OPERATION & MAINTENANCE MANUAL
INJECTION WELL SYSTEM
MEDLEY LANDFILL, INC.
MEDLEY, FLORIDA

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Prepared by:

L.S. Sims & Associates, Inc.
1530 U.S. Highway 1
Rockledge, Florida 32955
(321) 504-4046

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APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
bls	Below Land Surface
DMW	Deep Monitoring Well
DP	Differential Pressure
EPA	United States Environmental Protection Agency
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
fps	Feet Per Second
FRP	Fiberglass reinforced plastic
gpd	Gallons Per Day
gpm	Gallons Per Minute
HMI	Human Machine Interface
HP	Horse Power
I.D.	Inner Diameter
IW	Injection Well
lb/ft	Pounds Per Foot
MG	Million Gallons
MGD	Million Gallons Per Day
mg/L	Micrograms Per Liter
MIT	Mechanical Integrity Tests
MLF	Medley Landfill
µg/L	Micrograms per Liter
MSW	Municipal Solid Waste
NAVD	North American Vertical Datum
NPS	Nominal Pipe Size
O.D.	Outer Diameter
O&M	Operation and Maintenance
PLC	Programmable Logic Controller
psig	Pounds Per Square Inch Gauge
RPM	Revolutions Per Minute
RTS	Radioactive Tracer Survey
STD	Standard
su	Standard Units
TDH	Total Dynamic Head
USDW	Underground Sources of Drinking Water

OPERATION AND MAINTENANCE MANUAL

MEDLEY LANDFILL, INC.
CLASS I INJECTION WELL SYSTEM
MEDLEY, FLORIDA
56401-021-UC

1.0 – SYSTEM DESCRIPTION

This operation and maintenance manual has been prepared for the use of injection well system operators and other personnel to serve as written instructions for operation of the Medley Landfill Class I Injection Well System at the Waste Management, Inc. Medley Landfill (MLF) Facility, Medley Florida. This manual contains operation procedures, emergency procedures, maintenance procedures, testing procedures and required operating data and reports.

1.1 Landfill/Leachate Collection System

The Medley Landfill is a major regional solid waste management facility accepting municipal solid waste (MSW) and other permitted solid wastes. The disposal cells are lined and equipped with leachate collection and pumping systems. Leachate is transferred to on-site storage ponds where it accumulates for disposal in the injection well, or transport to a permitted off-site disposal facility.

1.2 Injection Well

1.2.1 Conductor Casing

The conductor casing is carbon steel, 44 Nominal Pipe Size (NPS), minimum wall thickness 0.375 inches, standard (STD) Weight Class, 175.88 pounds per foot (lb/ft). The casing outer diameter (O.D.) is 44.00 inches and the inner diameter (I.D.) is 43.25 inches. The casing conforms to the minimum standards for grade B in American Society for Testing and Materials (ASTM) A-139-00 for electrical-fusion arc-welded, helical-seam pipe. The injection well conductor casing extends from the top of the concrete pad to approximately 230 feet below land surface (bls).

1.2.2 Surface Casing

The surface casing is carbon steel, 34 NPS, minimum wall thickness 0.375 inches, STD Weight Class, 134.79 lb/ft. The casing O.D. is 34.00 inches and the I.D. is 33.25 inches. The casing conforms to the minimum standards for Grade B in ASTM A-139-00, for electrical-fusion arc-welded, helical-seam pipe. The injection well surface casing extends from the top of the concrete pad to approximately 1080 feet bls.

1.2.3 Intermediate Casing

The intermediate casing is carbon steel, 26 NPS, minimum wall thickness 0.375 inches, STD Weight Class, 102.63 lb/ft. The casing O.D. is 26.00 inches and the I.D. is 25.25 inches. The casing conforms to the minimum standards for Grade B in ASTM A-139-00 for electrical-fusion arc-welded, helical-seam pipe. The injection well intermediate casing extends from the top of the concrete pad to approximately 1,993 feet bls.

1.2.4 Injection Casing

The injection casing is carbon steel, 16 NPS, minimum wall thickness 0.500 inches, XS Weight Class, 82.77 lb/ft. The casing O.D. is 16.00 inches and the I.D. is 15.00 inches. The casing conforms to the minimum standards in ASTM A 53/A 53M-02, Type S, Grade B. The injection casing extends from the top of the concrete pad to approximately 2,778 feet bls.

1.2.5 Injection Tubing

The injection tubing is fiberglass reinforced plastic (FRP), 10 3/4-inch, Blue Box 1500 as manufactured by Future Pipe Industries. The tubing conforms to the minimum standards in ASTM D 2996-01. The tubing O.D. is 9.94 inches and the I.D. is 8.85 inches. The tubing has a wall thickness of 0.54 inches and a unit weight of 16.3 lb/ft. The tubing has a pressure rating of 1,500 pounds per square inch gauge (psig). The ends are threaded and coupled with integral pins. The injection tubing casing extends from the top of the concrete pad to approximately 2,767 feet bls.

1.3 Monitor Well

1.3.1 Conductor Casing

The conductor casing is carbon steel, 34 NPS, minimum wall thickness 0.375 inches, STD Weight Class, 134.79 lb/ft. The casing O.D. is 34.00 inches and the I.D. is 33.25 inches. The casing conforms to the minimum standards for Grade B in ASTM A-139-00 for electrical-fusion arc-welded, helical-seam pipe. The monitor well conductor casing extends from the top of the concrete pad to approximately 230 feet bls.

1.3.2 Surface Casing

The surface casing is carbon steel, 24 NPS, minimum wall thickness 0.375 inches, STD Weight Class, 94.91 lb/ft. The casing O.D. is 24.00 inches and the I.D. is 23.25 inches. The casing conforms to the minimum standards for Grade B in ASTM A-139-00 for electrical-fusion arc-welded, helical-seam pipe. The monitor surface casing extends from the top of the concrete pad to approximately 1087 feet bls.

1.3.3 Upper Monitor Zone Casing

The upper monitor zone casing is carbon steel, 16 NPS, minimum wall thickness 0.375 inches, STD Weight Class, 62.64 lb/ft. The casing O.D. is 16.00 inches and the I.D. is 15.00 inches. The casing conforms to the minimum standards for Grade B in ASTM A-139-00 for electrical-fusion arc-welded, helical-seam pipe. The upper monitor zone casing extends from the top of the concrete pad to approximately 1,620 feet bls.

1.3.4 Lower Monitor Zone Tubing

The lower monitor zone is FRP, 6 5/8-inch, FRP, Red Box 1500 as manufactured by Future Pipe Industries. The tubing conforms to the minimum standards in ASTM D 2996-01. The tubing O.D. is 6.10 inches and the I.D. is 5.43 inches. The tubing has a wall thickness of 0.335 inches and a unit weight of 5.70 lb/ft. The tubing has a pressure rating of 1,500 psig. The lower monitor zone tubing extends from the top of the concrete pad to approximately 1,890 feet bls.

1.4 Leachate Tanks

The three leachate storage tanks are located about 600 feet west of the injection well in secondary containment which is part of the treatment plant compound at the facility. The tanks are field erected steel above ground storage tanks that hold 125.000 gallons each (375,000 gallons total). The tanks are plumbed in series to facilitate settling of solids and leachate will be pumped from the third tank to the deep well disposal system when it is in operation.

1.5 Leachate Injection Pumps

Two new Leachate Injection Pumps were installed in conjunction with the deep well construction, and are designed to pump Leachate from the Leachate Tanks to the injection well. The design criteria for the system is as follows:

One pump duty, one pump standby
Approx flow capacity = 504,000 gallons per day (gpd)

The Leachate Pumps operate based on automatic or manual start/stop operation.

The Leachate pump specifications are as follows:

Horizontal Centrifugal Pumps.
Flowserve Model 2K4x3-10RV Mark III, 30 horse power (HP), 3550 revolutions per minute (RPM)
Design point: 350 gallons per minute (gpm) @ 161 feet total dynamic head (TDH)

1.6 Leachate Flow Measurement and Monitoring

The Leachate flow rate is continually monitored. The primary flow element is a Mag Meter which is installed in the piping at the injection well site. The flow data is recorded as follows:

- Instantaneous flow is read-out on the process control computer's display (located at the MLF Administration Building)
- Flow records are stored in a database on the process control computer
- The operators manually record daily total flow in the facility log book

The meter is a 8" Mag Meter manufactured by ABB. The meter was installed in the leachate piping in conjunction with the deep well construction project.

1.7 Injection Well System Piping

Injection system piping was constructed and pressure tested. Piping services related to the deep well project are as follows:

- Above-ground Leachate piping: 316 Stainless Steel SCH 10
- Below-ground Leachate piping: 8" diameter (I.D.) HDPE, DR-11

1.8 Injection Well Surge Protection

The initial operation of the injection well will be at a very low flow velocity, so there will be no potential of significant water hammer or hydraulic surge. The 9.7" injection tube flow velocity at 350 gpm (504,000 gpd) will be less than two (2) feet per second (fps).

A 10" flange fitting was installed in the injection well-head piping to allow installation of a surge suppression device in the future if flow rates are increased. This would be a stainless steel vessel that is equipped with an internal rubber bladder that can be pressurized by air. Pressure surges are attenuated by compression of the pressurized bladder, thus acting as a shock absorber. If this device is installed in the future, the bladder will be pressurized to level above the normal operating level of the pumping system.

1.9 Annulus Monitoring System

The annulus of the injection well contains clean water (with corrosion inhibitors) and is pressurized to a level that is greater than the operating pressure of the injection tube. This assures that no leakage of injected fluid can escape from the injection tube to the surrounding sub-surface environment.

An annulus pressure system is installed to maintain annulus pressure in the well. This consists of an American Society of Mechanical Engineers (ASME) certified stainless steel pressure vessel that is partially filled with water, and pressurized by an air compressor equipped with a pressure regulator. The annulus tank is connected to the well annulus via piping. If leakage should occur in the annulus, this would be indicated by falling pressure and/or liquid level drop in the annulus tank. Alarms would be initiated as described later in this report.

1.10 Stormwater System

There is one stormwater catch basin in each of the three concrete pads; one concrete containment pad is provided for each well (IW and DMW) and a third containment pad is provided for the third party waste receiving pad. The grading of the concrete pads are such that stormwater will flow into these catch basins. In addition, groundwater will be discharged to the catch basin from the monitoring well when the well is being purged prior to sampling.

Water from the two well catch basins flows to a stormwater sump via underground gravity piping. The sump is equipped with a submersible centrifugal pump to deliver the water to the injection well. The submersible pump operates automatically on level. The third party waste receiving pad has its own pump built into the pad and delivers all stormwater and third party waste to the injection well directly.

1.11 Control System, Monitoring and Alarms

1.11.1 Leachate Pump Station Control & Alarms

The Leachate pumps are automatically controlled by tank fluid levels. One pump is designated as the duty pump, and the other is designated as the stand-by pump. This is an operator selectable status, and the roles of the pumps will be switched periodically. The pumps are designed such that one pump will handle 100% of the flow under normal conditions.

1.11.2 Disposal Well System Alarms

Pressure

Well head pressure and annulus pressure are input to the programmable logic controller (PLC). The PLC calculates differential pressure (DP) which is the difference of the two pressure readings. The PLC generates the following alarm conditions:

- Well head pressure too low (set point modifiable by operator).
- Well head pressure too high (set point modifiable by operator).
- Annulus pressure too low (set point modifiable by operator).
- Annulus pressure too high (set point modifiable by operator).
- DP too low (set point modifiable by operator). DP too low alarm shall also initiate automatic shut down of the Leachate pumps.
- DP too high (set point modifiable by operator).

The above alarms are reported to the operators via the human machine interface (HMI) and activate the local alarm enunciator. Alarm condition continues until acknowledged by the operator.

Leachate pH

Leachate pH is input to the PLC. The PLC generates the following alarm conditions:

- Leachate pH too low (set point modifiable by operator).
- Leachate pH too high (set point modifiable by operator).

The above alarms are reported to the operators via the HMI. Alarm condition continues until acknowledged by the operator.

Annulus Liquid Level

Annulus tank low level is input to the PLC. The PLC generates the following alarm condition:

- Annulus tank level too low

The above alarm is reported to the operators via the HMI. Alarm condition continues until acknowledged by the operator. This is a critical alarm and initiates shut-down of the leachate pumping system.

1.11.3 Disposal Well System Data Reporting & Recording

The following parameters are continually reported to the HMI via the PLC. These readings are displayed on the HMI screen.

- Leachate flow
- Well head pressure
- Annulus pressure
- DP (calculated by PLC)
- Leachate pH

The HMI software records the above values to a database which will be used to generate Monthly Operating Reports.

1.11.4 Monitoring Well Data Reporting & Recording

The following parameters are continually reported to the HMI via the PLC. These readings are displayed on the HMI screen.

- Deep monitoring well water level
- Shallow monitoring well water level

The HMI software records the above values to a database which will be used to generate Monthly Operating Reports.

1.11.5 Data Recording & Report Generation

The data, as specified herein, is archived as real time values to a computer database at 60 sec intervals. This data will be used to generate reports and plots of critical system data for operations management and regulatory reporting.

The system is programmed to be capable of generating the following reports:

- Tabular listing of all operating data and alarms over a specified period of time
- Leachate flow and well-head pressure over a specified period of time
- Well-head pressure, annulus pressure & DP over a specified period of time
- Leachate flow and Leachate pH over a specified period of time
- Deep and shallow monitor well water levels over a specified period of time

2.0 OPERATION AND CONTROL

2.1 System Startup

2.1.1 Annulus Monitoring System

Following is the start-up procedure for the well annulus monitoring and pressurization system. It is assumed that the well annulus is full of water (treated with corrosion inhibitor) and is at atmospheric pressure. It is also assumed that all equipment has been checked for proper rotation and alignment, electrical and control connections have been verified and initial servicing and lubrication has been competed. If the annulus is under pressure or conditions are otherwise, startup steps should be modified accordingly.

a) Open valves connecting annulus tank to well.
b) Open valves for sight glass.
c) Fill annulus tank with water to the 75% full level. Add proper amount of corrosion inhibitor. Verify water level with sight glass.
d) Open valves for pressure devices (pressure gauges; pressure transducers)
e) Open valves connecting air compressor to annulus tank.
f) Adjust air compressor pressure regulator to bring pressure in annulus tank to the specified level.
g) Verify that annulus tank pressure and water level are stable.
h) Verify functionality of pressure transducer. Pressure reported via the HMI should be the same as pressure read on the pressure gauge.

2.1.2 Leachate Pumps & Injection Well

Following is the start-up procedure for the Leachate injection pumps and injection well. It is assumed that all equipment has been checked for proper rotation and alignment, electrical & control connections have been verified and initial servicing and lubrication has been competed. If conditions are otherwise, startup steps should be modified accordingly.

a) Verify that pressure and pH device valves are open:
b) Verify that sample valves are closed.
c) Verify that air relief isolation valve is open.
d) Verify proper operating position of valves at the Leachate pump station & injection well.
e) Open injection well valves.
f) Verify functionality of the pH element on the HMI.
g) Verify functionality of the flow element on the HMI.
h) Verify the functionality of the pressure transducer on the HMI. Value should agree with reading on pressure gauge.

2.1.3 Monitoring Well

Following is the start-up procedure for the monitoring well. Under normal conditions, the procedure should be the same every time the well is started-up for sampling purposes. Both the upper and lower monitoring zones are under artesian pressure and will flow unassisted for development. It is also assumed that both the deep zone and shallow zone are going to be sampled at the same time. If conditions are otherwise, startup steps should be modified accordingly.

a) Open monitor well development valves for each zone and verify flow.
b) Allow well flow to stabilize.
c) Measure flow with bucket & stopwatch method.
d) Calculate time required to achieve desired purge volume.
e) Allow zones to develop for calculated amount of time.
f) Verify flow rate twice per shift.
g) After the monitoring zones have developed for the proper amount of time, collect samples using sample kits provided by the contract laboratory. Preserve and containerize samples per instructions provided by the laboratory.
h) Valve off at the local monitoring zone valves.

2.2 Normal Operation

The injection well and all associated systems are designed to operate in fully automated mode under normal conditions. The operators will periodically verify operating parameters based on current leachate generation rates and inventory in the holding tanks.

2.3 System Shutdown

If the facility is to be shutdown for an extended period, follow the applicable manufacturer's instructions. All equipment within the station should be exercised on at least a weekly basis during shutdown periods.

2.4 Emergency Operational Procedures

Contingency provisions have been made for situations when the well is inoperable or must be taken off-line to conduct scheduled testing. During these situations, MLF will utilize the storage capacity in the leachate holding tanks or divert leachate to the existing sanitary sewer.

2.4.1 Power Outage

The leachate transfer pumps are connected to an electrical source that has an emergency back-up generator. If that system is non-functional for some unforeseen reason, a piping connection has been provided to hook up a portable diesel pump that can be used to transfer leachate to the injection well.

2.4.2 Injection Pump Failure

The Leachate pumping system is designed with 100% redundancy. The pumps are designed such that one pump can handle the entire Leachate flow. Thus, if the duty pump breaks down or is in need of maintenance, the standby pump will be available for service. A back-up diesel powered generator is on site in the event a power failure lasts more than several hours. In the event of failure of both injection pumps, leachate will be diverted to the sanitary sewer for disposal until repairs are made.

2.4.3 Injection System Down for Maintenance, Repair or Testing

When the injection well disposal system is taken off-line for planned maintenance and testing, the Leachate will be retained in the leachate storage tanks.

During the 5-Year Mechanical Integrity Tests (MIT), the Leachate will be diverted to the sanitary sewer.

If for some unforeseen reason the leachate tanks become full and the injection system is out of service, leachate will be diverted to the sanitary sewer (the disposal method used prior to implementation of the injection well).

3.0 MAINTENANCE

3.1 Well Maintenance

The below grade well components do not require regular maintenance. The above grade valves, gaskets and gauges should be inspected on a regular basis for leaks or deterioration. Valves should be exercised manually on a monthly basis as part of the injectivity testing. Valve stems should be cleaned and greased as necessary to ensure smooth operation. Rubber gaskets should be replaced as necessary to prevent leaking. Stainless steel bolts should be checked for deterioration and re-tightened as necessary to prevent leaking.

3.2 Above-Ground Mechanical Equipment

Mechanical equipment items associated with the injection well system that require servicing and maintenance are as follows:

Leachate pumps
Stormwater sump pump

MLF's Maintenance Department is responsible for preventative maintenance and repair of all equipment associated with the leachate disposal system. Maintenance of these items will be done in accordance with the equipment manufacturer's instructions. All lubricants shall be as specified by the equipment manufacturer.

4.0 MONITORING AND REPORTING

4.1 General

The monitoring and reporting requirements for the MLF Injection Well System are governed by FDEP permit conditions. During the first year of operational testing, the monitoring and reporting requirements are specified in FDEP Permit No. 56401-021-UC. After this initial testing phase the FDEP will issue a 5-year permit to operate the system. Future monitoring and reporting requirements will be specified in this and subsequent permits. A copy of Permit No. 56401-021-UC and the FDEP reporting forms are included in **Appendix A**.

The injection well system must be monitored at all times by continuous indicating, recording and totalizing devices for injection fluid flow rate and volume, and the water level in the lower & upper monitoring zones (LMZ & UMZ) and the injection well annulus. The pressure gauges, flow-meters, and other related equipment associated with the injection well system must be verified for proper calibration using standard engineering methods on an annual basis.

Laboratory equipment, methods, and quality control must follow United States Environmental Protection Agency (EPA) guidelines as expressed in Standard Methods for the Examination of Water and Wastewater.

Any failure of the MLF injection well monitoring and recording equipment for a period of more than 48 hours shall be reported within 24 hours to the FDEP. A written report describing the incident shall also be submitted to the FDEP within five days of the start of the event. The written report shall contain a complete description of the occurrence, a discussion of the cause(s) and the steps being taken to reduce, eliminate, and prevent recurrence.

All required data submissions, including Monthly Operating Reports (MORs), shall be clearly identified on each page with facility name, facility number, permit number, date of sampling/recording, operator's name, license and telephone number, and type of data shown. Monitoring zones shall be identified by monitoring well number and depth interval. The lead plant operator or higher official must sign and date each submittal. An approved copy (MOR summary sheet) from the FDEP Southeast District is included in **Appendix A**.

The MORs must be submitted monthly to the FDEP and include the results of all injection well and monitoring well data required by the permit no later than the last day of the month immediately following the month of record. The results should be sent to the Florida Department of Environmental Protection, Southeast District, Underground Injection Control Section, 3301 Gun Club Road, MSC 7210-1 West Palm Beach, Florida 33406. A copy of this report should also be sent to the Florida Department of Environmental Protection, Underground Injection Control Program, MS 3530, 2600 Blair Stone Road, Tallahassee, Florida, 32399-2400.

4.2 Injection Well

The injection wellhead and annulus pressures must be monitored continuously to ensure that the maximum pressure does not exceed 100 psig (66.6 % of 150 psig - the final casing string and injection tubing mechanical integrity test pressure). The IW-1 injection rate and cumulative volume injected must be monitored continuously to ensure that the peak hourly velocity down the well does not exceed the design rate of 10.9 fps.

The annulus wellhead pressure must be monitored continuously to ensure that the annulus pressure is maintained at approximately 5 psig higher than the normal operating pressure. Because the maximum sustained wellhead pressure is not expected to exceed 65 psig (at 504,000 gpd flow), the annulus pressure at the IW-1 wellhead should be maintained at approximately 65 psig.

The Leachate must be analyzed **annually** for primary and secondary drinking water standards parameters (**Appendix A**). The samples are to be collected as a 24-hour composite sample except for the biological and volatile organic compounds. These constituents must be collected as "grab" samples.

Sampling and analysis of the Leachate for the following parameters must be performed **monthly**:

- total dissolved solids (mg/L)
- chloride (mg/L)
- specific conductance (temperature compensated, µmho/cm or µS/cm)
- total suspended solids (TSS) (mg/L)
- nitrogen, ammonia, total as N (mg/L)
- nitrogen, total Kjeldahl as N (TKN, mg/L)
- nitrogen, nitrate, total as N (mg/L)
- sodium (mg/L)
- potassium (mg/L)
- calcium (mg/L)
- magnesium (mg/L)
- total iron (mg/L)
- bicarbonate (mg/L)
- phosphorous, total as P (mg/L)
- pH (standard units, su)
- sulfate, total as SO4 (mg/L)
- field temperature (°C)
- gross alpha (□Ci/L)
- combined radium-226 and radium-228 (□Ci/L)
- total and fecal coliform (cts/100ml),
- *E. Coli* (cts/100ml), *Enterococci sp.* (cts/100ml), and
- Turbidity (NTU).

The following physical characteristics for IW-1 should be recorded continuously and reported as follows:

Flow rate parameters:

- average daily flow rate (MGD)
- daily maximum sustained (15 minutes minimum) flow rate(MGD)
- daily minimum sustained (15 minutes minimum) flow rate (MGD)
- monthly average of the daily flow rates (MGD)
- monthly maximum (peak hour) flow rate (MGD)
- monthly minimum flow rate (MGD)

Volumetric parameters:

- total daily flow (MG)
- monthly average of the daily flow volumes (MG)
- monthly maximum of the daily flow volumes (MG)
- monthly minimum of the daily flow volumes (MG)

Injection pressure parameters:

- daily average injection pressure (psig)
- daily maximum sustained (15 minutes minimum) injection pressure (psig)
- daily minimum sustained (15 minutes minimum) injection pressure (psig)
- monthly average injection pressure (psig)
- monthly maximum sustained injection pressure (psig)
- monthly minimum sustained injection pressure (psig)

Annular pressure parameters:

- daily average annular pressure at (psig)
- daily maximum sustained (15 minutes minimum) annular pressure (psig)
- daily minimum sustained (15 minutes minimum) annular pressure (psig)
- monthly average annular pressure (psig)
- monthly maximum sustained annular pressure (psig)
- monthly minimum sustained annular pressure (psig)
- daily and monthly pressure added or removed (psig)
- daily and monthly volume of water added or removed (gallons)

Additional parameters:

- monthly wellhead pressure with no flow (shut-in pressure, psig)

4.3 Monitor Well

A minimum of 3 well volumes of fluid shall be evacuated from the monitoring systems prior to sampling for the chemical parameters listed above. All samples shall be analyzed by a state-certified laboratory. Sufficient purging shall have occurred when either of the following have occurred:

- pH, specific conductance and temperature when sampled, upon purging the third or subsequent well volume, each vary less than 5% total range of variance from that sampled upon purging the previous well volume; or
- upon purging the fifth well volume

Upper and lower monitoring zones potentiometric surface or water level height relative to the North American Vertical Datum (NAVD) in feet of head or pressure in psig—both shall be referenced to NAVD 1988.

The following water level data for MW-1 should be recorded continuously and reported as follows:

- daily maximum pressure or water level
- daily minimum pressure or water level
- daily average pressure or water level
- monthly maximum pressure or water level
- monthly minimum pressure or water level
- monthly average pressure or water level

4.4 Specific Injectivity Testing

In accordance with the FDEP permit and state Underground Control Regulations, Injectivity Tests must be conducted monthly during operational testing and then quarterly for the life of the well. FDEP sample forms for the collection of injection well and monitoring zone data are included in **Appendix A**.

The test procedures are as follows:

- Shut in well for a minimum of 30 minutes (Turn off flow and shut Leachate pump valves).
- Record shut in static wellhead pressure (at 10 sec., 20 sec., 30 sec., and 30 minutes after shut-in).
- Record initial totalizer flow reading.
- Open Leachate pump valve and establish constant flow rate using the maximum flow rate that can be repeated on a monthly basis (pump rate at 65%).
- Record flow rate and well head pressure every 2 minutes for 10 minutes.
- Record final totalizer flow reading.
- Shut well in (turn off Leachate pumps and shut valve) and record pressure fall off until static pressure is reached (minimum of 5 minutes).
- Exercise wellhead values manually

The injectivity is calculated by dividing the constant injection rate by the change in the injection pressure (well-head pressure minus the static or non-pumping pressure). Injectivity testing must be conducted at the same injection rate so that test comparisons can be made. Water levels or pressures in both monitor zones should be recorded before, during and after injectivity testing.

4.5 Mechanical Integrity Testing

An injection well has mechanical integrity if there is no leak in the injection casing, injection tubing or packer and no fluid movement into any underground source of drinking water through channel(s) adjacent to the injection casing or the injection well bore. In accordance with Rule 62-528.425(1)(d), Florida Administrative Code (F.A.C.), the mechanical integrity of the injection well must be demonstrated every 5 years. A down-hole video survey is required of both the injection casing and the injection zone. To demonstrate mechanical integrity, the injection tubing's annular space must be pressure tested (or tested by another approved method), at a hydrostatic pressure equal to 1.5 times the maximum wellhead pressure at the design flow rate (150 psig). The pressure test must be performed for a minimum of one (1) hour with no more than a five percent (5%) pressure change over the duration of the test.

A temperature or noise log and a Radioactive Tracer Survey (RTS) must be conducted to demonstrate the absence of fluid movement into any underground source of drinking water through channel(s) adjacent to the injection casing or the injection well bore.

5.0 PLUGGING AND ABANDONMENT

If the MLF Injection Well becomes inoperable or is determined to be a threat to Underground Sources of Drinking Water (USDW), the FDEP can order the well to be plugged and abandoned. The referenced rule for plugging and abandonment is Chapter 62.528.435 (7).

5.1 Injection Well Plugging and Abandonment Procedures

The following procedures have been developed for the plugging and abandonment of the MLF Injection Well:

I. Contractor Mobilization

1. Rig up
2. Layout piping and equipment

II. Remove Tubing & Packer Assembly

1. Rig up kill lines to 16-inch casing and 10-inch FRP tubing
2. Pump sufficient volume of weighting material (bentonite or salt) to suppress the fluid level in the 16-inch casing and 10-inch tubing to approximately 30 feet bls.
3. Unseat Packer
4. Remove 10-inch FRP tubing from well

III. Geophysical Logging

1. Rig up standpipe assembly
2. Flush casing with potable water
3. Conduct Video Survey
4. Complete Temperature, Caliper, CBL, and Fluid Resistivity logs
5. Rig down standpipe assembly

IV. Cementing

1. Install cementing head and blow-out preventer
2. Rig up and surface test packer (if used)
3. Use appropriate drill stem or tubing to set (inflate) centerline of packer or other bridging device at approximately 2,780 feet bls in Injection Well.
4. Trip out tubing and rig up for cementing
5. Pump neat cement (ASTM Type II) plug (100-foot fill-up)
6. Flush and trip out cement tremmie
7. Allow plug to set for 24-hours
8. Run in tremmie line and tag top of plug
    A. If no fill up
        a. Pump alternating lifts of 50 feet^3 of sand/gravel and neat cement with 12% gel and additives (flocele and gillsonite). Wait 8 hours between cement lifts and tags.
        b. After a tag is made fill remaining casing with neat cement to surface in lifts approximately 600 feet^3 each.
    B. If fill up
        a. Grout to surface with neat cement in lifts approximately 600 feet^3 each.
9. Remove cementing head and blow-out preventer

V. Contractor Demobilization

1. Rig down
2. Clean-up site

5.2 Monitor Well Plugging and Abandonment Procedures

The following procedures have been developed for the plugging and abandonment of the MLF, Inc. Medley Multi-zone Monitor Well:

I. Contractor Mobilization

1. Rig up
2. Layout piping and equipment

II. Wellhead Removal

1. Rig up kill lines to 16-inch casing and 6 $^{5}/_{8}$ –inch FRP tubing, if required.
2. Pump sufficient volume of weighting material (bentonite or salt) to suppress the fluid level in the 16-inch casing and 6 $^{5}/_{8}$ –inch FRP tubing to 30 feet bls.
3. Remove valve from well and install cementing head and blow-out preventer

III. Plug Lower Monitor Zone (1,890 to 1,962 feet bls)

1. Run 1-inch tremmie line to approximately 1,960 feet bls to clear obstructions
2. Pump approximately 16 feet^3 of neat cement (theoretical 100 linear feet)
3. Flush and remove tremmie line
4. After 24 hours, tag top of cement with 1-inch steel tremmie
5. Pump additional neat cement (approximately 273 ft^3) to surface through 1-inch tremmie
6. Remove and flush tremmie line
7. Remove cementing head and blow-out preventer

IV. Plug Upper Monitor Zone (1,620 to 1,714 feet bls)

1. Run tremmie to approximately 1,705 feet bls.
2. Pump approximately 135 feet^3 of ASTM Type II cement (approximately 100 linear feet)
3. Remove and flush tremmie line
4. After 24 hours tag cement with tremmie

5. Pump additional neat cement (approximately 675 ft^3) to surface through 1-inch tremmie
6. Remove and flush tremmie line
7. Remove cementing head and blow-out preventer

II. Contractor Demobilization

1. Rig down
2. Clean-up site

NOTE: All excess cement, drilling fluids and displacement fluids are to be containerized on-site and properly disposed of at a pre-approved facility. All tubing, valves, gaskets and fittings are to be stored on-site within the drilling pad area until recycled or properly disposed of at a pre-approved facility.

6.0 DRAWINGS

As-built drawings for the injection well and monitoring well are included as **Figures 1** and **2** in **Appendix B**. Drawings for the above-ground facilities are listed below, and also included in **Appendix B**.

MLF INJECTION WELL PROJECT

AS-BUILT DRAWING LIST - SURFACE FACILITIES

DWG NO.	TITLE	DATE
	CIVIL DRAWINGS	
S-1	BOUNDRY & LOCATION SURVEY (CRABEN - THOMPSON & ASSOC.)	28-Dec-14
C-1	SITE PLAN	28-Dec-14
C-2	WELL LOCATION SITE PLAN	28-Dec-14
C-4	DIW & MW LAYOUT PLANS	28-Dec-14
C-5	3RD PARTY RECEIVING FACILITY LOYOUT PLAN	28-Dec-14
	PIPING / PROCESS DRAWINGS	
P-1	DIW PROCESS FLOW DIAGRAM (PFD)	28-Dec-14
P-2	YARD PIPING PLAN	28-Dec-14
P-3	YARD PIPING - ENLARGED PLAN	28-Dec-14
P-4	DIW PIPING PLAN	28-Dec-14
P-5	DIW PIPING SECTIONS & DETAILS	28-Dec-14
P-6	MONITOR WELLHEAD DETAILS	28-Dec-14
P-8	ANNULUS TANK DETAILS	28-Dec-14
P-9	3RD PARTY RECEIVING FACILITY PIPING PLAN	28-Dec-14
P-10	3RD PARTY RECEIVING FACILITY PIPING DETAILS	28-Dec-14
P-11	LEACHATE PLANT PUMP STATION PIPING PLAN & DETAILS	28-Dec-14
P-12	EXISTING LTP PIPING PLAN	28-Dec-14
P-13	MECHANICAL DETAILS	28-Dec-14
P-14	PIPING & VALVE SPECIFICATIONS	28-Dec-14
	INSTRUMENTATION DRAWINGS	
I-1	DIW P&ID - SHT 1	28-Dec-14
I-2	DIW P&ID - SHT 2	28-Dec-14

7.0 EQUIPMENT SPECIFICATIONS AND O&M MANUALS

The specifications for the mechanical equipment installed in association with the MLF deep well system are included in the following table. Equipment supplier specifications and O&M data are included in **Appendix C** of this report.

MLF INJECTION WELL PROJECT MAJOR EQUIPMENT LIST			
TAG NO.	**DESCRIPTION**	**SPEC**	**MOTOR**
P-100	LEACHATE INJECTION PUMP	Horizontal Centrifugal Pumps. Flowserve Model 2K4x3-10RV M3 ST, 316 SS, Design point: 350gpm @ 161 ft TDH	30HP, 3500 RPM , 460V. 3-PH
P-101	LEACHATE INJECTION PUMP	Horizontal Centrifugal Pumps. Flowserve Model 2K4x3-10RV M3 ST, 316 SS, Design point: 350gpm @ 161 ft TDH	30HP, 3500 RPM , 460V. 3-PH
T-300	ANNULUS PRESSUR TANK	ASME PRESSURE VESSLE, 150 PSI, 30" DIAMETER, 250GAL, 316 SS	N/A
P-500	STORMWATER SUMP PUMP	BJM MODEL KB75H, 250 GPM @ 100' TDH	10HP, 3450 RPM, 460V. 3-PH

APPENDIX A

FDEP Permit and Forms

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHEAST DISTRICT OFFICE
400 NORTH CONGRESS AVENUE, 3RD FLOOR
WEST PALM BEACH, FL 33401
561-681-6600

RICK SCOTT
GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

July 29, 2013

Tim Hawkins
President
Waste Management, Inc. of Florida
2700 Wiles Rd
Pompano Beach, FL 33073-0000

Miami-Dade County
Permit Number 56401-021-UC
Medley Landfill
Class I Injection Well System
25º 51' 33" N / 80º 20' 36" W

NOTICE OF PERMIT

Enclosed is Permit Number 56401-021-UC to construct and test a 3500 foot Class I Injection well and associated dual zone monitoring well with the intent to dispose of landfill leachate from the Medley Landfill. The project location is 9350 NW 89th Avenue in Medley FL. The injection well construction design is of telescoped steel casings with each casing having a cemented annular space with a fiberglass reinforced pipe (FRP) tubing with fluid filled annulus. Similarly, the monitoring well design is of telescoped casing with cemented annular space. The upper monitoring zone is anticipated to be within 1850–1950 feet below pad level (bpl) and the lower monitoring zone is anticipated to be within 1950–2000 feet bpl. Each well casing outside dimension (O.D.) is listed below with estimated depth below bpl, contingent upon data to be obtained during drilling:

Well	Casing Type / O.D. (inches)	Depth (feet bpl)	Material	Thickness (inches)
Injection	Surface / 42	200	NPS Steel	0.375
Injection	Conductor / 34	1000	NPS Steel	0.375
Injection	Intermediate / 26	2000	NPS Steel	0.375
Injection	Final / 16	3100	NPS Steel	0.500
Injection	Tubing / 10.75	3100	FRP	0.66
Monitoring	Surface/ 34	200	NPS Steel	0.375
Monitoring	Conductor / 24	1000	NPS Steel	0.375
Monitoring	Upper / 16	1800	NPS Steel	0.500
Monitoring	Lower / 6-⅝	1950	FRP	0.335

Any party to this permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Executed in West Palm Beach, Florida.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Jill S. Creech, P.E.

Southeast District Director

JSC/LAB/jm BA

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on Date, to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to Section.120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Vanessa Osborne
Clerk

7/29/13
Date

Copies Furnished To:

Joseph Haberfeld, UIC-TLH
Joseph Lurix, WMA
Emily Richardson, SFWMD/WPB
Cathy McCarty, UIC-TLH
Jim McGrath, LS Sims & Assoc.
UIC OCULUS

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHEAST DISTRICT OFFICE
400 NORTH CONGRESS AVENUE, 3RD FLOOR
WEST PALM BEACH, FL 33401
561-681-6600

RICK SCOTT
GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

Underground Injection Control
Class I Injection Well System
Construction and Testing Permit

Tim Hawkins, President
Waste Management, Inc. of Florida
2700 Wiles Rd
Pompano Beach FL 33073-0000

Permit Number: 56401-021-UC
WACS ID: 10122
Date of Issuance: July 29, 2013
Date of Expiration: July 28, 2018

Facility
Medley Landfill
9350 NW 89th Ave
Medley FL 33178

Location
County: Miami-Dade
Latitude: 25º 51' 33" N
Longitude: 80º 20' 36" W

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.), Chapters 62-4, 62-520, 62-528, 62-550, 62-600, 62-601, 62-610 and 62-660. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows.

The permittee is reminded of the necessity to comply with the pertinent regulations of any other regulatory agency, as well as any county, municipal, and federal regulations applicable to the project. These regulations may include, but are not limited to, those of the Federal Emergency Management Agency in implementing flood control measures. This permit should not be construed to imply compliance with the rules and regulations of other regulatory agencies.

TO CONSTRUCT AND OPERATIONALLY TEST: to construct and test a Class I Injection well and associated dual zone monitoring well with the intent to dispose of landfill leachate from the Medley Landfill. The project location is the Medley Landfill near the intersection of NW 89th Ave. and NW 95th St. in Hialeah, Miami-Dade County. The injection well construction design is of telescoped steel casings with each casing having a cemented annular space with a fiberglass reinforced pipe (FRP) tubing with fluid filled annulus. Similarly, the monitoring well design is of telescoped casing with cemented annular space. The upper monitoring zone is anticipated to be within 1850–1950 feet bpl and the lower monitoring zone is anticipated to be within 1950–2000 feet bpl.

IN ACCORDANCE WITH: The Application to Construct DEP Form No. 62-528.900(1) received November 20, 2012 and technical specifications, drawings, plan of study and addenda (including responses for additional information) submitted to this agency.

LOCATION: 9350 NW 89th Ave., Medley FL 33178

The injection and monitoring wells at this facility are designated as follows:

Injection Wells:

Well Name	*WACS Effluent Testsite ID*	*Total Well Depth*	*Diameter (inches)*	*Interval Type*	*Interval (feet bls)**
IW-1		~3100 feet bpl	42		200
			34		1000
			26		2000
			16		3100
			10.75		3100

*Final depths can vary, subject to DEP approval.

Monitoring Wells

Well Name	*WACS Monitoring Well Testsite ID*	*Diameter (inches)*	*Interval Type*	*Depth Cased (ft bls)/Total (ft bls)**
DZMW-1		16	upper	1800
DZMW-1		6-⅝	lower	1950

*Final depths can vary, subject to DEP approval.

SUBJECT TO: Specific Conditions I– IX and General Conditions 1– 24.

Specific Conditions

I. GENERAL REQUIREMENTS

1. This permit is for Waste Management, Inc. of Florida to construct and operationally test a Class I injection well for the disposal of leachate. This permit does not authorize the construction or operational testing of any other well or wells. [62-528.440(2)(a)]

2. No underground injection is allowed that causes or allows movement of fluid into a USDW if such fluid movement may cause a violation of any Primary Drinking Water Standard or may otherwise affect the health of persons. [62-528.440(2)(c)]

3. In the event a well must be plugged or abandoned, the permittee shall obtain a permit from the Department as required by Chapter 62-528, Florida Administrative Code. When no longer used for their intended purpose, these wells shall be properly plugged and abandoned. Within 180 days of well abandonment, the permittee shall submit to the Department the proposed plugging method, pursuant to Rule 62-528.460, F.A.C. [62-528.460(1) and 62-528.435(6)]

4. If injection is to continue beyond the expiration date of this permit the permittee shall apply for, and obtain an operation permit. If necessary to complete the two-year operational testing period, the permittee shall apply for renewal of the construction permit at least 60 days prior to the expiration date of this permit. [62-528.307(2)(a)]

II. SITE REQUIREMENTS

1. A drilling pad shall be provided to collect spillage of contaminants and to support the heaviest load that will be encountered during drilling.[62-528.410(9)(b)]

2. No drilling operations shall begin without an approved disposal site for drilling fluids, cuttings, or waste. It shall be the permittee's responsibility to obtain the necessary approval(s) for disposal prior to the start of construction. A detailed disposal plan shall be submitted to the Department prior to the commencement of drilling activities (for the injection and monitoring wells). [62-528.410(9)(a)]

3. Specific drilling pad dimensions and design drawings for Department record shall be provided prior to commencing construction and shortly after selection of the drilling contractor. [62-528.410(9)(b)]

4. The water table monitoring wells surrounding the well pads shall be sampled and analyzed prior to drilling the test injection or monitoring wells and then weekly thereafter. Sampling shall include specific conductance (umhos/cm), pH (standard units), chloride (mg/L), temperature (C) and water level.(feet or PSI) [62-528.410(9)(b)]

5. Hurricane Preparedness – Upon the issuance of a "Hurricane Watch" by the National Weather Service, the preparations to be made include but are not necessarily limited to the following:
   a. Secure all on-site salt and stockpiled additive materials to prevent surface and/or groundwater contamination.
   b. Properly secure drilling equipment and rig(s) to prevent damage to well(s) and on-site treatment process equipment.

   [62-528.307(2)(b)]

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III. CONSTRUCTION AND TESTING REQUIREMENTS

A. General

1. Any construction, modification, repair, or abandonment of a well shall be performed by a Florida licensed water well contractor, licensed under Chapter 62-532, F.A.C., to engage in the business of construction, modification, repair or abandonment of a well. [62-532.200]

2. Well construction shall follow the requirements of Rule 62-532.500 for Water Well Construction Standards. [62-532.500]

3. The measurement points for drilling and logging operations shall be surveyed and referenced to the North American Vertical Datum of 1988 (NAVD 88) prior to the onset of drilling activities for the injection well and associated dual zone monitoring well. [62-160.240(2)]
4. Blow-out preventers or comparable flow control devices shall be installed on the wells prior to penetration of the Floridan aquifer system. [62-528.410(9)(c)]

5. The Department shall be notified 7 days prior to the mobilization of drilling operations to the site. [62-528.307(1)(g)]

6. Waters spilled during construction or testing of the injection well system shall be contained and properly disposed. [62-528.410(9)(b)]

7. If additives that were not approved in the permit application are used during grouting, for lost circulation or for any other reason, information on their properties shall be submitted to FDEP prior to their use for Department review and approval. [62-528.410(5)(c)]

B. Evaluation and Testing

1. The construction, geophysical logging program and packer testing program shall be implemented in accordance with this permit and as proposed in the following submittals:

    - Well Construction Application;
    - Responses to FDEP;
    - Any other approved submittals received by the Department.

    [62.528.307(1)(b)]

2. Exact depths of casing seats and monitoring intervals will be determined based on field conditions and the results obtained during the construction and testing program, and are subject to the conditions of this permit. The injection well will be constructed first followed by the monitoring well. [62-528.410(4)(c)]

3. Packer tests shall be conducted in both IW-1 and MW-1 to identify the base of the USDW.
    a. At least one straddle packer test shall be conducted in both the proposed upper and lower monitoring intervals of MW-1.
    b. At least 14 straddle packer tests conducted in the anticipated confining intervals, from the lowermost zone of the USDW to the top of the injection zone. Results from the packer tests will contribute to the demonstration of confinement. To the extent feasible, the packer tests shall be performed over intervals that are sufficiently narrow so as not to include high hydraulic conductivity beds.
    c. Water samples shall be collected from each packer test, and analyzed for total dissolved solids, chlorides, conductivity, ammonia, total Kjeldahl as nitrogen and sulfate.

d. The program shall, at a minimum include 14 packer tests, at intervals which are to be field determined.

[62-528.405(1)(a) and (2)(a)]

4. Department approval is required prior to the following stages of construction and testing:
    a. Contract documents and spud date
    b. Intermediate (26-inch) casing seat in each injection well
    c. Final (16-inch) casing seat in each injection well
    d. Final seat for tubing and packer in each injection well
    e. Intermediate (16-inch) casing seat in monitoring well
    f. Final (6-⅝-inch O.D.) casing seat in monitoring well
    g. Monitoring zone selection (upper and lower zones)
    h. Short-term injection test
    i. Operational testing

    [62-528.410(4)(c) and 62-528.420(4)(c)]

5. The depth of the USDW and the background water quality of the monitoring zones shall be determined during drilling and testing using the following information:
    a. Water samples Packer test data with analysis and interpretation
    b. Geophysical logging upon reaching the total depth of the appropriate pilot hole interval including the following logs: caliper, gamma, dual induction, borehole compensated sonic, pumping flowmeter, temperature, and fluid resistivity
    c. Plots of sonic porosity and apparent formation fluid resistivity (RWA) Interpretation will include calculation of sonic porosity and RWA. The input parameters used to make this calculation shall be provided.

    [62-528.405(1)(a) and 62-528.405(3)(b)]

6. The upper monitoring interval shall be positioned at or slightly below the base of the USDW. This zone must be established within the lowermost portion of the USDW unless it can be demonstrated that no zone is present that can produce adequate water for collection of representative ground water samples. It is acceptable for the TDS of this zone to be slightly greater than 10,000 mg/L. [62-528.425(1)(g)4.]

7. The lower monitoring interval shall be positioned in a zone that can produce adequate water for collection of representative ground water samples, below the base of the USDW. The purpose of the lower monitor zone is to verify the effectiveness of the confining unit and external mechanical integrity of the injection well. This zone shall be placed far enough below the base of the USDW to function as an early warning for fluid movement. [62-528.425(1)(g)4.]

8. The data and analysis supporting the selection of the monitoring intervals shall be submitted to the Department after the collection, interpretation and analysis of all pertinent cores, geophysical logs, packer tests and analysis of fluid samples. The Department shall approve the final selection of the specific upper and lower monitoring intervals prior to well completion. [62-528.420(3)(c)]

9. To identify the upper and lower monitoring zones, the following information from the injection well and all available on-site sources of data shall be analyzed, interpreted and submitted for UIC review and approval:

a. Borehole televiewer or downhole television survey
b. The characteristics of the transition zone (especially regarding TDS) in the vicinity of the USDW
c. Packer test data including water quality (TDS, chlorides, sulfate, specific conductance, ammonia and TKN, at a minimum)
d. The specific capacity of the proposed upper and lower monitoring zones based on packer testing results
e. The identification of the base of the USDW

[62-528.420(4)(c)]

10. Confinement shall be demonstrated using at a minimum, directly measured lithologic properties, geophysical evidence, and tests performed while pumping the formation. [62-528.405(2)(c)]

11. Test results pertaining to confinement shall include and/or specifically reference the following informational and quality control items:
    a. Information that documents the calibration of tools, including field checks prior to testing.
    b. The conditioning/development of the borehole prior to logging, including the techniques used and the time periods in which applied, and
    c. Pertaining to packer/pump testing - recording the pumping rate regularly throughout the test to account for possible variations in the pumping rate, and providing information regarding the detection of packer leaks, if any, during testing.

    [62-528.405(2)(c)]

12. Representative samples of circulation fluid shall be collected during the drilling of the pilot hole of Injection Well IW-1 and during the drilling of Monitoring Well DZMW-1, as follows:
    a. At IW-1, the representative samples of circulation fluid shall be collected at a minimum of every 90 feet in drilling from a depth of approximately 1000 feet bls to the top of the "Boulder Zone" preliminarily estimated at approximately 2950 to 3800 feet bls. The circulation fluid samples shall be analyzed for chlorides, TDS, and specific conductance — at a minimum.
    b. At DZMW-1, the representative samples shall be collected a minimum of every 90 feet in drilling from a depth of approximately 1000 feet bls to the total depth of the pilot hole. The circulation fluid samples shall be analyzed for chlorides, TDS and specific conductance — at a minimum. [62-528.405(3)(b)]

13. If effluent is encountered or suspected during pilot hole drilling and testing, the Department shall be notified immediately by telephone and in writing and immediate appropriate precautionary measures shall be taken to prevent any upward fluid movement. [62-528.440(2)(d)]

C. Mechanical Integrity

1. Mechanical Integrity.
   a. Injection is prohibited until the permittee affirmatively demonstrates that the well has mechanical integrity. Prior to operational testing the permittee shall establish, and thereafter maintain the mechanical integrity of the well at all times.
   b. If the Department determines that the injection well lacks mechanical integrity, written notice shall be given to the permittee.
   c. Within 48 hours of receiving written notice that the well lacks mechanical integrity, unless the Department requires immediate cessation of injection, the permittee shall cease injection into the well unless the Department allows continued injection pursuant to subparagraph d below.
   d. The Department shall allow the permittee to continue operation of a well that lacks mechanical integrity if the permittee has made a satisfactory demonstration that fluid movement into or between underground sources of drinking water is not occurring.

   [62-528.307(2)(f)]

2. Mechanical integrity of each injection well shall be determined pursuant to Rule 62-528.300(6)(b) and (c), F.A.C. For wells with a fluid-filled casing/tubing annulus, this includes both annular monitoring and a pressure test of the casing/tubing annulus every 5 years.

3. Verification of pressure gauge calibration must be provided to the Department representative at the time of the test and in the certified test report. [62-528.300(6)(f)]

4. The Department must be notified seventy-two (72) hours prior to all testing for mechanical integrity on the injection wells. The testing procedure must be approved by the Department before testing begins. All testing must be initiated during daylight hours, Monday through Friday. An evaluation of all test results must be submitted with all test data. [62-528.300(6)(f)]

<u>For interim tests</u>

5. To demonstrate internal mechanical integrity of the injection well alternative design, an additional (i.e., interim) pressure test shall be run and completed midway between the standard 5-year full mechanical integrity tests. A plan describing the interim test procedures shall be submitted to the Department's Southeast District and Tallahassee offices for approval at least 90 days prior to the interim pressure test date noted above, and the final report for the demonstration of interim mechanical integrity for the injection well shall be submitted within three months of the completion date for the interim pressure test. [62-528.430(2)(b)2.a.]

D. Surface Equipment

1. The integrity of the monitoring zone sampling systems shall be maintained at all times. Sampling lines shall be clearly and unambiguously identified by monitoring zone at the point at which samples are drawn. All reasonable and prudent precautions shall be taken to ensure that samples are properly identified by monitoring zone and that samples obtained are representative of those zones. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines. [62-528.307(1)(f) and 62-528.307(3)(b)]

2. The surface equipment for the each injection well shall maintain compliance with Chapter 62-528.450(2)(j), F.A.C. for water hammer control, screening, access for logging and testing, and reliability and flexibility in the event of damage to the well and effluent piping. A regular program of exercising the valves integral to the well head shall be instituted. At a minimum, all valves integral to the well head shall be exercised during the regularly scheduled monthly injectivity testing. A record shall be maintained at the facility that documents the exercising of the valves. [62-528.307(1)(f) and 62-528.307(3)(b)]

3. The surface equipment and piping for the injection and monitoring wells shall be kept free of corrosion at all times. [62-528.307(1)(f) and 62-528.307(3)(b)]

4. Spillage onto the injection well pad(s) during construction activities, and any waters spilled during mechanical integrity testing, other maintenance, testing or repairs to the system(s) shall be contained on the pad(s) and directed to a sump which in turn discharges to the pumping station wet well or via other approved means to the injection well system(s). [62-528.307(1)(f) and 62-528.307(3)(b)]

5. The injection well pads shall be maintained and retained in service for the life of the injection wells. The injection and monitoring well pads are not, unless specific approval is obtained from the Department, to be used for storage of any material or equipment at any time. [62-528.307(1)(f) and 62-528.307(3)(b)]

6. Four permanent surficial aquifer monitoring wells, identified as Pad Monitoring Wells (PMWs), shall be located near the corners of the pads to be constructed for IW-1 and MW-1, and shall be identified by location number and pad location, i.e. NW, NE, SW, and SE. If located in a traffic area the well head(s) must be protected by traffic bearing enclosure(s) and cover(s). Each cover must lock and be specifically marked to identify the well and its purpose. The PMWs shall be sampled as follows:
    a. During the construction and associated testing phases, the PMWs shall be sampled weekly for chlorides (mg/L), specific conductance (μmho/cm or μS/cm), temperature and water level (relative to the North American Vertical Datum of 1988 [NAVD 88]).
    b. Initial PMW analyses shall be submitted prior to the onset of drilling activities.
    c. The PMWs shall also be sampled for total dissolved solids (mg/L) during the first four weeks of PMW sampling and at all times when specifically requested by the Department.
    d. The results of the PMW analyses shall be submitted to the Department in the weekly progress report. The PMWs shall be retained in service throughout the construction phase of the project. Upon completion of construction, the permittee may submit a request to the Department for cessation of sampling followed by capping, or plugging and abandonment of these wells. [62-528.410(9)(b)]

IV. QUALITY ASSURANCE/QUALITY CONTROL

1. The permittee shall ensure that the construction and operational testing of this injection well system shall be as described in the application and supporting documents. Any proposed modifications to the permit shall be submitted in writing to the Underground Injection Control Program for review and clearance prior to implementation. Changes of negligible impact to the environment and staff time will be reviewed by the program manager, cleared when appropriate and incorporated into this permit. Changes or modifications other than those described above will require submission of a completed application and appropriate processing fee as per Rule 62-4.050, F.A.C. [62-528.100, 62-4.050]

2. Proper operation and maintenance include effective performance and appropriate quality assurance procedures; adequate operator staffing and training; and adequate laboratory and process controls. [62-528.307(2)(b)]

3. All water quality samples required by this permit shall be collected in accordance with the appropriate Department Standard Operation Procedures (SOP), pursuant to Chapter 62-160, Quality Assurance, Part II, Field Procedures, F.A.C. Except for monitoring well samples, a certified laboratory shall conduct the analytical work, as provided by Chapter 62-160, Quality Assurance, Part III, Laboratory Certification and Procedures, F.A.C. Department approved test methods shall be utilized, unless otherwise stated in this permit. All calibration procedures for field testing and laboratory equipment shall follow manufacturer's instrumentation manuals and satisfy the requirements of the Department SOPs. A listing of the SOPs pertaining to field and laboratory activities is available at the FDEP website at: **http://www.dep.state.fl.us/water/sas/sop/sops.htm**. [62-4.246, 62-160]

4. All indicating, recording and totalizing devices associated with the injection well system shall be maintained in good operating condition and calibrated annually at a minimum. Laboratory Agency (USEPA) guidelines as expressed in Standard Methods for the Examination of Water and Wastewater. The pressure gauges, flow meter, and chart records shall be calibrated using standard engineering methods. [62-528.307(2)(b)]

5. All reports submitted to satisfy the requirements of this permit shall be signed by a person authorized under Rule 62-528.340(1), F.A.C., or a duly authorized representative of that person under Rule 62-528.340(2), F.A.C. All reports required by this permit which are submitted to the Department shall contain the following certification as required by Rule 62-528.340(4), F.A.C.:

   I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.
   [62-528.340(1), (2), and (4)]

6. Analyses shall be conducted on unfiltered samples, unless filtered samples have been approved by the Southeast District office as being more representative of ground water conditions. [62-520.310(5)]

7. A professional engineer registered pursuant to Chapter 471, F.S., shall be retained throughout the construction period to be responsible for the construction operation and to certify the application, specifications, completion report and other related documents. The Department shall be notified immediately of any change of engineer. [62-528.440(5)(b)]

8. Continuous on-site supervision by qualified personnel (engineer and/or geologist, as applicable) is required during all testing and geophysical logging operations. [62-528.440(5)(b)]

V. REPORTING REQUIREMENTS

1. The permittee shall provide copies of all correspondence relative to this permit to the Department's Tallahassee and Southeast District offices. Such correspondence includes but is not limited to reports, schedules, analyses and geophysical logs required by the Department under the terms of this permit. In addition, a copy of the cover letters for final engineering/construction reports and mechanical integrity reports shall be sent to the U. S. Environmental Protection Agency, Region 4, UIC program, 61 Forsyth St. SW, Atlanta, GA 30303-8909.
   [62-528.430]

2. The drilling and construction schedule, site layout of drilling pad and pad monitoring well locations shall be submitted to the Department during site preparation but prior to drilling operation commencement for the injection well system. [62-528.430(2)(a)]

3. Weekly progress reports shall be submitted throughout the construction period for each well. These reports, which may be submitted by electronic mail, shall be submitted within 48 hours of the end of the period of record and shall include at a minimum the following information:
    a. A cover letter summary of the daily engineer report, driller's log and a projection for activities in the next reporting period
    b. Daily engineers reports and driller's/work logs with detailed descriptions of all drilling progress, cementing, testing, logging, and casing installation activities.
    c. Description of daily footage drilled by diameter of bit or size of hole opener or reamer being used.
    d. Description of work during installation and cementing of casing, including amounts of casing and cement used Details of cementing operations shall include the number of cementing stages, and the following information for each stage of cementing: the volume of cement pumped, the theoretical fill depth, and the actual tag depth. From both the physical tag and the geophysical logs, a percent fill shall be calculated. An explanation of any deviation between actual versus theoretical fill shall be provided
    e. Details of the additions of salt or other materials to suppress well flow, including the date, depth and amount of material used.
    f. Description of testing accomplished including (but not limited to) pumping and packer tests
    g. Lithologic logs and core descriptions with cuttings description, formation and depth encountered
    h. Geophysical logs, video logs, and deviation survey results.
    i. Water quality analyses, including but not limited to the weekly water quality analysis and water levels for the four PMWs.
    j. Well development records
    k. Description of any construction problems that developed during the reporting period and current status
    l. Interpretations included with all test results and logs submitted.
    m. Documentation of disposal of drilling fluids, cuttings, formation water or waste as per specific condition II.2.

    [62-528.430(1) and 62-528.410(9)(a)]

4. The final selection of specific injection and monitoring intervals must be approved by the Department. In order to obtain an approval, the permittee shall submit a written request to the Department. The request shall be submitted concurrently to both Department offices. All casing seat requests for the injection well(s) and the Floridan aquifer monitoring well(s) shall be accompanied by technical justification. To the extent possible, each casing seat request should address the following items:
    a. Lithologic and geophysical logs with interpretations, as the interpretations relate to the casing seat.
    b. Water quality data (including but not necessarily limited to TDS concentrations)
    c. Identification of confining units, including hydrogeologic data and interpretations
    d. Identification of monitoring zones
    e. Casing depth evaluation (mechanically secure formation, potential for grout seal)
    f. Lithologic drilling rate and weight on bit data, with interpretations (related to the casing seat)
    g. Identification of the base of the USDW using water quality, Rwa plots, and geophysical log interpretations
    h. A certified evaluation of all logging and test results, submitted with test data.
    i. Transmissivity or specific capacity of proposed monitoring zone
    j. Packer test drawdown curves and interpretation

    [62-528.410(4)(c), 62-528.420(4)(c) and 62-528.605(2)]

5. The short-term injection test request shall contain the following justifications:
    a. Cement bond logs and interpretation
    b. Final downhole television survey with interpretation
    c. Radioactive tracer test results
    d. Demonstration of mechanical integrity, which shall include Items **1)** through **3)** above, and the pressure testing and temperature logging results (if the test is to be run using non-potable water)
    e. Reasonable assurance that adequate confinement exists
    f. Proposed source water to be used. Per Rule 62-528.405(3)(b), F.A.C., if an adequate water supply for the injection test does not exist, and the data collected during drilling provide assurance of the presence of confining bed(s), the applicant shall, after demonstrating mechanical integrity pursuant to Rules 62-528.300(6)(b)2. and (c), F.A.C., be allowed to use an alternate source for testing only with specific prior written authorization from the Department as described in Rule 62-528.100(2), F.A.C. An analysis of the alternate water source according to the table below is required prior to Department approval:

Water Source	**Required Analyses**
Potable Water	No analysis needed
Domestic Wastewater	A copy of the latest comprehensive analysis submitted to the Department's domestic wastewater program
Desalination Concentrate or Other Industrial Wastewater	A copy of the latest comprehensive analysis submitted to the Department's industrial wastewater program. If more than one year old, sample the water for the parameters required for monthly monitoring of the wastewater in Specific Condition VII.
Ground Water	Sample the water for: • total dissolved solids (mg/L) • chloride (mg/L) • specific conductance (temperature compensated, µmho/cm or µS/cm) • total suspended solids (TSS) (mg/L) • nitrogen, ammonia, total as N (mg/L) • nitrogen, total Kjeldahl as N (TKN, mg/L) • nitrogen, nitrate, total as N (mg/L) • sodium (mg/L) • potassium (mg/L) • calcium (mg/L) • magnesium (mg/L) • total iron (mg/L) • bicarbonate (mg/L) • phosphorous, total as P (mg/L) • pH (standard units, s.u.) • sulfate, total as SO_4 (mg/L) • field temperature (°C) • gross alpha (ρCi/L) • combined radium-226 and radium-228 (ρCi/L)
Surface Water	The water as above for ground water, with the additional constituents: • total and fecal coliform (cts/100ml), • *E. Coli* (cts/100ml), *Enterococci sp.* (cts/100ml), and • Turbidity (NTU).

g. Planned injection testing procedures.
[62-528.405(3)(b)]

6. Upon completion of analysis of cores and sample cuttings recovered during the construction of wells covered by this permit (when no longer needed by the well owner), the permittee shall contact the Geological & Geotechnical Data Acquisition Program of the Florida Geological Survey (FGS) to arrange for the transfer of the cores and cuttings. The FGS shall also be contacted to arrange for the collection of 100 ml water samples, with nitric acid preservative for metal analysis, at the end of each packer test (where sufficient water is available) and aquifer background sample collection events.[62-528.450(5)]

7. All cores, cuttings, and water samples shall be shipped to the Florida Geological Survey, Geological & Geotechnical Data Acquisition Program, 3915 Commonwealth Boulevard, Tallahassee, Florida 32399. All cores and samples shall clearly identify the site name, well name/number, depths of samples/cores, and the latitude/longitude location of the well(s) using the form in this permit. [62-528.450(5)]

8. A final report of the construction and testing of the injection well(s) and monitoring well(s), shall be submitted no later than 120 days after commencement of operational testing, pursuant to Rule 62-528.430(1)(e), F.A.C. This report shall include as a minimum, definitions of the injection interval, all relevant confining units, the depth of the base of the USDW and all monitoring zones, including all relevant data and interpretations.[62-528.450(5)]

VI OPERATIONAL TESTING AND MONITORING REQUIREMENTS

Operational Testing

1. The permittee shall conduct operational testing of the injection well system to demonstrate that the well can absorb the design and peak daily flows that are expected, prior to granting approval for operational testing. [62-528.450(3)(a)]

2. Prior to operational testing, the permittee shall comply with the requirements of rule 62-528.450(3)(a),(b), and (c), F.A.C. [62-528.307(2)(e)]

3. The operational testing of the Class I injection well system under this permit shall not commence without written authorization from the Department. [62-528.450(3)(b)]

4. Prior to operational testing approval, the following items must be submitted (with the request for operational testing approval) for Department review and approval:

    a. Lithologic and geophysical logs with interpretations.
    b. A copy of the borehole television survey(s) or borehole televiewer log(s) of the injection well with interpretation.
    c. Certification of mechanical integrity and interpreted test data.
    d. Results of the short-term injection test with interpretation of the data.

    e. A description of the actual injection procedure including the anticipated maximum pressure and flow rate at which the well will be operated under normal and emergency conditions.

f. Information concerning the compatibility of the injected waste with fluids in the injection zone and minerals in both the injection zone and the confining zone.
g. Certification of completion of well construction from water well contractor and certification by the Engineer of Record that permit conditions are met.
h. Surface equipment (including piping, pressure gauges and flow meters, and all appurtenances) completion certified by the Engineer of Record.
i. A survey indicating the exact location in metes and bounds of all wells authorized by this permit shall be provided prior to issuance of an operating permit. Draft operation and maintenance manual, including a description of surge and water hammer control and emergency discharge management plan procedures. The emergency discharge system must be fully constructed and operational (ready to operate) prior to approval of operational testing.
j. Calibration certificates for pressure gauges and flow meters.
k. Signed and sealed record "as-built" engineering drawings of the injection well system including all well construction, subsurface and surface piping and equipment, and appurtenances.
l. Demonstration of confinement and definition of the injection and confining sequences shall utilize data collected during the drilling, logging and testing of the injection monitoring wells. This submittal shall be prepared, signed, and sealed by a Florida Registered Professional Geologist or appropriately qualified Professional Engineer.
m. Background water quality data from the monitoring and injection zones, analyzed for primary and secondary drinking water standards (62-550, F.A.C.) and minimum criteria parameters (62-520, F.A.C.) as attached. (The results submitted as part of the Facility's request for Department authorization to conduct injection testing may be referenced.)
n. Other data obtained during well construction needed by the Department to evaluate whether the well will operate in compliance with Department Rules.
o. [62-528.450 (3)(a)3.i. and 62-528.455(1)(c)6]

5. Prior to operational testing, the permittee shall comply with the requirements of Rule 62-528.450(3)(a),(b), and (c), F.A.C.

6. Pressure gauges and flow meters shall be installed on the injection well prior to initiating injection activities at the site. [62-528.450(3)(a)]

7. Prior to the authorization of operational testing by the Department, the permittee shall contact the UIC Section of the Department, Southeast District, to arrange a site inspection. The inspection will determine if the conditions of the permit have been met and to verify that the injection well system is operational. During the inspection, emergency procedures and reporting requirements shall be reviewed. [62-528.450(3)(c)]

8. The Engineer of Record or designated qualified representative must be present for the start-up operations and the Department must be notified in writing of the date operational testing commenced for the subject well. [62-528.440(5)(b)]

Monitoring

1. To assist the permittee in the submission of monitoring data required by this permit, a standardized data form has been developed and is attached to this permit. Use of these forms is strongly encouraged.
    a. If the permittee chooses to use the standardized forms provided, the monthly submittal will include the standardized reporting forms, laboratory pages and any supporting documents. The report may be sent via electronic mail in Adobe™ (.pdf) format to the following Program e-mail addresses:
        i. District e-mail
        ii. Tallahassee e-mail
    b. If the permittee prefers to use a data reporting format other than the attached forms, the following identifying information must be included on each data sheet:
        i. Facility Name
        ii. Well Name
        iii. UIC Permit Number
        iv. WACS Facility ID
        v. WACS Testsite ID
        vi. WACS Testsite Name

    The monthly submittal shall include the Permittee's reporting forms, signatory pages, laboratory pages and supporting documents. A paper copy of the monthly submittal should be sent to Department staff at the following addresses:

    District Address
    Tallahassee Address

[62-528.307(3)(d)]

2. The injection system shall be monitored in accordance with Rules 62-528.425(l)(g) and 62-528.430(2), F.A.C. The following injection well performance data and monitor zone data shall be recorded and reported in the Monthly Operating Report (MOR) as indicated below. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. [62-528.307(2)(d),528.430(2) and 62-528.450(3)(b)5.]

PARAMETER	UNIT	RECORDING FREQUENCY	FREQUENCY OF ANALYSES		
			IW-1	DZMW-1 upper	DZMW-1 lower
Flow Rate, max.	gpm	continuous	[a]		
Flow Rate, min.	gpm	continuous	[a]		
Flow Rate, avg.	gpm	continuous	[a]		
Total Volume Recharged	mg	daily			
Injection Pressure, max.	psi	continuous	[a]		
Injection Pressure, min.	psi	continuous	[a]		
Injection Pressure, avg.	psi	continuous	[a]		
Annular Pressure, max	Psi	continuous	[a]		
Annular Pressure, min	Psi	continuous	[a]		
Annular Pressure, avg.	psi	continuous	[a]		
Water Level, max.	feet (NGVD) or PSI	continuous		[a]	[a]
Water Level, min.	feet (NGVD) or PSI	continuous		[a]	[a]
Water Level, avg.	feet (NGVD) or PSI	continuous		[a]	[a]
Chloride	mg/L	Grab	W	W	W
pH [b]	std. units	Grab	W	W	W
Specific Conductance [b]	µmhos/cm	Grab	W	W	W
Sulfate	mg/L	Grab	W	W	W
Temperature [b]	°C	Grab	W	W	W
Total Dissolved Solids	mg/L	Grab	W	W	W
Additional parameters as applicable					

M - Monthly; Q- Quarterly; W - Weekly

[a] - Operational data reporting for flows, pressures and water levels: daily max, min and average from continuous reporting; monthly max, min and average (calculated from daily averages).
[b] - Field samples
Weekly monitoring well parameters may be requested to be reduced to monthly after a 6-month testing period and written Department approval.

3. A record shall be included in each MOR that documents the monthly exercising of valves. For each valve, this record shall include the valve identification number (tag), type of valve, date and time when exercised, and the initials of operator(s) performing the work. The record shall be maintained at the facility and shall be available for review by FDEP personnel at all times. [62-528.430(2)(b)2.b.]

4. A specific injectivity test shall be performed monthly on the injection well as required by Rule 62-528.450(3)(b)6., F.A.C. Pursuant to Rule 62-528.430(2) (d), F.A.C, the specific injectivity test shall be performed with the pumping rate to the well set at a predetermined level and reported as the specific injectivity index (gallons per minute/specific pressure). The pumping rate to be used shall be based on the expected flow, the design of the pump types, and the type of pump control used. As part of this test, the well shall be shut-in for a period of time necessary to conduct a valid observation of pressure fall-off. The specific injectivity test data shall be submitted along with the monitoring results of the injection and monitoring well data. [62-528.430(2) (b) and (d); 62-528.450(3)(b)6.]

5. Pertaining to the evacuation (purging) of the monitoring well(s), which is required prior to the collection of samples for the Monthly Operating Reports (MORs), the facility may elect to follow either one of the following two purging protocols:

   a. <u>The protocol stated below</u>:
   A minimum of three well volumes of fluid shall be evacuated from the monitoring systems prior to sampling for the chemical parameters listed above. Sufficient purging shall have occurred when either of the following has occurred:

      1) pH, specific conductance <u>and</u> temperature when sampled, upon purging the third or subsequent well volume, each vary less than 5% from that sampled upon purging the previous well volume; or
      2) Upon purging the fifth well volume.

b. The following protocol taken from DEP-SOP-001/01(Field Procedures):
   1) Purge until the water level has stabilized (well recovery rate equals the purge rate), then purge a minimum of one well volume, and then collect the first set of stabilization parameters, namely pH, specific conductance and temperature;
   2) Thereafter, collect stabilization parameters ≥ every ¼ well volume;
   3) Purging shall be complete when either of the following have occurred:
      a) 3 consecutive readings of the parameters listed below are within the following ranges[1]:
         - pH ± 0.2 Standard Units
         - Specific Conductance ± 5.0% of reading
         - Temperature ± 0.2°C
      b) Upon purging the fifth well volume.

[62-160.210(1) and 62-528.430(2)]

6. The flow from the monitoring zones during well evacuation and sampling shall not be discharged to surface waters or aquifers containing an Underground Source of Drinking Water (USDW). Waters purged from monitoring wells in preparation for sampling shall be diverted to the injection well head via the pad drainage system, wet well or treatment plant. [62-4.030, 62-620.320]

7. The permittee shall submit monthly to the Department the results of all injection well and monitoring well data required by this permit no later than the last day of the month immediately following the month of record. The results shall be sent to the Department of Environmental Protection, [Name] District Office, [Address]. A copy of this report shall also be sent to the Department of Environmental Protection, Underground Injection Control Program, MS 3530, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. [62-528.307(2)(d)]

[1] Provided dissolved oxygen in the groundwater of the zone being monitored is ≤ 20% of saturation for the measured temperature and turbidity is ≤ 20 NTUs. This assumption holds true for groundwater in most zones of the Floridan aquifer.

VII. ABNORMAL EVENTS

1. In the event the permittee is temporarily unable to comply with any of the conditions of a permit due to breakdown of equipment, power outages or destruction by hazard of fire, wind, or by other cause, the permittee of the facility shall notify the Department. [62-528.415(4)(a)]

    a. Notification shall be made in person, by telephone, or by electronic mail (e-mail) within 24 hours of breakdown or malfunction to the Southeast District office. [62-528.307(1)(x)]

    b. A written report of any noncompliance referenced in Specific Condition (1) above shall be submitted to the Southeast District office and the Tallahassee office within five days after its occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permit conditions. [62-528.415(4)(b)]

2. The Department shall be notified immediately of any problems that may seriously hinder compliance with this permit, construction progress or good construction practice. The Department may require a detailed written report describing the problem, remedial measures taken to assure compliance and measures taken to prevent recurrence of the problem. [62-528.415(4)(b)]

VIII. EMERGENCY DISPOSAL

1. All applicable federal, state and local permits must be in place to allow for any alternate discharges due to emergency or planned outage conditions. [62-528.415(4)(c)1]

2. Any proposed changes in emergency disposal methods shall be submitted for Departmental review for approval prior to implementation. [62-528.415(4)(c)]

3. The emergency disposal method must be fully operational in the event of planned or emergency outages of the injection well system. [62-528.415(4)(c)2]

IX. FINANCIAL RESPONSIBILITY

1. The permittee shall maintain at all times the financial resources necessary to close, plug, and abandon the injection and associated monitoring wells. [62-528.435(9)]

2. The permittee shall update annually the cost estimate for plugging and abandonment. Upon the occurrence of the annual plugging and abandonment cost estimate exceeding, by 10 percent or more, (Section b. previously), the cost estimate upon which the current financial responsibility is based; the permittee shall submit to the Department certified financial documentation necessary to amend, renew, or otherwise replace the existing financial responsibility pursuant to Rule 62-528.435(9)(b), F.A.C. and the conditions of this permit. [62-528.435(9)(b)]

3. In the event that the mechanism used to demonstrate financial responsibility should become insufficient or invalid for any reason, the permittee shall notify the Department of Environmental Protection in writing within 14 days of such insufficiency or invalidation. The permittee shall within 30 days of said notification submit to the Department for approval new financial documentation certifying either the remedy of current financial insufficiency or resolution of the financial instrument invalidation in order to comply with Rule 62-528.435(9)(b), F.A.C, and the conditions of this permit. [62-528.435(9)(b)]

General Conditions

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are "permit conditions" and are binding and enforceable pursuant to section 403.141, F.S. [62-528.307(1)(a)]

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action. [62-528.307(1)(b)]

3. As provided in subsection 403.087(7), F.S., the issuance of this permit does not convey any vested rights or exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in this permit. [62-528.307(1)(c)]

4. This permit conveys no title to land, water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title. [62-528.307(1)(d)]

5. This permit does not relieve the permittee from liability for harm to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties there from; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. [62-528.307(1)(e)]

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed and used by the permittee to achieve compliance with the conditions of this permit, or are required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules. [62-528.307(1)(f)]

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at reasonable times, access to the premises where the permitted activity is located or conducted to:
    a. Have access to and copy any records that must be kept under conditions of this permit;
    b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and
    c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.
    d. Reasonable time will depend on the nature of the concern being investigated.

    [62-528.307(1)(g)]

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:
    a. A description of and cause of noncompliance; and
    b. The period of noncompliance, including dates and times; or, if not corrected the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent the recurrence of the noncompliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

    [62-528.307(1)(h)]

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is proscribed by sections 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules. [62-528.307(1)(i)]

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. [62-528.307(1)(j)]

11. This permit is transferable only upon Department approval in accordance with rules 62-4.120 and 62-528.350, F.A.C. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department. [62-528.307(1)(k)]

12. This permit or a copy thereof shall be kept at the work site of the permitted activity. [62-528.307(1)(l)]

13. The permittee shall comply with the following:
    a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records shall be extended automatically unless the Department determines that the records are no longer required.
    b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
    c. Records of monitoring information shall include:
        i. the date, exact place, and time of sampling or measurements;
        ii. the person responsible for performing the sampling or measurements;
        iii. the dates analyses were performed;
        iv. the person responsible for performing the analyses;
        v. the analytical techniques or methods used;
        vi. the results of such analyses.
    d. The permittee shall furnish to the Department, within the time requested in writing, any information which the Department requests to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.
    e. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

    [62-528.307(1)(m)]

14. All applications, reports, or information required by the Department shall be certified as being true, accurate, and complete. [62-528.307(1)(n)]

15. Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each scheduled date. [62-528.307(1)(o)]

16. Any permit noncompliance constitutes a violation of the Safe Drinking Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. [62-528.307(1)(p)]

17. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. [62-528.307(1)(q)]

18. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit. [62-528.307(1)(r)]

19. This permit may be modified, revoked and reissued, or terminated for cause, as provided in 40 C.F.R. sections 144.39(a), 144.40(a), and 144.41 (1998). The filing of a request by the permittee for a permit modification, revocation or reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition. [62-528.307(1)(s)]

20. The permittee shall retain all records of all monitoring information concerning the nature and composition of injected fluid until five years after completion of any plugging and abandonment procedures specified under rule 62-528.435, F.A.C. The permittee shall deliver the records to the Department office that issued the permit at the conclusion of the retention period unless the permittee elects to continue retention of the records. [62-528.307(1)(t)]

21. All reports and other submittals required to comply with this permit shall be signed by a person authorized under rules 62-528.340(1) or (2), F.A.C. All reports shall contain the certification required in rule 62-528.340(4), F.A.C. [62-528.307(1)(u)]

22. The permittee shall notify the Department as soon as possible of any planned physical alterations or additions to the permitted facility. In addition, prior approval is required for activities described in rule 62-528.410(1)(h). [62-528.307(1)(v)]

23. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or injection activity which may result in noncompliance with permit requirements. [62-528.307(1)(w)]

24. The permittee shall report any noncompliance which may endanger health or the environment including:
    a. Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; or
    b. Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.
    c. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
    [62-528.307(1)(x)]

Issued this 29th day of July , 2013

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Jill S. Creech, P.E.

Southeast District Director

FDEP Underground Injection Control Program Sample Form (Cores/Cuttings/Formation Water)

Well Name:	
Well Type (circle one) Class I Class V Exploratory Monitoring	
Date Collected:	Date sent to FGS:
Sample type (circle one) Core Cuttings Formation Water	
Preservative used — if formation water sample — (circle one) Nitric n/a Other (describe)	
Datum and elevation:	Sample Interval:
Elevation method (circle one) Survey USGS Quadrangle Other (describe)	
Sample Interval Drilling Method (circle one) Reverse Air Mud Rotary Sonic/Acoustic Other (describe)	
Well Coordinates ____ º ____ ‘ _____“ N / ____ º ____ ‘ _____“ W	
Method (circle one) AGPS (hand held) DGPS (GPS survey) Map Derived	
FDEP Permit Number:	
Facility Name:	
Permittee (owner):	
Facility Address:	
Drilling Company:	Lead Driller:
Project Geologist:	Consulting Company:

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
BOB MARTINEZ CENTER
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

JONATHAN P. STEVERSON
SECRETARY

ELECTRONIC CORRESPONDENCE January 9, 2015

Responsible Official:
Mr. Tim Hawkins, President
2700 Wiles Road
Pompano Beach, Florida 33073
thawkins@wm.com

Facility:
Medley Landfill
9350 NW 89th Ave.
Medley, Florida 33178

Permittee:
Waste Management Inc. of Florida

Permit/Certification
Miami-Dade County UIC
Permit ID Number: 56401-021-UC
WACS ID Number: 101022

Class I Injection Well System
Operational Testing Authorization

RE: Medley Class I Injection Well Construction and Testing Permit – Authorization for Operational Testing

Dear Mr. Hawkins:

The Florida Department of Environmental Protection (Department or FDEP) acknowledges the completion of well construction and the request for operational testing of IW-1 at the Waste Management Inc. Medley Landfill.

Based on the information submitted the Department provides written authorization for operational testing of IW-1 under permit no. 56401-021-UC.

This authorization is subject to the following:

1. The permittee must maintain compliance with FDEP Permit 56401-021-UC in accordance with the conditions of the permit. Further, the permit and Operation and Maintenance manual should be referenced for injection well and monitor well monitoring and sampling requirements, monthly injectivity testing, and reporting requirements with reports submitted accordingly.
2. Provide written notification of the date of commencement of operations.
3. This authorization must be made a part of, and attached to, FDEP Permit 56401-021-UC. It must be available at the facility at all times along with the permit and the Operations and Maintenance Manual for ready reference by all operators.
4. Operational testing is authorized for a maximum of two years. The permittee must make timely application for an operation permit prior to the expiration of the two year operational testing period, with sufficient time to process and issue the permit. It is

suggested the operation permit application be submitted within six months of expiration of the two year testing period or the construction permit, whichever is applicable.

5. Flows to the injection well shall be monitored and controlled at all times to ensure the maximum injection rate for IW-1 shall not exceed **2100 gallons per minute (3.02 MGD).**
6. The injection pressure at the wellhead shall be monitored and controlled at all times to ensure the maximum pressure at the wellhead for IW-1 does not exceed **101 psig** (two-thirds of the tested pressure on the casing/tubing annulus performed on March 13, 2014 for IW-1). The next complete mechanical integrity testing must be completed by **March 12, 2019**.
7. Monthly operation reports shall be submitted as per Specific Condition VI, Monitoring, no. 1, of the permit. Electronic reports sent to the Tallahassee office should be sent TAL_UIC@dep.state.fl.us. Please contact the Southeast District office for their preferred email address and their new physical address.
8. Engineering Drawing P-12, Existing LTP Piping Plan, dated December 28, 2014 and received January 7, 2015, **shall be re-submitted by January 23, 2015** due to poor legibility of parts of the drawing. It may submitted to this office in electronic or paper format and must be signed and sealed by the Professional Engineer. If submitted electronically be sure the seal is legible.

If you have any questions, please contact me at (850) 245-8655. When referring to this project please reference the above date and file number.

Sincerely,

Joseph Haberfeld, P.G.
Aquifer Protection Program Administrator
Division of Water Resource Management

JH/jlh

Copies Furnished To:

Joseph Haberfeld, FDEP/TLH	*joe.haberfeld@dep.state.fl.us*
Len Fishkin, FDEP/SED	*len.fishkin@dep.state.fl.us*
Cathy McCarty, FDEP/SED	*cathleen.mccarty@dep.state.fl.us*
James McGrath, L.S. Sims/Rockledge	*Jmcgrath@simsenv.com*
Roger Mayfield	*rem.assoc.eng@gmail.com*
Jim Christiansen, WM	*jchristi@wm.com*

UNDERGROUND INJECTION CONTROL
MONTHLY OPERATING REPORT SUMMARY

		Report Month/Year	
Facility Name	Medley Landfill, Inc.	UIC Permit #	56401-021-UC
Facility ID# (WACS)	10122	Expiration Date	28-Jul-18
Permitted Peak Hr Rate (MGD)	0.00	Injection Interval (ft below pad)	2778' - 3512'
Permitted Max Injection Pressure (psig)	00	Casing Diameter ID (inches)	8.85
Lead Operator	Joe Gagne		

INJECTION WELL IW-1

Monthly Flow Rates	
Average Flow (gpm)	0
Peak Hour Maximum Flow (gpm)	0
Minimum Hourly Flow (gpm)	0
Monthly Volumes	
Average Daily Volume (MG)	0.0000
Maximum Daily Volume (MG)	0.0000
Minimum Daily Volume (MG)	0.0000
Monthly Volume -3rd Pary Cust #1 (MG)	0.0000
Monthly Volume - 3rd party Waste Pad (MG)	0.0000

Monthly Volume - (MG)
3rd PC #2 (MG) _____

Monthly Pressures	Well Head	Annular
Average Pressure (psig)	0.0	0.0
Maximum Sustained Pressure (psig)	0.0	0.0
Minimum Sustained Pressure (psig)	0.0	0.0
Well-head Shut-in Pressure (psig)	0.0	

Monthly Annular Fluid — Date

_____ gallons Added _____ Removed _____ _____
_____ gallons Added _____ Removed _____ _____
_____ gallons Added _____ Removed _____ _____

Monthly Annular Pressure — Date

_____ gallons Added _____ Removed _____ _____
_____ gallons Added _____ Removed _____ _____
_____ gallons Added _____ Removed _____ _____

DUAL ZONE DEEP MONITOR WELL MW-1

Monthly Water Levels (all Elev Ft NAVD)

	Upper Zone	Lower Zone
Average Potentiometric Surface Elev	0.0	0.0
Maximum Potentiometric Surface Elev	0.0	0.0
Minimum Potentiometric Surface Elev	0.0	0.0

Authorized Reprsentative: Joe Gagne
Phone: 954-658-6156 Fax: (855) 843-5315

Signature: _____
Email: jgagne1@wm.com Date _____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my

DAILY OPERATING REPORT SUMMARY

Facility Name: Medley Landfill, Inc.
Authorized Representative: Joe Gagne
Phone: 954-658-6156
Fax: (855) 843-5315
Email: jgagne1@wm.com

Report Month/Year January-00
UIC Permit #: 56401-021-UC
Expiration Date: 28-Jul-18
Facility ID Number (WACS) : 10122
Lead Operator: Joe Gagne

	Volume (MG)		Flow Rates (gpm)			Wellhead Pressure (psi)			Annular Pressure (psi)			
Day of Month	Totalizer Reading (Note A)	Volume Injected	Minimum Hourly Flow Rate	Maximum Hourly Flow Rate	Average Flow Rate	Min	Max	Avg	Min	Max	Avg	COMMENTS
1	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
2	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
3	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
8	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
9	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
10	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
11	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
12	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
13	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
14	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
15	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
16	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
17	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
18	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
19	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
20	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
21	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
22	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
23	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
24	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
25	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
26	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
27	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
28	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
29	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
30	0.0000	0.0000	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Minimu												
Maxim												
Averag												
Total												

DAILY OPERATING REPORT SUMMARY
DUAL ZONE MONITOR WELL MW-1

Facility Name: Medley Landfill, Inc.
Authorized Representative: Joe Gagne
Phone: 954-658-6156 Fax: (855) 843-5315

Email: jgagne1@wm.com

Report Mo./Yr.
UIC Permit #: 56401-021-UC
Expiration Date 28-Jul-18
Facility ID Number (WACS): 10122
Lead Operator: Joe Gagne

Day of Month	UMZ (1,620' to 1,714') POTENTIOMETRIC SURFACE ELEVATION (FT NAVD)			LMZ (1890' to 1962') POTENTIOMETRIC SURFACE ELEVATION (FT NAVD)			COMMENTS
	Min	Max	Avg	Min	Max	Avg	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
Minimum							
Maximum							
Average							

MONITORING RESULTS SUMMARY

Facility Name: Medley Landfill, Inc.
Authorized Representative: Joe Gagne
Phone: 954-658-6156
Fax: 855-843-5315
Email: jgagne1@wm.com

Report Mo./Yr.:
UIC Permit #: 56401-021-UC
Expiration Date 28-Jul-18
Facility ID Number (WACS) : 10122
Lead Operator: Joe Gagne

Injectate

Monthly Sampling	week 1	week 2	week 3	week 4	week 5	average
Date Sampled						
Chloride (mg/L)						
Calcium (mg/L)						
Bicarbonate (mg/L) as CaCO3						
Iron (mg/L)						
Magnesium (mg/L)						
Ammonia as N (mg/L)						
Total kjeldahl nitrogen as N (mg/L)						
Nitrate as N (mg/L)						
gross alpha (pCi/L)						
radium 226 (pCi/L)						
radium 228 (pCi/L)						
pH (standard units)(field)						
Phosphorous, total as P (mg/L)						
Potassium (mg/L)						
Total dissolved solids (mg/L)						
Sodium (mg/L)						
Specific Conductance (umohs/cm)						
Sulfate (mg/L)						
Temperature ◦C (field)						
Total suspended solids (mg/L)						
Total and Fecal Coliforms (cts/100 ml)						
E. Coli (cts/100 ml)						
Enterococci sp. (cts/100 ml)						
Turbidity (NTU)						

MW-1 Upper (Shallow) Monitor Zone 1,620' to 1,714' bls

Weekly Sampling	week 1	week 2	week 3	week 4	week 5	average
Chloride (mg/L)						
Calcium (mg/L)						
Bicarbonate (mg/L) as CaCO3						
Iron (mg/L)						
Magnesium (mg/L)						
Ammonia as N (mg/L)						
Total kjeldahl nitrogen as N (mg/L)						
Nitrate as N (mg/L)						
gross alpha (pCi/L)						
radium 226 (pCi/L)						
radium 228 (pCi/L)						
pH (standard units)(field)						
Phosphorous, total as P (mg/L)						
Potassium (mg/L)						
Total dissolved solids (mg/L)						
Sodium (mg/L)						
Specific Conductance (umohs/cm)						
Total suspended solids (mg/L)						
Sulfate (mg/L)						
Temperature ◦C (field)						
Turbidity (NTU)						

MW-1 Lower (Deep) Monitor Zone 1890' to 1962' bls

Weekly Sampling	week 1	week 2	week 3	week 4	week 5	average
Date Sampled						
Chloride (mg/L)						
Calcium (mg/L)						
Bicarbonate (mg/L) as CaCO3						
Iron (mg/L)						
Magnesium (mg/L)						
Ammonia as N (mg/L)						
Total kjeldahl nitrogen as N (mg/L)						
Nitrate as N (mg/L)						
gross alpha (pCi/L)						
radium 226 (pCi/L)						
radium 228 (pCi/L)						
pH (standard units)(field)						
Phosphorous, total as P (mg/L)						
Potassium (mg/L)						
Total dissolved solids (mg/L)						
Sodium (mg/L)						
Specific Conductance (umohs/cm)						
Total suspended solids (mg/L)						
Sulfate (mg/L)						
radium 228 (pCi/L)						
Temperature ◦C (field)						
Turbidity (NTU)						

Y-Analysis performed on an Unperserved or Improperly Preserved sample.
Not Analyzed
MNR-Monitoring Not Required
General Chemistry

U Indicates that the compound was analyzed for but not detected.
L Off-scale high. Actual value is known to be greater than the value given.
Q Sample held beyond the accepted holding time
I The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

INJECTIVITY TESTING SUMMARY

Facility:	Medley Landfill, Inc.	Date of Test:	00/00/0000
Phone:	954-658-6156	UIC Permit #:	56401-021-UC
Fax:	(855) 843-5315	Expiration Date:	28-Jul-2018
Email:	jgagne1@wm.com	Facility ID#: (WACS)	10122
		Lead Operator:	Joe Gagne

Were Wellhead Valves Exercised?

Valve name	Serial #	Exercised?
Main 10" Gate Valve	KZH080165-2	☑
6" Offest Gate Valve	126388	☑
6" Butterfly	807060152	☑
4" Butterfly	801040754	☑
4" Butterfly (3PW)	110205	☑

PREINJECTION/AFTER SHUT-IN (STEP 1)

TIME	START (Sec)	SHUT-IN PRESSURE (PSIG)
0:00	0	
	10	
	20	
	30	
0:30	30Min	

Column: 1	2	3	4	5	6	7	8	9	10
Time (after 10 min. of pumping)	Shut-In Pressure (after 30 Minutes) (PSIG)	Pump Number(s) On-Line	Flow Rate (after 10 min. of pumping) (GPM)	Calibrated Gauge At Injection Wellhead (after 10 min. of pumping) (PSIG)	Pressure Recorder (after 10 min. of pumping) (PSIG)	Pressure Differential (PSIG)	Injectivity Index (GPM/PSIG)	Upper Monitor Zone (after 10 min. of pumping) (Feet Above NAVD)	Lower Monitor Zone (after 10 min. of pumping) (Feet Above NAVD)
						(Col 6 - Col 2)			

Injectivity Index (GPM/PSI) = Injection Rate, GPM (col. 4) / (Injection Pressure, PSI (col 6) - Shut-In Pressure, PSI (col 2))

INJECTIVITY TEST DATA (STEP 2)

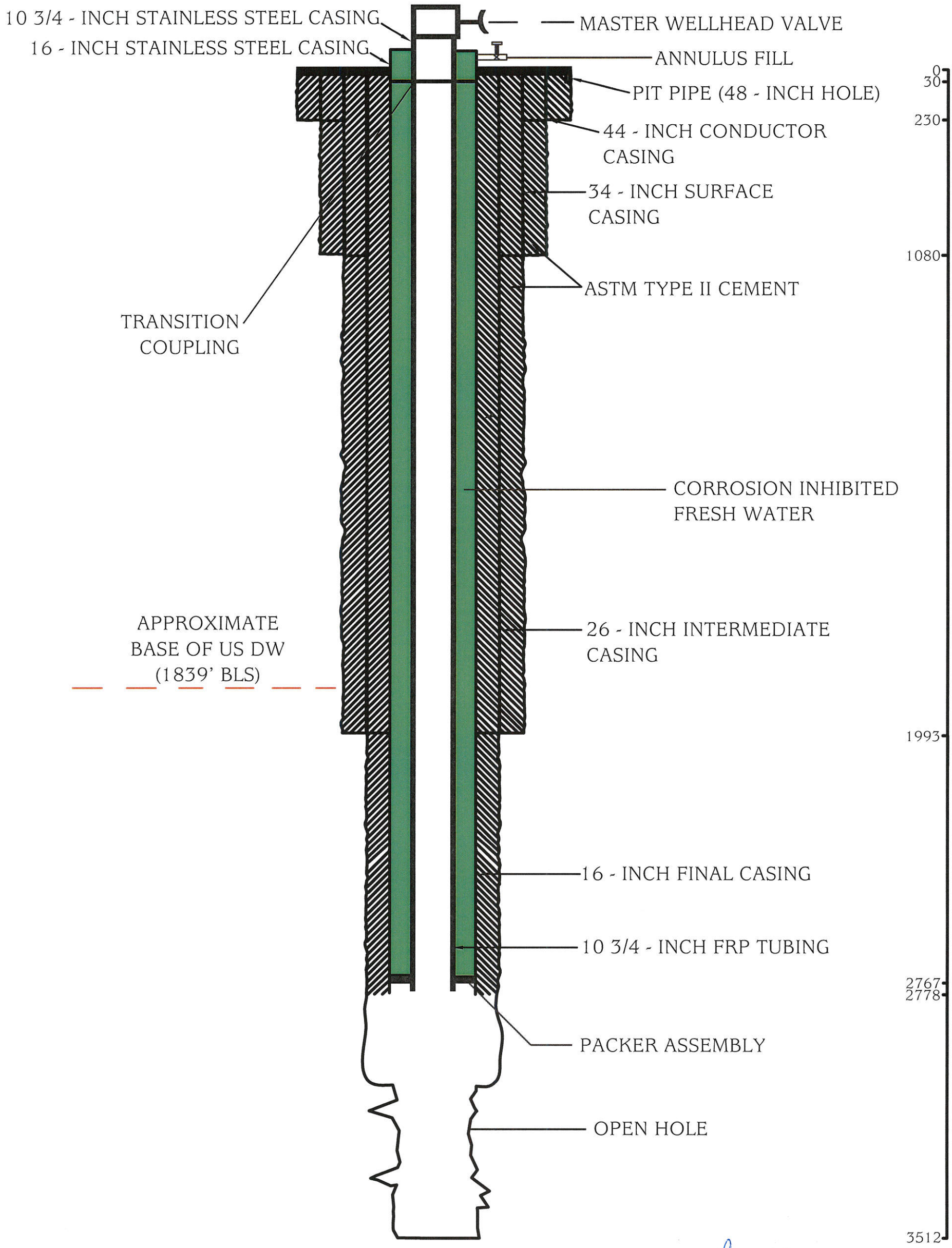
TOTALIZED FLOW (Gal)	TIME	START (Min)	WELL PRESSURE (PSIG)	FLOW RATE (GPM)
		0		
		2		
		4		
		6		
		8		
		10		

POST INJECTION/AFTER SHUT IN (STEP 3)

TIME	START (Min)	SHUT-IN PRESSURE (PSIG)
0:00	0	
	0.5	
	1	
	1.5	
	2	
	3	
	4	
0:05	5	

APPENDIX B

As-Built Drawings

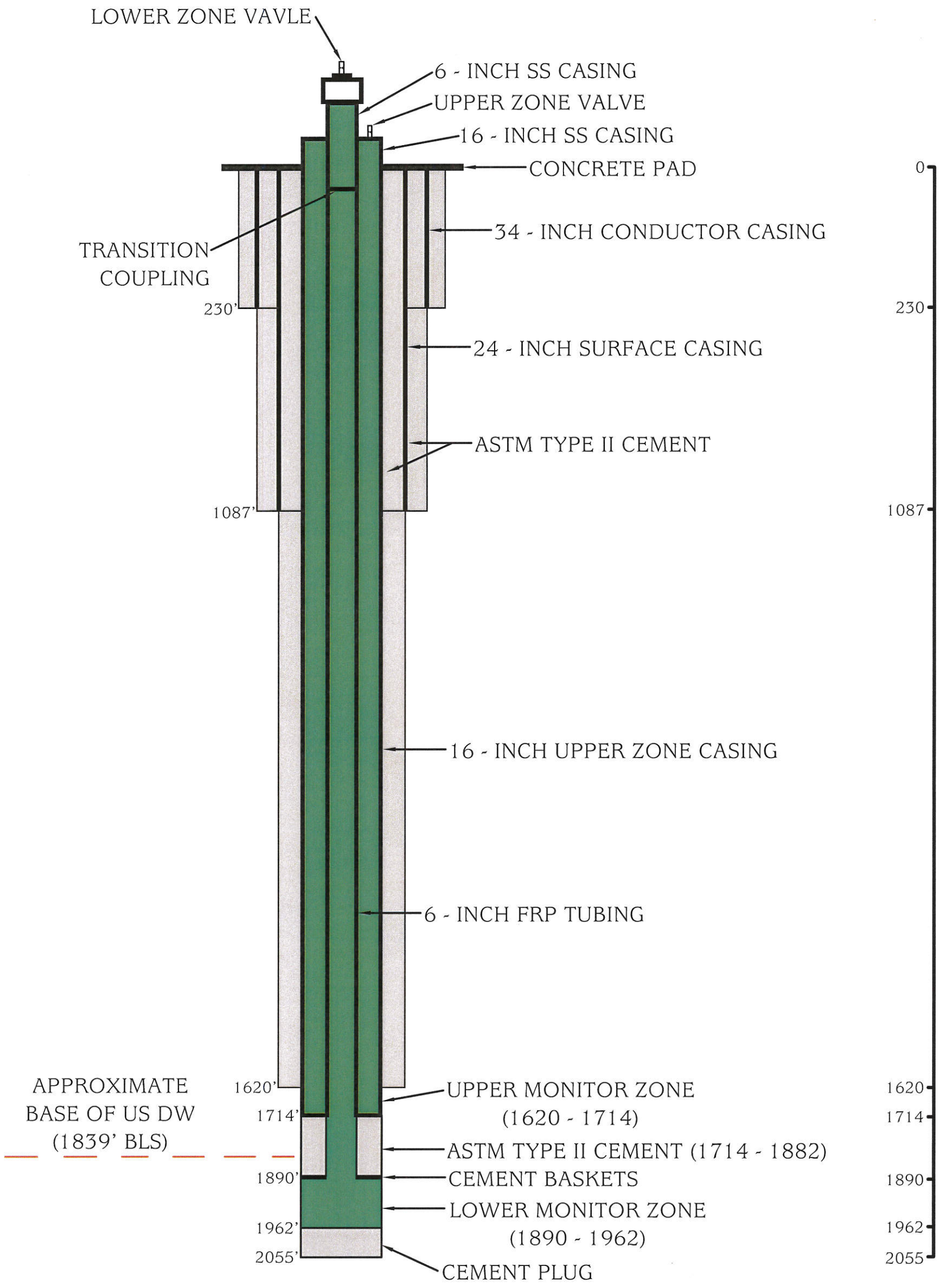


12/29/14

NOT TO SCALE

L.S. SIMS & ASSOCIATES
Environmental Consulting

FIGURE 1
CLASS 1 INJECTION WELL CONSTRUCTION DETAILS
PERMIT NUMBER: 563401-021-UC
MEDLEY LANDFILL, INC.
MEDLEY, FLORIDA



12/29/14

NOT TO SCALE

L.S. SIMS & ASSOCIATES
Environmental Consulting

FIGURE 2
DUAL ZONE MONITOR WELL CONSTRUCTION DETAILS
PERMIT NUMBER: 563401-021-UC
MEDLEY LANDFILL, INC.
MEDLEY, FLORIDA

WASTE MANAGEMENT, INC. OF FLORIDA

MEDLEY LANDFILL, FLORIDA

DISPOSAL INJECTION WELL & ASSOCIATED FACILITIES

WASTE MANAGEMENT INC. MEDLEY LANDFILL DISPOSAL INJECTION WELL
RECORD DRAWINGS DECEMBER 28, 2014

CIVIL DRAWINGS	
S-1	BOUNDRY & LOCATION SURVEY (CRAVEN - THOMPSON & ASSOC.)
C-1	SITE PLAN
C-2	WELL LOCATION SITE PLAN
C-4	DIW & MW LAYOUT PLANS
C-5	3RD PARTY RECEIVING FACILITY LAYOUT PLAN

PIPING / PROCESS DRAWINGS	
P-1	DIW PROCESS FLOW DIAGRAM (PFD)
P-2	YARD PIPING PLAN
P-3	YARD PIPING - ENLARGED PLAN
P-4	DIW PIPING PLAN
P-5	DIW PIPING SECTIONS & DETAILS
P-6	MONITOR WELLHEAD DETAILS
P-8	ANNULUS TANK DETAILS
P-9	3RD PARTY RECEIVING FACILITY PIPING PLAN
P-10	3RD PARTY RECEIVING FACILITY PIPING DETAILS
P-11	LEACHATE PLANT PUMP STATION PIPING PLAN & DETAILS
P-12	EXISTING LTP PIPING PLAN
P-13	MECHANICAL DETAILS
P-14	PIPING & VALVE SPECIFICATIONS

INSTRUMENTATION DRAWINGS	
I-1	DIW P&ID - SHT 1
I-2	DIW P&ID - SHT 2

ROGER E. MAYFIELD, P.E. FL #46092
L.S. SIMS ASSOCIATES
CERTIFICATE OF AUTHORIZATION # 28089
1530 U.S.HIGHWAY 1
ROCKLEDGE, FLORIDA 32955

L.S.SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

Signature
Date

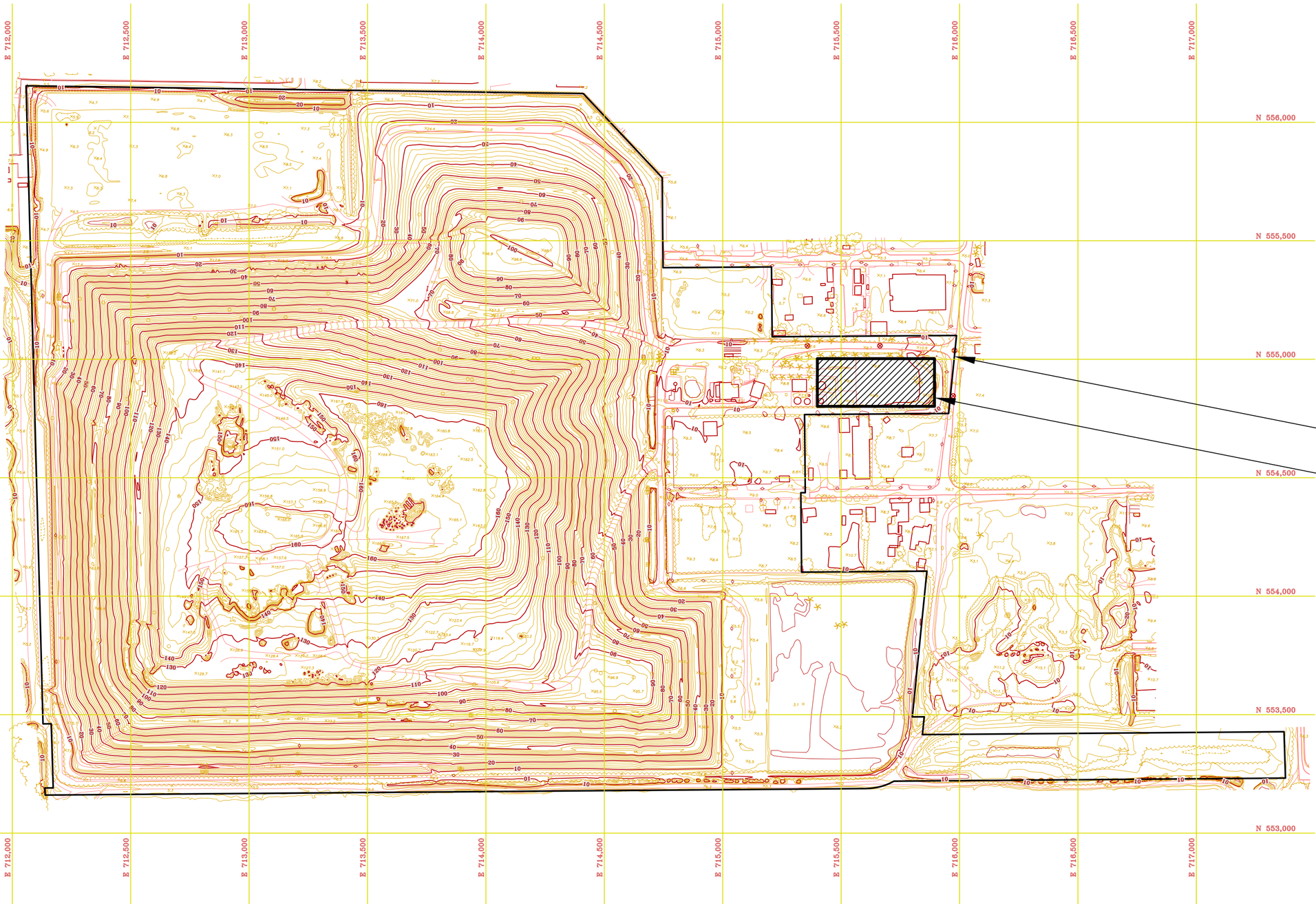
REV NO | DATE | DRWN BY | CHKD BY | DESCRIPTION

DESIGN | DRWN | CHKD | JOB NUMBER | ISSUE DATE | ISSUE

COVER SHEET

WMI MEDLEY DISPOSAL INJECTION WELL

DRAWING NUMBER
COVER SHT
SHEET OF



NORTH

RECORD DRAWING
12/28/2014

NOTE: BASE MAP BASED ON SITE SURVEY
BY PICKETT & ASSOCIATES, INC. DECEMBER 28, 2011

NOTE: ELEVATIONS ON ALL SHEETS, UNLESS OTHERWISE NOTED,
ARE NGVD29. OPERATIONAL DATA FOR REGULATORY REPORTING WILL BE NAVD88.

ROGER E. MAYFIELD, P.E. FL #46092
L.S. SIMS ASSOCIATES
CERTIFICATE OF AUTHORIZATION # 28089
1530 U.S.HIGHWAY 1
ROCKLEDGE, FLORIDA 32955

L.S. SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

Signature
Date

REV NO	DATE	DRWN BY	CHKD BY	DESCRIPTION

DESIGN
DRWN
CHKD
JOB NUMBER
ISSUE DATE
ISSUE

SITE PLAN

WMI MEDLEY
DISPOSAL
INJECTION WELL

WASTE MANAGEMENT

DRAWING NUMBER
C-1
SHEET OF

FACILITY	NORTHING	EASTING
DISPOSAL INJECTION WELL (DIW)	554868.644	715808.047
MONITORING WELL (MW)	554973.761	715812.018

MW

DIW

PROPERTY LINE

WELL LOCATION SURVEY
PROVIDED BY
CRAVEN THOMPSON & ASSOCIATES, INC.
FT LAUDERDALE, FLORIDA

0 FT 20 FT 40 FT 60 FT 80 FT

SCALE

NORTH

RECORD DRAWING
12/28/2014

ROGER E. MAYFIELD, P.E. FL #46092
L.S. SIMS ASSOCIATES
CERTIFICATE OF AUTHORIZATION # 28089
1530 U.S.HIGHWAY 1
ROCKLEDGE, FLORIDA 32955

L.S.SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

Signature Date

REV NO	DATE	DRWN BY	CHKD BY	DESCRIPTION

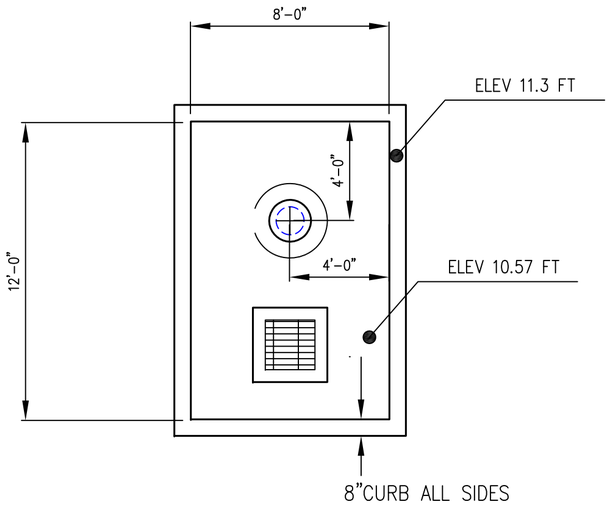
DESIGN DRWN CHKD

JOB NUMBER
ISSUE DATE
ISSUE

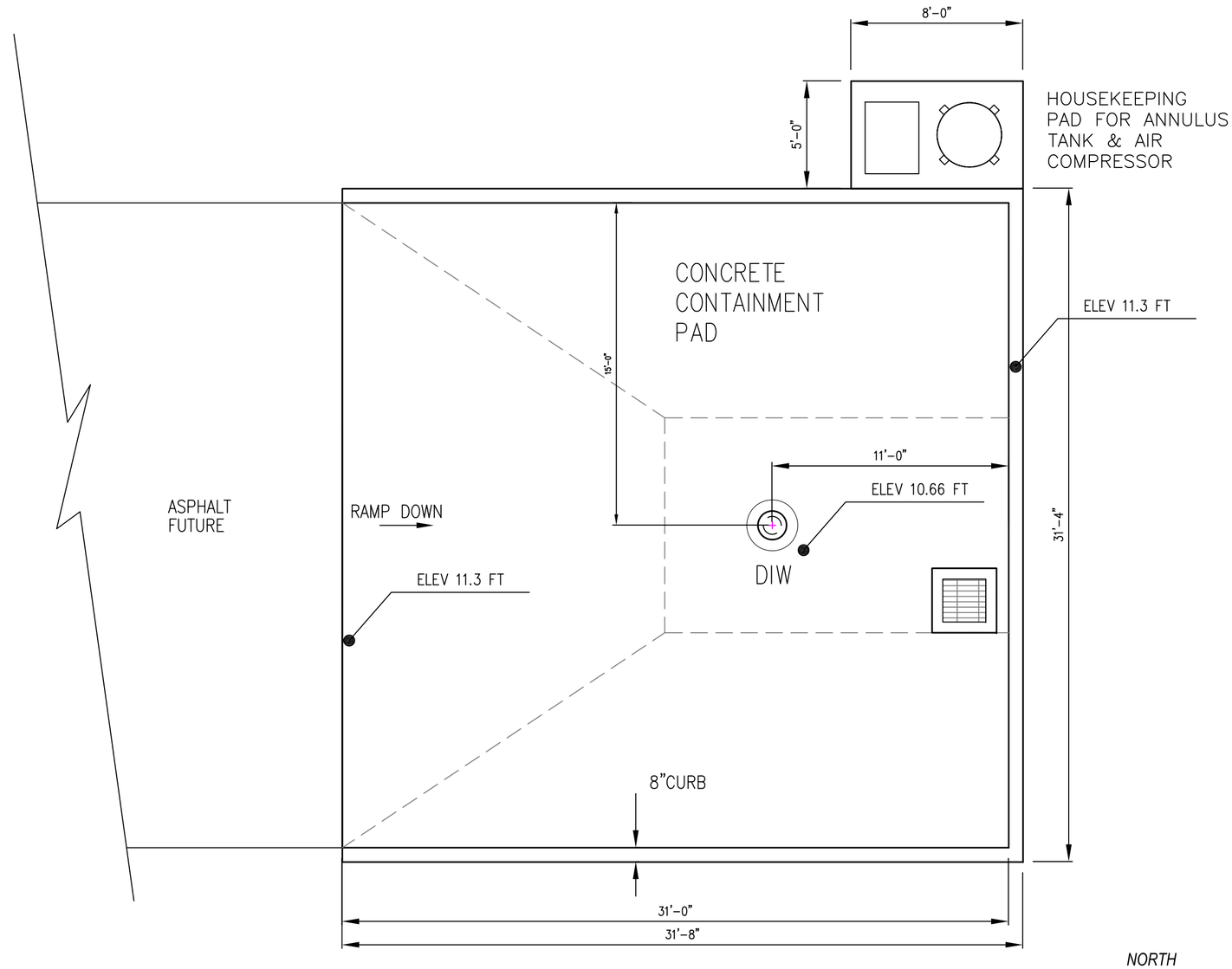
WELL LOCATION SITE PLAN

WMI MEDLEY DISPOSAL INJECTION WELL

DRAWING NUMBER
C-2
SHEET OF



MONITORING WELL PLAN
SCALE AS SHOWN



INJECTION WELL
SLAB PLAN
SCALE AS SHOWN

NORTH

RECORD DRAWING
12/28/2014

ROGER E. MAYFIELD, P.E. FL #46092
L.S. SIMS ASSOCIATES
CERTIFICATE OF AUTHORIZATION # 28089
1530 U.S.HIGHWAY 1
ROCKLEDGE, FLORIDA 32955

L.S.SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

Signature
Date

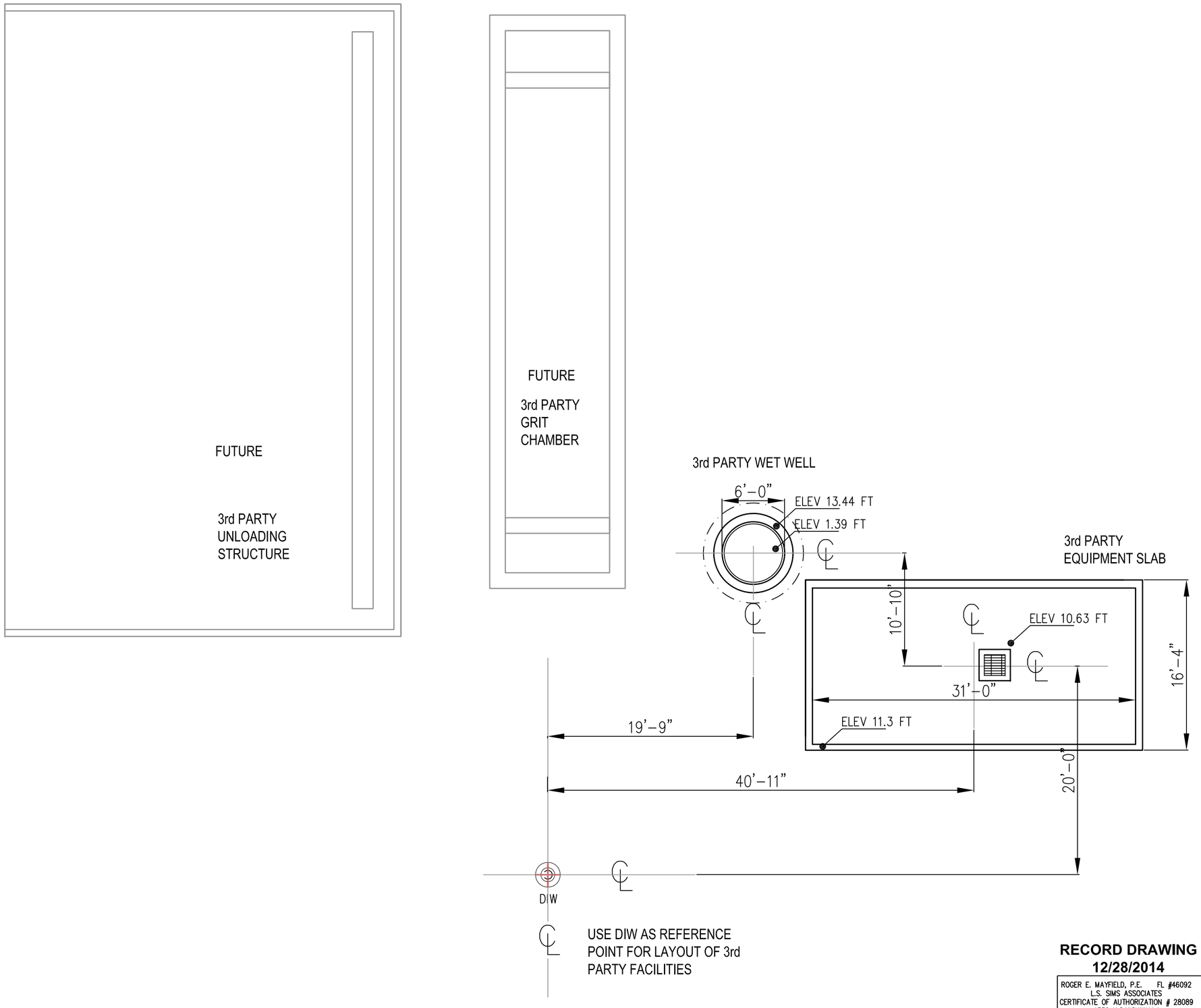
REV NO	DATE	DRWN BY	CHKD BY	DESCRIPTION

DESIGN | DRWN | CHKD | JOB NUMBER | ISSUE DATE | ISSUE

DIW & MW LAYOUT PLANS

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
C-4
SHEET OF



RECORD DRAWING
12/28/2014

ROGER E. MAYFIELD, P.E. FL #46092
L.S. SIMS ASSOCIATES
CERTIFICATE OF AUTHORIZATION # 28089
1530 U.S.HIGHWAY 1
ROCKLEDGE, FLORIDA 32955

L.S.SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

Signature
Date

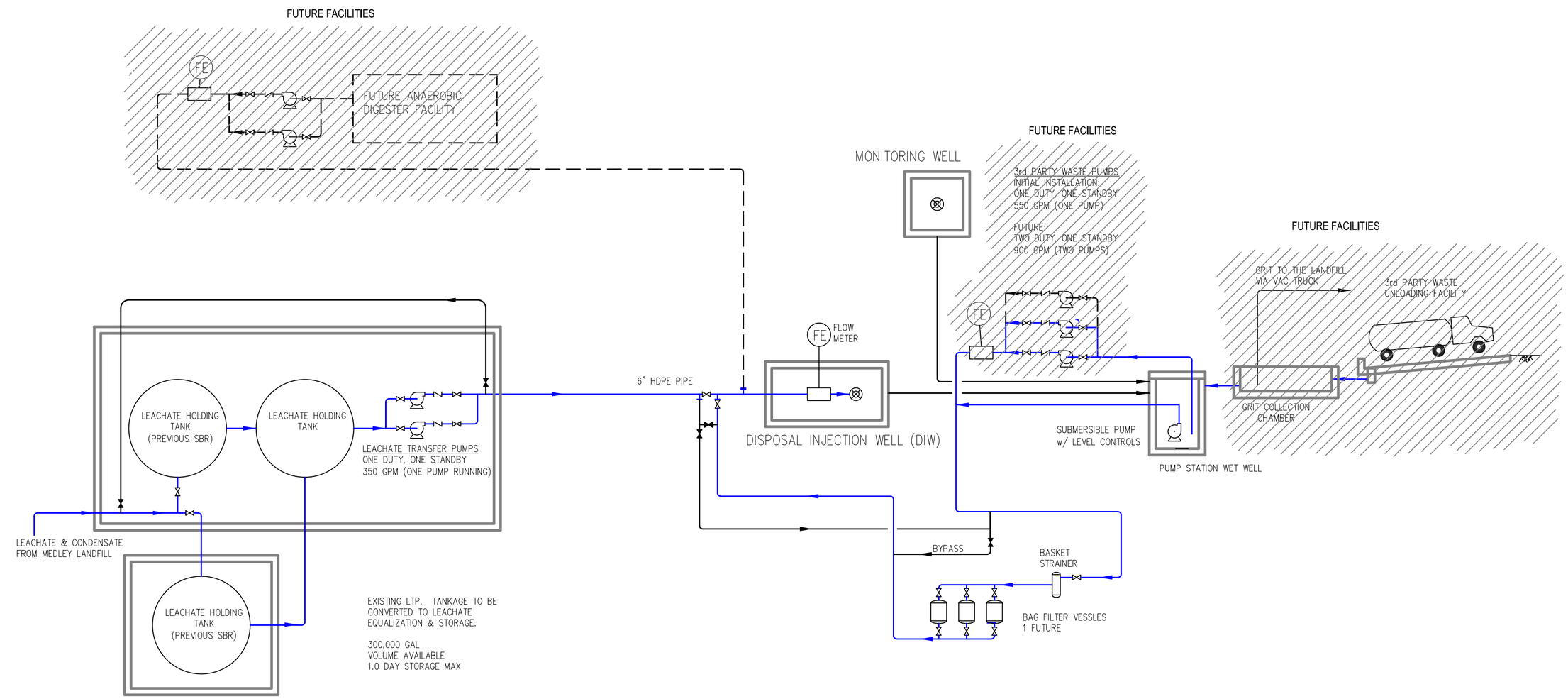
REV NO	DATE	DRWN BY	CHKD BY	DESCRIPTION

DESIGN | DRWN | CHKD
JOB NUMBER
ISSUE DATE
ISSUE

3RD PARTY RECEIVING FACILITY LAYOUT PLAN

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
C-5
SHEET OF



LEGEND

- VALVE NORMALLY OPEN
- VALVE NORMALLY CLOSED
- PRIMARY PROCESS FLOW
- SECONDARY PROCESS FLOW – BYPASS
- FUTURE

DESIGN FLOW CRITERIA

	DAILY GALLONS PER DAY
LEACHATE FROM LANDFILL	300,000 - 400,000
FUTURE ANAEROBIC DIGESTER	200,000 - 300,000
3rd PARTY WASTE	288,000 - 388,000
GROWTH ALLOWANCE (20%)	158,000
TOTAL	946,000

PUMP CRITERIA

LEACHATE PLANT PUMP STATION	
1 DUTY, 1 STANDBY	350 GPM
THIRD PARTY WASTE PUMP STATION	
1 DUTY, 1 STANDBY	550 GPM
2 DUTY, 1 STANDBY	900 GPM

RECORD DRAWING
12/28/2014

ROGER E. MAYFIELD, P.E. FL #46092
L.S. SIMS ASSOCIATES
CERTIFICATE OF AUTHORIZATION # 28089
1530 U.S.HIGHWAY 1
ROCKLEDGE, FLORIDA 32955

L.S.SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

Signature
Date

REV NO	DATE	DRWN BY	CHKD BY	DESCRIPTION

DESIGN | DRWN | CHKD
JOB NUMBER
ISSUE DATE
ISSUE

PROCESS FLOW DIAGRAM

WMI MEDLEY DISPOSAL INJECTION WELL

WASTE MANAGEMENT

P-1
SHEET

LEACHATE FORCE MAIN CONTRACT NOTES

1. The Leachate Force Main shall be 8" diameter (ID) HDPE, DRISCOPLEX 4000 by Performance Pipe, DR-11, or approved equal.
2. The City Water Pipeline shall be 2" diameter (ID) HDPE, DRISCOPLEX 4100 by Performance Pipe, DR-11, or approved equal.
3. Piping segments shall be joined together using Butt-Fusion technique, per the piping supplier's recommended procedure.
4. The HDPE Leachate Force Main shall terminate at each end in a 8" HDPE (ANSI Standard) flange which will be installed by the Force Main Contractor. Seal pipe with a blind flange at both ends.
5. A tracing wire shall be installed with the Leachate Force Main. The wire shall be 12 ga copper single -strand wire with green insulation. Strap to pipe every 20'. Provide 20' coil of wire at each end of the pipeline.
6. Owner's Surveyor shall stake pipeline termination points, and 100' stationing for FM Contractor's use when installing the pipelines.
7. The FM Contractor shall pressure test all HDPE pipelines after installation. Pressure test shall be 60 minutes at 1.5x maximum working pressure. Notify Owner's engineer 48 hrs in advance to witness pressure test.

Process Piping this Area:
P-4, P-5, P-7, P-8,P-9, P-10

Gravity Piping this Area: P-3

MW

3rd Party WASTE RECEIVING Future

Grit Chamber Future

Wet Well

Filters

DIW

Exist LTP

Exist LTP

New Leachate Pump Station (see Sht P-11)

8" HDPE Leachate Force Main
2" HDPE Water

STA 0+00

STA 1+00

STA 2+00

STA 3+00

STA 4+00

6" PVC bypass to LTP
(see Shts P-11 & P-12)

NORTH

0 FT 20 FT 40 FT 60 FT 80 FT

SCALE

RECORD DRAWING
12/28/2014

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ISSUE DATE

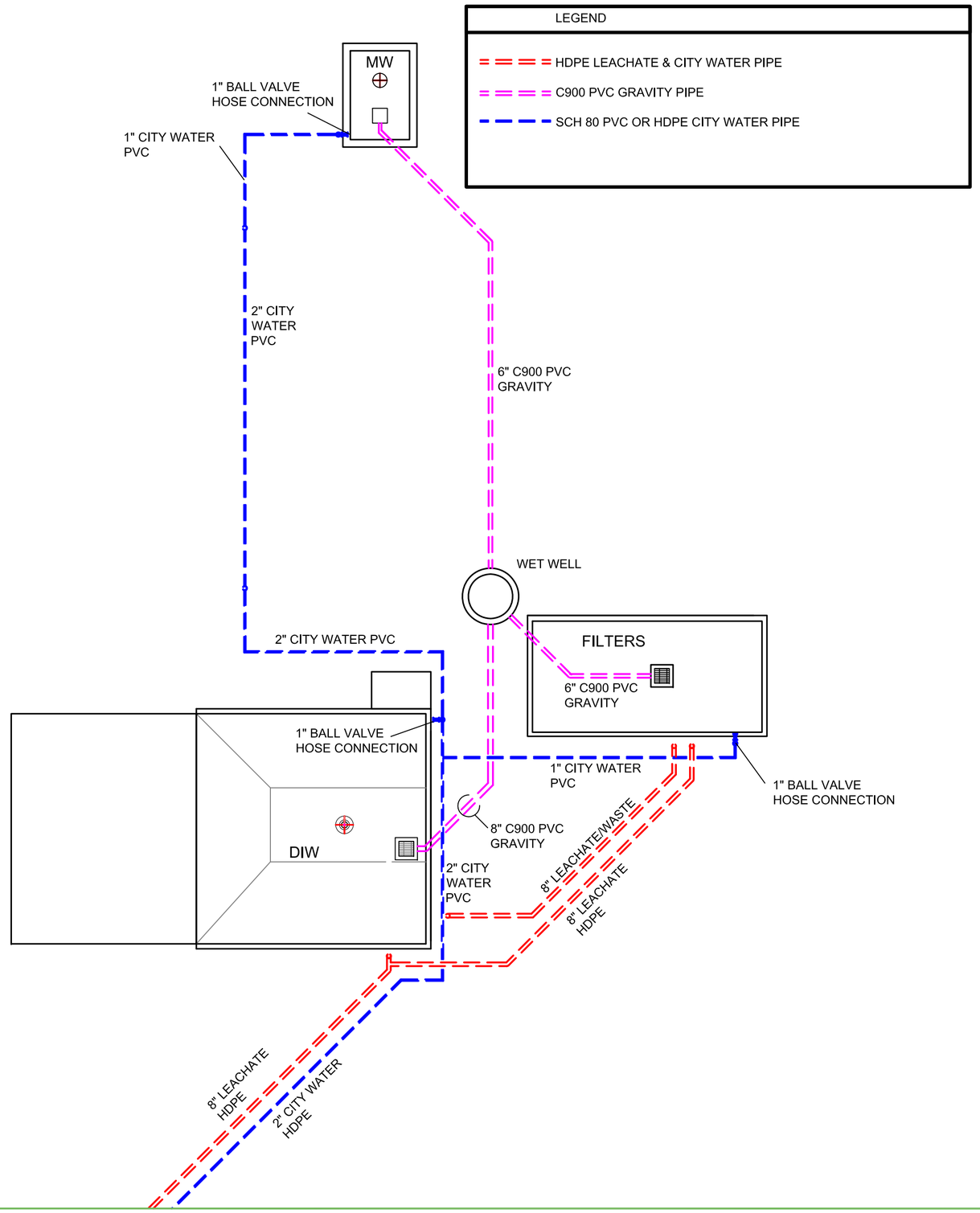
ISSUE

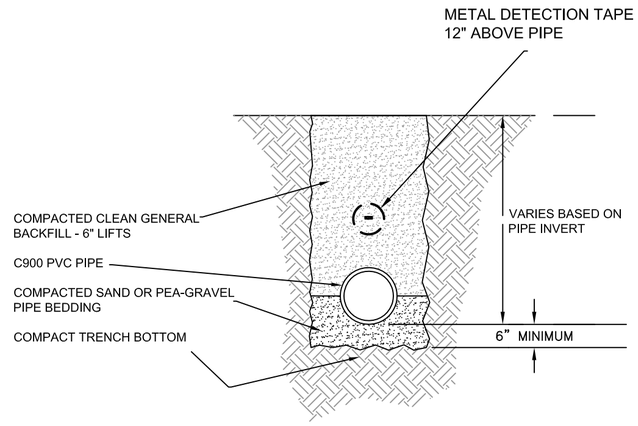
YARD PIPING PLAN

WMI MEDLEY DISPOSAL INJECTION WELL

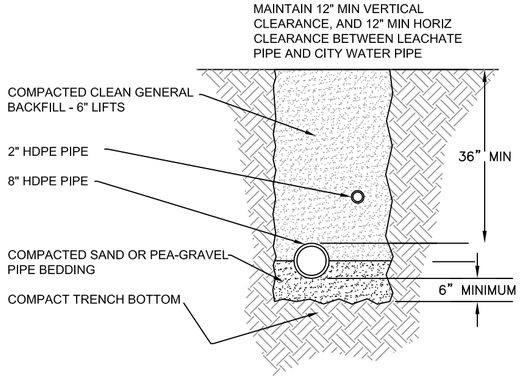
DRAWING NUMBER
P-2

SHEET OF





GRAVITY PIPE INSTALLATION DETAIL



LEACHATE FORCE MAIN & CITY WATER PIPE INSTALLATION DETAIL

NORTH

RECORD DRAWING
12/28/2014

ROGER E. MAYFIELD, P.E. FL #46092
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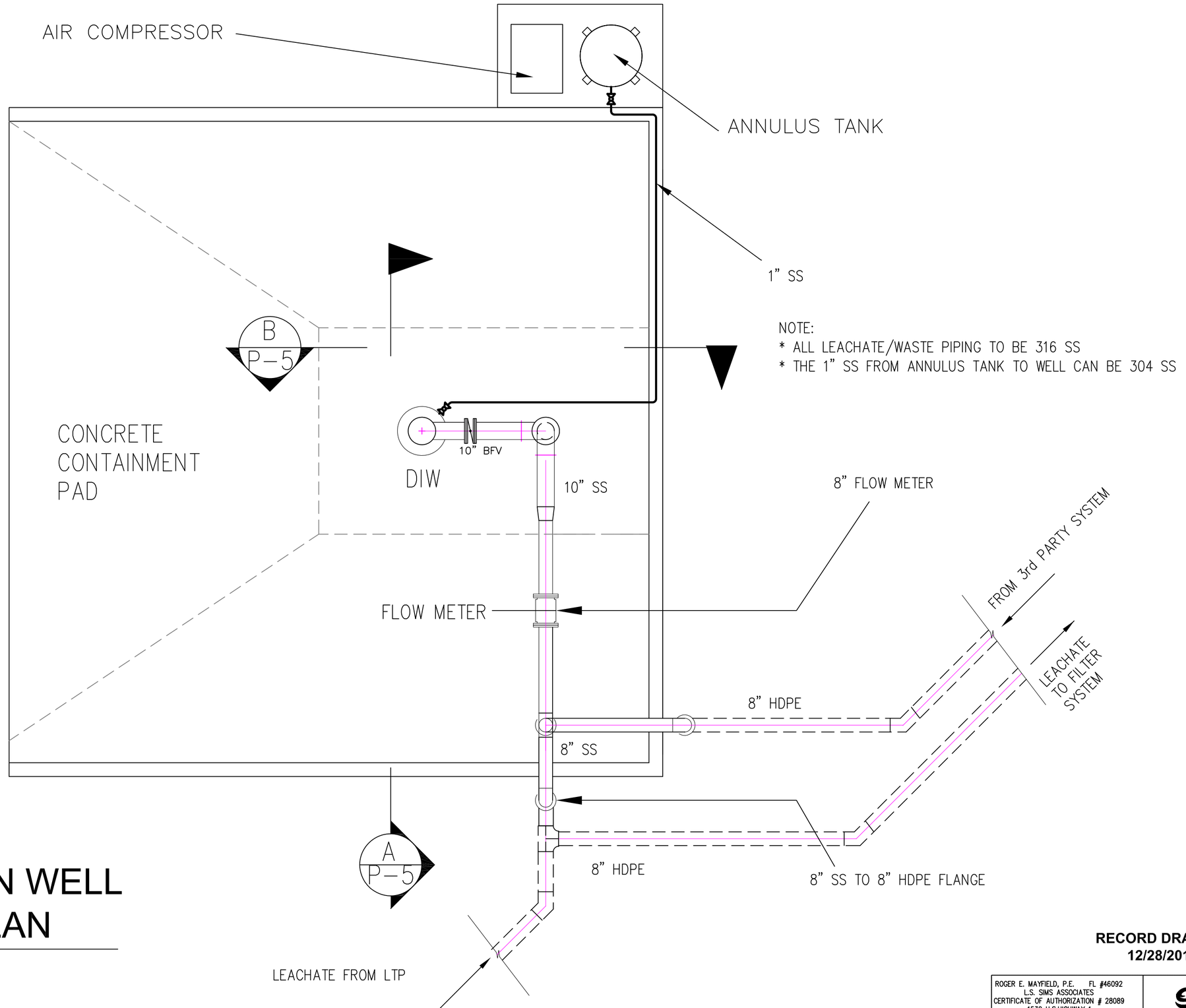
DESIGN | DRWN | CHK'D

JOB NUMBER | ISSUE DATE | ISSUE

YARD PIPING - ENLARGED PLAN

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
P-3
SHEET OF



INJECTION WELL PIPING PLAN

RECORD DRAWING
12/28/2014

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L.S. SIMS ASSOCIATES
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Date

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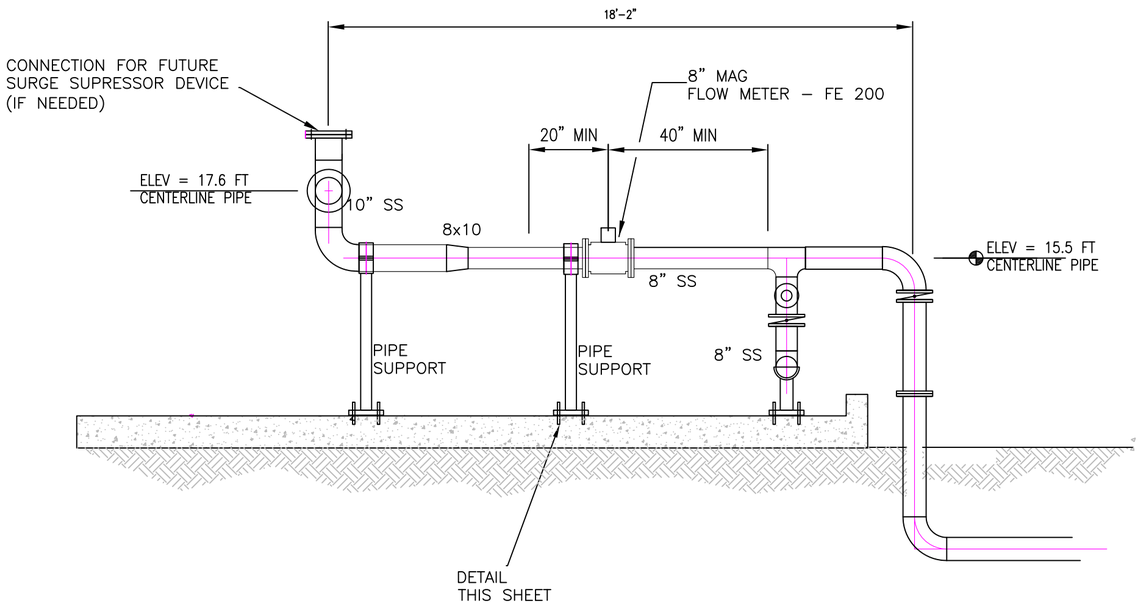
DRWN
CHKD
JOB NUMBER
ISSUE DATE
ISSUE

DIW PIPING PLAN

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
P-4
SHEET OF

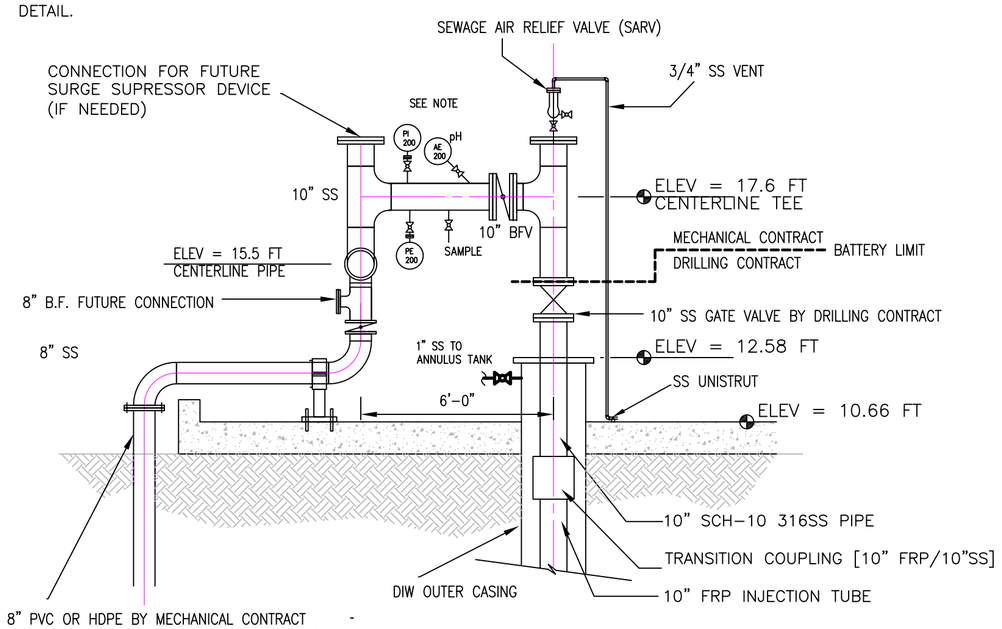


SECTION A / P-4

NOTE:
PI, PE & SAMPLE ALL 1/2" 316 SS BALL VALVES

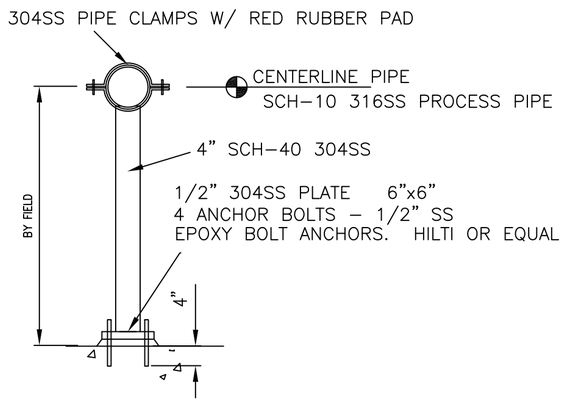
AE – 1–1/4" SS BALL VALVE @ 45 DEG ANGLE – SEE MFG. MOUNTING DETAIL.

INJECTION WELLHEAD



SECTION B / P-4

DETAIL 2 / PIPE SUPPORT -



RECORD DRAWING
12/28/2014

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L.S. SIMS ASSOCIATES
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1530 U.S.HIGHWAY 1
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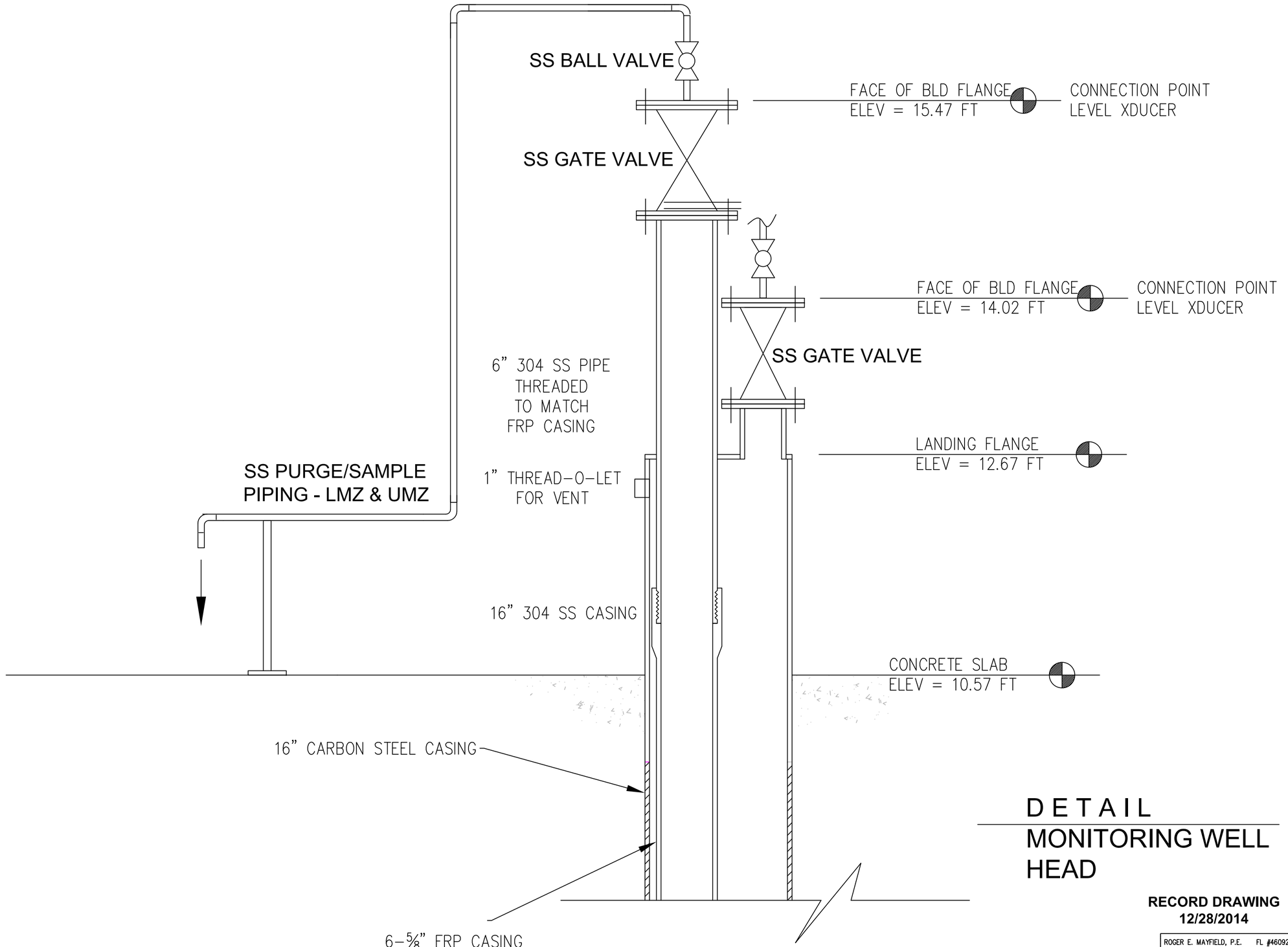
DIW PIPING SECTIONS & DETAILS

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
P-5
SHEET OF



DETAIL
MONITORING WELL HEAD

RECORD DRAWING
12/28/2014

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ENVIRONMENTAL CONSULTING

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Date

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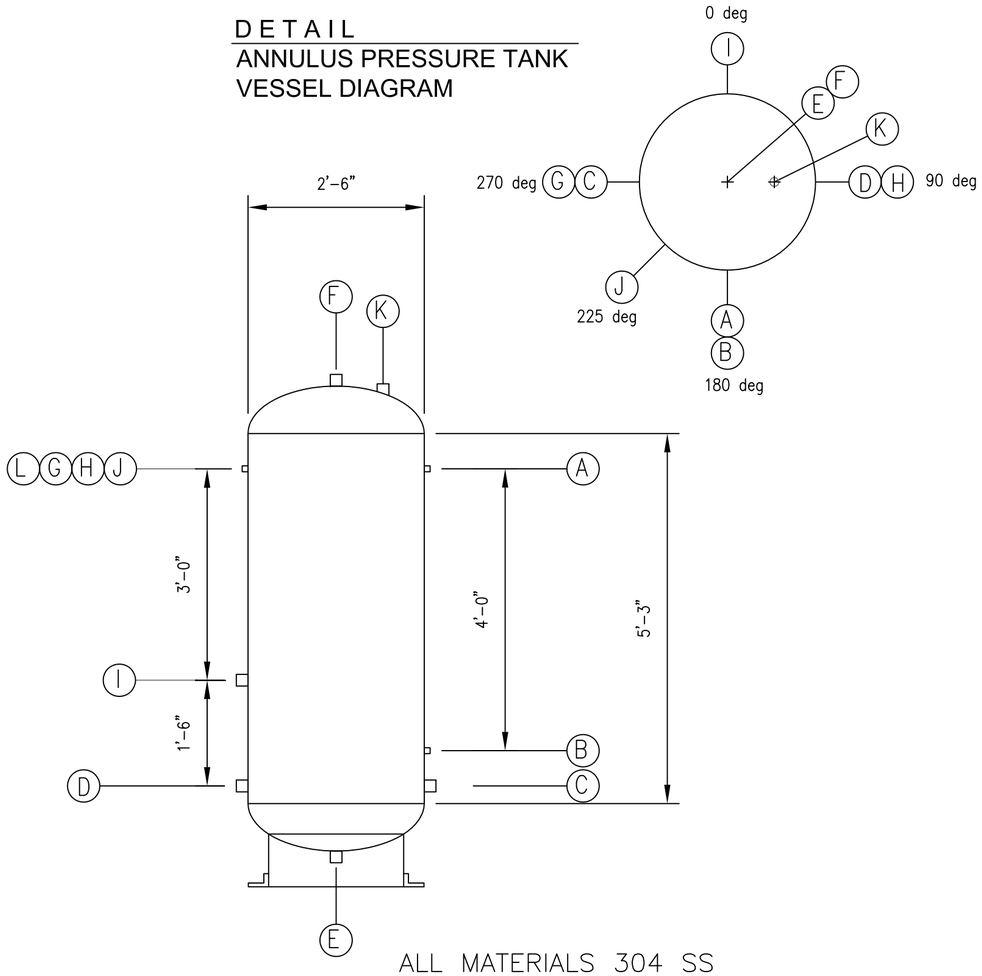
CHKD
JOB NUMBER
ISSUE DATE
ISSUE

MONITOR WELLHEAD DETAILS

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
P-6
SHEET OF

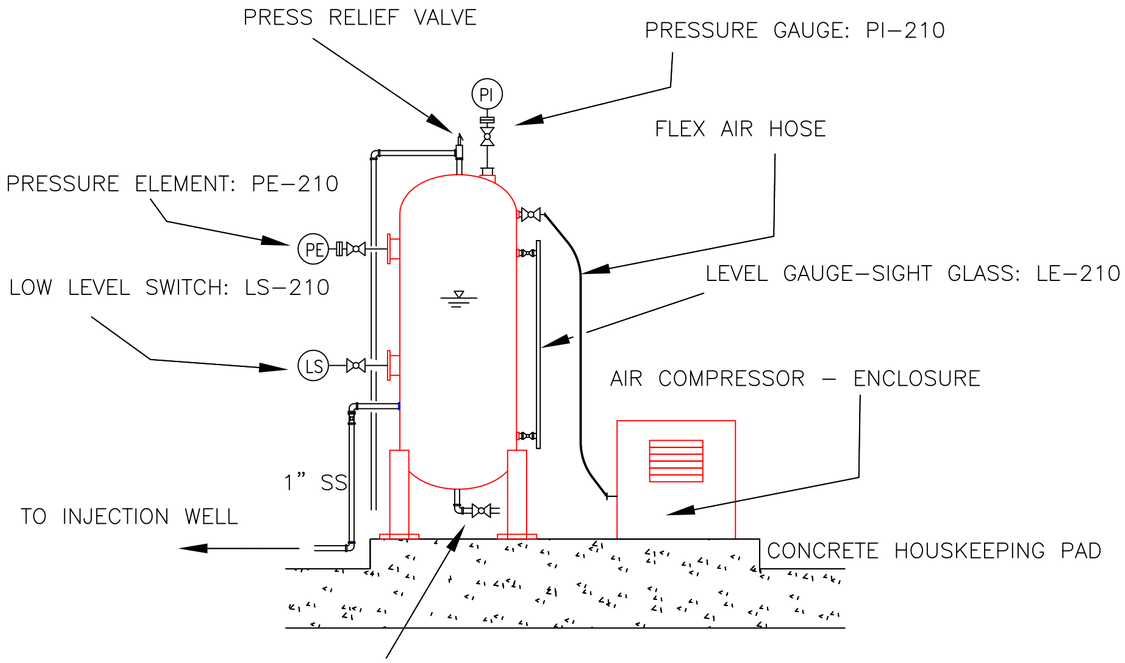
DETAIL
ANNULUS PRESSURE TANK
VESSEL DIAGRAM



ALL MATERIALS 304 SS

A	1/2"	NPT	LE 110
B	1/2"	NPT	LE 110
C	1"	NPT	LINE TO ANNULUS
D	1" w/ PLUG	NPT	EXTRA
E	1" w/ PLUG	NPT	DRAIN
F	1-1/2" w/ PLUG	NPT	FILL
G	1/2"	NPT	PE 110
H	1/2"	NPT	PRESSURE AIR
I	2"	NPT	LS 110
J	1/2"	NPT	PI 110
K	2"	NPT	PRV
L	1/2" w/ PLUG	NPT	EXTRA

A.S.M.E. SECTION VIII
MAWP 150 PSIG @ 200 DEG F
M.D.M.T. -20 DEG F @ 150 PSIG
235 GALLONS
HYDRO @ 199 PSIG MIN.



ALL PIPING & FITTINGS THIS DETAIL:
SCH-40 304 SS, N.P.T.
304 SS BALL VALVES

DETAIL
ANNULUS PRESSURE TANK
& AIR COMPRESSOR

RECORD DRAWING
12/28/2014

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ISSUE

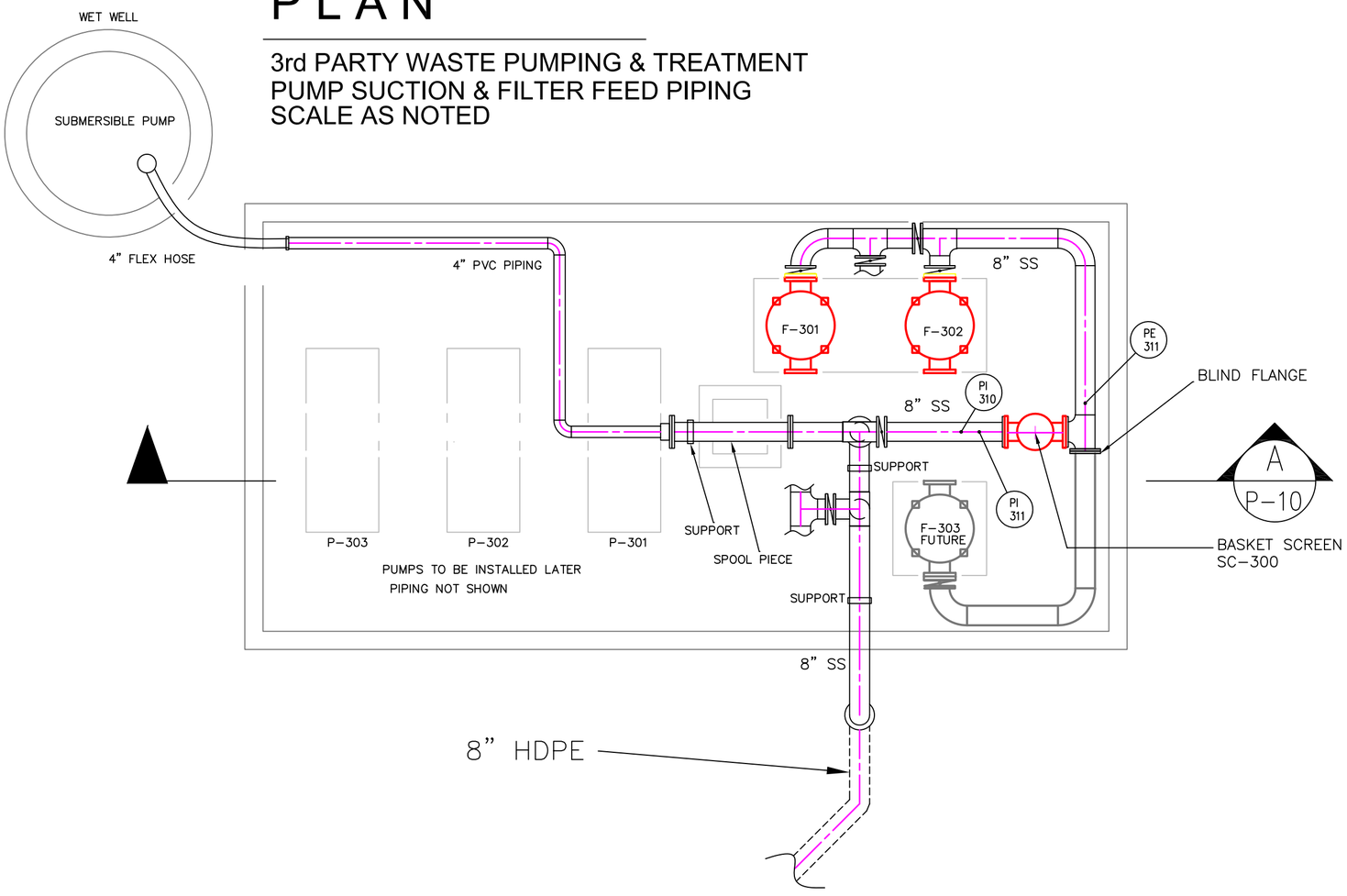
INJECTION WELL PIPING PLAN & DETAILS

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
P-8
SHEET OF

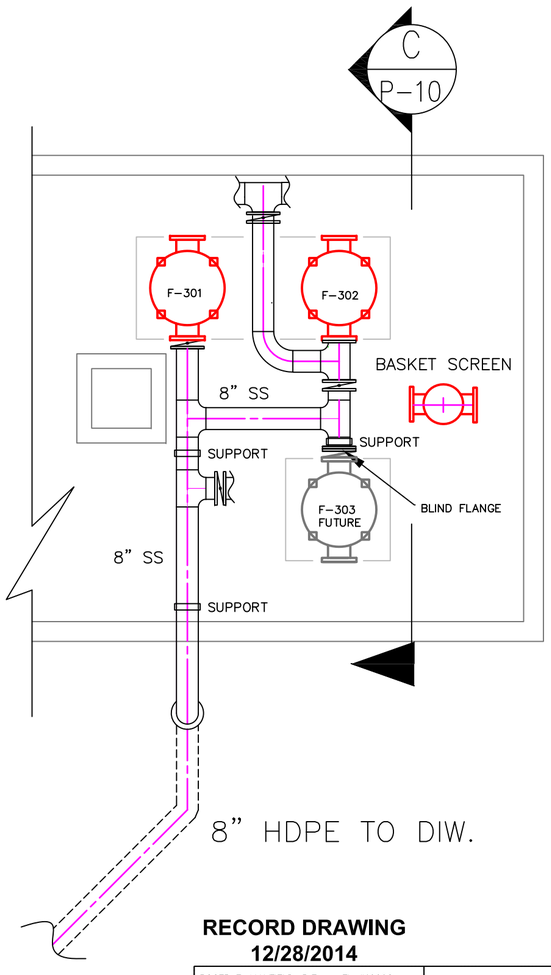
P L A N

3rd PARTY WASTE PUMPING & TREATMENT
PUMP SUCTION & FILTER FEED PIPING
SCALE AS NOTED



P L A N

3rd PARTY WASTE PUMPING & TREATMENT
FILTER DISCHARGE PIPING
SCALE AS NOTED



RECORD DRAWING
12/28/2014

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ENVIRONMENTAL CONSULTING

Signature / Date

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A	10/21/2014	REM		PALL FILTERS

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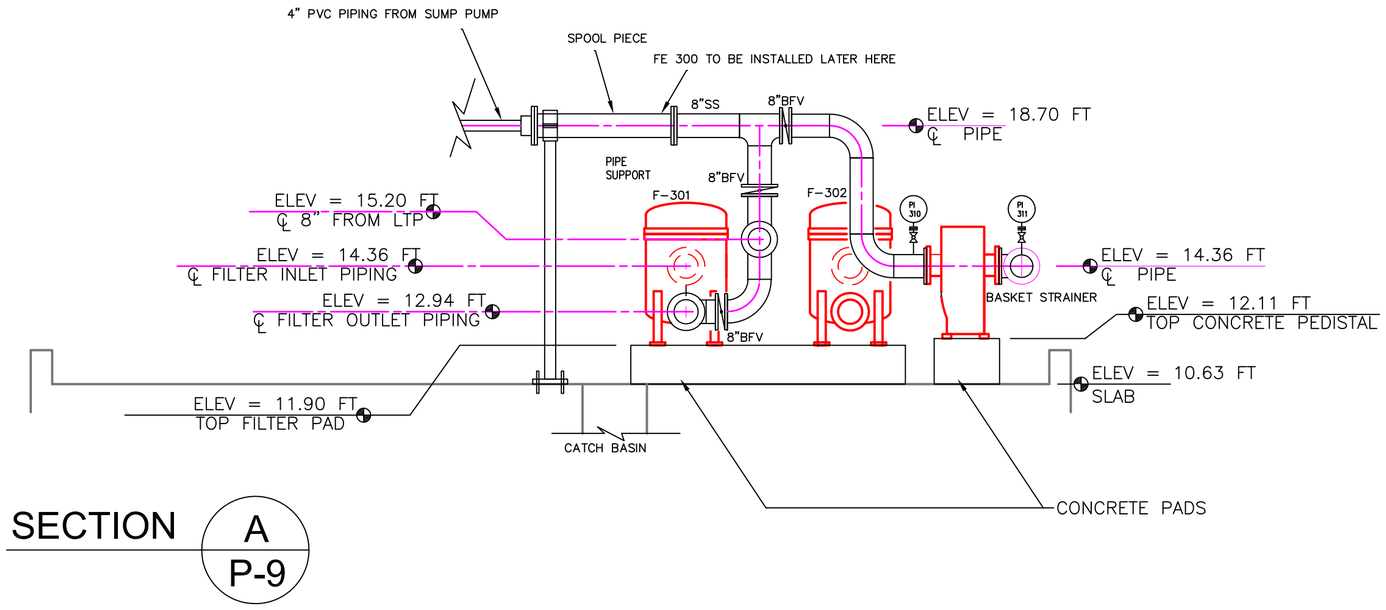
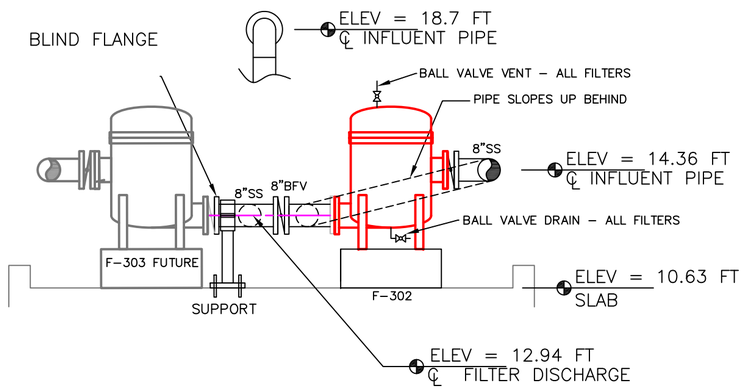
3RD PARTY RECEIVING FACILITY PIPING PLAN -

WMI MEDLEY
DISPOSAL
INJECTION WELL

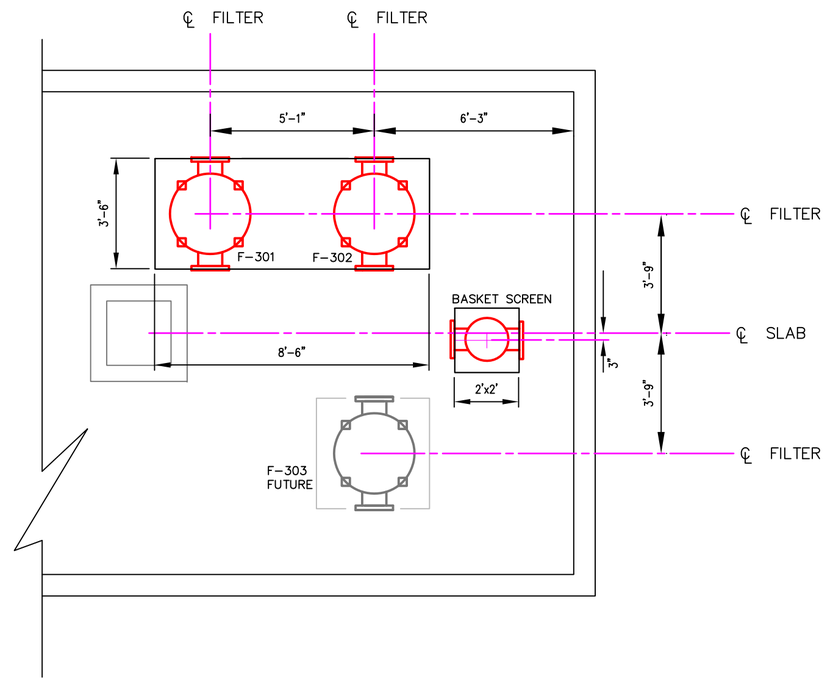
DRAWING NUMBER
P-9
SHEET OF



SECTION A / P-9



SECTION C / P-9



P L A N

3rd PARTY WASTE PUMPING & TREATMENT
FILTER LAYOUT SKETCH
SCALE AS NOTED

RECORD DRAWING
12/28/2014

ROGER E. MAYFIELD, P.E. FL #46092
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ENVIRONMENTAL CONSULTING

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A	10/21/2014	REM		PALL FILTERS

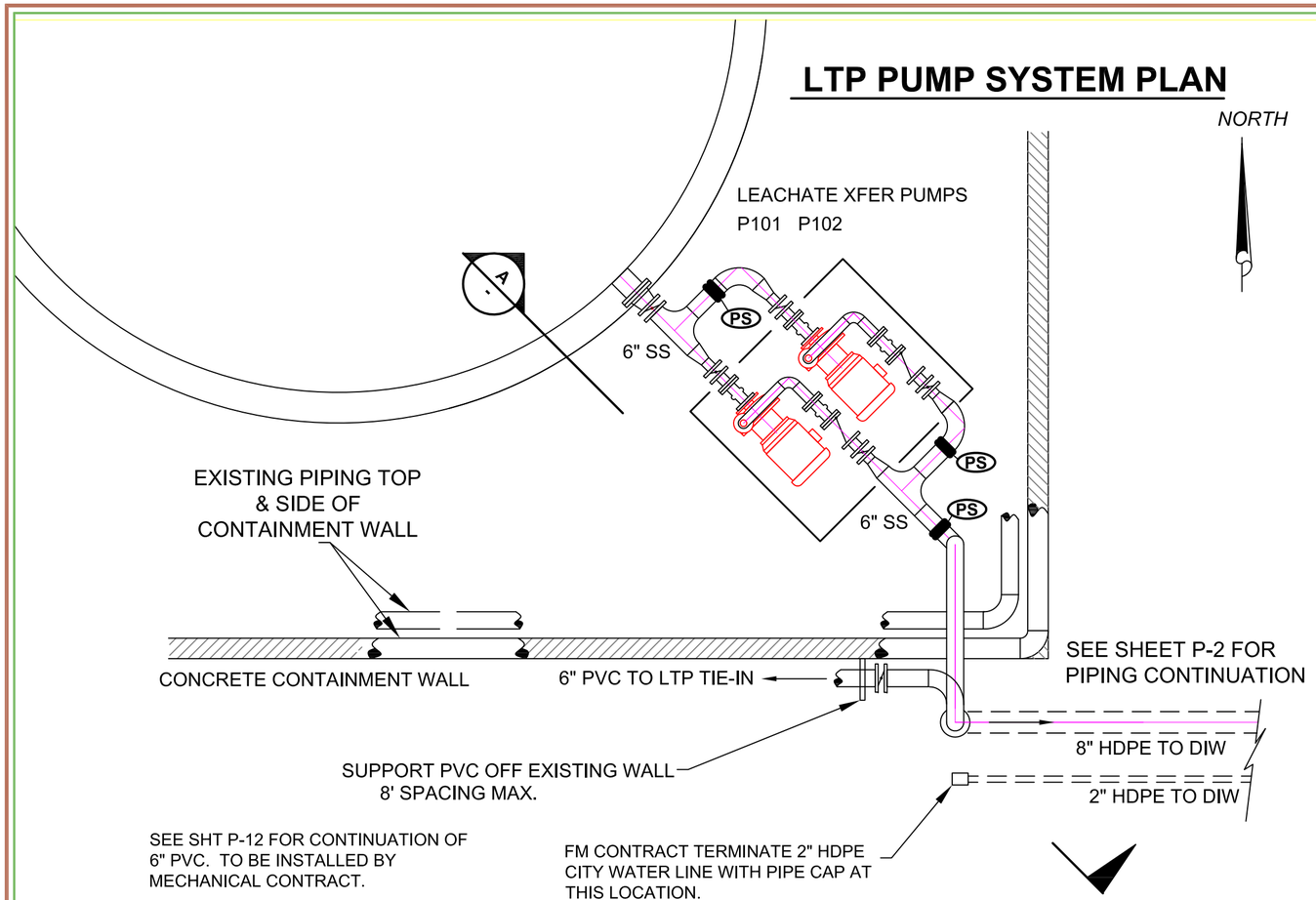
DESIGN / DRWN / CHK'D
JOB NUMBER / ISSUE DATE / ISSUE

3RD PARTY RECEIVING FACILITY PIPING DETAILS

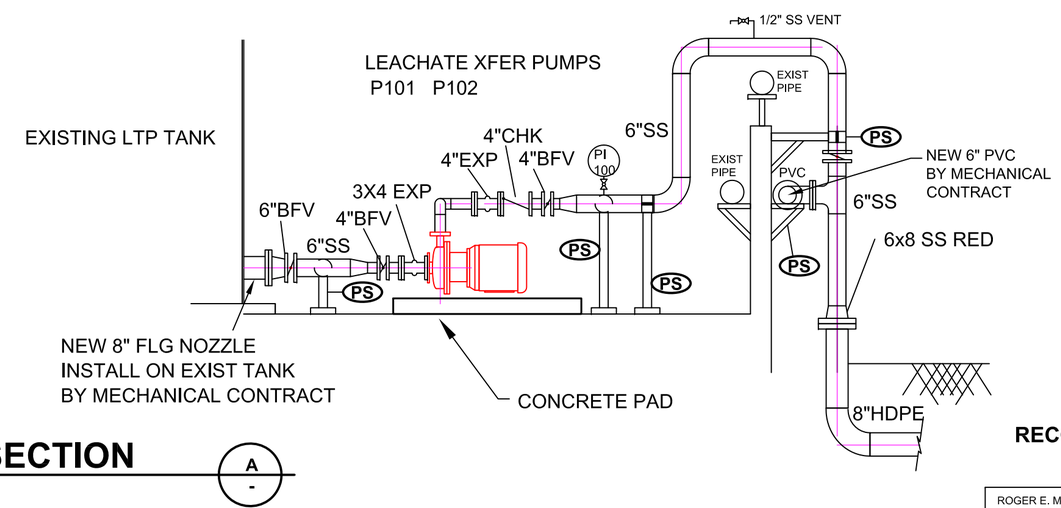
WMI MEDLEY DISPOSAL INJECTION WELL

DRAWING NUMBER **P-10**
SHEET OF

LTP PUMP SYSTEM PLAN



PS PIPE SUPPORT 304SS
DETAIL 2 SHEET P-5



SECTION A -

RECORD DRAWING
12/28/2014

ROGER E. MAYFIELD, P.E. FL #46092
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ENVIRONMENTAL CONSULTING

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Date

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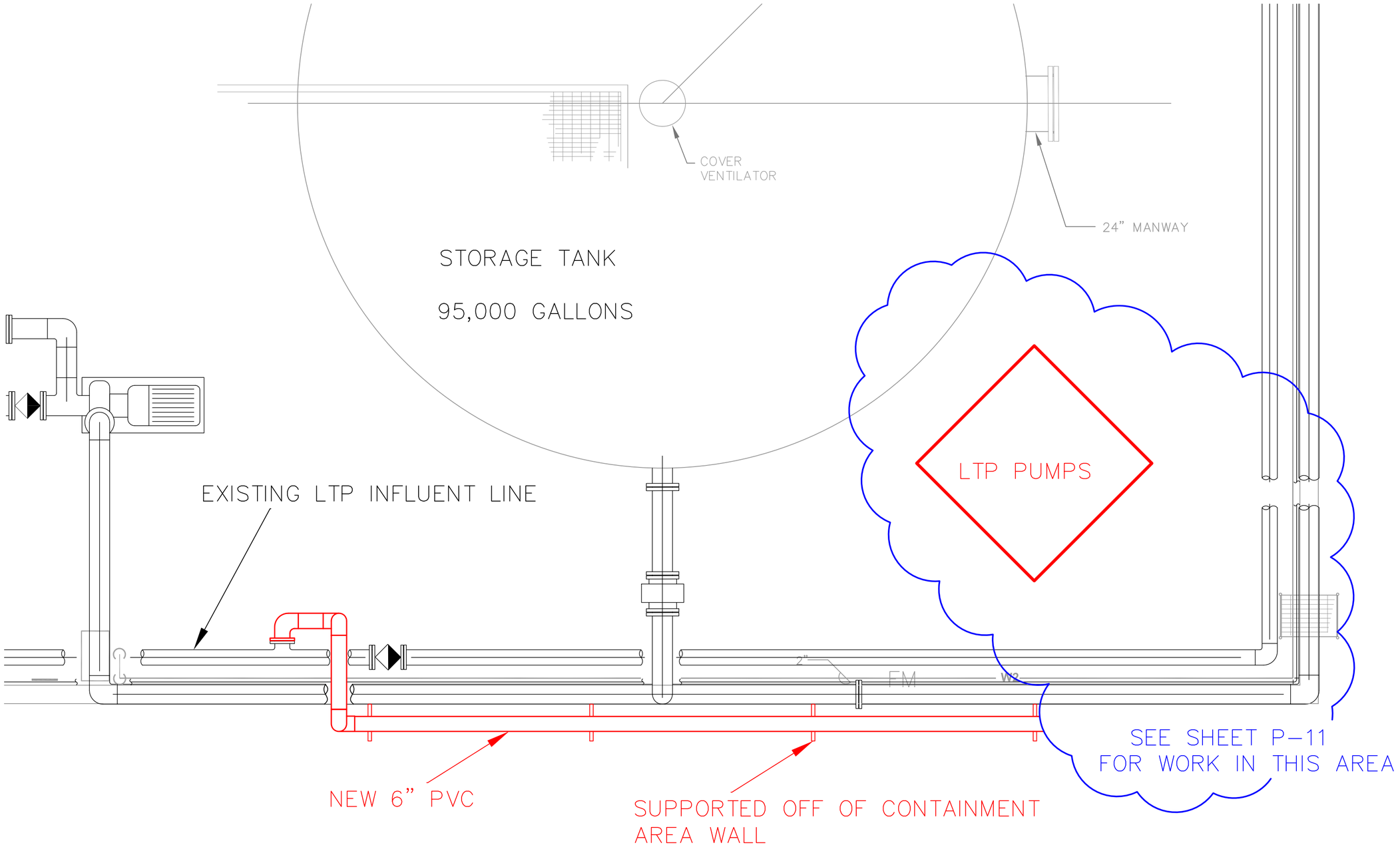
DRWN
CHK'D
JOB NUMBER
ISSUE DATE
ISSUE

LEACHATE PLANT PUMP STATION
PIPING PLAN & DETAILS

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
P-11
SHEET OF



WORK THIS SHEET FOR MECHANICAL CONTRACT: 6" PVC PIPE WITH SUPPORTS. CONNECT AS SHOWN TO EXISTING INFLUENT PIPE.

ALL OTHER ITEMS SHOWN THIS SHEET ARE EXISTING PLANT FACILITIES.

BACKGROUND FOR EXISTING FACILITIES TAKEN FROM SHEET M-5 SCS ENGINEERS, MARCH 2004.

RECORD DRAWING
1/16/2015

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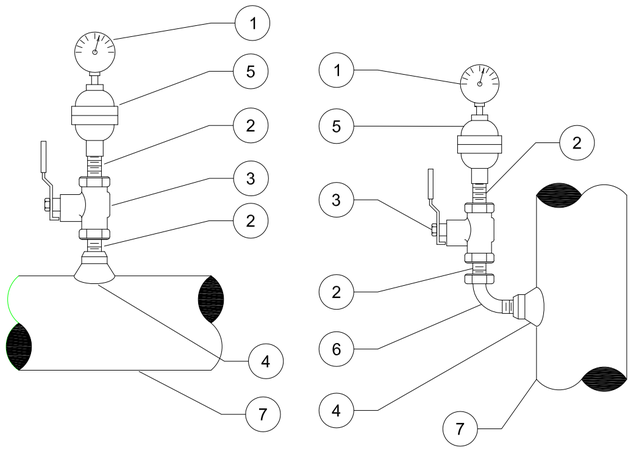
ISSUE

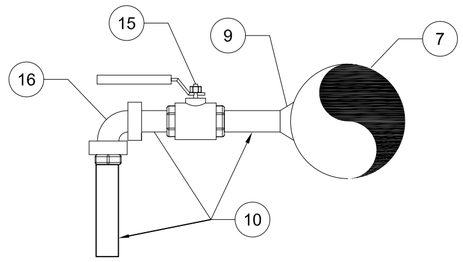
EXISTING LTP PIPING PLAN

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
P-12
SHEET OF



TYPICAL DETAIL
PRESSURE GAUGE (PI)



TYPICAL DETAIL
SAMPLE TAP

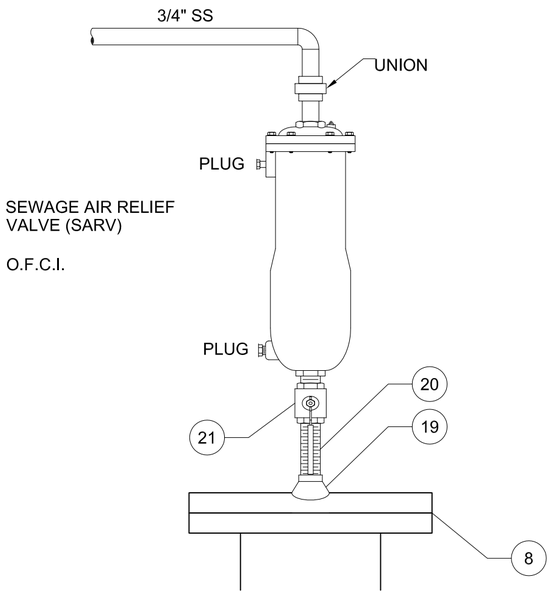
KEYNOTES:

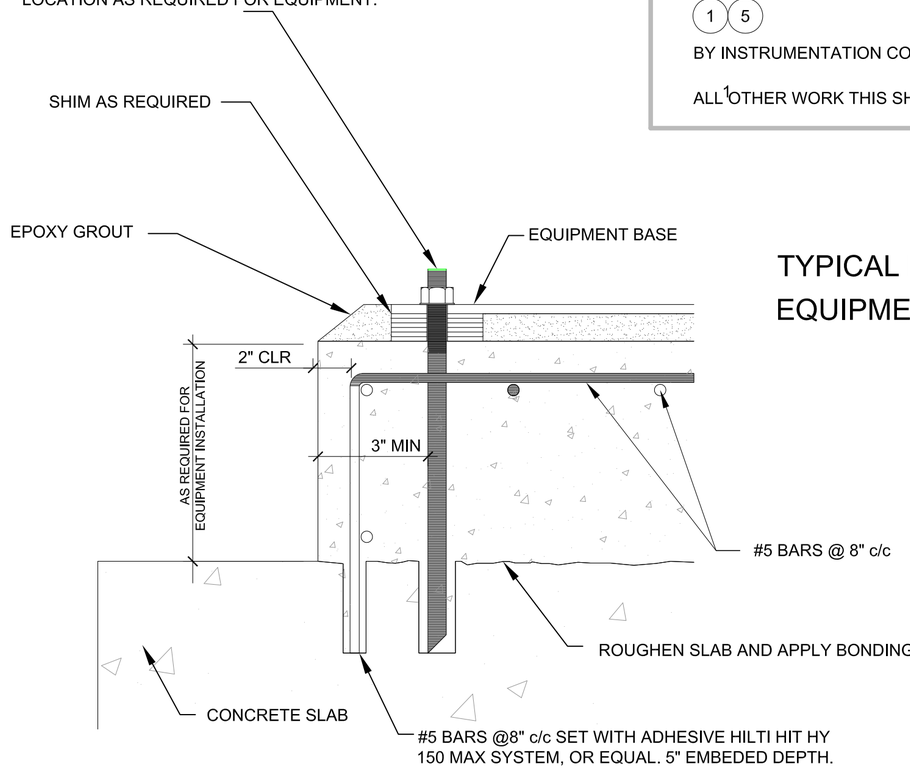
1. PRESSURE GAUGE
2. THREADED NIPPLE SIZE AS REQUIRED
3. ½" Ø BALL VALVE
4. ½" Ø FNPT THREAD-O-LET
5. GAUGE ISOLATOR ON WASTE WATER & SNUBBER ON AIR LINES.
6. ½" Ø 90° ELBOW
7. PROCESS PIPE, ORIENTATION VRIES
8. SS BLIND FLANGE ON DIW
9. ¾" Ø FNPT THREAD-O-LET
10. ¾" THREADED NIPPLES AND FITTINGS TO SUIT
15. ¾" Ø BALL VALVE
16. ¾" Ø 90° ELBOW
19. 2"Ø FNPT THREAD-O-LET
20. 2"Ø THREADED NIPPLE
21. 2" BALL VALVE 316SS

(1) (5) BY INSTRUMENTATION CONTRACTOR

ALL OTHER WORK THIS SHEET BY MECANICAL CONTRACT[1]

TYPICAL DETAIL
SEWAGE AIR RELEASE VALVE





TYPICAL DETAIL
EQUIPMENT HOUSEKEEPING PAD

RECORD DRAWING
12/28/2014

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L.S.SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

Signature
Date

DESCRIPTION
REV NO
DATE
DRWN BY
CHK'D BY

DESIGN
DRWN
CHK'D
JOB NUMBER
ISSUE DATE
ISSUE

MECHANICAL DETAILS

WMI MEDLEY
DISPOSAL
INJECTION WELL

DRAWING NUMBER
P-13
SHEET OF

GENERAL

1. DO WORK IN ACCORDANCE WITH ALL FEDERAL, STATE, TERRITORIAL, MUNICIPAL AND LOCAL CODES, LAWS, REGULATIONS, ORDINANCES, RULES AND REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
2. CONTRACTOR TO GIVE ALL NOTICES, OBTAIN ALL ADDITIONAL LICENSES AND PAY ALL ADDITIONAL FEES IN CONNECTION WITH PERFORMANCE OF THE WORK.
3. SUBMIT 3 SETS OF SHOP DRAWINGS FOR EACH PRODUCT INDICATING ALL APPROPRIATE INFORMATION SUCH AS MATERIALS OF CONSTRUCTION, DIMENSIONS, SERVICE RATINGS, INSTALLATION INSTRUCTIONS AND OTHER DESCRIPTIVE DATA.
4. REFERENCE STANDARDS: ANSI CODES FOR PRESSURE PIPING AND FITTINGS, ASTM STANDARDS, FACTORY INSURANCE ASSOCIATION, AWWA, AND ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES.
5. LAYOUT AND CONTROL: THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT. FIELD VERIFY THE SIZE AND LOCATION OF EXISTING STRUCTURES, EQUIPMENT, PIPING AND RELATED ACCESSORIES DEPICTED ON THE DRAWINGS. ALL ELEVATIONS ARE SHOWN IN FEET.
6. ENVIRONMENTAL PROTECTION/SAFETY: THROUGHOUT THE PROJECT, COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND MUNICIPAL REQUIREMENTS AND PRACTICES FOR ENVIRONMENTAL PROTECTION AND SAFETY. COMPLY WITH ALL SAFETY AND ENVIRONMENTAL REGULATIONS AND GUIDELINES IN FORCE AT OWNER'S PLANT. EACH SUBCONTRACTOR IS RESPONSIBLE FOR SUCH COMPLIANCE BY THEIR OWN PERSONNEL AND ANY RELATED SERVICES AND SUPPLIERS.
7. EXISTING UTILITIES AND UNDERGROUND SERVICES: THE CONTRACTOR IS TOTALLY RESPONSIBLE TO DETERMINE THE LOCATION OF EXISTING UTILITIES AND UNDERGROUND SERVICES PRIOR TO CONSTRUCTION AND TO ADEQUATELY PROTECT THEM THROUGHOUT THIS WORK. THE CONTRACTOR IS TO MAKE GOOD ANY DAMAGE CAUSED TO THE EXISTING FACILITIES AT NO EXTRA COST.

STAINLESS STEEL PIPING (SS) FOR WASTEWATER

1. PIPE
   a. STAINLESS STEEL, TYPE 316L.
   b. DIMENSIONS TO ANSI B36.10 AND B36.19, IPS-OD AS FOLLOWS:
      - 2 INCH AND SMALLER: TO ASTM A312, SEAMLESS SCHEDULE 40S OR BETTER.
      - 2 1/2 INCH AND LARGER: TO ASTM A778, "AS WELDED GRADE" OR BETTER, SCHEDULE 10S OR BETTER. USE HEAVIER SCHEDULES WHERE NOTED OR INDICATED.
   c. ALL PIPING, TUBING AND FITTINGS SHALL CARRY THE MANUFACTURER'S IDENTIFICATION AS TO THE MATERIAL.

2. JOINTS - FLANGED, BUTT-WELDED, OR SCREWED, AS FOLLOWS:
   a. 2 INCH AND SMALLER: SCREWED UNLESS INDICATED OR SHOWN AS BUTT-WELDED OR FLANGED.
   b. 2 1/2 INCH AND LARGER: BUTT-WELDED UNLESS INDICATED OR SHOWN AS FLANGED.

3. FITTINGS - STAINLESS STEEL, TYPE TO MATCH PIPE, BUTT-WELDED OR SCREWED AS FOLLOWS:
   a. 2 INCH AND SMALLER: SCREWED, 150 PSI RATED CWP CONFORMING TO ASTM A182 WITH DIMENSIONS TO ANSI B16.3 UNLESS NOTED OTHERWISE, UNIONS, CLASS 3000 CONFORMING TO ASTM A182 WITH DIMENSIONS TO MSS SP-83.
   b. 2 1/2 INCH AND LARGER: SMOOTH FLOW BUTT-WELDING TYPE "AS WELDED" TO ASTM A774, WITH DIMENSIONS CONFORMING TO ANSI B16.9 OR B16.28; THICKNESS TO MATCH PIPE. USE SHORT RADIUS ELBOWS UNLESS NOTED OTHERWISE OR AS SHOWN ON DRAWINGS.

4. FLANGES
   a. FORGED, STAINLESS STEEL TYPE TO MATCH PIPE, FLAT FACE WELDING NECK FLANGES WITH MATERIAL CONFORMING TO ASTM A182/ASME SA-182 AND WITH DIMENSIONS CONFORMING TO ANSI B16.5, CLASS 150 OR AS NOTED ON DRAWINGS.
   b. USE SLIP ON FLANGES ONLY WHERE INDICATED OR DIRECTED BY THE ADI SITE REPRESENTATIVE.
   c. BLIND FLANGES
      i. STAINLESS STEEL, TYPE TO MATCH PIPE.
      ii. HOLE PATTERN TO ANSI B16.1, CLASS 125 OR AS NOTED ON DRAWINGS.
      iii. THICKNESS TO MANUFACTURER'S STANDARD FOR 50 PSI OR BETTER RATING.
   d. WHERE EQUIPMENT HAS FLANGE TYPES OTHER THAN NOTED ABOVE, PROVIDE THE NECESSARY TRANSITION TO ACCOMMODATE CONNECTIONS.

5. BOLTING - FLANGE BOLTS, NUTS, AND WASHERS TO BE AS FOLLOWS:
   a. STAINLESS STEEL, TYPE TO MATCH PIPE.
   b. GRADE B HEX HEAD BOLTS TO ASTM A193.
   c. GRADE B HEX HEAD NUTS TO ASTM A194.
   d. BOLTS, NUTS, AND WASHERS FOR SPECIAL CONNECTIONS, SUCH AS VALVES AND PUMPS AS ABOVE WITH LENGTH TO SUIT AND TO MANUFACTURER'S REQUIREMENTS.
   e. COAT WITH ANTI-SEIZE JUST PRIOR TO INSTALLATION.

6. FLANGE GASKETS
   a. 1/8 INCH THICK BUNA-N FULL FACE TYPE OR RING TYPE WHERE REQUIRED.
   b. BLIND FLANGE GASKETS: 1/8 INCH THICK BUNA-N COVERING FULL AREA OF BLIND FLANGE.
   c. THREAD LUBRICANT/SEALANT: TEFLON TAPE.

EXPANSION JOINTS

1. WHERE EXPANSION JOINTS MATE DIRECTLY TO BUTTERFLY VALVES, PROVIDE TEFLON GASKETS BETWEEN FLANGES FOR ISOLATION.
2. FLANGED ENDS SHALL BE COMPLETE WITH EXTERNAL FLANGE REINFORCING RINGS. FLANGE TYPE TO MATCH EQUIPMENT OR PIPING FLANGE STYLE.
3. USE CONTROL RODS WHERE IDENTIFIED ON DRAWINGS.
4. EXPANSION JOINTS TO BE MANUFACTURED BY MERCER RUBBER OR EQUAL.

VALVES

MANUAL BUTTERFLY VALVES – WASTEWATER

- 125 LB LUG STYLE EPOXY COATED CAST IRON BODY
- 316 SS DISC AND SHAFT
- BUNA-N RESILIENT SEAT
- ACETAL BUSHINGS OR BETTER
- SEATS TO BE REPLACEABLE
- WEATHERPROOF ACTUATOR AND OPERATOR
- WORMGEAR ACTUATOR C/W HAND WHEEL OPERATOR ON VALVES 6" AND LARGER
- LEVER ACTUATOR ON VALVES 4" AND SMALLER
- ACTUATORS TO BE SIZED FOR A PRESSURE DIFFERENTIAL OF 50 PSI
- ALL EXPOSED NUTS/BOLTS TO BE ZINC COATED OR BETTER
- STANDARD OF ACCEPTANCE: BRAY SERIES 31

BALL VALVES – WASTEWATER

- 316 SS BODY, BALL AND TRIM
- PTFE SEATS
- FNPT x FNPT
- FULL PORT
- RATED FOR 150 PSI OR BETTER
- STANDARD OF ACCEPTANCE: APOLLO 76F-100-A SERIES

SEWAGE AIR RELEASE VALVES – WASTEWATER

- FLOAT OPERATED COMBINATION VACUUM AND AIR RELEASE VALVE HOUSED IN A SINGLE BODY
- RATED FOR 150 PSI OR BETTER
- CAPABLE OF SEATING UNDER LOW PRESSURES
- 2" NPT INLET, 1" NPT OUTLET
- BODY AND COVER TO BE CAST IRON TO ASTM A240 OR ASTM A269, 276, 313, 582
- BUNA-N SEATS
- INLET SHUT OFF VALVE AND BLOW OFF VALVE TO BE INCLUDED
- 316 SS BALL VALVE
- STANDARD OF ACCEPTANCE: VAL-MATIC MODEL 801-ABW

CHECK VALVES – WASTEWATER

- FULL BODY, FLANGED TYPE
- 316SS BODY AND COVER
- ANSI 125 LB FLANGED ENDS
- BUNA-N DISC
- RATED FOR 150 PSI OR BETTER
- STANDARD OF ACCEPTANCE: VAL-MATIC SWING FLEX CHECK VALVE

RECORD DRAWING
12/28/2014

Signature Date

REV NO	DATE	DRAWN BY	CHKD BY	DESCRIPTION

DESIGN DRAWN CHKD
JOB NUMBER
ISSUE DATE
ISSUE

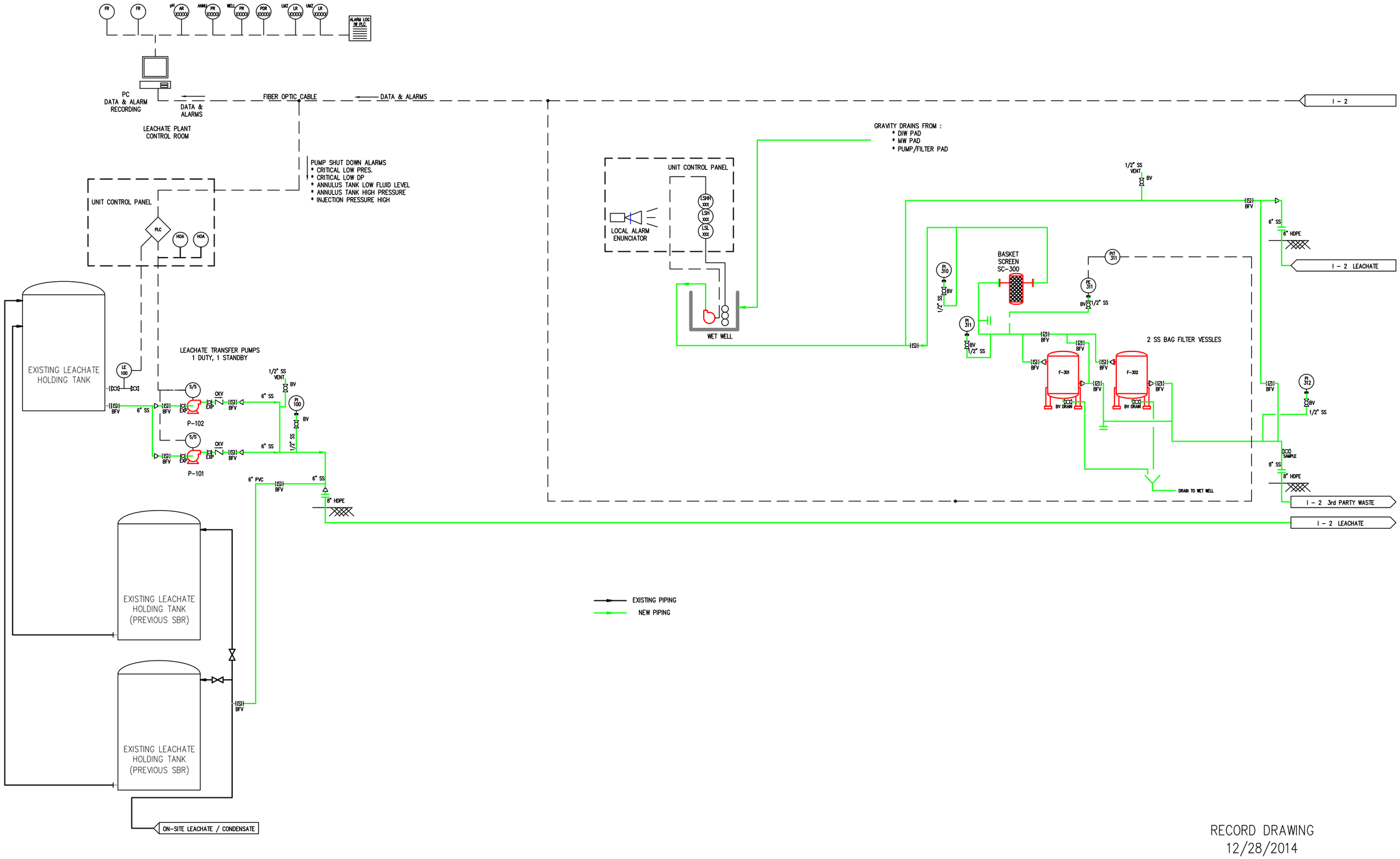
PIPING & VALVE SPECIFICATIONS

WMI MEDLEY DISPOSAL INJECTION WELL

ROGER E. MAYFIELD, P.E. FL #46092
L.S. SIMS ASSOCIATES
CERTIFICATE OF AUTHORIZATION # 28089
1530 U.S.HIGHWAY 1
ROCKLEDGE, FLORIDA 32955

L.S.SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

DRAWING NUMBER
P-14
SHEET OF



RECORD DRAWING
12/28/2014

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L.S. SIMS ASSOCIATES
CERTIFICATE OF AUTHORIZATION # 28089
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ROCKLEDGE, FLORIDA 32955

L.S.SIMS & ASSOCIATES
ENVIRONMENTAL CONSULTING

Signature
Date

DESCRIPTION
REV NO
DATE
DRWN BY
CHKD BY

DESIGN
DRWN
CHKD
JOB NUMBER
ISSUE DATE
ISSUE

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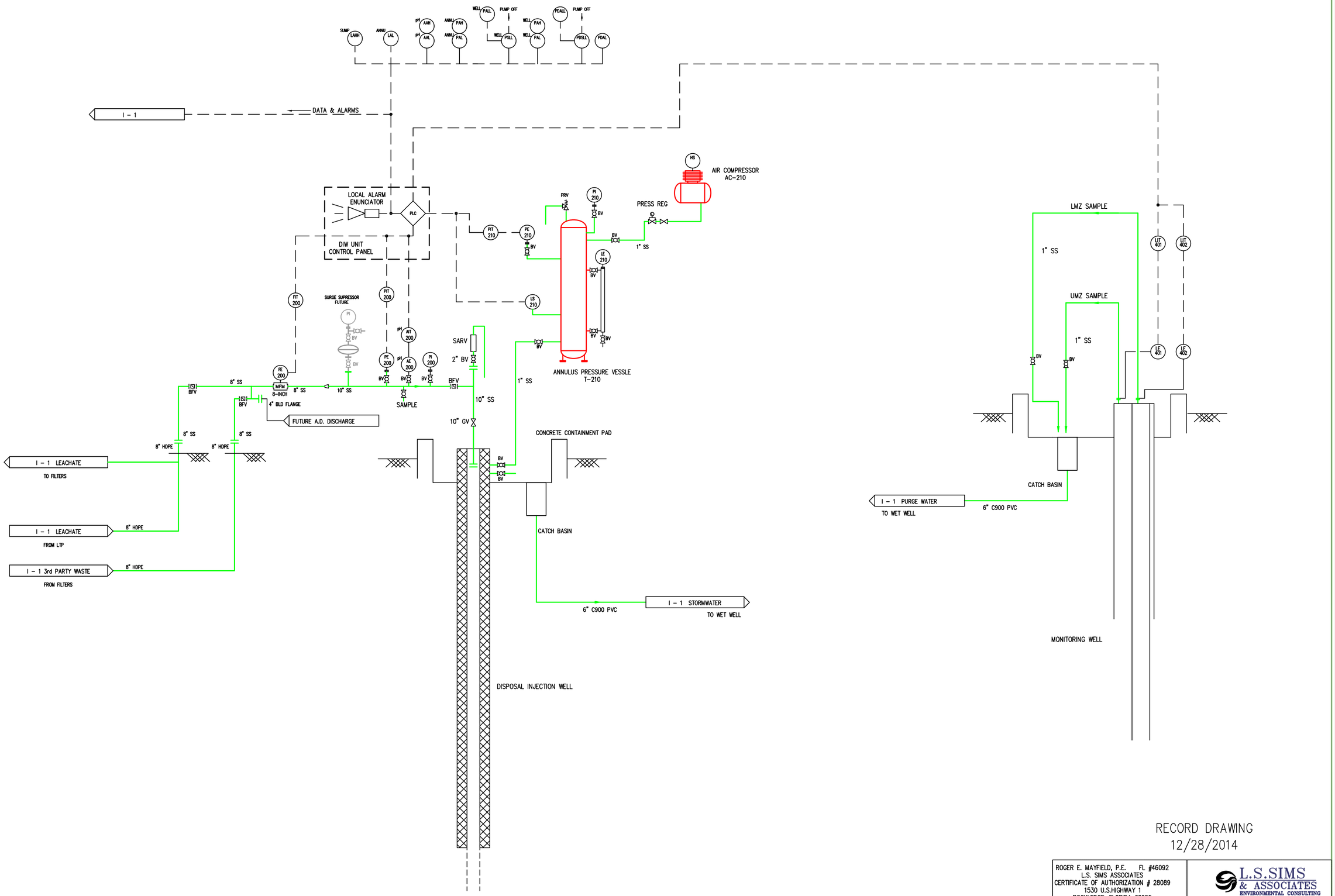
WMI MEDLEY
DISPOSAL
INJECTION WELL

WASTE MANAGEMENT

I - 1
SHEET



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Signature
Date

REV NO	DATE	DRWN BY	CHKD BY	DESCRIPTION

DESIGN
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ISSUE

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WMI MEDLEY DISPOSAL INJECTION WELL

WASTE MANAGEMENT

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SHEET

APPENDIX C

Equipment Specifications