PLANS OF PROPOSED
CITY OF SEBRING LIFT STATION AND FORCEMAIN EXTENSION

IN HIGHLANDS COUNTY, FROM THE EXISTING HAMMOCK MOBILE ESTATES WASTEWATER TREATMENT PLANT TO THE CITY OF SEBRING COLLECTION SYSTEM ALONG HAMMOCK ROAD, BEGINNING AT THE EXISTING HAMMOCK MOBILE ESTATES WASTEWATER TREATMENT PLANT MEANDER SOUTHERLY THROUGH THE EXISTING HAMMOCK MOBILE ESTATES TREATMENT TO HAMMOCK ROAD AND TIE INTO THE EXISTING 4" FORCEMAIN OF THE CITY OF SEBRING USING A STAINLESS STEEL TAPPING SADDLE TO BE PLACED WITHIN THE HAMMOCK ROAD RIGHT-OF-WAY

DATE OF PREPARATION:	12-FEB-18
STRAP NUMBER:	C-35-34-28-050-0AA0-0000
PROPERTY OWNER:	HAMMOCK ESTATES ROC INC
MAILING ADDRESS:	3022 ROGER ST SEBRING, FL 33872
DEVELOPMENT:	HAMMOCK MOBILE ESTATES LIFT STATION AND FORCEMAIN CONSTRUCTION AND DISMANTLE AND REMOVE EXISTING WWTP
SITE ADDRESS:	3022 ROGER ST SEBRING, FL 33872 SECTION 35, TOWNSHIP 34 S, RANGE 28 E
SYSTEM CONNECTED TO:	CITY OF SEBRING 368 SOUTH COMMERCE AVENUE SEBRING, FL 33870 863-471-5100
ENGINEER:	ROGER DALE POLSTON, P.E. POLSTON ENGINEERING, INC. 2925 KENILWORTH BOULEVARD SEBRING, FL 33870 (863) 385-5564 (863) 385-2462 FAX
SURVEYOR:	GERMAINE SURVEYING, INC. GARY GERMAINE 3803 KENILWORTH BLVD SEBRING, FL 33870 (863) 385-6856

NOTES:
--DUE TO THE PROXIMITY OF THE PROPOSED SEWER LINE TO THE EXISTING POWER POLES THE CONTRACTOR SHALL CONTACT THE POWER COMPANY TO HOLD THE POWER POLES AS NECESSARY DURING CONSTRUCTION
--THE UNDERGROUND UTILITY LINES ARE SHOWN ON THESE DRAWINGS ARE REPRESENTATIONAL ONLY. FIELD INVESTIGATION FOR EXACT LOCATIONS IS REQUIRED AND WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
--ALL DISTURBED PREVIOUSLY IMPROVED AREAS WILL BE COMPLETELY RESTORED TO ORIGINAL CONDITIONS, THIS INCLUDES SODDING, LANDSCAPING, IRRIGATION SYSTEMS, STRUCTURES, ETC.
--ALL CONSTRUCTION WITHIN THE RIGHT-OF-WAY IS TO BE IN ACCORDANCE WITH THE CURRENT F.D.O.T. ROADWAY AND TRAFFIC DESIGN STANDARD INDEX.
--THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTENANCE OF TRAFFIC DURING THE DURATION OF CONSTRUCTION.

GENERAL CONSTRUCTION NOTES
1. ALL CONSTRUCTION INCLUDING RESTORATION WORK SHALL CONFORM TO CITY OF SEBRING, HIGHLANDS COUNTY, OR F.D.O.T. STANDARDS, DEPENDING ON JURISDICTION.
2. ALL UTILITY COMPANIES IN THE CONSTRUCTION AREA SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ALLOW THEM TIME TO LOCATE AND IDENTIFY ALL BURIED SERVICES.
3. COMPLETE "AS BUILT" PLANS AND INFORMATION CONCERNING PIPES, SERVICES, VALVES, FITTINGS, QUANTITY AND GRADE OF INSTALLED ITEMS AND ALL OTHER PERTINENT INFORMATION SHALL BE ACCURATELY RECORDED AND SUBMITTED TO THE ENGINEER PRIOR TO THE FINAL ACCEPTANCE OF THE COMPLETED INSTALLATION.

FORCE MAIN
PIPE SPECIFICATION:
FORCE MAIN - SMALLER THAN 4", SDR 26
AWWA APPROVED RING-TITE PVC CLASS 200,
D-2241 (COLOR GREEN)

DIRECTIONAL BORE PIPE - 2" SDR 11 HDPE,
ASTM D 3350, PE 3408, ASTM F714
GREEN STRIPED FOR SEWER

INSTALLATION INSTRUCTIONS - THE PIPE SHALL BE BEDDED IN COMPACTED CLEAN SAND WITH ALL ORGANIC MATTER AND DEBRIS REMOVED.
BACKFILL SHALL BE OF SIMILAR MATERIAL AND PLACED BY HAND AND COMPACTED BY TAMPING TO AT LEAST 12" OVER THE TOP OF THE PIPE. ALL FILL SHOULD BE CLEAN SAND AND PLACED IN APPROXIMATE 12" LAYERS AND COMPACTED BY ROLLING OR TAMPING.

TESTING - WILL REQUIRE THE PRESENCE OF THE ENGINEER OR HIS DESIGNATED INSPECTOR. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS TO SECURE A WATERTIGHT SEWER LINE UNDER ALL CONDITIONS. ALL VISIBLE DAMAGE OR FLAWS SHALL BE REPAIRED OR REPLACED REGARDLESS OF THE OUT COME OF ANY TESTING PERFORMED.

FORCE MAINS - THE FORCE MAIN SHALL BE TESTED UNDER A HYDROSTATIC PRESSURE OF 70 PSI FOR AT LEAST 2 HOURS. (SEE DIRECTIONAL BORE TESTING NOTES FOR ADDITIONAL INFORMATION)

THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT TO PERFORM ALL TESTS.

V. LAYING PIPE:
A. BEFORE BEING LOWERED AND WHILE SUSPENDED, THE PIPE SHALL BE INSPECTED FOR DEFECTS. DEFECTIVE, DAMAGED, OR UNSOUND PIPE WILL BE REJECTED. THE FORCE MAIN SHALL BE LAID UNIFORMLY WITH NO LOW OR HIGH SPOTS. BEFORE THE PIPE IS LAID IN THE TRENCH THE EARTH FORMING THE BEDS SHALL BE CAREFULLY FREED OF ALL STONES, ROOTS, ETC. THE BOTTOM OF THE TRENCH WILL BE CLEANED BY HAND AND A FIRM FULL LENGTH OF SUPPORT FORMED FOR ALL PIPE AND FITTINGS. ALL PIPE SHALL BE LAID IN A BED OF SAND OF MINIMUM DEPTH OF 12 INCHES WITH 6 INCHES OF SAND ON EACH SIDE OF THE PIPE PROPERLY TAMPED AND WITH THE FIRST 12 INCHES OF COVER TO BE CLEAN SAND. NO STONE OF ANY KIND SHALL BE ALLOWED AS COVER MATERIAL FOR THE PIPE. COVER SHALL BE A MINIMUM OF 36 INCHES.
B. PREPARATORY TO MAKING PIPE JOINTS ALL SURFACES OF THE PORTIONS OF THE PIPE AND JOINTING MATERIAL TO BE JOINED SHALL BE CLEAN AND DRY. FOR THE INSTALLATION OF PIPES WITH THE "COMPRESSION RING" FITTING A RING LUBRICANT SHALL BE APPLIED TO THE BEVELED PORTION OF THE SPIGOT END. SUCH LUBRICANT SHALL BE OF THE TYPE AND QUALITY AS RECOMMENDED BY THE PIPE MANUFACTURER. CARE SHALL BE EXERCISED TO INSURE THAT THE COMPRESSION RING IS PROPERLY SEATED AND THE PIPE IS COMPLETELY INSERTED SO THAT THE REFERENCE MARKS ON THE SPIGOT END CAN JUST BE SEEN.
C. CONCRETE THRUST BLOCKS: CONCRETE THRUST BLOCKS SHALL BE INSTALLED AT ALL LOCATIONS WHERE HORIZONTAL AND/OR VERTICAL DEFLECTIONS ARE MADE AT JUNCTIONS OR JOINTS OF THE FORCE MAIN. CONCRETE SHALL BE PLACED BETWEEN UNDISTURBED GROUND AND THE FILLING TO BE ANCHORED. THE CONCRETE SHALL BE SO PLACED THAT THE PIPE JOINT AND FITTING WILL BE AVAILABLE FOR REPAIRS. CONCRETE PLACED OVER FITTINGS OR JOINTS WILL BE REMOVED BY THE CONTRACTOR. CONCRETE THRUST BLOCKS SHALL BE SIZED ACCORDING TO THE ILLUSTRATIVE STANDARDS.
D. METALLIC LOCATION: AFTER THE PIPE HAS BEEN INSTALLED, AND BEFORE BACK FILLING, A CONTINUOUS METALLIC CONDUCTOR SHALL BE PLACED ONE FOOT OVER THE CENTERLINE OF THE PIPE TO AID IN DETECTION OF THE NON-METALLIC PIPE. THE MATERIAL SHALL BE "DETECT A TAPE", "TERRA TAPE", OR OTHER ELECTRONICALLY DETECTABLE PLASTIC TAPE TO AID IN THE LOCATION OF THE PIPE BY USE OF CONVENTIONAL PIPE LOCATORS, AND SHALL BE LABELED AS "FORCE MAIN BELOW" AND GREEN IN COLOR.
E. BACKFILLING: ALL BACKFILLING SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE SIX, SECTION FOUR, UTILITY PERMITS, OF THESE REGULATIONS.

VI. FIELD TESTING
A. ALL TESTS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF THE ENGINEER OR HIS AUTHORIZED REPRESENTATIVE. ALL EXPENSE OF THESE TESTS SHALL BE BORNE BY THE CONTRACTOR.
B. AFTER THE PIPE HAS BEEN LAID AND SECURED, IT SHALL BE TESTED. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY EQUIPMENT AND PERFORM ALL WORK IN CONNECTION WITH THE TESTS.
C. ALL VISIBLE LEAKS SHALL BE REPAIRED REGARDLESS OF THE TOTAL AMOUNT OF LEAKAGE. ALL LINES WHICH FAIL TO MEET THESE TESTS SHALL BE REPAIRED AND RETESTED AS NECESSARY UNTIL THE LEAKAGE REQUIREMENTS ARE COMPLIED WITH.
D. THE ALLOWABLE LIMITS OF LEAKAGE SHALL NOT EXCEED THE FOLLOWING: THE ALLOWABLE LIMITS OF INFILTRATION, EXFILTRATION, OR LEAKAGE FOR THE ENTIRE SYSTEM OR ANY PORTION THEREOF, SHALL NOT EXCEED A RATE OF 50 GALLONS PER INCH DIAMETER OF SEWER PIPE PER MILE OF SEWER PIPE PER 24 HOURS.

VII. PIPE & FITTINGS:
A. POLYVINYLCHLORIDE PIPE: SHALL CONFORM TO THE ASTM DESIGNATION D2241; MINIMUM CLASS C-900 (SDR 25, CLASS 160). ELASTOMERIC GASKET BELL-END PIPE OR ELASTOMERIC GASKET COUPLINGS ARE TO BE USED FOR ALL JOINTS AND SHALL CONFORM TO ASTM D3139 AND F477.

WATERLINE CROSSING TABLE

	HORIZONTAL SEPARATION	CROSSING (1)	JOINT SPACING @ CROSSINGS (FULL JOINT CENTERED)
STORM SEWER, STORMWATER FORCE MAIN, RECLAIMED WATER (2)	WATER MAIN / 3' MINIMUM / OTHER	WATER MAIN / 12" IS THE MINIMUM, EXCEPT FOR STORM SEWER, THEN 6" IS THE MINIMUM AND 12" IS PREFERRED / OTHER	ALTERNATE 3' MINIMUM / OTHER / WATER MAIN
VACUUM SANITARY SEWER	WATER MAIN / 10' PREFERRED 3' MINIMUM / OTHER	WATER MAIN / 12" IS PREFERRED 6" IS THE MINIMUM / OTHER	ALTERNATE 3' MINIMUM / OTHER / WATER MAIN
GRAVITY OR PRESSURE SANITARY SEWER, SANITARY SEWER FORCE MAIN, RECLAIMED WATER (4)	WATER MAIN / 10' PREFERRED 6' MINIMUM (3) / OTHER	WATER MAIN / 12" IS THE MINIMUM, EXCEPT FOR GRAVITY SEWER, THEN 6" IS THE MINIMUM AND 12" IS PREFERRED / OTHER	ALTERNATE 6' MINIMUM / OTHER / WATER MAIN

(1) WATER MAIN SHOULD CROSS ABOVE OTHER PIPE. WHEN WATER MAIN MUST BE BELOW OTHER PIPE THE MINIMUM SEPARATION IS 12 INCHES.
(2) RECLAIMED WATER REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
(3) 3 FEET FOR GRAVITY SANITARY SEWER WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST 6 INCHES ABOVE THE TOP OF THE GRAVITY SANITARY SEWER.
(4) RECLAIMED WATER NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.

DIRECTIONAL BORE PIPE SPECIFICATIONS: 2" SDR 11 HDPE
ASTM D3350 AND ASTM F-714
GREEN STRIPE POLYETHYLENE PE3408
HDPE FORCE MAIN

NOTE: SDR 11 HDPE WILL BE USED FOR ALL DIRECTIONAL BORES.

DIRECTIONAL BORE NOTES FOR FORCE MAIN:
-BEFORE ANY CONSTRUCTION IS STARTED, THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL UTILITIES AND VERIFYING EXACT LOCATION AND ELEVATION OF UTILITIES NOT LIMITED TO TELEPHONE, WATER, SEWER, GAS AND CABLE.
-DURING DIRECTIONAL BORE OPERATION, THE CONTRACTOR (AT HIS EXPENSE, IF REQUIRED) MUST HAVE A REPRESENTATIVE OF EACH UTILITIES ON SITE AS A PREVENTATIVE MEASURE IN THE EVENT OF RUPTURE OF ANY UTILITIES SERVICES. IN LIEU OF A REPRESENTATIVE FROM THE UTILITY A NOTARIZED DOCUMENT FROM THE UTILITY STATING A REPRESENTATIVE IS NOT NEEDED ON SITE WILL BE ACCEPTABLE.
-ANY ITEMS GOVERNING THE CONSTRUCTION NOT COVERED IN THE PLANS AND SPECIFICATIONS WILL BE GOVERNED BY THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, "UTILITY ACCOMMODATION MANUAL", DATED JUNE 1993, DOCUMENT NUMBER 710-020, THE MAINTENANCE ENGINEER, OR HIS REPRESENTATIVE.
-ALL PERMITS FOR CONSTRUCTION WILL BE POSTED ON SITE.
-THE ACTUAL CROSSING OPERATION SHALL BE ACCOMPLISHED DURING DAYLIGHT HOURS.
-ANY ALTERATION OR WAIVER MUST BE APPROVED BY THE HIGHLANDS COUNTY ENGINEER AND THE ENGINEER OF RECORD.
-ERECTION OR INSTALLATION OF APPROPRIATE SAFETY AND WARNING DEVICES IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION MANUAL ON M.V.T.C.D. PRIOR TO BEGINNING WORK.
-SDR 11 WILL BE FLUSHED WITH CLEAN WATER AND BOTH ENDS CAPPED.
*** NOTE: ALL CROSSINGS OF WATER LINES OVER SEWER LINE AND/OR STORM DRAINS WILL HAVE A 18" VERTICAL SEPARATION OR:
1.) WATER LINE WILL BE ENCASED WITH CONCRETE 10' BOTH SIDES OF CROSSING.
2.) SEWER LINE WILL BE ENCASED AIR TIGHT WITH PVC 10' BOTH SIDES OF CROSSING

SDR-11 FORCE MAIN DIRECTIONAL PIPE:
-THE SDR-11 FORCE MAIN PIPE SHALL BE TESTED UNDER A HYDROSTATIC PRESSURE OF 70 PSI FOR AT LEAST 2 HOURS PRIOR TO CONNECTING TO THE SEWER SYSTEM.
-THE FORCE MAIN SDR-11 PIPE SHALL BE FLUSHED WITH CLEAN WATER PRIOR TO CONNECTION TO THE SEWER SYSTEM.

TESTING H.D.P.E. DIRECTIONAL BORE AND OPEN TRENCHING HDPE PIPE:
-THE H.D.P.E. PIPING SHOULD BE PRESSURE TESTED BEFORE BEING PUT INTO SERVICE. AFTER ALL FREE AIR IS REMOVED FROM THE TEST SECTION, RAISE THE PRESSURE AT A STEADY RATE TO THE REQUIRED PRESSURE. THE PRESSURE IN THE SECTION SHALL BE MEASURED AS CLOSE AS POSSIBLE TO THE LOWEST POINT OF THE TEST SECTION.
-TEST PRESSURE SHOULD NOT EXCEED 1.5 TIMES THE RATED OPERATING PRESSURE OF THE PIPE OR THE LOWEST RATED COMPONENT IN THE SYSTEM. INITIALLY, THE PIPE SHOULD BE RAISED TO TEST PRESSURE AND ALLOWED TO STAND WITHOUT MAKEUP PRESSURE FOR A SUFFICIENT TIME TO ALLOW FOR EXPANSION OF THE PIPE. THIS USUALLY OCCURS WITHIN 2-3 HOURS. AFTER EQUILIBRIUM IS ESTABLISHED, THE TEST SECTION IS PRESSURIZED TO 1.5 TIMES OPERATING PRESSURE, THE PUMP IS TURNED OFF, AND THE FINAL TEST PRESSURE IS HELD FOR 2 HOURS.
-POLYETHYLENE PIPE HOLDS PRESSURE BY DEVELOPING STRESS IN ITS WALLS. THIS PROCESS CONTINUES THROUGHOUT THE TEST PERIOD, AND THE PIPE INCREASES SLIGHTLY IN DIAMETER. PRESSURE DROP WILL OCCUR DUE TO CONTINUED EXPANSION OF THE PIPE DURING THE SECOND PHASE OF THE TEST. A DROP IN PRESSURE DURING THE TEST PHASE IS COMMON AND DOES NOT PROVE WITH ABSOLUTE CERTAINTY THAT A LEAK OR FAILURE IS PRESENT IN THE SYSTEM. POLYETHYLENE PIPE IS TESTED BY MEASURING THE "MAKE UP" WATER REQUIRED TO RETURN THE SECTION TO TEST PRESSURE. ALLOWABLE AMOUNTS OF MAKEUP WATER FOR EXPANSION DURING THE PRESSURE TEST ARE SHOWN IN THE TABLE BELOW. IF THE PRESSURE IS NOT RETURNED WITHIN THE ALLOWABLE VOLUME OF WATER, THE TEST FAILS. IF THERE ARE NO VISUAL LEAKS OR SIGNIFICANT PRESSURE DROPS DURING THE FINAL TEST PERIOD, THE PIPELINE PASSES THE TEST.

NOTE: UNDER NO CIRCUMSTANCES SHALL THE TOTAL TIME UNDER THE TEST EXCEED EIGHT (8) HOURS AT 1.5 TIMES THE PRESSURE RATING OF THE LOWEST RATED COMPONENT IN THE SYSTEM. IF THE TEST IS NOT COMPLETED DUE TO LEAKAGE, EQUIPMENT FAILURE, ETC., THE TEST SECTION SHALL BE ALLOWED TO "RELAX" FOR EIGHT (8) HOURS PRIOR TO THE NEXT TEST.

HYDROSTATIC TESTS
1) ALL COMPONENTS OF THE WATER DISTRIBUTION SYSTEM, INCLUDING FITTINGS, HYDRANTS, SERVICES, CONNECTIONS, AND VALVES SHALL BE HYDROSTATIC TESTED. SPECIFIC DISTRIBUTION SYSTEM COMPONENTS INCLUDING FITTINGS, VALVES, AND HYDRANTS, SHALL REMAIN UNCOVERED UNTIL TESTED AND APPROVED, PROVIDED, HOWEVER, THAT PIPE TRENCHES UNDER TRAVELED STREETS OR ROADS MAY BE BACKFILLED WITH THE PERMISSION OF THE PROJECT ENGINEER. NO TESTING SHALL BE DONE UNTIL ALL CONCRETE THRUST BLOCKING IS IN PLACE AND SET. IF HIGH EARLY STRENGTH CONCRETE IS USED, TESTING MAY BE CONDUCTED 48 HOURS AFTER THE CONCRETE IS PLACED; OTHERWISE, THRUST BLOCK CONCRETE MUST CURE 5 DAYS BEFORE PRESSURE TESTING COMMENCES. IN TESTING, THE PART OF THE SYSTEM UNDER TEST SHALL BE FILLED WITH POTABLE WATER AND SUBJECTED TO A SUSTAINED PRESSURE OF 150 PSI. THE PIPING SHALL BE TESTED IN SECTIONS, THEREBY TESTING EACH VALVE FOR SECURE CLOSURE. WHILE THE SYSTEM IS BEING FILLED, AIR SHALL BE CAREFULLY AND COMPLETELY EXHAUSTED. IF PERMANENT AIR VENTS ARE NOT LOCATED AT ALL HIGH POINTS, THE CONTRACTOR SHALL INSTALL CORPORATION STOPS OR FITTINGS AND VALVES AT SUCH POINTS SO THE AIR CAN BE EXPELLED AS THE PIPE SYSTEM IS SLOWLY FILLED WITH WATER.

2) TEST PRESSURE SHALL BE MAINTAINED BY PUMPING FOR AT LEAST TWO HOURS AND UNTIL ALL SECTIONS UNDER TEST HAVE BEEN CHECKED FOR EVIDENCE OF LEAKAGE. RATE OF LOSS SHALL NOT EXCEED THAT SPECIFIED BELOW, "ALLOWABLE LIMITS FOR LEAKAGE". VISIBLE LEAKS SHALL BE CORRECTED REGARDLESS OF TOTAL LEAKAGE SHOWN BY TEST.

3) THE SYSTEM AS A WHOLE, OR ANY PART, SHALL BE TESTED PRIOR TO CONSTRUCTION OF ANY SUBDIVISION ROADWAY OR PAVEMENT OVER THE WATER SYSTEM.

4) THE SYSTEM AS A WHOLE, OR ANY PART, SHALL BE RETESTED AFTER COMPLETION OF BACKFILLING WHEN IT IS BELIEVED NECESSARY, AS DIRECTED BY THE PROJECT ENGINEER. THE SYSTEM SHALL ALSO BE RETESTED UPON COMPLETION OF SUBDIVISION ROADWAY OR OTHER PAVEMENT CONSTRUCTION THAT IS CONSTRUCTED OVER THE WATER SYSTEM.

5) ALL PUMPS, GAUGES, AND MEASURING DEVICES SHALL BE FURNISHED, INSTALLED, AND OPERATED BY THE CONTRACTOR AND ALL SUCH EQUIPMENT AND DEVICES AND THEIR INSTALLATION SHALL BE APPROVED BY THE PROJECT ENGINEER. ALL PRESSURES AND LEAKAGE TESTING SHALL BE DONE IN THE PRESENCE OF A REPRESENTATIVE OF THE ENGINEER.

6) WATER FOR TESTING AND FLUSHING SHALL BE POTABLE WATER PROVIDED BY THE CONTRACTOR FROM A SOURCE APPROVED BY THE PROJECT ENGINEER.

THE HYDROSTATIC PRESSURE TESTS SHALL BE PERFORMED AS SPECIFIED AND NO INSTALLATION, OR SECTION THEREOF, WILL BE ACCEPTABLE UNTIL THE LEAKAGE IS LESS THAN THE NUMBER OF GALLONS PER HOUR AS DETERMINED BY THE FORMULA:

$$L = \frac{N * D * \sqrt{P}}{7400}$$

IN WHICH,
L = ALLOWABLE LEAKAGE, IN GALLONS PER HOUR
N = APPROXIMATE NUMBER OF JOINTS IN THE SECTION OF MAIN BEING TESTED
D = PIPE DIAMETER; IN INCHES
P = THE AVERAGE TEST PRESSURE DURING THE TEST, IN GAUGE PSI

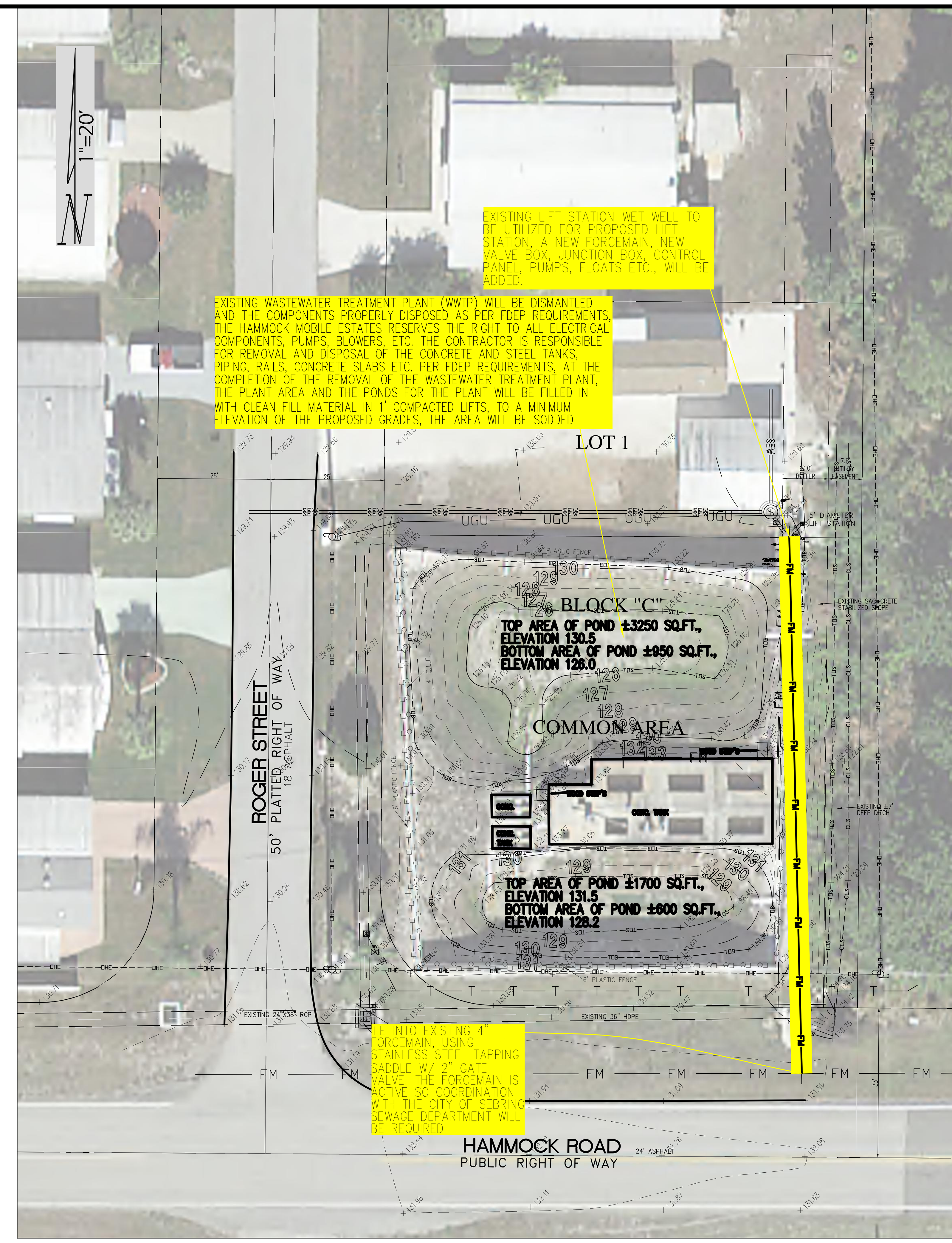
ALLOWANCE FOR EXPANSION (U.S. GALLONS / 100 FEET OF PIPE)

NOMINAL PIPE SIZE (INCHES)	2 HOUR TEST
2 and 3	0.15
4	0.25
6	0.60
8	1.0
10	1.30
12	2.3
16	3.3

-THIS PROJECT IS NOT SUBJECT TO FLOODING IN A 25-YEAR OR 100-YEAR REOCCURRENCE INTERVAL STORM.
-DEWATERING MAY BE REQUIRED, THE CONTRACTOR SHALL PROVIDED DEWATERING AS NECESSARY FOR THIS PROJECT.
-THE CONTRACTOR WILL PROVIDE BYPASS PUMPING AS REQUIRED TO COMPLETE THE PROJECT.
-THE CONTRACTOR WILL PROVIDE A MAINTENANCE OF TRAFFIC PLAN TO HIGHLANDS COUNTY AS APPROPRIATE FOR CONSTRUCTION WITHIN THE RIGHT-OF-WAYS
-THE CONTRACTOR WILL CONSTRUCT A COMPLETE FUNCTIONING PROJECT.

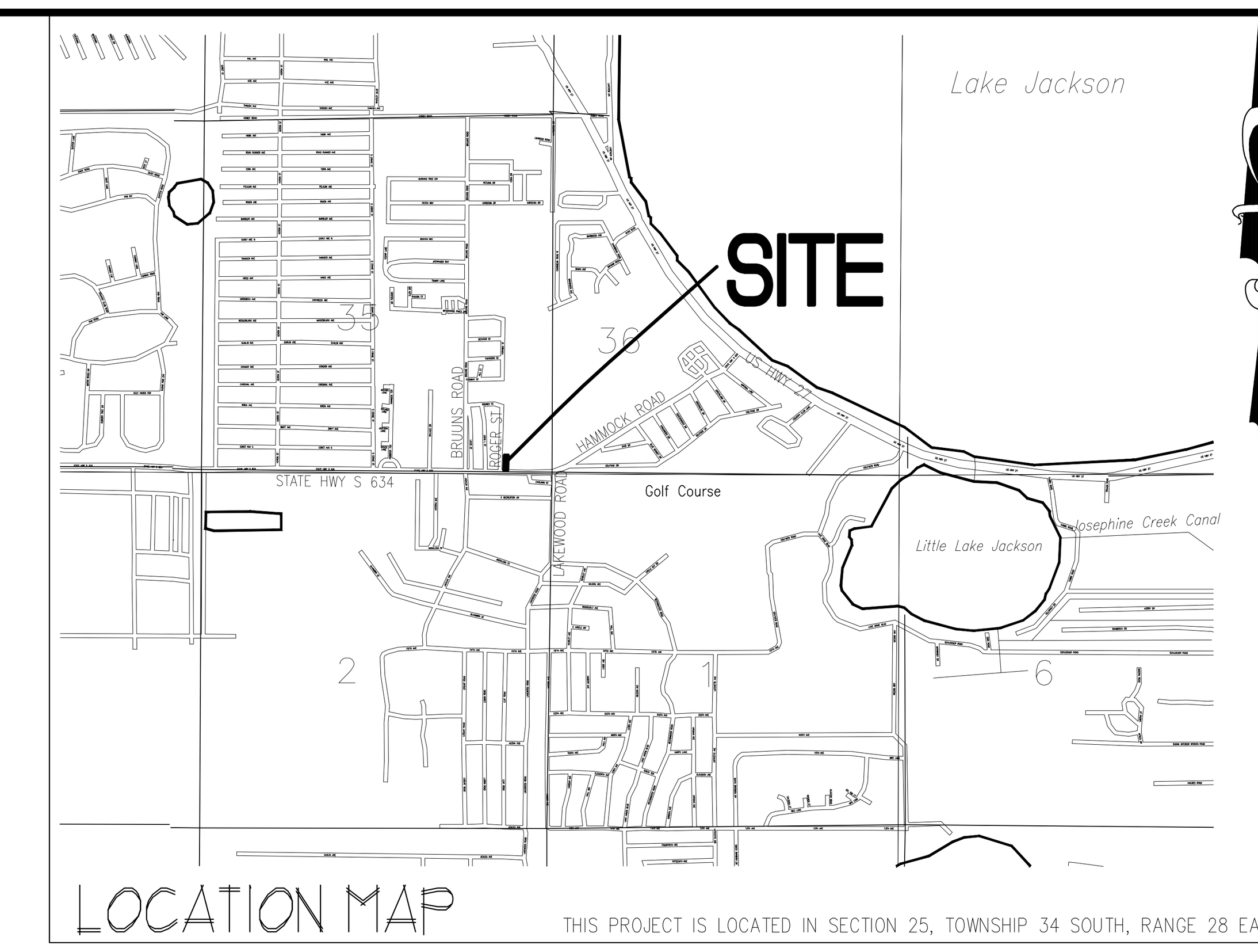
UTILITY NOTES:
--THE UNDERGROUND UTILITY LINES ARE SHOWN ON THESE DRAWINGS ARE REPRESENTATIONAL ONLY. FIELD INVESTIGATION FOR EXACT LOCATIONS IS REQUIRED AND WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
--ALL DISTURBED PREVIOUSLY IMPROVED AREAS WILL BE COMPLETELY RESTORED TO ORIGINAL CONDITIONS, THIS INCLUDES SODDING, LANDSCAPING, IRRIGATION SYSTEMS, STRUCTURES, ETC.
--ALL CONSTRUCTION WITHIN THE COUNTY RIGHT-OF-WAY IS TO BE IN ACCORDANCE WITH THE CURRENT HIGHLANDS COUNTY STANDARD.

IMPORTANT:
THE INFORMATION AND DESIGN SHOWN ON THESE DRAWINGS IS BASED ON THE BEST AVAILABLE INFORMATION PROVIDED FOR DESIGN. THE DRAWING IS TO SCALE AS MUCH AS POSSIBLE; HOWEVER NO MEASUREMENTS SHOULD BE MADE BY SCALING FROM THESE DRAWINGS AS SOME ITEMS MAY BE NOT TO SCALE FOR DRAWING CLARITY. ANY QUESTIONS OR CONFLICTS SHOULD BE BROUGHT TO THE ENGINEER IMMEDIATELY FOR CLARIFICATION OR RESOLUTION. POLSTON ENGINEERING INC. SHALL NOT BE RESPONSIBLE FOR ANY ERRORS MADE BY OTHERS CAUSED BY MAKING ASSUMPTIONS OR ERRORS CAUSED BY SCALING THE PLANS. ALL CONSTRUCTION SHALL FOLLOW THE ACCEPTED SAFETY PROCEDURES AND CONSTRUCTION TECHNIQUES AS REQUIRED BY ANY APPLICABLE GOVERNMENT STANDARDS.



PROPOSED WORK QUANTITIES
2" SDR 11 (FORCEMAIN) ±130'
LIFT STATION REHAB
DECOMMISSION WWTP
FILL IN PONDS

LINE LEGEND
—FM— PROPOSED FORCE MAIN
—WL— EXISTING WATERLINE
—T—T—T— EXISTING TELEPHONE LINES
—UGU— UNDERGROUND UTILITES



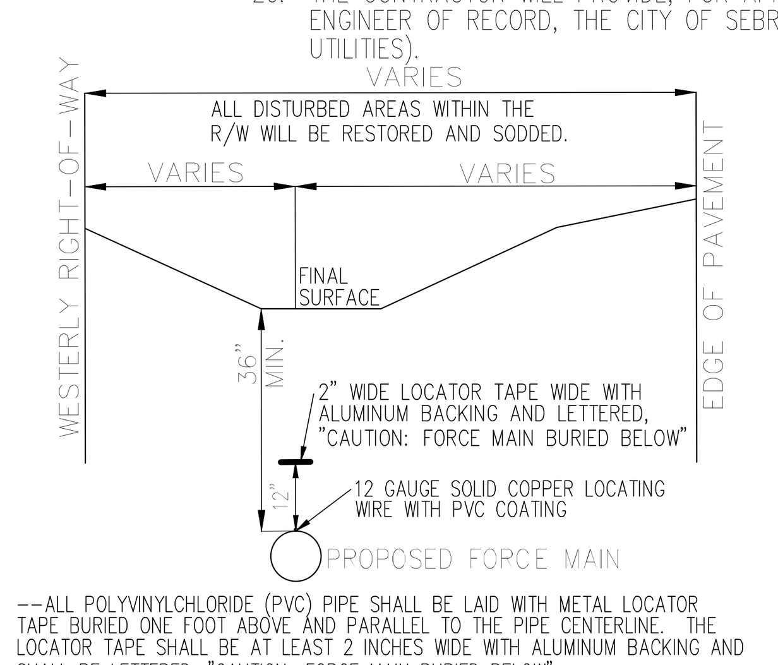
LOCATION MAP
THIS PROJECT IS LOCATED IN SECTION 25, TOWNSHIP 34 SOUTH, RANGE 28 EAST.

THIS SKETCH (SHEET 1) IS FOR THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION PERMITTING PROCESS. IT IS BY NO MEANS INTENDED FOR THIS SKETCH TO BE USED FOR CONSTRUCTION OF THIS SYSTEM. THE SEWER TRANSMISSION SYSTEM SHOULD BE CONSTRUCTED BASED ON THE SITE DEVELOPMENT PLANS (FOLLOWING SHEETS).

THIS PROJECT —FM—FM—FM—FM—FM—

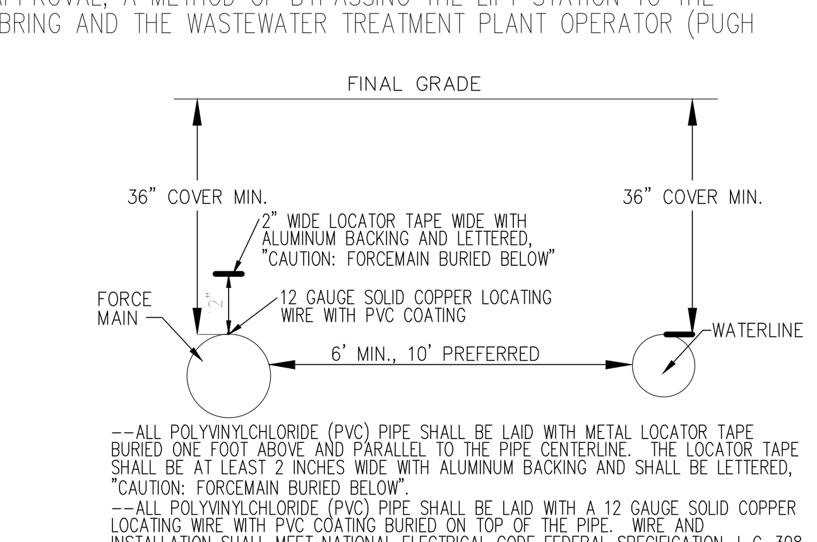
SCOPE OF WORK:
RE-PLUMB AN EXISTING LIFT STATION WITH SEWAGE PUMPS, VALVE BOX, PANEL BOX, JUNCTION BOX, METER CAN, POTABLE WATER SUPPLY AND FORCE MAIN FROM THE EXISTING SEWAGE TREATMENT PLANT AREA TO A EXISTING SEWER COLLECTION SYSTEM ALONG THE NORTHERLY RIGHT-OF-WAY OF HAMMOCK ROAD AND DISMANTLE AND THEN FILL IN THE EXISTING WASTEWATER TREATMENT FACILITY.

1. THE CONTRACTOR WILL REFURBISH THE EXISTING LIFT STATION. THE CONTRACTOR WILL SUPPLY PUMPS, CONTROL PANEL, JUNCTION BOX, VALVE BOX, PIPING, VALVES, FLOATS, CONNECTORS, ETC. THE CONTRACTOR WILL BE REQUIRED TO SUPPLY ALL ADDITIONAL SUPPLIES, MATERIALS AND EQUIPMENT FOR A FULLY OPERATIONAL LIFT STATION. CONTRACTOR WILL NEED THE SERVICES OF A LICENSED ELECTRICIAN. THE ENGINEER OF RECORD MUST BE NOTIFIED ON ANY CHANGES OR MODIFICATIONS FOR APPROVAL.
2. THE SYSTEM WILL BE LIVE DURING CONSTRUCTION AND THE FUNCTIONALITY OF THE SYSTEM MUST BE MAINTAINED BY THE CONTRACTOR DURING ALL PHASES OF THE PROJECT, WHICH COULD INCLUDE BY-PASS PUMPING.
3. ALL WORK MUST BE COORDINATED WITH THE ENGINEER OF RECORD, THE CITY OF SEBRING, AND THE WASTEWATER TREATMENT PLANT OPERATOR (PUGH UTILITIES) PRIOR TO ANY CONSTRUCTION.
4. THE CONTRACTOR WILL PRESSURE CLEAN THE INTERIOR OF THE EXISTING LIFT STATION AND PREPARE THE INTERIOR FOR 1/2" THICK LAYER OF SEWPER COAT LINING, WHICH SHOULD INCLUDE FILLING THE JOINTS BETWEEN RINGS AND ANY DEGRADED AREAS FOR PREPARATION IN THE APPLICATION OF THE SEWPER COAT LINING (SEE MANUFACTURES REQUIREMENTS FOR PROPER PREPARATION FOR SEWPER COAT LINING APPLICATION).
5. THE CONTRACTOR WILL SUPPLY AND INSTALL A 6 FOOT BY 6 FOOT BY 8 INCH THICK PRE-POURED CONCRETE SLAB AND DOUBLE DOOR LOCKABLE HATCH FOR THE TOP OF THE LIFT STATION AND A SEPARATE VALVE PIT BOX WITH ALUMINUM HATCH.
6. THE CONTRACTOR WILL THEN HAVE THE ALL INTERIOR SURFACES LINED WITH A MINIMUM OF 1/2" THICK SEWPER COAT LINING. (OR APPROVED EQUIVALENT)
7. THE CONTRACTOR WILL STABILIZE THE DITCH BANK AND ADD PILLOW RIP-RAP ADJACENT TO THE LIFT STATION AREA, INSTALLATION OF THE PILLOW RIP-RAP SHOULD BE IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS.
8. LAY THE 2" FORCEMAIN WITHIN THE WWTP AREA AND THEN DIRECTIONAL BORE AS NECESSARY TO THE FORCE MAIN LOCATED WITHIN THE HAMMOCK ROAD RIGHT-OF-WAY.
9. THE CONTRACTOR WILL TIE THE PROPOSED FORCEMAIN INTO THE EXISTING 4" FORCE MAIN RUNNING PARALLEL WITH HAMMOCK ROAD, COORDINATING THE ACTIVITY WITH THE CITY OF SEBRING AND HIGHLANDS COUNTY ROAD AND BRIDGE DEPARTMENT.
10. THEN CONNECT INTO THE 4" FORCEMAIN USING A STAINLESS STEEL TAPPING SADDLE WITH GATE VALVE
11. THE CONTRACTOR WILL BE RESPONSIBLE FOR TEST THE FORCEMAIN AS REQUIRED.
12. THE CONTRACTOR WILL CONSTRUCT VALVE BOX, NEW CONTROL PANEL, JUNCTION BOX, METER CAN, POTABLE WATER SUPPLY.
13. REPLACE PUMPS
14. TEST LIFT STATION FOR PROPER OPERATION.
15. ALL FITTINGS WILL BE MEGA LUG STYLE AS PER THE CITY OF SEBRING REQUIREMENTS.
16. THE SYSTEM WILL BE LIVE DURING CONSTRUCTION AND THE FUNCTIONALITY OF THE SYSTEM MUST BE MAINTAINED BY THE CONTRACTOR DURING ALL PHASES OF THE PROJECT.
17. ONCE THE NEW LIFT STATION IS FULLY OPERATIONAL, BEGIN DISMANTLING THE EXISTING WASTEWATER TREATMENT PLANT. ALL CONCRETE MATERIALS, METAL TANKS, PIPING, WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE AND DISPOSE OF PER FDEP REQUIREMENTS. ANY PUMPS, ELECTRICAL COMPONENTS, BLOWERS, MOTORS, ETC. WILL BE THE HAMMOCK MOBILE ESTATES AND ONLY AT THE ACKNOWLEDGEMENT OF THE HAMMOCK MOBILE ESTATES WILL THE CONTRACTOR TAKE POSSESSION OF THESE ITEMS.
18. AT THE COMPLETION OF THE REMOVAL WASTEWATER TREATMENT PLANT THE PLANT AREA AND THE PONDS FOR THE PLANT WILL BE FILLED IN WITH CLEAN FILL MATERIAL IN 1' COMPACTED LIFTS, TO A MINIMUM ELEVATION AS SHOWN ON THE PLANS, THEN SODDED.
19. THE CONTRACTOR WILL RESTORE THE RIGHT-OF-WAYS TO EXISTING GRADE AND ALL DISTURBED AREAS ARE TO BE SODDED WITH THE SAME TYPE OF GRASS. ANY IRRIGATION DAMAGED WILL BE FIXED TO ORIGINAL CONDITION.
20. THE CONTRACTOR WILL PROVIDE, FOR APPROVAL, A METHOD OF BYPASSING THE LIFT STATION TO THE ENGINEER OF RECORD, THE CITY OF SEBRING AND THE WASTEWATER TREATMENT PLANT OPERATOR (PUGH UTILITIES).



--ALL POLYVINYLCHLORIDE (PVC) PIPE SHALL BE LAID WITH METAL LOCATOR TAPE BURIED ONE FOOT ABOVE AND PARALLEL TO THE PIPE CENTERLINE. THE LOCATOR TAPE SHALL BE AT LEAST 2 INCHES WIDE WITH ALUMINUM BACKING AND SHALL BE LETTERED, "CAUTION: FORCE MAIN BURIED BELOW".
--ALL POLYVINYLCHLORIDE (PVC) PIPE SHALL BE LAID WITH A 12 GAUGE SOLID COPPER LOCATING WIRE WITH PVC COATING BURIED ON TOP OF THE PIPE. WIRE AND INSTALLATION SHALL MEET NATIONAL ELECTRICAL CODE FEDERAL SPECIFICATION J-C-308.

FORCE MAIN PLACEMENT IN OPEN TRENCH WITHIN RIGHT-OF-WAY



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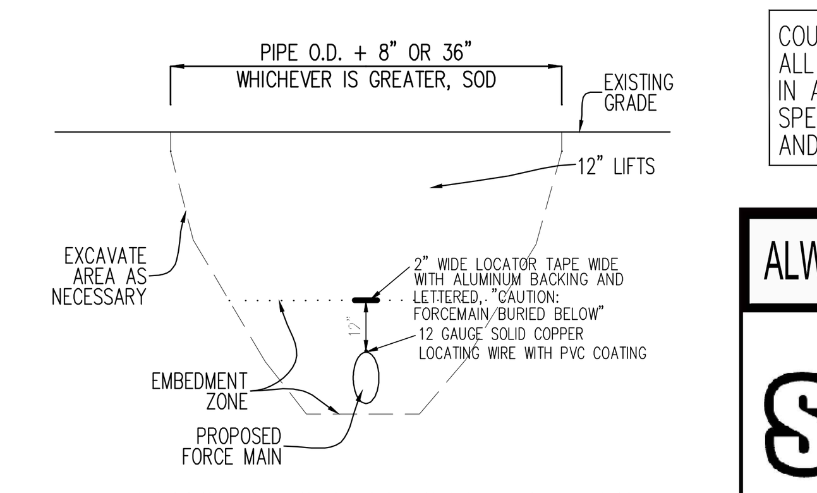
WATER LINE - SEWER LINE SEPARATION



TYPICAL OPEN CUT DETAIL

COUNTY NOTE:
ALL CONSTRUCTION WITHIN THE COUNTY RIGHT-OF-WAY IS TO BE IN ACCORDANCE WITH THE CURRENT HIGHLANDS COUNTY STANDARD SPECIFICATIONS FOR ROADWAY CONSTRUCTION AND THE ROADWAY AND THE F.D.O.T. TRAFFIC DESIGN STANDARD INDEX.

ALWAYS CALL 811 TWO FULL BUSINESS DAYS BEFORE YOU DIG

Sunshine811.com

DATE	REMARK	DR	CH
12-FEB-18	BID SET	MLW	

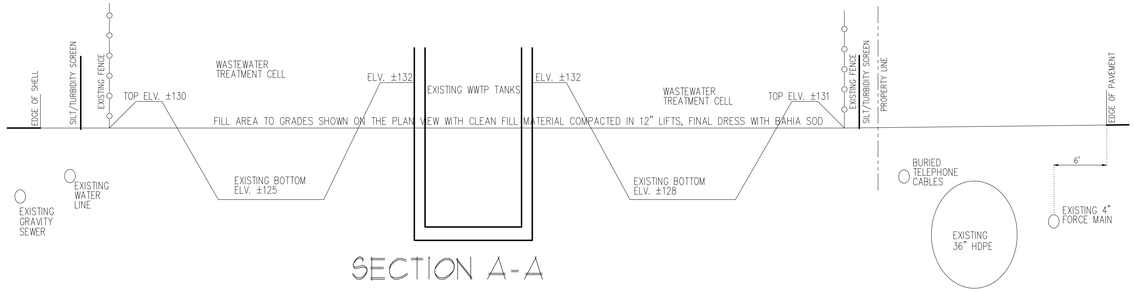
CERTIFICATE OF AUTHORIZATION # 5684
ROGER DALE POLSTON P. E. # 33222
MARVIN LUTHER WOLFE P.E. # 46030

PE Polston Engineering Inc.
CIVIL ENGINEERING CONSULTANTS
2925 KENILWORTH BLVD., SEBRING, FLORIDA 33870
863-385-5564 PHONE -- 863-385-2462 FAX

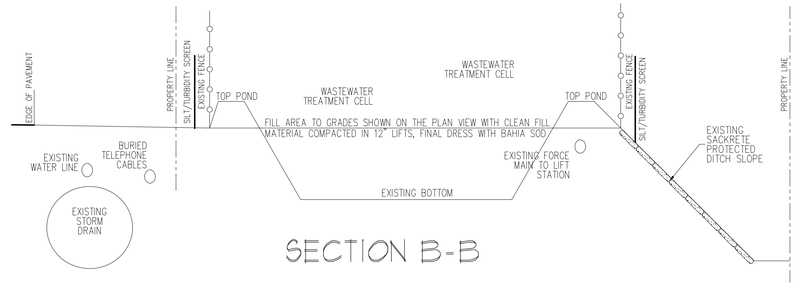
HAMMOCK MOBILE ESTATES & CITY OF SEBRING
JOINT PROJECT
COLLECTION SYSTEM CONNECTION TO CITY OF SEBRING TRANSMISSION SYSTEM

ENGINEER JOB # 18010

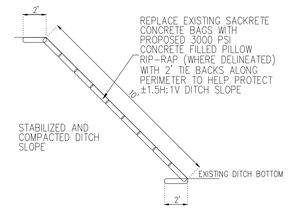
DRAWING SCALE 1"=20'



SECTION A-A

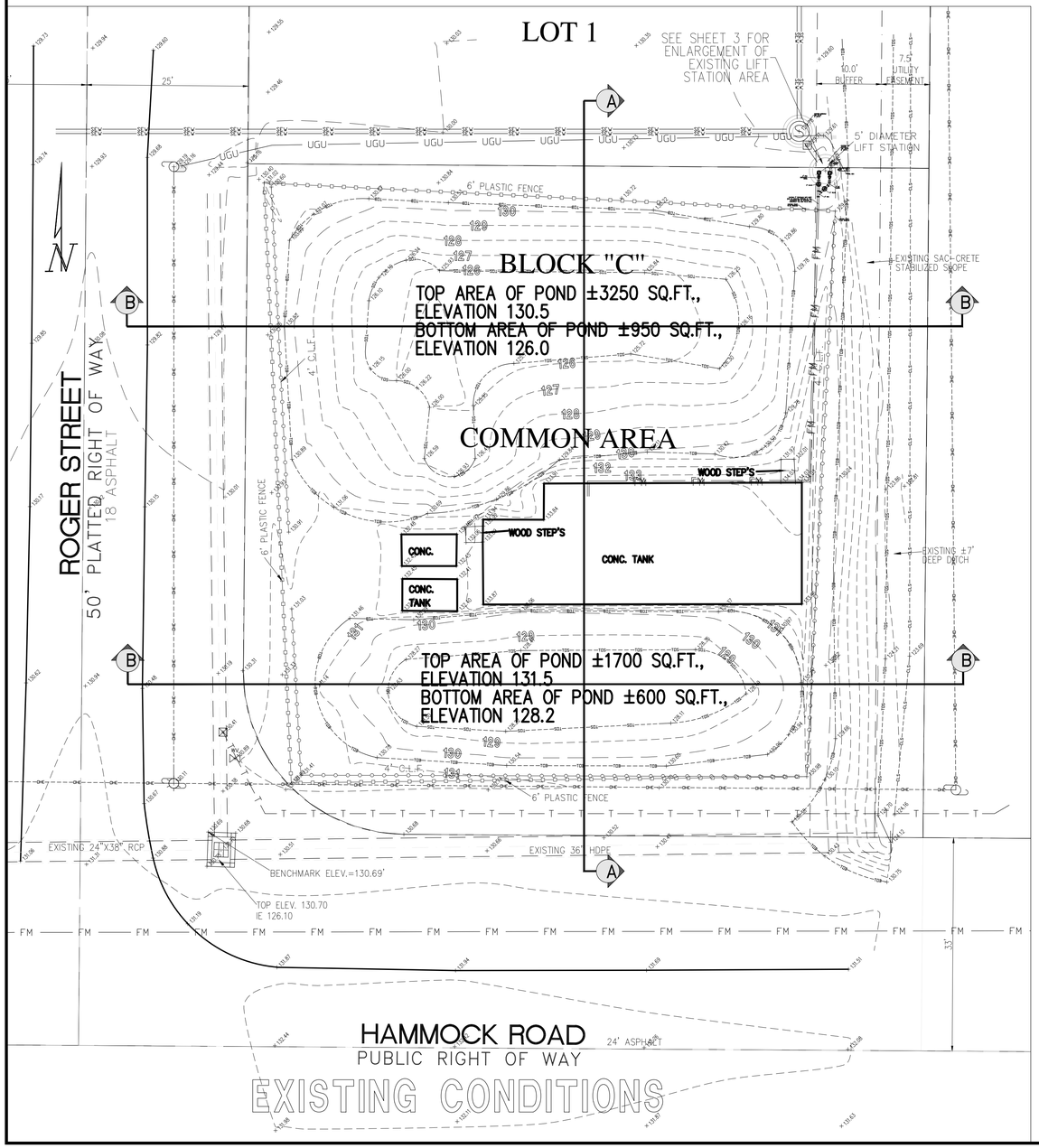


SECTION B-B

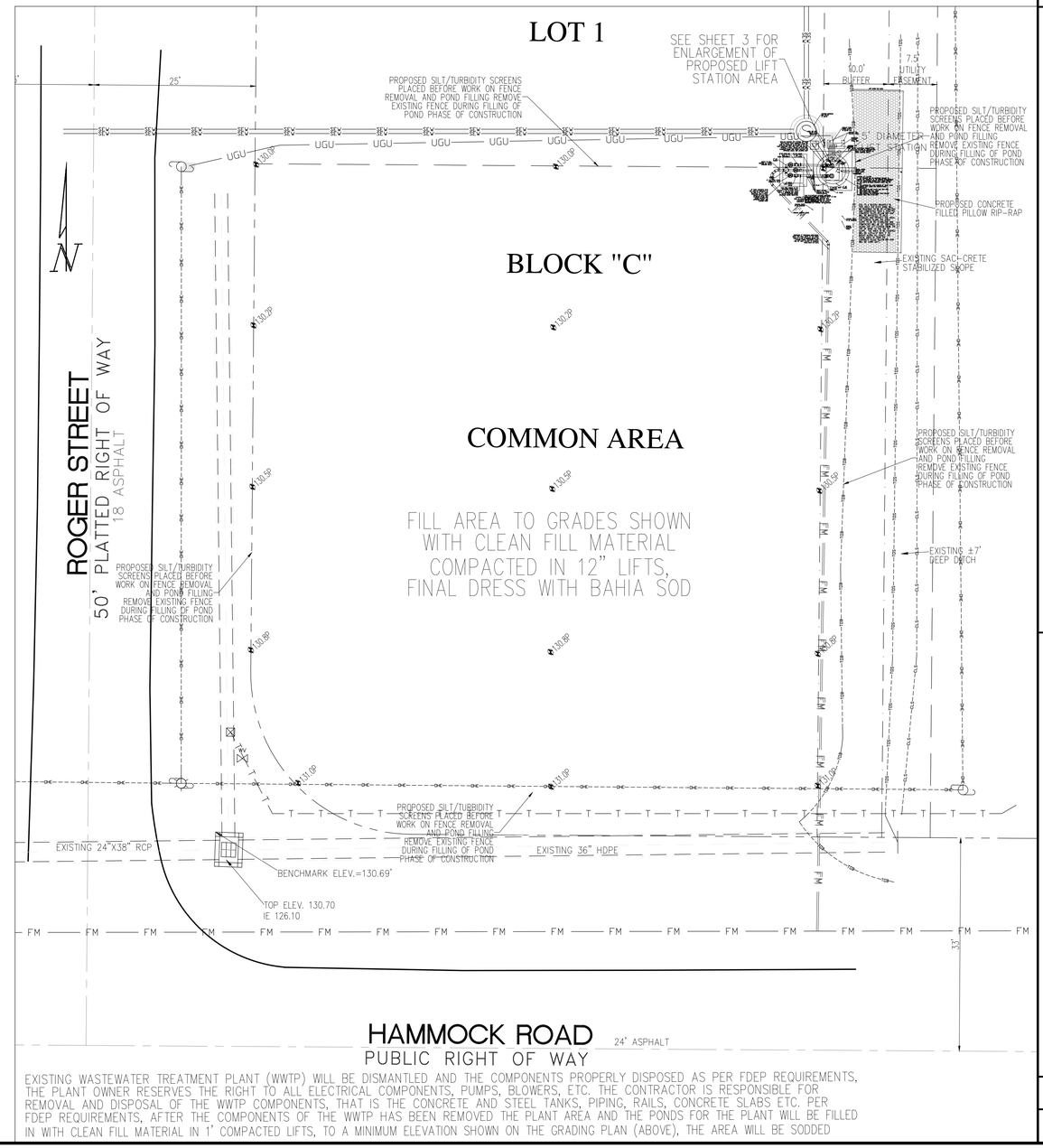


STABILIZATION OF DITCH NEAR LIFT STATION

DATE	REMARK	DR	CH
12-FEB-18	BID SET	MLW	



EXISTING CONDITIONS



EXISTING WASTEWATER TREATMENT PLANT (WWTP) WILL BE DISMANTLED AND THE COMPONENTS PROPERLY DISPOSED AS PER FDEP REQUIREMENTS. THE PLANT OWNER RESERVES THE RIGHT TO ALL ELECTRICAL COMPONENTS, PUMPS, BLOWERS, ETC. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND DISPOSAL OF THE WWTP COMPONENTS, THAT IS THE CONCRETE AND STEEL TANKS, PIPING, RAILS, CONCRETE SLABS ETC. PER FDEP REQUIREMENTS, AFTER THE COMPONENTS OF THE WWTP HAS BEEN REMOVED THE PLANT AREA AND THE PONDS FOR THE PLANT WILL BE FILLED IN WITH CLEAN FILL MATERIAL IN 1' COMPACTED LIFTS, TO A MINIMUM ELEVATION SHOWN ON THE GRADING PLAN (ABOVE), THE AREA WILL BE SODDED

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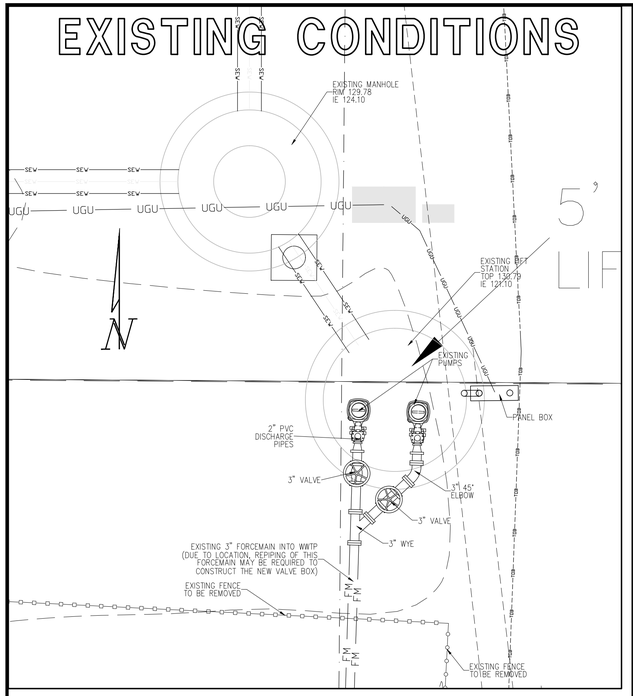
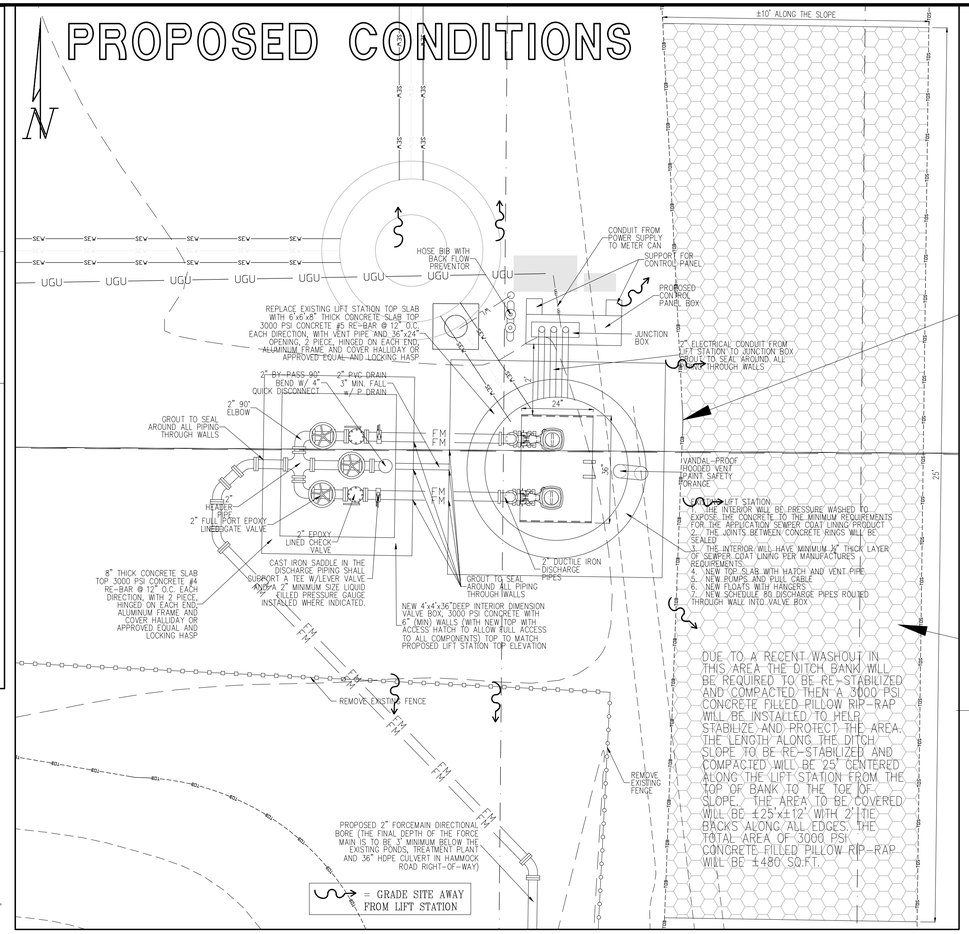
DRAWING SCALE 1"=10'

SHEET 2 OF 4

EXISTING CONDITIONS



PROPOSED CONDITIONS



-THIS PROJECT IS NOT SUBJECT TO FLOODING IN A 25-YEAR OR 100-YEAR REOCCURRENCE INTERVAL STORM.

SCOPE OF WORK:
RE-PLUMB AN EXISTING LIFT STATION WITH SEWAGE PUMPS, VALVE BOX, PANEL BOX, JUNCTION BOX, METER CAN, POTABLE WATER SUPPLY AND FORCE MAIN FROM THE EXISTING SEWAGE TREATMENT PLANT AREA TO A EXISTING SEWER COLLECTION SYSTEM ALONG THE NORTHERLY RIGHT-OF-WAY OF HAMMOCK ROAD AND DISMANTLE AND THEN FILL IN THE EXISTING WASTEWATER TREATMENT FACILITY.

1. THE CONTRACTOR WILL REFURBISH THE EXISTING LIFT STATION. THE CONTRACTOR WILL SUPPLY PUMPS, CONTROL PANEL, JUNCTION BOX, VALVE BOX, PIPING, VALVES, FLOATS, CONNECTORS, ETC. THE CONTRACTOR WILL BE REQUIRED TO SUPPLY ALL ADDITIONAL SUPPLIES, MATERIALS AND EQUIPMENT FOR A FULLY OPERATIONAL LIFT STATION. CONTRACTOR WILL NEED THE SERVICES OF A LICENSED ELECTRICIAN. THE ENGINEER OF RECORD MUST BE NOTIFIED ON ANY CHANGES OR MODIFICATIONS FOR APPROVAL.
2. THE SYSTEM WILL BE LIVE DURING CONSTRUCTION AND THE FUNCTIONALITY OF THE SYSTEM MUST BE MAINTAINED BY THE CONTRACTOR DURING ALL PHASES OF THE PROJECT, WHICH COULD INCLUDE BY-PASS PUMPING.
3. ALL WORK MUST BE COORDINATED WITH THE ENGINEER OF RECORD, THE CITY OF SEBRING, AND THE WASTEWATER TREATMENT PLANT OPERATOR (PUGH UTILITIES) PRIOR TO ANY CONSTRUCTION.
4. THE CONTRACTOR WILL PRESSURE CLEAN THE INTERIOR OF THE EXISTING LIFT STATION AND PREPARE THE INTERIOR FOR 1/2" THICK LAYER OF SEWPER COAT LINING, WHICH SHOULD INCLUDE FILLING THE JOINTS BETWEEN RINGS AND ANY DEGRADED AREAS FOR PREPARATION IN THE APPLICATION OF THE SEWPER COAT LINING (SEE MANUFACTURES REQUIREMENTS FOR PROPER PREPARATION FOR SEWPER COAT LINING APPLICATION).
5. THE CONTRACTOR WILL SUPPLY AND INSTALL A 6 FOOT BY 6 FOOT BY 8 INCH THICK PRE-POURED CONCRETE SLAB AND DOUBLE DOOR LOCKABLE HATCH FOR THE TOP OF THE LIFT STATION AND A SEPARATE VALVE PIT BOX WITH ALUMINUM HATCH.
6. THE CONTRACTOR WILL THEN HAVE THE ALL INTERIOR SURFACES LINED WITH A MINIMUM OF 1/2" THICK SEWPER COAT LINING. (OR APPROVED EQUIVALENT)
7. THE CONTRACTOR WILL STABILIZE THE DITCH BANK AND ADD PILLOW RIP-RAP ADJACENT TO THE LIFT STATION AREA. INSTALLATION OF THE PILLOW RIP-RAP SHOULD BE IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS.
8. LAY THE 2" FORCEMAIN WITHIN THE WWTP AREA AND THEN DIRECTIONAL BORE AS NECESSARY TO THE FORCE MAIN LOCATED WITHIN THE HAMMOCK ROAD RIGHT-OF-WAY.
9. THE CONTRACTOR WILL TIE THE PROPOSED FORCEMAIN INTO THE EXISTING 4" FORCE MAIN RUNNING PARALLEL WITH HAMMOCK ROAD, COORDINATING THE ACTIVITY WITH THE CITY OF SEBRING AND HIGHLANDS COUNTY ROAD AND BRIDGE DEPARTMENT.
10. THEN CONNECT INTO THE 4" FORCEMAIN USING A STAINLESS STEEL TAPPING SADDLE WITH GATE VALVE
11. THE CONTRACTOR WILL BE RESPONSIBLE FOR TEST THE FORCEMAIN AS REQUIRED.
12. THE CONTRACTOR WILL CONSTRUCT VALVE BOX, NEW CONTROL PANEL, JUNCTION BOX, METER CAN, POTABLE WATER SUPPLY.
13. REPLACE PUMPS.
14. TEST LIFT STATION FOR PROPER OPERATION.
15. ALL FITTINGS WILL BE MEGA LUG STYLE AS PER THE CITY OF SEBRING REQUIREMENTS.
16. THE SYSTEM WILL BE LIVE DURING CONSTRUCTION AND THE FUNCTIONALITY OF THE SYSTEM MUST BE MAINTAINED BY THE CONTRACTOR DURING ALL PHASES OF THE PROJECT.
17. ONCE THE NEW LIFT STATION IS FULLY OPERATIONAL, BEGIN DISMANTLING THE EXISTING WASTEWATER TREATMENT PLANT. ALL CONCRETE MATERIALS, METAL TANKS, PIPING, WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE AND DISPOSE OF PER FDEP REQUIREMENTS. ANY PUMPS, ELECTRICAL COMPONENTS, BLOWERS, MOTORS, ETC. WILL BE THE HAMMOCK MOBILE ESTATES AND ONLY AT THE ACKNOWLEDGEMENT OF THE HAMMOCK MOBILE ESTATES WILL THE CONTRACTOR TAKE POSSESSION OF THESE ITEMS.
18. AT THE COMPLETION OF THE REMOVAL WASTEWATER TREATMENT PLANT THE PLANT AREA AND THE PONDS FOR THE PLANT WILL BE FILLED IN WITH CLEAN FILL MATERIAL IN 1' COMPACTED LIFTS, TO A MINIMUM ELEVATION AS SHOWN ON THE PLANS, THEN SODDED.
19. THE CONTRACTOR WILL RESTORE THE RIGHT-OF-WAYS TO EXISTING GRADE AND ALL DISTURBED AREAS ARE TO BE SODDED WITH THE SAME TYPE OF GRASS. ANY IRRIGATION DAMAGED WILL BE FIXED TO ORIGINAL CONDITION.
20. THE CONTRACTOR WILL PROVIDE, FOR APPROVAL, A METHOD OF BYPASSING THE LIFT STATION TO THE ENGINEER OF RECORD, THE CITY OF SEBRING AND THE WASTEWATER TREATMENT PLANT OPERATOR (PUGH UTILITIES).

FLOWS TO LIFT STATION:

UNIT TYPE	# OF UNITS	FLOW/UNIT	TOTAL FLOW
MOBILE HOME	125	200	25000
TOTAL			25000

25000 GALLONS PER DAY / 1440 MINUTES PER DAY FOR ±17.5 GALLONS/MINUTE, USING A PEAK FACTOR OF 4 YIELDS 17.5 x 4 = 70 GALLONS PER MINUTE

4" DIAMETER LIFT STATION PROVIDES 94 GALLONS PER FOOT OF DEPTH

FOR EVERY MINUTE AT PEAK FLOW THE LEVEL IN THE LIFT STATION RISES 9" BEGINNING AT THE VOLUME 1' ABOVE THE BOTTOM OF LIFT STATION (122.1) TO INVERT OF INFLOW PIPE (124.0) YIELDS 178 GALLONS OR 178 / 70 = 2.5 MINUTES AT PEAK FLOW TO BEGIN BACKFILLING SYSTEM. SINCE THE INITIAL VOLUME IS 178, DIVIDE THE VOLUME BY THE DIFFERENCE OF THE PEAK INFLOW AND THE PUMPS OUTPUT FLOW AND THIS WILL BE THE LENGTH OF TIME THE PUMPS WILL NEED TO RUN TO DRAW THE VOLUME DOWN TO THE LEVEL WITHIN 1' OF THE BOTTOM OF THE LIFT STATION. THE MINIMUM VELOCITY IN A 4" PIPE IS 2 FEET PER SECOND WHICH EQUATES TO ±85 GALLONS PER MINUTE. CHOOSING 100 GALLONS PER MINUTE AS A MINIMUM FLOW RATE WILL ALLOW THE PUMP TO DRAW THE FLOW DOWN IN 178 / (100 – 70) = ±6 MINUTES, WHICH IS AN ACCEPTABLE LENGTH OF TIME FOR THE PUMP TO RUN.

	VELOCITY	HEAD LOSS
120' OF 2" FORCEMAIN	8.5	20 FT
3900' OF 4" FORCEMAIN	2.37	29 FT
TOTAL LINE HEAD LOSS		99 FT
ELEVATION OF LIFT STATION		131.1
INVERT ELEVATION FROM MANHOLE		124.0
DEPTH OF WET WELL		2.9
INVERT OF WET WELL		121.1
PEAK PUMPING ELEVATION		132.0
TOTAL ELEVATION HEAD LOSS		11
TOTAL HEAD LOSS	49 + 11 = ±60 FT	

PUMP DATA

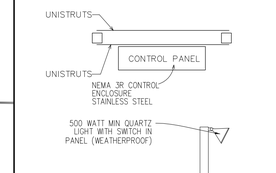
DUPLEX PUMP DATA
MAKE: SULZER
MODEL: PIRANHA – PE 45/2
DISCHARGE: 1.25"
HORSE POWER: 6.7 HP
SOLIDS: GRINDER PUMPS
VOLTAGE: 230
FREQUENCY: 60Hz
RATED SPEED: 3550 RPM
PHASE: 3 PHASE (VARIABLE FREQUENCY DRIVE REQUIRED)
FLOW: 100 GPM
TDH: 62 FT.

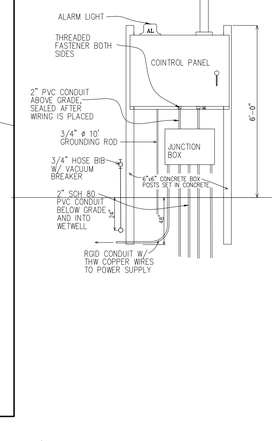
-THIS PROJECT IS NOT SUBJECT TO FLOODING IN A 25-YEAR OR 100-YEAR REOCCURRENCE INTERVAL STORM.
-DEWATERING MAY BE REQUIRED, THE CONTRACTOR SHALL PROVIDED DEWATERING AS NECESSARY FOR THIS PROJECT.
-THE CONTRACTOR WILL PROVIDE BYPASS PUMPING AS REQUIRED TO COMPLETE THE PROJECT.
-THE CONTRACTOR WILL PROVIDE A MAINTENANCE OF TRAFFIC PLAN TO HIGHLANDS COUNTY AS APPROPRIATE FOR CONSTRUCTION WITHIN THE RIGHT-OF-WAYS
-THE CONTRACTOR WILL CONSTRUCT A COMPLETE FUNCTIONING PROJECT.

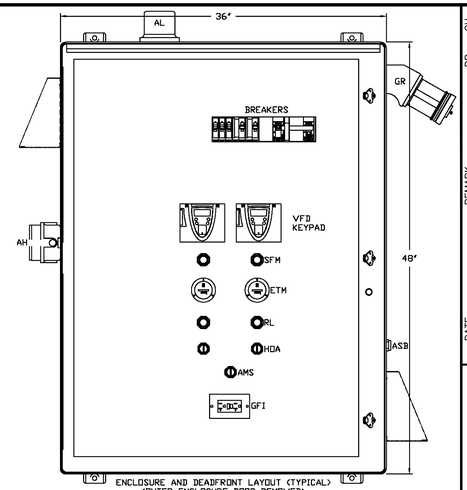
LEGEND

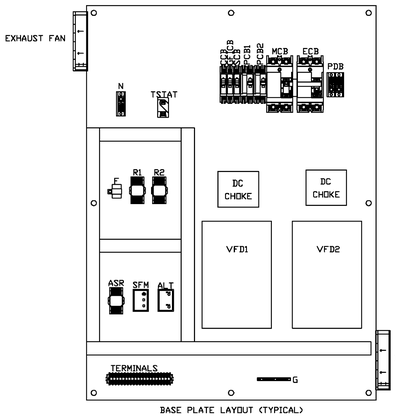
AH	ALARM HORN
AL	ALARM LIGHT
ASB	ALARM SILENCE BUTTON
ASR	ALARM SILENCE RELAY
ALT	ALTERNATOR
AMS	ALTERNATOR MODE SWITCH
CCB	CONTROL CIRCUIT BREAKER
R1,2	CONTROL RELAY
	DC LINK CHOKE
ETM	ELAPSED TIME METER
ECB	EMERGENCY CIRCUIT BREAKER
ENC	ENCLOSURE, FIG, N3R
F	FLASHER
GR	GENERATOR RECEPTACLE, 100A
GFICB	GFI CIRCUIT BREAKER
GFI	GFI RECEPTACLE
HOA	HAND OFF AUTO SWITCH
IL	INDICATING LIGHT, RED
MCB	MAIN CIRCUIT BREAKER
PCB1,2	PUMP CIRCUIT BREAKER
RL	RUN LIGHT, GREEN
SFM	SEAL FAIL MODULE
SCB	SPARE CIRCUIT BREAKER
SPD	SURGE PROTECTOR
TSTAT	THERMOSTAT
VFD1,2	VARIABLE FREQUENCY DRIVE
	VENTILATION FAN

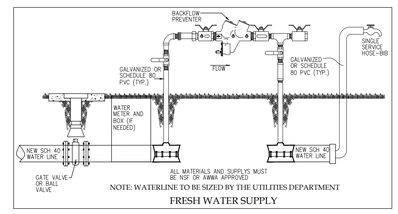
1 PHASE / 240 VOLT SUPPLY WILL NEED TO CONVERTED TO 3 PHASE











NOTES:
1. THE SITE WILL BE GRADED AWAY FROM THE LIFT STATION.
2. REFER TO THE CITY OF SEBRING "WASTEWATER MATERIALS SPECIFICATION" LIST FOR APPROVED PRODUCT BRANDS AND MODELS.
3. CONCRETE SHALL BE 4000 PSI CONCRETE WITH TYPE II CEMENT. CONCRETE SURFACES SHALL RECEIVE A LINER AS STATED.
4. ALL REINFORCED CONCRETE STRUCTURES SHALL BE IN ACCORDANCE WITH ACI CODE 318. STEEL YIELD STRENGTH SHALL BE 60,000 PSI (GRADE 60). WET WELL WALL SHALL CONFORM TO EITHER:
   A. CAST IN PLACE #5 RE-BAR@12" O.C.B.W. IN THE CENTER 1/3
   OR B. PRE CAST SECTIONS: ASTM C478.
5. UPPER SLABS SHALL BE POSITIVELY JOINED TO WET WELL WALL.
6. CAST IRON SADDLE IN THE DISCHARGE PIPING SHALL SUPPORT A 2" MINIMUM SIZE LIQUID FILLED PRESSURE GAUGE INSTALLED WHERE INDICATED.
7. BY-PASS CONNECTION TO BE BRASS QUICK-DISCONNECT TYPE, PART "D" FEMALE COUPLER AND PART "W" PLUG.
8. NON-SHRINK GROUT SHALL SEAL AROUND ALL PIPE UNLESS SPECIFIED OTHERWISE BY THE CITY.
9. GROUNDING SHALL BE TWO ⅝" COPPER-CLAD GROUNDING RODS, MINIMUM 8 FEET LONG AND 6 FEET APART, CONNECTED 12" BELOW GROUND LEVEL. CONDUCTORS SHALL BE #4 SOLID COPPER AND CONNECTORS SHALL BE CADWELD, BOLT CLAMP OR SPLIT CLAMP.
10. TOP OF SLAB TO BE A MINIMUM OF 6" ABOVE FINISH GRADE, AND DRAINAGE SHALL BE AWAY FROM THE LIFT STATION.
11. PUMP BASE ANCHOR BOLT LOCATION AND SIZE SHALL BE PER MANUFACTURER'S SHOP DRAWING.
12. FACE AND TOP OF POWER PANEL AND RTU TO BE FLUSH.
13. CONDUITS (ALL 2") SHALL HAVE A MINIMUM 24" OF COVER, WITH THE EXCEPTION OF POWER SUPPLY CONDUIT, IN WHICH CASE THE COVER SHALL BE MINIMUM 42".
14. CONDUIT SHALL BE AS FOLLOWS:
   ABOVE GRADE- RIGID ALUMINUM
   BELOW GRADE- RIGID ALUMINUM OR SCH 80 PVC
15. ALL ANCHORS SHALL BE HILTI TYPE 316 SS OR APPROVED EQUAL WITH TYPE 316 SS FASTENERS.
16. ALL APPROVALS AND SUBMISSIONS SHALL BE TO THE ENGINEER AND THE CITY OF SEBRING, WITH FINAL AUTHORITY RESTING WITH THE CITY OF SEBRING.

DATE	REMARK	DR	CH
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DRAWING SCALE
1"=10'

SHEET
3 OF 4

LIFT STATION SPECIFICATIONS

1.0 WET WELL

1.01 HOLES ARE TO BE MADE IN THE FIELD, THEIR MAXIMUM DIMENSION SHALL NOT EXCEED 1 ½ TIMES THE OUTSIDE DIAMETER OF THE PIPE PASSING THROUGH THE OPENING. REINFORCED STEEL IN THE WALL SHALL BE CUT CLEANLY AND IN NO CIRCUMSTANCES WILL CUT ENDS BE BENT SO AS TO TURN TO THE INSIDE OR THE OUTSIDE SURFACE. OPENINGS SO MADE SHALL BE THOROUGHLY FILLED WITH NON-SHRINKING GROUT AFTER INSTALLATION OF THE PIPES AND SPECIAL CARE SHALL BE TAKEN TO INSURE A WATERTIGHT CONNECTION AT THESE POINTS.

2.0 PIPING INSIDE PUMP STATION AND VALVE VAULT:

2.01 PIPING INSIDE THE STATION WET WELL AND VALVE VAULT SHALL BE PVC SCHEDULE 80.

3.0 VALVES

3.01 ECCENTRIC TYPE PLUG VALVES: PLUG VALVES SHALL BE NONLUBRICATED ECCENTRIC TYPE WITH RESILIENT FACED PLUGS HAVING MECHANICAL JOINT OR FLANGED ENDS.

A. PORT AREAS SHALL BE AT LEAST 80% OF FULL PIPE AREA.

B. VALVE SEATS, VALVE PLUG STEM SLEEVES AND PLUG STEM BUSHINGS SHALL BE FABRICATED OF MATERIALS, WHICH ARE CORROSION AND ABRASIVE RESISTANT. THE CORROSION RESISTANCE SHALL BE SUCH THAT EXPOSURE OVER A PERIOD OF FIVE YEARS TO DOMESTIC WASTEWATER, INDUSTRIAL SUCH THAT EXPOSURE OVER A PERIOD OF FIVE YEARS TO DOMESTIC WASTEWATER, INDUSTRIAL WASTEWATER, DOMESTIC SLUDGE'S OR INDUSTRIAL SLUDGE'S CONTAINING SULFURIC ACID, HYDROCHLORIC ACID, ACETIC ACID, MINERAL OILS, VEGETABLE OILS, POLYMERS, ESTERS OR ACETONES SHALL NOT RESULT IN SUFFICIENT CORROSION TO INTERFERE WITH THE SERVICEABILITY OF THE PLUG VALVE.

C. SEALS SHALL BE CAPABLE OF BEING REPLACED WHILE THE LINE AND VALVE REMAIN IN SERVICE, IF UNDER SUBMERGED CONDITIONS, THEREBY ELIMINATING THE NEED TO TAKE PROCESS UNITS OUT OF SERVICE.

D. ALL EXPOSED NUTS, BOLTS, SPRINGS, AND WASHERS SHALL BE PLATED WITH CORROSION RESISTANT MATERIAL. MEANS OF ACTUATION SHALL BE BY LEVER, GEAR ACTUATOR, TEE WRENCH, EXTENSION STEM, OR FLOOR STAND, AS INDICATED.

E. VALVES SHALL BE DEZURIK SERIES 100, HOMESTEAD BALLCENTRIC, DRESSER STYLE 800 X-CENTRIC, OR EQUAL.

3.02 GATE VALVES:

A. GATE VALVES SMALLER THAN 4-INCH INSTALLED ABOVE GROUND OR IN STRUCTURES SHALL BE BRONZE, 125 LB. S.W.P. DOUBLE DISC, SCREWED-IN BONNET, RISING STEM, INSIDE SCREW GATE VALVES WITH SCREWED ENDS AND MALLEABLE IRON HANDWHEELS. VALVES SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATION WW-V-54D FOR CLASS A, TYPE III VALVES.

3.03 CHECK VALVES SHALL BE SWING CHECK VALVES WITH OUTSIDE WEIGHTED ARM, IRON BODY, BRONZE MOUNTED, MUELLER OR APPROVED EQUAL.

4.00 FASTENERS, LIFT CHAINS

4.02 ALL FASTENERS AND HARDWARE INSIDE THE WET WELL AND VALVE BOX SHALL BE STAINLESS STEEL.

4.03 LIFT CHAINS SHALL BE STAINLESS STEEL. CHECK VALVES SHALL BE SWING CHECK VALVES WITH OUTSIDE WEIGHTED ARM, MUELLER OR APPROVED EQUAL.

5.00 ACCESS FRAME AND COVER

5.01 A DOOR ACCESS FRAME ASSEMBLY SHALL BE FURNISHED FOR THE WET WELL AND VALVE BOX. THE ACCESS FRAME COVER SHALL BE CAPABLE OF BEARING A 300 POUNDS PER SQUARE FOOT (PSF) LIVE LOAD. ACCESS FRAME AND COVERS SHALL BE FABRICATED OF ALUMINUM. FRAME SHALL SUPPORT STAINLESS STEEL GUIDE RAILS AND STAINLESS STEEL CABLE HOLDER. ALL HINGED COVER TO BE SPRING LOAD PROVIDED WITH LIFTING HANDLE AND SAFETY LATCH TO HOLD COVER IN THE OPEN POSITION. LOCKING HASPS SHALL BE FURNISHED FOR EACH COVER. FRAME AND ACCESS COVER SHALL BE MANUFACTURED BY HALLIDAY PRODUCTS; OR EQUAL. THE ENTRANCE LATCH SHALL BE CONSTRUCTED AND FABRICATED TO COMPLY WITH THE OSHA STANDARDS. ALL SURFACES IN CONTACT WITH CONCRETE SHALL HAVE A SHOP COAT OF ZINC CHROMATIC PRIMER, APPROVED ALKALI RESISTANT PAINT OR OTHER APPROVED PROTECTIVE COATING. COVER MUST BE COMPATIBLE WITH PUMPS AND GUIDE RAIL SYSTEM. ALL HARDWARE, INCLUDING ANCHORS, BOLTS, HASPS, HINGES, GUIDES AND CABLE HOLDERS SHALL BE STAINLESS STEEL.

6.0 PUMPS

HYDROMATIC PUMPS AS NOTED ON THE PLANS SHALL BE USED.

7.0 PANEL

THE PANEL SHALL HAVE THE FEATURES LISTED ON THE PLANS AS A MINIMUM.

8.0 DROP PIPES, IF REQUIRED, SHALL BE RELINER INSIDE DROP SYSTEM BY DURAN INC.

9.0 SHOP DRAWINGS

SHOP DRAWINGS SHOWING DETAILS OF CONSTRUCTION SHALL BE SUBMITTED TO THE PROJECT ENGINEER FOR APPROVAL PRIOR TO ANY CONSTRUCTION.

10.0 RECORD DRAWINGS AND OPERATION AND MAINTENANCE MANUAL

UPON COMPLETION OF THE PROJECT AND PRIOR TO FINAL PAYMENT THE CONTRACTOR SHALL SUPPLY RECORD DRAWINGS OF THE LIFT STATION AND PROVIDE AN OPERATION AND MAINTENANCE MANUAL DETAILING ALL EQUIPMENT USED AND DESCRIBING PROPER OPERATION PROCEDURES AND REQUIRED MAINTENANCE PROCEDURES. FOUR COPIES ARE TO BE SUPPLIED.

11.00 START UP

11.01 DURING CONSTRUCTION, THE SERVICES OF A MANUFACTURER'S REPRESENTATIVE SHALL BE PROVIDED, WITHOUT COST TO THE OWNER, TO INSPECT THE VARIOUS ITEMS OF EQUIPMENT DURING CONSTRUCTION AS WELL AS PRIOR TO PLACING INTO OPERATION. IN ADDITION TO THESE INSPECTIONS, THE SERVICES OF THE MANUFACTURER'S REPRESENTATIVE WILL BE REQUIRED TO PROVIDE CONSULTATION DURING INITIAL STATION START-UP AND FOR A PERIOD THEREAFTER TO INSTRUCT THE OWNER'S UTILITY PERSONNEL IN THE OPERATION OF THE SEWAGE PUMPING EQUIPMENT.

11.02 AFTER ERECTION, THE CONTRACTOR SHALL DEMONSTRATE THAT ALL EQUIPMENT IS OPERATING IN A SATISFACTORY MANNER. ALL EQUIPMENT SHALL BE LUBRICATED ACCORDING TO RECOMMENDATIONS OF THE MANUFACTURERS AND ALL ADJUSTMENTS SHALL BE MADE TO SUIT ANTICIPATED OPERATIONS. EACH PIECE OF EQUIPMENT SHALL BE TESTED TO SHOW THAT IT OPERATES QUIETLY, WITHOUT VIBRATION, OVERHEATING, OR SIGNS OF DISTRESS, AT FULL CAPACITY. ADJUSTMENTS SHALL BE MADE AS NECESSARY. ALL DEFECTIVE PARTS OF MACHINERY SHALL BE REPLACED.

A WARRANTY OF ONE YEAR ON ALL LABOR, EQUIPMENT, PARTS AND MATERIALS USED IN THE CONSTRUCTION SHALL BE PROVIDED BY THE CONTRACTOR TO THE OWNER.

PUMP CONTROL PANEL:

1.) NEMA TYPE 4X STAINLESS STEEL ENCLOSURE
2.) (2) BREAKERS (PUMPS) / (1) CONTROL BREAKER
3.) (2) RATED CONTACTORS
4.) EMERGENCY GENERATOR RECEPTACLE (METRIC 37-68072)
5.) (2) ADJUSTABLE OVERLOADS
6.) ELAPSE TIME METER FOR EACH PUMP
7.) LIGHTNING ARRESTOR
8.) (1) DEAD FRONT DOOR
9.) (1) DIVERSIFIED DUPLEX ALTERNATING CONTROLLER
10.) (1) ALTERNATOR WITH PUMP CONTROL SWITCH & LIGHTS
11.) (2) HOA SWITCHES
12.) (1) ALARM HORN/LIGHT WITH SILENCE BUTTON
13.) PUMP RUN LIGHTS
14.) EASY WIRING TERMINAL BLOCKS
15.) WIRING DIAGRAM WITH SCHEMATIC

CONTROL PANEL REQUIREMENTS NEMA RATED ENCLOSURE WITH INNER DOOR FOR CONTROLS; A CIRCUIT BREAKER WITH HANDLE THRU THE INNER DOOR AND A NEMA RATED STARTER AND OVERLOAD PROTECTION FOR EACH PUMP; A 3 POSITION SELECTOR LIGHT FOR EACH PUMP; AN ALTERNATOR RELAY SHALL ALTERNATE PUMPS EACH CYCLE AND PROVIDE BOTH PUMPS RUN ON DEMAND; MERCURY FLOAT TYPE LEVEL CONTROLS; MAIN BREAKER; A RED HIGH WATER ALARM LIGHT; LIGHTNING PROTECTION; A 120V SERVICE OUTLET

A. THE CONTROL PANEL SHALL BE STANDARD DUTY TYPE NEMA 4X (TYPE 304 STAINLESS STEEL) WITH DEAD FRONT INTERIOR DOOR, AND PROVISIONS FOR PAD LOCKING THE DOOR. THE INNER DOOR SHALL HAVE A POCKET FOR RETAINING THE PANEL WIRING DIAGRAM. EXTERIOR HARDWARE SHALL BE 304 STAINLESS STEEL.

B. PANEL SHALL BE MOUNTED ON A CONCRETE POST UNLESS OTHERWISE APPROVED, AND INCLUDE GROUND FAULT PROTECTION AND LIGHTNING ARRESTOR.

C. MOUNTED ON THE EXTERIOR SIDE SHALL BE A STANDBY GENERATOR RECEPTACLE COMPATIBLE WITH THE UTILITY COMPANY'S STANDBY POWER SUPPLY, A HIGH WATER LEVEL AUDIBLE ALARM WITH A SILENCE BUTTON, AN ALARM LIGHT WITH UNBREAKABLE OR PROTECTED LENS AND THE MAIN CIRCUIT BREAKER WITH PROVISIONS FOR LOCKING IN AN ON OR OFF POSITION. ALL EXTERIOR MOUNTED ACCESSORIES SHALL BE CONSTRUCTED OF CORROSION PROOF MATERIALS SUCH AS STAINLESS STEEL OR ALUMINUM. CONTROL WIRING FROM THE WET WELL SHALL ENTER THE PANEL IN A MANNER TO PREVENT THE POSSIBLE ENTRY OF GASES FROM THE WET WELL.

D. A THREE-POLE BQ FRAME CIRCUIT BREAKER SIZED TO N.E.C. SHALL BE REQUIRED FOR EACH PUMP WITH A THRU-THE-DOOR INTERLOCK SO THE DOORS CANNOT BE OPENED WITH THE CIRCUIT BREAKER ON. THE OPERATOR SHALL BE PROVIDED WITH AN INTERLOCK DEFEAT DEVICE WHICH REQUIRES A HAND TOOL TO OPERATE AND IS LOCKABLE IN AN OFF POSITION. EACH PUMP MOTOR SHALL BE PROVIDED WITH A NEMA RATED ACROSS THE LINE STARTER WITH INDIVIDUAL QUICK-TRIP OVERLOAD AND PHASE LOSS PROTECTION ON EACH LEG. OVERLOADS SHALL BE CAPABLE OF EITHER MANUAL OR AUTOMATIC RESET AND SHALL HAVE A MANUAL TRIP BUTTON TO FACILITATE TESTING OF THE OVERLOAD MECHANISM. A RESET BUTTON SHALL BE PROVIDED ON THE DOOR FOR EACH OVERLOAD. STARTER COILS AND CONTACTS SHALL BE EASILY REPLACEABLE WITH STANDARD HAND TOOLS.

E. THE PANEL SHALL INCLUDE A CONTROL CIRCUIT BREAKER AND AN AUTOMATIC ALTERNATOR TO ALTERNATE THE LEAD PUMP DUTY BETWEEN THE PUMPS ON SUCCESSIVE CYCLES.

F. THE TRANSFORMER SHALL BE SIZED ACCORDING TO THE TRANSFORMER MANUFACTURER'S INSTRUCTIONS TO SUPPLY THE TOTAL CONNECTED LOAD IN THE PANEL INCLUDING CONVENIENCE RECEPTACLE.

G. A ROTARY TYPE 3 POSITION SELECTOR SWITCH FOR HAND-OFF-AUTOMATIC OPERATION AND A RUN PILOT LIGHT FOR EACH PUMP SHALL BE ON THE INNER DOOR. A DPDT PLUG-IN TYPE ALTERNATOR RELAY SHALL ALTERNATE PUMPS EACH PUMPING CYCLE AND PROVIDE BOTH PUMPS RUN ON DEMAND. AN ALTERNATOR BYPASS SWITCH SHALL BE INSTALLED SO AS TO PREVENT, IN THE EVENT OF A PUMP FAILURE, THE REMAINING PUMP FROM OPERATING OFF THE HIGH LEVEL SWITCH. A ONE-POLE, 20 AMP CIRCUIT BREAKER SHALL BE PROVIDED FOR THE 120 VOLT CONTROL CIRCUIT FOR BOTH PUMPS AND THE CONVENIENCE RECEPTACLE, G.F.I., MOUNTED ON THE INNER DOOR. WIRE SHALL BE MINIMUM #14 GAUGE IN WIRE DUCT, WIRE MARKED AND FULLY ACCESSIBLE. WIRING SHALL BE LABELED, COLOR CODED OR NUMBERED. RELAYS AND CONTROL WIRING SHALL BE RATED NEMA 300 VOLT, FURNAS ELECTRIC CLASS 46, OR EQUAL.

H. POWER TERMINAL BLOCKS SHALL MEET 600 VOLT CREEPAGE AND CLEARANCE REQUIREMENTS OF NEMA AND UL FOR GENERAL INDUSTRIAL CONTROL EQUIPMENT AND PANEL BOARDS.

I. CONTROL CIRCUIT TERMINAL BLOCKS SHALL BE RATED 300 VOLTS AS NEMA GENERAL INDUSTRIAL CONTROL DEVICES.

J. THE PANEL SHALL HAVE A BQ FRAME NORMAL BREAKER AND A BQ FRAME EMERGENCY FOR MAIN BREAKER DISCONNECT WITH HANDLES THROUGH THE INNER DOOR AND A MECHANICAL INTERLOCK ON THE HANDLES TO INSURE ONLY ONE BREAKER IS IN THE "ON" POSITION AT A TIME. THE PANEL SHALL ALSO HAVE AN EXTERNAL MOUNTED (EMERGENCY) GENERATOR POWER RECEPTACLE, PRE-WIRED TO THE EMERGENCY BREAKER. BREAKERS SHALL BE SIZED AS REQUIRED, 200 AMP MAXIMUM. NO FUSES SHALL BE PERMITTED INSIDE THE CONTROL PANEL, ONLY RESETTABLE CIRCUIT BREAKERS. ALL BREAKERS AND STARTERS SHALL BE SQUARE D COMPANY, OR APPROVED EQUAL. THE PANEL SHALL BE FULL FACTORY TESTED PRIOR TO SHIPMENT AND INSTALLATION.

K. ALARM LIGHT: THE PANEL SHALL HAVE A VAPORPROOF RED LIGHT MOUNTED ON THE TOP OF THE PANEL FOR HIGH LEVEL ALARM VISUAL INDICATION AND A RED INDICATOR PILOT LIGHT MOUNTED ON THE INNER DOOR. THE ALARM LIGHT AND PILOT LIGHT SHALL BE PRE-WIRED TO TERMINALS TO OPERATE ON HIGH LEVEL CONTROL SIGNAL. PANEL SHALL HAVE A PUSH TO TEST SWITCH FOR THE ALARM LIGHT.

L. ELAPSED TIME METERS: THE PANEL SHALL HAVE A NON-RESET TYPE ELAPSED TIME METER FOR EACH STARTER MOUNTED ON THE INNER DOOR TO RECORD THE ACCUMULATED RUNNING TIME OF EACH PUMP. ELAPSED TIME METER FOR EACH CLOCK SHALL RECORD IN HOURS AND 1/10 OF AN HOUR.

M. PHASE MONITOR:

1. ALL STATIONS SHALL BE PROTECTED AGAINST ELECTRICAL INEQUITIES. PHASE MONITOR RELAY SHALL BE AS MANUFACTURED BY DIVERSIFIED ELECTRONICS, EVANSVILLE, IN., MODEL #SLA 440 ALE, INCLUDING SURGE CAPACITOR AS REQUIRED.
2. LIGHTNING ARRESTOR/SURGE SUPPRESSOR SHALL BE SILICON TYPE-N.

N. ELECTRICAL SERVICE ENTRANCE: A METER SOCKET AND DISCONNECT, ALL MEETING APPLICABLE ELECTRIC CODES AND REQUIREMENTS OF THE POWER COMPANY, SHALL BE PROVIDED. ELECTRICAL ENTRANCE SERVICE SHALL BE WIRED WITH #1-0 COPPER WIRE, MINIMUM.

O. EMERGENCY GENERATOR RECEPTACLE:

1. AN EMERGENCY GENERATOR RECEPTACLE, RUSSELL & STONE, HUBBEL, SQD, OR APPROVED EQUAL, ALL OF STANDARD NEMA CONFIGURATION, SHALL BE PROVIDED.
2. ALL WIRING AND GROUNDING SHALL CONFORM TO NEC AND LOCAL CODE.
3. SEPARATE PHASE PROTECTION AND LIGHTNING ARRESTORS SHALL BE PROVIDED FOR EMERGENCY GENERATOR.
4. CONDUIT SHALL ENTER THE WET WELL AND TERMINATE WITH A FIBER BRUSHING. NO SPLICES WILL BE ALLOWED IN THE WET WELL OR CONDUIT. ALL CONTROL AND MOTOR CORDS SHALL BE CONTINUOUS TO THE CONTROL CABINET.

P. MERCURY SWITCH LEVEL CONTROLS: MERCURY SWITCH LEVEL CONTROLS SHALL BE ENCASED IN FLOATS AND SUPPORTED BY MEANS OF HEAVILY NEOPRENE PACKETED THREE CONDUCTOR CABLES. THE FLOATS SHALL BE CONSTRUCTED OF MATERIAL SUITABLE FOR USE IN WASTEWATER AND SHALL BE RESISTANT TO FATTY ACIDS, HYDROGEN SULFIDE, CHLORINE, AND OTHER COMPOUNDS COMMON IN WASTEWATER. SWITCHES SHALL BE MOUNTED ON A STANDARD STAINLESS STEEL RACK ACCESSIBLE FROM THE HATCH COVER AND IN A PLACE THAT DOES NOT INTERFERE WITH THE REMOVAL OF THE PUMPS.

MERCURY SWITCHES SHALL BE SET UP AS FOLLOWS:

OPERATION OF THE SYSTEM:

UPON WET WELL SUMP LEVEL RISE, LOWER MERCURY SWITCH SHALL FIRST BE ENERGIZED, THEN THE UPPER LEVEL SWITCH SHALL NEXT ENERGIZE AND START THE LEAD PUMP. WITH THE LEAD PUMP OPERATING, THE WET WELL LEVEL SHALL LOWER TO THE LOW SWITCH TURNOFF SETTING AND THE PUMP SHALL STOP. ALTERNATING RELAY SHALL INDEX ON THE STOPPING OF THE PUMP, SO THAT THE LAG PUMP WILL START ON THE NEXT OPERATION. IF THE LEVEL CONTINUES TO RISE WHEN THE LEAD PUMP IS OPERATING, THE THIRD MERCURY SWITCH SHALL ENERGIZE AND START THE LAG PUMP AND ACTIVATE THE VISUAL ALARM LIGHT. BOTH THE LEAD AND LAG PUMPS SHALL OPERATE TOGETHER UNTIL THE LOW LEVEL SWITCH TURNS OFF BOTH PUMPS. IF THE LEVEL OF THE WET WELL SHOULD CONTINUE TO RISE WHEN BOTH PUMPS ARE OPERATING, THE UPPER-MOST SWITCH SHALL BE ENERGIZED AND THE AUDIBLE ALARM SHALL BE ACTIVATED. IF ONE PUMP SHALL FAIL FOR ANY REASON, THE SECOND PUMP SHALL OPERATE ON THE OVERRIDE CONTROL (THIRD LEVEL CONTROL), AND THE FLASHING VISUAL ALARM LIGHT SHALL ACTIVATE. IF THE LEVEL SHALL THEN RISE PAST THE FOURTH LEVEL CONTROL, THE AUDIBLE ALARM SHALL BE ACTIVATED. ALL LEVEL SWITCHES SHALL BE ADJUSTABLE, FOR LEVEL SETTING, FROM THE SURFACE.

SEWER FORCE MAINS SPECIFICATIONS

1.0 POLYVINYLCHLORIDE PIPE

1.01 POLYVINYLCHLORIDE PIPE: AWWA C900; PRESSURE CLASS 100, DR 25 FOR OPERATING PRESSURE LESS THAN 50 PSI; CLASS 150, DR 18, FOR OPERATING PRESSURE GREATER THAN 50 PSI. FORCE MAIN UNDER PAVED AREAS SHALL BE AWWA C900, DR 14, PRESSURE CLASS 200. FOR PIPE LESS THAN 4 INCHES IN DIAMETER, USE ASTM D2241, SDR 21, PRESSURE CLASS 200; FOR PRESSURE GREATER THAN 50 PSI, USE ASTM 1785 SCHEDULE 80.

1.02 ALL POLYVINYLCHLORIDE (PVC) PIPE SHALL BE LAID WITH METAL LOCATOR TAPE BURIED ONE FOOT ABOVE AND PARALLEL TO THE PIPE CENTERLINE. THE LOCATOR TAPE SHALL BE AT LEAST 2 INCHES WIDE WITH ALUMINUM BACKING AND SHALL BE LETTERED, "CAUTION FORCEMAIN BELOW" IN LARGE LETTERS.

AND

ALL POLYVINYLCHLORIDE (PVC) PIPE SHALL BE LAID WITH A 12 GAUGE SOLID COPPER LOCATING WIRE WITH PVC COATING BURIED ON TOP OF THE PIPE. WIRE AND INSTALLATION SHALL MEET NATIONAL ELECTRICAL CODE FEDERAL SPECIFICATION J-C-308.

1.03 ALL FITTINGS ON PVC PIPE SHALL BE MEGA-LUG TYPE OR APPROVED ALTERNATE. BY EBAA ONLY.

2.0 HIGH DENSITY POLYETHYLENE PIPE (HDPE)

2.01 POLYETHYLENE PIPING MATERIAL: THE PIPE AND FITTINGS SHALL BE MADE OF HIGH DENSITY, EXTRA HIGH MOLECULAR WEIGHT (EHMW) POLYETHYLENE WITH A STANDARD THERMOPLASTIC MATERIAL DESIGNATION CODE OF PE3408 AND HAVING A CELL CLASSIFICATION OF 345464E PER ASTM D3350. THE MOLECULAR WEIGHT CATEGORY SHALL BE EXTRA HIGH (25,000 TO 1,500,000) AS PER THE GEL PERMEATION CHROMATOGRAPHY DETERMINATION PROCEDURE WITH A TYPICAL VALUE OF 300,000 TO 330,000. THE PIPE WILL BE THE COLOR GREEN AND SHALL MEET THE UTILITY LOCATION AND COORDINATION COUNCIL "UNIFORM COLOR CODE," FOR SEWER AND DRAIN LINES, PER APWA/LCC STANDARDS COMMITTEE.

2.02 THE POLYETHYLENE PIPE MANUFACTURER SHALL PROVIDE CERTIFICATION THAT THE STRESS REGRESSION TESTING HAS BEEN PERFORMED ON THE SPECIFIC PRODUCT. THE SAID CERTIFICATION SHALL INCLUDE A STRESS LIVE CURVE PER ASTM D2837. THE STRESS REGRESSION TESTING SHALL HAVE BEEN PERFORMED IN ACCORDANCE WITH ASTM D2837, AND THE MANUFACTURER SHALL PROVIDE A PRODUCT SUPPLYING A MINIMUM HYDROSTATIC DESIGN BASIS (HDB) OF 1,600 PSI AS DETERMINED BY ASTM D2837.

2.03 THE MATERIAL SHALL BE LISTED BY THE PLASTICS PIPE INSTITUTE (PPI), A DIVISION OF THE SOCIETY OF THE PLASTICS INDUSTRY IN PPI TR-4. THE PIPE MATERIAL SHALL HAVE A HYDROSTATIC DESIGN BASIS OF 1600 PSI AT 730F AND 800 PSI AT 1400F. THE PPI LISTING SHALL BE IN THE NAME OF THE PIPE MANUFACTURER AND TESTING AND VALIDATION OF SAMPLES OF THE PIPE MANUFACTURER'S PRODUCTION PIPE SHALL BE BASED UPON ASTM D2837 AND PPI TR-3.

2.04 THE MANUFACTURER'S CERTIFICATION SHALL STATE THAT THE PIPE WAS MANUFACTURED FROM ONE SPECIFIC RESIN IN COMPLIANCE WITH THESE SPECIFICATIONS. THE CERTIFICATE SHALL STATE THE SPECIFIC RESIN USED AND ITS SOURCE.

2.05 HDPE PIPE MANUFACTURED FROM MATERIALS MEETING THE SPECIFICATIONS OF THIS SECTION SHALL HAVE AN ENVIRONMENTAL STRESS CRACK RESISTANCE OF NO FAILURES IN 10,000 HRS. (ESCR: F0>10,000) WHEN TESTED IN ACCORDANCE WITH ASTM F1248.

2.06 PIPE AND FITTINGS SHALL BE MANUFACTURED FROM MATERIAL MEETING THE REQUIREMENTS OF THIS SECTION. PIPE SUPPLIED UNDER THIS SPECIFICATION SHALL HAVE A NOMINAL IPS (IRON PIPE SIZE) OUTSIDE DIAMETER UNLESS OTHERWISE SPECIFIED. THE DIMENSION RATIO (DR) AND PRESSURE RATING OF THE PIPE AT 73* SHALL MATCH THE FOLLOWING UNLESS NOTED OTHERWISE ON THE DRAWINGS:

DR 7.3 – 250 PSI DR 13.5 – 130 PSI DR 21 – 80 PSI
DR 9 – 200 PSI DR 15.5 – 110 PSI DR 26 – 65 PSI
DR 11 – 160 PSI DR 17 – 100 PSI DR 32.5 – 50 PSI

2.07 THE PIPE AND FITTINGS SHALL HAVE PRODUCT TRACEABILITY. THE MANUFACTURER SHALL INCLUDE A PRINTLINE ON THE PIPE. THIS SHALL NOTATE THE MANUFACTURER'S NAME, ADDRESS, DATE OF MANUFACTURE, THE LOT AND SUPPLIER OF RAW MATERIAL, PLANT LOCATION, AND PRODUCTION SHIFT. THE ASTM STANDARD SHALL ALSO APPEAR AS ASTM F714 WITH THE MATERIAL DESIGNATION AS PE3408. THE PRINTLINH SHALL BE BLACK ON THE GREEN PIPE.

2.08 BOTH PIPE AND FITTINGS SHALL CARRY THE SAME PRESSURE RATING. ALL FITTINGS SHALL BE PRESSURE RATED TO MATCH THE SYSTEM PIPING TO WHICH THEY ARE JOINED. AT THE POINT OF FUSION, THE OUTSIDE DIAMETER AND MINIMUM WALL THICKNESS OF THE FITTING SHALL MATCH THE OUTSIDE DIAMETER AND MINIMUM WALL THICKNESS SPECIFICATIONS OF ASTM F714 FOR THE SAME SIZE PIPE. FITTINGS SHALL BE MANUFACTURED BY THE MANUFACTURER OF THE PIPE. ELLS, TEES, AND WYES SHALL BE MANUFACTURED BY MITERED FABRICATION. FOR FORCE MAINS OR PRESSURE RATED FITTINGS, ALL FITTINGS SHALL BE DERATED ACCORDING TO THE MANUFACTURER'S WRITTEN SPECIFICATIONS, AND CLEARLY LABELED ON THE FITTING AS SUCH. FOR GRAVITY OR SANITARY SEWER, EITHER DIRECT BURY OR INSERTION LINING FITTINGS WILL BE FULLY PRESSURE RATED. ALL FITTINGS WILL HAVE A QUALITY CONTROL LABEL AS APPROVED BY THE MANUFACTURER.

2.09 HEAT FUSION JOINING SYSTEMS: PIPE AND FITTINGS SHALL BE THERMAL BUTT FUSION, SADDLE FUSION, OR SOCKET FUSION ACCORDING TO MANUFACTURER RECOMMENDED PROCEDURES.

2.10 THE MANUFACTURER SHALL PROVIDE FUSION TRAINING. THE CONTRACTOR (ACTUAL INSTALLERS) AND THE ONSITE JOINT INSPECTOR SHALL BE TRAINED BY THE MANUFACTURER OR MANUFACTURER'S AUTHORIZED REPRESENTATIVE.

2.11 IT WILL NOT BE PERMITTED TO JOIN UNLIKE DR'S TO ONE ANOTHER. TRANSITION FROM UNLIKE SDR'S SHALL BE ACCOMPANIED BY MECHANICAL COUPLINGS CAPABLE OF IDENTICAL PRESSURE RATINGS OR MACHINED POLYETHYLENE NIPPLES WHERE A THICKER WALL POLYETHYLENE HAS BEEN MATCHED TO THE COMPANION PIPE WALL.

2.12 MECHANICAL JOINING SYSTEMS: POLYETHYLENE PIPE AND FITTINGS SHALL BE CONNECTED BY MEANS OF A POLYETHYLENE FLANGE ADAPTER AND BACKUP RING. THE POLYETHYLENE FLANGE ADAPTER WILL BE OF THE SAME SPECIFICATIONS AS THE LIGHTVIEW EXCEPT WILL BE MADE FROM BLACK PLATE STOCK. THIS METHOD IS ALSO APPROVED TO JOIN TO ANOTHER PIPING SYSTEM OR VALVES. MECHANICAL COMPRESSION COUPLINGS OR FULL CIRCLE ENCASEMENT CLAMPS MAY BE USED DEPENDING ON THE TEST SPECIFICATIONS.

2.13 MECHANICAL COUPLINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE MECHANICAL COUPLING MANUFACTURER'S RECOMMENDED PROCEDURES.

2.14 EQUIPMENT: THE FUSION EQUIPMENT AND OPERATOR SHALL BE REQUIRED TO DEMONSTRATE SUCCESSFUL FIELD EXPERIENCE. REGARDING FUSION OVER 36" CAPABILITY, THE FUSION UNIT SHALL BE FIELD TESTED FOR A PERIOD OF FIVE YEARS AND THE FUSION OPERATOR SHALL HAVE PIPE SIZE EXPERIENCE OF THE SAME SIZE PIPE ON THIS PROJECT FOR FIVE YEARS OR LONGER.

3.0 DUCTILE IRON PIPE

DUCTILE IRON PIPE SHALL MEET THE REQUIREMENTS OF ANSI SPECIFICATIONS A21.51, AWWA C151. PIPE WALL THICKNESS SHALL CONFORM TO A MINIMUM OF CLASS 50 WITH 350 PSI WORKING PRESSURE. EXTERIOR OF PIPE SHALL HAVE BITUMINOUS COATING. INTERIOR OF PIPE SHALL BE POLYLINED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND BE RESISTANT TO THE CORROSIVE ELEMENTS NORMALLY FOUND IN MUNICIPAL WASTE WATER.

4.0 AIR RELEASE VALVE UNIT:

AS SHOWN ON THE PLANS.

5.0 TESTS, INSPECTION, AND REPAIRS:

5.01 ALL MATERIALS SHALL BE TESTED IN ACCORDANCE WITH THE APPLICABLE FEDERAL, ASTM, OR AWWA SPECIFICATION AND THE BASIS FOR REJECTION SHALL BE AS SPECIFIED THEREIN. CERTIFIED COPIES OF THE TESTS SHALL BE SUBMITTED WITH EACH SHIPMENT OF MATERIAL.

5.02 ALL MATERIALS WILL BE SUBJECT TO INSPECTION AND APPROVED BY THE PROJECT ENGINEER AFTER DELIVERY AND NO BROKEN, CRACKED, MISSHAPEN, IMPERFECTLY COATED, OR OTHERWISE DAMAGED, OR UNSATISFACTORY MATERIAL SHALL BE USED.

5.03 ALL MATERIAL FOUND DURING THE PROGRESS OF THE WORK TO HAVE CRACKS, FLAWS, OR OTHER DEFECTS SHALL BE REJECTED AND PROMPTLY REMOVED FROM THE SITE.

5.04 IF DAMAGE OCCURS TO ANY PIPE, FITTINGS, VALVES HYDRANTS, OR WATER MAIN ACCESSORIES IN HANDLING, THE DAMAGE SHALL BE IMMEDIATELY BROUGHT TO THE PROJECT ENGINEER'S ATTENTION. THE PROJECT ENGINEER SHALL PRESCRIBE CORRECTIVE REPAIRS, OR REJECTION OF THE DAMAGE ITEMS.

6.00 CONSTRUCTION:

6.01 EXCAVATING THE TRENCH:

A) AS A GENERAL RULE, DO NOT OPEN THE TRENCH TO FAR AHEAD OF THE PIPE LAYING SO AS TO: AVOID POSSIBLY FLOODING THE TRENCH, REDUCE OR ELIMINATE PUMPING OR SHEETING, REDUCE CAVING CAUSED BY GROUND WATER, REDUCE POTENTIAL WORKMEN AND TRAFFIC HAZARD.

B) THE TRENCH WIDTH AT THE GROUND SURFACE MAY VARY WITH AND DEPEND UPON THE DEPTH, TYPE OF SOILS AND POSITION OF SURFACE STRUCTURES. THE MINIMUM CLEAR WIDTH OF THE TRENCH IN THE PIPE ZONE SHOULD BE ONE FOOT GREATER THAT THE OUTSIDE DIAMETER OF THE PIPE. THE MAXIMUM CLEAR WIDTH OF THE TRENCH AT THE TOP OF THE PIPE SHOULD NOT EXCEED A WIDTH EQUAL TO THE PIPE DIAMETER PLUS TWO FEET. IF THE ABOVE DEFINED TRENCH WIDTHS MUST BE EXCEEDED OR IF THE PIPE IS INSTALLED IN A COMPACTED EMBANKMENT, PIPE EMBEDMENT SHOULD BE COMPACTED TO A POINT OF AT LEAST 2.5 PIPE DIAMETERS ON BOTH SIDES OF THE PIPE OR TO THE TRENCH WALLS, WHICHEVER IS LESS.

C) MINIMUM COVER FOR THE TOP OF THE PIPE IS 36 INCHES BELOW THE FINISHED GRADE.

D) THE TRENCH BOTTOM SHOULD BE SMOOTH AND FREE FROM LARGE STONES, ROCKS OR LARGE DIRT CLODS. EXCAVATION OF BELLS SHOULD BE PROVIDED SO THAT THE PIPE IS UNIFORMLY SUPPORTED ALONG ITS LENGTH. USUALLY, LOOSE MATERIAL LEFT BY THE EXCAVATOR ON THE TRENCH BOTTOM WILL BE ADEQUATE FOR BEDDING THE PIPE BARREL AND PROVIDING FULL SUPPORT. WHEN ROCK OR OTHER NON-CUSHIONING MATERIAL IS ENCOUNTERED, EXCAVATION SHALL BE EXTENDED TO 6 INCHES BELOW THE OUTSIDE BOTTOM OF THE PIPE AND A BEDDING CUSHION OF SAND OR OTHER SELECTED BACKFILL USED AS THE PIPE BED.

6.02 PIPE LAYING:

A) WATER SHALL NOT BE ALLOWED IN THE TRENCHES WHILE THE PIPES ARE BEING LAID AND/OR TESTED. THE CONTRACTOR SHALL NOT OPEN UP MORE TRENCH THAN THE AVAILABLE PUMPING FACILITIES ARE ABLE TO DEWATER TO THE SATISFACTION OF THE ENGINEER. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR DISPOSING OF ALL WATER SO AS NOT TO INJURE OR INTERFERE WITH THE NORMAL DRAINAGE OF THE TERRITORY IN WHICH HE IS WORKING. IN NO CASE SHALL PIPELINES BE USED AS DRAINS FOR SUCH WATER, AND THE ENDS OF THE PIPE SHALL BE KEPT PROPERLY AND ADEQUATELY BLOCKED DURING CONSTRUCTION BY THE USE OF APPROVED STOPPERS AND NOT BY IMPROVISED EQUIPMENT. ALL NECESSARY PRECAUTIONS SHALL BE TAKEN TO PREVENT THE ENTRANCE OF MUD, SAND, OR OBSTRUCTING MATTER INTO THE PIPELINES. IF ON COMPLETION OF THE WORK, ANY SUCH MATERIAL HAS ENTERED THE PIPELINES, IT MUST BE CLEANED AS DIRECTED BY THE ENGINEER SO THAT THE ENTIRE SYSTEM WILL BE LEFT CLEAN AND UNOBSTRUCTED.

B) CLEANLINESS: THE INTERIOR OF THE PIPE SHALL BE THOROUGHLY CLEANED OF ALL FOREIGN MATTER BEFORE BEING GENTLY LOWERED INTO THE TRENCH AND SHALL BE KEPT CLEAN DURING THE LAYING OPERATIONS BY MEANS OF PLUGS OR OTHER APPROVED METHODS. DURING SUSPENSION OF WORK FOR ANY REASON AT ANY TIME, A SUITABLE STOPPER SHALL BE PLACED IN THE END OF THE PIPE LAST LAID TO PREVENT MUD OR OTHER FOREIGN MATERIAL FROM ENTERING THE PIPE.

C) GRADIENT: LINES SHALL BE LAID STRAIGHT, AND DEPTH OF COVER SHALL BE MAINTAINED UNIFORM WITH RESPECT TO FINISH GRADE, WHETHER GRADING IS EITHER COMPLETED OR PROPOSED AT TIME OF PIPE INSTALLATION. WHEN A GRADE OF SLOPE IS SHOWN ON THE DRAWINGS, BATTER BOARDS WITH STRING LINE PARALLELING DESIGN GRADE, OR OTHER PREVIOUSLY APPROVED MEANS, SHALL BE USED BY THE CONTRACTOR TO ASSURE CONFORMANCE TO REQUIRED GRADE. ALL PIPE SHALL BE LAID WITHIN A PIPE DIAMETER OF LINES AND GRADES INDICATED.

D) PIPE JOINT DEFLECTION: WHENEVER IT IS DESIRABLE TO DEFLECT PIPE, THE AMOUNT OF DEFLECTION SHALL NOT EXCEED THE FOLLOWING MAXIMUM LIMITS: A) FOR DUCTILE IRON PIPE, AWWA STANDARD C900; B) FOR PVC PIPE, NO DEFLECTION IS ALLOWED AT THE JOINTS, AND LONGITUDINAL DEFLECTION IS LIMITED TO THE MAXIMUM SHOWN IN AWWA PUBLICATION M23. ADDITIONALLY, JOINT DEFLECTION FOR DUCTILE IRON PIPE SHALL NOT EXCEED THE MAXIMUM ALLOWED BY THE MANUFACTURER.

E) PVC PIPE STORAGE: POLYVINYLCHLORIDE PIPE EXTERIOR MAY BE DAMAGED BY PROLONGED EXPOSURE TO DIRECT SUNLIGHT AND THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS DURING STORAGE AND INSTALLATION TO AVOID THIS DAMAGE. PIPE SHALL BE STORED UNDER COVER AND SUFFICIENT BACKFILL TO SHIELD FROM THE SUN SHALL BE PLACED AS THE PIPE IS INSTALLED.

F) JOINT COMPOUNDS: NO SULPHUR BASE JOINT COMPOUND SHALL BE USED.

G) ANCHORS: CONCRETE THRUST BLOCKS SHALL BE PLACED AT ALL BENDS, TEES, PLUGS, AND OTHER FITTINGS TO PROVIDE LATERAL SUPPORT. THRUST BLOCKS SHALL CONFORM TO THE DETAILS SHOWN ON THE ILLUSTRATIVE STANDARDS. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 2500 PSI AFTER 28 DAYS, AND SHALL HAVE A MINIMUM CURING TIME OF 3 DAYS. THE POURED CONCRETE SHALL BE LEFT EXPOSED FOR A MINIMUM OF 24 HOURS BEFORE BACKFILLING AND NOT MORE THAN 48 HOURS.

H) JOINTS: THE JOINTS OF ALL PIPELINES SHALL BE MADE ABSOLUTELY TIGHT. THE PARTICULAR JOINT SHALL BE APPROVED BY THE PROJECT ENGINEER PRIOR TO INSTALLATION. WHERE SHOWN ON PLANS OR WHERE, IN THE OPINION OF THE PROJECT ENGINEER, SETTLEMENT OR VIBRATION IS LIKELY TO OCCUR, ALL PIPE JOINTS SHALL BE BOLTED, OR RETAINED ACCORDINGLY.

I) MECHANICAL JOINTS: ALL MECHANICAL JOINTS SHALL BE MEGA-LUG TYPE BY EBAA, AND SHALL BE LAID AND JOINTED IN FULL CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS.

J) PUSH-ON JOINTS: PUSH-ON JOINTS SHALL BE MADE IN STRICT, COMPLETE COMPLIANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. LUBRICANT, IF REQUIRED, SHALL BE AN INERT, NONTOXIC, WATER SOLUBLE COMPOUND INCAPABLE OF HARBORING, SUPPORTING, OR CULTURING BACTERIAL LIFE. MANUFACTURER'S RECOMMENDATIONS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL BEFORE WORK IS BEGUN.

K) POLYVINYLCHLORIDE PIPE JOINTS: THE JOINTS OF ALL PIPELINES SHALL BE MADE IN CONFORMITY WITH THE RECOMMENDATIONS OF THE PIPE MANUFACTURER. THE PARTICULAR JOINT USED SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.

L) SANITARY SEWERS AND FORCE MAINS SHALL HAVE A MINIMUM OF 10 FEET HORIZONTAL CLEARANCE WITH PARALLEL POTABLE WATER LINES, AND 18 INCHES VERTICAL CLEARANCE WHEN CROSSING. CONCRETE ENCASEMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS SHOWN ON THE DRAWINGS USING 2500 PSI MINIMUM COMPRESSIVE STRENGTH CONCRETE. ENCASEMENT SHALL BE CONSTRUCTED WHERE:

1) THE WATER LINE CROSSES UNDER, OR AT A DEPTH WHICH PROVIDES LESS THAN 18 INCHES CLEAR DISTANCE BETWEEN PIPES WHEN CROSSING OVER SEWER LINES; ENCASEMENT SHALL EXTEND A MINIMUM OF TEN FEET ON EACH SIDE OF THE POINT OF CROSSING; OR

2) THE ENGINEER SHALL ORDER THE LINE ENCASED.

THE POINTS OF BEGINNING AND ENDING OF PIPE ENCASEMENT SHALL BE NOT MORE THAN 6 INCHES FROM A PIPE JOINT TO PROTECT THE PIPE FROM CRACKING DUE TO UNEVEN SETTLEMENT OF ITS FOUNDATION, OR THE EFFECTS OF SUPERIMPOSED LIVE LOADS.

CLASS I CONCRETE (MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI) ENCASEMENT, SHALL BE REQUIRED FOR BOTH GRAVITY SEWER MAINS AND FORCE MAINS WHEN THE ABOVE CRITERIA FOR SEPARATION OF WATER AND SEWER LINES CANNOT BE MAINTAINED.

M) FLUSHING: ALL SEWER MAINS SHALL BE FLUSHED TO REMOVE ALL SAND AND OTHER FOREIGN MATTER. THE VELOCITY OF THE FLUSHING WATER SHALL BE AT LEAST 4 FEET PER SECOND. FLUSHING SHALL BE TERMINATED AT THE DIRECTION OF THE ENGINEER. THE CONTRACTOR SHALL DISPOSE OF THE FLUSHING WATER WITHOUT CAUSING A NUISANCE OR PROPERTY DAMAGE.

LIFT STATION LINING MATERIAL AND METHOD

SEWPERCOAT®

SUGGESTED TECHNICAL SPECIFICATION FOR STRUCTURAL/STRUCTURALLY ENHANCED LINING INSTALLATIONS IN CORROSIVE MUNICIPAL ENVIRONMENTS

REFERENCE US 04/16 SCOAT

PART 1 –GENERAL

1.1. GENERAL: THIS SPECIFICATION DEFINES THE METHOD AND MATERIAL FOR THE REHABILITATION OF SANITARY SEWER STRUCTURES (MANHOLES, WET WELLS, LIFT/PUMP STATIONS, LARGE DIAMETER CONCRETE PIPE, ETC.) UTILIZING A SPRAY APPLIED CALCIUM ALUMINATE CEMENTITIOUS STRUCTURAL REHABILITATION SYSTEM. THE PURPOSE OF THIS PROJECT IS TO OBTAIN A DENSE AND DURABLE CONCRETE LINING THAT IS RESISTANT TO BIOSULFURIC ACID ATTACK AND MEETS THE STRENGTH REQUIREMENTS DESCRIBED ELSEWHERE IN THIS SPECIFICATION. THE WORK COVERED IN THIS SPECIFICATION CONSISTS OF FURNISHING ALL LABOR, EQUIPMENT, MATERIALS, AND SUPERVISION NECESSARY TO ACCOMPLISH THE REHABILITATION AS SPECIFIED. WHEN COMPLETE THE REHABILITATED STRUCTURE SHALL:

1.1.1. PROVIDE FOR A UNIFORMLY SMOOTH SURFACE OF SPECIFIED THICKNESS.
1.1.2. MINIMIZE, IF NOT ELIMINATE SOURCES OF INFLOW/INFILTRATION (I/I).
1.1.3. PROVIDE A SERVICE LIFE THAT IS SUPPORTED BY DOCUMENTED TEST ANALYSIS.

1.2. CONTRACTORS SEQUENCE OF OPERATION

1.2.1. THE CONTRACTOR'S SEQUENCE OF OPERATION RELATIVE TO STRUCTURAL REHABILITATION SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
1.2.2. ELIMINATE ALL SOURCES OF GROUNDWATER INFILTRATION AND VOIDS IN WALLS.
1.2.3. REHABILITATE ALL INTERIOR SURFACES INCLUDING WALLS, CEILINGS AND FLOORS IN ACCORDANCE WITH SPECIFICATION AND NATURE OF THE SUB-SURFACES.
1.2.4. PROVISION TO "CURE" THE INSTALLED LINING MATERIAL.
1.2.5. PROVISION TO "TEST"LINING AND STRUCTURAL REHABILITATION MATERIALS.

1.3. SUBMITTALS

1.3.1. THE CONTRACTOR SHALL FURNISH DETAILED AND COMPLETE DATA PERTAINING TO THE SURFACES OF THE STRUCTURE TO BE REHABILITATED, THE REHABILITATION PRODUCT, SURFACE PREPARATION AND INSTALLATION TO THE ENGINEER FOR APPROVAL. THE SUBMISSION OF THIS DATA SHALL BE MADE IN A TIMELY MANNER TO PREVENT PROJECT DELAY. AT THE REQUEST OF THE ENGINEER, THE CONTRACTOR SHALL TEST FOR ADVERSE CHEMICAL CONDITIONS THAT MAY HINDER OVERALL PRODUCT PERFORMANCE.
1.3.2. PRIOR TO INITIATING THE WORK, THE CONTRACTOR SHALL SUBMIT SPECIFIC TECHNICAL DATA WITH COMPLETE PHYSICAL PROPERTIES OF THE STRUCTURE TO BE REHABILITATED AND THE PROPOSED PRODUCT FOR THE REHABILITATION OF THE STRUCTURE, AS WELL AS A SPECIFIC PLAN FOR SUB-SURFACE PREPARATION.
1.3.3. A WORK PLAN.
1.3.4. A SAFETY PLAN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH OSHA STANDARDS AND ALL REGULATIONS PERTAINING TO THE WORK INCLUDING CONFINED SPACE ENTRY.

PART 2 –PRODUCTS

2.1 MATERIALS

2.1.1 LINING MATERIAL FURNISHED UNDER THIS SPECIFICATION SHALL BE A PREPACKAGED MORTAR MIX, INCLUDING ALL CEMENT, AGGREGATES, AND ANY REQUIRED ADDITIVES. IT IS THE INTENT OF THIS SPECIFICATION THAT THE CONTRACTOR ONLY BE REQUIRED TO ADD THE PROPER AMOUNT OF POTABLE WATER SO AS TO PRODUCE CONCRETE SUITABLE FOR SPRAY APPLICATION. DO NOT ADD PORTLAND CEMENT, OTHER AGGREGATES, OR ANY UNAPPROVED ADMIXTURES WHATSOEVER TO LINING MATERIAL. TYPICAL PACKAGE WEIGHTS SHALL NOT BE LESS THAN 50 LBS AND SHALL BE IDENTICAL FOR ALL MATERIAL FURNISHED ON THIS PROJECT.

2.1.2 THE CHEMICAL COMPOSITION OF THE CEMENT PORTION AS WELL AS THE AGGREGATES OF THE MORTAR MIX SHALL BE AS FOLLOWS:

Al2O3	CaO	FeO + Fe2O3	SiO2
39–44%	34–38%	9–15%	6–8%

2.1.3. THE PROPERTIES OF THE MORTAR MIX UNDER STANDARD LABORATORY CONDITIONS ARE TYPICALLY AS FOLLOWS:

COMPRESSIVE STRENGTH (ASTM C109)	> 5,500 PSI	24 HOURS
FLEXURAL STRENGTH (ASTM C348)	> 900 PSI	24 HOURS
SPLITTING TENSILE STRENGTH (ASTM C496)	> 550 PSI	24 HOURS
SLANT SHEAR TEST (ASTM C882)	> 2,500 PSI	28 DAYS
SHRINKAGE AT 28 DAYS (ASTM C157)	< 0.07%	
FREEZE/THAW AFTER 300 CYCLES (ASTM C666)	> 102	

2.1.4. THE MORTAR MIX SHALL BE EITHER "SEWPERCOAT PG"OR "SEWPERCOAT 2000HS REGULAR", BOTH AS MANUFACTURED BY KERNEOS INC. –CHESAPEAKE, VIRGINIA.

2.1.5. MORTAR MIX MUST HAVE AT LEAST FIFTEEN (15) YEARS OF SUCCESSFUL PERFORMANCE IN SIMILAR APPLICATIONS AND MANUFACTURER SHALL BE ISO 9001:2008 CERTIFIED FOR QUALITY MANAGEMENT. MANUFACTURER'S ISO 9001:2008 CERTIFICATE SHALL BE SUBMITTED TO ENGINEER AND OWNER.

2.1.6. MORTAR MIX MANUFACTURER SHALL OFFER TO THE OWNER A LABOR AND MATERIALS REPLACEMENT LIMITED WARRANTY FOR A PERIOD OF NO LESS THAN 10 YEARS FROM THE DATE OF OWNER ACCEPTANCE OF THE INSTALLATION.

2.1.7. IN ADDITION, THE MORTAR MIX SHALL BE DESIGNED TO WITHSTAND LONG-TERM EXPOSURE TO A BACTERIALLY CORROSIVE HYDROGEN SULFIDE ENVIRONMENT THAT MAY BE EXPECTED TO PRODUCE A PH OF 1 ON NORMAL PORTLAND CEMENT BASED CONCRETE OR TYPICAL BRICK AND MORTAR SURFACES.

2.1.8. WATER USED IN MIXING SHALL BE FRESH, CLEAN, POTABLE WATER, FREE FROM INJURIOUS AMOUNTS OF OIL, ACID, ALKALI, VEGETABLE, SEWAGE AND/OR ORGANIC MATTER. WATER SHALL BE CONSIDERED AS WEIGHING 8.32 POUNDS PER GALLON.

2.1.9. MORTAR MIX SHALL BE STORED WITH ADEQUATE PROVISIONS FOR THE PREVENTION OF ABSORPTION OF MOISTURE. IT SHALL BE STORED IN A MANNER THAT WILL PERMIT EASY ACCESS FOR INSPECTION AND IDENTIFICATION OF EACH SHIPMENT.

PART 3 –EXECUTION

3.1 SAMPLING AND TESTING

3.1.1 A RECOGNIZED INDEPENDENT TESTING LABORATORY SHALL TEST MORTAR MATERIALS USED ON THE PROJECT. THE MANUFACTURER, INSTEAD OF AN INDEPENDENT LABORATORY, MAY TEST PROJECT SAMPLE SPECIMENS, PROVIDED THE OWNER, ENGINEER, AND MANUFACTURER ARE IN AGREEMENT OF THIS TESTING METHOD PRIOR TO PROJECT COMMENCEMENT. SPECIFIC MATERIALS RECOMMENDED BY THE ENGINEER SHALL THEN BE TESTED.

3.1.2 THE COST OF SAMPLING AND TESTING OF THE MORTAR MIX DURING PLACEMENT AND THE SURFACE TO WHICH IT IS APPLIED SHALL BE BORN BY THE CONTRACTOR. OTHER TESTING REQUIRED SHOWING CONFORMANCE WITH THESE SPECIFICATIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CERTIFIED TEST REPORTS AND CERTIFICATES, WHEN SO DIRECTED, SHALL BE SUBMITTED IN DUPLICATE TO THE ENGINEER AND TO SUCH OTHER AGENCIES OR PERSONS THE ENGINEER MAY DESIGNATE.

3.1.3 ANY MATERIALS FAILING TO MEET THE REQUIREMENTS OF THESE SPECIFICATIONS SHALL NOT BE INCORPORATED INTO THE WORK PLAN.

3.2 QUALIFICATION OF WORK CREW

3.2.1 THE LINING MATERIAL MANUFACTURER SHALL MAINTAIN A LISTING OF COMPETENT CONTRACTORS THAT HAVE DEMONSTRATED REQUISITE SKILL AND TRAINING TO BE QUALIFIED APPLICATORS OF THEIR MATERIALS.

3.2.2 PRIOR TO PROJECT COMMENCEMENT, THE CONTRACTOR MUST SATISFY THE ENGINEER THAT ALL CONTRACTOR'S WORK CREW PERSONNEL HAVE PERFORMED SATISFACTORY WORK IN SIMILAR CAPACITIES ELSEWHERE FOR A SUFFICIENT PERIOD OF TIME TO BE FULLY QUALIFIED TO PROPERLY PERFORM THE WORK IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELATED SPECIFICATIONS.

3.2.3 FOREMAN SHALL HAVE AT LEAST 4 YEARS EXPERIENCE WITH SIMILAR WORK AND PROJECT CONDITIONS.

3.2.4 NOZZLEMEN SHALL BE QUALIFIED BY HAVING HAD SIMILAR WORK EXPERIENCE.

3.2.5 WORK CREW RESPONSIBILITIES PRIOR TO APPLICATION OF LINING MATERIAL SHALL INCLUDE THE FOLLOWING:

a) SURFACE PREPARATION AS DISCUSSED IN SECTION 4.1.
b) ENSURE THE OPERATING AIR PRESSURE IS UNIFORM AND PROVIDES ADEQUATE NOZZLE VELOCITY FOR PROPER COMPACTION.
c) CONTINUOUSLY REGULATE THE WATER CONTENT SO THAT THE APPLIED MATERIALS CONSISTENTLY ACHIEVE PROPER COMPACTION WITH A LOW PERCENTAGE OF REBOUND AND NO VISIBLE "SAG".
d) ENSURE THAT THE INSTALLATION EQUIPMENT NOZZLE IS HELD AT THE PROPER DISTANCE AWAY FROM AND AS NEARLY PERPENDICULAR TO THE PREPARED SUB-SURFACE AS THE WORKING CONDITIONS WILL PERMIT TO SECURE MAXIMUM MATERIAL COMPACTION WITH MINIMUM REBOUND AND NO VISIBLE "SAG".
e) FOLLOW A SEQUENCE ROUTINE THAT WILL FILL CORNERS WITH ADEQUATELY COMPACTED MATERIAL APPLIED AT A MAXIMUM PRACTICABLE LAYER THICKNESS.
f) DETERMINE NECESSARY OPERATING PROCEDURES FOR PLACEMENT IN CONFINED SPACES, EXTENDED DISTANCES OR AROUND UNUSUAL OBSTRUCTIONS WHERE PLACEMENT VELOCITIES AND MIX CONSISTENCY MAY NEED TO BE ADJUSTED.
g) DIRECT THE CREW AS TO WHEN TO START AND STOP THE FLOW OF MATERIALS DURING INSTALLATION AND TO IMMEDIATELY STOP ALL WORK WHEN MATERIAL IS NOT ARRIVING UNIFORMLY AT THE NOZZLE.
h) ENSURE THAT SLOUGH POCKETS ARE REMOVED AND PREPARED FOR INSTALLATION OF REPLACEMENT MATERIAL.
i) BRING THE INSTALLED MATERIALS TO ESTABLISHED FINISHED ELEVATIONS IN A NEAT AND TIMELY MANNER AND WITHIN ESTABLISHED TOLERANCES.

3.2.6 APPLICATOR'S JOB FOREMAN SHALL OPERATE THE MIXING/PLACING EQUIPMENT AND DIRECT THE WORK OF MIXING CREW PERSONNEL. APPLICATOR'S WORK CREW SHALL ALSO MAINTAIN PROPER LINE PRESSURES THROUGHOUT THE MIXING/PLACING EQUIPMENT TO ENSURE THE NECESSARY CONSISTENT NOZZLE VELOCITY. APPLICATOR'S WORK CREW SHALL FURTHER SEE THAT ALL MATERIAL FED TO THE NOZZLE IS UNIFORMLY FED THROUGH THIS EQUIPMENT.

3.3 EQUIPMENT

3.3.1 EQUIPMENT SHALL BE OF SPRAY TYPE AND APPROVED BY THE MATERIAL MANUFACTURER. ALTERNATE EQUIPMENT MAY BE UTILIZED PROVIDED IT MEETS THE PERFORMANCE REQUIREMENTS OF THE SPECIFICATION. ALL EQUIPMENT MUST BE KEPT IN OPERATING CONDITION AND GOOD REPAIR.

PART 4 – CONSTRUCTION METHODS

4.1 SURFACE PREPARATION

4.1.1 ENSURE ALL SUB-SURFACES ARE CLEAN AND FREE OF LAITANCE, LOOSE MATERIAL, RESIDUE AND ALL EXISTING COATING AND LINING MATERIALS. SEE SECTION 4.4 FOR INFLOW AND INFILTRATION PREVENTION. FOR DETAILED EXPLANATION OF THE REQUIRED SURFACE PREPARATION SEE ACI RAP-3 "SPALL REPAIR BY LOW PRESSURE SPRAYING"PAGE 2. ACI 546R "CONCRETE REPAIR GUIDE", CHAPTER 2 ALSO PROVIDES A GOOD REFERENCE FOR IMPORTANT CONSIDERATIONS FOR REPAIRING CONCRETE SURFACES USING MORTAR.

4.1.2 SUB-SURFACES SHALL BE THOROUGHLY SATURATED WITH WATER PRIOR TO THE APPLICATION OF THE LINING MATERIALS. IN NO INSTANCE SHALL SHOTCRETE BE APPLIED IN AN AREA WHERE RUNNING WATER EXISTS. IT IS THE INTENT OF THIS SPECIFICATION THAT THE EXISTING SURFACE BE SATURATED AND FREE OF ANY RUNNING WATER JUST PRIOR TO INSTALLATION –OR SSD, "SATURATED SURFACE DRY CONDITION." TO ACHIEVE THIS CONDITION IT MAY BE NECESSARY TO PRESOAK THE SUB-SURFACE FOR A AT LEAST 24 HOURS.

4.2 OPERATIONS

4.2.1 THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT NECESSARY TO INDIVIDUALLY GAUGE, CONTROL, AND MONITOR THE ACTUAL AMOUNTS OF ALL COMPONENT MATERIALS NECESSARY TO COMPLETE THE LINING INSTALLATION. THE TYPE OF EQUIPMENT AND METHODS USED TO GAUGE, CONTROL, AND MONITOR COMPONENT MATERIALS SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER AND MANUFACTURER.

4.2.2 ALL LINING MATERIALS SHALL BE THOROUGHLY MIXED BY MECHANICAL MEANS TO ENSURE ALL AGGLOMERATED PARTICLES ARE REDUCED TO ORIGINAL SIZE OR REMOVED PRIOR TO PLACEMENT INTO THE APPLICATION EQUIPMENT (I.E. THE HOPPER). EACH BATCH OF MATERIAL SHOULD BE ENTIRELY DISCHARGED BEFORE RECHARGING WITH FRESH MATERIAL. MIXING EQUIPMENT SHALL BE CLEANED AT REGULAR INTERVALS TO REMOVE ALL ADHERENT MATERIALS.

4.2.3 THE ADDITION OF WATER TO THE MIX SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

4.2.4 RE-MIXING OR TEMPERING SHALL NOT BE PERMITTED. REBOUND MATERIALS SHALL NOT BE REUSED.

4.3 PROTECTION OF ADJACENT SURFACES

4.3.1 DURING PROGRESS OF THE WORK, ADJACENT AREAS OR GROUNDS WHICH MAY BE PERMANENTLY DISCOLORED, STAINED OR OTHERWISE DAMAGED BY DUST AND REBOUND MATERIAL, SHALL BE ADEQUATELY PROTECTED AND, IF CONTACTED, SHALL BE CLEANED BY EARLY SCRAPING, BRUSHING OR WASHING AS THE SURROUNDINGS PERMIT.

4.4 INFLOW AND INFILTRATION PREVENTION

4.4.1 IF INFLOW OR INFILTRATION IS OBSERVED WITHIN THE STRUCTURE AFTER SURFACE PREPARATION IS COMPLETE, A RAPID SETTING CRYSTALLINE ENHANCED HYDRAULIC CEMENT PRODUCT SPECIFICALLY FORMULATED FOR INFILTRATION CONTROL SHALL BE USED TO STOP MINOR INFILTRATION FLOWS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE MATERIAL SHALL MEET THE FOLLOWING STRENGTH REQUIREMENTS:

COMPRESSIVE STRENGTH (ASTM C597B)	600 PSI	(24 HOURS)
	1,000 PSI	(7 DAYS)
BOND STRENGTH (ASTM C321)	30 PSI	(1 HOUR)
	80 PSI	(1 DAY)

4.4.2. THE MATERIAL SHALL BE PRECO PLUG, OCTOCRETE, BURKE PLUG OR ENGINEER APPROVED EQUAL. WHERE INFILTRATION FLOWS ARE MORE SEVERE, PRESSURE GROUTING MAY BE REQUIRED. THE MATERIAL FOR PRESSURE GROUTING SHALL BE AVANTI A-220, DENEEF OR ENGINEER APPROVED EQUAL INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.

4.4.3. ALL MATERIALS, LABOR, EQUIPMENT, AND INCIDENTALS REQUIRED TO CORRECT INFLOW AND INFILTRATION CONDITIONS WILL BE CONSIDERED INCIDENTAL TO REHABILITATION.

4.5. APPLICATION OF MATERIALS

4.5.1 LINING MATERIAL SHALL NOT BE APPLIED TO A FROZEN SURFACE OR TO A SURFACE THAT MAY FREEZE WITHIN 24 HOURS OF APPLICATION. FROZEN CONDITIONS SHALL BE DEFINED AS AMBIENT TEMPERATURES OF 32 DEGREES FAHRENHEIT OR BELOW.

4.5.2. SEQUENCE OF APPLICATION MAY BE FROM BOTTOM TO TOP OR VICE VERSA IF REBOUND IS PROPERLY REMOVED.

4.5.3. APPLICATION SHALL BE FROM AN ANGLE AS NEARLY PERPENDICULAR TO THE SURFACE AS PRACTICABLE, WITH THE NOZZLE HELD AT LEAST 1 FOOT FROM THE WORKING SUB-SURFACE (EXCEPT IN CONFINED CONTROL). IF THE FLOW OF MATERIAL AT THE NOZZLE IS NOT UNIFORM AND SLUGS, SAND SPOTS, OR WET SLOUGHS RESULT, THE NOZZLEMAN SHALL DIRECT THE NOZZLE AWAY FROM THE WORK UNTIL THE FAULTY CONDITIONS ARE CORRECTED. SUCH DEFECTS SHALL BE REPLACED AS THE WORK PROGRESSES.

4.5.4. APPLICATION SHALL BE SUSPENDED IF:

1) AIR VELOCITY SEPARATES THE CEMENT FROM THE AGGREGATE AT THE NOZZLE.
2) AMBIENT TEMPERATURE APPROACHES FREEZING AND THE NEWLY PLACED SEWPERCOAT CANNOT BE PROTECTED AND INSULATED.

4.0.1. THE TIME INTERVAL BETWEEN SUCCESSIVE LAYERS OF MATERIAL APPLICATION MUST BE SUFFICIENT TO ALLOW "TACKINESS"TO DEVELOP BUT NOT FINAL SET. IF FINAL SET DOES OCCUR, THIS SURFACE SHALL BE PREPARED IN ACCORDANCE WITH SECTIONS 4.1.1 OF THIS DOCUMENT.

4.0.2. CONSTRUCTION JOINTS WITHIN A MANHOLE SHALL BE AVOIDED. IN THE EVENT A CONSTRUCTION JOINT IS NECESSARY AND APPROVED BY THE ENGINEER, IT SHALL BE SLOPED OFF TO A THIN, CLEAN, REGULAR EDGE, AT A 45-DEGREE ANGLE. PRIOR TO PLACEMENT OF THE ADJOINING MATERIALS, THE SLOPED PORTION AND ADJACENT APPLIED MATERIAL SHALL BE THOROUGHLY CLEANED AS NECESSARY, THEN MOISTENED AND SCOURED WITH AN AIR JET.

4.0.3. NOZZLEMAN SHALL BRING THE MATERIAL TO AN EVEN PLANE AND TO WELL-FORMED CORNERS.

4.0.4. AFTER THE BODY COAT HAS BEEN PLACED, THE SURFACE SHALL BE TRUED WITH A THIN-EDGE SCREED TO REMOVE HIGH AREAS AND EXPOSE LOW AREAS. LOW AREAS SHALL BE PROPERLY FILLED WITH ADDITIONAL MATERIAL TO INSURE A TRUE, FLAT SURFACE IN ACCORDANCE WITH SECTION 4.5.5 OF THIS DOCUMENT.

4.0.5. FOR MANHOLE APPLICATIONS, THE RECOMMENDED THICKNESS OF SEWPERCOAT SHALL BE A ½-INCH COVER OVER ALL SURFACES, UNLESS SUBSTRATE CONDITIONS AND OTHER FACTORS REQUIRE ADDITIONAL THICKNESS. FOR OTHER LARGER STRUCTURES (LIFT STATIONS, WET WELLS, TREATMENT PLANT STRUCTURES, ETC.), THE RECOMMENDED THICKNESS OF SEWPERCOAT SHALL BE A 1-INCH COVER OVER ALL SURFACES, UNLESS SUBSTRATE CONDITIONS AND OTHER FACTORS REQUIRE ADDITIONAL THICKNESS.

4.1. CURING

IF THE MATERIAL HAS BEEN APPLIED AND FURNISHED IN ACCORDANCE TO THE SPECIFICATIONS, AND IT HAS BEEN DETERMINED THAT THE ENVIRONMENT IS NOT MOIST ENOUGH FOR NATURAL CURING, THE CONTRACTOR WILL BE REQUIRED TO APPLY A CURING COMPOUND TO ALL COATED SURFACES. CURING COMPOUND SHALL MEET THE REQUIREMENTS OF ASTM C309 AND HAVE THE APPROVAL OF THE LINING MATERIAL MANUFACTURER AND THE ENGINEER PRIOR TO USE.

MOIST CURING MAY ALSO BE USED IN LIEU OF CURING COMPOUND. IF MOIST CURING IS SELECTED, IT SHOULD BE IMPLEMENTED JUST AFTER THE NOTICE OF UNIFORM HEAT GENERATION OF THE INSTALLED LINING. MOIST CURING CAN CONSIST OF THE USE OF SOAKER HOSES, WATER SPRINKLERS, OR VAPOR/MISTING MACHINES. REGARDLESS OF DELIVERY METHOD, MOIST CURING SHOULD CONTINUE FOR A MINIMUM OF 18 HOURS.

DATE	REMARK	DR	CH
12-FEB-18	BID SET	MLW	

CERTIFICATE OF AUTHORIZATION # 5684
ROGER DALE POLSTON P. E. # 33222
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HAMMOCK MOBILE ESTATES & CITY OF SEBRING
JOINT PROJECT
COLLECTION SYSTEM CONNECTION TO CITY OF SEBRING TRANSMISSION SYSTEM

ENGINEER JOB # 18010

DRAWING SCALE N.T.S.