plant impact that will require coordination. The details of the plant impact are as follows:

Type of Plant Impact	M1 Door Access Control Shutdown
Drawing Sheet No.	E09
Date of Impact	Wednesday, April 24, 2024
Anticipated Duration	8 hours
Crew Size	2 +/-
Plant Responsibilities	Notify operations of no access control to M1 building, confirm removal or relocation of boxes shown in Attachment #2

APPROVAL/PRIOR TO SHUTDOWN COMMENCEMENT

Approval by VOW . . . . . .

. . . . . damage damages

COMPLETE AT START OF SHUTDOWN

Actual start date

Actual start time. . . . . .

Owner Signature

_____

Owner Name

Contractor's Signature

Contractor's Name

SHUTDOWN COMPLETION

Completion Date/Time:

Owner Initials

Contractor Initials _____

(Continued next page)

- Provide a detailed description of work to be performed and why the plant operation must be impacted. Identify potential conflicts and risks to work for duration of shutdown.
- Identify equipment impacted and expected duration for each activity.
- Include contact information for Contractor's project superintendent and any additional staff which are involved.
- Attach sheets, sketches, photographs with details as necessary that show the appropriate level of planning and coordination of resources

REQUESTED BY: _____ _____
Contractor Date

APPROVED BY: _____ _____
Village of Wellington Date

SECTION 01530

PROTECTION OF EXISTING FACILITIES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Contractor shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of the operations under this Contract. Any damage or injury occurring on account of any act, omission or neglect on the part of the Contractor shall be restored in a proper and satisfactory manner or replaced by and at the expense of the Contractor to an equal or superior condition than previously existed.

B. Contractor shall comply promptly with such safety regulations as may be prescribed by the Village or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of, his/her employees. In the event of the Contractor's failure to comply, the Village may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the Village to direct the correction of unsafe conditions or practices shall not relieve the Contractor of responsibility hereunder.

C. In the event of any claims for damage or alleged damage to property as a result of work under this Contract, the Contractor shall be responsible for all costs in connection with the settlement of or defense against such claims. Prior to commencement of work in the vicinity of property adjacent to the work site, the Contractor, at his/her own expense, shall take such surveys as may be necessary to establish the existing condition of the property. Before final payment can be made, the Contractor shall furnish satisfactory evidence that all claims for damage have been legally settled or sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.

1.02 PROTECTION OF WORK AND MATERIAL

A. During the progress of the work and up to the date of final payment, the Contractor shall be solely responsible for the care and protection of all work and materials covered by the Contract.

B. All work and materials shall be protected against damage, injury, or loss from any cause whatsoever, and the Contractor shall make good any such damage or loss at his/her own expense. Protection measures shall be subject to the approval of the Village.

1.03 BARRICADES, WARNING SIGNS AND LIGHTS

A. The Contractor shall provide, erect, and maintain as necessary, strong, and suitable barricades, danger signs and warning lights along all roads accessible to the public, as required by the authority having jurisdiction, to ensure safety to the public. All barricades and obstructions along public roads shall be illuminated at night and all lights for this purpose shall be kept burning from sunset to sunrise.

B. The Contractor shall provide and maintain such other warning signs and barricades in areas of and around their respective work as may be required for the safety of all those employed in the work, the Village's operating personnel, or those visiting the site.

C. In the case of a conflict between this Specification Section and the Contractor's Safety Plan, the more stringent requirement of the two documents shall govern.

1.04 EXISTING UTILITIES AND STRUCTURES

A. The term existing utilities shall be deemed to refer to both publicly-owned and privately-owned utilities such as electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.

B. Where existing utilities and structures are indicated on the Drawings, it shall be understood that all of the existing utilities and structures affecting the work may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the Contractor to ascertain the actual extent and exact location of existing utilities and structures. In every instance, the Contractor shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any work in the vicinity of existing utilities.

C. Prior to beginning any excavation work, the Contractor shall, through field investigations, determine any conflicts or interferences between existing utilities and new utilities to be constructed under this project. This determination shall be based on the actual locations, elevations, slopes, etc., of existing utilities as determined in the field investigations, and locations, elevation, slope, etc. of new utilities as shown on the Drawings. If an interference exists, the Contractor shall bring it to the attention of the Village as soon as possible. If the Village agrees that an interference exists, the Contractor shall modify the design as required. Additional costs to the Contractor for this change shall be processed through a Change Order as detailed elsewhere in these Contract Documents.

D. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to insure un-interruption of existing services. Any damage resulting from the work of this Contract shall be promptly repaired by the Contractor at his/her own expense in a manner satisfactory to the Village or the respective authority having jurisdiction over such work. Where it is required by the authority having jurisdiction that they perform their own

repairs or have them done by others, the Contractor shall be responsible for all costs thereof.

E. Where excavations by the Contractor require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the Contractor. All such work shall be performed in a manner satisfactory to the Village or the respective authority having jurisdiction over such work. In the event the Contractor fails to provide proper support or protection to any existing utility, the Village may, at his/her discretion, have the respective authority to provide such support or protection as may be necessary to ensure the safety of such utility, and the costs of such measures shall be paid by the Contractor.

1.05 TEMPORARY PROJECT IDENTIFICATION SIGNS

A. Contractor shall furnish, install, and maintain temporary signage for Project identification and construction site information.

B. Temporary signs required shall include:

a. Project sign at the site entrance

b. Site Informational Signage: Provide temporary signage as required for construction site operations and controlling traffic at the construction site.

B. Temporary signs shall be plainly visible to vehicular traffic.

C. Contractor shall install signs in a neat, professional, workmanlike manner.

D. Contractor shall maintain temporary signage so that signs are clean, legible, and upright.

E. Contractors shall cut grass, weeds, and other plants so that temporary signs are not covered or obscured.

F. Contractor shall repair and repaint damaged temporary signs.

G. Remove temporary signage prior to final inspection of the Work, or when directed by the Village.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01540

DEMOLITION AND REMOVAL OF EXISTING STRUCTURES AND EQUIPMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all labor, materials and equipment to demolish buildings and structures and to remove fixtures, anchors, supports, piping and accessories designated to be removed on the Drawings. Disposal of materials shall be as required by the Village.

1.02 SUMMARY

A. This Section covers the demolition, removal, and disposal of existing buildings, structures, pavement, curbs, and sidewalk, removal and disposal of asbestos materials, and any existing equipment including electrical, plumbing, heating and ventilating equipment and piping not required for the operation of the rehabilitated plant as indicated on the Drawings and as specified hereinafter.

1.03 SUBMITTALS

A. The Contractor shall submit for review, in accordance with Section 01300 entitled "Submittals" the proposed methods, equipment and operation sequence. Include coordination for shut-off, temporary services, continuation of service and other applicable items to ensure no interruption of plant operations except as hereinbefore specified.

1.04 TITLE TO EQUIPMENT AND MATERIALS

A. Contractor shall have no right or title to any of the equipment, materials or other items to be removed from the existing buildings or structures unless and until said equipment, materials and other items have been removed from the premises. The Contractor shall not sell or assign, or attempt to sell or assign any interest in the said equipment, materials or other items until the said equipment, materials or other items have been removed.

B. Contractor shall have no claim against the Village because of the absence of such fixtures and materials.

1.05 CONDITION OF STRUCTURES AND EQUIPMENT

A. The Village does not assume responsibility for the actual condition of structures and equipment to be demolished and removed.

B. Conditions existing at the time of inspection for bidding purposes will be maintained by the Village so far as practicable.

C. The information regarding the existing structures and equipment shown on the Drawings is based on visual inspection and a walk-through survey only. The Village will not be responsible for interpretations or conclusions drawn therefrom by the Contractor.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

3.01 DEMOLITION AND REMOVALS

A. The removal of all equipment and piping, and all materials from the demolition of buildings and structure shall, when released by the Village, shall be done by the Contractor, and shall become the Contractor's property, unless otherwise noted, for disposition in any manner not contrary to the Contract requirements and shall be removed from the site to the Contractor's own place of disposal.

B. The Electrical Subcontractor specifically, shall de-energize all panelboards, lighting fixtures, switches, circuit breakers, electrical conduits, motors, limit switches, pressure switches, instrumentation such as flow, level and/or other meters, wiring, and similar power equipment prior to removal. Any electric panels or equipment which are to be retained shall be relocated or isolated by the Electrical Subcontractor specifically, prior to the removal of the equipment specified herein. All existing electrical equipment to be removed shall be removed with such care as may be required to prevent unnecessary damage, to keep existing systems in operation and to keep the integrity of the grounding systems.

C. Conduits and wires shall be abandoned or removed where noted or as shown on the Drawings. All wires in abandoned conduits shall be removed. Abandoned conduits concealed in floor or ceiling slabs or in walls, shall be cut flush with the slab or wall at the point of entrance. The conduits shall be suitably plugged and the area repaired in a flush, smooth, approved manner. Exposed conduits and their supports shall be disassembled and removed from the project site. Repair all areas of removal to prevent rust spots on exposed surfaces.

D. The Contractor shall proceed with the removal of the equipment; piping and appurtenances in a sequence designed to maintain the plant in continuous operation as described in Section 01520 entitled "Maintenance of Utility Operations During Construction" and shall proceed only after approval of the Village.

E. Any equipment piping and appurtenances removed without proper authorization, which are necessary for the operation of the existing facilities, shall be replaced to the satisfaction of the Village at no cost to the Village.

F. Excavation caused by demolitions shall be backfilled with fill free from rubbish and debris.

G. Contractor shall provide to the Village a 60-day notice prior to demolition of assets.

H. At least 48 hours prior to commencement of a demolition or removal, the Contractor shall notify the Village in writing of the proposed schedule. No removals shall be started until it is acceptable to the Village.

3.02 PROTECTION

A. Demolition and removal work shall be performed by competent experienced workmen for the various type of demolition and removal work and shall be carried out through to completion with due regard to the safety of Village employees, workmen on-site and the public. The work shall be performed with as little nuisance as possible.

B. The work shall comply with the applicable provisions and recommendation of ANSI A10.2, Safety Code for Building Construction, all governing codes, and as hereinafter specified.

C. The Contractor shall make such investigations, explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. The Contractor shall give particular attention to shoring and bracing requirements so as to prevent any damage to new or existing construction.

D. The Contractor shall provide, erect, and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for proper protection of the public, occupants of the building, workmen engaged in demolition operations, and adjacent construction.

E. The Contractor shall provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.

F. The Contractor shall provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and new work is being done, connections made, materials handled or equipment moved.

G. The Contractor shall take necessary precautions to prevent dust from rising by wetting demolished masonry, concrete, plaster and similar debris. Unaltered portions of the existing buildings affected by the operations under this Section shall be protected by dust-proof partitions and other adequate means. Existing electrical and mechanical equipment to remain shall be protected from damage, dust, and debris.

H. The Contractor shall provide adequate fire protection in accordance with local Fire Department requirements.

I. The Contractor shall not close or obstruct walkways, passageways, or stairways and shall not store or place materials in passageways, stairs or other means of egress. The Contractor shall conduct operations with minimum traffic interference.

J. The Contractor shall be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.

3.03 WORKMANSHIP

A. The demolition and removal work shall be performed as described in the Contract Documents. The work required shall be done with care, and shall include all required shoring, bracing, etc. The Contractor shall be responsible for any damage which may be caused by demolition and removal work to any part or parts of existing structures or items designated for reuse or to remain. The Contractor shall perform patching, restoration and

new work in accordance with applicable Technical Sections of the Specifications and in accordance with the details shown on the Drawings.

B. All supports, pedestals and anchors shall be removed with the equipment and piping unless otherwise specified or required. Concrete bases, anchor bolts and other supports shall be removed to approximately 1-inch below the surrounding finished area and the recesses shall be patched to match the adjacent areas. Superstructure wall and roof openings shall be closed, and damaged surfaces shall be patched to match the adjacent areas, as specified under applicable Sections of these Specifications, as shown on the Drawings, or as directed by the Village. Wall sleeves and castings shall be plugged or blanked off, all openings in concrete shall be closed in a manner meeting the requirements of the appropriate Sections of these Specifications, as shown on the Drawings, and as directed and approved by the Village.

C. Where equipment is shown or specified to be removed and relocated, the Contractor shall not proceed with removal of this equipment without specific prior approval of the Village. Upon approval, and prior to commencing removal operations, the equipment shall be operated in the presence of representatives of the Contractor and Village. Such items shall be removed with care, under the supervision of the trade responsible for reinstallation and protected and stored until required. Material or items damaged during removal shall be replaced with similar new material or item. Any equipment that is removed without proper authorization and is required for plant operation shall be replaced at no cost to the Village.

D. Wherever piping is to be removed for disposition, the piping shall be drained by the Contractor and adjacent pipe and headers that are to remain in service shall be blanked off or plugged and then anchored in an approved manner.

E. Materials or items demolished and not designated to become the property of the Village or to be reinstalled shall become the property of the Contractor and shall be removed from the property and legally disposed of.

F. The Contractor shall execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the building.

G. In general, masonry shall be demolished in small sections, and where necessary to prevent collapse of any construction, the Contractor shall install temporary shores, struts, and bracing.

H. Where alterations occur, or new and old work join, the Contractor shall cut, remove, patch, repair or refinish the adjacent surfaces to the extent required by the construction conditions, so as to leave the altered work in as good a condition as existed prior to the start of the work. The materials and workmanship employed in the alterations, unless otherwise shown on the Drawing or specified, shall comply with that of the various respective trades which normally perform the particular items or work.

I. The Contractor shall finish adjacent existing surfaces to new work to match the specified finish for new work as shown in the Contract Documents. The Contractor shall clean existing surfaces of dirt, grease, loose paint, etc., before refinishing.

J. The Contractor shall cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.

K. The Contractor shall confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the new work. The Contractor shall cut and remove insulation, etc., and provide temporary weather tight protection as required until new roofing and flashings are installed.

L. The Contractor shall remove temporary work, such as enclosures, signs, guards, and the like when such temporary work is no longer required or when directed at the completion of the work.

3.04 EQUIPMENT AND MATERIALS RETAINED BY VILLAGE

A. Within the areas of the project designated to be demolished, the following materials or items are designated to remain the property of the Village. The Contractor shall carefully remove such items, load, off-site transport, unload and set the items at the Village of Wellington's Water Treatment Plant. The specific storage location within the Water Treatment Plant shall be designated by the Village. Contractor shall protect equipment to prevent damage.

3.05 MAINTENANCE

A. The Contractor shall maintain the buildings, structures and public properties free from accumulations of waste, debris and rubbish, caused by the demolition and removal operations.

B. The Contractor shall provide on-site dump containers for collection of waste materials, debris and rubbish, and shall wet down dry materials to lay down and prevent blowing dust.

C. At reasonable intervals during the progress of the demolition and removal work or as directed by the Village, the Contractor shall clean the site and properties, and dispose of waste materials, debris, and rubbish.

3.06 CLEANUP

A. The Contractor shall, promptly and on a regular basis, remove from the project site all debris resulting from the demolition and removal operations as it accumulates. Upon completion of the demolition work, all materials, equipment, waste and debris of every sort shall be removed and the premises shall be left clean, neat and orderly.

- END OF SECTION -

SECTION 01541

FIELD ENGINEERING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surveying services required for proper layout of work and record information.

1.02 RELATED SECTIONS

A. Section 01300 – Submittals

B. Section 01400 – Quality Control

C. Section 01700 – Project Closeout

D. Section 01720 – Project Record Drawings

1.03 QUALITY CONTROL

A. A Land Surveyor Registered in the State of Florida shall be used for verifying existing control points and establishing new control points. Contractor shall be responsible to verify the accuracy of the established control points prior to performing layout.

1.04 SUBMITTALS

A. Submit name, address, and telephone number of Registered Land Surveyor to the Village before starting work.

B. On request, submit documentation verifying accuracy of survey work for project boundary and vertical and horizontal control.

C. Submit certificate signed by Surveyor with Project Record Documents certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.

1.05 PROJECT RECORD DOCUMENTS

A. Maintain complete, accurate log of control and survey work as it progresses.

B. Maintain one set of plans that all record drawing information is kept on. These plans shall show the record information within one week of installation of work or information being

made available. Contractor's record drawing markups will be available for review by the Village at any time during the normal workday.

C. Project record drawings shall be maintained and submitted in accordance with Section 01720 entitled "Project Record Drawings".

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

3.01 INSPECTION

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Village of any discrepancies discovered.

3.02 SURVEY REFERENCE POINTS

A. Protect survey control points prior to starting site work; preserve permanent reference points during construction. Make no changes without prior written notice to the Village.

B. Promptly report to the Village the loss or destruction of any reference point or relocation required because of changes in grades or other reasons. Replace dislocated survey control points based on original survey control.

3.03 SURVEY REQUIREMENTS

A. The Village shall provide one benchmark for vertical and horizontal control during construction. Contractor shall be responsible for laying out the work, shall protect and preserve the established benchmark and shall make no changes or relocations without prior approval of the Village. Contractor shall report to the Village whenever any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

B. Contractor shall establish line and levels, locate and lay out by instrumentation and similar appropriate means:

1. Site improvements, including pavements, stakes for grading, fill and topsoil placement, utility locations, slopes, and invert, or centerline, elevations. Submit cut sheets for gravity sewers to the Village three days prior to construction.

2. Grid or axis for structures.

3. Building foundation, column locations, and ground floor elevations.

4. Piping locations, slopes, and invert, or centerline, elevations.

C. Periodically verify layouts by same means.

D. As the Work progresses, the Contractor shall provide an affidavit certifying the following items are installed at locations identified in the Contract Drawings as each item is installed/completed. The Contractor shall also incorporate into record drawing markups the horizontal and vertical record locations of improvements, including the following:

1. Corner coordinates of rectangular or square buildings, structures, and tanks.

2. Building floor elevations.

3. Floor elevations of structures and tanks as required to define floor slope.

4. Top elevations of structures and tanks.

5. Manhole center coordinates for sanitary sewers, storm sewers, and electrical duct banks.

6. Pipe coordinates at changes in direction.

7. Coordinates of buried valves, tees and fittings.

8. All underground piping invert or centerline elevations including at changes in slope.

9. All underground pipe invert or centerline elevations at tees and crosses.

10. Pipe invert, or centerline, elevations at crossing with another pipe.

11. Invert, or centerline, elevations and coordinates of existing pipe at crossing with underground pipe installed under this project.

12. Invert elevations of manhole pipe inlets and outlets.

13. Duct bank coordinates at changes in direction.

14. Top and bottom elevations of duct banks at manholes and handholes.

15. Other horizontal and vertical record data pertinent to completed Work.

E. Ground surface record/information shall include the following:

1. Spot elevations should be shown at a minimum 100-foot rectangular grid, sufficient to show all the important topographic features.

2. All elevations shown on the construction drawings shall be confirmed or amended on the record drawing markups if finished elevations are different.

- END OF SECTION -

SECTION 01550

SITE ACCESS AND STORAGE

PART 1 -- GENERAL

1.01 HIGHWAY LIMITATIONS

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

1.02 TEMPORARY CROSSINGS

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

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

C. Traffic Control: For the protection of traffic in public or private streets and ways, the Contractor shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of the "Manual of Uniform Traffic Control Devices, Part VI - Traffic Controls for Street and Highway Construction and Maintenance Operations," published by U.S. Department of Transportation, Federal Highway Administration (ANSI D6.1). The Contractor shall take all necessary precautions for the protection of the Work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The Contractor shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be

required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.

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

1.03 CONTRACTOR'S SITE ACCESS

A. The normal time of work for this Contract is limited to 40 hours per week and shall generally be between the hours of 7:00 a.m. and 4:00 p.m., Monday through Friday. The Contractor may elect to work beyond these hours or on holidays or weekends provided that all costs incurred by the Village for additional engineering shall be borne by the Contractor. The Village shall deduct the cost of additional engineering costs and overtime from monies due the Contractor.

B. Contractor shall be responsible for providing signage throughput the construction site indicating, at a minimum, Contractor's name, project name, subcontractors, and site access limits.

C. The use of tools, ladders, valve keys, cones and other equipment and accessories property of the Village by the Contractor is not acceptable.

1.04 CONTRACTOR'S WORK AND STORAGE AREA

A. Storage areas shall be provided within the designated staging area shown on the Drawings, or in coordination with the Village for small equipment storage. Responsibility for protection and safekeeping of equipment and materials at or near the sites will be solely that of the Contractor and no claim shall be made against the Village by reasons of any act of an employee or trespasser. Should an occasion arise necessitating access to an area occupied by stored equipment and/or materials, the Contractor shall immediately move them. No equipment or materials shall be placed upon the Village's property until it is acceptable to the Village.

B. If the Contractor requires additional staging area, the Contractor shall coordinate with facility staff for securing additional on-site area sources at no additional cost to the Village.

C. Upon completion of the Contract, the Contractor shall remove from the storage areas all of its equipment, temporary fencing, surplus materials, rubbish, etc., and restore the areas.

D. Contractor shall be responsible for keeping the work area clean and free of debris and for providing trash receptacles to be used by Contractor and Contractor's personnel including subcontractors for the duration of the project. The use of the plant's trash receptacles is not acceptable.

1.05 TRAFFIC CONTROL

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

B. The use of on-site plant roads, entrance gates, parking areas and property for the Contractor's personnel parking shall not be permitted except as designated on the Drawings. The Contractor shall be responsible for enforcing on-site parking regulations. Violators of these on-site parking restrictions will be towed or booted.

C. All dirt or debris spilled from the Contractor's trucks on existing pavements or other active areas of the facility shall be removed by the Contractor immediately.

1.06 SECURITY

A. The Contractor shall care for and protect against loss or damage of all material to be incorporated in the construction for the duration of the project and shall repair or replace damaged or lost materials and damage to structures.

1.07 SAFETY AND PROTECTION DEVICES

A. It shall be the sole responsibility of the Contractor to protect persons from injury and to avoid property damage. Adequate barricades, construction signs, torches, red lanterns, and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with all federal, OSHA and local ordinances.

B. The Contractor shall have unit responsibility for and be required to make good, at its own expense, all damage to property or adjacent properties caused in the execution of this Contract.

C. The Contractor shall take all necessary precautions for the safety of its employees on the job and shall comply with all applicable provisions of federal, State, County, and municipal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

D. In the event, the Contractor's tools or materials delivered to the premises are stolen or damaged, it shall be responsible for such theft.

E. Contractor shall be responsible for providing signs indicating restricted work areas.

1.08 CONTRACTOR DELIVERY LOGS

A. The Contractor shall provide a daily log of deliveries to the sites for the project. The daily log shall include deliveries received each day with the driver's name and truck license number, in addition to expected deliveries for the following day. The log shall be submitted to the Village when requested. This log will be used by the Village at its discretion for security purposes at the plant site.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01560

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 -- GENERAL

1.01 CHEMICALS

A. All chemicals used during project construction or furnished for testing of project operation, whether herbicide, pesticide, disinfectant, polymer, reactant of other classification, will be required to show approval of either EPA or HUD. The handling, use, storage and disposal of such materials, containers or residues shall be in strict conformance with manufacturer and/or Contractor's secured storage. Copies of antidote literature and a supply of antidotes shall be kept at the job site office.

1.02 DUST

A. During all work for this Contract, the Contractor shall by the application of water and/or calcium chloride or other means, approved by the Village, eliminate dust annoyance to adjacent property, business establishments and the plant site. The Contractor shall take all protective measures, to the satisfaction of the Village, necessary to ensure that dust and debris does not enter any of the mechanical or electrical equipment. The Contractor shall be responsible for the cleanup of existing buildings, equipment, controls, etc., which have become soiled due to the lack of proper dust control as determined by the Village. The Contractor shall provide daily application of water to all unpaved areas designated by the Village in the field and to the satisfaction of the Village in the field.

1.03 NOISE

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

1.04 EROSION ABATEMENT AND WATER POLLUTION

A. It is imperative that the Contractor's dewatering operations not contaminate or disturb the plant environment or properties adjacent to the Work. The Contractor, shall, therefore, schedule and control operations to confine all runoff water from disturbed surfaces, water from dewatering and/or from excavation below the ground water table operations that becomes contaminated with lime silt, muck and other deleterious matter, fuels, oils, bitumens, calcium chloride, chemicals and other polluting materials.

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

C. The Contractor shall be responsible for providing, operating, and maintaining materials

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

1.05 HURRICANE AND STORM WARNINGS

A. As the schedule for this project coincides, in part, with the recognized south Florida hurricane season, the Contractor's attention is drawn to the possibility of hurricane conditions, or severe storm conditions, occurring at the job and plant site during the course of Contract work.

B. Within 30-days of the date of Notice-to-Proceed, the Contractor shall submit to the Village a Hurricane Preparedness Plan. The plan should outline the necessary measures which the Contractor proposes to perform at no additional cost to the Village in case of a hurricane warning.

C. In the event of inclement weather, or whenever the Village shall direct, the Contractor shall, and will cause Sub-Contractors to carefully protect the Work and materials against damage or injury by reasons of failure on the part of the Contractor to so protect the Work. Such Work and materials so damaged shall be removed and replaced at the expense of the Contractor.

1. Hurricane Watch: Upon designation of a hurricane watch, Contractors shall be responsible for storing all loose supplies and equipment on the job site that may pose a danger. The Contractor shall backfill all open holes in preparation of inclement weather. In addition, the Contractor shall remove all bulkheads and plugs in pipelines that would impede drainage in the case of flooding. Structures that may be in danger of floatation shall be flooded. The Contractor shall also cooperate with Village personnel in protecting other structures at the site.

2. Hurricane Warning: No mobile "temporary facility" under the control of the Village, or on Village's property, shall be staffed during a hurricane warning. Contractor facilities meeting these criteria shall comply.

D. The Contractor is advised to take all necessary precautions to protect equipment by moving it to higher ground if in an area subject to flooding.

1.06 PESTS AND RODENTS

A. The Contractor shall be responsible for maintaining the jobsite free from litter, rubbish, and garbage. The Contractor shall provide containers for the disposal of garbage and other materials that attract and are breeding places for pests and rodents. The Contractor shall provide the services of an exterminator to inspect the Contractor's staging area on a periodic basis and to provide the service as required to control pests and rodents within the Contractor's staging area.

1.07 PERIODIC CLEAN-UP; BASIC SITE RESTORATION

A. During construction, the Contractor shall regularly remove from the site all accumulated

debris and surplus materials of any kind which result from the operations, or whenever the accumulation is in excess of one truck load. Unused equipment and tools shall be stored at the Contractor's yard or base of operations for the project.

B. When the work involves installation of sewers, drains, water mains, manholes, underground structures, or other disturbance of existing features in or across streets, rights-of-way, easements, or private property, the Contractor shall (as the work progresses) promptly backfill, compact, grade and otherwise restore the disturbed area to a basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or function consistent with the original use of the land. Unsightly mounds of earth, large stones, boulders, and debris shall be removed so that the site presents a neat appearance.

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

D. Upon failure of the Contractor to perform periodic clean-up and basic restoration of the site to the Village's satisfaction, the Village may, upon five (5) days prior written notice to the Contractor, employ such labor and equipment as he/she deems necessary for the purpose, and all costs resulting therefrom shall be charged to the Contractor and deducted from the amounts of money that may be due him.

1.08 SECURITY

A. The Contractor shall care for and protect against loss or damage of all material to be incorporated in the construction for the duration of the Contract and shall repair or replace damaged or lost materials and damage to structures.

B. The Contractor shall be responsible for providing and maintaining temporary fencing and gates and the daily securing of temporary fencing and gates used for construction purposes for the duration of the project.

C. The Contractor shall strictly comply with working hours on the project site. Prior to any work outside of the standard working hours, the Contractor shall request the Village's approval via written request (at least 8 hours in advance). The written request shall clearly define the work to be performed, the names of the employees, their employer and their trade and the hours and days during which the work is planed. The Village is considering, and the Contractor shall comply with additional security requirements including employee photo identification at all times on-site and employee parking passes.

D. The Contractor shall comply with all Village directed security requirements including employee photo identification at all times on-site and employee parking passes.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

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

B. Equipment Specifications may not deal individually with minute items required such as components, parts, controls, and devices which may be required to produce the equipment performance specified or as required to meet the equipment warranties. Where such items are required, they shall be included by the supplier of the equipment, whether or not specifically called for in the Contract Documents.

C. All equipment, materials, instruments, or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents. Equipment and materials to be incorporated into the work shall be delivered sufficiently in advance of their installation and use to prevent delay in the execution of the work, and they shall be delivered as nearly as feasible in the order required for executing the work.

D. Where the words "furnish", "provide", "supply", "replace", or "install" are used, whether singularly or in combination, they shall mean to furnish and install, unless specifically stated otherwise.

E. In the interest of brevity, the explicit direction "to furnish and install" has sometimes been omitted in specifying materials and/or equipment herein. Unless specifically noted otherwise, it shall be understood that all equipment and/or materials specified or shown on the Drawings shall be furnished and installed under the Contract as designated on the Drawings.

1.02 INSTALLATION OF EQUIPMENT

A. Equipment and materials shall be installed in accordance with the requirements of the General Conditions, Supplemental Conditions and the respective Specification Sections.

B. Concrete foundations for equipment shall be of approved design and shall be adequate in size, suitable for the equipment erected thereon, properly reinforced, and tied into floor slabs by means of reinforcing bars or dowels. Foundation bolts of ample size and strength shall be provided and properly positioned by means of suitable templates and secured

during placement of concrete. Foundations shall be built, and bolts installed in accordance with the manufacturer's certified drawings.

C. Before mounting equipment on a foundation, the Contractor shall clean the top surface; if necessary, rough it with a star chisel and clean again; and clean out all foundation bolt sleeves. The Contractor shall provide a sufficient number of stainless-steel plate shims about 2-inches wide and 4-inches long, and of a varying thickness from 1/8 to 1/2 inch. A combination of these shims shall be placed next to each foundation bolt to bring the bottom of the bedplate or frame about 1/8 inch above the final setting. The equipment shall be lowered by changing the combination of shims. Using stainless steel shim stock of various thicknesses, continue to level the equipment a little at a time and in rotation until it is at the correct elevation in both directions. When the equipment is level, tighten down on the foundation bolts a little at a time in rotation to make certain the equipment remains level and does not shift on the shims. A preliminary alignment check shall be made before grout is placed.

D. Equipment shall be set, aligned, and assembled in conformance with manufacturer's drawings or instructions. Run out tolerances by dial indicator method of alignment shall be plus or minus .002 inches, unless otherwise directed by the Village.

E. All blocking, and wedging required for the proper support and leveling of equipment during installation shall be furnished by the Contractor. All temporary supports shall be removed, except stainless steel wedges and shims, which may be left in place with the approval of the Village.

F. Each piece of equipment or supporting base, bearing on concrete foundations, shall be bedded in grout. The Contractor shall provide a minimum of 1-1/2-inch thick grouting under the entire baseplate supporting each pump, motor drive unit and other equipment. Grout shall be non-shrink grout, as specified under Section 03315 entitled "Grout".

1.03 CONNECTIONS TO EQUIPMENT

A. Connections to equipment shall follow manufacturer's recommendations as to size and arrangement of connections and/or as shown in detail on the Drawings or approved Shop Drawings. Piping connections shall be made to permit ready disconnection of equipment with minimum disturbance of adjoining piping and equipment.

B. The Electrical Contractor or Contractor if no electrical contract exists shall be responsible for bringing proper electrical service to each item of equipment requiring electrical service as shown on the Drawings or approved Shop Drawings. Electrical connections to equipment requiring electrical service shall be made by the Electrical Contractor, unless otherwise indicated on the Drawings or in the Technical Specifications.

C. The HVAC Contractor or Contractor if no HVAC Contract exists shall bring and connect HVAC service to all equipment items requiring same as shown on the Drawings. Electrical connections to equipment requiring electrical service shall be made by the Electrical Contractor, unless otherwise indicated on the Drawings or in the Technical Specifications.

D. The Plumbing Contractor or Contractor if no plumbing contract exists shall bring and connect plumbing service to all equipment items requiring same as shown on the Drawings.

1.04 IDENTIFICATION TAGS FOR EQUIPMENT AND INSTRUMENTS

A. All process equipment, pumps, blowers, valves, gates and process instruments that are identified by a tag number on the Process and Instrumentation Diagrams (P&IDs on Instrumentation contract drawings) shall have an identification tag at the device.

B. The identification tag shall show a unique tag number for the device (e.g., EP-51001), and the common name of the device (e.g., Effluent Pump No. 1).

C. For interior applications where the room temperature does not exceed 95° F the identification tag shall be a lamacoid tag with white background and black core letters. All other locations shall be provided with non-corrosive metal tags, ASTM A240 Grade 430 stainless steel with a bright annealed finish.

D. Characters on identification tags shall be 3/16" high and surface cut deep unless otherwise noted. Characters shall be cut into the lamacoid tags with a hardened steel router bit and into stainless steel tags with a diamond tip cutter.

E. Identification tags shall be buffed around the perimeter to remove any sharp edges or corners.

F. Identification tags shall be attached to the equipment item, valve, or instrument with 0.9 mm diameter wire or stainless-steel screws.

1.05 PRODUCT DELIVERY-STORAGE-HANDLING

A. The Contractor shall deliver, handle, and store products in accordance with supplier's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, the Contractor shall provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss. Any equipment or materials of whatever kind which may have become damaged or deteriorated from any cause shall be removed and replaced by good and satisfactory items at the Contractor's expense for both labor and materials.

1.06 TRANSPORTATION AND HANDLING

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

B. The Contractor shall provide equipment and personnel to handle products, materials, and equipment including those provided by Village, by methods to prevent soiling and damage.

C. The Contractor shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.07 STORAGE AND PROTECTION

A. The Contractor shall protect all equipment and materials from deterioration and damage,

including provisions for temporary storage buildings as needed and as specified in Section 01550 entitled "Site Access and Storage".

B. Products shall be stored in accordance with supplier's written instructions, with seals and labels intact and legible. Sensitive products shall be stored in weather-tight enclosures and temperature and humidity ranges shall be maintained within tolerances required by supplier's written instructions.

C. Storage of equipment and materials shall be in locations completely protected from flooding, standing water, excessive dust, falling rock, brush fire, etc. Storage areas shall be located sufficiently distant from all construction activities and the movement of construction vehicles to minimize the potential for accidental damage.

D. For exterior storage of fabricated products, they shall be placed on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering; ventilation shall be provided to avoid condensation.

E. Loose granular materials shall be stored on solid surfaces in a well drained area and shall be prevented from mixing with foreign matter.

F. Storage shall be arranged to provide access for inspection. The Contractor shall periodically inspect to assure products are undamaged and are maintained under required conditions.

G. Storage shall be arranged in a manner to provide access for maintenance of stored items and for inspection.

1.08 MAINTENANCE OF STORAGE

A. Stored products shall be periodically inspected on a scheduled basis. The Contractor shall maintain a log of inspections and shall make said log available to the Village on request.

B. The Contractor shall verify that storage facilities comply with supplier's product storage requirements.

C. The Contractor shall verify that supplier-required environmental conditions are maintained continually.

D. The Contractor shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes is acceptable under requirements of Contract Documents.

1.09 MAINTENANCE OF EQUIPMENT STORAGE

A. For mechanical and electrical equipment in long-term storage, the Contractor shall provide a copy of the supplier's service instructions to accompany each item, with notice on enclosed instruction shown on exterior of package.

B. Equipment shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document to the Village.

1.10 LUBRICANTS

A. During testing and prior to acceptance, the Contractor shall furnish all lubricants necessary for the proper lubrication of all equipment furnished under this Contract.

1.11 SPECIAL TOOLS

A. For each type of equipment furnished by him, the Contractor shall provide a complete set of all special tools (including calibration and test equipment) which may be necessary for the adjustment, operation, maintenance and disassembly of such equipment.

B. Special tools shall be delivered at the same time as the equipment to which they pertain. The Contractor shall properly store and safeguard such special tools until completion of the Work, at which time they shall be delivered to the Village.

1.12 PROTECTION AGAINST ELECTROLYSIS

A. Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other acceptable materials.

1.13 FASTENERS

A. All necessary bolts, anchor bolts, nuts, washers, plates, and bolt sleeves shall be furnished by the Contractor in accordance herewith. Bolts shall have suitable washers and, where so required, their nuts shall be hexagonal.

B. All bolts, anchor bolts, nuts, washers, plates, and bolt sleeves shall be Type 316 stainless steel unless otherwise specifically indicated or specified.

C. Unless otherwise specified, stud, tap, and machine bolts shall be of the best quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used.

1.14 EXCAVATED MATERIALS

A. All excavated materials needed for backfilling operation shall be stored on site. Where additional area is needed for stockpiling, it shall be obtained by the Contractor.

B. Any excess backfill shall be disposed of by the Contractor as part of the work of this Contract, unless directed by the Village.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01660

EQUIPMENT TESTING AND STARTUP

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Equipment testing and startup are requisite to satisfactory completion of the contract and, therefore, shall be completed within the time specified for substantial completion.

B. The Contractor shall allow sufficient time in the construction schedule to complete equipment testing, trouble shooting, corrections, and startup based upon the general sequence set forth in Section 01520 entitled "Maintenance of Utility Operations During Construction".

C. As construction of the project proceeds through the final stages of completion associated with each construction phase, the Contractor shall, in accordance with the requirements set forth in the Contract Documents, attend to the following items for the equipment and facilities scheduled to be placed into service:

1. Schedule equipment manufacturer's visits to site.

2. Calibrate instruments, controls and controlled equipment.

3. Perform required testing, adjusting, and balancing of project components.

4. Schedule start-up and initial operation.

5. Furnish skilled personnel during initiation operation.

6. Perform Village operation and maintenance training.

D. Thirty (30) days prior to startup of equipment, the Contractor shall submit to the Village for review, a detailed Equipment Testing and Startup Plan necessary to perform a successful initial startup of each piece of equipment. The Equipment Startup Plan shall include, but not be limited to, dates of proposed startup, upstream and downstream processes and equipment required for startup of equipment being tested, the medium that will be used to test the equipment (i.e., potable water, reclaimed water, etc.), required chemicals, fuels, oils, any applicable ancillary equipment, sequence of startup activities, and any other items requiring coordination with the Village for startup.

E. Refer to other Divisions for further requirements regarding this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01520 – Maintenance of Utility Operations During Construction

B. Section 11000 – Equipment General Provisions

1.03 EQUIPMENT TESTING

A. The Contractor shall provide the services of an experienced and authorized representative of the supplier of each item of equipment (excluding minor items of equipment specifically exempted by the Village in writing), who shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation prior to startup. In each case, the Contractor shall arrange to have the supplier's representative revisit the job site as often as necessary until any and all trouble is corrected, and the equipment installation and operation are satisfactory to the Village.

1. Certificate: Contractor shall submit to Village a letter from equipment Supplier, on Supplier's letterhead, stating that materials and equipment are installed in accordance with Supplier's requirements and installation instructions, and in accordance with the Contract Documents.

B. The Contractor shall require that each supplier's representative test performance of the equipment and furnish to the Village a written report addressed to the Village and copied to the Village, certifying that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts, and has been tested, operated satisfactorily under full-load conditions, is ready for operation, and the Village's operating personnel have been instructed in the operation, maintenance and lubrication of the equipment.

C. The Contractor shall be responsible for scheduling all operations testing. The Contractor is advised that the Village's operating personnel will witness operations testing.

D. The Contractor shall furnish all personnel, chemicals, fuel, oil, grease, and all other necessary equipment, facilities, and services required for conducting tests.

E. Preliminary Tests, Yellow Tag

1. As soon as conditions permit, after the equipment has been secured in its permanent position, the Contractor shall check the equipment for alignment, direction of rotation and that it is free from defects.

2. Contractor shall flush all bearings, gear housings, etc., in accordance with the manufacturer's recommendations, to remove any foreign matter accumulated during shipment, storage or erection. Lubricants shall be added as required by the manufacturer's instructions.

3. When the Contractor has demonstrated to the Village that the equipment is ready for operation, a yellow tag will be issued. The tag will be signed by the Village or his assigned representative and attached to the equipment. The tag shall not be removed.

4. Preliminary field tests, yellow tag, must be completed before equipment is subjected to final field tests, blue tag.

F. Final Field Tests, Blue Tag

1. Upon completion of the installation, and at a time approved by the Village, equipment will be tested by operating it as a unit with all related piping, ducting, electrical controls, and mechanical operations.

2. The equipment will be placed in continuous operation as prescribed or required and witnessed by the Village or his assigned representative and the Village or his assigned representative.

3. The tests shall prove that the equipment and appurtenances are properly installed, meet their operating cycles and are free from defects such as overheating, overloading, and undue vibration and noise. Equipment shall be tested for the characteristics as specified for the item.

4. Each pump shall be tested at maximum rated speed for at least four points on the pump curve for capacity, head, and electric power input. The rated motor nameplate current and power shall not be exceeded at any point within the specified range. Vibrometer readings shall be taken when directed by the Village and the results recorded. Additional tests shall be performed as prescribed in other sections of the Specifications.

5. Pumps with drive motors rated at less than five horsepower shall only be tested for excess current or power when overheating or other malfunction becomes evident in general testing.

6. Until final field tests are acceptable to the Village, the Contractor shall make all necessary changes, readjustments, and replacements at no additional cost to the Village.

7. Defects which cannot be corrected by installation adjustments will be sufficient grounds for rejection of any equipment.

8. Upon acceptance of the field tests, a blue tag will be issued. The tag will be signed by the Village and attached to the unit. The tag shall not be removed, and no further construction work will be performed on the unit, except as required during start-up operations and directed by the Village.

9. All costs in connection with such tests including all materials, equipment, instruments, labor, etc., shall be borne by the Contractor.

1.04 EQUIPMENT START-UP SERVICES

A. Equipment start-up period, for the training of plant personnel, shall begin after satisfactory completion and acceptance of the field tests and coincidentally with the completion date for the part of the work for which the equipment is included in accordance with the construction schedule. If the equipment is not covered by a certificate of substantial completion for a part of the work, the period shall begin upon substantial completion of the project.

B. During the equipment start-up period and in accordance with the sequence of construction and schedule, the Contractor shall furnish, at no additional cost to the Village, the services of factory trained representatives of the equipment manufacturers for the equipment designated in the Specifications to:

1. Assist in the start-up and operations of the equipment.

2. Assist in the training of plant personnel, designated by the Village in the proper operation and maintenance of the equipment.

C. The Village shall:

1. Provide the necessary plant personnel to be instructed in the operation and maintenance of the equipment. The Village's personnel shall operate all equipment.

2. Pay for all fuel, power and chemicals consumed beyond quantities specified in the Contract Documents. The Contractor shall pay for fuel, power, and chemicals consumed up to the date of "certified substantial completion" except as otherwise specified herein.

D. Contractor shall be available to promptly repair all work during the equipment startup to cause minimum disruption to the plant operation.

E. Upon completion of a minimum of thirty (30) consecutive and continuous days of satisfactory operation, or the number of days called for in the Technical Specifications, the Village will assume operation and operating cost of the equipment associated with the completed phase of work. If the equipment malfunctions during this start-up period, the start-up period will be repeated until satisfactory operation is achieved.

F. Contractor shall be responsible for equipment maintenance until equipment performance testing has been successfully completed and accepted by the Village. Equipment acceptance shall be dependent upon submission of final Operations and Maintenance Manuals, Electronic Equipment Data Sheets, and required Certifications associated with the piece of equipment.

G. In the event a system, equipment or component proves defective or is unable to meet specified performance criteria, the Contractor shall replace the defective item and the guarantee period called for in the Contract Documents for the item shall start after satisfactory replacement and testing of the item.

1.05 STARTUP

A. All defects in materials or workmanship which appear during this test period shall be immediately corrected by the Contractor. Time lost for equipment repairs, wiring corrections, control point settings, or other reasons which actually interrupt the startup may, at the discretion of the Village, be justifiable cause for extending the startup test duration.

B. During the startup, the Contractor shall provide the services of authorized representatives of the suppliers, in addition to those services required under operations testing, as necessary, to correct faulty equipment operation. Contractor shall coordinate with Village to have Village-furnished equipment representative present as necessary to correct faulty Village-furnished equipment operation.

1.06 DEMONSTRATION AND INSTRUCTION

A. Refer to specification Section 01821 - Instruction of Village's Personnel for training requirements.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01700

PROJECT CLOSEOUT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Substantial Completion

1. Prior to requesting Substantial Completion, the Contractor shall perform the following:

a. Materials and equipment for which Substantial Completion is requested shall be fully ready for their intended use, including full operating and monitoring capability in automatic and manual modes.

b. Complete field quality control Work, including testing at the Site, indicated in Specifications Sections for individual materials and equipment items. Submit results of, and obtain Village's acceptance of, field quality control tests required by the Contract Documents.

c. Startup and checkout shall be completed in accordance with Section 01660 – Equipment Testing and Plant Start-up, and requirements of the Specifications for the various materials and equipment in the substantially completed Work.

d. Cleaning for Substantial Completion shall be completed in accordance with this Section.

e. Spare parts, maintenance materials, and special tools shall be delivered and accepted in accordance with this Section and the Specifications for the various materials and equipment.

f. Training shall be completed in accordance with Section 01821 - Instruction of Village's Personnel.

g. Submit and obtain Village's acceptance of final operations and maintenance manuals and asset management data sheets.

h. Obtain and submit to Village all required permits, inspections, and approvals of authorities having jurisdiction for the substantially completed Work to be occupied and used by Village.

i. Complete other tasks that the Contract require be completed prior to Substantial Completion.

j. Procedures for requesting and documenting Substantial Completion are in the General Conditions, as may be modified by the Supplementary Conditions.

B. Final Cleaning

1. At the completion of each phase of the work and prior to startup, as scheduled the Contractor shall remove all rubbish from and about the site of the completed work, and all temporary structures, construction signs, tools, scaffolding, materials, supplies and equipment which the Contractor or any of his/her Subcontractors may have used in the performance of the work. Contractor shall broom clean paved surfaces and rake clean other surfaces of grounds.

2. Contractor shall thoroughly clean all materials, equipment and structures; all marred surfaces shall be touched up to match adjacent surfaces; dirty filters and burned out lights replaced as required; all glass surfaces cleaned and floors cleaned and polished so as to leave work in a clean and new appearing condition.

3. Contractor shall maintain cleaning until project, or portion thereof, is occupied by the Village.

C. Spare Parts, Maintenance Materials, and Special Tools

1. Contractor shall furnish spare parts, maintenance materials, and associated information, for materials and equipment furnished in accordance with the Contract Documents. Furnish such items in accordance with the requirements of this Section and the Sections in which such items are indicated.

2. Contractor shall be fully responsible for loss and damage to spare parts and maintenance materials until such items are received and accepted by the Village.

3. As soon as practicable after approval of the list of equipment, the Contractor shall furnish spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies, with current unit prices and source or sources of supply.

4. Prior to equipment startup, Contractor shall also furnish a list of parts, and supplies that are either normally furnished at no extra cost with the purchase of the equipment or specified to be furnished as part of the Contract and a list of additional items recommended by the manufacturer to assure efficient operation for a period of one-hundred and twenty (120) days for the particular installation.

5. For each delivery of spare parts, maintenance materials, and special tools, the Contractor shall submit to the Village a letter of transmittal, on Contractor's letterhead, for spare parts, maintenance materials, and special tools furnished under each Specification Section. Letter of transmittal shall accompany spare parts, maintenance materials, and special tools. Do not furnish letter of transmittal separate from associated spare parts, maintenance materials, and special tools.

6. Letter of transmittal shall include the following:

   a. Transmittal shall list spare parts, maintenance materials, and special tools furnished under each Specifications Section. List each individual part, material, equipment item, tool, and product and the associated quantity furnished.

   b. Include space for countersignature by Village as follows: space for signature,

space for printed name, and date.

7. All parts shall be securely boxed and tagged, and clearly marked on the box and individually for identification as to the name of manufacturer or supplier, applicable equipment, part number, description and location in the equipment. All parts shall be protected and packaged for a shelf life of at least ten (10) years.

8. Contractor shall furnish at no additional cost to the Village with each piece of equipment as a minimum, one (1) complete set, or the number of sets called for in the Technical Specifications, of suitably marked special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment prior to equipment startup.

9. Contractor shall submit, for approval by the Village, a complete list of the special tools and appliances to be furnished. Such tools and appliances shall be furnished in approved painted steel cases properly labeled and equipped with good grade cylinder locks and duplicate keys prior to equipment startup.

10. Storage Prior to Delivery to Village:

    a. Prior to furnishing spare parts, maintenance materials to Village, store spare parts and maintenance materials in accordance with the Contract Documents and manufacturers' recommendations.

11. Procedure for Delivery to Village:

    a. Deliver spare parts, maintenance materials, and special tools to Village's permanent storage rooms at the Site or area(s) designated by the Village.

    b. When spare parts, maintenance materials, and special tools are delivered, Contractor and Village will mutually inventory the spare parts and maintenance materials delivered to verify compliance with the Contract Documents regarding quantity, part numbers, and quality.

    c. Additional procedures for delivering spare parts, maintenance materials, and special tools to Village, if required, will be developed by Village, and complied with by Contractor.

    d. Contractor shall reimburse Village for all costs and expenses incurred by Village, including professional services, for delivery of inadequate, incorrect, or defective spare parts and maintenance materials. Village may withhold such amounts from payments due Contractor via set-offs in accordance with the Contract Documents.

12. Delivery Time and Eligibility for Payment:

    a. Deliver to Village spare parts and maintenance materials prior to date of Substantial Completion for materials and equipment associated therewith.

    b. Do not deliver spare parts and maintenance materials before commencing startup for associated material or equipment.

c. Spare parts and maintenance materials are not eligible for payment until delivered to Village and Contractor's receipt of Village's countersignature on letter of transmittal.

D. Final Cleanup; Site Rehabilitation

1. Before final acceptance, the Contractor shall wash and clean all exposed surfaces which have become soiled or marked, and shall remove from the site of work all accumulated debris and surplus materials of any kind which result from his/her operation, including construction equipment, tools, sheds, sanitary enclosures, etc. The Contractor shall leave all equipment, fixtures, and work, which he/she has installed, in a clean condition. The completed project shall be turned over to the Village in a neat and orderly condition.

2. The site of the work shall be rehabilitated or developed in accordance with other sections of the Specifications and the Drawings. In the absence of any portion of these requirements, the Contractor shall completely rehabilitate the site to a condition and appearance equal or superior to that which existed just prior to construction, except for those items whose permanent removal or relocation was required in the Contract Documents or ordered by the Village.

E. Final Inspection

1. Final cleaning and repairing shall be so arranged as to be finished upon completion of the construction work. The Contractor will ensure the final cleaning and repairing, and any portion of the work finally inspected and accepted by the Village to be kept clean by the Contractor until the final acceptance of the entire work.

2. When the Contractor has finally cleaned and repaired the whole or any portion of the work, he/she shall notify the Village that he/she is ready for final inspection of the whole or a portion of the work, and the Village will thereupon inspect the work. If the work is not found satisfactory, the Village will order further cleaning, repairs, or replacement.

3. When such further cleaning or repairing is completed, the Village, upon further notice, will again inspect the work. The "Final Payment" will not be processed until the Contractor has complied with the requirements set forth, and the Village has made the final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

E. Project Close Out

1. As construction of the project enters the final stages of completion, the Contractor shall, in concert with accomplishing the requirements set forth in the Contract Documents, attend to or have already completed the following items as they apply to his/her contract:

a. Scheduling equipment manufacturers' visits to site.

b. Required testing of project components.

c. Scheduling start-up and initial operation.

d. Scheduling and furnishing skilled personnel during initial operation.

e. Correcting or replacing defective work, including completion of items previously overlooked or work which remains incomplete, all as evidenced by the Village's "Punch" Lists.

f. Attend to any other items listed herein or brought to the Contractor's attention by the Village.

2. Just before the Certificate of Final Completion is issued, the Contractor shall accomplish the cleaning and final adjustment of the various building components as specified in the Specifications and as follows:

a. Clean all glass and adjust all windows and doors for proper operation.

b. Clean all finish hardware after adjustment for proper operation.

c. Touch up marks or defects in painted surfaces and touch up any similar defects in factory finished surfaces.

d. Wax all resilient flooring materials.

e. Remove bitumen from gravel stops, fasciae, and other exposed surfaces.

f. Remove all stains, marks, fingerprints, soil, spots, and blemishes from all finished surfaces, tile, stone, brick, and similar surfaces.

3. In addition, and before the Certificate of Final Completion is issued, the Contractor shall submit to the Village certain records, certifications, etc., which are specified elsewhere in the Contract Documents. A partial list of such items appears below, but it shall be the Contractor's responsibility to submit any other items which are required in the Contract Documents:

a. Test results of project components.

b. Performance Affidavits for equipment.

c. Certification of equipment or materials in compliance with Contract Documents.

d. Operation and maintenance instructions or manuals for equipment.

e. One set of neatly marked-up drawings showing as-built changes and additions to the work under his/her Contract.

f. Any special guarantees or bonds (Submit to Village).

4. The Contractor's attention is directed to the fact that required certifications and information, under Item 3 above, must actually be submitted earlier in accordance with the sequence of construction and other Sections of the Specifications.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01660 - Equipment Testing and Start-up

B. Section 01720 – Project Record Documents

C. Section 01730 - Operations and Maintenance Manuals

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01720

PROJECT RECORD DRAWINGS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall keep and maintain, at the job site, one record copy of all drawings, specifications, addenda, change orders, and other modifications to the Contract, Village's field orders or written instructions, approved shop drawings, samples, construction photographs, detailed progress schedule and field test records.

B. The Contractor shall mark the drawings to indicate all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Said record drawing markups shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the Work as actually constructed. These master record drawing markups of the Contractor's representation of as-built conditions, including all revisions made necessary by addenda and change orders shall be maintained up-to-date during the progress of the Work.

C. Throughout the duration of construction activities, the horizontal and vertical locations of all above and below ground improvements including floor elevations, weir elevations, underground and above ground piping, valves and duct banks installed by the Contractor shall be verified by a Florida Registered Land Surveyor furnished by the Contractor.

D. Project record drawing markups shall be maintained and updated by the Contractor on a month-to-month basis.

E. Record drawing markups shall be accessible to the Village at all times during the construction period.

F. Periodic payments shall not be processed prior to Village's review and acceptance of record drawing markups development for the pay period submitted.

G. Final payment will not be acted upon until the Contractor has prepared and delivered physical and electronic record drawing markups to the Village. Said up-to-date record drawing markups shall be in the form of a set of prints, 24 x 36 inch in size, with carefully plotted information overlaid in red ink. In addition to prints, the Contractor shall have prepared and delivered electronic full size (24 x 36 inch), full-color, portable document format (.PDF) drawings of all record drawings to the Village.

H. Upon substantial completion of the Work and prior to final acceptance, the Contractor shall finalize and deliver a complete set of record drawing markups to the Village conforming to the construction records of the Contractor. This set of drawings shall consist of corrected drawings showing the reported location of the Work. The information submitted by the Contractor and incorporated by the Village into the Record Drawings will be assumed to be correct, and the Contractor shall be responsible for the accuracy of such information and shall bear the costs resulting from the correction of incorrect data furnished to the Village.

1.02 RELATED REQUIREMENTS

A. Section 01300 - Submittals

B. Section 01541 - Field Engineering

C. Section 01700 - Project Closeout.

1.03 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed letters.

B. Record information concurrently with the progress of construction.

C. Legibly mark drawings to record actual construction in red ink

1. Incorporate changes made by Field Order, Change Order, or Construction Change Directive.

2. Incorporate details generated during the construction phase not shown on the original Contract Drawings.

1.04 SUBMITTAL

A. Prior to Final Completion, submit Record Documents to the Village.

B. Accompany submittal with a transmittal letter in duplicate, containing:

1. Date.

2. Project title and number.

3. Contractor's name and address.

4. Title and number of each record document.

5. Signature of Contractor or its authorized representative.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01730

OPERATION AND MAINTENANCE MANUALS

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and deliver operation and maintenance manuals, including instructions, technical bulletins, and any other printed matter such as diagrams, prints or drawings, containing full information required for the proper operations, maintenance, and repair of all Contractor furnished equipment. Also included shall be a spare parts diagram and complete spare parts list. Operation and Maintenance manuals shall be in accordance with the requirements of this section.

B. Operation and Maintenance Manuals shall be in accordance with the requirements specified herein.

1.02 SUBMITTALS

A. Written operations and maintenance instructions are required for all equipment items supplied for this project. The amount of detail shall be commensurate with the complexity of the equipment item. Pictorial cuts of equipment are required for operator reference in servicing.

B. In accordance with the provisions of Section 01300 – Submittals, submit the following:

1. Draft: Submit printed and bound copy or electronic copy of manufacturer's O&M Data not later than shipment of product. The Village will review and return comments.

2. Interim: Revise the manufacturer's O&M Data based upon Village's comments and manufactured product. Submit two (2) printed and bound copies or electronic copies of the manufacturer's O&M Data within 30 days after product shipment and before product is placed in service. O&M manuals shall be available at the site during equipment testing and start-up.

3. Final: Revise the manufacturer's O&M Data based upon completed installation and any deficiencies noted during instruction of Village's personnel. Submit six (6) printed and bound copies and electronic copies of the complete, final O&M Data. Submit final O&M Data not more than 30 days after final inspection and startup.

4. The Equipment Data Summary (see attached example) shall be completed IN FULL for each equipment item furnished by the Contractor. Completed Equipment Information Summary forms shall be assembled within a separate section so dedicated within the operation and maintenance Manual. An electronic copy of each completed Equipment Data Summary shall be provided as a separate worksheet within a Microsoft Excel workbook file (.xls) on a CD-ROM. Worksheet tabs shall be labeled with the associated equipment item's Equipment Tag.

1.03 FORMAT AND CONTENTS

A. Each operations and maintenance manual shall contain the following information:

1. Storage instructions and requirements (short term and long term)

2. Installation instructions

3. Assembly and erection drawings/details

4. Dimensional drawings

5. Wiring diagrams including all control and lightning systems

6. Equipment data summary table (see sample form at the end of this section)

7. Equipment preventative maintenance data summary (see sample form at the end of this section)

8. Manufacturer's operating manual/instructions including equipment start-up, normal operation, shutdown, and emergency operation

9. Manufacturer's maintenance instructions including equipment calibration and adjustment, preventive and repair maintenance, and lubrication instructions

10. Trouble shooting guide

11. Parts diagram/list

12. Spare parts list (these are parts that the manufacturer recommends having readily available for use during preventative maintenance or are normal wear items)

13. Preventative maintenance procedures and frequency

14. A description of safety precautions to be taken when operating and maintaining equipment or working near it

15. Recommended lubricant types (lubrication schedule shall be included with the preventative maintenance data summary)

16. Tools list (any tools that will be required for preventative maintenance, disassembly, or re-assembly of the equipment)

17. Single line schematic

18. List of electrical relay settings and control and alarm contact settings.

19. Applicable software (if required)

20. Software manuals (if required)

21. Warranty

22. Contact information for the contractor, manufacturer, manufacturer's representative and nearest service representative.

B. Any equipment that contains multiple components (for example a pump and motor), the above information shall be provided for each component.

C. For valve operation and maintenance manuals, provide one valve schedule giving valve number, location, fluid, and fluid destination for each valve installed. Group all valves in same piping systems together in the schedule. Obtain a sample of the valve numbering system from the Village.

D. All operation and maintenance manual material shall be printed on 8-1/2"x11" or 11"x17" paper.

E. Each manual shall be bound together in appropriate three-ring binders. Each binder shall be provided with front cover with the following information, as a minimum:

1. Village of Wellington logo
2. Project name
3. Date (Month / Year)
4. Equipment name
5. Applicable specification section
6. Manufacturer's name
7. Contractor's name

F. Each manual shall also be provided with the binder edge cover that contains, at a minimum, the project name, date and equipment name.

G. Each manual shall be divided into sufficient sections to facilitate ease of use and reference of the manual. Sections shall be identified using heavy section dividers with reinforced holes and numbered plastic index tabs; tabs with section titles shall be acceptable. A detailed table of contents shall be provided. At a minimum, the following sections shall be provided:

1. Equipment technical data summary
2. Storage / installation instructions
3. Operation instructions
4. Maintenance instructions
5. Dimensional/assembly drawings, diagrams, and parts lists
6. Wiring drawings and diagrams

7. Contact information

8. Warranty

H. All operating and maintenance material that comes bound by the equipment manufacturer shall be left in its original bound state. Cross-reference the appropriate sections of the Contractor's operations and maintenance manual to the manufacturers' bound manuals.

I. Label binders Volume 1, 2, and so on, where more than one binder is required. Include the table of contents for the entire set, identified by volume number, in each binder.

J. When manufacturer's manuals and diagrams contain information applicable to multiple models or configurations, the information not applicable to this specific installation shall be stricken.

K. The final operations and maintenance manual shall reflect the most current edition of the shop drawing accepted by the Village. Any field changes or modifications shall also be included.

L. All O&M manuals shall also be furnished in an electronic file format. All manuals and drawings for the vendor provided equipment, sub-system or system shall be in Adobe Portable Document Format (PDF). They shall be PDF formatted text and graphics or PDF Searchable Image. There shall be links from all Table of Contents entries to the actual occurrence in the body of the manual. Bookmarks shall be created for all linked Table of Contents entries. This requirement applies to all equipment to be furnished on this project.

M. Format of Electronic Copies:

1. Each electronic copy shall include all information included in the corresponding printed copy.

2. Submit electronic copy via transferable method and format acceptable to Village.

3. File Format:

a. Acceptable formats include Adobe PDF, Microsoft Word, Autodesk DWF, and AutoCAD.

b. Files shall be electronically searchable.

c. Submit separate file for each separate document in the printed copy.

d. Within each file, provide bookmarks for the following:

(1) Each chapter and subsection listed in the corresponding printed copy document's table of contents

(2) Each figure

(3) Each table

(4) Each appendix

4. Also submit drawings and figures in one of the following formats: ".bmp", ".tif", ".jpg", ".gif", "dwf", or "dwg". Submit files in a separate directory on the CD.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

NOTE: *"Equipment Data Summary" and Preventive Maintenance Summary" sheets after "End of Section" are included as part of this specification section.*

- END OF SECTION-

Equipment Data Summary	
Item	**Information**
Equipment Name	
Equipment Tag	
Model Number	
Serial Number	
Manufacture Date	
Purchase Date	
Purchase Price	
Date Placed In Service	
Warranty Period (Days)	
Life Expectancy (Months)	
Capacity / Units (if applicable)	
Motor Type (if applicable)	
Motor Size / HP (if applicable)	
Drive Type (if applicable)	
Lubrication Type	
Expected Date of Replacement / Rebuild	
Current Replacement Cost	
Current Rebuild Cost	
Preventive Maintenance (PM) Rpl. Part 1	
PM Rpl. Part 1 Interval (Days)	
PM Rpl. Part 1 Units of Measure	
PM Rpl. Part 1 Purchase Price	
PM Rpl. Part 1 Target Inventory	
PM Rpl. Part 1 Units Per Package	
PM Rpl. Part 1 Minimum Order	
PM Rpl. Part 1 Purchase Units of Measure	
Preventive Maintenance (PM) Rpl. Part 2	
PM Rpl. Part 2 Interval (Days)	
PM Rpl. Part 2 Units of Measure	
PM Rpl. Part 2 Purchase Price	
PM Rpl. Part 2 Target Inventory	
PM Rpl. Part 2 Units Per Package	

Equipment Data Summary	
Item	**Information**
PM Rpl. Part 2 Minimum Order	
PM Rpl. Part 2 Purchase Units of Measure	
Preventive Maintenance (PM) Rpl. Part 3	
PM Rpl. Part 3 Interval (Days)	
PM Rpl. Part 3 Units of Measure	
PM Rpl. Part 3 Purchase Price	
PM Rpl. Part 3 Target Inventory	
PM Rpl. Part 3 Units Per Package	
PM Rpl. Part 3 Minimum Order	
PM Rpl. Part 3 Purchase Units of Measure	
Manufacturer Name	
Manufacturer Address	
Manufacturer City	
Manufacturer State	
Manufacturer Zip	
Manufacturer Country	
Manufacturer Phone	
Manufacturer Fax	
Vendor Name	
Vendor Address	
Vendor City	
Vendor State	
Vendor Zip	
Vendor Country	
Vendor Phone	
Vendor Fax	

Preventive Maintenance Summary

Equipment Name:	Location:		
Manufacturer:			
Name:			
Address:			
Telephone:			
Model No:	Serial No:		
Maintenance Task	Lubricant/Part	D W M Q SA A	O&M Manual Reference
NOTES:			

**D-Daily W-Weekly M-Monthly Q-Quarterly SA-Semi-Annual A-Annual*

DIVISION 16

ELECTRICAL

SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 -- GENERAL

1.01 RELATED SECTIONS

A. Requirements specified within this section apply to all sections in Division 16, ELECTRICAL. Work specified herein shall be performed as if specified in the individual sections.

1.02 DESIGN REQUIREMENTS

A. All electronic boards as part of electrical equipment shall be fungus-resistant.

B. All electrical equipment shall be rated for the conditions the equipment is installed in.

1.03 ELECTRICAL SUBCONTRACTOR QUALIFICATIONS

A. The electrical subcontractor shall meet or exceed the criteria described below:

1. The electrical subcontractor shall be licensed by the State of Florida.

2. The electrical subcontractor shall have successfully completed electrical construction on three wastewater plant projects within the past five years.

3. The electrical subcontractor shall have, in their employ, the following full-time employees that will be assigned to perform the electrical work of this contract:

a. A minimum of (1) Licensed Master Electrician who is overall responsible for the supervision of personnel performing the construction, installation startup and testing of all electrical related facilities and systems.

b. A minimum of (1) Licensed Journeyman Electrician responsible for the daily construction activities and guidance of the electrical contractor's on-site employees. The Licensed Journeyman's primary assignment will be the construction of the electrical facilities of this project until project completion. The Licensed Journeyman shall be certified in Palm Beach County or shall meet the reciprocity standards of Florida State Statue 489 Part II.

1.04 STANDARDS, CODES, PERMITS, AND REGULATIONS

A. Perform all work; furnish and install all materials and equipment in full accordance with the latest applicable rules, regulations, requirements, and specifications of the following:

1. Local Laws and Ordinances.

2. State and Federal Laws.

3. NFPA 70 National Electrical Code (NEC). *(edition applicable at time of bid)*

4. State Fire Marshal.

5. Underwriters' Laboratories (UL).

6. National Electrical Safety Code (NESC).

7. American National Standards Institute (ANSI).

8. National Electrical Manufacturer's Association (NEMA).

9. National Electrical CONTRACTOR'S Association (NECA) Standard of Installation.

10. Institute of Electrical and Electronics Engineers (IEEE).

11. Insulated Cable Engineers Association (ICEA).

12. Occupational Safety and Health Act (OSHA).

13. National Electrical Testing Association (NETA).

14. American Society for Testing and Materials (ASTM).

15. Florida Building Code, including Palm Beach County amendments. *(edition applicable at time of bid)*

16. NFPA 70E Electrical Safety in the Workplace. *(edition applicable at time of bid)*

B. Conflicts, if any, which may exist between the above items, will be resolved at the discretion of the Village.

C. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern. Code compliance is mandatory. Construe nothing in the Contract Documents as permitting work not in compliance with these codes.

D. Obtain all permits and pay all fees required by any governmental agency having jurisdiction over the work. Arrange all inspections required by these agencies. On completion of the work, furnish satisfactory evidence to the Village that the work is acceptable to the regulatory authorities having jurisdiction.

1.05 ELECTRICAL COORDINATION

A. Work Provided Under this Contract, all as shown in the drawings and described in the specifications:

1. Furnish and install a new exposed raceways, interconnecting conductors, junction boxes, integration with existing motor control center MCC-RO as described in the Contract Documents, including all material, labor, and all appurtenances required for complete working system in place at each location:

2. Repair concrete pavement and asphalt pavement as described in the Contract Documents complete in place. Repair/replace damaged sod in areas disturbed by construction.

3. Furnish and install all new grounding/bonding systems as described in the Contract Documents complete in place.

4. Provide temporary power and construction sequencing for maintaining power to treatment facilities during power interruptions resulting from the Work of this Contract.

5. Furnishing and installation of all material, labor, and equipment for demolition, disposal, maintenance of operations during construction, construction, interconnections to existing plant facilities, startup and testing of the new facilities, site restoration, operation and maintenance manuals, record documents, facility staff training, spare parts, test equipment and all other appurtenant and miscellaneous work required for completion of the Work in accordance with the Contract Documents.

B. Temporary Power:

1. Provide temporary power for all construction areas. Coordinate with local power and telephone utility for temporary construction power and telephone service during construction.

1.06 SUBMITTALS

A. Quality Control Submittals:

1. Voltage Field Test Results.

2. Voltage Balance Report.

3. Equipment Line Current Report.

4. Factory test certification and reports for all major electrical equipment.

5. Site test certification and reports as specified in other Division 16, ELECTRICAL sections.

6. Provide complete conduit and equipment plan layouts for all areas of the work for

major power, instrumentation, control, and communications raceways, both interior and exterior, showing routing, size, and stub up locations for buried or in-slab conduits.

B. The following information shall be provided for all electrical equipment:

1. A copy of each specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check-marks (√) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined shall signify compliance on the part of the Contractor with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation.

2. Electrical equipment submittals shall be made by specification section. Submit one package per specification section and do not group multiple specification sections under one submittal package.

1.07 ENVIRONMENTAL CONDITIONS

A. All chemical rooms and areas shall be corrosive areas.

B. Electrical equipment in rooms/areas designated as Classified by NFPA 70 (national electrical code) as Division 1 or Division 2 shall meet all requirements set forth for that classification as described in NEC article 500.

1.08 INSPECTION OF THE SITE AND EXISTING CONDITIONS

A. The Electrical Drawings were developed from past record drawings and information supplied by the Village. Verify all scaled dimensions prior to submitting bids.

B. Before submitting a bid, the Contractor shall visit the site and determine existing conditions at the site and at all existing structures in order to become familiar with all existing conditions and the existing electrical system which will, in any way or manner, affect the work required under this Contract. No subsequent increase in Contract cost will be allowed for additional work required because of the Contractor's failure to fulfill this requirement.

1.09 RESPONSIBILITY

A. The CONTRACTOR shall be responsible for:

1. Complete systems in accordance with the intent of these Contract Documents.

2. Coordinating the details of facility equipment and construction for all Specification Divisions that affect the work covered under Division 16, ELECTRICAL.

3. Furnishing and installing all incidental items not actually shown or specified, but which are required by good practice to provide complete functional systems.

1.10 INTENT OF DRAWINGS

A. Electrical plan drawings show only general location of equipment, devices, and raceway, unless specifically dimensioned. The Contractor shall be responsible for the proper routing of raceway, subject to the approval of the Village.

B. All new electrical equipment sizes, characteristics, facilities, and room layouts are based on manufacturer Square D. Emergency Diesel Generators are based upon manufacturer Caterpillar. If the Contractor furnishes a different manufacturer, the Contractor shall be responsible for fitting all the equipment in the available space as shown on the drawings or shall re-design the facilities at no additional cost to the Village. Re-design shall be submitted to the Village for review and approval. Any expenses associated with the review and approval of the redesign shall be the responsibility of the Contractor.

PART 2 -- PRODUCTS

2.01 GENERAL

A. Provide materials and equipment listed by UL wherever standards have been established by that agency.

B. Equipment Finish:

1. Provide manufacturers' standard finish and color, except where specific color is indicated.

2. If manufacturer has no standard color, provide equipment with ANSI No. 61, light gray color.

PART 3 -- EXECUTION

3.01 GENERAL

A. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. Install work in accordance with NECA Standard of Installation, unless otherwise specified.

C. Prior to energization of any power distribution equipment installed, or modified, under this contract, the contractor shall implement all protective device settings as determined by the Electrical Systems Analysis Study specified in section 16015.

D. Prior to final completion inspection, Contractor shall apply all applicable arc flash labels to electrical power distribution equipment as determined by the Electrical Systems Analysis Study specified in section 16015.

3.02 LOAD BALANCE

A. Drawings and Specifications indicate circuiting to electrical loads and distribution equipment.

B. Balance electrical load between phases as nearly as possible on switchboards, panelboards, motor control centers, and other equipment where balancing is required.

C. When loads must be reconnected to different circuits to balance phase loads, maintain accurate record of changes made, and provide circuit directory that lists final circuit arrangement.

3.03 CHECKOUT AND STARTUP

A. Voltage Field Test:

1. Check voltage at point of termination of power company supply system to project when installation is essentially complete and is in operation.

2. Check voltage amplitude and balance between phases for loaded and unloaded conditions.

3. Record supply voltage (all three phases simultaneously on the same graph) for 24 hours during normal working day.

a. Submit Voltage Field Test Report within 5 days of test.

4. Unbalance Corrections:

a. Make written request to power company to correct condition if balance (as defined by NEMA) exceeds 1 percent, or if voltage varies throughout the day and from loaded to unloaded condition more than plus or minus 4 percent of nominal.

b. Obtain a written certification from a responsible power company official that the voltage variations and unbalance are within their normal standards if corrections are not made.

B. Equipment Line Current Tests:

1. Check line current in each phase for each piece of equipment.

2. Make line current check after Power Company has made final adjustments to supply voltage magnitude or balance.

3. If any phase current for any piece of equipment is above rated nameplate current, prepare Equipment Line Phase Current Report that identifies cause of problem and corrective action taken.

C. Startup:

1. Demonstrate satisfactory operation of all electrical equipment. Participate with other trades in all startup activities.

- END OF SECTION -

SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 -- GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American National Standards Institute (ANSI):

a. C62.11, Standard for Metal-Oxide Surge Arrestors for AC Circuits.

b. Z55.1, Gray Finishes for Industrial Apparatus and Equipment.

2. American Society for Testing and Materials (ASTM):

a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

b. A240, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.

c. A570, Standard Specification for Steel, Sheet, and Strip, Carbon, Hot-Rolled, Structural Quality.

3. Federal Specifications (FS):

a. W-C-596, Connector, Receptacle, Electrical.

b. W-S-896E, Switches Toggle, Flush Mounted.

4. National Electrical Contractors Association, Inc. (NECA): 5055, Standard of Installation.

5. National Electrical Manufacturers Association (NEMA):

a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

b. AB 1, Molded Case Circuit Breakers and Molded Case Switches.

c. ICS 2, Industrial Control Devices, Controllers, and Assemblies.

d. KS 1, Enclosed Switches.

e. LA I, Surge Arrestors.

f. PB 1, Panelboards.

g. ST 20, Dry-Type Transformers for General Applications.

h. WD I, General Requirements for Wiring Devices.

6. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).

7. Underwriters Laboratories, Inc. (UL):

a. 67, Standard for Panelboards.

b. 98, Standard for Enclosed and Dead-Front Switches.

c. 198C, Standard for Safety High-Interrupting-Capacity Fuses, Current-Limiting Types.

d. 198E, Standard for Class Q Fuses.

e. 486E, Standard for Equipment Wiring Terminals.

f. 489, Standard for Molded Case Circuit Breakers and Circuit Breaker Enclosures.

g. 508, Standard for Industrial Control Equipment.

h. 943, Standard for Ground-Fault Circuit Interrupters.

i. 1059, Standard for Terminal Blocks.

j. 1561, Standard for Dry-Type General-Purpose and Power Transformers.

1.02 SUBMITTALS

A. Shop Drawings:

1. Junction and pull boxes used at, or below, grade.

2. Hardware.

3. Terminal junction boxes.

4. All other miscellaneous material part of this project.

5. Wire pulling compound.

1.03 QUALITY ASSURANCE

A. UL Compliance: Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

B. Hazardous Areas: Materials and devices shall be specifically approved for hazardous areas of the class, division, and group shown and of a construction that will ensure safe performance when properly used and maintained.

1.04 SPARE PARTS (NOT USED)

PART 2 -- PRODUCTS

2.01 JUNCTION AND PULL BOXES

A. Outlet Boxes Used as Junction or Pull Box: As specified under Article OUTLET AND DEVICE BOXES.

B. Large Sheet Steel Box: NEMA 250, Type 1.

1. Box: Code-gauge, galvanized steel.

2. Cover: Full access, screw type.

3. Machine Screws: Corrosion-resistant.

C. Large Cast Metal Box: NEMA 250, Type 4.

1. Box: Cast malleable iron, hot-dip galvanized finished, with drilled and tapped conduit entrances.

2. Cover: Hinged with screws.

3. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.

4. Manufacturers, Surface Mounted Type:

a. Crouse-Hinds; Series W.

b. O.Z./Gedney; Series Y.

5. Manufacturers, Recessed Type:

a. Crouse-Hinds; Type WJBF.

b. O.Z./Gedney; Series YR.

D. Large Stainless-Steel Box: NEMA 250, Type 4X.

1. Box: 14-gauge, ASTM A240, Type 304 stainless steel.

2. Cover: Hinged with screws.

3. Hardware and Machine Screws: ASTM A167, Type 304 stainless steel.

4. Manufacturers:

    a. Hoffman Engineering Co.

    b. Robroy Industries.

E. Large Steel Box: NEMA 250, Type 4.

1. Box: 12-gauge steel, with white enamel painted interior and gray primed exterior, over phosphate surfaces, with final ANSI Z55.1, No. 61 gray enamel on exterior surfaces.

2. Cover: Hinged with screws.

3. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.

4. Manufacturers:

    a. Hoffman Engineering Co.

    b. Robroy Industries.

F. Large Nonmetallic Box:

1. NEMA 250, Type 4X.

2. Box: High-impact, fiberglass-reinforced polyester or engineered thermoplastic, with stability to high heat.

3. Cover: Hinged with screws.

4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.

5. Conduit hubs and mounting lugs.

6. Manufacturers:

    a. Crouse-Hinds; Type NJB.

    b. Carlon; Series N, C, or H.

    c. Robroy Industries.

G. Concrete Box:

1. Box: Rebar reinforced, cast concrete.

2. Cover: H20-44 traffic rated cast iron.

3. Cover Marking: ELECTRICAL, SIGNAL, CONTROL or as shown.

4. Manufacturers:

   a. Brooks Products Inc.; No. 36/36T.

   b. Qwikset; W 17.

2.02 NAMEPLATES

A. Material: Laminated plastic.

B. Attachment Screws: Stainless steel.

C. Color: black letters engraved to a white background.

D. Engraving:

   1. Pushbuttons/Selector Switches: Name of drive controlled on one, two, or three lines, as required.

   2. Panelboards: Panelboard designation, service voltage, and phases.

E. Letter Height:

   1. Pushbuttons/Selector Switches: 1/8 inch.

   2. Panelboards: 1/4 inch.

2.03 SUPPORT AND FRAMING CHANNELS

A. Material:

   1. Dry indoor - galvanized.

   2. All Other Areas: ASTM A167, Type 316 stainless steel or fiber-reinforced epoxy, as required.

B. Finish:

   1. Dry indoor - galvanized.

   2. All Other Areas: ASTM A167, Type 316 stainless steel or fiber-reinforced epoxy, as required.

C. Inserts: Continuous.

D. Beam Clamps: Gray cast iron.

E. Manufacturers:

   1. B-Line.

2. Unistrut.

PART 3 -- EXECUTION

3.01 GENERAL

A. Install equipment in accordance with NECA 5055.

3.02 JUNCTION AND PULL BOXES

A. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.

B. Install pull boxes where necessary in raceway system to facilitate conductor installation.

C. Install in conduit runs at least every 150 feet or after the equivalent of three right-angle bends.

D. Use outlet box as junction and pull boxes wherever possible and allowed by applicable codes.

E. Installed boxes shall be accessible.

F. Do not install on finished surfaces.

G. Install plumb and level.

H. Support boxes independently of conduit by attachment to building structure or structural member.

I. Install bar hangers in frame construction, or fasten boxes directly with wood screws on wood, bolts and expansion shields on concrete or brick, toggle bolts on hollow masonry units, and machine screws or welded threaded studs on steelwork.

J. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.

K. Boxes embedded in concrete or masonry need not be additionally supported.

L. At or Below Grade:

1. Install boxes for below grade conduit flush with finished grade in locations outside of paved areas, roadways, or walkways.

2. If adjacent structure is available, box may be mounted on structure surface just above finished grade in accessible but unobtrusive location.

3. Obtain VILLAGE'S written acceptance prior to installation in paved areas, roadways, or walkways.

4. Use boxes and covers suitable to support anticipated weights.

M. Flush Mounted:

1. Install with concealed conduit.

2. Holes in surrounding surface shall be no larger than required to receive box.

3. Make edges of boxes flush with final surface.

N. Mounting Hardware:

1. Non-corrosive Interior Areas: Galvanized.

2. All Other Areas: Stainless steel.

O. Location/Type:

1. Finished, Indoor, Dry: NEMA 250, Type 1.

2. Unfinished, Indoor, Dry: NEMA 250, Type 12.

3. Unfinished, Indoor and Outdoor, Wet and Corrosive: NEMA 250, Type 4X.

4. Unfinished, Indoor and Outdoor, Wet, Dust, or Oil: NEMA 250, Type 13.

5. Unfinished, Indoor and Outdoor, Hazardous: NEMA 250, Type 7 and Type 9, where indicated.

6. Underground Conduit: Concrete Encased.

7. Corrosive Locations: Nonmetallic.

3.03 SUPPORT AND FRAMING CHANNEL

A. Furnish zinc-rich primer; paint cut ends before installation, where applicable.

B. Install where required for mounting and supporting electrical equipment and raceway systems.

- END OF SECTION -

SECTION 16110

RACEWAYS

PART 1 -- GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO): Division I, Standard Specifications for Highway Bridges, Fourteenth Edition.

2. American National Standards Institute (ANSI):

a. C80.1, Rigid Steel Conduit-Zinc Coated.

b. CS0.5, Rigid Aluminum Conduit.

3. American Society for Testing and Materials (ASTM):

a. A123 EI, Standard Specification for Zinc-Coated (Galvanized) Coatings on Iron and Steel Products.

b. C857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

4. National Electrical Contractors Association, Inc. (NECA): 5055, Standard of Installation.

5. National Electrical Manufacturers Association (NEMA):

a. TC 2, Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

b. TC 3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.

c. TC 6, PVC and ABS Plastic Utilities Duct for Underground Installation.

6. National Fire Protection Association (NFPA): 70, National Electrical Code. (NEC)

7. Underwriters Laboratories, Inc. (UL):

a. 1, Standard for Safety Flexible Metal Conduit.

b. 6, Standard for Safety Rigid Metal Conduit.

c. 360, Standard for Safety Liquid-Tight Flexible Steel Conduit.

d. 514B, Standard for Safety Fittings for Conduit and Outlet Boxes.

e. 514C, Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers.

f. 651, Standard for Safety Schedule 40 and 80 PVC Conduit.

g. 651A, Standard for Safety Type EB and Rigid PVC Conduit and HDPF Conduit.

h. 797, Standard for Safety Electrical Metallic Tubing.

i. 870, Standard for Safety Wireways, Auxiliary Gutters, and Associated Fittings.

j. 1242, Standard for Safety Intermediate Metal Conduit.

k. 1660, Standard for Safety Liquid-Tight Flexible Nonmetallic Conduit.

1.02 SUBMITTALS

A. Shop Drawings:

1. Manufacturer's Literature:

a. Rigid aluminum conduit.

b. PVC Schedule 80 conduit.

c. Flexible metal, liquid-tight conduit.

d. Flexible, nonmetallic, liquid-tight conduit.

e. Conduit fittings.

f. Wireways.

1.03 UL COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

PART2 -- PRODUCTS

2.01 CONDUIT AND TUBING

A. Rigid Aluminum Conduits:

1. Meet requirements of ANSI C80.5 and UL 6.

2. Material: Type 6063, copper-free aluminum alloy.

B. PVC Schedule 80 Conduits:

1. Meet requirements of NEMA TC 2 and UL 651.

2. UL listed for use in aboveground and underground direct burial, concealed or direct sunlight exposure, including areas subject to physical damage and 90 degrees C insulated conductors.

2.02 FITTINGS

A. Rigid Aluminum Conduit:

1. General:
    a. Meet requirements of UL 514B.
    b. Type: Threaded, copper-free. Set screw fittings not permitted.
2. Insulated Bushing:
    a. Material: Cast aluminum, with integral insulated throat, rated for 150 degrees C.
    b. Manufacturer: O.Z. Gedney; Type AB.
3. Grounding Bushing:
    a. Material: Cast aluminum with integral insulated throat, rated for 150 degrees, with solderless lugs.
    b. Manufacturer: O.Z. Gedney; Type ABLG.
4. Conduit Hub:
    a. Material: Cast aluminum, with insulated throat.
    b. Manufacturers:
        1) O.Z. Gedney; Type CHA.
        2) T & B; Series 370AL.
5. Conduit Bodies:
    a. Manufacturers (For Normal Conditions):
        1) Appleton; Form 85 threaded Unilets.
        2) Crouse-Hinds; Mark 9 or Form 7-SA threaded condulets.
        3) Killark; Series O Electrolets.
    b. Manufacturers (For Hazardous Locations):
        1) Appleton.
        2) Crouse-Hinds.
        3) Killark.
6. Couplings: As supplied by conduit manufacturer.
7. Conduit Sealing Fitting Manufacturers:
    a. Appleton; Type EYF-AL or EYM-AL.
    b. Crouse-Hinds; Type EYS-SA or EZS-SA.
    c. Killark; Type EY or EYS.

8. Drain Seal Manufacturers:
    a. Appleton; Type EYDM-A.
    b. Crouse-Hinds; Type EYD-SA or EZD-SA.
9. Drain/Breather Fitting Manufacturers:
    a. Appleton; Type ECDB.
    b. Crouse-Hinds; ECD.
10. Expansion Fitting Manufacturers:
    a. Deflection/Expansion Movement: Steel City; Type DF-A.
    b. Expansion Movement Only: Steel City; Type AF-A.
11. Cable Sealing Fittings: To form watertight nonslip cord or cable connection to conduit.
    a. Bushing: Neoprene at connector entry.
    b. Manufacturer: Appleton CG-S.

B. PVC Conduit and Tubing:
1. Meet requirements of NEMA TC-3.
2. Type: PVC, slip-on.

2.03 WIREWAYS

A. Meet requirements of UL 870.

B. Type: Steel-enclosed, with removable, hinged cover.

C. Rating: Outdoor raintight if outdoor, and indoor if indoor.

D. Finish: Gray, baked enamel.

E. Manufacturers:
1. Square D.
2. B-Line Systems, Inc.

2.04 ACCESSORIES

A. Identification Devices:
1. Raceway Tags:
    a. Material: Permanent, nylon.

b. Shape: Round.

c. Raceway Designation: Pressure stamped, embossed, or engraved.

d. Tags relying on adhesives or taped-on markers not permitted.

2. Electric Detectable Warning Tape:

a. Material: Polyethylene, 4-mil gauge with solid aluminum foil core.

b. Color: Red, unless otherwise noted.

c. Width: Minimum 6-inch.

d. Designation: Warning on tape that electric circuit is located below tape.

e. Manufacturers:

1) Blackburn.

2) Griffolyn Co.

3) Or approved equal.

3. Buried Raceway Marker:

a. Material: 6"x6"x12" concrete monument, consisting of double-ended arrows, straight for straight runs and bent at locations where runs change direction.

b. Designation: Incise to depth of 3/32 inch, ELECTRIC CABLES. in letters 1/4-inch high.

c. Minimum Dimension: 1/4-inch thick, 10 inches long, and 3/4-inch wide.

B. Raceway Coating:

1. Material: Bitumastic or plastic tape coating.

2. Manufacturers:

a. Koppers bitumastic; No. 505.

b. Scotchwrap; No. 51, plastic tape.

C. Wraparound Duct Band:

1. Material: Heat-shrinkable, cross-linked polyolefin, precoated with hot-melt adhesive.

2. Manufacturer: Raychem; Type TWDB.

PART 3 – EXECUTION

3.01 GENERAL

A. Conduit and Tubing sizes shown are based on the use of copper conductors.

B. All installed Work shall comply with NECA 5055.

C. Crushed or deformed raceways not permitted.

D. Maintain raceway entirely free of obstructions and moisture.

E. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.

F. Aluminum Conduit: Do not install in direct contact with concrete.

G. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.

H. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.

I. Group raceways installed in same area.

J. Proximity to Heated Piping: Install raceways minimum 12 inches from parallel runs.

K. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.

L. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.

M. Install watertight fittings in outdoor, underground, or wet locations.

N. Paint threads, before assembly of fittings, of rigid aluminum conduit with anti-oxidation compound.

O. All metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.

P. Do not install raceways in concrete equipment pads, foundations, or beams.

Q. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.

R. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.

3.02 CONDUIT APPLICATION

A. Diameter: Minimum ¾ inch.

B. Exterior, Exposed:

1. Rigid Aluminum.

C. Interior, Exposed:

1. Rigid Aluminum or Rigid Galvanized Steel.

D. Direct Earth Burial: PVC Schedule 80.

E. Concrete-Encased Raceways: PVC Schedule 40.

F. Under Slabs-On-Grade: PVC Schedule 40.

3.03 CONNECTIONS

A. For motors, wall or ceiling mounted fans and unit heaters, dry type transformers, electrically operated valves, instrumentation, and other equipment where flexible connection is required to minimize vibration:

1. Conduit Size 4 Inches or Less: Flexible metal, liquid-tight conduit.

2. Conduit Size Over 4 Inches: Nonflexible.

3. Corrosive Areas: Flexible, nonmetallic, liquid or PVC-coated metallic, liquid-tight.

4. Length: 18-inch minimum, 60-inch maximum, of sufficient length to allow movement or adjustment of equipment.

B. Outdoor areas and process areas exposed to moisture; areas required to be oil tight and dust-tight: Flexible metal, liquid-tight conduit.

C. Under Equipment Mounting Pads: Rigid galvanized steel conduit.

D. Exterior Light Pole Foundations: Rigid galvanized steel conduit.

3.04 PENETRATIONS

A. Make at right angles, unless otherwise shown.

B. Notching or penetration of structural members, including footings and beams, not permitted.

C. Fire-Rated Walls, Floors, or Ceilings: Fire-stop openings around penetrations to maintain fire-resistance rating.

D. Apply single layer of wraparound duct band to all metallic conduit in contact with concrete slabs to a point 2 inches above concrete surface.

E. Concrete Walls, Floors, or Ceilings (Aboveground): Provide non-shrink grout dry-pack, or use watertight seal device.

F. Entering Structures:

1. General: Seal raceway at the first box or outlet with minimum 2 inches thick expandable plastic compound to prevent the entrance of gases or liquids from one area to another.

2. Concrete Roof or Membrane Waterproofed Wall or Floor:

   a. Provide a watertight seal.

   b. Without Concrete Encasement: Install watertight entrance seal device on each side.

   c. With Concrete Encasement: Install watertight entrance seal device on the accessible side.

   d. Securely anchor malleable iron body of watertight entrance seal device into construction with one or more integral flanges.

   e. Secure membrane waterproofing to watertight entrance seal device in a permanent, watertight manner.

3. Existing or Precast Wall (Underground): Core drill wall and install a watertight entrance seal device.

3.05 SUPPORT

A. Support from structural members only, at intervals not exceeding NFPA 70 requirements, and in any case not exceeding 10 feet. Do not support from piping, pipe supports, or other raceways.

B. Multiple Adjacent Raceways: Provide ceiling trapeze. For trapeze-supported conduit, allow 40 percent extra space for future conduit.

C. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:

   1. Wood: Wood screws.

   2. Hollow Masonry Units: Toggle bolts.

   3. Concrete or Brick: Expansion shields, or threaded studs driven in by powder charge, with lock washers and nuts.

   4. Steelwork: Machine screws.

D. Nails or wooden plugs inserted in concrete or masonry for attaching raceway not permitted. Do not weld raceways or pipe straps to steel structures. Do not use wire in lieu of straps or hangers.

3.06 BENDS

A. Install concealed raceways with a minimum of bends in the shortest practical distance.

B. Make bends and offsets of longest practical radius.

C. Install with symmetrical bends or cast metal fittings.

D. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.

E. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.

F. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run, and raceways are same size.

G. PVC Conduit:

1. Bends 30-Degree and Larger: Provide factory-made elbows.

2. 90-Degree Bends: Provide rigid steel elbows.

3. Use manufacturer's recommended method for forming smaller bends.

H. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

3.07 EXPANSION/DEFLECTION FITTINGS

A. Provide on all raceways at all structural expansion joints, and in long tangential runs.

B. Provide expansion/deflection joints for 50 degrees F maximum temperature variation.

C. Install in accordance with manufacturer's instructions.

3.08 PVC CONDUIT

A. Solvent Welding:

1. Provide manufacturer recommended solvent; apply to all joints.

2. Install such that joint is watertight.

B. Adapters:

1. PVC to Metallic Fittings: PVC terminal type.

2. PVC to Rigid Metal Conduit or IMC: PVC female adapter.

C. Belied-End Conduit: Bevel the un-belled end of the joint prior to joining.

3.09 WIREWAYS

A. Install in accordance with manufacturer's instructions.

B. Locate with cover on accessible vertical face of wireway, unless otherwise shown.

3.10 TERMINATION AT ENCLOSURES

A. Cast Metal Enclosure: Provide manufacturer's pre-molded insulating sleeve inside metallic conduit terminating in threaded hubs.

B. Sheet Metal Boxes, Cabinets, and Enclosures:

1. Rigid Galvanized and Aluminum Conduit:

a. Provide one lock nut each on inside and outside of enclosure.

b. Install grounding bushing.

c. Provide bonding jumper from grounding bushing to equipment ground bus or ground pad; if neither ground bus nor pad exists, connect jumper to lag bolt attached to metal enclosure.

d. Install insulated bushing on ends of conduit where grounding is not required.

e. Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.

2. Flexible Metal Conduit: Provide two screw type, insulated, malleable iron connectors.

3. Flexible, Nonmetallic Conduit: Provide nonmetallic, liquid-tight strain relief connectors.

4. PVC Schedule 80 Conduit: Provide PVC terminal adapter with lock nut.

3.11 UNDERGROUND RACEWAYS

A. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one manhole, handhole, or pull box to the next, or from a high point between them, depending on surface contour.

B. Cover: Maintain minimum 2-foot cover above conduit and concrete encasement, unless otherwise shown.

C. Make routing changes as necessary to avoid obstructions or conflicts.

D. Couplings: In multiple conduit runs, stagger so that couplings in adjacent runs are not in same transverse line.

E. Union type fittings not permitted.

F. Spacers:

1. Provide preformed, nonmetallic spacers, designed for such purpose, to secure and separate parallel conduit runs in a trench or concrete encasement.

2. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.

G. Support conduit so as to prevent bending or displacement during backfilling or concrete placement.

H. Installation with Other Piping Systems:

1. Crossings: Maintain minimum 12-inch vertical separation.

2. Parallel Runs: Maintain minimum 12-inch separation.

3. Installation over valves or couplings not permitted.

I. Metallic Raceway Coating: At couplings and joints and along entire length, apply wraparound duct band with one-half tape width overlap to obtain two complete layers.

J. Backfill:

1. Conduit trenches shall be backfilled with select backfill obtained from the excavation. Such material shall be placed in 6-inch layers, each compacted to 95 percent of the maximum density. Only hand operated mechanical compacting equipment shall be used within six inches of the installed conduit.

2. Compaction of backfill shall be 95 percent of the maximum density.

3. Do not backfill until inspected by VILLAGE.

3.12 IDENTIFICATION DEVICES

A. Raceway Tags:

1. Identify origin and destination.

2. Install at each terminus, near midpoint, and at minimum intervals of every 50 feet of exposed Raceway, whether in ceiling space or surface mounted.

3. Provide nylon strap for attachment.

B. Electric Detectable Warning Tape: Install approximately 12 inches above underground or concrete-encased raceways. Align parallel to, and within 12 inches of, centerline of runs.

C. Buried Raceway Markers:

1. Install at grade to indicate direction of underground raceways.

2. Install at all bends and at intervals not exceeding 100 feet in straight runs.

3.13 PROTECTION OF INSTALLED WORK

A. Protect products from effects of moisture, corrosion, and physical damage during construction.

B. Provide and maintain manufactured watertight and dust-tight seals over all conduit openings during construction.

C. Touch up painted conduit threads after assembly to cover nicks or scars.

D. Touch up damage to coating on PVC-coated conduit with patching compound approved by manufacturer.

- END OF SECTION -

SECTION 16120

CONDUCTORS

PART 1 -- GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI): 386, Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600V.

2. American Society for Testing and Materials (ASTM):

a. A167, Standard Specification for Stainless and Heat Resisting Chromium-Nickel-Plated Steel Plate, Sheet, and Strip.

b. B3, Standard Specification for Soft or Annealed Copper Wire.

c. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

d. B263, Standard Test Method for Determination of Cross-Sectional Area of Stranded Conductors.

3. Association of Edison Illuminating Companies (AEIC):

a. CS 5, Crosslinked Polyethylene Insulated Shielded Power Cables Rated 5 through 35 kV.

b. CS 6, Ethylene- Propylene-Rubber-Insulated Shielded Power Cables Rated 5 through 69 kV.

4. Insulated Cable Engineer's Association, Inc. (ICEA): T-29-250, Procedure for Conducting Vertical Cable Tray Flame Test with a Theoretical Heat Input of 210,000 Btu/hour.

5. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

a. 48, Standard Test Procedures and Requirements or High-Voltage Alternating Current Cable Terminations.

b. 404, Standard for Cable Joints for Use with Extruded Dielectric Cable Rated 5,000V through 46,000V and Cable Joints for Use with Laminated Dielectric Cable Rated 2,500V through 500,000V.

6. National Electrical Contractors Association, Inc. (NECA): 5055, Standard of Installation.

7. National Electrical Manufacturers' Association (NEMA):

    a. CC 1, Electric Power Connectors for Substations.

    b. WC 3, Rubber-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

    c. WC 5, Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

    d. WC 7, Crosslinked-Thermosetting-Polyethylene-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

    e. WC 8, Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

    f. WC 55, Instrumentation Cables and Thermocouple Wire.

8. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).

9. Underwriters Laboratories, Inc. (UL):

    a. 13, Standard for Safety Power-Limited Circuit Cables.

    b. 44, Standard for Safety Rubber-Insulated Wires and Cables.

    c. 62, Standard for Safety Flexible Cord and Fixture Wire.

    d. 486A, Standard for Safety Wire Connector and Soldering Lugs for Use with Copper Conductors.

    e. 486B, Standard for Safety Wire Connectors and Soldering Lugs for Use with Aluminum Conductors.

    f. 510, Standard for Safety Insulating Tape.

    g. 854, Standard for Safety Service-Entrance Cables.

    h. 910, Standard for Safety Test Method for Fire and Smoke Characteristics of Electrical and Optical-Fiber Cables Used in Air Handling Spaces.

    i. 1072, Standard for Safety Medium-Voltage Power Cables.

    j. 1277, Standard for Safety Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.

    k. 1581, Standard for Safety Reference Standard for Electrical Wires, Cables, and Flexible Cords.

1.02 SUBMITTALS

A. Shop Drawings:

1. Wire and cable descriptive product information.

2. Wire and cable accessories descriptive product information.

3. Cable fault detection system descriptive product information.

B. Quality Control Submittals:

1. Certified Factory Test Report for conductors 600 volts and below.

2. Certified Factory Test Report per AEIC CS6, including AEIC qualification report for conductors above 600 volts.

1.03 UL COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

PART 2 -- PRODUCTS

2.01 CONDUCTORS 600 VOLTS AND BELOW

A. Conform to applicable requirements of NEMA WC 3, WC 5, and WC 7.

B. Conductor Type:

1. 120- and 277-Volt Lighting, No. 10 AWG and Smaller: Stranded copper.

2. 120-Volt Receptacle Circuits, No. 10 AWG and Smaller: Stranded copper.

3. All Other Circuits: Stranded copper.

C. Insulation: Type THHN/THWN, except for sizes No. 6 and larger, with XHHW insulation. XHHW type insulation shall be used for 480V power conductors in conduits installed below grade.

D. Direct Burial and Aerial Conductors and Cables:

1. Type USE/RHH/RHW insulation, UL IC54 listed, Type RHW-2/USE-2.

2. Conform to physical and minimum thickness requirements of NEMA WC 3.

E. Flexible Cords and Cables:

1. Type SOW-A50 with ethylene propylene rubber insulation in accordance with UL 62.

2. Conform to physical and minimum thickness requirements of NEMA WC 8.

F. Cable Tray Conductors and Cables: Type TC.

2.02 600-VOLT RATED CABLE

A. General:

1. Type: TC, meeting the requirements of UL 1277 including Vertical Tray Flame Test at 20,000 Btu/hr., and NFPA 70, Article 340, or UL 13 Listed Power Limited Circuit Cable meeting requirements of NFPA 70, Article 725.

2. Permanently and legibly marked with manufacturer's name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.

3. Suitable for installation in open air, in cable trays, or conduit.

4. Minimum Temperature Rating: 90 degrees C dry locations, 75 degrees C wet locations.

5. Overall Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

B. Wire and Connectors

1. Cable shall be rated for 600 volts and shall meet the requirements below:

a. Conductors shall be stranded

b. All wire shall be brought to the job in unbroken packages and shall bear the data of manufacturing; not older than 12 months.

c. Type of wire shall be XHHW or THWN, rated 75 degrees C suitable for wet locations except where required otherwise by the drawings.

d. No wire smaller than No. 12 gauge shall be used unless specifically indicated.

e. Conductor metal shall be copper.

f. All conductors shall be megger tested after installation and insulation must comply with the Insulated Power Cable Engineers Association Minimum Values of Insulation Resistance.

C. No. 16 AWG, Twisted, Shielded Pair, Instrumentation Cable: Single pair, tinned copper designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 55 requirements.

1. Outer Jacket: 45-mil nominal thickness.

2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer overlapped to provide 100 percent coverage.

3. Dimension: 0.31-inch nominal OD.

4. Conductors:

   a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8

   b. 20 AWG, seven-strand tinned copper drain wire.

   c. Insulation: 15-mil nominal PVC.

   d. Jacket: 4-mil nominal nylon.

   e. Color Code: Pair conductors' black and red.

5. Manufacturers:

   a. Okonite Co.

   b. Alpha Wire Corp.

   c. Belden

6. The following test shall be performed on instrumentation and control system cables. All tests shall be end-to-end test of installed cables with the ends supported in free air, not adjacent to any ground object. All test data shall be recorded on forms acceptable to the Village. Complete records of all tests shall be made and delivered to the Village.

   a. Continuity tests shall be performed by measuring wire/shield loop resistances of signal cable as the wires, taken one at a time, are shorted to the channel shield. No loop resistance measurement shall carry by more than $\pm$2 ohms from the calculated average loop resistance valve.

   b. Insulation resistance tests shall be performed by using a 500 volt megohmmeter to measure the insulation resistance between each channel wire and channel shield, between individual channel shields in a multi-channel cable, between each individual channel and the overall cable shield in multi-channel cable, between each wire and ground, and between each shield and ground. Values of resistance less than 10 megohms shall be unacceptable.

2.03 GROUNDING CONDUCTORS

A. Equipment: Stranded copper with green, Type USE/RHH/RHW-XLPE or THHN/THWN, insulation.

B. Direct Buried: Bare tinned stranded copper.

2.04 ACCESSORIES FOR CONDUCTORS 600 VOLTS AND BELOW

A. Tape:

1. General Purpose, Flame-Retardant: 7-mil, vinyl plastic, Scotch Brand 33, rated for 90 degrees C minimum, meeting requirements of UL 510.

2. Flame Retardant, Cold and Weather Resistant: 8.5-mil, vinyl plastic, Scotch Brand 88.

3. Arc and Fireproofing:

   a. 30-mil, elastomer

   b. Manufacturers and Products:

      (1) Scotch; Brand 77, with Scotch Brand 69 glass cloth tape binder.

      (2) Plymount; Plyarc 30, with Plymount Plyglas glass cloth tape binder.

B. Identification Devices:

1. Sleeve: Permanent, PVC, yellow or white, with legible machine-printed black markings.

2. Marker Plate: Nylon, with legible designations permanently hot stamped on plate.

3. Grounding Conductor: Permanent green heat-shrink sleeve, 2-inch minimum.

C. Connectors and Terminations:

1. Nylon, Self-Insulated Crimp Connectors:

   a. Manufacturers and Products:

      (1) Thomas & Betts; Sta-Kon.

      (2) Burndy; Insulink.

      (3) ILSCO.

2. Nylon, Self-Insulated, Crimp Locking-Fork, Torque-Type Terminator:

   a. Manufacturers and Products:

      (1) Thomas & Betts; Sta-Kon.

      (2) Burndy; Insulink.

      (3) ILSCO.

D. Cable Lugs:

1. In accordance with NEMA CC I.

2. Rated 600 volts of same material as conductor metal.

3. Insulated, Locking-Fork, Compression Lugs:

a. Manufacturers and Products:

(1) Thomas & Betts; Sta-Kon.

(2) ILSCO; ILSCONS.

4. Un-insulated Crimp Connectors and Terminators:

a. Manufacturers and Products:

(1) Square D; Versitide.

(2) Thomas & Betts; Color-Keyed.

(3) ILSCO.

5. Un-insulated, Bolted, Two-Way Connectors and Terminators:

a. Manufacturers and Products:

(1) Thomas & Betts; Locktite.

(2) Burndy; Quiklug.

(3) ILSCO.

E. Cable Ties: Nylon, adjustable, self-locking, and reusable.

1. Manufacturer and Product: Thomas & Betts; TY-RAP.

F. Heat Shrinkable Insulation: Thermally stabilized, crosslinked polyofin.

1. Manufacturer and Product: Thomas & Betts; SHRINK-KON.

2.05 PULLING COMPOUND

A. Nontoxic, non-corrosive, noncombustible, nonflammable, wax-based lubricant; UL listed.

B. Suitable for rubber, neoprene, PVC, polyethylene, hypalon, CPE, and lead-covered wire and cable.

C. Suitable for zinc-coated steel, aluminum, PVC, bituminized fiber, and fiberglass raceways.

D. Manufacturers and Products:

1. Ideal Co.; Yellow 77.

2. Polywater, Inc.

3. Cable Grip Co.

2.06 WARNING TAPE

A. As specified in Section 16110, RACEWAYS.

2.07 SOURCE QUALITY CONTROL

A. Conductors 600-Volts and below: Test in accordance with UL 44 and 854 Standards.

PART 3 -- EXECUTION

3.01 GENERAL

A. Conductor installation to be in accordance with NECA 5055.

B. Conductor and cable sizing shown is based on copper conductors, unless noted otherwise.

C. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii.

D. Tighten screws and terminal bolts in accordance with UL 486A for copper conductors.

E. Cable Lugs: Provide with correct number of holes, bolt size, and center-to-center spacing as required by equipment terminals.

F. Bundling: Where single conductors and cables in manholes, handholes, vaults, and other indicated locations are not wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 18 inches on center.

G. Ream, remove burrs, and clear interior of installed conduit before pulling wires or cables.

H. Concrete-Encased Raceway Installation: Before installation of conductors, pull through each raceway a mandrel approximately 1/4-inch smaller than raceway inside diameter.

I. Cable Tray Installation:

1. Install wire and cable parallel and straight in tray.

2. Bundle, in groups, all wire and cable of same voltage having a common routing and destination; use cable ties, at maximum intervals of 8 feet.

3. Clamp cable bundles prior to making end termination connections.

4. Separate cables of different voltage rating in same cable tray with barriers.

5. Fasten wires, cables, and bundles to tray with nylon cable straps at the following maximum intervals:

a. Horizontal Runs: 20 feet.

b. Vertical Runs: 5 feet.

3.02 POWER CONDUCTOR COLOR CODING

A. Conductors 600 Volts and Below:

1. No. 6 AWG and Larger. Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering an area 1-1/2 to 2 inches wide.

2. No. 8 AWG and Smaller: Provide colored conductors.

3. Colors:

System	Conductor	Color
All Systems	Equipment Grounding	Green
240/120 Volts Single-Phase, Three-Wire	Grounded Neutral One Hot Leg Other Hot Leg	White Black Red
208Y/120 Volts Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	White Black Red Blue
240/120 Volts Three-Phase, Four-Wire Delta, Center Tap Ground on Single-Phase	Grounded Neutral Phase A High (wild) Leg Phase C	White Black Orange Blue
480Y/277 Volts Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	Gray Brown Purple Yellow

NOTE: Phase A, B, C implies direction of positive phase rotation

4. Tracer: Outer covering of white with an identifiable colored strip other than green in accordance with NFPA 70.

3.03 CIRCUIT IDENTIFICATION

A. Circuits Appearing in Circuit Schedules: Identify power, instrumentation, and control conductor circuits, using circuit schedule designations, at each termination and in accessible locations such as manholes, handholes, panels, switchboards, motor control centers, pull boxes, and terminal boxes.

B. Circuits Not Appearing in Circuit Schedules:

1. Assign circuit name based on device or equipment at load end of circuit.

2. Where this would result in same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.

C. Method:

1. Conductors No. 3 AWG and Smaller: Identify with sleeves.

2. Cables, and Conductors No. 2 AWG and Larger:

a. Identify with marker plates.

b. Attach marker plates with nylon tie cord.

3. Taped-on markers or tags relying on adhesives not permitted.

3.04 CONDUCTORS 600 VOLTS AND BELOW

A. Install 10 AWG or 12 AWG conductors for branch circuit power wiring in lighting and receptacle circuits.

B. Do not splice incoming service conductors and branch power distribution conductors No. 6 AWG and larger unless specifically indicated or approved by VILLAGE.

C. Connections and Terminations:

1. Install butt splices only on stranded conductors.

2. Install nylon self-insulated crimp connectors and terminators for instrumentation, control, and power circuit conductors No. 6 AWG and smaller.

3. Install uninsulated crimp connectors and terminators for instrumentation, control, and power circuit conductors No. 4 AWG through No. 2/0 AWG.

4. Install uninsulated, bolted, two-way connectors and terminators for power circuit conductors No. 4/0 AWG and larger.

5. Install uninsulated bolted, two-way connectors for motor circuit conductors No. 12 and larger.

6. Tape-insulate all uninsulated connections.

7. Place no more than one conductor in any single-barrel pressure connection.

8. Install crimp connectors with tools approved by connector manufacturer.

9. Install terminals and connectors acceptable for type of material used.

10. Compression Lugs

a. Attach with a tool specifically designed for purpose.

b. Tool shall provide complete controlled crimp and shall not release until crimp is complete.

c. Do not use plier type crimpers.

D. Do not use soldered mechanical joints.

E. Splices and Terminations:

1. Indoors: Use general purpose, flame retardant tape.

2. Outdoors: Use flame retardant, cold- and weather-resistant tape.

F. Terminate all spare wires on terminal block in all cabinets and boxes.

G. Cabinets, Panels, and Motor Control Centers:

1. Terminate all spare wires on terminal blocks.

2. Where conductors pass through openings or over edges in sheet metal, remove bums, chamfer edges, and install bushings and protective strips of insulating material to protect the conductors.

H. Extra Conductor Length: For conductors to be connected by others, install minimum 6 feet of extra conductor in freestanding panels and minimum 2 feet in other assemblies.

- END OF SECTION -

SECTION 16450

GROUNDING

PART 1 -- GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI): C2, National Electrical Safety Code (NESC).

2. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).

1.02 SUBMITTALS

A. Shop Drawings:

1. Product Data:

a. Exothermic weld connectors.

b. Mechanical connectors.

1.03 UL COMPLIANCE

A. Materials manufactured within scope of Underwriters Laboratories shall conform to UL Standards and have an applied UL listing mark.

PART2 -- PRODUCTS

2.01 GROUND ROD

A. Material: Copper clad.

B. Diameter: 3/4 inch.

C. Length: 20 feet.

2.02 GROUND CONDUCTORS

A. As specified in Section 16120, CONDUCTORS.

2.03 CONNECTORS

A. Exothermic Weld Type:

1. Outdoor Weld: Suitable for exposure to elements or direct burial.

2. Indoor Weld: Utilize low-smoke, low-emission process.

3. Manufacturers:

   a. Erico Products, Inc.; Cadweld amd Cadweld Exolon.

   b. Thermoweld.

B. Mechanical Type: Split-bolt, saddle, or cone screw type; copper alloy material.

1. Manufacturers:

   a. Burndy Corp.

   b. Thomas and Betts Co.

PART 3 -- EXECUTION

3.01 GENERAL

A. Grounding shall be in compliance with NFPA 70 and ANSI C2.

B. Ground electrical service neutral at service entrance equipment to supplementary grounding electrodes.

C. Ground each separately derived system neutral to nearest effectively grounded building structural steel member or separate grounding electrode.

D. Bond together system neutrals, service equipment enclosures, exposed non-current-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.

E. Shielded Power Cables: Ground shields at each splice or termination in accordance with recommendations of splice or termination manufacturer.

F. Shielded Control Cables:

1. Ground shield to ground bus at power supply for analog signal.

2. Expose shield minimum I inch at termination to field instrument and apply heat shrink tube.

3. Do not ground control cable shield at more than one point.

3.02 WIRE CONNECTIONS

A. Ground Conductors: Install in conduit containing power conductors and control circuits above 50 volts.

B. Nonmetallic Raceways and Flexible Tubing: Install an equipment grounding conductor connected at both ends to non current-carrying grounding bus.

C. Connect ground conductors to raceway grounding bushings.

D. Extend and connect ground conductors to ground bus in all equipment containing a ground bus.

E. Connect enclosure of equipment containing ground bus to that bus.

F. Bolt connections to equipment ground bus.

G. Bond grounding conductors to metallic enclosures at each end, and to intermediate metallic enclosures.

H. Junction Boxes: Furnish materials and connect to equipment grounding system with grounding clips mounted directly on box, or with 3/8-inch machine screws.

3.03 GROUND RODS

A. Install full length with conductor connection at upper end.

B. Install with connection point below finished grade, unless otherwise shown.

3.04 CONNECTIONS

A. General:

1. Above grade Connections: Use either exothermic weld or mechanical-type connectors.

2. Below grade Connections: Install exothermic weld type connectors.

3. Remove paint, dirt, or other surface coverings at connection points to allow good metal-to-metal contact.

4. Notify VILLAGE prior to backfilling ground connections.

B. Exothermic Weld Type:

1. Wire brush or file contact point to bare metal surface.

2. Use welding cartridges and molds in accordance with manufacturer's recommendations.

3. Avoid using badly worn molds.

4. Mold to be completely filled with metal when making welds.

5. After completed welds have cooled, brush slag from weld area and thoroughly clean joint.

C. Mechanical Type:

1. Apply homogeneous blend of colloidal copper and rust and corrosion inhibitor before making connection.

2. Install in accordance with connector manufacturer's recommendations.

3. Do not conceal mechanical connections.

3.06 MANHOLE AND HANDHOLE GROUNDING

A. Install one ground rod inside each.

B. Ground Rod Floor Protrusion: 4 to 6 inches above floor.

C. Make connections of grounding conductors fully visible and accessible.

D. Connect all non current-carrying metal parts, and any metallic raceway grounding bushings to ground rod with No. 6 AWG copper conductor.

3.07 SURGE PROTECTION EQUIPMENT GROUNDING

A. Connect surge arrestor ground terminals to equipment ground bus.

- END OF SECTION -

SECTION 16950

ELECTRICAL TESTING

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI):

a. 450, Recommended Practice for Maintenance, Testing, and Replacement of Large lead Storage Batteries for Generator Stations and Substations.

b. C2, National Electrical Safety Code.

c. C37.20.1, Metal-Enclosed Low Voltage Power Circuit Breaker Switchgear.

d. C37.20.2, Metal-Clad and Station-Type Cubicle Switchgear.

e. C37.20.3, Metal-Enclosed Interrupter Switchgear.

f. C62.33, Standard Test Specifications for Varistor Surge-Protective Devices.

2. American Society for Testing and Materials (ASTM):

a. D665, Standard Test Method for Rust Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water.

b. DS77, Standard Test Method for Dielectric Breakdown Voltage of Insulating Liquids Using Disk Electrodes.

c. D923, Standard Test Method for Sampling Electrical Insulating Liquids.

d. D924, Standard Test Methods for A-Class Characteristics and Relative Permittivity (Dielectric Constant) of Electrical Insulating Liquids.

e. D971, Standard Test Method for Interfacial Tension of 0.1 Against Water by the Ring Method.

f. D974, Standard Test Method for Acid and Base Number by Color-Indicator Titration.

g. D1298, Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.

h. D1500, Standard Test Method for ASTM Color of Petroleum Products.

i. D1524, Standard Test Method for Visual Examination of Used Electrical Insulating Oils of Petroleum Origin in the Field.

j. D1533, Standard Test Methods for Water in Insulating Liquids.

k. D1816, Standard Test Method for Dielectric Breakdown Voltage of Insulating Oils of Petroleum Origin Using VDE Electrodes.

l. D2285, Standard Test Method for Interfacial Tension of Electrical Insulating Oils of Petroleum Origin Against Water by the Drop-Weight Method.

3. Institute of Electrical and Electronics Engineers (IEEE):

a. 43, Recommended Practice for Testing Insulating Resistance of Rotating Machinery.

b. 48, Standard Test Procedures and Requirements for High-Voltage Alternating-Current Cable Terminators.

c. 81, Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

d. 95, Recommended Practice for Insulation Testing of Large AC Rotating Machinery with High Direct Voltage.

e. 118, Standard Test Code for Resistance Measurement.

f. 400, Guide for Making High-Direct-Voltage Tests on Power Cable Systems in the Field.

4. National Electrical Manufacturers Association (NEMA):

a. AB 4, Guideline for Inspection and Preventive Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Applications.

b. PB 2, Dead front Distribution Switchboards.

c. WC 7, Cross-Linked-Thermosetting-Polyethylene- Wire and Cable for the Transmission and Distribution of Electrical Energy.

d. WC 8, Ethylene-Propylene-Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

5. International Electrical Testing Association (NETA): ATS, Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

6. National Fire Protection Association (NFPA):

   a. 70, National Electrical Code (NEC).

   b. 70E, Standard for Electrical Safety Requirements for Employee Workplaces.

1.02 SUBMITTALS

A. Administrative Submittals: Submit 30 days prior to performing inspections or tests:

   1. Schedule for performing inspection and tests.

   2. List of references to be used for each test.

   3. Sample copy of equipment and materials inspection form(s).

   4. Sample copy of individual device test form.

   5. Sample copy of individual system test form.

B. Quality Control Submittals: Submit within 30 days after completion of test:

   1. Test or inspection reports and certificates for each electrical item tested.

C. Contract Closeout Submittals:

   1. Operation and Maintenance Data:

      a. In accordance with Section 01730, OPERATION AND MAINTENANCE MANUALS.

      b. After test or inspection reports and certificates have been reviewed by Village and returned, insert a copy of each in operation and maintenance manual.

1.03 QUALITY ASSURANCE

A. Testing Firm Qualifications:

   1. Corporately and financially independent organization functioning as an unbiased testing authority.

   2. Professionally independent of manufacturers, suppliers, and installers, of electrical equipment and systems being tested.

   3. Employer of engineers and technicians regularly engaged in testing and inspecting of electrical equipment, installations, and systems.

   4. Supervising engineer accredited as Certified Electrical Test Technologist by National Institute for Certification of Engineering Technologists

(NICET), or International Electrical Testing Association and having a minimum of 5 years testing experience on similar projects.

5. Technicians certified by NICET or NETA.

6. Assistants and apprentices assigned to project at ratio not to exceed two certified to one noncertified assistant or apprentice.

7. Registered Professional Engineer to provide comprehensive project report outlining services performed, results of such services, recommendations, actions taken, and opinions.

8. In compliance with OSHA Title 29, Part 1907 criteria for accreditation of testing laboratories or a full Member Company of International Electrical Testing Association.

B. Test equipment shall have an operating accuracy equal to, or greater than, requirements established by NETA ATS.

C. Test instrument calibration shall be in accordance with NETA ATS.

1.04 SEQUENCING AND SCHEDULING

A. Perform inspection and electrical tests after equipment has been installed.

B. Perform tests with apparatus de-energized whenever feasible.

C. Inspection and electrical tests on energized equipment are to be:

1. Scheduled with Village prior to de-energization.

2. Minimized to avoid extended period of interruption to the operating plant equipment.

D. Notify Village at least 24 hours prior to performing tests on energized electrical equipment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Tests specified in this section are to be performed in accordance with the requirements of Section 01660, EQUIPMENT TESTING AND STARTUP.

B. Tests and inspection shall establish that:

1. Electrical equipment is operational within industry and manufacturer's tolerances.

2. Installation operates properly.

3. Equipment is suitable for energization.

4. Installation conforms to requirements of Contract Documents and NFPA 70, NFPA 70E, and ANSI C2.

C. Perform inspection and testing in accordance with NETA ATS, industry standards, and manufacturer's recommendations.

D. Adjust mechanisms and moving parts for free mechanical movement.

E. Adjust adjustable relays and sensors to correspond to operating conditions, or as recommended by manufacturer.

F. Verify nameplate data for conformance to Contract Documents.

G. Realign equipment not properly aligned and correct unevenness.

H. Properly anchor electrical equipment found to be inadequately anchored.

I. Tighten accessible bolted connections, including wiring connections, with calibrated torque wrench to manufacturer's recommendations, or as otherwise specified.

J. Clean contaminated surfaces with cleaning solvents as recommended by manufacturer.

K. Provide proper lubrication of applicable moving parts.

L. Inform Village of working clearances not in accordance with NFPA 70.

M. Investigate and repair or replace:

1. Electrical items that fail tests.

2. Active components not operating in accordance with manufacturer's instructions.

3. Damaged electrical equipment.

N. Electrical Enclosures:

1. Remove foreign material and moisture from enclosure interior.

2. Vacuum and wipe clean enclosure interior.

3. Remove corrosion found on metal surfaces.

4. Repair or replace, as determined by Village, door and panel sections having dented surfaces.

5. Repair or replace, as determined by Village, poor fitting doors and panel sections.

6. Repair or replace improperly operating latching, locking, or interlocking devices.

7. Replace missing or damaged hardware.

8. Finish:

a. Provide matching paint and touch up scratches and mars.

b. If required due to extensive damage, as determined by Village, refinish the entire assembly.

O. Replace fuses and circuit breakers that do not conform to size and type required by the Contract Documents.

3.02 LOW VOLTAGE CABLES, 600 VOLTS MAXIMUM

A. Visual and Mechanical Inspection:

1. Inspect Each Individual Exposed Power Cable No. 8 and Larger For:

a. Physical damage.

b. Proper connections in accordance with single-line diagram.

c. Cable bends not in conformance with manufacturer's minimum allowable bending radius where applicable.

d. Color coding conformance with specifications.

e. Proper circuit identification.

2. Mechanical Connections For:

a. Proper lug type for conductor material.

b. Proper lug installation.

c. Bolt torque level in accordance with NETA ATS, Table 10. 1, unless otherwise specified by manufacturer.

3. Shielded Instrumentation Cables For:

a. Proper shield grounding.

b. Proper terminations.

c. Proper circuit identification.

4. Control Cables For:

a. Proper termination.

b. Proper circuit identification.

B. Electrical Tests for Conductors No. 8 and Larger:

1. Insulation Resistance Tests:

a. Test each conductor with respect to ground and to adjacent conductors per IEEE 118 procedures for 1 minute.

b. Evaluate ohmic values by comparison with conductors of same length and type.

c. Investigate values less than 50 megohms.

d. Utilize 1,000V dc megohmmeter for 600V insulated conductors.

2. Continuity test by ohmmeter method to ensure proper cable connections.

3.03 GROUNDING SYSTEMS

A. Visual and Mechanical Inspection:

1. Equipment and circuit grounds in motor control centers, panelboards, switchboards, and switchgear assemblies for proper connection and tightness.

2. Ground bus connections in motor control centers, panelboards, switchboards, and switchgear assemblies for proper termination and tightness,

3. Effective transformer core and equipment grounding.

4. Accessible connections to grounding electrodes for proper fit and tightness.

5. Accessible exothermic-weld grounding connections to verify that molds were fully filled, and proper bonding was obtained.

3.05 LOW VOLTAGE MOTOR CONTROL

A. Visual and Mechanical Inspection, as applicable:

1. Proper operation of indicating and monitoring devices.

2. Verify performance of each control device and feature as part of the motor starters impacted in the existing motor control center.

3. Control Wiring:

a. Compare wiring to local and remote control, and protective devices with elementary diagrams.

b. Check for proper conductor lacing and bundling.

c. Check for proper conductor identification.

d. Check for proper conductor lugs and connections.

4. Exercise active components.

5. Inspect Contactors For:

a. Correct torque of all connections.

6. Compare overload heater rating with full-load current for proper size.

19. Compare motor protector and circuit breaker with motor characteristics and power factor correction capacitors for proper size.

20. Check phase rotation to ensure reconnected motor rotates in correct direction.

B. Electrical Tests, as applicable:

1. Insulation Resistance Tests:

a. Applied megohmmeter dc voltage in accordance with NETA ATS, Table 10.2.

b. Bus section phase-to-phase and phase-to-ground for 1 minute on each phase.

c. Contactor phase-to-ground and across open contacts for 1 minute on each phase.

d. Starter section phase-to-phase and phase-to-ground on each phase with starter contacts closed and protective devices open.

e. Test values to comply with NETA ATS, Table 10.2.

2. Overpotential Tests:

a. Maximum applied ac or dc voltage in accordance with NETA ATS, Table 7.1.2.

b. Phase-to-phase and phase-to-ground for 1 minute for each phase of each bus section.

c. Test results evaluated on pass/fail basis.

3. Operational test by initiating control devices to affect proper operation.

- END OF SECTION -