Riege, Ed

From: Riege, Ed

Sent: Wednesday, April 01, 2009 1:54 PM

To: Jones, Brad A., EMNRD; Monzeglio, Hope, NMENV

Cc: 'Chavez, Carl J, EMNRD'; 'Bill.Olson@state.nm.us'; Young, Michelle; Turri, Mark; Rajen, Gaurav

Subject: Western Gallup Refinery Sanitary Wastewater Project

Attachments: 7788.05 - Sheet 09.pdf; 7788.05 - Sheet 01.pdf; 7788.05 - Sheet 02.pdf; 7788.05 - Sheet 03.pdf; 7788.05 - Sheet 04.pdf; 7788.05 - Sheet 05.pdf; 7788.05 - Sheet 06.pdf; 7788.05 - Sheet 07.pdf; 7788.05 - Sheet 08.pdf

Hi Brad,

Awhile back the Gallup Refinery had mentioned to Carl Chavez and Wayne Price that we were looking into routing some of our sanitary wastewater streams to the new Pilot Lift Station we are installing. They mentioned that I should check with NMED's Bill Olson (Groundwater Quality Bureau Chief) which I have done. He stated that since this was an OCD regulated facility OCD would have oversight of the proposed wastewater changes. We have made some progress with this project and now have some sanitary wastewater drawings for you to review (attached). Basically we will be taking some sanitary wastewater lines in the Refinery that either reported to septic systems or surface sewage lagoons and rerouting these lines to the new Pilot Lift Station which currently reports to aeration lagoon #1. This improvement will allow Western to close two existing surface sewage lagoons and older septic systems. Your approval of these drawings is appreciated. Please contact me if you have any questions, a hard copy of the drawings will be placed into the mail for you.

Sincerely,

Ed Riege

Ed Riege
Environmental Manager

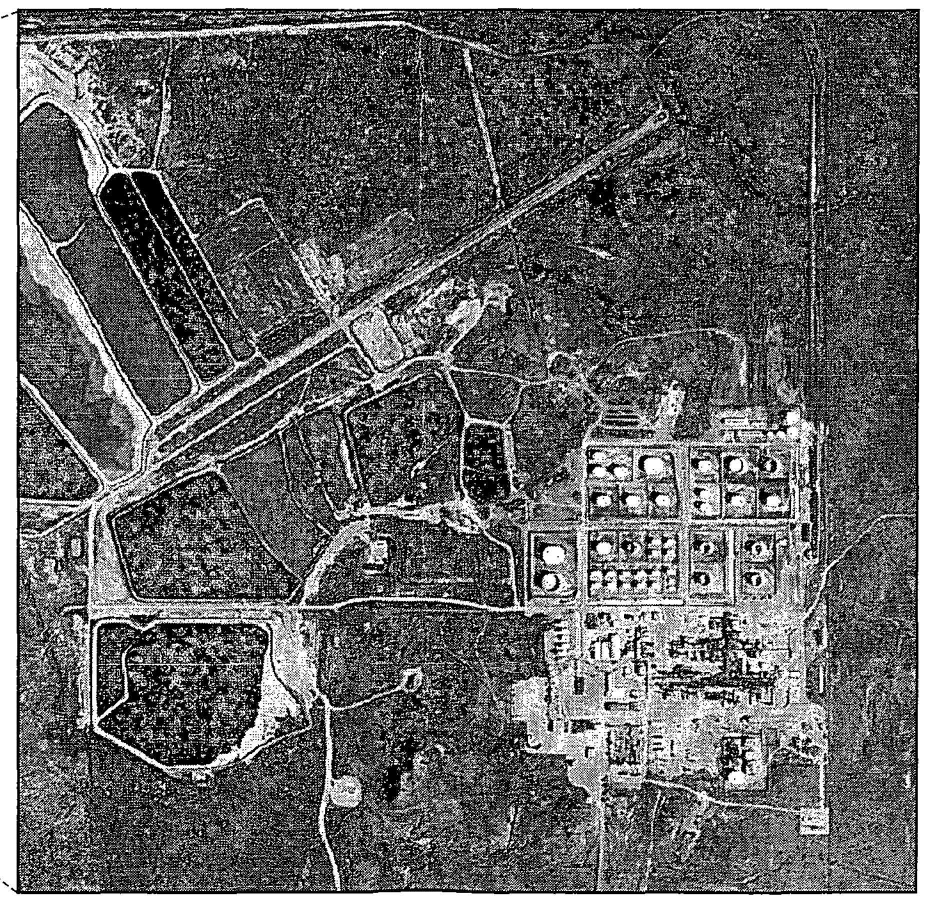
Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com

WESTERN REFINING - GALLUP REFINERY

SANITARY WASTEWATER COLLECTION

PREPARED BY: RMT, INC.
ANN ARBOR, MICHIGAN

DATE: FEBRUARY 2009



SITE LOCATION MAP
N.T.S.
BASE MAP DEVELOPED FROM AERIAL PHOTOGRAPH TAKEN FROM GOOGLE EARTH, 09-2008.

N

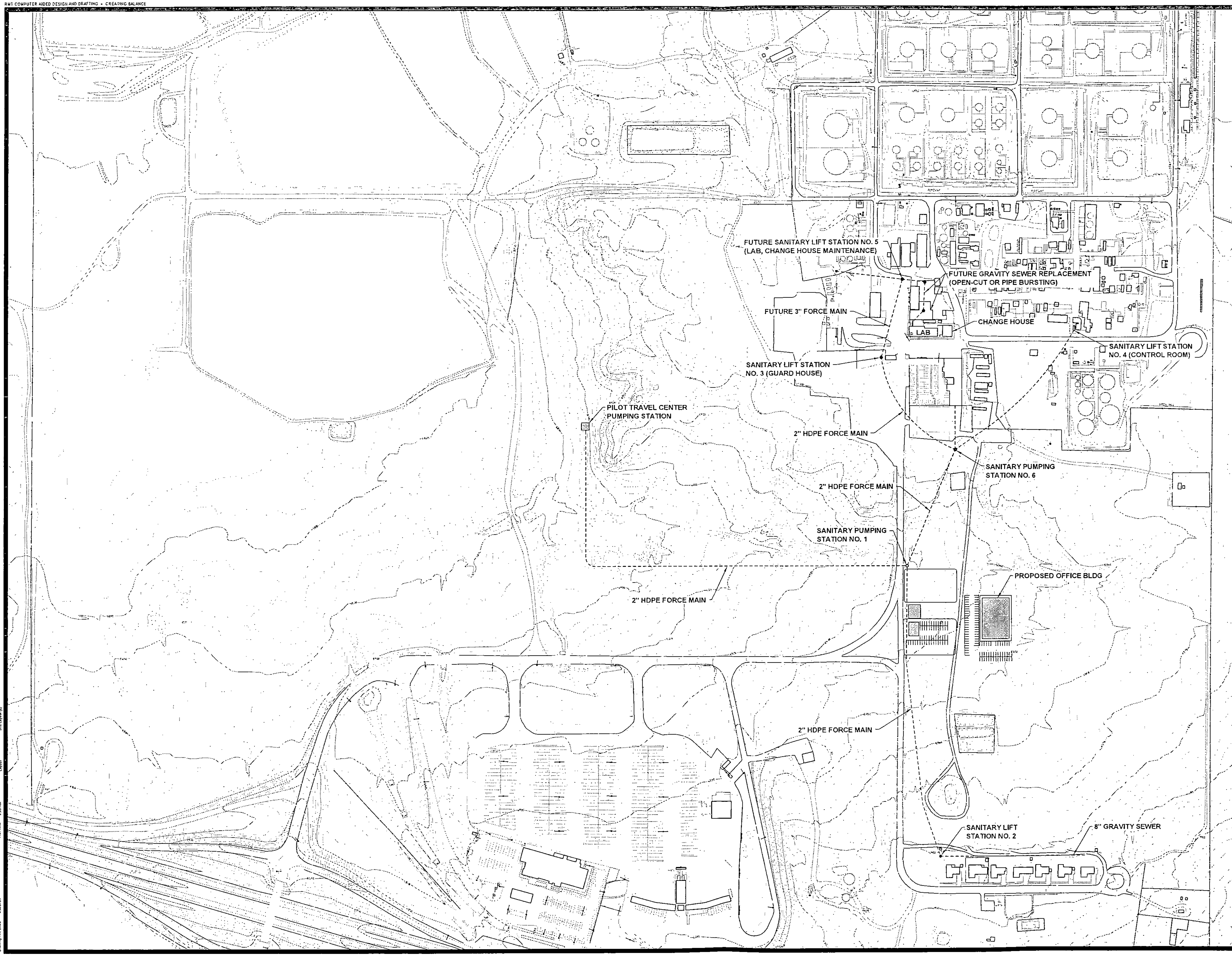
DRAWING INDEX

SHEET NUMBER	SHEET TITLE
1	TITLE SHEET / SITE LOCATION MAP / INDEX OF DRAWINGS
2	SANITARY WASTEWATER COLLECTION SYSTEM - OVERALL PLAN
3	SITE PLAN (1 of 4)
4	PARTIAL SITE PLAN (2 of 4)
5	PARTIAL SITE PLAN (3 of 4)
6	PARTIAL SITE PLAN (4 of 4)
7	DETAILS
8	DETAILS
9	SPECIFICATIONS

RMT

PLOT DATA:
Drawing Name: J10778805\0778.05.02.dwg | Dwg Size: 5.28 Mb | Attached Xrefs:
Operator Name: SAM LUCIDO | Plot Date: February 2, 2009 | Attached Images: SKMBT_C35108022215270_0002,
Drawing Plot Scale: 0.385983 | Plot Time: 9:39 AM | Layout: Site Layout (2)

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



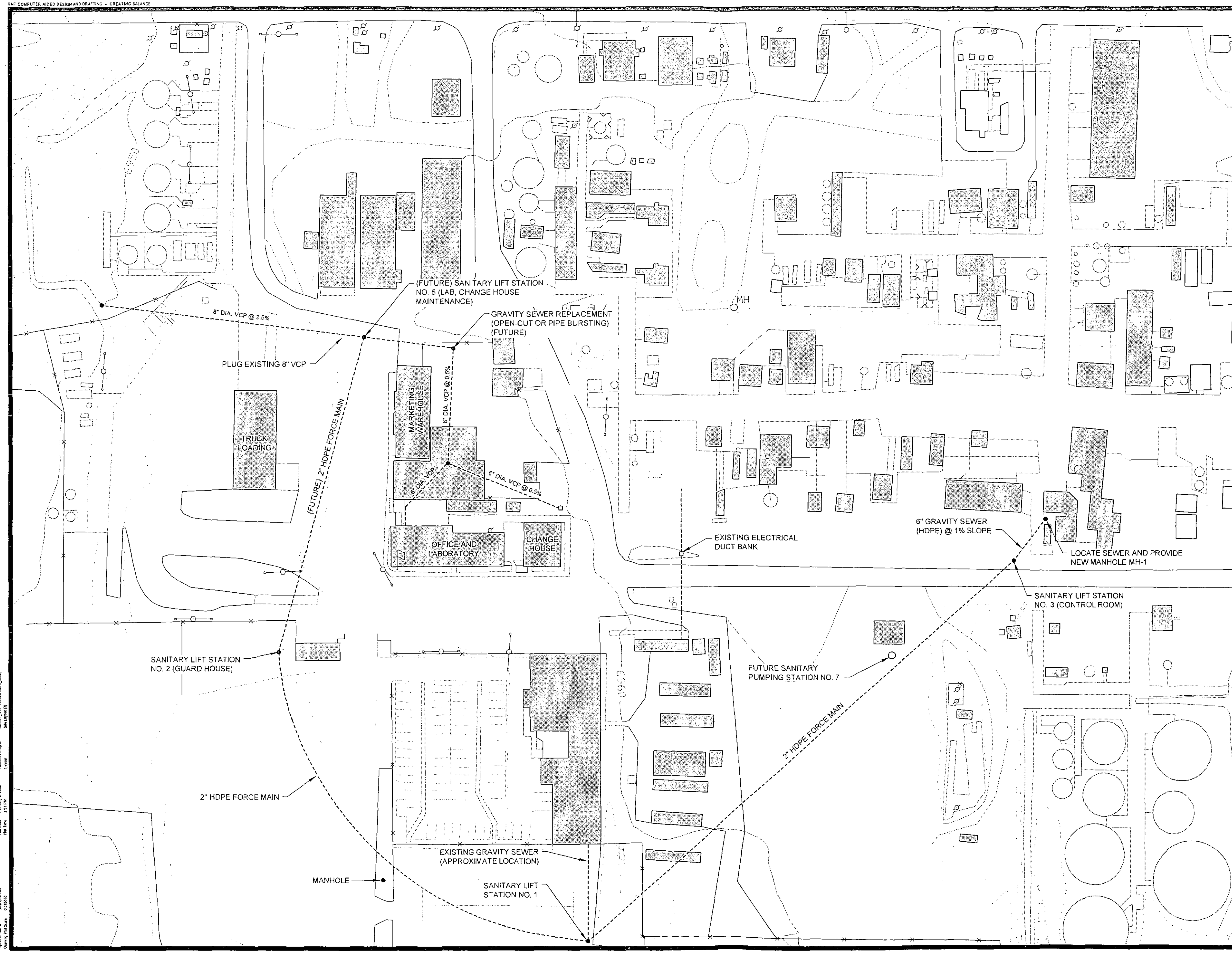
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	S.JL	02-02-09	ISSUED FOR 90% OWNER'S REVIEW	ELC
1.	S.JL	11-01-08	ISSUED FOR 75% OWNER'S REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

SANITARY WASTEWATER COLLECTION SYSTEM -
OVERALL PLAN

DRAWN BY: S.JL	DRAWING SCALE: SHOWN	PROJECT NO: J10778805	
CHECKED BY: ELC		FILE NO: 7788.05.02.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 2 of 9	
DATE: February 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022



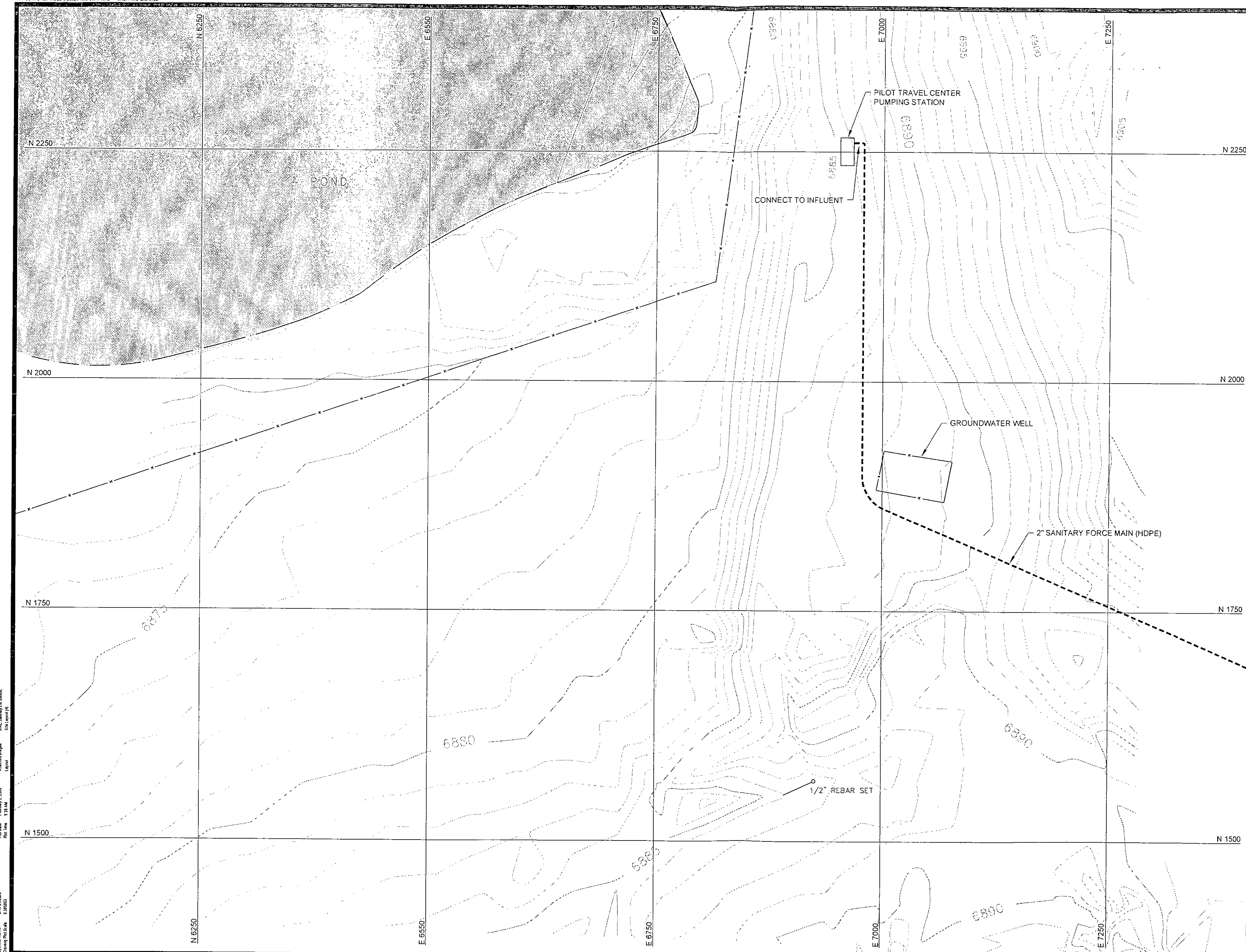
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	02-02-09	ISSUED FOR 90% OWNER'S REVIEW	ELC
1.	SJL	11-01-08	ISSUED FOR 75% OWNER'S REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

SANITARY WASTEWATER COLLECTION SYSTEM - REFINERY AREA

DRAWN BY: SJL	DRAWING SCALE: SHOWN	PROJECT NO.	J107788I05
CHECKED BY: ELC		FILE NO.	7788.05.03.dwg
APPROVED BY: ELC	DATE PRINTED:	Sheet 3 of 9	
DATE: February 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022



NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	S.J.	02-02-09	ISSUED FOR 90% OWNER'S REVIEW	ELC
1.	S.J.	11-01-08	ISSUED FOR 75% OWNER'S REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

SANITARY WASTEWATER COLLECTION SYSTEM - REFINERY AREA SITE PLAN (1 of 3)

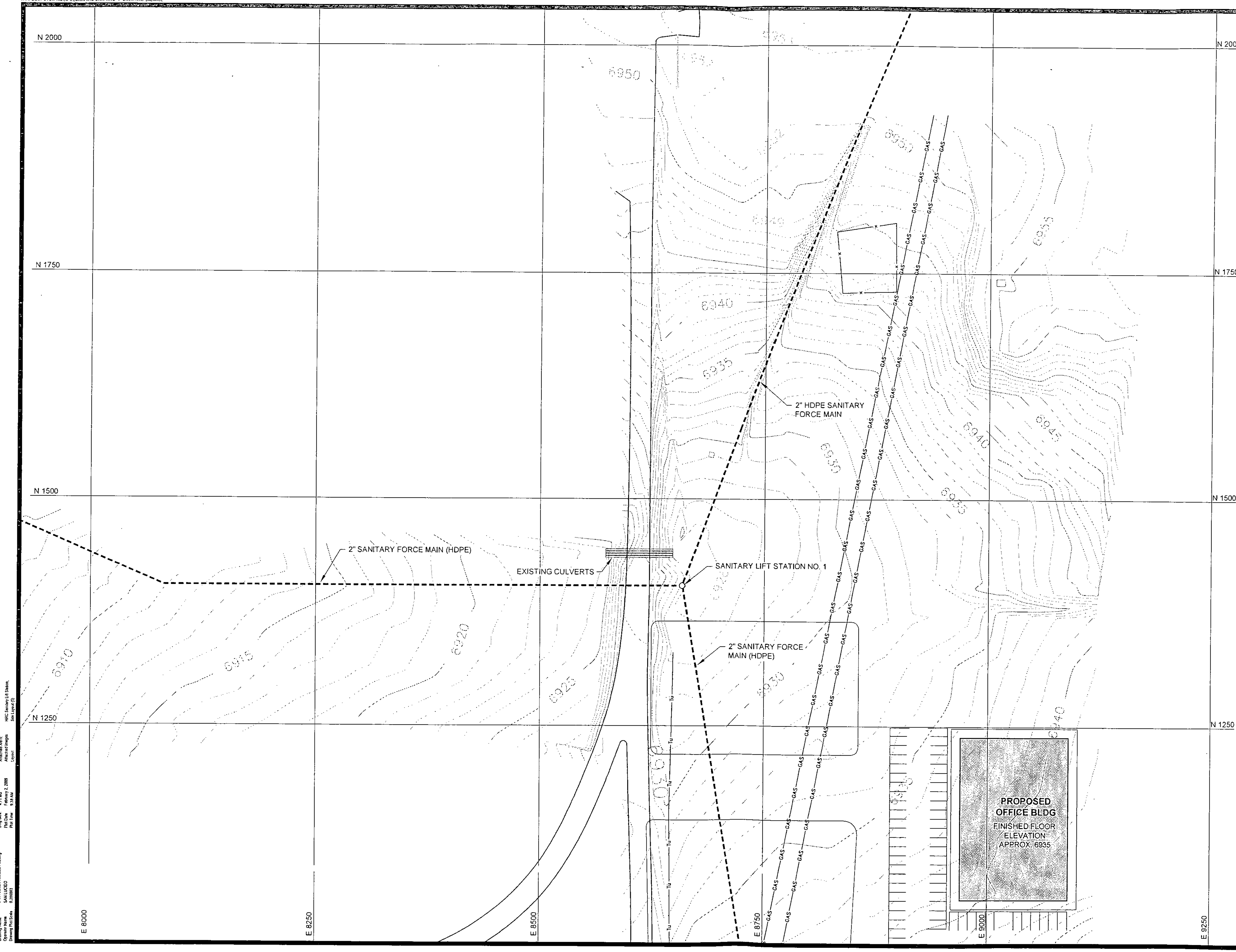
DRAWN BY: S.J.	DRAWING SCALE: SHOWN	PROJECT NO. J10778805	
CHECKED BY: ELC		FILE NO. 7788.05.04-06.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 4 of 9	
DATE: February 2009			

RMT

3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

PLOT DATA:
Drawing Name J:\07788\05\7788.05.04-06.dwg | Dwg Size 4.71 Mb | Attached Xrefs:
Operator Name SAM LUCIDO | Plot Date February 2, 2009 | Attached Images HRC Sanitary Lift Station,
Drawing Plot Scale 0.266883 | Plot Time 9:38 AM | Layout Site Layout (5)

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	02-02-09	ISSUED FOR 90% OWNER'S REVIEW	ELC
1.	SJL	11-01-08	ISSUED FOR 75% OWNER'S REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

SANITARY WASTEWATER COLLECTION SYSTEM -
REFINERY AREA SITE PLAN (2 of 3)

DRAWN BY: SJL	DRAWING SCALE:	PROJECT NO. J 107788105	
CHECKED BY: ELC	SHOWN	FILE NO. 7788.05.04-06.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 5 of 9	
DATE: February 2009			

RMT

3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE

NOTES

1. TOC REFERS TO TOP OF CONCRETE SPOT ELEVATION

0 50' 100' 150' 200'
SCALE IN FEET

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	S.A.	02-02-09	ISSUED FOR 90% OWNER'S REVIEW	ELC
1.	S.A.	11-01-08	ISSUED FOR 75% OWNER'S REVIEW	ELC

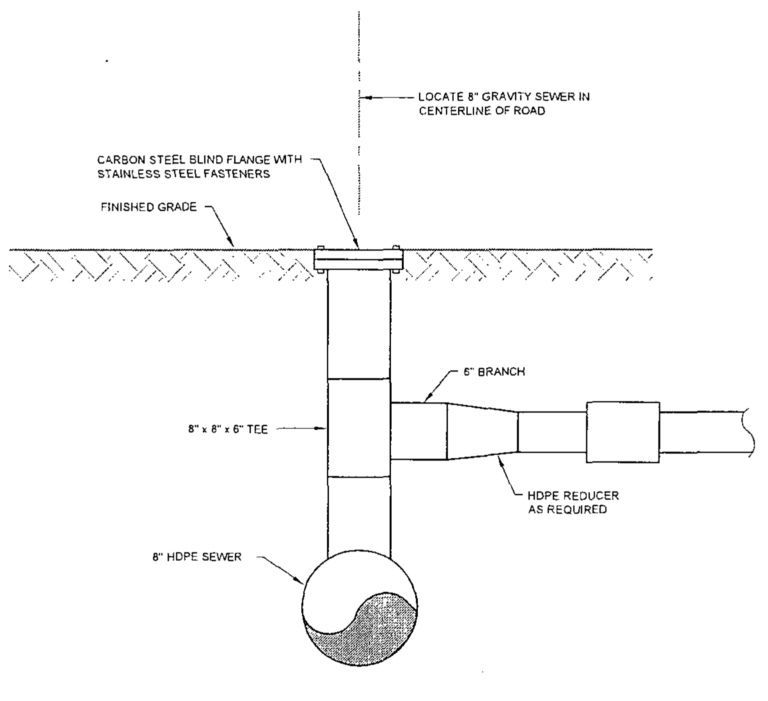
WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

SANITARY WASTEWATER COLLECTION SYSTEM - REFINERY AREA SITE PLAN (3 of 3)

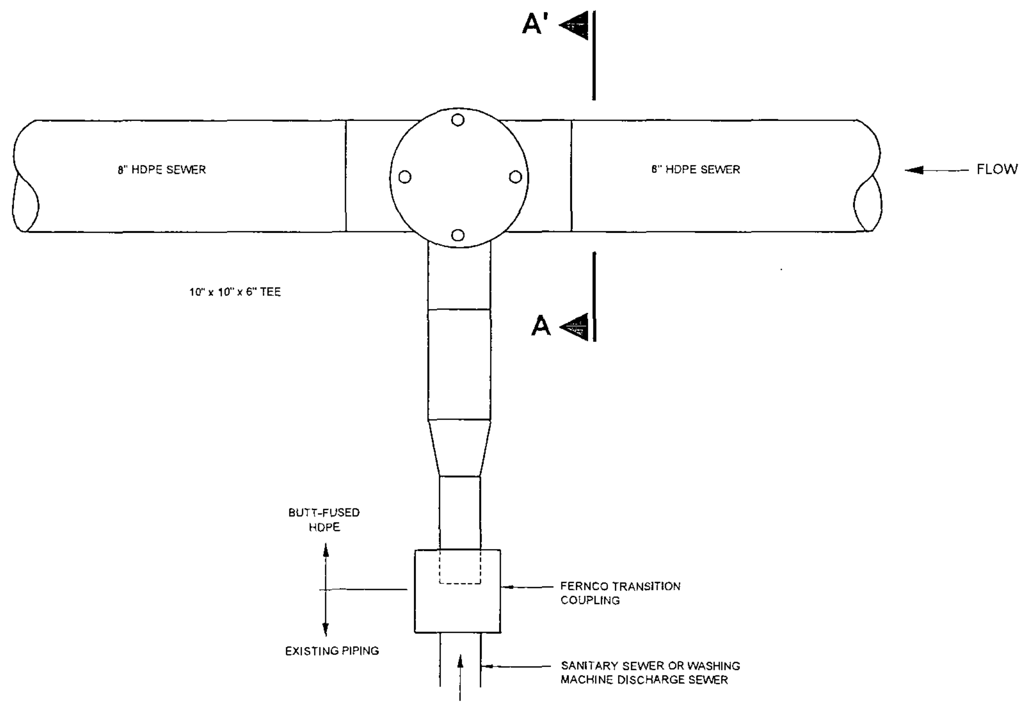
DRAWN BY: S.A.	DRAWING SCALE: SHOWN	PROJECT NO. J:107788105	
CHECKED BY: ELC		FILE NO. 7788.05.04-06.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 6 of 9	
DATE: February 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

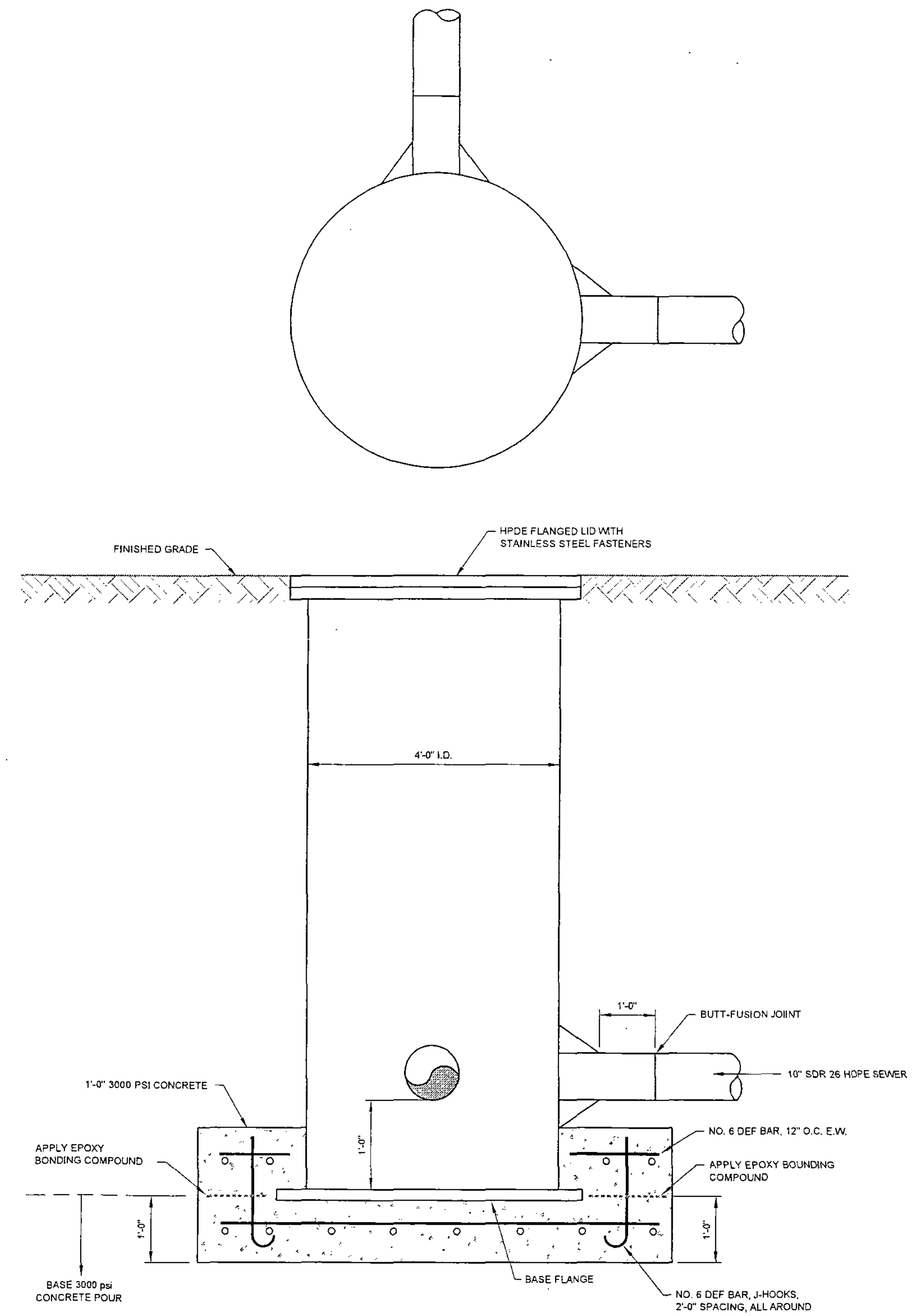
PLOT DATA
Drawing Name J107788\0517788.05.07.dwg | Dwg Size 0.18 Mb | Attached Xref's
Operator Name SAM LUCIDO | Plot Date February 2, 2009 | Attached Images SKMBT_C35109020215270_0001;
Drawing Plot Scale 0.386063 | Plot Time 3:51 PM | Layout Details (8)



1/8 **SECTION A - A'**
NOT TO SCALE



2/8 **PLAN - HOME SEWER CONNECTIONS**
NOT TO SCALE



3/8 **SANITARY MANHOLE**
NOT TO SCALE

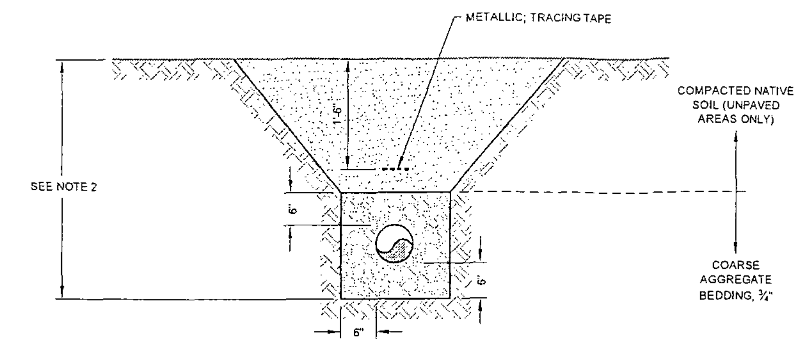
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	S.A.	02-02-09	ISSUED FOR 90% OWNER'S REVIEW	ELC
1.	S.A.	11-01-08	ISSUED FOR 75% OWNER'S REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

DETAILS

DRAWN BY: S.A.	DRAWING SCALE: SHOWN	PROJECT NO. J.107788105	
CHECKED BY: ELC		FILE NO: 7788.05.07.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 7 of 9	
DATE: February 2009			

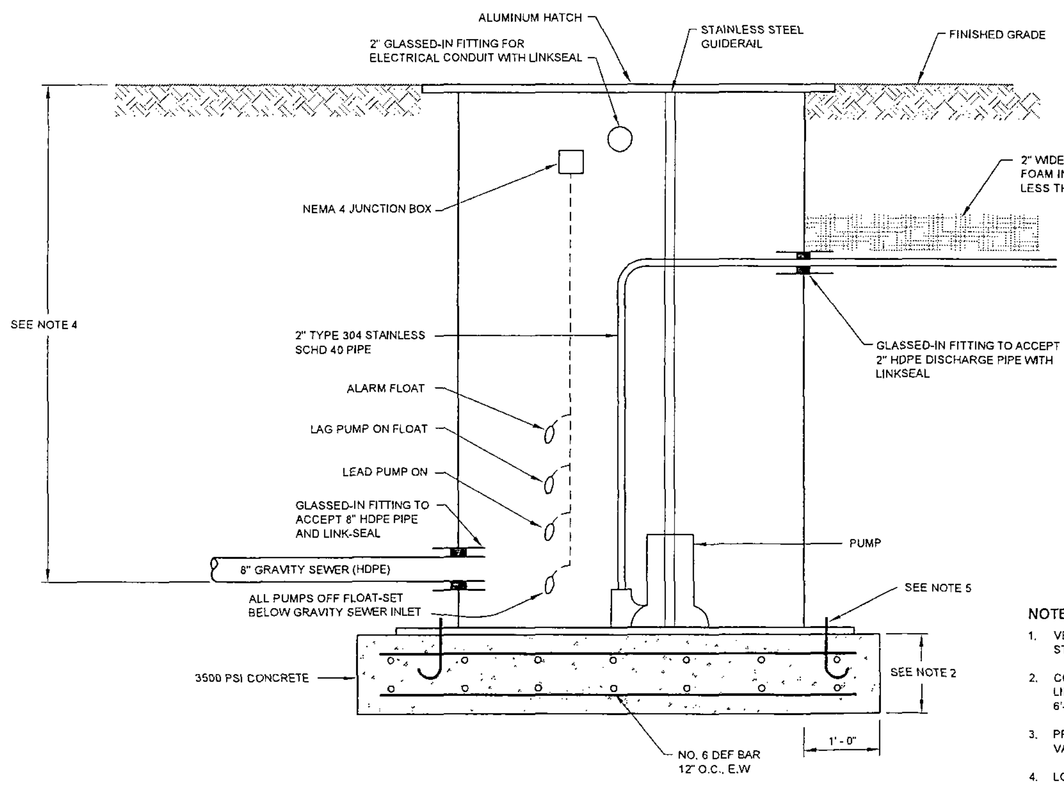
RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022



NOTES:
1. COMPACT TO 90% PROCTOR DENSITY.
2. PROVIDE 100% COARSE AGGREGATE BACKFILL UNDER ROADWAY.

1/9 **GRAVITY SEWER BEDDING - UNPAVED AREAS**

NOT TO SCALE



NOTES:
1. VERIFY THE LOCATION AND SIZE OF ALL FITTINGS PRIOR TO ORDERING LIFT STATION.
2. CONCRETE ANCHORING BASE THICKNESS IS BASED UPON DETAIL OF BURIAL. FOR LIFT STATIONS LESS THAN 6'-0" PROVIDE 1'-0" THICK BASE SLAB; GREATER THAN 6'-0" PROVIDE 1'=6" THICK SLAB WITH 2 LAYERS OF REBAR.
3. PROVIDE VALVE MANHOLE FOR LIFT STATIONS NO. 1 AND NO. 2; PROVIDE CHECK VALVE AND PLUG VALVE WITHIN LIFT STATION FOR ALL OTHER LIFT STATION.
4. LOCATED EXISTING SANITARY SEWER. DETERMINE ELEVATION OF GRAVITY SEWER AT LIFT STATION PRIOR TO PLACING ORDER.
5. ANCHOR BOLTS DESIGNED AND PROVIDED LIFT STATION SUPPLIER TO RESIST BUOYANT FORCES IF THE LIFT STATION IS EMPTY AND THE EXCAVATION IS FILLED WITH WATER.

2/9 **SANITARY WASTEWATER LIFT STATION**

NOT TO SCALE

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	S.J.	02-02-09	ISSUED FOR 90% OWNER'S REVIEW	ELC
1.	S.J.	11-01-08	ISSUED FOR 75% OWNER'S REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

DETAILS

DRAWN BY: S.J.	DRAWING SCALE: SHOWN	PROJECT NO. 3.10778805	
CHECKED BY: ELC		FILE NO. 7788.05.08.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 8 of 9	
DATE: February 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone 734-971-7080 • Fax 734-971-9022

HDPE MANHOLE SPECIFICATIONS

1. MATERIALS: MANHOLES SHALL BE HIGH DENSITY POLYETHYLENE CONFORMING TO ASTM D-23350-02 WITH MINIMUM CELL CLASSIFICATION VALUES OF 345464 C. DENSITY NO LESS THAN 0.995 PER ASTM 1505. MELT INDEX NO GREATER THAN .15 GRAMS IN 10 MINUTES PER ASTM 1238-CONDITION 3.2.3. FLEXURAL MODULUS SHALL BE 110,000 TO 160,000 PSI PER ASTM D 790. TENSILE STRENGTH AT YIELD SHALL BE 3,200 TO 3,500 PSI PER ASTM D 638. HYDROSTATIC DESIGN BASIS SHALL BE 1,600 PSI AT 23 DEGREES C IN ACCORDANCE WITH ASTM D 2837.

2. SUPPLIERS:

   a. ISCO INDUSTRIES, (800) 345-4726

   b. PERFORMANCE PIPE

3. SUBMITTALS: PROVIDE COMPLETE MATERIAL SPECIFICATIONS AND DRAWINGS SHOWING THE LOCATION OF INLETS, OUTLETS, OVERALL DIMENSIONS, WALL THICKNESS. PROVIDE DETAILS OF CONNECTIONS AND GUSSETING OF NOZZLES. PROVIDE CERTIFICATION THAT THE MANHOLE WAS DESIGNED PER ASTM F 1759 DESIGN OF HIGH DENSITY POLYETHYLENE MANHOLES FOR SUBSURFACE APPLICATIONS.

4. DESIGN: PROVIDE GUSSETING OF ALL PIPING CONNECTIONS. MANHOLE SHALL BE OF DOUBLE-WALLED CONSTRUCTION AS SHOWN. MANHOLE SHALL BE DESIGNED TO WITHSTAND THE BUOYANT FORCE ASSUMING THAT THE EXCAVATION IS FILLED WITH WATER TO THE GROUND SURFACE. PERFORM HYDROSTATIC TESTING IN THE FACTORY FOR A MINIMUM OF ONE HOUR AND PROVIDE TEST RESULTS TO THE OWNER'S REPRESENTATIVE. PROVIDE MANHOLE COVER AND STRUCTURAL DESIGN FOR H20 LOADINGS.

5. INSTALLATION: FLANGED AND MECHANICAL CONNECTIONS SHALL BE TIGHTENED IN STRICT ACCORDANCE WITH THE MANUFACTURES WRITTEN INSTRUCTIONS FOR TORQUE VALUES AND SHALL BE PERFORMED IN A STAR PATTERN. PIPING CONNECTIONS SHALL BE BUTT FUSION JOINTS WHERE FEASIBLE.

HDPE PIPING SPECIFICATIONS

1. MATERIALS: ASTM PE 3408 RESIN LISTED WITH THE PLASTIC PIPE INSTITUTE AS TR-4. ASTM D3350-02 WITH MINIMUM CELL CLASSIFICATION OF PE345464C. THE PIPE SHALL CONTAIN NO RECYCLED COMPOUNDS EXCEPT THAT GENERATED IN THE MANUFACTURER'S OWN PLANT.

2. MANUFACTURERS:

   a. ISCO

   b. PERFORMANCE PIPE

3. FITTINGS: BUTT FUSION FITTINGS PER ASTM D3261 MANUFACTURED BY INJECTION MOLDING, EXTRUSION AND MACHINING, OR OTHER FABRICATION.

4. FLANGED AND MECHANICAL JOINT ADAPTERS: RATED AT NO LESS THAN THE PRESSURE RATING OF THE PIPE.

5. MECHANICAL JOINTS: PROVIDE MECHANICAL JOINTS DESIGNED SPECIFICALLY FOR HDPE PIPE. METALLIC COMPONENTS SHALL BE COATED TO PREVENT CORROSION WITH PAINT OR GALVANIZING. PROVIDE STAINLESS STEEL (TYPE 304 OR 316) STIFFENERS.

6. INSTALLATION: PIPE JOINING SHALL BE PERFORMED BY CREWS CERTIFIED BY THE PIPE SUPPLIER TO BE EXPERIENCED WITH THE APPLICATION. BUTT-FUSE JOINTS PER THE STRICT WRITTEN INSTRUCTION OF THE EQUIPMENT SUPPLIER. JOINT SHALL BE EQUAL TO OR EXCEED THE PRESSURE RATING OF THE PIPE. PROVIDE SUFFICIENT COOLING TIME AFTER FUSING PRIOR TO MOVING PIPE TO PREVENT DAMAGE. INSTALL MECHANICAL JOINTS PER THE STRICT REQUIREMENTS OF THE JOINT SUPPLIER INCLUDING TIGHTENING BOLTS IN A STAR PATTERN TO THE SPECIFIED TORQUE.

7. STORAGE AND HANDLING: PIPE SHALL BE REJECTED THAT IS PHYSICALLY GOUGED.

8. TESTING: PERFORM 100 PSI HYDRO-TEST PER THE PLASTIC PIPING INSTITUTES STANDARDS, MINIMUM OF 2 HOURS.

SANITARY WASTEWATER PUMPING STATION

1. GENERAL: PROVIDE COMPLETE DESIGN, FABRICATION, TESTING, INSTALLATION, AND START-UP OF A DUPLEX SUBMERSIBLE SANITARY WASTEWATER PUMPING STATION. THE SYSTEM SHALL BE AS MANUFACTURED BY HYDROMATIC PUMP COMPANY OF ASHLAND, OHIO, CONTACT: GLENN KLINE (248) 543-3880.

2. BASIN: BASIN SHALL BE SINGLE-WALLED FIBERGLASS DESIGNED TO BE BURIED AS SHOWN. THE STRUCTURAL DESIGN WILL BE SUCH THAT THE UNIT WILL WITHSTAND BUOYANT FORCES IF THE BASIN IS EMPTY AND THE BACKFILLED EXCAVATION IS FILLED WITH WATER. ALL FASTENERS INSIDE AND OUTSIDE OF THE BASIN SHALL BE TYPE 304 OR 316 STAINLESS STEEL. PUMPS SHALL BE SECURED WITH STAINLESS STEEL GUIDE RAILS AND BRACKETS. PROVIDE ALUMINUM ACCESS COVER WITH H20 LOADING.

3. PUMPS: PUMPS SHALL BE 2 HORSEPOWER, EXPLOSION-PROOF SUBMERSIBLE GRINDER PUMPS CAPABLE OF PUMPING RAW SANITARY WASTEWATER. MOTORS SHALL BE 1750 RPM. PROVIDE TWO-BARRIER SEAL WITH TWO MOISTURE PROBES LOCATED IN THE SEAL CHAMBER TO PROVIDE CONTACT CLOSURE TO THE CONTROL PANEL. CAST BRONZE IMPELLER. CAST IRON OR BRONZE IMPELLERS OR PUMP CASINGS. PUMP CAPACITY SHALL BE HYDROMATIC HPG200 RATED AT 40 GPM AT 32 FEET TOTAL DYNAMIC HEAD.

4. CHECK VALVES: PROVIDE BALL CHECK VALVES EQUAL TO FLOMATIC WITH FLANGED CONNECTIONS. PHENOLIC OR RUBBER COATED BALLS, NITRILE SEATS. PLUG VALVES SHALL BE MOTORIZED, FLANGED CAST IRON BODY VALVES WITH ECCENTRIC, ELASTOMER COATED PLUGS. PLUG VALVES SHALL BE AS MANUFACTURED BY DEZURIK, VALMATIC, MILIKEN, OR EQUAL. PROVIDE SINGLE-WALL FIBERGLASS VALVE CHAMBER WHERE SHOWN.

5. CONTROLS: PROVIDE CONTROL PANEL WITH THE FOLLOWING FEATURES:

   a. STAINLESS STEEL NEMA 4 ENCLOSURE WITH STAINLESS STEEL FASTENERS AND HINGES FOR OUTDOOR INSTALLATION. PROVIDE HASP FOR A PADLOCK.

   b. NON-MERCURY LEVEL FLOATS FOR LEAD PUMP ON, LAG PUMP ON, LOW LEVEL PUMPS OFF, AND HIGH LEVEL ALARM.

   c. AUTOMATIC ALTERNATING RELAY.

   d. FLASHING RED LIGHT FOR PUMP FAILURE.

   e. PUMP RUN TIME METERS.

   f. ALLEN BRADLEY MOTOR STARTERS.

   g. PUSH-TO-TEST INDICATOR LIGHTS.

   h. ALARM TO INDICATE MECHANICAL SEAL FAILURE.

6. BACKPRESSURE CONTROL VALVES: PROVIDE MOTOR ACTUATED PLUG VALVES AND CONTROL FOR SANITARY LIFT STATIONS NO. 1 AND NO. 2 TO CREATE BACKPRESSURE FOR THE PUMPS. VALVES SHALL BE THROTTLED WITH A PRESSURE SENSOR/TRANSMITTED LOCATED IN THE ADJACENT VALVE BOX. THE PRESSURE SENSOR SHALL BE A RED VALVE MODEL 42/742 STAINLESS STEEL DIAPHRAGM SEAL WITH BUNA-N ELATOMERS WITH A MANUAL STAINLESS STEEL PRESSURE GAUGE, READING ZERO TO 60 PSIG. THE PLUG VALVE WILL BE CLOSED UPON PUMP START-UP AND GRADUALLY OPENED TO MAINTAIN THE REQUIRED BACKPRESSURE TO PREVENT OVERLOADING THE PUMP MOTOR. THE PIPING AND PUMPS ARE DESIGNED SUCH THAT THE CONTROL VALVE IS EXPECTED TO BE 100 PERCENT OPEN ONCE THE DISCHARGE LINE IS FILLED WITHIN THE FIRST ONE TO TWO MINUTES. CLOSE THE VALVE WHEN THE LOW LEVEL FLOAT IS TRIPPED, THEN TURN THE PUMP OFF. THE VALVE SHALL REMAIN CLOSED TO PREVENT WATER FROM FLOWING THROUGH THE PUMPS WHILE OFF SINCE THE DISCHARGE POINT IS SUBSTANTIALLY LOWER IN ELEVATION THAN THE LIFT STATION.

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	S.A.	02-02-09	ISSUED FOR 90% OWNER'S REVIEW	ELC
1.	S.A.	11-01-08	ISSUED FOR 75% OWNER'S REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

SPECIFICATIONS

DRAWN BY: S.A.	DRAWING SCALE: SHOWN	PROJECT NO. J10778805	
CHECKED BY: ELC		FILE NO. 7788.05.09.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 9 of 9	
DATE: February 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone 734-971-7080 • Fax 734-971-9022

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

October 27, 2009

Mr. Ed Riege
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
Route 3, Box 7
Gallup, New Mexico 87301

RE: NOTICE OF DISAPPROVAL
PROCESS DESIGN REPORT FOR THE WASTEWATER TREATMENT PLANT WORK PLAN (ALTERNATIVE DESIGN)
WESTERN REFINING COMPANY, SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-GRCC-09-006

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has completed its review of the *Process Design Report for the Wastewater Treatment Plant Work Plan (Alternative Design)* (Work Plan), dated September 2009, submitted on behalf of Western Refining Company, Southwest Inc., Gallup Refinery (the Permittee). The Permittee must provide additional information before NMED can complete its technical review. NMED hereby issues this Notice of Disapproval (NOD).

Comments 1-3 Address Responses in the Cover Letter

Comment 1
The "Response to Comment A" identified in the Cover Letter dated September 25, 2009 "Process Design for the Wastewater Treatment Plant Work Plan (Alternative Design)." The Permittee requests approval to continuously discharge flows of less than 30 gpm from the storm sewer to T27 and T28.

NMED Response
NMED approves the use of Tank T27 and T28 to receive storm water flow. See Comment 8 below for required revisions to the Work Plan.

Comment 2
The Permittee states on the second page of the Cover Letter that "[Note: We believe it is prudent to have interconnectivity between the process sewer and the storm sewer in order to provide flexibility in management of our process wastewater and storm waters. This "normally closed" interconnection is reflected in Figure 1 of the PDR Work Plan.]"

NMED Response
NMED is assuming this is the line identified in Figure 1 with arrows on either end that states "(NORMALLY CLOSED)" upstream of Tanks T27 and T28 and the Equalization (EQ) Tank. The above statement does not explain the purpose of this connection between the Storm Water Tanks and the EQ Tank. The Permittee must explain the purpose for the proposed interconnectivity between the process sewer and the storm sewer and explain flexibility in management of the process wastewater and storm water and why it is desirable.

Comment 3
In the "Response to Comment D" identified in the Cover Letter dated September 25, 2009; "Process Design for the Wastewater Treatment Plant Work Plan (Alternative Design)," the Permittee requests an extension from September 4, 2010 to March 31, 2011 to have the upgraded wastewater treatment system installed and operating. The Permittee also states that "[t]o date, we have researched an upgraded wastewater treatment system and completed its process design. However, we have not been able to complete the full design package required for construction due to the negotiation of the recently finalized Compliant and Consent Agreement and Final Order (CAFO). The CAFO now requires compliance with 40 CFR 62.34(a) [sic] which has a major impact on the design requirements for the alternative system."

NMED Response
NMED does not approve of this extension request. An alternate deadline may be established upon approval of the revised Work Plan, if and when this Work Plan is approved; however, the

Permittee already has an approved work plan and could have begun implementing the plan as of September 1, 2009. The Permittee has known since the first submittal of the February 26, 2009 *Process Design Report For Wastewater Treatment Plant Upgrade* that the system would likely have to comply with 40 CFR 262.34(a). In addition, a meeting was held on August 7, 2009 between NMED and Gallup explaining that these requirements would be required. No response is necessary.

Below are Comments addressing the Work Plan

Comment 4
In Section 1.2 (Project Scope), bullet one, page 2, the Permittee states "[t]wo existing tanks put in service for the storage of process area stormwater and diversion of off-spec wastewater."

NMED Response
It is not clear which two existing tanks are being referenced, nor is it clear what "off-spec wastewater" is. The Permittee must revise the Work Plan to identify the two existing tanks by name (e.g., Tanks 27 and 28). The Permittee must clearly define what "off-spec wastewater" is (identify all sources) since this term is used throughout the Work Plan. The Permittee must also discuss the capacity of these tanks and their ability to handle the additional flow volumes and the ability of the API separator to handle potential increased flow from these tanks.

Comment 5
In Section 1.4 (Treatment Objectives), page 2, the Permittee states "[t]he treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and ≤ 0.5 mg/L benzene. This project design was developed based on these objectives."

NMED Response
The effluent entering into the unlined Evaporation Pond 1 (EP-1) must have benzene concentrations less than 0.5 mg/L. In addition, the treatment objective of the upgraded wastewater treatment system (WWTS) is for all effluent entering into EP-1 to comply with all applicable regulations. Discharges to the unlined Evaporation Ponds must not create the potential for impacts to groundwater. The Permittee must revise the Work Plan to state that benzene concentrations will be below 0.5 mg/L for benzene.

Comment 6
In Section 2.3 (Pilot Travel Center Wastewaters), page 4, the Permittee states "[t]he lift station's submersible pumps then transfer the wastewater through a pipeline to the refinery for further pumping and treatment." In Section 4.2.5 (Travel Center Pretreatment), page 9, the Permittee states "The sanitary wastewater from the Pilot Travel Center and the refinery will be pretreated

prior to discharge to EP-1"..."[t]he new pretreatment system will provide removal of soluble organics. The technology selection for the system has not been finalized, but candidate technologies include: A new lined aeration lagoon (treating only Pilot Travel Center and refinery sanitary wastewaters), vertical flow wetlands, a recirculation media filter."

NMED Response
The Permittee does not appear to have a finalized pretreatment system design to treat the sanitary wastewater generated at the Pilot Station and at the refinery. NMED cannot evaluate the design of a system without knowing the system being proposed. The revised Work Plan must include the selected proposed pretreatment technology and design, process flow diagram(s), required maintenance, and contingencies that will be put in place if the system fails, etc. A list of candidate technologies is not acceptable.

Comment 7
In Section 3.3 (Macro Porous Polymer Extraction Technology), page 6, the Permittee states "[a] schematic of the MPPE process is provided in Figure 2."

NMED Response
The schematic diagram shown in Figure 2 is a generic schematic diagram from the manufacturer, which was also shown in Attachment B. The Permittee must revise Figure 2 of the Work Plan to include the design drawing of Macro Porous Polymer Extraction (MPPE) Technology that will actually be installed at the facility, in addition to all design details.

Comment 8
In Section 4.2.1 (Stormwater/Diversion Tanks), page 8, paragraph 2, the Permittee states "Oil that may accumulate on the liquid surfaces of T27 and T28 will be captured from a skimmer devise contained within each tank's floating roof. The skimmed oil will be collected by a vacuum truck and transferred to the refinery's rerun oil system for recycling back to the refining process. Prior to pumping the T27/T28 contents to the API Separator, solid material that may have settled on the tank bottom will be re-suspended through mixing."

NMED Response
The Permittee provided insufficient detail concerning the removal of skimmed oil and the mixing process described above. The Permittee must revise the Work Plan to address the following. (see also Comment 1)

a. Indicate how often oil will be skimmed from Tank T27 and T28.

b. Explain how the solid material will be re-suspended through mixing (e.g., how will the mixing occur, what equipment will be used). The Permittee must also discuss what measures will be implemented to demonstrate that mixing was successful.

c. Explain how the refinery will demonstrate that the liquids and solids in Tanks T27 and T28 meet the 90-day storage requirements, by clearly explaining the type of measurements and record keeping to be implemented to assure that the 90-day accumulation period is not exceeded.

d. Tanks T27 and T28 shall not accumulate more than two feet of sludge during any 90-day accumulation period. The Permittee must demonstrate how the sludge level will be measured.

Comment 9

In Section 4.2.1 (Stormwater/Diversion Tanks), page 8, paragraph 3, the Permittee states "Cleanouts will be installed on the conveyance pipelines to and from the Stormwater/Diversion Tanks....[u]nderground piping will be buried below the frost line to prevent freezing. Above ground piping will be electric heat traced to prevent freezing."

NMED Response

The Permittee must revise the Work Plan to provide a figure of the WWST that identifies where all cleanouts and above and below ground piping will be placed and describe how pipelines will be tested for mechanical integrity or leakage.

Comment 10

In Section 4.2.1 (Stormwater/Diversion Tanks), page 8, paragraph 3, the Permittee states "[u]nderground piping will be buried below the frost line to prevent freezing. Above ground piping will be electric heat traced to prevent freezing. The piping design is referenced in section 4.5."

NMED Response

Section 4.5 does not include many details relating to the piping design as stated above. Section 4.5 states "[t]he secondary containment and leak detection requirements for piping systems covered by the CAFO will also be implemented where required." The Permittee must revise the Work Plan to describe what type of secondary containment and leak detection will be used for the piping systems. All design details proposed to comply with the CAFO must be included in the Work Plan.

Comment 11

The Permittee addresses the Equalization Tank (EQ) in Section 4.2.2.

NMED Response

The Permittee provided insufficient detail concerning the EQ Tank and must address the items below in the revised Work Plan.

a. Discuss the operation of this tank in detail (e.g., flow controls, residence time, capacity).

b. Explain the oil recovery process including the destination of the skimmed oil.

c. Discuss sludge accumulation and address how the sludge be managed. Describe tank maintenance procedures (e.g., how will the tank be cleaned, frequency of cleaning, will cleaning require the tank to be removed from service, if so, how long will it be removed from service, effects on the operation of the wastewater treatment system, contingencies to be put in place to accommodate cleaning).

Comment 12

The Permittee address the Dissolved Gas Flotation System in Section 4.2.3.

NMED Response

This Section did not discuss the maintenance of the Dissolved Gas Flotation (DGF) system. The Permittee must revise this section to address maintenance required for this system, the frequency of maintenance, and all other operation and maintenance details.

Comment 13

In Section 3.3 (Macro Porous Polymer Extraction Technology), page 6, the Permittee states "[t]he design of the MPPE system employs two extraction columns allowing continuous operation in one column with simultaneous extraction and regeneration in the other column. A cycle time of one-hour extraction and one hour regeneration is typical." The Permittee states in Section 4.2.4 (MPPE System), page 9, that "[t]he MPPE system will consist of two columns operating in parallel. One column will be in service while the other is being regenerated. The columns will switch their mode of operation on a routine schedule (e.g., hourly)."

NMED Response

The Permittee must revise the Work Plan to address the maintenance of the MPPE system to include the frequency of maintenance and the effects of such maintenance on the operation of the WWTS.

Comment 14

In Section 4.2.3 (DGF System), page 9, paragraph 3, the Permittee states "The DGF float material will be skimmed from the top of the DGF using a variable speed scraping mechanism. The skimmed float will be sent to the DGF float storage and dewatering system. The float system will consist of retention tanks with gravity dewatering. This material will normally be recycled to a refining process (on-site or off-site). If recycling is not available, the float material will be managed as a hazardous waste."

NMED Response

The Permittee must provide more details about the DGF unit and DGF float storage and dewatering system and revise the Work Plan to identify how many retention tanks will be utilized and discuss all maintenance requirements and frequency of maintenance of the DGF unit and the DGF float storage and dewatering system.

Comment 15

In Section 4.4 (Management of Off-Spec Wastewater), page 10, the Permittee states "[p]rocess monitoring will be used to identify when this diversion is needed."

NMED Response

The Permittee did not describe or define the process monitoring, does not address how the upgraded WWTS will be monitored to ensure system is operating correctly, or discuss how the Permittee will demonstrate that the effluent entering into EP-1 is not a hazardous waste. The Permittee must revise the Work Plan to include sampling activities that will be conducted to monitor the upgraded wastewater treatment system and describe "process monitoring." In addition, the Permittee must discuss in detail in the text of the Work Plan where sample ports will be located within the wastewater treatment system (influent and effluent sampling ports in the EQ Tank, new API separator, DGF, MPPE, T27/T28). The sampling ports must be constructed in a manner that allows for reduced flow rates (low flow) to minimize the loss of volatile organic compounds (VOCs) when samples are collected (Figure 1 depicts sample points but these are not described within the text).

Comment 16

In Section 4.5 (Tank Design, Secondary Containment, and Leak Detection), page 11, the Permittee states "Under the terms of the CAFO, the tanks and ancillary equipment downstream of the API Separator, including diversion tank systems, are subject to 40 CFR §262.34(a). By reference, these systems are therefore subject to 40 CFR 265 Subpart J for tank systems. Accordingly, the systems downstream of the new API separator will comply with the tank design requirements of 40 CFR 265 Subpart J, including secondary containment and leak detection. Since the CAFO was signed just recently, Western Refining is still determining how the specific design requirements of the CAFO will be implemented."

NMED Response

NMED cannot evaluate a Work Plan that does not include complete design specifications. The Permittee must revise the Work Plan to include all the design details that comply with 40 CFR

262.34(a) and 40 CFR 265 Subpart J Tank Systems. The Permittee must identify all units by name that are subject to the requirements and how they will comply with 40 CFR 262.34(a) and 40 CFR 265 Subpart J (this must include the EQ Tank, Tanks T27 and T28, the DGF, the DGF Float Storage and Dewatering tank(s), and the MPPE unit).

<u>**Comment 17**</u>

In Section 4.5 (Tank Design, Secondary Containment, and Leak Detection), page 11, the Permittee states "[i]n general, secondary containment requirements for tanks will be met through concrete or impermeable liner containment areas. Containment volumes will be 1.3 times the volume of the largest tank within that area to include an allowance of precipitation. Leak detection for tanks with bottoms that cannot be visually inspected will be provided by installing double bottoms with leak detection on those tanks. The secondary containment and leak detection requirements for piping systems covered by the CAFO will also be implemented where required."

NMED Response

The Permittee indicates that the upgraded system, where applicable, will comply with secondary containment and leak detection requirements. The Permittee must revise the Work Plan to provide the specific design details where secondary containment and leak detection will be constructed, including the specific units and individual type of secondary containment to be constructed, including piping and leak detection devices. The upgraded WWTS must comply with the applicable requirements of the OCD Discharge Permit (GW-032) as well.

<u>**Comment 18**</u>

In Section 4.5 (Tank Design, Secondary Containment, and Leak Detection), page 11, the Permittee states "In the event that there are new tanks(s) or ancillary equipment not covered by the CAFO, such as those upstream of the API Separator, those systems will be designed to standards in accordance with GW-032 and related OCD requirements."

NMED Response

The WWTS must be designed to meet all applicable regulations upstream and downstream of the API separator.

<u>**Comment 19**</u>

In Section 4.6 (Air Emissions Control), page 11, the Permittee states that some units generate "negligible air emissions."

NMED Response

The Permittee must revise the Work Plan to define the methods used to determine air emission levels and, based on those methods what would be considered negligible. The Permittee must identify and describe air sampling ports and their locations within the WWTS.

Comment 20

The Permittee provided supplemental information for the DGF and MPPE in Attachments A and B, respectively. The attachments provide the general manufacturers information about the DGF and MPPE units, which also include system diagrams. The diagrams are not necessarily specific to the WWTS. The Permittee must revise the Work Plan to include the design and process flow diagrams for the actual DGF and MPPE units that will be installed at the refinery. See Comment 21 Below.

Comment 21

The Permittee included a flow diagram of the alternative design to the WWTS in Figure 1 Flow Diagram Alternative WWTP UPGRADE (attached). The Permittee must revise the figure and add additional figures as necessary to address the following in the revised Work Plan.

a. The Legend found in Figure 1 defines dashed lines as existing; the figure has the API separator surrounded by dashed lines because it is an existing structure. In the response letter, the Permittee must explain why the Storm Water Tanks T27 and T28 were not surrounded by dashed lines since these also are existing structures. The Permittee must revise the figure accordingly.

b. The figure(s) must be design drawings of the actual WWTS that will be installed. The drawings must include the exact number of tanks that make up each component of the WWTS, piping, secondary containment, and leak detection. The drawing must also depict exactly where the flows will be entering and exiting through the various WWTS units (e.g., will influent enter at the top of tanks, sides).

c. The flow diagram must present all above and underground piping associated with the WWTS.

d. NMED requires additional flow meters. The locations of the flow meters are shown on the Attached Figure 1.

If the Permittee intends to proceed with the construction of the alternate WWTS, the Permittee must address all comments contained in this NOD and submit the revised Work Plan as soon as possible to ensure the September 4, 2010 deadline to have the upgraded WWTS installed and operating is met. The revised Work Plan must be submitted with a response letter detailing where all revisions have been made, cross-referencing NMED's numbered comments. In addition, an electronic version of the revised Work Plan must be submitted with all changes shown in red-line strikeout.

If you have questions regarding this letter please contact Hope Monzeglio of my staff at 505-476-6045.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
D. Cobrain NMED HWB
H. Monzeglio, NMED HWB
D. McElroy, NMED AQB
C. Chavez, OCD
J. Dougherty, EPA Region 6
D. Edelstein, EPA Region 6
A. Allen, Western Refining Southwest, Inc.
File: Reading File and GRCC 2009 File
HWB-GRCC-09-006

Western Refining
GALLUP

WNR LISTED NYSE

September 25, 2009

RECEIVED OCD

2009 SEP 28 P 12: 04

Mr. James P. Bearzi
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Process Design Report for the Wastewater Treatment Plant Work Plan (Alternative Design)
Western Refining Company Southwest, Inc. (Gallup Refinery)
EPA ID# NMD000333211
HWB-GRCC-09-022

Dear Mr. Bearzi:

Enclosed with this letter is the Process Design Report for the Wastewater Treatment Plant Work Plan (PDR Work Plan). This version of the PDR Work Plan presents an alternative system design and replaces the previous Work Plan submitted on May 26, 2009. The two major changes in the proposed design are as follows:

1. A new equalization tank upstream of the API Separator and a new dissolved gas flotation (DGF) system downstream of the API Separator will be installed. These systems replace the proposed tank-based separator system in the previous submittal.
2. A new macro porous polymer extraction (MPPE) system will be installed for removal of benzene. This system replaces the proposed bioreactor system in the previous submittal.

We are requesting approval from New Mexico Environment Bureau (NMED) and the Oil Conservation Division (OCD) for this alternative design. Please note that we will continue our ongoing design efforts for the alternative system while awaiting approval, in order to maintain the schedule for system implementation presented in Section 5 of the PDR Work Plan.

As part of these ongoing design efforts, we will be conducting an on-site pilot-scale test of the MPPE technology during the month of October 2009 and possibly extending into November 2009. The pilot test is being performed to confirm design criteria for the MPPE vendor as a standard requirement of their design process. A pilot-scale DGF system will be operated upstream of the pilot-scale MPPE system in order to simulate the full-scale treatment scheme. The pilot-scale system will be processing approximately 20 gallons per minute (gpm) of API Separator effluent.

We are also responding to certain comments in your September 1, 2009 letter (Attachment AA) regarding the Approval with Modification of the May 26, 2009 PDR

I-40 Exit 39, Jamestown, New Mexico 87347 • 505 722-3833 • www.wnr.com
Mail: Route 3 Box 7, Gallup, New Mexico 87301

Work Plan. We have no response to Comments 1, 2, 4, 9, B, C, E, and G. They are either accepted (*1,4,9,C,E,G*) or do not apply (*2,B*) to the alternative design. Our responses to Comments A and D are provided below as they still apply to the alternative design.

Response to Comment A: We request the approval to continuously discharge flows of less than 30 gpm from the storm sewer to T27 and T28. We agree that T27 and T28 will potentially receive hazardous waste and that hazardous waste cannot accumulate in these tanks for more than 90 days. However, we disagree that these facts are a basis for not allowing the storm sewer to discharge to these tanks during low flow (dry weather) conditions. In fact, our objective in directing dry weather flow to T-27/28 is to improve the RCRA compliance situation at these tanks. If the storm sewer low flow condition is continuously discharged to these tanks and the tanks are operated at a low liquid level, then with the appropriate recordkeeping it can be assured that the 90-day accumulation period would not be exceeded. For example, if the tanks are operated at a 2-ft liquid level (13,000 gallons each), a 1 gpm flow rate from the storm sewer would turn over the contents of the tanks every 18 days. The tanks would be managed to provide turnover of the solids along with the liquid. We believe that this mode of operation is acceptable as a "continuous flow process" as described in the USEPA's February 16, 2007 interpretation letter (attached) regarding the turnover of hazardous waste stored in generator accumulation tanks.

We would also like to note that enough liquid needs to be maintained in T27/28 at all times to allow the floating roof to properly control air emissions (i.e., to remain floating). The tank cannot be completely emptied on a batch basis without landing the roof on its support legs, which is contrary to Clean Air Act (CAA) air emission standards (specifically, the New Source Performance Standards or NSPS at 40 CFR 61 Subpart QQQ). Since the roof supports will be at the 1.5-ft level, the minimum liquid level is approximately 2 ft as discussed above. Some amount of tank turnover will be required to maintain compliance with both the 90-day accumulation requirements and to maintain a floating roof for the air emission standards. Thus, during dry weather periods lasting longer than 90 days, influent sources to T-27/28 other than wet weather stormwater will be required (a minimum of 26,000 gallons every 90 days).

If we were required to always discharge the storm sewer directly to the API separator during dry weather conditions, we would be concerned about the risk of overflowing the API separator during subsequent storm events. A potential failure could occur with the redirection of the storm sewer from the API Separator to T27/28 at the start of wet weather conditions. Thus, our preference is to not have redirection of the storm sewer as a mandatory requirement.

[Note: We believe it is prudent to have interconnectivity between the process sewer and the storm sewer in order to provide flexibility in management of our process wastewaters and storm waters. This "normally closed" interconnection is reflected in Figure 1 of the PDR Work Plan].

Response to Comment D: We request an extension to March 31, 2011 for the date by which the upgraded system has to be installed and operational. The September 4, 2010 deadline presented by NMED is not achievable given the time required to complete the design, obtain an air permit for construction, construct the system, and initiate start-up. The intermediate milestones that comprise the overall March 31, 2011 schedule are provided in Table 5-1 of the PDR Work Plan. To date, we have researched an upgraded wastewater treatment system and completed its process design. However, we have not been able to complete the full design package required for construction due to the negotiation of the recently finalized Complaint and Consent Agreement and Final Order (CAFO). That CAFO now requires compliance with 40 CFR 62.34(a) which has a major impact on the design requirements for the alternative system. Other limiting factors are that construction cannot start until an air permit is obtained and also that the specialized equipment has long lead times. For example, the DGF system will take 20 to 24 weeks to be fabricated and delivered after it is purchased.

During the period of requested extension (September 4, 2010 to March 10, 2011), we will be operating under the Interim Measures Work Plan (IM Work Plan) required by the CAFO. We will have fully implemented the interim measures to cease the discharge of any hazardous wastewater to any surface impoundment, unless such discharge complies with applicable RCRA standards.

Please contact me at (505) 722-0217 if you have any comments or questions regarding the contents of this letter or the enclosed report.

Sincerely,

Ed Riege
Environmental Manager

cc: Mark Turri
Ann Allen
Don Riley
Shane White
OCD
EPA Region 6

Attachment - February 17, 2002 Interpretation Letter

Attachment AA- September 1, 2009 Letter

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 16 2007

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

Mr. John Hopewell
Manager, Environmental Affairs
National Paint and Coatings Association
1500 Rhode Island Avenue N.W.
Washington, D.C. 20005

Dear Mr. Hopewell:

Thank you for your October 12, 2006 letter in which you seek clarification of 40 CFR 262.34(a)(1)(ii) in connection with the turnover of hazardous wastes stored in generator accumulation tanks. Specifically, you request guidance on whether a hazardous waste generator accumulation tank has to be completely emptied every 90 days to meet the accumulation time requirement, or whether the tank volume can be "turned over," removing a volume of material equal to or greater than the tank volume from the tank every 90 days. This turnover approach (which EPA refers to in our letter as the "mass balance approach") appears to be used, as described in your letter, in connection with tanks that receive hazardous wastes on an ongoing, continuing basis (which EPA refers to in our letter as a "continuous flow process"). By completing this turnover, you believe that the hazardous waste volume remaining in the tank unit would not be considered as being stored or accumulated for more than 90 days, thus avoiding the need to obtain a Resource Conservation and Recovery Act (RCRA) Part B storage permit. In response to your request, EPA is interpreting 40 CFR 262.34(a)(1)(ii) to allow for the turnover approach you describe in your letter, subject to the various conditions and requirements we discuss in greater detail below.

As you state in your letter, large quantity generators accumulating hazardous wastes in tanks must comply with the 40 CFR 262.34(a)(1)(ii) requirements in order to accumulate hazardous waste on-site in tanks for 90 days or less without a permit, provided they comply with the 40 CFR part 265 Subpart J requirements (except 265.197(c) and 265.200). You believe that, as written, this regulation is unclear and, in the absence of any clarification in this area, may be interpreted to mean that each tank must be completely emptied at least every 90 days even where the tank's "volume capacity" has already been turned over within the 90 day timeframe. You argue instead for an interpretation of this regulation to allow for hazardous waste "turnover" at least once every 90 days.

EPA interprets this regulation to allow large quantity generators accumulating hazardous wastes in tanks to meet the 40 CFR 262.34(a)(1)(ii) requirement by using periodic tank "turnover," so long as hazardous waste entering the tank remains in the unit for no more than 90 days. EPA's interpretation of this regulation is set forth below in greater detail.

Tanks can be operated in one of two ways – in a batch process or in a continuous flow process.

Batch Process

Under a batch process, a tank receives a batch (or batches) of hazardous waste on a one-time or intermittent basis. Under a batch process scenario, the 90-day waste accumulation clock for a large quantity generator starts when hazardous waste first enters the tank. If, for example, the tank fills up in 30 days, and is emptied on day 30, the requirements of 40 CFR 262.34(a)(1)(ii) are met since the hazardous waste has been in the tank for less than 90 days. The next 90 day period begins when hazardous waste is added to the tank that has been emptied (for example, on day 31). If the tank is emptied a second time within 90 days of day 31, the requirements of 40 CFR 262.34(a)(1)(ii) are met.

EPA explained this particular method of 90-day waste accumulation calculation, intended to apply to tanks utilizing a batch process, in the preamble to the generator accumulation final rule promulgated on January 11, 1982 (47 FR 1250):

> As with accumulation in containers, the 90-day period begins the moment the generator first places hazardous wastes in an "empty tank." The generator then must remove all wastes from the tank within 90 days from the time he first places wastes in the "empty" tank. A tank will be considered empty when its contents have been drained to the fullest extent possible. Since many tank designs do not allow for complete tank drainage due to flanges, screens or siphons, it is not expected that 100% of the wastes will always be removed. As general guidance, a tank should be considered empty when the generator has left the tank's drainage system open until a steady, continuous flow has ceased."

Large quantity generators utilizing a batch process must meet the requirements of 40 CFR 262.34(a)(1)(ii). For example, the use of inventory records in conjunction with tank markings may provide confirmation that the tank has been emptied within an appropriate time period. Specifically, the inventory records typically show the dates and associated quantity of hazardous waste entering the tank, as well as the dates the tank was emptied. Shipping or hazardous waste manifest records also may be used to verify when the tank was emptied. Likewise, tanks accumulating hazardous wastes may have information indicating the time and date hazardous waste first entered the tank. There may be other methods to demonstrate that a tank has been emptied, but any method used to confirm compliance with 40 CFR 262.34(a)(1)(ii) must be reasonable and easily discernible to EPA or an authorized state.

Continuous Flow Process

Under the continuous flow process, in contrast to the batch process described above, the tank receives hazardous waste on an ongoing, continuous basis. In the case of hazardous wastes flowing through tanks continuously, there is a means of demonstrating when a tank is "emptied" within 90 days under 40 CFR 262.34(a)(1)(ii) that would not require completely emptying the tank, and may be more suitable for tanks with continuous flow. More specifically, a mass balance approach (i.e., the "turnover" approach, as you referred to it, in your letter) can be used for continuous flow tanks rather than the approach described above for batch process tanks. The key parameters in this mass balance approach are the volume of the tank (e.g., 6,000 gallons), the daily throughput of hazardous waste (e.g., 300 gallons per day) and the time period the hazardous waste "resides" in the tank. In this example, the hazardous waste entering the tank would have a residence time of 20 days ((6,000 gallons/300 gallons per day) = 20 days) and meet the requirements of 40 CFR 262.34(a)(1)(ii) since the hazardous waste has been in the tank for less than 90 days.

Large quantity generators accumulating hazardous wastes through a continuous flow process must also demonstrate that the hazardous waste has not been stored for more than 90 days. This may be achieved by the use of inventory, or some form of accounting or monitoring data. For example, a generator could confirm that the volume of a tank has been emptied every 90 days by recording the results of monitoring equipment both entering and leaving a tank. This recordkeeping, in conjunction with the tank volume, would enable inspectors, as well as facility personnel to demonstrate compliance with 40 CFR 262.34(a)(1)(ii). Likewise, in marking the tank, a generator could mark both the tank volume and estimated daily throughput to allow inspectors to determine the number of days that hazardous waste resides in a tank to determine compliance with 40 CFR 262.34(a)(1)(ii). As noted above, there may be other methods to demonstrate that a tank has been emptied, but any method or demonstration to confirm compliance must be reasonable and easily discernible to EPA or an authorized state.

As you state in your letter, generators also would still be required to meet all applicable hazardous waste tank regulations found in 40 CFR part 265, Subpart J. In addition, if the tank is removed from service, the regulation requires the system to undergo a formal RCRA closure to remove or decontaminate all hazardous waste associated with the tank system.

Please note that this is EPA's interpretation of the federal hazardous waste regulations. Most states are authorized to operate their own hazardous waste management program. As such, states may impose regulations which may be more stringent and/or broader in scope than the federal regulations. Therefore, you should check with the appropriate state agency to determine the requirements applicable to your activities.

Should you have any questions on this subject, please contact Jim O'Leary at (703) 308-8827 or oleary.jim@epa.gov.

Sincerely yours,

Matt Hale, Director
Office of Solid Waste

cc: Tom Kennedy, Association of State and Territorial Solid Waste Management Officials (ASTSWMO)
Barry Elman, OPEI

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

September 1, 2009

Mr. Ed Riege
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
Route 3, Box 7
Gallup, New Mexico 87301

RE: APPROVAL WITH MODIFICATION
PROCESS DESIGN REPORT FOR WASTEWATER TREATMENT PLANT UPGRADE (REV. A)
WESTERN REFINING COMPANY, SOUTHWEST, INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-GRCC-09-002

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has reviewed the *Process Design Report For Wastewater Treatment Plan Upgrade (REV. A)* (Work Plan), dated May 26, 2009, submitted on behalf of Western Refining Company, Southwest Inc., Gallup Refinery (the Respondent). On August 17, 2009, NMED received an e-mail with an attached letter from the Respondent stating "[t]his letter serves as Western Refining Gallup's ("Gallup") withdrawal from NMED's consideration of the Process Design Report For Wastewater Treatment Plan Upgrade (Rev. A) prepared by Brown and Caldwell and submitted to NMED on May 26, 2009. As we discussed, Gallup intends to submit to NMED an alternative wastewater treatment system work plan." The

May 26, 2009 Work Plan is referenced in the EPA Compliant and Consent Agreement and Final Order dated August 26, 2009 (CAFO), paragraph 100.C which states "[t]he Respondent submitted, on May 30, 2009, a Process Design Report for Wastewater Treatment System Work Plan for NMED and OCD approval for the design and construction of the upgraded wastewater treatment system. Upon NMED and OCD approval, all deadlines, work/design requirements, and sampling and monitoring requirements in a Process Design Report for Wastewater Treatment System Workplan shall become part of, and enforceable under, this CAFO."

Comments to the Work Plan already submitted are provided below. NMED understands that the Respondent may submit a work plan for the wastewater treatment system. Nevertheless, the Respondent must adhere to Comments C and D below and all other applicable comments.

Comment 1/Response 1

In the Response Letter (dated May 28, 2009), Response 1, the Respondent states "[n]ote: the Refinery is an interim status facility so the correct regulatory citations are HWA 20.4.1.600 and 40 CFR 265 as indicated in the response, rather than 20.4.1.500 and 40 CFR 264 stated in the original comment." In Section 1.5 (Regulatory Criteria) of the Work Plan, page 1-2, the Respondent states "[o]nce a [National Pollutant Discharge Elimination System] NPDES Permit is issued, the WWTP will be regulated under the Clean Water Act and thus exempt from RCRA's 40 CFR 265[1] requirements. Therefore, the design basis for the WWTP upgrades assumes the compliance with RCRA 40 CFR 265 is not required. If for some reason a NPDES permit cannot be obtained, the design will be revised and resubmitted to reflect compliance with 40 CFR 265." Footnote 1 states "[n]ote: The Refinery is an interim status facility so New Mexico Hazardous Waste Act [sic] 20.4.1.600 and 40 CFR 265 apply rather than 20.4.1.500 and 40 CFR 264."

NMED Response

The following corrections and requirements apply to the Respondent:

a. The Gallup Refinery is not an interim status facility. If the Respondent considered Aeration Lagoons 1 and 2 (AL-1 and AL-2) as interim status units, then the Respondent would have needed to submit a revised Part A Permit Application for those units in accordance with 20.4.900 NMAC (incorporating) 40 CFR 270.10 and a Part B permit application would have been required. In addition, interim status requires compliance with the requirements found in 20.4.1.900 NMAC (incorporating) 40 CFR 270.70 and 270.10(e)(ii). AL-1 and AL-2 are solid waste management units (SWMU), as indicated in Appendix A of the Post-Closure Care Permit (Permit).

b. As long as the Respondent continues to treat wastewater in AL-1 and AL-2 that is characteristically hazardous for benzene, the facility is treating hazardous waste. The CAFO allows the Respondent 120 days from NMED's approval of an Interim Measure Work Plan to achieve compliance.

c. The regulations cited by the Respondent ("HWA [sic] 20.4.1.600 and 40 CFR 265") are incorrect. The Respondent has not met the requirements for interim status; therefore, 40 CFR 265 (20.4.1.600 NMAC) does not apply.

d. The CAFO appropriately requires the Respondent to comply with the hazardous waste generator requirements found in 20.4.1.300 NMAC (incorporating) 40 CFR 262.34(a).

Comment 2/Repsonse 2

In the Response Letter, Response 2, the Respondent states "[s]hould Western Refining elect to perform BOX testing, and should that testing indicate that the addition of the MBBR media is not required, then Western Refining will seek approval from OCD to modify the Bioreactor design to exclude media."

NMED Response: The Respondent must also obtain approval from NMED to modify any portion of the wastewater treatment system.

Comment 4/Response 4

In the Response letter, Comment 4, NMED states "[t]he WWTS must contain influent and effluent sampling ports to accommodate sampling at the new API separator…."

NMED Response: From review of Section 6.1 (Sampling Locations), the influent to the API separator cannot be sampled. NMED reserves the right to require sampling of the influent entering the new API separator and the Respondent must be capable of collecting such samples.

Comment 6/Response 6

In the Response letter, Comment 6/Response 6 addresses dredging of Evaporation Pond 1 (EP-1). The Respondent responded stating "[d]redging of EP-1 will be addressed in the Corrective Measures Implementation Work Plan due to NMED on July 31, 2009. Western Refining will take the position that the initial dredging is not warranted and that the frequency a [of] future dredging events can allow for more than one foot of accumulation."

NMED Response: There have been documented releases when hazardous waste has entered EP-1; therefore, at a minimum, EP-1 contains listed hazardous waste (F037/F038). The upgraded wastewater treatment system is intended to ensure that hazardous waste will not enter EP-1. Dredging will remove residual contamination in order to enable the Respondent to demonstrate future compliance. The Respondent shall comply with the dredging requirements found in NMED's April 15, 2009 Notice of Disapproval (NOD), Comment 6. No revision is necessary.

Comment 9/Response 9

In the Response Letter, Response 9, the Respondent states "[m]eeting the [requirements of] 20.6.2.3103 standards is not a stated treatment objective of the upgraded WWTS. The treatment objectives (as stated in Section 1.4 of the Report) are for there to be no visible free oil and <0.5 mg/L benzene. The concentrations of other parameters are expected to be consistent with the historical data reported for the EP-1 inlet under the GW-32 monitoring requirements." Section 1.4 of the Work Plan states "[t]he treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. This project design was developed based on these objectives."

NMED Response: As identified in the objectives, the effluent entering into EP-1 must not contain free oil, and benzene concentrations must be below <0.5 mg/L. However, these should not be the sole objectives of the WWTS upgrade. The WWTS and the effluent entering into EP-1 must comply with all applicable requirements found in the Oil Conservation Divisions (OCD) Discharge Plan GW-32, as well as comply with all other applicable regulations. Discharges to the unlined Evaporation Ponds must not create the potential for impacts to groundwater.

Additional NMED/OCD Comments

Comment A

In Section 4.2.1 (Stormwater/Diversion Tanks), page 4-1, paragraph 2, the Respondent states "[o]il that may accumulate on the surface of T27 and T28 [Stormwater/Diversion Tanks] will be captured from a skimmer device mounted on each tank's floating roof. The skimmed oil will be collected by a vacuum truck and transferred to the Refinery's slop oil system for recycling back to the refining process. Solid material that may settle on the bottom of T27 and T28 will be removed on a periodic basis and managed along with similar material collected from the NAPIS. This material is normally recycled to an off-site refining process. If recycling to a refining process is not available, the T27 and T28 bottom solids will be managed as a hazardous waste."

NMED Response: Storm water at the refinery comingles with process water and therefore potentially contains hazardous waste (D018 and F037/F038 listed wastes). The Respondent is not allowed to accumulate hazardous waste in Tanks T27 and T28 for more than 90 days. Therefore, the Respondent's must design their storm water system to direct the ongoing low flow of process wastewater in the storm water system to the API separator except during storm events when higher flows trigger diversion of storm water to Tanks T27 and T28 at flow rates greater than approximately 30 gallons per minute (gpm) to prevent flow rates from exceeding capacity of the API separator or wastewater treatment system.

Comment B

In Section 4.2.4 (Tank-Based Separator), page 4-2, paragraph 5, the Respondent states "[t]he Tank-based separator is not designed to be compliant with 40 CFR 265 Subpart J due to Western Refining's intention to obtain an NPDES permit for the WWTP. If an NPDES permit cannot be obtained, the design of the Tank-based separator will be modified to be compliant with 40 CFR 265 Subpart J."

NMED Response: The CAFO requires the Respondent to comply with the requirements found in 20.4.1.300 NMAC (incorporating) 40 CFR 262.34(a). This applies to all applicable sections within the Work Plan (e.g. Section 4.2.5 (Bioreactors), paragraph 1 and Section 4.5 (Secondary Containment and Leak Detection)).

Comment C

In Section 4.6 (Alternative Upgrade Approach), page 4-6, last sentence, the Respondent states "Western Refining will submit the alternative design approach to OCD for approval prior to implementation."

NMED Response: The Respondent discussed an alternative approach to the upgraded WWTS to NMED and OCD in a meeting on July 1, 2009 that addressed the use of Macro Porous Polymer Extraction and a dissolved gas flotation unit. On August 17, 2009, the Respondent submitted a letter withdrawing the Process Design Report For Wastewater Treatment Plan Upgrade (REV. A). If the Respondent chooses to pursue an alternative wastewater treatment system, a new work plan must be submitted to OCD and NMED for approval by both agencies. The new work plan must describe all aspects of the alternative design. The implementation of an alternative approach will not change the deadline established in Comment D below which provides a deadline for the start of operation of an upgraded WWTS.

Comment D
The Respondent includes a Project Schedule in Section 5.

NMED Response: NMED does not approve the schedule presented in Section 5. The facility has had ample time to research and design an upgraded wastewater treatment system and first proposed upgrades in May 2007. Therefore, the Respondent must have the upgraded wastewater treatment system installed and operating by September 4, 2010.

Comment E
In Section 6.1 (Sample Locations), page 6-1, the Respondent states "[t]he WWTP upgrades will include wastewater sample stations at key locations for monitoring system performance. These locations are indicated by notations on the process flow diagrams in Attachments A and C and are listed below:"

NMED Response: The sampling ports were not described in the Work Plan. The Respondent must ensure that the sampling port mechanisms to be installed are capable of controlling the flow through the sampling ports to minimize volatilization. There are no notations for sample locations in Attachment C. No revision is necessary; the Respondent must install the sampling ports as required in the NMED's April 15, 2009 NOD.

Comment F
In Section 6.3 (Sample Analysis for Regulatory Reporting), page 6-2, the Respondent identifies sampling parameters for the EP-1 influent. The Respondent must address the following:

a. Table 6-2 lists the EPA method for semi volatile organic compounds (SVOCs) as "EPA 8260 C." The correct analytical method for SVOCs is EPA Method 8270. The Respondent must revise Table 6-2 to include the correct EPA Method and submit a replacement page that includes the corrections.

b. The EPA method proposed to be used to detect benzene is 8021B. In addition to benzene, EPA Method 8021B also analyzes for toluene, ethylbenzene, and total xylenes (BTEX). When reporting the analytical data, the Respondent must report all BTEX data. The Respondent must revise the Table 6-2 to include the analysis of toluene, ethylbenzene, and xylenes in addition to the benzene and submit a replacement page. If EPA Method 8260 is used, all analytes listed for the Method must be reported.

c. The Respondent states in Section 6.3 that "Western Refining will seek approval from OCD to discontinue the regulatory reporting requirements for the Pilot Travel Center (i.e., "Effluent from the Pilot Gas Station to the Aerated Lagoon") and the NAPIS

Effluent (i.e., "Effluent from the new API Separator) as required by Condition 19 of GW-032...." The Respondent must also obtain approval from NMED. Since this page is being resubmitted, this proposed revision must be included with the replacement pages.

Comment G

During the month of June 2009, the refinery reported an overflow at the API separator due to intense rain events. The API separator must be able to handle storm water surges caused by rain events. The overflow at the API separator implies that the storm water and the process water sewer systems are still interconnected. The Respondent must account for intense rain events in the wastewater treatment system design to ensure API overflows do not occur in the future.

The Respondent must comply with all comments contained in this letter. The replacement page(s) as specified must be submitted to NMED and OCD on or before September 25, 2009 in the event that an alternate wastewater treatment system design plan is not submitted. Provided that the Respondent complies with all the requirements of this letter, NMED approves the May 26, 2009 Work Plan. In any event, the upgraded wastewater treatment system must be installed and operating by September 4, 2010.

If you have questions regarding this letter please contact Hope Monzeglio of my staff at 505-476-6045.

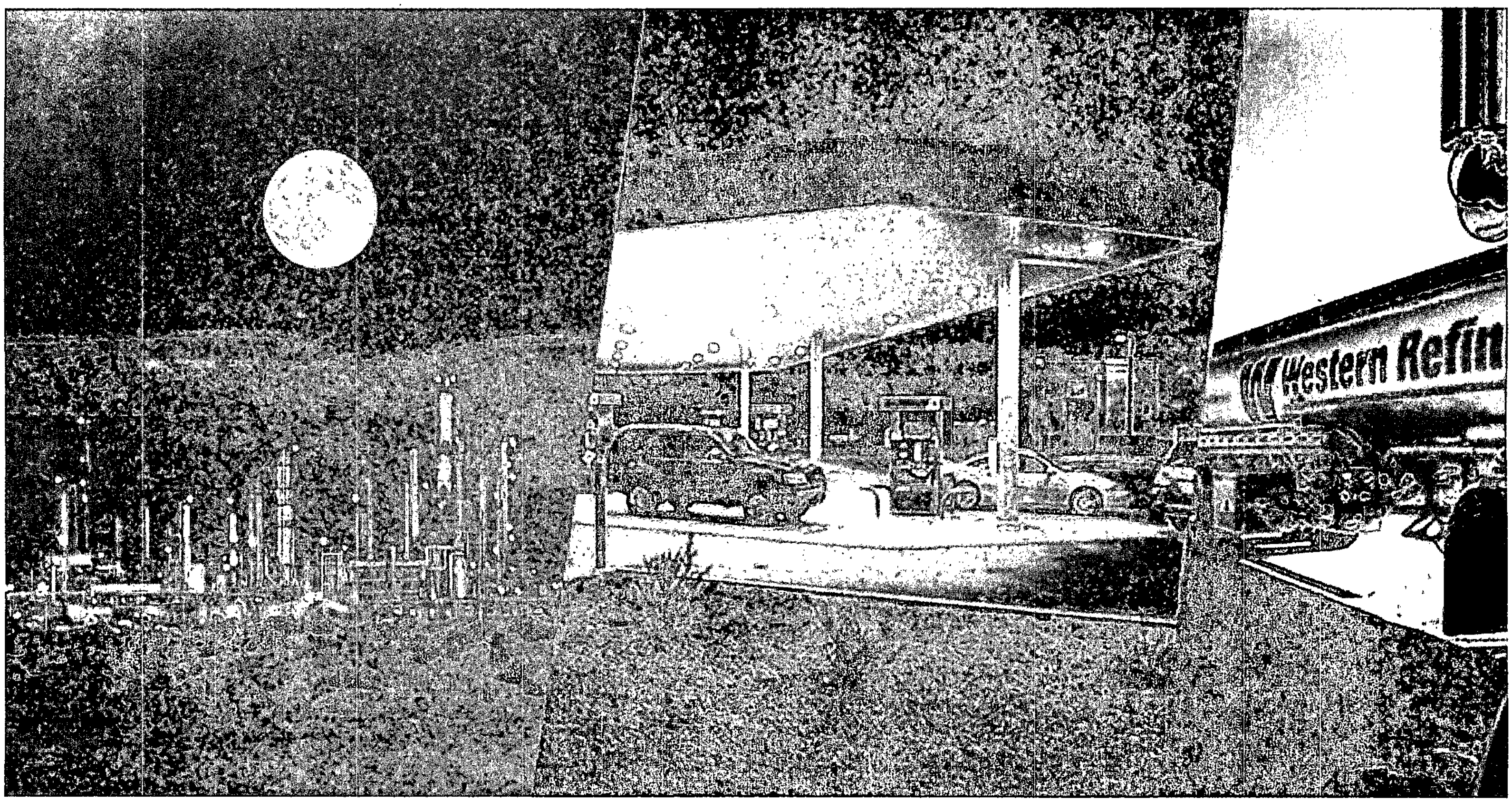
Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
D. Cobrain NMED HWB
H. Monzeglio, NMED HWB
C. Chavez, OCD
G. Rajen, Gallup
J. Dougherty, EPA Region 6
D. Edelstein, EPA Region 6
A. Allen, Western
File: Reading File and GRCC 2009 File
HWB-GRCC-09-002

Process Design Report for Wastewater Treatment Plant Work Plan (Alternative Design)

Western Refining
Gallup, New Mexico



September 2009

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1. INTRODUCTION

1.1 Introduction

The Western Refining Southwest's Gallup Refinery is a petroleum refinery located in Jamestown, New Mexico at Interstate 40 Exit 39. This Process Design Report for Wastewater Treatment Plant Work Plan (PDR Work Plan) presents the planned upgrades of the wastewater treatment plant (WWTP) at the refinery. This version of the PDR Work Plan replaces the May 26, 2009 version and presents an alternative design concept.

On August 27, 2007 Western Refining received a renewal of its discharge permit GW-032 from the New Mexico Oil Conservation Division (OCD). The permit required the refinery to complete certain actions related to wastewater management. This Work Plan addresses aspects of the following permit conditions:

1. Condition 16C - Treatment Study and Design
2. Condition 16D - Aeration Lagoons
3. Condition 16E – Evaporation Ponds

In August 2009, Western Refining and USEPA Region 6 agreed to the terms of a Complaint and Consent Agreement and Final Order (CAFO) that imposes additional regulatory requirements on the upgraded WWTP. Paragraph 100 of the CAFO sets forth certain WWTP-related compliance requirements under the Resource Conservation and Recovery Act (RCRA). These include:

1. Paragraph 100 B – "*Respondent shall cease the operation of, and dismantle, all existing Benzene/Air Strippers at its facility. . .*"
2. Paragraph 100 C – "*Respondent shall design, construct, properly permit, and commence operation of an upgraded wastewater treatment system . . . that is capable of treating all wastewater. . .*"
3. Paragraph 100 E – ". . . *The tanks and ancillary equipment in the upgraded wastewater treatment system that are in operation downstream of the API Separator shall be compliant with 40 C.F.R. § 262.34(a) . . .*"
4. Paragraph 100 G – "*Respondent shall limit volatile organic ("VO") air emissions from the upgraded waste water treatment system . . . to the limits in 40 CFR 265 subpart CC.*"

This document is an updated version of the May 26, 2009 Work Plan referenced by the CAFO.

The design presented herein for the upgraded WWTP is intended to meet the requirements of permit GW-032 and the CAFO. The new treatment system components will replace the Benzene Strippers and Aeration Lagoons, which will be taken out of service and dismantled. The effluent quality from the new treatment system will be suitable for discharge to an unlined surface impoundment - Evaporation Pond No. 1 (EP-1).

1.2 Project Scope

The scope of the WWTP upgrade project consists of the following new systems:

- Two existing tanks put in service for the storage of process area stormwater and diversion of off-spec wastewater
- A new equalization (EQ) tank upstream of the existing "new" American Petroleum Institute (API) separator that is connected to the process sewer. [Note: this API separator is referred to as the "API Separator" in this Work Plan. It is also known as the NAPIS]
- A dissolved gas flotation (DGF) system downstream of the API Separator
- A Macro Porous Polymer Extraction (MPPE) system downstream of the DGF system
- A pretreatment system for the sanitary wastewater from the Pilot Travel Center and refinery

The new system will allow the following existing systems to be decommissioned:

- Benzene Stripper Nos. 1, 2 and 3
- Aeration Lagoons Nos. 1 and 2 (AL-1 and AL-2)
- The Old API Separator (OAPIS) that is connected to the storm sewer. [Note: this API separator is referred to as "OAPIS" in this Work Plan]

The following existing equipment will continue to be operated in their current function within the upgraded system:

- API Separator
- EP-1 through EP-12

A flow diagram of the upgraded system is provided in Figure 1 at the end of this Work Plan.

1.3 Related Project - Pilot Travel Center Lift Station

A lift station to collect, screen, and pump the sanitary/restaurant wastewater from the Pilot Travel Center to the WWTP has recently been installed and put into service. A force main conveys the wastewater from the new refinery lift station to the WWTP. In the new, upgraded configuration of the WWTP, the wastewater from the new refinery lift station will be pretreated before being discharged into EP-1.

1.4 Treatment Objectives

The treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and ≤0.5 mg/L benzene. The project design was developed based on these objectives.

1.5 Regulatory Compliance

The upgraded WWTP described herein will be designed and constructed in accordance with the requirements of OCD permit GW-032 and the CAFO.

1.6 Report Organization

The PDR Work Plan is organized as follows:

Section 1.	Introduction
Section 2.	Wastewater Sources
Section 3.	Technology Selection
Section 4.	Process Description
Section 5.	Project Schedule

Attachments to the Process Design Report include the following documents:

Attachment A.	Supplemental DGF System Information
Attachment B.	Supplemental MPPE System Information

2. WASTEWATER SOURCES

2.1 Overview

This section of the report reviews the sources of wastewater generated at the refinery. The wastewater sources discharged to the refinery's WWTP fall under two broad categories: those wastewaters generated at the refinery and those generated at the adjacent Pilot Travel Center. The two sources are further described below.

2.2 Refinery Wastewaters

The process wastewaters generated by the refinery are directed to the process sewer that serves as the influent to the API Separator. In addition, two non-oily refinery wastewaters are discharged directly to Evaporation Pond No. 2 (EP-2). These sources are the water softener system and the reverse osmosis (RO) system. Both of these systems are part of the larger boiler feed water treatment system. These wastewaters are not oily and do not contain benzene.

The sanitary wastewater generated at the refinery and the seven adjacent homes owned by the refinery currently discharges to the refinery's newly constructed lift station for the Pilot Travel Center (see Section 2.3 below).

2.3 Pilot Travel Center Wastewaters

The refinery has a contract with the adjacent Pilot Travel Center to treat the sanitary and restaurant wastewaters generated by that facility. The wastewater from the restaurant at the Pilot Travel Center passes through a new grease trap system installed in 2008. The grease trap effluent and the sanitary/restaurant wastewaters from the rest of the Pilot Travel Center flow to a septic tank system. Septage is pumped out of the septic tank system on a scheduled quarterly basis for off-site disposal (as reported by Pilot Travel Center staff). The effluent from the septic tank system gravity flows to a lift station on the Pilot Travel Center property. This lift station, the grease trap, and the septic tank system are owned and operated by the Pilot Travel Center. The lift station's submersible pumps then transfer the wastewater through a pipeline to the refinery for further pumping and treatment. Western Refining is now operating a new lift station on its property to receive the wastewater from the Pilot Travel Center's lift station and the refinery's sanitary systems.

The Pilot Travel Center generates other wastewaters that are not discharged to the refinery. These other wastestreams include truck washing and vehicle maintenance activities. They are managed with on-site oil-water separators, holding tanks, and retention ponds at the Pilot Travel Center.

The design basis assumes that the wastestream discharges from the refinery's new lift station are only sanitary/restaurant in origin and do not include any sources from vehicle service or vehicle washing operations. On this basis, the Pilot Travel Center wastewater was assumed to be free of benzene and hydrocarbon-based oil and grease (O/G).

2.4 Design Flow

The design flow rates for the individual sources are summarized in Table 2-1.

Table 2-1. Design Flow Rates

	Average, gpm	Maximum, gpm
API Separator Effluent	250	500
Pilot Travel Center	50	120
RO Reject	109	149
Refinery Sanitary	4	--

The design flows for the API Separator effluent were set at an average of 250 gallons per minute (gpm) and a maximum of 500 gpm. The average rate was based on historical data, and allowances for future flows. The maximum flow rate equals the maximum flow capacity of the API Separator with both bays in service.

The contract between Western Refining and the Pilot Travel Center limits the maximum flow to 50 gpm. However, the refinery's new lift station pumps are capable of pumping a combined flow of 120 gpm. Accordingly, the Pilot Travel Center design flows were set at 50 gpm average and 120 gpm maximum.

The average flow rate for the refinery's sanitary sources is based on the number of refinery employees. The maximum flow rate for the refinery's sanitary source is included in the Pilot Travel Center maximum flow rate, since it is also constrained by the combined pumping capacity of the new lift station pumps.

3. TECHNOLOGY SELECTION

3.1 Overview

This Section provides the basis of the two major technologies that were selected for the WWTP upgrade: dissolved gas flotation (DGF) and macro porous polymer extraction (MPPE). The DGF system replaces the Tank-based Separator concept from the prior version of the Work Plan. The MPPE system provides the benzene removal capacity of prior bioreactor concept. For further explanation please see attachment A & B.

3.2 Dissolved Gas Flotation

API separators (including the Gallup API Separator) provide first-stage (i.e., primary) oil-water separation. As such, they provide removal of free oil that readily separates from the wastewater by gravity. A second-stage oil-water separation step is required to provide additional O/G removal beyond what is consistently achievable by an API separator. Second-stage oil-water separation can remove the residual O/G and suspended solids that do not readily separate by gravity (i.e., emulsified O/G). This additional removal is required to provide the appropriate influent quality to the downstream unit process (MPPE).

A DGF system will provide the second-stage oil-water separation process for the upgraded WWTP. DGF systems are a common refinery technology downstream of API separators. The DGF process involves the pressurization of wastewater in the presence of air or nitrogen, creating a super-saturated solution that when passed into the flotation chamber at atmospheric pressure creates small gas bubbles in the liquid. These bubbles unite with the dispersed oil phase to form a collection of distinct gas-oil particles called coagules that are carried to the surface. The float is removed to disposal by mechanical flight scrapers while the underflow is the clarified water effluent. The air or nitrogen is introduced to the wastewater by pressurizing a side stream of DGF effluent and recycling it back to the flotation chamber. Organic polymers are added to the DGF influent stream to facilitate the oil-water separation.

3.3 Macro Porous Polymer Extraction Technology

The MPPE technology removes dissolved and dispersed hydrocarbons from water. Developed in the early 1990s by Akzo Nobel, MPPE is a liquid-liquid extraction process where the extraction liquid is immobilized in a macro-porous polymer particle. MPPE particles have a diameter of 1,000 microns, with pore sizes of 0.1 to 10 microns.

The MPPE technology has been successfully applied to the treatment of process water, offshore produced water, industrial wastewater, and contaminated groundwater since 1994. Dissolved and dispersed compounds that can be removed from water and wastewater with the MPPE technology include aromatics (e.g., benzene, toluene, xylenes, and ethylbenzene); polyaromatic hydrocarbons (PAHs) (e.g., naphthalenes, phenanthrenes, dibenzothiophenes); and aliphatics including halogenated aliphatics. MPPE systems currently in operation are removing dissolved aromatics (principally benzene), PAHs, and aliphatics. The high hydrocarbon removal efficiencies achievable with MPPE technology result from the number of mass transfer stages that are developed in the packed bed, mainly from the high specific surface area for mass transfer associated with the porous polymer beads. Benzene is the rate limiting constituent and determines the sizing of the MPPE system. The proposed DGF pretreatment system upstream of the MPPE technology will minimize fouling of the porous polymer beads by free oils and solids in the influent wastewater.

A schematic of the MPPE process is provided in Figure 2. Following primary and secondary oil-water separation, the refinery wastewater is passed through a column packed with MPPE particles. The particles are porous polymer beads that contain an appropriate extraction liquid suitable for the removal of aromatic hydrocarbons and PAHs. The immobilized extraction liquid removes only the dissolved hydrocarbons that have a high affinity for the extraction liquid (i.e., the constituents that are removed have partition coefficients that guarantee a high affinity for the extraction liquid). The treated wastewater is then free of the target constituents (e.g., BTEX), which now reside only in the extraction liquid.

The extraction liquid must be regenerated at fixed intervals to sustain effective target constituent removal. The extraction liquid (immobilized on polymer beads) is regenerated by stripping the hydrocarbons from the MPPE bed with low pressure steam. The stripped hydrocarbons are condensed and separated from the water phase by gravity. This 100 percent pure hydrocarbon phase is recycled to the refinery for reprocessing. The condensed water is recycled to the MPPE system. . The design of the MPPE system employs two extraction columns allowing continuous operation in one column with simultaneous extraction and regeneration in the other column. A cycle time of one-hour extraction and one hour regeneration is typical.

The MPPE technology provides the following benefits:

- The dual-column system can be sized for the specific flow requirements and optimized for benzene removal.
- Pure hydrocarbon phase recovery is feasible.
- The wastewater flow turndown ratio can be adjusted to less than 20 percent of the installed flow capacity of the unit.
- The system is flexible in that it can be adjusted to changing flow and target constituent concentration levels while maintaining consistent effluent quality.

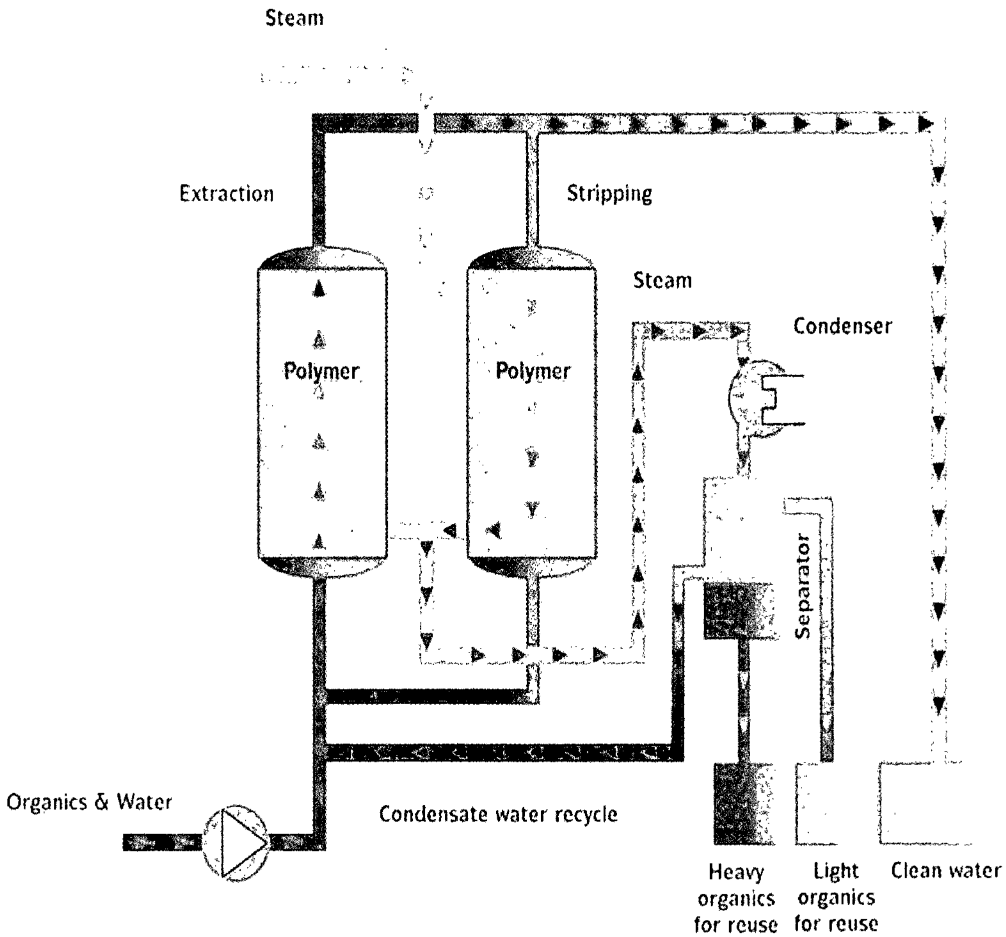


Figure 2. MPPE Process Schematic
(courtesy of Veolia Water)

4. PROCESS DESCRIPTION

4.1 Overview

This section provides a process description of the new systems that will comprise the refinery's WWTP following implementation of the upgrades. The first subsection discusses the new systems to be installed as part of the WWTP upgrades. The second subsection discusses the existing systems that will be decommissioned as part of the WWTP upgrades. This section concludes with a discussion of management of off-spec wastewater, and secondary containment and leak detection. A flow diagram is included as Figure 1 at the end of this Work Plan.

4.2 New Systems

A description of the major equipment for the new WWTP is provided below.

4.2.1 Stormwater/Diversion Tanks

A new stormwater management system will be constructed for the stormwater collected in the process area. This stormwater is currently collected in a dedicated sewer that discharges to the OAPIS. In the new system, stormwater will flow by gravity to two Stormwater/Diversion Tanks. These tanks are existing with a designation of Z84-T27 and T28. The tanks have dimensions of 33 ft-5 inch diameter by 32 ft height, for a volume of 210,000 gallons each. The combined volume of 420,000 gallons will provide storage capacity for a 100-yr, 1-hour storm event (415,886 gallons). The tanks will have internal floating roofs for air emissions control. Stormwater that collects in the tanks will be pumped at a rate of 50 to 200 gpm in a dedicated line to the new API Separator. Two variable speed pumps will be provided (one operating, one standby). Because the stormwater will be diverted and treated in the new API Separator, the OAPIS will be taken out of service (see Section 4.3.3).

Oil that may accumulate on the liquid surfaces of T27 and T28 will be captured from a skimmer device contained within each tank's floating roof. The skimmed oil will be collected by a vacuum truck and transferred to the refinery's rerun oil system for recycling back to the refining process. Prior to pumping the T27/28 contents to the API Separator, solid material that may have settled on the tank bottom will be re-suspended through mixing.

Cleanouts will be installed on the conveyance pipelines to and from the Stormwater/Diversion Tanks. Cleaning events will be scheduled on a regular, recurring basis with collected material managed along with similar material collected from the API Separator. This material is normally recycled to an off-site refining process. If recycling to a refining process is not available, the cleanout material will be managed as a hazardous waste. Underground piping will be buried below the frost line to prevent freezing. Aboveground piping will be electric heat traced to prevent freezing. The piping design is referenced in section 4.5.

The Stormwater/Diversion Tanks will also be configured to accept diverted off-spec wastewater from various points within the WWTP including API Separator effluent/DGF influent, DGF effluent/MPPE influent, and MPPE effluent that is diverted away from EP-1.

4.2.2 Equalization Tank

A new Equalization (EQ) Tank will be constructed to dampen variability in both flow and concentration prior to the API Separator and the rest of the WWTP. It will operate with a variable level/volume. The process sewer will gravity flow into the EQ Tank. Pumps will transfer the wastewater from the EQ Tank to the API Separator. The tank will have a floating roof for air emissions control. Oil will be recovered from the water surface using a skimming device contained in the floating roof. There will be sample ports for both the EQ Tank influent and effluent.

During dry weather conditions, the EQ Tank will be operated at a less than full capacity, such that the EQ Tank can provide surge capacity during wet weather events. This available surge capacity will be used to help prevent potential overflow of the API Separator during storm events.

4.2.3 DGF System

The DGF system will be in a covered above-ground vessel. The API Separator effluent will be pumped to the DGF system using the existing API Separator effluent pumps. Polymer will be injected into the DGF influent line to enhance flocculation. Dissolved gas for flotation will be either plant nitrogen or plant air from the refinery's utility system. The gas will be injected into a pumped recycle stream of the DGF effluent. The choice of gas (air or nitrogen) will be made following a process hazard evaluation.

The clarified effluent wastewater from the DGF system will be pumped to the MPPE system.

The DGF float material will be skimmed from the top of the DGF using a variable speed scraping mechanism. The skimmed float will be sent to the DGF float storage and dewatering system. The float system will consist of retention tanks with gravity dewatering. This material will normally be recycled to a refining process (on-site or off-site). If recycling is not available, the float material will be managed as a hazardous waste.

4.2.4 MPPE System

The MPPE system will consist of two columns operating in parallel. One column will be in service while the other is being regenerated. The columns will switch their mode of operation on a routine schedule (e.g., hourly). The operating column will receive pumped DGF effluent. The wastewater will pass through the column in an up-flow mode and discharge to EP-1 by gravity. Steam will be used to regenerate the non-operating column. The steam will be supplied by the plant utility system or an electric boiler as part of the MPPE skid. The steam will pass through the column in down-flow mode and will extract the hydrocarbons that had previously been retained by the polymer beads. The hydrocarbon-laden steam will then be sent through a condenser to convert the stream to a cooled liquid phase. The hydrocarbon-water liquid mixture will then go to a separator phase. The separator will produce a water stream that is recycled to the operating column and a pure hydrocarbon stream that will be sent to the refinery for reprocessing.

4.2.5 Pilot Travel Center Pretreatment

The sanitary wastewater from the Pilot Travel Center and the refinery will be pretreated prior to discharge to EP-1. The wastewater already receives treatment for solids removal by the upstream septic tank (owned and operated by Pilot) and the screening system in the new refinery lift station. The new pretreatment system will provide removal of soluble organics. The technology selection for the system has not been finalized, but candidate technologies include:

- A new lined aeration lagoon (treating only Pilot Travel Center and refinery sanitary wastewaters)
- Vertical flow wetlands

- A recirculating media filter

4.2.6 Evaporation Pond No. 1

The MPPE effluent will flow by gravity into EP-1. A flow meter will be installed on this EP-1 influent line to track discharge volumes. EP-1 will not be lined or otherwise modified because the MPPE effluent will be free of floating oil and will have a benzene concentration ≤0.5 mg/L. This EP-1 influent quality will be assured by the following WWTP upgrades:

- Less variability in flow rates and wasteloads provided by the EQ Tank
- Improved upstream oil-water separation provided by the DGF system
- Reliable removal of benzene and other hydrocarbons using the MPPE technology

4.3 Decommissioned Systems

Placing the new WWTP systems into service will allow some of the existing systems to be decommissioned.

4.3.1 Benzene Strippers Nos. 1, 2 and 3

The MPPE system will replace the benzene removal capacity of the two Benzene Strippers (Z84-V4 and Z84-V5) located at the WWTP and the one Benzene Stripper located in the process area of the Refinery (Z84-V7). These units will be decommissioned and dismantled. The associated Benzene Stripper Air Blowers (Z84-AB3, Z84-AB4 and Z84-AB5) will also be decommissioned and dismantled.

4.3.2 AL-1 and AL-2

The two Aeration Lagoons (AL-1 and AL-2) will be decommissioned. The associated surface aerators will also be decommissioned. The Corrective Measures Implementation Work Plan for the Wastewater Aeration Lagoons (Solid Waste Management Unit No. 1) has been submitted separately to NMED (July 30, 2009).

4.3.3 OAPIS

The OAPIS currently collects stormwater from the process area. In the future, this sewer will be directed to the Stormwater/Diversion Tanks in the new stormwater system. The Stormwater/Diversion Tank contents will then be pumped to the API Separator. Therefore, the OAPIS will be decommissioned. A separate work plan to be submitted to NMED will address the closure of the OAPIS (Solid Waste Management Unit No. 14).

4.4 Management of Off-Spec Wastewater

Off-spec events are not anticipated for the MPPE effluent. However, contingencies have been included in the design as safeguards. If at anytime the MPPE effluent is deemed unsuitable for discharge to EP-1, it will be diverted to the new Stormwater/Diversion Tanks. Process monitoring will be used to identify when this diversion is needed. The diversion would be "all or nothing" rather than a partial diversion and partial flow to EP-1. For added flexibility, diversion lines to the Stormwater/Diversion Tanks will also be provided for the API Separator effluent and DGF effluent.

4.5 Tank Design, Secondary Containment, and Leak Detection

Under the terms of the CAFO, the tanks and ancillary equipment downstream of the API Separator, including diversion tank systems, are subject to 40 CFR §262.34(a). By reference, these systems are therefore subject to 40 CFR 265 Subpart J for tank systems. Accordingly, the systems downstream of the new API separator will comply with the tank design requirements of 40 CFR 265 Subpart J, including secondary containment and leak detection. Since the CAFO was signed just recently, Western Refining is still determining how the specific design requirements of the CAFO will be implemented. In general, the secondary containment requirements for tanks will be met through concrete or impermeable liner containment areas. Containment volumes will be 1.3 times the volume of the largest tank within that area to include an allowance for precipitation. Leak detection for tanks with bottoms that cannot be visually inspected will be provided by installing double bottoms with leak detection on those tanks. The secondary containment and leak detection requirements for piping systems covered by the CAFO will also be implemented where required.

In the event that there are new tank(s) or ancillary equipment not covered by the CAFO, such as those upstream of the API Separator, those systems will be designed to standards in accordance with GW-032 and related OCD requirements.

4.6 Air Emissions Control

The upgraded WWTP will meet the air emission regulatory requirements, including Paragraph 100 G of the CAFO as applicable, through the following measures:

- The Stormwater/Diversion Tanks will have floating roofs that will generate negligible air emissions.
- The DGF system will be enclosed but will generate a continuous point source air or nitrogen emission. If a control device is determined to be required for the DGF air emissions, the off-gas will be routed through an activated carbon bed system prior to discharge to the atmosphere.
- The MPPE units will be enclosed and generate negligible air emissions.

5. PROJECT SCHEDULE

The required project schedule for design and construction of the WWTP upgrade is 18 months as presented in Table 5-1.

Table 5-1. Project Schedule Through Construction

Description	Period
Detailed Engineering	October 2009 - March 2010*
Air Permit Application Submittal	December 2009
Contractor Bidding	March-April 2010
Air Permit Issuance	April 2010**
Contract Award & Notice to Proceed	May 2010
Equipment Procurement, Fabrication and Delivery	May through November 2010
Construction	June 2010 through February 2011
Testing, Start-up, and Clean-up	February through March 2011
Operational	March 31, 2011

*Start date pending NMED and OCD approval. ** The project cannot proceed beyond the April 2010 milestones above until the required air permit(s) have been issued by the NMED Air Quality Bureau.

Attachment A – Supplemental DGF System Information

poseïdon

POSEÏDON SATURN CLARIFIER™

HIGH PERFORMANCE FLOTATION CLARIFIER

SYSTEM DESCRIPTION AND OPERATION PRINCIPLE
The patented Poseïdon SATURN Clarifier™ uses dissolved air flotation technology to separate particles from water. The unique design of the Poseïdon SATURN Clarifier™ (Patent # 5.565.009) provides cost efficient water treatment and allows for the achievement of a high solids capture rate and thicker sludge with maximum operational flexibility.

Poseïdon SATURN Clarifiers™ offer a column shape configuration. The SATURN units are modular, extremely space-efficient and require very small footprints and minimal field erection.

FEEDING THE CLARIFIER
The raw water to be treated is collected in a feed chest and pumped into the inlet compartment at the bottom of the flotation unit. The Poseidon SATURN Clarifier™ can be fed on either constant or variable flow, and tolerates variations in feed concentration, which allows operational flexibility. On a variable flow system, it is required to install a proportional flow regulator for the chemical dosage pumps. A dual chemical or a single chemical system may be required for optimum suspended solids removal. In a dual chemical system, a coagulant is mixed with the influent at the suction of the feed pump in order to coagulate the finely dispersed material. Downstream, prior to the inlet compartment of the flotation unit, a polyelectrolyte (flocculant) is mixed into the stream, initiating floc formation. In a single chemical system, the flocculant is also mixed into the stream prior to the inlet compartment.

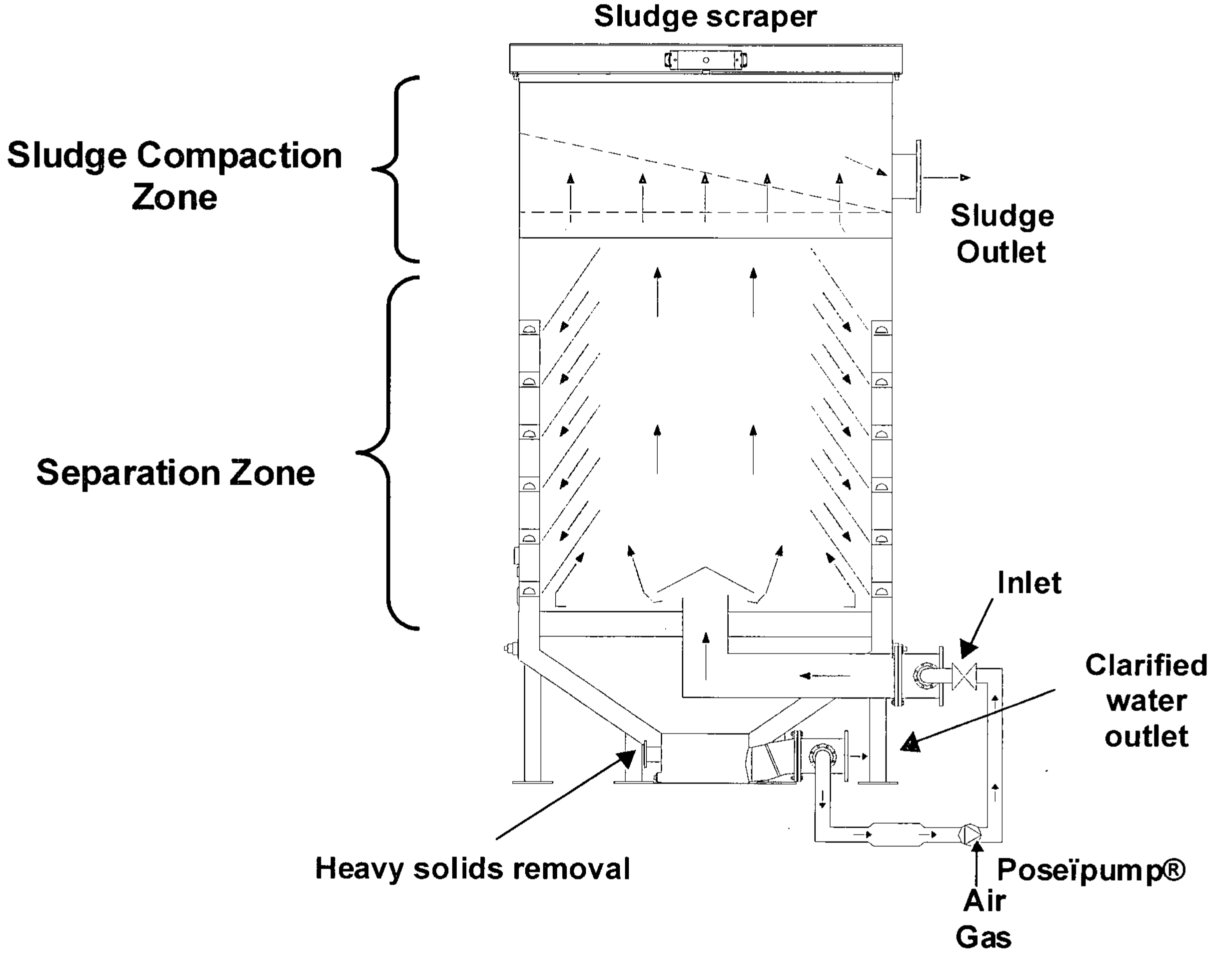
RECIRCULATION SYSTEM
The micro-bubbles required for flotation are produced with a recirculation system. This system, designed to operate on a continuous basis, meets the essential conditions for proper air dissolution and micro-bubbles generation. It also ensures a high solids capture rate by allowing the combining of flocs and microscopic air bubbles, forming air-floc conglomerates.
The recirculation system is composed of a pneumatic box, a patented Poseïpump™ recirculation pump (U.S. Patent 5.385.443), a header, an injection valve and a bleeder valve. The efficiency of the recirculation system is mainly attributed to the Poseïpump™, which ensures fine air dispersion into the recirculated water and builds a proper pressure to allow for air dissolution (90-100 psi). The Poseïpump™ is fed from the clarified water outlet, the recirculation water ratio being about 15% of the total flow. From the recirculation pump, the water passes into a header, which provides required retention time for air dissolution. The micro-bubbles are formed when the recirculated water is released to atmospheric pressure prior to entering the inlet compartment of the clarifer.
The Poseïdon dissolving air system generates very small air bubbles (30-40 μm) and ensures the combination of the micro-bubbles with the flocculated particles, increasing their buoyancy. The floatable air-floc conglomerates along with the rest of the wastewater stream, enters into the flotation unit inlet compartment and then into the separation cell. The floatable material then rises to the surface and any heavy settleable particles (sand, grit, etc.) settle into the cone-shaped bottom.

INTERMEDIATE CAPTURE SURFACE ZONE
The Poseïdon SATURN Clarifier™ is equipped with an intermediate capture surface zone that maintains a low overflow rate and ensures a high capture rate. The separation cones also allow for low polymer consumption. Particles having different densities will rise and form the sludge layer at different rates. Fast rising particles will rise rapidly without entering into the intermediate capture surface zone while smaller, slow rising particles, will be either entrained with the fast rising particles which are forming a filtering layer in the peripheral zone of the intermediate capture surface zone, or be separated within the intermediate capture surface, located prior to the outlet of the flotation unit. The clarified water flows down the separation cones where it is collected through a water collection system towards the bottom of the flotation unit.

SLUDGE REMOVAL SYSTEM
The Poseïdon SATURN Clarifier™ is equipped with a rotative sludge removal system which allows continuous proper removal of the floating sludge. This system includes a motoreducer with variable speed adjustment capability, this allows for flexibility on the sludge consistency and removal.

LEVEL ADJUSTMENT
The Poseïdon SATURN Clarifiers™ are equipped with an automatic level control system consisting of a level control valve and a level transmitter. This type of level adjustment allows flexibility on sludge consistency and removal, and also increases the stability of the treatment by maintaining a constant level in the unit, even during flow and solids loading variations of the raw water.

SEDIMENT REMOVAL SYSTEM
In order to avoid any build-up of heavy solids in the bottom of the clarifier, an automatic drain valve is installed at the cone-shaped bottom of the unit. The sequence of drainage is set upon applications.



The Patented Poseïdon SATURN Clarifier™ (US patent No. 5662804)

HIGHLIGHTS

HIGH PERFORMANCE AND OPERATIONAL FLEXIBILITY

- Highest TSS capture rate
- Tolerates upstream variations in flow rate and feed concentration
- Tolerates high solids loading
- High sludge consistency (5% - 12%)

LOW INSTALLATION COSTS

- Modular and pre-mounted
- Space efficient:
  - Column configuration
  - Smallest footprints
- Minimal field erection: unload, position and connect

LOW OPERATING COSTS

- Minimum operator attention
- Minimum maintenance
- Low polymer consumption
- Complete stainless steel, corrosion-proof construction

Poseidon Inc.
1290, avenue Van Horne, Suite 310, Outremont (Quebec) Canada H2V 4S2
Tel. (514) 270-9593 – Fax. (514) 270-9355 – E-mail: info@poseidoninc.com

Attachment B – Supplemental MPPE System Information

WHITTIER FILTRATION

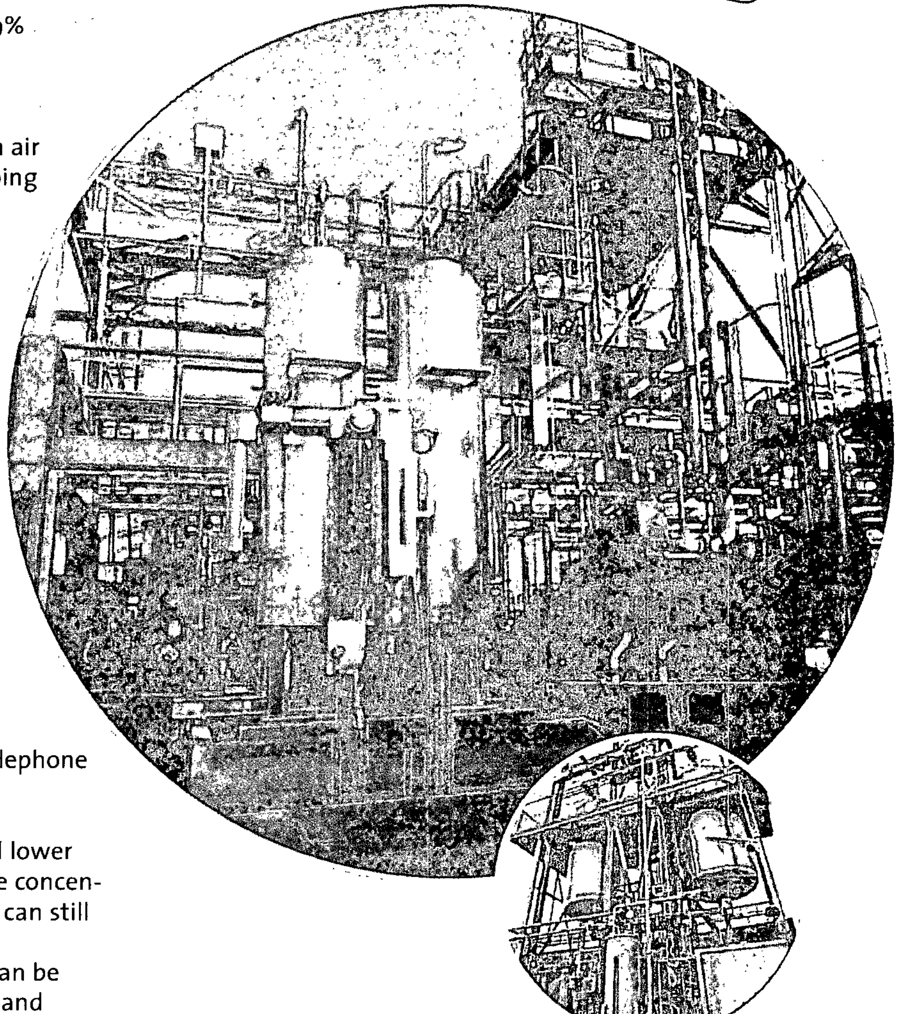
MPPE Systems

VEOLIA
WATER

Solutions & Technologies

MPPE Benefits

price quotation within one week



1 **Very High Separation Performance**
Reduction factor 1,000,000 times = 99.9999% removal if required

2 **Cost Competitive**
Cost competitiveness proven compared with air stripping and activated carbon, steam stripping and biotreatment systems

3 **Low Energy Consumption**
- Low energy input to release hydrocarbons from MPPE particles (in situ regeneration)
- Energy consumption up to 50 times lower than steam stripping

4 **Robust, No Fouling**
- Anaerobic operation at ambient temperature. No interference from dissolved iron, heavy metals, surfactants, salt and polar compounds, and no scaling
- No biological fouling because of periodic in situ regeneration by steam

5 **Reliable and Easy Operation**
- Fully automated
- Remote control using laptop and mobile telephone

6 **Flexible Operation**
Once installed, the unit can treat higher and lower flows and concentrations. For example, if the concentration is 50% higher, effluent requirements can still be maintained with only a 10% lower flow.
At lower feed concentrations, higher flows can be treated while still meeting the effluent demand

7 **Compact Equipment**
Compared to existing technologies, the unit is compact with a small footprint

8 **Ideal for Upstream Process Integration**
Because it is compact, robust, reliable, fully-automated, remote controlled, easy-to-operate and flexible, it is ideal for process integrated applications

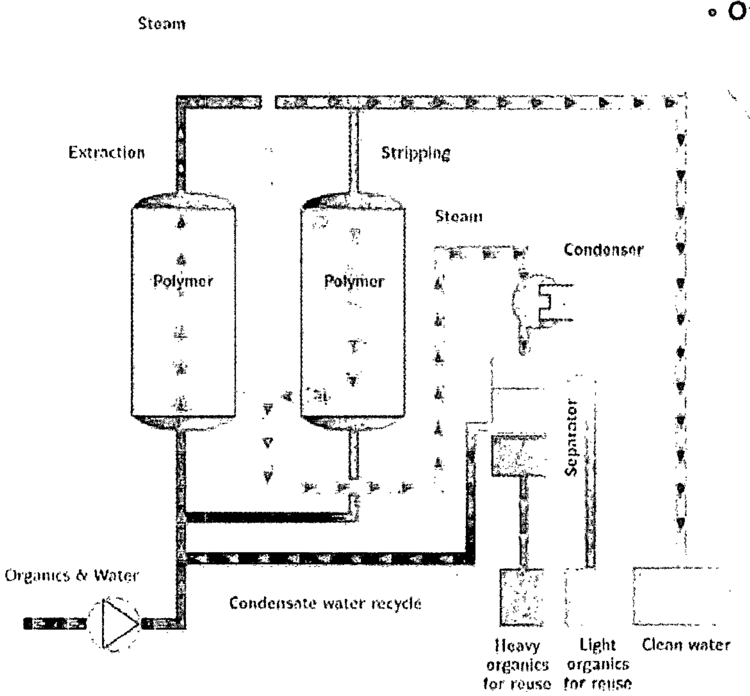
9 **Performance Guarantee during Operational Life**
The material performance is guaranteed during the operational life of the unit, regardless of how many times the MPPE material is changed.

10 **Environmental Benefits**
- Practically pure, separated hydrocarbons for use/reuse
- Low waste of polymer
  - Long lifetime
  - Reuse of spent material
- Low energy consumption
- Low noise
- No addition of chemicals
- No emission to air
- No sludge formation
- No (chemical) iron hydroxide waste

MPPE Systems

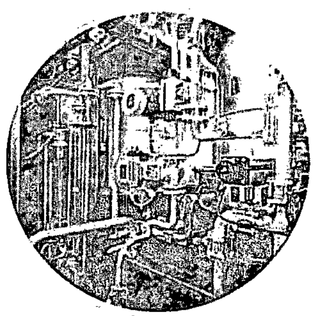
The Macro Porous Polymer Extraction (MPPE) system is a highly-effective, fully-automated, remote-controlled and guaranteed technology for removing hydrocarbons from water by means of extraction in a Macro Porous Polymer (MPP) bed.

The MPPE Process



MPPE systems are used for:

- **Process water**
- **Offshore produced water**
- **Groundwater remediation**
- **Wastewater**



MPPE systems remove dissolved and dispersed hydrocarbons with efficiencies 99.9999%, down to below ppb level, or as specified. This applies to different types of hydrocarbons, including:

- Aliphatic
- Aromatic
- Polyaromatic
- Halogenated, such as chlorinated, bromated

The MPPE Process Description

In the MPPE process, hydrocarbon-contaminated water is passed through a column packed with MPPE particles. The particles are porous polymer beads, which contain a specific extraction liquid. The immobilized extraction liquid removes the hydrocarbons from the water. Only the hydrocarbons, which have a high affinity for the extraction liquid, are removed. The purified water can either be reused or discharged. Periodical in situ regeneration of the extraction liquid is accomplished by stripping the hydrocarbons with low-pressure steam. The stripped hydrocarbons are condensed and then separated from the water phase by gravity. The almost 100% pure hydrocarbon phase is recovered, removed from the system and ready for use/reuse or disposal. The condensed aqueous phase is recycled within the system. The application of two columns allow continuous operation with simultaneous extraction and regeneration. A typical cycle is one hour of extraction and one hour of regeneration.

Industrial Process & Wastewater

Process water streams are treated upstream and end of pipe for possible reuse of water in the production process, or for discharge to surface water or to site/community biological wastewater treatment.

Typical challenges MPPE can meet:

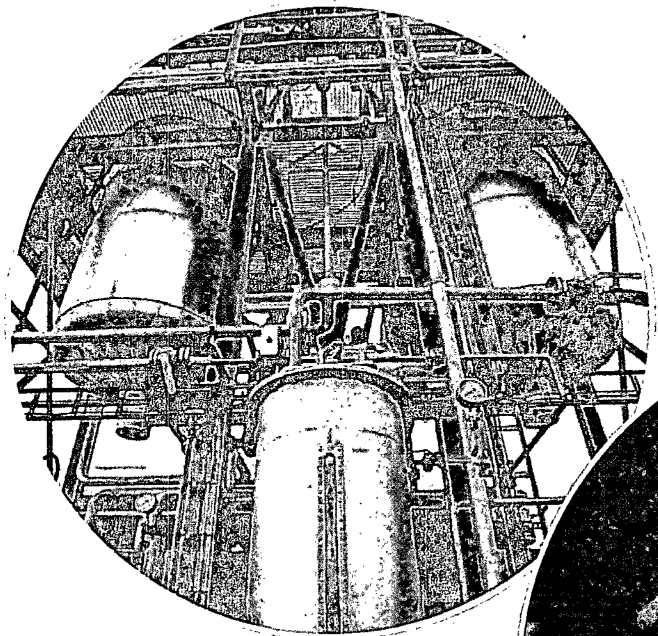
- High influent concentrations
- High reduction factors
- Varying concentrations and compositions
- Varying flows
- Varying/wide pH range
- Presence of salts, surfactants, heavy metals, alcohols, monomer residues, pre-polymers, etc.

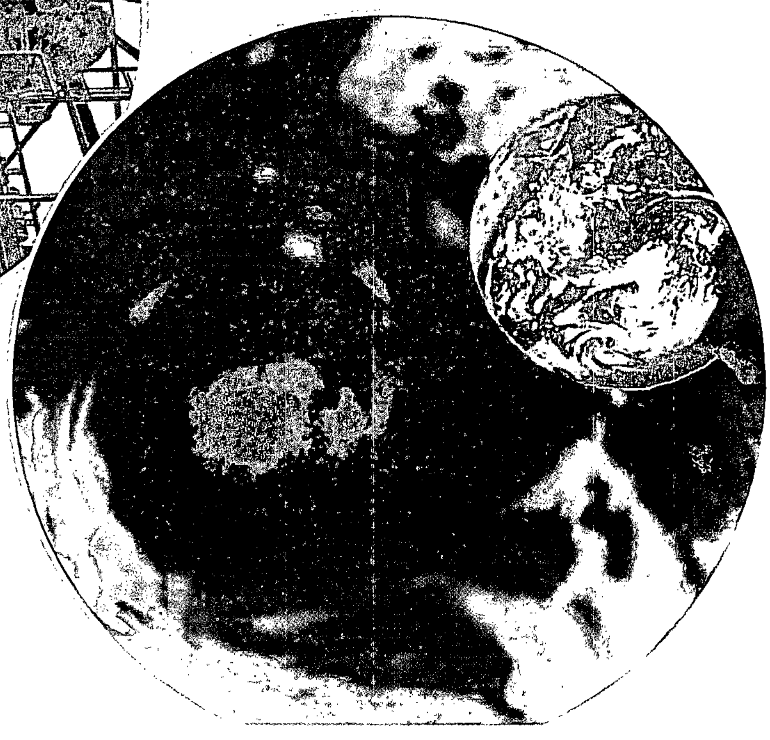
Extra benefits are:

- Small footprint
- Upstream integrated operation with remote control
- Scope for adding other process and groundwater streams, for treatment in one unit
- Reduced sludge formation in biotreatment
- Modular setup for large flows (thousands of m^3/hr)

Industries

- Natural gas production/treatment
  - Aromatics, polyaromatics, aliphatics (3000 ppm and above)
- LNG terminals/gas to liquid plants
  - Aromatics, polyaromatics, aliphatics
- Underground gas storage
  - THT (tetrahydrothiophene), aromatics
- Water, oil, gas/condensate produced onshore
  - Aromatics, polyaromatics, aliphatics
- Chemical, specialty chemical and pharmaceutical raw material producers
  - Broad range of aromatics, aliphatics and halogenated (chlorinated/bromated) hydrocarbons
- Chemicals/oil storage distribution industry
  - Tank cleaning process water
  - Aromatics, aliphatics and halogenated hydrocarbons
- Resin production
  - Solvents/aromatics removal from process streams containing monomer residues
- Electronics Industry
  - Solvents removal (toluene) e.g. television screen factories
- Rayon/viscose industry
  - Carbon disulphide (CS_2), aromatics, aliphatics
- Over 40 years accumulated experience



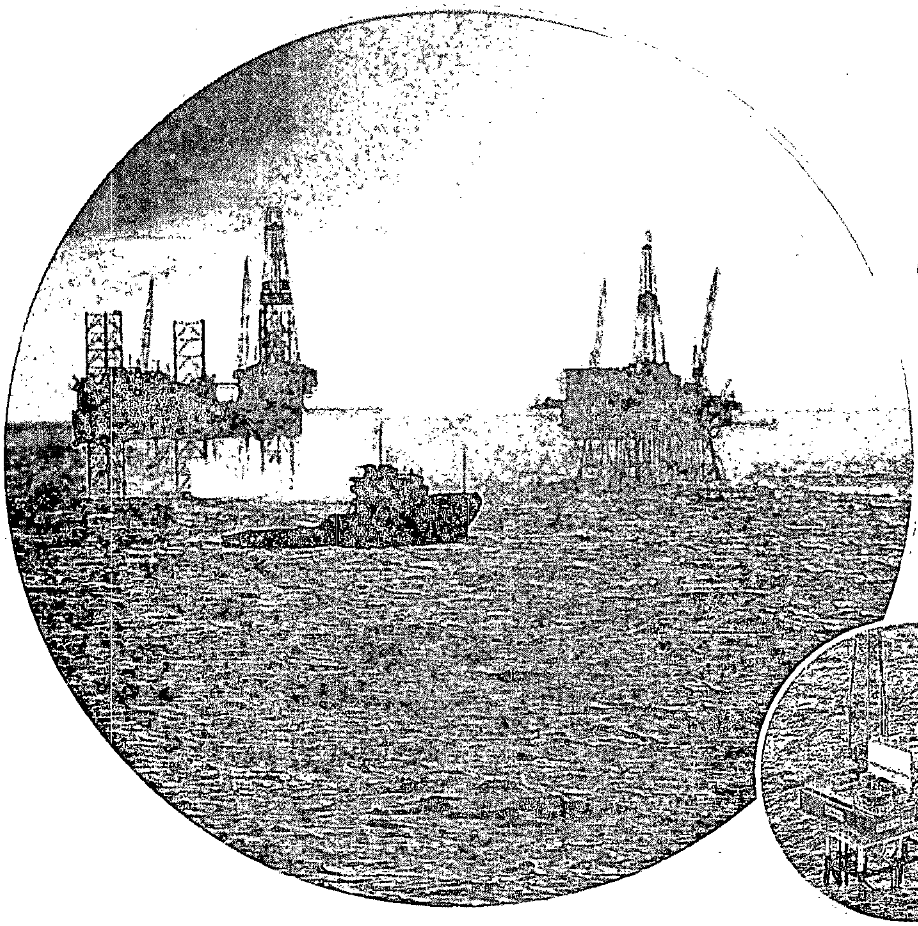


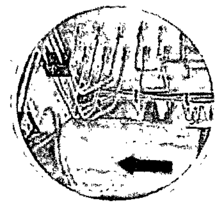
Removal of total spectrum of non-polar and polar organics proven in practice:
Non-polar toxic non-biodegradable compounds and polar biodegradable compounds are removed by MPPE in series with biotreatment.

Full turnkey contracting is possible, as is partnering with local biotreatment suppliers.

Offshore Produced Water

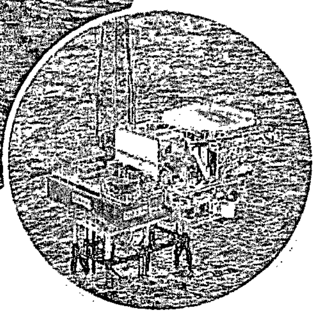
Regulations for offshore produced water are becoming more and more stringent. New technologies are required for this challenging segment in order to meet future emission standards that are being set by international organizations, for example OSPAR* for the Northeast Atlantic.





MPPE systems proven in removal of dissolved and dispersed:

- Aromatic hydrocarbons (BTEX)
- Polyaromatic hydrocarbons (PAHs)
- NPD (naphtalenes, phenanthrenes, dibenzothiophenes)
- Aliphatics
- Hydrophobic components in oil field chemicals (e.g. inhibitors)



Robust and can withstand:

- Salt, methanol, glycols
- Corrosion inhibitors
- Scale inhibitors
- H2S scavengers
- Demulsifiers
- Defoamers
- Dissolved (heavy) metals

Environmental aspects:

- Separated hydrocarbons are recovered in practically pure form for use as a product
- No emissions to air and water and no sludge formation
- Small footprint

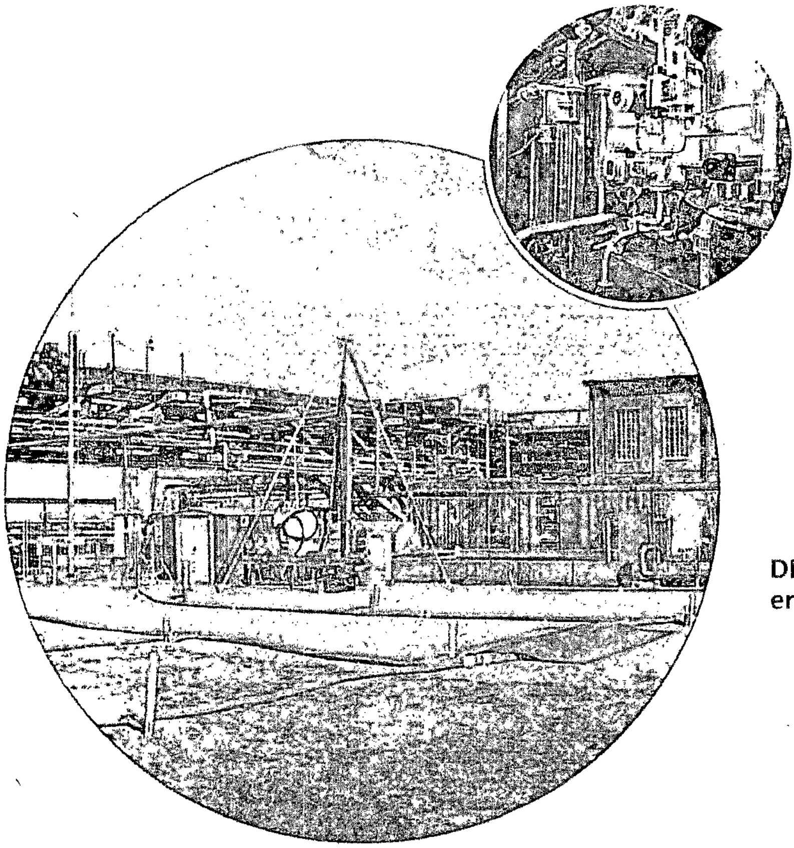
Evidence of success:

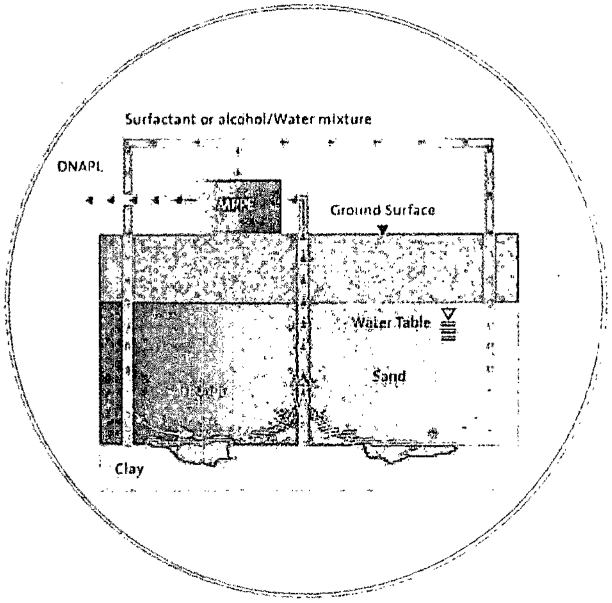
- Verified by Orkney Water Technology Center on water produced with oil and gas
- MPPE selected as best option from among 55 technologies (Government and Oil & Gas Industry Study)
- MPPE listed by OSPAR* as Best Available Technology (BAT)
- Experiences published in SPE Conference (TOTAL & Akzo Nobel) and Offshore Technology Conference (Shell/Exxon & Akzo Nobel)
- Commercial units running at TOTAL, NAM (Shell/Exxon), Statoil, and Hydro/Shell with over 25 years accumulated experience.

*OSPAR: Oslo Paris Convention for the Protection of the Marine Environment of the Northeast Atlantic

Groundwater

Aromatic, polyaromatic and halogenated hydrocarbons in groundwater can be found in lower concentrations dissolved in water diffused over the area or concentrated as DNAPLs (dense non-aqueous-phase liquids) or LNAPLs (light non-aqueous-phase liquids) creating an enduring source of contaminant supply to the water phase.





DNAPL and LNAPL removal by solvent or surfactant enhanced aquifer remediation (SEAR)

- Surfactant or alcohol injection enhances the dissolution of chlorinated hydrocarbons, PAHs, DNAPLs and LNAPLs in water from a few ppm to 10,000 - 50,000 ppm
- Organics recovered in two weeks equaled eight years of normal pump and treat
- MPPE proven as the ideal separation technology for these extremely high concentrations in surfactant/alcohol water mixtures
- Surfactant/solvent consumption savings as MPPE enables recirculation and recovery

MPPE benefits for meeting challenges in groundwater applications are:

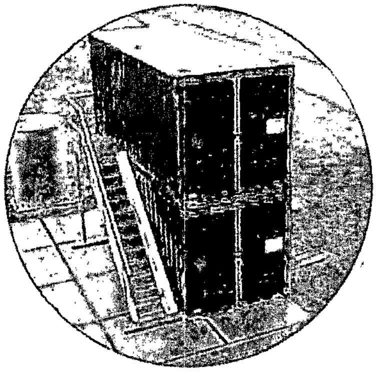
- Ideal for handling a broad range of compositions
- Able to cope with unexpected higher influent compositions at no additional costs
- No iron removal necessary (anaerobic process)
- Robust, can withstand salts, humic acids, surfactants, heavy metals, dissolved/suspended solids, high/low pH, etc.
- No sludge formation (as with iron removal and biotreatment)
- Scope for combination with other ground and process water streams in one unit

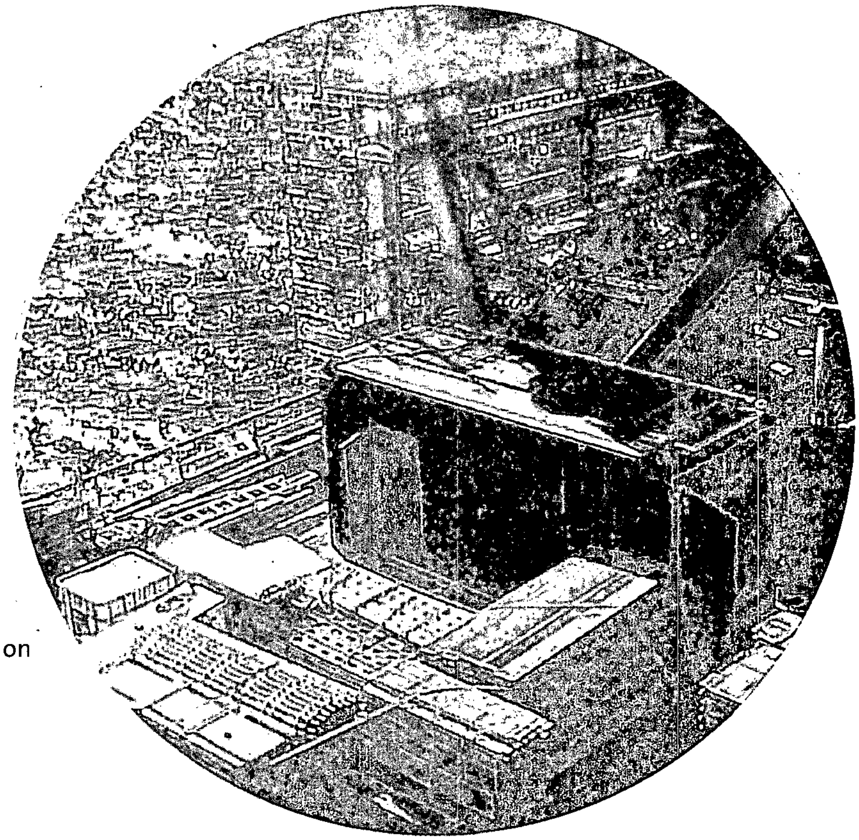
MPPE applied in

Jacksonville, Florida	USA	Alcohol injection
Alameda, California	USA	Surfactant injection
Tampa, Florida	USA	Alcohol injection
Schkopau	Germany	Surfactant injection
Leipzig	Germany	Surfactant injection
Castrop Rauxel	Germany	Surfactant injection

How to start...

In practice, local situations, water compositions and effluent requirements are always specific, as is the technology to be chosen.





Preliminary cost estimate within one week

A preliminary cost estimate can be made based on

- influent specification
- effluent requirements
- flow rate
- non/availability of steam

Laboratory test

If economically attractive, the usefulness of the various types of laboratory tests compared with an immediate field test can be jointly evaluated.

Onsite field demonstration

An onsite field demonstration on customer premises can be arranged upon request for either offshore or onshore.

Lease/rent or buy

Options for lease or buy can be evaluated. Various mobile units are available for immediate leasing for periods ranging from weeks to years.

Turnkey delivery of integrated units

The investment cost is based on turnkey delivery including startup and, if applicable, including other technologies to be combined with the unit, such as:

- Pretreatment/pre-filter unit
- After-treatment/polishing, such as:
  - Biotreatment
  - Activated carbon
  - Air stripping

Ongoing Performance Guarantee and Service

A clear annual operating expenditure overview will be given for the MPPE technology, including an ongoing performance guarantee and service. This is valid for the total operational life of the unit and independent of the frequency of MPPE material exchange.

Mobile unit/operating characteristics:

- Self-contained, including a steam generator
- Can be installed and started up in one day
- Designed for onshore and offshore with all necessary HSE provisions
- Remote control by means of a mobile telephone connection or direct line
- Built in a container for operations in remote areas
- Turndown ratio to <10% of design capacity
- Operational support by remote control and onsite possible
- Onsite training and education of local personnel
- Operation by Whittier Filtration MPP Systems possible

WHITTIER FILTRATION

Whittier Filtration, Inc.
12854 East Florence Avenue
Santa Fe Springs, CA 90670 USA
Direct: 562-204-2550
Fax: 562-204-2551
Toll Free: 800-487-3458
E-mail: whittier.filtration@veoliawater.com
www. whittierfiltration.com

VWS MPP Systems B.V.
Celsiusstraat 34
6716 BZ Ede
PO Box 250
6710 BG Ede
The Netherlands
Tel: +31 318 664 010
Fax: +31 318 664 001
E-mail: mppsystems@veoliawater.com

Whittier Filtration is a subsidiary of Veolia Water Solutions & Technologies and combines technology innovation with industry experience to provide economical and effective operation of filtration and water treatment applications.

LEAF FILTERS:
Auto-Jet®, Filtra-Matic, Verti-Jet

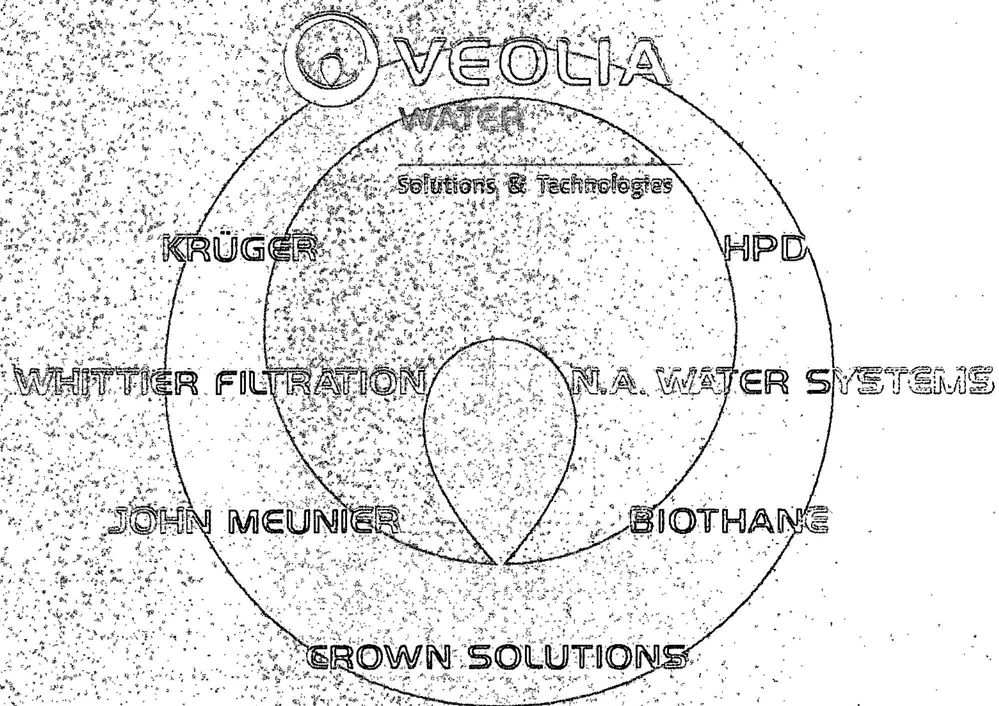
TUBULAR FILTERS:
Auto-Shok, Auto-Pulse

MEDIA FILTERS:
L'eau Claire Upflow
High-Rate Sand Filters

SEPARATORS:
Autoflot®, Power Clean Systems

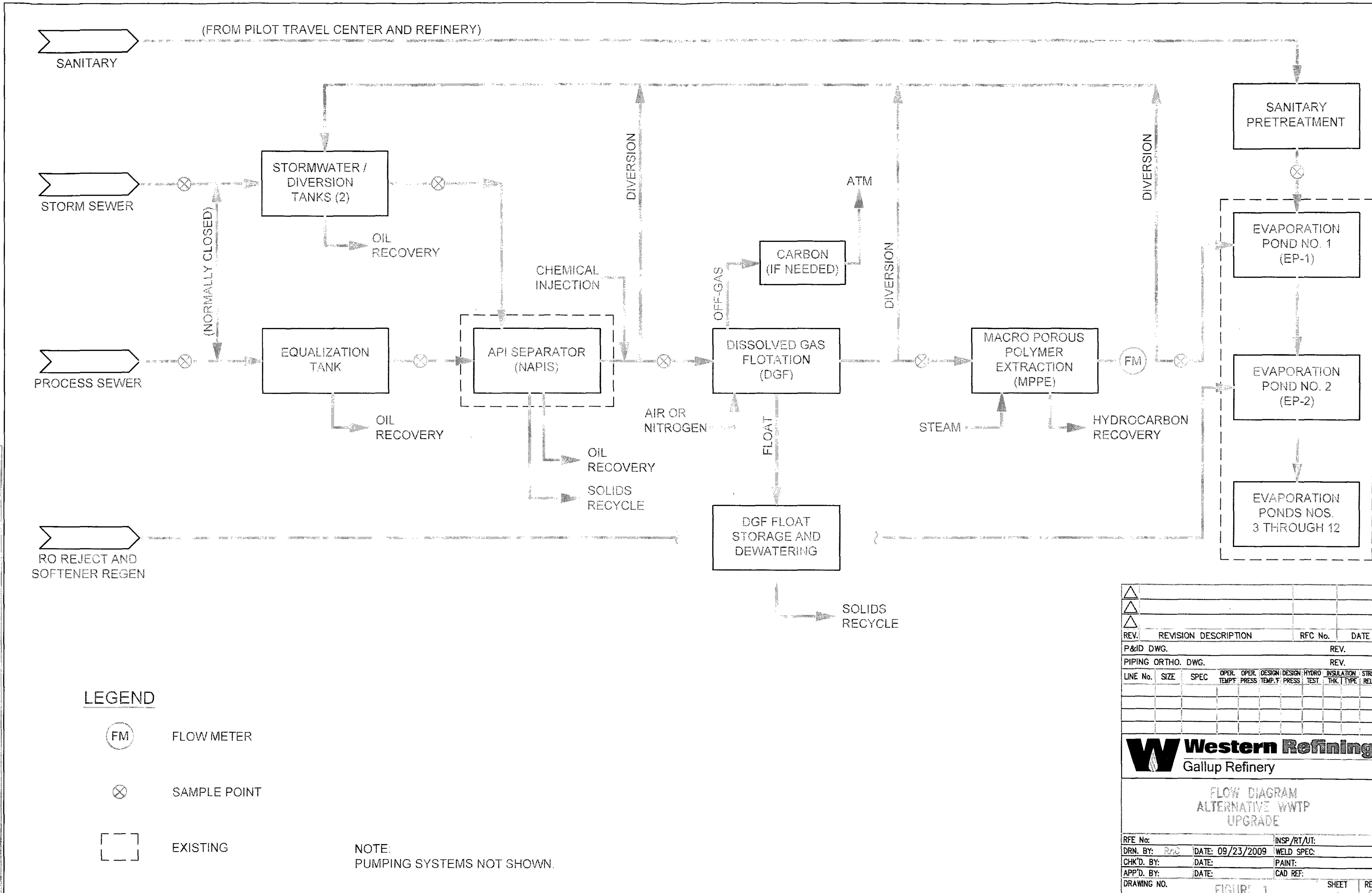
ION EXCHANGE/SOFTENERS

SPARE PARTS AND SERVICE



VEOLIA
WATER
Solutions & Technologies

MPPE 10/2008


(FROM PILOT TRAVEL CENTER AND REFINERY)
SANITARY
STORM SEWER
PROCESS SEWER
RO REJECT AND SOFTENER REGEN
(NORMALLY CLOSED)
STORMWATER / DIVERSION TANKS (2)
OIL RECOVERY
EQUALIZATION TANK
OIL RECOVERY
API SEPARATOR (NAPIS)
OIL RECOVERY
SOLIDS RECYCLE
CHEMICAL INJECTION
DIVERSION
DISSOLVED GAS FLOTATION (DGF)
OFF-GAS
CARBON (IF NEEDED)
ATM
AIR OR NITROGEN
FLOAT
DGF FLOAT STORAGE AND DEWATERING
SOLIDS RECYCLE
DIVERSION
MACRO POROUS POLYMER EXTRACTION (MPPE)
STEAM
HYDROCARBON RECOVERY
FM
DIVERSION
SANITARY PRETREATMENT
EVAPORATION POND NO. 1 (EP-1)
EVAPORATION POND NO. 2 (EP-2)
EVAPORATION PONDS NOS. 3 THROUGH 12
LEGEND
FM FLOW METER
SAMPLE POINT
EXISTING
NOTE:
PUMPING SYSTEMS NOT SHOWN.
REV.
REVISION DESCRIPTION
RFC No.
DATE
P&ID DWG.
REV.
PIPING ORTHO. DWG.
REV.
LINE No.
SIZE
SPEC
OPER. TEMP°F
OPER. PRESS
DESIGN TEMP.°F
DESIGN PRESS
HYDRO TEST
INSULATION THK. TYPE
STRESS RELIEF
Western Refining
Gallup Refinery
FLOW DIAGRAM
ALTERNATIVE WWTP UPGRADE
RFE No:
INSP/RT/UT:
DRN. BY: RAC
DATE: 09/23/2009
WELD SPEC:
CHK'D. BY:
DATE:
PAINT:
APP'D. BY:
DATE:
CAD REF:
DRAWING NO.
FIGURE 1
SHEET
REV
0

Bill Richardson
Governor

Joanna Prukop
Cabinet Secretary
Reese Fullerton
Deputy Cabinet Secretary

Mark Fesmire
Division Director
Oil Conservation Division

September 3, 2009

Mr. Ed Riege
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
Route 3, Box 7
Gallup, New Mexico 87301

Re: Process Design Report for Wastewater Treatment Plant Upgrade (Rev. A) for OCD Discharge Permit (GW-032)

Dear Mr. Riege:

The New Mexico Oil Conservation Division (OCD) has reviewed the *Process Design Report For Wastewater Treatment Plan Upgrade (REV. A)* (Work Plan), dated May 26, 2009, submitted on behalf of Western Refining Southwest (WRSW) - Gallup Refinery (the Operator).

The OCD discharge permit revised target date had been moved back to March 1, 2009 from December 31, 2007. The OCD received a process design report (OCD Discharge Permit Section 16(C)) dated February 26, 2009, which was later amended and resubmitted with a date of May 26, 2009.

During this period, WRSW expressed an interest in obtaining a National Pollutant Discharge Elimination System (NPDES) Permit with the EPA and was involved with meetings with the OCD and NMED-Surface Water Quality Bureau related to provisions within the Order. The OCD issued a letter dated July 30, 2009 outlining the process for an NPDES Permit through the OCD. WRSW later signed the Order on August 14, 2009. To date, the OCD has not received a "Modification" request under the OCD discharge permit for an NPDES permit to discharge at the facility.

On August 27, 2009, OCD received a forwarded e-mail from WRSW with an attached letter dated August 17, 2009 from the Operator to the New Mexico Environmental Department (NMED) stating "[t]his letter serves as Western Refining Gallup's ("Gallup") withdrawal from New Mexico Environment Department's (NMED) consideration of the Process Design Report For Wastewater Treatment Plan Upgrade (Rev. A) prepared by Brown and Caldwell and submitted to NMED on May 26, 2009. NMED issued an approval letter with conditions on the Process Design Report dated September 1, 2009.

In addition, the OCD recently reviewed the NMED's letter dated September 1, 2009 indicating NMED's approval with conditions. The OCD concurs with the NMED and hereby approves the design report with a final deadline for implementation of a waste water treatment system upgrade at the facility.

As indicated by the NMED in their September 1, 2009 letter, WRSW shall have an operational system in place by the September 4, 2010 deadline. WRSW adherence to this date will satisfy the OCD's discharge permit objective for an adequate waste water treatment system design under the discharge permit.

Please contact Carl Chavez at (505) 476-3490 or carlj.chavez@state.nm.us if you have questions. Thank you for your cooperation in this matter.

Sincerely,

For Glenn von Gonten
Acting Supervisor, Environmental Bureau

Attachments: NMED letter dated September 1, 2009

GvG/cjc

xc: Hope Monzeglio, NMED- HWB
OCD District Office

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

September 1, 2009

Mr. Ed Riege
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
Route 3, Box 7
Gallup, New Mexico 87301

RE: APPROVAL WITH MODIFICATION
PROCESS DESIGN REPORT FOR WASTEWATER TREATMENT PLANT UPGRADE (REV. A)
WESTERN REFINING COMPANY, SOUTHWEST, INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-GRCC-09-002

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has reviewed the *Process Design Report For Wastewater Treatment Plan Upgrade (REV. A)* (Work Plan), dated May 26, 2009, submitted on behalf of Western Refining Company, Southwest Inc., Gallup Refinery (the Respondent). On August 17, 2009, NMED received an e-mail with an attached letter from the Respondent stating "[t]his letter serves as Western Refining Gallup's ("Gallup") withdrawal from NMED's consideration of the Process Design Report For Wastewater Treatment Plan Upgrade (Rev. A) prepared by Brown and Caldwell and submitted to NMED on May 26, 2009. As we discussed, Gallup intends to submit to NMED an alternative wastewater treatment system work plan." The

May 26, 2009 Work Plan is referenced in the EPA Compliant and Consent Agreement and Final Order dated August 26, 2009 (CAFO), paragraph 100.C which states "[t]he Respondent submitted, on May 30, 2009, a Process Design Report for Wastewater Treatment System Work Plan for NMED and OCD approval for the design and construction of the upgraded wastewater treatment system. Upon NMED and OCD approval, all deadlines, work/design requirements, and sampling and monitoring requirements in a Process Design Report for Wastewater Treatment System Workplan shall become part of, and enforceable under, this CAFO."

Comments to the Work Plan already submitted are provided below. NMED understands that the Respondent may submit a work plan for the wastewater treatment system. Nevertheless, the Respondent must adhere to Comments C and D below and all other applicable comments.

Comment 1/Response 1

In the Response Letter (dated May 28, 2009), Response 1, the Respondent states "[n]ote: the Refinery is an interim status facility so the correct regulatory citations are HWA 20.4.1.600 and 40 CFR 265 as indicated in the response, rather than 20.4.1.500 and 40 CFR 264 stated in the original comment." In Section 1.5 (Regulatory Criteria) of the Work Plan, page 1-2, the Respondent states "[o]nce a [National Pollutant Discharge Elimination System] NPDES Permit is issued, the WWTP will be regulated under the Clean Water Act and thus exempt from RCRA's 40 CFR 265[1] requirements. Therefore, the design basis for the WWTP upgrades assumes the compliance with RCRA 40 CFR 265 is not required. If for some reason a NPDES permit cannot be obtained, the design will be revised and resubmitted to reflect compliance with 40 CFR 265." Footnote 1 states "[n]ote: The Refinery is an interim status facility so New Mexico Hazardous Waste Act [sic] 20.4.1.600 and 40 CFR 265 apply rather than 20.4.1.500 and 40 CFR 264."

NMED Response

The following corrections and requirements apply to the Respondent:

a. The Gallup Refinery is not an interim status facility. If the Respondent considered Aeration Lagoons 1 and 2 (AL-1 and AL-2) as interim status units, then the Respondent would have needed to submit a revised Part A Permit Application for those units in accordance with 20.4.900 NMAC (incorporating) 40 CFR 270.10 and a Part B permit application would have been required. In addition, interim status requires compliance with the requirements found in 20.4.1.900 NMAC (incorporating) 40 CFR 270.70 and 270.10(e)(ii). AL-1 and AL-2 are solid waste management units (SWMU), as indicated in Appendix A of the Post-Closure Care Permit (Permit).

b. As long as the Respondent continues to treat wastewater in AL-1 and AL-2 that is characteristically hazardous for benzene, the facility is treating hazardous waste. The CAFO allows the Respondent 120 days from NMED's approval of an Interim Measure Work Plan to achieve compliance.

c. The regulations cited by the Respondent ("HWA [sic] 20.4.1.600 and 40 CFR 265") are incorrect. The Respondent has not met the requirements for interim status; therefore, 40 CFR 265 (20.4.1.600 NMAC) does not apply.

d. The CAFO appropriately requires the Respondent to comply with the hazardous waste generator requirements found in 20.4.1.300 NMAC (incorporating) 40 CFR 262.34(a).

Comment 2/Repsonse 2

In the Response Letter, Response 2, the Respondent states "[s]hould Western Refining elect to perform BOX testing, and should that testing indicate that the addition of the MBBR media is not required, then Western Refining will seek approval from OCD to modify the Bioreactor design to exclude media."

NMED Response: The Respondent must also obtain approval from NMED to modify any portion of the wastewater treatment system.

Comment 4/Response 4

In the Response letter, Comment 4, NMED states "[t]he WWTS must contain influent and effluent sampling ports to accommodate sampling at the new API separator…."

NMED Response: From review of Section 6.1 (Sampling Locations), the influent to the API separator cannot be sampled. NMED reserves the right to require sampling of the influent entering the new API separator and the Respondent must be capable of collecting such samples.

Comment 6/Response 6

In the Response letter, Comment 6/Response 6 addresses dredging of Evaporation Pond 1 (EP-1). The Respondent responded stating "[d]redging of EP-1 will be addressed in the Corrective Measures Implementation Work Plan due to NMED on July 31, 2009. Western Refining will take the position that the initial dredging is not warranted and that the frequency a [of] future dredging events can allow for more than one foot of accumulation."

NMED Response: There have been documented releases when hazardous waste has entered EP-1; therefore, at a minimum, EP-1 contains listed hazardous waste (F037/F038). The upgraded wastewater treatment system is intended to ensure that hazardous waste will not enter EP-1. Dredging will remove residual contamination in order to enable the Respondent to demonstrate future compliance. The Respondent shall comply with the dredging requirements found in NMED's April 15, 2009 Notice of Disapproval (NOD), Comment 6. No revision is necessary.

Comment 9/Response 9

In the Response Letter, Response 9, the Respondent states "[m]eeting the [requirements of] 20.6.2.3103 standards is not a stated treatment objective of the upgraded WWTS. The treatment objectives (as stated in Section 1.4 of the Report) are for there to be no visible free oil and <0.5 mg/L benzene. The concentrations of other parameters are expected to be consistent with the historical data reported for the EP-1 inlet under the GW-32 monitoring requirements." Section 1.4 of the Work Plan states "[t]he treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. This project design was developed based on these objectives."

NMED Response: As identified in the objectives, the effluent entering into EP-1 must not contain free oil, and benzene concentrations must be below <0.5 mg/L. However, these should not be the sole objectives of the WWTS upgrade. The WWTS and the effluent entering into EP-1 must comply with all applicable requirements found in the Oil Conservation Divisions (OCD) Discharge Plan GW-32, as well as comply with all other applicable regulations. Discharges to the unlined Evaporation Ponds must not create the potential for impacts to groundwater.

Additional NMED/OCD Comments

Comment A

In Section 4.2.1 (Stormwater/Diversion Tanks), page 4-1, paragraph 2, the Respondent states "[o]il that may accumulate on the surface of T27 and T28 [Stormwater/Diversion Tanks] will be captured from a skimmer device mounted on each tank's floating roof. The skimmed oil will be collected by a vacuum truck and transferred to the Refinery's slop oil system for recycling back to the refining process. Solid material that may settle on the bottom of T27 and T28 will be removed on a periodic basis and managed along with similar material collected from the NAPIS. This material is normally recycled to an off-site refining process. If recycling to a refining process is not available, the T27 and T28 bottom solids will be managed as a hazardous waste."

NMED Response: Storm water at the refinery comingles with process water and therefore potentially contains hazardous waste (D018 and F037/F038 listed wastes). The Respondent is not allowed to accumulate hazardous waste in Tanks T27 and T28 for more than 90 days. Therefore, the Respondent's must design their storm water system to direct the ongoing low flow of process wastewater in the storm water system to the API separator except during storm events when higher flows trigger diversion of storm water to Tanks T27 and T28 at flow rates greater than approximately 30 gallons per minute (gpm) to prevent flow rates from exceeding capacity of the API separator or wastewater treatment system.

Comment B

In Section 4.2.4 (Tank-Based Separator), page 4-2, paragraph 5, the Respondent states "[t]he Tank-based separator is not designed to be compliant with 40 CFR 265 Subpart J due to Western Refining's intention to obtain an NPDES permit for the WWTP. If an NPDES permit cannot be obtained, the design of the Tank-based separator will be modified to be compliant with 40 CFR 265 Subpart J."

NMED Response: The CAFO requires the Respondent to comply with the requirements found in 20.4.1.300 NMAC (incorporating) 40 CFR 262.34(a). This applies to all applicable sections within the Work Plan (e.g. Section 4.2.5 (Bioreactors), paragraph 1 and Section 4.5 (Secondary Containment and Leak Detection)).

Comment C

In Section 4.6 (Alternative Upgrade Approach), page 4-6, last sentence, the Respondent states "Western Refining will submit the alternative design approach to OCD for approval prior to implementation."

NMED Response: The Respondent discussed an alternative approach to the upgraded WWTS to NMED and OCD in a meeting on July 1, 2009 that addressed the use of Macro Porous Polymer Extraction and a dissolved gas flotation unit. On August 17, 2009, the Respondent submitted a letter withdrawing the Process Design Report For Wastewater Treatment Plan Upgrade (REV. A). If the Respondent chooses to pursue an alternative wastewater treatment system, a new work plan must be submitted to OCD and NMED for approval by both agencies. The new work plan must describe all aspects of the alternative design. The implementation of an alternative approach will not change the deadline established in Comment D below which provides a deadline for the start of operation of an upgraded WWTS.

Comment D
The Respondent includes a Project Schedule in Section 5.

NMED Response: NMED does not approve the schedule presented in Section 5. The facility has had ample time to research and design an upgraded wastewater treatment system and first proposed upgrades in May 2007. Therefore, the Respondent must have the upgraded wastewater treatment system installed and operating by September 4, 2010.

Comment E
In Section 6.1 (Sample Locations), page 6-1, the Respondent states "[t]he WWTP upgrades will include wastewater sample stations at key locations for monitoring system performance. These locations are indicated by notations on the process flow diagrams in Attachments A and C and are listed below:"

NMED Response: The sampling ports were not described in the Work Plan. The Respondent must ensure that the sampling port mechanisms to be installed are capable of controlling the flow through the sampling ports to minimize volatilization. There are no notations for sample locations in Attachment C. No revision is necessary; the Respondent must install the sampling ports as required in the NMED's April 15, 2009 NOD.

Comment F
In Section 6.3 (Sample Analysis for Regulatory Reporting), page 6-2, the Respondent identifies sampling parameters for the EP-1 influent. The Respondent must address the following:

a. Table 6-2 lists the EPA method for semi volatile organic compounds (SVOCs) as "EPA 8260 C." The correct analytical method for SVOCs is EPA Method 8270. The Respondent must revise Table 6-2 to include the correct EPA Method and submit a replacement page that includes the corrections.

b. The EPA method proposed to be used to detect benzene is 8021B. In addition to benzene, EPA Method 8021B also analyzes for toluene, ethylbenzene, and total xylenes (BTEX). When reporting the analytical data, the Respondent must report all BTEX data. The Respondent must revise the Table 6-2 to include the analysis of toluene, ethylbenzene, and xylenes in addition to the benzene and submit a replacement page. If EPA Method 8260 is used, all analytes listed for the Method must be reported.

c. The Respondent states in Section 6.3 that "Western Refining will seek approval from OCD to discontinue the regulatory reporting requirements for the Pilot Travel Center (i.e., "Effluent from the Pilot Gas Station to the Aerated Lagoon") and the NAPIS

> Effluent (i.e., "Effluent from the new API Separator) as required by Condition 19 of GW-032...." The Respondent must also obtain approval from NMED. Since this page is being resubmitted, this proposed revision must be included with the replacement pages.

Comment G

During the month of June 2009, the refinery reported an overflow at the API separator due to intense rain events. The API separator must be able to handle storm water surges caused by rain events. The overflow at the API separator implies that the storm water and the process water sewer systems are still interconnected. The Respondent must account for intense rain events in the wastewater treatment system design to ensure API overflows do not occur in the future.

The Respondent must comply with all comments contained in this letter. The replacement page(s) as specified must be submitted to NMED and OCD on or before September 25, 2009 in the event that an alternate wastewater treatment system design plan is not submitted. Provided that the Respondent complies with all the requirements of this letter, NMED approves the May 26, 2009 Work Plan. In any event, the upgraded wastewater treatment system must be installed and operating by September 4, 2010.

If you have questions regarding this letter please contact Hope Monzeglio of my staff at 505-476-6045.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
D. Cobrain NMED HWB
H. Monzeglio, NMED HWB
C. Chavez, OCD
G. Rajen, Gallup
J. Dougherty, EPA Region 6
D. Edelstein, EPA Region 6
A. Allen, Western
File: Reading File and GRCC 2009 File
HWB-GRCC-09-002

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

September 1, 2009

Mr. Ed Riege
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
Route 3, Box 7
Gallup, New Mexico 87301

RE: APPROVAL WITH MODIFICATION
PROCESS DESIGN REPORT FOR WASTEWATER TREATMENT PLANT UPGRADE (REV. A)
WESTERN REFINING COMPANY, SOUTHWEST, INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-GRCC-09-002

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has reviewed the *Process Design Report For Wastewater Treatment Plan Upgrade (REV. A)* (Work Plan), dated May 26, 2009, submitted on behalf of Western Refining Company, Southwest Inc., Gallup Refinery (the Respondent). On August 17, 2009, NMED received an e-mail with an attached letter from the Respondent stating "[t]his letter serves as Western Refining Gallup's ("Gallup") withdrawal from NMED's consideration of the Process Design Report For Wastewater Treatment Plan Upgrade (Rev. A) prepared by Brown and Caldwell and submitted to NMED on May 26, 2009. As we discussed, Gallup intends to submit to NMED an alternative wastewater treatment system work plan." The

May 26, 2009 Work Plan is referenced in the EPA Compliant and Consent Agreement and Final Order dated August 26, 2009 (CAFO), paragraph 100.C which states "[t]he Respondent submitted, on May 30, 2009, a Process Design Report for Wastewater Treatment System Work Plan for NMED and OCD approval for the design and construction of the upgraded wastewater treatment system. Upon NMED and OCD approval, all deadlines, work/design requirements, and sampling and monitoring requirements in a Process Design Report for Wastewater Treatment System Workplan shall become part of, and enforceable under, this CAFO."

Comments to the Work Plan already submitted are provided below. NMED understands that the Respondent may submit a work plan for the wastewater treatment system. Nevertheless, the Respondent must adhere to Comments C and D below and all other applicable comments.

Comment 1/Response 1

In the Response Letter (dated May 28, 2009), Response 1, the Respondent states "[n]ote: the Refinery is an interim status facility so the correct regulatory citations are HWA 20.4.1.600 and 40 CFR 265 as indicated in the response, rather than 20.4.1.500 and 40 CFR 264 stated in the original comment." In Section 1.5 (Regulatory Criteria) of the Work Plan, page 1-2, the Respondent states "[o]nce a [National Pollutant Discharge Elimination System] NPDES Permit is issued, the WWTP will be regulated under the Clean Water Act and thus exempt from RCRA's 40 CFR 265[1] requirements. Therefore, the design basis for the WWTP upgrades assumes the compliance with RCRA 40 CFR 265 is not required. If for some reason a NPDES permit cannot be obtained, the design will be revised and resubmitted to reflect compliance with 40 CFR 265." Footnote 1 states "[n]ote: The Refinery is an interim status facility so New Mexico Hazardous Waste Act [sic] 20.4.1.600 and 40 CFR 265 apply rather than 20.4.1.500 and 40 CFR 264."

NMED Response

The following corrections and requirements apply to the Respondent:

a. The Gallup Refinery is not an interim status facility. If the Respondent considered Aeration Lagoons 1 and 2 (AL-1 and AL-2) as interim status units, then the Respondent would have needed to submit a revised Part A Permit Application for those units in accordance with 20.4.900 NMAC (incorporating) 40 CFR 270.10 and a Part B permit application would have been required. In addition, interim status requires compliance with the requirements found in 20.4.1.900 NMAC (incorporating) 40 CFR 270.70 and 270.10(e)(ii). AL-1 and AL-2 are solid waste management units (SWMU), as indicated in Appendix A of the Post-Closure Care Permit (Permit).

b. As long as the Respondent continues to treat wastewater in AL-1 and AL-2 that is characteristically hazardous for benzene, the facility is treating hazardous waste. The CAFO allows the Respondent 120 days from NMED's approval of an Interim Measure Work Plan to achieve compliance.

c. The regulations cited by the Respondent ("HWA [sic] 20.4.1.600 and 40 CFR 265") are incorrect. The Respondent has not met the requirements for interim status; therefore, 40 CFR 265 (20.4.1.600 NMAC) does not apply.

d. The CAFO appropriately requires the Respondent to comply with the hazardous waste generator requirements found in 20.4.1.300 NMAC (incorporating) 40 CFR 262.34(a).

Comment 2/Repsonse 2

In the Response Letter, Response 2, the Respondent states "[s]hould Western Refining elect to perform BOX testing, and should that testing indicate that the addition of the MBBR media is not required, then Western Refining will seek approval from OCD to modify the Bioreactor design to exclude media."

NMED Response: The Respondent must also obtain approval from NMED to modify any portion of the wastewater treatment system.

Comment 4/Response 4

In the Response letter, Comment 4, NMED states "[t]he WWTS must contain influent and effluent sampling ports to accommodate sampling at the new API separator…."

NMED Response: From review of Section 6.1 (Sampling Locations), the influent to the API separator cannot be sampled. NMED reserves the right to require sampling of the influent entering the new API separator and the Respondent must be capable of collecting such samples.

Comment 6/Response 6

In the Response letter, Comment 6/Response 6 addresses dredging of Evaporation Pond 1 (EP-1). The Respondent responded stating "[d]redging of EP-1 will be addressed in the Corrective Measures Implementation Work Plan due to NMED on July 31, 2009. Western Refining will take the position that the initial dredging is not warranted and that the frequency a [of] future dredging events can allow for more than one foot of accumulation."

NMED Response: There have been documented releases when hazardous waste has entered EP-1; therefore, at a minimum, EP-1 contains listed hazardous waste (F037/F038). The upgraded wastewater treatment system is intended to ensure that hazardous waste will not enter EP-1. Dredging will remove residual contamination in order to enable the Respondent to demonstrate future compliance. The Respondent shall comply with the dredging requirements found in NMED's April 15, 2009 Notice of Disapproval (NOD), Comment 6. No revision is necessary.

Comment 9/Response 9

In the Response Letter, Response 9, the Respondent states "[m]eeting the [requirements of] 20.6.2.3103 standards is not a stated treatment objective of the upgraded WWTS. The treatment objectives (as stated in Section 1.4 of the Report) are for there to be no visible free oil and <0.5 mg/L benzene. The concentrations of other parameters are expected to be consistent with the historical data reported for the EP-1 inlet under the GW-32 monitoring requirements." Section 1.4 of the Work Plan states "[t]he treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. This project design was developed based on these objectives."

NMED Response: As identified in the objectives, the effluent entering into EP-1 must not contain free oil, and benzene concentrations must be below <0.5 mg/L. However, these should not be the sole objectives of the WWTS upgrade. The WWTS and the effluent entering into EP-1 must comply with all applicable requirements found in the Oil Conservation Divisions (OCD) Discharge Plan GW-32, as well as comply with all other applicable regulations. Discharges to the unlined Evaporation Ponds must not create the potential for impacts to groundwater.

Additional NMED/OCD Comments

Comment A

In Section 4.2.1 (Stormwater/Diversion Tanks), page 4-1, paragraph 2, the Respondent states "[o]il that may accumulate on the surface of T27 and T28 [Stormwater/Diversion Tanks] will be captured from a skimmer device mounted on each tank's floating roof. The skimmed oil will be collected by a vacuum truck and transferred to the Refinery's slop oil system for recycling back to the refining process. Solid material that may settle on the bottom of T27 and T28 will be removed on a periodic basis and managed along with similar material collected from the NAPIS. This material is normally recycled to an off-site refining process. If recycling to a refining process is not available, the T27 and T28 bottom solids will be managed as a hazardous waste."

NMED Response: Storm water at the refinery comingles with process water and therefore potentially contains hazardous waste (D018 and F037/F038 listed wastes). The Respondent is not allowed to accumulate hazardous waste in Tanks T27 and T28 for more than 90 days. Therefore, the Respondent's must design their storm water system to direct the ongoing low flow of process wastewater in the storm water system to the API separator except during storm events when higher flows trigger diversion of storm water to Tanks T27 and T28 at flow rates greater than approximately 30 gallons per minute (gpm) to prevent flow rates from exceeding capacity of the API separator or wastewater treatment system.

Comment B

In Section 4.2.4 (Tank-Based Separator), page 4-2, paragraph 5, the Respondent states "[t]he Tank-based separator is not designed to be compliant with 40 CFR 265 Subpart J due to Western Refining's intention to obtain an NPDES permit for the WWTP. If an NPDES permit cannot be obtained, the design of the Tank-based separator will be modified to be compliant with 40 CFR 265 Subpart J."

NMED Response: The CAFO requires the Respondent to comply with the requirements found in 20.4.1.300 NMAC (incorporating) 40 CFR 262.34(a). This applies to all applicable sections within the Work Plan (e.g. Section 4.2.5 (Bioreactors), paragraph 1 and Section 4.5 (Secondary Containment and Leak Detection)).

Comment C

In Section 4.6 (Alternative Upgrade Approach), page 4-6, last sentence, the Respondent states "Western Refining will submit the alternative design approach to OCD for approval prior to implementation."

NMED Response: The Respondent discussed an alternative approach to the upgraded WWTS to NMED and OCD in a meeting on July 1, 2009 that addressed the use of Macro Porous Polymer Extraction and a dissolved gas flotation unit. On August 17, 2009, the Respondent submitted a letter withdrawing the Process Design Report For Wastewater Treatment Plan Upgrade (REV. A). If the Respondent chooses to pursue an alternative wastewater treatment system, a new work plan must be submitted to OCD and NMED for approval by both agencies. The new work plan must describe all aspects of the alternative design. The implementation of an alternative approach will not change the deadline established in Comment D below which provides a deadline for the start of operation of an upgraded WWTS.

Comment D
The Respondent includes a Project Schedule in Section 5.

NMED Response: NMED does not approve the schedule presented in Section 5. The facility has had ample time to research and design an upgraded wastewater treatment system and first proposed upgrades in May 2007. Therefore, the Respondent must have the upgraded wastewater treatment system installed and operating by September 4, 2010.

Comment E
In Section 6.1 (Sample Locations), page 6-1, the Respondent states "[t]he WWTP upgrades will include wastewater sample stations at key locations for monitoring system performance. These locations are indicated by notations on the process flow diagrams in Attachments A and C and are listed below:"

NMED Response: The sampling ports were not described in the Work Plan. The Respondent must ensure that the sampling port mechanisms to be installed are capable of controlling the flow through the sampling ports to minimize volatilization. There are no notations for sample locations in Attachment C. No revision is necessary; the Respondent must install the sampling ports as required in the NMED's April 15, 2009 NOD.

Comment F
In Section 6.3 (Sample Analysis for Regulatory Reporting), page 6-2, the Respondent identifies sampling parameters for the EP-1 influent. The Respondent must address the following:

a. Table 6-2 lists the EPA method for semi volatile organic compounds (SVOCs) as "EPA 8260 C." The correct analytical method for SVOCs is EPA Method 8270. The Respondent must revise Table 6-2 to include the correct EPA Method and submit a replacement page that includes the corrections.

b. The EPA method proposed to be used to detect benzene is 8021B. In addition to benzene, EPA Method 8021B also analyzes for toluene, ethylbenzene, and total xylenes (BTEX). When reporting the analytical data, the Respondent must report all BTEX data. The Respondent must revise the Table 6-2 to include the analysis of toluene, ethylbenzene, and xylenes in addition to the benzene and submit a replacement page. If EPA Method 8260 is used, all analytes listed for the Method must be reported.

c. The Respondent states in Section 6.3 that "Western Refining will seek approval from OCD to discontinue the regulatory reporting requirements for the Pilot Travel Center (i.e., "Effluent from the Pilot Gas Station to the Aerated Lagoon") and the NAPIS

Effluent (i.e., "Effluent from the new API Separator) as required by Condition 19 of GW-032…." The Respondent must also obtain approval from NMED. Since this page is being resubmitted, this proposed revision must be included with the replacement pages.

Comment G
During the month of June 2009, the refinery reported an overflow at the API separator due to intense rain events. The API separator must be able to handle storm water surges caused by rain events. The overflow at the API separator implies that the storm water and the process water sewer systems are still interconnected. The Respondent must account for intense rain events in the wastewater treatment system design to ensure API overflows do not occur in the future.

The Respondent must comply with all comments contained in this letter. The replacement page(s) as specified must be submitted to NMED and OCD on or before September 25, 2009 in the event that an alternate wastewater treatment system design plan is not submitted. Provided that the Respondent complies with all the requirements of this letter, NMED approves the May 26, 2009 Work Plan. In any event, the upgraded wastewater treatment system must be installed and operating by September 4, 2010.

If you have questions regarding this letter please contact Hope Monzeglio of my staff at 505-476-6045.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
D. Cobrain NMED HWB
H. Monzeglio, NMED HWB
C. Chavez, OCD
G. Rajen, Gallup
J. Dougherty, EPA Region 6
D. Edelstein, EPA Region 6
A. Allen, Western
File: Reading File and GRCC 2009 File
HWB-GRCC-09-002

Chavez, Carl J, EMNRD

From: Riege, Ed [Ed.Riege@wnr.com]
Sent: Thursday, August 27, 2009 9:28 AM
To: Chavez, Carl J, EMNRD
Subject: FW: Withdrawal of Gallup Work Plan Request
Attachments: 20090817093026236.pdf

Carl,
Sorry for the oversight, but I forgot to copy you on this withdrawal of Gallup work plan request. I will keep you in the loop on the upcoming submission.

Thanks
Ed

Ed Riege
Environmental Manager

Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com
-----Original Message-----
From: Riege, Ed
Sent: Monday, August 17, 2009 9:39 AM
To: 'Monzeglio, Hope, NMENV'
Subject: Withdrawal of Gallup Work Plan Request

Hi Hope,

Attached is Withdrawal of Work Plan letter. Original hard copy is in the mail.

Thanks,
Ed

Ed Riege
Environmental Manager

Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com

WNR LISTED NYSE

Western Refining
GALLUP REFINERY

August 17, 2009

Via Email [hope.monzeglio@state.nm.us]

Hope Monzeglio
New Mexico Environmental Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Re: Withdrawal of Work Plan

Dear Hope:

This letter serves as Western Refining Gallup's ("Gallup") withdrawal from NMED's consideration of the Process Design Report For Wastewater Treatment Plan Upgrade (Rev. A) prepared by Brown and Caldwell and submitted to NMED on May 26, 2009. As we have discussed, Gallup intends to submit to NMED an alternate wastewater treatment system work plan.

If you have any questions, please let me know.

Sincerely,

Ed Riege
Environmental Manager

Chavez, Carl J, EMNRD

From: Riege, Ed [Ed.Riege@wnr.com]
Sent: Tuesday, July 07, 2009 9:39 AM
To: Monzeglio, Hope, NMENV; Chavez, Carl J, EMNRD
Subject: Alternate WWTP Design
Attachments: WWTP 2.ppt

Hope and Carl,

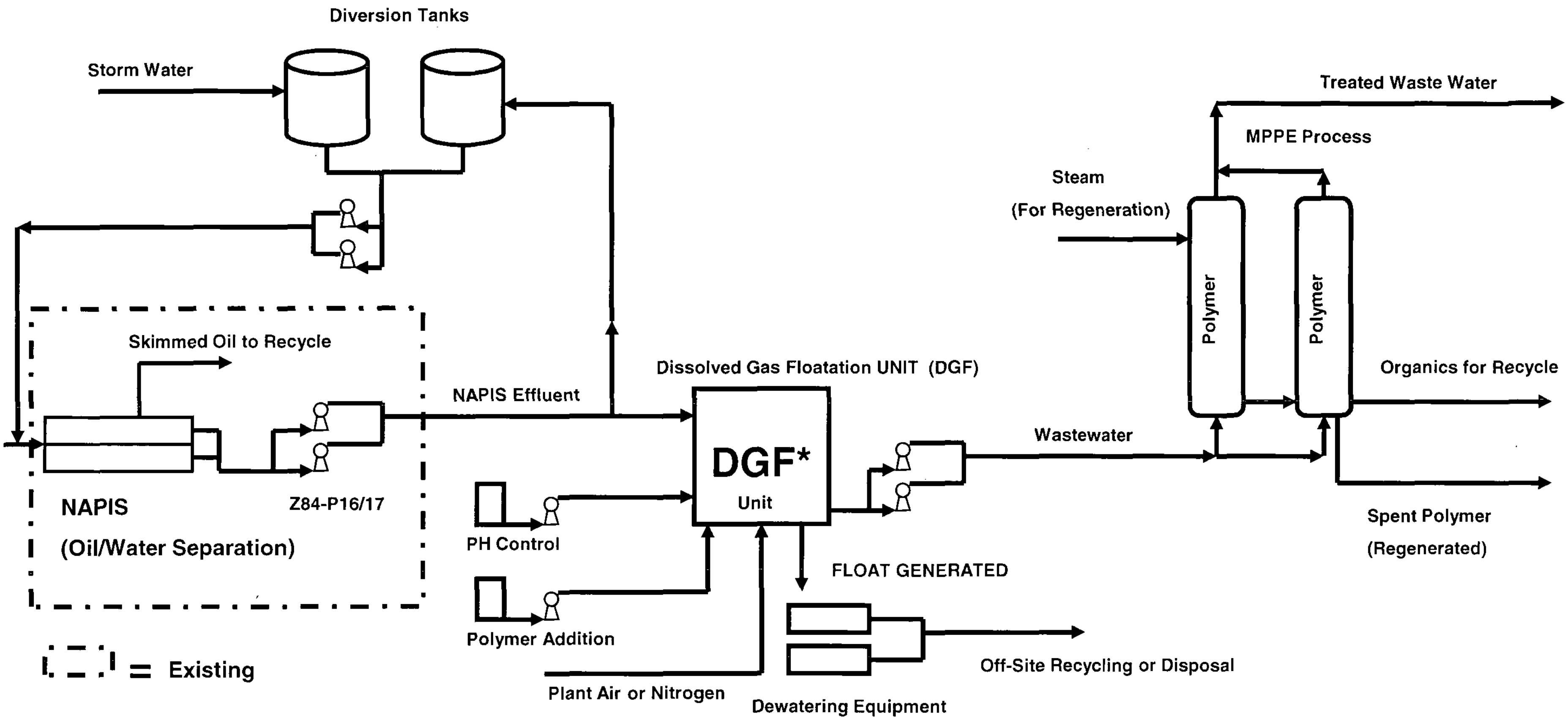
As promised in last weeks meeting, attached is the drawing for the alternate modular design Gallup is considering which now consists of the following steps: 1) Oil is separated in the existing oil/water separator (NAPIS), 2) Additional oil will be separated from the wastewater in second stage oil/water separation equipment using dissolved gas floatation technology. 3) Organics (including benzene) will be extracted from the de-oiled wastewater in a macro porous polymer extraction process using polymer beads and steam. The extraction processs is an enclosed process with no vent to atmosphere. The organics (including benzene) will be returned to the refinery for recycling. The design will meet the same treatment objectives required by our NMOCD permit and RCRA regulation. Those objectives are to remove oil so no visible free oil is on Evaporation Pond No. 1 and to reduce the benzene concentration going to Evaporation Pond No. 1 to below 0.5 mg./l.

Thanks,

Ed

Ed Riege
Environmental Manager

Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com



NOTE: MPPE = Macro Porous Polymer Extraction

Enclosed System – No air Emissions

The MPPE system will operate with one packed column In service while the second one is being regenerated.

•Second Stage Oil/Water Separation

Western Refining

Western Refining
GALLUP REFINERY

WNR LISTED NYSE

RECEIVED

2009 MAY 29 AM 11 31

May 28, 2009

135741.021.300

Mr. James P. Bearzi
Chief, Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Response to Notice of Disapproval
Process Design Report for Wastewater Treatment Plant Upgrade
Western Refining Company Southwest, Inc. (Gallup Refinery)
EPA ID# NMD000333211
HWB-GRCC-09-022

Dear Mr. Bearzi:

This letter is in response to the Notice of Disapproval (NOD) for Western Refining's Process Design Report for Wastewater Treatment Plant Upgrade (Report). The comments from the NOD and the responses addressing those comments are included below. In addition, the Report has been revised and is being re-submitted with this response.

> **Comment 1**: "In Section 3.3 (Biological Treatment), the Permittee states '[t]he biological treatment technology selected for [Wastewater Treatment Plant] WWTP upgrade project was a Bioreactor without sludge (biomass) recycle. This technology is akin to an aerated lagoon, but in an above-ground steel tank.'
> The Permittee currently does not have a National Pollutant Discharge Elimination System (NPDES) Permit. Therefore, the wastewater treatment system (WWTS) upgrade is subject to the Resource Conservation Recovery Act (RCRA) and the New Mexico Hazardous Waste Act (HWA). The bioreactors, tank-based separator, and any future tanks must comply with 20.4.1.500, incorporating 40 CFR 264 Subpart J. The Permittee must revise the Report to show that the tanks comply with the Subpart J design requirements. The Permittee must revise the text and attachments as necessary."

Response 1: Western Refining is in the process of preparing a NPDES permit application to be submitted to USEPA Region 6. We have assumed that the permit will be approved and in-place by the time the upgraded WWTS is operational. Therefore, the design basis for the Report assumes that the upgraded WWTS is not subject to HWA 20.4.1.600 (incorporating 40 CFR 265 Subpart J). The NPDES permit should be issued within the next 9 months. Should at any time it become evident that a NPDES permit will not be issued prior to WWTS start-up, the tank design will then be modified to comply with 20.4.1.600 and 40 CFR 265 Subpart J and the Report will be resubmitted to NMED/OCD for approval. Contingencies will be built into the design approach to accommodate these potential modifications such that the schedule presented in Section 5 of the Report will not be jeopardized. Sections 4.2.4 and 4.2.5 of the Report have been modified to reflect this approach.

Note: The Refinery is an interim status facility so the correct regulatory citations are HWA 20.4.1.600

I-40 Exit 39, Jamestown, New Mexico 87347 • 505 722-3833 • www.wnr.com
Mail: Route 3 Box 7, Gallup, New Mexico 87301

and 40 CFR 265 as indicated in the response, rather than 20.4.1.500 and 40 CFR 264 stated in the original comment.

> **Comment 2**: "In Section 3.3 (Biological Treatment), page 3-3, the Permittee states '[t]he shutdown of Benzene Stripper No. 3 will increase the benzene loading in the NAPIS effluent above current levels. In the detailed engineering phase, Brown and Caldwell will evaluate the impact of this change on the design conditions and evaluate whether or not MBBR media addition to the Bioreactors will be required as a result.' The Permittee must revise the Report to include all changes to the WWTS to account for the increased benzene load resulting from the removal of Benzene Stripper 3."

Response 2: Section 3.3 has been modified to reflect this comment. The design approach for the upgraded WWTS will be to add MBBR media to the Bioreactors in order to accommodate the higher benzene loading from the shutdown of Benzene Stripper No. 3. However, Western Refining reserves the right to conduct further wastewater treatability studies that may prove media addition is not required.

The modeling of benzene removal efficiency in the Bioreactors was based on a conservative benzene biodegradation rate. The biodegradation rate was taken as the default value from the USEPA WATER9 modeling. Brown and Caldwell's experience is that the WATER9 default biodegradation rates for individual volatile organic compounds typically under predict actual biodegradation rates observed in full-scale systems with acclimated biomass. USEPA recognizes the potential for this underestimation by allowing for the site-specific measurement of biodegradation rates through BOX testing as prescribed in 40 CFR 63 Appendix C.

Should Western Refining elect to perform BOX testing, and should that testing indicate that the addition of MBBR media is not required, then Western Refining will seek approval from OCD to modify the Bioreactor design to exclude media.

> **Comment 3**: "In Section 4.5 (Secondary Containment and Leak Detection), page 4-5, the Permittee states '[t]he proposed design does not include leak detection or containment berms for the Bioreactors (T11 and T12)...However, the Bioreactors will be situated such that a potential leak would flow into EP-1, which is the destination of the Bioreactor effluent.' If the system has a leak, the discharge may not be completely treated and therefore may potentially be characteristic for benzene and/or be a F037/F038 listed waste, which would then enter EP-1. Hazardous waste must not be discharged to EP-1 since it is not permitted by the NMED to receive hazardous waste and requirements in the OCD Discharge Plan. Because the Permittee does not have a NPDES Permit for the WWTS, the tank systems within the WWTS are subject to the requirements of 20.4.1.500 NMAC, incorporating 40 CFR 264 Subpart J. The Permittee must revise this Report to reflect compliance with the requirements of 40 CFR 264 Subpart J and revise the attachments as applicable. The Permittee must also revise the Report to comply with Condition 9 (Above Ground Tanks) of the OCD Discharge Permit (GW-32), dated August 23, 2007. The WWTS cannot be retrofitted and does not qualify for the exemption (tanks that contain fresh water or fluids that are gases at atmospheric temperature and pressure are exempt) under Condition 9 of the OCD Permit."

Response 3: Section 4.5 of the Report has been modified to incorporate this comment. Leak detection will be provided by installing channels in the concrete foundation under the tank or by an alternative method that is suitable to OCD. The secondary containment for the Bioreactors will be an earthen secondary containment berm (or by an alternative method that is suitable to OCD), and will meet the requirements of Condition 9 of GW-32. As discussed in Response 1, the leak detection and secondary containment for the Bioreactors will not be intended to meet 40 CFR 265 Subpart J requirements, unless it is later determined that a NPDES permit cannot be obtained.

> **Comment 4**: "The Permittee must revise the Report to include the following modifications:
> a. The WWTS must contain influent and effluent sampling ports to accommodate sampling at the new API separator, the tank-based separator, and the bioreactors.
> b. The WWTS must include air vents for the tank-based separator and the bioreactors. These locations must be constructed to allow for emissions sampling.
> The text and attachments must be revised as necessary to address items a and b above."

Response 4: Item (a) of Comment 4 has been addressed by the addition of Section 6.0 Sampling and Analysis to the Report. This new section includes the identification of sampling locations as well as the anticipated parameters and measurement frequencies. The process flow diagrams in Attachment A and Attachment C also include notations to indicate sampling locations.

Item (b) of Comment 4 has been addressed in Section 4.2.4 of the Report for the Tank-based Separator and in Section 4.2.5 of the Report for the Bioreactors. The Tank-based Separator will have an external floating roof that will maintain a condition of no air headspace above the liquid. Further, the roof will have appropriate primary and secondary seals per 40 CFR 60.693-2 (NSPS Subpart QQQ standards), which are designed to prevent a venting situation. Therefore, T10 will have near-zero air emissions and an air emission sampling point is not applicable. The roof will be equipped with pressure and vacuum vents for non-routine start-up/shutdown events. The roofs of the Bioreactors will be equipped with vents to allow the aeration air a means of exiting the tank. A mechanism for sampling the air emissions from the roofs will be included.

> **Comment 5**: "In Section 2.2 (Refinery Wastewaters), page 2-1, the Permittee states '[t]he sanitary wastewater generated at the Refinery and the seven adjacent homes owned by the Refinery currently discharges to the septic systems and not the WWTP. However, the WWTP upgrades will include the option for these sanitary sources to be redirected to the WWTP at a future date at Western Refining's discretion.' If and when the sanitary sources are redirected to the WWTS, the Permittee must notify the OCD and the Gallup Field Office (http://www.nmenv.state.nm.us/NMED/field_op.html) prior to implementing this change over and comply with all requirements. No revision is necessary."

Response 5: The text of Section 2.2 has been revised to affirm Western Refining's intent to implement this change. Ed Riege of Western Refining sent an e-mail to OCD and NMED HWB staff members on April 1, 2009 informing them of this change. Mr. Riege also included drawings for review. As requested above, the same information was emailed to Charles Lundstrom of the Gallup Field Office on April 29, 2009. Please advise if additional notification is required per Comment 5.

> **Comment 6**: "In Section 3.3 (Biological Treatment), page 3-3, the Permittee states '[b]iomass will exit the Bioreactors by being carried out in the Bioreactor effluent. The biomass will settle out in the downstream evaporation ponds, primarily [Evaporation Pond] EP-1. Over time, the settled

biomass may accumulate in EP-1 to the extent that dredging will be required.' The Permittee has allowed upsets with the current WWTS resulting in hazardous waste being discharged to EP-1. Therefore the follow requirements apply and the Permittee must revise the Report to address these requirements.

a. Within 30 days of demonstration that the new WWTS is achieving cleanup criteria, the Permittee must dredge EP-1. The dredged material must be properly characterized and managed for proper disposal. All dredging and waste disposal activities must be approved by both NMED and OCD prior to implementation. The Report must be revised to describe the dredging process, alternatively, the Permittee may submit a separate work plan to NMED and OCD for approval that addresses the dredging activities.

b. After the initial dredging of EP-1, the Permittee must dredge the biomass from EP-1 anytime the biomass accumulation is greater than one foot. The dredged biomass must be properly characterized as nonhazardous if considered for placement in the OCD landfarm to assist the remediation of contamination soil, pending OCD approval. NMED must be included on all correspondence."

Response 6: Dredging of EP-1 will be addressed in the Corrective Measures Implementation Work Plan due to NMED on July 31, 2009. Western Refining will take the position that the initial dredging is not warranted and that the frequency a future dredging events can allow for more than one foot of accumulation.

Comment 7: "In Section 4.2.1 (Stormwater/Diversion tanks), page 4-1, the Permittee states '[i]n the new system, stormwater will flow by gravity to two Stormwater/Diversion Tanks. These tanks are existing with a numerical designation of Z84-T27 and T-28...Stormwater that collects in the tanks will be pumped at a rate of 50 to 200 gpm to the process sewer that feeds to the NAPIS.' Since the stormwater and process wastewater at the refinery comingle, any sludge removed from the bottom of the Stormwater/Diversion tanks must be managed as hazardous waste."

Response 7: Section 4.2.1 of the Report has been revised in to address this comment. This material will normally be recycled to an off-site refining process. If recycling to a refining process is not available, the material removed from the bottom of the Stormwater/Diversion tanks will be managed as a hazardous waste.

Comment 8: "In Section 4.2.1 (Stormwater/Diversion tanks), page 4-1, the Permittee states '[c]leanouts will be installed on the conveyance pipelines to and from the Stormwater/Diversion Tanks. Cleaning events will be scheduled on a regular, recurring basis.' Any sludge removed during the cleanouts of the pipelines must be managed as hazardous waste. The Permittee must revise the Report to address the management of this sludge."

Response 8: Section 4.2.1 of the report has been revised to address this comment. This material will normally be recycled to an off-site refining process. If recycling to a refining process is not available, the cleanout sludge will be managed as a hazardous waste.

Comment 9: "In Section 4.2.5 (Bioreactors), page 4-3 and 4-4 the Permittee states '[t]here will be provisions for diverting the Bioreactor effluent away from EP-1 in the event that the treated water quality it not acceptable. A diversion line will be connected to the combined Bioreactor effluent, with its valve normally closed. To divert, this valve would be opened and the valve to EP-1 closed' and the Permittee later states in Section 4.4 (Management of Off-Spec Wastewater), page 4-5, that '[i]f at anytime the Bioreactor effluent were deemed unsuitable for discharge to EP--1, it could be diverted to the new Stormwater/Diversion Tanks as described in Section 4.2.5' The Permittee must provide a sampling plan that explains how the Permittee will characterize the effluent from the bioreactors entering EP-1. The sampling plan must identify the location of samples that will be collected and address sampling frequency, water quality parameters, and test methods. The effluent must comply with the Water Quality Control Commission standards found in 20.6.2.3103."

Response 9: Section 6.0 Sampling and Analysis has been added to the Report to provide a sampling plan for the Bioreactor effluent/EP-1 influent.

Meeting the 20.6.2.3103 standards is not a stated treatment objective of the upgraded WWTS. The treatment objectives (as stated in Section 1.4 of the Report) are for there to be no visible free oil and <0.5 mg/L benzene. The concentrations of other parameters are expected to be consistent with the historical data reported for the EP-1 inlet under the GW-32 monitoring requirements.

Comment 10: "In Section 4.3.3 (OAPIS), page 4-5, the Permittee states 'the [Old API Separator] OAPIS will no longer be required and can be decommissioned.'
The OAPIS is Solid Waste Management Unit (SWMU) No. 14. This SWMU is subject to correction action under the Refinery's RCRA Permit. The Permittee must provide a schedule for the submittal of an investigation work plan to assess releases from the OAPIS."

Response 10: A schedule for submitting this investigation work plan will be included in the Corrective Measures Implementation Work Plan due to NMED on July 31, 2009.

Closing

A hardcopy of the revised report is included with this response letter. Additionally, an electronic red-line version of the Report is being emailed. The distribution list for these submittals includes NMED HWB, OCD, and EPA Region 6.

I can be reached at (505) 722-0217 or ed.riege@wnr.com.

Very truly yours,

Ed Riege
Environmental Manager

RECEIVED
2009 MAY 29 AM 11 31

Western Refining

PROCESS DESIGN REPORT FOR WASTEWATER TREATMENT PLANT UPGRADE (REV. A)

Prepared for
Western Refining Southwest
Gallup Refinery

~~February 26~~May 26, 2009

Submitted to:
New Mexico Oil Conservation Division
Environmental Bureau
Santa Fe, New Mexico

New Mexico Environment Department
Hazardous Waste Bureau
Santa Fe, New Mexico

Prepared by:
BROWN AND CALDWELL
30 East Seventh Street, Suite 2500
Saint Paul, MN 55101

30 East Seventh Street
Suite 2500
Saint Paul, MN 55101

Tel: 651-298-0710
Fax: 651-298-1931

www.brownandcaldwell.com

BROWN AND CALDWELL

~~February 26~~May 26, 2009 135741.021.300

Mr. Ed Riege
Western Refining Southwest
Gallup Refinery
Route 3, Box 7
Gallup, NM 87301

Subject: Transmittal of Process Design Report for Wastewater Treatment Plant Upgrade (Revision A)

Dear Mr. Riege:

Brown and Caldwell is pleased to provide the attached Process Design Report ~~to Western Refining Southwest~~ for the ~~upgrades to the wastewater treatment plant (WWTP)~~Wastewater Treatment Plant Upgrade at the Gallup Refinery. The Report has been revised (Revision A) to address the comments provided by the New Mexico Environment Department's Notice of Disapproval dated April 15, 2009. Revision A supersedes the previous version dated February 26, 2009.

Brown and Caldwell appreciates the opportunity to work with Western Refining on the design of the WWTP upgrades. If you have any questions on this report, please contact me at (651) 468-2061 or jallen@brwncald.com.

Very truly yours,

BROWN AND CALDWELL

Jeffrey S. Allen, P.E.
Project Manager
New Mexico Registration No. 18988

Professional Engineer Certification for Jeffrey S. Allen, P.E.

This is to certify that the Process Design Report (Revision A) for Western Refining Southwest dated ~~February~~May 2009 was prepared under my direction and supervision. The exception to this certification is the material in Attachment C.

License No. 18988
May 26~~February 26~~, 2009

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF TABLES

1. INTRODUCTION

1.1 Introduction

The Western Refining Southwest's Gallup Refinery is a petroleum refinery with a crude oil processing capacity of 23,000 barrels per day (bpd). The Refinery is located in Jamestown, New Mexico at Interstate 40 Exit 39.

Brown and Caldwell has prepared the following Process Design Report on behalf of Western Refining. This document presents the planned upgrades of the wastewater treatment plant (WWTP) at the Refinery.

On August 27, 2007 Western Refining received a renewal of its discharge permit GW-032 from the New Mexico Oil Conservation Division (OCD). The permit required the Refinery to complete certain actions related to wastewater management. The Process Design Report addresses aspects of the following permit conditions:

1. Condition 16C - Treatment Study and Design
2. Condition 16D - Aerated Lagoons
3. Condition 16E – Evaporation Ponds

The design presented herein is for WWTP upgrades that include a new biological treatment system in above-ground tanks. The new biological treatment system will replace the current function of Aeration Lagoons 1 and 2 (AL-1 and AL-2). Thus, AL-1 and AL-2 will no longer be required and can be taken out of service. The effluent quality from the biological treatment system will be suitable for discharge to the unlined Evaporation Pond 1 (EP-1). Therefore, the installation of a liner in EP-1 is not required.

1.2 Project Scope

The scope of the WWTP upgrade project consists of the following new systems:

- Two existing tanks will be put in service for the storage of process area stormwater and diversion of EP-1 influent.
- pH adjustment capabilities downstream of the existing New American Petroleum Institute (API) Separator (NAPIS).
- Equalization and additional oil-water-solids separation using an above-ground Tank-based Separator.
- Two Bioreactors in above-ground tanks with moving bed biofilm reactor media and without sludge recycle. The Bioreactors will be aerated using blowers and air diffusers. The Bioreactors will have chemical feed systems for pH control and nutrient (phosphorus) addition.

The new system will allow the following existing systems to be decommissioned:

- Benzene Stripper Nos. 1, 2 and 3.
- AL-1 and AL-2
- The Old API Separator (OAPIS)

The following existing equipment will continue to be operated in their current function within the upgraded system:

- NAPIS
- EP-1 through EP-12

1.3 Related Project - Pilot Travel Center Lift Station

A lift station to collect, screen, and pump the sanitary/restaurant wastewater from the Pilot Travel Center to the WWTP is currently under construction. A force main will convey the wastewater from the new lift station to the WWTP. The wastewater from the new lift station will discharge into AL-1 until the new Bioreactors are placed in service. At that time, the wastewater will be routed to the Bioreactor influent.

1.4 Treatment Objectives

The treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. The project design was developed based on these objectives.

1.5 Regulatory Compliance

The focus of the process design presented herein is compliance with the requirements of OCD permit GW-032. Western Refining is in the process of preparing an application for a discharge permit under the National Pollutant Discharge Elimination System (NPDES). The application will be submitted to the U.S Environmental Protection Agency Region 6 and OCD. Once a NPDES permit is issued, the WWTP will be regulated under the Clean Water Act and thus exempt from RCRA's 40 CFR 265[1] requirements. Therefore, the design basis for the WWTP upgrades assumes that compliance with RCRA 40 CFR 265 is not required.

If for some reason a NPDES permit cannot be obtained, the design will be revised and resubmitted to reflect compliance with 40 CFR 265.~~Brown and Caldwell and Western Refining recognize that this Process Design Report will also be reviewed by the New Mexico Environment Department and U.S. Environmental Protection Agency Region 6 with respect to other regulatory requirements such as RCRA. The design will be modified as necessary to meet additional compliance requirements as advised by the three agencies.~~

1.6 Report Organization

The Process Design Report is organized as follows:

Section 1.	Introduction
Section 2.	Wastewater Sources
Section 3.	Technology Selection
Section 4.	Process Description
Section 5.	Project Schedule
Section 6.	Sampling and Analysis

[1] Note: The Refinery is an interim status facility so New Mexico Hazardous Waste Act 20.4.1.600 and 40 CFR 265 apply rather than 20.4.1.500 and 40 CFR 264.

2. WASTEWATER SOURCES

2.1 Overview

This section of the report reviews the sources of wastewater generated at the Refinery. The wastewater sources discharged to the Refinery's WWTP fall under two broad categories: those wastewaters generated at the Refinery and those generated at the adjacent Pilot Travel Center. The two sources are further described below.

2.2 Refinery Wastewaters

The process wastewaters generated by the Refinery are directed to the process sewer that serves as the influent to the existing NAPIS. There are two additional wastewater sources generated within the Refinery that do not discharge to the process sewer/NAPIS but discharge elsewhere within the WWTP. These sources are the water softener system and the reverse osmosis (RO) system. Both of these systems are part of the larger boiler feed water treatment system. The batch discharge from the water softener's regeneration cycle and the continuous discharge of reject from the RO membranes are collected in a dedicated sewer system. RO reject and water softener brine are the only two sources to this sewer. This wastewater is not oily and does not contain benzene; and it does not require oil-water separation unit or biological treatment. It is currently sent to the process sewer/NAPIS influent via its segregated gravity line, with the option of diversion to Evaporation Pond No. 2 (EP-2). As part of the WWTP upgrades, there will be an option to re-direct this stream to the new biological treatment units.

The sanitary wastewater generated at the Refinery and the seven adjacent homes owned by the Refinery currently discharges to septic systems and not the WWTP. ~~However, t~~The WWTP upgrades will include ~~the~~ measures ~~option~~ for these sanitary sources to be redirected to the WWTP at a future date ~~at Western Refining's discretion~~. Western Refining has previously notified OCD and NMED of its intention to make this change.

2.3 Pilot Travel Center Wastewaters

The Refinery has a contract with the adjacent Pilot Travel Center to treat the sanitary and restaurant wastewaters generated by that facility. The wastewater from the restaurant at the Pilot Travel Center goes through a new grease trap system installed in 2008. The grease trap effluent and the sanitary/restaurant wastewaters from the rest of the Pilot Travel Center flow to a septic tank system. Septage is pumped out of the septic tank system on a scheduled quarterly basis (as reported by Pilot Travel Center staff). The effluent from the septic tank system gravity flows to a lift station on the Pilot Travel Center property. This lift station, the grease trap, and the septic tank system are owned and operated by the Pilot Travel Center. The lift station's submersible pumps then transfer the wastewater through a pipeline to the Refinery for further pumping and treatment. Western Refining is currently constructing a new lift station on its property to receive the wastewater from the Pilot Travel Center's lift station (see Section 1.3).

The Pilot Travel Center generates other wastewaters that are not discharged to the Refinery. These other wastestreams include truck washing and vehicle maintenance activities. They are managed with on-site oil-water separators, holding tanks, and retention ponds at the Pilot Travel Center.

3. TECHNOLOGY SELECTION

3.1 Overview

Brown and Caldwell evaluated and selected technologies to upgrade the oil removal and biological treatment systems within the WWTP.

3.2 Second-Stage Oil-Water Separation

As discussed in Section 1.4, the treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. This objective will be met by replacing the aerated lagoons with a tank-based biological treatment system. In order for biological treatment to be effective, wastewater must meet certain specifications (pH, temperature, nutrient concentrations, etc.). Included in those specifications is a limit on the concentration of oil. This limitation is the reason why refinery wastewater treatment systems have oil-water separation devices. Brown and Caldwell uses a guideline of <50 mg/L O/G as an average for biological treatment influents. Indications from the Refinery were that historically the NAPIS effluent has been consistently above the 50 mg/L threshold. Therefore, in addition to a new biological treatment process, Brown and Caldwell considered technologies for providing improved upstream O/G removal.

API separators (including the existing NAPIS) provide first-stage (i.e., primary) oil-water separation. As such, they provide removal of free oil that readily separates from the wastewater by gravity. The intent of second-stage oil-water separation is to provide additional O/G removal beyond what is consistently achievable by an API separator. Second-stage oil-water separation can remove the residual O/G that does not readily separate by gravity (i.e., emulsified O/G). Removal of this residual O/G by second-stage oil-water separation is often required to achieve the <50 mg/L guideline for biological treatment.

A Tank-based Separator was selected as the technology for providing second-stage oil-water separation at the Refinery, with the objective of producing a biological treatment influent with an average O/G concentration of <50 mg/L. The Tank-based Separator was selected for the following reasons:

- It provides a dual function of flow and wasteload equalization in addition to oil-water separation.
- It does not require the handling of oil and oily-solids on a continuous basis. Oil can be allowed to accumulate at the top of the tank and removed periodically (e.g., weekly).
- It is mechanically simple, with no moving parts except for the feed pumps and the floating roof.
- Because of its floating roof, it does not need a separate air emissions control device (i.e., there is no headspace above the liquid and thus no air emissions).
- It requires minimal operator attention or process control.
- It does not require chemical addition other than influent pH adjustment.

A Tank-based Separator functions in a similar fashion to an API separator; it is essentially an API separator in a larger tank with a longer residence time. Oil accumulates at the surface of the Tank-based Separator, is skimmed, and is returned to the Refinery for reprocessing just as with an API Separator. Solids that settle to the bottom of the Tank-based Separator are periodically removed and sent to oily solids recycling. Some refineries use a Tank-based Separator in place of an API separator. At the Gallup Refinery, the Tank-based

floating oil will be skimmed from the bioreactor surface using a vacuum truck. Floating oil is not anticipated in the Bioreactors; these measures are precautionary.

The Bioreactors will require ancillary systems to provide effective biological treatment. The Bioreactors will provide aerobic biodegradation and thus will require oxygen. Oxygen will be transferred to the Bioreactor contents using forced air from a blower system and air diffusers mounted to the bottom of the tank. The airflow will be controlled to maintain a minimum dissolved oxygen (DO) concentration of 2 mg/L. Each Bioreactor will have pH control capabilities to maintain a target pH range of 6.5 to 8.5 for effective biological treatment.

Biomass will exit the Bioreactors by being carried out in the Bioreactor effluent. The biomass will settle out in the downstream evaporations ponds, primarily EP-1. Over time, the settled biomass may accumulate in EP-1 to the extent that dredging will be required. Solids will not accumulate in the Bioreactors. The residence time of solids in the Bioreactors will be the same as the hydraulic residence time of the Bioreactors.

This Bioreactor technology was selected for the following reasons:

- The Bioreactors do not require the handling of solids on a continuous basis. The excess biomass solids will accumulate in the bottom of EP-1. After several years of operation, EP-1 may require dredging to restore its solids settling capacity.
- The Bioreactors are mechanically simple, with no moving parts except for the aeration blowers and chemical feed systems (pH control and nutrients).
- The Bioreactors require minimal operator attention and minimal process control.
- The Bioreactors are tank-based, so they can treat water containing >0.5 mg/L benzene.

Brown and Caldwell has designed similar Bioreactor systems (without sludge recycle) at three refineries. These systems shared the same treatment objective as Western Refining, to prevent visible free oil and >0.5 mg/L benzene from reaching downstream unlined ponds. Refinery X is a 10,000 to 20,000 bpd refinery with a single bioreactor. Refinery Y was a 50,000 bpd refinery with two parallel bioreactors. Refinery Z is a 90,000 bpd refinery with two parallel bioreactors. In each of these three cases, the bioreactor systems were designed for a hydraulic retention time of 24 hours. Recent verbal communications with current or former environmental staff at the refineries confirmed that the operating performance of the bioreactors achieved the design treatment objectives.

The biodegradation capacity of the Bioreactors will be enhanced by adding ~~can be expanded in the future if needed. The additional capacity would be achieved by increasing the biomass concentration. A simple means of raising the biomass concentration would be to add~~ plastic media to the Bioreactors, resulting in a process known as ~~making it a~~ moving bed biofilm reactor (MBBR). This technology is available through wastewater equipment vendors including Veolia, Siemens, and Hydroxyl Systems. The media (also known as suspended carrier elements) floats freely in the Bioreactors. The media is mixed in a random pattern throughout the bioreactor via the aeration system and is retained in each~~the~~ Bioreactor by a screen on the outlet nozzle. Biomass grows on the surface of the media, thereby effectively increasing the biomass concentration in the bioreactor. The estimated media volume required to achieve the treatment objectives is 7,250 ft^3 per Bioreactor, or the equivalent of approximately 8 percent of the liquid volume of the tank. If ever needed, additional media can be added to the tanks, up to a 67 percent volumetric fill.

~~The Bioreactors will be constructed with an air diffuser system compatible with suspending and mixing the MBBR media. They will also be constructed with the effluent media screens in place. With these components in place, media can be added directly to the Bioreactors in the future without further modifications.~~

~~The shutdown of Benzene Stripper No.3 will increase the benzene loading in the NAPIS effluent above current levels. In the detailed engineering phase, Brown and Caldwell will evaluate the impact of this change on the design conditions and evaluate whether or not MBBR media addition to the Bioreactors will be required as a result.~~The need to add media to the Bioreactors is based on conservative design values for the benzene biodegradation rate. Western Refining may elect to perform USEPA-prescribed wastewater treatability testing to develop site-specific benzene biodegradation rates. If Western Refining elects to do the testing, and the testing indicates that the media is not required, then Western Refining will seek regulatory approval of a revised design without adding media in the Bioreactors.

4. PROCESS DESCRIPTION

4.1 Overview

This section provides a process description of the new systems that will comprise the Refinery's WWTP following implementation of the upgrades. The first subsection discusses the new systems to be installed as part of the WWTP upgrades. The second subsection discusses the existing systems that will be decommissioned as part of the WWTP upgrades. This section concludes with a discussion of management of off-spec wastewater, secondary containment and leak detection, and an alternative upgrade approach. Process flow diagrams and a site layout drawing that accompany the process description are available in Attachments A and B, respectively.

4.2 New System

A description of the major equipment for the new system is provided below.

4.2.1 Stormwater/Diversion Tanks

A new stormwater management system will be constructed for the stormwater collected in the process area. This stormwater is currently collected in a dedicated sewer that discharges to the OAPIS. In the new system, stormwater will flow by gravity to two Stormwater/Diversion Tanks. These tanks are existing with a numerical designation of Z84-T27 and T28. The tanks have dimensions of 33'-5" diameter by 32 ft height, for a volume of 210,000 gallons each. The combined volume of 420,000 gallons will provide storage capacity for a 100-yr, 1-hour storm event (415,886 gallons). The tanks have existing, internal floating roofs for air emissions control. Stormwater that collects in the tanks will be pumped at a rate of 50 to 200 gpm to the process sewer that feeds the NAPIS. Two variable speed pumps will be provided (one operating, one standby). Because the stormwater will be treated in the NAPIS, the OAPIS will be taken out of service (see Section 4.3.3).

Oil that may accumulate on the surface of T27 and T28 will be captured from a skimmer device mounted on each tank's floating roof. The skimmed oil will be collected by a vacuum truck and transferred to the Refinery's slop oil system for recycling back to the refining process. Solid material that may settle on the bottom of T27 and T28 will be removed on a periodic basis and managed along with similar material collected from the NAPIS. This material is normally recycled to an off-site refining process. If recycling to a refining process is not available, the T27 and T28 bottom solids will be managed as a hazardous waste.

Cleanouts will be installed on the conveyance pipelines to and from the Stormwater/Diversion Tanks. Cleaning events will be scheduled on a regular, recurring basis with collected material managed along with the NAPIS and T27/28 solid material as described above. Underground piping will be buried below the frost line to prevent freezing. Aboveground piping will be electric heat traced to prevent freezing.

The conceptual design was developed by Tetra Tech and presented in a report dated October 2007. The report, entitled "Storm Drain System Extension – Process Design" was previously submitted to OCD. The design was further developed by RMT, as represented by four design drawings that are provided in Attachment C. Going forward, Brown and Caldwell will take over responsibility for completing the design.

The Stormwater/Diversion Tanks will also be configured to accepted Bioreactor effluent that is diverted away from EP-1. This configuration is further described in Sections 4.2.5 and 4.4.

4.2.2 NAPIS Effluent Pumping

The new system will include existing NAPIS Effluent Pumps Z84-P38 and Z84-P39. A new, third pump will be added as installed standby capacity (P40). The pumps will transfer the NAPIS effluent from the sump internal to the NAPIS to the new Tank-based Separator. The discharge from the pumps will join in a common pipe going to the Tank-based Separator. A flow meter will be installed on this line to measure the NAPIS effluent flow. The existing P38 and P39 may need to be replaced with larger capacity pumps to account for the higher head requirements of the new tank-based separator and/or higher design flow rates.

4.2.3 NAPIS Effluent pH Control

There will be an in-line pH control system installed on the wastewater pipe connecting the NAPIS and the Tank-based Separator. The purpose of this system will be to adjust the wastewater pH to enhance oil separation in the Tank-based Separator. A sulfuric acid feed system will be provided to lower alkaline pH conditions to the target pH of 6.5 s.u. The sulfuric acid would be added through an injection quill upstream of an in-line pH probe on the Tank-based Separator inlet that controls the rate of acid or addition. If the NAPIS effluent pH is <6.5, it will not be adjusted upwards.

4.2.4 Tank-Based Separator

The Tank-based Separator will be an above-ground circular tank with welded-steel construction and a concrete foundation. The tank will be unmixed and equipped with a floating roof for emissions control. The tank size will be 790,000 gallons tank with dimensions of 58 ft diameter by 40 ft height (38 ft water depth; 750,000 gallon working volume). The tank will be designated as Tank-based Separator Z84-T10. The tank will provide two functions. First, it will provide flow and concentration equalization in order to improve the performance of the downstream biological treatment. Second, it will provide additional oil removal to provide suitable feed characteristics for biological treatment.

Oil that accumulates on the liquid surface in the tank will be removed by a skimmer device internal to the floating roof. The skimmer will be connected to a valve at the bottom of the tank via a flexible hose. Oil removal will be periodic (typically once every 1 to 4 weeks). The oil will flow by gravity through a new piping to the Refinery's existing slop oil system.

The water phase will be withdrawn from the tank through a pipe in the tank wall and allowed to flow by gravity to downstream biological treatment. The flow rate out of T10 will be a constant rate using a flow meter and flow control valve.

The external floating roof on T10 will maintain a condition of no air headspace above the liquid. Further, the roof will have appropriate primary and secondary seals per 40 CFR 60.693-2 (NSPS Subpart QQQ standards), which are designed to prevent a venting situation. Therefore, T10 will have near-zero air emissions and an air emission sampling point is not applicable. The roof will be equipped with pressure and vacuum vents for non-routine start-up/shutdown events.

The Tank-based separator is not designed to be compliant with 40 CFR 265 Subpart J due to Western Refining's intention to obtain an NPDES permit for the WWTP. If an NPDES permit cannot be obtained, the design of the Tank-based separator will be modified to be compliant with 40 CFR 265 Subpart J.

A second, parallel Tank-based Separator will be constructed in the future. The second tank is not required until such time that T10 needs to be taken out of service for cleaning.

4.2.5 Bioreactors

Two tanks designated as Bioreactors Z84-T11 and Z84-T12 will provide biological treatment of the T10 effluent. The Bioreactors will be above-ground circular tanks with welded-steel construction and a concrete foundation. The tanks will be completely mixed by aeration. T11 and T12 will each have a 790,000 gallon tank with dimensions of 75 ft diameter by 24 ft height (21 ft water depth; 650,000 gallon working volume each). Each Bioreactor will contain polyethylene MBBR media to increase the effective biomass concentration thus enhancing the benzene biodegradation. The Bioreactors will not be designed to be compliant with 40 CFR 265 Subpart J due to Western Refining's plan to obtain an NPDES permit for the WWTP. If an NPDES permit cannot be obtained, the design of the Bioreactors will be modified to be compliant with 40 CFR 265 Subpart J.

Phosphoric acid will be injected into the common line from T10 feeding the Bioreactors. Phosphoric acid will be provided as a source of phosphorus, which is required as a nutrient for biological treatment. The phosphoric acid will be delivered by a feed system and injection quill. The rate of phosphoric acid addition will be proportionately controlled based on the measured flow rate of the T10 effluent. The target phosphorus concentration in the Bioreactor effluent is 0.5 to 1.0 mg/L as orthophosphate-phosphorus.

Two other wastewater sources will join the process wastewater (T10 effluent) upstream of biological treatment. The first source is the sanitary and restaurant wastewater from the adjacent Pilot Travel Center. The Refinery has historically treated this wastewater and is under contract to continue this practice. The Travel Center wastewater will be pumped into the T10 effluent line via the new Lift Station currently under construction by Western Refining. The second source is the RO and water softener brines from the Refinery's boiler feedwater treatment system. These brines are currently discharged to the NAPIS or EP-2. They will be re-routed to the biological treatment influent with the upgraded system. The brines will flow by gravity from their source. Provisions will also be made for a third source to be added to the T10 effluent, which is sanitary wastewater from a portion of the Refinery (laboratory, change house, and warehouse). The future connection of the sanitary wastewater from the rest of the Refinery and the Refinery's residences would occur upstream of the WWTP, joining with the Pilot Travel Center wastewater.

The common line from T10 plus the additional sources will split to feed the two Bioreactor tanks in parallel. The flow will be split equally to the two tanks using symmetrical piping downstream of the phosphoric acid injection point. In addition, manual flow control valves will be provided on the lines to each tank for further adjustment. The operator will be able to monitor the relative flow split based on the readings from the influent flow meter at each tank.

The Bioreactors will normally operate in parallel as described above. However, the piping and valves will be in-place to switch to series operation if treatment conditions dictate. T11 would be the lead tank and T12 would be the lag tank for series operation.

In the Bioreactors, influent organics (including benzene and free oil) will be degraded by organisms in the presence of dissolved oxygen and converted into carbon dioxide, water and additional biomass. The DO will be provided by an aeration grid of coarse bubble diffusers installed in bottom of each Bioreactor. The aeration diffusers will be compatible with the use of MBBR media ~~for possible future conversion to that technology~~. Air will be supplied to the diffusers by variable speed aeration blowers external to the Bioreactors. The blowers will be designated Bioreactor Blowers Nos. 1 through 3 (Z84-B26 through Z84-B28). B26 will be dedicated to T11 and B28 will be dedicated to T12. B27 will serve as a common installed spare. Each blower will have a 125 hp motor with a capacity of 1,300 standard[1] cubic feet per

[1] Defined as 1 atmosphere, 20 degrees Celsius, and 36 percent relative humidity.

minute (scfm) at 10.2 pounds per square inch gauge (psig). Although normally idle, the third blower (B27) can be operated to supplement the air to either/both Bioreactors if process conditions dictate. T11 and T12 will also include pH control provisions to maintain the target pH range of 6.5 to 8.5 for effective biological treatment in the Bioreactors.

The Bioreactors will be covered with fixed roofs for purposes of heat conservation during the winter. The roofs will be equipped with vents to allow the aeration air a means of exiting the tank. A mechanism for sampling the air emissions from the roofs will be included. Since Western Refining anticipates receiving an NPDES permit for the upgraded WWTP, the Bioreactors should not be subject to the air emission control requirements of 40 CFR 265 Subpart CC. ~~The need for the installation of~~ Western Refining's air consultant (Trinity Consultants) is not aware of any other regulatory requirements for air emission capture and control from the Bioreactors. Therefore, an air emission control device for the Bioreactors is not included in the design. ~~measures is being considered.~~

The effluent from the Bioreactors will be a gravity discharge at a fixed level. As a result, the tank will operate at a constant level. The wastewater flow rate out of the Bioreactors will equal the flow rate into the Bioreactors. The effluent discharge from the Bioreactors will have two~~hree~~ unique features. First, wedge-wire screens will be installed on the outlet connection ~~making the Bioreactors compatible with the use of MBBR media. The screens are necessary~~ to retain the MBBR media in the tank. Second, the outlet will be configured such that the wastewater discharge is withdrawn from the subsurface. This arrangement will be configured by elevating the discharge piping outside to maintain the desired 21-ft water depth in the tank. In this way, floating oil that potentially might accumulate on the water surface would be retained in the Bioreactor rather than flowing on to EP-1. This measure will provide the opportunity for additional biodegradation of the floating oil and the opportunity for the operator to remove oil with a vacuum truck. Visible oil in the Bioreactor is not anticipated. This contingency has been included in the design as a safeguard.

There will be provisions for diverting the Bioreactor effluent away from EP-1 in the event that the treated water quality is not acceptable. A diversion line will be connected to the combined Bioreator effluent, with its valve normally closed. To divert, this valve would be opened and the valve to EP-1 closed. The diverted wastewater would flow to Stormwater/Diversion Tanks T27 and T28 of the new stormwater tank system (420,000 gallon storage capacity). The need for Bioreactor effluent diversion is not anticipated. However, this contingency has been included in the design as another safeguard.

The size of the Bioreactors was selected to provide a combined liquid volume of approximately 1.36 million gallons. This volume initially was based on the matching the estimated combined volume of AL-1 and AL-2. This volume also provides the design criteria of ≥1 day hydraulic residence time that Brown and Caldwell has used in successful bioreactor designs at other refineries.

The Bioreactors were designed to meet the aggressive biological treatment (ABT) requirements of 40 CFR 261.31(b)(2)(i). There are two design criteria in this regulation: that the aeration intensity be ≥6 hp per million gallons and that the HRT be not longer than 5 days. The supporting calculations provided in Attachment F confirm that these criteria will be satisfied.

4.2.6 Evaporation Pond No. 1

The effluent from each Bioreactor will combine and flow by gravity through a common Parshall flume (Z84-FL1) for flow measurement. Following the flume, the combined Bioreactor effluent will discharge into EP-1. EP-1 will not be lined or otherwise modified because the Bioreactor effluent will be free of floating oil and will have a benzene concentration <0.5 mg/L. This Bioreactor effluent quality will be assured by the following WWTP upgrades:

- Improved upstream oil-water separation provided by the Tank-based Separator.
- Improved biological treatment (due to the equalization and improved upstream oil-water separation provided by the Tank-based Separator).
- The ability to retain floating oil in the Bioreactors via the underflow baffle and submerged outlet.
- ~~The ability to add MBBR media to the Bioreactors to provide additional biodegradation.~~

4.2.7 Chemical Feed Systems

Feed systems for three different chemicals will be required. Sulfuric acid will be used to provide pH adjustment of the Tank-based Separator influent and the Bioreactor contents. Caustic (sodium hydroxide) will be used to provide pH adjustment for the Bioreactor contents. Phosphoric acid will be added to the Bioreactor influent as a source of phosphorus nutrient to the biological treatment process. Diaphragm chemical metering pumps will be used to feed the chemicals to their point of use. There will be one dedicated pump for each chemical at each point of use (3 sulfuric acid pumps, 2 caustic pumps, and 1 phosphoric acid pump).

4.2.8 WWTP Operations Building

A new building will be constructed to support the WWTP operations and to house non-outdoor equipment.

4.3 Decommissioned Systems

Placing the new WWTP systems into service will allow some of the existing systems to be decommissioned.

4.3.1 Benzene Strippers Nos. 1, 2 and 3

The new Bioreactors will replace the benzene removal capacity of the two Benzene Strippers (Z84-V4 and Z84-V5) located at the WWTP and the one Benzene Stripper located in the process area of the Refinery (Z84-V7). Therefore, these units can be decommissioned. The associated Benzene Stripper Air Blowers (Z84-AB3, Z84-AB4 and Z84-AB5) can also be decommissioned.

4.3.2 AL-1 and AL-2

The new Bioreactors will replace the biodegradation capacity of the two Aerated Lagoons. Therefore, AL-1 and AL-2 can be decommissioned. The associated surface aerators can also be decommissioned. The Closure Plan will be further addressed in the Corrective Measures Implementation Work Plan due to NMED on July 31, 2009.~~Scott Crouch of RPS JDC is preparing the Closure Plan on behalf of Western Refining.~~

4.3.3 OAPIS

The Old API Separator currently receives stormwater from the segregated storm sewer in the process area. In the future, this sewer will be directed to the Stormwater/Diversion Tanks in the new stormwater system. The Stormwater/Diversion Tank contents will then be pumped to the NAPIS. Therefore, the OAPIS will no longer be required and can be decommissioned. The Corrective Measures Implementation Work Plan due to NMED on July 31, 2009 will provide schedule for the submittal of an investigation work plan to assess releases from the OAPIS (Solid Waste Management Unit No. 14).

4.4 Management of Off-Spec Wastewater

Off-spec events are not anticipated for the Bioreactor effluent. However, contingencies have been included in the design as safeguards. If at anytime the Bioreactor effluent were deemed unsuitable for discharge to EP-1, it could be diverted to the new Stormwater/Diversion Tanks as described in Section 4.2.5. The diversion would be "all or nothing" rather than a partial diversion and partial flow to EP-1. The process monitoring described in Section 6.2 will be used to identify when this diversion is needed.

When diversion occurs~~red~~, the RO reject stream will be redirected to EP-2 (current practice) from the Bioreactors to save storage capacity in the stormwater system. The available storage time in the stormwater system will be further increased by reducing the flow rate out of the Tank-based Separator. Assuming the new Stormwater/Diversion Tanks are empty when the diversion starts, the available storage time would be 1.5 days at a Bioreactor effluent flow of 200 gpm and 1 day at 300 gpm. If the liquid level in the Tank-based Separator were 24 ft at the time diversion began, it could store 275,000 gallons of wastewater if the liquid level were increased to 38 ft. This amount would allow the Bioreactor influent to be reduced by 100 gpm for a period of 2 days. Reducing the Bioreactor influent flow rate would increase the amount of biodegradation occurring in the Bioreactors and thereby improve the water quality of the Bioreactor effluent, bringing it back on-spec and allowing operations to return to normal.

4.5 Secondary Containment and Leak Detection

Leak detection will be provided on the Tank-based Separator (T10) and the Bioreactors (T11 and T12) by installing channels in the concrete foundation under the tank or an alternative system suitable to OCD. A compacted earthen berm (or an alternative system suitable to OCD) will be constructed around T10, T11, and T12. The volume contained within the berm will equal the tank's maximum volume plus a 30 percent safety factor. The secondary containment provisions for these new tanks will meet the requirements Condition 9 of the Refinery's OCD Discharge Permit GW-032. If an NPDES permit is not obtained, the secondary containment and leak detection systems for T10, T11, and T12 will also be designed for compliance with 40 CFR 265 Subpart J.

~~The proposed design does not include leak detection or containment berms for the Bioreactors (T11 and T12). The tanks will not contain oil. Further, since the tanks will be completely mixed, the contents within the tank have the same characteristics of the Bioreactor effluent. However, the Bioreactors will be situated such that a potential leak would flow into EP-1, which is the destination of the Bioreactor effluent. If it becomes necessary to design the Bioreactor leak detection and secondary containment requirements for RCRA compliance, these requirements will be address during detailed engineering.~~

4.6 Alternative Upgrade Approach

The design proposed herein is based on the new construction of permanent tanks and equipment purchased by Western Refining. Western Refining may elect to pursue the installation of trailer- or skid-mounted equipment on a rental or lease basis. This approach may be more cost-effective for Western Refining on a short-term or mid-term basis. The rental/lease equipment would likely consist of different treatment configuration than the one selected for the permanent tank/equipment design. This difference would arise due to the limitations on the size and availability of rented/leased equipment. The leased/rented equipment would selected to meet the same treatment objectives as a permanent system (protect biological treatment from elevated oil concentrations, and treat the EP-1 influent to acceptable levels of benzene and visible free oil). Western Refining will submit the alternative design approach to OCD for approval prior to implementation.

6. SAMPLING AND ANALYSIS

6.1 Sample Locations

The WWTP upgrades will include wastewater sample stations at key locations for monitoring system performance. These locations are indicated by notations on the process flow diagrams in Attachments A and C and are listed below:

- Stormwater/Diversion Tank Effluent
- NAPIS Effluent/Tank-Based Separator Influent
- Tank-Based Separator Effluent/Bioreactor Influent from Tank-Based Separator
- Bioreactor Influent from Pilot Travel Center
- Bioreactor Influent from RO Reject
- Combined Bioreactor Influent
- Effluent from each Bioreactor
- Combined Effluent from Bioreactors/EP-1 Inlet

6.2 Sample Analysis for Process Monitoring

Western Refining intends to use five of the above sample locations for routine wastewater treatment process monitoring. The anticipated parameters and frequencies are provided in Table 6-1.

Table 6-1. Process Monitoring Samples

	pH	Oil Visual	Condu-ctivity	Turbidity	COD	NH3-N	Phosphate	Phenols	Sulfide	TSS
NAPIS Effluent	4/day	4/day	--	2/day	2/day	2/day	--	2/day	2/day	3/week
Tank-Based Separator Effluent	4/day	4/day	4/day	2/day	2/day	2/day	--	2/day	2/day	3/week
Pilot Travel Center	4/day	4/day	--	--	--	--	--	--	--	--
RO Reject	4/day	4/day	--	--	--	--	--	--	--	--
Combined Bioreactor Effluent	4/day	12/day	--	2/day	2/day	2/day	2/day	2/day	2/day	3/week

This list of sample locations, parameters, and frequencies may be modified over time by Western's Refining's process engineers as conditions dictate. Since these sample results are for process monitoring purposes and not for regulatory reporting, the analyses will be performed on grab samples collected and analyzed by on-site staff. Analytical methods will not necessarily be in accordance with 20.6.4.14 NMAC approved methods. Generally, the spectrophotometric methods offered by Hach Company (or equal) will be used. The NAPIS effluent and Bioreactor Effluent will also have on-line pH probes. In the latter case, the probes will be located in the Bioreactor themselves. The pH readings indicated in Table 6-1 for these two locations will be a manual check of the on-line probes.

The process monitoring of the Combined Bioreactor Effluent will be used to identify periods when the discharge to EP-1 is "off-spec" and requires manual diversion to the Stormwater/Diversion tanks. Visual observation of floating oil/oil sheen will be one trigger. Elevated concentrations of chemical oxygen demand (COD) or phenols will be surrogate indicators of the potential for elevated benzene concentrations. The COD and phenols trigger levels will be developed based on operational history.

6.3 Sample Analysis for Regulatory Reporting

The EP-1 inlet (same as combined Bioreactor effluent) will be sampled and analyzed for regulatory reporting purposes. The anticipated parameters and frequency are provided in Table 6-2.

Table 6-2. EP-1 Inlet Sampling [illegible]

	Sample Type	Frequency	Analytical Method
Free Oil	Grab	12/day	Visual Observation
Benzene	Grab	1/month[a]	EPA 8021B
pH	Grab	Quarterly	SM 4500-H^+ B
Specific Conductance	Grab	Quarterly	EPA 120.1
WQCC Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag, U)	Grab	Quarterly	EPA 601B; EPA 7470 for Hg
Other Cations (Ca, Cu, Fe, Mg, Mn, K, Na, Zn)	Grab	Quarterly	EPA 6010B
Anions (F, Cl, NO_3-N, PO_4-P, SO_4)	Grab	Quarterly	EPA 300.0
VOC	Grab	Quarterly	EPA 8260B
SVOC (including phenol)	Grab	Quarterly	EPA 8260C
DRO (extended)	Grab	Quarterly	EPA 8015B
GRO	Grab	Quarterly	EPA 8015B

[a] The initial monitoring frequency will be once per week for the first 16 weeks of operation of the upgraded WWTP to demonstrate compliance.

With the exception of visual oil and benzene, the sample parameters and frequency are consistent with the regulatory reporting requirements for "Effluent from the new API Separator" and "Pond 1 Inlet (EP1-IN)" in Condition 19 of the OCD Discharge Permit (GW-032). The Table 6-2 sample frequency adopts the more frequent of the two (quarterly versus semi-annual). "Free oil" will be a visual determination made and recorded by the WWTP operators. The analytical frequency for benzene will be once a week, which is consistent with the current monitoring of the effluent from the benzene strippers.

Western Refining will seek approval from OCD to discontinue the regulatory reporting requirements for the Pilot Travel Center (i.e., "Effluent from Pilot Gas Station to the Aerated Lagoon") and the NAPIS Effluent (i.e., "Effluent from the new API Separator) as required by Condition 19 of GW-032 since these sources will no longer will be directly discharged to a surface impoundment. The listing in Table 6-2 is intended to replace the EP-1 inlet [i.e., "Pond 1 Inlet (EP1-IN)"] requirements under Condition 19.

ATTACHMENT A: PROCESS FLOW DIAGRAMS

Drawing No. and Title

Z84-34-008: API Separator Basin and Slop Oil Recovery Sump

Z84-34-030: Chemical Systems

Z84-34-031: NAPIS Effluent

Z84-34-032: Tank-Based Separator

Z84-34-033: Biological System

(Note: Drawing Z84-34-033 has been modified for Revision A of this report with text changes to the equipment tag on T-11/T-12 and Notes 2 and 5).

ATTACHMENT C: STORMWATER/DIVERSION TANK DRAWINGS

Drawing No. and Title

7788.03.01: Flow Diagram

7788.03.02: Tank Details

7788.03.03: Pump Building

7788.03.04: Details

(Note: Drawing 7788.03.01 has been modified to include a sampling port on the effluent line from the Stormwater/Diversion Tanks)

Western Refining

PROCESS DESIGN REPORT FOR WASTEWATER TREATMENT PLANT UPGRADE (REV. A)

Prepared for
Western Refining Southwest
Gallup Refinery

May 26, 2009

Submitted to:
New Mexico Oil Conservation Division
Environmental Bureau
Santa Fe, New Mexico

New Mexico Environment Department
Hazardous Waste Bureau
Santa Fe, New Mexico

Prepared by:
BROWN AND CALDWELL
30 East Seventh Street, Suite 2500
Saint Paul, MN 55101

30 East Seventh Street
Suite 2500
Saint Paul, MN 55101

Tel: 651-298-0710
Fax: 651-298-1931

www.brownandcaldwell.com

May 26, 2009 135741.021.300

BROWN AND CALDWELL

Mr. Ed Riege
Western Refining Southwest
Gallup Refinery
Route 3, Box 7
Gallup, NM 87301

Subject: Transmittal of Process Design Report for Wastewater Treatment Plant Upgrade (Revision A)

Dear Mr. Riege:

Brown and Caldwell is pleased to provide the attached Process Design Report for the Wastewater Treatment Plant Upgrade at the Gallup Refinery. The Report has been revised (Revision A) to address the comments provided by the New Mexico Environment Department's Notice of Disapproval dated April 15, 2009. Revision A supersedes the previous version dated February 26, 2009.

Brown and Caldwell appreciates the opportunity to work with Western Refining on the design of the WWTP upgrades. If you have any questions on this report, please contact me at (651) 468-2061 or jallen@brwncald.com.

Very truly yours,

BROWN AND CALDWELL

Jeffrey S. Allen

Jeffrey S. Allen, P.E.
Project Manager
New Mexico Registration No. 18988

Professional Engineer Certification for Jeffrey S. Allen, P.E.

This is to certify that the Process Design Report (Revision A) for Western Refining Southwest dated May 2009 was prepared under my direction and supervision. The exception to this certification is the material in Attachment C.

JEFFREY S. ALLEN
NEW MEXICO
18988
PROFESSIONAL ENGINEER

Jeffrey S. Allen
5/26/09

License No. 18988
May 26, 2009

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF TABLES

1. INTRODUCTION

1.1 Introduction

The Western Refining Southwest's Gallup Refinery is a petroleum refinery with a crude oil processing capacity of 23,000 barrels per day (bpd). The Refinery is located in Jamestown, New Mexico at Interstate 40 Exit 39.

Brown and Caldwell has prepared the following Process Design Report on behalf of Western Refining. This document presents the planned upgrades of the wastewater treatment plant (WWTP) at the Refinery.

On August 27, 2007 Western Refining received a renewal of its discharge permit GW-032 from the New Mexico Oil Conservation Division (OCD). The permit required the Refinery to complete certain actions related to wastewater management. The Process Design Report addresses aspects of the following permit conditions:

1. Condition 16C - Treatment Study and Design
2. Condition 16D - Aerated Lagoons
3. Condition 16E – Evaporation Ponds

The design presented herein is for WWTP upgrades that include a new biological treatment system in above-ground tanks. The new biological treatment system will replace the current function of Aeration Lagoons 1 and 2 (AL-1 and AL-2). Thus, AL-1 and AL-2 will no longer be required and can be taken out of service. The effluent quality from the biological treatment system will be suitable for discharge to the unlined Evaporation Pond 1 (EP-1). Therefore, the installation of a liner in EP-1 is not required.

1.2 Project Scope

The scope of the WWTP upgrade project consists of the following new systems:

- Two existing tanks will be put in service for the storage of process area stormwater and diversion of EP-1 influent.
- pH adjustment capabilities downstream of the existing New American Petroleum Institute (API) Separator (NAPIS).
- Equalization and additional oil-water-solids separation using an above-ground Tank-based Separator.
- Two Bioreactors in above-ground tanks with moving bed biofilm reactor media and without sludge recycle. The Bioreactors will be aerated using blowers and air diffusers. The Bioreactors will have chemical feed systems for pH control and nutrient (phosphorus) addition.

The new system will allow the following existing systems to be decommissioned:

- Benzene Stripper Nos. 1, 2 and 3.
- AL-1 and AL-2
- The Old API Separator (OAPIS)

The following existing equipment will continue to be operated in their current function within the upgraded system:

- NAPIS
- EP-1 through EP-12

1.3 Related Project - Pilot Travel Center Lift Station

A lift station to collect, screen, and pump the sanitary/restaurant wastewater from the Pilot Travel Center to the WWTP is currently under construction. A force main will convey the wastewater from the new lift station to the WWTP. The wastewater from the new lift station will discharge into AL-1 until the new Bioreactors are placed in service. At that time, the wastewater will be routed to the Bioreactor influent.

1.4 Treatment Objectives

The treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. The project design was developed based on these objectives.

1.5 Regulatory Compliance

The focus of the process design presented herein is compliance with the requirements of OCD permit GW-032. Western Refining is in the process of preparing an application for a discharge permit under the National Pollutant Discharge Elimination System (NPDES). The application will be submitted to the U.S Environmental Protection Agency Region 6 and OCD. Once a NPDES permit is issued, the WWTP will be regulated under the Clean Water Act and thus exempt from RCRA's 40 CFR 265[1] requirements. Therefore, the design basis for the WWTP upgrades assumes that compliance with RCRA 40 CFR 265 is not required.

If for some reason a NPDES permit cannot be obtained, the design will be revised and resubmitted to reflect compliance with 40 CFR 265.

1.6 Report Organization

The Process Design Report is organized as follows:

Section 1.	Introduction
Section 2.	Wastewater Sources
Section 3.	Technology Selection
Section 4.	Process Description
Section 5.	Project Schedule
Section 6.	Sampling and Analysis

[1] Note: The Refinery is an interim status facility so New Mexico Hazardous Waste Act 20.4.1.600 and 40 CFR 265 apply rather than 20.4.1.500 and 40 CFR 264.

Attachments to the Process Design Report include the following documents:

- Attachment A. Process Flow Diagrams
- Attachment B. Preliminary Site Plan
- Attachment C. Stormwater Tank Drawings
- Attachment D. Technical Paper on Tank-Based Separator Case Studies
- Attachment E. Membrane Bioreactor Pilot Study
- Attachment F. Aggressive Biological Treatment Calculations

2. WASTEWATER SOURCES

2.1 Overview

This section of the report reviews the sources of wastewater generated at the Refinery. The wastewater sources discharged to the Refinery's WWTP fall under two broad categories: those wastewaters generated at the Refinery and those generated at the adjacent Pilot Travel Center. The two sources are further described below.

2.2 Refinery Wastewaters

The process wastewaters generated by the Refinery are directed to the process sewer that serves as the influent to the existing NAPIS. There are two additional wastewater sources generated within the Refinery that do not discharge to the process sewer/NAPIS but discharge elsewhere within the WWTP. These sources are the water softener system and the reverse osmosis (RO) system. Both of these systems are part of the larger boiler feed water treatment system. The batch discharge from the water softener's regeneration cycle and the continuous discharge of reject from the RO membranes are collected in a dedicated sewer system. RO reject and water softener brine are the only two sources to this sewer. This wastewater is not oily and does not contain benzene; and it does not require oil-water separation unit or biological treatment. It is currently sent to the process sewer/NAPIS influent via its segregated gravity line, with the option of diversion to Evaporation Pond No. 2 (EP-2). As part of the WWTP upgrades, there will be an option to re-direct this stream to the new biological treatment units.

The sanitary wastewater generated at the Refinery and the seven adjacent homes owned by the Refinery currently discharges to septic systems and not the WWTP. The WWTP upgrades will include measures for these sanitary sources to be redirected to the WWTP at a future date. Western Refining has previously notified OCD and NMED of its intention to make this change.

2.3 Pilot Travel Center Wastewaters

The Refinery has a contract with the adjacent Pilot Travel Center to treat the sanitary and restaurant wastewaters generated by that facility. The wastewater from the restaurant at the Pilot Travel Center goes through a new grease trap system installed in 2008. The grease trap effluent and the sanitary/restaurant wastewaters from the rest of the Pilot Travel Center flow to a septic tank system. Septage is pumped out of the septic tank system on a scheduled quarterly basis (as reported by Pilot Travel Center staff). The effluent from the septic tank system gravity flows to a lift station on the Pilot Travel Center property. This lift station, the grease trap, and the septic tank system are owned and operated by the Pilot Travel Center. The lift station's submersible pumps then transfer the wastewater through a pipeline to the Refinery for further pumping and treatment. Western Refining is currently constructing a new lift station on its property to receive the wastewater from the Pilot Travel Center's lift station (see Section 1.3).

The Pilot Travel Center generates other wastewaters that are not discharged to the Refinery. These other wastestreams include truck washing and vehicle maintenance activities. They are managed with on-site oil-water separators, holding tanks, and retention ponds at the Pilot Travel Center.

The design basis assumes that the wastestream discharges from the Pilot Travel Center to the Refinery are only sanitary/restaurant in origin and do not include any sources from vehicle service or vehicle washing operations. On this basis, the Pilot Travel Center wastewater was assumed to be free of benzene and hydrocarbon-based oil and grease (O/G).

2.4 Design Flow

The design flow rates for the individual sources are summarized in Table 2-1.

Table 2-1. Design Flow Rates

	Average, gpm	Maximum, gpm
NAPIS Effluent	250	500 (375)
Pilot Travel Center	50	120
RO Reject	109	149
Refinery Sanitary	4	--
Bioreactor Influent	413	664

The design flows for the NAPIS effluent were set at an average of 250 gallons per minute (gpm) and a maximum of 500 gpm. The average rate was based on historical data, allowances for future flows, and engineering judgment. The current average NAPIS effluent flow is approximately 150 gpm. The maximum flow rate equals the maximum flow capacity of the NAPIS with both bays in service.

The contract between Western Refining and the Pilot Travel Center limits the maximum flow to 50 gpm. However, the lift station pumps will be capable of pumping a combined flow of 120 gpm. Accordingly, the Pilot Travel Center design flows were set at 50 gpm average and 120 gpm maximum.

The NAPIS effluent design maximum flow will be equalized to 375 gpm by the Tank-based Separator. The maximum flow rate for the Refinery's sanitary source is included in the Pilot Travel Center maximum flow rate.

3. TECHNOLOGY SELECTION

3.1 Overview

Brown and Caldwell evaluated and selected technologies to upgrade the oil removal and biological treatment systems within the WWTP.

3.2 Second-Stage Oil-Water Separation

As discussed in Section 1.4, the treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. This objective will be met by replacing the aerated lagoons with a tank-based biological treatment system. In order for biological treatment to be effective, wastewater must meet certain specifications (pH, temperature, nutrient concentrations, etc.). Included in those specifications is a limit on the concentration of oil. This limitation is the reason why refinery wastewater treatment systems have oil-water separation devices. Brown and Caldwell uses a guideline of <50 mg/L O/G as an average for biological treatment influents. Indications from the Refinery were that historically the NAPIS effluent has been consistently above the 50 mg/L threshold. Therefore, in addition to a new biological treatment process, Brown and Caldwell considered technologies for providing improved upstream O/G removal.

API separators (including the existing NAPIS) provide first-stage (i.e., primary) oil-water separation. As such, they provide removal of free oil that readily separates from the wastewater by gravity. The intent of second-stage oil-water separation is to provide additional O/G removal beyond what is consistently achievable by an API separator. Second-stage oil-water separation can remove the residual O/G that does not readily separate by gravity (i.e., emulsified O/G). Removal of this residual O/G by second-stage oil-water separation is often required to achieve the <50 mg/L guideline for biological treatment.

A Tank-based Separator was selected as the technology for providing second-stage oil-water separation at the Refinery, with the objective of producing a biological treatment influent with an average O/G concentration of <50 mg/L. The Tank-based Separator was selected for the following reasons:

- It provides a dual function of flow and wasteload equalization in addition to oil-water separation.
- It does not require the handling of oil and oily-solids on a continuous basis. Oil can be allowed to accumulate at the top of the tank and removed periodically (e.g., weekly).
- It is mechanically simple, with no moving parts except for the feed pumps and the floating roof.
- Because of its floating roof, it does not need a separate air emissions control device (i.e., there is no headspace above the liquid and thus no air emissions).
- It requires minimal operator attention or process control.
- It does not require chemical addition other than influent pH adjustment.

A Tank-based Separator functions in a similar fashion to an API separator; it is essentially an API separator in a larger tank with a longer residence time. Oil accumulates at the surface of the Tank-based Separator, is skimmed, and is returned to the Refinery for reprocessing just as with an API Separator. Solids that settle to the bottom of the Tank-based Separator are periodically removed and sent to oily solids recycling. Some refineries use a Tank-based Separator in place of an API separator. At the Gallup Refinery, the Tank-based

Separator will be an extension of the NAPIS, providing two oil-water separation stages in series for enhanced oil removal ahead of the Bioreactors.

Brown and Caldwell has designed Tank-based Separators for second-stage oil-water separation at several other refineries. These systems have been in successful operation for several years. A technical paper presenting case histories of three of these designs is provided in Attachment D.

The WWTP upgrade will be constructed initially with a single Tank-based Separator. At some future date (3 to 5 years away), the tank will require manual cleaning for oily solids removal, and thus the operating tank will need to be taken out of service. The cleaning effort generally requires several weeks or months. A second Tank-based Separator will need to be constructed and in service by this time so that second-stage oil-water separation can continue during the cleaning period. Construction of the second tank will be deferred for approximately two or more years following the start-up of the first tank, as it will not be needed until the first tank requires cleaning.

3.3 Biological Treatment

Western Refining commissioned a pilot study of activated sludge technology that was performed in November and December 2007. A report of this pilot study has been previously submitted to OCD. The pilot study was not successful and the resulting recommendation was to pursue the membrane bioreactor (MBR) technology. A MBR pilot study was performed during the months of May through July, 2008. A summary report of this study is provided in Attachment E.

A key issue with both the activated sludge and MBR pilot studies was that the concentration of O/G in the biological treatment influent exceeded the 50 mg/L average threshold discussed in Section 3.2. This observation led to the decision to pursue a second-stage oil water treatment step. The elevated O/G concentration in the feed stream precluded effective biological treatment in both pilot studies.

Brown and Caldwell does not recommend the MBR technology for the Gallup Refinery. Although the MBR technology has many benefits for other wastewaters, its applicability in refineries is suspect given the potential for fouling of the membranes with free oil. Even with highly efficient oil removal upstream, one would still expect there to be instances where free oil could reach the MBR. A cautious approach to installing MBR systems for refinery wastewaters is shared throughout the industry. There are currently no U.S. oil refineries with full-scale MBR systems.

The biological treatment technology selected for WWTP upgrade project was a Bioreactor without sludge (biomass) recycle. This technology is akin to an aerated lagoon, but in an above-ground steel tank. Two Bioreactors will be constructed to provide redundancy. The Bioreactors will normally be operated in parallel but series operation will be possible through valve changes. The combined liquid volume of the two bioreactors was selected to equal the combined liquid volume of AL-1 and AL-2.

The treatment capacity of the Bioreactors is designed to achieve the effluent treatment objectives of no visible free oil and <0.5 mg/L benzene. The oil objective (no visible free oil entering EP-1) will be attained by improving upstream oil removal, providing effective biodegradation, and utilizing a subsurface effluent withdrawal from the Bioreactors. The benzene objective will be met by effective biodegradation in the Bioreactor.

As mentioned above, the Bioreactors will have a subsurface effluent discharge to minimize the potential for floating oil that may reach the Bioreactors from being discharged to EP-1. An underflow baffle will also be provided on the outlet to further minimize this potential. The intent of these measures is to retain the floating oil on the surface of the Bioreactors, allowing the opportunity for further biodegradation. Excess

floating oil will be skimmed from the bioreactor surface using a vacuum truck. Floating oil is not anticipated in the Bioreactors; these measures are precautionary.

The Bioreactors will require ancillary systems to provide effective biological treatment. The Bioreactors will provide aerobic biodegradation and thus will require oxygen. Oxygen will be transferred to the Bioreactor contents using forced air from a blower system and air diffusers mounted to the bottom of the tank. The airflow will be controlled to maintain a minimum dissolved oxygen (DO) concentration of 2 mg/L. Each Bioreactor will have pH control capabilities to maintain a target pH range of 6.5 to 8.5 for effective biological treatment.

Biomass will exit the Bioreactors by being carried out in the Bioreactor effluent. The biomass will settle out in the downstream evaporations ponds, primarily EP-1. Over time, the settled biomass may accumulate in EP-1 to the extent that dredging will be required. Solids will not accumulate in the Bioreactors. The residence time of solids in the Bioreactors will be the same as the hydraulic residence time of the Bioreactors.

This Bioreactor technology was selected for the following reasons:

- The Bioreactors do not require the handling of solids on a continuous basis. The excess biomass solids will accumulate in the bottom of EP-1. After several years of operation, EP-1 may require dredging to restore its solids settling capacity.
- The Bioreactors are mechanically simple, with no moving parts except for the aeration blowers and chemical feed systems (pH control and nutrients).
- The Bioreactors require minimal operator attention and minimal process control.
- The Bioreactors are tank-based, so they can treat water containing >0.5 mg/L benzene.

Brown and Caldwell has designed similar Bioreactor systems (without sludge recycle) at three refineries. These systems shared the same treatment objective as Western Refining, to prevent visible free oil and >0.5 mg/L benzene from reaching downstream unlined ponds. Refinery X is a 10,000 to 20,000 bpd refinery with a single bioreactor. Refinery Y was a 50,000 bpd refinery with two parallel bioreactors. Refinery Z is a 90,000 bpd refinery with two parallel bioreactors. In each of these three cases, the bioreactor systems were designed for a hydraulic retention time of 24 hours. Recent verbal communications with current or former environmental staff at the refineries confirmed that the operating performance of the bioreactors achieved the design treatment objectives.

The biodegradation capacity of the Bioreactors will be enhanced by adding plastic media to the Bioreactors, resulting in a process known as moving bed biofilm reactor (MBBR). This technology is available through wastewater equipment vendors including Veolia, Siemens, and Hydroxyl Systems. The media (also known as suspended carrier elements) floats freely in the Bioreactors. The media is mixed in a random pattern throughout the bioreactor via the aeration system and is retained in each Bioreactor by a screen on the outlet nozzle. Biomass grows on the surface of the media, thereby effectively increasing the biomass concentration in the bioreactor. The estimated media volume required to achieve the treatment objectives is 7,250 ft^3 per Bioreactor, or the equivalent of approximately 8 percent of the liquid volume of the tank. If ever needed, additional media can be added to the tanks, up to a 67 percent volumetric fill.

The need to add media to the Bioreactors is based on conservative design values for the benzene biodegradation rate. Western Refining may elect to perform USEPA-prescribed wastewater treatability testing to develop site-specific benzene biodegradation rates. If Western Refining elects to do the testing, and the testing indicates that the media is not required, then Western Refining will seek regulatory approval of a revised design without adding media in the Bioreactors.

4. PROCESS DESCRIPTION

4.1 Overview

This section provides a process description of the new systems that will comprise the Refinery's WWTP following implementation of the upgrades. The first subsection discusses the new systems to be installed as part of the WWTP upgrades. The second subsection discusses the existing systems that will be decommissioned as part of the WWTP upgrades. This section concludes with a discussion of management of off-spec wastewater, secondary containment and leak detection, and an alternative upgrade approach. Process flow diagrams and a site layout drawing that accompany the process description are available in Attachments A and B, respectively.

4.2 New System

A description of the major equipment for the new system is provided below.

4.2.1 Stormwater/Diversion Tanks

A new stormwater management system will be constructed for the stormwater collected in the process area. This stormwater is currently collected in a dedicated sewer that discharges to the OAPIS. In the new system, stormwater will flow by gravity to two Stormwater/Diversion Tanks. These tanks are existing with a numerical designation of Z84-T27 and T28. The tanks have dimensions of 33'-5" diameter by 32 ft height, for a volume of 210,000 gallons each. The combined volume of 420,000 gallons will provide storage capacity for a 100-yr, 1-hour storm event (415,886 gallons). The tanks have existing, internal floating roofs for air emissions control. Stormwater that collects in the tanks will be pumped at a rate of 50 to 200 gpm to the process sewer that feeds the NAPIS. Two variable speed pumps will be provided (one operating, one standby). Because the stormwater will be treated in the NAPIS, the OAPIS will be taken out of service (see Section 4.3.3).

Oil that may accumulate on the surface of T27 and T28 will be captured from a skimmer device mounted on each tank's floating roof. The skimmed oil will be collected by a vacuum truck and transferred to the Refinery's slop oil system for recycling back to the refining process. Solid material that may settle on the bottom of T27 and T28 will be removed on a periodic basis and managed along with similar material collected from the NAPIS. This material is normally recycled to an off-site refining process. If recycling to a refining process is not available, the T27 and T28 bottom solids will be managed as a hazardous waste.

Cleanouts will be installed on the conveyance pipelines to and from the Stormwater/Diversion Tanks. Cleaning events will be scheduled on a regular, recurring basis with collected material managed along with the NAPIS and T27/28 solid material as described above. Underground piping will be buried below the frost line to prevent freezing. Aboveground piping will be electric heat traced to prevent freezing.

The conceptual design was developed by Tetra Tech and presented in a report dated October 2007. The report, entitled "Storm Drain System Extension – Process Design" was previously submitted to OCD. The design was further developed by RMT, as represented by four design drawings that are provided in Attachment C. Going forward, Brown and Caldwell will take over responsibility for completing the design.

The Stormwater/Diversion Tanks will also be configured to accepted Bioreactor effluent that is diverted away from EP-1. This configuration is further described in Sections 4.2.5 and 4.4.

4.2.2 NAPIS Effluent Pumping

The new system will include existing NAPIS Effluent Pumps Z84-P38 and Z84-P39. A new, third pump will be added as installed standby capacity (P40). The pumps will transfer the NAPIS effluent from the sump internal to the NAPIS to the new Tank-based Separator. The discharge from the pumps will join in a common pipe going to the Tank-based Separator. A flow meter will be installed on this line to measure the NAPIS effluent flow. The existing P38 and P39 may need to be replaced with larger capacity pumps to account for the higher head requirements of the new tank-based separator and/or higher design flow rates.

4.2.3 NAPIS Effluent pH Control

There will be an in-line pH control system installed on the wastewater pipe connecting the NAPIS and the Tank-based Separator. The purpose of this system will be to adjust the wastewater pH to enhance oil separation in the Tank-based Separator. A sulfuric acid feed system will be provided to lower alkaline pH conditions to the target pH of 6.5 s.u. The sulfuric acid would be added through an injection quill upstream of an in-line pH probe on the Tank-based Separator inlet that controls the rate of acid or addition. If the NAPIS effluent pH is <6.5, it will not be adjusted upwards.

4.2.4 Tank-Based Separator

The Tank-based Separator will be an above-ground circular tank with welded-steel construction and a concrete foundation. The tank will be unmixed and equipped with a floating roof for emissions control. The tank size will be 790,000 gallons tank with dimensions of 58 ft diameter by 40 ft height (38 ft water depth; 750,000 gallon working volume). The tank will be designated as Tank-based Separator Z84-T10. The tank will provide two functions. First, it will provide flow and concentration equalization in order to improve the performance of the downstream biological treatment. Second, it will provide additional oil removal to provide suitable feed characteristics for biological treatment.

Oil that accumulates on the liquid surface in the tank will be removed by a skimmer device internal to the floating roof. The skimmer will be connected to a valve at the bottom of the tank via a flexible hose. Oil removal will be periodic (typically once every 1 to 4 weeks). The oil will flow by gravity through a new piping to the Refinery's existing slop oil system.

The water phase will be withdrawn from the tank through a pipe in the tank wall and allowed to flow by gravity to downstream biological treatment. The flow rate out of T10 will be a constant rate using a flow meter and flow control valve.

The external floating roof on T10 will maintain a condition of no air headspace above the liquid. Further, the roof will have appropriate primary and secondary seals per 40 CFR 60.693-2 (NSPS Subpart QQQ standards), which are designed to prevent a venting situation. Therefore, T10 will have near-zero air emissions and an air emission sampling point is not applicable. The roof will be equipped with pressure and vacuum vents for non-routine start-up/shutdown events.

The Tank-based separator is not designed to be compliant with 40 CFR 265 Subpart J due to Western Refining's intention to obtain an NPDES permit for the WWTP. If an NPDES permit cannot be obtained, the design of the Tank-based separator will be modified to be compliant with 40 CFR 265 Subpart J.

A second, parallel Tank-based Separator will be constructed in the future. The second tank is not required until such time that T10 needs to be taken out of service for cleaning.

4.2.5 Bioreactors

Two tanks designated as Bioreactors Z84-T11 and Z84-T12 will provide biological treatment of the T10 effluent. The Bioreactors will be above-ground circular tanks with welded-steel construction and a concrete foundation. The tanks will be completely mixed by aeration. T11 and T12 will each have a 790,000 gallon tank with dimensions of 75 ft diameter by 24 ft height (21 ft water depth; 650,000 gallon working volume each). Each Bioreactor will contain polyethylene MBBR media to increase the effective biomass concentration thus enhancing the benzene biodegradation. The Bioreactors will not be designed to be compliant with 40 CFR 265 Subpart J due to Western Refining's plan to obtain an NPDES permit for the WWTP. If an NPDES permit cannot be obtained, the design of the Bioreactors will be modified to be compliant with 40 CFR 265 Subpart J.

Phosphoric acid will be injected into the common line from T10 feeding the Bioreactors. Phosphoric acid will be provided as a source of phosphorus, which is required as a nutrient for biological treatment. The phosphoric acid will be delivered by a feed system and injection quill. The rate of phosphoric acid addition will be proportionately controlled based on the measured flow rate of the T10 effluent. The target phosphorus concentration in the Bioreactor effluent is 0.5 to 1.0 mg/L as orthophosphate-phosphorus.

Two other wastewater sources will join the process wastewater (T10 effluent) upstream of biological treatment. The first source is the sanitary and restaurant wastewater from the adjacent Pilot Travel Center. The Refinery has historically treated this wastewater and is under contract to continue this practice. The Travel Center wastewater will be pumped into the T10 effluent line via the new Lift Station currently under construction by Western Refining. The second source is the RO and water softener brines from the Refinery's boiler feedwater treatment system. These brines are currently discharged to the NAPIS or EP-2. They will be re-routed to the biological treatment influent with the upgraded system. The brines will flow by gravity from their source. Provisions will also be made for a third source to be added to the T10 effluent, which is sanitary wastewater from a portion of the Refinery (laboratory, change house, and warehouse). The future connection of the sanitary wastewater from the rest of the Refinery and the Refinery's residences would occur upstream of the WWTP, joining with the Pilot Travel Center wastewater.

The common line from T10 plus the additional sources will split to feed the two Bioreactor tanks in parallel. The flow will be split equally to the two tanks using symmetrical piping downstream of the phosphoric acid injection point. In addition, manual flow control valves will be provided on the lines to each tank for further adjustment. The operator will be able to monitor the relative flow split based on the readings from the influent flow meter at each tank.

The Bioreactors will normally operate in parallel as described above. However, the piping and valves will be in-place to switch to series operation if treatment conditions dictate. T11 would be the lead tank and T12 would be the lag tank for series operation.

In the Bioreactors, influent organics (including benzene and free oil) will be degraded by organisms in the presence of dissolved oxygen and converted into carbon dioxide, water and additional biomass. The DO will be provided by an aeration grid of coarse bubble diffusers installed in bottom of each Bioreactor. The aeration diffusers will be compatible with the use of MBBR media. Air will be supplied to the diffusers by variable speed aeration blowers external to the Bioreactors. The blowers will be designated Bioreactor Blowers Nos. 1 through 3 (Z84-B26 through Z84-B28). B26 will be dedicated to T11 and B28 will be dedicated to T12. B27 will serve as a common installed spare. Each blower will have a 125 hp motor with a capacity of 1,300 standard[1] cubic feet per minute (scfm) at 10.2 pounds per square inch gauge (psig).

[1] Defined as 1 atmosphere, 20 degrees Celsius, and 36 percent relative humidity.

Although normally idle, the third blower (B27) can be operated to supplement the air to either/both Bioreactors if process conditions dictate. T11 and T12 will also include pH control provisions to maintain the target pH range of 6.5 to 8.5 for effective biological treatment in the Bioreactors.

The Bioreactors will be covered with fixed roofs for purposes of heat conservation during the winter. The roofs will be equipped with vents to allow the aeration air a means of exiting the tank. A mechanism for sampling the air emissions from the roofs will be included. Since Western Refining anticipates receiving an NPDES permit for the upgraded WWTP, the Bioreactors should not be subject to the air emission control requirements of 40 CFR 265 Subpart CC. Western Refining's air consultant (Trinity Consultants) is not aware of any other regulatory requirements for air emission capture and control from the Bioreactors. Therefore, an air emission control device for the Bioreactors is not included in the design.

The effluent from the Bioreactors will be a gravity discharge at a fixed level. As a result, the tank will operate at a constant level. The wastewater flow rate out of the Bioreactors will equal the flow rate into the Bioreactors. The effluent discharge from the Bioreactors will have two unique features. First, wedge-wire screens will be installed on the outlet connection to retain the MBBR media in the tank. Second, the outlet will be configured such that the wastewater discharge is withdrawn from the subsurface. This arrangement will be configured by elevating the discharge piping outside to maintain the desired 21-ft water depth in the tank. In this way, floating oil that potentially might accumulate on the water surface would be retained in the Bioreactor rather than flowing on to EP-1. This measure will provide the opportunity for additional biodegradation of the floating oil and the opportunity for the operator to remove oil with a vacuum truck. Visible oil in the Bioreactor is not anticipated. This contingency has been included in the design as a safeguard.

There will be provisions for diverting the Bioreactor effluent away from EP-1 in the event that the treated water quality is not acceptable. A diversion line will be connected to the combined Bioreator effluent, with its valve normally closed. To divert, this valve would be opened and the valve to EP-1 closed. The diverted wastewater would flow to Stormwater/Diversion Tanks T27 and T28 of the new stormwater tank system (420,000 gallon storage capacity). The need for Bioreactor effluent diversion is not anticipated. However, this contingency has been included in the design as another safeguard.

The size of the Bioreactors was selected to provide a combined liquid volume of approximately 1.36 million gallons. This volume initially was based on the matching the estimated combined volume of AL-1 and AL-2. This volume also provides the design criteria of ≥1 day hydraulic residence time that Brown and Caldwell has used in successful bioreactor designs at other refineries.

The Bioreactors were designed to meet the aggressive biological treatment (ABT) requirements of 40 CFR 261.31(b)(2)(i). There are two design criteria in this regulation: that the aeration intensity be ≥6 hp per million gallons and that the HRT be not longer than 5 days. The supporting calculations provided in Attachment F confirm that these criteria will be satisfied.

4.2.6 Evaporation Pond No. 1

The effluent from each Bioreactor will combine and flow by gravity through a common Parshall flume (Z84-FL1) for flow measurement. Following the flume, the combined Bioreactor effluent will discharge into EP-1. EP-1 will not be lined or otherwise modified because the Bioreactor effluent will be free of floating oil and will have a benzene concentration <0.5 mg/L. This Bioreactor effluent quality will be assured by the following WWTP upgrades:

- Improved upstream oil-water separation provided by the Tank-based Separator.
- Improved biological treatment (due to the equalization and improved upstream oil-water separation provided by the Tank-based Separator).

- The ability to retain floating oil in the Bioreactors via the underflow baffle and submerged outlet.

4.2.7 Chemical Feed Systems

Feed systems for three different chemicals will be required. Sulfuric acid will be used to provide pH adjustment of the Tank-based Separator influent and the Bioreactor contents. Caustic (sodium hydroxide) will be used to provide pH adjustment for the Bioreactor contents. Phosphoric acid will be added to the Bioreactor influent as a source of phosphorus nutrient to the biological treatment process. Diaphragm chemical metering pumps will be used to feed the chemicals to their point of use. There will be one dedicated pump for each chemical at each point of use (3 sulfuric acid pumps, 2 caustic pumps, and 1 phosphoric acid pump).

4.2.8 WWTP Operations Building

A new building will be constructed to support the WWTP operations and to house non-outdoor equipment.

4.3 Decommissioned Systems

Placing the new WWTP systems into service will allow some of the existing systems to be decommissioned.

4.3.1 Benzene Strippers Nos. 1, 2 and 3

The new Bioreactors will replace the benzene removal capacity of the two Benzene Strippers (Z84-V4 and Z84-V5) located at the WWTP and the one Benzene Stripper located in the process area of the Refinery (Z84-V7). Therefore, these units can be decommissioned. The associated Benzene Stripper Air Blowers (Z84-AB3, Z84-AB4 and Z84-AB5) can also be decommissioned.

4.3.2 AL-1 and AL-2

The new Bioreactors will replace the biodegradation capacity of the two Aerated Lagoons. Therefore, AL-1 and AL-2 can be decommissioned. The associated surface aerators can also be decommissioned. The Closure Plan will be further addressed in the Corrective Measures Implementation Work Plan due to NMED on July 31, 2009.

4.3.3 OAPIS

The Old API Separator currently receives stormwater from the segregated storm sewer in the process area. In the future, this sewer will be directed to the Stormwater/Diversion Tanks in the new stormwater system. The Stormwater/Diversion Tank contents will then be pumped to the NAPIS. Therefore, the OAPIS will no longer be required and can be decommissioned. The Corrective Measures Implementation Work Plan due to NMED on July 31, 2009 will provide schedule for the submittal of an investigation work plan to assess releases from the OAPIS (Solid Waste Management Unit No. 14).

4.4 Management of Off-Spec Wastewater

Off-spec events are not anticipated for the Bioreactor effluent. However, contingencies have been included in the design as safeguards. If at anytime the Bioreactor effluent were deemed unsuitable for discharge to EP-1, it could be diverted to the new Stormwater/Diversion Tanks as described in Section 4.2.5. The diversion would be "all or nothing" rather than a partial diversion and partial flow to EP-1. The process monitoring described in Section 6.2 will be used to identify when this diversion is needed.

When diversion occurs, the RO reject stream will be redirected to EP-2 (current practice) from the Bioreactors to save storage capacity in the stormwater system. The available storage time in the stormwater system will be further increased by reducing the flow rate out of the Tank-based Separator. Assuming the new Stormwater/Diversion Tanks are empty when the diversion starts, the available storage time would be 1.5 days at a Bioreactor effluent flow of 200 gpm and 1 day at 300 gpm. If the liquid level in the Tank-based Separator were 24 ft at the time diversion began, it could store 275,000 gallons of wastewater if the liquid level were increased to 38 ft. This amount would allow the Bioreactor influent to be reduced by 100 gpm for a period of 2 days. Reducing the Bioreactor influent flow rate would increase the amount of biodegradation occurring in the Bioreactors and thereby improve the water quality of the Bioreactor effluent, bringing it back on-spec and allowing operations to return to normal.

4.5 Secondary Containment and Leak Detection

Leak detection will be provided on the Tank-based Separator (T10) and the Bioreactors (T11 and T12) by installing channels in the concrete foundation under the tank or an alternative system suitable to OCD. A compacted earthen berm (or an alternative system suitable to OCD) will be constructed around T10, T11, and T12. The volume contained within the berm will equal the tank's maximum volume plus a 30 percent safety factor. The secondary containment provisions for these new tanks will meet the requirements Condition 9 of the Refinery's OCD Discharge Permit GW-032. If an NPDES permit is not obtained, the secondary containment and leak detection systems for T10, T11, and T12 will also be designed for compliance with 40 CFR 265 Subpart J.

4.6 Alternative Upgrade Approach

The design proposed herein is based on the new construction of permanent tanks and equipment purchased by Western Refining. Western Refining may elect to pursue the installation of trailer- or skid-mounted equipment on a rental or lease basis. This approach may be more cost-effective for Western Refining on a short-term or mid-term basis. The rental/lease equipment would likely consist of different treatment configuration than the one selected for the permanent tank/equipment design. This difference would arise due to the limitations on the size and availability of rented/leased equipment. The leased/rented equipment would selected to meet the same treatment objectives as a permanent system (protect biological treatment from elevated oil concentrations, and treat the EP-1 influent to acceptable levels of benzene and visible free oil). Western Refining will submit the alternative design approach to OCD for approval prior to implementation.

5. PROJECT SCHEDULE

Brown and Caldwell's construction management group developed an estimate of the project schedule through construction (see Table 5-1). This Process Design Report represents the completion of the process design; however, detailed engineering is still required to provide the necessary information for the equipment vendors and construction contractor.

Table 5-1. Estimate of Project Schedule Through Construction

Description	Period
Engineering and Procurement	
Detailed Engineering	Months 1 through 6
Air Permit Application Submittal	Month 3
Contractor Bidding	Months 7 and 8
Air Permit Issuance	Month 9
Contract Award & Notice to Proceed	Month 9
Equipment Submittal Review	Months 10 and 11
Equipment Procurement	Months 12 and 13
Construction	
Site Preparation	Month 10
Wastewater Treatment Building	Months 10 through 15
Tank Based Separator	Months 10 through 22
Bioreactor Tanks	Months 10 through 20
Stormwater System	Months 16 through 18
Utility Installation	Months 12 through 16
Testing, Start-up, and Clean-up	Months 23 and 24

The project schedule assumes that Day 1 of Month 1 represents the date of written, final approval of the Process Design Report by the New Mexico Oil Conservation Division (Environmental Bureau), the New Mexico Environment Department (Hazardous Waste Bureau), and U.S. Environmental Protection Agency Region 6. Engineering will not proceed beyond this Process Design Report until this approval is received.

A potential delay in the project schedule is the issuance of any air permits that may be required. The project will not proceed beyond the Month 9 milestones above until the required air permits have been issued.

6. SAMPLING AND ANALYSIS

6.1 Sample Locations

The WWTP upgrades will include wastewater sample stations at key locations for monitoring system performance. These locations are indicated by notations on the process flow diagrams in Attachments A and C and are listed below:

- Stormwater/Diversion Tank Effluent
- NAPIS Effluent/Tank-Based Separator Influent
- Tank-Based Separator Effluent/Bioreactor Influent from Tank-Based Separator
- Bioreactor Influent from Pilot Travel Center
- Bioreactor Influent from RO Reject
- Combined Bioreactor Influent
- Effluent from each Bioreactor
- Combined Effluent from Bioreactors/EP-1 Inlet

6.2 Sample Analysis for Process Monitoring

Western Refining intends to use five of the above sample locations for routine wastewater treatment process monitoring. The anticipated parameters and frequencies are provided in Table 6-1.

Table 6-1: Process Monitoring Samples

	pH	Oil Visual	Condu-ctivity	Turbidity	COD	NH3-N	Phosphate	Phenols	Sulfide	TSS
NAPIS Effluent	4/day	4/day	--	2/day	2/day	2/day	--	2/day	2/day	3/week
Tank-Based Separator Effluent	4/day	4/day	4/day	2/day	2/day	2/day	--	2/day	2/day	3/week
Pilot Travel Center	4/day	4/day	--	--	--	--	--	--	--	--
RO Reject	4/day	4/day	--	--	--	--	--	--	--	--
Combined Bioreactor Effluent	4/day	12/day	--	2/day	2/day	2/day	2/day	2/day	2/day	3/week

This list of sample locations, parameters, and frequencies may be modified over time by Western's Refining's process engineers as conditions dictate. Since these sample results are for process monitoring purposes and not for regulatory reporting, the analyses will be performed on grab samples collected and analyzed by on-site staff. Analytical methods will not necessarily be in accordance with 20.6.4.14 NMAC approved methods. Generally, the spectrophotometric methods offered by Hach Company (or equal) will be used. The NAPIS effluent and Bioreactor Effluent will also have on-line pH probes. In the latter case, the probes will be located in the Bioreactor themselves. The pH readings indicated in Table 6-1 for these two locations will be a manual check of the on-line probes.

The process monitoring of the Combined Bioreactor Effluent will be used to identify periods when the discharge to EP-1 is "off-spec" and requires manual diversion to the Stormwater/Diversion tanks. Visual observation of floating oil/oil sheen will be one trigger. Elevated concentrations of chemical oxygen demand (COD) or phenols will be surrogate indicators of the potential for elevated benzene concentrations. The COD and phenols trigger levels will be developed based on operational history.

6.3 Sample Analysis for Regulatory Reporting

The EP-1 inlet (same as combined Bioreactor effluent) will be sampled and analyzed for regulatory reporting purposes. The anticipated parameters and frequency are provided in Table 6-2.

Table 6-2. EP-1 Inlet Sampling Program

	Sample Type	Frequency	Analytical Method
Free Oil	Grab	12/day	Visual Observation
Benzene	Grab	1/month[a]	EPA 8021B
pH	Grab	Quarterly	SM 4500-H^+ B
Specific Conductance	Grab	Quarterly	EPA 120.1
WQCC Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag, U)	Grab	Quarterly	EPA 601B; EPA 7470 for Hg
Other Cations (Ca, Cu, Fe, Mg, Mn, K, Na, Zn)	Grab	Quarterly	EPA 6010B
Anions (F, Cl, NO_3-N, PO_4-P, SO_4)	Grab	Quarterly	EPA 300.0
VOC	Grab	Quarterly	EPA 8260B
SVOC (including phenol)	Grab	Quarterly	EPA 8260C
DRO (extended)	Grab	Quarterly	EPA 8015B
GRO	Grab	Quarterly	EPA 8015B

[a]The initial monitoring frequency will be once per week for the first 16 weeks of operation of the upgraded WWTP to demonstrate compliance.

With the exception of visual oil and benzene, the sample parameters and frequency are consistent with the regulatory reporting requirements for "Effluent from the new API Separator" and "Pond 1 Inlet (EP1-IN)" in Condition 19 of the OCD Discharge Permit (GW-032). The Table 6-2 sample frequency adopts the more frequent of the two (quarterly versus semi-annual). "Free oil" will be a visual determination made and recorded by the WWTP operators. The analytical frequency for benzene will be once a week, which is consistent with the current monitoring of the effluent from the benzene strippers.

Western Refining will seek approval from OCD to discontinue the regulatory reporting requirements for the Pilot Travel Center (i.e., "Effluent from Pilot Gas Station to the Aerated Lagoon") and the NAPIS Effluent (i.e., "Effluent from the new API Separator) as required by Condition 19 of GW-032 since these sources will no longer will be directly discharged to a surface impoundment. The listing in Table 6-2 is intended to replace the EP-1 inlet [i.e., "Pond 1 Inlet (EP1-IN)"] requirements under Condition 19.

ATTACHMENT A: PROCESS FLOW DIAGRAMS

Drawing No. and Title

Z84-34-008: API Separator Basin and Slop Oil Recovery Sump

Z84-34-030: Chemical Systems

Z84-34-031: NAPIS Effluent

Z84-34-032: Tank-Based Separator

Z84-34-033: Biological System

(Note: Drawing Z84-34-033 has been modified for Revision A of this report with text changes to the equipment tag on T-11/T-12 and Notes 2 and 5).

Z84–T105
SLOP OIL TANK

Z84–T5/T6
API SEPARATORS
TYPE: CONCRETE ABOVE GROUND
SIZE: 6.5'WIDE (EACH) x 5'SWD x 36'EFFECTIVE LENGTH
DESIGN PRESSURE: 2"W.C. VAC, 6" W.C. PRESSURE
DESIGN TEMPERATURE: ≤110° F.

Z84–P22 & P23
SLOP OIL PUMPS
TYPE: SELF–PRIMING CENTRIFUGAL
CAPACITY: 50 GPM @ 158" TDH
MOTOR: 15.0 HP., 460V,3PH., 60HZ., TEFC

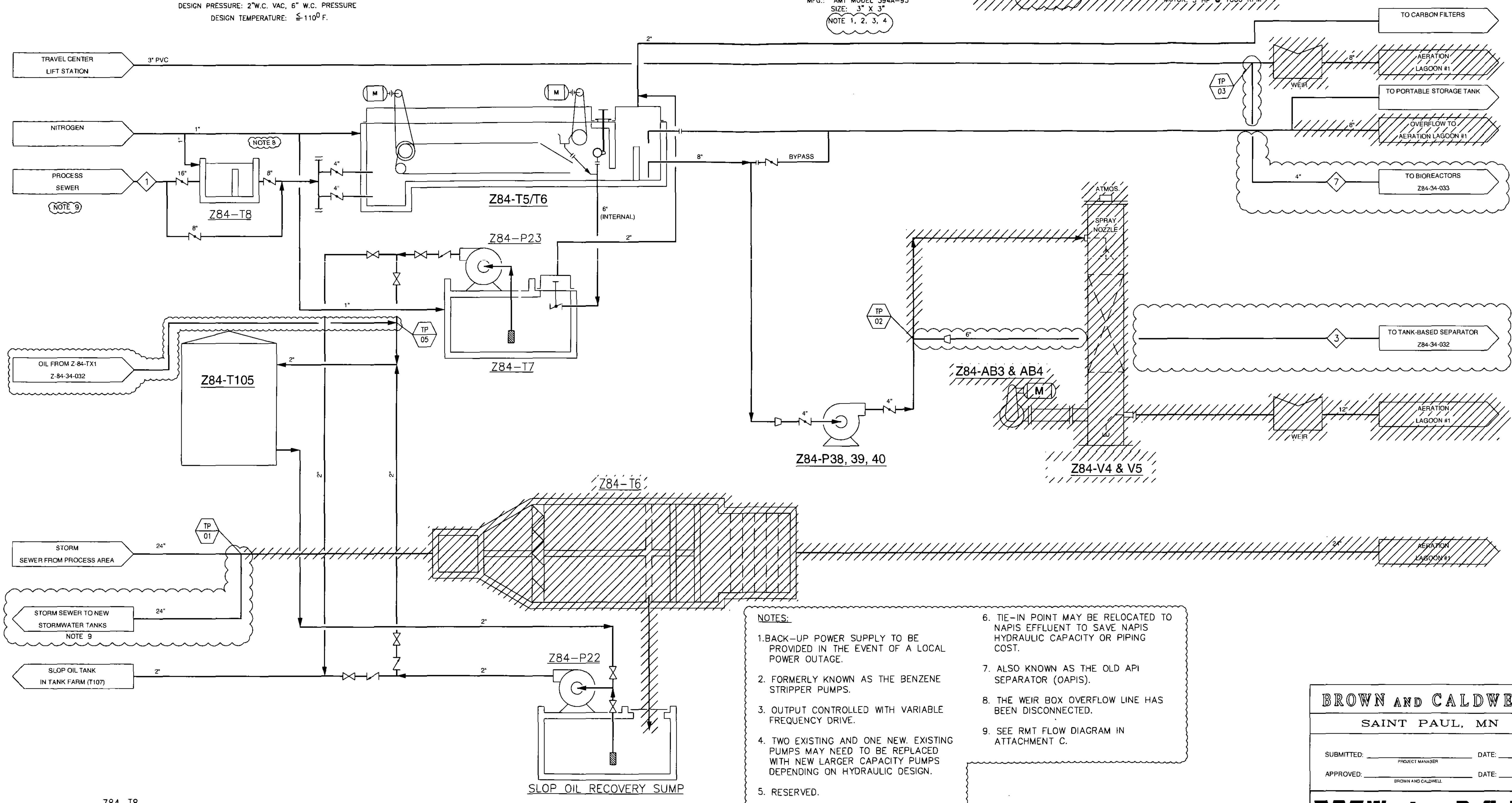
Z84–T7
SLOP OIL RECOVERY SUMP
TYPE: CONCRETE ABOVE GOUND
SIZE: 5' WIDE X 4.5' SWD X 6.5' LENGTH
DESIGN PRESSURE: 2"W.C. VAC, 6" W.C. PRESSURE
DESIGN TEMPERATURE: ≤ –110' F.

Z84–P38, 39, 40
NAPIS EFFLUENT PUMPS
TYPE: CENTRIFUGAL, SEWAGE AND TRASH
FLOW CAPACITY: 150 GPM @ 70' TDH
MOTOR: 7.5 HP, 3500 RPM, S.F. 1.15
MFG.: AMT MODEL 394A–95
SIZE: 3" X 3"
NOTE 1, 2, 3, 4

Z84–API
STORM SEWER BASIN
SIZE: 135'-0" x 22'-0"
(EXISTING)
NOTE 7

Z84–AB3 & AB4
BENZENE STRIPPER AIR BLOWERS
MFG.: CHICAGO BLOWERS
FLOW CAPACITY: 200 CFM @ 20'F
FAN SPEED: 3350 RPM
MOTOR: 3 HP @ 1800 RPM

Z84–V4 & V5
BENZENE STRIPPERS
MFG.: LIPSTRIPPERS YR.1996
SIZE: 36" I.D. X 18'-0"
MAT'L.: FIBERGLASS



Z84–T8
API WEIR BOX
TYPE: CONCRETE ABOVE GROUND
SIZE: 4'–2" WIDE X 9'–4" LONG X 6'–3" TALL

NOTES:

1. BACK–UP POWER SUPPLY TO BE PROVIDED IN THE EVENT OF A LOCAL POWER OUTAGE.
2. FORMERLY KNOWN AS THE BENZENE STRIPPER PUMPS.
3. OUTPUT CONTROLLED WITH VARIABLE FREQUENCY DRIVE.
4. TWO EXISTING AND ONE NEW. EXISTING PUMPS MAY NEED TO BE REPLACED WITH NEW LARGER CAPACITY PUMPS DEPENDING ON HYDRAULIC DESIGN.
5. RESERVED.
6. TIE–IN POINT MAY BE RELOCATED TO NAPIS EFFLUENT TO SAVE NAPIS HYDRAULIC CAPACITY OR PIPING COST.
7. ALSO KNOWN AS THE OLD API SEPARATOR (OAPIS).
8. THE WEIR BOX OVERFLOW LINE HAS BEEN DISCONNECTED.
9. SEE RMT FLOW DIAGRAM IN ATTACHMENT C.

BROWN AND CALDWELL
SAINT PAUL, MN

SUBMITTED: ________ PROJECT MANAGER DATE: ________
APPROVED: ________ BROWN AND CALDWELL DATE: ________

Western Refining
Gallup Refinery

PROCESS FLOW DIAGRAM
API SEPARATOR BASIN AND
SLOP OIL RECOVERY SUMP

MARK	DATE	DESCRIPTION	BY	APRVD
0	02/23/09	ISSUED FOR REGULATORY APPROVAL	DBF	JSA

SCALE	NONE	APRV'D.
DATE	02/03/09	APRV'D
DRN.	S. ZIMIC	1=1
CHK'D.	DWG NO.	Z84-34-008

Z84-P30, 31, 32
SULFURIC ACID PUMPS

TYPE: DIAPHRAGM CHEMICAL METERING
CAPACITY: 0 TO 10 GPH
MOTOR: 0.5 HP
NOTE 5

Z84-P33, 34
CAUSTIC PUMPS

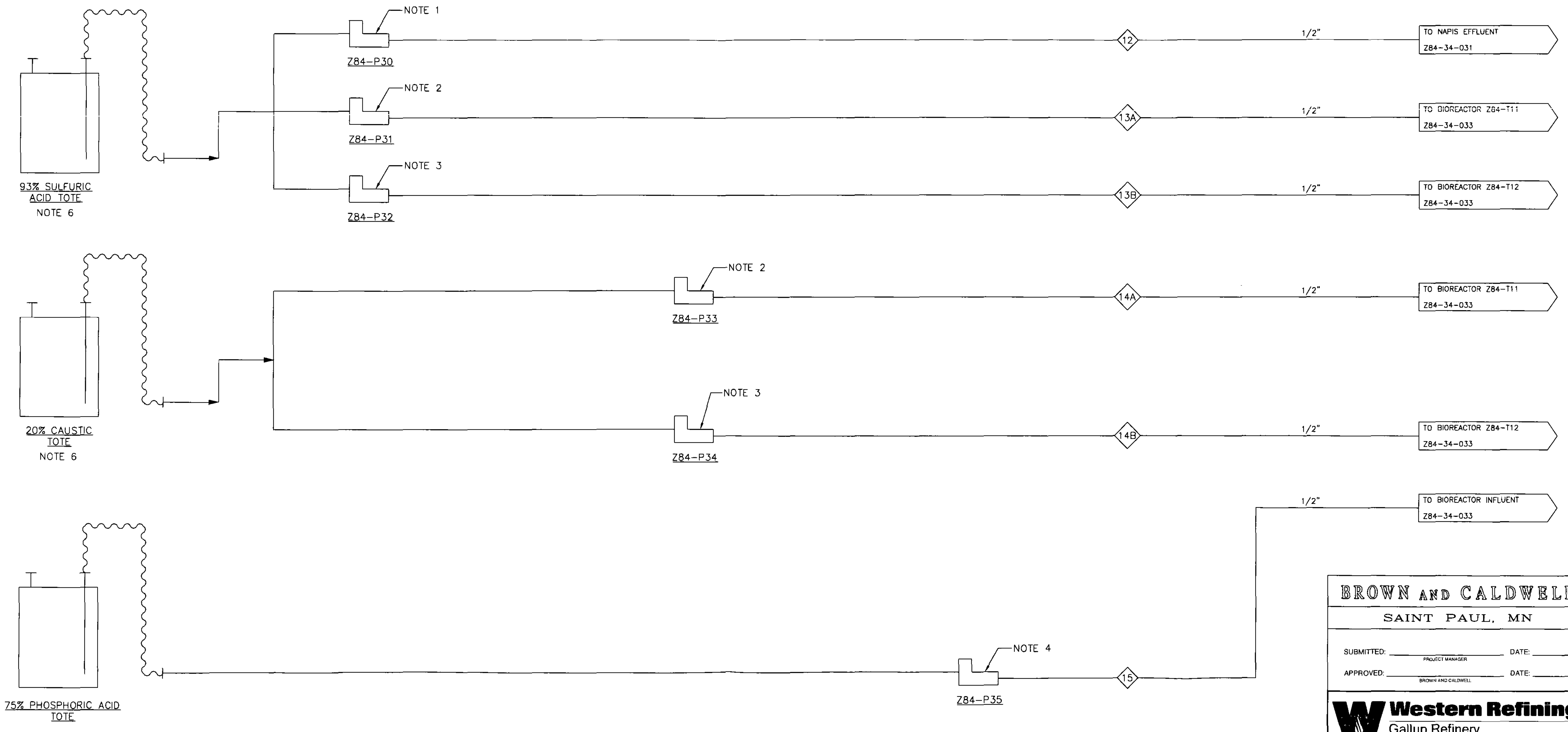
TYPE: DIAPHRAGM CHEMICAL METERING
CAPACITY: 0 TO 10 GPH
MOTOR: 0.5 HP
NOTE 5

Z84-P35
PHOSPHORIC ACID PUMP

TYPE: DIAPHRAGM CHEMICAL METERING
CAPACITY: 0 TO 0.5 GPH
MOTOR: 0.5 HP
NOTE 5

NOTES:

1. PUMPING RATE AUTO CONTROLLED BY NAPIS EFFLUENT PH (AEXXX).
2. PUMPING RATE AUTO CONTROLLED BY BAAT NO. 1 PH (AEXXX).
3. PUMPING RATE AUTO CONTROLLED BY BAAT NO. 2 PH (AEXXX).
4. PUMPING RATE AUTO CONTROLLED BY TANK BASED SEPARATOR EFFLUENT FLOW RATE (FEXXX).
5. SHELF SPARE PUMP ALSO PROVIDED.
6. PLOT SPACE WILL BE RESERVED FOR 6,000 GAL STORAGE TANK IF FUTURE CHEMICAL USAGE RATES WARRANT.



EVERYTHING ON THIS SHEET IS NEW

BROWN AND CALDWELL
SAINT PAUL, MN

SUBMITTED: ____________ (PROJECT MANAGER) DATE: ______
APPROVED: ____________ (BROWN AND CALDWELL) DATE: ______

Western Refining
Gallup Refinery

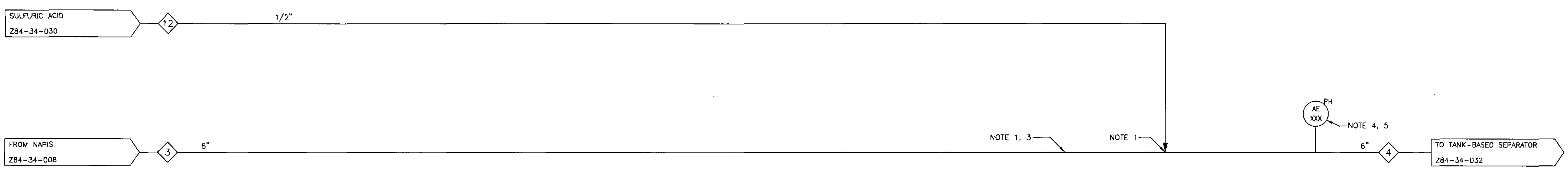
WASTEWATER TREATMENT SYSTEM
CHEMICAL FEED SYSTEMS
PROCESS FLOW DIAGRAM

MARK	DATE	DESCRIPTION	BY	APRVD
0	02/23/09	ISSUED FOR REGULATORY APPROVAL	DBF	JSA

SCALE	NONE	APRV'D.
DATE	01/07/09	APRV'D
DRN.	S. ZIMIC	1=1
CHK'D.	DWG NO.	Z84-34-030

NOTES:

1. INJECTION QUILL AND SPOOL PIECE.
2. RESERVED.
3. FOR FUTURE CAUSTIC ADDITION (IF NECESSARY)
4. NAPIS EFFLUENT PH (AEXXX) AUTOMATICALLY CONTROLS RATE OF ACID PUMP Z84-P30.
5. INCLUDES DUPLICATE PROBE.



EVERYTHING ON THIS SHEET IS NEW

BROWN AND CALDWELL

SAINT PAUL, MN

SUBMITTED: ______ DATE: ______
PROJECT MANAGER

APPROVED: ______ DATE: ______
BROWN AND CALDWELL

Western Refining
Gallup Refinery

WASTEWATER TREATMENT SYSTEM
NAPIS EFFLUENT
PROCESS FLOW DIAGRAM

MARK	DATE	DESCRIPTION	BY	APRVD
0	02/23/09	ISSUED FOR REGULATORY APPROVAL	DBF	JSA

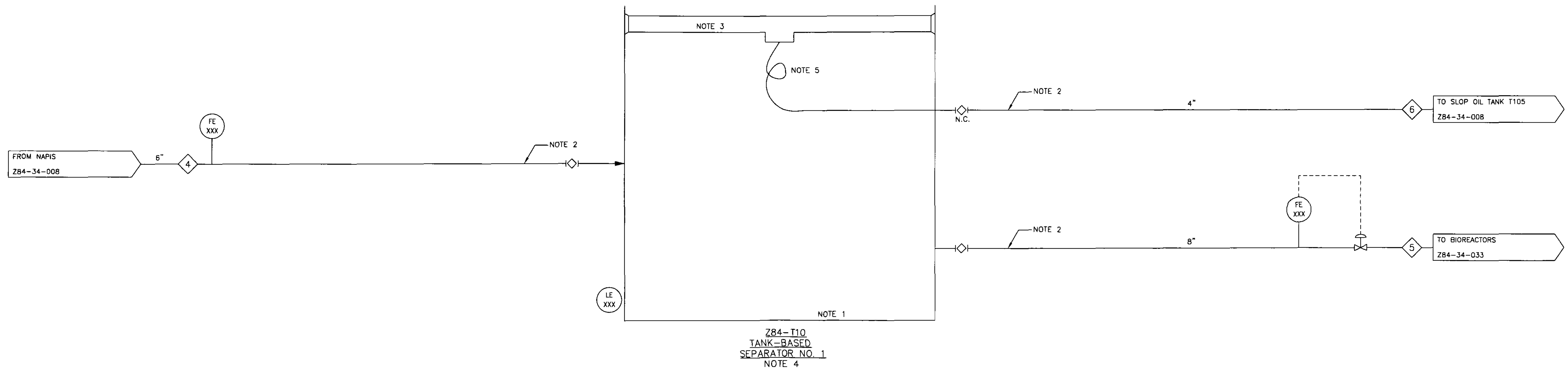
SCALE	NONE	APRV'D.	
DATE	01/07/09	APRV'D	
DRN.	S. ZIMIC	1=1	
CHK'D.	DWG NO.	Z84-34-031	

Z84-T10
TANK BASED SEPARATOR NO. 1

VOLUME: 790,000 GAL TOTAL, 750,000 GAL LIQUID
DIMENSIONS: 58 FT DIA X 40 FT H (38 FT LIQUID)
MATERIAL: COATED CS
NOTE 6, 7

NOTES:

1. SOLIDS WILL BE MANUALLY REMOVED AS NECESSARY AND SENT TO OILY SOLIDS RECYCLING.
2. SAMPLE LOCATION.
3. EXTERNAL FLOATING ROOF WITH OIL SKIMMER.
4. SECOND TANK WILL BE REQUIRED IN THE FUTURE WHEN THE FIRST TANK IS TO BE CLEANED.
5. FLEXIBLE HOSE.
6. TANK OPERATES AT VARIABLE VOLUME/ LEVEL.
7. 2" X 2" CHANNELS IN CONCRETE TANK FOUNDATION FOR LEAK DETECTION.



EVERYTHING ON THIS SHEET IS NEW

BROWN AND CALDWELL
SAINT PAUL, MN

SUBMITTED: ______ PROJECT MANAGER DATE: ______
APPROVED: ______ BROWN AND CALDWELL DATE: ______

Western Refining
Gallup Refinery

WASTEWATER TREATMENT SYSTEM
TANK-BASED SEPARATOR
PROCESS FLOW DIAGRAM

MARK	DATE	DESCRIPTION	BY	APRVD
0	02/23/09	ISSUED FOR REGULATORY APPROVAL	DBF	JSA

SCALE	NONE	APRV'D.	
DATE	01/07/09	APRV'D	
DRN.	S. ZIMIC	1=1	
CHK'D.	DWG NO.	Z84-34-032	

Z84-B26, 27, 28
BIOREACTOR BLOWERS NO. 1, 2, AND 3

TYPE: ROTARY LOBE POSITIVE DISPLACEMENT
MOTOR: 125 HP
CAPACITY: 1,300 SCFM @ 10.2 PSIG
MATERIAL: CAST IRON
NOTE 7, 8, 9

Z84-T11
BIOREACTOR NO. 1

VOLUME: 793,000 GAL TOTAL
694,000 GAL LIQUID
MBBR MEDIA: 7,250CF;
POLYETHYLENE
DIMENSIONS: 75 FT DIA X 24 FT H
(21 FT LIQUID)
MATERIAL: COATED CS
NOTE 6

Z84-T12
BIOREACTOR NO. 2

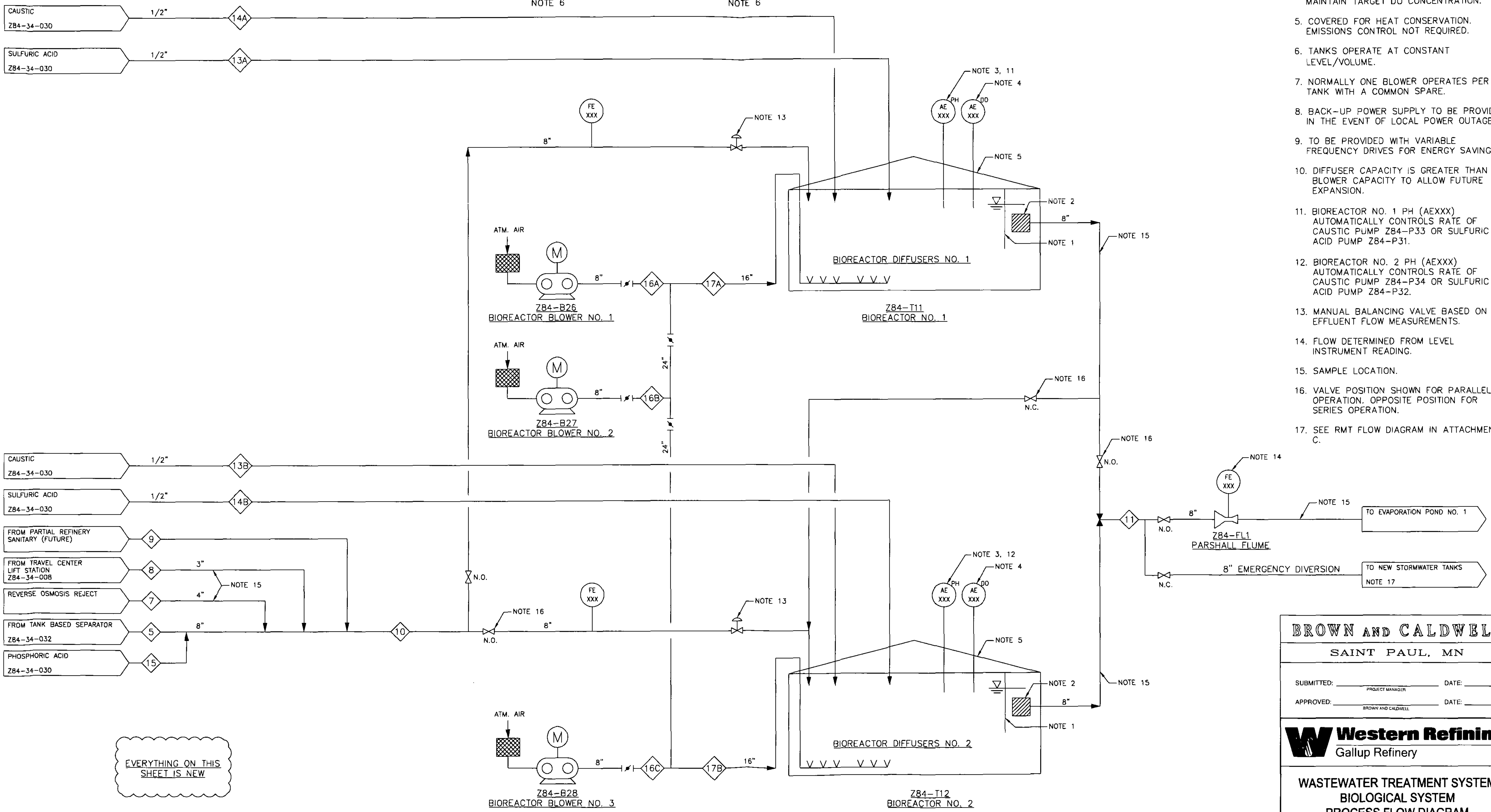
VOLUME: 793,000 GAL TOTAL
694,000 GAL LIQUID
MBBR MEDIA: 7,250CF;
POLYETHYLENE
DIMENSIONS: 75 FT DIA X 24 FT H
(21 FT LIQUID)
MATERIAL: COATED CS
NOTE 6

XX-XX
BIOREACTOR DIFFUSERS NO. 1 AND 2

TYPE: WIDE-BAND COARSE BUBBLE
CAPACITY: 4,800 SCFM EACH
MATERIAL: 316L SS
NOTE 10

Z84-FL1
PARSHALL FLUME

CAPACITY: 4 TO 834 GPM
MATERIAL: FRP



NOTES:

1. UNDER-FLOW BAFFLE TO MINIMIZE THE POTENTIAL FOR OIL TO EXIT TANK.
2. 5 MM WEDGE-WIRE SCREEN FOR RETENTION OF MBBR MEDIA.
3. A SECOND pH PROBE TO BE INSTALLED IN EACH TANK FOR REDUNDANCY.
4. CONTROLS BLOWER SPEED (AIRFLOW) TO MAINTAIN TARGET DO CONCENTRATION.
5. COVERED FOR HEAT CONSERVATION. EMISSIONS CONTROL NOT REQUIRED.
6. TANKS OPERATE AT CONSTANT LEVEL/VOLUME.
7. NORMALLY ONE BLOWER OPERATES PER TANK WITH A COMMON SPARE.
8. BACK-UP POWER SUPPLY TO BE PROVIDED IN THE EVENT OF LOCAL POWER OUTAGE.
9. TO BE PROVIDED WITH VARIABLE FREQUENCY DRIVES FOR ENERGY SAVINGS.
10. DIFFUSER CAPACITY IS GREATER THAN BLOWER CAPACITY TO ALLOW FUTURE EXPANSION.
11. BIOREACTOR NO. 1 PH (AEXXX) AUTOMATICALLY CONTROLS RATE OF CAUSTIC PUMP Z84-P33 OR SULFURIC ACID PUMP Z84-P31.
12. BIOREACTOR NO. 2 PH (AEXXX) AUTOMATICALLY CONTROLS RATE OF CAUSTIC PUMP Z84-P34 OR SULFURIC ACID PUMP Z84-P32.
13. MANUAL BALANCING VALVE BASED ON EFFLUENT FLOW MEASUREMENTS.
14. FLOW DETERMINED FROM LEVEL INSTRUMENT READING.
15. SAMPLE LOCATION.
16. VALVE POSITION SHOWN FOR PARALLEL OPERATION. OPPOSITE POSITION FOR SERIES OPERATION.
17. SEE RMT FLOW DIAGRAM IN ATTACHMENT C.

BROWN AND CALDWELL
SAINT PAUL, MN

SUBMITTED: ______ PROJECT MANAGER DATE: ______
APPROVED: ______ BROWN AND CALDWELL DATE: ______

Western Refining
Gallup Refinery

WASTEWATER TREATMENT SYSTEM
BIOLOGICAL SYSTEM
PROCESS FLOW DIAGRAM

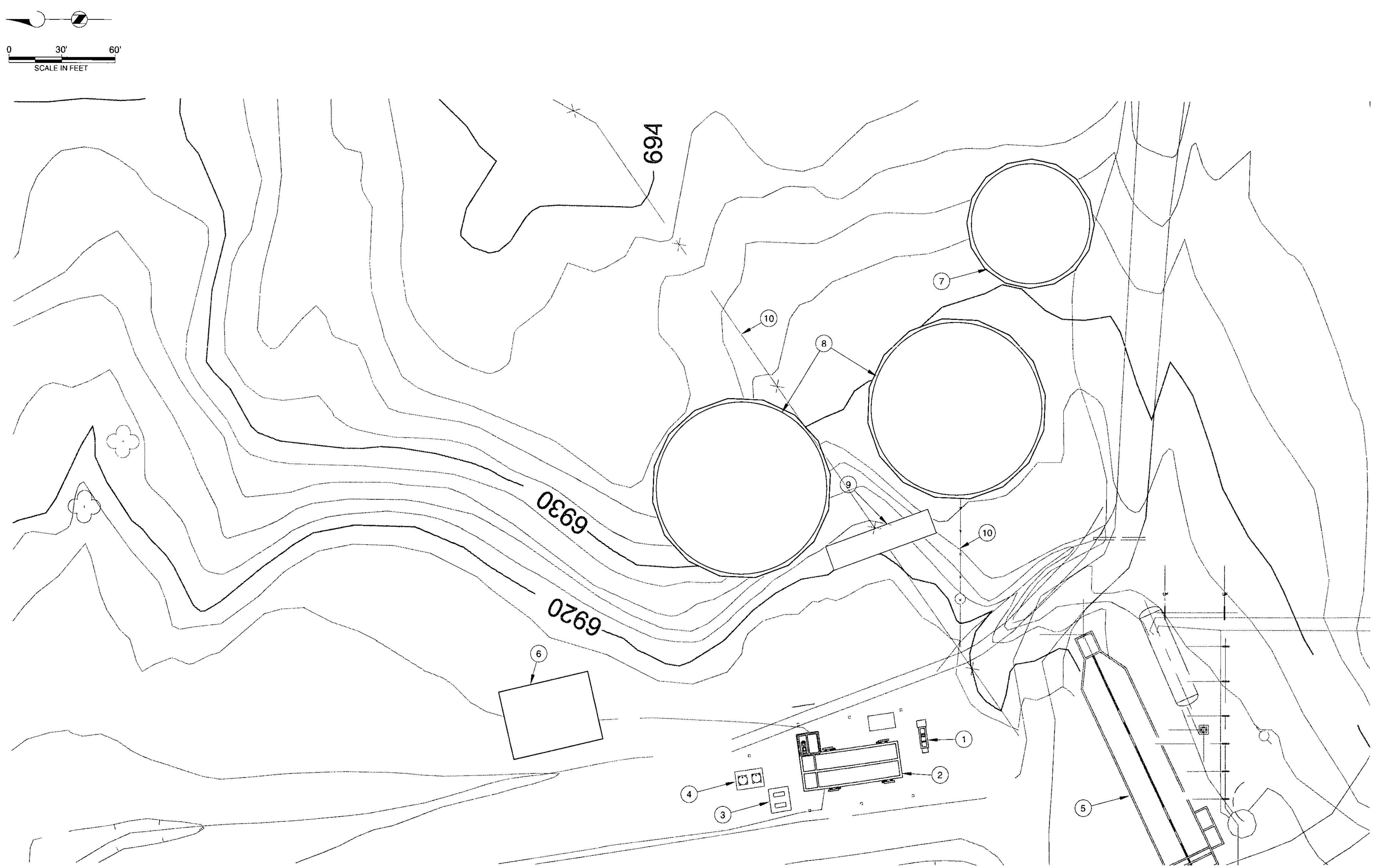
MARK	DATE	DESCRIPTION	BY	APRVD
0	5/25/09	REVISION A	DBF	JSA

SCALE	NONE	APRV'D.
DATE	01/07/09	APRV'D
DRN.	S. ZIMIC	1=1
CHK'D.	DWG NO.	Z84-34-033

ATTACHMENT B: PRELIMINARY SITE PLAN

Drawing No. and Title

C1: Site Plan



GENERAL NOTES

1. ITEM NOS. 1, 2, 3 AND 4 ARE EXISTING AND WILL REMAIN FOLLOWING THE WWTP UPGRADES.
2. ITEM NO. 5 IS EXISTING BUT WILL NOT BE OPERATIONAL FOLLOWING THE WWTP UPGRADES.
3. ITEM NOS. 6, 7, 8 AND 9 ARE NEW FOR THE WWTP UPGRADES.

KEY NOTES:

1. WEIR BOX
2. NEW API SEPARATOR
3. NAPIS EFFLUENT PUMPS
4. CARBON VESSELS
5. OLD API SEPARATOR
6. 40' x 30' WWTP CONTROL BUILDING
7. TANK BASED SEPARATOR
8. BIOREACTOR
9. AERATION BLOWER PAD
10. SECURITY FENCE TO BE RELOCATED

BROWN AND CALDWELL
SAINT PAUL, MN

SUBMITTED: ________ PROJECT MANAGER DATE: ________
APPROVED: ________ BROWN AND CALDWELL DATE: ________

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED:
DRAWN: JME
CHECKED:
CHECKED:
APPROVED:

EXTERNAL REFERENCE FILES
135741-000-G-00000-01.dwg
135741-100-S-01-MP-0001.dwg
135741-000-C-01-MP-0001.DWG
135741-100-M-01-MP-0001.dwg
MODEL.dwg

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	0	ISSUED FOR REGULATORY APPROVAL	DBF	2/23/09	JSA

Western Refining

GALLUP WASTEWATER TREATMENT PLANT UPGRADE
SITE PLAN

FILENAME
BC PROJECT NUMBER 135741
CLIENT PROJECT NUMBER
DRAWING NUMBER C1
SHEET NUMBER OF

Feb 26, 2009 - 1:57pm szimic
P:\Western_Refining\135741_Gallup_Wastewater\CADD\2-SHEETS\C-CIVIL\135741-000-C-001-SFP-001 TEMP.dwg

ATTACHMENT C: STORMWATER/DIVERSION TANK DRAWINGS

Drawing No. and Title

7788.03.01: Flow Diagram

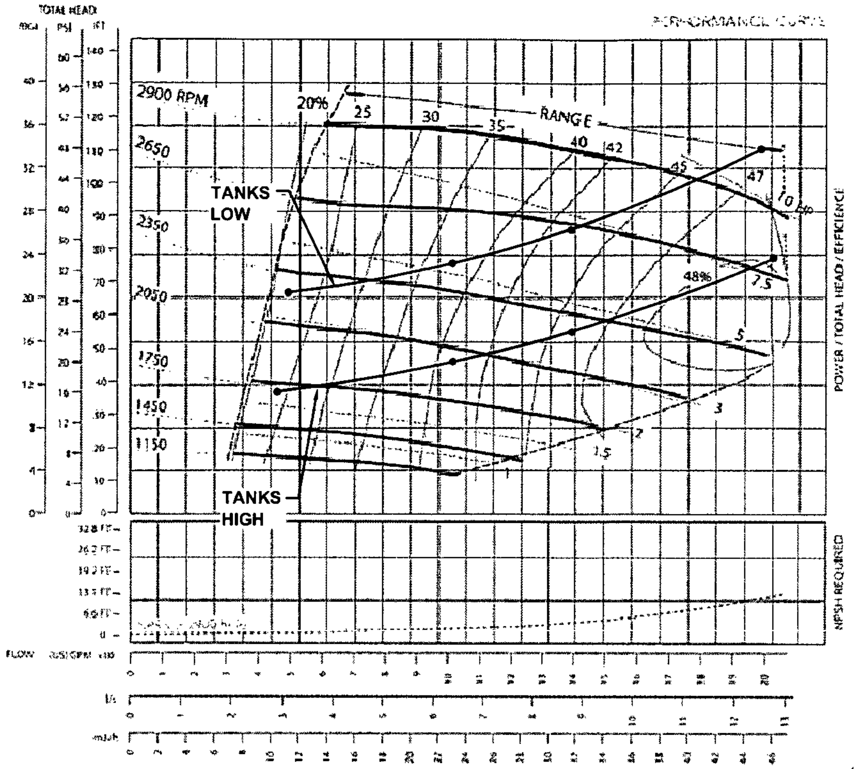
7788.03.02: Tank Details

7788.03.03: Pump Building

7788.03.04: Details

(Note: Drawing 7788.03.01 has been modified to include a sampling port on the effluent line from the Stormwater/Diversion Tanks)

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



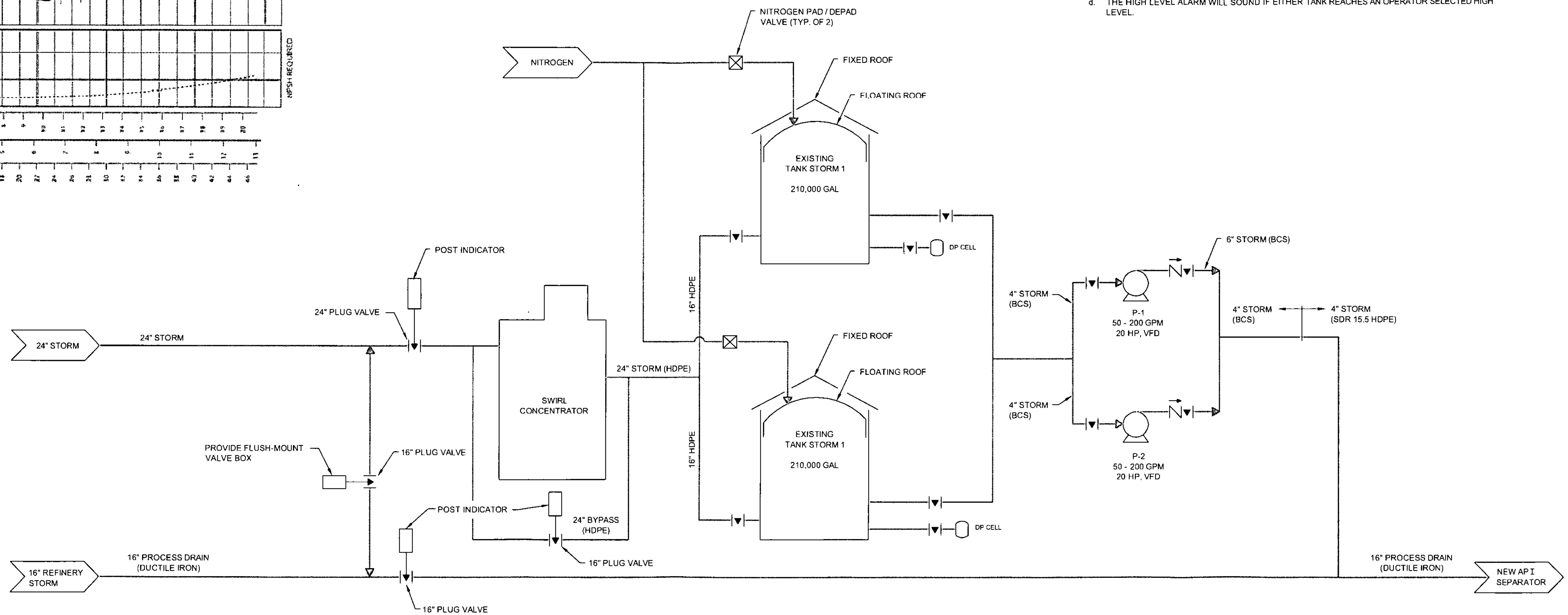
NOTES:

1. 63 FT. ELEVATION RISE FROM SLOP OIL TANK BASE TO ROAD NORTH OF LOADING RACK AREA.
2. ASSUME 30 FT. HEIGHT OF FORMER SLOP OIL TANKS
3. PUMP CURVE SHOWN IS ALLPRIME MODEL S-2, CONTACT (800) 803-0353.

SEQUENCE OF OPERATION

1. STORMWATER FLOWS BY GRAVITY FROM THE REFINERY TO TANKS 1 AND 2. THE TANKS ARE FLOATING ROOF VESSELS AND WILL BE EQUIPPED WITH NITROGEN BLANKETING WITH A PAD/DEPAD VALVE PER TANK.
2. STORMWATER IS PUMPED BY PUMPS P-1 AND P-2 TO THE REFINERY'S 16 INCH PROCESS DRAIN WHICH FLOWS TO THE NEW API SEPARATOR. THE PUMPS WILL BE CONTROLLED BY A PLC WITH HAND/OFF/AUTO CONTROL. LEVEL SENSING SHALL BE BY A DIFFERENTIAL PRESSURE CELL WITH ONE LOCATED IN EACH TANK. THE OPERATOR WILL BE ABLE TO SELECT WHICH DP CELL WILL CONTROL PUMP OPERATION. A MAGNETIC FLOWMETER WILL BE PROVIDED WITH 4-20 MILLIAMP SIGNAL SENT TO THE PLC. IN AUTO MODE, THE PUMPS WILL OPERATE AS FOLLOWS:

a. ONE PUMP WILL TURN ON AT AN OPERATOR SELECTABLE LEVEL AND TURN OFF AT AN OPERATOR SELECTABLE LOW LEVEL.
b. THE PUMPS WILL AUTOMATICALLY ALTERNATE.
c. EACH PUMP SHALL BE PROVIDED WITH A VARIABLE FREQUENCY DRIVE (VFD). THE OPERATOR WILL BE ABLE TO INPUT THE DESIRED FLOWRATE AS MEASURED BY THE MAGNETIC FLOWMETER AND CONTROLLED BY THE VFD.
d. THE HIGH LEVEL ALARM WILL SOUND IF EITHER TANK REACHES AN OPERATOR SELECTED HIGH LEVEL.



NO.	BY	DATE	REVISION	APP'D
5.				
4.				
3.				
2.	SJL	09-22-06	ISSUED FOR BIDS	ELC
1.	SJL	08-29-06	100% OWNER'S REVIEW	ELC

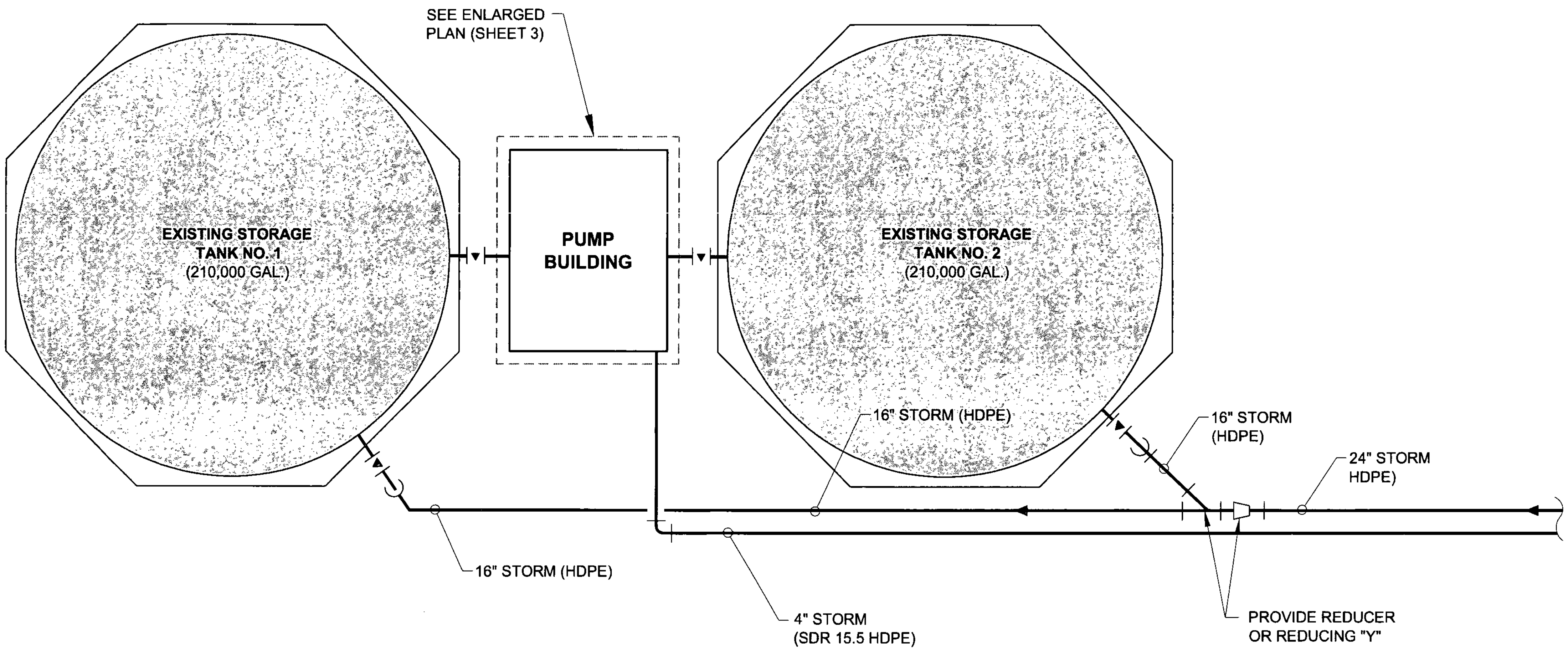
WESTERN REFINING GALLUP REFINERY

FLOW DIAGRAM

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO. J:107788103	
CHECKED BY: EC		FILE NO. 7788.03.01.dwg	
APPROVED BY: EC	DATE PRINTED:	**Sheet 1 of 4**	
DATE: September 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	09-22-08	ISSUED FOR BIDS	ELC
1.	SJL	08-29-08	100% OWNER'S REVIEW	ELC

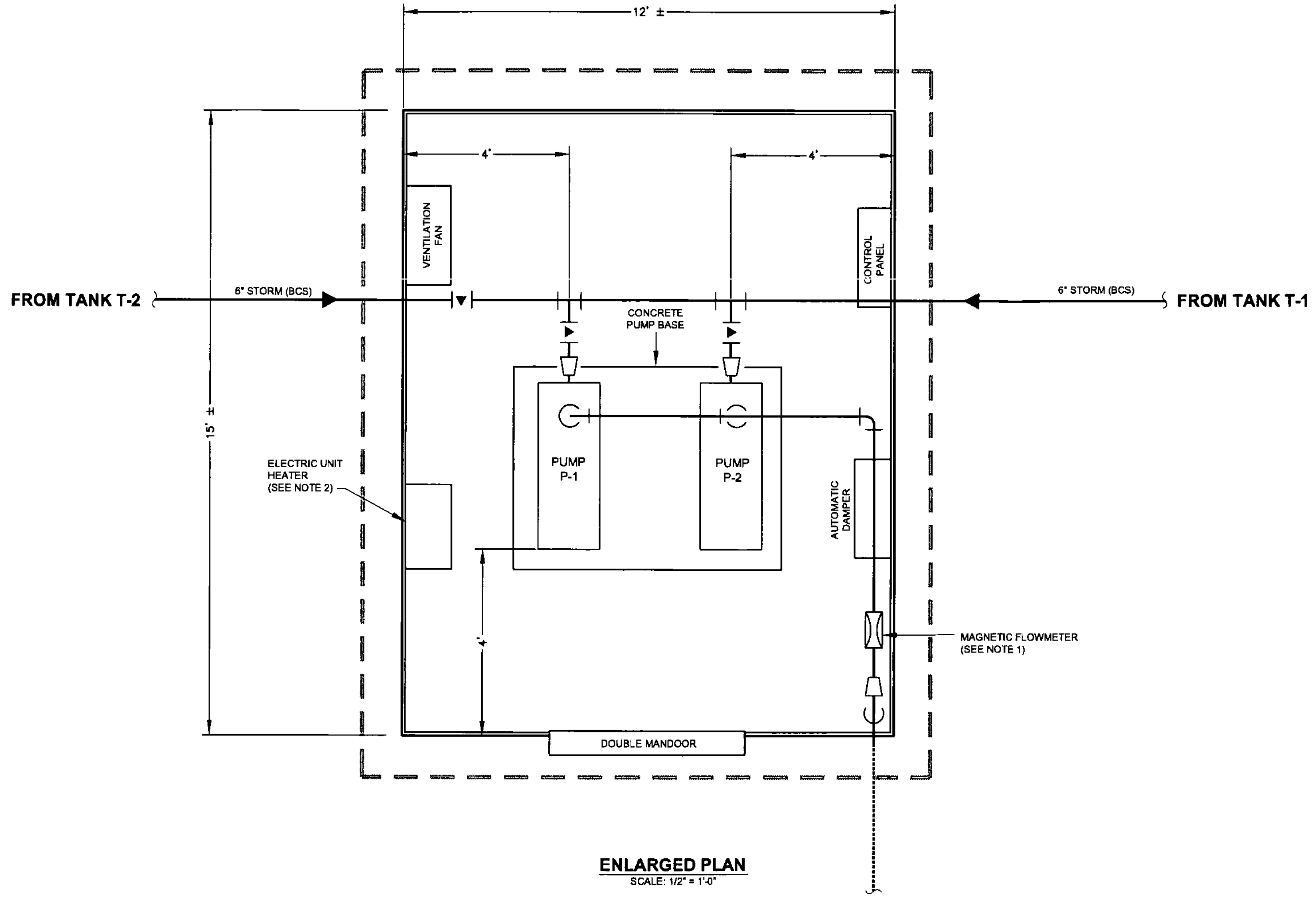
WESTERN REFINING
GALLUP REFINERY

TANK DETAILS

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO: J:\07788\03	
CHECKED BY: EC		FILE NO: 7788.03.02.dwg	
APPROVED BY: EC	DATE PRINTED:	**Sheet 2 of 4**	
DATE: September 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



ENLARGED PLAN
SCALE: 1/2" = 1'-0"

NOTES:

1. PUMPS SHALL BE SELF-PRIMING, NON-CLOG WASTEWATER PUMPS EQUAL TO ALL PRIME MODEL S-2. GORMAN-RUPP MAKES AN EQUIVALENT PRODUCT. PUMP SHALL HAVE 2 INCH FLANGED INLET AND OUTLET, PASS 1 ¾ INCH SPHERES WITH CAST OR DUCTILE IRON BODY AND IMPELLER. STAINLESS STEEL SHAFT SLEEVE AND BUNA-N ELASTOMERS.
2. ABOVE GRADE PIPING SHALL BE SCHEDULE 40 BLACK CARBON STEEL. GALVANIZED OR STAINLESS STEEL, HIGH STRENGTH FLANGE BOLTS AND NEOPRENE FLANGE GASKETS. PRESSURE TEST AT 100 PSIG.
3. VALVES SHALL BE PLUG VALVES WITH BUNA-N COATED PLUG, CAST IRON BODY EQUAL TO VALMATIC FROM USA BLUEBOOK, (800) 548-1234.
4. CHECK VALVES SHALL BE EQUAL TO FLOMATIC 78, CAST IRON BODY, NEOPRENE FLAPPER.
5. BUILDING SHALL BE METAL SHED AS SUPPLIED BY WHITE WATER STORAGE SHEDS IN GALLUP, (505) 722-5883. PROVIDE 4 INCHES OF INSULATION AND LINER PANEL. DOOR OPENING SHALL BE A MINIMUM OF 34 INCH CLEAR OPENING. EPOXY COATED FINISH WITH GALVANIZED STEEL OR STAINLESS STEEL FASTENERS.
6. PROVIDE MINIMUM 3.6 KILOWATT ELECTRIC UNIT HEATER CONTROLLED BY THERMOSTAT DESIGNED TO MAINTAIN 40 DEGREE INTERIOR TEMPERATURE WITH -20 DEGREE AMBIENT CONDITIONS AND 50 MPH WINDS. UNIT SHALL BE DESIGNED FOR HAZARDOUS LOCATIONS AND EQUAL TO W. W. GRAINGER STOCK NUMBER 3UG37. PROVIDE THERMOSTAT FOR HAZARDOUS LOCATION.
7. PROVIDE EXHAUST FAN AND AUTOMATED DAMPER TO VENTILATE THE BUILDING WHEN INTERIOR TEMPERATURE EXCEEDS 90 DEGREES. EXHAUST FAN SHALL HAVE SHUTTERS AND DESIGNED FOR HAZARDOUS LOCATIONS EQUAL TO W.W. GRAINGER STOCK NUMBER 4C370, 18 INCH, ¼ HP. PROVIDE AUTOMATIC 18 INCH DAMPER OF ALUMINUM CONSTRUCTION. INTERLOCK THE DAMPER'S ACTUATOR WITH THE FAN OPERATION.
8. ABOVE GRADE PIPING SHALL BE HEAT TRACED AND INSULATED. INSULATION SHALL BE 2 INCHES OF FIBERGLASS WITH ALUMINUM JACKET. BELOW GRADE PIPING SHALL BE INSULATED AND HEAT TRACED BETWEEN FINISHED GRADE AND 3'0" BELOW GRADE. BELOW GRADE INSULATION SHALL BE EXPANDED GLASS (FOAMGLASS) INSULATION. THE HEAT TRACING SYSTEM SHALL BE DESIGNED BY THE SUPPLIER FOR -20 DEGREE AMBIENT CONDITIONS WITH A 50 MILE PER HOUR WIND. PROVIDE SHOP DRAWINGS FOR REVIEW BY THE OWNER WITH SUPPORTING CALCULATIONS. THE SYSTEM SHALL BE SELF-REGULATING CABLE AND CONTROLS AS MANUFACTURED BY RAYCHEM, COOPERHEAT, OR EQUAL. PROVIDE AMBIENT TEMPERATURE SENSOR TO TURN OFF HEAT TRACING WHEN ABOVE 32 DEGREES F.
9. PROVIDE MAGNETIC FLOWMETER EQUAL TO ENDRESS AND HAUSER 3" PROMAG, USA BLUEBOOK MC-47038. POLYETHANE LINING, REMOTE READOUT, STAINLESS STEEL ELECTRODES.

N

0 1' 2' 3' 4'
SCALE IN FEET

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	09-22-08	ISSUED FOR BIDS	ELC
1.	SJL	08-29-08	100% OWNER'S REVIEW	ELC

WESTERN REFINING
GALLUP REFINERY

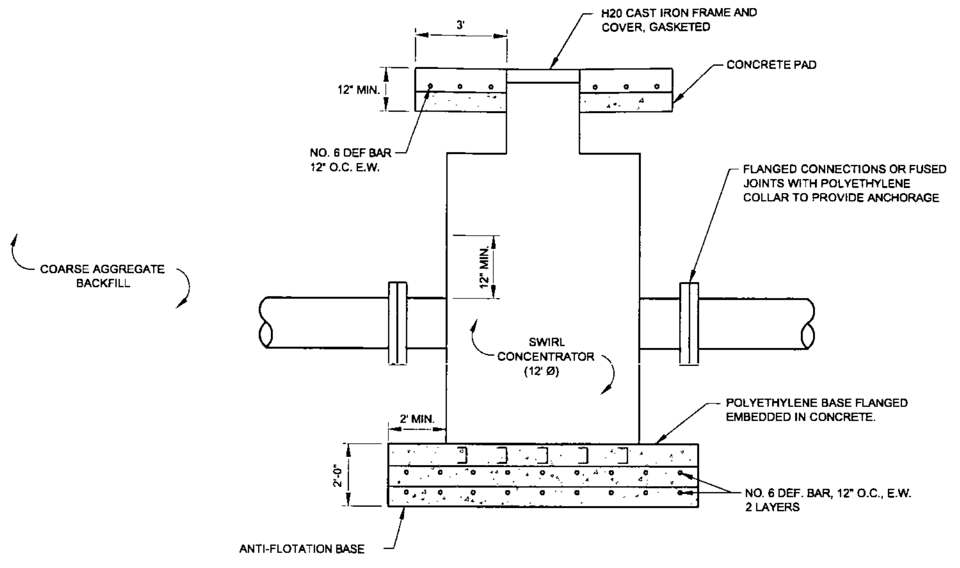
PUMP BUILDING

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO: J:107788\03	
CHECKED BY: EC		FILE NO: 7788.03.03.dwg	
APPROVED BY: EC	DATE PRINTED:	Sheet 3 of 4	
DATE: September 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

NOTES:

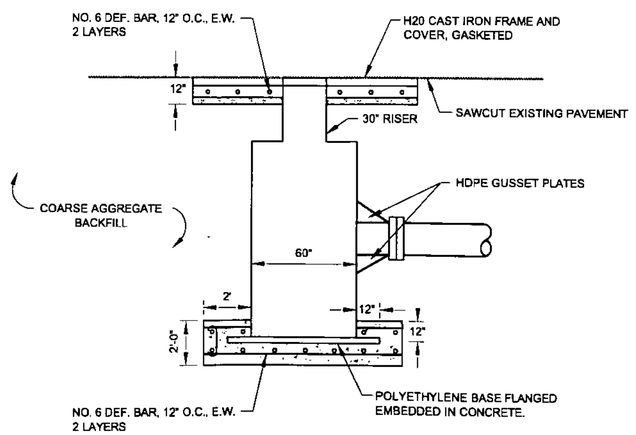
1. MINIMUM 3500 PSI CONCRETE WITH AIR ENTRAINMENT
2. PROVIDE GRANULAR BACKFILL EXTENDING 3' AROUND SWIRL CONCENTRATOR. COMPACT TO MINIMUM 90% PROCTOR DENSITY. MAXIMUM AGGREGATE SIZE OF 1".
3. SWIRL CONCENTRATION SHALL BE AQUA-SWIRL MODEL AS-12, (888)-344-9044.
4. PERFORM EXPLORATORY EXCAVATION TO DETERMINE PIPE CONNECTION, SIZING, AND ELEVATIONS PRIOR TO PLACING ORDER.
5. PROVIDE FLANGED RISER WITH GASKETED COVER TO SEAL THE MANHOLE TO PREVENT GAS EMISSIONS.
6. TIGHTEN ALL FLANGE BOLTS PER PLASTIC PIPE INSTITUTE TECHNICAL NOTE 38.
7. CONTACT OWNER / ENGINEER IF GROUNDWATER IS PRESENT DURING EXCAVATING.



1/3 SWIRL CONCENTRATOR
NOT TO SCALE

NOTES:

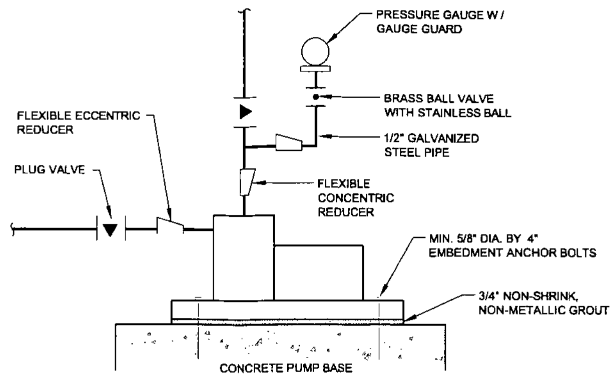
1. MINIMUM 3500 PSI CONCRETE WITH AIR ENTRAINMENT.
2. PROVIDE GRANULAR BACKFILL EXTENDING 3' AROUND SWIRL CONCENTRATOR. COMPACT TO MINIMUM 90% PROCTOR DENSITY. MAXIMUM AGGREGATE SIZE OF 1".
3. MANHOLE SHALL BE HDPE AS MANUFACTURED BY ISCO INDUSTRIES, (800) 345-4276.
4. PERFORM EXPLORATORY EXCAVATION TO DETERMINE PIPE CONNECTION, SIZING, AND ELEVATIONS PRIOR TO PLACING ORDER.
5. PROVIDE FLANGED RISER WITH GASKETED COVER TO SEAL THE MANHOLE TO PREVENT GAS EMISSIONS.
6. TIGHTEN ALL FLANGE BOLTS, THEN RE-TIGHTEN 7 DAYS AFTER INITIAL INSTALLATION TO ACCOUNT FOR COLD FLOW.



2/3 POLYETHYLENE MANHOLE
NOT TO SCALE

NOTES:

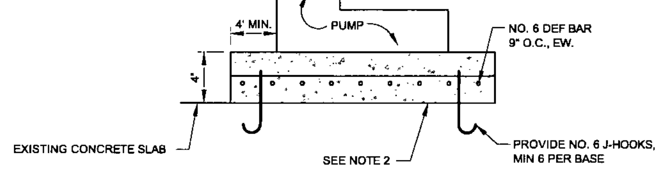
1. ANCHOR BOLTS SHALL BE SIZED PER PUMP SUPPLIER'S RECOMMENDATIONS.
2. FLEXIBLE COUPLING, INCLUDING REDUCING COUPLINGS SHALL BE SINGLE-ARCH ELASTOMER COUPLINGS OF BUNA-N CONSTRUCTION.
   a. MERCER RIBBON COMPANY.
   b. RED VALVE COMPANY
   c. USA BLUEBOOK (800-548-1234)
3. PRESSURE GAUGE SHALL BE 0 to 60 psi RANGE, 2-1/2" DIAMETER WIKA STAINLESS STEEL GAUGE WITH PVC SEAL BODY EQUAL TO USA BLUEBOOK STOCK NO. MC-44450 (800-548-1234)



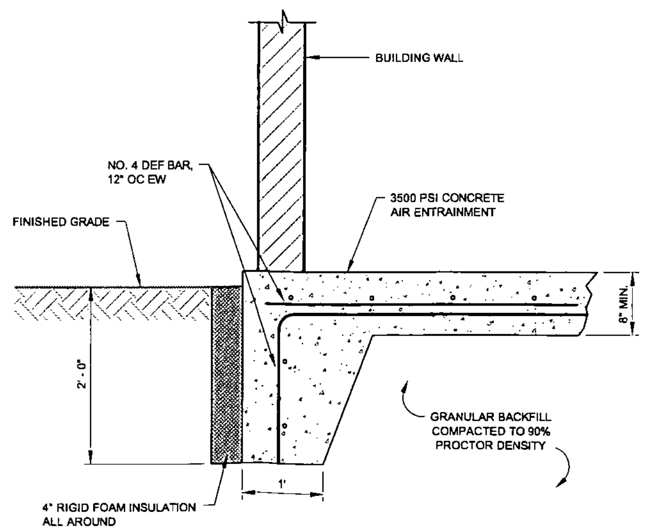
3/3 CENTRIFUGAL PUMP INSTALLATION
NOT TO SCALE

NOTES:

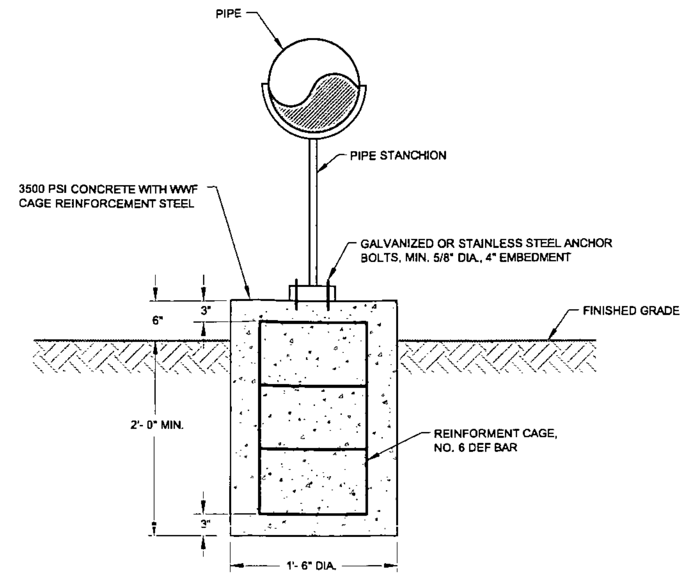
1. 3,500 PSI, AIR ENTRAINED CONCRETE.
2. ROUGHEN EXISTING CONCRETE PAD AND APPLY EPOXY BONDING COMPOUND. POUR PUMP BASE WHILE EPOXY IS TACKY PER SUPPLIER'S WRITTEN INSTRUCTIONS.



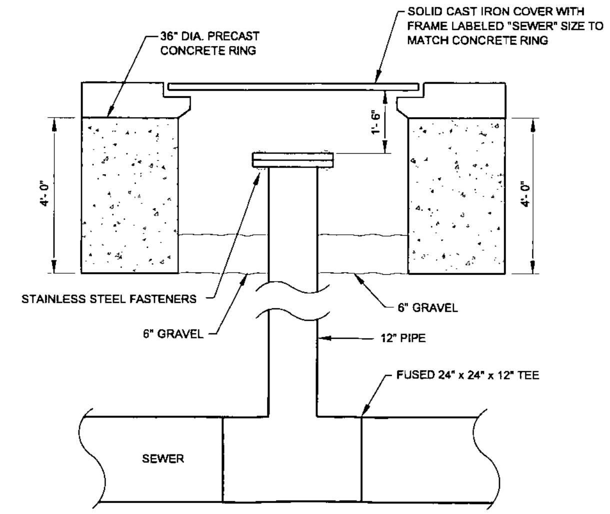
4/3 PUMP BASE
NOT TO SCALE



5/3 BUILDING FOUNDATION
NOT TO SCALE



6/3 OUTDOOR PIPE STANCHION
NOT TO SCALE



NOTE: PROVIDE 6" RISER PIPE FOR 6" FORCE MAIN

7/3 SEWER CLEANOUTS
NOT TO SCALE

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	09-22-08	ISSUED FOR BIDS	ELC
1.	SJL	08-29-08	100% OWNER'S REVIEW	ELC

WESTERN REFINING
GALLUP REFINERY

DETAILS

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO:	J:107788103
CHECKED BY: EC		FILE NO:	7788.03.04.dwg
APPROVED BY: EC	DATE PRINTED:	**Sheet 4 of 4**	
DATE: September 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

ATTACHMENT D: TECHNICAL PAPER ON TANK-BASED SEPARATOR CASE STUDIES

NATIONAL PETROLEUM REFINERS ASSOCIATION

SUITE 1000
1899 L STREET, N.W.
WASHINGTON, D. C. 20036

ENV-95-161

UPGRADING REFINERY WASTEWATER TREATMENT SYSTEMS WITH ABOVE-GROUND OIL/WATER SEPARATION TANKS: THREE CASE HISTORIES

David R. Marrs
Patrick M. Maroney
Brown and Caldwell
Pleasant Hill, California

Steven L. Reynolds
Chevron U.S.A. Products Company
Salt Lake City, Utah

Mark J. Mielke
Total Petroleum, Inc.
Alma, Michigan

Greg E. Elliot
Total Petroleum, Inc.
Ardmore, Oklahoma

Presented at the
1995 NPRA
ENVIRONMENTAL CONFERENCE
October 15-17, 1995
San Francisco, California

UPGRADING REFINERY WASTEWATER TREATMENT SYSTEMS WITH ABOVE-GROUND OIL/WATER SEPARATION TANKS: THREE CASE HISTORIES

David R. Marrs
Patrick M. Maroney
Brown and Caldwell
Pleasant Hill, California

Steven L. Reynolds
Chevron U.S.A Products Company
Salt Lake City, Utah

Mark J. Mielke
Total Petroleum, Inc.
Alma, Michigan

Greg E. Elliot
Total Petroleum, Inc.
Ardmore, Oklahoma

Experience has shown that effective oil/water/solids separation and wasteload equalization are essential for the successful operation of refinery biological wastewater treatment systems. The performance of these upstream operations critically affects the quality of the final effluent from activated sludge units, especially when nitrification is a treatment objective. Upstream treatment also influences the final effluent quality that can be obtained by rotating biological contractors (RBCs) and trickling filters, both of which have short hydraulic retention times and tend to lose efficiency as free oil accumulates in the biomass.

Conventionally, wastewater treatment systems in North American refineries have included API-type gravity separators for the initial removal of free oil and solids from the influent wastewater, followed by a secondary fine oil removal step such as dissolved air flotation (DAF), induced air flotation (IAF), sand filtration, or a coalescing plate separator. Ponds were used in the past to provide surge control and perhaps some equalization upstream of the biological treatment system. However, these types of ponds have been all but eliminated in the United States as a result of regulatory changes over the last five years. Many refineries have replaced their surge and equalization ponds with a flow-through tank of either constant or variable volume placed in line with the oil/water treatment facilities.

Brown and Caldwell has designed numerous improvements to refinery wastewater treatment systems over the past twenty years. These projects have been driven by several factors, including improved compliance with existing NPDES permits, new and more restrictive effluent limitations, and, more recently, requirements to bring older treatment systems into compliance with various RCRA and Clean Air Act (e.g., benzene NESHAPS and Subpart QQQ) provisions. Improved oil/water/solids separation and equalization have typically been important considerations for our clients.

This paper presents design concepts and operating data for three such wastewater treatment upgrades recently completed in the United States at refineries ranging in size from 45,000 bpd to approximately 70,000 bpd. In each case, the existing surge ponds and API separator were replaced with above-ground tanks to accomplish gravity oil/water/solids separation and wastewater equalization in a single process vessel. These tank-based separators have now been in service for over two years, demonstrating the following advantages over conventional approaches to primary wastewater treatment and equalization in refinery service:

- The objectives of surge control, influent equalization, and primary oil/water/solids separation have been achieved in a single tank. The need for a separate wastewater equalization tank has been eliminated.

- Oil/grease concentrations in tank-based separator effluents have surpassed the quality that would typically be expected from an API separator. Two of the three facilities discussed in this paper have even been able to eliminate downstream fine oil removal units (IAFs or DAFs) from their treatment systems, leading to reduced chemical and maintenance costs as well as eliminating the need to manage the emulsified oily sludges produced by flotation processes.

- The amount of operator attention required at the wastewater treatment unit has been reduced. Unlike a conventional API separator, there is no need for frequent adjustment of the oil skimmer level. Those facilities that have removed their IAFs and DAFs have also eliminated the operating nuisances associated with adjustment and maintenance of the froth skimmers.

- The quality of the recovered oil has improved, reducing the processing required before this material can be recycled to the refinery.

- The above-ground separation tanks are in compliance with existing RCRA and Clean Air Act regulations. Furthermore, they will be easier to upgrade than conventional below-grade gravity separators if future RCRA requirements for wastewater treatment tanks become more restrictive.

Overall, by changing the design concept for oil/water/solids separation facilities, the projects discussed in this paper have demonstrated that refinery effluent quality can be improved at lower capital and operating costs than would be expected in a conventional wastewater treatment train.

DEVELOPMENT OF TANK-BASED SEPARATOR CONCEPT

The development of the tank-based separator concept began in the mid 1980's when Brown and Caldwell was conducting several refinery wastewater treatment plant upgrades across the United States. At one facility in California, we replaced an in-ground stormwater surge basin with large storage tanks. The hilly terrain, local weather patterns, and regulatory requirements to contain a 25-year, 24-hour rainfall event necessitated approximately 18.5 million gallons of stormwater storage capacity. A large pumping system was also designed to send dry-weather process flows to the wastewater treatment plant and excess storm flows to the storage tanks. Retained stormwater would be sent to the API separator at a controlled rate when the storm event passed.

After the stormwater tanks were commissioned, Brown and Caldwell continued to provide consulting services to this refinery on operational and regulatory compliance issues such as benzene NESHAPS. When computing the total annual benzene content of various waste streams in 1990, we discovered that slop oil quantities from the API separator were significantly lower than historical values for this facility. Upon further review and inquiry, it was determined that the treatment plant operators were routing the entire process wastewater flow (both dry weather and wet weather) through the stormwater tanks. Free oil was separating and accumulating in the storage tanks, with the result that the downstream API separator and DAF unit were receiving much lower oil loadings.

The operation of the stormwater surge tanks at this California facility was then considered in light of other refinery wastewater treatment projects we were undertaking at the same time. Brown and Caldwell began to propose to our clients the possibility of consolidating in a single process vessel the function of primary and most probably secondary oil/water/solids separation with surge control and equalization. Total Petroleum, Inc. agreed to try this significant change to refinery wastewater treatment process design at two facilities then undergoing major upgrades. While we were confident that the tank-based separator system could produce an acceptable biotreatment feed without an IAF or DAF, space was also provided at each of these plants for a future fine oil removal system if necessary. The actual performance of these tank-based separators has been excellent, eliminating any further consideration of secondary oil removal units and persuading other refinery clients that these systems offer significant improvements over conventional wastewater treatment approaches.

Design and operational details for tank-based separators differ according to the needs and preferences of individual refineries. Nevertheless, general separator design concepts have beome established over the last several years and are illustrated in Figure 1. The separator consists of an above-ground circular steel tank equipped with a double mechanical seal floating roof, oil skimmer attached to the floating roof, and a flexible hose for draining recovered oil. A sump is provided in the tank floor for periodic sludge removal. Quiescent conditions in the tank enable free oil to separate and form a floating layer while solids settle to the bottom as sludge. The separator may be operated as either a fixed or variable volume tank, depending on whether flow equalization ahead of the biological treatment system is a process objective.

Design considerations include the following:

- ž Hydraulic residence time. The working volume of the tank should provide a minimum hydraulic residence time of 8-12 hours for optimum oil removal. The actual residence time in tanks designed by Brown and Caldwell has been on the order of 10-30 hours to allow for simultaneous oil/water separation and concentration equalization.

- ž Surface overflow rate. Surface overflow rates for the tank-based separators designed by Brown and Caldwell have been in the range of 0.1-0.5 gpm/ft^2, based on horizontal surface area. A design maximum overflow rate has not been established for tank-based separators of the type discussed in this paper. The overflow rates for the units installed to date are approximately an order of magnitude below comparable values for conventional API separators.

- ž Depth of floating oil layer. The floating oil layer should be maintained well below the skimmer inlet to minimize water carryover into the recovered oil system. A minimum oil depth of two feet has been recommended on tanks designed by Brown and Caldwell.

- ž Acid addition. Gravity separation of oil and water is optimum at slightly acidic conditions (approximately pH 6.0-6.5). Acid destabilizes oily emulsions, resulting in a more easily separable free oil. As refinery process wastewater is usually alkaline, provision should be made for sulfuric acid addition to the separator influent. It may also be necessary to add caustic to raise the separator effluent back to about pH 7 prior to biological treatment. Spent caustic may be suitable at some refineries for this neutralization step.

  We generally recommend acid addition in proportion to wastewater flow rate, a strategy which requires that the akalinity of the waste stream be reasonably constant. The alternative, an on-line pH monitoring and control system, does not function well in this application because the free oil in refinery process wastewater tends to foul commercially-available pH probes.

- ž Safety. In day to day operation, the tank-based separators raise no safety concerns which are unusual in a refinery environment. Nevertheless, wastewater treatment plant operators must be aware of the potential for accumulation of explosive vapors under the floating roof covers and plan oil skimming and maintenance activities accordingly.

These types of oil/water separation tanks must comply with the design requirements of the New Source Performance Standards (NSPS) for refinery wastewater treatment systems promulgated at 40 CFR 60.690-699. In locations subject to extreme cold weather, fixed external roofs are recommended with an internal floating roof (as shown in Figure 1). Manways must be provided in the fixed and floating roofs and along the side walls for maintenance access. Depending on climate, the designer should also consider insulating the tank to conserve process heat ahead of the biological treatment unit.

REFINERY CASE HISTORIES

Refinery A

Refinery A is a 45,000 bpd facility located in the Midwest. Two above-ground oil/water separation tanks were installed to replace an existing API separator and IAF as part of a general wastewater treatment plant upgrade completed in September 1994. The tanks provide flow and concentration equalization while removing free oil and solids ahead of two new bioreactors.

Each tank was designed with a working volume of approximately 750,000 gallons, equivalent to a hydraulic retention time of 19 hours at the design flow rate. The design maximum surface overflow rate of each tank is 0.16 gpm/ft^2. The tanks are insulated and equipped with internal floating roofs to comply with Subpart QQQ requirements.

The system operates with only one tank normally in service. The on-line tank is maintained at a high level, with treated wastewater flowing by gravity to the downstream bioreactors. The other tank, which is normally maintained at a low level, serves as a standby to collect excess stormwater and process upsets. Wastewater collected in the standby tank is transferred back to the on-line tank at a controlled rate via a pump. The dual tank arrangement also allows the refinery to continue wastewater processing when one tank is taken out of service for maintenance or sludge removal.

Oil is pumped to the slop oil system weekly on a batch basis. The free oil layer in the on-line separator tank is skimmed to a cut-off point of about 10 percent water. No analytical data is available on the quality of the recovered oil. Refinery A is very satisfied with the mechanical operation of the skimmer system.

The design sludge accumulation rate for the on-line tank was 2 feet per year. Actual sludge accumulation of approximately 3 feet was recorded during the first year of operation, and sludge has been removed once. Sludge removal was accomplished by first taking the tank out of service and draining the free oil and water layers. The bottom sludge layer was then removed to the extent possible using a pump connected to the sludge sump on the tank floor. Once the liquid level in the tank dropped below the access manways, maintenance workers were able to move the residual sludge to the floor sump using hoses.

Table 1 presents design targets and operating data for the tank-based separators at Refinery A. Data for the former API separator and IAF are provided for comparison. The results show that the new separator tanks have produced an effluent which is equivalent to or slightly better than the discharge from the former treatment units. Concentrations of oil/grease and total suspended solids (TSS) are acceptable for the downstream bioreactors, which consist of two parallel aeration tanks operated without biosolids recycle. In addition, removal of the IAF unit from the wastewater treatment train has eliminated management of IAF float as an operating concern.

As originally designed and operated, the wastewater treatment upgrade at Refinery A included sulfuric acid addition to the separator tank influent. Acid was added proportionally to the wastewater flow rate to achieve approximately pH 6 in the on-line tank. Spent caustic was used to neutralize the separator tank effluent prior to the bioreactors. Acid addition was discontinued after about four months because of odor problems at the bioreactor tanks. The odors were traced to the spent caustic in the wastewater. There has been no noticeable deterioration of separator tank effluent quality since acid addition ceased. Nevertheless, Refinery A plans to resume adding sulfuric acid to the separator tank influent once in-plant process modifications are completed to reduce sulfide and mercaptan levels in the spent caustic stream fed to the bioreactors.

Refinery B

Refinery B has a rated crude capacity of 45,000 bpd and is located in the West. Two above-ground oil/water separation tanks have been in service since March 1993 to treat process wastewater upstream of an existing IAF unit. RBCs provide biological treatment downstream of the IAF. The tanks were initially installed as part of a project to bring the refinery into compliance with NSPS and benzene NESHAPS requirements and have since replaced the existing API separator.

The separator tanks at Refinery B each have a working capacity of approximately 1.05 million gallons. The system is designed to operate with one tank in service and one on standby to manage excess flow and process upsets. The on-line tank provides a hydraulic retention time of 11.5 hours at the design flow rate of 1,500 gpm. The design surface overflow rate is 0.38 gpm/ft^2 at the design maximum flow. Actual wastewater flow rates have averaged about half the design flow.

The tanks are equipped with external floating roofs, with the oil skimmers attached to the roofs. Roof seals have not been replaced since start-up. Side-mounted mixers have been provided near the bottom of the tanks. The tanks are not insulated, and there is no capability to add sulfuric acid to the influent wastewater, which is typically in the range of pH 7.5-8.0. On the basis of operating experience, Refinery B has determined that addition of a chemical demulsifier to the separator influent significantly improves oil/grease removal.

For the February-September 1995 operating period, the average effluent oil/grease concentration for the on-line separator tank was 79 mg/L; the median oil/grease concentration was 50 mg/L. The average flow was 793 gpm.

Recovered oil is removed from the on-line separator tank weekly. Refinery B operates the oil skimmer to maintain a minimum free oil thickness of three feet in the tank. No BS&W measurements are available for the recovered oil. However, refinery staff report that oil collected from the separator tanks contains much less water than recovered oil from the former API separator. As a result, operating problems in the slop oil system have decreased since start-up of the separator tanks.

Liquid sludge accumulation in the on-line tank is estimated at 8 feet per year. Refinery B reports no unusual problems in removing bottom sludge, which separates as a pumpable liquid with high water content. Sludge removal has been accomplished by taking the on-line tank out of service, draining the free oil and free water layers, suspending the sludge layer with the mechanical mixer, and pumping the sludge from the tank through a floor drain. The only sludge removal event completed to date at Refinery B took one separator tank out of wastewater service for approximately 6 weeks.

Refinery C

Refinery C is a 68,000 bpd facility located in the Southwest. Two above-ground oil/water separation tanks were installed to replace and existing API separator and IAF during a wastewater treatment plant upgrade completed in August 1994. The tanks remove free oil and solids while equalizing process wastewater ahead of two new bioreactors operated without biosolids recycle. Stormwater and process wastewater are segregated at this refinery.

The separator tanks at Refinery C are each designed with a maximum working capacity of 720,000 gallons. Both tanks are on-line and operated in parallel, an arrangement which is possible because the separators do not have to accommodate stormwater surges. The hydraulic retention time for both tanks at the design flow rate is 29 hours. The design maximum surface overflow rate is 0.13 gpm/ft^2. Average process wastewater flow rates are slightly less than half the design maximum.

The tanks are equipped with external floating roofs, with oil skimmers attached to the roofs. Oil is drained by gravity on a daily basis to the recovered oil system. The quality of the recovered oil is very good, typically less than 0.1% BS&W. Since the separator tanks have come on line, Refinery B has been able to return this recovered oil directly to the crude unit, bypassing slop oil treatment. According to plant staff, this was not possible with the recovered oil skimmings from the former API separator.

For the period August 1994-August 1995, the average effluent oil/grease concentration for the separator tanks at Refinery C was 42 mg/L. The average flow rate was 358 gpm.

Refinery C continuously injects spent sulfuric acid from boiler feedwater treatment into the separator tank influent. Caustic is also added as necessary to maintain the separators within the operating target of pH 6.5-7.5. Additional caustic is added to the separator tank effluent as needed to adjust process wastewater pH prior to the bioreactors.

Sludge accumulation in each tank is estimated at about 5 feet per year. To date, sludge has not been removed from either tank Based on sampling and visual observations, the bottom sludge appears to bean easily pumpable liquid. Initial plans at Refinery C call for the separator tanks to remain on line during the first sludge removal event, which is scheduled for 1996.

SUMMARY AND CONCLUSIONS

Design and operating data for the three case histories presented in this paper are summarized in Table 2. These results, along with the supporting information discussed above, clearly show that above-ground oil/water separation tanks are a viable and proven alternative to conventional API separators for refinery wastewater service. By achieving the objectives of surge control, influent equalization, and oil/water/solids separation in a single process vessel, this design concept offers refiners the opportunity to meet their wastewater treatment objectives at lower capital and operating cost than would be expected from conventional process designs.

Table 1.

Performance of Oil/Water Separation Facilities at Refinery A

Unit	Flow (gal/min.)	Average Effluent Oil & Grease (mg/L)	Average Effluent TSS (mg/L)
Former Treatment System[a]			
API Separator	521	300	350
IAF	421	80	110
New Separator Tanks			
Design	645	45	96
Actual[b]	420	70	83

[a] January 1991 - March 1992
[b] September 1994 - August 1995

Table 2.

Summary of Design Criteria and Performance Data for Above-Ground Oil/Water Separation Tanks

Refinery	Overflow Rate gpm/ft^2	Retention Time (hrs.)	Average Effluent Oil/Grease (mg/L)
A	0.16[a]	19[a]	70
B	0.38[a]	11.5[a]	50[c]
C	0.13[b]	29[b]	42

[a] Calculated with one tank on line at design flow rate
[b] Calculated with two tanks on line at design flow rate
[c] Median value

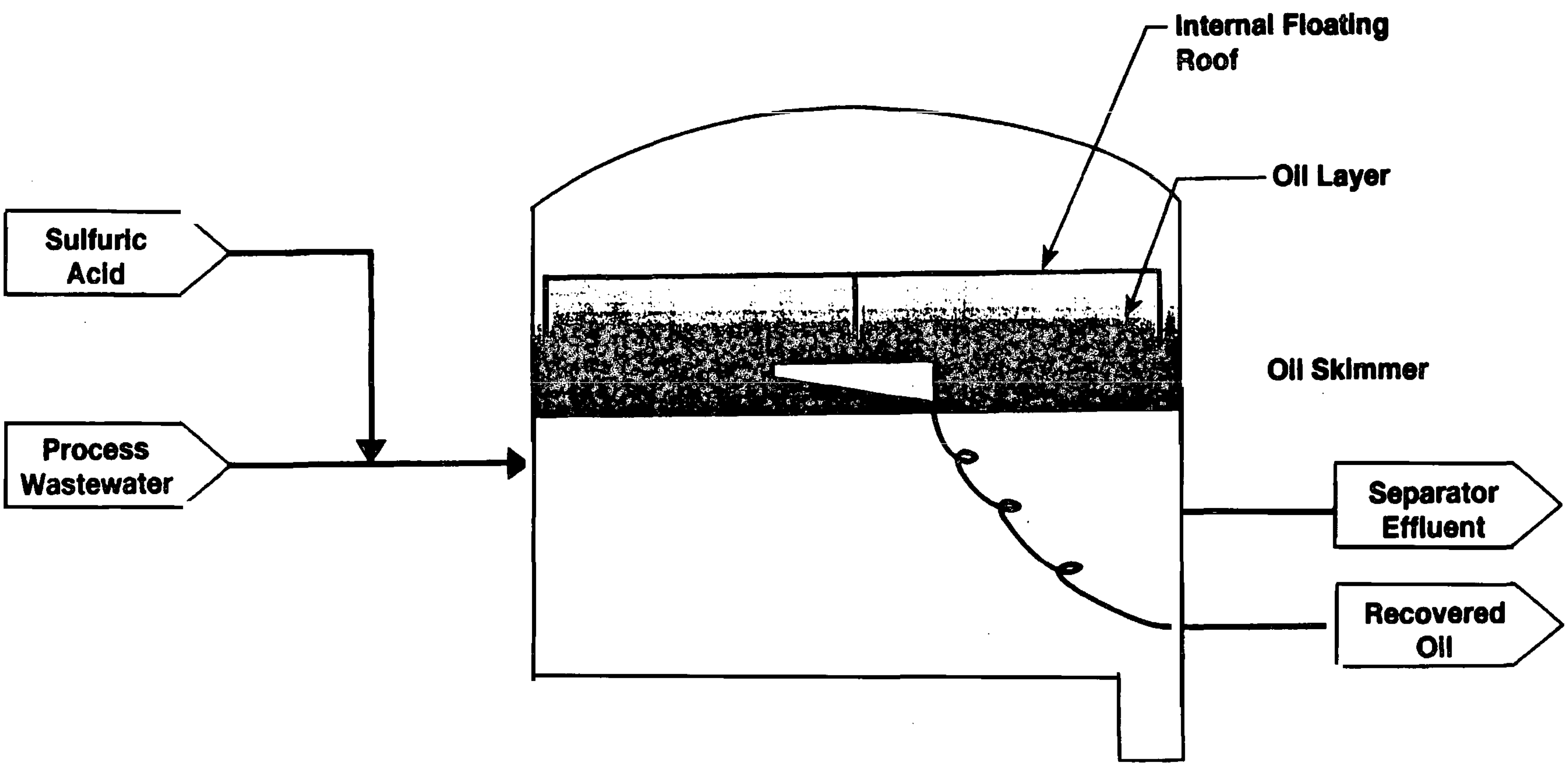


Figure 1
Tank-Based Oil/Water Separator

ENV-95-161

9222-01

ATTACHMENT E: MEMBRANE BIOREACTOR PILOT STUDY

Membrane Bioreactor Study
May – August 2008

Prepared by

Gaurav Rajen, Environmental Engineer

Reviewed by

Ed Riege, Environmental Manager

1.0 Introduction

This report describes the findings of a wastewater treatability study conducted at the Gallup Refinery of Western Refining using a small-scale membrane bioreactor (MBR) system leased from GE Water and Process Technologies.[1]

Figure 1 presents a schematic of the system, and Figures 2 and 3 present photographs of some key components.

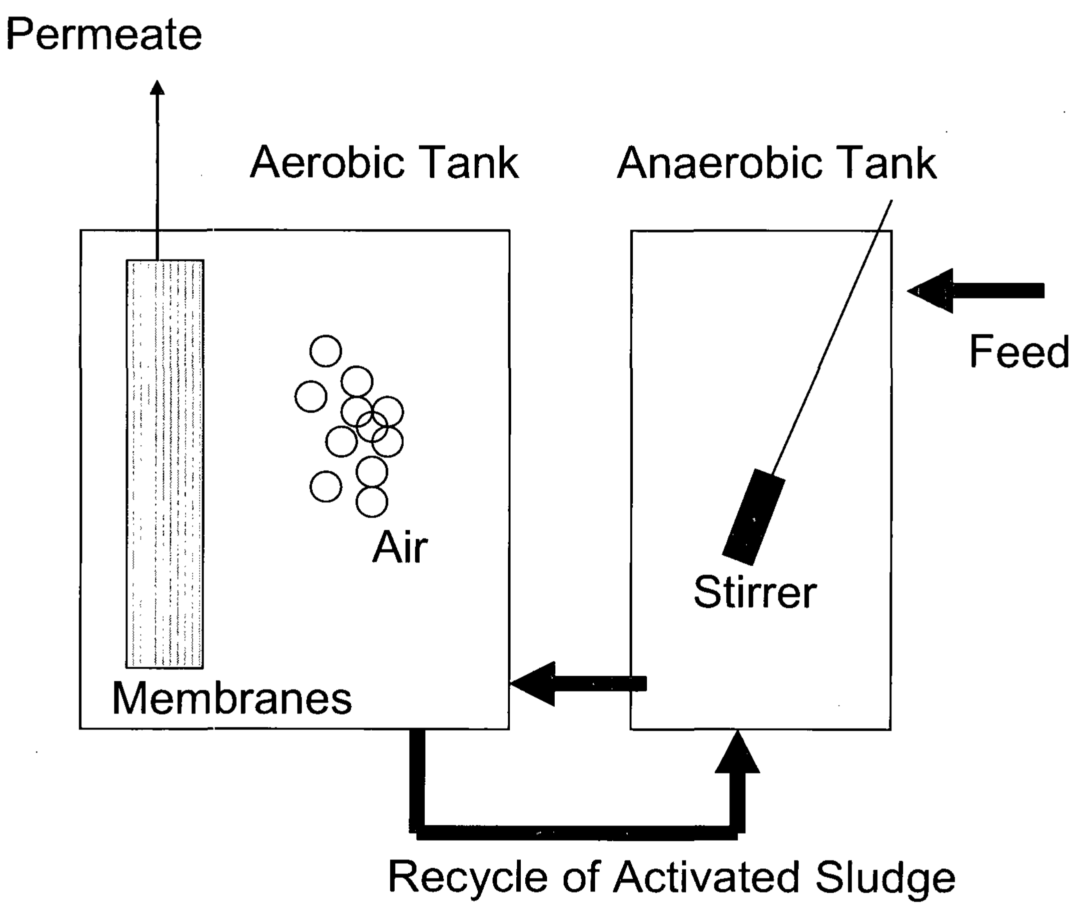


Figure 1: Schematic of Small-scale Membrane Bioreactor System

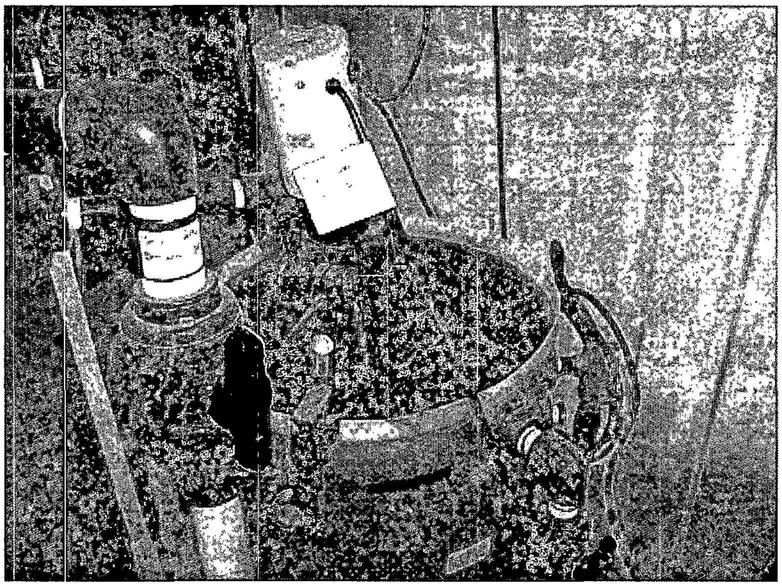


Figure 2: Photograph of the Anaerobic Tank

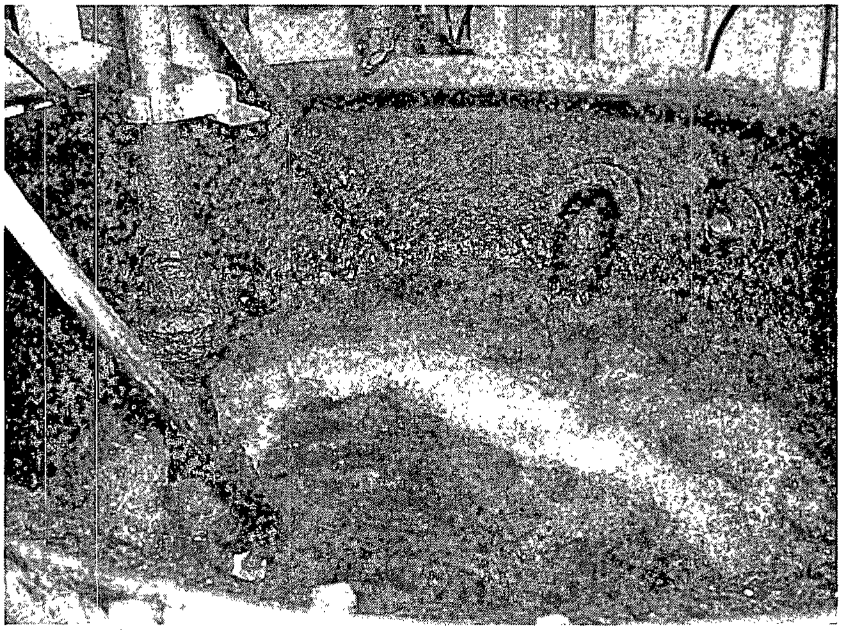


Figure 3: Photograph of the Aerobic Tank with Submerged Membrane Filters (lower left of picture)

2.0 Operational Procedures

Wastewater from the refinery was collected from the existing aeration lagoon system at the influent pipes. This wastewater was a mixture of the industrial wastewater generated within the refinery, as well as sanitary effluent received from the Pilot Travel Center. Periodic samples of this feed were taken. The feed was collected in three large tanks, and measured amounts of phosphates and other balancing chemicals were added. This feed was then pumped into an anaerobic tank in which it was continually stirred. From the anaerobic tank, the wastewater entered an aerobic tank which had a continuous supply of air pumped into it. We also twice added approximately 5 gallons of sludge from the City of Gallup's wastewater treatment plant to this tank. The wastewater then was filtered through a set of membrane filters that were hanging in the aerobic tank, and permeate was collected for further testing. These membranes had the capability to send a back-pulse of air that kept them free of clogging.

3.0 Data and Measurements

Various operational parameters were measured during the study. Among these were pressures and flow rates before and after the back-pulse, pH and temperatures in the various tanks, Dissolved Oxygen levels in the anaerobic and aerobic tanks, and the Dissolved Oxygen Uptake Rate in the aerobic tank. Table 1 presents the maximum and minimum values for some of these parameters.

Feed and permeate samples were collected and sent to an environmental laboratory for testing, and at various times aerobic tank liquids were also sampled. Table 2 presents some of these analytical data. All of the analytical data collected will be included in our 2008 Annual Groundwater Report which has a section on all water quality monitoring activities conducted at the Gallup Refinery of Western Refining.

Table 1: Representative Set of Operational and Other Parameters Measured During the Study

	Feed pH	Permeate pH	Dissolved Oxygen Uptake Rate	Dissolved Oxygen Anaerobic Tank	Dissolved Oxygen Aerobic tank	Temperature Anaerobic tank
			(mg/L.hour)	(mg/L)	(mg/L)	(°C)
Maximum	8.52	8.55	69	10.6	12.63	29.8
Minimum	5.73	6.5	30	0.19	0.76	5

Table 2: Representative Set of Sampling Data (all units in mg/L unless noted otherwise)

Type of sample	Oil and Grease	Total Phenolics	Ammonia	Total Dissolved Solids	Turbidity (NTU)	Chemical Oxygen Demand	Biochemical Oxygen Demand
Feed	690	17000	600	3200	2300	3440	1288
Permeate	1.2	290	480	3800	Non-detect	1720	765

Oil and Grease and Phenolics were dramatically reduced as is clear in Table 2. However, Ammonia levels did not drop considerably. Figure 4 depicts a graph comparing Ammonia levels in the Feed and the Permeate. Figure 5 depicts reductions in Chemical Oxygen Demand; and Figure 6 depicts reductions in Biochemical Oxygen Demand. These measures of water quality were markedly improved.

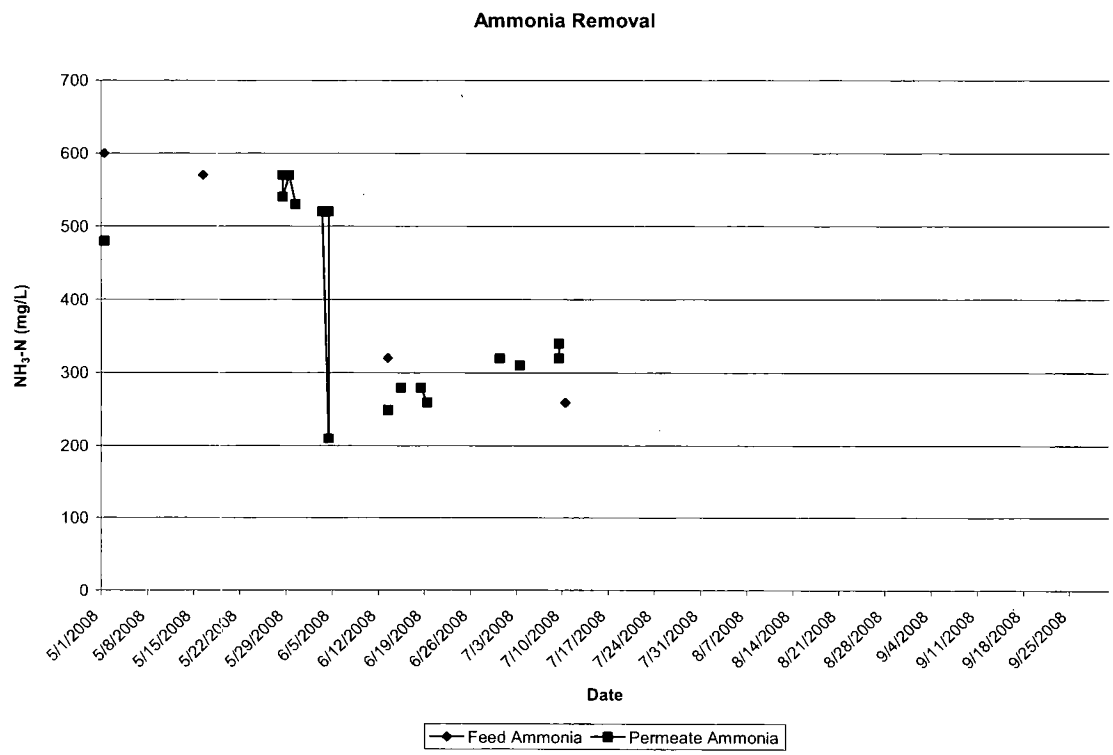


Figure 4: Graph of Ammonia Levels in the Feed and Permeate

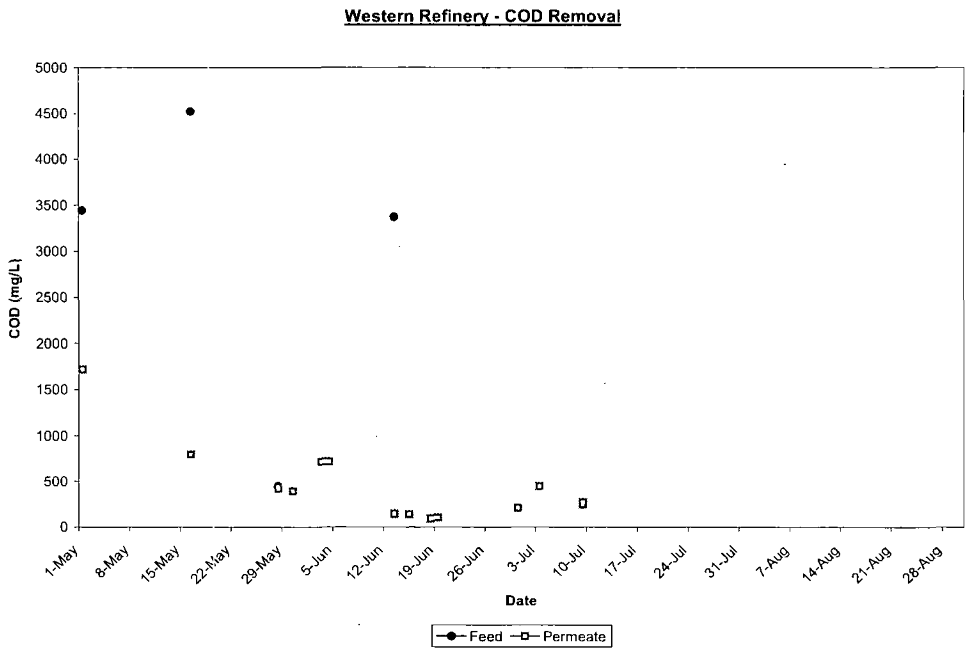


Figure 5: Graph of Chemical Oxygen Demand Levels in the Feed and Permeate

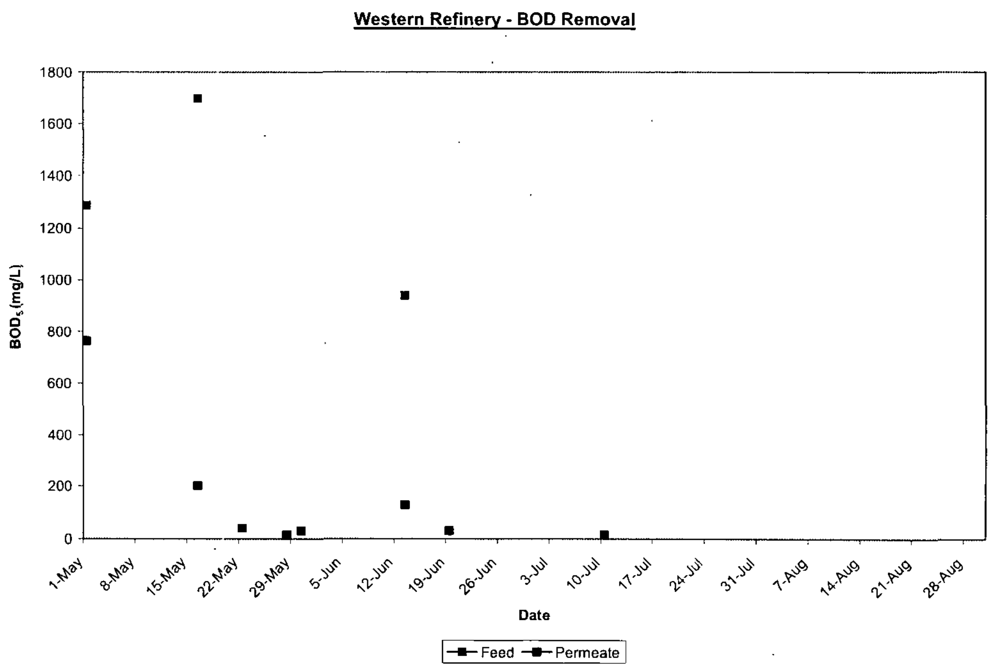


Figure 6: Graph of Biochemical Oxygen Demand Levels in the Feed and Permeate

4.0 Conclusions

The results of the MBR study did not favor proceeding forward with a larger scale system. What became readily apparent through the course of the study was that the refinery wastewater would need to undergo second-stage oil-water separation for the bioreactor to be effective. Currently the refinery wastewater only undergoes primary gravity-based oil-water separation in an API Separator.

There was a fear of the membrane filtration system being clogged by the oil in the refinery wastewater. This fear was expressed by GE representatives when we suggested spiking the feed with oil. We also had at various times the bacteria in the anaerobic and aerobic tanks suffer a loss of productivity – this was from a die-off caused by system malfunctions, such as clogged switches, failed pumps, ruptured tubing, all of which could be traced to the levels of oil and grease and other solids in the wastewater that the MBR system was not optimized to treat..

We realized that the MBR system would probably be most effective in a non-refinery setting. To make it effective for our applications, we would need more oil-water separation, better screening and pre-filtration to protect the membranes.

We also found from a survey of the refining industry that MBRs are not in use at refineries to treat wastewater, but are in some use at refineries for treating process water. A recent survey of new technologies for refinery wastewater by a Task Force made up of Purdue University's Calumet Water Institute and Argonne National Laboratory[2] reached these conclusions regarding MBRs in a refinery setting -

"The effectiveness, small footprint, and high effluent quality of MBR technologies are counterbalanced by higher costs, higher energy use, waste generation, and still unresolved fouling issues that may provide inconsistent performance and reliability. Although their use in treating refinery wastewater is currently limited, significant interest in MBR technologies is growing in the refinery sector because they promise to achieve advanced effluent quality for ammonia, TSS, and many other effluent parameters. This interest reflects the significant growth and increasing efficiency of MBRs worldwide. More testing of these technologies will be needed to understand and optimize their performance under specific loading rates, their energy lifecycle inputs, their overall cost-effectiveness in real application scenarios, and the generation of secondary waste. Just as importantly, more testing will be needed to understand their ability to provide integrated treatment by removing other refinery pollutants and heavy metals at the required levels."

[1] http://www.gewater.com/index.jsp

[2] http://www.calumet.purdue.edu/pwi/emergtech/Phase%20I%20Final%20Report_10202008.pdf

ATTACHMENT F: AGGRESSIVE BIOLOGICAL TREATMENT CALCULATIONS

Residence Time for Bioreactors

Tank Dimensions

Number, n $n := 2$

Diameter, d $d := 75 \cdot ft$

Liquid Height, h_{liq} $h_{liq} := 21 \cdot ft$

Surface Area, sa

$$sa := \pi \left(\frac{d}{2}\right)^2$$

$$sa = 4418\,ft^2$$

Liquid Volume per tank, vol_{tank} $vol_{liq.tank} := sa \cdot h_{liq}$

$$vol_{liq.tank} = 694006\,gal$$

Total Liquid Volume, vol $vol_{liq} := vol_{liq.tank} \cdot n$

$$vol_{liq} = 1388013\,gal$$

Flow Conditions

Average Flow, Total, q_{avg} $q_{avg} := 413 \cdot gpm$

Peak Flow, Total, q_{peak} $q_{peak} := 644 \cdot gpm$

Average Flow, per tank, $q_{avg.tank}$ $q_{avg.tank} := \frac{q_{avg}}{n}$

$$q_{avg.tank} = 206.5\,gpm$$

Peak Flow, per tank, $q_{peak.tank}$ $q_{peak.tank} := \frac{q_{peak}}{n}$

$$q_{peak.tank} = 322\,gpm$$

BROWN AND CALDWELL

Residence Time

Hydraulic Residence Time, Average Flow, $t_{r.avg}$ $t_{r.avg} := \frac{vol_{liq.tank}}{q_{avg.tank}}$

$t_{r.avg} = 2.3\,day$

Hydraulic Residence Time, Peak Flow, $t_{r.peak}$ $t_{r.peak} := \frac{vol_{liq.tank}}{q_{peak.tank}}$

$t_{r.peak} = 1.5\,day$

At average and peak flow conditions the residence time in the Bioreactors meets the aggressive biological treatment requirement of <5 days.

BROWN AND CALDWELL

Aeration Power Level of Bioreactors

A blower manufacturer;s selection curve (attached) shows 106 bhp required when the airflow is 1350 scfm, design airflow of blower is 1300 scfm per tank. Therefore the actual operating power per tank will be:

$$P_{operating} := \left(1300 \cdot \frac{ft^3}{min}\right) \cdot \left(\frac{106}{1350} \cdot \frac{bhp}{\frac{ft^3}{min}}\right)$$

$$P_{operating} = 102.1\,bhp$$

Number of tanks, n $\quad n := 2$

Diameter, d $\quad d := 75 \cdot ft$

Surface Area, sa

$$sa := \pi \left(\frac{d}{2}\right)^2$$

$$sa = 4418\,ft^2$$

Liquid Depth, h_{liq} $\quad h_{liq} := 21ft$

Liquid Volume, vol_{liq} $\quad vol_{liq} := sa \cdot h_{liq}$

$$vol_{liq} = 694006\,gal$$

Power Level per tank, P_t

$$P_t := \frac{P_{operating}}{vol_{liq}}$$

$$P_t = 147\,\frac{bhp}{10^6 gal}$$

The aeration power level of 147 hp per million gallons meets the aggressive biological treatment requirement of greater than 6 hp per million gallons.

KAESER OMEGA BLOWERS

OMEGA/OMEGA PLUS ROTARY BLOWERS - PACKAGE RECOMMENDATIONS -

Project: Gallup Bioreactor **Distributor: BC**

INPUT DATA:

Operating mode:	Gauge pressure		Flow medium : dry air		
Kind of package:	Standard Package		Specific heat constant κ:	1.40	
Inlet temperature :	95	°F	Specific weight at standard conditions :	0.077	lb/ ft³
Inlet pressure :	11.3	psi	Pressure difference :	10.2	psig
			Discharge pressure :	21.5	psi

ATTENTION:Is the place of installation above of 3300 ft. Please ensure that the motor is sufficiently cooled!

Technical data:

NOTE: ACCESSORIES SHOWN ARE INTENDED FOR AIR USE ONLY.

Package:	**FB 790P**		Blower speed:	2600 rpm
Motor power:	125.0	hp	Connection DN:	10"
Operating voltage:	460V/ 60Hz		% of maximum speed:	76

Accessories:

		yes	no		yes	no
Relief valve:	2x 2 1/2"	☐	☐	Maintenance indicator mounted in s. enclosure:	☐	☐
Unloaded start up valve:	60/S	☐	☐	Inlet silencer-suction out of room:	☐	☐
Check plate:	10"	☐	☐	Inlet silencer-suction out of pipe:	☐	☐
Temperature gauge:		☐	☐	Sound enclosure-suction out of room:	☐	☐
Temperature gauge with switch point:		☐	☐	Sound enclosure-suction out of pipe:	☐	☐
Pressure gauge:		☐	☐	Spool piece for relief valve:	☐	☐
				Spool piece for RV and unloaded start up valve:	☐	☐

Performance data:	**max. load**		**design point**	
Pressure difference Δp:	12.0	psig	10.2	psig
Inlet flow Q1:	1829	icfm	1857	icfm
Q1 Standard* : Standard conditions 14.7 psia, 68°F and 36% RH			1350	scfm
Discharge temp.*:	298	°F	264	°F
Motor shaft power with belt losses + dirty filter*:	132.9	hp	114.9	hp
Blower shaft power*:			106.0	bhp

Sound pressure level** : without 96 dB(A) with enclosure 78 dB(A)

*** Performance data to DIN ISO 1217, part 1, annex C**
The pressure difference at max. load corresponds to relief valve setting!
**** Measured to PN 8 NTC 2.3, 1 meter distance, free field measurement with sound isolated pipework.**
Minimum input power required includes additional dirty filter losses of approx. 40 mbar.
Motor shaft power includes belt losses!
Attention OMEGA 23, 43 and 63 model blowers can be run over 12 psig, but requires factory APPROVAL, a limited warranty may apply.

V 7.0 AD VERSION 03/20/02

Chavez, Carl J, EMNRD

From: Monzeglio, Hope, NMENV
Sent: Friday, June 19, 2009 9:30 AM
To: Chavez, Carl J, EMNRD
Cc: Cobrain, Dave, NMENV
Subject: Gallup
Attachments: GRCC-09-002 NOD WWT upgrade 4_09.pdf

Carl

Brad mentioned you are still covering the refinery stuff. (?) Just a heads up, I have started to review Gallup's Process Design Report for Wastewater Treatment Plan Upgrade, dated May 26, 2009. This is the revised report that addressed our comments in the April 15, 2009 Notice of Disapproval letter (see attached). When I have my comments completed, I will email them to you for review to make sure OCD is in agreement and see if you have anything to add. I am trying to keep this process of the new WWTS moving. Let me know if you have questions.

Thanks
Hope

Hope Monzeglio
Environmental Specialist
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, BLDG 1
Santa Fe NM 87505
Phone: (505) 476-6045; Main No.: (505)-476-6000
Fax: (505)-476-6060
hope.monzeglio@state.nm.us

Websites:
New Mexico Environment Department
Hazardous Waste Bureau

NEW MEXICO
ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

BILL RICHARDSON
Governor

DIANE DENISH
Lieutenant Governor

2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Phone (505) 476-6000 Fax (505) 476-6030
www.nmenv.state.nm.us

RON CURRY
Secretary

JON GOLDSTEIN
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

April 15, 2009

Mr. Ed Riege
Environmental Superintendent
Western Refining, Southwest Inc., Gallup Refinery
Route 3, Box 7
Gallup, New Mexico 87301

RE: NOTICE OF DISAPPROVAL
PROCESS DESIGN REPORT FOR WASTEWATER TREATMENT PLANT UPGRADE
WESTERN REFINING COMPANY, SOUTHWEST, INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-GRCC-09-002

Dear Mr. Riege:

The New Mexico Environment Department (NMED) and the New Mexico Energy Minerals, and Natural Resource Department, Oil Conservation Division (OCD) have completed their review of the *Process Design Report For Wastewater Treatment Plan Upgrade* (Report), dated February 26, 2009, submitted on behalf of Western Refining Company, Southwest Inc., Gallup Refinery (the Permittee). The Permittee must provide additional information before NMED and OCD can complete their technical review and hereby issues this Notice of Disapproval (NOD) and provides comments below. Comments 5 through 10 are not directly related to the system design but are part of the wastewater treatment plan upgrade. The Permittee may choose to address these comments in an appendix of the revised Report.

Comment 1

In Section 3.3 (Biological Treatment), the Permittee states "[t]he biological treatment technology selected for [Wastewater Treatment Plant] WWTP upgrade project was a Bioreactor without sludge (biomass) recycle. This technology is akin to an aerated lagoon, but in an above-ground steel tank."

The Permittee currently does not have a National Pollutant Discharge Elimination System (NPDES) Permit. Therefore, the wastewater treatment system (WWTS) upgrade is subject to the Resource Conservation Recovery Act (RCRA) and the New Mexico Hazardous Waste Act (HWA). The bioreactors, tank-based separator, and any future tanks must comply with 20.4.1.500, incorporating 40 CFR 264 Subpart J. The Permittee must revise the Report to show that the tanks comply with the Subpart J design requirements. The Permittee must revise the text and attachments as necessary.

Comment 2

In Section 3.3 (Biological Treatment), page 3-3, the Permittee states "[t]he shutdown of Benzene Stripper No. 3 will increase the benzene loading in the NAPIS effluent above current levels. In the detailed engineering phase, Brown and Caldwell will evaluate the impact of this change on the design conditions and evaluate whether or not MBBR media addition to the Bioreactors will be required as a result."

The Permittee must revise the Report to include all changes to the WWTS to account for the increased benzene load resulting from the removal of Benzene Stripper 3.

Comment 3

In Section 4.5 (Secondary Containment and Leak Detection), page 4-5, the Permittee states "[t]he proposed design does not include leak detection or containment berms for the Bioreactors (T11 and T12)....However, the Bioreactors will be situated such that a potential leak would flow into EP-1, which is the destination of the Bioreactor effluent."

If the system has a leak, the discharge may not be completely treated and therefore may potentially be characteristic for benzene and/or be a F037/F038 listed waste, which would then enter EP-1. Hazardous waste must not be discharged to EP-1 since it is not permitted by NMED to received hazardous waste and requirements in the OCD Discharge Plan. Because the Permittee does not have a NPDES Permit for the wastewater treatment system, the tank systems within the WWTS are subject to the requirements of 20.4.1.500 NMAC, incorporating 40 CFR 264 Subpart J. The Permittee must revise this Report to reflect compliance with the requirements of 40 CFR 264 Subpart J and revise the attachments as applicable. The Permittee must also revise the Report to comply with Condition 9 (Above Ground Tanks) of the OCD Discharge Permit (GW-32), dated August 23, 2007. The WWTS cannot be retrofitted and does not qualify for the exemption (tanks that contain fresh water or fluids that are gases at atmospheric temperature and pressure are exempt) under Condition 9 of the OCD Permit.

Comment 4

The Permittee must revise the Report to include the following modifications:

a. The WWTS must contain influent and effluent sampling ports to accommodate sampling at the new API separator, the tank based separator, and the bioreactors.

b. The WWTS must include air vents for the Tank Based Separator and the Bioreactors. These locations must be constructed to allow for emissions sampling.

The text and attachments must be revised as necessary to address items a and b above.

Do they have clean ✓ permits from NMED?

Comment 5

In Section 2.2 (Refinery Wastewaters), page 2-1, the Permittee states "[t]h
generated at the Refinery and the seven adjacent homes owned by th
discharges to septic systems and not the WWTP. However, the WWTP upg
option for these sanitary sources to be redirected to the WWTP at a fu
Refining's discretion."

If and when the sanitary sources are redirected to the WWTS, the Permittee must notify the OCD and the Gallup Field Office (http://www.nmenv.state.nm.us/NMED/field_op.html) prior to implementing this change over and comply with all requirements. No revision is necessary.

Comment 6

In Section 3.3 (Biological Treatment), page 3-3, the Permittee states "[b]iomass will exit the Bioreactors by being carried out in the Bioreactor effluent. The biomass will settle out in the downstream evaporation ponds, primarily [Evaporation Pond] EP-1. Over time, the settled biomass may accumulate in EP-1 to the extent that dredging will be required."

The Permittee has allowed upsets with the current wastewater treatment system resulting in hazardous waste being discharged to EP-1. Therefore the following requirements apply and the Permittee must revise the Report to address these requirements.

a. Within 30 days of demonstration that the new wastewater treatment system is achieving cleanup criteria, the Permittee must dredge EP-1. The dredged material must be properly characterized and managed for proper disposal. All dredging and waste disposal activities must be approved by both NMED and OCD prior to implementation. The Report must be revised to describe the dredging process, alternatively, the Permittee may submit a separate work plan to NMED and OCD for approval that addresses the dredging activities.

b. After the initial dredging of EP-1, the Permittee must dredge the biomass from EP-1 anytime the biomass accumulation is greater than one foot. The dredged biomass must be properly characterized as nonhazardous if considered for placement in the OCD landfarm to assist the remediation of contamination soils, pending OCD approval. NMED must be included on all correspondence.

Comment 7

In Section 4.2.1 (Stormwater/Diversion tanks), page 4-1, the Permittee states "[i]n the new system, stormwater will flow by gravity to two Stormwater/Diversion Tanks. These tanks are existing with a numerical designation of Z84-T27 and T-28....Stormwater that collects in the tanks will be pumped at a rate of 50 to 200 gpm to the process sewer that feeds to the NAPIS."

Since the stormwater and process wastewater at the refinery comingle, any sludge removed from the bottom of the Stormwater/Diversion tanks must be managed as hazardous waste.

Comment 8

In Section 4.2.1 (Stormwater/Diversion tanks), page 4-1, the Permittee states "[c]leanouts will be installed on the conveyance pipelines to and from the Stormwater/Diversion Tanks. Cleaning events will be scheduled on a regular, recurring basis."

Any sludge removed during the cleanouts of the pipelines must be managed as hazardous waste. The Permittee must revise the Report to address the management of this sludge.

Comment 9

In Section 4.2.5 (Bioreactors), page 4-3 and 4-4 the Permittee states "[t]here will be provisions for diverting the Bioreactor effluent away from EP-1 in the event that the treated water quality is not acceptable. A diversion line will be connected to the combined Bioreactor effluent, with its valve normally closed. To divert, this valve would be opened and the valve to EP-1 closed" and the Permittee later states in Section 4.4 (Management of Off-Spec Wastewater), page 4-5, that "[i]f at anytime the Bioreactor effluent were deemed unsuitable for discharge to EP-1, it could be diverted to the new Stormwater/Diversion Tanks as described in Section 4.2.5."

The Permittee must provide a sampling plan that explains how the Permittee will characterize the effluent from the bioreactors entering EP-1. The sampling plan must identify the location of samples that will be collected and address sampling frequency, water quality parameters, and test methods. The effluent must comply with the Water Quality Control Commission standards found in 20.6.2.3103.

Comment 10
In Section 4.3.3 (OAPIS), page 4-5, the Permittee states "the [Old API Separator] OAPIS will no longer be required and can be decommissioned."

The OAPIS is Solid Waste Management Unit (SWMU) No. 14. This SWMU is subject to corrective action under the Refinery's RCRA Permit. In the response letter, the Permittee must provide a schedule for the submittal of an investigation work plan to assess releases from the OAPIS.

The Permittee must address all comments contained in this NOD. The revised Report must be submitted with a response letter that details where all revisions have been made, cross-referencing NMED's numbered comments. In addition, an electronic version of the revised Report must be submitted that identifies where all changes made in red-line strikeout format. The Permittee must submit the revised Report to NMED, OCD, and EPA on or before May 30, 2009.

If you have questions regarding this letter please contact Hope Monzeglio of my staff at 505-476-6045.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, NMED HWB
D. Cobrain NMED HWB
H. Monzeglio, NMED HWB
B. Jones, OCD
C. Chavez, OCD
G. Rajen, Gallup
J. Dougherty, EPA Region 6
File: Reading File and GRCC 2009 File
HWB-GRCC-09-002

Western Refining
GALLUP REFINERY

WNR LISTED NYSE

Certified Mail 7008 2810 0000 4726 0539

January 26, 2009

Mr. Carl Chavez
Oil Conservation Division
Environmental Bureau
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Re: OCD Discharge Permit GW-032, Permit Condition 24.A. and 24.B.

Dear Mr. Chavez:

This letter is to update you regarding OCD Permit Condition 24.A. and 24.B. Gallup is proceeding with the new Pilot Travel Center lift station/underground line design you approved in the fourth quarter of 2008. As you requested, final design drawings are included in this package. The two new four inch underground sewer lines were installed and pressure tested in December 2008 to demonstrate mechanical integrity. Future testing will follow Permit Condition 12.A. test procedure and timeline for underground wastewater lines.

The existing line is still in use but a few piping modifications will be completed by March 1 allowing the wastewater to be transferred over to one of the new lines should a problem arise with the existing line. This will assure that after March 1, 2009 there will be no bypass to the evaporation pond.

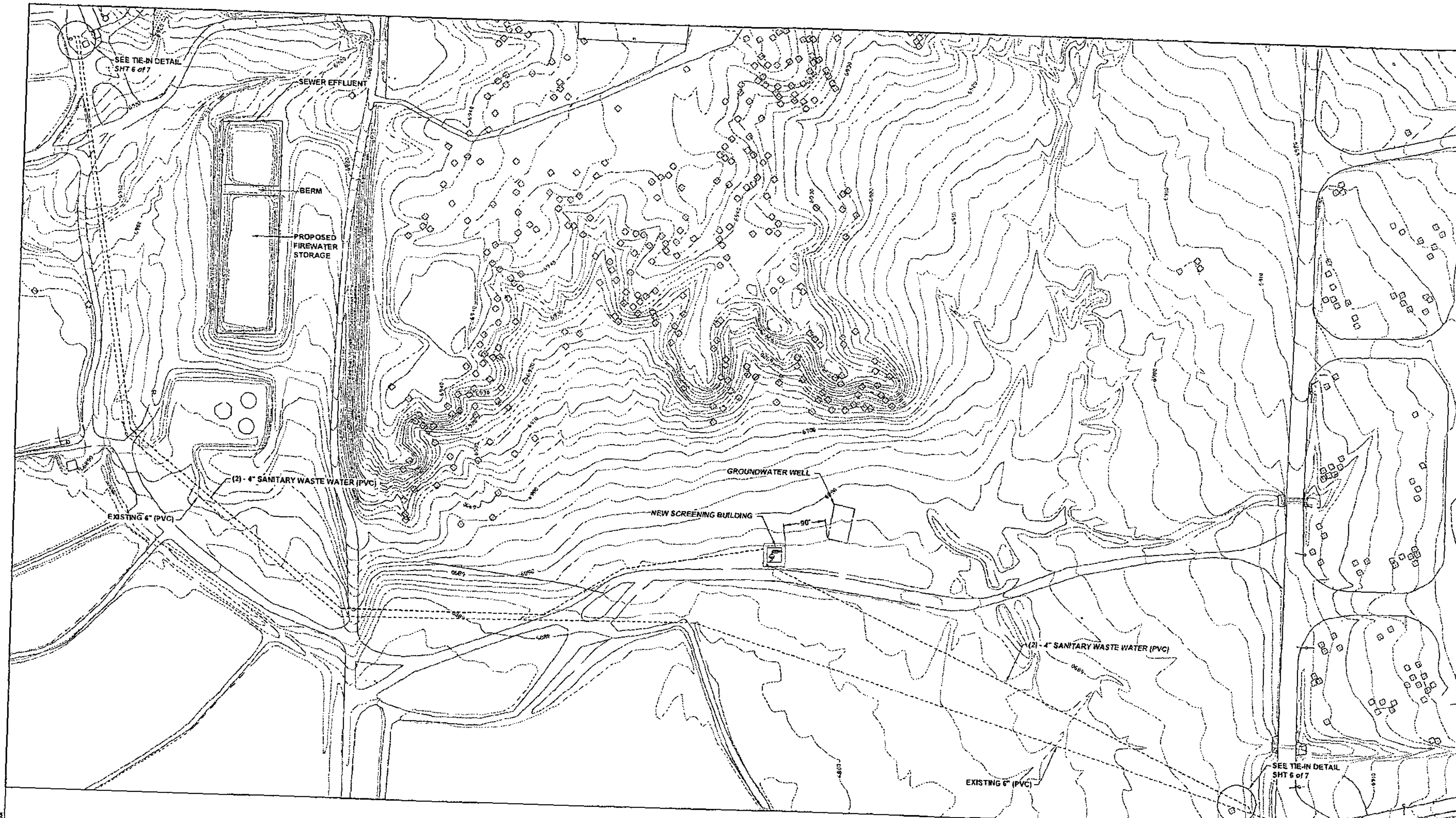
The Pilot Lift Station is progressing but there is a delay on the equipment arrival. The Lakeside Strainers will arrive on-site the middle of April 2009, and will be the completing step in the commissioning process. Three to four weeks before the screens arrive on-site the lift station will begin construction. The lift station holding tank will be buried and a foundation will be constructed around the new sump. The next phase will include installation of the electrical and plumbing components. This process will be completed during the construction and completion of the enclosing structure. The final phase will include the installation of the process screens and processing the waste water received from the Pilot Travel Center. Western Refining is therefore requesting an extension from March 1, 2009 to June 13, 2009 to complete the entire project primarily due to equipment delivery delays.

Your review and approval of this request are appreciated. Please contact me at (505) 722-0217 if you have any comments or questions regarding this submittal.

Sincerely,

Ed Riege
Environmental Manager

C: Ms. Hope Monzeglio
Mark Turri
Don Riley
Shane White
Gaurav Rajen

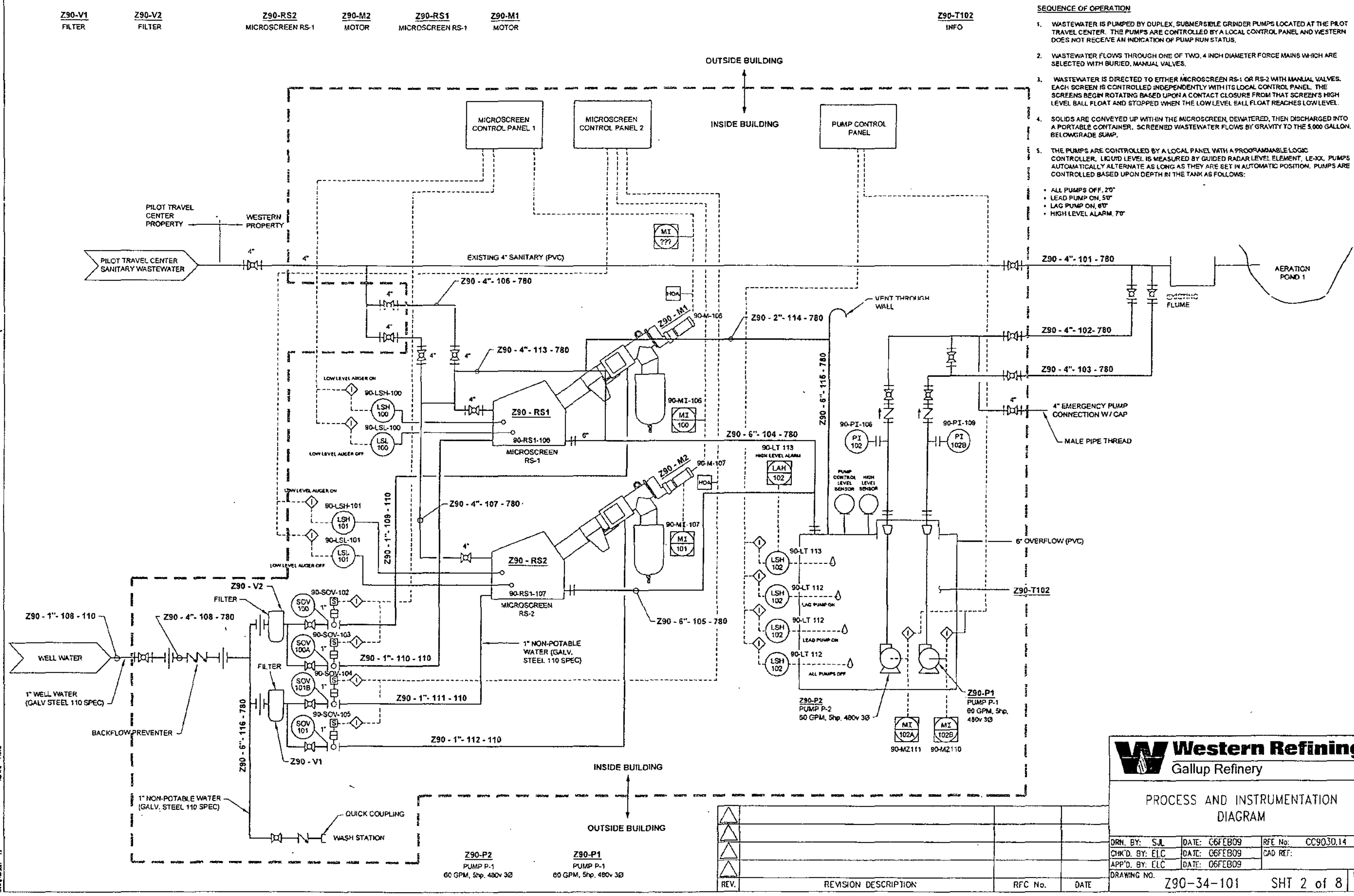


Western Refining
Gallup Refinery

SITE PLAN

REV.	REVISION DESCRIPTION	RFC No.	DATE

DRN. BY: SJL	DATE: 06FEB09	RFE No: CC9030.14
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:
APP'D. BY: ELC	DATE: 06FEB09	
DRAWING NO. Z90-09-301	SHT 1 of 8	REV 0



SEQUENCE OF OPERATION

1. WASTEWATER IS PUMPED BY DUPLEX, SUBMERSIBLE GRINDER PUMPS LOCATED AT THE PILOT TRAVEL CENTER. THE PUMPS ARE CONTROLLED BY A LOCAL CONTROL PANEL AND WESTERN DOES NOT RECEIVE AN INDICATION OF PUMP RUN STATUS.
2. WASTEWATER FLOWS THROUGH ONE OF TWO, 4 INCH DIAMETER FORCE MAINS WHICH ARE SELECTED WITH BURIED, MANUAL VALVES.
3. WASTEWATER IS DIRECTED TO EITHER MICROSCREEN RS-1 OR RS-2 WITH MANUAL VALVES. EACH SCREEN IS CONTROLLED INDEPENDENTLY WITH ITS LOCAL CONTROL PANEL. THE SCREENS BEGIN ROTATING BASED UPON A CONTACT CLOSURE FROM THAT SCREEN'S HIGH LEVEL BALL FLOAT AND STOPPED WHEN THE LOW LEVEL BALL FLOAT REACHES LOW LEVEL.
4. SOLIDS ARE CONVEYED UP WITHIN THE MICROSCREEN, DEWATERED, THEN DISCHARGED INTO A PORTABLE CONTAINER. SCREENED WASTEWATER FLOWS BY GRAVITY TO THE 5,000 GALLON, BELOWGRADE SUMP.
5. THE PUMPS ARE CONTROLLED BY A LOCAL PANEL WITH A PROGRAMMABLE LOGIC CONTROLLER. LIQUID LEVEL IS MEASURED BY GUIDED RADAR LEVEL ELEMENT, LE-XX. PUMPS AUTOMATICALLY ALTERNATE AS LONG AS THEY ARE SET IN AUTOMATIC POSITION. PUMPS ARE CONTROLLED BASED UPON DEPTH IN THE TANK AS FOLLOWS:

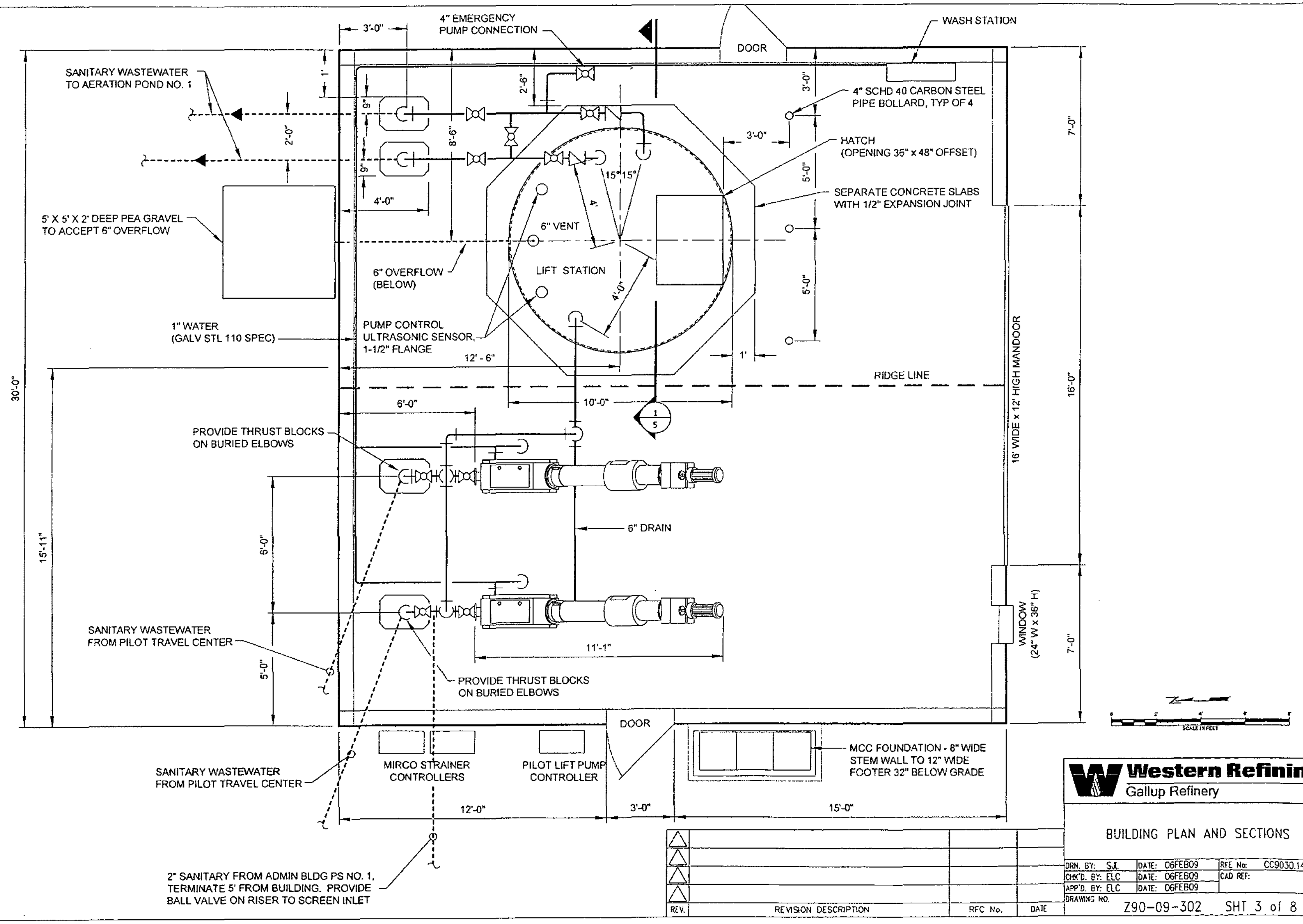
- ALL PUMPS OFF, 2'0"
- LEAD PUMP ON, 5'0"
- LAG PUMP ON, 6'0"
- HIGH LEVEL ALARM, 7'0"

REV.	REVISION DESCRIPTION	RFC No.	DATE

Western Refining
Gallup Refinery

PROCESS AND INSTRUMENTATION DIAGRAM

DRN. BY: SJL	DATE: 06FEB09	RFC No: CC9030.14
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:
APP'D. BY: ELC	DATE: 06FEB09	
DRAWING NO. Z90-34-101	SHT 2 of 8	REV 0

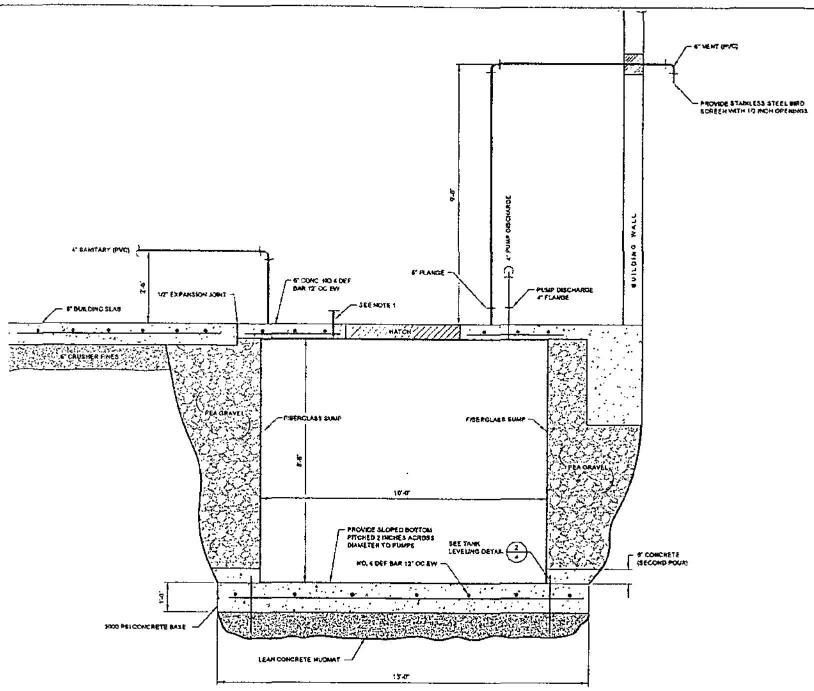


Western Refining
Gallup Refinery

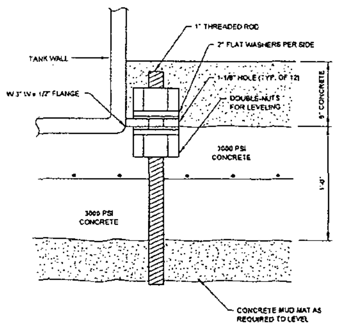
BUILDING PLAN AND SECTIONS

REV.	REVISION DESCRIPTION	RFC No.	DATE

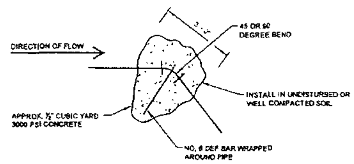
DRN. BY: SJL	DATE: 06FEB09	REF. No:	CC9030.14
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:	
APP'D. BY: ELC	DATE: 06FEB09		
DRAWING NO. Z90-09-302	SHT 3 of 8	REV 0	



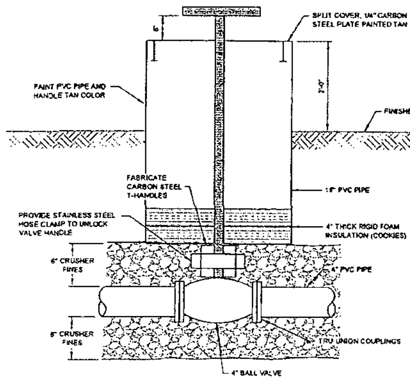
SECTION (1/4)
SCALE: 1/4" = 1'



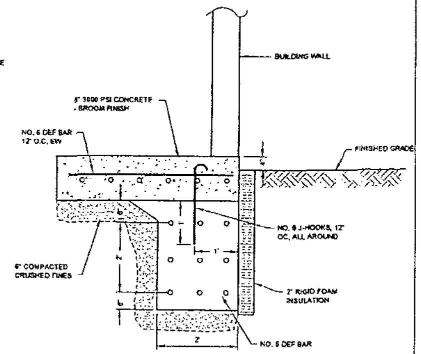
TANK LEVELING DETAIL (2/4)
NOT TO SCALE



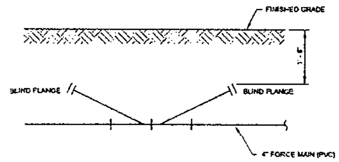
THRUST BLOCK (3/4)
NOT TO SCALE



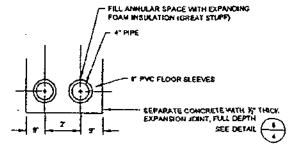
VALVE BOX (4/4)
NOT TO SCALE



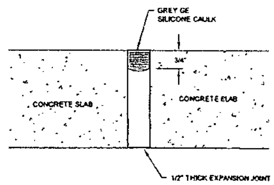
BUILDING FOUNDATION (5/4)
NOT TO SCALE



BI-DIRECTIONAL CLEANOUTS (6/4)
NOT TO SCALE



PIPE CHASE (PLAN VIEW) (7/4)
NOT TO SCALE



EXPANSION JOINT (8/4)
NOT TO SCALE

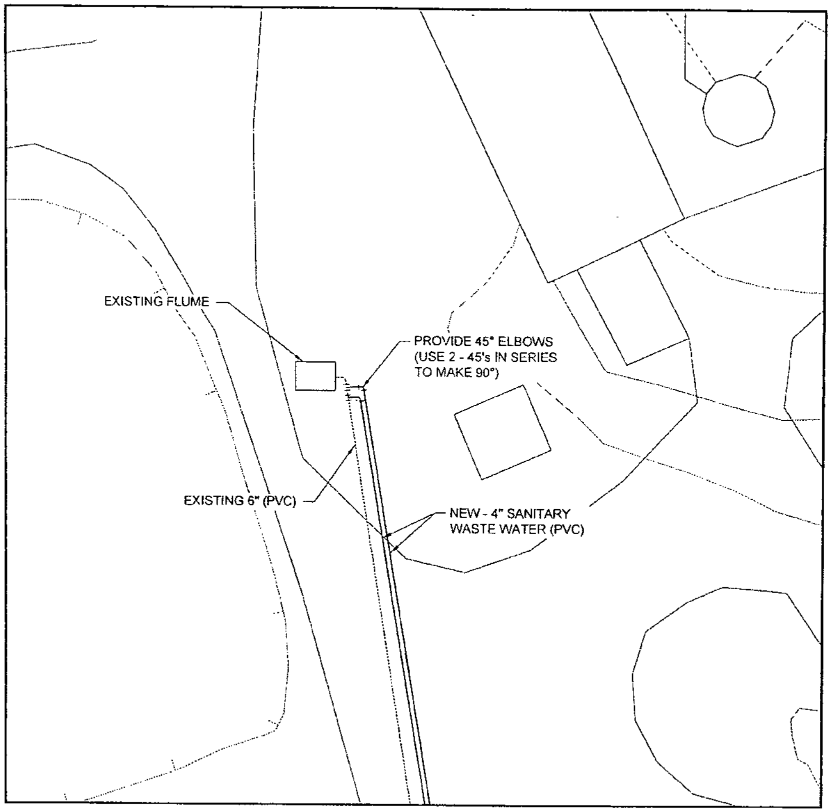
NOTES:
1. ALL NOZZLES SHALL EXTEND 1' - 0" ABOVE FIBERGLASS TOP.

Western Refining
Gallup Refinery

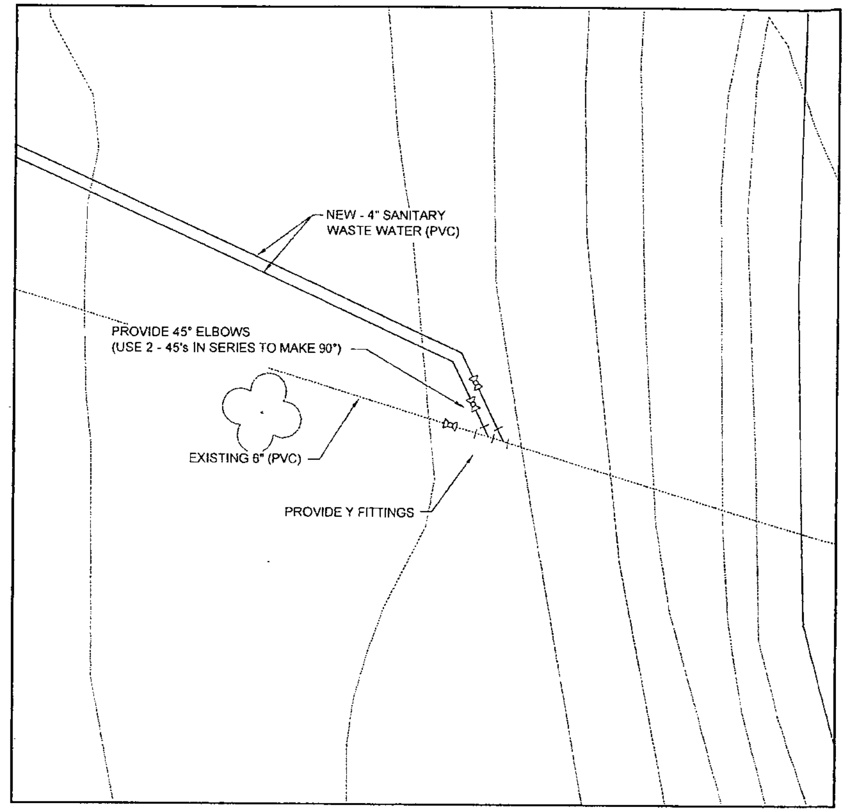
DETAILS

REV.	REVISION DESCRIPTION	RFC No.	DATE

DRN. BY: SJL	DATE: 06FEB09	RFE No:	CC9030.14
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:	
APP'D. BY: ELC	DATE: 06FEB09		
DRAWING NO. Z90-03-102	SHT 4 of 8	REV 0	



TIE-IN NEAR AERATION PONDS
NTS



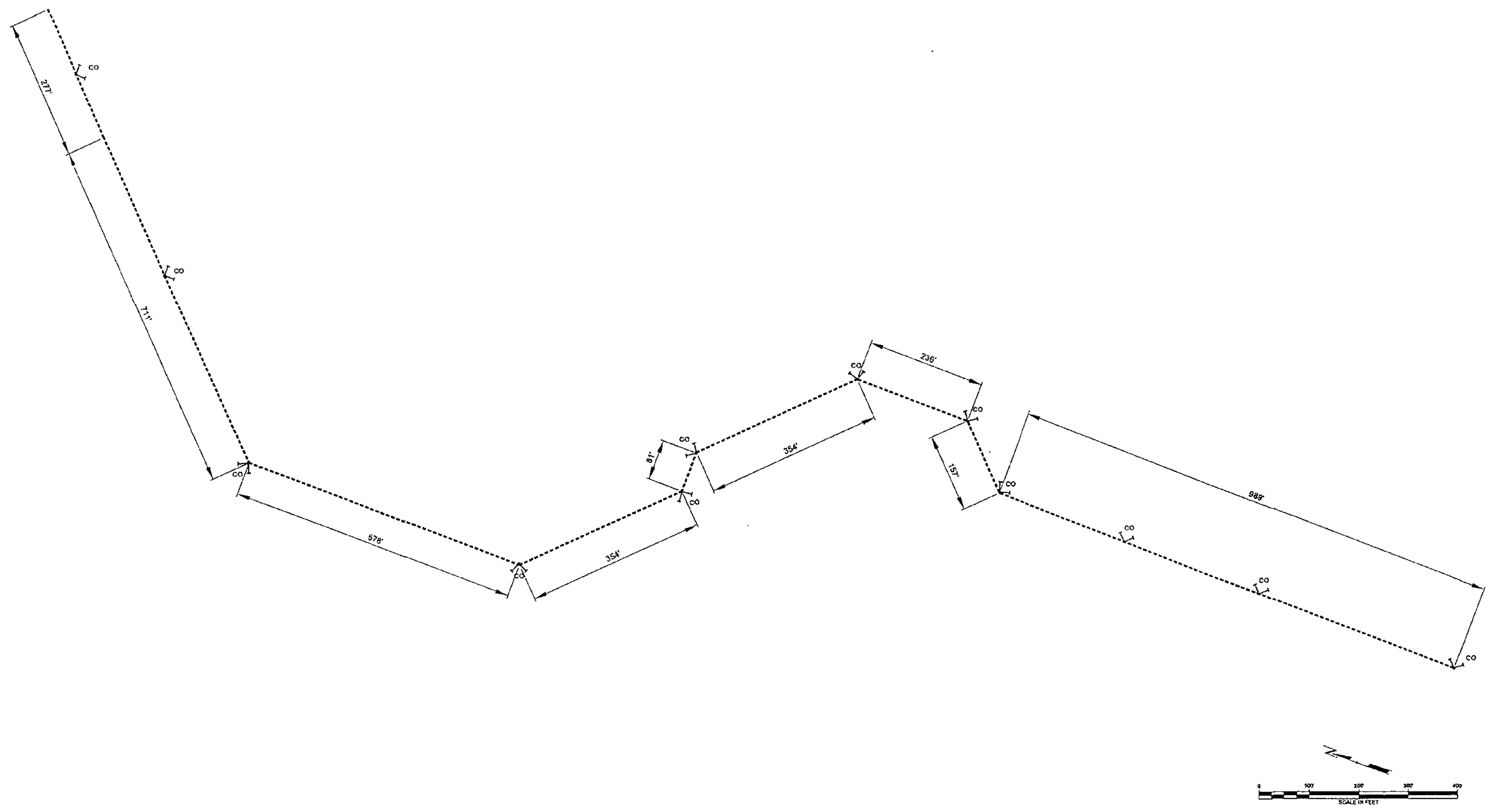
TIE-IN NEAR SOUTH PROPERTY LINE
NTS

REV.	REVISION DESCRIPTION	RFC No.	DATE

Western Refining
Gallup Refinery

TIE-INS

DRN. BY: SJL	DATE: 05FEB09	RFE No: CC9030.14
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:
APP'D. BY: ELC	DATE: 05FEB09	
DRAWING NO. Z90-09-304	SHT 6 of 8	REV 0

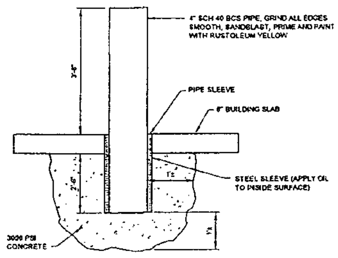


Western Refining
Gallup Refinery

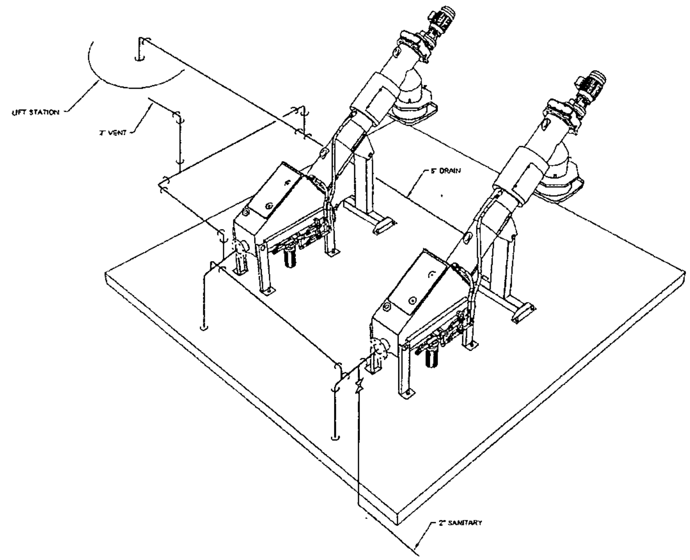
CLEANOUT LOCATIONS

DRN. BY: SJL	DATE: 06FEB09	RFE No: CC9030.14	
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:	
APP'D. BY: ELC	DATE: 06FEB09		
DRAWING NO. Z-90-09-303	SHT 5 of 8		REV 0

REV.	REVISION DESCRIPTION	RFC No.	DATE
△			
△			
△			
△			



BOLLARD DETAIL
NOT TO SCALE



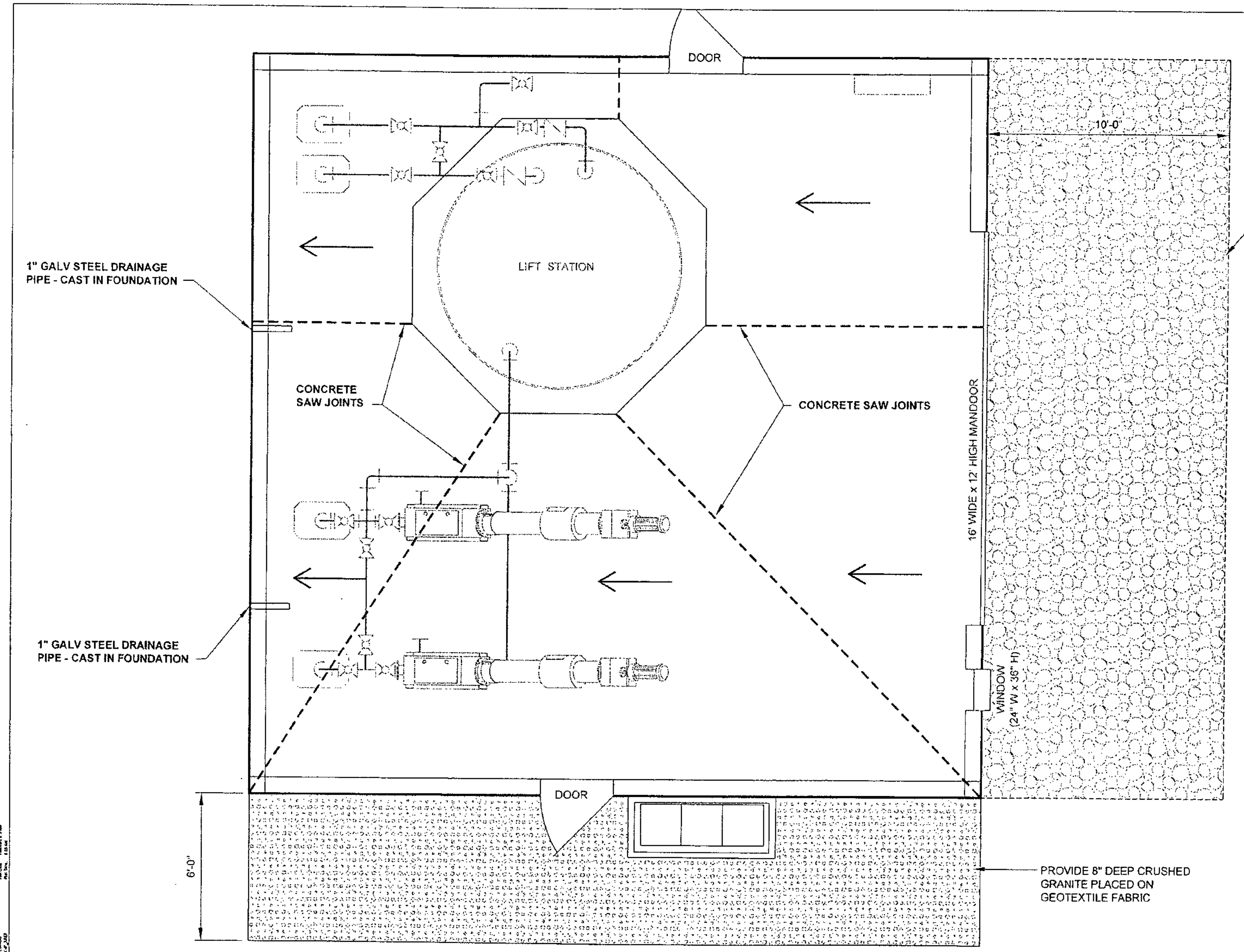
SCREEN PIPING
NOT TO SCALE

REV.	REVISION DESCRIPTION	RFC No.	DATE

Western Refining
Gallup Refinery

DETAILS

DRN. BY: SJL	DATE: 06FEB09	RFE No: CC9030.14
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:
APP'D. BY: ELC	DATE: 06FEB09	
DRAWING NO. Z-90-09-305	SHT 7 of 8	REV 0



NOTES:

1. SAWCUT CONCRETE 1" DEEP 24 HOURS AFTER POUR. SEAL WITH GREY GE SILICONE 2 WEEKS LATER.
2. SET BUILDING FOUNDATION SUCH THAT TOP OF SLAB IS 6" ABOVE FINISHED GRADE.
3. SLOPE FLOOR 3-1/2" OVER 30 FEET.

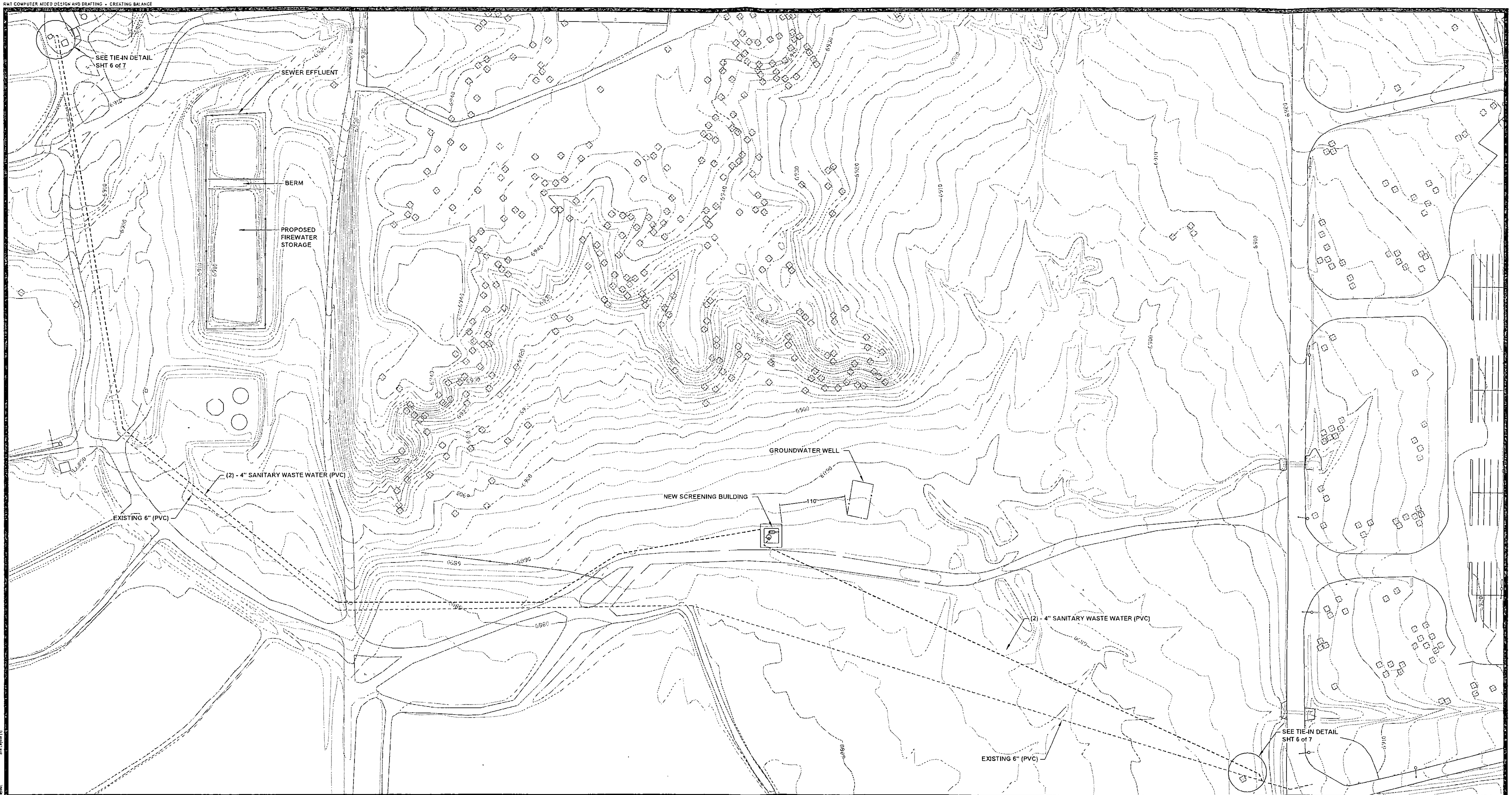
SCALE IN FEET

Western Refining
Gallup Refinery

CONCRETE FOUNDATIONS

DRN. BY: SJL	DATE: 06FEB09	RFE No: CC9030.14
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:
APP'D. BY: ELC	DATE: 06FEB09	
DRAWING NO. Z-90-03-103	SHT 8 of 8	REV 0

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

SITE PLAN

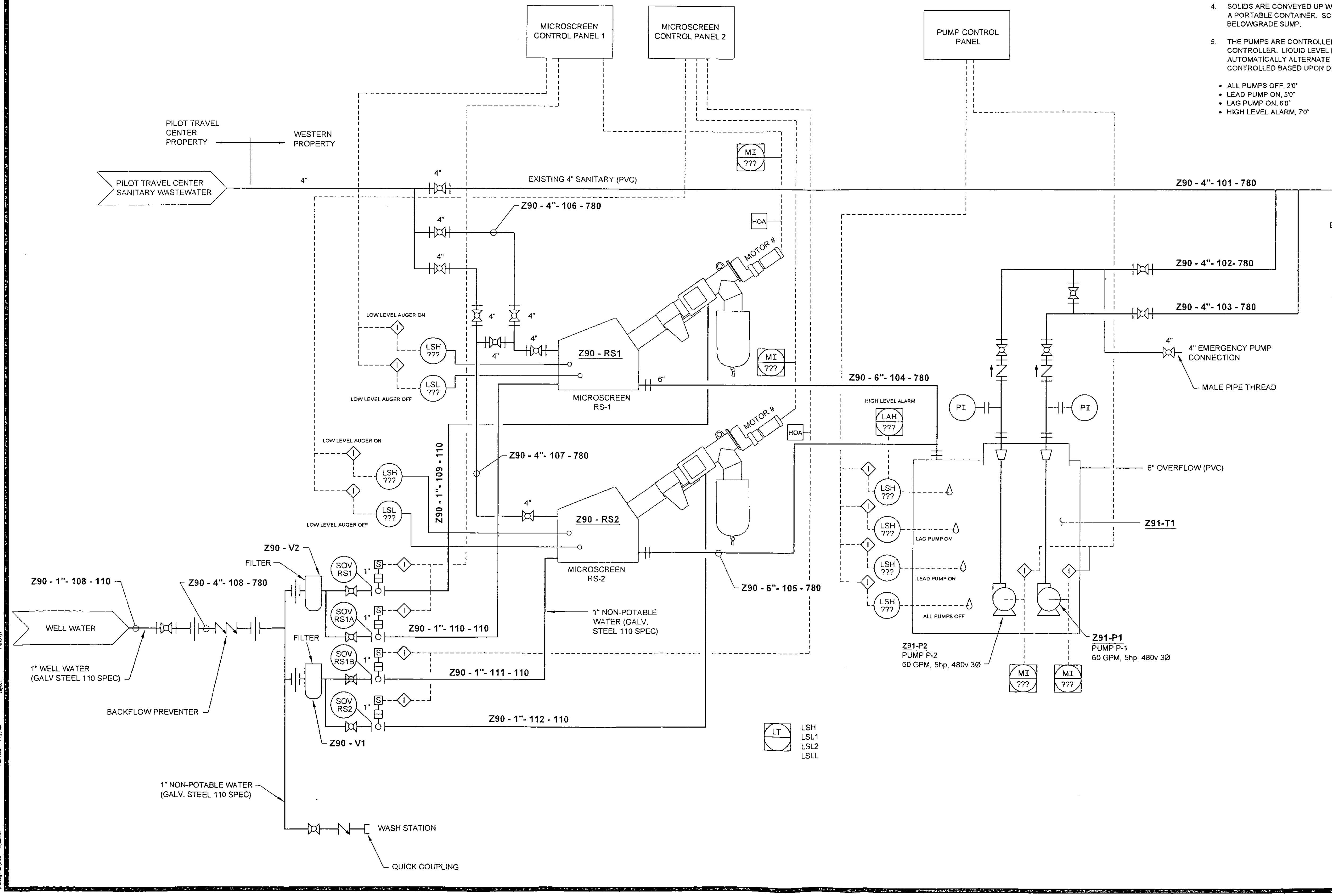
DRAWN BY: SJL	DRAWING SCALE:	PROJECT NO.	J:107788106
CHECKED BY: ELC	SHOWN	FILE NO.	7788.06.01.dwg
APPROVED BY: ELC	DATE PRINTED:	Sheet 1 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

SEQUENCE OF OPERATION

1. WASTEWATER IS PUMPED BY DUPLEX, SUBMERSIBLE GRINDER PUMPS LOCATED AT THE PILOT TRAVEL CENTER. THE PUMPS ARE CONTROLLED BY A LOCAL CONTROL PANEL AND WESTERN DOES NOT RECEIVE AN INDICATION OF PUMP RUN STATUS.
2. WASTEWATER FLOWS THROUGH ONE OF TWO, 4 INCH DIAMETER FORCE MAINS WHICH ARE SELECTED WITH BURIED, MANUAL VALVES.
3. WASTEWATER IS DIRECTED TO EITHER MICROSCREEN RS-1 OR RS-2 WITH MANUAL VALVES. EACH SCREEN IS CONTROLLED INDEPENDENTLY WITH ITS LOCAL CONTROL PANEL. THE SCREENS BEGIN ROTATING BASED UPON A CONTACT CLOSURE FROM THAT SCREEN'S HIGH LEVEL BALL FLOAT AND STOPPED WHEN THE LOW LEVEL BALL FLOAT REACHES LOW LEVEL.
4. SOLIDS ARE CONVEYED UP WITHIN THE MICROSCREEN, DEWATERED, THEN DISCHARGED INTO A PORTABLE CONTAINER. SCREENED WASTEWATER FLOWS BY GRAVITY TO THE 5,000 GALLON, BELOWGRADE SUMP.
5. THE PUMPS ARE CONTROLLED BY A LOCAL PANEL WITH A PROGRAMMABLE LOGIC CONTROLLER. LIQUID LEVEL IS MEASURED BY GUIDED RADAR LEVEL ELEMENT, LE-XX. PUMPS AUTOMATICALLY ALTERNATE AS LONG AS THEY ARE SET IN AUTOMATIC POSITION. PUMPS ARE CONTROLLED BASED UPON DEPTH IN THE TANK AS FOLLOWS:

- ALL PUMPS OFF, 2'0"
- LEAD PUMP ON, 5'0"
- LAG PUMP ON, 6'0"
- HIGH LEVEL ALARM, 7'0"



Z90 - 34- 101 - REV 0

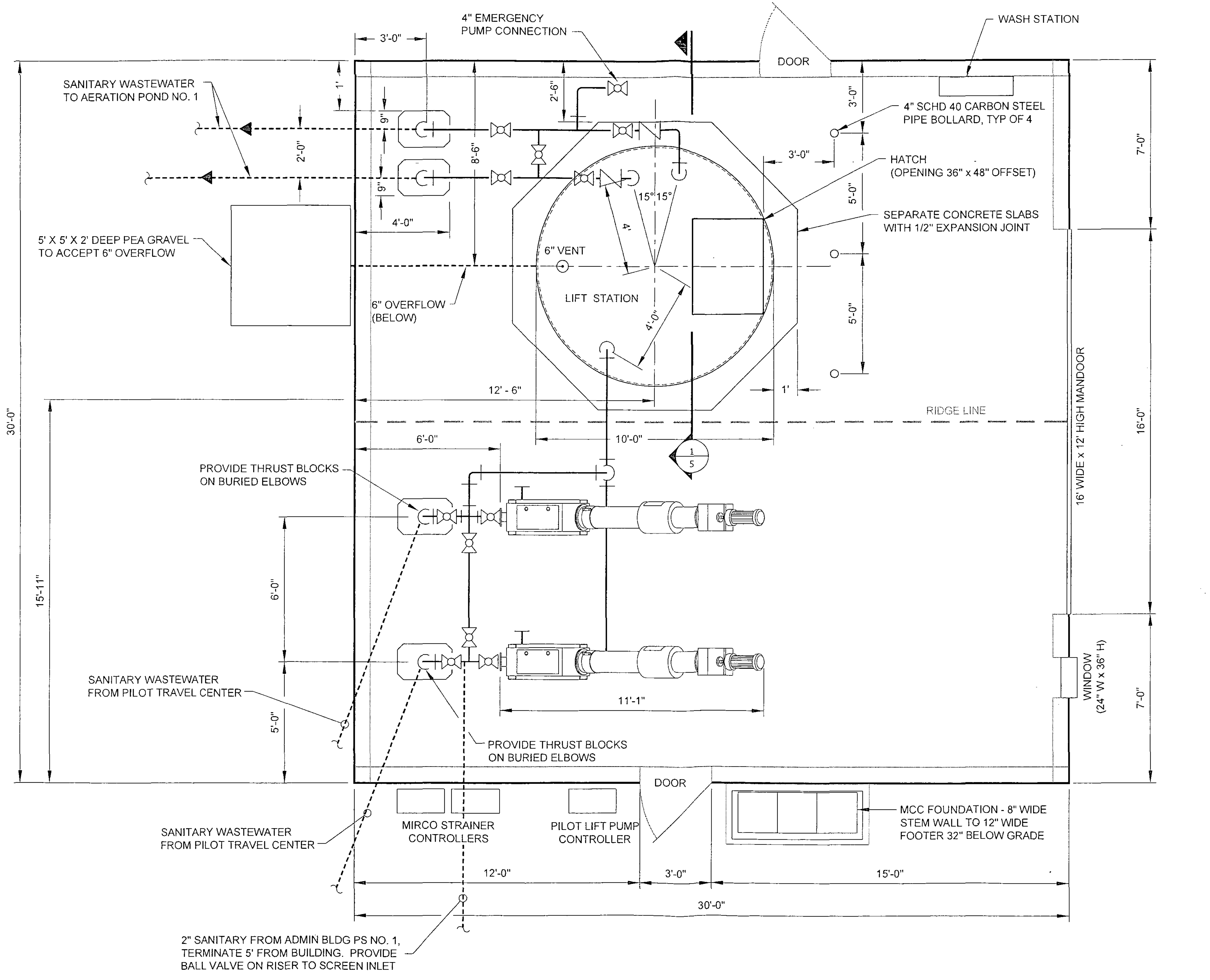
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

PIPING AND INSTRUMENTATION DIAGRAM

DRAWN BY: SJL	DRAWING SCALE:	PROJECT NO.	J10778806
CHECKED BY: ELC	SHOWN	FILE NO:	7788.06.02.dwg
APPROVED BY: ELC	DATE PRINTED:	Sheet 2 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone 734-971-7080 • Fax 734-971-9022



NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

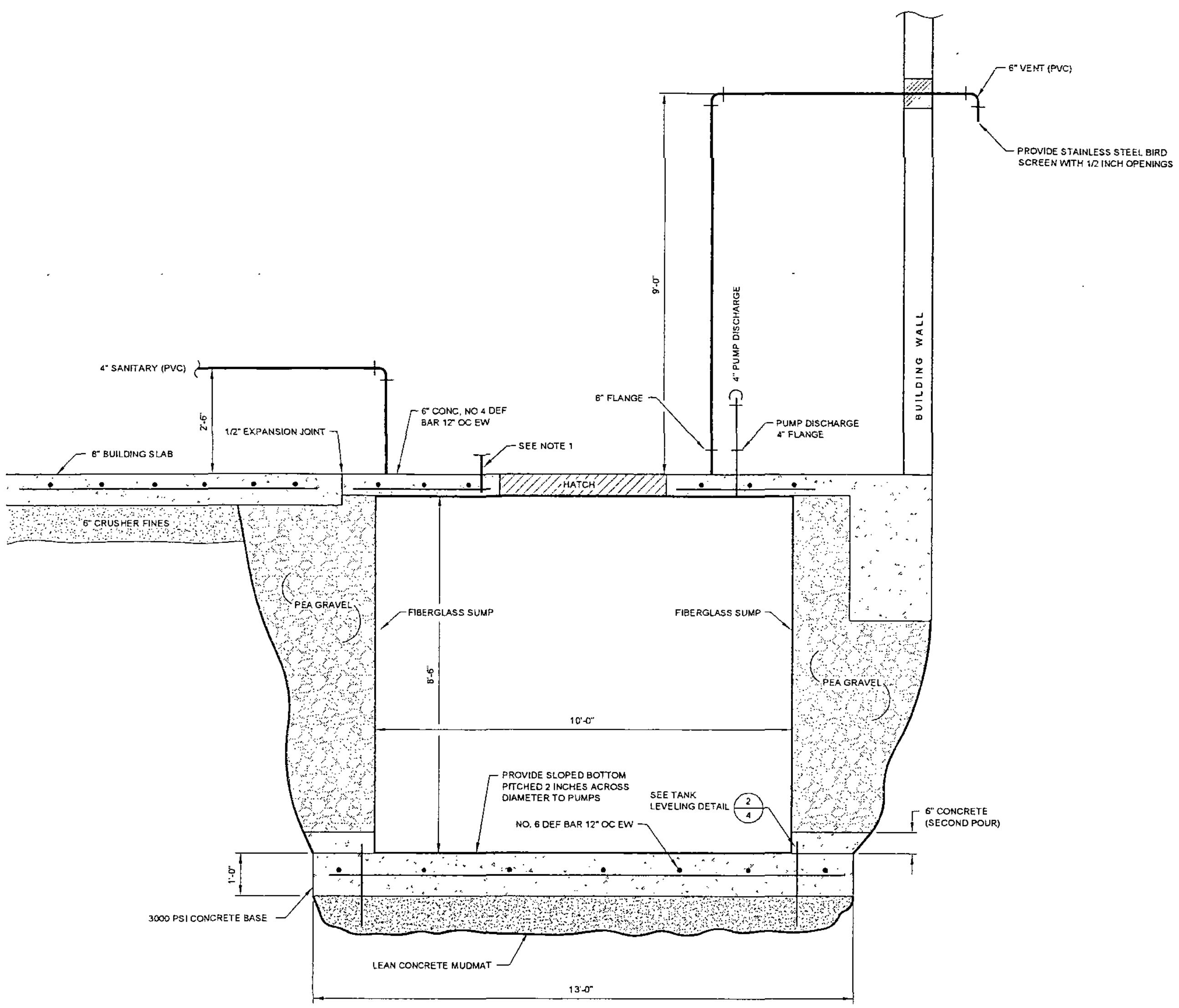
BUILDING PLAN AND SECTIONS

DRAWN BY: SJL	DRAWING SCALE: SHOWN	PROJECT NO: J.10778806	
CHECKED BY: ELC		FILE NO: 7788.06.03.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 3 of 8	
DATE: January 2009			

RMT

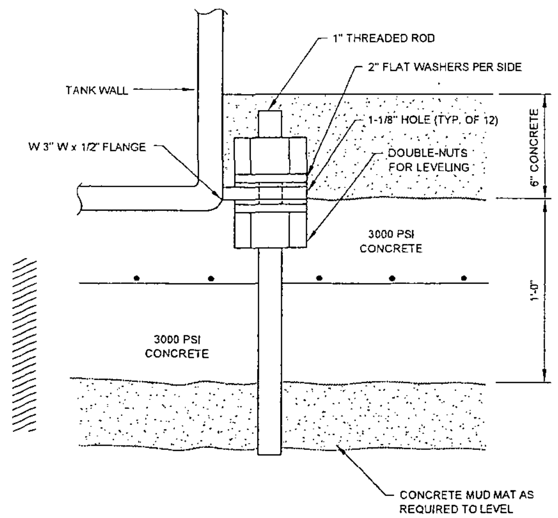
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE

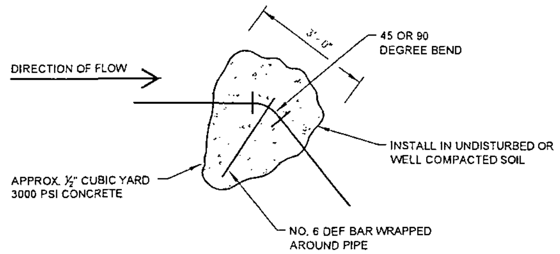


NOTES:
1. ALL NOZZLES SHALL EXTEND 1' - 0" ABOVE FIBERGLASS TOP.

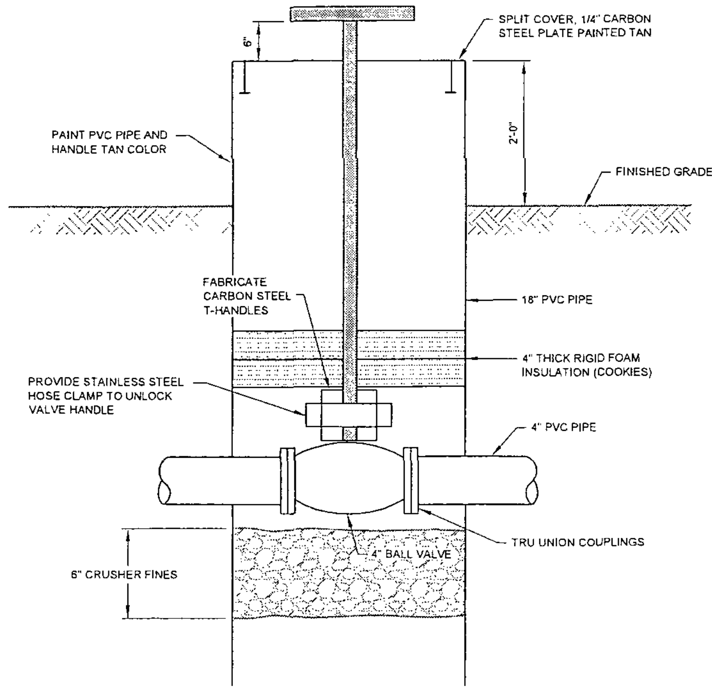
1/4 **SECTION**
SCALE: 1/4" = 1'



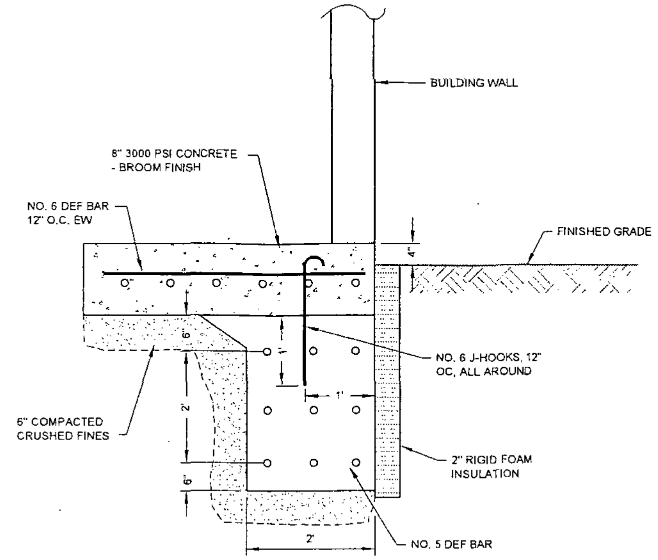
2/4 **TANK LEVELING DETAIL**
NOT TO SCALE



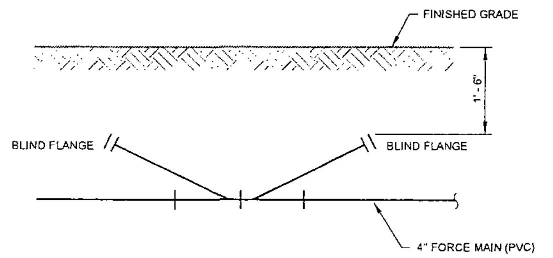
3/4 **THRUST BLOCK**
NOT TO SCALE



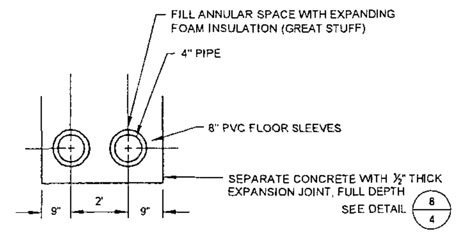
4/4 **VALVE BOX**
NOT TO SCALE



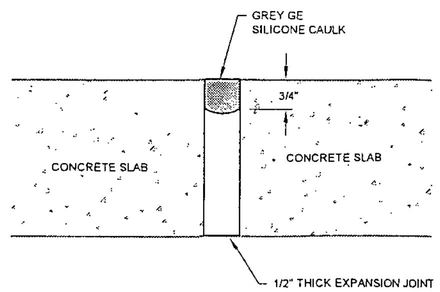
5/4 **BUILDING FOUNDATION**
NOT TO SCALE



6/4 **BI-DIRECTIONAL CLEANOUTS**
NOT TO SCALE



7/4 **PIPE CHASE (PLAN VIEW)**
NOT TO SCALE



8/4 **EXPANSION JOINT**
NOT TO SCALE

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

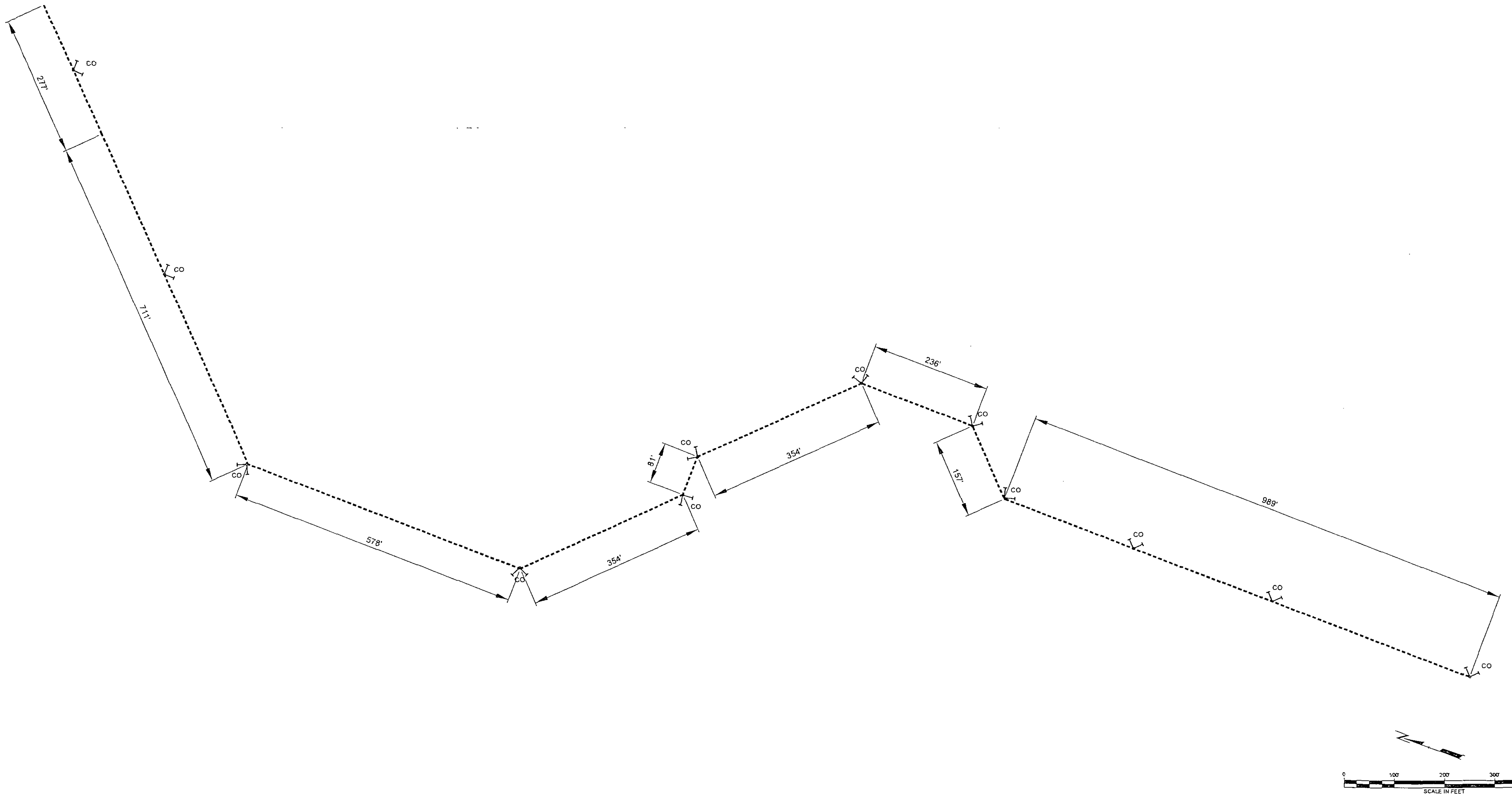
WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

DETAILS

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO. J:\07788106	
CHECKED BY: EC		FILE NO: 7788.06.04.dwg	
APPROVED BY: EC	DATE PRINTED:	Sheet 4 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

PLOT DATA:
Drawing Name: J:\07788106\7788.06.04.dwg
Operator Name: SAN LUCIDO
Drawing Plot Scale: 0.265663
Dwg Size: 0.21 Mb
Plot Date: January 13, 2009
Plot time: 11:29 AM
Attached Xrefs:
Attached Images:
Layout: Details (8)
Section Detail



NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

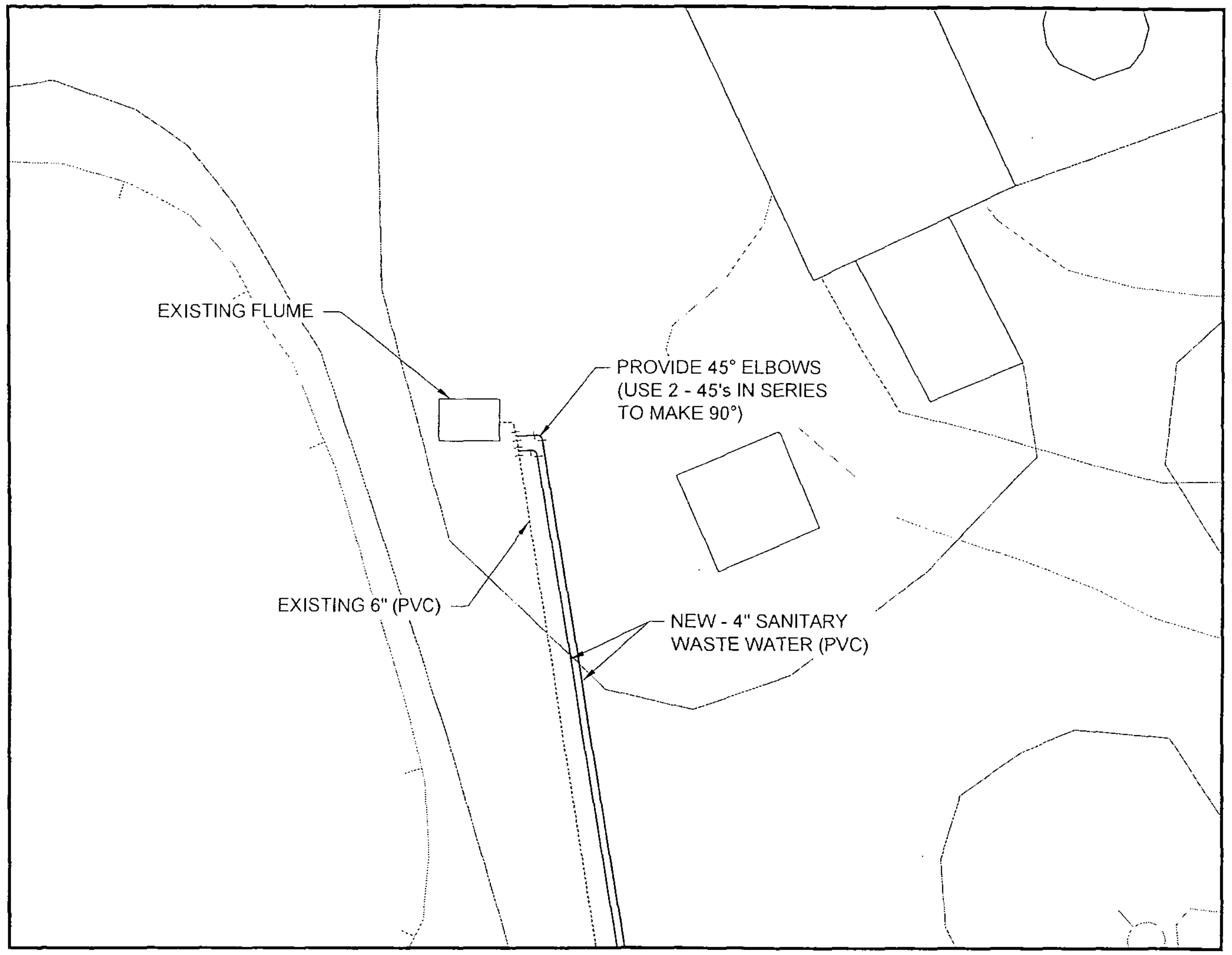
WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

CLEANOUT LOCATIONS

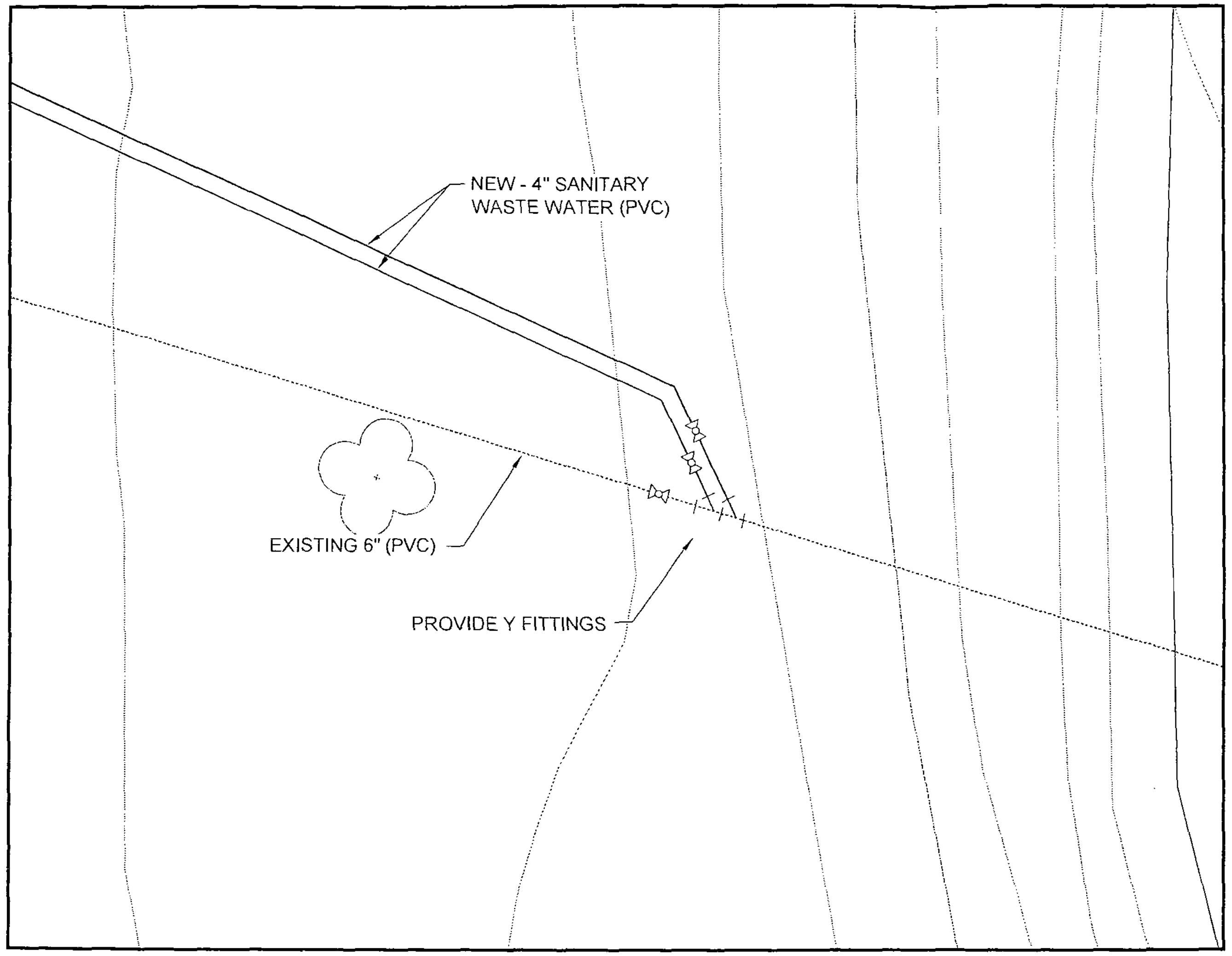
DRAWN BY: S.A.	DRAWING SCALE: SHOWN	PROJECT NO:	J10778806
CHECKED BY: ELC		FILE NO:	7788.06.05.dwg
APPROVED BY: ELC	DATE PRINTED:	Sheet 5 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



TIE-IN NEAR AERATION PONDS
NTS



TIE-IN NEAR SOUTH PROPERTY LINE
NTS

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

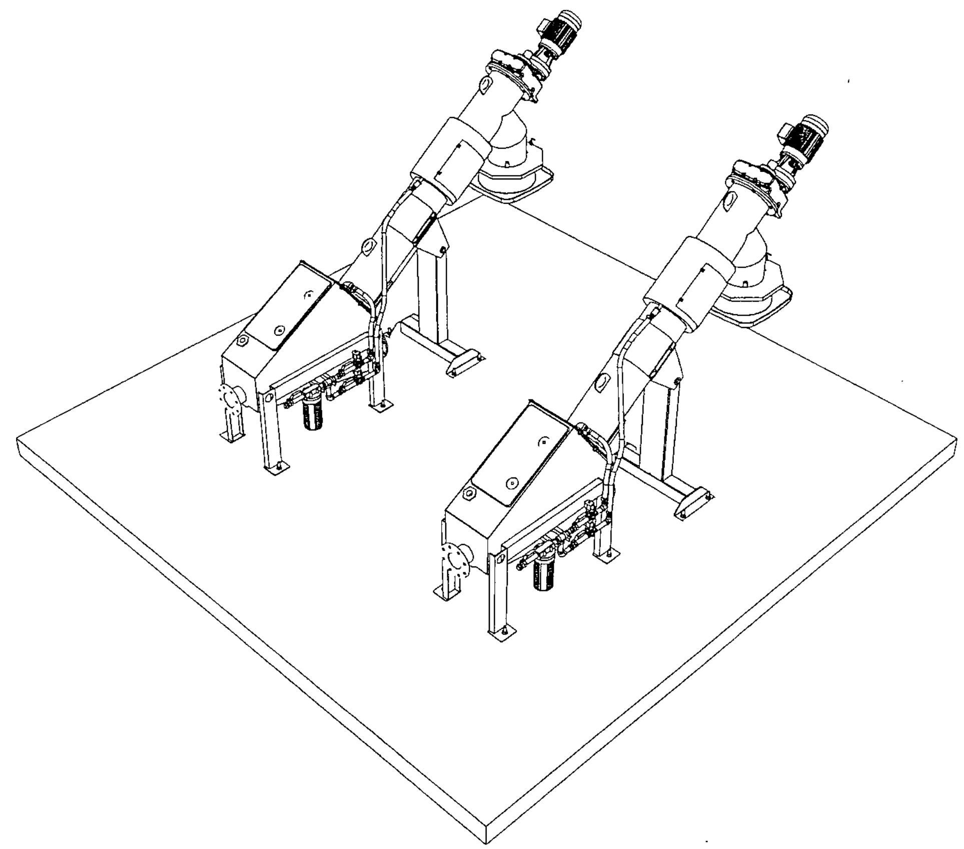
WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

TIE INS

DRAWN BY: S.A.	DRAWING SCALE: SHOWN	PROJECT NO: J10778I06	
CHECKED BY: ELC		FILE NO: 7788.06.06.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 7 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



1/2 **BOLLARD DETAIL**

NOT TO SCALE

2/8 **SCREEN PIPING**

NOT TO SCALE

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

DETAILS

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO: J:\07788\06
CHECKED BY: EC		FILE NO. 7788.06.07.dwg
APPROVED BY: EC	DATE PRINTED:	Sheet 8 of 8
DATE: January 2009		

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

Chavez, Carl J, EMNRD

From: Jones, Brad A., EMNRD
Sent: Wednesday, June 17, 2009 10:02 AM
To: Chavez, Carl J, EMNRD
Subject: FW: GW-032 Permit Conditions 24.A. and 24.B.
Attachments: 20090617095028602.pdf; Lift 1.jpg; Lift 2.jpg; Lift 3.jpg

-----Original Message-----
From: Riege, Ed [mailto:Ed.Riege@wnr.com]
Sent: Wednesday, June 17, 2009 9:58 AM
To: Jones, Brad A., EMNRD
Cc: Monzeglio, Hope, NMENV
Subject: FW: GW-032 Permit Conditions 24.A. and 24.B.

Hi Brad,

Attached is a letter (PDF) to be mailed today indicating that the new Pilot Travel Center lift station and underground sewer line were placed into service on June 16, 2009. Photos of the installation are also attached.

Thanks,

Ed

Ed Riege
Environmental Manager

Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com

Western Refining

GALLUP REFINERY

WNR LISTED NYSE

Certified Mail 7008 2810 0000 4726 0850

June 16, 2009

Mr. Brad Jones
Oil Conservation Division
Environmental Bureau
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Re: OCD Discharge Permit GW-032, Permit Condition 24.A. and 24.B.

Dear Mr. Jones:

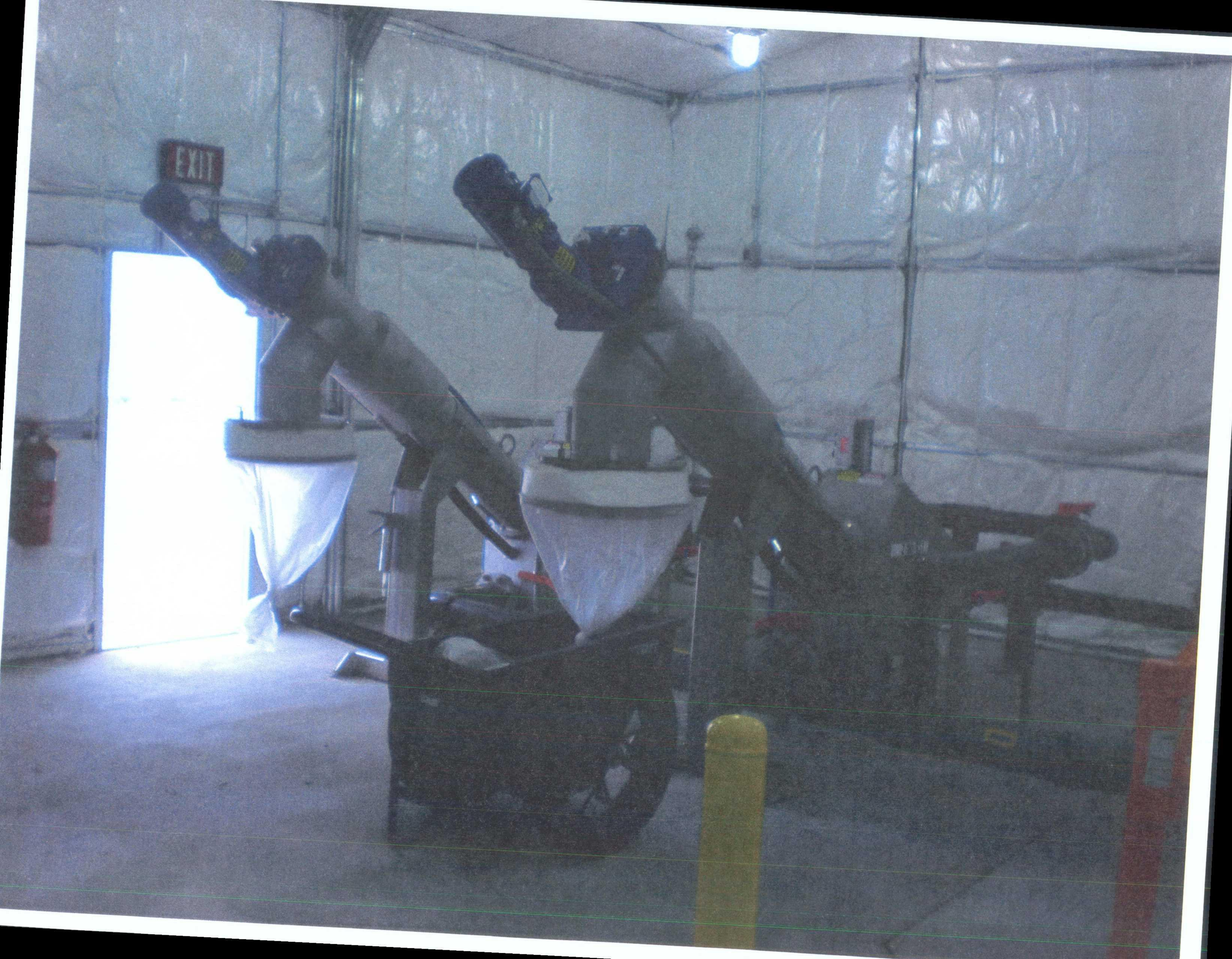
This letter is to update you regarding OCD Permit Condition 24.A. and 24.B. The Western Gallup refinery has completed the new Pilot Travel Center lift station/underground line design OCD approved in the fourth quarter of 2008. The new lift station and one of the two new four inch underground sewer lines were placed into service today June 16, 2009 and are processing the Pilot Travel Center wastewater. Photos of the new system are attached.

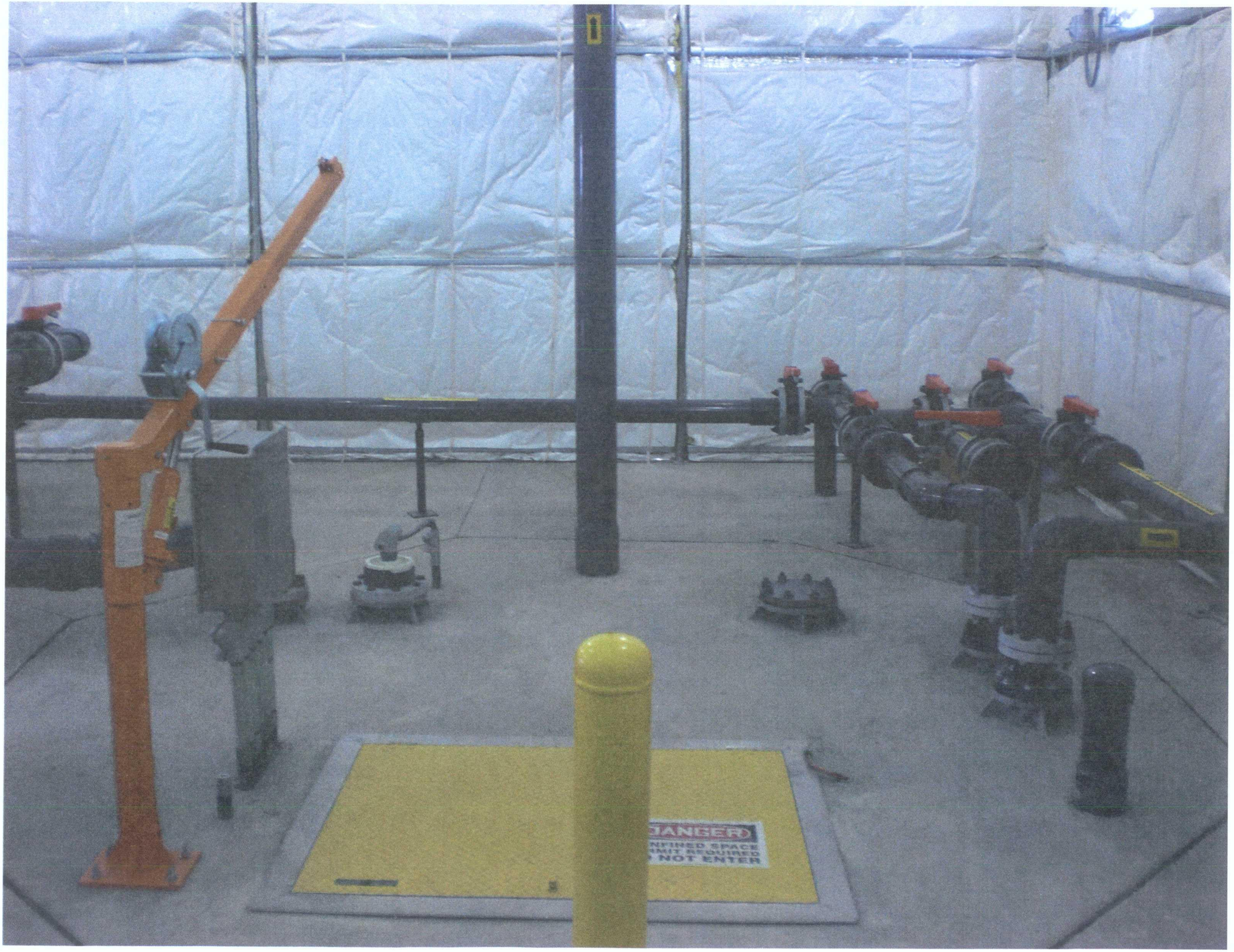
Please contact me at (505) 722-0217 if you have any questions regarding this submittal.

Sincerely,

Ed Riege
Environmental Manager

C: Ms. Hope Monzeglio
Ann Allen
Mark Turri
Don Riley
Shane White
Gaurav Rajen


EXIT


DANGER
NFINED SPACE
RMIT REQUIRED
NOT ENTER

Western Refining

GALLUP REFINERY

WNR LISTED NYSE

RECEIVED

2009 FEB 27 PM 12 06

February 26, 2009

Brad Jones
Oil Conservation Division
Environmental Bureau
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Hope Monzeglio
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Re: OCD Discharge Permit GW-032 Condition 16.C

Dear Mr. Jones and Ms. Monzeglio:

This letter and submissions are to address the OCD Discharge Permit GW-032 Condition 16.C. requirement. Specifically the below listed item addresses the OCD GW-032 revised schedule letter dated March 12, 2008, which granted a submission due date of March 1, 2009.

- **Condition 16.C.** - Attachment 1 contains the Process Design Report For Wastewater Treatment Plant Upgrade prepared by Brown and Caldwell.

Please note that while Western will identify and timely seek permits and authorizations necessary to construct and operate the wastewater treatment plant in compliance with applicable laws, the proposed schedule submitted herein is subject to, and contingent upon, approval by the NMOCD, the NMED, and the U.S. EPA of such permits and authorizations. Additionally, Western must reserve the right to make any design revisions that may become appropriate based upon agency action on any applications for permits and authorizations, or other agency directives. For example, Western currently expects to submit an application for a National Pollutant Discharge Elimination System permit for the wastewater treatment plant. Western will undertake any additions and modifications to the wastewater treatment plant that may be necessary to meet the terms and conditions of any NPDES permit that is granted. Similarly, if an NPDES permit is either not sought or granted, it may be necessary to modify the installation and design plans to incorporate any RCRA standards that may become applicable (such as those standards in 40 CFR 265, Subpart J applicable to RCRA-regulated tanks.) Any period of time associated with undertaking the engineering design and other steps necessary to satisfy NMOCD, NMED, and the U.S. EPA, of course, will affect the proposed schedule.

Please contact me at (505) 722-0217 if you have any comments or questions regarding this submittal.

Sincerely,

Ed Riege
Environmental Manager

C: Mark B. Turri
Ann Allen
Don Riley
Shane White

I-40 Exit 39, Jamestown, New Mexico 87347 • 505 722-3833 • www.wnr.com
Mail: Route 3 Box 7, Gallup, New Mexico 87301

PROCESS DESIGN REPORT FOR WASTEWATER TREATMENT PLANT UPGRADE

Prepared for
Western Refining Southwest
Gallup Refinery

February 26, 2009

Submitted to:
New Mexico Oil Conservation Division
Environmental Bureau
Santa Fe, New Mexico

Prepared by:
BROWN AND CALDWELL
30 East Seventh Street, Suite 2500
Saint Paul, MN 55101

30 East Seventh Street
Suite 2500
Saint Paul, MN 55101

Tel: 651-298-0710
Fax: 651-298-1931

www.brownandcaldwell.com

BROWN AND CALDWELL

February 26, 2009 135741.021.300

Mr. Ed Riege
Western Refining Southwest
Gallup Refinery
Route 3, Box 7
Gallup, NM 87301

Subject: Transmittal of Process Design Report

Dear Mr. Riege:

Brown and Caldwell is pleased to provide the attached Process Design Report to Western Refining Southwest for the upgrades to the wastewater treatment plant (WWTP) at the Gallup Refinery.

Brown and Caldwell appreciates the opportunity to work with Western Refining on the design of the WWTP upgrades. If you have any questions on this report, please contact me at (651) 468-2061 or jallen@brwncald.com.

Very truly yours,

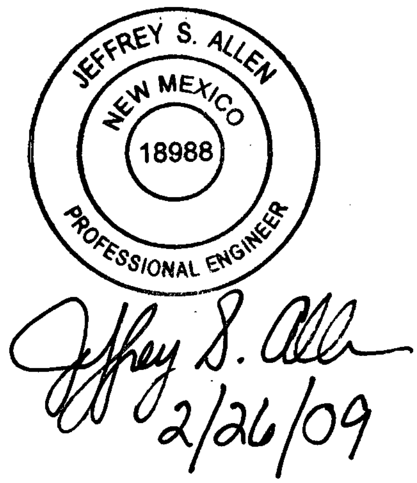
BROWN AND CALDWELL

Jeffrey S. Allen

Jeffrey S. Allen, P.E.
Project Manager
New Mexico Registration No. 18988

Professional Engineer Certification for Jeffrey S. Allen, P.E.

This is to certify that the Process Design Report for Western Refining Southwest dated February 2009 was prepared under my direction and supervision. The exception to this certification is the material in Attachment C.



License No. 18988
February 26, 2009

TABLE OF CONTENTS

LIST OF ATTACHMENTS

LIST OF TABLES

1. INTRODUCTION

1.1 Introduction

The Western Refining Southwest's Gallup Refinery is a petroleum refinery with a crude oil processing capacity of 23,000 barrels per day (bpd). The Refinery is located in Jamestown, New Mexico at Interstate 40 Exit 39.

Brown and Caldwell has prepared the following Process Design Report on behalf of Western Refining. This document presents the planned upgrades of the wastewater treatment plant (WWTP) at the Refinery.

On August 27, 2007 Western Refining received a renewal of its discharge permit GW-032 from the New Mexico Oil Conservation Division (OCD). The permit required the Refinery to complete certain actions related to wastewater management. The Process Design Report addresses aspects of the following permit conditions:

1. Condition 16C - Treatment Study and Design
2. Condition 16D - Aerated Lagoons
3. Condition 16E – Evaporation Ponds

The design presented herein is for WWTP upgrades that include a new biological treatment system in above-ground tanks. The new biological treatment system will replace the current function of Aeration Lagoons 1 and 2 (AL-1 and AL-2). Thus, AL-1 and AL-2 will no longer be required and can be taken out of service. The effluent quality from the biological treatment system will be suitable for discharge to the unlined Evaporation Pond 1 (EP-1). Therefore, the installation of a liner in EP-1 is not required.

1.2 Project Scope

The scope of the WWTP upgrade project consists of the following new systems:

- Two existing tanks will be put in service for the storage of process area stormwater and diversion of EP-1 influent.
- pH adjustment capabilities downstream of the existing New American Petroleum Institute (API) Separator (NAPIS).
- Equalization and additional oil-water-solids separation using an above-ground Tank-based Separator.
- Two Bioreactors in above-ground tanks without sludge recycle. The Bioreactors will be aerated using blowers and air diffusers. The Bioreactors will have chemical feed systems for pH control and nutrient (phosphorus) addition.

The new system will allow the following existing systems to be decommissioned:

- Benzene Stripper Nos. 1, 2 and 3.
- AL-1 and AL-2
- The Old API Separator (OAPIS)

The following existing equipment will continue to be operated in their current function within the upgraded system:

- NAPIS
- EP-1 through EP-12

1.3 Related Project - Pilot Travel Center Lift Station

A lift station to collect, screen, and pump the sanitary/restaurant wastewater from the Pilot Travel Center to the WWTP is currently under construction. A force main will convey the wastewater from the new lift station to the WWTP. The wastewater from the new lift station will discharge into AL-1 until the new Bioreactors are placed in service. At that time, the wastewater will be routed to the Bioreactor influent.

1.4 Treatment Objectives

The treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. The project design was developed based on these objectives.

1.5 Regulatory Compliance

The focus of the process design presented herein is compliance with the requirements of OCD permit GW-032. Brown and Caldwell and Western Refining recognize that this Process Design Report will also be reviewed by the New Mexico Environment Department and U.S. Environmental Protection Agency Region 6 with respect to other regulatory requirements such as RCRA. The design will be modified as necessary to meet additional compliance requirements as advised by the three agencies.

1.6 Report Organization

The Process Design Report is organized as follows:

Section 1.	Introduction
Section 2.	Wastewater Sources
Section 3.	Technology Selection
Section 4.	Process Description
Section 5.	Project Schedule

Attachments to the Process Design Report include the following documents:

Attachment A.	Process Flow Diagrams
Attachment B.	Preliminary Site Plan
Attachment C.	Stormwater Tank Drawings
Attachment D.	Technical Paper on Tank-Based Separator Case Studies
Attachment E.	Membrane Bioreactor Pilot Study
Attachment F.	Aggressive Biological Treatment Calculations

2. WASTEWATER SOURCES

2.1 Overview

This section of the report reviews the sources of wastewater generated at the Refinery. The wastewater sources discharged to the Refinery's WWTP fall under two broad categories: those wastewaters generated at the Refinery and those generated at the adjacent Pilot Travel Center. The two sources are further described below.

2.2 Refinery Wastewaters

The process wastewaters generated by the Refinery are directed to the process sewer that serves as the influent to the existing NAPIS. There are two additional wastewater sources generated within the Refinery that do not discharge to the process sewer/NAPIS but discharge elsewhere within the WWTP. These sources are the water softener system and the reverse osmosis (RO) system. Both of these systems are part of the larger boiler feed water treatment system. The batch discharge from the water softener's regeneration cycle and the continuous discharge of reject from the RO membranes are collected in a dedicated sewer system. RO reject and water softener brine are the only two sources to this sewer. This wastewater is not oily and does not contain benzene; and it does not require oil-water separation unit or biological treatment. It is currently sent to the process sewer/NAPIS influent via its segregated gravity line, with the option of diversion to Evaporation Pond No. 2 (EP-2). As part of the WWTP upgrades, there will be an option to re-direct this stream to the new biological treatment units.

The sanitary wastewater generated at the Refinery and the seven adjacent homes owned by the Refinery currently discharges to septic systems and not the WWTP. However, the WWTP upgrades will include the option for these sanitary sources to be redirected to the WWTP at a future date at Western Refining's discretion.

2.3 Pilot Travel Center Wastewaters

The Refinery has a contract with the adjacent Pilot Travel Center to treat the sanitary and restaurant wastewaters generated by that facility. The wastewater from the restaurant at the Pilot Travel Center goes through a new grease trap system installed in 2008. The grease trap effluent and the sanitary/restaurant wastewaters from the rest of the Pilot Travel Center flow to a septic tank system. Septage is pumped out of the septic tank system on a scheduled quarterly basis (as reported by Pilot Travel Center staff). The effluent from the septic tank system gravity flows to a lift station on the Pilot Travel Center property. This lift station, the grease trap, and the septic tank system are owned and operated by the Pilot Travel Center. The lift station's submersible pumps then transfer the wastewater through a pipeline to the Refinery for further pumping and treatment. Western Refining is currently constructing a new lift station on its property to receive the wastewater from the Pilot Travel Center's lift station (see Section 1.3).

The Pilot Travel Center generates other wastewaters that are not discharged to the Refinery. These other wastestreams include truck washing and vehicle maintenance activities. They are managed with on-site oil-water separators, holding tanks, and retention ponds at the Pilot Travel Center.

The design basis assumes that the wastestream discharges from the Pilot Travel Center to the Refinery are only sanitary/restaurant in origin and do not include any sources from vehicle service or vehicle washing operations. On this basis, the Pilot Travel Center wastewater was assumed to be free of benzene and hydrocarbon-based oil and grease (O/G).

2.4 Design Flow

The design flow rates for the individual sources are summarized in Table 2-1.

Table 2-1. Design Flow Rates

	Average, gpm	Maximum, gpm
NAPIS Effluent	250	500 (375)
Pilot Travel Center	50	120
RO Reject	109	149
Refinery Sanitary	4	--
Bioreactor Influent	413	664

The design flows for the NAPIS effluent were set at an average of 250 gallons per minute (gpm) and a maximum of 500 gpm. The average rate was based on historical data, allowances for future flows, and engineering judgment. The current average NAPIS effluent flow is approximately 150 gpm. The maximum flow rate equals the maximum flow capacity of the NAPIS with both bays in service.

The contract between Western Refining and the Pilot Travel Center limits the maximum flow to 50 gpm. However, the lift station pumps will be capable of pumping a combined flow of 120 gpm. Accordingly, the Pilot Travel Center design flows were set at 50 gpm average and 120 gpm maximum.

The NAPIS effluent design maximum flow will be equalized to 375 gpm by the Tank-based Separator. The maximum flow rate for the Refinery's sanitary source is included in the Pilot Travel Center maximum flow rate.

3. TECHNOLOGY SELECTION

3.1 Overview

Brown and Caldwell evaluated and selected technologies to upgrade the oil removal and biological treatment systems within the WWTP.

3.2 Second-Stage Oil-Water Separation

As discussed in Section 1.4, the treatment objectives for the WWTP upgrade are to provide water quality that is suitable for discharge to the unlined EP-1. Specifically, the objectives are for there to be no visible free oil and <0.5 mg/L benzene. This objective will be met by replacing the aerated lagoons with a tank-based biological treatment system. In order for biological treatment to be effective, wastewater must meet certain specifications (pH, temperature, nutrient concentrations, etc.). Included in those specifications is a limit on the concentration of oil. This limitation is the reason why refinery wastewater treatment systems have oil-water separation devices. Brown and Caldwell uses a guideline of <50 mg/L O/G as an average for biological treatment influents. Indications from the Refinery were that historically the NAPIS effluent has been consistently above the 50 mg/L threshold. Therefore, in addition to a new biological treatment process, Brown and Caldwell considered technologies for providing improved upstream O/G removal.

API separators (including the existing NAPIS) provide first-stage (i.e., primary) oil-water separation. As such, they provide removal of free oil that readily separates from the wastewater by gravity. The intent of second-stage oil-water separation is to provide additional O/G removal beyond what is consistently achievable by an API separator. Second-stage oil-water separation can remove the residual O/G that does not readily separate by gravity (i.e., emulsified O/G). Removal of this residual O/G by second-stage oil-water separation is often required to achieve the <50 mg/L guideline for biological treatment.

A Tank-based Separator was selected as the technology for providing second-stage oil-water separation at the Refinery, with the objective of producing a biological treatment influent with an average O/G concentration of <50 mg/L. The Tank-based Separator was selected for the following reasons:

- It provides a dual function of flow and wasteload equalization in addition to oil-water separation.
- It does not require the handling of oil and oily-solids on a continuous basis. Oil can be allowed to accumulate at the top of the tank and removed periodically (e.g., weekly).
- It is mechanically simple, with no moving parts except for the feed pumps and the floating roof.
- Because of its floating roof, it does not need a separate air emissions control device.
- It requires minimal operator attention or process control.
- It does not require chemical addition other than influent pH adjustment.

A Tank-based Separator functions in a similar fashion to an API separator; it is essentially an API separator in a larger tank with a longer residence time. Oil accumulates at the surface of the Tank-based Separator, is skimmed, and is returned to the Refinery for reprocessing just as with an API Separator. Solids that settle to the bottom of the Tank-based Separator are periodically removed and sent to oily solids recycling. Some refineries use a Tank-based Separator in place of an API separator. At the Gallup Refinery, the Tank-based

Separator will be an extension of the NAPIS, providing two oil-water separation stages in series for enhanced oil removal ahead of the Bioreactors.

Brown and Caldwell has designed Tank-based Separators for second-stage oil-water separation at several other refineries. These systems have been in successful operation for several years. A technical paper presenting case histories of three of these designs is provided in Attachment D.

The WWTP upgrade will be constructed initially with a single Tank-based Separator. At some future date (3 to 5 years away), the tank will require manual cleaning for oily solids removal, and thus the operating tank will need to be taken out of service. The cleaning effort generally requires several weeks or months. A second Tank-based Separator will need to be constructed and in service by this time so that second-stage oil-water separation can continue during the cleaning period. Construction of the second tank will be deferred for approximately two or more years following the start-up of the first tank, as it will not be needed until the first tank requires cleaning.

3.3 Biological Treatment

Western Refining commissioned a pilot study of activated sludge technology that was performed in November and December 2007. A report of this pilot study has been previously submitted to OCD. The pilot study was not successful and the resulting recommendation was to pursue the membrane bioreactor (MBR) technology. A MBR pilot study was performed during the months of May through July, 2008. A summary report of this study is provided in Attachment E.

A key issue with both the activated sludge and MBR pilot studies was that the concentration of O/G in the biological treatment influent exceeded the 50 mg/L average threshold discussed in Section 3.2. This observation led to the decision to pursue a second-stage oil water treatment step. The elevated O/G concentration in the feed stream precluded effective biological treatment in both pilot studies.

Brown and Caldwell does not recommend the MBR technology for the Gallup Refinery. Although the MBR technology has many benefits for other wastewaters, its applicability in refineries is suspect given the potential for fouling of the membranes with free oil. Even with highly efficient oil removal upstream, one would still expect there to be instances where free oil could reach the MBR. A cautious approach to installing MBR systems for refinery wastewaters is shared throughout the industry. There are currently no U.S. oil refineries with full-scale MBR systems.

The biological treatment technology selected for WWTP upgrade project was a Bioreactor without sludge (biomass) recycle. This technology is akin to an aerated lagoon, but in an above-ground steel tank. Two Bioreactors will be constructed to provide redundancy. The Bioreactors will normally be operated in parallel but series operation will be possible through valve changes. The combined liquid volume of the two bioreactors was selected to equal the combined liquid volume of AL-1 and AL-2.

The treatment capacity of the Bioreactors is designed to achieve the effluent treatment objectives of no visible free oil and <0.5 mg/L benzene. The oil objective (no visible free oil entering EP-1) will be attained by improving upstream oil removal, providing effective biodegradation, and utilizing a subsurface effluent withdrawal from the Bioreactors. The benzene objective will be met by effective biodegradation in the Bioreactor.

As mentioned above, the Bioreactors will have a subsurface effluent discharge to minimize the potential for floating oil that may reach the Bioreactors from being discharged to EP-1. An underflow baffle will also be provided on the outlet to further minimize this potential. The intent of these measures is to retain the floating oil on the surface of the Bioreactors, allowing the opportunity for further biodegradation. Excess

floating oil will be skimmed from the bioreactor surface using a vacuum truck. Floating oil is not anticipated in the Bioreactors; these measures are precautionary.

The Bioreactors will require ancillary systems to provide effective biological treatment. The Bioreactors will provide aerobic biodegradation and thus will require oxygen. Oxygen will be transferred to the Bioreactor contents using forced air from a blower system and air diffusers mounted to the bottom of the tank. The airflow will be controlled to maintain a minimum dissolved oxygen (DO) concentration of 2 mg/L. Each Bioreactor will have pH control capabilities to maintain a target pH range of 6.5 to 8.5 for effective biological treatment.

Biomass will exit the Bioreactors by being carried out in the Bioreactor effluent. The biomass will settle out in the downstream evaporations ponds, primarily EP-1. Over time, the settled biomass may accumulate in EP-1 to the extent that dredging will be required. Solids will not accumulate in the Bioreactors. The residence time of solids in the Bioreactors will be the same as the hydraulic residence time of the Bioreactors.

This Bioreactor technology was selected for the following reasons:

- The Bioreactors do not require the handling of solids on a continuous basis. The excess biomass solids will accumulate in the bottom of EP-1. After several years of operation, EP-1 may require dredging to restore its solids settling capacity.
- The Bioreactors are mechanically simple, with no moving parts except for the aeration blowers and chemical feed systems (pH control and nutrients).
- The Bioreactors require minimal operator attention and minimal process control.
- The Bioreactors are tank-based, so they can treat water containing >0.5 mg/L benzene.

Brown and Caldwell has designed similar Bioreactor systems (without sludge recycle) at three refineries. These systems shared the same treatment objective as Western Refining, to prevent visible free oil and >0.5 mg/L benzene from reaching downstream unlined ponds. Refinery X is a 10,000 to 20,000 bpd refinery with a single bioreactor. Refinery Y was a 50,000 bpd refinery with two parallel bioreactors. Refinery Z is a 90,000 bpd refinery with two parallel bioreactors. In each of these three cases, the bioreactor systems were designed for a hydraulic retention time of 24 hours. Recent verbal communications with current or former environmental staff at the refineries confirmed that the operating performance of the bioreactors achieved the design treatment objectives.

The biodegradation capacity of the Bioreactors can be expanded in the future if needed. The additional capacity would be achieved by increasing the biomass concentration. A simple means of raising the biomass concentration would be to add plastic media to the Bioreactor, making it a moving bed biofilm reactor (MBBR). This technology is available through wastewater equipment vendors including Veolia, Siemens, and Hydroxyl Systems. The media (also known as suspended carrier elements) floats freely in the Bioreactor. The media is mixed in a random pattern throughout the bioreactor via the aeration system and is retained in the Bioreactor by a screen on the outlet nozzle. Biomass grows on the surface of the media, thereby effectively increasing the biomass concentration in the bioreactor.

The Bioreactors will be constructed with an air diffuser system compatible with suspending and mixing the MBBR media. They will also be constructed with the effluent media screens in-place. With these components in place, media can be added directly to the Bioreactors in the future without further modifications.

The shutdown of Benzene Stripper No.3 will increase the benzene loading in the NAPIS effluent above current levels. In the detailed engineering phase, Brown and Caldwell will evaluate the impact of this change on the design conditions and evaluate whether or not MBBR media addition to the Bioreactors will be required as a result.

4. PROCESS DESCRIPTION

4.1 Overview

This section provides a process description of the new systems that will comprise the Refinery's WWTP following implementation of the upgrades. The first subsection discusses the new systems to be installed as part of the WWTP upgrades. The second subsection discusses the existing systems that will be decommissioned as part of the WWTP upgrades. This section concludes with a discussion of management of off-spec wastewater, secondary containment and leak detection, and an alternative upgrade approach. Process flow diagrams and a site layout drawing that accompany the process description are available in Attachments A and B, respectively.

4.2 New System

A description of the major equipment for the new system is provided below.

4.2.1 Stormwater/Diversion Tanks

A new stormwater management system will be constructed for the stormwater collected in the process area. This stormwater is currently collected in a dedicated sewer that discharges to the OAPIS. In the new system, stormwater will flow by gravity to two Stormwater/Diversion Tanks. These tanks are existing with a numerical designation of Z84-T27 and T28. The tanks have dimensions of 33'-5" diameter by 32 ft height, for a volume of 210,000 gallons each. The combined volume of 420,000 gallons will provide storage capacity for a 100-yr, 1-hour storm event (415,886 gallons). The tanks have existing, internal floating roofs for air emissions control. Stormwater that collects in the tanks will be pumped at a rate of 50 to 200 gpm to the process sewer that feeds the NAPIS. Two variable speed pumps will be provided (one operating, one standby). Because the stormwater will be treated in the NAPIS, the OAPIS will be taken out of service (see Section 4.3.3).

Cleanouts will be installed on the conveyance pipelines to and from the Stormwater/Diversion Tanks. Cleaning events will be scheduled on a regular, recurring basis. Underground piping will be buried below the frost line to prevent freezing. Aboveground piping will be electric heat traced to prevent freezing.

The conceptual design was developed by Tetra Tech and presented in a report dated October 2007. The report, entitled "Storm Drain System Extension – Process Design" was previously submitted to OCD. The design was further developed by RMT, as represented by four design drawings that are provided in Attachment C. Going forward, Brown and Caldwell will take over responsibility for completing the design.

The Stormwater/Diversion Tanks will also be configured to accepted Bioreactor effluent that is diverted away from EP-1. This configuration is further described in Sections 4.2.5 and 4.4.

4.2.2 NAPIS Effluent Pumping

The new system will include existing NAPIS Effluent Pumps Z84-P38 and Z84-P39. A new, third pump will be added as installed standby capacity (P40). The pumps will transfer the NAPIS effluent from the sump internal to the NAPIS to the new Tank-based Separator. The discharge from the pumps will join in a common pipe going to the Tank-based Separator. A flow meter will be installed on this line to measure the NAPIS effluent flow. The existing P38 and P39 may need to be replaced with larger capacity pumps to account for the higher head requirements of the new tank-based separator and/or higher design flow rates.

4.2.3 NAPIS Effluent pH Control

There will be an in-line pH control system installed on the wastewater pipe connecting the NAPIS and the Tank-based Separator. The purpose of this system will be to adjust the wastewater pH to enhance oil separation in the Tank-based Separator. A sulfuric acid feed system will be provided to lower alkaline pH conditions to the target pH of 6.5 s.u. The sulfuric acid would be added through an injection quill upstream of an in-line pH probe on the Tank-based Separator inlet that controls the rate of acid or addition. If the NAPIS effluent pH is <6.5, it will not be adjusted upwards.

4.2.4 Tank-Based Separator

The Tank-based Separator will be an above-ground circular tank with welded-steel construction and a concrete foundation. The tank will be unmixed and equipped with a floating roof for emissions control. The tank size will be 790,000 gallons tank with dimensions of 58 ft diameter by 40 ft height (38 ft water depth; 750,000 gallon working volume). The tank will be designated as Tank-based Separator Z84-T10. The tank will provide two functions. First, it will provide flow and concentration equalization in order to improve the performance of the downstream biological treatment. Second, it will provide additional oil removal to provide suitable feed characteristics for biological treatment.

Oil that accumulates on the liquid surface in the tank will be removed by a skimmer device internal to the floating roof. The skimmer will be connected to a valve at the bottom of the tank via a flexible hose. Oil removal will be periodic (typically once every 1 to 4 weeks). The oil will flow by gravity through a new piping to the Refinery's existing slop oil system.

The water phase will be withdrawn from the tank through a pipe in the tank wall and allowed to flow by gravity to downstream biological treatment. The flow rate out of T10 will be a constant rate using a flow meter and flow control valve.

A second, parallel Tank-based Separator will be constructed in the future. The second tank is not required until such time that T10 needs to be taken out of service for cleaning.

4.2.5 Bioreactors

Two tanks designated as Bioreactors Z84-T11 and Z84-T12 will provide biological treatment of the T10 effluent. The Bioreactors will be above-ground circular tanks with welded-steel construction and a concrete foundation. The tanks will be completely mixed by aeration. T11 and T12 will each have a 790,000 gallon tank with dimensions of 75 ft diameter by 24 ft height (21 ft water depth; 650,000 gallon working volume each).

Phosphoric acid will be injected into the common line from T10 feeding the Bioreactors. Phosphoric acid will be provided as a source of phosphorus, which is required as a nutrient for biological treatment. The phosphoric acid will be delivered by a feed system and injection quill. The rate of phosphoric acid addition will be proportionately controlled based on the measured flow rate of the T10 effluent. The target phosphorus concentration in the Bioreactor effluent is 0.5 to 1.0 mg/L as orthophosphate-phosphorus.

Two other wastewater sources will join the process wastewater (T10 effluent) upstream of biological treatment. The first source is the sanitary and restaurant wastewater from the adjacent Pilot Travel Center. The Refinery has historically treated this wastewater and is under contract to continue this practice. The

Travel Center wastewater will be pumped into the T10 effluent line via the new Lift Station currently under construction by Western Refining. The second source is the RO and water softener brines from the Refinery's boiler feedwater treatment system. These brines are currently discharged to the NAPIS or EP-2. They will be re-routed to the biological treatment influent with the upgraded system. The brines will flow by gravity from their source. Provisions will also be made for a third source to be added to the T10 effluent, which is sanitary wastewater from a portion of the Refinery (laboratory, change house, and warehouse). The future connection of the sanitary wastewater from the rest of the Refinery and the Refinery's residences would occur upstream of the WWTP, joining with the Pilot Travel Center wastewater.

The common line from T10 plus the additional sources will split to feed the two Bioreactor tanks in parallel. The flow will be split equally to the two tanks using symmetrical piping downstream of the phosphoric acid injection point. In addition, manual flow control valves will be provided on the lines to each tank for further adjustment. The operator will be able to monitor the relative flow split based on the readings from the influent flow meter at each tank.

The Bioreactors will normally operate in parallel as described above. However, the piping and valves will be in-place to switch to series operation if treatment conditions dictate. T11 would be the lead tank and T12 would be the lag tank for series operation.

In the Bioreactors, influent organics (including benzene and free oil) will be degraded by organisms in the presence of dissolved oxygen and converted into carbon dioxide, water and additional biomass. The DO will be provided by an aeration grid of coarse bubble diffusers installed in bottom of each Bioreactor. The aeration diffusers will be compatible with the use of MBBR media for possible future conversion to that technology. Air will be supplied to the diffusers by variable speed aeration blowers external to the Bioreactors. The blowers will be designated Bioreactor Blowers Nos. 1 through 3 (Z84-B26 through Z84-B28). B26 will be dedicated to T11 and B28 will be dedicated to T12. B27 will serve as a common installed spare. Each blower will have a 125 hp motor with a capacity of 1,300 standard[1] cubic feet per minute (scfm) at 10.2 pounds per square inch gauge (psig). Although normally idle, the third blower (B27) can be operated to supplement the air to either/both Bioreactors if process conditions dictate. T11 and T12 will also include pH control provisions to maintain the target pH range of 6.5 to 8.5 for effective biological treatment in the Bioreactors.

The Bioreactors will be covered with fixed roofs for purposes of heat conservation during the winter. The need for the installation of air emission capture and control measures is being considered.

The effluent from the Bioreactors will be a gravity discharge at a fixed level. As a result, the tank will operate at a constant level. The wastewater flow rate out of the Bioreactors will equal the flow rate into the Bioreactors. The effluent discharge from the Bioreactors will have three unique features. First, wedge-wire screens will be installed on the outlet connection making the Bioreactors compatible with the use of MBBR media. The screens are necessary to retain the media in the tank. Second, the outlet will be configured such that the wastewater discharge is withdrawn from the subsurface. This arrangement will be configured by elevating the discharge piping outside to maintain the desired 21-ft water depth in the tank. In this way, floating oil that potentially might accumulate on the water surface would be retained in the Bioreactor rather than flowing on to EP-1. This measure will provide the opportunity for additional biodegradation of the floating oil and the opportunity for the operator to remove oil with a vacuum truck. Visible oil in the Bioreactor is not anticipated. This contingency has been included in the design as a safeguard.

There will be provisions for diverting the Bioreactor effluent away from EP-1 in the event that the treated water quality is not acceptable. A diversion line will be connected to the combined Bioreator effluent, with its

[1] Defined as 1 atmosphere, 20 degrees Celsius, and 36 percent relative humidity.

valve normally closed. To divert, this valve would be opened and the valve to EP-1 closed. The diverted wastewater would flow to Stormwater/Diversion Tanks T27 and T28 of the new stormwater tank system (420,000 gallon storage capacity). The need for Bioreactor effluent diversion is not anticipated. However, this contingency has been included in the design as another safeguard.

The size of the Bioreactors was selected to provide a combined liquid volume of approximately 1.36 million gallons. This volume initially was based on the matching the estimated combined volume of AL-1 and AL-2. This volume also provides the design criteria of ≥1 day hydraulic residence time that Brown and Caldwell has used in successful bioreactor designs at other refineries.

The Bioreactors were designed to meet the aggressive biological treatment (ABT) requirements of 40 CFR 261.31(b)(2)(i). There are two design criteria in this regulation: that the aeration intensity be ≥6 hp per million gallons and that the HRT be not longer than 5 days. The supporting calculations provided in Attachment F confirm that these criteria will be satisfied.

4.2.6 Evaporation Pond No. 1

The effluent from each Bioreactor will combine and flow by gravity through a common Parshall flume (Z84-FL1) for flow measurement. Following the flume, the combined Bioreactor effluent will discharge into EP-1. EP-1 will not be lined or otherwise modified because the Bioreactor effluent will be free of floating oil and will have a benzene concentration <0.5 mg/L. This Bioreactor effluent quality will be assured by the following WWTP upgrades:

- Improved upstream oil-water separation provided by the Tank-based Separator.
- Improved biological treatment (due to the equalization and improved upstream oil-water separation provided by the Tank-based Separator).
- The ability to retain floating oil in the Bioreactors via the underflow baffle and submerged outlet.
- The ability to add MBBR media to the Bioreactors to provide additional biodegradation.

4.2.7 Chemical Feed Systems

Feed systems for three different chemicals will be required. Sulfuric acid will be used to provide pH adjustment of the Tank-based Separator influent and the Bioreactor contents. Caustic (sodium hydroxide) will be used to provide pH adjustment for the Bioreactor contents. Phosphoric acid will be added to the Bioreactor influent as a source of phosphorus nutrient to the biological treatment process. Diaphragm chemical metering pumps will be used to feed the chemicals to their point of use. There will be one dedicated pump for each chemical at each point of use (3 sulfuric acid pumps, 2 caustic pumps, and 1 phosphoric acid pump).

4.2.8 WWTP Operations Building

A new building will be constructed to support the WWTP operations and to house non-outdoor equipment.

4.3 Decommissioned Systems

Placing the new WWTP systems into service will allow some of the existing systems to be decommissioned.

4.3.1 Benzene Strippers Nos. 1, 2 and 3

The new Bioreactors will replace the benzene removal capacity of the two Benzene Strippers (Z84-V4 and Z84-V5) located at the WWTP and the one Benzene Stripper located in the process area of the Refinery

(Z84-V7). Therefore, these units can be decommissioned. The associated Benzene Stripper Air Blowers (Z84-AB3, Z84-AB4 and Z84-AB5) can also be decommissioned.

4.3.2 AL-1 and AL-2

The new Bioreactors will replace the biodegradation capacity of the two Aerated Lagoons. Therefore, AL-1 and AL-2 can be decommissioned. The associated surface aerators can also be decommissioned. Scott Crouch of RPS JDC is preparing the Closure Plan on behalf of Western Refining.

4.3.3 OAPIS

The Old API Separator currently receives stormwater from the segregated storm sewer in the process area. In the future, this sewer will be directed to the Stormwater/Diversion Tanks in the new stormwater system. The Stormwater/Diversion Tank contents will then be pumped to the NAPIS. Therefore, the OAPIS will no longer be required and can be decommissioned.

4.4 Management of Off-Spec Wastewater

Off-spec events are not anticipated for the Bioreactor effluent. However, contingencies have been included in the design as safeguards. If at anytime the Bioreactor effluent were deemed unsuitable for discharge to EP-1, it could be diverted to the new Stormwater/Diversion Tanks as described in Section 4.2.5. The diversion would be "all or nothing" rather than a partial diversion and partial flow to EP-1. When diversion occurred, the RO reject stream will be redirected to EP-2 (current practice) from the Bioreactors to save storage capacity in the stormwater system. The available storage time in the stormwater system will be further increased by reducing the flow rate out of the Tank-based Separator. Assuming the new Stormwater/Diversion Tanks are empty when the diversion starts, the available storage time would be 1.5 days at a Bioreactor effluent flow of 200 gpm and 1 day at 300 gpm. If the liquid level in the Tank-based Separator were 24 ft at the time diversion began, it could store 275,000 gallons of wastewater if the liquid level were increased to 38 ft. This amount would allow the Bioreactor influent to be reduced by 100 gpm for a period of 2 days. Reducing the Bioreactor influent flow rate would increase the amount of biodegradation occurring in the Bioreactors and thereby improve the water quality of the Bioreactor effluent, bringing it back on-spec and allowing operations to return to normal.

4.5 Secondary Containment and Leak Detection

Leak detection will be provided on the Tank-based Separator (T10) by installing channels in the concrete foundation under the tank or alternative system suitable to OCD. A compacted earthen berm will be constructed around T10. The volume contained within the berm will equal the tank's maximum volume plus a 30 percent safety factor.

The proposed design does not include leak detection or containment berms for the Bioreactors (T11 and T12). The tanks will not contain oil. Further, since the tanks will be completely mixed, the contents within the tank have the same characteristics of the Bioreactor effluent. However, the Bioreactors will be situated such that a potential leak would flow into EP-1, which is the destination of the Bioreactor effluent. If it becomes necessary to design the Bioreactor leak detection and secondary containment requirements for RCRA compliance, these requirements will be address during detailed engineering.

4.6 Alternative Upgrade Approach

The design proposed herein is based on the new construction of permanent tanks and equipment purchased by Western Refining. Western Refining may elect to pursue the installation of trailer- or skid-mounted equipment on a rental or lease basis. This approach may be more cost-effective for Western Refining on a short-term or mid-term basis. The rental/lease equipment would likely consist of different treatment configuration than selected for the permanent tank/equipment design. This difference would arise due to the limitations on the size and availability of rented/leased equipment. The leased/rented equipment would selected to meet the same treatment objectives as a permanent system (protect biological treatment from elevated oil concentrations, and treat the EP-1 influent to acceptable levels of benzene and visible free oil). Western Refining will submit the alternative design approach to OCD for approval prior to implementation.

5. PROJECT SCHEDULE

Brown and Caldwell's construction management group developed an estimate of the project schedule through construction (see Table 5-1). This Process Design Report represents the completion of the process design; however, detailed engineering is still required to provide the necessary information for the equipment vendors and construction contractor.

Table 5-1. Estimate of Project Schedule Through Construction

Description	Period
Engineering and Procurement	
Detailed Engineering	Months 1 through 6
Air Permit Application Submittal	Month 3
Contractor Bidding	Months 7 and 8
Air Permit Issuance	Month 9
Contract Award & Notice to Proceed	Month 9
Equipment Submittal Review	Months 10 and 11
Equipment Procurement	Months 12 and 13
Construction	
Site Preparation	Month 10
Wastewater Treatment Building	Months 10 through 15
Tank Based Separator	Months 10 through 22
Bioreactor Tanks	Months 10 through 20
Stormwater System	Months 16 through 18
Utility Installation	Months 12 through 16
Testing, Start-up, and Clean-up	Months 23 and 24

The project schedule assumes that Day 1 of Month 1 represents the date of written, final approval of the Process Design Report by the New Mexico Oil Conservation Division (Environmental Bureau), the New Mexico Environment Department (Hazardous Waste Bureau), and U.S. Environmental Protection Agency Region 6. Engineering will not proceed beyond this Process Design Report until this approval is received.

A potential delay in the project schedule is the issuance of any air permits that may be required. The project will not proceed beyond the Month 9 milestones above until the required air permits have been issued.

ATTACHMENT A: PROCESS FLOW DIAGRAMS

Drawing No. and Title

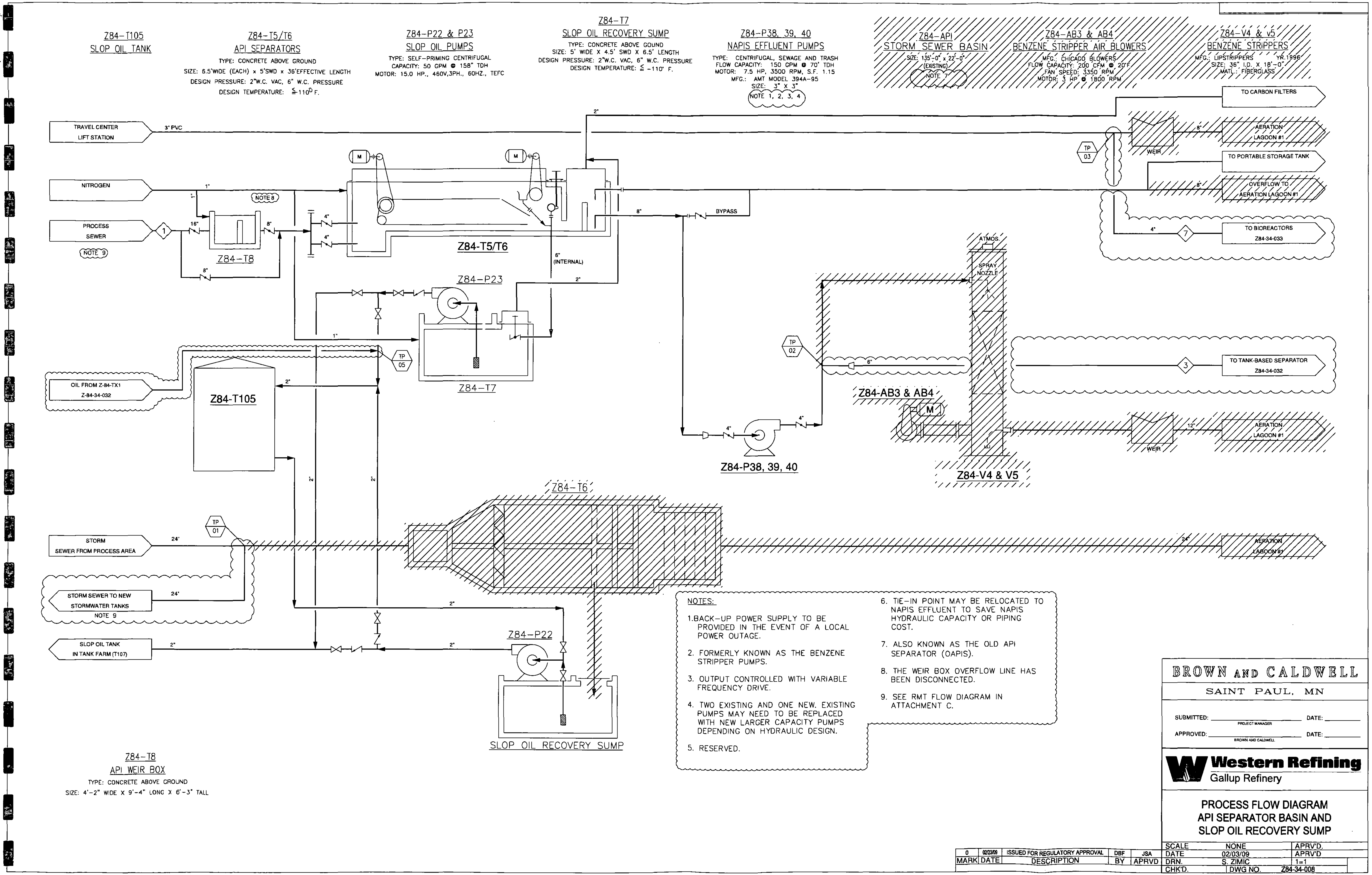
Z84-34-008: API Separator Basin and Slop Oil Recovery Sump

Z84-34-030: Chemical Systems

Z84-34-031: NAPIS Effluent

Z84-34-032: Tank-Based Separator

Z84-34-033: Biological System


Z84-T105
SLOP OIL TANK
Z84-T5/T6
API SEPARATORS
TYPE: CONCRETE ABOVE GROUND
SIZE: 6.5'WIDE (EACH) x 5'SWD x 36'EFFECTIVE LENGTH
DESIGN PRESSURE: 2"W.C. VAC, 6" W.C. PRESSURE
DESIGN TEMPERATURE: ≤110° F.
Z84-P22 & P23
SLOP OIL PUMPS
TYPE: SELF-PRIMING CENTRIFUGAL
CAPACITY: 50 GPM @ 158' TDH
MOTOR: 15.0 HP., 460V,3PH., 60HZ., TEFC
Z84-T7
SLOP OIL RECOVERY SUMP
TYPE: CONCRETE ABOVE GOUND
SIZE: 5' WIDE X 4.5' SWD X 6.5' LENGTH
DESIGN PRESSURE: 2"W.C. VAC, 6" W.C. PRESSURE
DESIGN TEMPERATURE: ≤ -110° F.
Z84-P38, 39, 40
NAPIS EFFLUENT PUMPS
TYPE: CENTRIFUGAL, SEWAGE AND TRASH
FLOW CAPACITY: 150 GPM @ 70' TDH
MOTOR: 7.5 HP, 3500 RPM, S.F. 1.15
MFG.: AMT MODEL 394A-95
SIZE: 3" X 3"
NOTE 1, 2, 3, 4
Z84-API
STORM SEWER BASIN
SIZE: 135'-0" x 22'-0"
(EXISTING)
NOTE 7
Z84-AB3 & AB4
BENZENE STRIPPER AIR BLOWERS
MFG.: CHICAGO BLOWERS
FLOW CAPACITY: 200 CFM @ 20'F
FAN SPEED: 3350 RPM
MOTOR: 3 HP @ 1800 RPM
Z84-V4 & V5
BENZENE STRIPPERS
MFG.: LIPSTRIPPERS YR.1996
SIZE: 36" I.D. X 18'-0"
MATL.: FIBERGLASS
TRAVEL CENTER
LIFT STATION
3" PVC
2"
TO CARBON FILTERS
AERATION
LAGOON #1
8"
WEIR
TP
03
TO PORTABLE STORAGE TANK
OVERFLOW TO
AERATION LAGOON #1
NITROGEN
1"
NOTE 8
PROCESS
SEWER
NOTE 9
1
16"
8"
4"
4"
Z84-T8
Z84-T5/T6
BYPASS
TO BIOREACTORS
Z84-34-033
7
6"
(INTERNAL)
ATMOS.
SPRAY
NOZZLE
Z84-P23
Z84-T7
TP
02
TO TANK-BASED SEPARATOR
Z84-34-032
3
TP
05
OIL FROM Z-84-TX1
Z-84-34-032
Z84-T105
Z84-AB3 & AB4
M
12"
Z84-P38, 39, 40
Z84-V4 & V5
Z84-T6
TP
01
STORM
SEWER FROM PROCESS AREA
24"
STORM SEWER TO NEW
STORMWATER TANKS
NOTE 9
SLOP OIL TANK
IN TANK FARM (T107)
Z84-P22
SLOP OIL RECOVERY SUMP
Z84-T8
API WEIR BOX
TYPE: CONCRETE ABOVE GROUND
SIZE: 4'-2" WIDE X 9'-4" LONG X 6'-3" TALL
NOTES:
1.BACK-UP POWER SUPPLY TO BE PROVIDED IN THE EVENT OF A LOCAL POWER OUTAGE.
2. FORMERLY KNOWN AS THE BENZENE STRIPPER PUMPS.
3. OUTPUT CONTROLLED WITH VARIABLE FREQUENCY DRIVE.
4. TWO EXISTING AND ONE NEW. EXISTING PUMPS MAY NEED TO BE REPLACED WITH NEW LARGER CAPACITY PUMPS DEPENDING ON HYDRAULIC DESIGN.
5. RESERVED.
6. TIE-IN POINT MAY BE RELOCATED TO NAPIS EFFLUENT TO SAVE NAPIS HYDRAULIC CAPACITY OR PIPING COST.
7. ALSO KNOWN AS THE OLD API SEPARATOR (OAPIS).
8. THE WEIR BOX OVERFLOW LINE HAS BEEN DISCONNECTED.
9. SEE RMT FLOW DIAGRAM IN ATTACHMENT C.
BROWN AND CALDWELL
SAINT PAUL, MN
SUBMITTED: DATE:
PROJECT MANAGER
APPROVED: DATE:
BROWN AND CALDWELL
Western Refining
Gallup Refinery
PROCESS FLOW DIAGRAM
API SEPARATOR BASIN AND
SLOP OIL RECOVERY SUMP
0 | 02/23/09 | ISSUED FOR REGULATORY APPROVAL | DBF | JSA
MARK | DATE | DESCRIPTION | BY | APRVD
SCALE NONE APRV'D.
DATE 02/03/09 APRV'D
DRN. S. ZIMIC 1=1
CHK'D. DWG NO. Z84-34-008

Z84–P30, 31, 32
SULFURIC ACID PUMPS

TYPE: DIAPHRAGM CHEMICAL METERING
CAPACITY: 0 TO 10 GPH
MOTOR: 0.5 HP
NOTE 5

Z84–P33, 34
CAUSTIC PUMPS

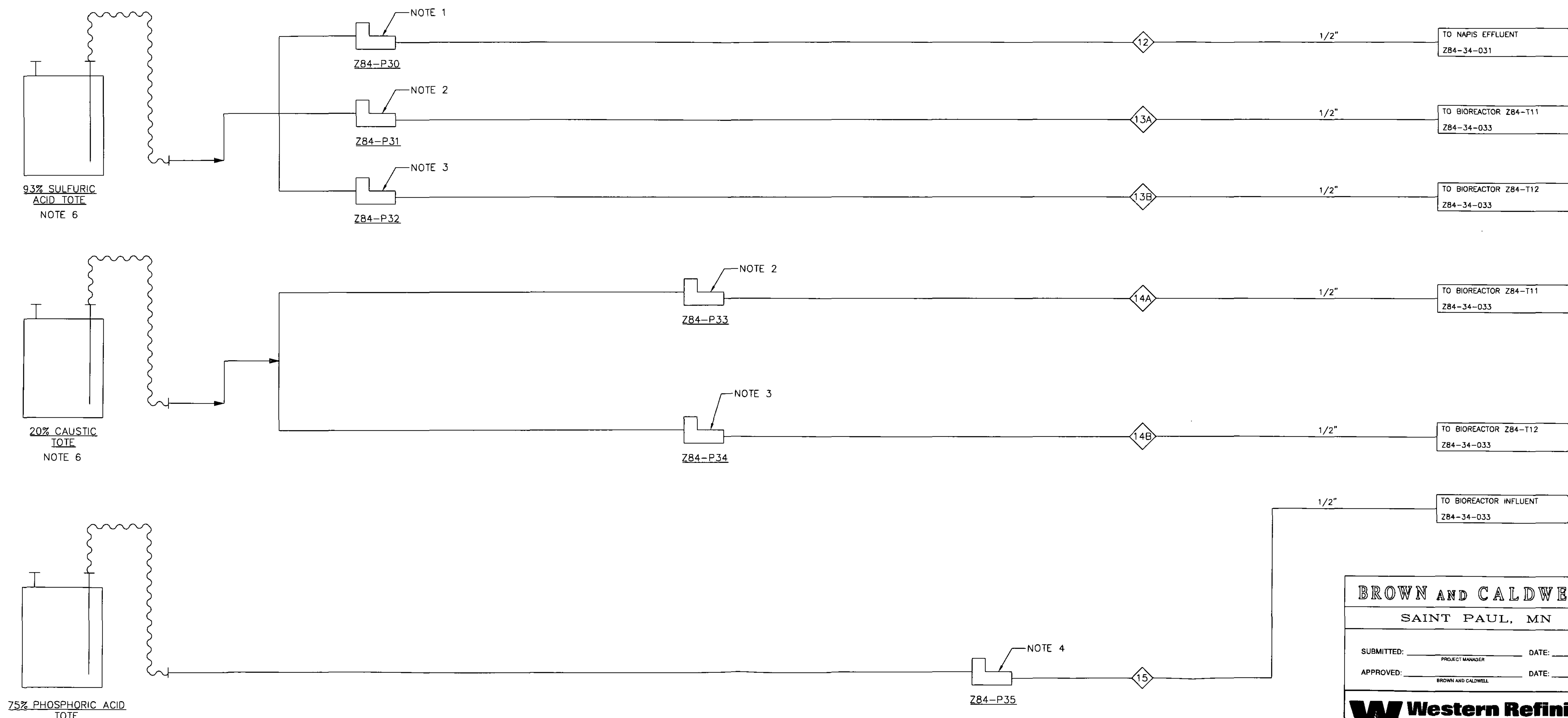
TYPE: DIAPHRAGM CHEMICAL METERING
CAPACITY: 0 TO 10 GPH
MOTOR: 0.5 HP
NOTE 5

Z84–P35
PHOSPHORIC ACID PUMP

TYPE: DIAPHRAGM CHEMICAL METERING
CAPACITY: 0 TO 0.5 GPH
MOTOR: 0.5 HP
NOTE 5

NOTES:

1. PUMPING RATE AUTO CONTROLLED BY NAPIS EFFLUENT PH (AEXXX).
2. PUMPING RATE AUTO CONTROLLED BY BAAT NO. 1 PH (AEXXX).
3. PUMPING RATE AUTO CONTROLLED BY BAAT NO. 2 PH (AEXXX).
4. PUMPING RATE AUTO CONTROLLED BY TANK BASED SEPARATOR EFFLUENT FLOW RATE (FEXXX).
5. SHELF SPARE PUMP ALSO PROVIDED.
6. PLOT SPACE WILL BE RESERVED FOR 6,000 GAL STORAGE TANK IF FUTURE CHEMICAL USAGE RATES WARRANT.



EVERYTHING ON THIS SHEET IS NEW

BROWN AND CALDWELL
SAINT PAUL, MN

SUBMITTED: ____________ DATE: ______
PROJECT MANAGER
APPROVED: ____________ DATE: ______
BROWN AND CALDWELL

Western Refining
Gallup Refinery

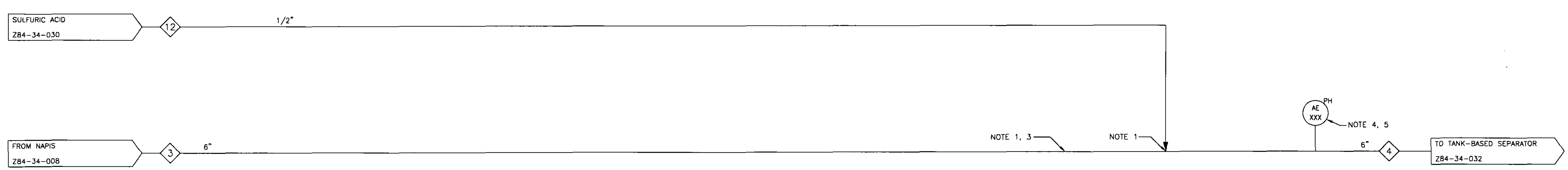
WASTEWATER TREATMENT SYSTEM
CHEMICAL FEED SYSTEMS
PROCESS FLOW DIAGRAM

MARK	DATE	DESCRIPTION	BY	APRVD
0	02/23/09	ISSUED FOR REGULATORY APPROVAL	DBF	JSA

SCALE	NONE	APRV'D.	
DATE	01/07/09	APRV'D	
DRN.	S. ZIMIC	1=1	
CHK'D.		DWG NO.	Z84-34-030

NOTES:

1. INJECTION QUILL AND SPOOL PIECE.
2. RESERVED.
3. FOR FUTURE CAUSTIC ADDITION (IF NECESSARY)
4. NAPIS EFFLUENT PH (AEXXX) AUTOMATICALLY CONTROLS RATE OF ACID PUMP Z84-P30.
5. INCLUDES DUPLICATE PROBE.



EVERYTHING ON THIS SHEET IS NEW

BROWN AND CALDWELL

SAINT PAUL, MN

SUBMITTED: ______ DATE: ______
PROJECT MANAGER

APPROVED: ______ DATE: ______
BROWN AND CALDWELL

Western Refining
Gallup Refinery

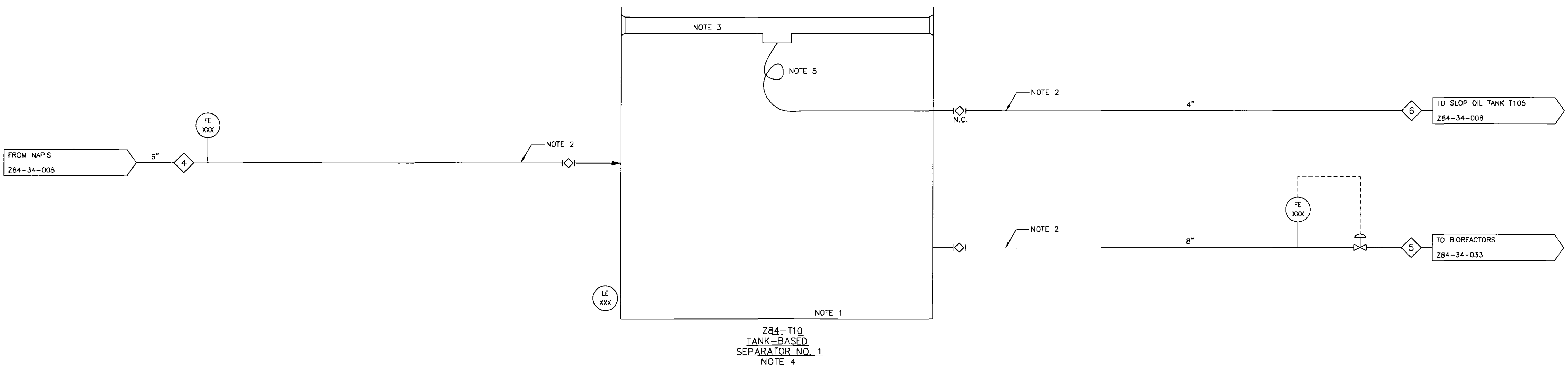
WASTEWATER TREATMENT SYSTEM
NAPIS EFFLUENT
PROCESS FLOW DIAGRAM

0	02/23/09	ISSUED FOR REGULATORY APPROVAL	DBF	JSA
MARK	DATE	DESCRIPTION	BY	APRVD

SCALE	NONE	APRV'D.
DATE	01/07/09	APRV'D
DRN.	S. ZIMIC	1=1
CHK'D.	DWG NO.	Z84-34-031

Z84–T10
TANK BASED SEPARATOR NO. 1

VOLUME: 790,000 GAL TOTAL, 750,000 GAL LIQUID
DIMENSIONS: 58 FT DIA X 40 FT H (38 FT LIQUID)
MATERIAL: COATED CS
NOTE 6, 7



NOTES:

1. SOLIDS WILL BE MANUALLY REMOVED AS NECESSARY AND SENT TO OILY SOLIDS RECYCLING.
2. SAMPLE LOCATION.
3. EXTERNAL FLOATING ROOF WITH OIL SKIMMER.
4. SECOND TANK WILL BE REQUIRED IN THE FUTURE WHEN THE FIRST TANK IS TO BE CLEANED.
5. FLEXIBLE HOSE.
6. TANK OPERATES AT VARIABLE VOLUME/ LEVEL.
7. 2" X 2" CHANNELS IN CONCRETE TANK FOUNDATION FOR LEAK DETECTION.

EVERYTHING ON THIS SHEET IS NEW

BROWN AND CALDWELL
SAINT PAUL, MN

SUBMITTED: ____________ DATE: ________
PROJECT MANAGER
APPROVED: ____________ DATE: ________
BROWN AND CALDWELL

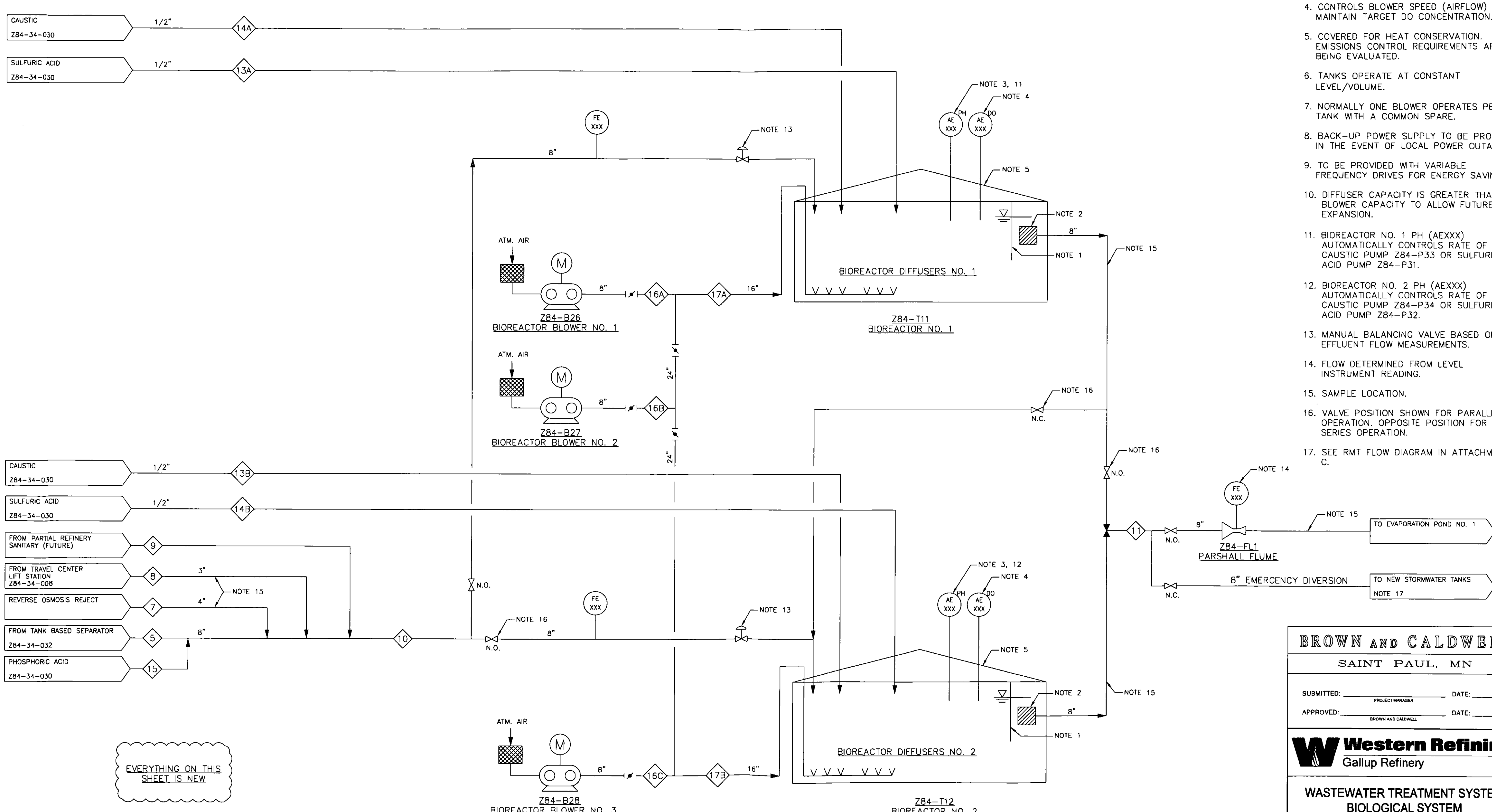
Western Refining
Gallup Refinery

WASTEWATER TREATMENT SYSTEM
TANK-BASED SEPARATOR
PROCESS FLOW DIAGRAM

MARK	DATE	DESCRIPTION	BY	APRVD
0	02/23/09	ISSUED FOR REGULATORY APPROVAL	DBF	JSA

SCALE	NONE	APRV'D.	
DATE	01/07/09	APRV'D	
DRN.	S. ZIMIC	1=1	
CHK'D.	DWG NO.	Z84-34-032	

Z84-B26, 27, 28 BIOREACTOR BLOWERS NO. 1, 2, AND 3	Z84-T11 BIOREACTOR NO. 1	Z84-T12 BIOREACTOR NO. 2	XX-XX BIOREACTOR DIFFUSERS NO. 1 AND 2	Z84-FL1 PARSHALL FLUME
TYPE: ROTARY LOBE POSITIVE DISPLACEMENT MOTOR: 125 HP CAPACITY: 1,300 SCFM @ 10.2 PSIG MATERIAL: CAST IRON NOTE 7, 8, 9	VOLUME: 793,000 GAL TOTAL 694,000 GAL LIQUID DIMENSIONS: 75 FT DIA X 24 FT H (21 FT LIQUID) MATERIAL: COATED CS NOTE 6	VOLUME: 793,000 GAL TOTAL 694,000 GAL LIQUID DIMENSIONS: 75 FT DIA X 24 FT H (21 FT LIQUID) MATERIAL: COATED CS NOTE 6	TYPE: WIDE-BAND COARSE BUBBLE CAPACITY: 4,800 SCFM EACH MATERIAL: 316L SS NOTE 10	CAPACITY: 4 TO 834 GPM MATERIAL: FRP



NOTES:

1. UNDER-FLOW BAFFLE TO MINIMIZE THE POTENTIAL FOR OIL TO EXIT TANK.
2. 5 MM WEDGE-WIRE SCREEN FOR RETENTION OF FUTURE MBBR MEDIA.
3. A SECOND pH PROBE TO BE INSTALLED IN EACH TANK FOR REDUNDANCY.
4. CONTROLS BLOWER SPEED (AIRFLOW) TO MAINTAIN TARGET DO CONCENTRATION.
5. COVERED FOR HEAT CONSERVATION. EMISSIONS CONTROL REQUIREMENTS ARE BEING EVALUATED.
6. TANKS OPERATE AT CONSTANT LEVEL/VOLUME.
7. NORMALLY ONE BLOWER OPERATES PER TANK WITH A COMMON SPARE.
8. BACK-UP POWER SUPPLY TO BE PROVIDED IN THE EVENT OF LOCAL POWER OUTAGE.
9. TO BE PROVIDED WITH VARIABLE FREQUENCY DRIVES FOR ENERGY SAVINGS.
10. DIFFUSER CAPACITY IS GREATER THAN BLOWER CAPACITY TO ALLOW FUTURE EXPANSION.
11. BIOREACTOR NO. 1 PH (AEXXX) AUTOMATICALLY CONTROLS RATE OF CAUSTIC PUMP Z84-P33 OR SULFURIC ACID PUMP Z84-P31.
12. BIOREACTOR NO. 2 PH (AEXXX) AUTOMATICALLY CONTROLS RATE OF CAUSTIC PUMP Z84-P34 OR SULFURIC ACID PUMP Z84-P32.
13. MANUAL BALANCING VALVE BASED ON EFFLUENT FLOW MEASUREMENTS.
14. FLOW DETERMINED FROM LEVEL INSTRUMENT READING.
15. SAMPLE LOCATION.
16. VALVE POSITION SHOWN FOR PARALLEL OPERATION. OPPOSITE POSITION FOR SERIES OPERATION.
17. SEE RMT FLOW DIAGRAM IN ATTACHMENT C.

BROWN AND CALDWELL

SAINT PAUL, MN

SUBMITTED: ____________ DATE: ______
PROJECT MANAGER

APPROVED: ____________ DATE: ______
BROWN AND CALDWELL

Western Refining
Gallup Refinery

WASTEWATER TREATMENT SYSTEM
BIOLOGICAL SYSTEM
PROCESS FLOW DIAGRAM

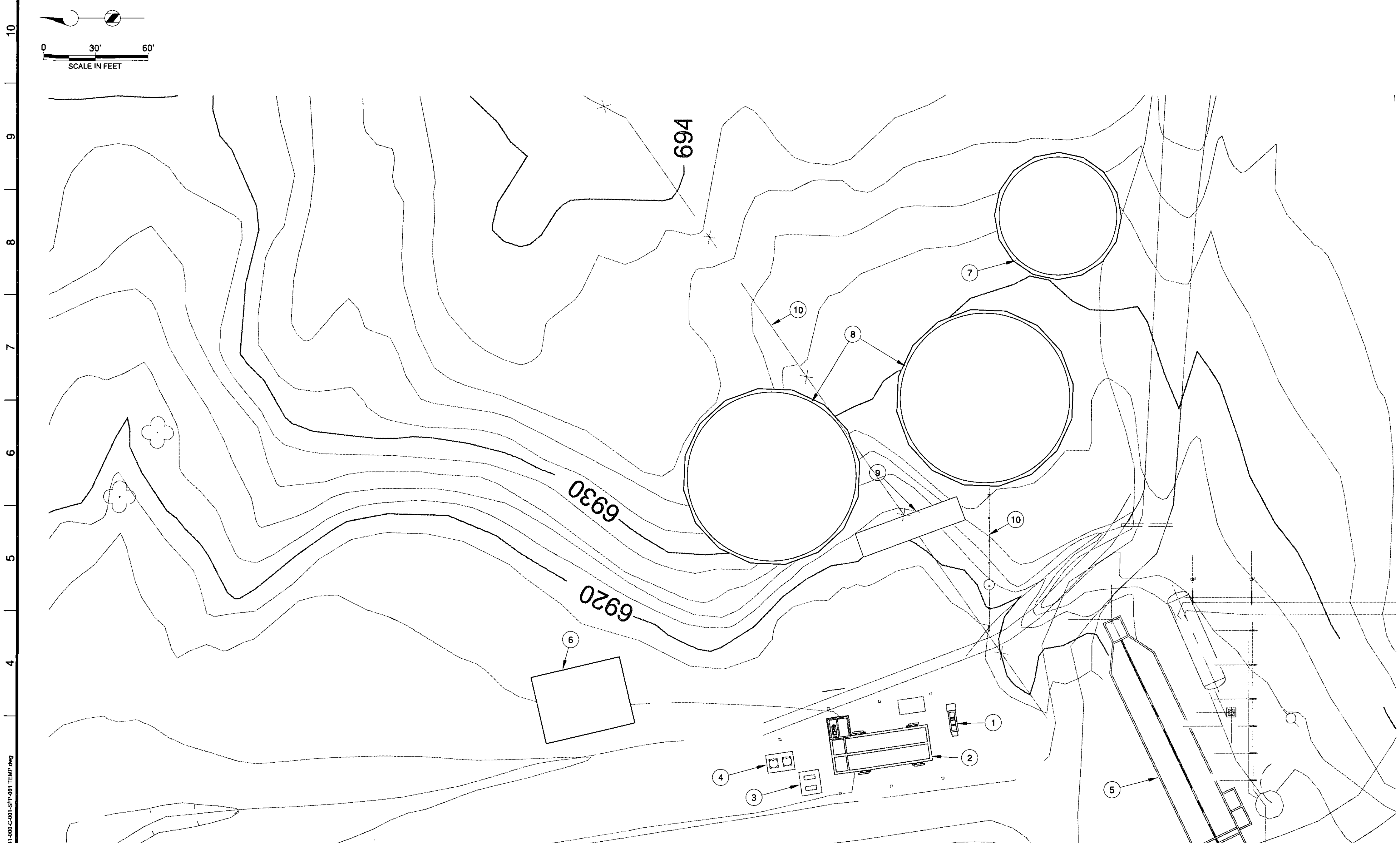
MARK	DATE	DESCRIPTION	BY	APRVD
0	02/23/09	ISSUED FOR REGULATORY APPROVAL	DBF	JSA

SCALE	NONE	APRV'D.	
DATE	01/07/09	APRV'D	
DRN.	S. ZIMIC	1=1	
CHK'D.	DWG NO.	Z84-34-033	

ATTACHMENT B: PRELIMINARY SITE PLAN

Drawing No. and Title

C1: Site Plan



GENERAL NOTES

1. ITEM NOS. 1, 2, 3 AND 4 ARE EXISTING AND WILL REMAIN FOLLOWING THE WWTP UPGRADES.
2. ITEM NO. 5 IS EXISTING BUT WILL NOT BE OPERATIONAL FOLLOWING THE WWTP UPGRADES.
3. ITEM NOS. 6, 7, 8 AND 9 ARE NEW FOR THE WWTP UPGRADES.

KEY NOTES:

(1) WEIR BOX
(2) NEW API SEPARATOR
(3) NAPIS EFFLUENT PUMPS
(4) CARBON VESSELS
(5) OLD API SEPARATOR
(6) 40' x 30' WWTP CONTROL BUILDING
(7) TANK BASED SEPARATOR
(8) BIOREACTOR
(9) AERATION BLOWER PAD
(10) SECURITY FENCE TO BE RELOCATED

BROWN AND CALDWELL
SAINT PAUL, MN

SUBMITTED: ____ PROJECT MANAGER DATE: ____
APPROVED: ____ BROWN AND CALDWELL DATE: ____

LINE IS 2 INCHES AT FULL SIZE (IF NOT 2" - SCALE ACCORDINGLY)

DESIGNED:
DRAWN: JME
CHECKED:
CHECKED:
APPROVED:

EXTERNAL REFERENCE FILES
135741-000-G-00000-01.dwg
135741-100-S-01-MP-0001.dwg
135741-000-C-01-MP-0001.DWG
135741-100-M-01-MP-0001.dwg
MODEL.dwg

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.
	0	ISSUED FOR REGULATORY APPROVAL	DBF	2/23/09	JSA

Western Refining

GALLUP WASTEWATER TREATMENT PLANT UPGRADE
SITE PLAN

FILENAME
BC PROJECT NUMBER 135741
CLIENT PROJECT NUMBER
DRAWING NUMBER C1
SHEET NUMBER
OF

Feb 26, 2009 - 1:57pm
P:\Western_Refining\135741_Gallup_Wastewater\CADD\2-SHEETS\C-CIVIL\135741-000-C-001-SFP-001 TEMP.dwg
sztinic
wnr-l.gif

ATTACHMENT C: STORMWATER/DIVERSION TANK DRAWINGS

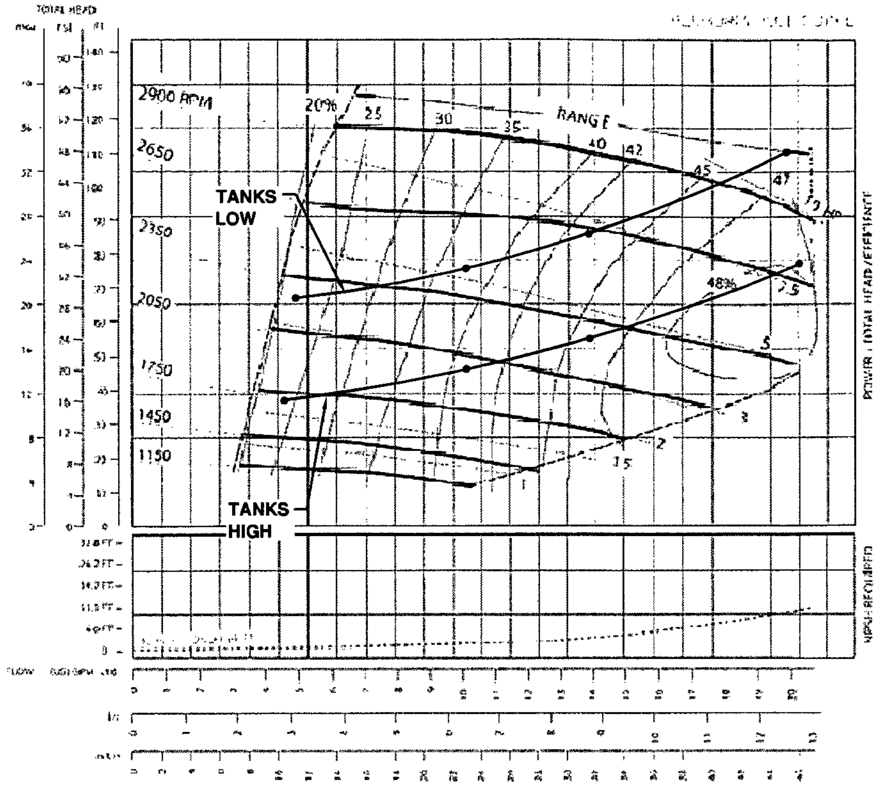
Drawing No. and Title

7788.03.01: Flow Diagram

7788.03.02: Tank Details

7788.03.03: Pump Building

7788.03.04: Details



NOTES:

1. 63 FT. ELEVATION RISE FROM SLOP OIL TANK BASE TO ROAD NORTH OF LOADING RACK AREA.
2. ASSUME 30 FT. HEIGHT OF FORMER SLOP OIL TANKS
3. PUMP CURVE SHOWN IS ALLPRIME MODEL S-2, CONTACT (800) 803-0353.

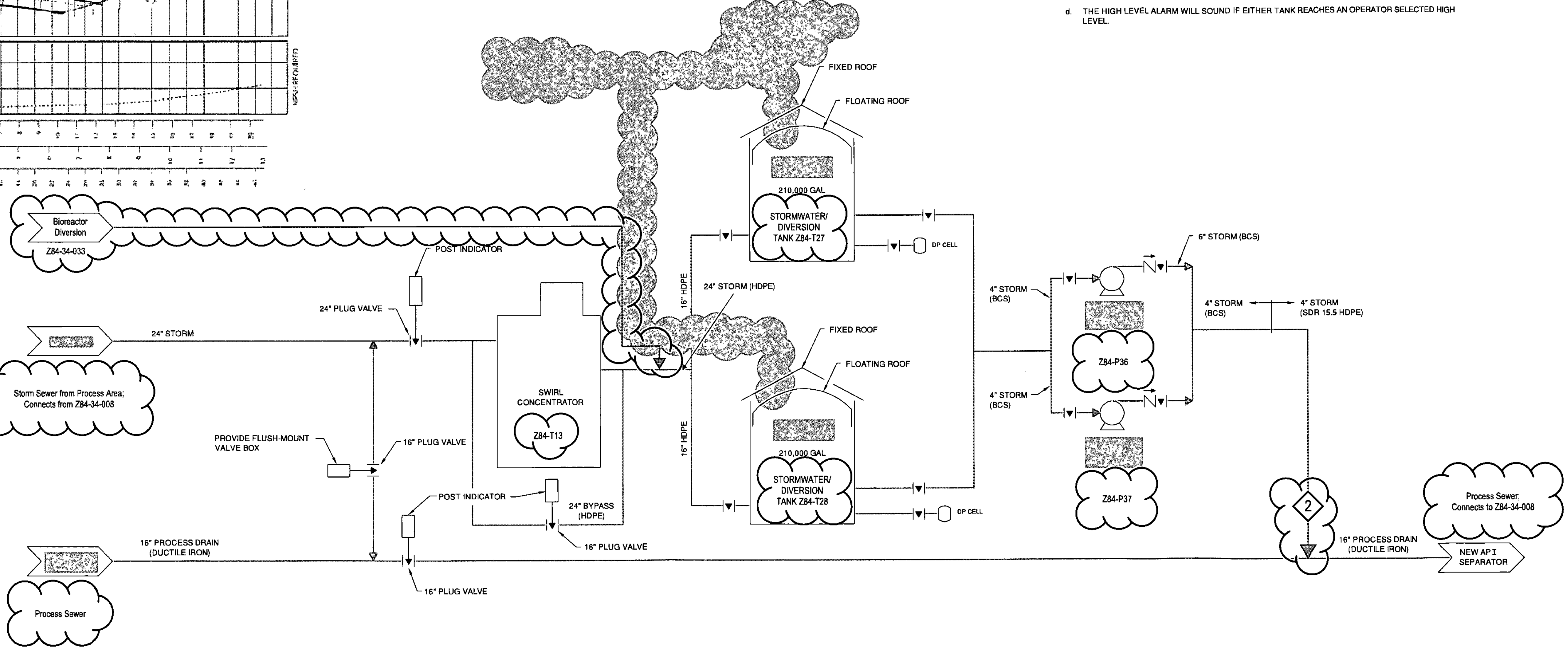
Z84-T28
STORMWATER/DIVERSION TANK
(EXISTING)
VOLUME: 210,000 GAL
DIMENSIONS: 33'-5" FT DIA, 32 FT H
MATERIAL: COATED CS

Z84-T27
STORMWATER/DIVERSION TANK
(EXISTING)
VOLUME: 210,000 GAL
DIMENSIONS: 33'-5" FT DIA, 32 FT H
MATERIAL: COATED CS

SEQUENCE OF OPERATION

1. STORMWATER FLOWS BY GRAVITY FROM THE REFINERY TO TANKS 1 AND 2. THE TANKS ARE FLOATING ROOF VESSELS.
2. STORMWATER IS PUMPED BY PUMPS P-1 AND P-2 TO THE REFINERY'S 16 INCH PROCESS DRAIN WHICH FLOWS TO THE NEW API SEPARATOR. THE PUMPS WILL BE CONTROLLED BY A PLC WITH HAND/OFF/AUTO CONTROL. LEVEL SENSING SHALL BE BY A DIFFERENTIAL PRESSURE CELL WITH ONE LOCATED IN EACH TANK. THE OPERATOR WILL BE ABLE TO SELECT WHICH DP CELL WILL CONTROL PUMP OPERATION. A MAGNETIC FLOWMETER WILL BE PROVIDED WITH 4-20 MILLIAMP SIGNAL SENT TO THE PLC. IN AUTO MODE, THE PUMPS WILL OPERATE AS FOLLOWS:

a. ONE PUMP WILL TURN ON AT AN OPERATOR SELECTABLE LEVEL AND TURN OFF AT AN OPERATOR SELECTABLE LOW LEVEL.
b. THE PUMPS WILL AUTOMATICALLY ALTERNATE.
c. EACH PUMP SHALL BE PROVIDED WITH A VARIABLE FREQUENCY DRIVE (VFD). THE OPERATOR WILL BE ABLE TO INPUT THE DESIRED FLOWRATE AS MEASURED BY THE MAGNETIC FLOWMETER AND CONTROLLED BY THE VFD.
d. THE HIGH LEVEL ALARM WILL SOUND IF EITHER TANK REACHES AN OPERATOR SELECTED HIGH LEVEL.



Z84-T13
SWIRL CONCENTRATOR
DIMENSIONS: 12 FT DIA
CAPACITY: 25.2 CFS
MATERIAL: HDPE

Z84-P-36,37
STORMWATER PUMPS
TYPE: SELF-PRIMING NON-CLOG
CAPACITY: 50 - 200 GPM @ 90 FT TDH
MOTOR: 20 HP
MATERIAL: CI/DI CASING & IMPELLER

ALL EQUIPMENT ON THIS SHEET IS NEW. CLOUDED ITEMS ARE ADDITIONS TO THE DRAWINGS BY BROWN AND CALDWELL (FEB 2009). THE GREY SHADED ITEMS ARE DELETIONS.

Issued for Regulatory Approval 02/25/09

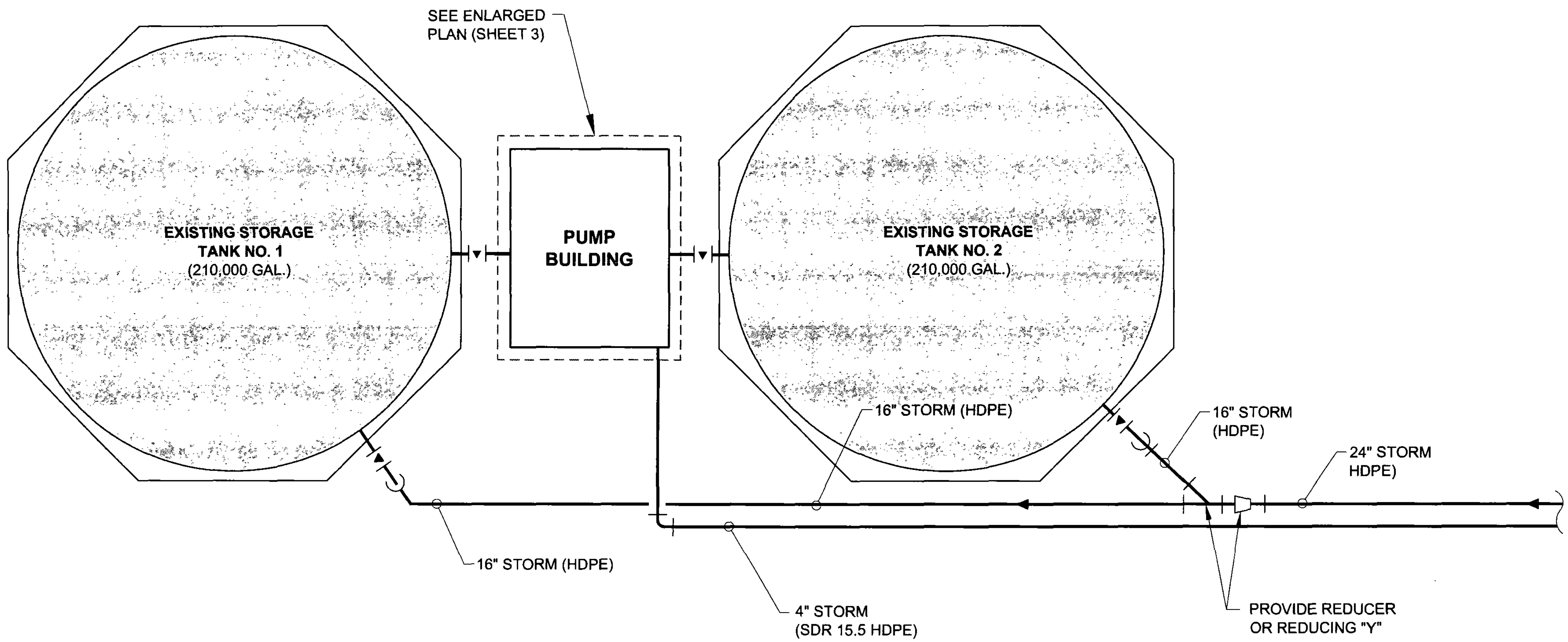
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	09-22-08	ISSUED FOR BIDS	ELC
1.	SJL	08-29-08	100% OWNER'S REVIEW	ELC

WESTERN REFINING
GALLUP REFINERY

FLOW DIAGRAM

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO: J:\07788103	
CHECKED BY: EC		FILE NO: 7788.03.01.dwg	
APPROVED BY: EC	DATE PRINTED:	Sheet 1 of 4	
DATE: September 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022



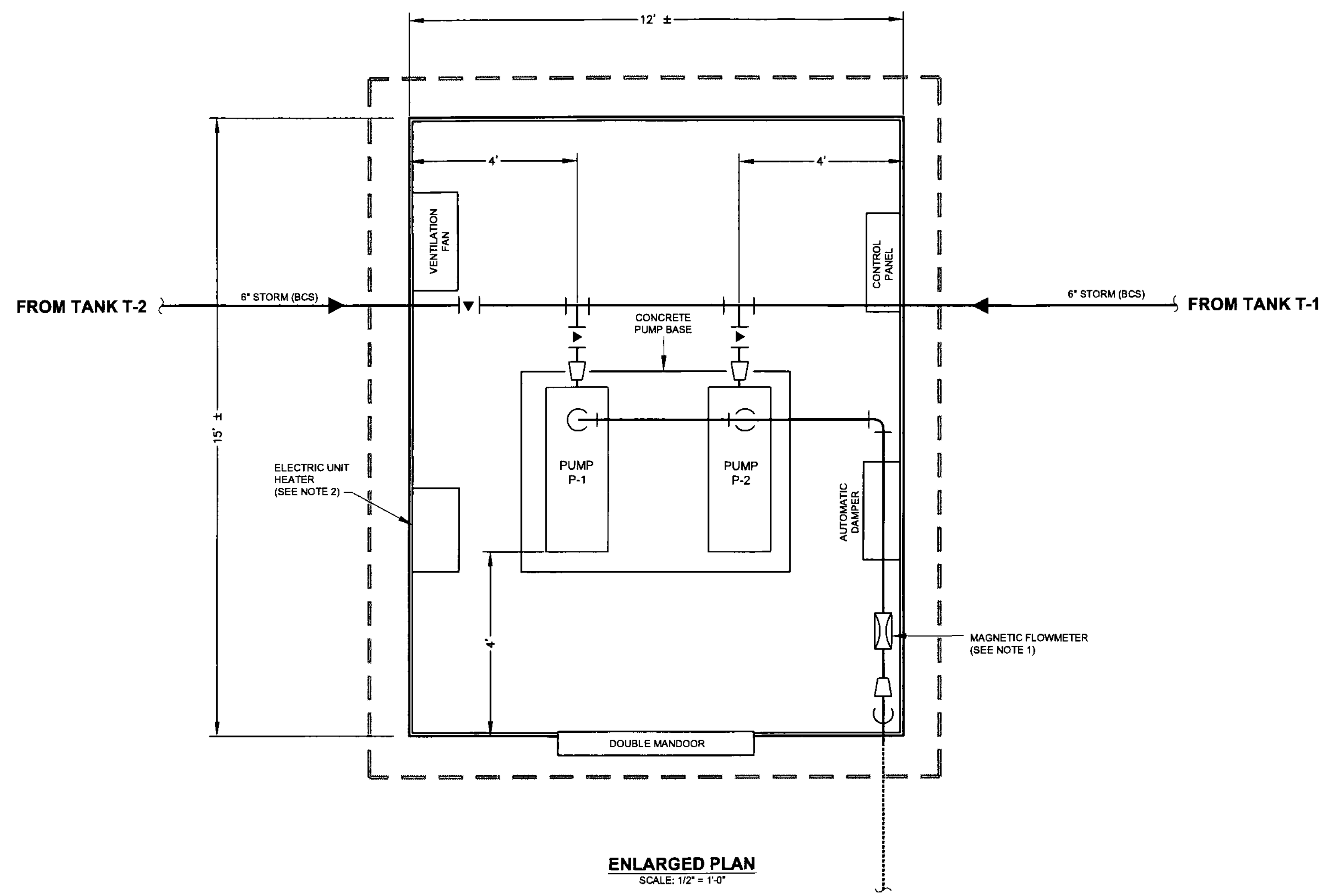
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	09-22-08	ISSUED FOR BIDS	ELC
1.	SJL	08-29-08	100% OWNER'S REVIEW	ELC

WESTERN REFINING
GALLUP REFINERY

TANK DETAILS

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO: J:\07788\03	
CHECKED BY: EC		FILE NO: 7788.03.02.dwg	
APPROVED BY: EC	DATE PRINTED:	**Sheet 2 of 4**	
DATE: September 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022



ENLARGED PLAN
SCALE: 1/2" = 1'-0"

NOTES:

1. PUMPS SHALL BE SELF-PRIMING, NON-CLOG WASTEWATER PUMPS EQUAL TO ALL PRIME MODEL S-2. GORMAN-RUPP MAKES AN EQUIVALENT PRODUCT. PUMP SHALL HAVE 2 INCH FLANGED INLET AND OUTLET, PASS 1 ¾ INCH SPHERES WITH CAST OR DUCTILE IRON BODY AND IMPELLER. STAINLESS STEEL SHAFT SLEEVE AND BUNA-N ELASTOMERS.
2. ABOVE GRADE PIPING SHALL BE SCHEDULE 40 BLACK CARBON STEEL. GALVANIZED OR STAINLESS STEEL, HIGH STRENGTH FLANGE BOLTS AND NEOPRENE FLANGE GASKETS. PRESSURE TEST AT 100 PSIG.
3. VALVES SHALL BE PLUG VALVES WITH BUNA-N COATED PLUG, CAST IRON BODY EQUAL TO VALMATIC FROM USA BLUEBOOK, (800) 548-1234.
4. CHECK VALVES SHALL BE EQUAL TO FLOMATIC 78, CAST IRON BODY, NEOPRENE FLAPPER.
5. BUILDING SHALL BE METAL SHED AS SUPPLIED BY WHITE WATER STORAGE SHEDS IN GALLUP, (505) 722-5883. PROVIDE 4 INCHES OF INSULATION AND LINER PANEL. DOOR OPENING SHALL BE A MINIMUM OF 34 INCH CLEAR OPENING. EPOXY COATED FINISH WITH GALVANIZED STEEL OR STAINLESS STEEL FASTENERS.
6. PROVIDE MINIMUM 3.6 KILOWATT ELECTRIC UNIT HEATER CONTROLLED BY THERMOSTAT DESIGNED TO MAINTAIN 40 DEGREE INTERIOR TEMPERATURE WITH -20 DEGREE AMBIENT CONDITIONS AND 50 MPH WINDS. UNIT SHALL BE DESIGNED FOR HAZARDOUS LOCATIONS AND EQUAL TO W. W. GRAINGER STOCK NUMBER 3UG37. PROVIDE THERMOSTAT FOR HAZARDOUS LOCATION.
7. PROVIDE EXHAUST FAN AND AUTOMATED DAMPER TO VENTILATE THE BUILDING WHEN INTERIOR TEMPERATURE EXCEEDS 90 DEGREES. EXHAUST FAN SHALL HAVE SHUTTERS AND DESIGNED FOR HAZARDOUS LOCATIONS EQUAL TO W.W. GRAINGER STOCK NUMBER 4C370, 18 INCH, ¼ HP. PROVIDE AUTOMATIC 18 INCH DAMPER OF ALUMINUM CONSTRUCTION. INTERLOCK THE DAMPER'S ACTUATOR WITH THE FAN OPERATION.
8. ABOVE GRADE PIPING SHALL BE HEAT TRACED AND INSULATED. INSULATION SHALL BE 2 INCHES OF FIBERGLASS WITH ALUMINUM JACKET. BELOW GRADE PIPING SHALL BE INSULATED AND HEAT TRACED BETWEEN FINISHED GRADE AND 3'0" BELOW GRADE. BELOW GRADE INSULATION SHALL BE EXPANDED GLASS (FOAMGLASS) INSULATION. THE HEAT TRACING SYSTEM SHALL BE DESIGNED BY THE SUPPLIER FOR -20 DEGREE AMBIENT CONDITIONS WITH A 50 MILE PER HOUR WIND. PROVIDE SHOP DRAWINGS FOR REVIEW BY THE OWNER WITH SUPPORTING CALCULATIONS. THE SYSTEM SHALL BE SELF-REGULATING CABLE AND CONTROLS AS MANUFACTURED BY RAYCHEM, COOPERHEAT, OR EQUAL. PROVIDE AMBIENT TEMPERATURE SENSOR TO TURN OFF HEAT TRACING WHEN ABOVE 32 DEGREES F.
9. PROVIDE MAGNETIC FLOWMETER EQUAL TO ENDRESS AND HAUSER 3" PROMAG, USA BLUEBOOK MC-47038. POLYETHANE LINING, REMOTE READOUT, STAINLESS STEEL ELECTRODES.

N

0 1' 2' 3' 4'
SCALE IN FEET

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	09-22-08	ISSUED FOR BIOS	ELC
1.	SJL	08-29-08	100% OWNER'S REVIEW	ELC

WESTERN REFINING
GALLUP REFINERY

PUMP BUILDING

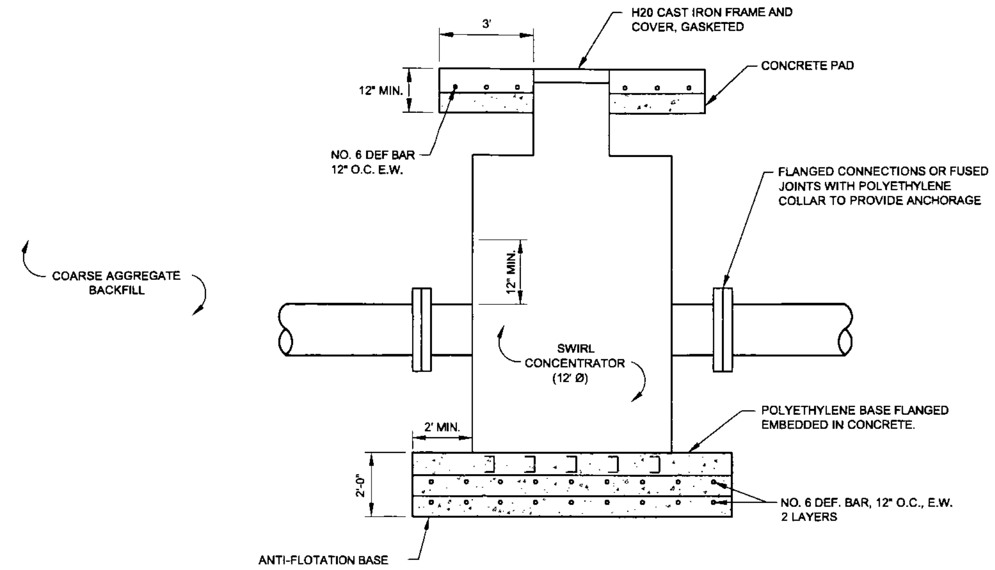
DRAWN BY: SL	DRAWING SCALE:	PROJECT NO: J:\07788\03	
CHECKED BY: EC	SHOWN	FILE NO: 7788.03.03.dwg	
APPROVED BY: EC	DATE PRINTED:	**Sheet 3 of 4**	
DATE: September 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE

NOTES:

1. MINIMUM 3500 PSI CONCRETE WITH AIR ENTRAINMENT
2. PROVIDE GRANULAR BACKFILL EXTENDING 3' AROUND SWIRL CONCENTRATOR. COMPACT TO MINIMUM 90% PROCTOR DENSITY. MAXIMUM AGGREGATE SIZE OF 1".
3. SWIRL CONCENTRATION SHALL BE AQUA-SWIRL MODEL AS-12, (888)-344-9044.
4. PERFORM EXPLORATORY EXCAVATION TO DETERMINE PIPE CONNECTION, SIZING, AND ELEVATIONS PRIOR TO PLACING ORDER.
5. PROVIDE FLANGED RISER WITH GASKETED COVER TO SEAL THE MANHOLE TO PREVENT GAS EMISSIONS.
6. TIGHTEN ALL FLANGE BOLTS PER PLASTIC PIPE INSTITUTE TECHNICAL NOTE 38.
7. CONTACT OWNER / ENGINEER IF GROUNDWATER IS PRESENT DURING EXCAVATING.

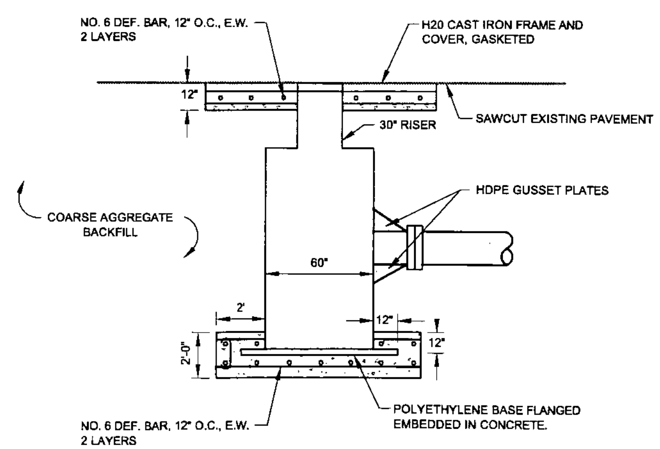


1/3 SWIRL CONCENTRATOR

NOT TO SCALE

NOTES:

1. MINIMUM 3500 PSI CONCRETE WITH AIR ENTRAINMENT.
2. PROVIDE GRANULAR BACKFILL EXTENDING 3' AROUND SWIRL CONCENTR0R. COMPACT TO MINIMUM 90% PROCTOR DENSITY. MAXIMUM AGGREGATE SIZE OF 1".
3. MANHOLE SHALL BE HDPE AS MANUFACTURED BY ISCO INDUSTRIES, (800) 345-4276.
4. PERFORM EXPLORATORY EXCAVATION TO DETERMINE PIPE CONNECTION, SIZING, AND ELEVATIONS PRIOR TO PLACING ORDER.
5. PROVIDE FLANGED RISER WITH GASKETED COVER TO SEAL THE MANHOLE TO PREVENT GAS EMISSIONS.
6. TIGHTEN ALL FLANGE BOLTS, THEN RE-TIGHTEN 7 DAYS AFTER INITIAL INSTALLATION TO ACCOUNT FOR COLD FLOW.

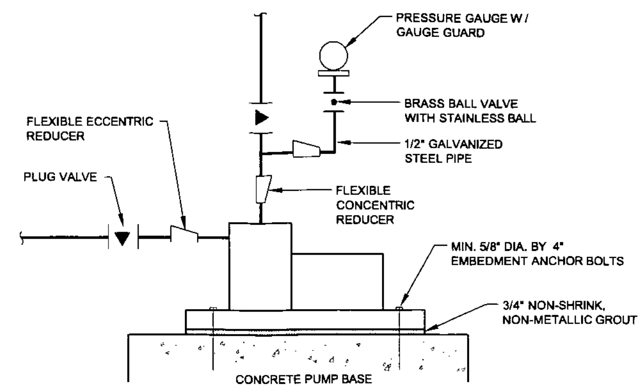


2/3 POLYETHYLENE MANHOLE

NOT TO SCALE

NOTES:

1. ANCHOR BOLTS SHALL BE SIZED PER PUMP SUPPLIER'S RECOMMENDATIONS.
2. FLEXIBLE COUPLING, INCLUDING REDUCING COUPLINGS SHALL BE SINGLE-ARCH ELASTOMER COUPLINGS OF BUNA-N CONSTRUCTION.
   a. MERCER RIBBON COMPANY.
   b. RED VALVE COMPANY
   c. USA BLUEBOOK (800-548-1234)
3. PRESSURE GAUGE SHALL BE 0 to 60 psi RANGE, 2-1/2" DIAMETER WIKA STAINLESS STEEL GAUGE WITH PVC SEAL BODY EQUAL TO USA BLUEBOOK STOCK NO. MC-44450 (800-548-1234)

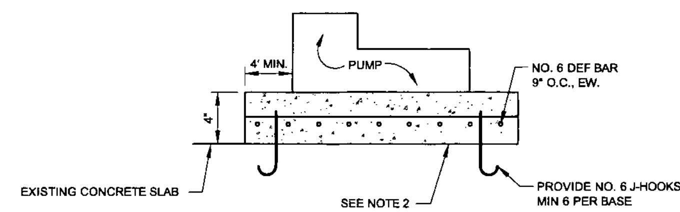


3/3 CENTRIFUGAL PUMP INSTALLATION

NOT TO SCALE

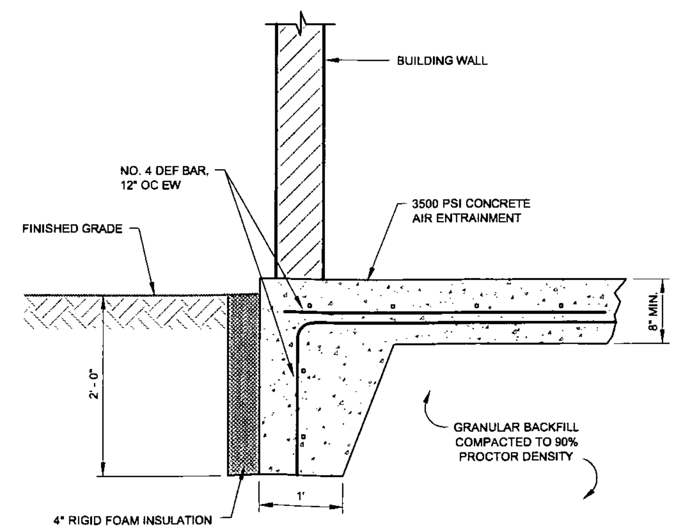
NOTES:

1. 3,500 PSI, AIR ENTRAINED CONCRETE.
2. ROUGHEN EXISTING CONCRETE PAD AND APPLY EPOXY BONDING COMPOUND. POUR PUMP BASE WHILE EPOXY IS TACKY PER SUPPLIER'S WRITTEN INSTRUCTIONS.



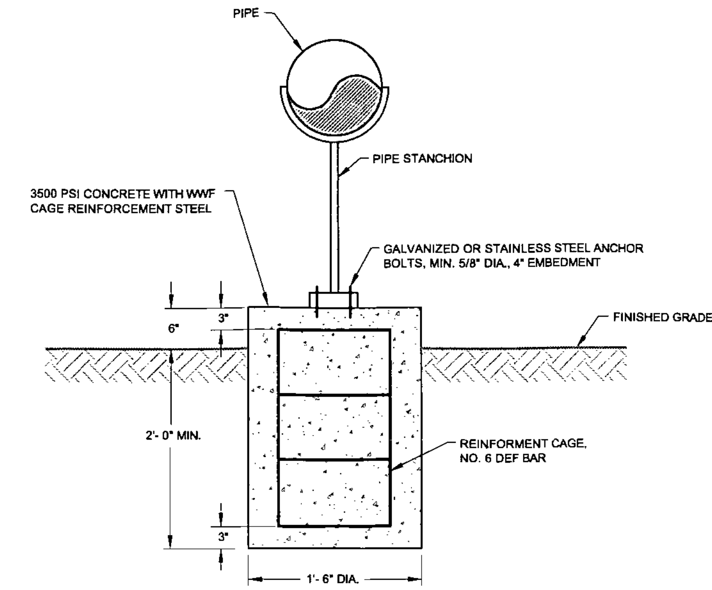
4/3 PUMP BASE

NOT TO SCALE



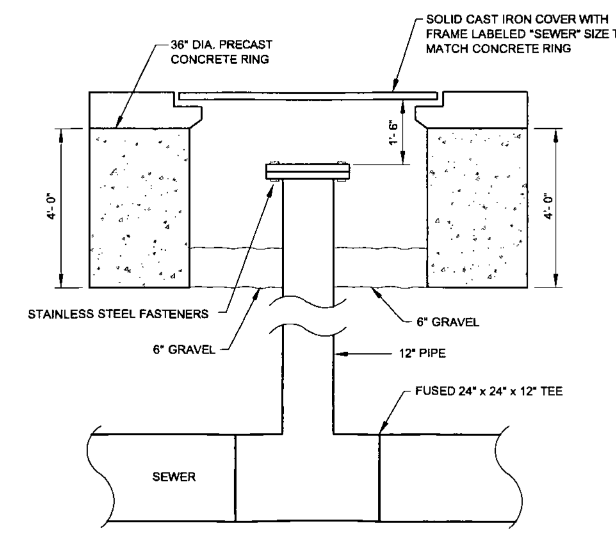
5/3 BUILDING FOUNDATION

NOT TO SCALE



6/3 OUTDOOR PIPE STANCHION

NOT TO SCALE



NOTE: PROVIDE 6" RISER PIPE FOR 6" FORCE MAIN

7/3 SEWER CLEANOUTS

NOT TO SCALE

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.	SJL	09-22-08	ISSUED FOR BIDS	ELC
1.	SJL	08-29-08	100% OWNER'S REVIEW	ELC

WESTERN REFINING
GALLUP REFINERY

DETAILS

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO:	J:\07788103
CHECKED BY: EC		FILE NO:	7788.03.04.dwg
APPROVED BY: EC	DATE PRINTED:	Sheet 4 of 4	
DATE: September 2008			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

ATTACHMENT D: TECHNICAL PAPER ON TANK-BASED SEPARATOR CASE STUDIES

NATIONAL PETROLEUM REFINERS ASSOCIATION

SUITE 1000
1899 L STREET, N.W.
WASHINGTON, D.C. 20036

ENV-95-161

UPGRADING REFINERY WASTEWATER TREATMENT SYSTEMS WITH ABOVE-GROUND OIL/WATER SEPARATION TANKS: THREE CASE HISTORIES

David R. Marrs
Patrick M. Maroney
Brown and Caldwell
Pleasant Hill, California

Steven L. Reynolds
Chevron U.S.A. Products Company
Salt Lake City, Utah

Mark J. Mielke
Total Petroleum, Inc.
Alma, Michigan

Greg E. Elliot
Total Petroleum, Inc.
Ardmore, Oklahoma

Presented at the
1995 NPRA
ENVIRONMENTAL CONFERENCE
October 15-17, 1995
San Francisco, California

UPGRADING REFINERY WASTEWATER TREATMENT SYSTEMS WITH ABOVE-GROUND OIL/WATER SEPARATION TANKS: THREE CASE HISTORIES

David R. Marrs
Patrick M. Maroney
Brown and Caldwell
Pleasant Hill, California

Steven L. Reynolds
Chevron U.S.A Products Company
Salt Lake City, Utah

Mark J. Mielke
Total Petroleum, Inc.
Alma, Michigan

Greg E. Elliot
Total Petroleum, Inc.
Ardmore, Oklahoma

Experience has shown that effective oil/water/solids separation and wasteload equalization are essential for the successful operation of refinery biological wastewater treatment systems. The performance of these upstream operations critically affects the quality of the final effluent from activated sludge units, especially when nitrification is a treatment objective. Upstream treatment also influences the final effluent quality that can be obtained by rotating biological contractors (RBCs) and trickling filters, both of which have short hydraulic retention times and tend to lose efficiency as free oil accumulates in the biomass.

Conventionally, wastewater treatment systems in North American refineries have included API-type gravity separators for the initial removal of free oil and solids from the influent wastewater, followed by a secondary fine oil removal step such as dissolved air flotation (DAF), induced air flotation (IAF), sand filtration, or a coalescing plate separator. Ponds were used in the past to provide surge control and perhaps some equalization upstream of the biological treatment system. However, these types of ponds have been all but eliminated in the United States as a result of regulatory changes over the last five years. Many refineries have replaced their surge and equalization ponds with a flow-through tank of either constant or variable volume placed in line with the oil/water treatment facilities.

Brown and Caldwell has designed numerous improvements to refinery wastewater treatment systems over the past twenty years. These projects have been driven by several factors, including improved compliance with existing NPDES permits, new and more restrictive effluent limitations, and, more recently, requirements to bring older treatment systems into compliance with various RCRA and Clean Air Act (e.g., benzene NESHAPS and Subpart QQQ) provisions. Improved oil/water/solids separation and equalization have typically been important considerations for our clients.

This paper presents design concepts and operating data for three such wastewater treatment upgrades recently completed in the United States at refineries ranging in size from 45,000 bpd to approximately 70,000 bpd. In each case, the existing surge ponds and API separator were replaced with above-ground tanks to accomplish gravity oil/water/solids separation and wastewater equalization in a single process vessel. These tank-based separators have now been in service for over two years, demonstrating the following advantages over conventional approaches to primary wastewater treatment and equalization in refinery service:

- ž The objectives of surge control, influent equalization, and primary oil/water/solids separation have been achieved in a single tank. The need for a separate wastewater equalization tank has been eliminated.

- ž Oil/grease concentrations in tank-based separator effluents have surpassed the quality that would typically be expected from an API separator. Two of the three facilities discussed in this paper have even been able to eliminate downstream fine oil removal units (IAFs or DAFs) from their treatment systems, leading to reduced chemical and maintenance costs as well as eliminating the need to manage the emulsified oily sludges produced by flotation processes.

- ž The amount of operator attention required at the wastewater treatment unit has been reduced. Unlike a conventional API separator, there is no need for frequent adjustment of the oil skimmer level. Those facilities that have removed their IAFs and DAFs have also eliminated the operating nuisances associated with adjustment and maintenance of the froth skimmers.

- ž The quality of the recovered oil has improved, reducing the processing required before this material can be recycled to the refinery.

- ž The above-ground separation tanks are in compliance with existing RCRA and Clean Air Act regulations. Furthermore, they will be easier to upgrade than conventional below-grade gravity separators if future RCRA requirements for wastewater treatment tanks become more restrictive.

Overall, by changing the design concept for oil/water/solids separation facilities, the projects discussed in this paper have demonstrated that refinery effluent quality can be improved at lower capital and operating costs than would be expected in a conventional wastewater treatment train.

DEVELOPMENT OF TANK-BASED SEPARATOR CONCEPT

The development of the tank-based separator concept began in the mid 1980's when Brown and Caldwell was conducting several refinery wastewater treatment plant upgrades across the United States. At one facility in California, we replaced an in-ground stormwater surge basin with large storage tanks. The hilly terrain, local weather patterns, and regulatory requirements to contain a 25-year, 24-hour rainfall event necessitated approximately 18.5 million gallons of stormwater storage capacity. A large pumping system was also designed to send dry-weather process flows to the wastewater treatment plant and excess storm flows to the storage tanks. Retained stormwater would be sent to the API separator at a controlled rate when the storm event passed.

After the stormwater tanks were commissioned, Brown and Caldwell continued to provide consulting services to this refinery on operational and regulatory compliance issues such as benzene NESHAPS. When computing the total annual benzene content of various waste streams in 1990, we discovered that slop oil quantities from the API separator were significantly lower than historical values for this facility. Upon further review and inquiry, it was determined that the treatment plant operators were routing the entire process wastewater flow (both dry weather and wet weather) through the stormwater tanks. Free oil was separating and accumulating in the storage tanks, with the result that the downstream API separator and DAF unit were receiving much lower oil loadings.

The operation of the stormwater surge tanks at this California facility was then considered in light of other refinery wastewater treatment projects we were undertaking at the same time. Brown and Caldwell began to propose to our clients the possibility of consolidating in a single process vessel the function of primary and most probably secondary oil/water/solids separation with surge control and equalization. Total Petroleum, Inc. agreed to try this significant change to refinery wastewater treatment process design at two facilities then undergoing major upgrades. While we were confident that the tank-based separator system could produce an acceptable biotreatment feed without an IAF or DAF, space was also provided at each of these plants for a future fine oil removal system if necessary. The actual performance of these tank-based separators has been excellent, eliminating any further consideration of secondary oil removal units and persuading other refinery clients that these systems offer significant improvements over conventional wastewater treatment approaches.

Design and operational details for tank-based separators differ according to the needs and preferences of individual refineries. Nevertheless, general separator design concepts have beome established over the last several years and are illustrated in Figure 1. The separator consists of an above-ground circular steel tank equipped with a double mechanical seal floating roof, oil skimmer attached to the floating roof, and a flexible hose for draining recovered oil. A sump is provided in the tank floor for periodic sludge removal. Quiescent conditions in the tank enable free oil to separate and form a floating layer while solids settle to the bottom as sludge. The separator may be operated as either a fixed or variable volume tank, depending on whether flow equalization ahead of the biological treatment system is a process objective.

Design considerations include the following:

- Hydraulic residence time. The working volume of the tank should provide a minimum hydraulic residence time of 8-12 hours for optimum oil removal. The actual residence time in tanks designed by Brown and Caldwell has been on the order of 10-30 hours to allow for simultaneous oil/water separation and concentration equalization.

- Surface overflow rate. Surface overflow rates for the tank-based separators designed by Brown and Caldwell have been in the range of 0.1-0.5 gpm/ft^2, based on horizontal surface area. A design maximum overflow rate has not been established for tank-based separators of the type discussed in this paper. The overflow rates for the units installed to date are approximately an order of magnitude below comparable values for conventional API separators.

- Depth of floating oil layer. The floating oil layer should be maintained well below the skimmer inlet to minimize water carryover into the recovered oil system. A minimum oil depth of two feet has been recommended on tanks designed by Brown and Caldwell.

- Acid addition. Gravity separation of oil and water is optimum at slightly acidic conditions (approximately pH 6.0-6.5). Acid destabilizes oily emulsions, resulting in a more easily separable free oil. As refinery process wastewater is usually alkaline, provision should be made for sulfuric acid addition to the separator influent. It may also be necessary to add caustic to raise the separator effluent back to about pH 7 prior to biological treatment. Spent caustic may be suitable at some refineries for this neutralization step.

  We generally recommend acid addition in proportion to wastewater flow rate, a strategy which requires that the akalinity of the waste stream be reasonably constant. The alternative, an on-line pH monitoring and control system, does not function well in this application because the free oil in refinery process wastewater tends to foul commercially-available pH probes.

- Safety. In day to day operation, the tank-based separators raise no safety concerns which are unusual in a refinery environment. Nevertheless, wastewater treatment plant operators must be aware of the potential for accumulation of explosive vapors under the floating roof covers and plan oil skimming and maintenance activities accordingly.

These types of oil/water separation tanks must comply with the design requirements of the New Source Performance Standards (NSPS) for refinery wastewater treatment systems promulgated at 40 CFR 60.690-699. In locations subject to extreme cold weather, fixed external roofs are recommended with an internal floating roof (as shown in Figure 1). Manways must be provided in the fixed and floating roofs and along the side walls for maintenance access. Depending on climate, the designer should also consider insulating the tank to conserve process heat ahead of the biological treatment unit.

REFINERY CASE HISTORIES

Refinery A

Refinery A is a 45,000 bpd facility located in the Midwest. Two above-ground oil/water separation tanks were installed to replace an existing API separator and IAF as part of a general wastewater treatment plant upgrade completed in September 1994. The tanks provide flow and concentration equalization while removing free oil and solids ahead of two new bioreactors.

Each tank was designed with a working volume of approximately 750,000 gallons, equivalent to a hydraulic retention time of 19 hours at the design flow rate. The design maximum surface overflow rate of each tank is 0.16 gpm/ft^2. The tanks are insulated and equipped with internal floating roofs to comply with Subpart QQQ requirements.

The system operates with only one tank normally in service. The on-line tank is maintained at a high level, with treated wastewater flowing by gravity to the downstream bioreactors. The other tank, which is normally maintained at a low level, serves as a standby to collect excess stormwater and process upsets. Wastewater collected in the standby tank is transferred back to the on-line tank at a controlled rate via a pump. The dual tank arrangement also allows the refinery to continue wastewater processing when one tank is taken out of service for maintenance or sludge removal.

Oil is pumped to the slop oil system weekly on a batch basis. The free oil layer in the on-line separator tank is skimmed to a cut-off point of about 10 percent water. No analytical data is available on the quality of the recovered oil. Refinery A is very satisfied with the mechanical operation of the skimmer system.

The design sludge accumulation rate for the on-line tank was 2 feet per year. Actual sludge accumulation of approximately 3 feet was recorded during the first year of operation, and sludge has been removed once. Sludge removal was accomplished by first taking the tank out of service and draining the free oil and water layers. The bottom sludge layer was then removed to the extent possible using a pump connected to the sludge sump on the tank floor. Once the liquid level in the tank dropped below the access manways, maintenance workers were able to move the residual sludge to the floor sump using hoses.

Table 1 presents design targets and operating data for the tank-based separators at Refinery A. Data for the former API separator and IAF are provided for comparison. The results show that the new separator tanks have produced an effluent which is equivalent to or slightly better than the discharge from the former treatment units. Concentrations of oil/grease and total suspended solids (TSS) are acceptable for the downstream bioreactors, which consist of two parallel aeration tanks operated without biosolids recycle. In addition, removal of the IAF unit from the wastewater treatment train has eliminated management of IAF float as an operating concern.

As originally designed and operated, the wastewater treatment upgrade at Refinery A included sulfuric acid addition to the separator tank influent. Acid was added proportionally to the wastewater flow rate to achieve approximately pH 6 in the on-line tank. Spent caustic was used to neutralize the separator tank effluent prior to the bioreactors. Acid addition was discontinued after about four months because of odor problems at the bioreactor tanks. The odors were traced to the spent caustic in the wastewater. There has been no noticeable deterioration of separator tank effluent quality since acid addition ceased. Nevertheless, Refinery A plans to resume adding sulfuric acid to the separator tank influent once in-plant process modifications are completed to reduce sulfide and mercaptan levels in the spent caustic stream fed to the bioreactors.

Refinery B

Refinery B has a rated crude capacity of 45,000 bpd and is located in the West. Two above-ground oil/water separation tanks have been in service since March 1993 to treat process wastewater upstream of an existing IAF unit. RBCs provide biological treatment downstream of the IAF. The tanks were initially installed as part of a project to bring the refinery into compliance with NSPS and benzene NESHAPS requirements and have since replaced the existing API separator.

The separator tanks at Refinery B each have a working capacity of approximately 1.05 million gallons. The system is designed to operate with one tank in service and one on standby to manage excess flow and process upsets. The on-line tank provides a hydraulic retention time of 11.5 hours at the design flow rate of 1,500 gpm. The design surface overflow rate is 0.38 gpm/ft^2 at the design maximum flow. Actual wastewater flow rates have averaged about half the design flow.

The tanks are equipped with external floating roofs, with the oil skimmers attached to the roofs. Roof seals have not been replaced since start-up. Side-mounted mixers have been provided near the bottom of the tanks. The tanks are not insulated, and there is no capability to add sulfuric acid to the influent wastewater, which is typically in the range of pH 7.5-8.0. On the basis of operating experience, Refinery B has determined that addition of a chemical demulsifier to the separator influent significantly improves oil/grease removal.

For the February-September 1995 operating period, the average effluent oil/grease concentration for the on-line separator tank was 79 mg/L; the median oil/grease concentration was 50 mg/L. The average flow was 793 gpm.

Recovered oil is removed from the on-line separator tank weekly. Refinery B operates the oil skimmer to maintain a minimum free oil thickness of three feet in the tank. No BS&W measurements are available for the recovered oil. However, refinery staff report that oil collected from the separator tanks contains much less water than recovered oil from the former API separator. As a result, operating problems in the slop oil system have decreased since start-up of the separator tanks.

Liquid sludge accumulation in the on-line tank is estimated at 8 feet per year. Refinery B reports no unusual problems in removing bottom sludge, which separates as a pumpable liquid with high water content. Sludge removal has been accomplished by taking the on-line tank out of service, draining the free oil and free water layers, suspending the sludge layer with the mechanical mixer, and pumping the sludge from the tank through a floor drain. The only sludge removal event completed to date at Refinery B took one separator tank out of wastewater service for approximately 6 weeks.

Refinery C

Refinery C is a 68,000 bpd facility located in the Southwest. Two above-ground oil/water separation tanks were installed to replace and existing API separator and IAF during a wastewater treatment plant upgrade completed in August 1994. The tanks remove free oil and solids while equalizing process wastewater ahead of two new bioreactors operated without biosolids recycle. Stormwater and process wastewater are segregated at this refinery.

The separator tanks at Refinery C are each designed with a maximum working capacity of 720,000 gallons. Both tanks are on-line and operated in parallel, an arrangement which is possible because the separators do not have to accommodate stormwater surges. The hydraulic retention time for both tanks at the design flow rate is 29 hours. The design maximum surface overflow rate is 0.13 gpm/ft^2. Average process wastewater flow rates are slightly less than half the design maximum.

The tanks are equipped with external floating roofs, with oil skimmers attached to the roofs. Oil is drained by gravity on a daily basis to the recovered oil system. The quality of the recovered oil is very good, typically less than 0.1% BS&W. Since the separator tanks have come on line, Refinery B has been able to return this recovered oil directly to the crude unit, bypassing slop oil treatment. According to plant staff, this was not possible with the recovered oil skimmings from the former API separator.

For the period August 1994-August 1995, the average effluent oil/grease concentration for the separator tanks at Refinery C was 42 mg/L. The average flow rate was 358 gpm.

Refinery C continuously injects spent sulfuric acid from boiler feedwater treatment into the separator tank influent. Caustic is also added as necessary to maintain the separators within the operating target of pH 6.5-7.5. Additional caustic is added to the separator tank effluent as needed to adjust process wastewater pH prior to the bioreactors.

Sludge accumulation in each tank is estimated at about 5 feet per year. To date, sludge has not been removed from either tank Based on sampling and visual observations, the bottom sludge appears to bean easily pumpable liquid. Initial plans at Refinery C call for the separator tanks to remain on line during the first sludge removal event, which is scheduled for 1996.

SUMMARY AND CONCLUSIONS

Design and operating data for the three case histories presented in this paper are summarized in Table 2. These results, along with the supporting information discussed above, clearly show that above-ground oil/water separation tanks are a viable and proven alternative to conventional API separators for refinery wastewater service. By achieving the objectives of surge control, influent equalization, and oil/water/solids separation in a single process vessel, this design concept offers refiners the opportunity to meet their wastewater treatment objectives at lower capital and operating cost than would be expected from conventional process designs.

Table 1.

Performance of Oil/Water Separation Facilities at Refinery A

Unit	Average Effluent		
	Flow (gal/min.)	Oil & Grease (mg/L)	TSS (mg/L)
Former Treatment System[a]			
API Separator	521	300	350
IAF	421	80	110
New Separator Tanks			
Design	645	45	96
Actual[b]	420	70	83

[a] January 1991 - March 1992
[b] September 1994 - August 1995

Table 2.

Summary of Design Criteria and Performance Data for Above-Ground Oil/Water Separation Tanks

Refinery	Overflow Rate gpm/ft^2	Retention Time (hrs.)	Average Effluent Oil/Grease (mg/L)
A	0.16[a]	19[a]	70
B	0.38[a]	11.5[a]	50[c]
C	0.13[b]	29[b]	42

[a] Calculated with one tank on line at design flow rate
[b] Calculated with two tanks on line at design flow rate
[c] Median value

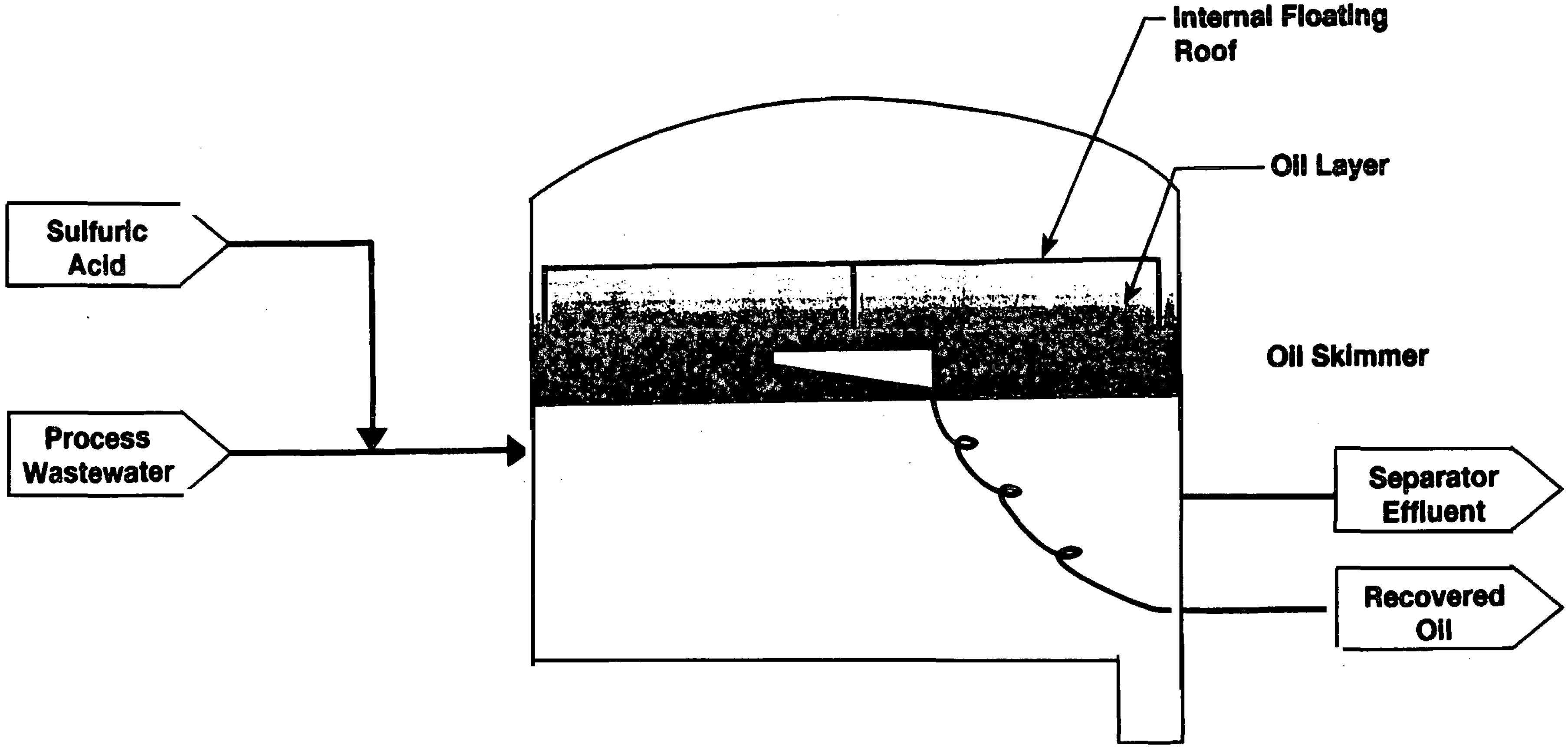


Figure 1
Tank-Based Oil/Water Separator

ENV-95-161

9222-01

ATTACHMENT E: MEMBRANE BIOREACTOR PILOT STUDY

Membrane Bioreactor Study
May – August 2008

Prepared by

Gaurav Rajen, Environmental Engineer

Reviewed by

Ed Riege, Environmental Manager

1.0 Introduction

This report describes the findings of a wastewater treatability study conducted at the Gallup Refinery of Western Refining using a small-scale membrane bioreactor (MBR) system leased from GE Water and Process Technologies.[1]

Figure 1 presents a schematic of the system, and Figures 2 and 3 present photographs of some key components.

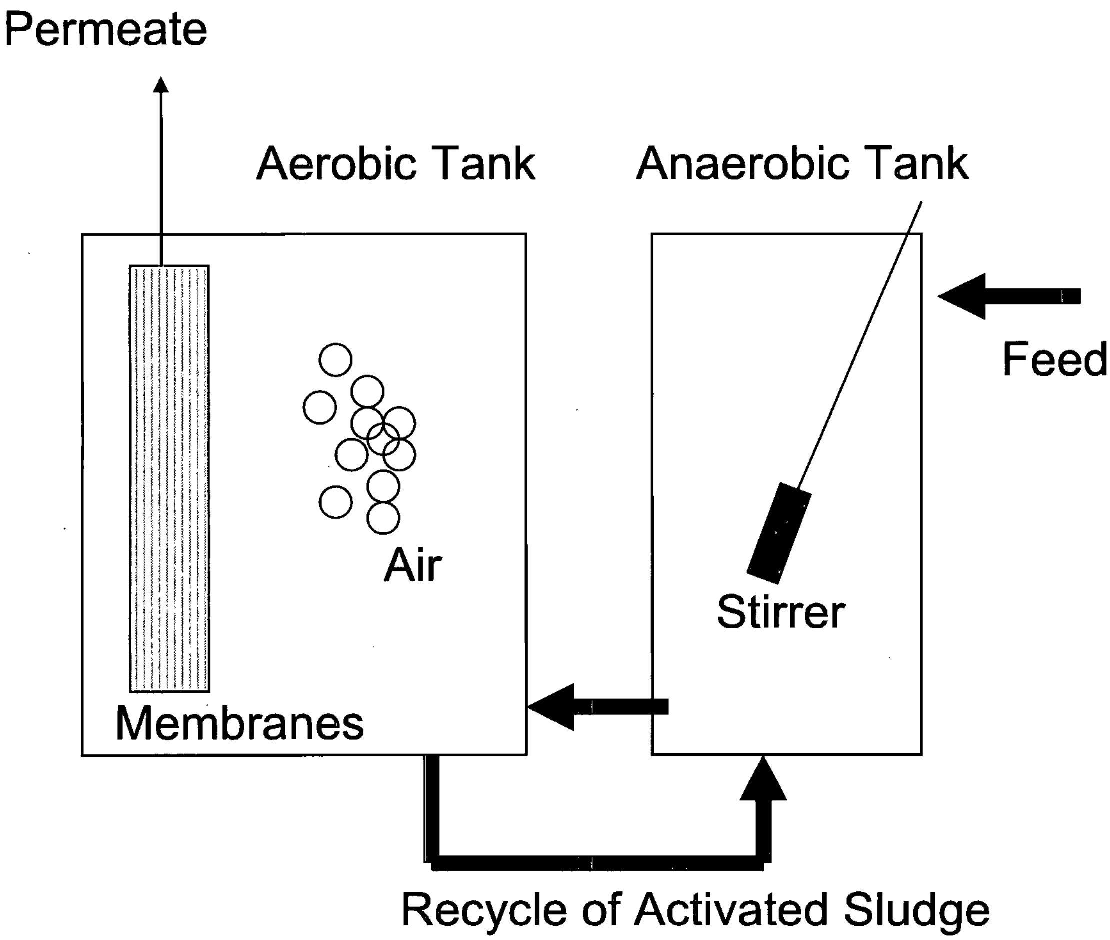


Figure 1: Schematic of Small-scale Membrane Bioreactor System

Figure 2: Photograph of the Anaerobic Tank

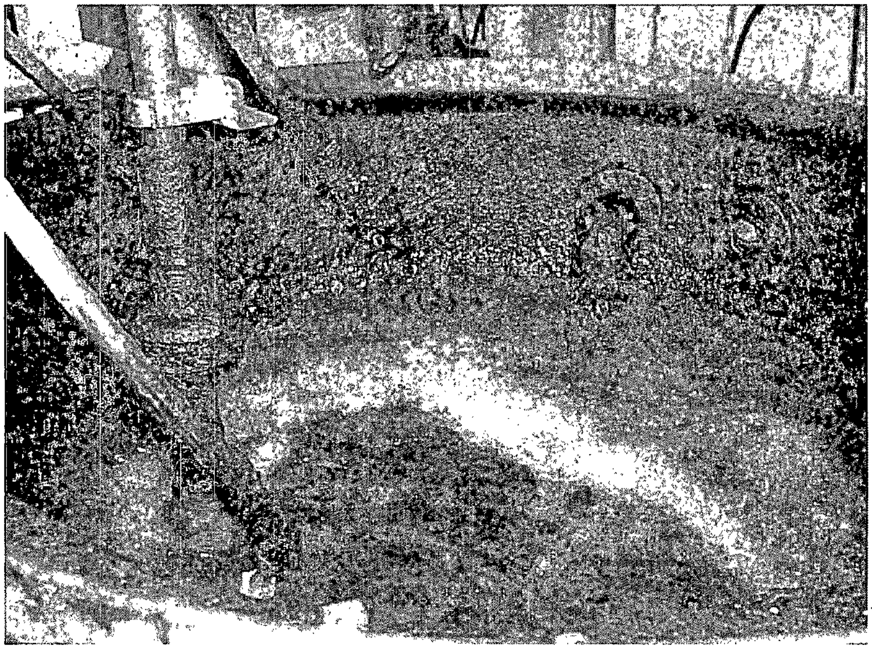


Figure 3: Photograph of the Aerobic Tank with Submerged Membrane Filters (lower left of picture)

2.0 Operational Procedures

Wastewater from the refinery was collected from the existing aeration lagoon system at the influent pipes. This wastewater was a mixture of the industrial wastewater generated within the refinery, as well as sanitary effluent received from the Pilot Travel Center. Periodic samples of this feed were taken. The feed was collected in three large tanks, and measured amounts of phosphates and other balancing chemicals were added. This feed was then pumped into an anaerobic tank in which it was continually stirred. From the anaerobic tank, the wastewater entered an aerobic tank which had a continuous supply of air pumped into it. We also twice added approximately 5 gallons of sludge from the City of Gallup's wastewater treatment plant to this tank. The wastewater then was filtered through a set of membrane filters that were hanging in the aerobic tank, and permeate was collected for further testing. These membranes had the capability to send a back-pulse of air that kept them free of clogging.

3.0 Data and Measurements

Various operational parameters were measured during the study. Among these were pressures and flow rates before and after the back-pulse, pH and temperatures in the various tanks, Dissolved Oxygen levels in the anaerobic and aerobic tanks, and the Dissolved Oxygen Uptake Rate in the aerobic tank. Table 1 presents the maximum and minimum values for some of these parameters.

Feed and permeate samples were collected and sent to an environmental laboratory for testing, and at various times aerobic tank liquids were also sampled. Table 2 presents some of these analytical data. All of the analytical data collected will be included in our 2008 Annual Groundwater Report which has a section on all water quality monitoring activities conducted at the Gallup Refinery of Western Refining.

Table 1: Representative Set of Operational and Other Parameters Measured During the Study

	Feed pH	Permeate pH	Dissolved Oxygen Uptake Rate	Dissolved Oxygen Anaerobic Tank	Dissolved Oxygen Aerobic tank	Temperature Anaerobic tank
			(mg/L.hour)	(mg/L)	(mg/L)	(^oC)
Maximum	8.52	8.55	69	10.6	12.63	29.8
Minimum	5.73	6.5	30	0.19	0.76	5

Table 2: Representative Set of Sampling Data (all units in mg/L unless noted otherwise)

Type of sample	Oil and Grease	Total Phenolics	Ammonia	Total Dissolved Solids	Turbidity (NTU)	Chemical Oxygen Demand	Biochemical Oxygen Demand
Feed	690	17000	600	3200	2300	3440	1288
Permeate	1.2	290	480	3800	Non-detect	1720	765

Oil and Grease and Phenolics were dramatically reduced as is clear in Table 2. However, Ammonia levels did not drop considerably. Figure 4 depicts a graph comparing Ammonia levels in the Feed and the Permeate. Figure 5 depicts reductions in Chemical Oxygen Demand; and Figure 6 depicts reductions in Biochemical Oxygen Demand. These measures of water quality were markedly improved.

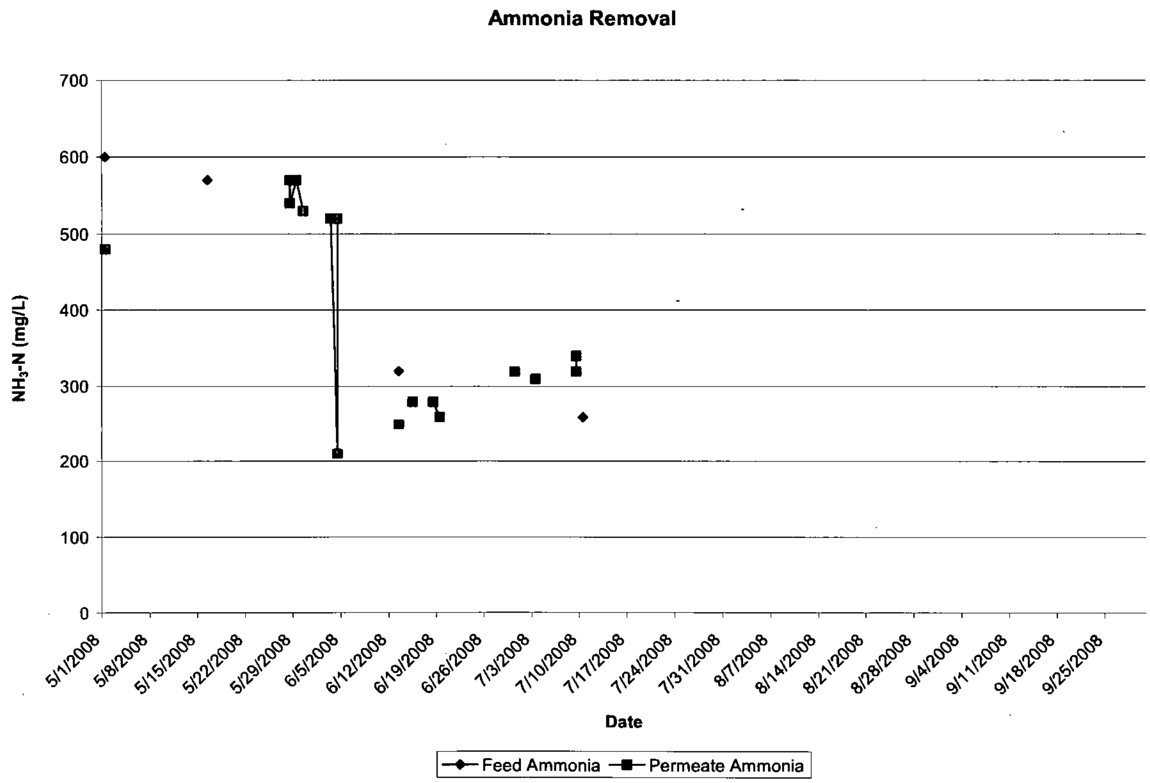


Figure 4: Graph of Ammonia Levels in the Feed and Permeate

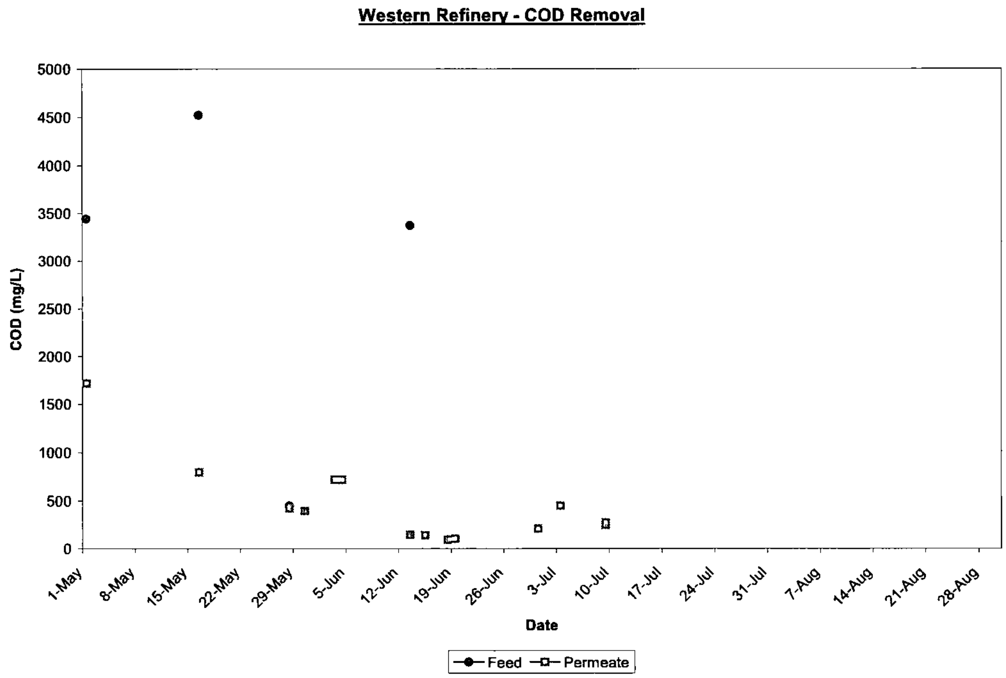


Figure 5: Graph of Chemical Oxygen Demand Levels in the Feed and Permeate

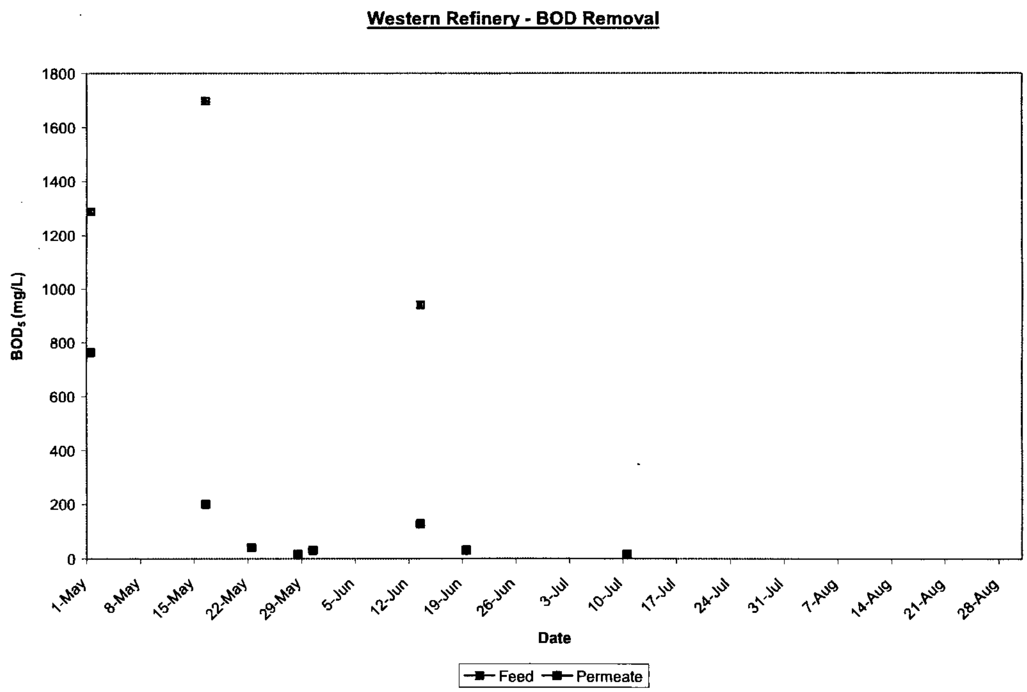


Figure 6: Graph of Biochemical Oxygen Demand Levels in the Feed and Permeate

4.0 Conclusions

The results of the MBR study did not favor proceeding forward with a larger scale system. What became readily apparent through the course of the study was that the refinery wastewater would need to undergo second-stage oil-water separation for the bioreactor to be effective. Currently the refinery wastewater only undergoes primary gravity-based oil-water separation in an API Separator.

There was a fear of the membrane filtration system being clogged by the oil in the refinery wastewater. This fear was expressed by GE representatives when we suggested spiking the feed with oil. We also had at various times the bacteria in the anaerobic and aerobic tanks suffer a loss of productivity – this was from a die-off caused by system malfunctions, such as clogged switches, failed pumps, ruptured tubing, all of which could be traced to the levels of oil and grease and other solids in the wastewater that the MBR system was not optimized to treat..

We realized that the MBR system would probably be most effective in a non-refinery setting. To make it effective for our applications, we would need more oil-water separation, better screening and pre-filtration to protect the membranes.

We also found from a survey of the refining industry that MBRs are not in use at refineries to treat wastewater, but are in some use at refineries for treating process water. A recent survey of new technologies for refinery wastewater by a Task Force made up of Purdue University's Calumet Water Institute and Argonne National Laboratory[2] reached these conclusions regarding MBRs in a refinery setting -

"The effectiveness, small footprint, and high effluent quality of MBR technologies are counterbalanced by higher costs, higher energy use, waste generation, and still unresolved fouling issues that may provide inconsistent performance and reliability. Although their use in treating refinery wastewater is currently limited, significant interest in MBR technologies is growing in the refinery sector because they promise to achieve advanced effluent quality for ammonia, TSS, and many other effluent parameters. This interest reflects the significant growth and increasing efficiency of MBRs worldwide. More testing of these technologies will be needed to understand and optimize their performance under specific loading rates, their energy lifecycle inputs, their overall cost-effectiveness in real application scenarios, and the generation of secondary waste. Just as importantly, more testing will be needed to understand their ability to provide integrated treatment by removing other refinery pollutants and heavy metals at the required levels."

---

[1] http://www.gewater.com/index.jsp

[2] http://www.calumet.purdue.edu/pwi/emergtech/Phase%20I%20Final%20Report_10202008.pdf

ATTACHMENT F: AGGRESSIVE BIOLOGICAL TREATMENT CALCULATIONS

BROWN AND CALDWELL

Residence Time for Bioreactors

Tank Dimensions

Number, n $n := 2$

Diameter, d $d := 75 \cdot ft$

Liquid Height, h_{liq} $h_{liq} := 21 \cdot ft$

Surface Area, sa

$$sa := \pi \left(\frac{d}{2}\right)^2$$

$$sa = 4418\,ft^2$$

Liquid Volume per tank, vol_{tank} $vol_{liq.tank} := sa \cdot h_{liq}$

$$vol_{liq.tank} = 694006\,gal$$

Total Liquid Volume, vol $vol_{liq} := vol_{liq.tank} \cdot n$

$$vol_{liq} = 1388013\,gal$$

Flow Conditions

Average Flow, Total, q_{avg} $q_{avg} := 413 \cdot gpm$

Peak Flow, Total, q_{peak} $q_{peak} := 644 \cdot gpm$

Average Flow, per tank, $q_{avg.tank}$ $q_{avg.tank} := \frac{q_{avg}}{n}$

$$q_{avg.tank} = 206.5\,gpm$$

Peak Flow, per tank, $q_{peak.tank}$ $q_{peak.tank} := \frac{q_{peak}}{n}$

$$q_{peak.tank} = 322\,gpm$$

Residence Time

Hydraulic Residence Time, Average Flow, $t_{r.avg}$ $$t_{r.avg} := \frac{vol_{liq.tank}}{q_{avg.tank}}$$

$$t_{r.avg} = 2.3\,\text{day}$$

Hydraulic Residence Time, Peak Flow, $t_{r.peak}$ $$t_{r.peak} := \frac{vol_{liq.tank}}{q_{peak.tank}}$$

$$t_{r.peak} = 1.5\,\text{day}$$

At average and peak flow conditions the residence time in the Bioreactors meets the aggressive biological treatment requirement of <5 days.

BROWN AND CALDWELL

Aeration Power Level of Bioreactors

A blower manufacturer;s selection curve (attached) shows 106 bhp required when the airflow is 1350 scfm, design airflow of blower is 1300 scfm per tank. Therefore the actual operating power per tank will be:

$$P_{operating} := \left(1300 \cdot \frac{ft^3}{min}\right) \cdot \left(\frac{106}{1350} \cdot \frac{bhp}{\frac{ft^3}{min}}\right)$$

$$P_{operating} = 102.1\,bhp$$

Number of tanks, n $\quad n := 2$

Diameter, d $\quad d := 75 \cdot ft$

Surface Area, sa $\quad sa := \pi \left(\frac{d}{2}\right)^2$

$$sa = 4418\,ft^2$$

Liquid Depth, h_{liq} $\quad h_{liq} := 21ft$

Liquid Volume, vol_{liq} $\quad vol_{liq} := sa \cdot h_{liq}$

$$vol_{liq} = 694006\,gal$$

Power Level per tank, P_t $\quad P_t := \frac{P_{operating}}{vol_{liq}}$

$$P_t = 147 \frac{bhp}{10^6 gal}$$

The aeration power level of 147 hp per million gallons meets the aggressive biological treatment requirement of greater than 6 hp per million gallons.

KAESER OMEGA BLOWERS — OMEGA/OMEGA PLUS ROTARY BLOWERS - PACKAGE RECOMMENDATIONS -

Project: Gallup Bioreactor **Distributor: BC**

INPUT DATA:

Operating mode:	Gauge pressure	Flow medium :	dry air
Kind of package:	Standard Package	Specific heat constant κ:	1.40
Inlet temperature :	95 °F	Specific weight at standard conditions :	0.077 lb/ ft³
Inlet pressure :	11.3 psi	Pressure difference :	10.2 psig
		Discharge pressure :	21.5 psi

ATTENTION:Is the place of installation above of 3300 ft. Please ensure that the motor is sufficiently cooled!

Technical data:

NOTE: ACCESSORIES SHOWN ARE INTENDED FOR AIR USE ONLY.

Package:	**FB 790P**	Blower speed:	2600 rpm
Motor power:	125.0 hp	Connection DN:	10"
Operating voltage:	460V/ 60Hz	% of maximum speed:	76

Accessories:

		yes	no		yes	no
Relief valve:	2x 2 1/2"	☐	☐	Maintenance indicator mounted in s. enclosure:	☐	☐
Unloaded start up valve:	60/S	☐	☐	Inlet silencer-suction out of room:	☐	☐
Check plate:	10"	☐	☐	Inlet silencer-suction out of pipe:	☐	☐
Temperature gauge:		☐	☐	Sound enclosure-suction out of room:	☐	☐
Temperature gauge with switch point:		☐	☐	Sound enclosure-suction out of pipe:	☐	☐
Pressure gauge:		☐	☐	Spool piece for relief valve:	☐	☐
				Spool piece for RV and unloaded start up valve:	☐	☐

Performance data:	**max. load**	**design point**
Pressure difference Δp:	12.0 psig	10.2 psig
Inlet flow Q1:	1829 icfm	1857 icfm
Q1 Standard* : Standard conditions 14.7 psia, 68°F and 36% RH		1350 scfm
Discharge temp.*:	298 °F	264 °F
Motor shaft power with belt losses + dirty filter*:	132.9 hp	114.9 hp
Blower shaft power*:		106.0 bhp

Sound pressure level** : without 96 dB(A) with enclosure 78 dB(A)

*** Performance data to DIN ISO 1217, part 1, annex C**
The pressure difference at max. load corresponds to relief valve setting!
**** Measured to PN 8 NTC 2.3, 1 meter distance, free field measurement with sound isolated pipework.**
Minimum input power required includes additional dirty filter losses of approx. 40 mbar.
Motor shaft power includes belt losses!
Attention OMEGA 23, 43 and 63 model blowers can be run over 12 psig, but requires factory APPROVAL, a limited warranty may apply.

GW - ___32_____

Engineering Drawings

Sanitary Wastewater Lift Station

Western Refining
GALLUP REFINERY

WNR LISTED NYSE

Certified Mail 7008 2810 0000 4726 0539

January 26, 2009

Mr. Carl Chavez
Oil Conservation Division
Environmental Bureau
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Re: OCD Discharge Permit GW-032, Permit Condition 24.A. and 24.B.

Dear Mr. Chavez:

This letter is to update you regarding OCD Permit Condition 24.A. and 24.B. Gallup is proceeding with the new Pilot Travel Center lift station/underground line design you approved in the fourth quarter of 2008. As you requested, final design drawings are included in this package. The two new four inch underground sewer lines were installed and pressure tested in December 2008 to demonstrate mechanical integrity. Future testing will follow Permit Condition 12.A. test procedure and timeline for underground wastewater lines.

The existing line is still in use but a few piping modifications will be completed by March 1 allowing the wastewater to be transferred over to one of the new lines should a problem arise with the existing line. This will assure that after March 1, 2009 there will be no bypass to the evaporation pond.

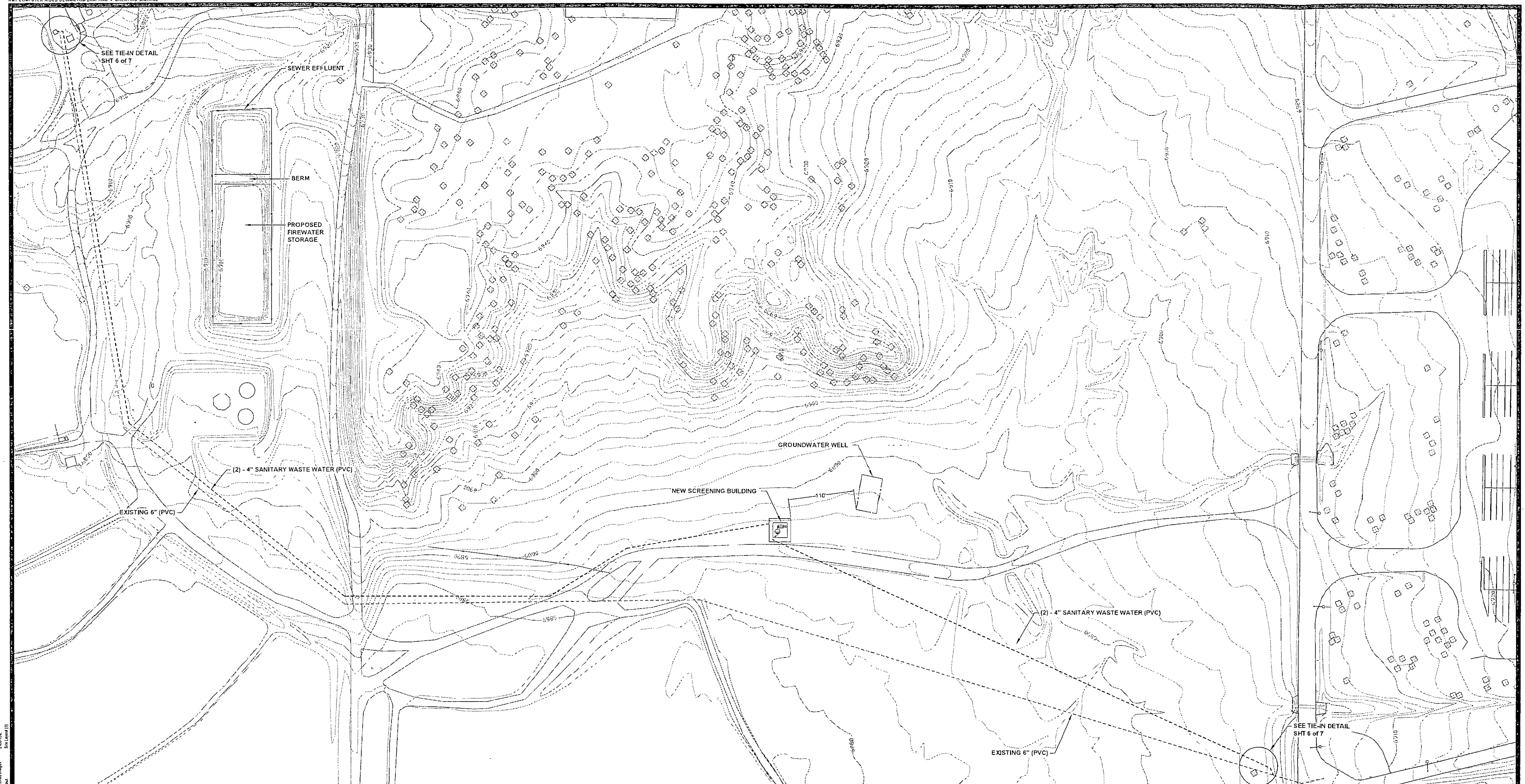
The Pilot Lift Station is progressing but there is a delay on the equipment arrival. The Lakeside Strainers will arrive on-site the middle of April 2009, and will be the completing step in the commissioning process. Three to four weeks before the screens arrive on-site the lift station will begin construction. The lift station holding tank will be buried and a foundation will be constructed around the new sump. The next phase will include installation of the electrical and plumbing components. This process will be completed during the construction and completion of the enclosing structure. The final phase will include the installation of the process screens and processing the waste water received from the Pilot Travel Center. Western Refining is therefore requesting an extension from March 1, 2009 to June 13, 2009 to complete the entire project primarily due to equipment delivery delays.

Your review and approval of this request are appreciated. Please contact me at (505) 722-0217 if you have any comments or questions regarding this submittal.

Sincerely,

Ed Riege
Environmental Manager

C: Ms. Hope Monzeglio
Mark Turri
Don Riley
Shane White
Gaurav Rajen



RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	S.L.	12-29-08	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

SITE PLAN

DRAWN BY: S.L.	DRAWING SCALE: SHOWN	PROJECT NO: J:\07788\06	
CHECKED BY: ELC		FILE NO. 7788.06 C1.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 1 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

SEQUENCE OF OPERATION

1. WASTEWATER IS PUMPED BY DUPLEX, SUBMERSIBLE GRINDER PUMPS LOCATED AT THE PILOT TRAVEL CENTER. THE PUMPS ARE CONTROLLED BY A LOCAL CONTROL PANEL AND WESTERN DOES NOT RECEIVE AN INDICATION OF PUMP RUN STATUS.

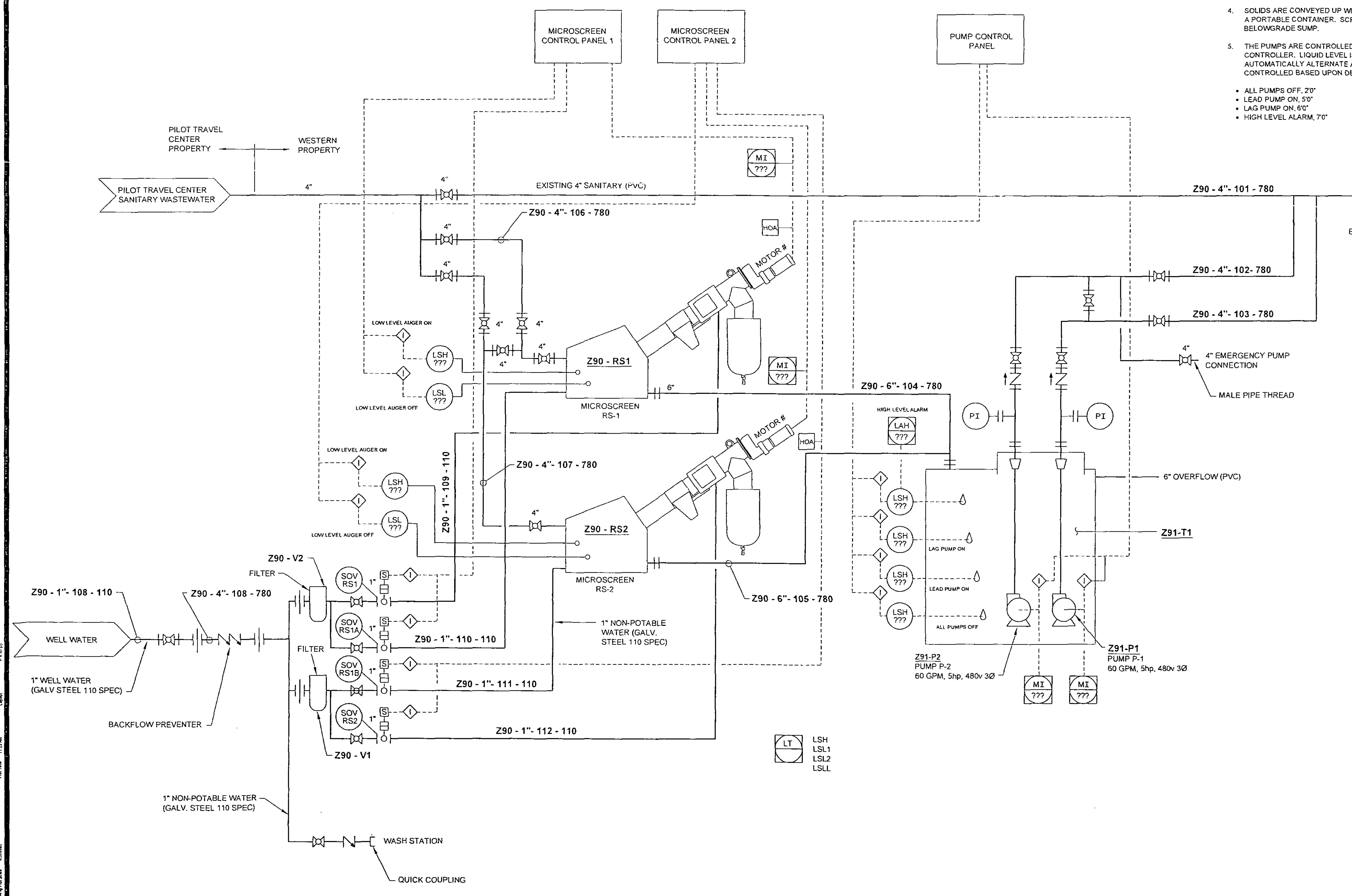
2. WASTEWATER FLOWS THROUGH ONE OF TWO, 4 INCH DIAMETER FORCE MAINS WHICH ARE SELECTED WITH BURIED, MANUAL VALVES.

3. WASTEWATER IS DIRECTED TO EITHER MICROSCREEN RS-1 OR RS-2 WITH MANUAL VALVES. EACH SCREEN IS CONTROLLED INDEPENDENTLY WITH ITS LOCAL CONTROL PANEL. THE SCREENS BEGIN ROTATING BASED UPON A CONTACT CLOSURE FROM THAT SCREEN'S HIGH LEVEL BALL FLOAT AND STOPPED WHEN THE LOW LEVEL BALL FLOAT REACHES LOW LEVEL.

4. SOLIDS ARE CONVEYED UP WITHIN THE MICROSCREEN, DEWATERED, THEN DISCHARGED INTO A PORTABLE CONTAINER. SCREENED WASTEWATER FLOWS BY GRAVITY TO THE 5,000 GALLON, BELOWGRADE SUMP.

5. THE PUMPS ARE CONTROLLED BY A LOCAL PANEL WITH A PROGRAMMABLE LOGIC CONTROLLER. LIQUID LEVEL IS MEASURED BY GUIDED RADAR LEVEL ELEMENT, LE-XX. PUMPS AUTOMATICALLY ALTERNATE AS LONG AS THEY ARE SET IN AUTOMATIC POSITION. PUMPS ARE CONTROLLED BASED UPON DEPTH IN THE TANK AS FOLLOWS:

- ALL PUMPS OFF, 2'0"
- LEAD PUMP ON, 5'0"
- LAG PUMP ON, 6'0"
- HIGH LEVEL ALARM, 7'0"



Z90 - 34- 101 - REV 0

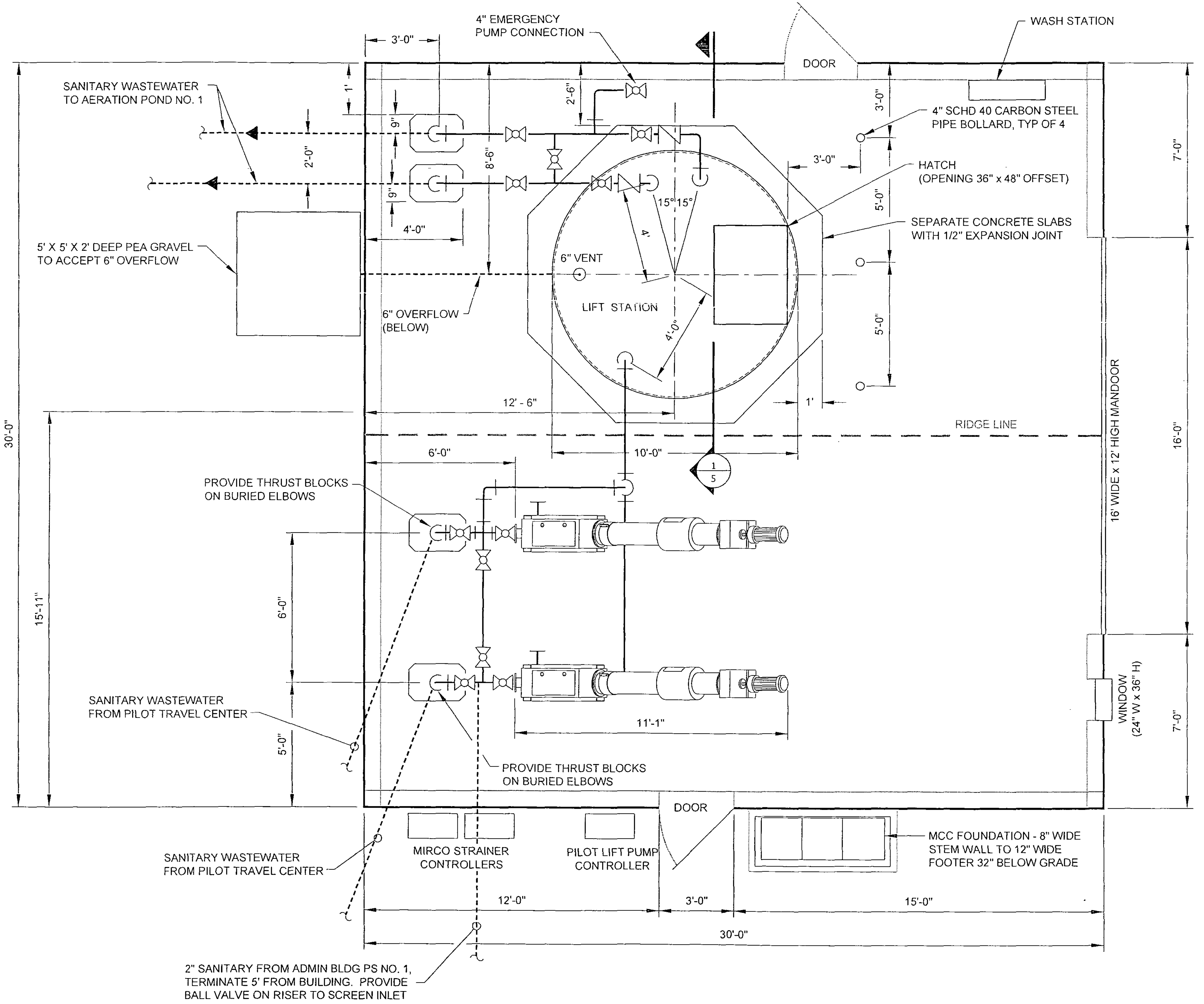
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-06	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

PIPING AND INSTRUMENTATION DIAGRAM

DRAWN BY: SJL	DRAWING SCALE:	PROJECT NO.	J.10778.B06
CHECKED BY: ELC	SHOWN	FILE NO:	7788.06.02.dwg
APPROVED BY: ELC	DATE PRINTED:	Sheet 2 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone 734-971-7080 • Fax: 734-971-9022



NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

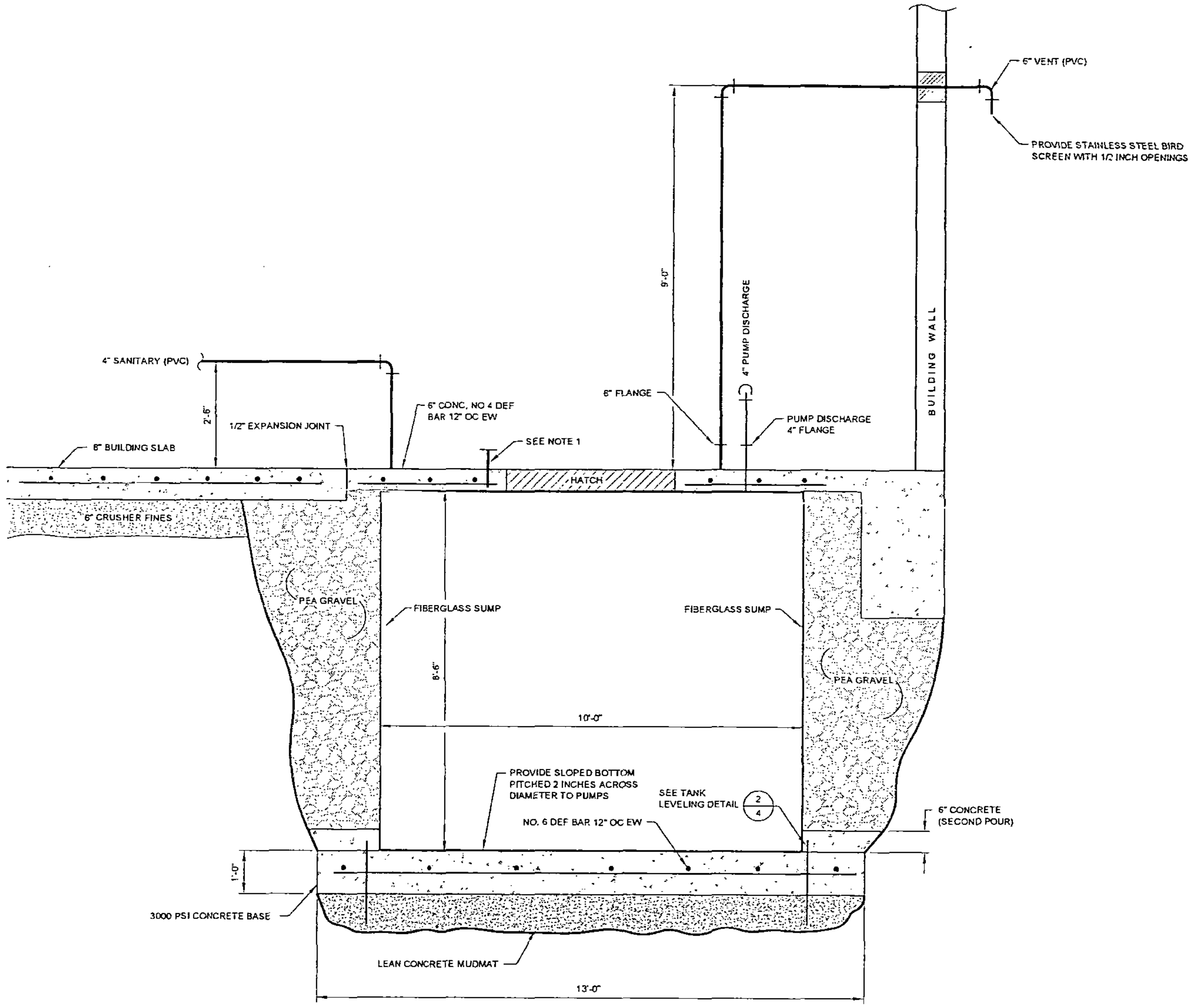
WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

BUILDING PLAN AND SECTIONS

DRAWN BY: SJL	DRAWING SCALE:	PROJECT NO.	J.107788.06
CHECKED BY: ELC	SHOWN	FILE NO.	7788.06.03.dwg
APPROVED BY: ELC	DATE PRINTED:	Sheet 3 of 8	
DATE: January 2009			

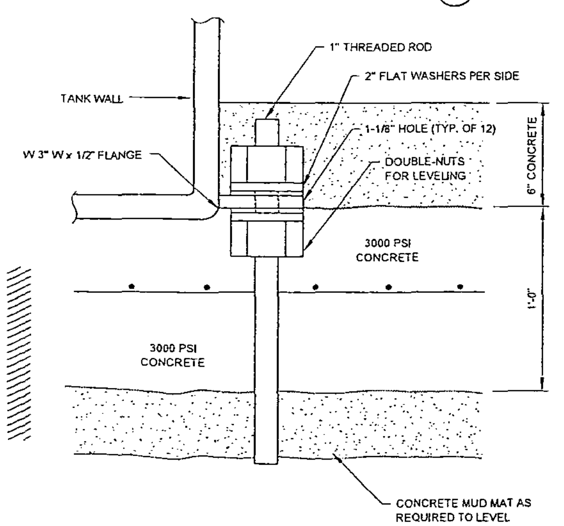
RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE

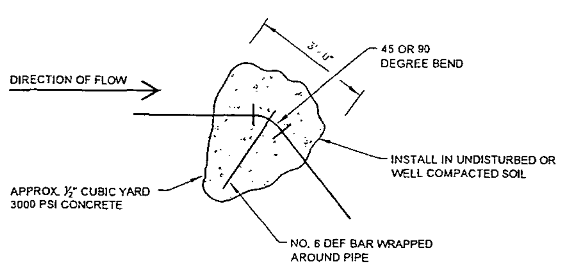


NOTES:
1. ALL NOZZLES SHALL EXTEND 1' - 0" ABOVE FIBERGLASS TOP.

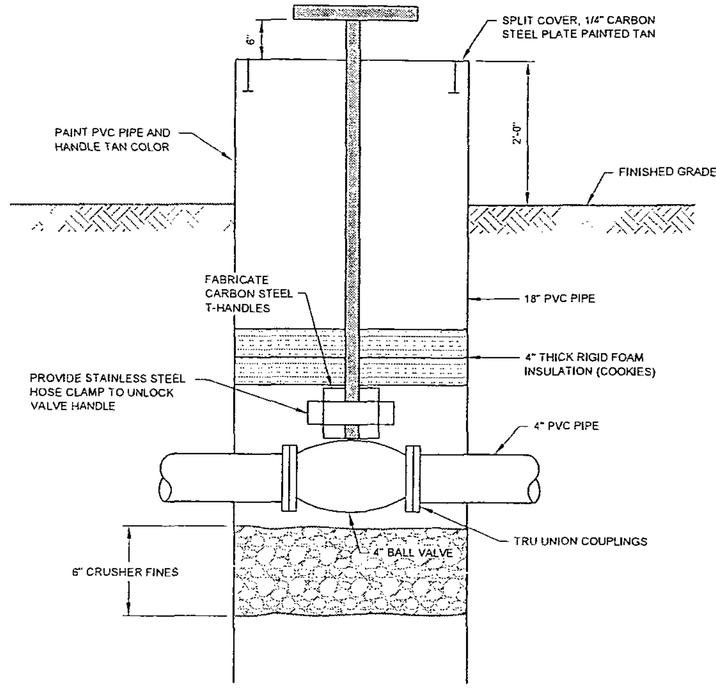
1/4 **SECTION**
SCALE: 1/4" = 1'



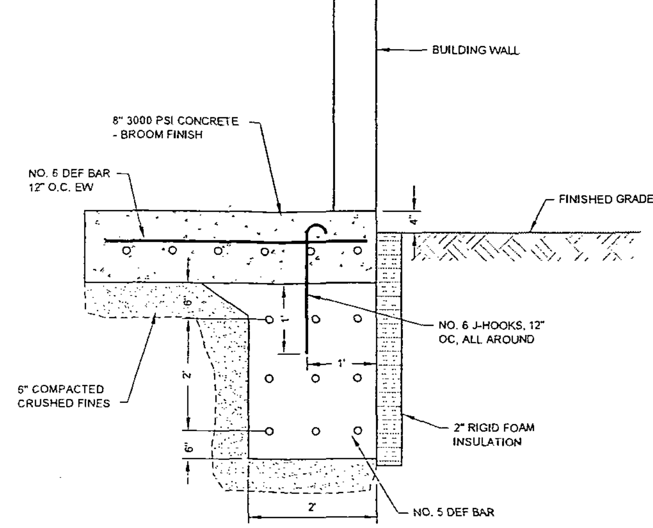
2/4 **TANK LEVELING DETAIL**
NOT TO SCALE



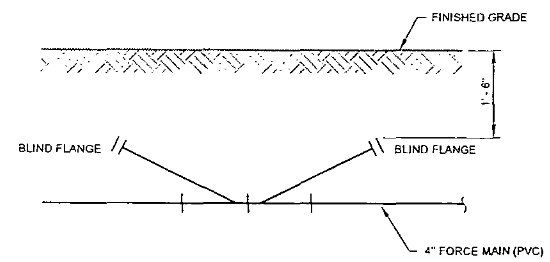
3/4 **THRUST BLOCK**
NOT TO SCALE



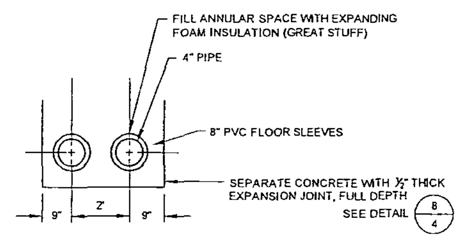
4/4 **VALVE BOX**
NOT TO SCALE



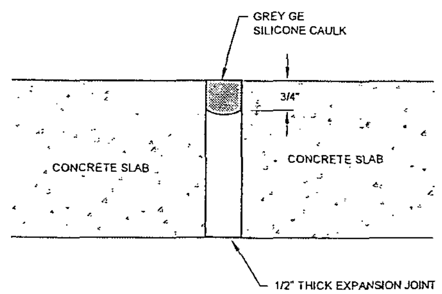
5/4 **BUILDING FOUNDATION**
NOT TO SCALE



6/4 **BI-DIRECTIONAL CLEANOUTS**
NOT TO SCALE



7/4 **PIPE CHASE (PLAN VIEW)**
NOT TO SCALE



8/4 **EXPANSION JOINT**
NOT TO SCALE

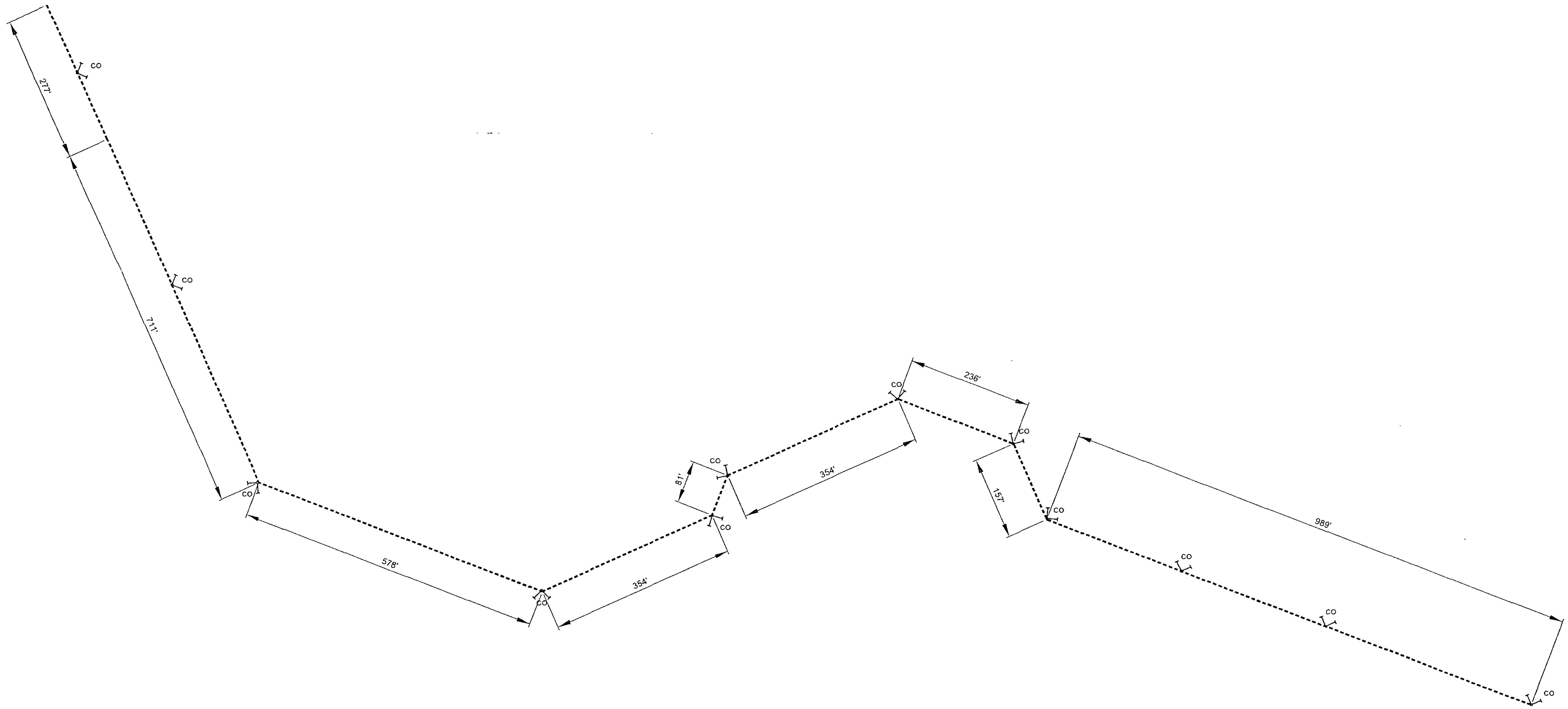
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

DETAILS

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO.	J107788806
CHECKED BY: EC		FILE NO:	7788.06.04.dwg
APPROVED BY: EC	DATE PRINTED:	Sheet 4 of 8	
DATE: January 2005			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022



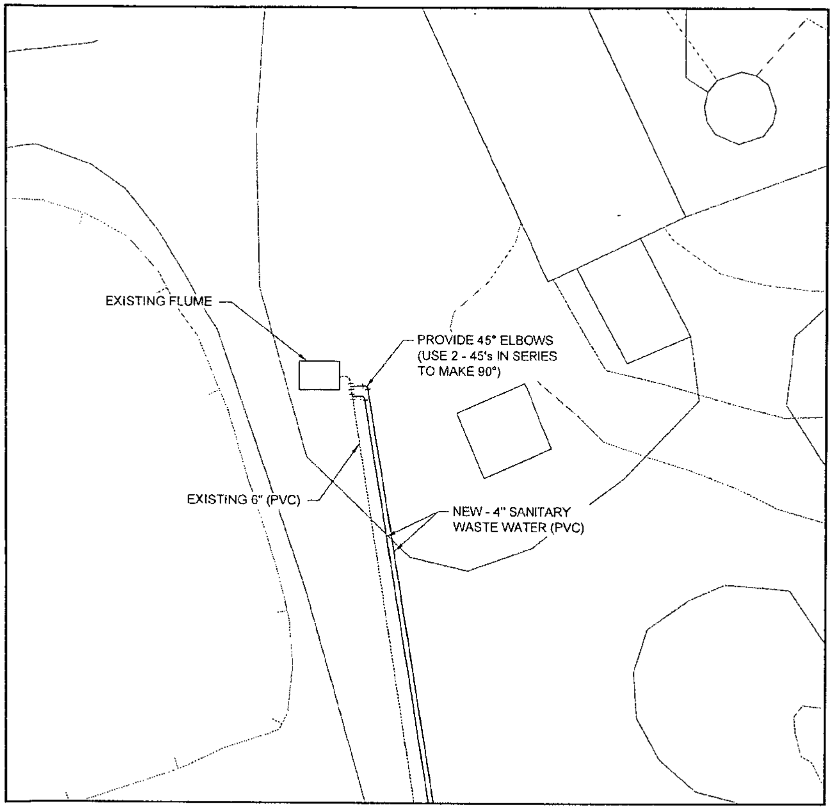
NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

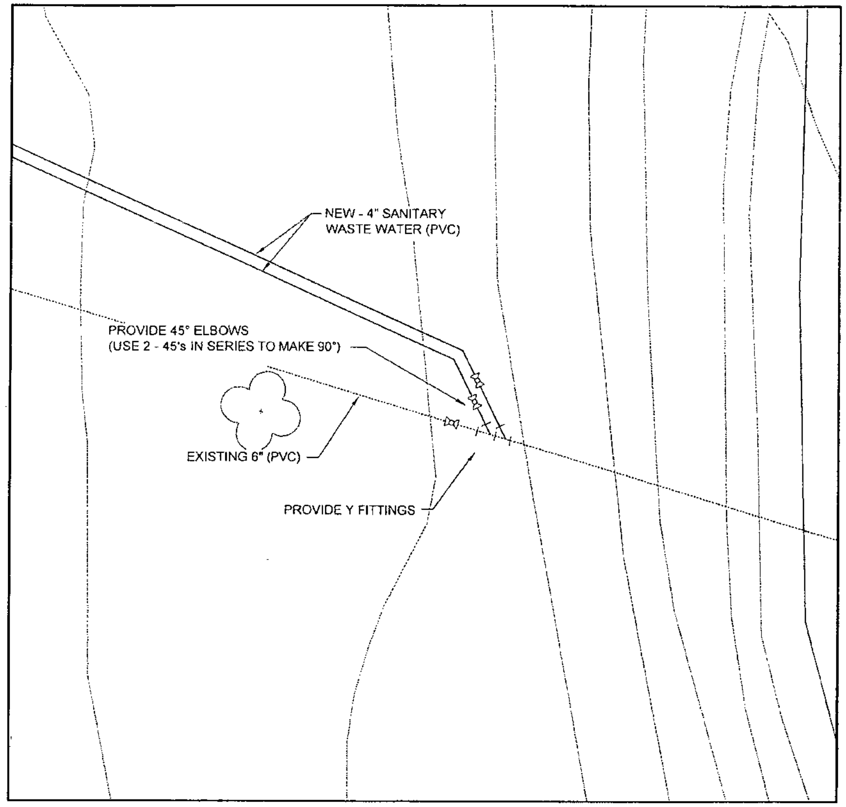
CLEANOUT LOCATIONS

DRAWN BY: SJL	DRAWING SCALE: SHOWN	PROJECT NO: 3107788106	
CHECKED BY: ELC		FILE NO: 7788.06.05.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 5 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022



TIE-IN NEAR AERATION PONDS
NTS



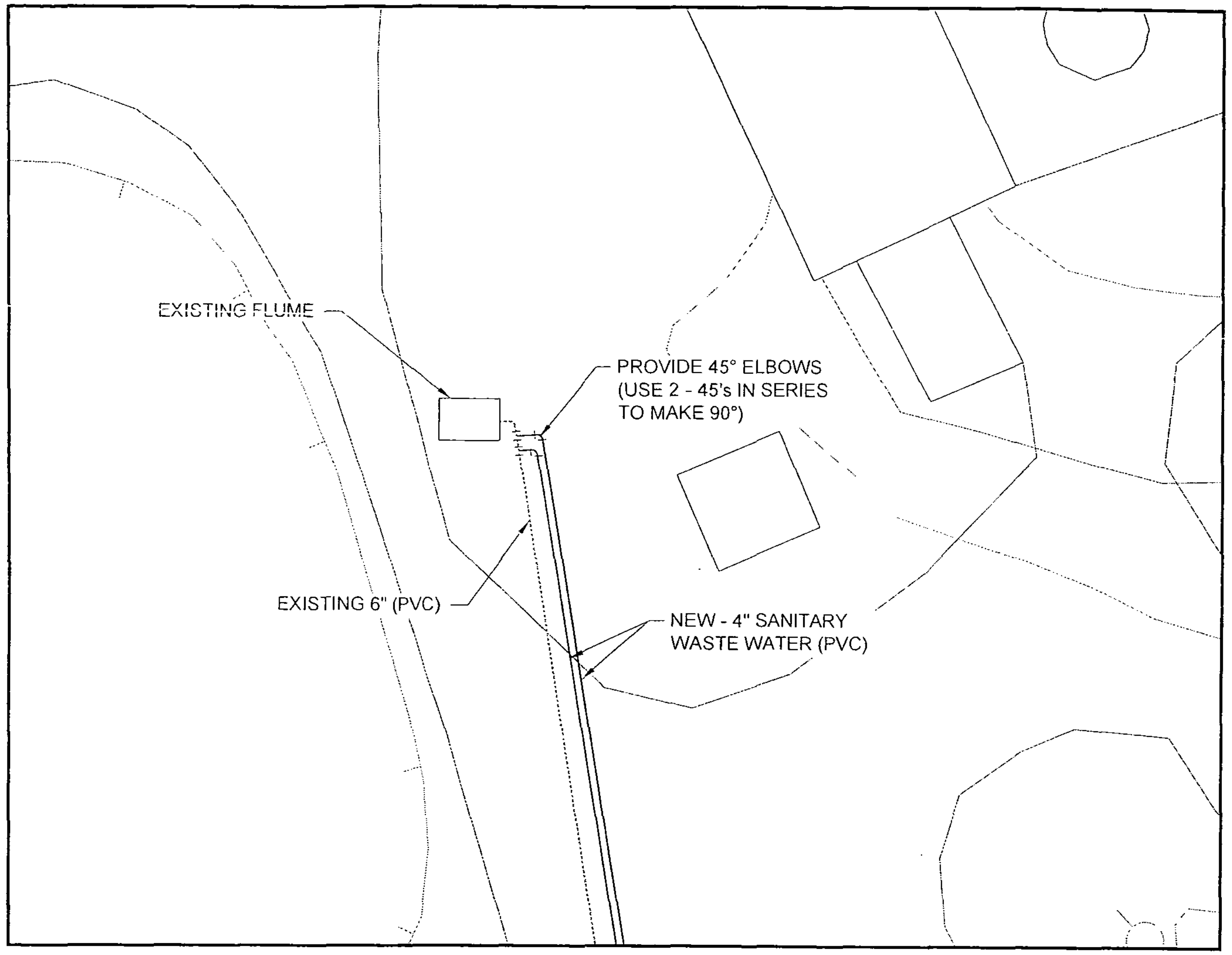
TIE-IN NEAR SOUTH PROPERTY LINE
NTS

Western Refining
Gallup Refinery

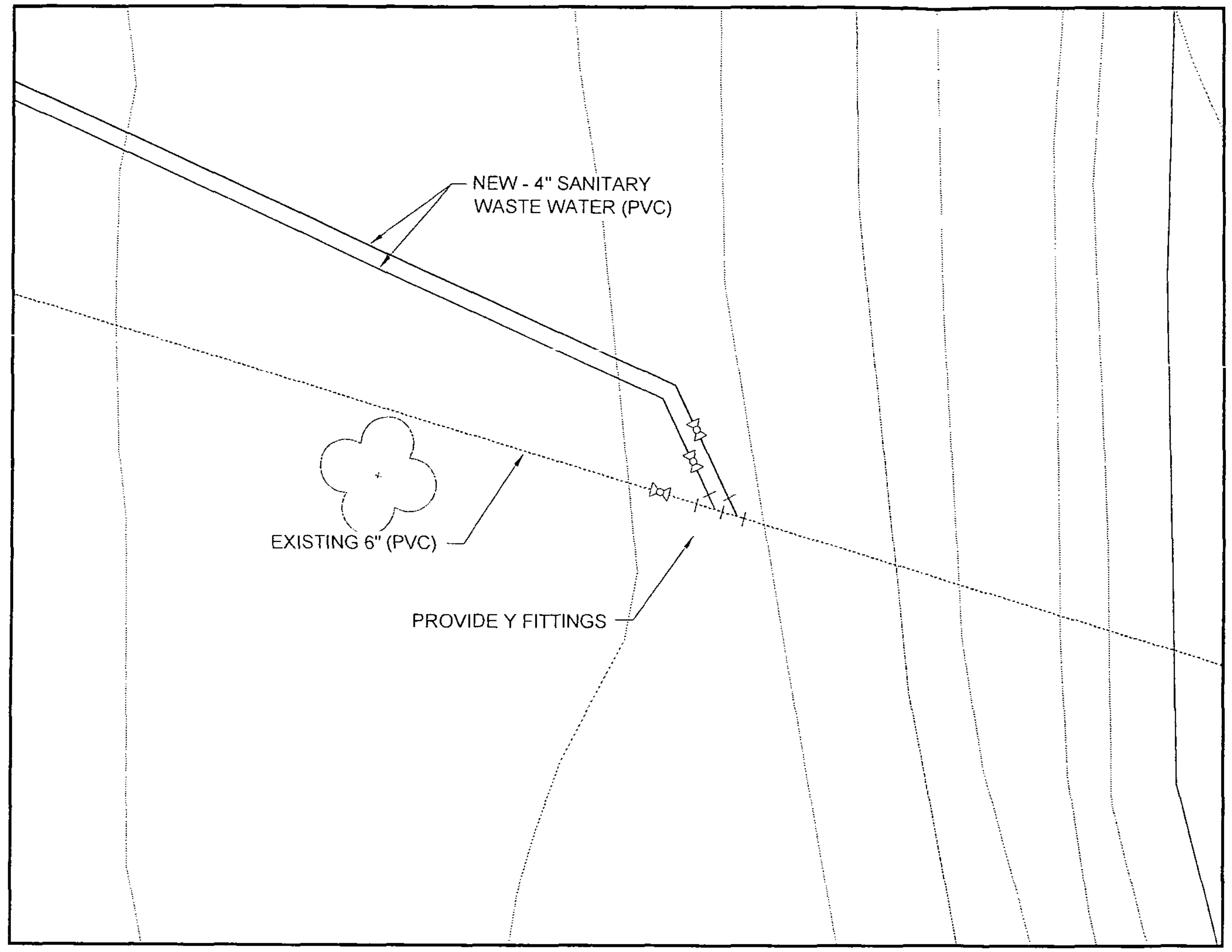
TIE-INS

DRN. BY: SJL	DATE: 06FEB09	RFE No: CC9030.14	
CHK'D. BY: ELC	DATE: 06FEB09	CAD REF:	
APP'D. BY: ELC	DATE: 05FEB09		
DRAWING NO. Z90-09-304		SHT 6 of 8	REV 0

REV.	REVISION DESCRIPTION	RFC No.	DATE



TIE-IN NEAR AERATION PONDS
NTS



TIE-IN NEAR SOUTH PROPERTY LINE
NTS

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

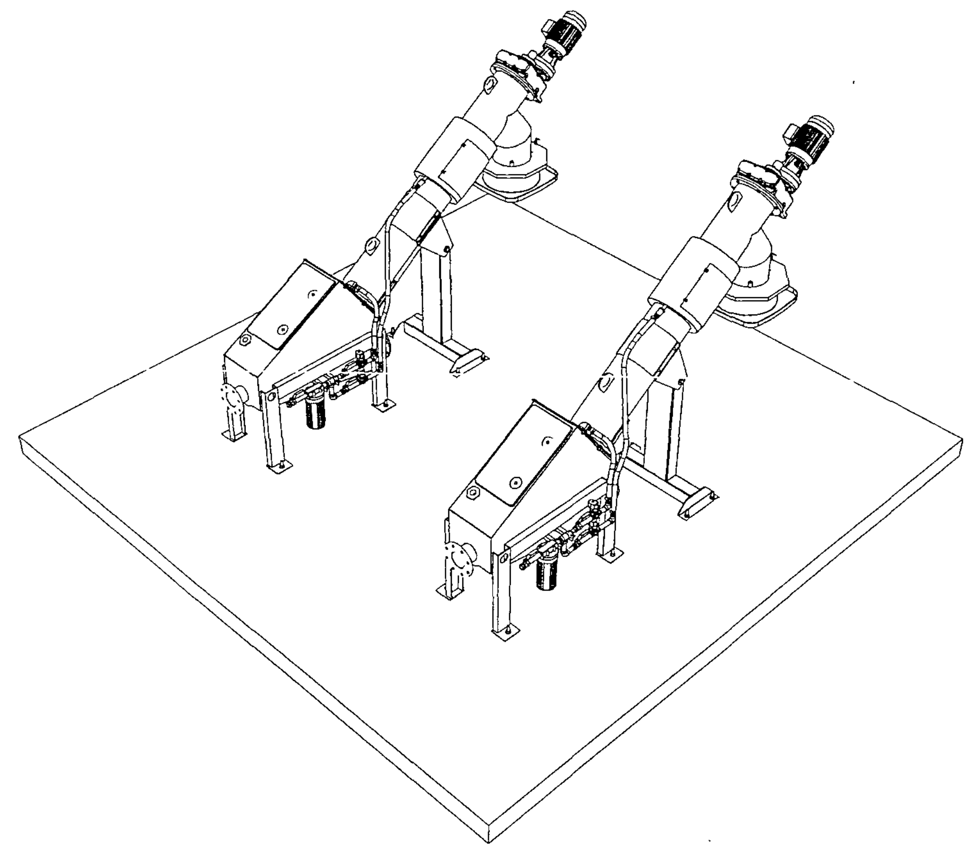
WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

TIE INS

DRAWN BY: S.A.	DRAWING SCALE: SHOWN	PROJECT NO.: J.107788.06	
CHECKED BY: ELC		FILE NO.: 7788.06.06.dwg	
APPROVED BY: ELC	DATE PRINTED:	Sheet 7 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone: 734-971-7080 • Fax: 734-971-9022

RMT COMPUTER AIDED DESIGN AND DRAFTING • CREATING BALANCE



1/2 **BOLLARD DETAIL**
NOT TO SCALE

2/8 **SCREEN PIPING**
NOT TO SCALE

NO.	BY	DATE	REVISION	APP'D.
5.				
4.				
3.				
2.				
1.	SJL	12-29-08	90% REVIEW	ELC

WESTERN REFINING - GALLUP REFINERY
GALLUP, NEW MEXICO

DETAILS

DRAWN BY: SL	DRAWING SCALE: SHOWN	PROJECT NO. J:\07788\05	
CHECKED BY: EC		FILE NO. 7788.06.07.dwg	
APPROVED BY: EC	DATE PRINTED:	Sheet 8 of 8	
DATE: January 2009			

RMT
3754 Ranchero Drive
Ann Arbor, MI 48108-2237
Phone 734-971-7080 • Fax 734-971-9022

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Tuesday, March 03, 2009 4:07 PM
To: Krapfl, Heidi, DOH
Cc: Jones, Brad A., EMNRD; 'Rajen, Gaurav'
Subject: Western Refining SW- Gallup Refinery (GW-032) - Bio-Hazard Plan

Heidi Krapfl
Department of Health
(505) 476-3577

Good afternoon. Per our telephone conversation today, the New Mexico Oil Conservation Division (OCD) would appreciate any comments that the NM Department of Health (DOH) would like to make on the submitted bio-hazard Plan for the above refinery by April 3, 2009.

As we discussed, the DOH review is optional, but would be appreciated in the event you identify any concerns based on the bio-hazard plan. The nearby Pilot Travel Center discharges its sanitary effluent into the Gallup Refinery Waste-Water Treatment Plant and is used in the remediation or breakdown of organics in the refinery treatment system. The OCD just wants to make sure that there is or are no bio-hazard issues based on the bio-hazard plan.

The OCD is currently reviewing the Bio-Hazard Plan submitted to the OCD by Western Refining SW- Gallup Refinery. Any comments on the bio-hazard plan would be appreciated. If the OCD does not receive comments from DOH, this shall not be misconstrued to mean that DOH has no concerns.

Please contact me if you have questions. Thank you in advance.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

Chavez, Carl J, EMNRD

From: Larsen, Thurman [Thurman.Larsen@wnr.com]
Sent: Monday, February 09, 2009 4:05 PM
To: Chavez, Carl J, EMNRD
Subject: Pilot Travel Line tie-in Notification-Final Report

Dear Mr. Chavez;
As per our telephone conversation, I am submitting a final report on the tie-in to the Pilot Center line which is part of the Sanitary Wastewater Treatment Design Project.

At approximately 0900 hrs on February 5, 2009, sanitary flow from Pilot Travel Center Lagoon #1 was temporarily diverted from Lagoon #1 to Pond #9 in order to initiate a line tie-in between the sanitary lines from the Pilot Travel and the API that leads to Lagoon #1. Once the flow was diverted to Pond #9, the Contractors installed three valves and tied these lines directly to the API inlet line. These valves are intended to allow flexibility in the repair and operation of the influent to the API system from the Pilot Travel Center.

At approximately 0900 hrs on February 6, 2009, flow was returned to Lagoon #1. The average flow rate from Pilot Travel Center is approximately (*20* gpm) or approximately ((28,800 gallons). Tank Farm personnel were instructed to minimize the flow from the Pilot Travel Center during this period. Also, Tank Farm personnel were instructed to add chlorine during this time frame. Utilizing the Best Engineering Judgment based on the average flow rate, on the time, and on the minimization of flow during this period, the flow was estimated to be approximately (1 -2 gpm) or approximately (1440 - 2880 gallons) during the 24 hour period.

If you require additional information on this matter, please feel free to contact me at the telephone indicated below.
Sincerely,

Beck Larsen; CHMM, REM, RPG
Environmental Engineer

Western Refining Company
Route 3, Box 7
Gallup, NM 87301
Office:(505) 722-0258
Fax: (505) 722-0210
Office Cell: (505) 862-1749
thurman.larsen@wnr.com

From: Larsen, Thurman
Sent: Wednesday, February 04, 2009 2:51 PM
To: 'Carlj.Chavez@state.nm.us'
Subject: Pilot Travel Line tie-in Notification

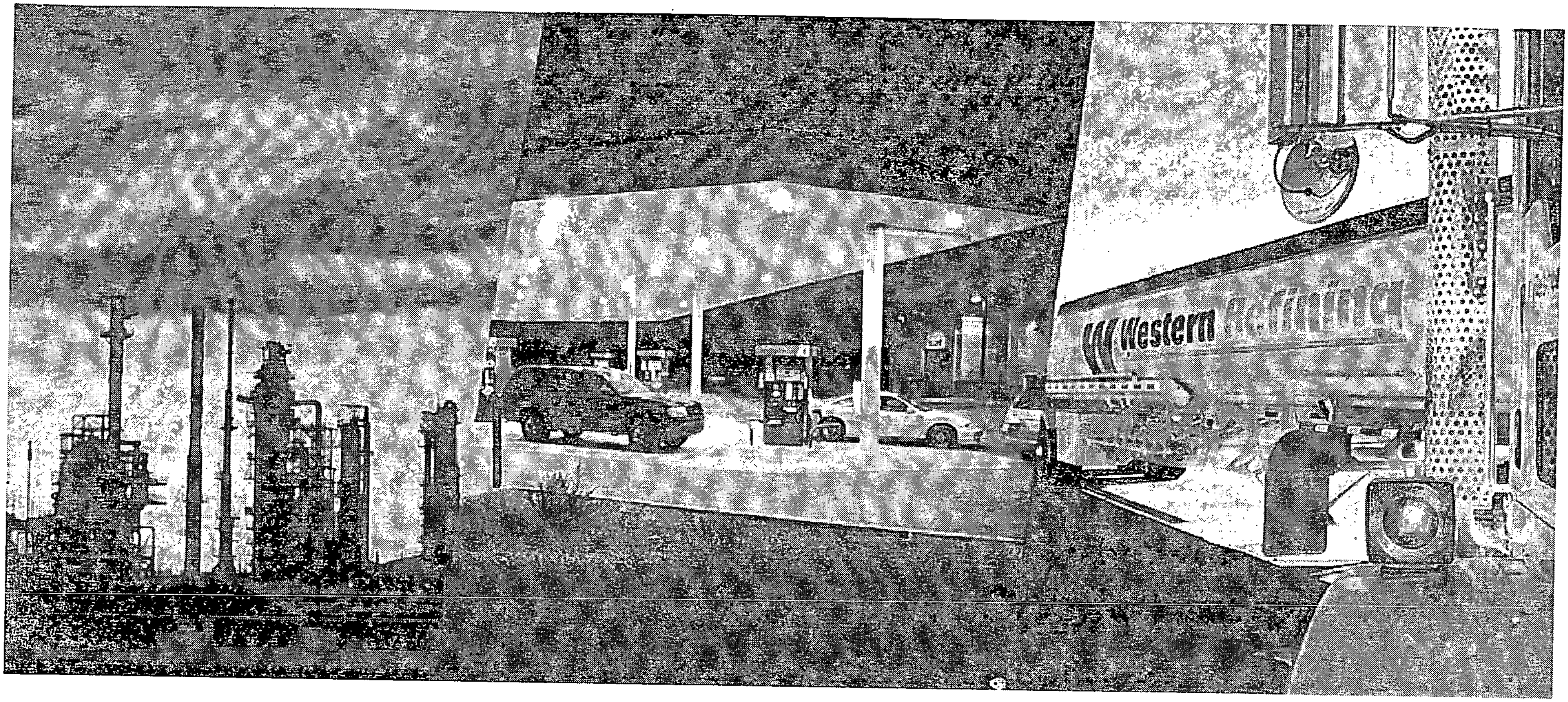
Dear Mr. Chavez,

This memo is a follow-up to my telephone call to your office this afternoon as a means of formal notification. Western Refining (Gallup) is in the process to begin a tie-in of two new lines to an existing line. I order to proceed we are going to have to temporarily divert the sanitary flow from Pilot Travel Center going into Lagoon 1 to Pond 9. The purpose of this temporary diversion is to insert the necessary valves and to tie-in the other two lines into a main line going to Lagoon 1. Once completed, this modification will allow us the flexibility to isolate these lines if required. The diversion will last about a 24 hour period, long enough to allow the glue to set. During this diversionary period, chlorine will be added to the system in order to provide the proper chlorination for the system. Also, the flow going into the Pond 9 will be minimized.

Sincerely,

Beck Larsen; CHMM, REM, RPG
Environmental Engineer

Western Refining Company
Route 3, Box 7
Gallup, NM 87301
Office:(505) 722-0258
Fax: (505) 722-0210
Office Cell: (505) 862-1749
thurman.larsen@wnr.com



Western Refining

Overview of New Western Refining Wastewater Treatment System at Gallup Refinery

1/21/09

Western Refining

Outline: Topics Covered

- Treatment Objectives

- Proposed System
  - Process flow
  - Related systems – Stormwater, Pilot Travel Center
  - Key features of main system components

- Plans to be provided to OCD/NMED by March 1, 2009

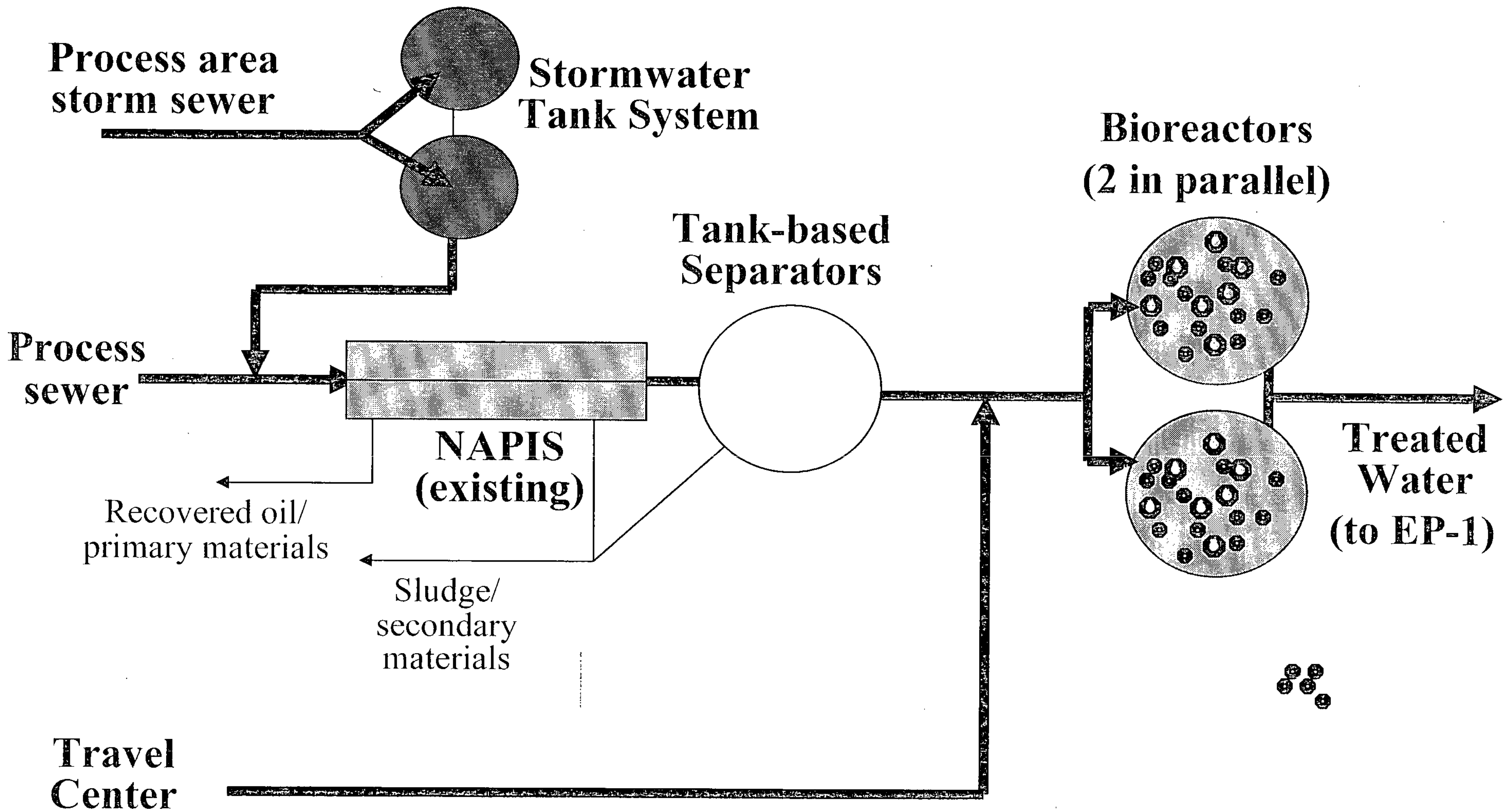
Treatment Objectives

- Treat for oil and benzene upstream of the ponds and meet OCD/NMED requirements
  - No free oil to EP-1; <0.5 ppm benzene

Proposed System

- NAPIS (keep existing)
- Tank-based separator (secondary oil-water separation)
- Bioreactors (2 tanks)
  - Eliminate API-Separator benzene strippers

Flow Diagram

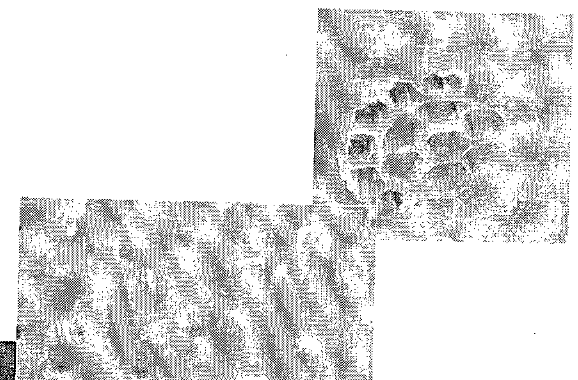


Tank Based Separator Features

- Provides additional oil and solids removal
- Provides flow and wasteload equalization
- Protects biological treatment

Bioreactor Features

- Above-ground tanks – aerated, sufficient biomass, no sludge recycle (→ EP1 [illegible])
- Expandable to moving bed biofilm reactor as needs dictate – by adding media to increase biological activity
- Will discharge to EP-1
  - no free oil
  - <0.5 ppm benzene



Media are suspended and move with aeration

Do NOT clog with biofilm

Related Systems

- New Travel Center Lift Station – alternative lines already in place
- Stormwater Tanks Design Plans – to be completed by March 1, 2009

Plans by March 1, 2009

- Wastewater treatment system
  - Process design plan
    - Process flow diagrams, major equipment list, etc.
  - Project schedule through construction
- Closure Plans for aeration lagoons
- Biohazard study, Operation and Maintenance Plan

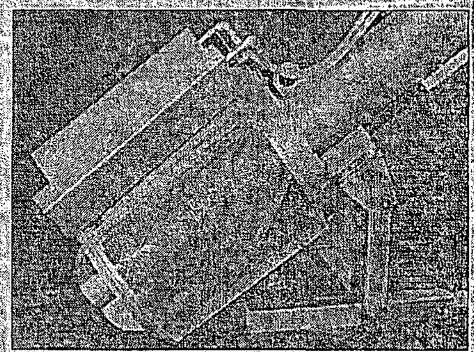
Chavez, Carl J, EMNRD

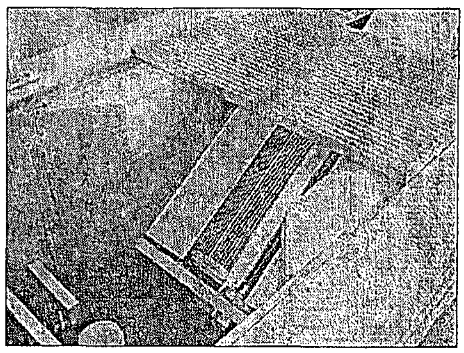
From:	Rajen, Gaurav [Gaurav.Rajen@wnr.com]
Sent:	Tuesday, November 04, 2008 1:59 PM
To:	Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV
Cc:	Riege, Ed; Hallock, Jim
Subject:	Additional attachment for earlier e-mail RE: Engineering and Design of the Pilot Travel Center's Sanitary Wastewater Lift Station GW-032
Attachments:	Raptor bulletin.pdf

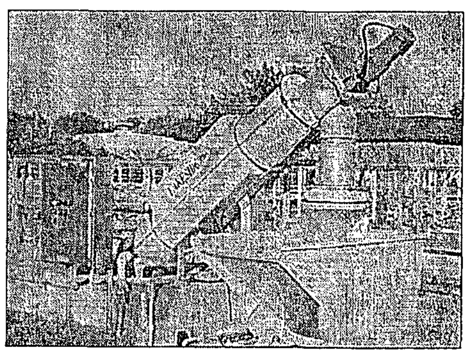
FYI: additional attachment related to our previous e-mail regarding "Engineering and Design of the Pilot Travel Center's Sanitary Wastewater Lift Station GW-032."

Bulletin #2316   July 2005

Raptor® Rotating Drum Screen



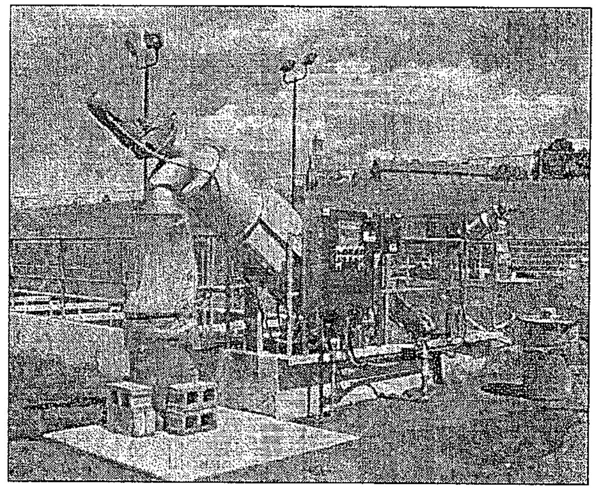




LAKESIDE
Water Purification Since 1928

The Lakeside *RAPTOR*® Rotating Drum Screen

The Lakeside *Raptor®* Rotating Drum Screen meets and exceeds the expectations of operators worldwide with its innovative screening solutions. Not only does the Rotating Drum Screen remove solids, but it also washes and dewaters captured screenings. Along with a simple design and operation process, this screen has a high removal efficiency and low disposal costs.

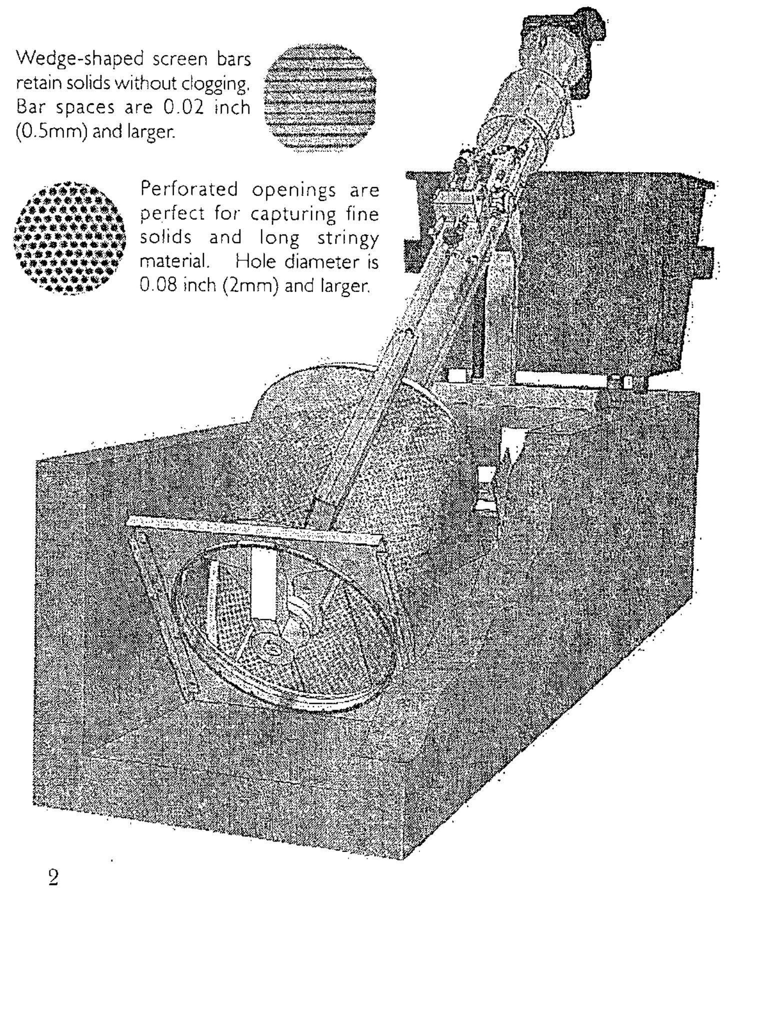


Screen, Compact and Dewater in a Single Unit

Wastewater from the influent channel flows directly into the screening basket. Fabricated with either wedge-shaped screen bars or perforated plate, the screening basket retains fine solids without clogging. Installed at the front of the screening basket, a seal assembly plate prevents unscreened wastewater from bypassing the screen.

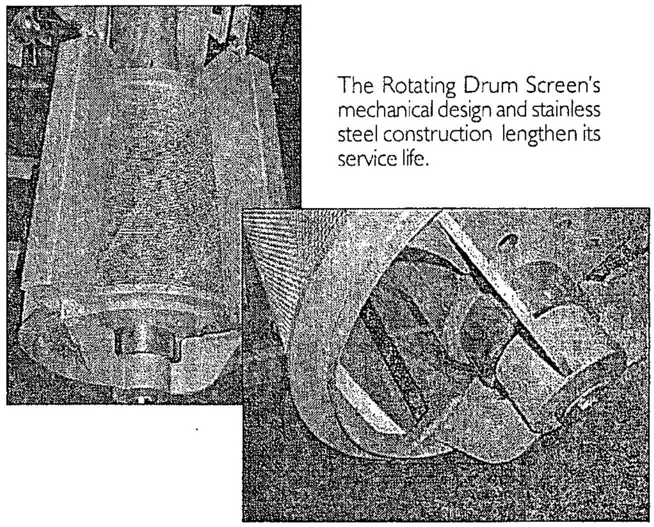
When the wastewater rises to a predetermined level, the screening basket rotates and lifts the screened material out of the influent flow stream. As the material reaches the top of the screening basket, with the help of gravity, it drops into the central screw conveyor/compactor. Any material still in the screening basket is removed by a spray wash system. This system also flushes organic materials back into the influent channel.

The central screw conveyor/compactor transports screened material to the discharge chute and storage container. During transport, the solids are compacted and dewatered up to a 40 percent dry solids content.



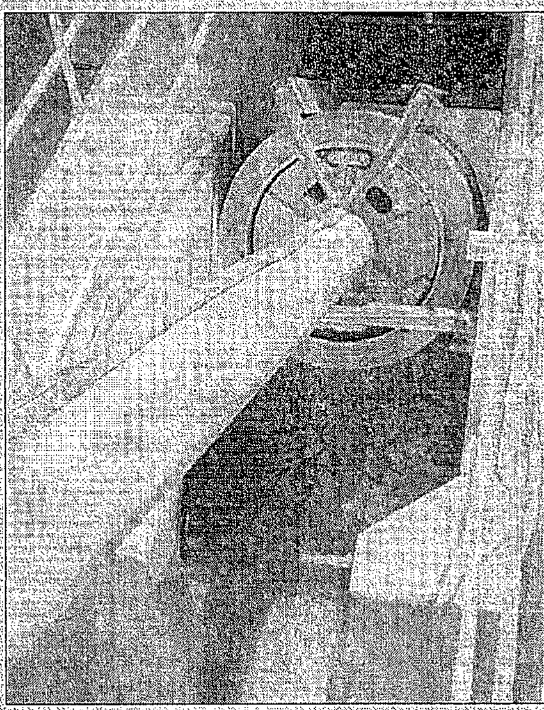
Equipment Features and Benefits

- All stainless steel construction for superior corrosion resistance
- Simple mechanical design requires little maintenance
- Hinged structural support allows unit to pivot out of channel for maintenance at floor level
- Simple drive assembly makes service easy and reduces maintenance costs
- Unit is shipped fully assembled to minimize installation expenses
- All mating parts are machined to ensure proper fit and operation



The Rotating Drum Screen's mechanical design and stainless steel construction lengthen its service life.

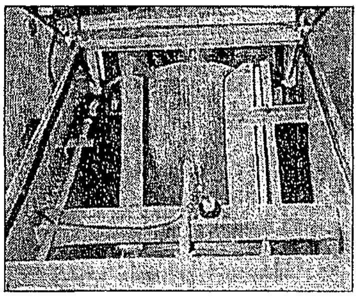
Exceptional Efficiency and Handling



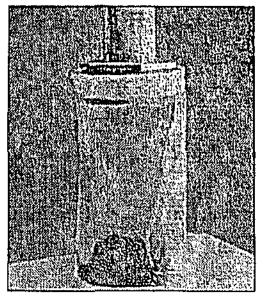
- Unique screening basket provides high screening removal efficiency
- Ideal for scum removal applications
- Two-stage screenings wash water system helps return organic material to wastewater stream
- Integrated screening press reduces volume and weight of screenings for lower disposal costs and cleaner operation
- Enclosed transport tube and optional bagging attachment reduce odors and offer a clean working environment for operators
- Optional insulation and heating systems permit cold climate operation

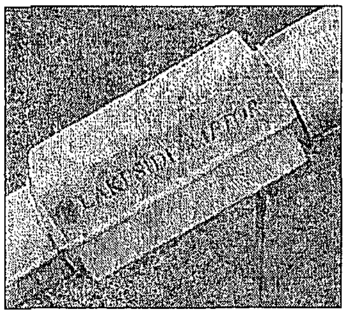
Product Options

Tank Mounting
Available for all size screens, the entire unit can be enclosed in a pre-engineered tank.

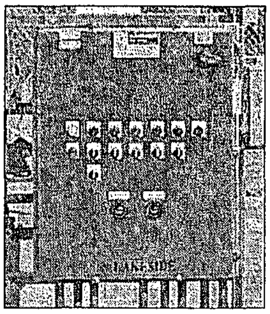


Bagging Attachment
Available for all size screens, the enclosed transport and optional continuous bagging attachment reduce odors and provide a clean work area.





Weather Protection
Available for all size screens and transport tubes, the Lakeside weather protection system protects to 13° below zero (minus 25° C).



Control Panel
Lakeside control panels are PLC-equipped for versatile and efficient operation. Explosion-proof designs are also available.

Treatment equipment and systems solutions from Lakeside

Lakeside offers a wide range of equipment and systems for virtually all stages of wastewater treatment from influent through final discharge. Each process and equipment item that we supply is manufactured with one goal in mind . . . to reliably improve the quality of our water resources in the most cost-effective way possible.

We've been doing just that since 1928.

Aeration
newair® Diffuser
CLR Process
E.A. Aerotor
Magna Rotors
Rotor Covers
Level Control Weirs

Submersible Products
Mixers
Propeller Pumps
Grinder Pumps

Clarification
Spiraflo Clarifier
Spiravac Clarifier
Tertiary Treatment using Series Clarification
Full-Surface Skimming

Trickling Filters

Trash & Screen Rakes

***RAPTOR*® Screening Products**
Fine Screen
Micro Strainer
Rotating Drum Screen
Wash Press
Septage Acceptance Plant

Other Screening Products
Water Intake Screens
CSO Screens

Packaged Headworks Systems
RAPTOR® Complete Plant
H-PAC

Grit Collection
SpiraGrit
Aeroductor
RAPTOR® Grit Washer
Inline Grit Collector
Model L Grit Classifier

Screw Pumps
Open Screw Pumps
Enclosed Screw Pumps

LAKESIDE
Water Purification Since 1928

1022 E. Devon, P.O. Box 8448
Bartlett, IL 60103
630/837-5640, FAX: 630/837-5647
E-mail: sales@lakeside-equipment.com
http://www.lakeside-equipment.com

Rotating Drum Screen is Maintenance-free

Wheaton, IL

Lakeside Equipment Installed

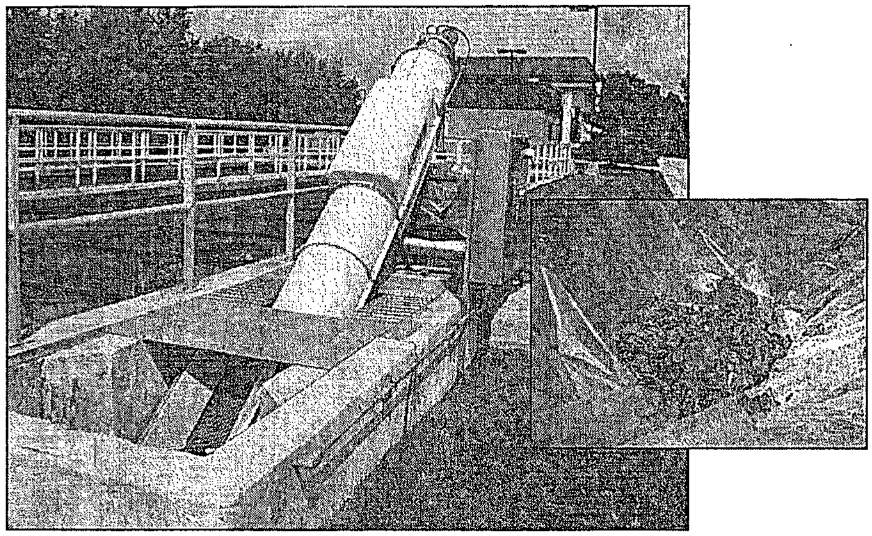
31RDS-0.02-105 *Raptor®* Rotating Drum Screen

Equipment Operation

Fully automated with one hour of general up-keep per week

Contact

Steve Bollweg
Plant Superintendent
630/668-1515



At the Wheaton Sanitary District, Wheaton, Ill., the Raptor® *Rotating Drum Screen (above) has been in operation for five years. The screen is highly efficient in processing scum, grease and floatables from the adjacent clarifiers, producing discharge (inset) that regularly passes paint filter tests.*

Primary settling tank grease and skimmings are difficult materials to process at wastewater treatment facilities. While many facilities tend to pump this scum into their digesters, it is difficult to mix and more difficult to biologically stabilize, forcing plants to look for other methods of treatment.

The Wheaton Sanitary District, Wheaton, Illinois, operates with three rectangular chain and flight primary clarifiers. Surface scum and other floatables were skimmed into a pit to be decanted then pumped to an externally fed drum screen. The screen was located in one building and the pump in another with the process running five steps: skimming/decanting, pumping, filtering, and conveyance to a dumpster.

While testing septage screening equipment for a new receiving station, the staff at Wheaton noted the capability of a different type of rotating drum screen, which handles grease and solid material by removing, dewatering and compacting in one machine. The unit, Lakeside Equipment Corporation's ***Raptor®* Rotating Drum Screen (RDS)**, was brought in to test its handling of grease and floating material removed by the skimming troughs.

The RDS, with 0.5mm-spaced wedge wire, receives skimmings from the scum pit next to the screen, effectively removing grease and solid material. The material enters the rotating drum where it is screened and deposited in the screw conveyor to be dewatered and compacted. Discharged screenings were a solid material of grease and debris. It became apparent during testing the RDS could perform the five-step process of scum handling with one piece of equipment. After

1022 E. Devon • Bartlett, IL 60103
630/837–5640 • FAX: 630/837–5647

Lakeside Equipment Corporation

sales@lakeside-equipment.com
http://www.lakeside-equipment.com

Rotating Drum Screen is Maintenance-free

Wheaton, IL

... continued

further testing, the plant concluded the RDS could be installed directly into the scum pit, eliminating the need for pumping. The District contacted Lakeside and purchased a 31-inch Rotating Drum Screen for installation directly into the existing scum pit.

Skimmings from three sedimentation tank troughs enter the chamber through a common pipe. Operator attention is minimal as the unit operates automatically based on preset water levels. The first processed material was visibly free of liquids and accepted by the landfill and wastehauler. The staff inspected the filtrate that had passed through the drum screen as it left the scum pit and flowed down the lowered decant tube. The filtrate was clear and contained little solids.

Plant operators adjust the common pipeline to allow skimmings from adjacent clarifiers to enter the screen's channel. The screen starts to process the scum, grease and floatables without any attention required.

Aside from weekly high-pressure spray wash cleanings, the RDS has been maintenance free. The Rotating Drum Screen has now provided 5 years of reliable scum processing in one unit. The discharged material passes paint filter testing for free liquids and provides a quick, economical and clean way to process primary tank skimmings.

Lakeside Equipment Corporation

Chavez, Carl J, EMNRD

From:	Rajen, Gaurav [Gaurav.Rajen@wnr.com]
Sent:	Tuesday, November 04, 2008 1:48 PM
To:	Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV
Cc:	Riege, Ed; Hallock, Jim; Turri, Mark; Riley, Don
Subject:	Engineering and Design of the Pilot Travel Center's Sanitary Wastewater Lift Station GW-032
Attachments:	Letter with list of attachments and basic drawing.pdf; Travel Center pond-2.ppt; Lakeside RAPTOR dwg.pdf; Pilot Travel Center Site Plan rev 1.pdf; Pilot Travel Center Land Survey.pdf; Z-02-158 refinery elevatin contours rev 1.pdf

Dear Carl and Hope:

It is a pleasure to send you a letter from Ed Riege and supporting documents related to our proposed sanitary wastewater lift station connecting sanitary wastewater from the Pilot Travel Center to our wastewater treatment system. Ed is out of town, so I am sending on the letter he signed including related documents – we have mailed copies of these to you all today.

We look forward to your review.

With my best regards,

Raj

Gaurav Rajen
Environmental Engineer
Western Refining Gallup Refinery
505-722-0227

PS: I am also sending a separate e-mail with one more of the attachments as we have a 5 Megabyte limit on attachments.

Western Refining
GALLUP REFINERY

WNR
LISTED
NYSE

October 31, 2008

Mr. Carl Chavez
Oil Conservation Division
Environmental Bureau
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Ms. Hope Monzeglio
Environmental Specialist
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, BLDG 1
Santa Fe NM 87505

Re: Engineering and Design of the Sanitary Wastewater Lift Station GW-032

Dear Mr. Chavez and Ms. Monzeglio:

Enclosed are various documents for your consideration that describe our proposed alternative to our previous plan for the Western Refining, Gallup Refinery, Sanitary Wastewater Lift Station. This submission is based on our preliminary telephone discussions with you, Carl, on Thursday, October 24, 2008. Our alternative plan we believe will be more effective, with lower operational requirements, and less system complexity, and meet the requirements in the OCD letter dated March 12, 2008.

Earlier, we had submitted various drawings to meet the requirement of sending engineering and design details to the agencies by June 2008, and these drawings and our plan had been approved by the OCD/NMEMNRD. Through this submittal we are sending you detailed drawings of important features of our proposed alternative and various other documents (maps, satellite photographs, drawings, block-flow diagrams, etc.) that will help you understand our reasoning and enable you to provide us with an evaluation of the alternative approach. At this time, the detailed drawings for our entire alternative plan are under preparation, and will be completed based on your approval of our proposed alternative.

The plan submitted earlier involved the construction of tanks with a capacity of 48-hours flow holding capacity, to account for the circumstance of a rupture or leak in the pipeline between the Pilot Travel Center and our wastewater treatment system. We are now proposing the construction of a second back-up pipeline, along with the new pipeline and new lift station to serve as an alternative to holding tanks in case the primary pipeline suffers a break. A second back-up line has the advantage that a rupture that lasts longer than 48 hours to repair could be dealt with more easily by using the secondary back-up line. Also, we will connect the two pipelines at various junctions (along with several clean-out locations) to account for any eventuality that both pipelines suffer a break (or leak for whatever reason) at the same time. We will thus be able to use sections of each pipeline in the extreme unlikely eventuality that both lines ever need repair simultaneously. We will also hydro-test the lines prior to commissioning, have a regular inspection and maintenance schedule to avoid any such possibility, and test the lines on a five year schedule.

We do understand the OCD and the NMED are concerned about the possibility that the Pilot Travel Center might send oil along with its sanitary wastewaters to the Western Refining new Wastewater Treatment System. The Pilot Travel Center does operate its own oil-water separator for all water generated from its truck and automobile service areas (this stream is kept separate from sanitary wastewater), and the water from the oil-water separator goes to the Pilot Travel Center's on-site evaporation lagoon (see satellite photograph and maps). Sludge from this oil-water separator is pumped out on a regular basis and is shipped off-site. The kitchen wastewater is also segregated and goes through grease traps before entering the sanitary wastewater stream. The Pilot Travel Center, therefore, will only send sanitary wastewater (and kitchen wastewater without oil and grease) to our wastewater treatment system, as the various streams within the Travel Center are physically segregated and treated differently.

The new alternative we are proposing has an additional great benefit - we are now proposing screens that will screen out < 2 mm solids, a scale smaller than our original plan. This finer scale is needed for the effective operation of our proposed new wastewater treatment system that deals with process wastewater along with the sanitary wastewater from the Pilot Travel Center.

Please contact me at (505) 722-0217 if you have any comments or questions regarding this submission.

Sincerely,

Ed Riege
Environmental Superintendent

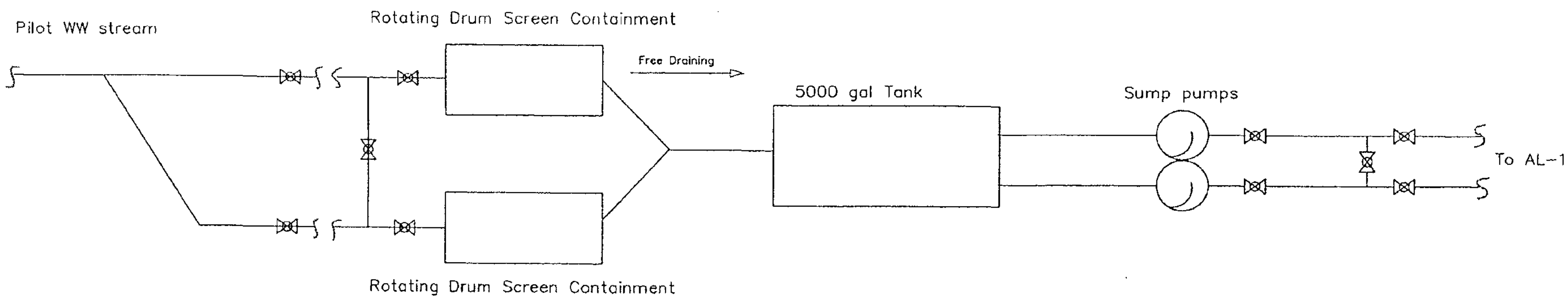
/Attachments

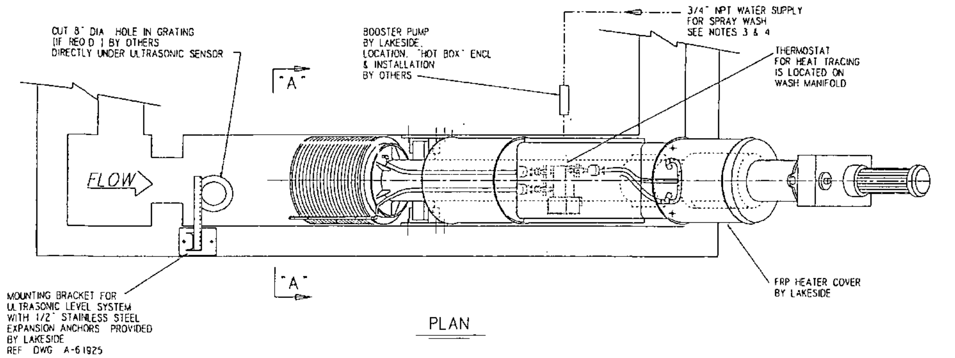
cc: Mark Turri
Don Riley
Jim Hallock
Gaurav Rajen
Western Refining

ATTACHMENTS

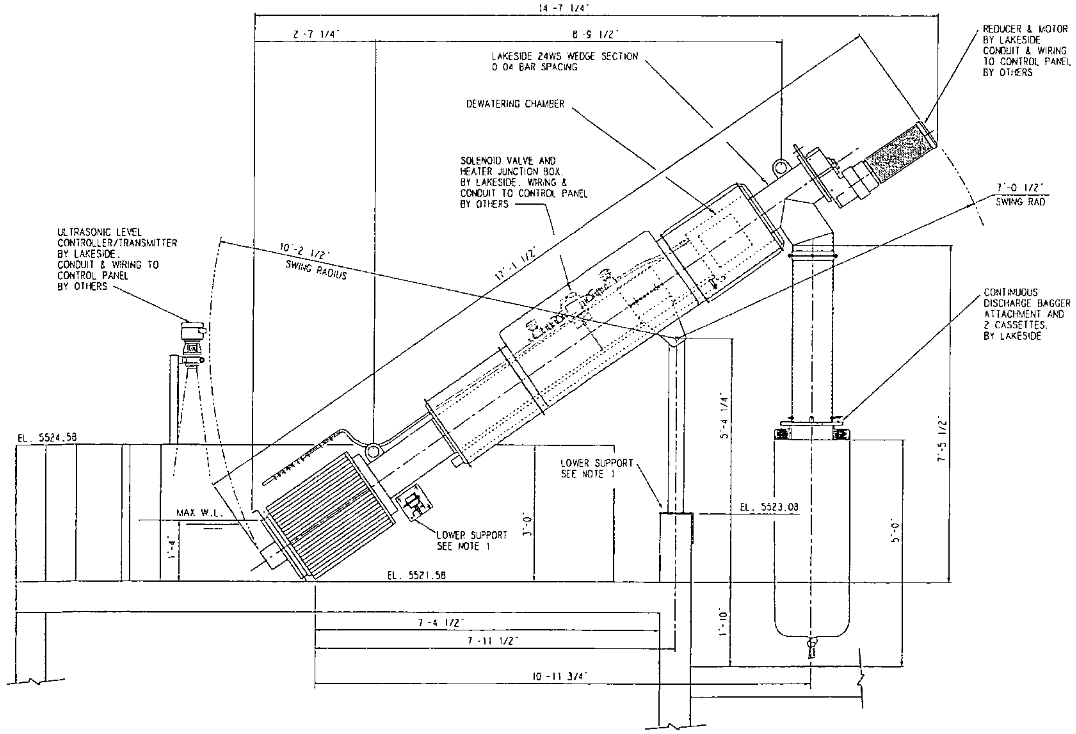
- Pilot Lift Station Basic Drawing rev 1
- Pilot Travel Center Site Plan rev 1
- Pilot Travel Center Land Title Survey
- Figure 1 – Pilot Travel Center Satellite photograph
- Figure 2 – Pilot Travel Center Satellite photograph
- Z-02-158 Refinery elevation & Contours rev 1 (indicates new waste water pipe routing)
- D78534 Lakeside RAPTOR Rotating Drum Screen Model 24RDS-0.08-102
- D-68979 Lakeside RAPTOR Wedge Section Installation Model 24WS-0.04-89
- Lakeside Raptor Rotating Drum Screen bulletin #2316
- Lakeside Raptor Rotating Drum Screen Plant Performance Report #169

Pilot Lift Station Basic Drawing

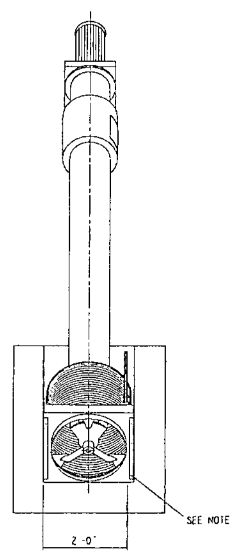




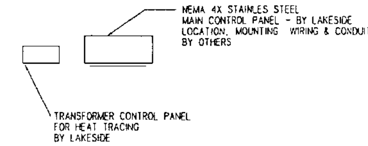
PLAN



ELEVATION



SECTION "A-A"
(HEATER COVER NOT SHOWN THIS VIEW)



NOTE:
THESE CONTROL PANELS HAVE BEEN DESIGNED TO POWER ONLY THOSE ELECTRICAL LOADS SPECIFICALLY SHOWN OR NOTED ON LAKESIDE ELECTRICAL DRAWINGS. CONNECTIONS TO OTHER POWER CONSUMING DEVICES WILL VOID THE WARRANTY.

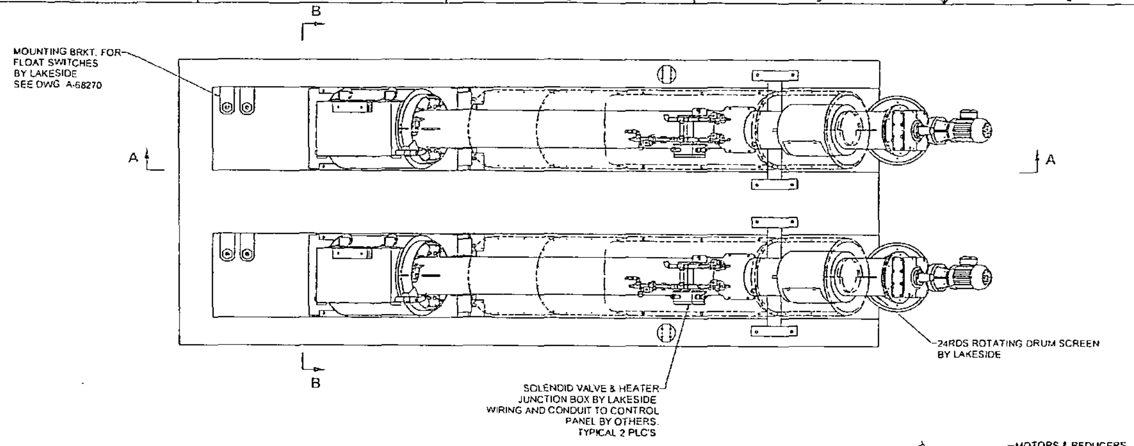
INSTALLATION NOTES:

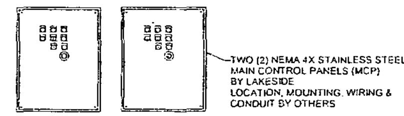
1) SEE DRAWING B-57350
2) AFTER LOWERING SCREEN INTO CHANNEL, ANCHOR UPPER SUPPORT ASSEMBLY WITH 5/8" STAINLESS STEEL ADHESIVE ANCHORS SUPPLIED BY LAKESIDE. SEE DWG. A-63524
3) **WATER SUPPLY LINES AND ELECTRICAL CONNECTIONS TO BE FLEXIBLE OR QUICK DISCONNECT TYPE TO ALLOW UNIT TO PIVOT OUT OF CHANNEL.**
4) KEEP AREA UNDER UNDER SCREENINGS TRANSPORT SCREW FROM FIXED OBSTRUCTIONS SUCH AS ELECTRICAL CONDUIT, PIPING, ETC. TO PERMIT ROTATION OF THE ROTAMAT OUT OF THE CHANNEL FOR SERVICE

SAFETY WARNING:
THERE ARE INHERENT DANGERS WHILE INSTALLING OR OPERATING ELECTRICALLY POWERED MECHANICAL EQUIPMENT. CONSULT AND WORK WITH YOUR PROJECT SAFETY COORDINATOR TO DETERMINE ALL NECESSARY CAUTION IS EXERCISED AND GUARDING IS BEING PROVIDED TO PREVENT ACCIDENTS

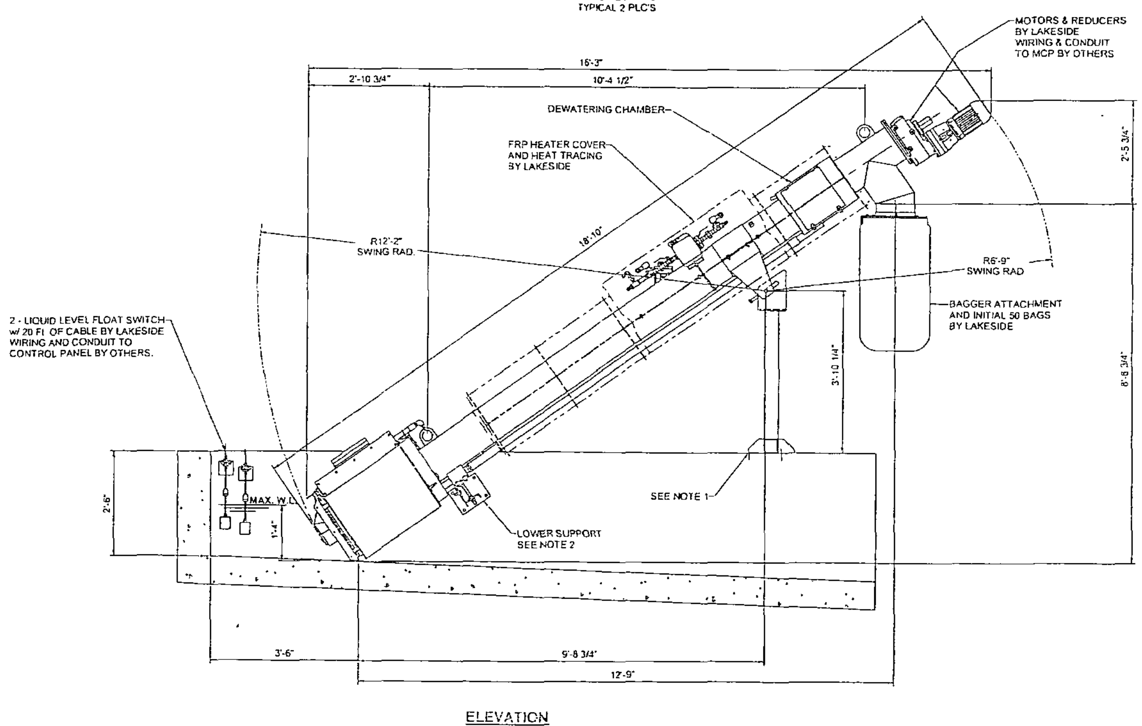
REVISIONS	DATE	DR.	CHKD	REVISIONS	DATE	DR.	CHKD	REVISIONS	DATE	DR.	CHKD	REVISIONS	DATE	DR.	CHKD

LAKESIDE EQUIPMENT CORPORATION	DR. R.D. / CHKD. CKH	DATE 2-5-04 / FILE NO. 172	WEDGE SECTION INSTALLATION MODEL 24WS-0.04-89	COCHITI LAKE, N.M. COCHITI LAKE WWTF S.O. #03-236	DWG. NO. D-68979	REV.

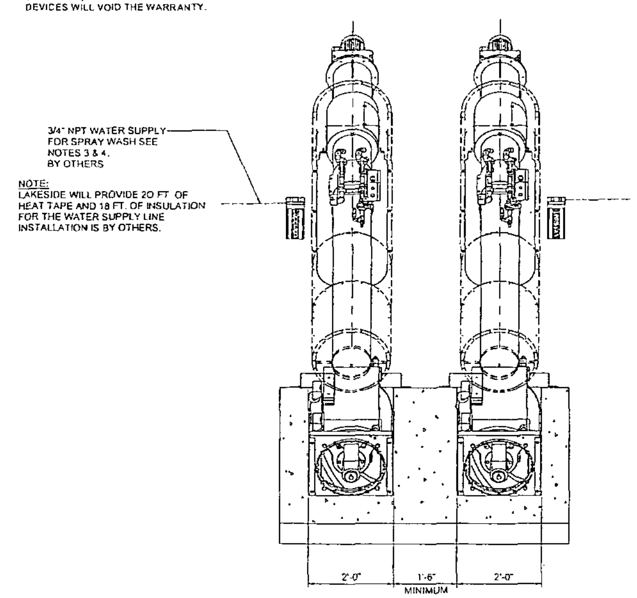




NOTE:
THESE CONTROL PANELS HAVE BEEN DESIGNED TO POWER ONLY THOSE ELECTRICAL LOADS SPECIFICALLY SHOWN OR NOTED ON LAKESIDE ELECTRICAL DRAWINGS. CONNECTIONS TO OTHER POWER CONSUMING DEVICES WILL VOID THE WARRANTY.



ELEVATION



SECTION B-B

SAFETY WARNING:
THERE ARE INHERENT DANGERS WHILE INSTALLING OR OPERATING ELECTRICALLY POWERED MECHANICAL EQUIPMENT. CONSULT AND WORK WITH YOUR PROJECT SAFETY COORDINATOR TO DETERMINE ALL NECESSARY CAUTION IS EXERCISED AND GUARDING IS BEING PROVIDED TO PREVENT ACCIDENTS.

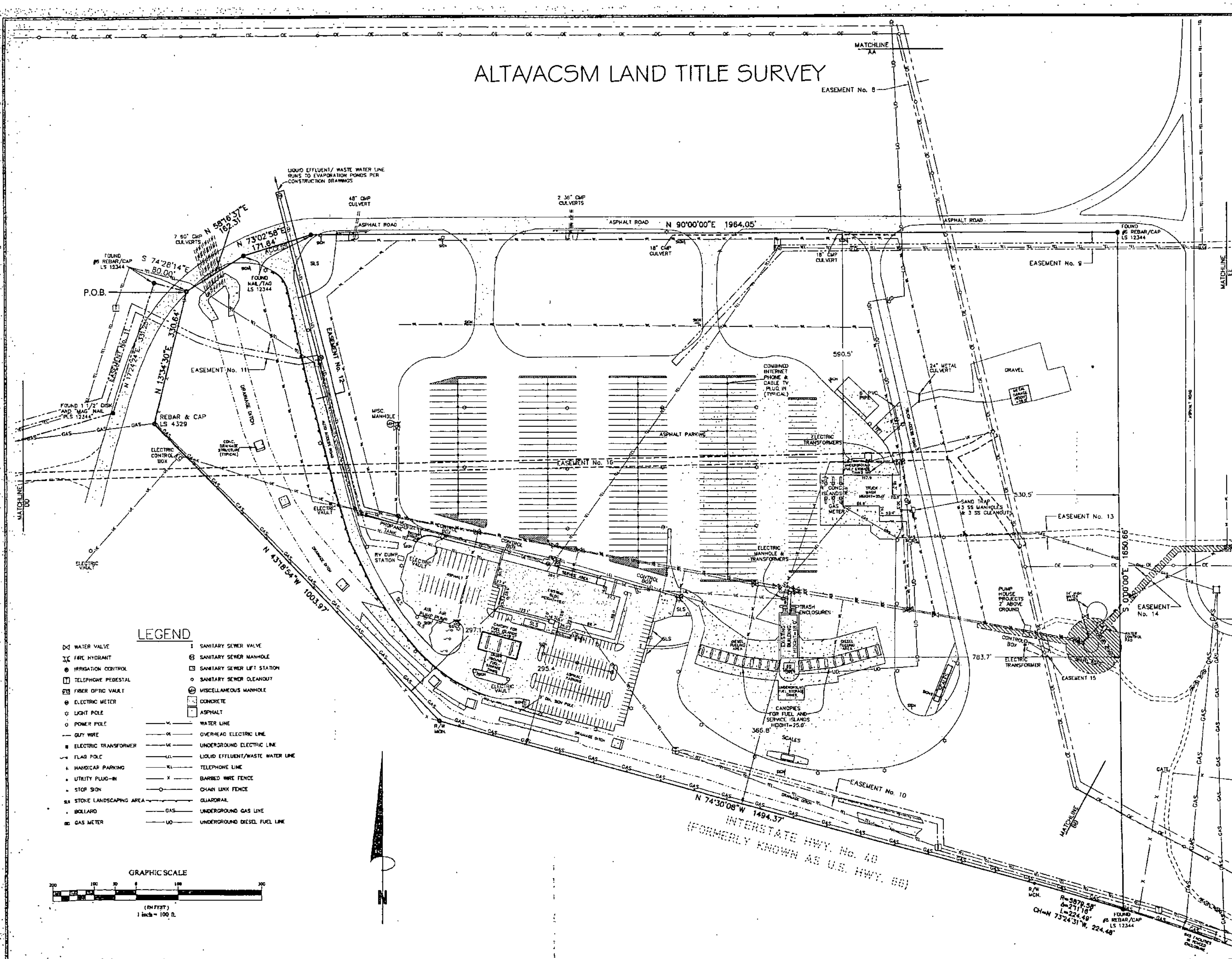
INSTALLATION NOTES:
1) AFTER LOWERING SCREEN IN TO CHANNEL ANCHOR SUPPORT ASSEMBLY WITH 5/8" STN STL. ADHESIVE ANCHOR PROVIDED BY LAKESIDE SEE DWG A-54117
2) AFTER LOWERING SCREEN IN TO CHANNEL ANCHOR LOWER SUPPORT ASSEMBLY WITH 5/8" STN STL. ADHESIVE ANCHOR PROVIDED BY LAKESIDE SEE DWG B-57360
3) WATER SUPPLY LINES AND ELECTRICAL CONNECTIONS TO BE FLEXIBLE OR QUICK DISCONNECT TYPE TO ALLOW UNIT TO PIVOT OUT OF CHANNEL.
4) KEEP AREA UNDER SCREENINGS TRANSPORT SCREW FREE FROM FIXED OBSTRUCTIONS SUCH AS ELECTRICAL CONDUIT, PIPING, ETC. TO PERMIT ROTATION OF THE SCREEN OF THE CHANNEL FOR SERVICE.

REVISED TO SHOW NEW UPPER SUPPORT	3-5-08	RD	JS	
REVISION	DATE	DR	CHK'D	

LAKESIDE EQUIPMENT CORPORATION

PROJECT	Dalton, GA. Mill Creek WWTP - Dalton Utilities
TITLE	RAPTOR® ROTATING DRUM SCREEN MODEL 24RDS-0.08-102
DRAWN	RD — DATE 11/12/2007
CHECKED	CKH — 11/14/2007
SIZE	D
S O #	07-191
DWG NO	D78534
REV	B
SHEET	1 OF 1
FILE NO	172

ALTA/ACSM LAND TITLE SURVEY



"ALTA / ACSM LAND TITLE SURVEY"

PREPARED FOR:

The Matthews Company, Inc.

Address comments

GIANT INDUSTRIES, INC.

Exit 39, Interstate 40
Jamestown, NM 87347
(Travel Center)

SCALE: 1" = 100'
DATE: June 11, 2003
DWN. BY: EB / MSJ
CHKD. BY: CEB
CHKD. / APVD:
APPROVED:

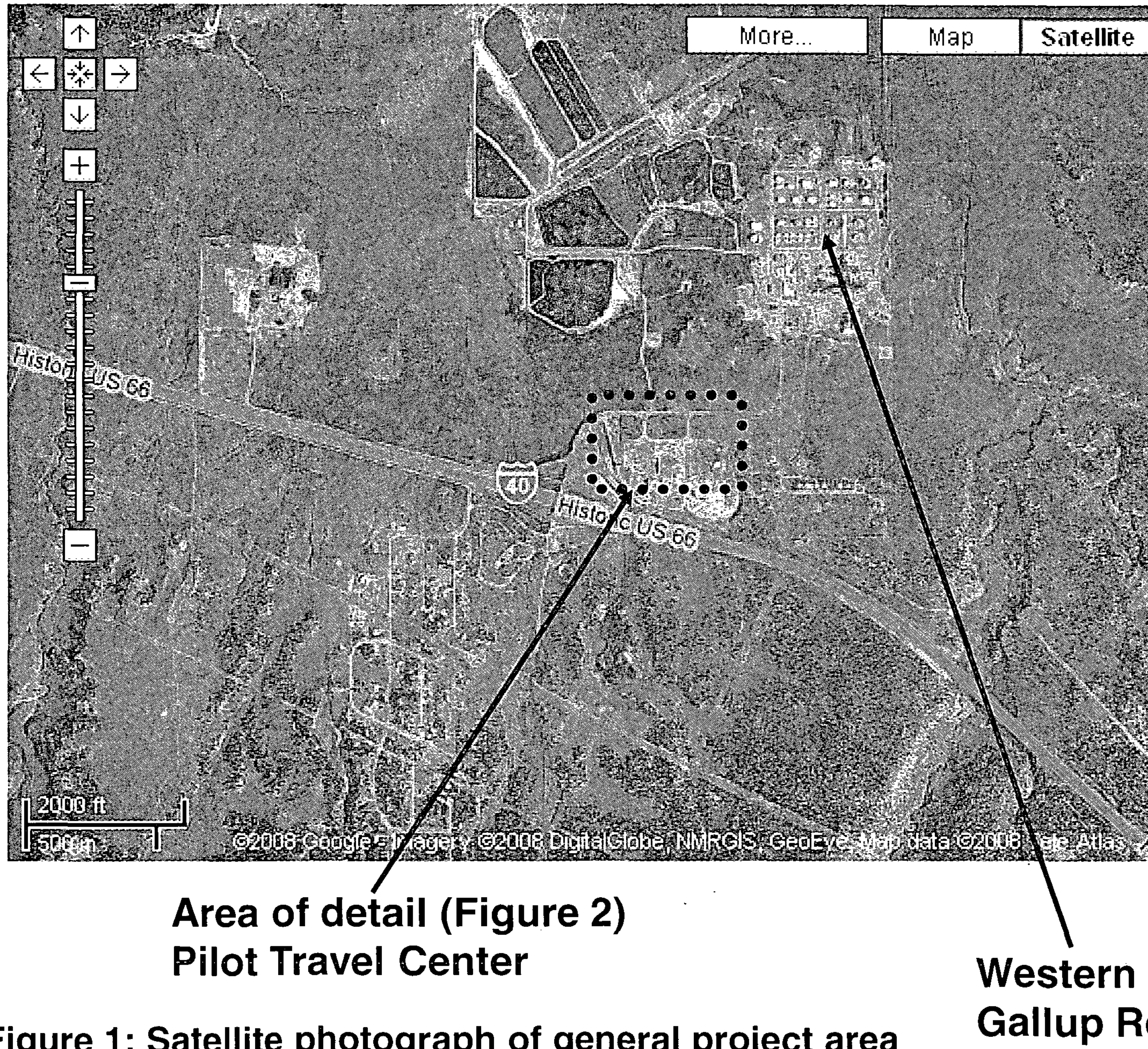


Figure 1: Satellite photograph of general project area

On-site evaporation pond for Pilot Travel Center's water from underground Oil-Water Separator

Figure 2: Satellite photograph of Pilot Travel Center

CONSTRUCTION NOTES

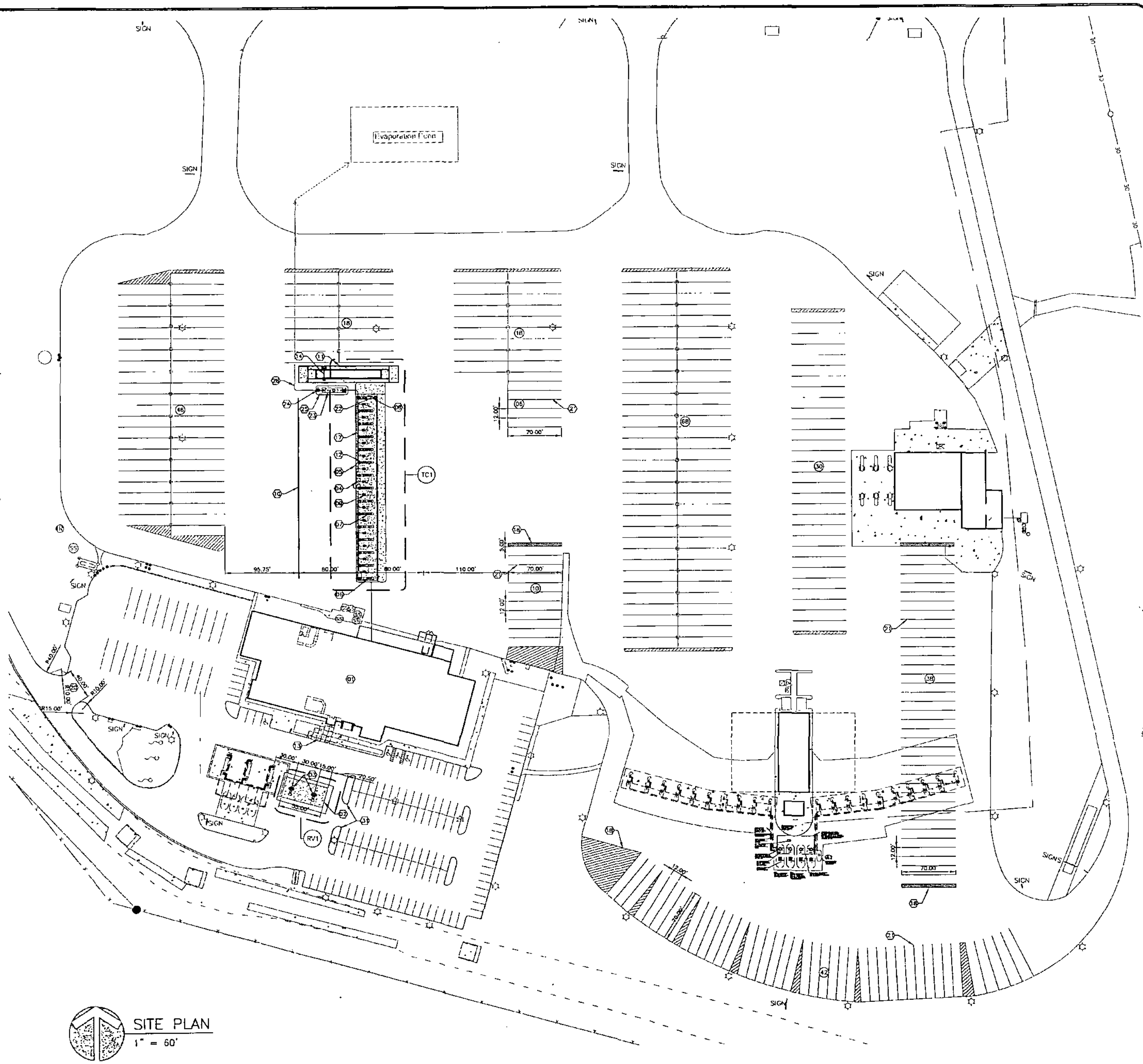
1. EXISTING TRAVEL CENTER BUILDING (SEE ARCHITECTURAL DRAWINGS).
2. NEW 27'-0" x 55'-0" 6" REINFORCED CONCRETE PAD FOR RV DISPENSERS. INSTALLED BY GC. (SEE SHEET RV1)
3. (2) NEW CONCRETE ISLANDS WITH A GAS/AUTO DIESEL DISPENSER AND CONTAINMENT BOX, INSTALLED BY GC.
4. NEW 25'-0" x 243'-4" TRUCK CANOPY, FURNISHED AND INSTALLED BY CANOPY SUPPLIER, CANOPY FOUNDATIONS INSTALLED BY GC.
5. NEW 38-0" x 248'-0" x 8" REINFORCED CONCRETE PAD FOR TRUCK CANOPY, INSTALLED BY GC.
6. NEW CONCRETE ISLAND WITH A DIESEL MASTER DISPENSER AND CONTAINMENT BOX TYPICAL AT (1) PLACE, INSTALLED BY GC.
7. NEW CONCRETE ISLAND WITH A DIESEL MASTER DISPENSER, DIESEL SATELLITE DISPENSER AND CONTAINMENT BOX TYPICAL AT (13) PLACES, INSTALLED BY GC.
8. NEW CONCRETE ISLAND WITH A DIESEL SATELLITE DISPENSER AND CONTAINMENT BOX TYPICAL AT (1) PLACE. INSTALLED BY GC.
9. NEW PREFABRICATED TRUCK ISLAND CATCH BASIN (TYP (14) PLACES). SUPPLIED BY PILOT INSTALLED BY GC
10. NEW 12" WIDE PAINTED (SHERWIN WILLIAM'S WHITE TRAFFIC TM 2116) PULL FORWARD LINE INSTALLED BY GC.
11. NEW TRUCK SCALE CONCRETE TRUCK SCALE PIT AND TRUCK SCALE FURNISHED AND INSTALLED BY TRUCK SCALE SUPPLIER. ELECTRICAL, COMMUNICATIONS AND DRAINAGE PROVIDED TO THE SCALE PIT BY GC, COORDINATION BY GC.
12. NEW TRUCK AIR/WATER STAND, TYPICAL AT EVERY OTHER TRUCK FUELING ISLAND, FURNISHED BY OWNER, INSTALLED BY GC.
13. NEW CONCRETE SIDEWALK INSTALLED BY GC
14. NEW "TRUCK SCALE" INTERNALLY ILLUMINATED SIGN FURNISHED AND INSTALLED BY TRUCK SCALE SUPPLIER. CONCRETE FOUNDATION BY TRUCK SCALE SUPPLIER, ELECTRICAL PROVIDED TO SCALE BY GC.
15. "ONE WAY" SIGN FURNISHED AND INSTALLED BY GC.
16. "WRONG WAY" SIGN FURNISHED AND INSTALLED BY GC.
17. NEW "NON-SLIP" COATING AREA APPLIED TO FINISHED CONCRETE. (SEE TC1 FOR DETAILS).
18. NEW TRAFFIC STRIPING 4" WIDE PAINTED (SHERWIN WILLIAM'S WHITE TRAFFIC TM 2116) PARALLEL STRIPES AT 16" O.C. FURNISHED AND INSTALLED BY GC.
19. PAVEMENT SYMBOL AND LETTERING PER D.O.T. SPECIFICATIONS (TYP). FURNISHED AND INSTALLED BY GC.
20. NEW RV ENTRY EXIT, INSTALLED BY GC. SEE DRAWINGS 3.1 AND 3.2 FOR PAVEMENT AND CURB DETAILS.
21. NEW 12'-0" x 70'-0" TRUCK PARKING SPACES TO BE PAINTED BY GC.
22. NEW (1) REMOTE SMT SYSTEM INSIDE OF BUMPER AT TRUCK ISLAND #15.
23. NEW 6,000 GALLON, 6'-0" x 30'-1", SINGLE-WALL STEEL UNDERGROUND OIL/WATER INTERCEPTOR (WITH EXTERIOR OF TANK COATED WITH A POLYURETHANE FINISH) FURNISHES BY PILOT, INSTALLED BY GC.
24. NEW CONCRETE OIL/WATER SAMPLING MANHOLE FURNISHED AND INSTALLED BY GC.
25. NEW 8" REINFORCED CONCRETE PAD AT OIL/WATER INTERCEPTOR, SEE SECTIONS AND DETAILS FOR SPECIFICATIONS, INSTALLED BY GC.
26. NEW STORM WATER DETENTION BASIN, INSTALLED BY GC.
27. NEW ENVIRONMENTAL CONTROL BASIN, INSTALLED BY GC.
28. GC TO FURNISH AND INSTALL 8" PVC FROM THE OIL/WATER SAMPLING MANHOLE TO THE ENVIRONMENTAL CONTROL BASIN. INVERT ELEVATION AT THE OIL/WATER SAMPLING MANHOLE OUTLET=XXX.
29. GC TO FURNISH AND INSTALL 8" PVC FROM THE ENVIRONMENTAL CONTROL BASIN TO THE STORM WATER CONTROL BASIN. INVERT ELEVATION AT THE ENVIRONMENTAL CONTROL BASIN OUTLET=XXL INVERT ELEVATION AT THE STORM WATER CONTROL BASIN INLET=XXX.
30. GC TO INSTALL 8" PVC TRUNK LINE FROM 3" PVC CANOPY DRAIN LINES TO TIE INTO 8" OIL/WATER INTERCEPTOR.
31. PROVIDE NEW PARKING ISLANDS TO MATCH EXISTING ISLANDS.

SPECIAL INSTRUCTIONS

1. CIVIL PLANS ARE TO BE USED AS A GUIDE TO FIND THE APPROXIMATE LOCATION OF UTILITIES, MANHOLES, STRUCTURES, ETC. GC IS TO FIELD VERIFY ALL ACTUAL LOCATION BEFORE STARTING CONSTRUCTION. GC IS ALSO RESPONSIBLE FOR REPLACING ANY AND ALL UTILITIES, PRODUCT PIPING, STRUCTURES, ETC. DAMAGED THROUGH DEMOLITION AND CONSTRUCTION OF THIS SITE THAT WAS INTENDED NOT TO BE DISTURBED OR DAMAGED.

SITE INFORMATION

PARKING	PROVIDED
AUTO PARKING	70
HANDICAP PARKING	03
TRUCK PARKING	87



SITE PLAN
1" = 60'

ROY B. PARSONS II, AIA
REGISTERED ARCHITECT
5008 LONAS ROAD
KNOXVILLE, TENNESSEE 37909
(865) 588-7488
STATE OF NEW MEXICO · REGISTERED ARCHITECT · ROY B. PARSONS III · NO. 3721

PILOT TRAVEL CENTERS

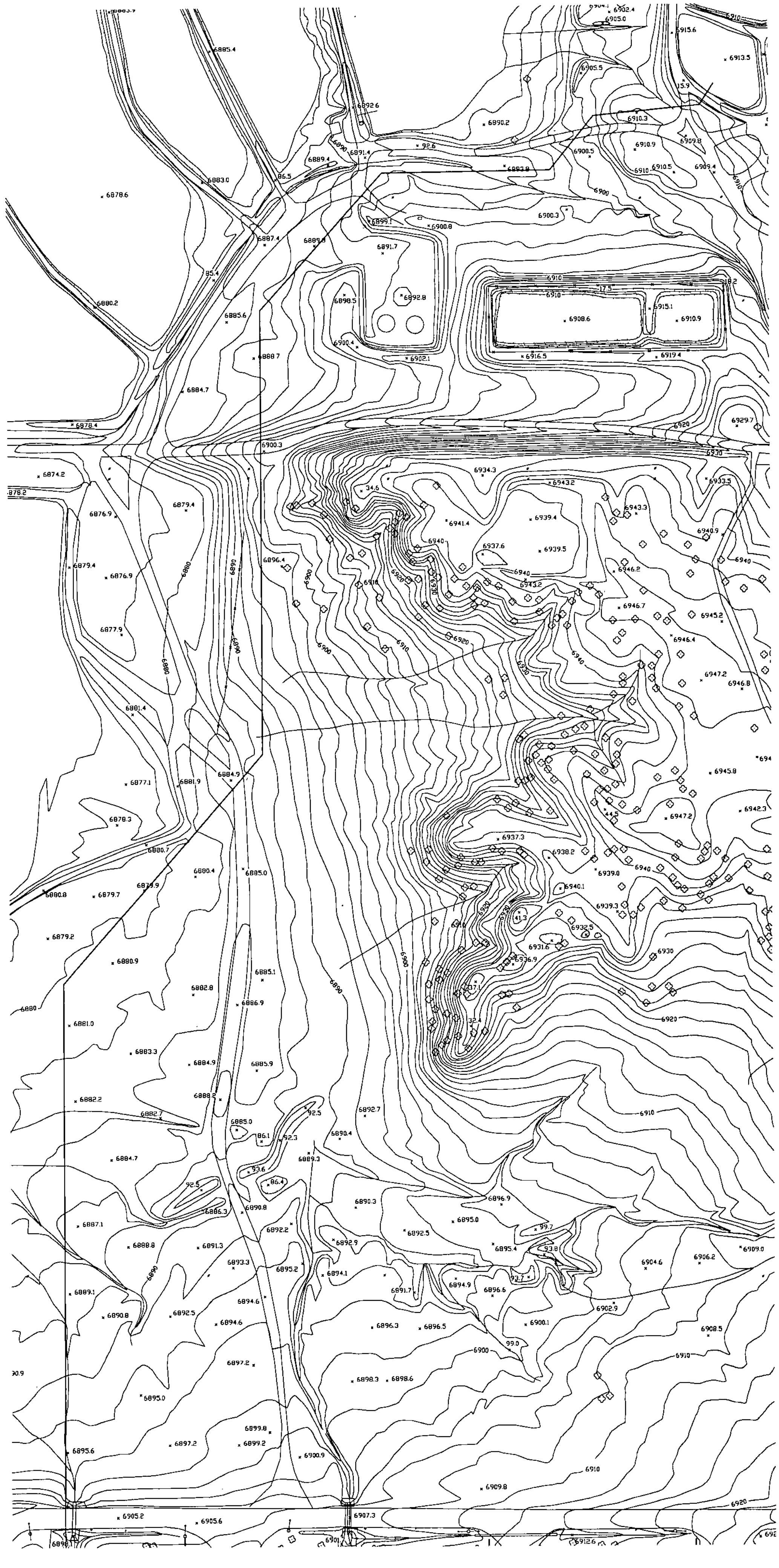
SITE PLAN

PILOT TRAVEL CENTER

INTERSTATE 40, EXIT 39
JAMESTOWN, NEW MEXICO 87347

DATE	07-15-03	DRAWN BY:	CML	PROJECT:	305
DATE	REV	REVISION DESCRIPTION			INT

SHEET:
C3.0
OF



6885.4
6902.4
6905.0
6915.6
6913.5
6905.5
6892.6
6890.2
6910.3
6910.9
6909.8
6889.4
6891.4
92.6
6900.5
6910.5
6909.4
6883.0
86.5
6878.6
6899.1
6900.8
6900.3
6887.4
6891.7
85.4
6910
6915.1
6910.9
6880.2
6890.5
6892.8
6908.6
6885.6
6900.4
6902.1
6916.5
6919.4
6888.7
6884.7
6978.4
6920
6929.7
6900.3
6930
6874.2
6934.3
6943.2
6933.5
34.6
6876.9
6879.4
6943.3
6941.4
6939.4
6940.9
6940
6937.6
6939.5
6896.4
6879.4
6876.9
6946.2
6943.2
6946.7
6945.2
6877.9
6920
6946.4
6947.2
6946.8
6881.4
6945.8
6877.1
6881.9
6884.9
6878.3
44.5
6947.2
6942.3
6937.3
6938.2
6880.7
6939.0
6880.4
6885.0
6940.1
6879.9
6880.8
6879.7
6939.3
6932.5
6879.2
6931.6
6930
6880.9
6936.9
6885.1
6882.8
6886.9
6880
6881.0
6920
6883.3
6884.9
6885.9
6882.2
6888.2
6892.7
6882.7
92.5
6885.0
6890.4
6910
6884.7
6889.3
93.6
86.4
92.5
6896.9
6890.3
6895.0
6886.3
6890.8
6887.1
6892.2
6892.5
99.7
6888.8
6891.3
6892.9
6895.4
93.8
6909.0
6893.3
6895.2
6894.1
6904.6
6906.2
6891.7
6894.9
6896.6
6889.1
6894.6
6902.9
6890.8
6892.5
6894.6
6896.3
6896.5
6900.1
6908.5
99.0
6900
6910
6897.2
6898.3
6898.6
6895.0
6899.8
6895.6
6897.2
6899.2
6900.9
6910
6909.8
6920
6905.2
6905.6
6907.3
6912.6

Chavez, Carl J, EMNRD

From:	Rajen, Gaurav [Gaurav.Rajen@wnr.com]
Sent:	Tuesday, November 04, 2008 1:48 PM
To:	Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV
Cc:	Riege, Ed; Hallock, Jim; Turri, Mark; Riley, Don
Subject:	Engineering and Design of the Pilot Travel Center's Sanitary Wastewater Lift Station GW-032
Attachments:	Letter with list of attachments and basic drawing.pdf; Travel Center pond-2.ppt; Lakeside RAPTOR dwg.pdf; Pilot Travel Center Site Plan rev 1.pdf; Pilot Travel Center Land Survey.pdf; Z-02-158 refinery elevatin contours rev 1.pdf

Dear Carl and Hope:

It is a pleasure to send you a letter from Ed Riege and supporting documents related to our proposed sanitary wastewater lift station connecting sanitary wastewater from the Pilot Travel Center to our wastewater treatment system. Ed is out of town, so I am sending on the letter he signed including related documents – we have mailed copies of these to you all today.

We look forward to your review.

With my best regards,

Raj

Gaurav Rajen
Environmental Engineer
Western Refining Gallup Refinery
505-722-0227

PS: I am also sending a separate e-mail with one more of the attachments as we have a 5 Megabyte limit on attachments.

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, November 21, 2008 3:38 PM
To: 'Riege, Ed'
Cc: Monzeglio, Hope, NMENV; Hallock, Jim; Rajen, Gaurav; Larsen, Thurman
Subject: RE: 305 - Jamestown, NM: OWS information

Ed:

I received your phone message today.

You are approved to move forward with sanitary project and the agencies will expect a more detailed design drawing based on the Pilot Travel Center's treatment system and effluent into the refinery treatment system.

I have asked Hope Monzeglio to contact you if she has any concerns as the agencies had discussed your plans during a meeting last week, but could not approve until we received more info. from the Pilot Travel Center.

Please contact me if you have questions. I will be out of the office until 12/3/2008. You may contact me next week at (505) 660-1067 next week if you have questions. You may also contact Hope. Thank you.

Please be advised that NMOCD approval of this plan does not relieve Western Refining Southwest- Gallup Refinery of responsibility should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Western Refining Southwest- Gallup Refinery of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3491
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Riege, Ed [mailto:Ed.Riege@wnr.com]
Sent: Thursday, November 20, 2008 1:31 PM
To: Chavez, Carl J, EMNRD
Cc: Monzeglio, Hope, NMENV; Hallock, Jim; Rajen, Gaurav; Larsen, Thurman
Subject: FW: 305 - Jamestown, NM: OWS information

Carl,
Good news, I got more detail on Pilot's oil water separator for you from Joey Cupp. His email to me is below along with 5 attachments.

Thanks
Ed

Ed Riege
Environmental Manager

Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com

From: Chip Hughes [mailto:Chip.Hughes@pilottravelcenters.com]
Sent: Thursday, November 20, 2008 1:06 PM
To: Riege, Ed
Cc: Joey Cupp
Subject: 305 - Jamestown, NM: OWS information

Ed,

Per our discussion, please find attached the schematic of the oil water separator (one from the supplier & one from our plans) that is installed at our site. I included some of the details of the diesel islands as well, showing the center drains and how they are piped to the OWS.

As I mentioned in our meeting, the OWS is monitored on a weekly to monthly basis so if anything comes up out of the ordinary we address it ASAP. The last oil pick up was conducted on 9-20-08 and before that it was done during the 2-7-08 cleaning. Based on past monitoring data, it has been emptied on a semi annual basis, but as previously stated, we monitor the OWS levels and if the oil gets to 20 or more inches the product is picked up for recycling. The 20-inch number is when the pickup becomes profitable for the carrier; therefore, there is no cost to Pilot for this service.

I have also looked into the last time the system was completely cleaned (emptied of all fluids, entered and inspected) and its next scheduled service. The OWS was last serviced on 2-7-08 and the next scheduled maintenance is February 2010. The water that is discharged from the OWS goes directly to our environmental pond located in the grassy area north of the OWS past the truck scales.

Let me know is you need anything else from me.

<<PTC #305 -- Oil-Water Separator Drawings.pdf>> <<DSL Island overview(TEMP015).pdf>> <<Site Plan (TEMP003).pdf>> <<DSL Island detail(TEMP016).pdf>> <<OWS detail(TEMP014).pdf>>

Chip Hughes

Environmental Project Manager

Pilot Travel Centers, LLC

Main: 865-588-7488 x2438

Direct: 865-474-2438

Fax: 865-297-1383

Cell: 865-206-5269

chip.hughes@pilottravelcenters.com

Chavez, Carl J, EMNRD

From: Riege, Ed [Ed.Riege@wnr.com]
Sent: Tuesday, November 18, 2008 12:38 PM
To: Chavez, Carl J, EMNRD; Monzeglio, Hope, NMENV
Cc: Hallock, Jim; Rajen, Gaurav
Subject: RE: Engineering and Design of the Pilot Travel Center's Sanitary Wastewater Lift Station GW-032
Attachments: Pilot color scan 1.jpg; Pilot color scan 2.jpg; _1118112725_001.pdf

Carl,
On drawing C3.0 I highlighted in yellow the 6,000 gal oil water separator where oil is separated and pumped out and water overflows to the environmental control basin evaporation pond located on Pilot property. Any spills emanating from the truck filling station and surrounding area is directed to this separator. On drawing #2 I highlighted the following:
Blue: the four 2,000 gal septic tanks. One is located at the service building which also serves as the truck wash which is currently not in service, one is located at the truck tire and service facility, one or possibly two are located behind the main building which houses the restaurants, and one for the RV dump station.
Blue with yellow trim: this is a sand trap for the truck wash facility.
Pink: location of sanitary sewer line.
Drawing P-10 of the service building shows the waste oil collection area leading to a waste oil storage tank.
Also included is sheet 15 of 15 detailing the RV dump and septic tank detail.

The environmental project manager for Pilot is Chip Hughes and he can be reached at 865-206-5269 or chip.hughes@pilottravelcenters.com.

Thanks
Ed

Ed Riege
Environmental Manager

Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com

From: Rajen, Gaurav
Sent: Tuesday, November 04, 2008 1:48 PM
To: 'Chavez, Carl J, EMNRD'; 'Monzeglio, Hope, NMENV'
Cc: Riege, Ed; Hallock, Jim; Turri, Mark; Riley, Don
Subject: Engineering and Design of the Pilot Travel Center's Sanitary Wastewater Lift Station GW-032

Dear Carl and Hope:

It is a pleasure to send you a letter from Ed Riege and supporting documents related to our proposed sanitary wastewater lift station connecting sanitary wastewater from the Pilot Travel Center to our wastewater treatment system. Ed is out of town, so I am sending on the letter he signed including related documents – we have mailed copies of these to you all today.

We look forward to your review.

With my best regards,

Raj

Gaurav Rajen
Environmental Engineer
Western Refining Gallup Refinery
505-722-0227

PS: I am also sending a separate e-mail with one more of the attachments as we have a 5 Megabyte limit on attachments.

CONSTRUCTION NOTES

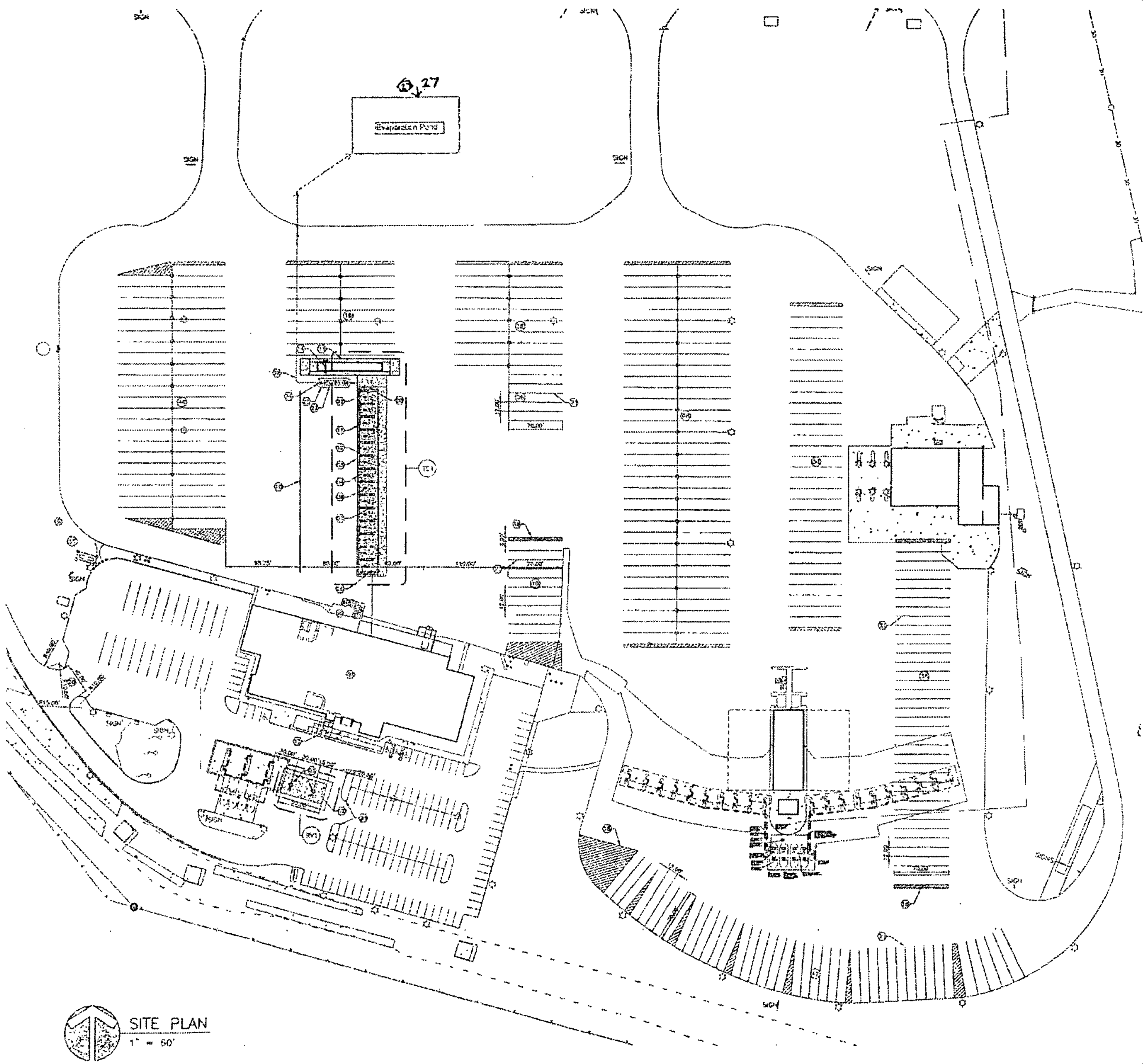
- EXISTING TRAVEL CENTER BUILDING (SEE ARCHITECTURAL DRAWINGS).
- NEW 27'-0" x 55'-6" 8" REINFORCED CONCRETE PAD FOR RV DISPENSING, INSTALLED BY GC. (SEE SHEET RV1)
- (2) NEW CONCRETE ISLANDS WITH A GAS/AUTO DIESEL DISPENSER AND CONTAINMENT BOX, INSTALLED BY GC.
- NEW 55'-0" x 247'-4" TRUCK CANOPY, FURNISHED AND INSTALLED BY CANOPY SUPPLIER, CANOPY FOUNDATIONS INSTALLED BY GC.
- NEW 55'-0" x 248'-0" x 8" REINFORCED CONCRETE PAD FOR TRUCK CANOPY, INSTALLED BY GC.
- NEW CONCRETE ISLAND WITH A DIESEL MASTER DISPENSER AND CONTAINMENT BOX TYPICAL AT (1) PLACE, INSTALLED BY GC.
- NEW CONCRETE ISLAND WITH A DIESEL MASTER DISPENSER, DIESEL SATELLITE DISPENSER AND CONTAINMENT BOX TYPICAL AT (13) PLACES, INSTALLED BY GC.
- NEW CONCRETE ISLAND WITH A DIESEL SATELLITE DISPENSER AND CONTAINMENT BOX TYPICAL AT (1) PLACE, INSTALLED BY GC.
- NEW PREFABRICATED TRUCK ISLAND CATCH BASIN (TYP (14) PLACES). SUPPLIED BY PILOT, INSTALLED BY GC.
- NEW 12" WIDE PAINTED (SHERWIN WILLIAMS WHITE TRAFFIC TM 2116) PULL FORWARD LINE INSTALLED BY GC.
- NEW TRUCK SCALE CONCRETE TRUCK SCALE PIT AND TRUCK SCALE FURNISHED AND INSTALLED BY TRUCK SCALE SUPPLIER. ELECTRICAL, COMMUNICATIONS AND DRAINAGE PROVIDED TO THE SCALE PIT BY GC, COORDINATION BY GC.
- NEW TRUCK AIR/WATER STAND, TYPICAL AT EVERY OTHER TRUCK FUELING ISLAND, FURNISHED BY OWNER, INSTALLED BY GC.
- NEW CONCRETE SIDEWALK INSTALLED BY GC.
- NEW "TRUCK SCALE" INTERNALLY ILLUMINATED SIGN FURNISHED AND INSTALLED BY TRUCK SCALE SUPPLIER, CONCRETE FOUNDATION BY TRUCK SCALE SUPPLIER, ELECTRICAL PROVIDED TO SCALE BY GC.
- "ONE WAY" SIGN FURNISHED AND INSTALLED BY GC.
- "WRONG WAY" SIGN FURNISHED AND INSTALLED BY GC.
- NEW "NON-SLIP" COATING AREA APPLIED TO FINISHED CONCRETE. (SEE TC1 FOR DETAILS).
- NEW TRAFFIC STRIPING 6" WIDE PAINTED (SHERWIN WILLIAMS WHITE TRAFFIC TM 2116) PARALLEL STRIPES AT 18" O.C. FURNISHED AND INSTALLED BY GC.
- PAVEMENT SYMBOL AND LETTERING PER D.O.T. SPECIFICATIONS (TYP). FURNISHED AND INSTALLED BY GC.
- NEW RV ENTRY EXIT, INSTALLED BY GC. SEE DRAWINGS 3.1 AND 3.2 FOR PAVEMENT AND CURB DETAILS.
- NEW 12'-0" x 70'-0" TRUCK PARKING SPACES TO BE PAINTED BY GC.
- NEW (1) REMOTE TANK SYSTEM INSIDE OF [illegible] AT TRUCK ISLAND #13.
- NEW 6,000 GALLON, 4'-0" x 20'-1", DOUBLE-WALL STEEL UNDERGROUND OIL/WATER INTERCEPTOR (WITH EXTERIOR OF TANK COATED WITH A POLYURETHANE FINISH) FURNISHED BY PILOT, INSTALLED BY GC.
- NEW CONCRETE OIL/WATER SAMPLING MANHOLE FURNISHED AND INSTALLED BY GC.
- NEW 8" REINFORCED CONCRETE PAD AT OIL/WATER INTERCEPTOR, SEE SECTIONS AND DETAILS FOR SPECIFICATIONS, INSTALLED BY GC.
- NEW STORM WATER DETENTION BASIN, INSTALLED BY GC.
- NEW ENVIRONMENTAL CONTROL BASIN, INSTALLED BY GC.
- GC TO FURNISH AND INSTALL 8" PVC FROM THE OIL/WATER SAMPLING MANHOLE TO THE ENVIRONMENTAL CONTROL BASIN. INVERT ELEVATION AT THE OIL/WATER SAMPLING MANHOLE OUTLET=XX.XX.
- GC TO FURNISH AND INSTALL 8" PVC FROM THE ENVIRONMENTAL CONTROL BASIN TO THE STORM WATER CONTROL BASIN. INVERT ELEVATION AT THE ENVIRONMENTAL CONTROL BASIN OUTLET=XX.XX. INVERT ELEVATION AT THE STORM WATER CONTROL BASIN INLET=XX.XX.
- GC TO INSTALL 6" PVC TRUNK LINE FROM 3" PVC CANOPY DRAIN LINES TO TIE INTO 6" OIL/WATER INTERCEPTOR.
- PROVIDE NEW PARKING ISLANDS TO MATCH EXISTING ISLANDS.

SPECIAL INSTRUCTIONS

1. CIVIL PLANS ARE TO BE USED AS A GUIDE TO FIND THE APPROXIMATE LOCATION OF UTILITIES, MANHOLES, STRUCTURES, ETC. GC IS TO FIELD VERIFY ALL ACTUAL LOCATIONS BEFORE STARTING CONSTRUCTION. GC IS ALSO RESPONSIBLE FOR REPLACING ANY AND ALL UTILITIES, PRODUCT PIPING, STRUCTURES, ETC. DAMAGED THROUGH EXCAVATION AND CONSTRUCTION OF THIS SITE THAT WAS INTENDED NOT TO BE DISTURBED OR DAMAGED.

SITE INFORMATION

PARKING	PROVIDED
AUTO PARKING	70
HANDICAP PARKING	03
TRUCK PARKING	87



ROY B. PARSONS III, AIA
REGISTERED ARCHITECT
5508 LONAS ROAD
KNOXVILLE, TENNESSEE 37909

STATE OF NEW MEXICO
ROY B. PARSONS III
NO. 3721

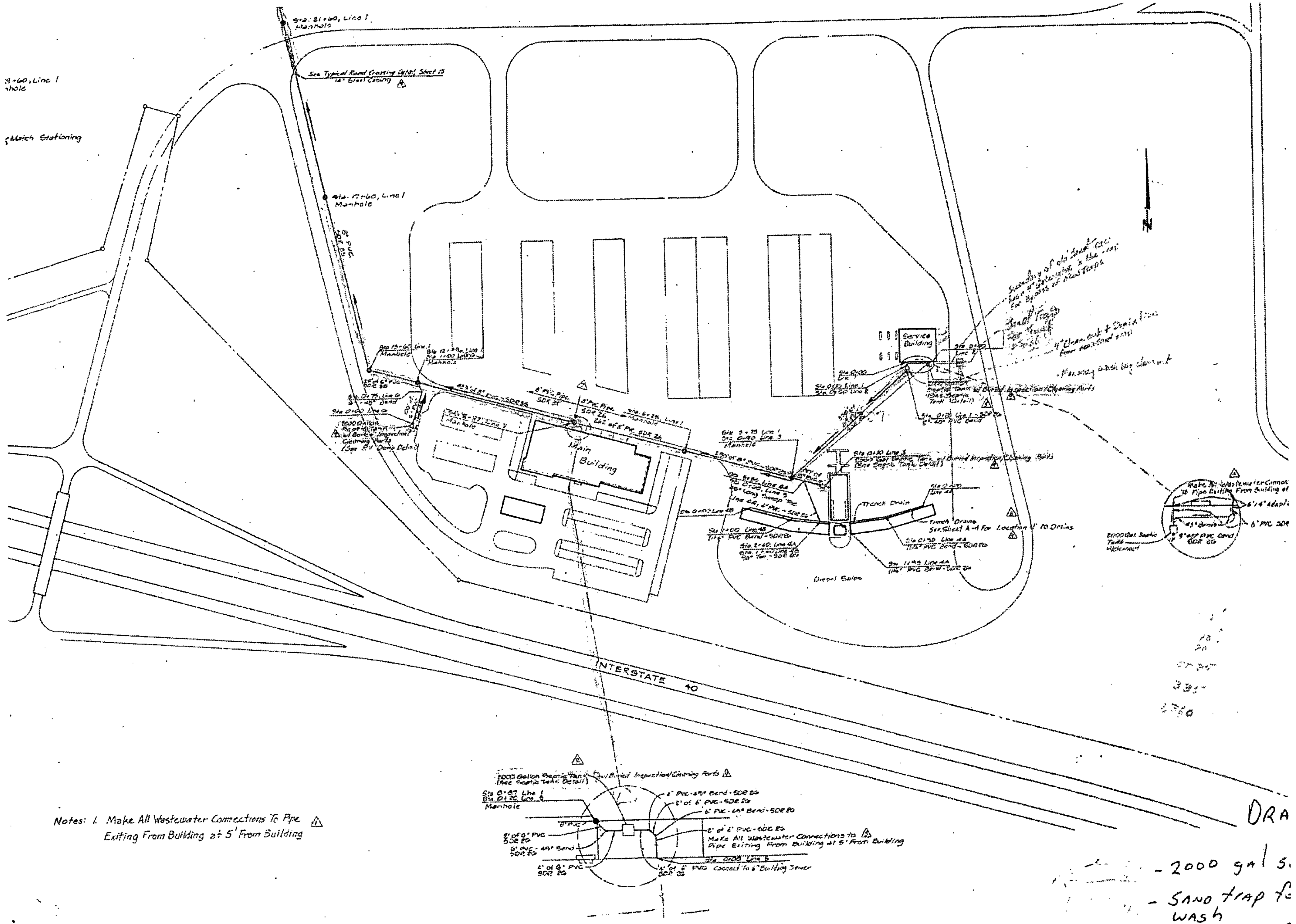
SITE PLAN

PILOT TRAVEL CENTER

DATE: 07-13-23	DRAWN BY: CML	PROJECT: 305	
DATE	REV	REVISION DESCRIPTION	INT.

SHEET

C3.1



Notes: 1. Make All Wastewater Connections To Pipe Exiting From Building at 5' From Building

CONSTRUCTION NOTES

01 EXISTING TRAVEL CENTER BUILDING (SEE ARCHITECTURAL DRAWINGS).

02 NEW 27'-0" x 55'-0" 6" REINFORCED CONCRETE PAD FOR RV DISPENSERS, INSTALLED BY GC. (SEE SHEET RV1)

03 (2) NEW CONCRETE ISLANDS WITH A GAS/AUTO DIESEL DISPENSER AND CONTAINMENT BOX, INSTALLED BY GC.

04 NEW 25'-0" x 243'-4" TRUCK CANOPY, FURNISHED AND INSTALLED BY CANOPY SUPPLIER, CANOPY FOUNDATIONS INSTALLED BY GC.

05 NEW 38-0" x 248'-0" x 8" REINFORCED CONCRETE PAD FOR TRUCK CANOPY, INSTALLED BY GC.

06 NEW CONCRETE ISLAND WITH A DIESEL MASTER DISPENSER AND CONTAINMENT BOX TYPICAL AT (1) PLACE, INSTALLED BY GC.

07 NEW CONCRETE ISLAND WITH A DIESEL MASTER DISPENSER, DIESEL SATELLITE DISPENSER AND CONTAINMENT BOX TYPICAL AT (13) PLACES, INSTALLED BY GC.

08 NEW CONCRETE ISLAND WITH A DIESEL SATELLITE DISPENSER AND CONTAINMENT BOX TYPICAL AT (1) PLACE, INSTALLED BY GC.

09 NEW PREFABRICATED TRUCK ISLAND CATCH BASIN (TYP (14) PLACES). SUPPLIED BY PILOT INSTALLED BY GC

10 NEW 12" WIDE PAINTED (SHERWIN WILLIAM'S WHITE TRAFFIC TM 2116) PULL FORWARD LINE INSTALLED BY GC.

11 NEW TRUCK SCALE CONCRETE TRUCK SCALE PIT AND TRUCK SCALE FURNISHED AND INSTALLED BY TRUCK SCALE SUPPLIER. ELECTRICAL, COMMUNICATIONS AND DRAINAGE PROVIDED TO THE SCALE PIT BY GC, COORDINATION BY GC.

12 NEW TRUCK AIR/WATER STAND, TYPICAL AT EVERY OTHER TRUCK FUELING ISLAND, FURNISHED BY OWNER, INSTALLED BY GC.

13 NEW CONCRETE SIDEWALK INSTALLED BY GC.

14 NEW "TRUCK SCALE" INTERNALLY ILLUMINATED SIGN FURNISHED AND INSTALLED BY TRUCK SCALE SUPPLIER. CONCRETE FOUNDATION BY TRUCK SCALE SUPPLIER. ELECTRICAL PROVIDED TO SCALE BY GC.

15 "ONE WAY" SIGN FURNISHED AND INSTALLED BY GC.

16 "WRONG WAY" SIGN FURNISHED AND INSTALLED BY GC.

17 NEW "NON-SLIP" COATING AREA APPLIED TO FINISHED CONCRETE. (SEE TC1 FOR DETAILS).

18 NEW TRAFFIC STRIPING 4" WIDE PAINTED (SHERWIN WILLIAM'S WHITE TRAFFIC TM 2116) PARALLEL STRIPES AT 18" O.C. FURNISHED AND INSTALLED BY GC.

19 PAVEMENT SYMBOL AND LETTERING PER D.O.T. SPECIFICATIONS (TYP), FURNISHED AND INSTALLED BY GC.

20 NEW RV ENTRY EXIT, INSTALLED BY GC. SEE DRAWINGS 3.1 AND 3.2 FOR PAVEMENT AND CURB DETAILS.

21 NEW 12'-0" x 70'-0" TRUCK PARKING SPACES TO BE PAINTED BY GC.

22 NEW (1) REMOTE SMT SYSTEM INSIDE OF BUMPER AT TRUCK ISLAND #15.

23 NEW 6,000 GALLON, 6'-0" x 30'-1", SINGLE-WALL STEEL UNDERGROUND OIL/WATER INTERCEPTOR (WITH EXTERIOR OF TANK COATED WITH A POLYURETHANE FINISH) FURNISHES BY PILOT, INSTALLED BY GC.

24 NEW CONCRETE OIL/WATER SAMPLING MANHOLE FURNISHED AND INSTALLED BY GC.

25 NEW 8" REINFORCED CONCRETE PAD AT OIL/WATER INTERCEPTOR. SEE SECTIONS AND DETAILS FOR SPECIFICATIONS, INSTALLED BY GC.

26 NEW STORM WATER DETENTION BASIN, INSTALLED BY GC.

27 NEW ENVIRONMENTAL CONTROL BASIN, INSTALLED BY GC.

28 GC TO FURNISH AND INSTALL 8" PVC FROM THE OIL/WATER SAMPLING MANHOLE TO THE ENVIRONMENTAL CONTROL BASIN. INVERT ELEVATION AT THE OIL/WATER SAMPLING MANHOLE OUTLET=XXX.

29 GC TO FURNISH AND INSTALL 8" PVC FROM THE ENVIRONMENTAL CONTROL BASIN TO THE STORM WATER CONTROL BASIN. INVERT ELEVATION AT THE ENVIRONMENTAL CONTROL BASIN OUTLET=XX. INVERT ELEVATION AT THE STORM WATER CONTROL BASIN INLET=XXX.

30 GC TO INSTALL 8" PVC TRUNK LINE FROM 3" PVC CANOPY DRAIN LINES TO TIE INTO 8" OIL/WATER INTERCEPTOR.

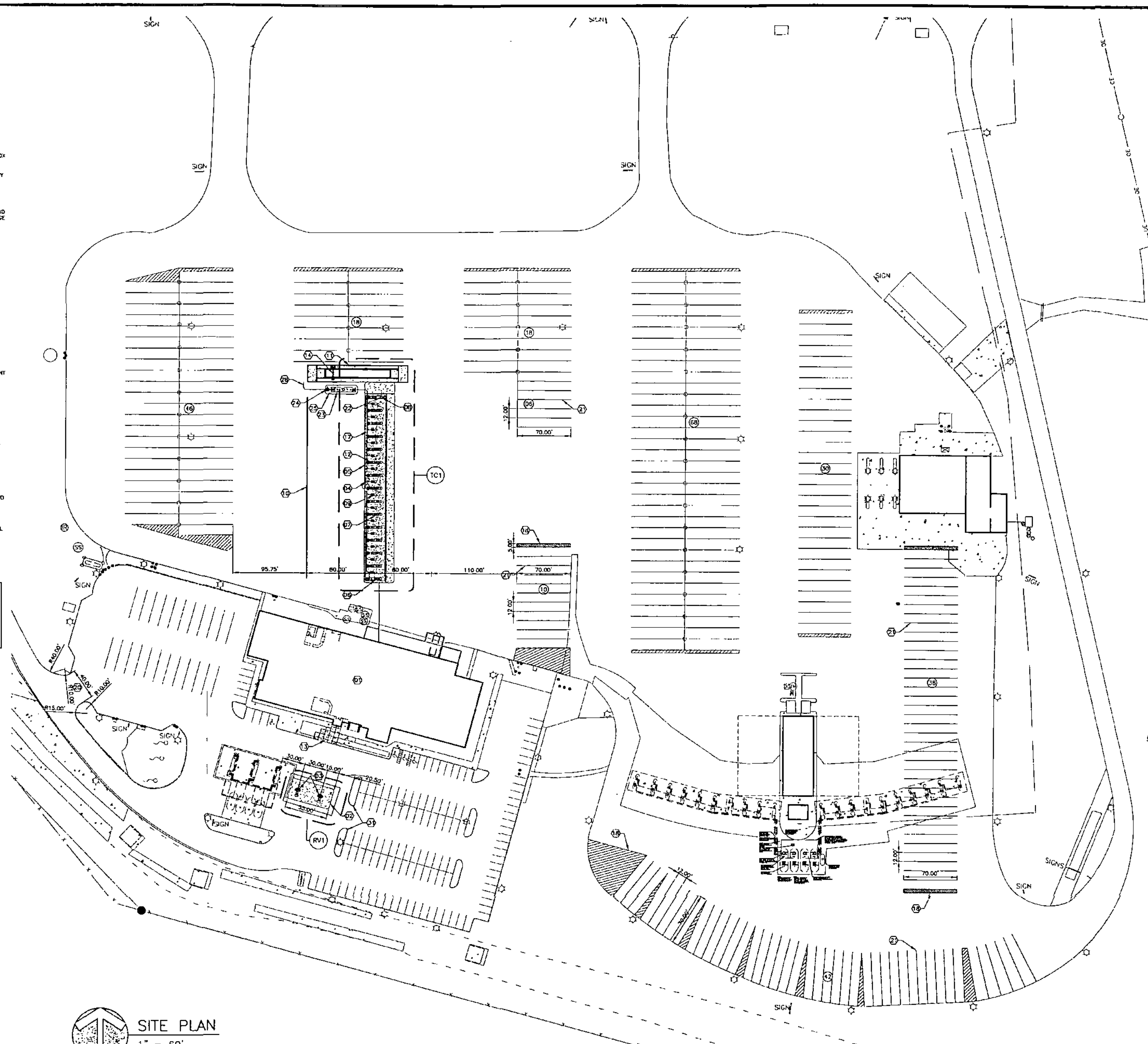
31 PROVIDE NEW PARKING ISLANDS TO MATCH EXISTING ISLANDS.

SPECIAL INSTRUCTIONS

1. CIVIL PLANS ARE TO BE USED AS A GUIDE TO FIND THE APPROXIMATE LOCATION OF UTILITIES, MANHOLES, STRUCTURES, ETC. GC IS TO FIELD VERIFY ALL ACTUAL LOCATION BEFORE STARTING CONSTRUCTION. GC IS ALSO RESPONSIBLE FOR REPLACING ANY AND ALL UTILITIES, PRODUCT PIPING, STRUCTURES, ETC. DAMAGED THROUGH DEMOLITION AND CONSTRUCTION OF THIS SITE THAT WAS INTENDED NOT TO BE DISTURBED OR DAMAGED.

SITE INFORMATION

PARKING	PROVIDED
AUTO PARKING	70
HANDICAP PARKING	03
TRUCK PARKING	87



SITE PLAN
1" = 60'

ROY B. PARSONS III, AIA
REGISTERED ARCHITECT
5508 LONAS ROAD
KNOXVILLE, TENNESSEE 37909
(865) 588-7488

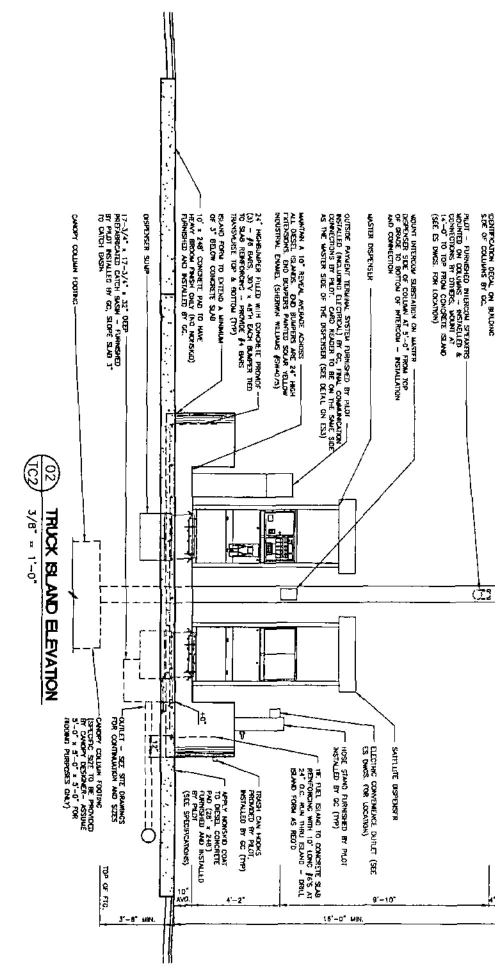
SITE PLAN

PILOT TRAVEL CENTER

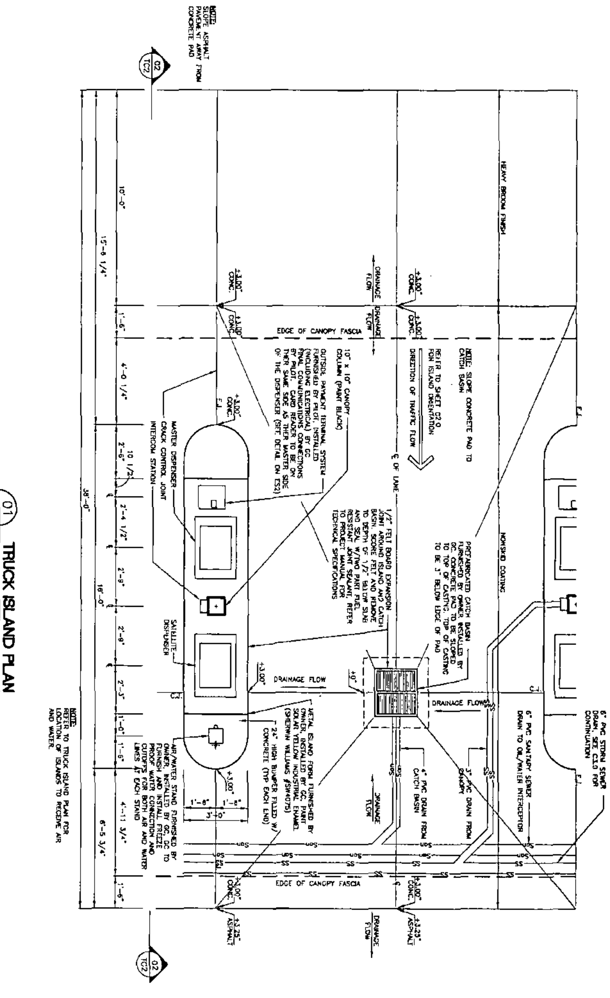
INTERSTATE 40, EXIT 39
JAMESTOWN, NEW MEXICO 87347

DATE: 07-15-03	DRAWN BY: CML	PROJECT: 305	
DATE	REV	REVISION DESCRIPTION	INT.

SHEET
C3.0
OF



TRUCK ISLAND ELEVATION
02 TC2 3/8" = 1'-0"



TRUCK ISLAND PLAN
01 TC2 3/8" = 1'-0"

DATE: 07-15-03	DRAWN BY: CML	PROJECT: 305	
DATE	REV	REVISION DESCRIPTION	INT

SHEET: TC2 OF 2

TRUCK CANOPY PLAN AND ELEVATIONS

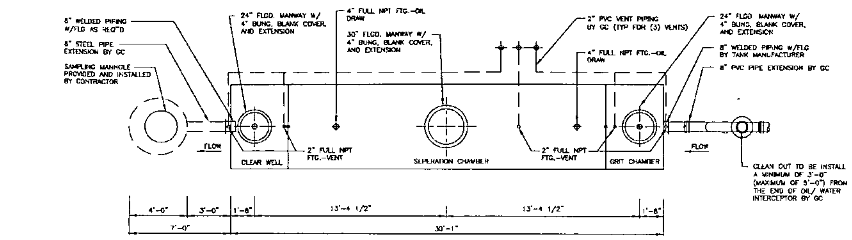
PILOT TRAVEL CENTER

INTERSTATE 40, EXIT 39
JAMESTOWN, NEW MEXICO 87347

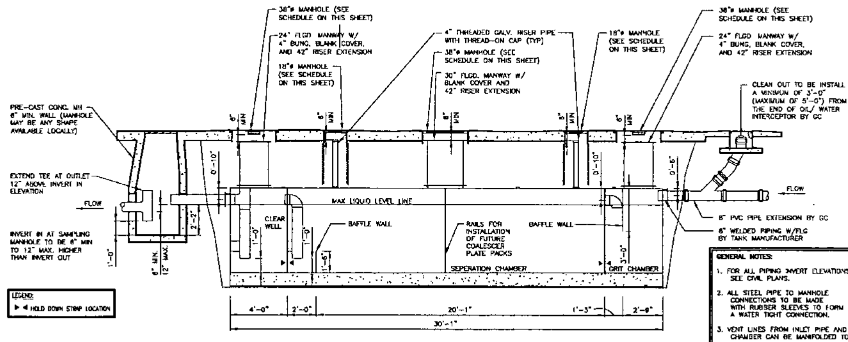
Pilot TRAVEL CENTERS

ROY B. PARSONS III, AIA
REGISTERED ARCHITECT
6308 LONAS ROAD
KNOXVILLE, TENNESSEE 37909
(865) 558-7486

STATE OF NEW MEXICO ROY B. PARSONS III NO. 3721 REGISTERED ARCHITECT



TANK PLAN VIEW



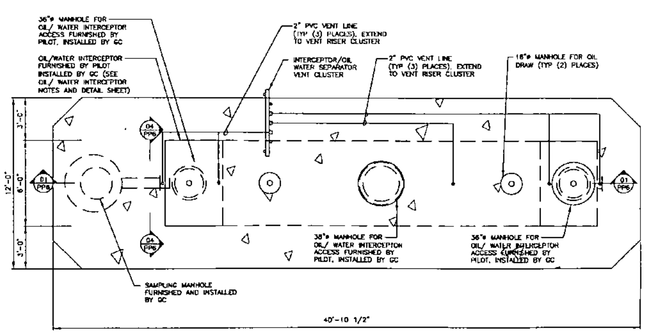
ELEVATION

GENERAL NOTES:

1. FOR ALL PIPING INVERT ELEVATIONS SEE CIVIL PLANS.
2. ALL STEEL PIPE TO MANHOLE CONNECTIONS TO BE MADE WITH RUBBER SLEEVES TO FORM A WATER TIGHT CONNECTION.
3. VENT LINES FROM INLET PIPE AND GRIT CHAMBER CAN BE MANIFOLDED TOGETHER.
4. VENT LINES FROM OUTLET PIPE AND CLEAR WELL CAN BE MANIFOLDED TOGETHER.

LEGEND: ▶ ◀ HOLD DOWN STRIP LOCATION

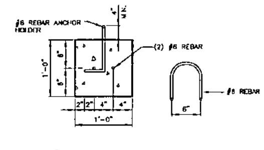
01/PP4 **SIDE SECTION**
1/4" = 1'-0"



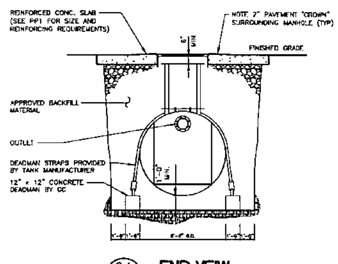
02/PP4 **CONCRETE PLAN**
1/4" = 1'-0"

OWS MANHOLE/SUMP SCHEDULE

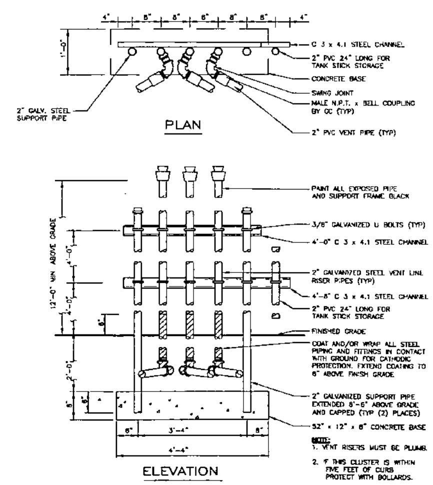
LOCATION	SIZE	MANUF.	MODEL NO.	EXTENSION	SUMP NO.
OIL DRAW/STICK PORT RISER'S	18"ø	PEMCO	10618X10	HDPE	---
24" MANWAY EXTENSION	36"ø	PEMCO	10636X10	GALV. STEEL SKIRT	---
30" MANWAY EXTENSION	36"ø	PEMCO	10638X100A	GALV. STEEL SKIRT	---



03/PP4 **DEADMAN DETAIL**
1" = 1'-0"

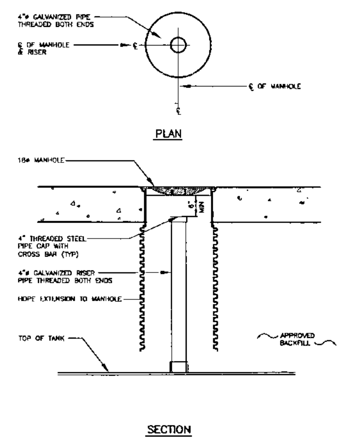


04/PP4 **END VIEW**
1/4" = 1'-0"



NOTE:
1. VENT RISERS MUST BE PLUMB.
2. IF THIS CLUSTER IS WITHIN FIVE FEET OF CURB PROTECT WITH BOLLARDS.

05/PP4 **VENT CLUSTER DETAILS**
3/4" = 1'-0"



06/PP4 **RISER MANHOLE DETAIL**
3/4" = 1'-0"

OIL/ WATER INTERCEPTOR INSTALLATION NOTES

1. OWI TANKS MUST BE INSTALLED ACCORDING TO OWI MANUFACTURER INSTALLATION INSTRUCTIONS, (PUB NO INST 6001), AND NFPA 30 AND 31.
2. THE EXCAVATION SHALL BE FREE FROM MATERIAL THAT MAY CAUSE DAMAGE TO THE OR INTERCEPTOR. (CARE SHALL BE TAKEN DURING INSTALLATION THAT FOREIGN MATTER IS NOT INTRODUCED INTO THE EXCAVATION OR BACKFILL.)
3. THE BOTTOM OF THE EXCAVATION SHALL BE COVERED WITH CLEAN BACKFILL TO A DEPTH OF ONE FOOT MINIMUM AND GRADED LEVEL.
4. THE EXCAVATION SHALL EXTEND A DISTANCE OF 24" MINIMUM AROUND THE PERIMETER OF THE TANK.
5. A PRE-INSTALLATION AIR TEST OF THE INTERCEPTOR ABOVE GROUND IS REQUIRED. PRESSURE SHALL NOT EXCEED 5 POUNDS PER SQUARE INCH (PSIG) WHILE A SOAP SOLUTION IS APPLIED TO ENTIRE TANK SURFACE AND ALL FITTINGS. ADDITIONALLY INSPECT OWI EXTERIOR FOR DAMAGE UPON DELIVERY. REMOVE THE MAN WAY COVER PLATE(S) AND INSPECT THE INTERIOR TO INSURE THAT ALL BAFFLES AND INTERNAL PIPING ARE SECURE AND HAVE NOT BEEN DAMAGED DURING TRANSPORT.
6. EQUIPMENT TO LIFT THE INTERCEPTOR SHALL BE OF ADEQUATE SIZE TO LIFT AND LOWER THE INTERCEPTOR WITHOUT DRAGGING OR DROPPING TO ENSURE NO DAMAGE TO THE INTERCEPTOR.
7. INTERCEPTOR SHALL BE CAREFULLY LIFTED AND LOWERED BY USE OF CABLES OR CHAINS OF ADEQUATE LENGTH (NOT MORE THAN 60 DEGREE INCLUDED ANGLE) AND ATTACHED TO THE LIFTING LUGS PROVIDED. A SPREADER BAR SHOULD BE USED WHERE NECESSARY. UNDER NO CIRCUMSTANCES ARE THE USE OF CHAINS OR SLINGS AROUND THE INTERCEPTOR SHELL ALLOWED.
8. THE INTERCEPTOR MUST BE INSTALLED IN A LEVEL AND PLUMB POSITION. CHECK ELEVATIONS AT EACH END OF THE INTERCEPTOR WITH A TRANSIT AND ADJUST AS NECESSARY TO 1/2" IN 20'-0". CHECK ELEVATIONS ACROSS THE DIAMETER OF THE INTERCEPTOR AND ADJUST TO 1/4" IN 10'-0".
9. SPECIAL CARE SHOULD BE EXERCISED WHEN INSTALLING THE HOLD DOWN. MAKE SURE THAT DEADMEN SECTIONS HAVE AT LEAST TWO ANCHOR POINTS. DEADMEN MUST BE AT LEAST THE SAME LENGTH AS THE TANK. FOLLOW OWI MANUFACTURERS INSTRUCTIONS FOR DEADMEN ANCHORING. ALL EXPOSED STEEL HOOKS, WIRE, ETC., TO BE COATED FOR CATHODIC PROTECTION.
10. APPROVED BACKFILL MATERIAL, CONSISTING OF SAND, CLEAN GRAVEL, OR PEA STONE, SHALL BE PLACED 12" HIGH ALONG BOTTOM SIDES OF INTERCEPTOR BY HAND SHOVELING AND PROBING TO ENSURE PROPER SUPPORT BENEATH TANK BOTTOM. REPEAT PROCEDURE WITH ANOTHER 12" LIFT AND THEN COMPLETE BACKFILLING TO THE TOP OF TANK.
11. FILL INTERCEPTOR WITH CLEAN WATER TO BALLAST. AFTER BALLASTING IS COMPLETE, CHECK ELEVATIONS FOR PROPER TOLERANCES. CLOSE VALVES OF INLET AND OUTLET PIPES UNTIL THE DRAINAGE AREA IS PAVED.
12. WHERE AIR OR HYDROSTATIC TESTING IS REQUIRED AFTER INSTALLATION , IT IS RECOMMENDED THAT THE PRESSURE APPLIED SHALL NOT BE IN EXCESS OF 5 POUNDS PER SQUARE INCH (PSIG) AS MEASURED AT THE TOP OF THE INTERCEPTOR.
13. EXTEND ALL VENT LINES TO ATMOSPHERE AS SHOWN. INTERCEPTOR MUST BE VENTED TO ASSURE PROPER OPERATION. EXTEND RISERS TO A MINIMUM OF 12'-0" ABOVE FINISHED GRADE.
14. THE THREAD PROTECTORS OF UNUSED OPENINGS SHALL BE REMOVED. PERMANENT METAL PLUGS TREATED WITH PIPE COMPOUND SHALL BE INSTALLED AT ALL UNUSED OPENINGS.
15. TOP OFF INTERCEPTOR WITH CLEAN WATER UNTIL WATER IS DISCHARGED FROM OUTLET PIPING. THE INTERCEPTOR MUST BE FULL OF WATER TO OPERATE. VENT PLUGS MUST BE REMOVED FOR INTERCEPTOR TO FILL.

CATHODIC PROTECTION NOTES

1. ALL GALVANIZED PIPE & FITTINGS IN CONTACT WITH THE GROUND ARE TO BE WRAPPED AND/ OR COATED FOR CATHODIC PROTECTION PER SPECIFICATIONS. ALL METAL PIPING IS TO BE ELECTRICALLY ISOLATED FROM ANY ABOVE GROUND STRUCTURE; THAT IS, CONCRETE BUILDINGS, CANOPIES, PIPING OR EQUIPMENT.

INTERCEPTOR/ OIL WATER SEPARATOR GENERAL NOTES

1. GENERAL TANK SPECIFICATIONS:

-SINGLE-WALL STEEL OIL/WATER INTERCEPTOR.
-NOMINAL CAPACITY OF THE GRIT CHAMBER AND CLEAR WELL IS 848 GALLONS EACH NOMINAL CAPACITY OF THE SEPARATOR CHAMBERS IS 4070 GALLONS TOTAL CAPACITY: 6,362.
-OIL STORAGE CAPACITY IS 20% OF OVERALL TANK CAPACITY.
-SPILL CAPACITY IS 60% OF OVERALL TANK CAPACITY.
-ESTIMATED WEIGHT OF TANK IS 3,050 lbs.
-DESIGNED FLOW RATE IS 500 GPM.
-REMOVABLE POLYPROPYLENE COALESCER PLATE PACKS ARE AVAIABLE.
-TANK TESTING PRESSURE IS 5 PSIG MAXIMUM.
-(2) HOLD-DOWN STRAPS ARE OROVIDED BY MANUFACTURER.

STATE OF NEW MEXICO — ROY B. PARSONS III — NO. 3721 — REGISTERED ARCHITECT

ROY B. PARSONS III, AIA
REGISTERED ARCHITECT
5308 LONAS ROAD
KNOXVILLE, TENNESSEE 37909
(865) 588-7488

PILOT TRAVEL CENTERS

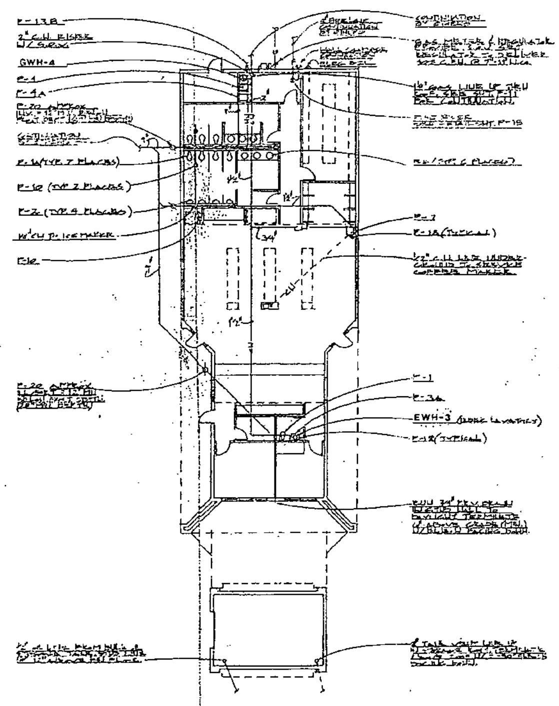
OIL/WATER INTERCEPTOR DETAILS AND NOTES

PILOT TRAVEL CENTER

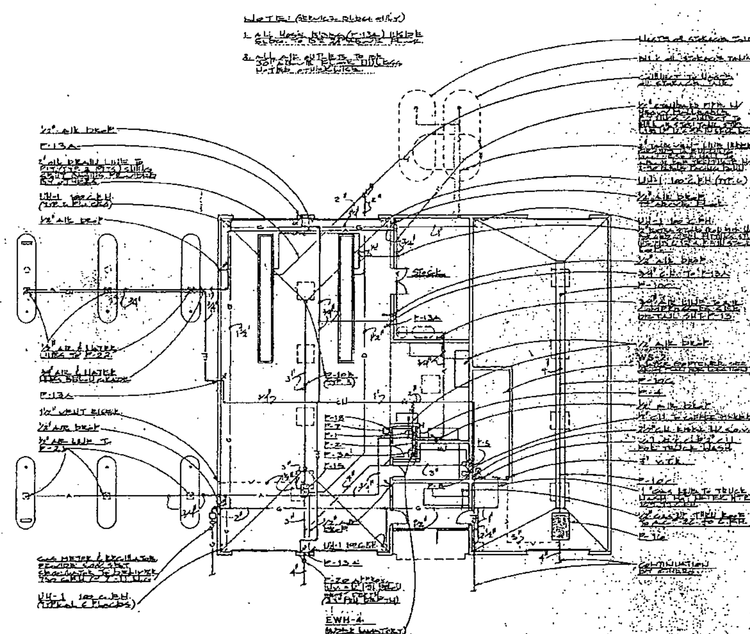
INTERSTATE 40, EXIT 39
JAMESTOWN, NEW MEXICO 87347

DATE: 07-15-03	DRAWN BY: CML	PROJECT: 305	
DATE	REV	REVISION DESCRIPTION	INT.

SHEET
PP4
of
5



DIESEL SALES BUILDING PLUMBING FLOOR PLAN



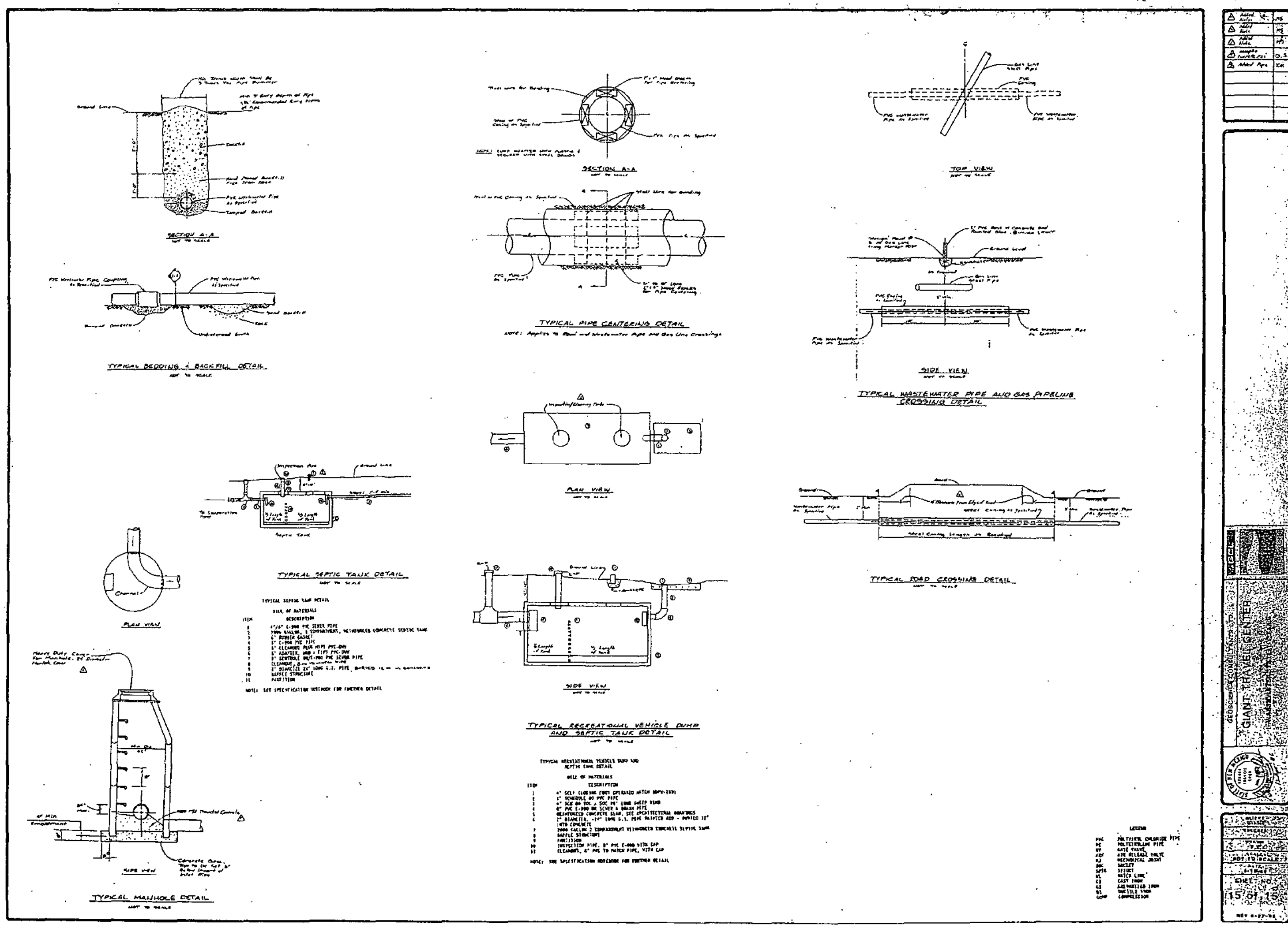
SERVICE BUILDING PLUMBING FLOOR PLAN

Giant Travel Center

Owner: Giant Industries, Inc.

Gallup, New Mexico

P-10



SECTION A-A
TYPICAL BEDDING & BACKFILL DETAIL
SECTION A-A
TYPICAL PIPE CENTERING DETAIL
TOP VIEW
SIDE VIEW
TYPICAL WASTEWATER PIPE AND GAS PIPELINE CROSSING DETAIL
PLAN VIEW
TYPICAL ROAD CROSSING DETAIL
TYPICAL SEPTIC TANK DETAIL
PLAN VIEW
SIDE VIEW
TYPICAL RECREATIONAL VEHICLE DUMP AND SEPTIC TANK DETAIL
TYPICAL MANHOLE DETAIL
LEGEND
GIANT TRAVEL CENTER
15 of 15

Chavez, Carl J, EMNRD

From:	Riege, Ed [Ed.Riege@wnr.com]
Sent:	Thursday, November 20, 2008 1:31 PM
To:	Chavez, Carl J, EMNRD
Cc:	Monzeglio, Hope, NMENV; Hallock, Jim; Rajen, Gaurav; Larsen, Thurman
Subject:	FW: 305 - Jamestown, NM: OWS information
Attachments:	PTC #305 -- Oil-Water Separator Drawings.pdf; DSL Island overview(TEMP015).pdf; Site Plan (TEMP003).pdf; DSL Island detail(TEMP016).pdf; OWS detail(TEMP014).pdf

Carl,
Good news, I got more detail on Pilot's oil water separator for you from Joey Cupp. His email to me is below along with 5 attachments.

Thanks
Ed

Ed Riege
Environmental Manager

Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com

From: Chip Hughes [mailto:Chip.Hughes@pilottravelcenters.com]
Sent: Thursday, November 20, 2008 1:06 PM
To: Riege, Ed
Cc: Joey Cupp
Subject: 305 - Jamestown, NM: OWS information

Ed,

Per our discussion, please find attached the schematic of the oil water separator (one from the supplier & one from our plans) that is installed at our site. I included some of the details of the diesel islands as well, showing the center drains and how they are piped to the OWS.

As I mentioned in our meeting, the OWS is monitored on a weekly to monthly basis so if anything comes up out of the ordinary we address it ASAP. The last oil pick up was conducted on 9-20-08 and before that it was done during the 2-7-08 cleaning. Based on past monitoring data, it has been emptied on a semi annual basis, but as previously stated, we monitor the OWS levels and if the oil gets to 20 or more inches the product is picked up for recycling. The 20-inch number is when the pickup becomes profitable for the carrier; therefore, there is no cost to Pilot for this service.

I have also looked into the last time the system was completely cleaned (emptied of all fluids, entered and inspected) and its next scheduled service. The OWS was last serviced on 2-7-08 and the next scheduled maintenance is February 2010. The water that is discharged from the OWS goes directly to our environmental pond located in the grassy area north of the OWS past the truck scales.

Let me know is you need anything else from me.

<<PTC #305 -- Oil-Water Separator Drawings.pdf>> <<DSL Island overview(TEMP015).pdf>> <<Site Plan (TEMP003).pdf>> <<DSL Island detail(TEMP016).pdf>> <<OWS detail(TEMP014).pdf>>

Chip Hughes

Environmental Project Manager

Pilot Travel Centers, LLC

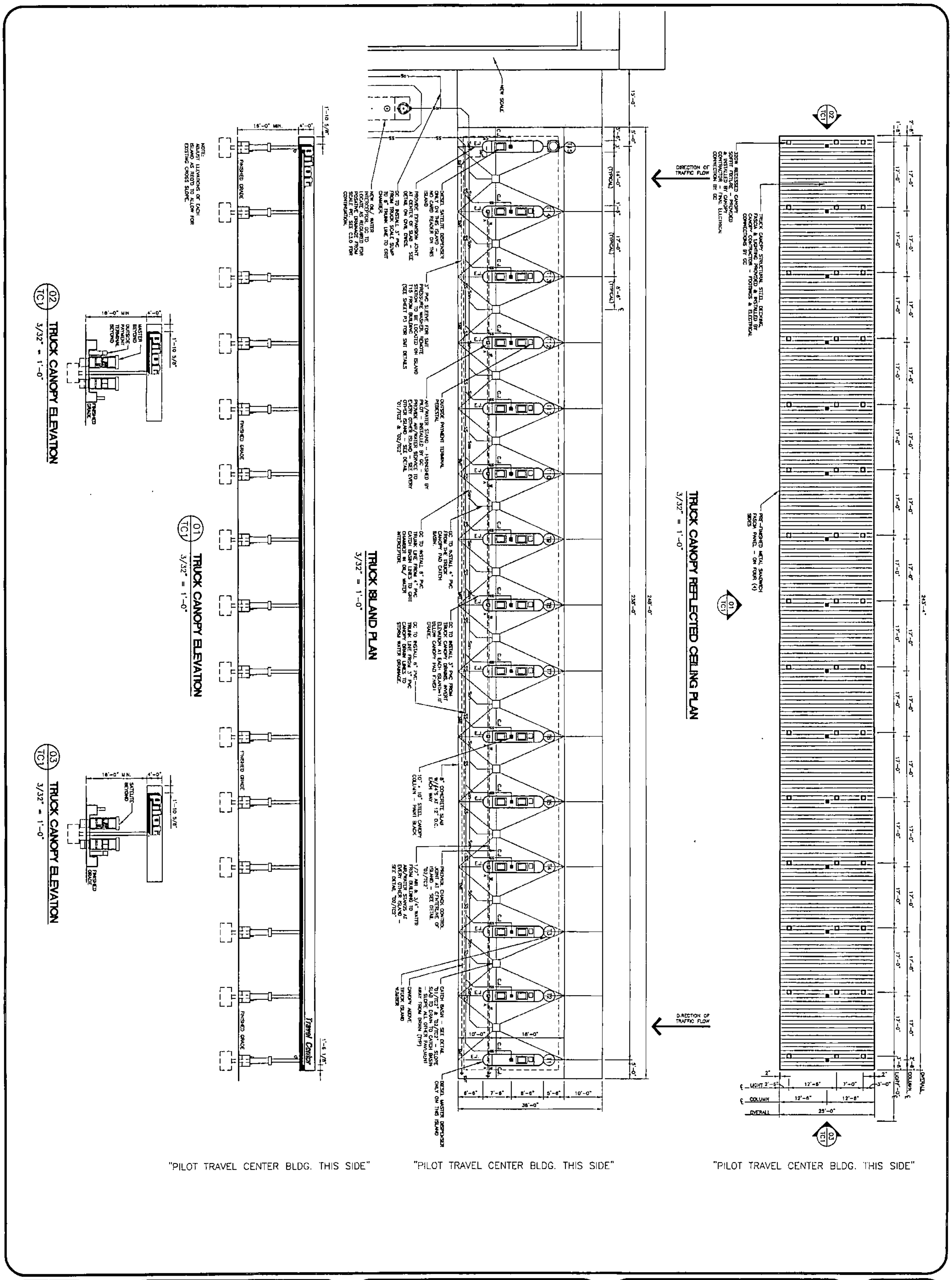
Main: 865-588-7488 x2438

Direct: 865-474-2438

Fax: 865-297-1383

Cell: 865-206-5269

chip.hughes@pilottravelcenters.com



DATE: 07-15-03	DRAWN BY: CML	PROJECT: 305	
DATE	REV.	REVISION DESCRIPTION	INT.

TRUCK CANOPY PLAN
AND ELEVATIONS

PILOT TRAVEL CENTER

INTERSTATE 40, EXIT 39
JAMESTOWN, NEW MEXICO 87347

ROY B. PARSONS III, AIA
REGISTERED ARCHITECT
5508 LONAS ROAD
KNOXVILLE, TENNESSEE 37909
(865) 588-7488

SHEET
TC1
OF 1

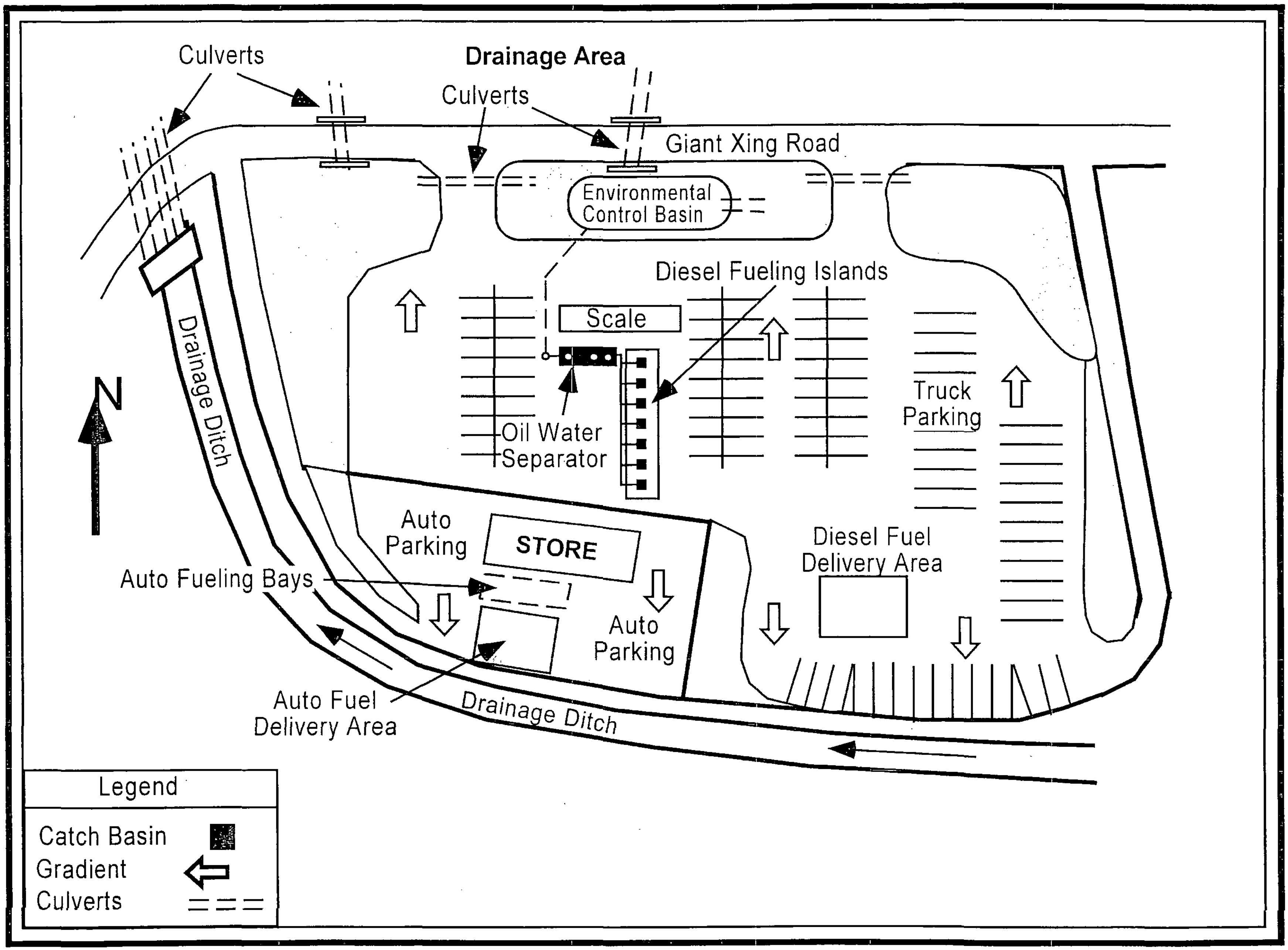
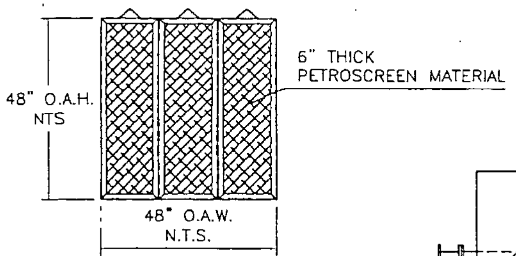
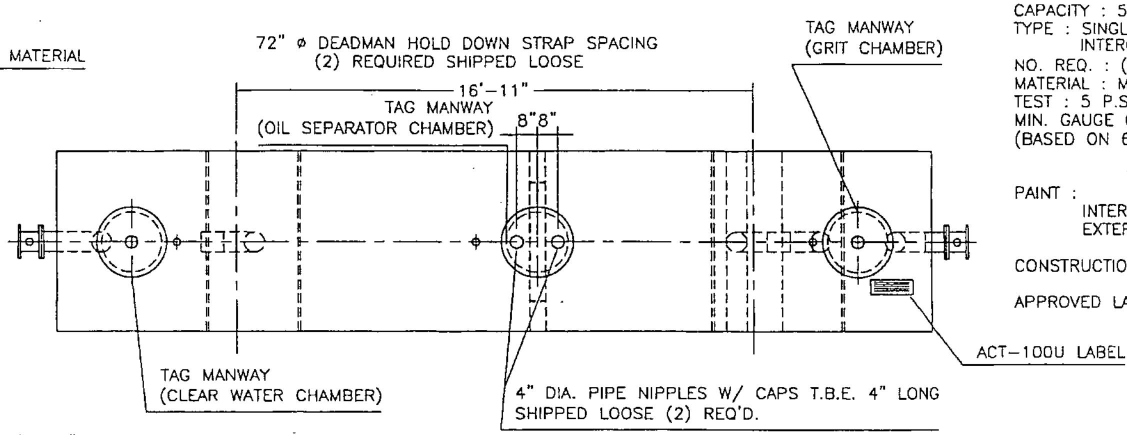


Figure 1. Site Plot for Pilot Travel Center No. 305, Jamestown, NM 87347

Dynamis, Inc.



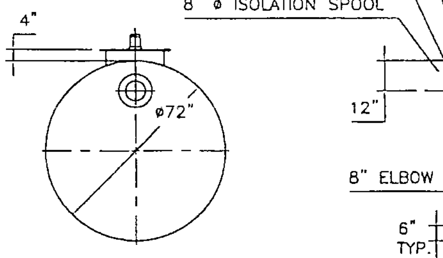
DETAIL–A
(PETROSCREEN COALESCER)
NOT TO SCALE



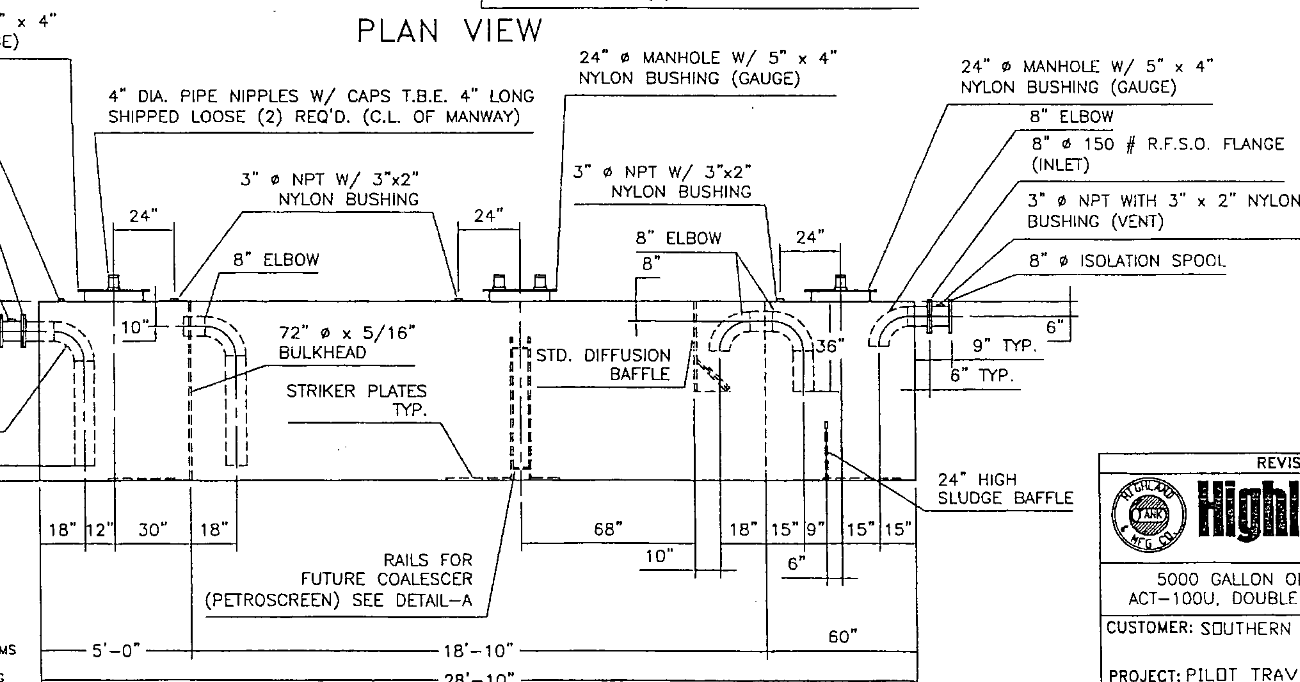
PLAN VIEW

GENERAL NOTES

CAPACITY : 5000 GALLONS
TYPE : SINGLE WALL, ACT-100U, DOUBLE BASIN OIL INTERCEPTOR, "G" SERIES
NO. REQ. : (1)
MATERIAL : MILD CARBON STEEL
TEST : 5 P.S.I.
MIN. GAUGE OR THICKNESS (PER U.L. 58):
(BASED ON 60" MAX. BURIAL DEPTH)
HEADS : 1/4"
SHELL : 1/4"
PAINT :
INTERIOR : NONE
EXTERIOR : SP-6 BLAST, COAT WITH 70 MILS OF POLYURETHANE
CONSTRUCTION : FLAT FLANGED HEADS, LAP WELD ALL EXTERIOR SEAMS ONLY
APPROVED LABELS : ACT-100U



END VIEW



ELEVATION

NOTE:
CUSTOMER TO ADVISE IF MANHOLE EXTENSIONS ARE NEEDED AND WHAT THE LENGTH SHOULD BE

NOTE:
HIGHLAND TANK & MFG. CO. SHALL BE RESPONSIBLE ONLY FOR ITEMS INDICATED ON THIS FABRICATION DRAWING. CONTRACTOR OR OTHERS SHALL BE RESPONSIBLE FOR ANY ITEMS NOT INDICATED ON DRAWING INCLUDING, BUT NOT LIMITED TO, INTERNAL / EXTERNAL PIPING-COATINGS-FITTINGS-ACCESSORIES, ETC. APPROVEROF DRAWING SHALL BE RESPONSIBLEFOR VERIFYING CORRECTNESS OF SIZE / LOCATION OF FITTINGS, ACCESSORIES, COATINGS, ETC. HIGHLAND TANK & MFG. CO. SHALL FABRICATE TANK IN ACCORDANCE TO THIS DRAWING (WHICH MAY OR MAY NOT BE IN EXACT ACCORDANCE TO PLANS & SPECIFICATIONS

REVISIONS

Highland Tank

5000 GALLON OIL INTERCEPTOR
ACT-100U, DOUBLE BASIN, SINGLE WALL

CUSTOMER: SOUTHERN PUMP AND TANK CO.

PROJECT: PILOT TRAVEL CENTER

QUOTE NO:

CHK'D BY:

SCALE:	DATE:	DWG. BY:	DWG. NO.:
1/4"=1'-0"	10-18-02	DB	PILOT5000DBINTSWACT-100U

APPENDIX E

FIGURE 1: SITE PLAN
FIGURE 2: SITE VICINITY MAP

RECEIVED

2008 NOV 5 PM 1 32

October 31, 2008

Mr. Carl Chavez
Oil Conservation Division
Environmental Bureau
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Ms. Hope Monzeglio
Environmental Specialist
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, BLDG 1
Santa Fe NM 87505

Re: Engineering and Design of the Sanitary Wastewater Lift Station GW-032

Dear Mr. Chavez and Ms. Monzeglio:

Enclosed are various documents for your consideration that describe our proposed alternative to our previous plan for the Western Refining, Gallup Refinery, Sanitary Wastewater Lift Station. This submission is based on our preliminary telephone discussions with you, Carl, on Thursday, October 24, 2008. Our alternative plan we believe will be more effective, with lower operational requirements, and less system complexity, and meet the requirements in the OCD letter dated March 12, 2008.

Earlier, we had submitted various drawings to meet the requirement of sending engineering and design details to the agencies by June 2008, and these drawings and our plan had been approved by the OCD/NMEMNRD. Through this submittal we are sending you detailed drawings of important features of our proposed alternative and various other documents (maps, satellite photographs, drawings, block-flow diagrams, etc.) that will help you understand our reasoning and enable you to provide us with an evaluation of the alternative approach. At this time, the detailed drawings for our entire alternative plan are under preparation, and will be completed based on your approval of our proposed alternative.

The plan submitted earlier involved the construction of tanks with a capacity of 48-hours flow holding capacity, to account for the circumstance of a rupture or leak in the pipeline between the Pilot Travel Center and our wastewater treatment system. We are now proposing the construction of a second back-up pipeline, along with the new pipeline and new lift station to serve as an alternative to holding tanks in case the primary pipeline suffers a break. A second back-up line has the advantage that a rupture that lasts longer than 48 hours to repair could be dealt with more easily by using the secondary back-up line. Also, we will connect the two pipelines at various junctions (along with several clean-out locations) to account for any eventuality that both pipelines suffer a break (or leak for whatever reason) at the same time. We will thus be able to use sections of each pipeline in the extreme unlikely eventuality that both lines ever need repair simultaneously. We will also hydro-test the lines prior to commissioning, have a regular inspection and maintenance schedule to avoid any such possibility, and test the lines on a five year schedule.

We do understand the OCD and the NMED are concerned about the possibility that the Pilot Travel Center might send oil along with its sanitary wastewaters to the Western Refining new Wastewater Treatment System. The Pilot Travel Center does operate its own oil-water separator for all water generated from its truck and automobile service areas (this stream is kept separate from sanitary wastewater), and the water from the oil-water separator goes to the Pilot Travel Center's on-site evaporation lagoon (see satellite photograph and maps). Sludge from this oil-water separator is pumped out on a regular basis and is shipped off-site. The kitchen wastewater is also segregated and goes through grease traps before entering the sanitary wastewater stream. The Pilot Travel Center, therefore, will only send sanitary wastewater (and kitchen wastewater without oil and grease) to our wastewater treatment system, as the various streams within the Travel Center are physically segregated and treated differently.

The new alternative we are proposing has an additional great benefit - we are now proposing screens that will screen out < 2 mm solids, a scale smaller than our original plan. This finer scale is needed for the effective operation of our proposed new wastewater treatment system that deals with process wastewater along with the sanitary wastewater from the Pilot Travel Center.

Please contact me at (505) 722-0217 if you have any comments or questions regarding this submission.

Sincerely,

Ed Riege
Environmental Superintendent

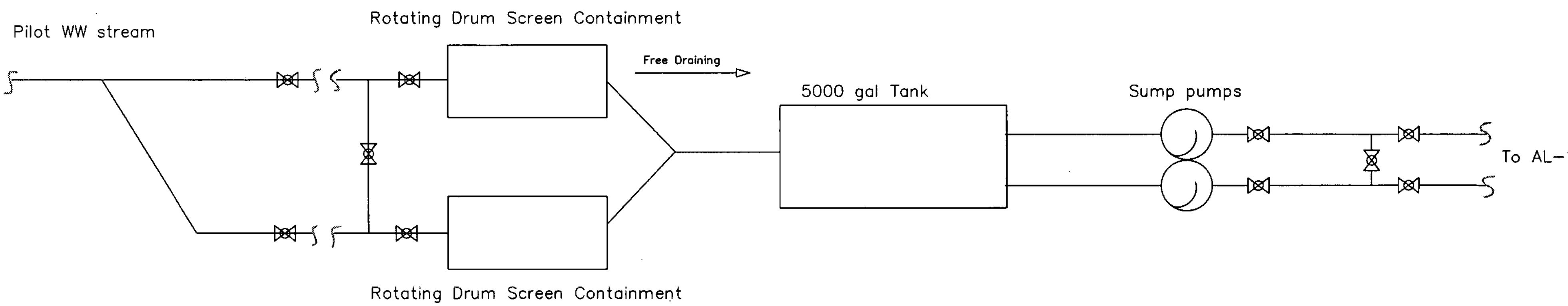
/Attachments

cc: Mark Turri
Don Riley
Jim Hallock
Gaurav Rajen
Western Refining

ATTACHMENTS

- Pilot Lift Station Basic Drawing rev 1
- Pilot Travel Center Site Plan rev 1
- Pilot Travel Center Land Title Survey
- Figure 1 – Pilot Travel Center Satellite photograph
- Figure 2 – Pilot Travel Center Satellite photograph
- Z-02-158 Refinery elevation & Contours rev 1 (indicates new waste water pipe routing)
- D78534 Lakeside RAPTOR Rotating Drum Screen Model 24RDS-0.08-102
- D-68979 Lakeside RAPTOR Wedge Section Installation Model 24WS-0.04-89
- Lakeside Raptor Rotating Drum Screen bulletin #2316
- Lakeside Raptor Rotating Drum Screen Plant Performance Report #169

Pilot Lift Station Basic Drawing



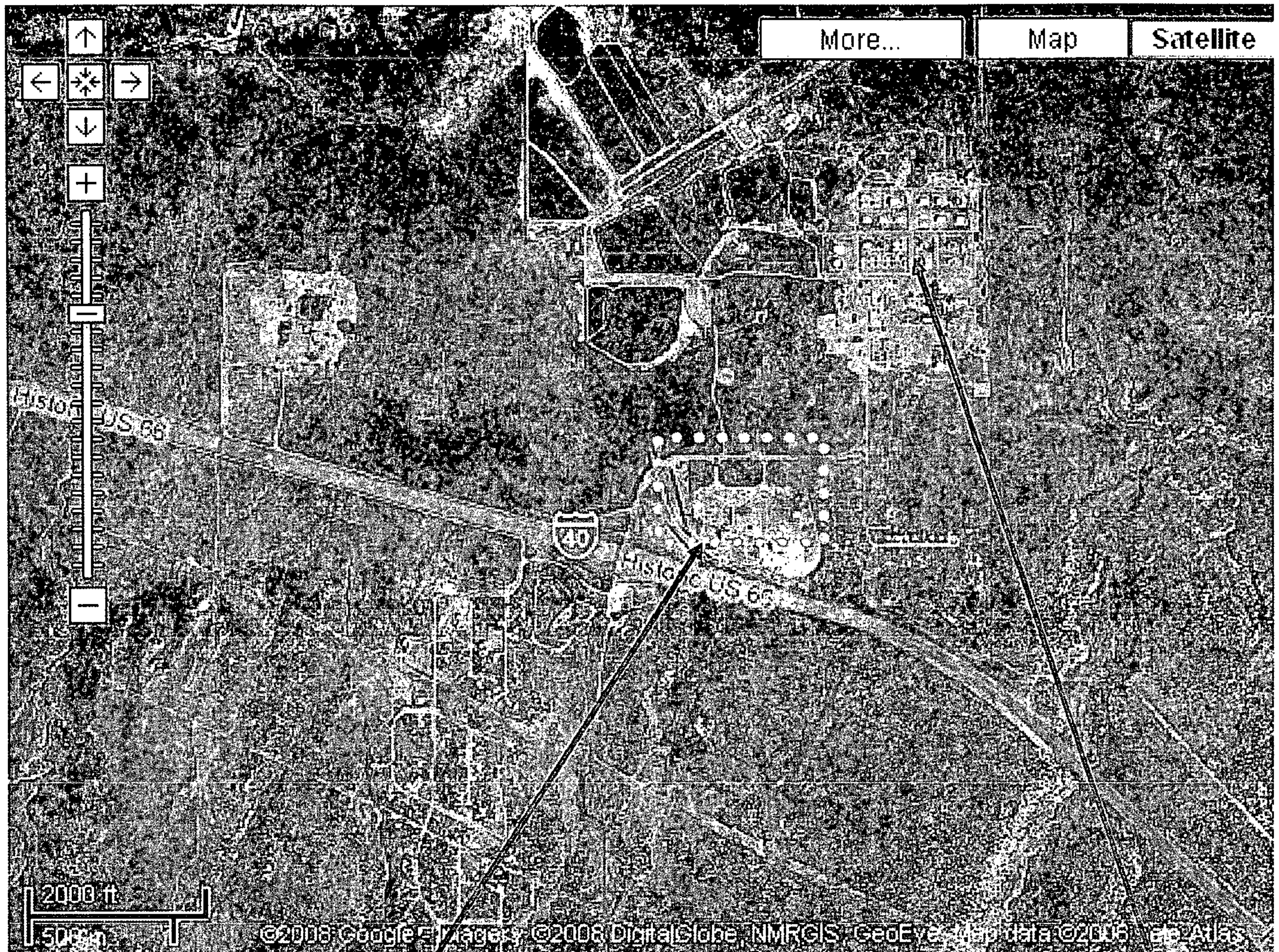
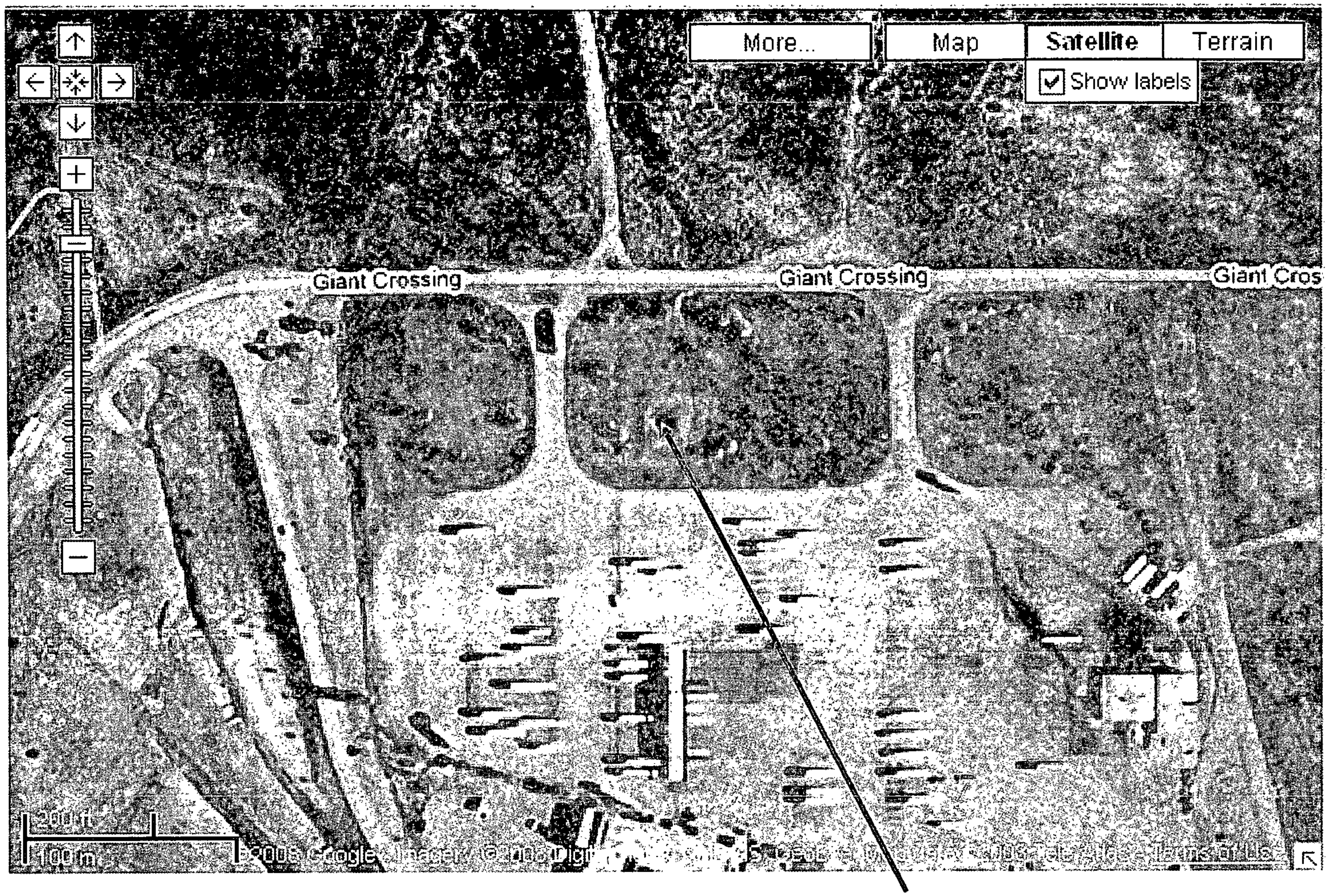
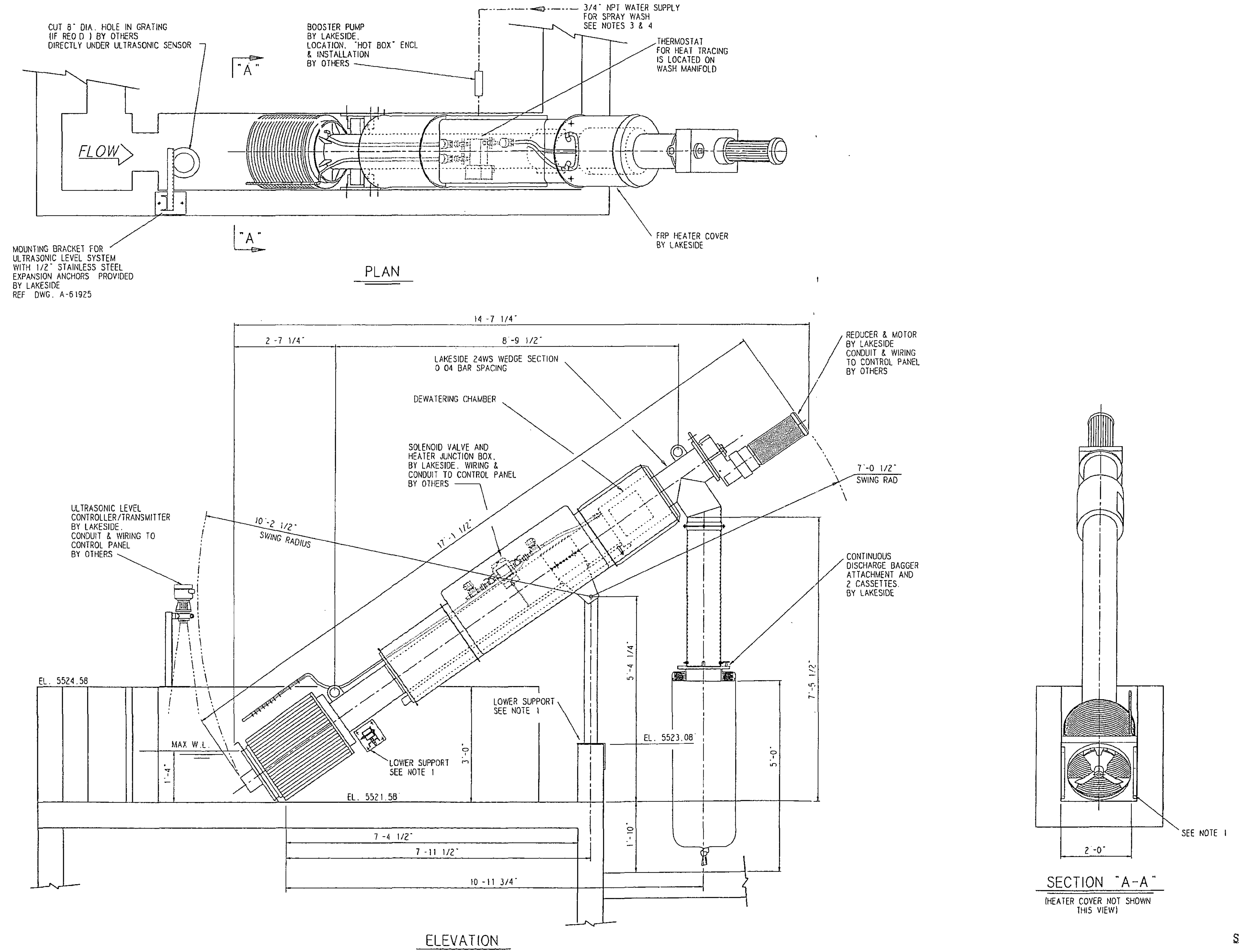


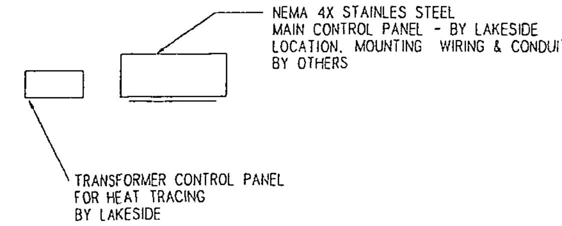
Figure 1: Satellite photograph of general project area



On-site evaporation pond for Pilot Travel Center's water from underground Oil-Water Separator

<u>Figure 2: Satellite photograph of Pilot Travel Center</u>





NOTE:
THESE CONTROL PANELS HAVE BEEN DESIGNED TO POWER ONLY THOSE ELECTRICAL LOADS SPECIFICALLY SHOWN OR NOTED ON LAKESIDE ELECTRICAL DRAWINGS. CONNECTIONS TO OTHER POWER CONSUMING DEVICES WILL VOID THE WARRANTY.

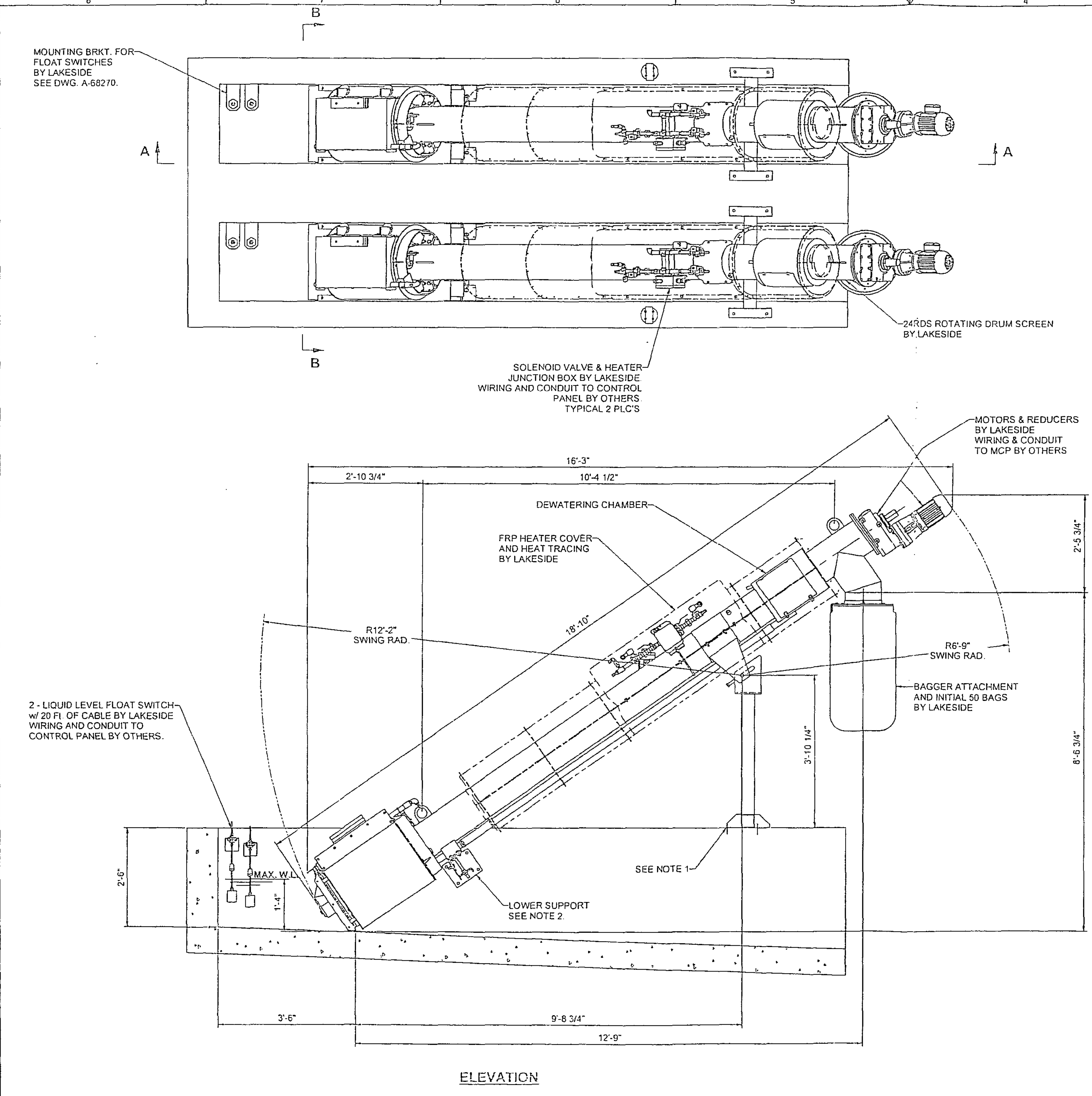
INSTALLATION NOTES:

1) SEE DRAWING B-57360
2) AFTER LOWERING SCREEN INTO CHANNEL, ANCHOR UPPER SUPPORT ASSEMBLY WITH 5/8" STAINLESS STEEL ADHESIVE ANCHORS SUPPLIED BY LAKESIDE. SEE DWG. A-63524
3) **WATER SUPPLY LINES AND ELECTRICAL CONNECTIONS TO BE FLEXIBLE OR QUICK DISCONNECT TYPE TO ALLOW UNIT TO PIVOT OUT OF CHANNEL.**
4) KEEP AREA UNDER UNDER SCREENINGS TRANSPORT SCREW FROM FIXED OBSTRUCTIONS SUCH AS ELECTRICAL CONDUIT, PIPING, ETC. TO PERMIT ROTATION OF THE ROTAMAT OUT OF THE CHANNEL FOR SERVICE

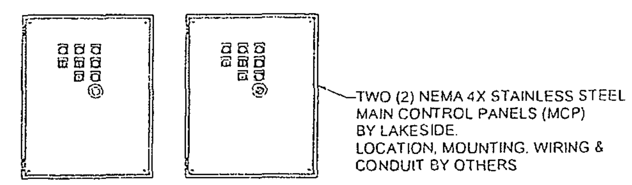
SAFETY WARNING:
THERE ARE INHERENT DANGERS WHILE INSTALLING OR OPERATING ELECTRICALLY POWERED MECHANICAL EQUIPMENT. CONSULT AND WORK WITH YOUR PROJECT SAFETY COORDINATOR TO DETERMINE ALL NECESSARY CAUTION IS EXERCISED AND GUARDING IS BEING PROVIDED TO PREVENT ACCIDENTS

REVISIONS	DATE	DR.	CHKD.	REVISIONS	DATE	DR.	CHKD.	REVISIONS	DATE	DR.	CHKD.	REVISIONS	DATE	DR.	CHKD.

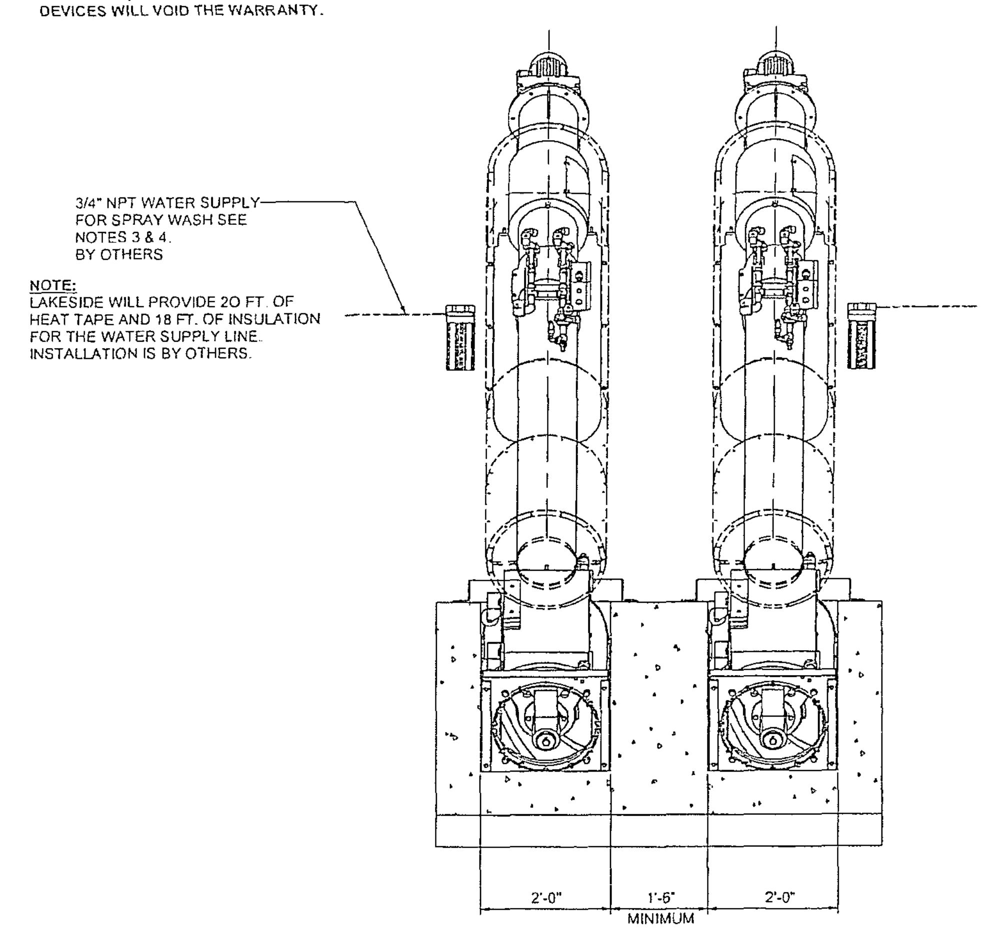
LAKESIDE EQUIPMENT CORPORATION	DR. R.D. / CHKD. CKH	DATE 2-5-04 / FILE NO. 172	*WEDGE SECTION INSTALLATION* MODEL 24WS-0.04-89	COCHITI LAKE, N.M. COCHITI LAKE WWTF S.O. #03-236	DWG. NO. D-68979	REV.



ELEVATION



NOTE:
THESE CONTROL PANELS HAVE BEEN DESIGNED TO POWER ONLY THOSE ELECTRICAL LOADS SPECIFICALLY SHOWN OR NOTED ON LAKESIDE ELECTRICA; DRAWINGS. CONNECTIONS TO OTHER POWER CONSUMING DEVICES WILL VOID THE WARRANTY.



SECTION B-B

SAFETY WARNING:
THERE ARE INHERENT DANGERS WHILE INSTALLING OR OPERATING ELECTRICALLY POWERED MECHANICAL EQUIPMENT. CONSULT AND WORK WITH YOUR PROJECT SAFETY COORDINATOR TO DETERMINE ALL NECESSARY CAUTION IS EXERCISED AND GUARDING IS BEING PROVIDED TO PREVENT ACCIDENTS.

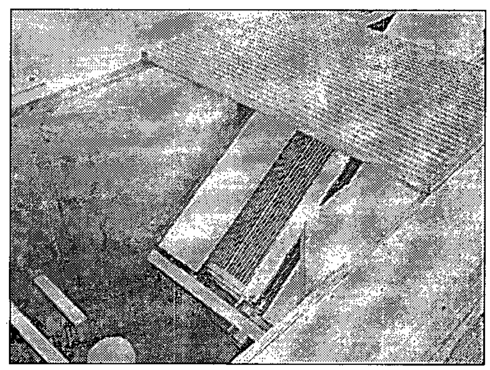
INSTALLATION NOTES:
1) AFTER LOWERING SCREEN IN TO CHANNEL, ANCHOR SUPPORT ASSEMBLY WITH 5/8" STN STL. ADHESIVE ANCHOR PROVIDED BY LAKESIDE. SEE DWG A-54117
2) AFTER LOWERING SCREEN IN TO CHANNEL, ANCHOR LOWER SUPPORT ASSEMBLY WITH 5/8" STN. STL. ADHESIVE ANCHOR PROVIDED BY LAKESIDE. SEE DWG B-57360
3) WATER SUPPLY LINES AND ELECTRICAL CONNECTIONS TO BE FLEXIBLE OR QUICK DISCONNECT TYPE TO ALLOW UNIT TO PIVOT OUT OF CHANNEL.
4) KEEP AREA UNDER SCREENINGS TRANSPORT SCREW FREE FROM FIXED OBSTRUCTIONS SUCH AS ELECTRICAL CONDUIT, PIPING, ETC. TO PERMIT ROTATION OF THE SCREEN OF THE CHANNEL FOR SERVICE.

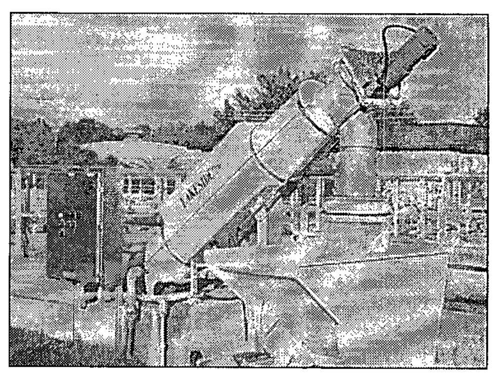
REVISION	DATE	DR	CHKD
B REVISED TO SHOW NEW UPPER SUPPORT	3-5-08	RD	JS

LAKESIDE EQUIPMENT CORPORATION	PROJECT	Dalton, GA. Mill Creek WWTP - Dalton Utilities
	TITLE	RAPTOR® ROTATING DRUM SCREEN MODEL 24RDS-0.08-102
DRAWN RD	DATE 11/12/2007	SIZE D · S O # 07-191 · DWG NO D78534 · REV B
CHECKED CKH	11/14/2007	SCALE · SHEET 1 OF 1 · FILE NO 172

Bulletin #2316 July 2005

Raptor® Rotating Drum Screen

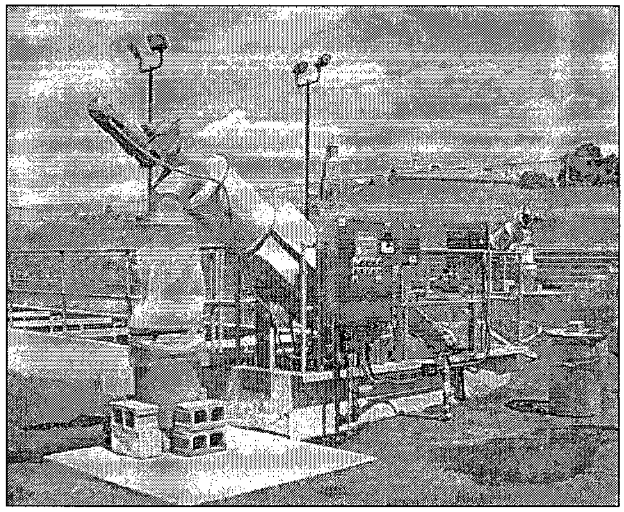




LAKESIDE
Water Purification Since 1928

The Lakeside *RAPTOR*® Rotating Drum Screen

The Lakeside *Raptor*® Rotating Drum Screen meets and exceeds the expectations of operators worldwide with its innovative screening solutions. Not only does the Rotating Drum Screen remove solids, but it also washes and dewaters captured screenings. Along with a simple design and operation process, this screen has a high removal efficiency and low disposal costs.

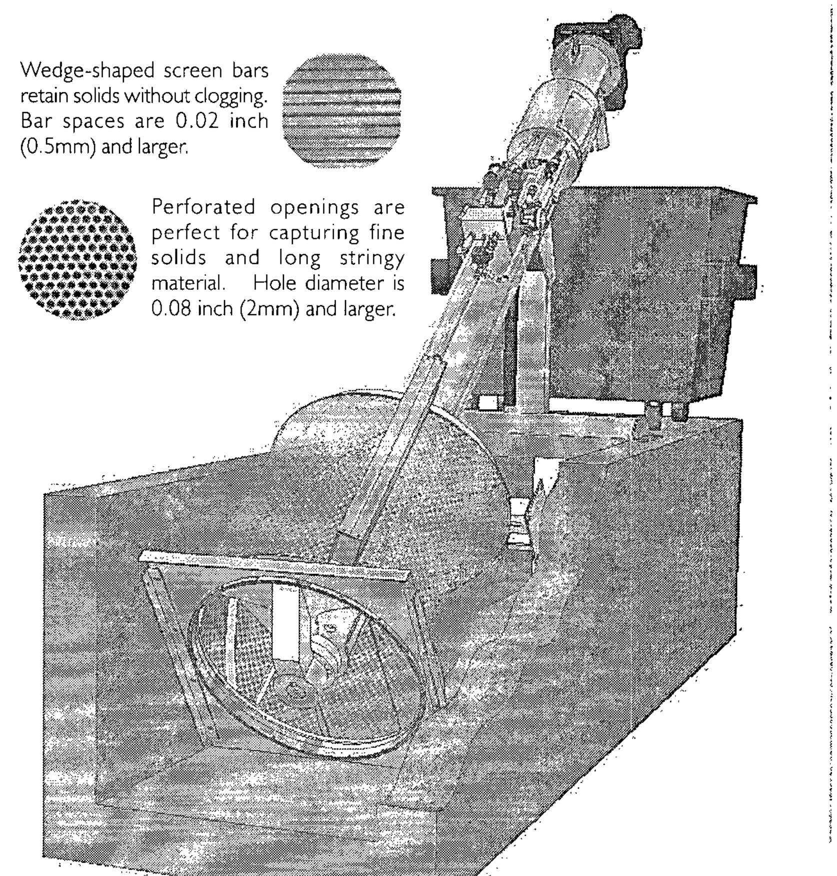


Screen, Compact and Dewater in a Single Unit

Wastewater from the influent channel flows directly into the screening basket. Fabricated with either wedge-shaped screen bars or perforated plate, the screening basket retains fine solids without clogging. Installed at the front of the screening basket, a seal assembly plate prevents unscreened wastewater from bypassing the screen.

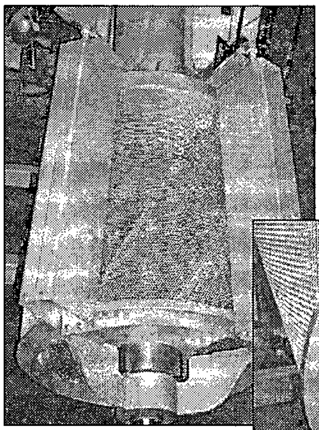
When the wastewater rises to a predetermined level, the screening basket rotates and lifts the screened material out of the influent flow stream. As the material reaches the top of the screening basket, with the help of gravity, it drops into the central screw conveyor/compactor. Any material still in the screening basket is removed by a spray wash system. This system also flushes organic materials back into the influent channel.

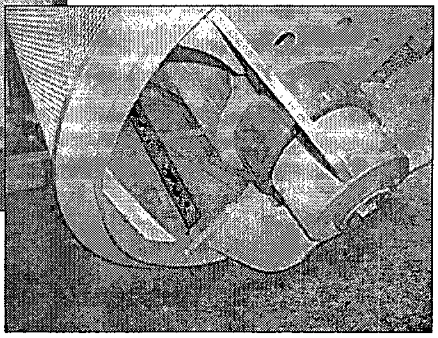
The central screw conveyor/compactor transports screened material to the discharge chute and storage container. During transport, the solids are compacted and dewatered up to a 40 percent dry solids content.



Equipment Features and Benefits

- All stainless steel construction for superior corrosion resistance
- Simple mechanical design requires little maintenance
- Hinged structural support allows unit to pivot out of channel for maintenance at floor level
- Simple drive assembly makes service easy and reduces maintenance costs
- Unit is shipped fully assembled to minimize installation expenses
- All mating parts are machined to ensure proper fit and operation





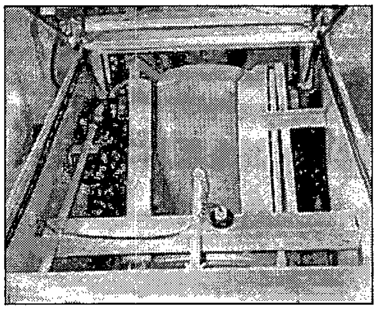
The Rotating Drum Screen's mechanical design and stainless steel construction lengthen its service life.

Exceptional Efficiency and Handling

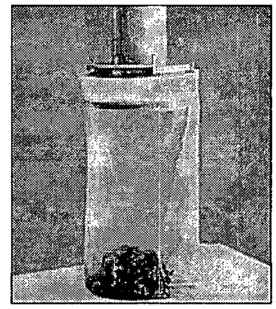
- Unique screening basket provides high screening removal efficiency
- Ideal for scum removal applications
- Two-stage screenings wash water system helps return organic material to wastewater stream
- Integrated screening press reduces volume and weight of screenings for lower disposal costs and cleaner operation
- Enclosed transport tube and optional bagging attachment reduce odors and offer a clean working environment for operators
- Optional insulation and heating systems permit cold climate operation

Product Options

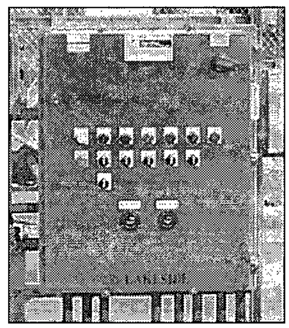
Tank Mounting
Available for all size screens, the entire unit can be enclosed in a pre-engineered tank.



Bagging Attachment
Available for all size screens, the enclosed transport and optional continuous bagging attachment reduce odors and provide a clean work area.



Weather Protection
Available for all size screens and transport tubes, the Lakeside weather protection system protects to 13° below zero (minus 25° C).



Control Panel
Lakeside control panels are PLC-equipped for versatile and efficient operation. Explosion-proof designs are also available.

Treatment equipment and systems solutions from Lakeside

Lakeside offers a wide range of equipment and systems for virtually all stages of wastewater treatment from influent through final discharge. Each process and equipment item that we supply is manufactured with one goal in mind . . . to reliably improve the quality of our water resources in the most cost-effective way possible.

We've been doing just that since 1928.

Aeration
newair® Diffuser
CLR Process
E.A. Aerotor
Magna Rotors
Rotor Covers
Level Control Weirs

Submersible Products
Mixers
Propeller Pumps
Grinder Pumps

Clarification
Spiraflo Clarifier
Spiravac Clarifier
Tertiary Treatment using Series Clarification
Full-Surface Skimming

Trickling Filters

Trash & Screen Rakes

***RAPTOR*® Screening Products**
Fine Screen
Micro Strainer
Rotating Drum Screen
Wash Press
Septage Acceptance Plant

Other Screening Products
Water Intake Screens
CSO Screens

Packaged Headworks Systems
RAPTOR® Complete Plant
H-PAC

Grit Collection
SpiraGrit
Aeroductor
RAPTOR® Grit Washer
Inline Grit Collector
Model L Grit Classifier

Screw Pumps
Open Screw Pumps
Enclosed Screw Pumps

LAKESIDE
Water Purification Since 1928
1022 E. Devon, P.O. Box 8448
Bartlett, IL 60103
630/837-5640, FAX: 630/837-5647
E-mail: sales@lakeside-equipment.com
http://www.lakeside-equipment.com

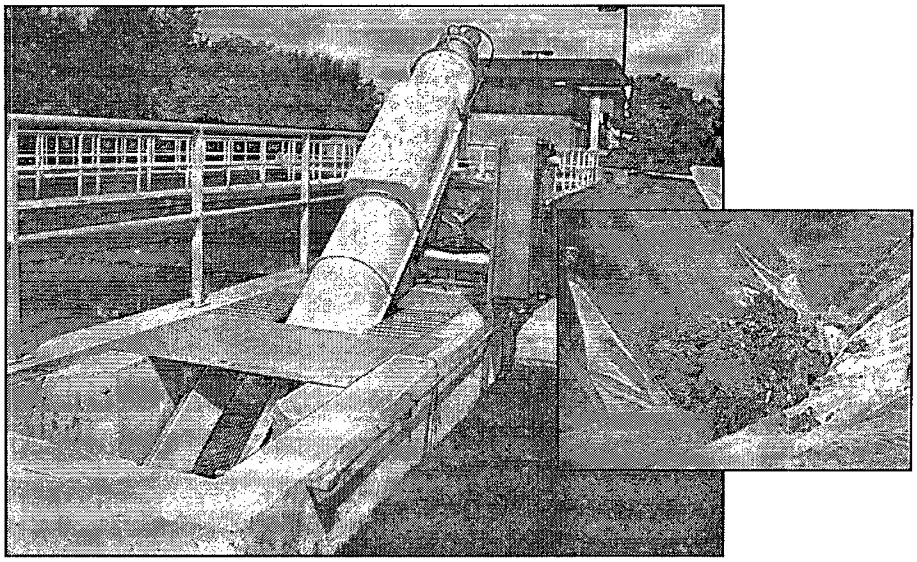
Rotating Drum Screen is Maintenance-free

Wheaton, IL

Lakeside Equipment Installed
31RDS-0.02-105 *Raptor®* Rotating Drum Screen

Equipment Operation
Fully automated with one hour of general up-keep per week

Contact
Steve Bollweg
Plant Superintendent
630/668-1515



At the Wheaton Sanitary District, Wheaton, Ill., the Raptor® *Rotating Drum Screen (above) has been in operation for five years. The screen is highly efficient in processing scum, grease and floatables from the adjacent clarifiers, producing discharge (inset) that regularly passes paint filter tests.*

Primary settling tank grease and skimmings are difficult materials to process at wastewater treatment facilities. While many facilities tend to pump this scum into their digesters, it is difficult to mix and more difficult to biologically stabilize, forcing plants to look for other methods of treatment.

The Wheaton Sanitary District, Wheaton, Illinois, operates with three rectangular chain and flight primary clarifiers. Surface scum and other floatables were skimmed into a pit to be decanted then pumped to an externally fed drum screen. The screen was located in one building and the pump in another with the process running five steps: skimming/decanting, pumping, filtering, and conveyance to a dumpster.

While testing septage screening equipment for a new receiving station, the staff at Wheaton noted the capability of a different type of rotating drum screen, which handles grease and solid material by removing, dewatering and compacting in one machine. The unit, Lakeside Equipment Corporation's ***Raptor®* Rotating Drum Screen (RDS)**, was brought in to test its handling of grease and floating material removed by the skimming troughs.

The RDS, with 0.5mm-spaced wedge wire, receives skimmings from the scum pit next to the screen, effectively removing grease and solid material. The material enters the rotating drum where it is screened and deposited in the screw conveyor to be dewatered and compacted. Discharged screenings were a solid material of grease and debris. It became apparent during testing the RDS could perform the five-step process of scum handling with one piece of equipment. After

1022 E. Devon • Bartlett, IL 60103
630/837-5640 • FAX: 630/837-5647

Lakeside Equipment Corporation

sales@lakeside-equipment.com
http://www.lakeside-equipment.com

Rotating Drum Screen is Maintenance-free

Wheaton, IL

... continued

further testing, the plant concluded the RDS could be installed directly into the scum pit, eliminating the need for pumping. The District contacted Lakeside and purchased a 31-inch Rotating Drum Screen for installation directly into the existing scum pit.

Skimmings from three sedimentation tank troughs enter the chamber through a common pipe. Operator attention is minimal as the unit operates automatically based on preset water levels. The first processed material was visibly free of liquids and accepted by the landfill and wastehauler. The staff inspected the filtrate that had passed through the drum screen as it left the scum pit and flowed down the lowered decant tube. The filtrate was clear and contained little solids.

Plant operators adjust the common pipeline to allow skimmings from adjacent clarifiers to enter the screen's channel. The screen starts to process the scum, grease and floatables without any attention required.

Aside from weekly high-pressure spray wash cleanings, the RDS has been maintenance free. The Rotating Drum Screen has now provided 5 years of reliable scum processing in one unit. The discharged material passes paint filter testing for free liquids and provides a quick, economical and clean way to process primary tank skimmings.

Lakeside Equipment Corporation

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, November 21, 2008 3:38 PM
To: 'Riege, Ed'
Cc: Monzeglio, Hope, NMENV; Hallock, Jim; Rajen, Gaurav; Larsen, Thurman
Subject: RE: 305 - Jamestown, NM: OWS information

Ed:

I received your phone message today.

You are approved to move forward with sanitary project and the agencies will expect a more detailed design drawing based on the Pilot Travel Center's treatment system and effluent into the refinery treatment system.

I have asked Hope Monzeglio to contact you if she has any concerns as the agencies had discussed your plans during a meeting last week, but could not approve until we received more info. from the Pilot Travel Center.

Please contact me if you have questions. I will be out of the office until 12/3/2008. You may contact me next week at (505) 660-1067 next week if you have questions. You may also contact Hope. Thank you.

Please be advised that NMOCD approval of this plan does not relieve Western Refining Southwest- Gallup Refinery of responsibility should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Western Refining Southwest- Gallup Refinery of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3491
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

From: Riege, Ed [mailto:Ed.Riege@wnr.com]
Sent: Thursday, November 20, 2008 1:31 PM
To: Chavez, Carl J, EMNRD
Cc: Monzeglio, Hope, NMENV; Hallock, Jim; Rajen, Gaurav; Larsen, Thurman
Subject: FW: 305 - Jamestown, NM: OWS information

Carl,
Good news, I got more detail on Pilot's oil water separator for you from Joey Cupp. His email to me is below along with 5 attachments.

Thanks
Ed

Ed Riege
Environmental Manager

Western Refining
Gallup Refinery
Route 3 Box 7
Gallup, NM 87301
(505) 722-0217
ed.riege@wnr.com

From: Chip Hughes [mailto:Chip.Hughes@pilottravelcenters.com]
Sent: Thursday, November 20, 2008 1:06 PM
To: Riege, Ed
Cc: Joey Cupp
Subject: 305 - Jamestown, NM: OWS information

Ed,

Per our discussion, please find attached the schematic of the oil water separator (one from the supplier & one from our plans) that is installed at our site. I included some of the details of the diesel islands as well, showing the center drains and how they are piped to the OWS.

As I mentioned in our meeting, the OWS is monitored on a weekly to monthly basis so if anything comes up out of the ordinary we address it ASAP. The last oil pick up was conducted on 9-20-08 and before that it was done during the 2-7-08 cleaning. Based on past monitoring data, it has been emptied on a semi annual basis, but as previously stated, we monitor the OWS levels and if the oil gets to 20 or more inches the product is picked up for recycling. The 20-inch number is when the pickup becomes profitable for the carrier; therefore, there is no cost to Pilot for this service.

I have also looked into the last time the system was completely cleaned (emptied of all fluids, entered and inspected) and its next scheduled service. The OWS was last serviced on 2-7-08 and the next scheduled maintenance is February 2010. The water that is discharged from the OWS goes directly to our environmental pond located in the grassy area north of the OWS past the truck scales.

Let me know is you need anything else from me.

<<PTC #305 -- Oil-Water Separator Drawings.pdf>> <<DSL Island overview(TEMP015).pdf>> <<Site Plan (TEMP003).pdf>> <<DSL Island detail(TEMP016).pdf>> <<OWS detail(TEMP014).pdf>>

Chip Hughes

Environmental Project Manager

Pilot Travel Centers, LLC

Main: 865-588-7488 x2438

Direct: 865-474-2438

Fax: 865-297-1383

Cell: 865-206-5269

chip.hughes@pilottravelcenters.com

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Wednesday, July 09, 2008 2:34 PM
To: Chavez, Carl J, EMNRD
Subject: GW-032 Sanitary Lift Station

The Agencies hereby conclude that the engineering design drawings are satisfactory to fulfill the OCD Letter of March 12, 2008, and OCD Discharge Permit (GW-032) Item 5 (Condition 24A & B).

Please be advised that NMOCD approval of this plan does not relieve Western Refining Southwest- Gallup Refinery of responsibility should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Western Refining Southwest- Gallup Refinery of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3491
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: http://www.emnrd.state.nm.us/ocd/index.htm
(Pollution Prevention Guidance is under "Publications")

Western Refining
GALLUP REFINERY

WNR LISTED NYSE

RECEIVED
2008 JUN 20 AM 11 42

June 18, 2008

Mr. Carl Chavez
Oil Conservation Division
Environmental Bureau
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Ms. Hope Monzeglio
Environmental Specialist
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, BLDG 1
Santa Fe NM 87505

Re: Engineering and Design of the Sanitary Wastewater Lift Station GW-032

Dear Mr. Chavez and Ms. Monzeglio:

Enclosed are the engineering and design drawings for the Western Refining Gallup Refinery Sanitary Wastewater Lift Station. These drawings meet the requirement for Item 5) of the OCD letter of March 12, 2008 regarding Revised Schedules for OCD Discharge Permit GW-032. Item 5) Condition 24.A and 24.B. Installation of Dual Separation Device and Emergency Holding Tank for Pilot Travel Center Waste Water. These drawings meet the requirement to send engineering and design to the agencies by June 2008.

Please contact me at (505) 722-0217 if you have any comments or questions regarding these drawings.

Sincerely,

Ed Riege
Environmental Superintendent

C: Mark Turri
Don Riley
Guarav Rajen