Georgia-Pacific
CONSUMER OPERATIONS LLC
401 NE Adams Street, Camas, WA 98607
Telephone: (360) 834-3021

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

July 30, 2020

Ms. Ha Tran
State of Washington
Department of Ecology
Industrial Section
P.O. Box 47706
Olympia, WA 98504-7706

Dear Ms. Tran:

Pursuant to Condition S4.A of the Camas Mill's NPDES Permit (No. WA0000256), we are submitting an updated version of the "Camas Mill Wastewater Collection and Treatment, Standard Operation and Maintenance Procedures". The manual has been updated to include the most recent wastewater data, updates to testing frequency of chemical oxygen demand and dissolved oxygen, and to address changes in flow contributions to the former acid sewer.

If you have any questions concerning this submittal or wastewater treatment at the Camas Mill, please contact Sam McDowell at 360-834-8439 or samantha.mcdowell@gapac.com. I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Shawn Wood
Vice President

Enclosure

cc:
Sam McDowell - GP/Camas

WASTEWATER COLLECTION AND TREATMENT

STANDARD OPERATION AND MAINTENANCE MANUAL

July 2020

GEORGIA-PACIFIC CONSUMER OPERATIONS LLC

CAMAS, WASHINGTON

Manual 26

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1.0 TREATMENT SYSTEM OPERATING PLAN

1.1 PURPOSE

Condition S4.A of the Georgia-Pacific Consumer Operations LLC (Camas Mill) NPDES permit number WA0000256, issued by the State of Washington Department of Ecology (WDOE or Ecology), requires that an update to the Operations and Maintenance (O&M) Manual by January 1, 2017. This manual was submitted on December 28, 2016 to satisfy this requirement. Additionally, any substantial changes or updates to the O&M Manual must be submitted to Ecology within 30 days after they are incorporated.

The permit requires that the first chapter of the O&M Manual is the Treatment System Operating Plan (TSOP). The TSOP is a part of the NPDES renewal application and is required for submission by June 1, 2020. The TSOP was submitted with the NPDES renewal application on April 17, 2020. The TSOP follows a specified format and is a concise summary of key elements of the "Camas Mill Wastewater Collection and Treatment, Standard Operation and Maintenance Manual". Although it can stand alone, it must also be included as the beginning chapter and must not conflict with the remainder of the O&M Manual.

1.2 EQUIPMENT

The wastewater treatment system consists of the following unit operations:

- Collection System – Process wastewater from the mill is collected in the mill's process sewer which handles effluent from all the manufacturing processes as well as stormwater. The process sewer is pumped under the Camas Slough for treatment on Lady Island. Additionally, a separate sewer line previously collected corrosive effluent (primarily from the Steam Plant Demineralizers and acidic processes of the pulp mill) and flowed by gravity under the Camas Slough. The Steam Plant Demineralizer flow was re-routed to the main process sewer in January 2020, leaving the effluent line in place to collect any residual flow, but without any significant routine contributions. In addition to the normal process and non-process wastewaters collected, the mill may discharge wastewaters resulting from essential maintenance, demolition activities, regularly scheduled maintenance, during startups and shutdowns, and from incidental spills and releases (whether anticipated or unanticipated) from anywhere in the permitted facility.
- Main Pump Station – The main pump station is located on the north bank of the Camas Slough. It receives wastewater and industrial stormwater by gravity from the Camas Business Center property (located on NW 7th Avenue), the repulper located at the corner of NE 6th Avenue and NE Adams Street, the main mill site including stock preparation, the paper machine, the steam plant demineralizers, converting areas, decommissioned areas, and the fresh water well field; these flows do not include any sanitary wastewater. The wastewater is coarsely screened and pumped to Lady Island for primary treatment. The station consists of a roughly 27

feet by 48 feet by 17 feet deep concrete sump equipped with coarse bar screens, two traveling screens, three debris grinders, and three 25,000 gallon/minute wastewater pumps.

- Primary Treatment – In 1967, the mill installed a 330-foot diameter primary clarifier with concrete sidewalls and a compacted native clay bottom. The drive mechanism was of Dorr-Oliver design. This drive was replaced with a hydraulic motor drive in 1989. This approach provides an even application of torque to the rake mechanism and less wear on the bull gear. The primary clarifier receives wastewater from the main pump station. It is pumped to the center of the clarifier where it is dispersed toward the periphery by a series of baffles. As the wastewater moves to the overflow launder, it encounters a scum baffle and V-notch overflow weir (stainless steel construction, installed 2005). Solids settle to the bottom of the clarifier and are raked to the center well. There they are thickened and flow by gravity to sludge pumps in the basement of the filter building. Sludge may then be pumped to a 11.5 foot by 10-foot diameter Komline-Sanderson spring coil vacuum filter. Filter cake at 15-20% solids is conveyed to a Reitz V-Press where the solids level is raised to 35-45%. The solids are then sent to a landfill (on or off site), or may be sent for beneficial reuse.
- Secondary Treatment – Wastewater from the primary clarifier is combined with the former corrosive sewer in the mixing chamber and conveyed by two 54-inch ID high density polyethylene (HDPE) pipelines to a diversion structure. The diversion structure directs flow to two aerated stabilization basins in series. The secondary treatment process at Camas is a two stage ASB system which was completed in 1977. The system's flow pattern is between plug flow and completely mixed flow and consists of a 250 MG (66 acre) basin followed by a 150 MG (42 acre) basin with a settling zone.
    - Effluent from the outlet of ASB 1 may be recirculated (at approximately 6,000 gpm) to the inlet of the system to provide the bacteria for BOD removal. Engineering studies have shown the recirculation process to have little impact upon performance under current conditions; therefore, it has been made optional and may be turned on or off as needed.
    - Effluent may be diverted around ASB 1 and directly to ASB 2, to reduce system residence time. Engineering studies have also shown that a two stage ASB system is not required to meet effluent discharge limits under current conditions; therefore, flow diversions around ASB 1 are considered a part of normal operations.

1.3 PERSONNEL REQUIREMENTS

The mill's wastewater treatment system typically operates 24 hours per day, seven days per week. The Lady Island operator is typically on-site during one shift per day, five days per week. Additional shifts, weekends, vacations, and holidays are covered by operators from the Utilities department who complete rounds on Lady Island at least once per shift and monitor the compliance parameters continuously. A third-party contractor conducts routine and compliance sampling; as such, additional

operations personnel are not required during sampling periods. During major equipment maintenance, additional personnel may be required. During extended mill shutdowns, curtailments, and/or other periods of non-operation, the wastewater treatment staffing may be adjusted accordingly, and the mill will ensure that compliance parameters are monitored continuously.

1.4 BASELINE OPERATION

1.4.1 Primary Treatment

The primary clarifier was originally designed for a flow of 76 MGD and a solids loading of 215,000 lb/day. A comparison of the original design to typical design standards and current baseline conditions is as follows:

Parameter	Units	Design Standards	Original Design	2018 – 2019 Data*
Flow	MGD	–	76.0	6.4 – 21.9
Hydraulic Retention Time	hours	1.5 – 4	2.9	10.4 – 37.4
Overflow Rate	gpd/ft^2	400 – 2,000	889	69 – 248
Removal Rate – BOD	%	10 – 20	10	32
Removal Rate – TSS	%	35 – 95	70	93
Side Water Depth	feet	6 – 15	10.5	10.5
Solids Loading	$lb/ft^2/day$	1 – 5	2.5	0.4
Solids Loading	lb/day	–	215,000	30,000
Weir Loading	gpd/lineal ft	–	73,000	5,700 – 20,450

**Data collected between July 2018 and December 2019 following operational changes at the Camas Mill. Ranges indicated are minimum and maximum monthly values, while a single value represents an average.*

Treatment in the primary clarifier under current loading conditions has been found to be adequate for meeting permit requirements, and the clarifier has excess capacity to treat additional loading.

1.4.2 Secondary Treatment

The secondary treatment system was originally designed for a flow of 76 MGD and a sustained BOD loading of 175,000 – 190,000 lb/day. Following the 2009 aeration reductions in ASB 1, the system capacity is in the 65,000 – 85,000 lb/day range.

A comparison of the new design to typical design standards and current baseline conditions is as follows:

Parameter	Units	Design Standards	Current Design	2018 – 2019 Data*
Aeration: ASB 1	hp	--	1,950	1,950
Aeration ASB 1 Ratio	hp/MG	6 – 50	8	11
Aeration: ASB 2	hp	--	450	375
Aeration ASB 2 Ratio	hp/MG	<1 – 6	3	3
BOD: ASB 1 Inlet	lb/day	--	85,000	1,138 – 4,908
BOD Loading	lb/acre/day	400 – 2,000	787	17.2 – 74.4
BOD: ASB 2 Outlet	lb/day	--	9,307	208 – 1,219
Depth	feet	6 – 20	12 – 14	12 – 14
Dissolved Oxygen: ASB 1 Outlet	mg/L	0.1 – 1.0	0.5	4.6 – 11.8
Dissolved Oxygen: ASB 2 Outlet	mg/L	0.1 – 1.0	0.5	6.5 – 12.6
Flow	MGD	--	76	6.4 – 21.9
Hydraulic Retention Time	days	3 – 24	5.2	13 – 46
pH: ASB 1 Inlet	--	--	5.0 – 10.0	--
pH: ASB 2 Outlet	--	--	6.0 – 9.0	6.3 – 9.2**
TSS: ASB 2 Outlet	lb/day	--	24,895	396 – 3,388

**Data collected between July 2018 and December 2019 following operational changes at the Camas Mill. Ranges indicated are minimum and maximum monthly values, while a single value represents an average.*

***pH greater than 9.0 occurred due to suspected algae bloom intermittently for periods <60 consecutive minutes.*

The normal (baseline) monitoring frequency at the ASB 2 outlet:

- Continuous Sample: flow, pH, temperature
- As needed Grab Sample: dissolved oxygen
- 3X/week Composite Sample: BOD, TSS
- Monthly Composite Sample: AOX
- Annual Composite Sample: Dioxin (2,3,7,8-TCDD), Furan (2,3,7,8-TCDF)

1.5 BELOW BASELINE OPERATION

1.5.1 Primary Treatment

If the primary solids loading drops below the baseline, the coil filter and Reitz V-Press production rates may be decreased or stopped completely to compensate. When the primary clarifier rake drive hydraulic pressure drops below approximately 300-500 psi, the dewatering equipment and recirculating to the clarifier can be shut down until additional sludge accumulates and is available to process.

If the hydraulic flow through the primary clarifier decreases significantly, the retention

time in the clarifier would increase. Additional oxygen injection is available upstream at the effluent pump station to control any fugitive odors that may results as material in the primary clarifier undergoes anaerobic breakdown. Due to the reduced constituent load in the wastewater entering the clarifier, this is not expected to occur.

1.5.2 Secondary Treatment

ASB aeration may be reduced to conserve energy, while flow and stabilization basin dissolved oxygen continue to be monitored. The liquid level in ASB 1 is maintained by adjusting the flow control gate between ASB 1 and ASB 2, and flow control gates at the diversion structure allow diversion of flow around ASB 1 in the event of lower flow volumes or amount of treatment required.

During periods of low flow, such as summertime months, or as otherwise needed, flow can be diverted around ASB 1 in order to reduce the hydraulic retention time (HRT) in the system, which would help to control algae growth in ASB 2 and stabilize the effluent pH. When this occurs, an aerated liquid level is maintained in ASB 1 to minimize odors while the diversion is in place. ASB 1 may be brought online during the rainy season, typically from October 1 through April 30, with both ASB 1 and ASB 2 available to manage the additional stormwater. Modeling has shown that ASB 2 alone is sufficient to meet secondary treatment objectives.

1.6 ABOVE BASELINE OPERATION

1.6.1 Primary Treatment

1.6.1.1 Basic Procedure

If the primary solids loading increases, the coil filter and Reitz V-Press production rates may be increased to compensate. When they reach their maximum capacity, solids will accumulate in the primary clarifier. A high-level alarm sounds when the primary clarifier rake hydraulic pressure (comparable to rake torque) reaches 1100 psi. A high-high level alarm sounds when the rake pressure reaches 1250 psi. At 1350 psi, the hydraulic system compensates for the increased pressure by maintaining the hydraulic flow rate but reducing the rake speed. The system shuts down completely at 1400 psi to prevent structural damage. If the clarifier solids inventory produces the hydraulic pressure maximum, the clarifier can be bypassed by opening the bypass valve on the east side of the coil filter building. Flow to the clarifier can be restored when the rake hydraulic pressure returns to the baseline condition.

1.6.1.2 Coil Filter Failure

The mill has a single coil filter for primary solids dewatering. If it should fail during above baseline operation, file a work request in PTM and contact the Manufacturing Engineer for the area and the Environmental Group. Our first step would be to accumulate solids in the primary clarifier. A next step would be to bypass the clarifier.

If the clarifier cannot be bypassed (ASB compliance issues, mechanical problems, etc.), notify the Manufacturing Engineer and the Environmental Group and standby for instructions. The mill may choose to curtail or shut down production. Alternatively, the mill may choose to rent a temporary sludge removal system.

1.6.1.3 V-Press Failure

The mill has a single V-Press for primary solids dewatering. If it should fail during above baseline operation, file a work request in PTM and contact the Manufacturing Engineer and the Environmental Group. Our first step would be to accumulate solids in the primary clarifier. A next step would be to bypass the clarifier. If the clarifier cannot be bypassed (ASB compliance issues, mechanical problems, etc.), run the coil filter ("wet") directly to the landfill (bypass the V-Press) at the maximum sustainable speed. An outside contractor may be required to continuously manage the landfill. Once the landfill becomes too soft for cat operation due to the increased moisture, "wet" operation must stop. Again, notify the Manufacturing Engineer and the Environmental Group and standby for instructions. The mill may choose to curtail or shut down production. Alternatively, the mill may choose to rent a temporary sludge removal system.

1.6.2 Secondary Treatment

Above baseline or upset conditions can result from spills, shutdowns (equipment failure, maintenance outages, etc.), and natural events (flooding, severe weather, volcanic eruptions, earthquakes, etc.). Secondary treatment aspects to consider are flow, high BOD, and pH. They are discussed separately in the following sections.

1.6.2.1 Flow

The Camas wastewater treatment system was designed for a maximum flow of 76 MGD. Before the recent shutdowns in 2018, the flows had averaged around 20 to 30 MGD, and are expected to operate <10 MGD going forward. The Camas ASBs are bisected by a midfeather or curtain of plasticized fabric. Dimensional stability of the midfeather is maintained by floats on the surface of the basin and opposing bottom anchors. Level control in the basin is accomplished by an outlet gate in ASB 1 and exit weir in ASB 2. Solids deposition on the curtains (against and in the folds of the curtain), float deterioration, and fabric deterioration can cause portions of the midfeather in both ASBs to sink or leak which can greatly impact treatment efficiency through short circuiting. Annual maintenance is performed on the midfeathers in both ASBs to remove solids buildup and repair damaged or deteriorating floats and fabric.

The ASB curtains normally float 3-6 inches above the surface of the basin. In ASB 1, a 3-inch elevation change corresponds to a flow surge of 5.4 MGD. With the shutdown of the Kraft pulping mill and communication papermaking assets, daily flow surges during normal mill operation should be minimal; however, flow variability can be greatly accentuated by stormwater events. Maximum rainfall in the Portland area occurs in

December and January of each year and averages about 6 inches per month. This weather pattern suggests that winter ASB 1 liquid levels should be adjusted to about 6 inches below submergence elevations to avoid storm event short circuiting (either over or under the curtain).

1.6.2.2 High BOD

As previously discussed, (see Section 1.4.2), the secondary treatment system was designed to effectively treat a sustained BOD load of 85,000 lb/day. The time frame implied in this conclusion is an interval of a month or more. If additional BOD treatment is needed, the following conditions are recommended:

- Maintain uniform influent pH in the range of 6.0 to 7.0.
- Strategically operate the installed aeration in both treatment basins.
- Operate the wastewater recirculation pump ("bug pump") as needed with the air bleed valve closed.

Other validated techniques which have been historically used to limit the BOD load applied to the basins or the quantity discharged include the following:

Action Steps	BOD Reduction (lb/day)
Flow reduction on the last day of the month by raising the liquid level in ASB 1 (15-20 million gallons).	10,000
Flow reduction by mill wide water conservation (assume a flow reduction of 3 million gallons/day, k = 0.9).	1,400

As of May 2018, the BOD load entering the water treatment system is greatly reduced and the above measures are not expected to necessary to meet effluent treatment requirements.

1.6.2.3 pH

The target pH for optimum wastewater treatment is 6.0 to 8.0. Major pH swings outside of this range are expected during routine mill operation but do not impact overall water treatment efficiency. Under previous operating conditions, some of these upsets exceeded the capabilities of our pH control system. When that occurred, it was necessary to immediately notify operations to control the issue at its source and make arrangements for feeding acid or caustic, as needed, on Lady Island to restore the pH. If the pH upset continued for 24 hours or more, we may have had to reseed the ASBs with bacteria to maintain the required treatment efficiency by adding waste activated sludge (WAS) from a pulp and paper mill (e.g. Georgia-Pacific's Wauna Mill) or freeze-dried bacteria. The suggested WAS dosage was four or more tank truck loads per day added to the ASB inlet until the pH returned to the 6.0 to 8.0 range. Under current mill

operating conditions, however, it is rare for an upset to occur in the mill that is too large to be buffered by the primary clarifier and the ASBs. Therefore, it is unlikely that reseeding would be necessary.

Another factor that could impact pH during the summer months is algae growth. Two of the most important factors that can contribute to algae growth in ASBs are HRT and light availability, both of which have increased as a result of the shutdown of the Kraft pulp mill and related equipment in 2018. Because of the reduction in influent flow, the HRT in the two ASBs has increased from the design value of 5.2 days to upwards of 50 days (total). For aerated lagoon systems divided by curtains, algae growth is expected if the total HRT exceeds 3.6 days[1]. Furthermore, the water throughout the wastewater treatment system experienced a significant decrease in TSS and color, allowing additional light to reach greater depths in the pond. Combined with residual nutrients in the ASBs, this created an ideal environment for various types of algae to grow.

During peak sunlight hours, algae consume carbon dioxide though photosynthesis and the pH of the water increases. This is a result of the reduction in carbonate and bicarbonate levels of water as they are used to replenish the lost carbon dioxide. The pH decreases overnight as the sun sets and photosynthesis slows. In July/August of 2018, several corrective actions (outlined below) were trialed and utilized to maintain compliance with the Outfall 001 pH limits during a suspected algae bloom.

After testing several options for pH control, two long-term solutions were implemented. The first was the installation of a vendor-supplied carbon dioxide (CO_2) system near the outlet from ASB 2, and the second was diversion of flow around ASB 1. Each of these, and the other options that were tested, are discussed in Section 6.2 in the O&M Manual below.

1.7 SIGNIFICANT SCHEDULED MAINTENANCE

Scheduled mill maintenance occurs on a routine basis. Potentially significant items are the annual mill outage (approximately 1- to 2-week event typically in the spring or the fall), and paper machine cleanups which historically have impacted the organic load and pH of the treatment system. Paper machines typically run continuously with water wash-ups and occasional “boil outs”. The boil outs occur on an infrequent basis (2-12 times/year) and usually employ caustic (sodium hydroxide) plus a surfactant (or surfactants) or phosphoric/sulfuric acid solutions with or without surfactants. The chemicals in question are permitted in food grade packaging pursuant to 21 CFR 176. The specific chemicals, dosage rates and annual consumptions are confidential business information.

Generally, wastewater system maintenance does not generate wastewaters except

[1] Rich, L. 1999. *Control of Algae*. Clemson University, Clemson, South Carolina. https://www.clemson.edu/cecas/departments/eees/documents/AERATEDLAGOONTECHNOLOGY.pdf. Accessed May 17, 2019.

when dredge spoils from the ASBs are being dewatered. Such wastewater is introduced back into the secondary treatment system on the southside of ASB 1. This is discussed in greater detail in Section 6.8.4 of this manual.

2.0 INTRODUCTION

2.1 PURPOSE

The Wastewater Treatment Standard Operation and Maintenance Manual has been prepared to improve the compliance performance, safety, and productivity of the solid waste landfill and wastewater treatment. A companion document is the Lady Island Landfill Operations and Closure Plan. Together, these materials provide the tools for new employee orientation, cross task training, safety training, and continuous improvement. This document was revised and submitted (per NPDES permit Condition S4.A) to comply with the January 1, 2017 deadline, per the issuance of our new wastewater discharge permit, and has been most recently revised to reflect changes in sampling frequency, and operating parameters in preparation of the upcoming NPDES permit renewal application. It will be revised again whenever warranted by changes in operating equipment or procedures.

2.2 OVERVIEW

This manual is arranged in the natural sequence of wastewater treatment, starting with effluent collection in the mill and ending with the final discharge to the Columbia River. Solids collection, dewatering, and disposal will also be discussed as part of the treatment system.

Paper manufacturing processes utilize water to resuspend pulp and distribute it evenly on the paper machine wire. Much of this water is recycled, but streams remain which are discharged. These must first be treated to preserve the multiple uses of our rivers, lakes, and streams. Wastewater treatment was pioneered at the Camas Mill in 1960 when one of the first treatment basins in the Northwest was installed. Since that time, the system has received regular upgrades and expansions including the installation of primary treatment and sludge dewatering in 1967, secondary treatment Phase I in 1975, secondary treatment Phase II in 1977, primary sludge landfill cells in 1987, 1988 and 1992, and secondary sludge removal in 1989, 1990, 1997, 1999, 2001, and 2005. The company has also spent a great deal of time and money over the years investigating new treatment methods (aeration alternatives, fixed film reactors, hydraulic optimization, system seeding, nutrients, etc.) and surveying the quality of the Columbia River to ensure that the waste treatment systems were operating properly.

2.3 DEFINITIONS

ACUTE TOXICITY – The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AEROBIC – A biochemical process occurring in the presence of molecular oxygen.

ALIQUOT – A portion of a solution.

ANOXIC – An environment in which dissolved oxygen is absent and nitrate is present in sufficient quantities to meet metabolic demands.

AOX – Absorbable organic halide.

ASB – Aerated stabilization basin.

AUTHORIZED INSPECTOR – An authorized inspector in the mill tank integrity program will have at least one of the following qualifications:

- A degree in engineering plus one year of experience in inspection of tanks, pressure vessels, or piping.
- A two-year certificate in engineering or technology from a technical college, and two years of experience in construction, repair, operation or inspection, of which one year must be in inspection of tanks, pressure vessels, or piping.
- The equivalent of a high school education and three years of experience in construction, repair, operation or inspection, of which one year must be in inspection of tanks, pressure vessels, or piping.
- Five years of experience in the inspection of above ground storage tanks in the chemical or pulp and paper industry.

BIOASSAY – A test for evaluating the relative potency of a chemical by measuring its effect on a living organism.

BOD – Biochemical oxygen demand. An empirical test in which standardized laboratory procedures are used to determine the relative oxygen requirements of wastewater, when decomposed by organisms (mainly bacteria). The usual incubation period is five days at 20°C.

BUSINESS AREA - In the current organizational lexicon, a business area is the term used to describe groupings of employees and equipment as related to their product manufacturing roles. Examples at the Camas Mill are as follows:

Business Area	Equipment/Process Role
Consumer Products	No. 11 Paper Machine, Product Converting, Production Planning, Shipping, Unitizing, Product Development, Product Quality
Safety	Clockroom/Dispatch, Health, MERT, Safety
Technical	Environmental, Technical (laboratory, field collection)
Utilities	Process Air, Steam, Dams, Engineering, Maintenance, Solid Waste Disposal, Wastewater Treatment

CAUSTIC – Sodium hydroxide.

CERCLA – The Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986.

CFR – Code of Federal Regulations.

CHAIN OF CUSTODY – Chain of custody is the process that traces the possession and handling of a sample from the time of collection, through analysis, and to final disposition.

CHRONIC TOXICITY – The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's life span or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

CL – Control limit.

CLEAN WATER ACT (CWA) – The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

CLOCKROOM – The location at the Camas Mill which houses the employees who take calls and make notifications pertaining to environmental and safety emergencies.

COD – Chemical oxygen demand. The quantity of dichromate ion ($Cr_2O_7^{-2}$) consumed under the test conditions (heat and acid) expressed in terms of its oxygen equivalence.

CODs – Soluble chemical oxygen demand as defined by filtration with a Whatman 934AH filter paper.

COMPLETELY MIXED FLOW – A condition where no measurable difference in the concentration of a constituent exists across a transect of the fluid.

COMPOSITE SAMPLE – A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

CONDUCTIVITY – Conductivity, k, is a measure of the ability of an aqueous solution to carry an electric current. This ability depends on the presence of ions; on their total concentration, mobility, and valence; and on the temperature of measurement.

DIOXIN – 2,3,7,8 tetrachlorodibenzo-p-dioxin.

DMR – Discharge Monitoring Report. The monthly wastewater permit monitoring report filed with the Washington Department of Ecology.

DMRQA – Discharge Monitoring Report Quality Assurance Program.

DO – Dissolved oxygen.

EPA – U. S. Environmental Protection Agency.

gpd – Gallons per day.

GRAB SAMPLE – A single sample or measurement taken at a specific time or over a short period of time as is feasible.

HDPE – High density polyethylene.

HMIS – The Hazardous Material Identification System (HMIS) is a visual format using colors, numbers, letters, and symbols which communicates risk information to workers. The system addresses health, flammability, and reactivity on a scale of 0 to 4 with zero denoting a negligible risk and four a severe hazard. Personal protective equipment is defined by a letter and/or pictograms. "A," for example, denotes safety glasses.

hp – Horsepower.

hp/MG – Horsepower per million gallons of wastewater under aeration.

HYDROGEN SULFIDE (H_2S) – Hydrogen sulfide is a colorless, flammable gas with an offensive odor reminiscent of rotten eggs. The odor threshold is in the range of 0.5-10 ppb. The gas is heavier than air (specific gravity 1.2, air = 1.0) and slightly soluble in water (one gram will dissolve in 242mL of water). A significant amount of hydrogen sulfide present in the atmosphere is produced naturally from volcanic eruptions, sulfur springs, undersea vents, swamps, stagnant bodies of water, and biological decomposition.

IMMEDIATE PROCESS AREA – The location at the mill where pulping, screening, knotting, pulp washing, pulping liquor concentration, pulping liquor processing, and chemical recovery facilities was located, generally the battery limits of the aforementioned processes. “Immediate process area” included spent pulping liquor storage and spill control tanks located at the mill, whether or not they were located in the immediate process area. This is a legacy term from when a pulp mill operated at the site.

INTENTIONAL DIVERSION – The planned removal of spent pulping liquor, soap, or turpentine from equipment items in spent pulping liquor, soap, or turpentine service by the mill for any purpose including, but not limited to, maintenance, grade changes, or process shutdowns. This is a legacy term from when a pulp mill operated at the site.

MANUFACTURING ENGINEER – Plans production and assists operators in troubleshooting and resolving day-to-day issues.

MERT – Mill Emergency Response Team.

METHYL MERCAPTAN (MeSH) – Methyl mercaptan (CH_4S) is a colorless, flammable gas with a characteristic odor reminiscent of decayed cabbage. The odor threshold is in the range of 2-8 ppb. The gas is lighter than air (specific gravity 0.87, air = 1.0) and slightly soluble in water (2.3g/100mL water). Methyl mercaptan is evolved naturally from mineral deposits, natural gas, petroleum, and biological decomposition. It is also an essential flavor component of several vegetables (especially onion and garlic), nuts, and cheeses.

mg/L – Milligrams per liter (parts per million).

NCASI – National Council for Air and Stream Improvement, Inc.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) – The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

NUTRIENT – Any substance assimilated by living organisms that promotes growth. The term is generally applied to nitrogen and phosphorus in wastewater treatment. At Camas, nitrogen and phosphorus may be supplied in the form of ammonium polyphosphate.

PASSPORT – A computer-based system for maintenance tracking, purchasing, and stores management.

pg/L – Picograms per liter.

pH – The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

PI PROCESSBOOK SYSTEM – Camas mill process database and data historian, used for remote monitoring and controls of equipment and instrumentation.

PLUG FLOW – A fluid flow pattern characterized by complete mixing in the radial direction and no mixing in the axial direction.

POTW – Publicly owned treatment works. At the Camas mill, this refers to the City of Camas' wastewater treatment facilities.

PRIMARY TREATMENT – The first step in most wastewater treatment systems in which materials that will float or settle are removed. At Camas, the majority of the effluent flow is treated with traveling screens followed by a gravity clarifier.

PTM – PTM stands for performance tracking manager. This system allows anyone in the mill to generate a work request. Once approved by the appropriate maintenance personnel, the work request flows into Passport for execution. Access to PTM is as follows: on a mill computer, click Mill home page, Applications, and then PTM.

REPORTABLE QUANTITY – The reportable quantity or RQ is the threshold in pounds for emergency notification under CERCLA and SARA.

SECONDARY TREATMENT – The second step in most wastewater treatment systems in which bacteria consume the organic portion of the solution. It is accomplished by bringing together wastewater, bacteria, nutrients, and oxygen. At Camas, aerated stabilization basins are employed as secondary treatment.

SEDIMENTATION – Letting solids settle out of wastewater by gravity during wastewater treatment.

SIGMA – Sigma or standard deviation is the square root of the population (sample) variance.

SIGNIFICANT SPILL – For the purposes of the engineering analysis and the archived BMP plan, a significant spill was defined as a loss of material that increases the biochemical oxygen demand applied to wastewater treatment by 73,800 lb/day above the historical base load of 22,700 lb/day (2013 July - December average). This is a legacy term from when a pulp mill operated at the site.

SM – "Standard Methods."

SOAP - The product of a reaction between the alkali in kraft pulping liquor and fatty acid portions of the wood which precipitates when water is evaporated from the spent pulping liquor. This is a legacy term from when a pulp mill operated at the site.

SOLID WASTE – All putrescible and nonputrescible and semisolid wastes, including but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

SOLID WASTE HANDLING – The management, storage, collection, transportation, treatment, use, processing or final disposal of solid wastes, including the recovery and recycling of materials from solid wastes, the recovery of energy resources from such wastes or the conversion of the energy in such wastes to more useful forms or combinations thereof.

STANDARD METHODS – “Standard Methods For The Examination of Water and Wastewater”, a publication by the American Public Health Association, American Water Works Association, and Water Environment Federation first published in 1905 and including hundreds of analytical techniques for the determination of water quality.

TSS – Total suspended solids. Total suspended solids are the particulate matter in a wastewater. They can be volatile or nonvolatile. The TSS discharged by an aerated stabilization basin with a long retention time are typically small biological particles such as bacterial cells. Larger particles such as calcium carbonate, clay, fiber, lime mud, and soil settle out in the primary clarifier or in unaerated areas of an ASB near the inlet.

TURPENTINE – Turpentine is a complex mixture of essential oils and terpene compounds such as pinene, camphene, and dipentene. The components vary depending on the source of the wood and the method of preparation. This is a legacy term from when a pulp mill operated at the site.

ug/L – Micrograms per liter (parts per billion).

2.4 REGULATORY CROSS REFERENCE TABLES

Cross Reference Between Requirements of NPDES Permit Number WA0000256 and O&M Manual			
Permit Section Number	**Requirement**	**O&M Manual Section Numbers**	**How Requirement is Met**
S4.A.b.1	O&M Manual must include emergency procedures for plant shutdown and cleanup in the event of a wastewater system upset or failure.	1.5 Below Baseline Operation 1.6 Above Baseline Operation	For each unit process or major piece of equipment, O&M manual describes recommended operational response for upset conditions.
S4.A.b.2	O&M Manual must include a review of system components which if failed could pollute surface water or could impact human health. Provide a procedure for a routine schedule for checking the function of these components.	7.2 High Risk Scenarios	Section lists components that pose a greater risk to the environment due to the possibility of polluting surface waters in the event of equipment failure. Describes inspection schedule and procedures.
S4.A.b.3	O&M Manual must include wastewater system maintenance procedures that contribute to the generation of process wastewater.	1.7 Significant Scheduled Maintenance	Describes maintenance activities (specifically dredging) that contribute to the generation of wastewater.
S4.A.b.4	O&M Manual must include any directions to maintenance staff for cleaning, or maintaining other equipment or performing other tasks which are necessary to protect the operation of the wastewater system (for example, defining maximum allowable discharge rate for draining a tank).	3.0 Effluent Collection Systems 4.0 Primary Treatment 6.0 Secondary Treatment	Each section has subsections listing operating, maintenance, and inspection procedures for components in order to protect operation of wastewater system.

Cross Reference Between Requirements of NPDES Permit Number WA0000256 and O&M Manual			
Permit Section Number	**Requirement**	**O&M Manual Section Numbers**	**How Requirement is Met**
S4.A.b.5	O&M Manual must include wastewater sampling protocols and procedures for compliance with the sampling and reporting requirements in the wastewater discharge permit.	8.1 Wastewater Sample Collection	Wastewater sample collection protocols and procedures listed, rules that are applicable to all sampling are included.
S4.A.b.6	O&M Manual must include minimum staffing adequate to operate and maintain treatment processes and carry out compliance monitoring required by the permit.	1.3 Personnel Requirements	Describes minimum staffing for normal operations and explains that additional maintenance personnel may be needed during major equipment maintenance. Also notes that external contractors perform compliance sampling.
S4.A.b.7	O&M Manual must include treatment plant process control monitoring schedule.	8.2 Wastewater Process Variable Monitoring	Lists normal monitoring frequency for Outfall 001 and Blue Creek
S4.A.b.8	O&M Manual must specify other O&M items on a case-by-case basis such as any pump stations, lagoon maintenance, etc.	Sections 3 - 6	Describes the operations and maintenance requirements associated with each piece of equipment/unit process, item by item
S4.A.c.1	Treatment System Operating Plan must include a baseline operating condition, which describes the operating parameters and procedures, used to meet the effluent limits of S1 at the production levels used in developing these limits.	1.4 Baseline Operation	Discusses key operational parameters, outlines design criteria and current baseline conditions, and compares against accepted design standards

Cross Reference Between Requirements of NPDES Permit Number WA0000256 and O&M Manual			
Permit Section Number	**Requirement**	**O&M Manual Section Numbers**	**How Requirement is Met**
S4.A.c.2	In the event of production rates, which are below the baseline levels used to establish these limits, the Treatment System Operating Plan must describe the operating procedures and conditions needed to maintain design treatment efficiency. The monitoring and reporting must be described in the plan.	1.5 Below Baseline Operation	Describes operating procedures during low solids loading and low flows.
S4.A.c.3	In the event of an upset, due to a plant maintenance activities, severe stormwater events, start ups or shut downs, or other causes, the plan must describe the operating procedures and conditions employed to mitigate the upset. The monitoring and reporting must be described in the plan.	1.6 Above Baseline operations	Lists procedures employed to mitigate upset for each component in the system including operating procedures and conditions employed.
S4.A.c.4	A description of any regularly scheduled maintenance or repair activities at the facility which would affect the volume or character of the wastes discharged to the wastewater treatment system and a plan for monitoring and treating/controlling the discharge of maintenance-related materials (such as cleaners, degreasers, solvents, etc.)	1.7 Significant Scheduled Maintenance	Describes maintenance operations within the mill and within the wastewater system that would impact wastewater treatment operations.

Cross Reference Between Requirements of WAC Section 173-240-150 and O&M Manual			
WAC Subsection Number	**Requirement**	**O&M Manual Section Numbers**	**How Requirement is Met**
2a	The operation and maintenance manual shall include the names and phone number of the responsible individuals.	10.1 Personnel listing and contact information	Lists contact information for Lady Island operations and compliance
2b	The operation and maintenance manual shall include a description of plant type, flow pattern, operation, and efficiency expected.	1.4 Baseline Operation	Discusses key operational parameters, outlines design criteria and current baseline conditions, and compares against accepted design standards
2c	The operation and maintenance manual shall include the principle design criteria.	4.0 Primary Treatment 6.0 Secondary Treatment	Each section provides a table summarizing the principle design criteria, and comparing design standards against the original design parameters against current baseline conditions.
2d	The operation and maintenance manual shall include a process description of each plant unit that includes function, relationship to other plant units, and schematic diagrams.	3.0 Effluent Collection Systems 4.0 Primary Treatment 6.0 Secondary Treatment 10.2 Drawings and Figures	Lists a description of each plant unit that includes function and relationship to other plant units. Appendix includes schematic diagrams.
2e	The operation and maintenance manual shall include an explanation of the operational objectives for the various wastewater parameters such as sludge age, settleability, etc.	4.0 Primary Treatment 6.0 Secondary Treatment	Each section provides a table summarizing the principle design criteria, and comparing design standards against the original design parameters against current baseline conditions. The text in each section

Cross Reference Between Requirements of WAC Section 173-240-150 and O&M Manual			
WAC Subsection Number	**Requirement**	**O&M Manual Section Numbers**	**How Requirement is Met**
			details operational objectives for each part of the treatment process.
2f	The operation and maintenance manual shall include a discussion of the detailed operation of each unit and a description of various controls, recommended settings, fail-safe features, etc.	3.0 Effluent Collection Systems 4.0 Primary Treatment 6.0 Secondary Treatment 10.2 Drawings and Figures	Each section offers a detailed description of how to operate the equipment within that system, including a discussion about controls and instrumentation, upsets and contingency, and other related information.
2g	The operation and maintenance manual shall include a discussion of how the facilities are to be operated during anticipated startups and shutdowns, maintenance procedures, and less than design loading conditions, so as to maintain efficient treatment.	1.5 Below Baseline Operation 1.6 Above Baseline Operation 1.7 Significant Scheduled Maintenance	Each section describes operational measures to be taken during non-routine conditions to maintain treatment efficiency.
2h	The operation and maintenance manual shall include a section on laboratory procedures that includes sampling techniques, monitoring requirements and sample analysis.	8.0 Wastewater Monitoring and Sample Collection	Describes monitoring and sampling requirements and schedule, and notes that
2i	The operation and maintenance manual shall include recordkeeping procedures and sample forms to be used.	3.0 Effluent Collection Systems 4.0 Primary Treatment 5.0 Solids Management	Provides sample forms for daily inspection log sheets, daily and weekly lubrication checklists, and landfill visual inspection checklists. Permit-related recordkeeping requirements are included.

Cross Reference Between Requirements of WAC Section 173-240-150 and O&M Manual			
WAC Subsection Number	**Requirement**	**O&M Manual Section Numbers**	**How Requirement is Met**
		9.0 NPDES Permit	
2j	The operation and maintenance manual shall include a maintenance schedule that incorporates manufacturer's recommendations, preventative maintenance and housekeeping schedules, and special tools and equipment usage.	6.11 Equipment Inventory	Link is provided to intranet listing all of the required information.
2k	The operation and maintenance manual shall include a section on safety.	7.3 Site Safety	Describes safety precautions on Lady Island.
2l	The operation and maintenance manual shall include a section that contains the spare parts inventory, address of local suppliers, equipment warranties, and appropriate equipment catalogues	6.11 Equipment Inventory	Link is provided to intranet listing all of the required information
2m	The operation and maintenance manual shall include emergency plans and procedures.	7.1 Emergencies	Lists plans and procedures for medical emergencies, fires, floods, chemical spills/releases, hunters, trespassers, traffic accident victims, and vandals.

3.0 EFFLUENT COLLECTION SYSTEMS

3.1 OVERVIEW

Process wastewater from the mill is collected in the mill's process sewer system. The mill process sewers are illustrated in Drawing G-38184 (see Section 10.2). Process and stormwater are collected in the sewers at the Camas Business Center (CBC), Halsey repulper (formerly known as secondary fiber repulper), the outside repulper, No. 11 paper machine, the converting operations, the former Kraft pulp mill area, and former wood processing area. It is collected and flows by gravity through a traveling screen to remove coarse debris and then to the main pump station where it is pumped under the Camas Slough to the treatment plant.

Following the shutdown of the Kraft pulp mill in 2018, the mill is no longer subject to 40 CFR 430.03 for best management practices (BMPs) to prevent leaks and spills of spent pulping liquor, soap, and turpentine. No further engineering analyses will be completed as BMP operating targets are no longer required. All compliance parameters will continue to be monitored as required. Risks of exceeding current BOD and TSS limits are greatly reduced due to the excess capacity of the wastewater treatment system, and the nonuse of pulping liquor, soap, and turpentine onsite. However, the excessive capacity of the treatment system has resulted in other operational challenges, including high effluent pH at times. This is discussed in greater detail in later sections.

3.2 FORMER CORROSIVE SEWER

3.2.1 Overview

Wastewater from the Steam Plant Demineralizers was historically collected in the corrosive sewer and flowed by gravity to the secondary treatment system. The sewer system is illustrated in Drawings LO-28436, P-28390, and P-28391 (see Section 10.2). In January 2020, the demineralizer cation discharge (acidic discharge) was rerouted into the process sewer for pH dilution and neutralization and no longer discharges to the corrosive sewer. This system is now referred to as the former corrosive sewer and does not receive any significant routine process flow contributions, but it remains in place for any residual flow. Any water in the line would continue to drain by gravity to Lady Island for treatment.

3.3 MAIN PUMP STATION AND TRAVELING SCREENS

3.3.1 Overview

3.3.1.1 Description

The main pump station is located on the north bank of the Camas Slough. It receives wastewater by gravity from repulping operations, No. 11 paper machine, and the fresh water well field (formerly Outfall 003). The wastewater is coarsely screened and

pumped to Lady Island for primary treatment. The station consists of a roughly 27 feet by 48 feet by 17 feet deep concrete sump equipped with coarse bar screens, two traveling screens, three debris grinders, and three 25,000 gallon/minute (36 MGD) wastewater pumps. The traveling screens employ a custom “low fouling” design which includes fiberglass basket frames, No. 14 wire mesh, 304 stainless steel wire and 0.50 by 0.25-inch slot openings with flattened wire profiles. The design is illustrated in Drawings M-26279 and M-26286 (see Section 10.2). Power is supplied from either of two substations or an emergency diesel generator.

Oxygen can be injected into the pump station discharge at a rate up to about 30 lb/day to prevent nuisance odors at the primary clarifier.

3.3.1.2 Significant Scheduled Maintenance

Scheduled mill maintenance occurs on a routine basis. Examples of regularly scheduled significant maintenance items include the annual mill outage (a 1 – 2 week event in the spring or fall), and paper machine cleanups. Outages could increase the organic load on the treatment system. This is discussed in Section 6.10.2 (“High BOD”). Paper machine cleanups could affect pH (see Section 6.10.4). Paper machines typically run continuously with water wash-ups and occasional “boil outs”. The chemicals in question are permitted in food grade packaging pursuant to 21 CFR 176. The specific chemicals, dosage rates, and annual consumptions are considered to be confidential business information. When maintenance is required to take the effluent pumps and/or sump out of service for any reason, a temporary bypass can be implemented by routing the mill effluent to the corrosive sewer.

3.3.2 Operating Procedures

During normal operation, the traveling screens are operated based on load and can be operated individually or in parallel. The screens can be isolated for maintenance. Screen movement and cleaning are facilitated by differential head across the screen. For example, at 0 inch of head differential, the screen is stopped, and wastewater just passes through the mesh baskets to the wastewater pumps. As the screen becomes clogged with debris, the differential builds. At a 5-inch differential, the screen begins moving slowly and the cleaning process begins (debris is backwashed off the screen, ground up, and returned to the station inlet). At a 10-inch differential, the screen movement switches to fast. A high alarm sounds at the screen and the Steam Plant Control Room when the differential reaches 24 inches of water head.

The three wastewater pumps are operated according to the liquid level in the sump. The following schedule is applied using automatic level indication:

Sump Liquid Level: 3 ft. All pumps off.

7 ft. One pump on (primary), normal operation.

8 ft. Low sump level alarm.

9 ft. Two pumps on.

10 ft. Three pumps on.

11 ft. High level alarm.

12 ft. Overflow to the Camas Slough.

To prevent undue wear on any one pump, the primary pump (as above) is periodically rotated by the operators among the three pumps. Operation, lubrication, and maintenance of the main pump station are the responsibility of Utilities.

START-UP

Before starting the system, check the following:

1. Check the settled water supply to the showers for the traveling screens and gland packing on the effluent pumps. If the settled water system has been down (i.e., during the annual mill shutdown), call the Lady Island operator or Steam Plant to check availability.

2. Check the instrumentation air supply by reading the pressure gauge. Trace the airlines to all the control instrumentation to be sure that all supply air valves are open. Drain the oil/water separators as necessary.

NORMAL OPERATION

Selector Switch Positions (Located in the operator shack.)

1. Set all three trash grinders to "AUTO" position.

2. Set both traveling water screens to "AUTO" position.

3. Set one screen to manual "slow".

4. Set other screen to "auto". (During freezing weather, both screens are set on "manual" slow.)

5. Set effluent pump control to "AUTO" position with primary pump selector switch set to the desired pump combination.

Operation Sequence

1. The primary pumps selected will run continuously with the following exceptions:

   - The standby pump will start at high level (10' 0") and stop at normal level (8' 5"). Note that overflow to the slough occurs at 12' 0". Overflows must be reported to the Clockroom immediately (call Ext. 5555).

- One of the two primary pumps stops at low level (8’0”) and restarts automatically at 10’9”.

2. The screen will start on slow speed at a 5-inch differential across the screen.

3. The screen switches from slow to fast speed at a 10-inch differential across the screen.

4. The screen switches back to slow speed when the differential decreases to 6 inches across the screen.

5. The screen stops when the differential decreases to 2 inches across the screen.

6. All grinders start when either screen starts and all grinders stop when both screens stop.

7. The spray wash pump starts and the valve opens when the respective screen starts. The pump stops and the valve closes when the respective screen stops.

SHUTDOWN

Note: This system can only be shut down after the mill sewer system is dry. The only time that this system may be down is during a total mill outage.

Shutdown Sequence

1. Place the three selector switches for the trash grinders in “MANUAL” and “STOP”.

2. Place the selector switches for the traveling screens in “MANUAL” and “STOP”.

3. Set the effluent pump control to “MANUAL” and “STOP”.

4. Isolate the settled water to the station by closing the valves on the inlets of the two screen spray wash pumps.

5. Isolate the air supply to the station by closing the hand valve in the air supply line located just north of the west screen spray wash pump.

3.3.3 Alarms and Instruments

ALARMS

Effluent PLC Failure

Refer to the section in this write-up on operation if the PLC fails; have the electricians

correct the problem by entering an emergency work request in PTM.

Hi Differential Across the Screen

A differential of at least 24 inches has occurred across either screen. The system should clear itself, but equipment should be monitored for damage.

Overflow to Slough

Wastewater is overflowing to the slough. Call the Clockroom (ext. 5555) to implement the emergency response plan. Check the equipment to verify that it is operating properly.

Effluent Grinder Down

One or more of the grinders has jammed. The grinders need to be locked out, cleared, and restarted.

Low Level Pump Sump

The sump level is at elevation 9'0". Also, one of the two primary pumps running may soon shut down. The pump should automatically restart at elevation 10'9". The operator should check the screens for proper operation and clear the stationary overflow screen.

Plugged Effluent Screen

The elevation upstream of one or both screens is 11'0" or more. The operator should check the screens for proper operation and make sure that the stationary overflow screen is clear.

Low Pressure Spray Water

The screen(s) will not operate properly or clean themselves if the water pressure is not adequate. Check the spray water pump operation.

Screen Shear Pin Failure

The screen shear pin has failed. Enter an emergency work request in PTM.

High Level Standby Pump Running

The sump elevation is at 11'0" and the standby pump is running.

No. 1 Effluent Pump is Down

The pump is not running.

No. 2 Effluent Pump is Down

The pump is not running.

No. 3 Effluent Pump is Down

The pump is not running.

INSTRUMENT CALIBRATION

Objective:

To be able to calibrate and maintain the control equipment without overflows to the Camas slough.

Safety Considerations:

Special care must be taken when working around the traveling screens. The walkway surfaces are frequently slippery. Normal personal protective equipment (safety glasses, safety shoes, etc.) is required.

Procedure:

Written Description

1. Review the main pump station control drawings (see Drawing LD-89007, etc.)

2. Notify the Utilities team leader that an operator's presence is required for the time period that it takes to complete the task. The operator should monitor the sump level and start or stop a pump, as necessary, to maintain the sump level as close to normal as possible.

3. Put each pump control to manual.

4. Put both traveling screens to manual control.

5. Foxboro Model 40: Adjust manual pressure regulator pressure to match auto pressure output. If both auto and manual control pressures are the same when the controller is switched to manual, the change will be bumpless.

6. Put Foxboro Model 40 level controller to manual (this will freeze the valve position in its current position).

Checklist:

1)_____ Have the operator on site.

2)_____ Put the pump controls to manual.

3)_____ Put the traveling screen control to manual.

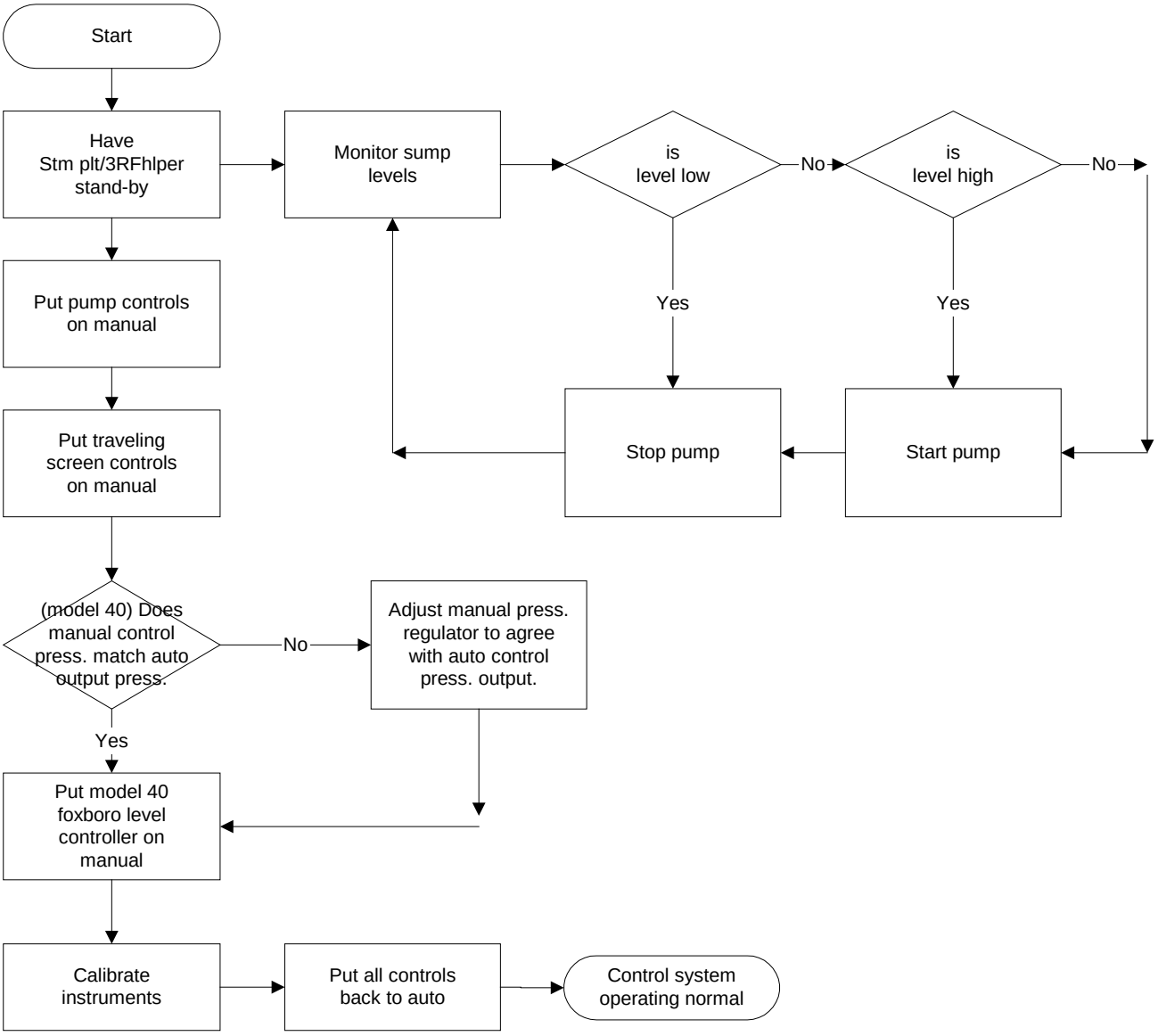
4)_____ Adjust the level control valve manual pressure regulator to match auto pressure output.

5)_____ Put the Foxboro Model 40 level controller in manual.

TROUBLESHOOTING:

Problem	Possible Cause	Verification/Corrective Action
Cannot lower sump level or sump level increasing.	1. All pumps are not running. 2. Recirculation valve is partially or fully open.	Switch pumps to manual and start all pumps. Visually check valve position. If open, manually adjust controller to close valve. If unsuccessful, switch operation all back to auto and file an emergency work request in PTM.
Bubble tube plugged.	Bottom of the tube may be plugged with debris.	File an emergency work request in PTM and use the SOP.
Broken tubing to bubble pipe.	Excess movement caused from vibration or impact damage.	Same as above.
Instrument air line freeze up.	Water in the air supply.	Same as above.
PLC down.	Malfunction in PLC.	The electrician will put the power supply switch in manual.
Power supply interrupted and backup power did not engage.	PLC failure.	Same as above or on/off selector switch is in off rather than in the auto.

SOP
EFFLUENT PUMP STATION
INSTRUMENT CALIBRATION



3.3.4 Maintenance

Utilities operating personnel (steam power ladder) are responsible for periodic equipment monitoring at the Main Effluent Pump Station. This includes minor maintenance and minor lubrication. Upset condition alarms are also monitored and responded to by personnel on this ladder. Maintenance personnel have a regular schedule of preventative maintenance for this equipment.

EQUIPMENT	MAINTENANCE PERFORMED	PERSONNEL ASSIGNED	FREQUENCY	FOLLOW-UP BY
Effluent Pumps	Inspection	Maintenance	Once/Month	Mechanical Leader
Effluent Pump Motors	Inspection	Maintenance	Once/Quarter	E & I Leader
Effluent Traveling Screens	Adjust and Inspect	Maintenance	Once/Quarter	Mechanical Leader
Effluent Traveling Screen Electrical	Preventative Maintenance on Starters	Maintenance	Annually	E & I Leader
Effluent Trash Grinders	Ship One Out for Overhaul	Maintenance	Twice/Year	Mechanical Leader
Effluent System Backup Power	Check Function	Maintenance	Once/Quarter	E & I Leader
Effluent system Main Power	Check Function	Maintenance	Once/Quarter	E & I Leader
Effluent System Instrumentation	Check Function and Levels	Maintenance	Bimonthly	E & I Leader
Lubrication	Lube	Maintenance	Once/Month	Mechanical Leader

3.3.5 Power

Electrical power is supplied to the effluent pump station from either of two substations (Substation No. 9 or Substation No. 10) through independent transmission lines across the Columbia River. If power from one substation were interrupted, the programmable logic controller (PLC) would automatically switch to the other substation. If both power sources failed, a standby diesel generator would be activated to operate the pump station and prevent untreated wastewater discharges to the Camas Slough. The power switching and emergency generator capabilities are tested monthly according to the following procedures:

EMERGENCY DIESEL GENERATOR TEST PROCEDURE

1. Safety note—Hearing protection is required for this test.

2. Call the Steam Plant at telephone Ext. 343451 and inform them of the test.

3. At the diesel control panel, rotate the control switch from “AUTO” to “OFF/RESET.” Acknowledge the “SYSTEM NOT IN AUTO” alarm on the control panel.

4. Observe that the air inlet and outlet louvers start to open.

5. Rotate the control switch counterclockwise to the “MANUAL START” position. The diesel engine will start. Observe the generator output voltage and frequency indication on the control panel. Adjust the generator voltage to 580 volts and the frequency to 60.0 Hertz.

6. Run the diesel for 20 minutes and then rotate the control switch clockwise to the “COOL DOWN/STOP” position. This will initiate the cool-down mode for the diesel engine. The diesel will automatically stop after the cool-down cycle is completed. This will take 5-30 minutes depending upon the diesel temperature.

7. When the diesel engine stops or 30 minutes of cool-down time has expired, rotate control switch clockwise to the “OFF/REST” position (the diesel will stop if it was still running) and then to the “AUTO” position. Observe that the “SYSTEM NOT IN AUTO” alarm light goes off. Observe that the inlet and outlet air louvers start to close. Note that the louvers close very slowly, so give them time to move.

8. Check the diesel battery charger located on the east wall. Observe that charger output voltage is 26-28 volts.

9. Call the Steam Plant to inform them the diesel start test is completed.

POWER AUTOMATIC TRANSFER TEST PROCEDURE

1. Call the Steam Plant at telephone Ext. 343451 and inform them of the test.

2. Check that selector switches on US-EPS-1, DS-1, and DS-2 are in the “PLC” mode. The switches must be in the “PLC” mode for the automatic transfer between the 7200-volt sources to work.

3. At the Panelmate, call up the “7200 VOLT” page and verify that the “PRIMARY and ALT” selections match the actual field conditions, i.e., if No. 9 is the “PRIMARY” and No. 10 is the “ALT,” then DS-2 should be closed (red light) and DS-1 should be open (green light). Make sure the “POWER AVAILABLE” indication or both sources of 7200-volt power is on.

4. At the Panelmate, call up the “SUMP” page and verify that the controller LIC 89007A is in auto. Enter a new set point of 7.5 feet.

5. At the Panelmate, call up the “PUMP” and the “GRINDERS” page and verify that everything is in auto. Note the pump priority selection.

6. When the sump level reaches 7.5 feet, go to the “PRIMARY” 7200-volt source and turn the selector switch from “PLC” mode to “OFF,” The “PRIMARY” contactor will drop out and the lights will go out. About 10 seconds later, the “ALT” contactor will close. If this transfer does not occur, put the selector switch on the “ALT” unit to “HAND” mode and push the start button. The contactor will then close.

7. Call up the “OVERVIEW” page. Observe that at least one pump comes on. The traveling screens will start when the differential reaches 5.0. The grinders will start as a function of the screens starting.

8. On the “PRIMARY” unit, note that the contactor is open (green light) and then open the isolation switch to remove the 7200-volt power to unit. This simulates the loss of 7200-volt power and tests the 7200-volt power sensor in the unit. At the Panelmate, go to “7200 VOLT” page and note that the indicator for power stable for “PRIMARY” unit is off. Close the isolation switch and turn the selector switch from “OFF’ to “PLC.” After two minutes, the power stable indicator for “PRIMARY” will come on, the “ALT” contactor will drop out, the lights will go out, and 10 seconds later, the “PRIMARY” contactor will close.

9. Call up the “OVERVIEW” page. Observe that at least one pump comes on. The screen will start when the differential reaches 5.0. The grinders will start as a function of the screen starting.

10. At the Panelmate, go to the “SUMP” page and change the controller LIC 89007A to 8.5 feet.

11. Manually start the room air purification unit. It is located outside the north entrance door.

12. Call the Steam Plant to inform then that the automatic transfer test is completed.

3.3.6 Upset/Contingency

COLD WEATHER OPERATION

Cold weather operation is the same as normal operation with the following exceptions:

Selector Switch Positions

1. Set both screens in manual position, slow speed.

Operation Sequence

1. The screen will run continuously at slow speed.

2. The screen will switch from slow speed to fast speed at a 10-inch differential across

the screen.

3. The screen will switch from fast to slow speed when the differential decreases to 6 inches across the screen.

OPERATION IF PLC FAILS

Selector Switch Positions

1. Set all three grinders to the manual position and use “START/STOP” buttons to operate as desired.

2. Set both traveling water screens to manual position and place “SLOW/FAST” selector in either the “SLOW” or “FAST” position as desired for operation.

3. Set the effluent pumps to manual position and use the “START/STOP” push buttons to operate as desired.

Operation Sequence

1. The recirculation valve will operate based on the level in the sump, but no other controls will be available.

2. The grinders will operate, but will trip if they jam.

3. The traveling water screens will operate in the position selected, but will not change speeds when the differential changes.

4. Pumps will operate as selected, but will not cycle on and off as the level in the sump changes.

3.4 BLUE CREEK

Blue Creek is permitted as Outfall 002 and receives Clear Well overflow (well water prior to being introduced to the mill), stormwater runoff from the City of Camas, stormwater runoff from the CBC, and historically received the residual flow from Lacamas and Round Lakes. In 2018, the Lacamas and Round Lake Dams and the Mill Ditch were donated to the City of Camas. As such, flow is no longer directed into the Mill Ditch from Lacamas and Round Lake, and the Mill Ditch collects only minor seepage and precipitation flows. The combined stream (including Whiskey Creek) flows by gravity under the mill proper and into the Camas Slough. Stream flow volume and pH are monitored continuously.

3.4.1 Alarms and Instrumentation

3.4.1.1 Flow Meter

Stream flow is measured using a Palmer-Bowlus flume (see Drawing LD-89001 in Section 10.2) that is located in the Blue Creek pipeline just west of the former K5 Multistage Bleach Tower. Liquid elevations in the flume are determined by an ultrasonic level indicator. The system is checked on a monthly basis for any required preventative maintenance items by a reoccurring work order. The calibration is verified annually by independent auditors.

3.4.1.2 pH Meter

The Blue Creek pH meter is located on the south side of the tunnel just as the creek emerges from under the railroad tracks. Instrument Technicians can obtain water samples at this location for calibration. The signal from the pH probe is fed to the shared display instrumentation system within the mill. The alarms (pH less than 6.0 or greater than 9.0) are monitored in the Steam Plant Control Room. If the upper or lower limit is reached, the emergency notification system is placed into motion by calling 5555.

Calibration Procedure

1. Pull the electrode assembly out of Blue Creek.

2. Using certified buffer solutions of pH 4.0 and 10.0. Use distilled water to clean the electrodes between the test.

    a. Insert the electrode into the pH 4.0 buffer and standardize the pH meter to read 4.0 pH. All instruments in the loop must reach 4.00 pH. This would include the chart recorder, computer system, and the local instrument (see Drawing LD-89009 in Section 10.2). If this is not true, then you will need to go to the vendor's manual and do the instrument calibration procedure.

    b. Clean the electrode with the distilled water.

    c. After the electrode has been cleaned, you will place the electrode into the 10.0 pH buffer solution. After it has stabilized you will need to standardize the upper range to reach 10.0 pH. As before, you will need to make sure all instruments in the loop read the same. If not, then you will need to recalibrate as per the vendor's manual.

    d. Rinse the electrodes off and reinsert them into Blue Creek. After the system has become stable, you will need to get a water sample from the creek. Take the sample to the certified lab test instrument and test the sample. Note the reading and standardize the Blue Creek pH meter so it reads the same as the lab test. This must be within + or - 0.1 pH units.

3. After the unit is checked and calibrated, log the information in the Passport (maintenance computer) system under the equipment number. Let Environmental know you are done and that the instrument is back online.

4. This procedure should take about four hours to complete.

3.4.2 Upset/Contingency

When the pH alarms on the Steam Plant Honeywell TDC, the Clockroom should be notified (Ext. 5555). The problem source must be investigated and corrected. The Team Leader is responsible for leading the investigation. Inspection on the north side of the mill should be done at the following locations:

- South of former K5 bleach plant (manhole).

- Inside former K5 building (concrete cover).

- North of the former pulp mill in the creek by parking lot. (This will determine if the problem is coming from Blue Creek or Whiskey Creek.)

- Whiskey Creek (manhole).

Inspection in the Steam Plant area and the south side of the mill should be done at the following locations:

- "Scott's Hole" manhole (west one). (This will determine if the problem is coming from the Steam Plant area.)

- North of Will Sheeter No. 1 at the Blue Creek sample station.

3.5 SANITARY SEWER

All sanitary sewage at the Camas Mill is pumped to the City of Camas POTW. Lift station and pipeline locations (subject to verification) are illustrated in Drawing LO-23020 (see Section 10.2). The sanitary sewer system is not expected to be impacted due to the 2018 pulp mill shutdown. The following sections describe the remote collection sumps located throughout the mill.

3.5.1 Old Office Building

Maintenance manages and maintains the sanitary systems for both the old and new office building complexes including periodic inspections and lubrication. They will respond to any problems (pump failures, flooding, etc.) with the system. The pumps for the old office building are located in the bushing storage area under the railcar trestle just outside and east of the machine shop. They service the old storeroom, the

machine shop locker room, and the old office building. There are two pumps with above ground motors which receive their power from a single electrical source. These pumps have level controls with no alarms. If a failure occurs in this system, the sump will overflow to the mill process sewer.

3.5.2 New Office Building

Sewage pumps for this area are located in the southwest corner of the main locker room under the front office building. They service the rest rooms, the locker room showers, and the toilets in the front office building. There are two pumps with above ground motors which obtain their power from two power sources. They have level controls with audible alarms. If a failure occurs in this system, the sumps will overflow to the mill process sewer system. An audible alarm would sound, and maintenance personnel would be alerted.

3.5.3 North Mill

Mill sewer collection stations north of the railroad tracks are collected in sumps that are monitored and maintained by personnel in the area where they are located. The sumps are pumped into a system that eventually flows to the main sanitary sewer collection sump located near the tailrace south of the No. 11 Paper Machine Building. The sump has alarms and, upon failure, overflows to the alleyway and tailrace which then flows to the mill wastewater collection system. This equipment is maintained by Maintenance personnel.

3.5.4 South Mill

Mill sewer collection stations in the south part of the mill pump to a collection system that flows, by gravity, east to the City of Camas collection station on 3rd Avenue east of the South (or Converting) Gate. All systems are monitored and maintained by Maintenance personnel.

No. 20 Paper Machine -- Sewage from the former No. 20 Paper Machine area drains to a lift station with two pumps located adjacent to maintenance locker rooms in the basement. Level alarms are located in the basement alley way and on the No. 20 Paper Machine TDC control panels. The system collects wastes from four dry end rest rooms, the maintenance lunchroom, two janitorial rooms, the dry end rest room, and the dry end control room fixtures, and pumps into a gravity drain line out the east end of the building. The drain line at this point (downstream from the lift station) also picks up the wet end locker room, control room, and rest room. An overflow would drain to the trench drain in basement alley way, and then to the mill process sewer.

No. 5 Paper Machine – Sewage from the former No 5 Paper Machine area is collected by a collection sump located in the west end of the basement which has two pumps and controls. The system has high a level alarm and overflow alarms located near the dry end pulper operator's enclosure. A failure of this system would result in flooding of

the basement. The overflow to Blue Creek has been plugged.

Will Sheeter No.1/No. 3 Finishing – The Will I Sheeter No.1/No. 3 Finishing process equipment has been shut down, but an active collection sump is located outside at the southwest corner of the building and has two lift pumps. The sump collects sewage from locker rooms, rest rooms on the mezzanine of the old No. 15/16 Paper Machine Building. A level float switch controls the operation of the two pumps. The system would flood the adjacent paved area if the pumps failed.

Will Sheeter No. 2 -- Wastewater from the restroom and lunchroom in the shut down Will Sheeter No. 2 area drain by gravity to the north side of building, then west and north to an 8-inch sanitary sewer line at S. E. 3rd Avenue and Adams Streets.

Additives -- The rest room in the basement of the old No. 16 Paper Machine Building flows east by gravity and connects to an existing sewer in the converting building.

Dock Warehouse, Wood Processing, Lady Island – Residual wastewater from the Dock Warehouse and Wood Processing areas drain by gravity to underground holding tanks. These holding tanks have level indicators with limit switches which will periodically pump the contents of the tank (when the material in the tanks reaches specified levels) to the mill's sanitary sewer system, then out to the City of Camas' municipal wastewater treatment plant. Wastewater from the Lady Island restroom, and control room are collected and managed through a septic system located on Lady Island.

3.6 MISCELLANEOUS COLLECTION

3.6.1 Camas Business Center

The Camas Business Center area transmits collected industrial stormwater runoff to the mill's treatment system. Additional areas of non-industrial stormwater at the Camas Business Center are collected and routed to Blue Creek for discharge to Outfall 002. The main process sewer gravity line at the Camas Business Center property flows along the western edge of Blue Creek and joins the tailrace sewer just south of NW 6th Avenue. The Camas Business Center property was abandoned in January 2020 and is scheduled to be demolished. Since these activities present an insignificant load, this sewer segment contains no controls or alarms.

3.6.2 Halsey Repulper

The Halsey Repulper (formerly known as the secondary fiber repulper) is located at the corner of NE 6th Avenue and NE Adams Street, and transmits collected stormwater runoff and process wastewater from repulping operations to the mill's treatment system. The wastewater line runs underneath NE 6th Avenue to the main mill site. The repulper has level alarms to alert the operator of upset conditions to prevent an overflow of wastewater from the process sewer system.

3.6.3 South Roadway Stormwater

Following a routine wastewater inspection by WDOE, two stormwater catch basins were identified near the south roadway guard shack that appeared to drain into the wooded area owned by Georgia-Pacific to the south. Stormwater contributions to these basins were observed to be from the paved roadway and empty trailer staging areas above the roadway. Stormwater from this area was reviewed and classified as industrial stormwater. The mill developed a project to capture stormwater from this area into the process sewer and began implementation on April 14, 2020. The target date for completion and commissioning of the project is September 30, 2020. Updates will be provided to Ecology upon completion.

3.6.4 Sand Trap Backwash

The deep wells which supply groundwater for mill operations, are located to the East of the mill, near the corner of SE Everett Street, and SE 4th Ave. Prior to use, the water from the wells pass through one of two sand filters, which work to remove sediment from the well water before it is utilized in the mill process. The sand filters are back-flushed approximately once per week to avoid fouling of the filter media. The water from the weekly backflush flows back to the effluent pump station for treatment on Lady Island.

3.6.5 Dangerous Waste Handling Area

The dangerous waste handling area (DWHA) sump is under the control of Communication Papers. This sump is a simple concrete box with a pump which transfers yard runoff and groundwater seepage to the K-7 sewer. A backup gas driven pump is available in the event of primary pump failure. An audible and visual alarm displays at the DWHA. If the alarm is activated, crews are instructed to call the Clockroom at telephone extension 5555.

3.6.5.1 Operating & Maintenance Procedures

It is recommended to check the pump once per day (weekdays) by the DWHA operator for correct operation and is lubricated once per month.

3.6.6 Dock Warehouse Collection

The dock warehouse includes the sump at the east end of the basement and a collection tank at the west end of the basement. A sump is located at the foot of the ramp leading into the dock basement (east wall) and collects stormwater runoff from the surrounding paved areas. The sump includes two electric pumps operated on a level control and one manually started gasoline backup pump. See Drawing LD-96001 and LD-96002 for details. The system alarms at high level in the Clockroom. Additional curbing has been installed in the vicinity of the pump to increase the collection volume capacity of the sump. Curbing has also been installed along the south wall of the Dock Warehouse as an additional measure of containment. A failure

of this system would result in flooding of the dock basement and potential discharge to the Camas Slough.

An 11,300-gallon capacity tank is located at the west end of the basement and collects stormwater runoff from the dock roof, the PECO dock area, and a catch basin at the northwest corner of the dock warehouse. The tank includes two electric pumps operated on a level control. See Drawing LD-96003 for details. The system has high level and system trouble alarms that are broadcast to the Clockroom. A failure of this system would result in flooding of the dock basement and potential seepage to the Camas Slough.

3.6.7 Lady Island Landfill Leachate Collection

Leachate from the Lady Island landfill is collected in 4-inch, slotted PVC pipelines placed at 50-foot intervals along the bottom of the landfill cells. These lines are solid when they pass through the berm and drain into one of three pump stations. Cleanouts are located on each line at the outer slope of the berm. From the pump stations leachate is pumped to secondary treatment through two separate 6-inch PVC lines (one line for the north and south pump stations and one line for the east pump station) that discharge to the HDPE pipelines (new 1999) just north of State Highway 14.

Each pump station has two Flygt-brand pumps, a control panel, and four Flygt-brand level sensors. The north pump station has a potential flow capacity of 110 gallons per minute (gpm), the south a capacity of 216 gpm, and the east a capacity of 313 gpm. A hand-off-auto switch, a run time meter, and a run light for each pump are located inside the control panel box. A high sump level alarm light is installed outside of each control box. There is also a high level alarm in the building to the west of the primary clarifier. Each pump station has four Flygt-10 level sensors to monitor/control the following:

1. Low level. All pumps off.
2. Increasing level. First pump on.
3. Increasing level. First and second pumps on.
4. High level alarm.

The pump system functions automatically and does not require continuous operator attention. The pump stations should, however, be checked weekly (as part of routine landfill inspections) for proper operation. Please note that rain falling on the landfill will eventually become leachate. Increased flow in response to a storm event may not be apparent until several days after the onset of rain.

Routine analyses have demonstrated that the pump station sumps and the leachate piping can accumulate high concentrations of methane or other gases. Before entering a sump for inspection, maintenance, or any other purpose a safe work permit must be obtained. In addition, the atmosphere in the sump must be checked for the presence of combustible gases and oxygen. It is likely that the sumps will have to be ventilated before

entry. Under no circumstances will an employee enter a leachate sump or enclosed space without following all the steps on the safe work permit including having the equipment and manpower necessary for rescue. The leachate sumps will be padlocked shut except during inspection, sampling, or maintenance periods.

3.6.8 Tailrace

The Tailrace is a portion of the main wastewater sewer that runs in a southeasterly direction from NW 6th Avenue to the effluent pump station. It is of open concrete channel design and carries wastewater from the Camas Business Center, repulpers, shutdown pulp mill washing and screening areas, and the paper machine. Detailed sewer maps are provided in Drawing G-38184. Just north of the Central Additives area is a tailrace sump equipped with a 12.5-foot wide vertical bar screen (bars on 3.5-inch centers). Utilities operators are required to check and manually clean (if necessary) this screen at least once per 8-hour shift to avoid flooding the tailrace. As required, a contractor removes accumulated debris from this sewer opening. A larger scale cleaning project is typically completed during each dry-sewer mill outage. On the southwest corner of the tailrace sump is a 4-foot wide wooden gate that connects this sewer to Blue Creek. Under normal operating conditions, the gate is to remain closed and tagged with a “Do Not Operate” warning.

3.6.9 Will II and Unitizer Buildings

Stormwater runoff from Will II and the surrounding pavement area drains to a sump pit adjacent to the northwest manhole. Two pumps convey the runoff through a 12-inch line which is connected to the process sewer and flows by gravity to the effluent pumping station.

Similarly, at the Unitizer Building, a sump pit on the west side of the building collects runoff from the building and surrounding paved area, including stormwater from the roadways in the old “City Shops” area (which were previously connected into a City of Camas stormwater sewer). Two pumps convey the runoff to a manhole on the south side of SE 3rd Avenue. This manhole is connected to the process sewer and flows by gravity to the effluent pumping station.

Both of these systems have backup emergency engines. These engines are both 57.5 HP and will turn on if the pumps ever lose electrical power (i.e., due to a power outage). They are typically tested weekly to ensure reliability.

3.7 WOOD PROCESSING

3.7.1 Collection System

Four separate collection sumps (see Drawing LO-38236) are located throughout the fiber receiving and storage areas described below. The pumps in each of these areas are visually inspected weekly by mill personnel and annually by maintenance personnel. Weekly inspections are logged and include confirmations that the pumps and all associated components are in good working condition and functioning properly. Inspections include checks for bearing noise and that pump switches are working. If problems are encountered, file a work request in PTM. Two back up portable pumps are available for use should a failure occur. The weekly inspection is either recorded on the inspection sheet below, or in an electronic format. The weekly inspection reports are submitted to the Environmental Department and kept in the Environmental Files.

3.7.1.1 Fir Sump

The fir sump is located southwest of the chip screen room at the eastern edge of the fir chip pile (see Drawing LO-38236). Additionally, water that is collected from the former north woodyard area is pumped to the fir sump. Stormwater and groundwater are pumped from this location to the Wood Yard Sump. If the fir sump pump fails, water pools in this area (the overflow to the Camas Slough has been plugged). In this situation, temporary pumps may be used to pump storm and ground water to the Wood Yard Sump.

Operating & Maintenance Procedures

a) Weekly inspection by the Mill Emergency Response Team (MERT).

b) Annual inspection by maintenance personnel (Equipment No. 0312-1200, located at the entrance of the turn table tunnel on the west side of the discharge conveyor).

3.7.1.2 Rail Unloader Sump

Groundwater and seepage are collected from the pit area below the rail transfer conveyors (see Drawing LO-38236). This water is pumped to the Wood Yard Sump. A pump failure here results in flooding of the chip conveyor.

Operating & Maintenance Procedures

c) Weekly inspection by the Mill Emergency Response Team (MERT).

a) Annual inspection by maintenance personnel (Equipment No. 0308-0275, located in the northwest corner of the rail dump pit).

3.7.1.3 Truck Tipper Sump

Groundwater from the Chip Screen Room west to the Rail Car Unloader and stormwater in the western portion of the Wood Processing area flows to the Truck Tipper Sump. From there it is pumped to the Wood Yard Sump (please see Drawing LO-38236). A pump failure at this location would result in flooding of the Truck Tipper equipment vault.

Operating & Maintenance Procedures

d) Weekly inspection by the Mill Emergency Response Team (MERT).

a) Annual inspection by maintenance personnel.

3.7.1.4 Wood Yard Sump

Historically, the majority of wood processing wastewater was generated by cleaning and debarking logs before chipping them in the Woodmill. This portion of the Woodmill was shut down in 1993 and demolished in 2003. In 2018, the mill switched to a purchased pulp feed and stopped receiving all raw wood material. Currently, wastewater from this area consists of groundwater and stormwater. They flow by gravity or are pumped from satellite collection sumps to the Wood Yard Sump. This sump is approximately 17 feet deep (see Drawing LO-38236). Two Flygt 1250 gallon/minute submersible pumps (No. 1 East and No. 2 West) pump this water through a 10-inch line to the K-7 sewer just southeast of the Dangerous Waste Handling Area (Chemical Waste Storage). The Wood Yard Sump pumps operate intermittently based on level control and are provided with backup power from the Wood Yard Generator (see Drawings E-37279 and E-33861). A failure of the Wood Yard Sump pumps would flood the sump and then the paved areas surrounding the truck tipper.

3.7.1.4.1 Operating Procedures

The mill emergency response team (MERT) inspects the sump area once a week. The No. 1 Pump and the No. 2 Pump are both set in “Auto” mode. If the No. 1 Pump fails or the levels rises, the No. 2 Pump will automatically activate. When the weekly inspection is performed, any pump malfunction or failure will be documented and reported to Operations or Utilities. File an emergency work request in PTM.

3.7.1.4.2 Alarms and Instrumentation

A level indicator is installed in the Wood Yard Sump. At an elevation of 10 feet, the high-level indicator operates a local light and alarms in the Clockroom. Since the overflow to the Camas Slough has been plugged, excessive flow will flood the paved areas to the north and west of the sump. Additional details are provided in Drawings LD-10014 and LD-10016.

3.7.1.4.3 Maintenance

The pumps and associated equipment are inspected/repaired by maintenance personnel annually. Complete a work request in PTM for any repairs or replacement equipment.

3.7.1.4.4 Power

Electrical power is supplied to the Wood Yard Sump Pumps and associated control system from MCC WY-1, which has two sources of electrical power. The normal source is the 600V Unit substation US-WY-1 and the alternate source is a standby 250KW diesel generator set. US-WY-1 and the standby diesel generator set are both located in the Wood Processing electrical room near the grit sump pump system. If power from US WY-1 is interrupted, an automatic transfer switch, ATS WY-1, will start the standby diesel and transfer electrical supply power for MCC WY-1 over to the diesel generator. See Drawings E-37279 and E-33861 for additional details. The emergency generator capabilities are tested monthly according to the following procedure:

EMERGENCY DIESEL GENERATOR TEST PROCEDURE

1. Safety note—Hearing protection is required for this test.

2. Call the chip screening plant at telephone Ext. 3231 and inform them of the test.

3. At ATS WY-1, verify that the LED screen indicates electrical power for MCC WY-1 is from normal source(Source 1).

4. At the diesel control panel, rotate the control switch from “AUTO” to “OFF/RESET.” Acknowledge the “SYSTEM NOT IN AUTO” alarm on the control panel. At the diesel control panel, record the diesel run time hour meter value.

5. Rotate the control switch counterclockwise to the “MANUAL START” position. The diesel engine will start. Observe the generator output voltage and frequency indication on the control panel. Adjust the generator voltage to 580-585 volts and the frequency to 60.0 Hertz. Observe that the inlet and outlet air dampers open. At ATS WY-1, observe that the alternative source (Source 2) LED indicates source 2 power is available. Observe that the yellow beacon on the North outside wall of the wood yard electric building is on indicating that the diesel generator is running.

6. Run the diesel for 20 minutes and then rotate the control switch clockwise to the “COOL DOWN/STOP” position. This will initiate the cool-down mode for the diesel engine. The diesel will automatically stop after the cool-down cycle is completed. This will take 5-30 minutes depending upon the diesel temperature.

7. When the diesel engine stops or 30 minutes of cool-down time has expired, rotate control switch clockwise to the “OFF/REST” position (the diesel will stop if it was

still running) and then to the “AUTO” position. Observe that the “SYSTEM NOT IN AUTO” alarm light goes off. Observe that the inlet and outlet air louvers start to close. Note that the louvers close very slowly, so give them time to move. Observe that the yellow beacon listed in step 5 above is off. At the diesel control panel, record the diesel run time hour meter value.

8. Check the diesel battery charger located on the east wall. Observe that charger output voltage is 26-28 volts.

9. Call the chip screening plant to inform them the diesel start test is completed.

10. Enter the diesel run time hour meter value, diesel generator voltage and hertz values, test date and time along with the name(s) of the person(s) performing the test in the appropriate Passport work order.

3.7.1.4.5 Upset/Contingency

In the event of a pump failure, the Wood Yard Sump would fill and overflow to the paved parking area. A high-level alarm signals a potential system failure and prompt action should be taken.

Weekly Inspections – Woodyard Sump Areas

Date: _____

Time: _____

Name: _____

Signature: _____

Rail Sump Pump

Is pump operational? Yes / No

Any leaks? Comments: _____

Mechanical Problems? Comments: _____

Pump Tested? Yes / No

Wood Yard Sump Pump #1 East

Is pump operational? Yes / No

Any leaks? Comments: _____

Mechanical Problems? Comments: _____

Pump Tested? Yes / No

Wood Yard Sump Pump #2 West

Is pump operational? Yes / No

Any leaks? Comments: _____

Mechanical Problems? Comments: _____

Pump Tested? Yes / No

Red Fir Sump Pump

Is pump operational? Yes / No

Any leaks? Comments: _____

Mechanical Problems? Comments: _____

Pump Tested? Yes / No

Is the sump well and screen clean and the water draining? Yes / No

Is the pump set in “Auto” mode? Yes / No

Pump tested in “Manual” mode? Yes / No

Truck Tipper Sump Pump

Is pump operational? Yes / No

Any leaks? Comments: _____

Mechanical Problems? Comments: _____

Pump Tested? Yes / No

Check for signs of oil or sheen in Catch Basin Yes / No

Truck Tipper Oil & Water Catch Basin

Any sign of oil? Yes /No

If yes corrective action taken: _____

Do spill mate pillows need changed?* Yes / No

If yes, number of pillows changed: _____

Does Catch Basin need drained?** Yes / No

Was Catch Basin drained? Yes / No

***Keep at least 2 spill mate pillows in catch basin at all times*

****MERT is authorized to drain the Catch Basin (or coordinate draining), per Environmental Engineer and Manufacturing Engineer.*

3.8 EQUIPMENT INVENTORY

An inventory of all spare parts relating to the effluent collection system can be found in the Camas Mill Passport system, which may be accessed from the Camas home page. This includes information regarding equipment warranties, manufacturer instructions, and ordering information. Supplemental equipment information including catalogues and manuals can be found in the engineering or maintenance file system. Contact information for parts suppliers can be found on the Camas Mill Intranet or by contacting the Purchasing Department.

4.0 PRIMARY TREATMENT

4.1 OVERVIEW

In 1967, the mill installed a 330-foot diameter primary clarifier with concrete sidewalls and a compacted native clay bottom. The drive mechanism was of Dorr-Oliver design. This drive was replaced with a hydraulic motor drive in 1989. This approach provides a more even application of torque to the rake mechanism and less wear on the bull gear. The primary clarifier receives wastewater from the main pump station. It is pumped to the center of the clarifier where it is dispersed toward the periphery by a series of baffles. As the wastewater moves to the overflow launder, it encounters a scum baffle and V-notch overflow weir (stainless steel construction, new 2005). Prior to the closure of the Kraft Pulp mill and related assets in 2018, total suspended solids (TSS) removal routinely averaged in the 42 to 78% range and BOD removal in the 60 to 88% range. Both TSS and BOD removal are expected to decrease as the loads entering the clarifier decrease with the reduced mill operation. Solids settle to the bottom of the clarifier and are raked to the center well. There they are thickened and flow by gravity to sludge pumps in the basement of the filter building. Sludge is then pumped to an 11.5-foot by 10-foot diameter Komline-Sanderson spring coil vacuum filter. Filter cake at 15-20% solids is conveyed to a Reitz V-press where the solids level is raised to 35-45%. The solids are then sent to a landfill (on or off site) or may be beneficially reused. Polymer may be used to coagulate suspended solids and increase the efficiency of the solids removal equipment.

The primary clarifier was originally designed for a flow of 76 MGD and a solids loading of 215,000 lb/day. A comparison of the original design to typical design standards and conditions in 2018 is as follows:

Parameter	Units	Design Standards	Original Design	2018 – 2019 Data*
Flow	MGD	–	76.0	5.9 – 21.2
Hydraulic Retention Time	hours	1.5 – 4	2.9	10.4 – 37.4
Overflow Rate	gpd/ft^2	400 – 2,000	889	70 – 248
Removal Rate – BOD	%	10 – 20	10	32
Removal Rate – TSS	%	35 – 95	70	93
Side Water Depth	feet	6 – 15	10.5	10.5
Solids Loading	$lb/ft^2/day$	1 – 5	2.5	0.35
Solids Loading	Lb/day	–	215,000	29,800
Weir Loading	gpd/lineal ft	–	73,000	5,690 – 20,450

**Data collected between July 2018 and December2019 following operational changes at the Camas Mill. Ranges indicated are minimum and maximum monthly values, while a single value represents an average.*

Treatment in the primary clarifier under current loading conditions has been found to be adequate for meeting permit requirements, and the clarifier has excess capacity to treat additional loading.

4.2 PRIMARY CLARIFIER

4.2.1 Operation

Start-Up

1. Start the clarifier drive hydraulic pumps.

2. Review operating targets and parameters during startup.

Shutdown

1. Make certain that the clarifier sludge inventory is low. You may not be able to restart the drive in a full clarifier without damaging the equipment.

2. Stop the clarifier drive hydraulic pumps. The clarifier drive alarm will sound.

3. Silence the clarifier drive alarm.

4.2.2 Alarms and Instrumentation

4.2.2.1 Hydraulic Pressure Alarm

A high-level alarm sounds when the primary clarifier rake hydraulic pressure (comparable to torque) reaches 1100 psi. A high-high level alarm sounds when the rake pressure reaches 1250 psi. At 1350 psi, the hydraulic system compensates for the increased pressure by maintaining the hydraulic flow rate but reducing the rake speed. The system shuts down completely at 1400 psi to prevent structural damage.

4.2.2.2 Parshall Flume

Flow from the primary clarifier is measured with a Parshall flume (Equipment No. 0418L89017, new in 1999). A Parshall flume was selected for this application because it is self-cleaning, has a low head loss, and can measure flow over a wide range of conditions. Parshall flumes consist of three parts: a converging section, a throat, and a diverging section. They are constructed in standard sizes with the elevation of the water surface being measured at the crest two-thirds of the length of the converging section. At Camas, a bubble pipe is used for this measurement.

Flow Meter Calibration Procedure

This is a standard 8-foot Parshall flume. Please refer to Drawings LD-89017-1 and LD-89017-2 for additional calibration information.

1. Each month, this unit will have a calibration check as follows:

   a. Using the staff gauge provided with the flume, read the level in inches. Then read the flow transmitter. They should match within +/- 5% of the reading.

   b. Now check the flow reading on the transmitter and compare with the loop drawing for the level that is indicated. It should be within +/- 5% of the reading.

   c. If either reading is off, then you must recalibrate both units using the manufacturer's manual and procedures. The bubble pipe must also be cleaned using water and air.

2. Each year we will have an independent company come in and do an accuracy audit. Our unit must be within +/- 5% of reading of these calculations. If either reading is off, then both units must be calibrated using the manufacturer's manual and procedures. The bubble pipe must also be cleaned using water and air.

The general formula for computing the free discharge from a Parshall flume is as follows:

$Q = 4WH^n$

Where:

Q = Discharge, cfs

W = Throat width, feet

H = Head of water above the level floor in feet in the converging section.

$n = 1.522\ W^{0.026}$

MGD = (Q ft^3/second) (60 seconds/minute) (60 minutes/hour) (24 hours/day) (7.48 gallons/ft^3) (1/1,000,000)

4.2.2.3 Sulfuric Acid System

The Clarifier outlet pH (also known as ASB inlet pH) has in the past been adjusted as needed using a sulfuric acid addition system which dosed acid into the clarifier launder ring. Following the shutdown of the Kraft Pulp Mill in 2018, pH of the ASB inlet water has stabilized, and this system may no longer be necessary. As of May 2020, the mill is no longer receiving deliveries of sulfuric acid to the primary clarifier system, and it is expected that this system will eventually be permanently shutdown.

4.3 SLUDGE DEWATERING

4.3.1 Process Description

Primary solids from the clarifier are dewatered in a two-step process using a spring coil vacuum filter and a V-Press. A vacuum filter is a continuous dewatering machine. It consists of a cylinder or drum which is suspended in a filter vat. Sludge flows into the vat continuously and filter cake and filtrate are removed continuously. The drum periphery is divided into compartments or sections by division strips which prevent leakage of air from one compartment to another. The filter medium lays over the division strips and vacuum is applied in the shallow chamber between the filter medium and the drum surface. The vacuum is applied by means of pipes which are connected to one edge of each compartment. Each of these radial pipes connects to one of the two drum trunnions. The trunnion is cored so that the connections to the filtrate pipes are equally spaced near the periphery of the trunnion.

The heart of the coil filter is the filter valve and valve disc, which in some vacuum filters are combined into one. The valve disc butts against the trunnion face and controls the application of vacuum to each compartment. Thus, it is possible for vacuum to be applied exactly where it is needed to pick up a cake and dewater it. By the same token, no vacuum is applied to those compartments which do not require it, like the cake discharge area of the filter.

The sludge level in the filter vat is usually maintained so that about 25% of the drum area is submerged. It is in this area that the cake is formed by removing much of the liquid from the sludge adjacent to the drum. As the drum rotates, the surface which emerges from the sludge is covered with a wet cake. Air is drawn through this cake by the pressure differential created by the vacuum pump, which results in a negative pressure beneath the filter medium. This air entrains moisture from the cake, so that by the time the cake is discharged, it is relatively dry due to the volume of air that has passed through it. In general, approximately 75% of the liquid in the sludge will be separated from the solids in this operation.

In addition to the drum and vat, a vacuum filter has an agitator to keep the sludge solids in suspension and to prevent localized thickening and settling. This agitator is of the swing type, consisting of curved channels and angles that operate with a pendulum motion between the drum and the vat. The filter drum and agitator are driven by individual motors. The drum drive is variable so that a different speed of revolution may be obtained (generally expressed in minutes per revolution). The coil filter drum speed is regulated to control cake thickness and dryness. The drum rotation is adjusted to a speed which produces a clean cake and a volume that subsequent equipment (press, etc.) can process.

The coil filter vacuum is controlled by:

Drum Speed - The slowest drum speed produces the thickest, driest cake and

the lowest vacuum. As the drum speeds up, it has less time to remove the water and the vacuum increases. At approximately 75% of the maximum speed, a thinner cake is generated due to a shorter contact time with the feed solids and the vacuum usually drops.

Sludge Level in the Vat – Maintaining a full vat provides the maximum solids contact and the minimum drying time. This results in a thick cake and the highest vacuum. As the level is lowered, these factors reverse, reducing the vacuum, until the level falls below approximately 6 inches from the top of the vat. At this point, the first of the filtrate pipe connections to pass the slot in the valve disc is open to atmosphere, which drops the vacuum further.

Mechanical Devices - A spring-loaded vacuum release valve can be set to relieve at any vacuum level. When a wet vacuum pump and standpipe have been installed, the valve to the standpipe may be opened, with the water turned off, to relieve vacuum. This is an emergency procedure.

The coil filter operating variables may be manipulated to maximize production, reduce chemical cost, improve cake dryness, or any combination of these attributes. Once a balance is achieved, it is only necessary to make small adjustments. Large changes will result in a need to strike a new balance.

The primary sludge cake is shredded as it leaves the coil filter and falls onto the No. 1 conveyor belt. It travels west and is deposited on the No. 2 conveyor belt or the Filter Building (FB) No. 3 conveyor belt. From FB No. 3, it goes to the transverse conveyor and into the V-Press. The V-Press was originally developed for squeezing juice from fruit pulp. Its use in sludge dewatering was limited in scope and is now virtually extinct. The V-Press feed screws force the sludge through a progressively smaller cavity lined with stainless steel screens. With clean screens, the sludge solids content increases from 15-20% solids at the inlet to 35-45% solids at the outlet. Discharged sludge is then conveyed (via FB No. 5 conveyor) back to the No. 2 conveyor belt for landfill deposition or diversion into trucks for transport.

4.3.2 Start-up Sequence

1. Close the coil filter vat drain valve.
2. Start No. 6 and/or Nos. 2, 5, landfill conveyors.
3. Start the press expeller
4. Start the press drive
5. Start the press feeder
6. Start No. 4 conveyor
7. Start No. 3 conveyor
8. Start No. 1 conveyor

9. Start settled water pump
10. Start the coil filter agitator.
11. Start the coil filter shredder.
12. Start the coil filter spring wash water sprays.
13. Start seal water flow to the filtrate and vacuum pumps.
14. Start the filtrate pumps
15. Start the vacuum pump.
16. Start one sludge pump.
17. Adjust the valving to direct the sludge to coil filter No. 1 (west)
18. Set auto/manual control to auto for filter to be started.
19. Set vat level on vat level chart (start at 80% for No. 1 filter).
20. When the coil filter vat fills, move the vacuum control handle to the up position.
21. Wait 15 seconds, then start the vacuum filter drum drive.
22. Adjust the press speed to 10%.

4.3.3 Shutdown Sequence

1. Shut off sludge pump.
2. Run vat to empty.
3. Open the drain valve on the coil filter.
4. Wait 5-10 minutes for sludge on belts to clear. Shut off both sludge pump.
5. Wash up the coil filter. Hose off the tine bar, discharge rolls, splash pan, trough, drumhead, headbox, drum face, and vat.
6. Shut off the coil filter shredder, agitator, drum drive, filtrate pump, and vacuum pump.

4.3.4 Annual Press Maintenance Procedure

1. Open the pressure release valves (2) in the press hydraulic cylinder (hydraulic jack) system. The pressure gauge should read zero.
2. Pull out the press pin.
3. Open the press doors. If the press is to be open more than one hour, the doors must be supported with jacks to avoid bent hinges.
4. Wash up the press.
5. Close the press.
6. Reinstall the press pin.

7. Shut the press pressure relief valve (hydraulic jack bleed valve).
8. Jack the press hydraulic pressure to 2300 psi.
9. Shut the press second pressure relief valve.
10. Open the press hydraulic pressure accumulator valve.

4.3.5 Coil Spring Replacement

A new connection can be made at any point in the spring in the event of a break or disconnection by following this procedure. There is a special crimping tool for use with K-S Type No. 5101 connectors and it should be kept along with other maintenance tools in the operator's control room. If one of the coil springs has to be replaced, the two ends of that coil spring should be cut, and the end of the coil spring squared off so that there is no deviation at this point from the remainder of the spring. The No. 5101 connector should be inserted in the coil spring, burr end first; and the spring set on the saddle of the crimping tool, with the last turn of the coil spring facing away from the tool. The anvil should be brought down so that the curved part is touching the end of the wire. The wire should not extend beyond the end of the crimping tool. (This tends to distort the spring when the crimp is made.) The spring end should be crimped into the groove on the No. 5101 connector about three-quarters of the way. This will allow the connector to rotate freely. The other end should be brought around the drum, being careful that it is in the right position and over the correct rolls. The spring is then slipped over the exposed end of the No. 5101 connector and turned so that the end of the spring lines up squarely with the end already crimped. The crimping tool can then be put in place and the second end crimped into the groove in the same manner as the first. Either the tool or the coil spring can now be rotated so that the anvil spans both ends and pressure is applied to drive both ends the full depth of the groove on the plug. This will produce a good joint which should have flexibility and allow the coil spring to turn during operation. If, in forming the joint, the crimping tool is held in an incorrect position and a distorted joint is produced, the spring should be cut as close as possible to the distorted section. The damaged area should be removed and the joint remade.

If one coil spring is replaced, check the discharge rolls to determine whether it is an upper- or lower-layer spring. Then go to the back of the drum (the end opposite the cake discharge). Fasten the end of the spring in two places, one on the end and one back about 6 inches to the spring next to it so it will follow and track. Tape, wire, or string may be used for this purpose. Start the drum, and after the fastened end has made about one-fourth turn with the drum, pull back on the spring to stretch it uniformly. If the coil spring is in the upper layer, the tine must be pulled (against the discharge roll) out of the way (with a pair of pliers) to allow both springs to pass. When the end makes the complete cycle, you should have enough stretch to match the ends and crimp. Tap the tine back into position (hit it at the base). It is not necessary to drain the vat or completely clean the springs to accomplish this task.

4.4 MAINTENANCE

4.4.1 Primary Clarifier

Utilities maintenance personnel are responsible for clarifier maintenance. The DBS (clarifier rake) drive unit is made up of several speed reducers coupled together. Every speed reducer is totally enclosed and is oil bath lubricated. The required lubricants and the change intervals are listed in this section.

Operation: Once a year, change the oil in the planetary gearbox.

Inspection: Every week, check the filter dirt indicator on the hydraulic power unit. If the gauge reads 20-25 psi, replace the spin-on filter. The hydraulic oil should be replaced when it breaks down or becomes contaminated. Every week, check the oil level in the planetary gearbox and power unit; if applicable, add fluid as required.

Increase the oil change frequency if there is:

A. High humidity, dust or dirt, and/or a corrosive chemical atmosphere.

B. Water contamination. Periodically remove any accumulated water. The service frequency will depend on atmospheric humidity. Inspect the fluid for cloudiness or darkening. Use this as a sign of contamination. Pier mounted “D” series drives have a higher rate of moisture condensation than bridge mounted drives. Therefore, a ball valve has been provided on the center drain line for easy removal of water trapped in the main gearbox. Pier mounted drives may require weekly condensation draining.

An inspection of the structural steel, concrete side slopes, and clay bottom should be completed at regular intervals (currently every 7-8 years). The most recent inspection was in 2016.

4.4.2 Other Maintenance

The Lady Island Operator is responsible for overseeing the routine lubrication of all treatment system equipment. Lubrication routes are completed by the maintenance department. Lubrication routes and records are stored in the mill’s electronic maintenance system. Of course, all equipment should be checked at least once a day while equipment is operating and more often if conditions warrant. Lubrication professionals suggest the following guidelines:

- Bearings of about 3-inch diameter on a monthly grease schedule should receive approximately eight strokes from the grease gun. Larger or smaller bearings should receive more or less, on a proportional basis.

- Oil reservoirs with sight glasses or oil cups should be checked carefully to ensure that the sight glass or oil cup hole is not plugged, thus indicating oil in the reservoir when, in fact, there is none.

- Oil should be changed when it becomes contaminated with dirt or water or has a burned smell to it.

- Keep in mind that too much oil in the reservoir or too much grease in the bearing is as bad as not enough.

Exxon Mobil Lubricants (equivalent products are acceptable):

Air Compressor	Mobil DTE PM 150
Bearings	Mobilgrease SHC 460
Gear Boxes	Mobilgear 600 XP 220
Press Chain	Mobil DTE PM 150 and /or 220
Press Hydraulic	Nuto H 46

4.5 UPSET/CONTINGENCY

4.5.1 High Solids Load

1. Determine if the clarifier rake hydraulic pressure (torque) is increasing and is approaching the high-level alarm. If so, maximize the sludge removal with the coil filter and V-press.

2. If the hydraulic system high pressure alarm is reached (1100 psi), contact the No. 11 Paper Machine Team Leader and/or Repulper Operator to assist in identifying areas in the mill where excessive fiber is being sewered.

3. If the high-high alarm is reached (1250 psi), open the primary clarifier bypass to avoid damaging the structural steel of the rake, or divert the clarifier underflow pumps to the launder ring. Clarifier bypassing is not recommended if the aerated stabilization basin discharge is close to the NPDES permit limits for BOD or total suspended solids. Contact the Environmental Group for advice.

4. Close the bypass, or underflow diversion once the rake motor hydraulic pressure has dropped to safe levels, typically less than 500-700 psi.

4.5.2 Coil Filter Failure

The mill has a single coil filter for primary solids dewatering. If a failure occurs, file a work request in PTM. Solids can be retained in the clarifier until the rake hydraulic

pressure reaches the high-high alarm set point (1250 psi). At that point, open the primary clarifier bypass to avoid damaging the structural steel of the rake. Clarifier bypassing is not recommended if the aerated stabilization basin discharge is close to the NPDES permit limits for BOD or total suspended solids (TSS). Contact the Environmental Group for advice. When the coil filter has been repaired, restart it and the V-Press. Monitor the rake motor hydraulic pressure.

4.5.3 V-Press Failure

The mill has a single V-Press for primary solids dewatering. If a failure occurs, file a work request in PTM. Solids can be retained in the clarifier until the rake hydraulic pressure reaches the high-high alarm set point (1250 psi). At that point, open the primary clarifier bypass to avoid damaging the structural steel of the rake. Clarifier bypassing is not recommended if the aerated stabilization basin discharge is close to the NPDES permit limits for BOD or total suspended solids (TSS). Contact the Environmental Group for advice. When the V-Press has been repaired, return it and the coil filter (if shut down) to service. Monitor the rake motor hydraulic pressure. When it has dropped below 500-700 psi, close the clarifier bypass (if opened).

4.5.4 Primary Clarifier Odor Risks

Because of the mill's location in the community, nuisance odors need to be addressed promptly. When the flow through the clarifier drops off significantly, solids that remain suspended in the primary clarifier have an increased chance of decomposing anaerobically in the oxygen deficient clarifier.

If mill personnel find the dissolved oxygen in the primary clarifier has dropped to low levels, or abnormal odor is observed, oxygen injection should be started at the effluent pump station. The oxygen injection system is designed to add oxygen to the main pump discharge. This will ensure that the wastewater to the primary clarifier will be sufficiently oxygenated to prevent nuisance odors.

4.6 EQUIPMENT INVENTORY

An inventory of all spare parts relating to the primary treatment system can be found in the Camas Mill Passport system, which may be accessed through the Camas Home page. This includes information regarding equipment warranties, manufacturer instructions, and ordering information. Supplemental equipment information including catalogues and manuals can be found in the engineering or maintenance file system. Contact information for parts suppliers can be found on the Camas Mill Intranet or by contacting the Purchasing Department.

5.0 SOLIDS MANAGEMENT

5.1 OVERVIEW

The Washington State Solid Waste Plan (RCW 70.95.010) established a management hierarchy for waste solids based upon predicted environmental impact. The alternatives arranged in order of descending preference were as follows:

- waste reduction
- recycling and reuse
- combustion with energy recovery
- incineration
- physical, chemical, and/or biological treatment
- landfilling

Consistent with this philosophy, the Camas Mill has spent millions of dollars on research devoted to reducing the impact of our manufacturing residuals. For many years we even operated an animal bedding/cat litter manufacturing plant on Lady Island using primary solids as the feedstock (this was known as the CaLi Plant).

5.2 LANDFILL

The Lady Island landfill has been constructed as a disposal site for primary solids, stabilized secondary solids, and waste wood fiber generated in the papermaking and wastewater treatment processes at the Camas Mill. The landfill has been constructed according to state regulations as administered by Clark County Public Health and includes containment berms, clay liners, leachate collection and treatment, landscaping, and stormwater control. The three landfill cells (see Drawing 001-C-0011 in Section 10.2) occupy approximately 20 acres to the west of the primary clarifier and the entire project, including landscaping, covers some 35 acres. A complete discussion of landfill construction, operation, and closure is presented in the "Lady Island Landfill Operations and Closure Plan." Please consult this document for important details.

6.0 SECONDARY TREATMENT

6.1 OVERVIEW

Wastewater from the primary clarifier is combined with any residual flows from the former corrosive sewer at the mixing chamber, and conveyed by two 54-inch ID high density polyethylene (HDPE) pipelines to two aerated stabilization basins (in series).

Aerated stabilization basins (ASBs) are commonly used in the pulp and paper industry for biological treatment of mill wastewaters. If land is available and relatively inexpensive, ASBs are preferred over other treatment methods because they produce fewer biological solids and provide the greatest operational resistance to mill process upsets. Aerated stabilization basins are sized according to the following equation:

$$S_e = \left(\frac{FS_o}{1 + kt} \right)$$

Where:

S_e = BOD at ASB exit, lb/day.

F = BOD feedback factor from the anaerobic decomposition of settled solids. F varies from 0.8 to 1.5 in typical basin designs due to the season of the year, and the quantity and character of the accumulated solids.

S_o = BOD at the ASB inlet, lb/day.

k = ASB BOD removal rate, one/day.

t = ASB hydraulic retention time, days.

For ASBs in the paper industry, hydraulic retention times of 5 to 15 days are common, but some mills have used retention times of 20 days or more. With typical retention times, BOD removal efficiencies usually exceed 80%.

The ASB BOD removal rate factor, k, is dependent upon effluent temperature, pH, mixing, short circuiting, the concentration of active biomass, nutrient addition, and aeration. In small scale pilot plant operations where conditions can be optimized, the k rate can reach 1.5-3.0/day. In full scale operation, though, k rates above 2.0 are only achieved in high rate, completely mixed (60-100 hp/million gallons) basins. The typical pulp and paper ASB design utilizes plug flow (through the use of flow control curtains) and a low mixing/aeration (<10 hp/million gallons) input. This results in k rates in the 0.2 to 0.9/day range.

The secondary treatment process at Camas is a two stage ASB system which was completed in 1977. The system consists of a 250 MG (66 acre) moderately mixed plug flow basin followed by a 150 MG (42 acre) partially mixed basin with a settling zone

(see Drawing I-26666 in Section 10.2). Effluent from the outlet of ASB 1 can be recirculated at a rate of approximately 6,000 gal/min to the inlet of the system to provide the bacteria for BOD removal. The secondary treatment system was originally designed for a flow of 76 MGD and a sustained BOD loading of 175,000 – 190,000 lb/day. Following the 2009 aeration reductions in ASB 1, the system BOD loading capacity is in the 65,000 – 85,000 lb/day range. A comparison of the new design to typical design standards and post process shutdown baseline conditions (established between July 2018 – December 2019) is shown below. This table will be updated as more data becomes available.

Parameter	Units	Design Standards	Current Design	2018 – 2019 Data*
Aeration: ASB 1	hp	--	1,950	1,950
Aeration ASB 1 Ratio	hp/MG	6 – 50	8	11
Aeration: ASB 2	hp	--	450	375
Aeration ASB 2 Ratio	hp/MG	<1 – 6	3	3
BOD: ASB 1 Inlet	lb/day	--	85,000	1,138 – 4,908
BOD Loading	lb/acre/day	400 – 2,000	787	17.2 – 74.4
BOD: ASB 2 Outlet	lb/day	--	9,307	208 – 1,219
Depth	feet	6 – 20	12 – 14	12 – 14
Dissolved Oxygen: ASB 1 Outlet	mg/L	0.1 – 1.0	0.5	4.6 – 11.8
Dissolved Oxygen: ASB 2 Outlet	mg/L	0.1 – 1.0	0.5	6.5 – 12.6
Flow	MGD	--	76	6.4 – 21.9
Hydraulic Retention Time	days	3 – 24	5.2	13 – 46
pH: ASB 1 Inlet	--	--	5.0 – 10.0	--
pH: ASB 2 Outlet	--	--	6.0 – 9.0	6.3 – 9.2**
TSS: ASB 2 Outlet	lb/day	--	24,895	396 – 3,388

**Data collected between July 2018 and December 2019 following operational changes at the Camas Mill. Ranges indicated are minimum and maximum monthly values, while a single value represents an average.*

***pH greater than 9.0 occurred due to suspected algae bloom intermittently for periods <60 consecutive minutes.*

Wastewater testing for NPDES permit compliance is completed by 3rd party analytical testing labs. The normal (baseline) monitoring frequency would be as follows:

- Continuous Sample: flow, pH, temperature
- As needed Grab Sample: dissolved oxygen
- 3X/week Composite Sample: BOD, TSS
- Monthly Composite Sample: AOX
- Annual Composite Sample: Dioxin (2,3,7,8-TCDD), Furan (2,3,7,8-TCDF)

6.2 PH

The microorganisms important to the biological treatment of wastewaters have an optimum pH range of 6.0-8.0. For a typical gram-negative bacterium, the growth rate under ideal conditions is 2-4 generations/hour. The growth rate at a pH of 5.0 is about one generation/hour and falls to zero at pH's below 4.0. Similar growth inhibition occurs under alkaline conditions, but the decline is much swifter. The growth rate at pH 8.5 is about one generation/hour and falls to zero at pH's above 9.0. This explains the bacteriostatic properties of ordinary hand soap which has a pH of 9.0-9.5. Despite this, wastewater treatment systems have been successfully operated at a pH of 5.0 and 8.5 for extended periods of time. The key to success, though, is consistency. The further the pH is from neutral (7.0), the less resilient the organisms are to variability. Variability is most important in high rate treatment systems such as activated sludge plants but can also be significant in aerated stabilization basins. The time frame for activated sludge plants is a change over an hour; in ASB treatment, swings away from acclimation levels lasting a day or more are important.

Historically, wastewater pH at Camas has been highly variable due to the absence of an automatic pH control system. To offset chemical losses in the sulfite mill and bleach plants, the company added slaked lime to the corrosive sewer using manual control. During the 1980s, the operating groups increasingly focused on the reduction of chemical losses. The dividend was no pH related NPDES permit excursions, smoother wastewater treatment operation, and a substantial reduction in the use of purchased lime for pH control. By October of 1992, pH control could economically be addressed by the use of caustic in the bleach plant. Caustic use continued until October of 2001 when the sulfite pulp mill and bleach plant were permanently shut down. This closure changed the character of the wastewater from acidic to intermittently alkaline. During this time, the mill operated an automatic pH control system that fed virgin sulfuric acid to the primary clarifier launder ring to stabilize the inlet pH. The Kraft pulp mill and bleach plant were permanently shut down in 2018. This changed the character of the wastewater from intermittently alkaline to predominantly neutral (e.g., paper machine whitewater) and the inlet pH stabilized, eliminating the need for pH adjustments at the inlet. Additionally, in 2019 a CO_2 system was installed upstream of the ASB 2 effluent weir to provide pH reduction during periods of high pH.

6.2.1 Instrumentation

A pH probe (see Drawing LD-89171 in Section 10.2) is located at the ASB 2 outfall weir. It is directly calibrated on a weekly basis.

ASB pH Probe Calibration Procedure

1. Pull the electrode assembly out of the ASB outfall stream.

2. Use fresh certified lab buffers of 4.0 and 10.0 and water to clean the electrodes between each test.

- Insert the electrode into the 4.0 buffer and adjust the pH meter to read 4.0 pH. All instruments in the loop must read 4.0 pH. If this is does not occur then you will need to go to the vendor's manual and do the instrument calibration procedure.

- Now rinse the electrode with the water.

- Place the electrode into the 10.0 pH buffer solution. After it has stabilized, adjust the upper range to read 10.0 pH. As before, you will need to make sure all instruments in the loop read the same. If not then you will need to CALIBRATE as per the vendor's manual.

- Rinse the electrodes and reinsert into the ASB outfall stream. After the system has become stable you will need to take a sample. Take the sample to the certified lab test instrument and test the sample. Note the reading and adjust the ASB pH meter so it reads the same as the lab test instrument. This must be within + or - 0.1 pH units.

3. After the unit is checked and calibrated, log the information in the MILL PASSPORT COMPUTER SYSTEM under the equipment number. Let Environmental know you are done and the instrument is back on line and log in the red logbook that the upset was due to a calibration check.

6.2.2 Carbon Dioxide (CO_2) System

In March 2019, a vendor-supplied CO_2 system for pH control was installed on the east bank of ASB 2, near Outfall 001. The system consists of a pressurized tank of liquid CO_2, a vaporizer, and series of perforated distribution tubing to bubble CO_2 into the effluent upstream of Outfall 001 and lower the effluent pH prior to discharge. The tank and vaporizer are vendor-owned and maintained and were supplied on a prefabricated concrete slab; however, the perforated distribution hose was purchased and installed by the Camas Mill. The system is operated manually, such that when pH reaches a designated setpoint, a manual ball valve at the CO_2 system can be opened to begin diffusing gas into the effluent. In 2020, the system was updated so that CO_2 addition may also be controlled remotely from the mill without accessing Lady Island (see Drawing I-45932, and Drawing LD-89173 in Section 10.2). The system may also be automated so that CO_2 dosing may be controlled using feedback from the pH meter which will improve dosing efficiency.

The CO_2 system can be used in conjunction with two of the surface mixing style aerators which were installed to facilitate mixing of the CO_2 into the effluent (See Figure 1 below). TSS data collected during periods of aeration demonstrate that operating the mixing style aerators does not significantly contribute to TSS loading at Outfall 001. As an example, the mixing aerators were operated throughout the months of June and July 2019, during which the maximum daily TSS result at Outfall

001 was approximately 1350 lb/day, or less than 4% of the daily TSS permit limit of 36,575 lb/day. TSS monitoring will continue to occur at Outfall 001 as required by the NPDES permit, and additional sampling will be completed if a daily TSS result exceeds 80% of the permit limit (29,260 lb/day), or if a monthly average value exceeds 80% of the monthly permit limit (15,710 lb/day) .

The CO_2 tank is equipped with a solar-powered telemetric pressure gage, which can be used to determine the tank level. Additionally, tank level can be remotely monitored from the mill. The system has been set up so that when the tank pressure reaches approximately 30-in H_2O, the vendor will receive an automatic notification to refill the tank. Consumption varies based on conditions within the pond, as the system is only operated when needed during periods of elevated pH.

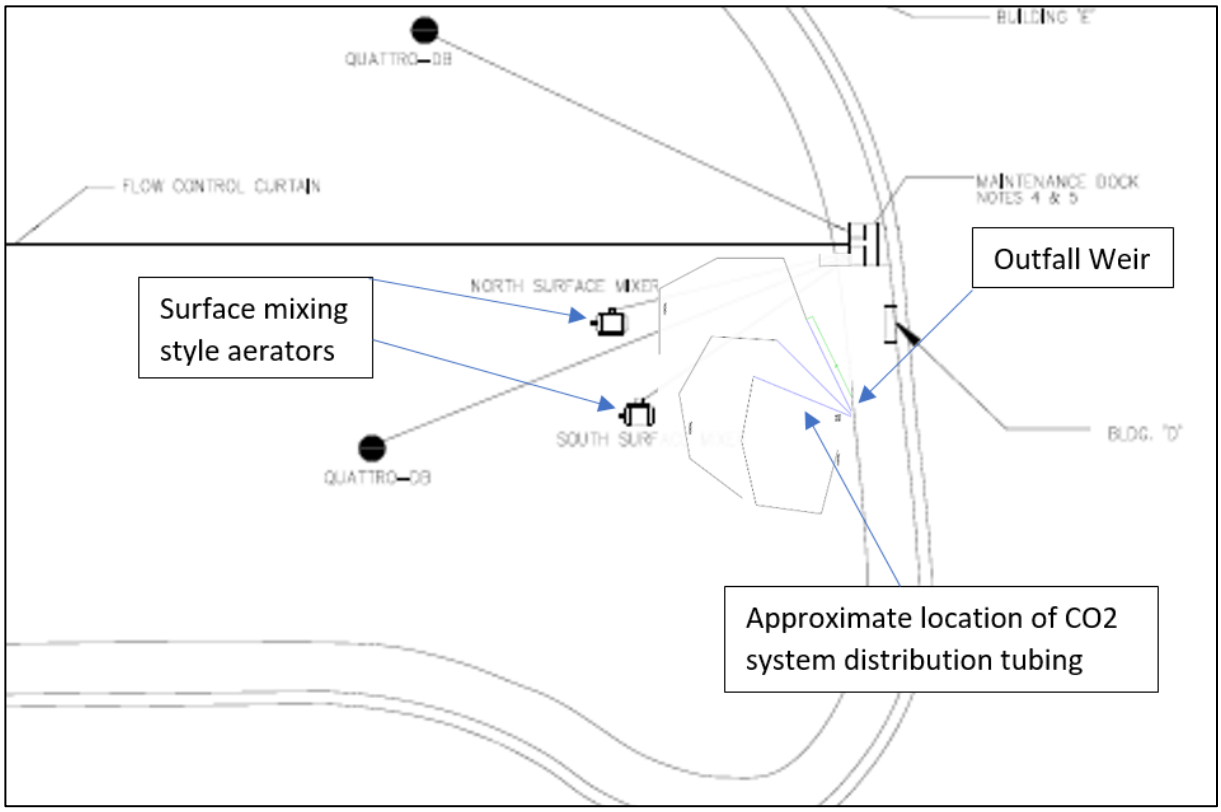


Figure 1 – CO_2 Distribution Tubing and Mixing Style Aerators in ASB 2

6.2.3 Increased Mixing

One alternative that was tested at Outfall 001 was mixing lower layers of water (where sunlight could not penetrate, so the pH remained lower) with the top layers of elevated pH through the use of a temporary recirculation pump, or Lady Island boat near the outfall weir. Additionally, two mixing style aerators were installed near Outfall 001 to provide additional mixing prior to discharge. While these aerators are not required for pH control, they may be used as needed to improve mixing of CO_2 into the effluent, as described below. However, the method of mixing with aerators alone was found to be

insufficient to manage elevated pH. TSS should be monitored closely during periods of increased mixing near the outfall.

6.2.4 Ultrasound

A system of five (5) ultrasound transducers was added to the South ASB in September 2018 (see Drawing E-45857 in Section 10.2). The system is intended to disrupt the buoyancy of the algae, causing it to sink in the pond which limits access to sunlight, and reduces the bloom. The system is designed to utilize 5 separate buoys to cover the area of the South ASB. Installation was completed in September 2018, and results have indicated that the ultrasonic transducers were ineffective at improving the effluent pH.

6.3 NUTRIENTS

6.3.1 Alarms and Instrumentation

The mill used to have a nutrient supply system for wastewater treatment. Under current operations, nutrient addition is not needed to meet treatment objectives, and the nutrient tanks have been emptied to prevent surplus chemical from expiring and congealing. This section may be used as reference if needed. Level indicators are in place for the chemical storage tanks (see Drawing I-26666 in Section 10.2) but there are no alarms.

6.3.2 Discussion/Need Calculations

The organisms responsible for wastewater treatment are collectively called protists and include bacteria, protozoa, and rotifers. Of these, bacteria are the most important in aerated stabilization basin treatment. Bacteria share some of the characteristics of primitive plants and, as such, require nitrogen and phosphorus for adequate growth and nutrition. BOD removal in secondary treatment is directly related to nitrogen and phosphorus dosage rates until the basic physiological needs have been satisfied.

Conventional design calls for a BOD:N:P (biochemical oxygen demand:nitrogen: phosphorus) ratio of 100:5:1 to provide for adequate conversion of soluble organics to bacteria. This design figure is often conservative. However, the design and wastewater characteristics of the specific system can influence the optimum ratio. The general operating target for the Camas Mill has been chosen as 100:2.0:0.5.

Many factors influence the treatment performance of an aerated stabilization basin. In most plants, though, only nutrients and aeration are used as control measures in the face of a constantly fluctuating input load. From a purely operational standpoint, there are several reasons for basing supplemental nutrient addition on the maximum expected treatment needs and adjusting the aeration based on the input BOD load. The most powerful of these is that the system responds to aeration in the short term (i.e., one day), whereas nutrient deprivation or surplus acts over a period of a week or more. If we follow

the aeration method of control, then our maximum nutrient requirements would be as follows:

Assume: 21,437 lbs BOD/day (2016 annual mean), a BOD:N:P of 100:2:0.5, and the use of ammonium poly-phosphate (APP, 11-37-0) as the nutrient source.

Nitrogen needs = 2 lbs per 100 lbs BOD:
(21,437 lbs BOD/day)(0.02) = 429 lbs nitrogen/day

$$\left(\frac{429\ lbs\ N}{day}\right)\left(\frac{3.54\ APP}{lb\ N}\right)\left(\frac{1}{0.57}\right) = \frac{2{,}664\ lbs\ APP\ liquid}{day}$$

$$\left(\frac{2{,}664\ lbs\ APP}{day}\right)\left(\frac{gal\ APP}{11.9\ lbs}\right)\left(\frac{day}{1{,}440\ min}\right)$$
$$= 0.155\ gal\ APP/\min\ or\ 0.587\ liters\ APP/min$$

Phosphorus Needs = 0.5 lbs per 100 lbs BOD:
(21,437 lbs BOD/day)(0.005) = 107.2 lbs P/day

$$(107.2\ lb\ P)\left(\frac{4.81\ lbs\ APP}{lb\ P}\right)\left(\frac{1}{0.57}\right) = \frac{905\ lbs\ APP\ liquid}{day}$$

$$\left(\frac{905\ lbs\ APP}{day}\right)\left(\frac{gal\ APP}{11.9\ lbs}\right)\left(\frac{day}{1{,}440\ min}\right)$$
$$= 0.048\ gallons\ APP/\min\ or\ 0.182\ liters\ APP/min$$

The calculations above indicate that prior to the mill operational changes in 2018, we needed 2,417 pounds of ammonium polyphosphate per day to satisfy the nitrogen demand and 821 pounds of APP to satisfy the phosphorus demand. Since 50 – 100% of the nitrogen needed for wastewater treatment is already present in the wastewater, we generally focus on phosphorus as the limiting nutrient. By sampling the nutrient loading in the aerated stabilization basin at regular intervals, the exact nutrient addition rate can be fine-tuned to provide optimal nutrient loading to promote efficient treatment. Nutrient addition rates, however, should be decreased during the summer months to control algae blooms and pH spikes.

Following the shutdown of the Kraft Pulp Mill and related assets in 2018, the ASBs were found to have excess nutrient levels, which likely promoted the growth of an algae bloom in the ASBs. Due to this, nutrient addition was shut off until nutrient levels in the ponds return to lower levels. ASB performance continues to be monitored so that nutrient levels can be optimized.

6.3.3 Ammonium Poly-Phosphate System

6.3.3.1 Start-Up

Ammonium polyphosphate (APP) will be pumped from a 10,500-gallon storage tank into the clarifier launder ring. Nutrient flow will be regulated by a pump controller. The operating sequence is as follows:

1. Open the storage tank valve.

2. Turn on supply pump.

3. Adjust the pump to the desired flow rate.

6.3.3.2 Shutdown

1. Turn off supply pump.

2. Close storage tank valve.

6.4 OXYGEN INJECTION SYSTEM

There is a vendor-supplied oxygen injection system located adjacent to the Effluent Pump Station. The system consists of a 1580-gallon oxygen storage tank, vaporizer, and an injection system which injects oxygen into the exposed portion of each pump discharge pipe from the Effluent Pump Station. The oxygen injection system was installed in 2018 and is used to prevent anaerobic conditions from developing in the primary clarifier under reduced flow rates and higher residence times. When abnormal odors are observed from the primary clarifier, DO levels may be measured in the primary clarifier. If low DO is detected (typically, less than 1 mg/L), operations personnel should manually open the valve on the oxygen injection system to begin feeding oxygen into the Effluent Pump Station discharge. Oxygen should continue to be fed until the abnormal odor conditions are resolved, at which time the valve should be manually closed. Consult the Environmental Department for situation specific DO targets as needed. Maintenance of the system is conducted by the vendor.

6.5 AERATION REQUIREMENTS

6.5.1 Design Capacity

The oxygen required for biological treatment of wastewater in an aerated stabilization basin is determined by the BOD (biochemical oxygen demand) load at the inlet of the biological treatment system (at Camas, this is the primary effluent plus corrosive sewer). While many kinds of aeration equipment (including surface, brush, submerged static, diffused, and several versions of jet) are available, surface aeration is commonly employed in ASBs. Surface aeration is attractive because of its low cost, flexible

operation, and efficient oxygen transfer in shallow basins (i.e., less than 15 feet deep).

We currently have twenty-six 75-horsepower (hp) Aqua-Aerobic surface aerators in ASB 1 and five 75-hp aerators in ASB 2 (see Drawing E-38955 in Section 10.2). In 2009, an engineering study was completed to reduce the number of aerators in our biological treatment system. To maintain compliance with our permit limit at the time (11,085 lb/day monthly BOD average), we calculated a limited applied load to the installed (or operable) aeration capacity. Based on the design data, we had sufficient aeration to address a long-term BOD load of up to 85,000 lb/day. The calculations were as follows:

ASB 1 (26 aerators)(75 hp/aerator)(24 hours/day)(1.55 lbs BOD/hp-hr)	=	72,415 lb/day
ASB 2 Average 2009 BOD Removal (aeration + settling)	=	1,500 lb/day
2009-2014 NPDES Permit Limit	=	11,085 lb/day
Maximum Sustained Input BOD Load		85,000 lb/day

From these calculations it would be reasonable to say that we have enough design capacity for a sustained load of approximately 85,000 lbs of BOD per day (monthly average). For periods of less than a month, the load could be higher.

6.5.2 Operating Procedures

BOD samples are collected three times per week from the inlet and outlets of ASBs which are actively being used for treatment. The BOD test requires five days to complete. In the past, we routinely measured surrogates for BOD such as CODs (soluble chemical oxygen demand) as a tool for predictive load management in the ASB system. Following the shutdown of the kraft pulp mill in 2018 BOD values have decreased dramatically and become more stable. COD samples are no longer necessary, but may be collected for trending purposes; however BOD and COD no longer correlate as they had while the pulp mill was operating.

Wastewater samples are collected and analyzed on a routine basis. The Environmental Engineer then selects the number and locations of aerators to be operated. Because BOD decay is logarithmic, aeration at the inlet to ASB 1 is more important to treatment than aeration near the outlet. As a consequence, intentional aerator curtailment was always taken at a distance corresponding to 60-90% of the ASB 1 path length. Currently, the environmental engineers make decisions concerning the operation and maintenance of aeration equipment based on results of DO testing conducted by a third-party contractor.

6.5.3 Odor

Odors in wastewater treatment systems are caused when conditions in the pond become anaerobic. Under anaerobic conditions, bacteria use sulfates as an electron donor rather than oxygen, reducing sulfates to sulfides. Sulfides, which have a very strong odor resembling rotten eggs, can be dissolved or can be released as a gas,

causing odor problems for the wastewater system in question. The release of hydrogen sulfide is dependent upon the pH. At pH values less than 7, sulfides predominantly exist as H_2S which is a gas. As the pH increases above 7, the concentration of H_2S decreases and less hydrogen sulfide (odors) are released to the atmosphere. The most successful strategies for minimizing odor generation in wastewater treatment systems typically involve allowing for anaerobic conditions to develop along the bottom of the pond, near the sludge layer, and then preventing the release of gaseous sulfides by maintaining aerobic conditions in the upper zones of the pond or maintaining an alkaline pH (>8) to prevent the release of gaseous sulfides.

With changes at the mill in the past and with the 2018 restructure, the risk of nuisance odors from the influent to the ASBs is reduced. Aeration in ASB 1 has historically been abundant to provide for the metabolism of BOD. Aeration in ASB 2, though, has been managed to optimize BOD, TSS (total suspended solids) capture, energy consumption, and odor minimization.

Traditional wastewater treatment design calls for a dissolved oxygen residual in the basin of 0.5 – 1.0 mg/L at average BOD load and 0.1 – 0.5 mg/L at peak BOD load to control odor. Unfortunately, the odor determination has always been qualitative and subjective. To determine the optimum level of aeration for odor control in our system, we studied the aeration level and measured the wastewater TRS (total reduced sulfur gas) content at the ASB outlet. Our conclusion, based on this study, is that one aerator is adequate to control hydrogen sulfide odor in ASB 2. GP typically operates an aerator near the exit of ASB 1 in addition to one aerator in ASB 2 (see Drawing E-38955 in Section 10.2).

6.5.3.1 Odor Control During ASB 1 Diversion Operations

During ASB 1 diversion operations, it is important to continue aerating and mixing ASB 1 in order to minimize odor production. This allows for anaerobic conditions to develop only at the very bottom of the pond and relies on aerators to maintain a mixed and aerated zone throughout the rest of the water column. This aerated zone will serve to “cap” the pond, oxidizing any sulfides to sulfates before they are released.

6.5.3.1.1 Baseline Sampling and Characterization (During ASB 1 Operation)

At the beginning of a diversion, ASB 1 transitions from a flow-through reactor that operates under quasi steady-state conditions to a system that acts more like a batch reactor. When it no longer has a constant inflow contributing BOD and TSS, the pond continues to degrade the sludge; however the flow is not present to flush the system. Over time, the oxygen demand from the benthal feedback is met and aeration will no longer be needed. The period of time needed to meet that demand is difficult to predict.

GP has conducted a preliminary sampling event to establish an understanding of baseline operating conditions before ASB 1 is taken out of service. Results from this sampling event provide insight into active operating conditions in ASB 1, while it is not

emitting nuisance odors. Key parameters that were tested during the initial sampling event include dissolved oxygen (DO), Oxidation-Reduction Potential (ORP), temperature, pH, and hydrogen sulfide (H_2S) in the water column at 18 locations in the basin (See Figure C-4 in Section 10.2); as well as a characterization of the influent sulfate concentrations.

6.5.3.1.2 Periodic Monitoring during ASB 1 Diversion

At the beginning of a diversion, monitoring is conducted in the pond on at least a weekly basis at three sampling locations, including a location near the front end of the pond, one near the middle, and one near the end of the pond (see Drawing C-3 in Section 10.2). Periodic monitoring includes sampling for DO and pH.

Upon initiating the diversion, weekly pH sampling will be conducted until pH readings are within +/- 0.5 pH of the average of all previous readings for 4 consecutive weeks, at which time sample frequency may be reduced to bi-weekly until 4 consecutive measurements are within the stated range, and then monthly after 4 consistent bi-weekly measurements. Similarly, weekly DO measurements will be conducted until DO readings are +/- 2 mg/L of the average of all previous readings for 4 weeks, before transitioning to bi-weekly, and then monthly as described above. Over the course of a diversion, ASB 1 sampling frequency can be reduced in this manner and may eventually be eliminated. If either of the operational response levels discussed below are reached, sample frequency will be increased as needed.

After diversion operations commence, there is an opportunity to reduce operational costs by reducing and eventually eliminating the number of aerators that are in operation. Beginning with seven aerators in operation across the pond, one aerator at a time is taken out of service, and conditions in the pond continue to be monitored to assess the impact of the reduced aeration on ASB 1 conditions. Aerator spacing is kept as uniform as possible even while turning off aerators, in order to keep the pond uniformly aerated throughout as much as possible.

Any decisions to reduce monitoring or eliminating aeration during diversion operations should be agreed upon by the Environmental Engineer and Manufacturing Engineer and approved by the facility's Environmental Manager and Operations Manager.

6.5.3.1.3 Operational Response

As aerators are taken offline and conditions in ASB 1 change, a reduction in DO can be expected. This can be tolerated to an extent without requiring an operational response. However, before conditions in the pond start to reach detrimental levels, operational responses should be implemented, as shown in the table below.

Parameter (measured in ASB 1)	**Condition**	**Action**
Dissolved Oxygen	Less than 2 mg/L	Incrementally increase number of operational aerators as needed to reach 2 mg/L
Dissolved Oxygen	Less than 1 mg/L	Turn on all available aerators

Notes: 1. mg/L – milligrams per liter

6.5.3.2 Transitioning out of Diversion Operations

In order to transition ASB 1 from diversion operations back to active operations successfully, the transition should occur slowly, providing ASB 1 time to transition back into active treatment without stirring up TSS and BOD or shocking the microbial population, and without negatively impacting treatment capacity in ASB 2 or compromising the ability of the system to meet the NPDES permit limits.

Before bringing ASB 1 back into normal operation, aerators should be turned back on one at a time, allowing for a few days between turning on each aerator. At this point, a full basin sampling event should be conducted, similar to the one that was conducted prior to initiating diversion operations. While fully aerating the pond before bringing it online should prevent problematic conditions, conducting a comprehensive sampling event will ensure that that is the case.

After receiving results from the sampling event, the flow control gates in the Diversion Structure should be manipulated to slowly begin introducing flow into ASB 1. This can be done by partially opening the inlet and outlet gates to the ASB 1 and allowing that configuration to be maintained for several days, while ASB 1 re-acclimates. Alternatively, the inlet and outlet gates can be fully opened for several hours at a time, and then closed. The amount of flow in and out of ASB 1 should start as a small portion of the total forward flow (approximately 15% - 20%) and increase over time.

6.6 SOLIDS

With the 2018 Kraft pulp mill shutdown, the amount of solids in the wastewater treatment plant significantly decreased. Aerated stabilization basins are designed so that the total suspended solids settle in areas in which mixing is reduced, where a portion of the organic content is digested, and the remaining solids compacted. Over time the settled sludge volume will increase to the point that active basin volume and depth can be reduced to adversely impact treatment. Therefore, the basins must be periodically dredged to maintain adequate treatment capacity.

Historically, dredging of the Camas ASBs has occurred at the following times:

- 1989 and 1990: 13,900 dry tons of solids removed.

- 1996 to 1999: 18,882 dry tons of solids removed.
- 2001: 14,698 dry tons of solids removed.
- 2005: 14,633 dry tons of solids removed.

Flows through the ASBs have greatly decreased over the years. The treatment system was designed for flows of about 76 MGD. In 1999, flows were typically around 50 MGD, and today flows are roughly 14 MGD. Likewise, influent BOD_5 and TSS loads have greatly decreased over the last 15 years. As such, the treatment system has a much greater capacity, and the frequency of dredging has decreased significantly.

The effect of accumulated solids on treatment performance is twofold; first they reduce the hydraulic retention time and, second, their decomposition leads to an increased aeration demand (due to the conversion of sludge to soluble BOD). Settled solids can also feedback nutrients (ammonia and phosphorus) into the water columns particularly during the warmer months. The Mill's ASBs are surveyed approximately annually (typically during the late summer) using a sonar unit equipped with a built-in GPS tracker. Data points are mapped to visually identify areas of accumulation. From the last several survey reports, it is evident that the majority of solids accumulate in ASB 1. TSS and BOD are measured at the inlet and outlet of the ASB 1, and at the outlet of ASB 2.

In collaboration with NCASI, a model was developed based on data from January 2012 – April 2014. This model was run to predict the minimum volume required to treat a 135,800 lb BOD/day load (the greatest single day load that the treatment system has received in recent history) with an average background load of 38,500 lb BOD/day and a flow of 23 MGD. The target for treatment at the outlet of the south ASB was set to 9,307 lb/day (our permit limit). This run was assuming that all aerators (approximately 32) were running. The required volumes in both ASBs were calculated to be 67 MG for ASB 1 and 51 MG for the ASB 2. As such, according to the sludge survey volume calculations, scheduling secondary solids removal/dredging the ASBs will be triggered when the volumes are reduced beyond 80 MG and/or 60 MG for the north and south ASBs, respectively. According to the latest cost estimates on pricing a dredging operation, mobilization/demobilization would cost about $50,000, and the cost per yard of materials dredged varies from $4/yard to $10/yard. The previously modeled load of 135,800 lb BOD/day is greater than the maximum expected loading now that the kraft pulp mill has been shut down. As a result, the previously calculated capacity requirements will be re-evaluated, and it is expected that the capacity requirements will be further reduced under new loading conditions. Based on treatment data and spreadsheet modeling, we believe that a single ASB will provide sufficient treatment, thus with two ASBs, the system will have excess capacity.

6.7 FLOW

6.7.1 Overview

As noted in the ASB design equation (see previous discussion), flow directly affects BOD removal by changing the retention time in the basin. Increasing flows reduce BOD removal by shortening the time available for treatment. The effect is most pronounced in high rate systems. By reducing the flow, BOD removal efficiency can be maintained even if the k factor deteriorates. Due to the mill restructure, the flow rate has been greatly reduced, and has been demonstrated to be more than adequate under the new conditions.

The Camas wastewater treatment system was designed for a maximum flow of 76 MGD. Recent flows have been well below this level following the Kraft pulp mill shutdown in 2018. Average monthly values between July 2018 – December 2019 have been in the range of 6 – 22 MGD. Total average flow is not a problem, but flow spikes could become significant if the first ASB is operated year around near its maximum volume (the traditional procedure to optimize retention time). This is due to the design of the flow curtains. The Camas ASBs are bisected by a midfeather or curtain of plasticized fabric. Dimensional stability of the midfeather is maintained by floats on the surface of the basin and opposing bottom anchors. Level control in the basin is accomplished by an outlet gate in ASB 1 and exit weir in ASB 2. Over the years, solids deposition (against and in the folds of the curtain), loss of float buoyancy, and fabric deterioration have caused portions of the midfeather in both ASBs to sink or leak. This has greatly impacted treatment efficiency by facilitating short circuiting.

The ASB curtains normally float 3-6 inches above the surface of the basin. In ASB 1, a 3-inch elevation change corresponds to a flow surge of 5.4 MGD. During normal mill operation, daily flow surges of 1-3 MGD are common and a monthly peak in the 4-5 MGD range is expected. This flow variability can be greatly accentuated, though, by storm events. Maximum rainfall in the Portland area occurs in December and January of each year and averages about 6 inches per month. The 24-hour maximums are approximately 2.6 inches/year with a once in 100-year maximum of 7.7 inches (December 1882). This weather pattern suggests that winter ASB 1 liquid levels should be adjusted to about 6 inches below submergence elevations to avoid storm event short circuiting (either over or under the curtain).

6.7.2 Instrumentation

Flow is measured by an ultrasonic level detector at the outfall weir. The instrument is calibrated on a monthly repetitive work order, and a third-party calibration is conducted on an annual basis.

ASB Outfall Flow Meter Calibration Procedure

There is a measuring element located on the outfall weir in the ASB 2 pond (see Drawing LD-89170 in Section 10.2). The weirs system was reduced from three weirs to one in 2018 to better handle lower effluent flow rates.

The standard formula of Q = 3.33(L-.2H)H^1.5 is used to calculate the effluent flow through the weir. Where Q = cfs, L = width of flume in feet, H = head of water over weir in feet, and MGD = Q*0.64632.

1. One caution, when measuring the head, it must be the head of the basin and not the head at the weirs. There are four instruments in this loop: an Endress ultrasonic sensor, an Endress transmitter, a recorder and a PLC.

2. On the Endress+Hauser Ultrasonic Measurement unit check the sensing element and make sure it is clean and the cable is in good shape. Check the transmitter for error code and record if any.

3. In the Endress+Hauser transmitter/computer check the zero and spans and compare to the loop drawing, set on if needed per service manual.

4. For monthly checks, measure the water level going over the dam. This is the level from the top of the weir's knife edge to the surface of the water (north weir only). Compare to the reading that the Endress+Hauser transmitter/computer shows. If needed, go to the standardizing section and set on.

   For yearly checks with the outside company, measure the water level going over the weir. This will be done by the Endress+Hauser factory technician. They will first put the measuring stick on the weir's knife edge below the surface of the water and record that reading. Now take the measuring stick to a place on the bank and put on the surface of the water and record that reading. Now subtract the two readings and compare to the reading that the Endress+Hauser transmitter/computer shows. If needed, go to the standardizing section and set on.

5. The recorder will also need to be checked. Using a 4-20 ma calibration transmitter, feed both zero, 25%, 50%, 75%, and 100% signals to it. Reading both the chart and digital display, make any needed adjustment so it matches the loop sheet.

6. The last item is the PLC/Honeywell system. Contact the steam plant control room and verify the reading on their display is the same that is on the Endress+Hauser transmitter/computer. If there is a difference, then you will need to check the PLC output card and replace if needed per manual.

7. When done, make a note in the logbook at the meter and also on the chart with your name, date and what you did. When you get back to the shop, log into the computer system and enter what you did, date, work order #, and any other needed data.

6.8 TEMPERATURE

Wastewater permits frequently contain an effluent temperature limit to protect the movement and reproductive success of fish and other organisms in the receiving water. Camas does not currently have a specific limit but is governed by general water quality requirements for the Columbia River. Effluent temperature is also important in wastewater treatment because if affects the sizing of aeration equipment and determines the time required for BOD removal (by controlling the bacterial reaction rates of both the organics in solution and the settled sludge, see previous sections).

The relative growth rate of bacteria typically found in wastewater treatment generally doubles for each 10° C (18° F) rise in the wastewater temperature up to the optimum. Temperatures above the optimum rapidly reduce the growth rate due to enzyme inactivation. Wastewater treatment involves bacteria from either of two groups, mesophilic or thermophilic. Mesophilic bacteria (the largest and most frequently occurring group) exhibit optimum growth rates at temperatures ranging from 20-40° C (68-104° F). The specific optimum depends upon the bacteria and the substrate. Thermopiles grow at temperatures above 40° C with a typical optimum of 55° C (131° F). Thermophilic bacteria grow faster than mesophilic bacteria, but they do not autofloc and are easily upset by changes in pH, temperature, substrate, and nutrients. They are also less resistant to toxic chemicals. As a consequence, thermophilic wastewater treatment is normally limited to special cases where other methods are impractical. Thus, wastewater temperatures are usually limited to about 35° C (95° F) to provide for optimal BOD removal under mesophilic conditions.

Effluent temperatures at Camas are decidedly mesophilic. Based on measurements at the outlet of ASB 1 in 2013, the monthly mean temperatures ranged from 4.4°C (40° F) in April to 29.9° C (86° F) in August. Since summertime temperatures are generally below 95° F, there appears to be ample opportunity for water volume savings should the economics be favorable. Smaller volumes and high temperatures would improve treatment efficiency.

6.8.1 Instrumentation

A temperature sensor (see Drawing LD-89172 in Section 10.2) is located at the outfall weir. It is calibrated on a semi-annual repetitive work order. The continuous monitoring instrument is verified annually to achieve an accuracy of 0.2°C.

ASB Temperature Outfall Calibration Procedure

1. The measuring element is located right before the ASB 2 outlet weir. Remove the temperature element and place it in a dry well calibrator. Read the value from the ASB OUT chart recorder. The temperature element and the dry well calibrator should read within 0.2 C. The dry well calibrator and chart recorder should both read the same temperature on both ranges.

2. If they don't read the correct temperature, then you will need to calibrate the meter as per the vendor's manual.

Reinsert the temperature sensor into the basin. and make a note in the logbook at the meter and also note on the chart your name and what was done. When you return to the shop call up the equipment number in the Passport system and log what was done and any problems you encountered.

6.9 MAINTENANCE

6.9.1 Aerators

The aerated stabilization basins have a sustained BOD removal capacity of 65,000 – 85,000 lb/day. In 2016, the average BOD inlet load was just 19,536 lb/day, but in 2018, the load dropped considerably due to the Kraft pulp mill shutdown. Clearly, under normal conditions, there is significant excess aeration capacity in ASB 1. As a consequence, the system has been operated to conserve energy and provide a buffer for multiple aerator failures, maintenance scheduling, and the failures that occur in winter when it is unsafe to do repair work on the basins (high winds, freezing conditions, etc.). To provide guidance for maintenance and operations, the Environmental Group regularly prepares an aerator operation strategy which considers the following items:

- Aerators positioned close to the inlet of ASB 1 are more important for BOD removal than those located at the exit of ASB 2.

- Aeration must be regulated across the length of treatment to provide sufficient dissolved oxygen for aerobic conditions. Anaerobic conditions lead to odor generation (hydrogen sulfide).

- Annually, most aerators should be fully functional. They are typically inspected and maintained as needed in the summer or fall (in anticipation of winter). In conjunction with this equipment milestone, we normally conduct our annual inspections of aerator anchors, tethers, cables, floats, and power supply components. A written report is prepared by the diving contractor and the necessary repairs are completed.

- Aeration in ASB 2 is minimized to provide quiescent conditions for solids capture. Aeration here is usually only needed in summer.

6.9.1.1 Startup

Power switches for the aerators are located in the electrical block houses located around the ponds. The aerators may be turned on or off as needed by the Lady Island Operator, electricians, or other knowledgeable mill employees.

6.9.2 Curtain Structures

The Camas aerated stabilization basins are bisected by a midfeather or curtain of plasticized fabric. This curtain maintains BOD removal efficiency by preserving the desired fluid retention time. The curtains and other underwater structures such as gates, pipelines, and outfalls are inspected at the same time as the aerators. This is done annually by a diving contractor. The diver swims the entire length of the curtain feeling for damage and potential problem areas. A written report is then prepared. Problems identified during previous inspections include the following:

- Anchors - Curtain anchors broken off or disconnected. Curtain positioning lines frayed, loosened, or broken.
- Fabric - Deteriorated fabric due to sun or decay. Tears due to localized turbulence (aerators placed or drifting too close to the curtain). Failure of seams or previous patches.
- Flotation - Leaking or waterlogged flotation. Anchor weights and floats unbalanced in localized areas.
- Solids - Solids accumulation against one side of the curtain or in the folds of the fabric that resulted in curtain submergence. Note that curtain cleaning can result in total suspended solids clouds that can affect monitoring or permit compliance. Plan accordingly.

If the needed repairs are minor the diving contractor usually completes them shortly after the inspection. Larger issues such as curtain replacement take longer to arrange but are usually completed during favorable weather in the year following discovery.

6.9.3 pH Control System

The outlet of ASB 2 is equipped with a CO2 distribution system which is composed of a microbulk tank, connected to three segments of porous tubing which diffuse CO2 gas into the water in front of the outfall. The tubing is tethered to lengths of chain which hold it in place on the bottom of the pond. Additionally, a set of mixing style aerators may be used as needed to aid with mixing in the effluent stream.

The distribution tubing is designed such that the pores in the tubing close when there is no pressure in the line, which reduces risks of plugging. Despite this, extended periods of disuse and heavy vegetation may result in accumulation of material on the tubing which could reduce the dosing efficiency. If plugging or reduced efficiency is suspected, it is appropriate to utilize an air compressor to pressure the line as long as pressure in the line does not exceed approximately 50 psig. Additionally, the lines may be inspected visually and reseated as needed to ensure that they do not become buried in sediment.

The mixing style aerators must be kept free from debris as much as reasonably possible. It is anticipated that vegetation will accumulate around the mixers during the

summer months. During this time, routine vegetation removal must be completed in order to protect the mixers from becoming entangled and damaged.

6.9.3.1 Startup

Power switches for the mixing style aerators are located in the South boat house which is located adjacent to the outfall. The CO2 dosing may be controlled either locally at the tank using a manual bypass valve, or remotely from the mill's process control system.

6.9.4 Dikes

The aerated stabilization basin containment dikes are constructed of compacted native soils such as clay and silt. Scheduled maintenance on these structures usually consists of routine grading and leveling of the perimeter road which is positioned on the top of the dike. The dikes are visually inspected during routine rounds made by operations and maintenance personnel. A more detailed visual examination is completed when the Columbia River is at seasonal low flow. Key inspection items are a search for seeps, leaks, and chemical staining; saturation or cup failures in the exterior surface of the dike; subsidence or slumping of the dike structure; and the presence of burrowing animals or incursive woody vegetation. A more formal civil engineering evaluation is also conducted after any significant structural stress such as the spring 1996 flooding. Since the first treatment basin (south ASB, ASB 2) was built, no leakage or structural failure has occurred.

6.9.5 Dredging

Aerated stabilization basins are designed so that total suspended solids settle in unaerated portions of the basin. These solids accumulate and, at some point, must be removed to avoid NPDES permit excursions of total suspended solids (TSS) and biochemical oxygen demand (BOD). The useful (undredged) life span of an ASB is highly mill specific, but generally falls in the range of 5-15 years. In large basins, the most frequent indicator of excessive sludge accumulation is seasonal TSS excursions similar to spring/fall overturns in shallow fresh water lakes. When the basin warms up, bacterial gasification disturbs the sludge blanket and carries TSS to the outfall. As time goes on, the excursions increase in intensity and duration and other problems such as high effluent BOD occur. At Camas, we have had some difficulty with localized sludge deposition which may submerge the flow diversion curtain and produce short circuiting. There have also been a number of seasonal TSS excursions in the past, when the pulp mill operated at the site. In these instances, system performance has been restored by solids removal and portions of the basins have been dredged six times since 1989. With the reduced TSS loading in the influent water following the mill restructure, the life span of the pond is expected to dramatically increase. The most recent effort was concluded in the summer of 2005.

While necessary to maintaining the efficiency of the aerated stabilization basins, dredging causes some side effects that need to be considered beforehand. Chiefly among them, the generation of waste solids that need to be properly disposed. Historically, this has been done onsite at the landfill. Additionally, sludge dredging, by its very nature, disturbs the solids blanket and generates clouds of total suspended solids. To minimize this effect, the Project Engineer should utilize the following techniques:

- Aerators – Aerator removal and replacement should be completed in a manner than avoids dragging floats and anchor blocks through sludge deposits.
- Dredging – Prioritize the dredging effort so that work begins in the latter regions of ASB 2 (the settling zone) and proceeds toward the inlet of ASB 1.
- Dredging Equipment – Use a suction dredge (either high or low volume) with polymer flocculation and centrifuge dewatering.
- Dredging Return Flow – Effluent from the dewatering system should be discharged to the middle of the south half of ASB 1. This provides for BOD removal in ASB 1 and TSS capture in ASB 2.
- Gates, Curtains, and Weirs – Keep mechanical dredging equipment away from gates, curtains, and weirs. Hand dredge or hydraulically flush solids from these areas. Review your plan with the Environmental Group before proceeding.

6.9.6 Effluent Recirculation (Bug) Pump

Wastewater from the discharge of the north basin (ASB 1) can be recirculated to the inlet structure at 6,000 gal/min for maximum BOD removal by providing temperature control and a supply of healthy microbes at the inlet. The treatment plant operator inspects the pump as needed while running, checking for bearing noise and lubricant level. Oil is added as necessary. If maintenance is indicated, file a work request in PTM and notify the Technical Leader and the Environmental Group.

6.9.7 Pest Control

6.9.7.1 Animals

Lady Island supports a significant population of resident and transient wildlife including birds (more than seventy species like blue heron, Canadian geese, ducks, egrets, killdeer, osprey, red tailed hawks, sparrows, pigeons, and numerous song birds), beaver, coyotes, deer, rabbits, mice, moles, small amphibians, reptiles, and mammals. In the past 30 years, only beaver and deer have presented a significant operational problem. Both have damaged trees which were planted to provide a vegetative visual screen for the landfills and the wastewater treatment system. Our response has been to replace the trees and fence key areas to prevent future damage. This has been reasonably successful. In addition to tree damage, beavers have also dammed up the stormwater drainage ditches to the west of the Lady Island Landfill. Since repeated dam removal was an ineffective beaver deterrent, the Washington

Department of Fish & Wildlife was contacted to remove the animals.

6.9.7.2 Insects

Landfills and wastewater treatment systems have the potential to propagate massive blooms of flying insects including black flies, house flies, mayflies, midges, and mosquitoes. Clark County has a program to control nuisance and disease carrying insects, and routinely inspects Lady Island. We control undesirable insects at the landfill by prohibiting the placement of garbage, putrescible waste, trash, and untreated secondary solids. Control is accomplished in the temporary secondary solids storage basin by varying the liquid level during dredging, removing marginal vegetation, and allowing the solids to crust when the dredging has been completed.

The aerated stabilization basins present a continuing problem due their static liquid level, rich wastewater nutrient content, and tendency to grow sheltering vegetation at the basin margins. ASB insect control depends upon herbicidal restraint of water side dike vegetation and physical removal of marginal reeds and grasses which are resistant to the U. S. EPA approved herbicides. Grass removal is completed annually (late spring/early summer) by lightly scraping the dike slope with a backhoe or by mowing. The dike is maintained at the desired slope by adding additional fill, as necessary. The harvested vegetation is loaded into a dump truck and hauled to one of several compost sites on Lady Island or left to dry in place if not creating additional nuisance. Both the herbicide applications and the vegetation removal events are completed by outside contractors.

Elsewhere on Lady Island, insect control is accomplished by routine cleaning of drainage ditches, maintenance of proper drainage slopes (to avoid ponded water) and regular mowing of grassed areas. In wetland/natural areas insect control is provided free of charge by the Clark County Public Health who routinely monitor insect larvae levels and treat the offending areas.

6.9.7.3 Weeds

Clark County has a noxious weed program and the mill is obligated to treat Lady Island operating areas to control this problem. Herbicides are usually applied in the spring (pre-emergence) by a licensed contractor. In addition to these activities, proper management of the ASBs and the limited purpose landfill requires the prevention of growth or the removal of woody plant incursions on the containment dikes or berms. This is needed to prevent leachate or wastewater leakage and ultimately failure of the containment structure. A single annual removal campaign is usually sufficient.

6.10 UPSET/CONTINGENCY

6.10.1 Flow

The Camas wastewater treatment system was designed for a maximum flow of 76 MGD. Recent flows have been well below this level with monthly values before the 2018 mill restructure ranging from 18 – 28 MGD and future flow expected to range from 5 – 10 MGD. Total average flow is not a problem, but flow spikes could become significant if the first ASB is operated year around near its maximum volume (the traditional procedure to optimize retention time). This is due to the design of the flow curtains. The Camas ASBs are bisected by a midfeather or curtain of plasticized fabric. Dimensional stability of the midfeather is maintained by floats on the surface of the basin and opposing bottom anchors. Level control in the basin is accomplished by an outlet gate in ASB 1 and exit weirs in ASB 2. Over the years, solids deposition (against and in the folds of the curtain), loss of float buoyancy, and fabric deterioration have caused portions of the midfeather in both ASBs to sink or leak. This has greatly impacted treatment efficiency by facilitating short circuiting.

The ASB curtains normally float 3-6 inches above the surface of the basin. In ASB 1, a 3-inch elevation change corresponds to a flow surge of 5.4 MGD. During normal mill operation, daily flow surges of 1-3 MGD are common and a monthly peak in the 4-5 MGD range is expected. This flow variability can be greatly accentuated, though, by storm events. Maximum rainfall in the Portland area occurs in December and January of each year and averages about 6 inches per month. This weather pattern suggests that winter ASB 1 liquid levels should be adjusted to about 6 inches below submergence elevations to avoid storm event short circuiting (either over or under the curtain).

6.10.2 High BOD

As mentioned previously (see Section 6.3), following the 2018 Kraft pulp mill shutdown, the expected BOD loading to the ASBs should be far below the established design capacity of the secondary treatment system of 65,000 – 85,000 lb/day. The time frame implied in this conclusion is an interval of a month or more. Although not anticipated due to the decreased loading following the pulp mill shutdown, the system can handle substantially higher loads for shorter periods if the following steps are executed:

- Maintain uniform influent pH in the range of 6.0 to 8.0.
- Operate all of the installed aeration in both treatment basins.
- Operate the wastewater recirculation pump (“bug pump”) with the air bleed valve closed.
- Increase the nutrient addition rate in proportion to the BOD load at a BOD:N:P ratio of 100:2.0:0.5.
- Increase the north ASB mixed liquor solids level by adding waste activated sludge (WAS) from a pulp and paper mill (ex. Georgia-Pacific’s Wauna Mill) or acclimated freeze dried bacteria. The suggested WAS dosage is four or more tank truck loads

per day added to the ASB inlet during the BOD excursion.

Other validated techniques which have been used to limit the BOD load applied to the basins or the quantity discharged include the following:

	BOD Reduction (lb/day)
Flow reduction on the last day of the month by raising the liquid level in ASB 1 (15-20 million gallons).	10,000
Flow reduction by mill wide water conservation (assume a flow reduction of 3 million gallons/day, k = 0.9).	1,400

6.10.3 North ASB Foam

6.10.3.1 Description

This section may be referenced as needed. Excessive aeration basin foaming usually follows a large increase in BOD load, a spill or major shifts in process chemical usage (ex. defoamers or dispersing agents). The risk of a significant foaming event be drastically decreased following the shutdown of the Kraft pulp pill in 2018. As such, all the defoamer was removed from the Camas Mill wastewater treatment operations in 2019 to prevent chemical expiration and spoiling. Spills at night can be identified by excessive foaming in the coil filter filtrate vacuum separator.

The defoamer application rate should be increased whenever weather conditions and the foam level in the basin poses the risk of airborne foam. The initial operator response to a large liquor spill should be to notify the team leader and file a PGR (performance gap report) in the PTM system. This would be followed by an increase in the defoamer feed rate by placing on manual control (operating 24 hours/day instead of automatic—4 periods of 3 hours) and/or increasing the gallons per day pumping rate. A follow-up evaluation of the foam situation should be conducted at two-hour intervals with corresponding adjustments to the defoamer feed rate. If four or more hours have elapsed since the onset of excessive foam and the situation has not improved, the operator should consider the addition of a shock load of defoamer (250-350 gallons) at the clarifier launder ring.

If conditions are severe and airborne foam is occurring, immediate action must be taken to control the foam. One useful technique has been to use a trailer tank with a pressure pump to spray a mixture of wastewater and defoamer on foam accumulations on the north ASB. This is especially helpful if the spill has moved more than a third of the path length in the basin and previous control methods have been ineffective.

6.10.3.2 Defoamer Start-Up

Defoamer will be pumped from a 5,600 gallon storage tank into the clarifier launder ring. Defoamer flow rate is controlled by a pump controller. The operating sequence is as follows:

1. Open storage tank valve.

2. Turn on supply pump.

3. Adjust the pump to the desired flow rate.

6.10.3.3 Defoamer Shutdown

1. Turn off supply pump.

2. Close storage tank valve.

6.10.4 pH

The mill used to control pH by adding acid (reduces the pH number) to wastewater at Lady Island. Operators monitored this system by observing the inlet pH on the PI System or the monitor in the primary clarifier control room. Inlet water currently remains at a neutral level during operation, so no such adjustment is needed going forward. The target pH for optimum wastewater treatment is 6.0 to 8.0. Major pH swings outside of this range may occur due to process upsets or storage tank leakage. If that occurs, immediately notify the team leader to control the issue at its source. If the pH upset continues for 24 hours or more, we may have to reseed the ASBs with bacteria to maintain the required treatment efficiency. This can be accomplished by adding waste activated sludge (WAS) from a pulp and paper mill (ex. Georgia-Pacific's Wauna Mill) or acclimated freeze-dried bacteria. The suggested WAS dosage is four or more tank truck loads per day added to the ASB inlet until the pH returns to the 6.0 to 8.0 range.

Additionally, CO_2 is added to the effluent at the ASB 2 outfall weir as described above. CO_2 dissociates to carbonic acid in water which has proven to be a reliable, safe, and gentle way to reduce effluent pH compared to mineral acids such as sulfuric acid.

6.11 EQUIPMENT INVENTORY

An inventory of all spare parts relating to the secondary treatment system can be found in the Camas Mill Passport system, which may be accessed through the Camas home page. This includes information regarding equipment warranties, manufacturer instructions, and ordering information. Supplemental equipment information including catalogues and manuals can be found in the engineering or maintenance file system. Contact information for parts suppliers can be found on the Camas Mill Intranet or by contacting the Purchasing Department.

7.0 LADY ISLAND SAFETY/SECURITY

7.1 EMERGENCIES

7.1.1 Introduction

The most likely emergency to occur on Lady Island is a personal injury or medical emergency. Since the Lady Island and Steam Plant operators are mobile and usually work alone, they are equipped with two-way radios for instant communication with the Clockroom. The Clockroom can mobilize the resources necessary to address medical emergencies, fires, floods, chemical spills/releases, hunters, trespassers, traffic accident victims, and vandals.

7.1.2 Fires

Industry and mill experience indicate that primary solids landfills and wastewater treatment plants by themselves seldom encounter fires. The fires that do occur are usually associated with trespasser negligence (smoking, fires, etc.) and mobile equipment (bulldozers, loaders, trucks, and traffic accidents). The fire potential for mobile equipment is greatly diminished by regular cleaning and maintenance, especially of engine compartments and radiators.

7.1.3 Floods

The elevation of the Columbia River at Camas is directly proportional to river flow and peaks most years in June. The low typically occurs in September or October. River levels had never presented a problem for landfill or wastewater treatment operations until February 1996 when the mill experienced a once in 30 plus years flow. The Columbia River crested at 29.6 feet CMD (Camas Mill datum) which was sufficient to cause significant flooding on Lady Island and force the shutdown of the mill. In most cases, severe Columbia River flooding is preceded by enough warning that preventative measures (orderly shutdown, sandbagging, waste diversion, etc.) can be taken to avoid catastrophic failures. To aid in the prioritization of these protective measures, we have assembled the following flood and Lady Island equipment elevations. The data are expressed in feet relative to the Camas Mill datum (CMD plus 0.96 feet equals U.S.G.S. mean sea level datum):

		Feet, CMD
Flood Events:	June 1948	37.90
	December 1964	29.90
	February 1996	29.63
Lady Island:	Primary Solids Pump Room Floor	16.00
	Landfill Perimeter Roads	26.00

South ASB Outlet Weirs (3)	26.70
South ASB Normal Level	27.50
Landfill East Leachate Pump Station Top	28.00
Primary Clarifier Launder Ring Floor	29.00
ASB Berms (Original Construction)	33.00
Landfill Berms	34.00
Coil Filter Building Floor	34.50
Primary Clarifier Launder Ring Top	40.00

7.1.4 Spills and Releases

Spills or releases of hazardous chemicals (ammonium poly-phosphate, sulfuric acid, etc.), fuels (gasoline, diesel), oil (defoamer products, lube oil, etc.), boiler ash, sludge, or wastewater to the environment (air, bare ground, water) must be reported immediately to the Clockroom at telephone extension 5555. The Clockroom attendant will mobilize the resources necessary to address the problem.

7.2 HIGH RISK SCENARIOS

Because of the proximity to the Columbia River, some equipment and system components pose a greater risk to the environment due to the possibility of polluting surface waters in the event of equipment failure. Components that pose this risk include:

- One diesel tank at the effluent pump station.
- The main conveyance line that goes under the Camas Slough.
- The dam berms at the North and South ASBs.

Routine inspections are in place to ensure that these systems are in good condition and are functioning as designed. The inspection schedule for the above listed components are as follows:

- The diesel tank at the effluent pump station is checked daily by Outside Operator. Once a month the Instrumentation department checks inspects the system and tests the pumps to ensure their functionality.
- The main effluent line and the former corrosive sewer line are inspected annually by a third party. An annual report of this inspection is sent to the Department of Ecology. MERT conducts visual checks on the slough during their daily rounds which occur at least once per shift.
- The dam berms at the North and South ASBs are checked daily by the Lady Island Operator and/or Steam Plant Operator, monthly and annually by the Lady Island Optimizer and Environmental Engineer. An annual dam inspection report on the ASBs is sent to the Washington Department of Ecology’s Dam Safety Office.

7.3 SITE SAFETY

The employees who routinely work on Lady Island are subject to Camas Mill and department safety rules. In the aggregate, these procedures cover chemical hazards, compressed gases, confined spaces, guards, electrical equipment emergency procedures, fire-fighting, flammable materials, glassware hazards, heating equipment, housekeeping, injury reporting, lockouts, mechanical equipment, mobile equipment, personnel protective equipment, visitor safety, and waste disposal.

7.4 SITE SECURITY

The Lady Island Landfill and wastewater treatment facilities are separated from State Route 14 by fencing and gates that requires badge or key entry. "No Trespassing/No Hunting" signs are posted along the fence and "No Admittance" signs are located at the entrance gates. Key facility locations are lighted. Operators are instructed to notify the Clockroom (at telephone extension 5555) of any "unauthorized visitors". The operator presence is supplemented by roving mill emergency response team patrols. In addition, police from the City of Camas will respond to reports of illegal entry, hunting, trespassing, dumping, theft, or vandalism.

8.0 WASTEWATER MONITORING AND SAMPLE COLLECTION

8.1 WASTEWATER SAMPLE COLLECTION

Wastewater samples are collected at multiple points in the overall system by refrigerated composite samplers: the inlet to the North ASB, the inlet to the South ASB, and the outlet to the river. Composite samplers are also periodically set up at the inlet and outlet of the Primary Clarifier to assess the efficiency of the primary treatment system. Refrigeration within these samplers are maintained at 0-6°C. At each of these locations the sampler typically takes a 50 ml sample every 15 minutes for a 24-hour period. The sample size may be adjusted, as needed.

A third-party sample company collects the composite samples as needed from a 2.5-gallon glass sample container. The composite sample glass container located at the outlet to the river is exchanged with a cleaned container. The filled container is separated into sample containers and then prepared for shipment to the analytical lab. Dissolved oxygen is measured at the outlet of each ASB in the secondary treatment system to determine wastewater aeration needs.

The general rules that are applicable to all sampling include:

- Make sure that the aliquot of the sample taken for analysis is representative of the sample (i.e., that the sample collected is well mixed before removing the aliquot to the analyzed).
- For samples sent offsite for analysis, custody seals should be placed over the top of the container or the shipping cooler.
- Adherence to proper sample storage and preservation procedures is critical.
- Documentation of sample custody is essential.

8.2 WASTEWATER PROCESS VARIABLE MONITORING

The normal (baseline) monitoring frequency is outlined as follows:

- For Outfall 001:
  - Continuous Sample: flow, pH, temperature
  - As needed Grab Sample: dissolved oxygen
  - 3X/week Composite Sample: BOD, TSS
  - Monthly Composite Sample: AOX
  - Annual Composite Sample: Dioxin (2,3,7,8-TCDD), Furan (2,3,7,8-TCDF)
- For Blue Creek:
  - Continuous: flow, pH

9.0 NPDES PERMIT

The full text of the mill's NPDES permit can be found on the Camas Mill Intranet. (M:\BUSTECH\Environmental Data\docs\Permits\2015 NPDES Permit.pdf).

The Camas NPDES permit requires that records of all monitoring information be retained for a minimum of three years. This includes "all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit." In addition, the permit requires that the following information be recorded for each measurement or sample:

1. The date, exact place, method, and time of sampling or measurement
2. The individual who performed the sampling or measurement
3. The dates the analyses were performed
4. The individual who performed the analyses
5. The analytical techniques or methods used
6. The results of all analyses

Continuous monitoring instrumentation data (such as pH, flow, and temperature) is maintained electronically in the mill's PI Process Book system (PI). The data from PI is summarized and reviewed for anomalies on a routine basis and is used to prepare applicable compliance reports. If PI data is unavailable, a backup electronic recorder is located at critical compliance points within the mill and may be used as needed to verify compliance with applicable limits and backfill missing PI data for reporting.

Additional reporting requirements, particularly concerning noncompliance, are detailed in the NPDES permit.

10.0 APPENDIX

10.1 PERSONNEL LISTING AND CONTACT INFORMATION

Lady Island is manned by a Lady Island Operator Monday through Friday during day shift. During swing, graveyard shift, and on weekends, the Steam Plant operators make rounds on Lady Island at least once per shift. Below is contact information for Lady Island operations and compliance. Anyone below may be contacted through the GP Clock room.

Name	Phone Number
GP Clockroom	(360) 834-8115
Lady Island Control Room*	Ext. 348208
Steam Plant Control Room*	Ext. 343254
Erik Mattson	(360) 600-9611
Samantha McDowell	(360) 834-8439
Jeff Dambrun	(360) 834-8485
Sunanda Chunder	(360) 607-8469

*Contacted through the GP Clockroom

10.2 DRAWINGS AND FIGURES

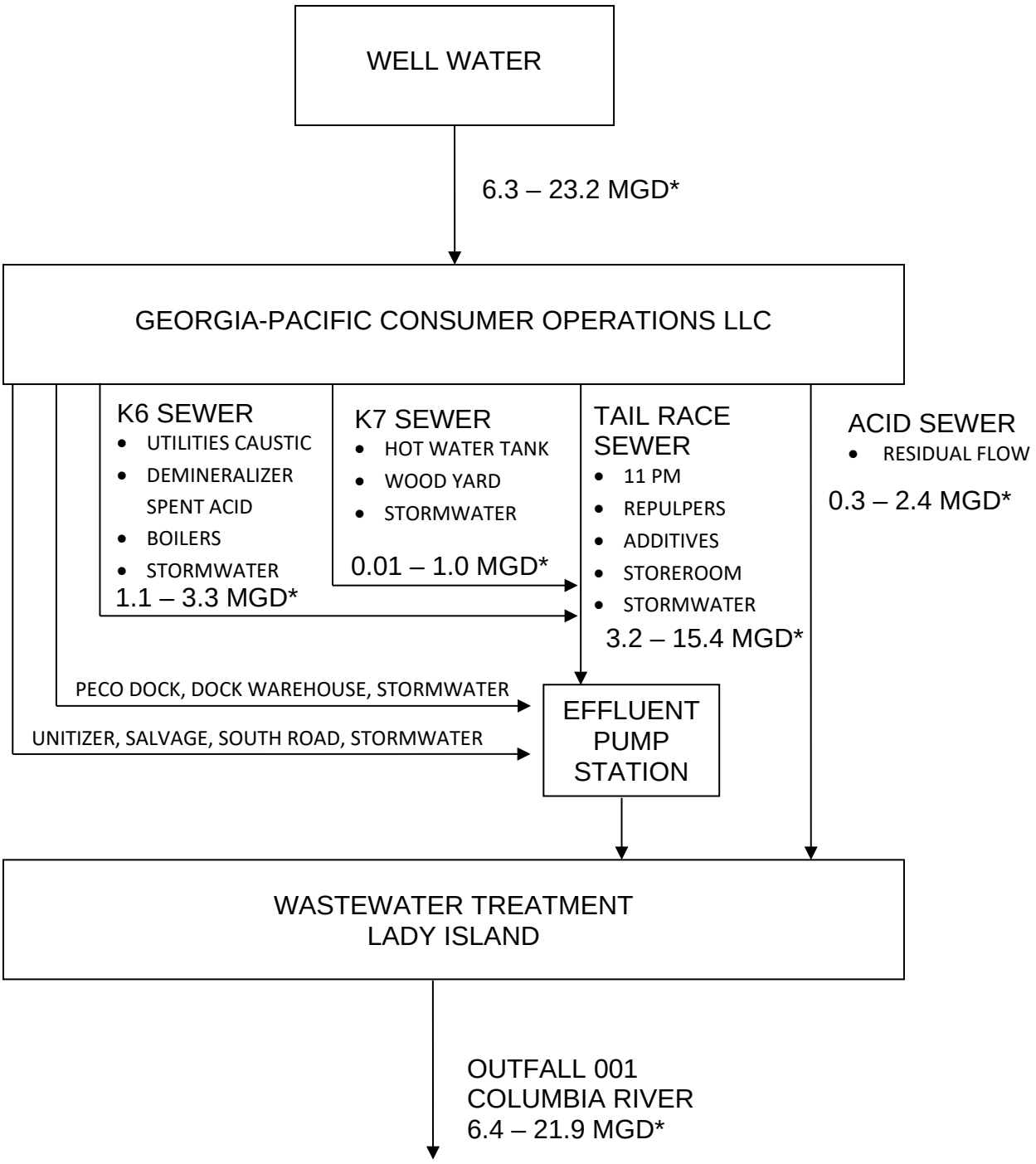
Figure C-1	-	Camas Mill Fresh Water Flow Schematic, 2020
Figure C-2	-	Camas Mill Outfall 001 Wastewater Treatment Flow Schematic, 2020
Drawing G-38184	-	Total Mill Sewer and Tank Map Camas Mill (Sht 1-14)
Drawing F-38208	-	Camas Mill Sewer Mix Point Flow Diagram
Drawing M-26279	-	Mill Effluent Screens – G. A. Plans
Drawing M-26286	-	Mill Effluent Screens – G. A. Sections
Drawing LD-89007-1	-	Primary Treatment Effluent Pumps Sump – Level, Sheet 1
Drawing LD-89007-2	-	Primary Treatment Effluent Pumps Sump – Level, Sheet 2
Drawing LD-89007-3	-	Primary Treatment Effluent Pumps Sump – Level, Sheet 3
Drawing LD-89007-4	-	Primary Treatment Effluent Pumps Sump – Level, Sheet 4
Drawing LD-89001-1	-	North Blue Creek – Flow, Sheet 1
Drawing LD-89001-2	-	North Blue Creek – Flow, Sheet 2
Drawing LD-89009	-	South Blue Creek pH
Drawing LO-23020	-	Sanitary Sewers Plan

Drawing LD-96001	-	Dock Warehouse Basement Drainage Sump – Level
Drawing LD-96002	-	Dock Warehouse Sump RTU
Drawing E-33861	-	Woodyard MCC WY-1 Power One-Line Diagram
Drawing LD-10014	-	Wood Yard Sump Status – Alarm
Drawing LD-10016	-	Grit Sump Area RTU
Drawing LD-89017-1	-	Effluent Clarifier Outfall – Flow, Sheet 1
Drawing LD-89017-2	-	Effluent Clarifier Outfall – Flow, Sheet 2
Drawing 001-C-0011	-	Ground Water Monitoring Well Locations
Drawing P&ID-26666	-	Secondary Treatment P&ID
Drawing I-45932	-	Secondary Treatment ASB Outfall pH Control Block Diagram
Drawing LD-89171-1	-	ASB Outfall Effluent – pH
Drawing LD-89171-2	-	ASB Outfall Effluent pH
Drawing LD 89173-1	-	ASB Outfall CO2 Addition - Flow
Drawing LD 89173-2	-	ASB Outfall CO2 Addition - Flow
Drawing E-38955	-	ASB Electrical Layout
Drawing LD-89170-1	-	ASB Outfall Effluent Line – Flow, Sheet 1
Drawing LD-89170-2	-	ASB Outfall Effluent Line – Flow, Sheet 2
Drawing LD-89172	-	ASB Outfall Effluent - Temperature
Drawing LO-38236	-	Fiber Receiving and Storage Area Sumps
Drawing LO-28436	-	Corrosive Sewer Layout
Drawing LD-96003-1	-	Dock Warehouse Stormwater Tank – Sheet 1 of 3
Drawing LD-96003-2	-	Dock Warehouse Stormwater Tank – Sheet 2 of 3
Drawing LD-96003-3	-	Dock Warehouse Stormwater Tank – Sheet 3 of 3
Drawing E-37279	-	Woodyard Generator
Drawing E-45857	-	South ASB Algae Control Layout
Drawing P-28390	-	36-inch Acid Sewer Crossing to Lady Island
Drawing P-28391	-	36-inch Acid Sewer Line Details
DrawingCSA2019063	-	Airgas CO2 Site Layout (vendor drawing)
DrawingCSA2019063	-	Airgas CO2 System Layout (vendor drawing)
Figure C-3	-	Baseline Characterization Sample Locations – ASB 1
Figure C-4	-	Periodic Monitoring Sample Locations – ASB 1

10.3 VERSION CONTROL LOG

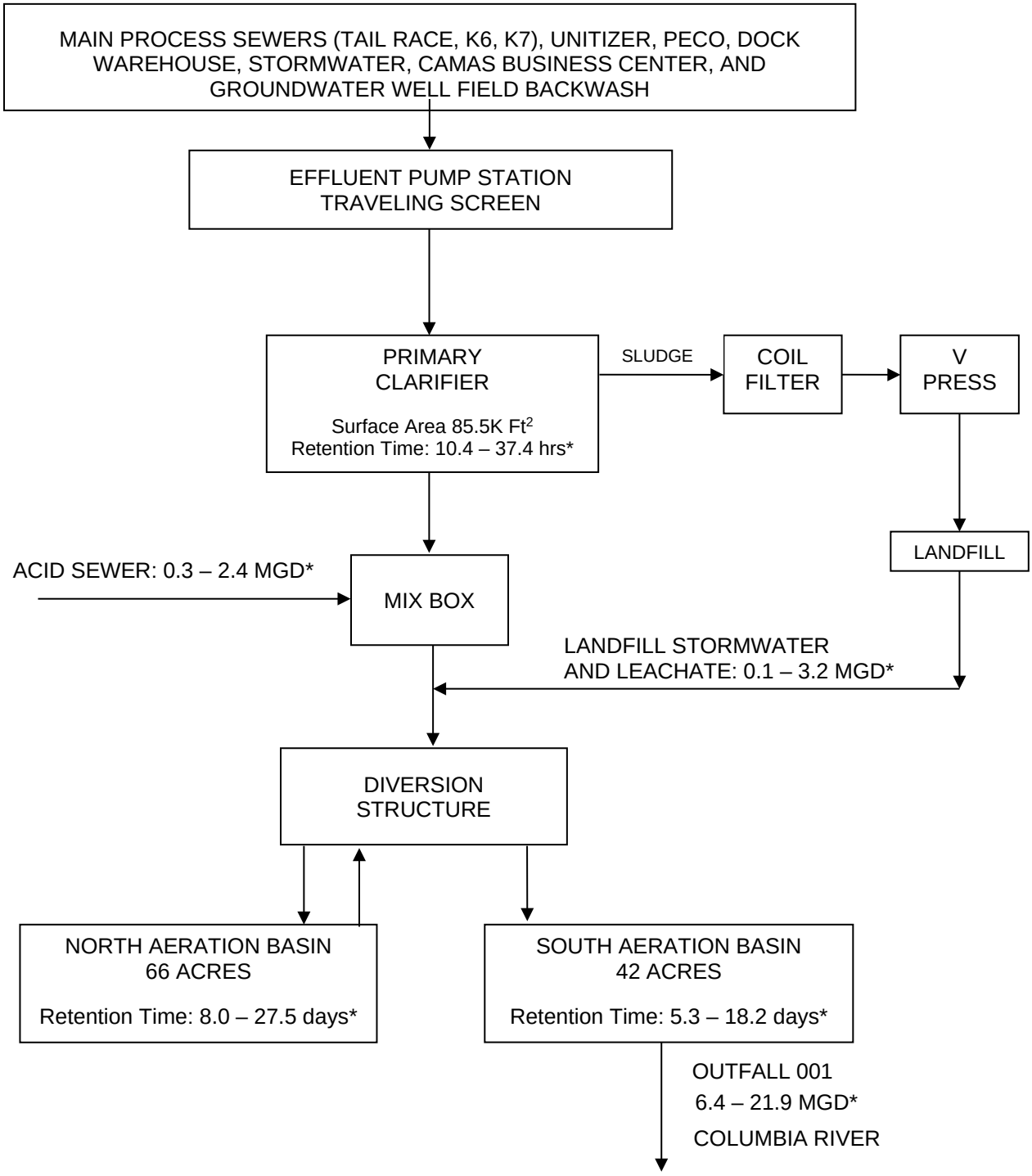
Wastewater Collection and Treatment Standard Operation and Maintenance Procedures	
Date	**Description of Revision(s)**
July 2019	Initial version control log. Revision completed with Arcadis including Outfall 001 CO_2 pH control system and North ASB flow diversion procedures. General updates throughout for clarification. Updated wastewater data tables.
August 2019	Revision completed to incorporate comments from Ecology's review of the July 2019 version. Added maps of sample locations for periodic and baseline testing during North ASB Diversion Conditions. Clarified relation of mixing style aerators at the ASB Out to TSS conditions at outfall. Included schematic identifying location of mixers and CO_2 distribution tubing.
July 2020	Revision completed to update testing frequency of COD and DO, and to provide updated operational data for the period following the shutdown (July 2018-December 2019) in preparation of the upcoming NPDES permit renewal. Removed language about contributions from former corrosive (acid) sewer as it now a closed system with no stormwater, and minimal contributions after reroute of demineralizers in January 2020. Clarified that sulfuric acid addition is no longer required and will be decommissioned going forward. Added verbiage about using backup strip chart data as needed to supplement PI data for compliance reporting. Made NPDES permit into section 9.0.

FIGURE C-1. CAMAS MILL FRESH WATER FLOW SCHEMATIC, 2020

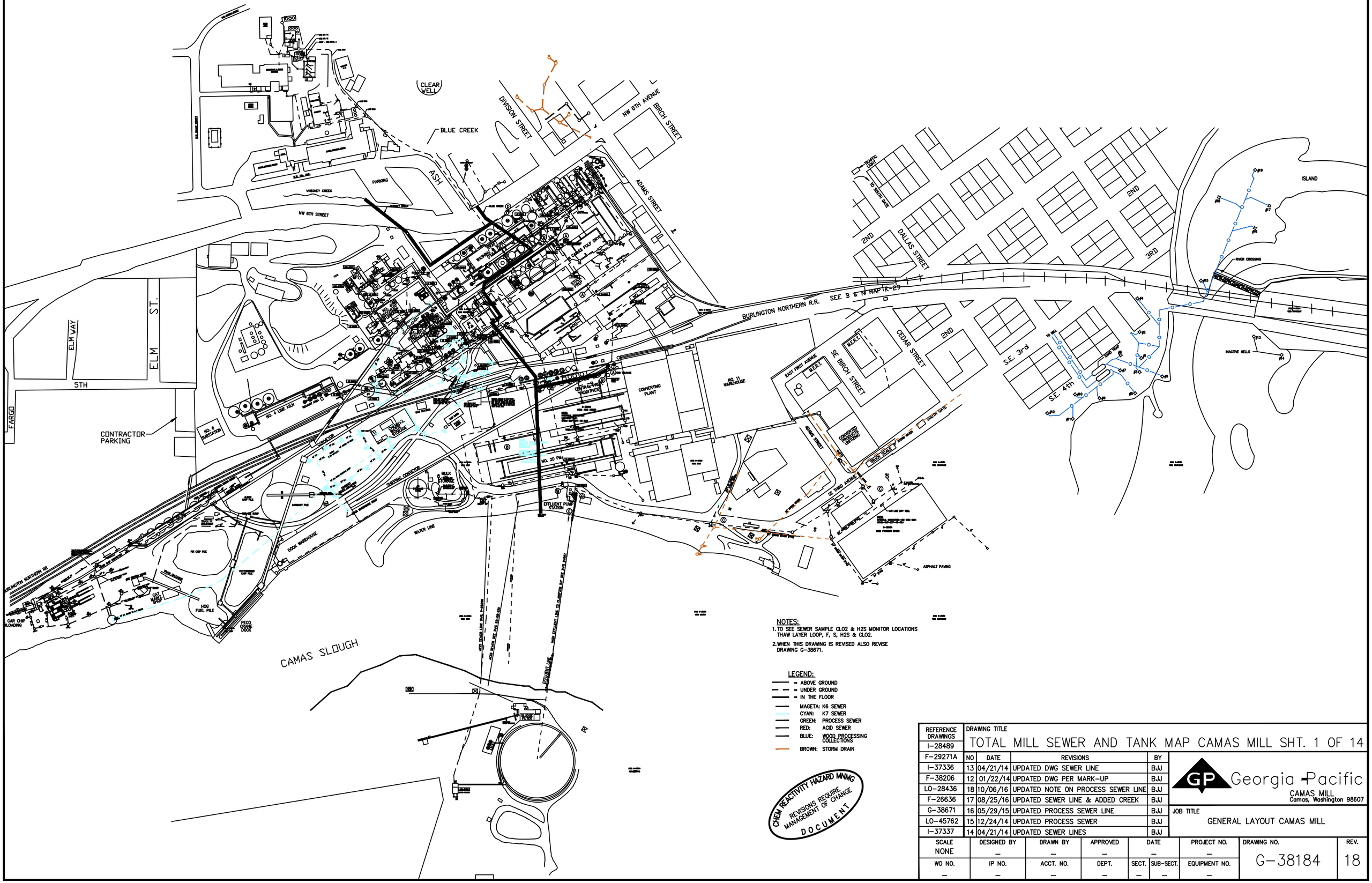


*Range of monthly averages based on data collected between July 2018 and December 2019

FIGURE C-2. CAMAS MILL OUTFALL 001 WASTEWATER TREATMENT FLOW SCHEMATIC, 2020



* Range of monthly averages based on data collected between July 2018 and December 2019.



NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

LEGEND:

- = ABOVE GROUND
- = UNDER GROUND
- = IN THE FLOOR
- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS
- BROWN: STORM DRAIN

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE: TOTAL MILL SEWER AND TANK MAP CAMAS MILL SHT. 1 OF 14

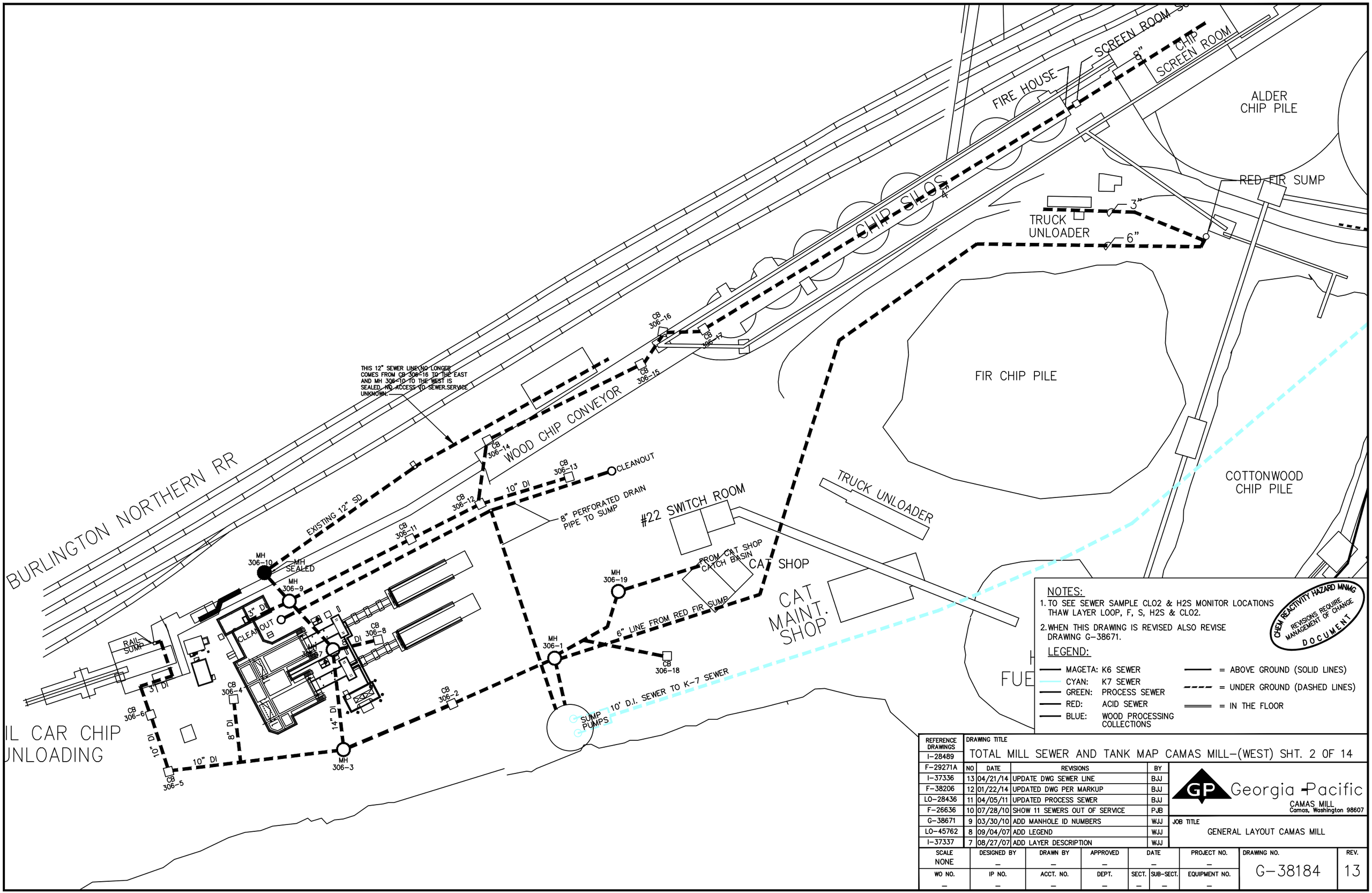
NO	DATE	REVISIONS	BY
13	04/21/14	UPDATED DWG SEWER LINE	BJJ
12	01/22/14	UPDATED DWG PER MARK-UP	BJJ
18	10/06/16	UPDATED NOTE ON PROCESS SEWER LINE	BJJ
17	08/25/16	UPDATED SEWER LINE & ADDED CREEK	BJJ
16	05/29/15	UPDATED PROCESS SEWER LINE	BJJ
15	12/24/14	UPDATED PROCESS SEWER	BJJ
14	04/21/14	UPDATED SEWER LINES	BJJ

Georgia-Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	18

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–



NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG — REVISIONS REQUIRE MANAGEMENT OF CHANGE — DOCUMENT

LEGEND:

MAGETA:	K6 SEWER	= ABOVE GROUND (SOLID LINES)
CYAN:	K7 SEWER	= UNDER GROUND (DASHED LINES)
GREEN:	PROCESS SEWER	= IN THE FLOOR
RED:	ACID SEWER	
BLUE:	WOOD PROCESSING COLLECTIONS	

REFERENCE DRAWINGS: I-28489, F-29271A, I-37336, F-38206, LO-28436, F-26636, G-38671, LO-45762, I-37337

DRAWING TITLE: TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(WEST) SHT. 2 OF 14

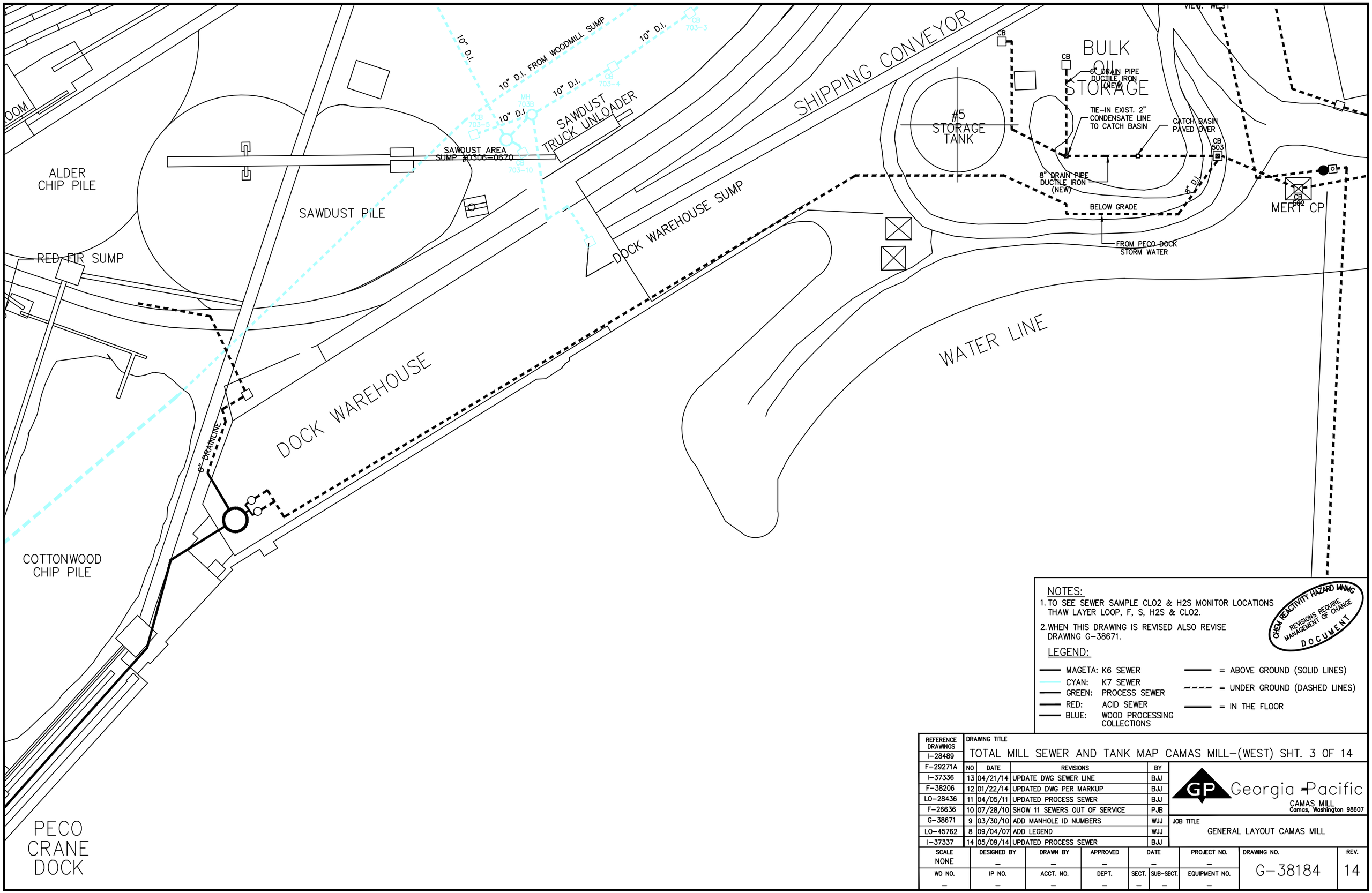
NO	DATE	REVISIONS	BY
13	04/21/14	UPDATE DWG SEWER LINE	BJJ
12	01/22/14	UPDATED DWG PER MARKUP	BJJ
11	04/05/11	UPDATED PROCESS SEWER	BJJ
10	07/28/10	SHOW 11 SEWERS OUT OF SERVICE	PJB
9	03/30/10	ADD MANHOLE ID NUMBERS	WJJ
8	09/04/07	ADD LEGEND	WJJ
7	08/27/07	ADD LAYER DESCRIPTION	WJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	13

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–



NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE
TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(WEST) SHT. 3 OF 14

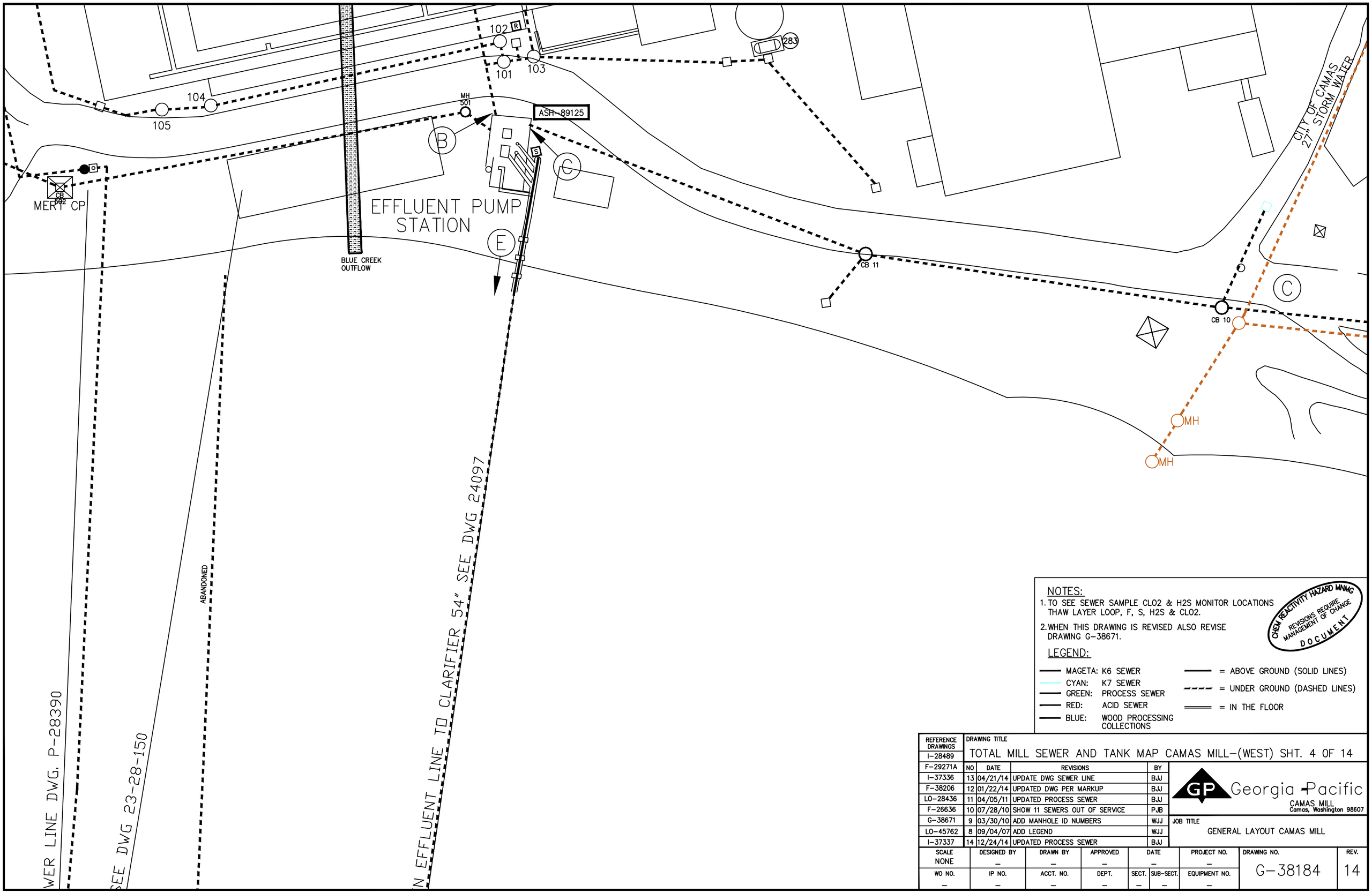
NO	DATE	REVISIONS	BY
13	04/21/14	UPDATE DWG SEWER LINE	BJJ
12	01/22/14	UPDATED DWG PER MARKUP	BJJ
11	04/05/11	UPDATED PROCESS SEWER	BJJ
10	07/28/10	SHOW 11 SEWERS OUT OF SERVICE	PJB
9	03/30/10	ADD MANHOLE ID NUMBERS	WJJ
8	09/04/07	ADD LEGEND	WJJ
14	05/09/14	UPDATED PROCESS SEWER	BJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE
GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	14

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–



NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE: TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(WEST) SHT. 4 OF 14

NO	DATE	REVISIONS	BY
13	04/21/14	UPDATE DWG SEWER LINE	BJJ
12	01/22/14	UPDATED DWG PER MARKUP	BJJ
11	04/05/11	UPDATED PROCESS SEWER	BJJ
10	07/28/10	SHOW 11 SEWERS OUT OF SERVICE	PJB
9	03/30/10	ADD MANHOLE ID NUMBERS	WJJ
8	09/04/07	ADD LEGEND	WJJ
14	12/24/14	UPDATED PROCESS SEWER	BJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	14

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–

CITY OF CAMAS
27" STORM WATER

18" STORM SEWER

SE THIRD AVENUE

TRUCK DOCK

CB 1
CB 2
CB 3
CB 5
CB 6
CB 7
CB 8
CB
C.O.

4" LINE FROM DEEP WELL BACKFLUSH

AIR LINE DRY WELL

24" STORM WATER (PVC)

MH

10

NOTE:
INTERNAL INSPECTION USE WITH SMP:
CRHM-SMP-EFF-48-024

G-38184

VIEW: PROCESS SEWER

24" STORM WATER (PVC)

8"

12"

MH

12"

24" (PVC)

10"

MH

ASPHALT PAVING

NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE
TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(NORTHWEST) SHT. 5 OF 14

NO	DATE	REVISIONS	BY
13	04/21/14	UPDATE DWG SEWER LINE	BJJ
12	01/22/14	UPDATED PER MARK UP	BJJ
11	04/05/11	UPDATED PROCESS SEWER	BJJ
10	07/28/10	SHOW 11 SEWERS OUT OF SERVICE	PJB
9	03/30/10	ADD MANHOLE ID NUMBERS	WJJ
8	09/04/07	ADD LEGEND	WJJ
7	08/27/07	ADD LAYER DESCRIPTION	WJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE
GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	-	-	-	-	-	G-38184	13

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
-	-	-	-	-	-	-

ASH-24487
AE 89028
ASH-24674
AE 24430
ASH-23674
ASH-22306
AE 22241
AE 22242
AE 22341
AE 22342
AE 89077
AE 89073
AE 89075
AE 89076
FI-89014
AE 89003
ASH-89000
ASH-22206
AE 89074
ASH-20117
ASH-20010
AE 89070
AE 89071
AE 89072
AE 89004
FI-89015
FI-89058
AE 89057
VIEW: NORTHWEST
NO. 5 RECOVERY FURNACE
NO. 4 RECOVERY FURNACE
#4 P.B.
#5 P.B.
#3
#4
#5 STORAGE TANK
SOG AREA
LD-20011
DEAD
NO. 4 LIME KILN
RECAUST AREA
CHIP CONVEYOR
CONVEYOR
SHIPPING CONVEYOR
GAS STATION
CAR BARN
PAINT SHOP
CHEMICAL WASTE STORAGE
SUMP PUMP
SLOPE 0 TO 1/16" /FT
10" SEWER TO SUMP
10" D.I. FROM WOODMILL SUMP
10" D.I.
12" D.I.
SAWDUST TRUCK UNLOADER
SAWDUST AREA
6" PERFORATED DRAIN PIPE
FOAM TRAP IN SEWER PREVENTS ACCESS TO SEWER LINE BETWEEN M.H. 701-2 AND M.H. 702
ACID SEWER VENT AND NCG VENT ENTER AT MANHOLE 701-2
NOTE: NO ACCESS TO THIS VAULT CAN NOT INSPECT VAULT AND CAN NOT INSPECT SEWER LINE BETWEEN M.H. 701-2 AND 702 BECAUSE NO ACCESS TO M.H. 701-2 AND FOAM TRAP IN M.H. 702.

NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG REVISIONS REQUIRE MANAGEMENT OF CHANGE DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE: TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(NORTHWEST) SHT. 6 OF 14

NO	DATE	REVISIONS	BY
13	04/21/14	UPDATE DWG SEWER LINE	BJJ
12	01/22/14	UPDATED PER MARK UP	BJJ
11	04/05/11	UPDATED PROCESS SEWER	BJJ
10	07/28/10	SHOW 11 SEWERS OUT OF SERVICE	PJB
16	08/25/16	UPDATED SEWER LINE & ADDED CREEK	BJJ
15	05/29/15	UPDATED K6 SEWER LINE	BJJ
14	05/09/14	UPDATED PROCESS SEWER	BJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	16

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–

VIEW: NORTHEAST

BURL

606 605 604 603 602 607

FI-89014 AE 89003 ASH-89000

FI-89023

20 21

RAILROAD TRACK

AE 89004 FI-89015

707 706 708

25 23 22

A END TAILRACE

BLUE CREEK SEALED AT VAULT.

B

5 4 3 2 1 7 6

27 26

FI-89058

601 112

AE 89057

CENTRAL PREP. (ADDITIVES)

CONVERTING PLANT

NO. 11 WAREHOUSE

NOTE: NO ACCESS TO THIS VAULT CAN NOT INSPECT VAULT AND CAN NOT INSPECT SEWER LINE BETWEEN M.H. 701-2 AND 702 BECAUSE NO ACCESS TO M.H. 701-2 AND FOAM TRAP IN M.H. 702.

VENT
NT ENTER
701-2

G-38184
VIEW: ACID SEWER

NOTE:
INTERNIAL INSPECTION
USE WITH SMP:
CRHM-SMP-EFF-48-022

111 110 109 108

G-38184
VIEW: K-6 SEWER

106 107

NOTE:
THE 700 SERIES NUMBERS IDENTIFY K7 SEWER MANHOLES.

INTERNAL INSPECTION
USE WITH SMP:
CRHM-SMP-EFF-48-023

G-38184
VIEW: K-7 SEWER

NO. 20 PM

FI-89012

102 R 101 103 283

104 105

MH 501

ASH-89125

B

NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

MAGETA:	K6 SEWER	= ABOVE GROUND (SOLID LINES)
BLUE:	K7 SEWER	
GREEN:	PROCESS SEWER	= UNDER GROUND (DASHED LINES)
RED:	ACID SEWER	= IN THE FLOOR
BLUE:	WOOD PROCESSING COLLECTIONS	

REFERENCE DRAWINGS	DRAWING TITLE
I-28489	TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(EAST) SHT. 7 OF 14
F-29271A	
I-37336	
F-38206	
LO-28436	
F-26636	
G-38671	
LO-45762	
I-37337	

NO	DATE	REVISIONS	BY
13	04/21/14	UPDATE DWG SEWER LINE	BJJ
12	01/22/14	GENERAL UPDATE TO K-7 SEWER	BJJ
11	04/05/11	UPDATED PROCESS SEWER	BJJ
10	07/28/10	SHOW 11 SEWERS OUT OF SERVICE	PJB
9	03/30/10	ADD MANHOLE ID NUMBERS	WJJ
8	09/04/07	ADD LEGEND	WJJ
14	08/25/16	UPDATED SEWER LINE & ADDED CREEK	BJJ

Georgia-Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	14

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–

BURLINGTON

NO. 11
WAREHOUSE

EAST FIRST AVENUE

M.E.R.T.

M.E.R.T.

SE BIRCH STREET

CEDAR STREET

2ND

ADAMS STREET

CONVERTED
PRODUCTS
UNITIZING

MH

TRUCK SCALE

21" STORM WATER

SOUTH GATE

CITY OF CAMAS
27" STORM WATER

TRUCK DOCK

CB

CB 6

SE THIRD AVENUE

CB 1

CB 2

CB 3

4"
DE

C

NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE

TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(NORTHEAST) SHT. 8 OF 14

NO	DATE	REVISIONS	BY
13	04/21/14	UPDATE DWG SEWER LINE	BJJ
12	01/22/12	UPDATED PER MARK UP	BJJ
11	04/05/11	UPDATED PROCESS SEWER	BJJ
10	07/28/10	SHOW 11 SEWERS OUT OF SERVICE	PJB
9	03/30/10	ADD MANHOLE ID NUMBERS	WJJ
8	09/04/07	ADD LEGEND	WJJ
7	08/27/07	ADD LAYER DESCRIPTION	WJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE
GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	13

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–

ASH-39341
ASH-39175
ASH-39340
ASH-39089
AE 89002
AE 39199
AE 89028
ASH-24574
ASH-24487
AE 24430
ASH-23674
ASH-22306
AE 22241
AE 22242
AE 22341
AE 22342
AE 89073
AE 89075
AE 89076
ASH-22206
AE 89074
ASH-20117
AE 89077
AE 89078
FI-89014
ASH-89000
ASH-35156
AE 89021
ASH-35562
FI-8901
MGO FURNACE
NO. 4 RECOVERY FURNACE
NO. 5 RECOVERY FURNACE
KRAFT WASHING & SCREENING (PULP MILL)
#4 P.B.
#5 P.B.
SOG AREA LD-20011
DEAD
DWG: G-38184
VIEW: NORTHWEST

NOTES:
1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:
- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS
- BROWN: STORM DRAIN

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS	
LO-45762	I-28489
I-37337	F-29271A

DRAWING TITLE: TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(NORTHEAST) SHT. 9 OF 14

NO	DATE	REVISIONS	BY
I-37336	13	02/25/14	ADDED UTILITIES TO FIBER AREA	BJJ
F-38206	12	01/22/12	UPDATED PER MARK UP	BJJ
LO-28436	11	04/05/11	UPDATED PROCESS SEWER	BJJ
F-26636	17	08/25/16	UPDATED SEWER LINE & ADDED CREEK	BJJ
G-38671	16	05/29/15	UPDATED K6 SEWER LINE	BJJ
2414-401-C-0005	15	05/09/14	UPDATED DWG SEWER LINES	BJJ
	14	04/21/14	UPDATED DWG SEWER LINES	BJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	17

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–

BLUE CREEK

ADAMS STREET

AE 21554

AE 89022

ASH-30389

ASH-35562

ASH-36020

ASH-50015

ASH-50021

FI-89013

FI-89018

FI-89019

FI-89023

FI-61115

FI-61116

OUT OF SERVICE

OUT OF SERVICE

DAM
(INFO IN MEMO)

START
TAILRACE

RIVER WATER HEADER
INTER-TIE LOCATION

K5

K7

KRAFT SCREENING & WASHING (PULP MILL)

CAMAS PULP DRYER

STOCK PREP

NO. 11 PM

DEAD

100

132 210 211 214 209 246 219 218 217 216 128 125 127 124 123 130 213 212 131 133 176 185 186 129 122 121 126 120 178 179 180 132 126 202 201 200 204 199 119 606 605 116 115 114 113 118 117 176

NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE
TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(SOUTHEAST) SHT. 10 OF 14

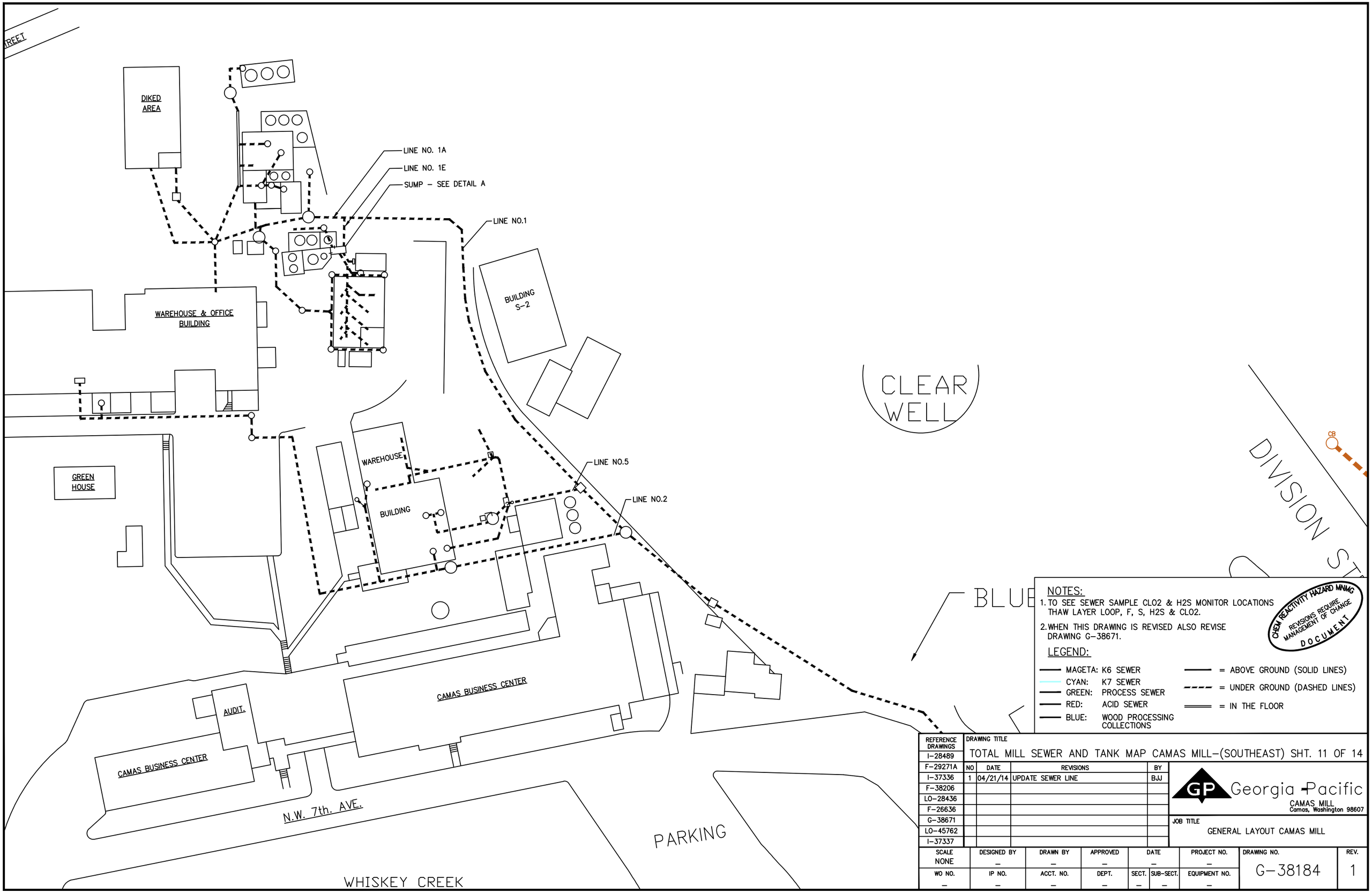
NO	DATE	REVISIONS	BY
13	04/21/14	UPDATE DWG SEWER LINE	BJJ
12	01/22/14	UPDATED K7 SEWER LINE	BJJ
11	04/05/11	UPDATED PROCESS SEWER	BJJ
10	07/28/10	SHOW 11 SEWERS OUT OF SERVICE	PJB
9	03/30/10	ADD MANHOLE ID NUMBERS	WJJ
15	10/06/16	UPDATED NOTE ON PROCESS SEWER LINE	BJJ
14	08/25/16	UPDATED SEWER LINE & ADDED CREEK	BJJ

Georgia-Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE
GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	15

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–



NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE: TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(SOUTHEAST) SHT. 11 OF 14

NO	DATE	REVISIONS	BY
1	04/21/14	UPDATE SEWER LINE	BJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	1

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–

VIEW: WEST

ACID SEWER LINE DWG

ACID SEWER SEE DWG 23-

ABANDONED

MAIN EFFLUENT

EFFLUENT LINE

SLUDGE FILTER

SECONDARY WATER TREATMENT

135

136

137

138

E

T

ASH-89059

MIXING CHAMBER

TO ASB

U

NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNWG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)

= UNDER GROUND (DASHED LINES)

= IN THE FLOOR

REFERENCE DRAWINGS	DRAWING TITLE
LO-33868	TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(SOUTHEAST) SHT. 12 OF 14
LO-45762	
I-37337	

NO	DATE	REVISIONS	BY
1	04/21/14	UPDATES DWG SEWER LINES	BJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	-	-	-	-	-	G-38184	1

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
-	-	-	-	-	-	-

DEEPWELLS No.1 THROUGH No.19

RIVER CROSSING

#15

#4

#2

#1

#6

#7

#3

#5

#8

#9

#10

#12

#11

#13

#14

TO MILL

SAND TRAP

S.E. 4th

INACTIVE WELLS

DWG: G-

VIEW: SOU

NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG REVISIONS REQUIRE MANAGEMENT OF CHANGE DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)

= UNDER GROUND (DASHED LINES)

= IN THE FLOOR

REFERENCE DRAWINGS	DRAWING TITLE
LO-33868	TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(SOUTHEAST) SHT. 13 OF 14
LO-45762	
I-37337	

NO	DATE	REVISIONS	BY
1	04/21/14	UPDATES DWG SEWER LINES	BJJ

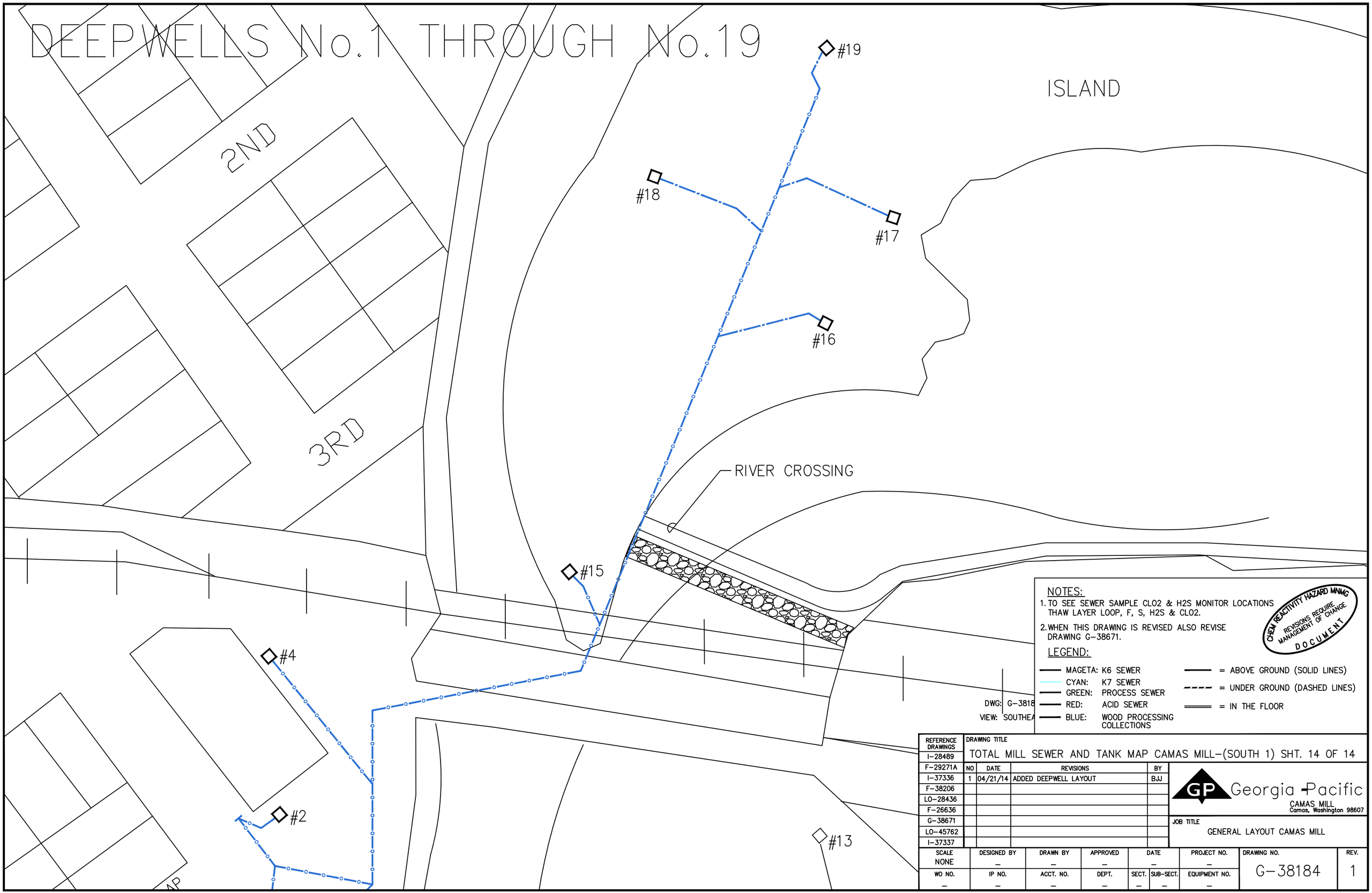
Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	-	-	-	-	-	G-38184	1

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
-	-	-	-	-	-	-

DEEPWELLS No.1 THROUGH No.19



NOTES:

1. TO SEE SEWER SAMPLE CLO2 & H2S MONITOR LOCATIONS THAW LAYER LOOP, F, S, H2S & CLO2.
2. WHEN THIS DRAWING IS REVISED ALSO REVISE DRAWING G-38671.

CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

LEGEND:

- MAGETA: K6 SEWER
- CYAN: K7 SEWER
- GREEN: PROCESS SEWER
- RED: ACID SEWER
- BLUE: WOOD PROCESSING COLLECTIONS

= ABOVE GROUND (SOLID LINES)
= UNDER GROUND (DASHED LINES)
= IN THE FLOOR

REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
F-38206
LO-28436
F-26636
G-38671
LO-45762
I-37337

DRAWING TITLE: TOTAL MILL SEWER AND TANK MAP CAMAS MILL-(SOUTH 1) SHT. 14 OF 14

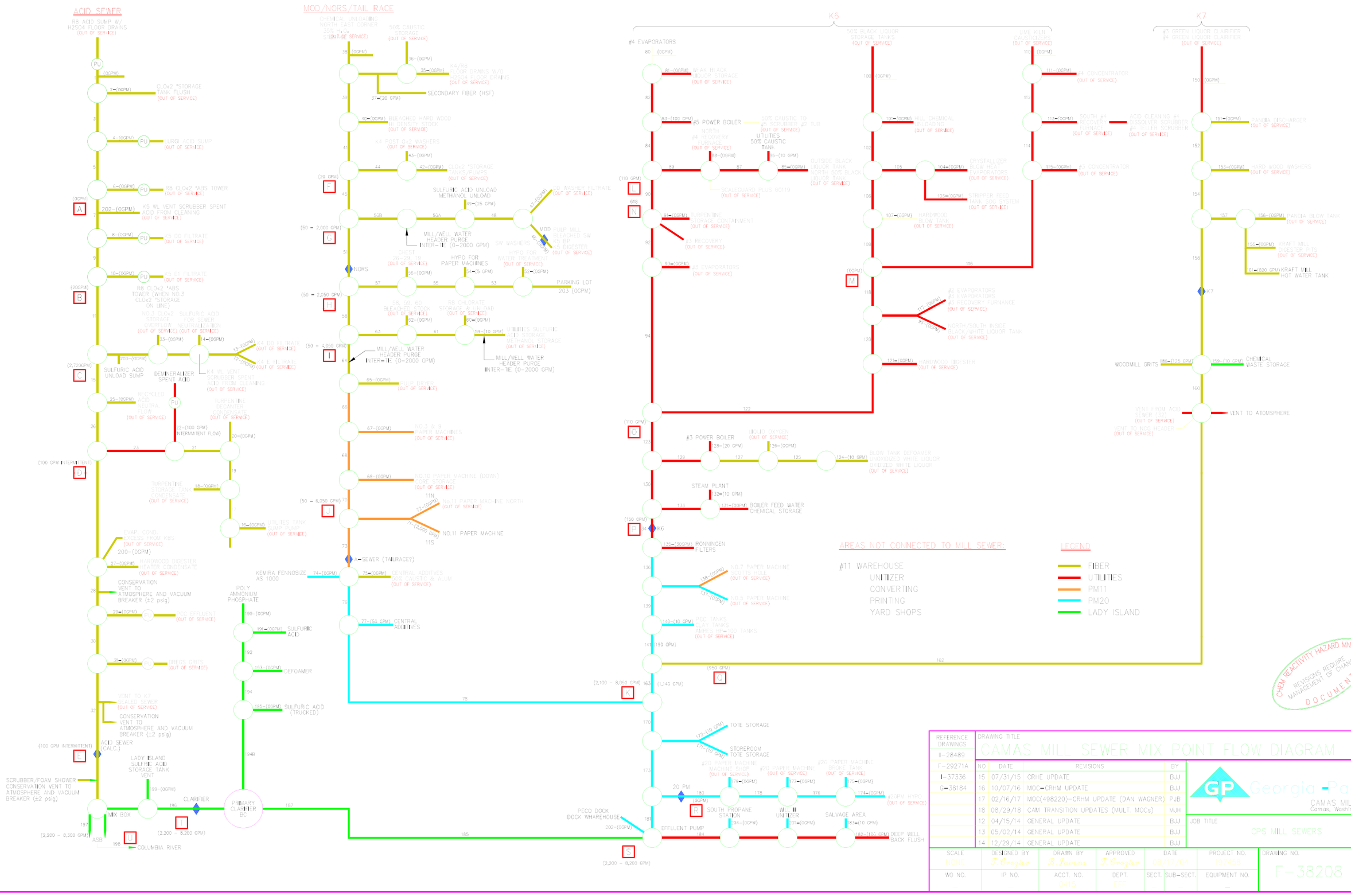
NO	DATE	REVISIONS	BY
1	04/21/14	ADDED DEEPWELL LAYOUT	BJJ

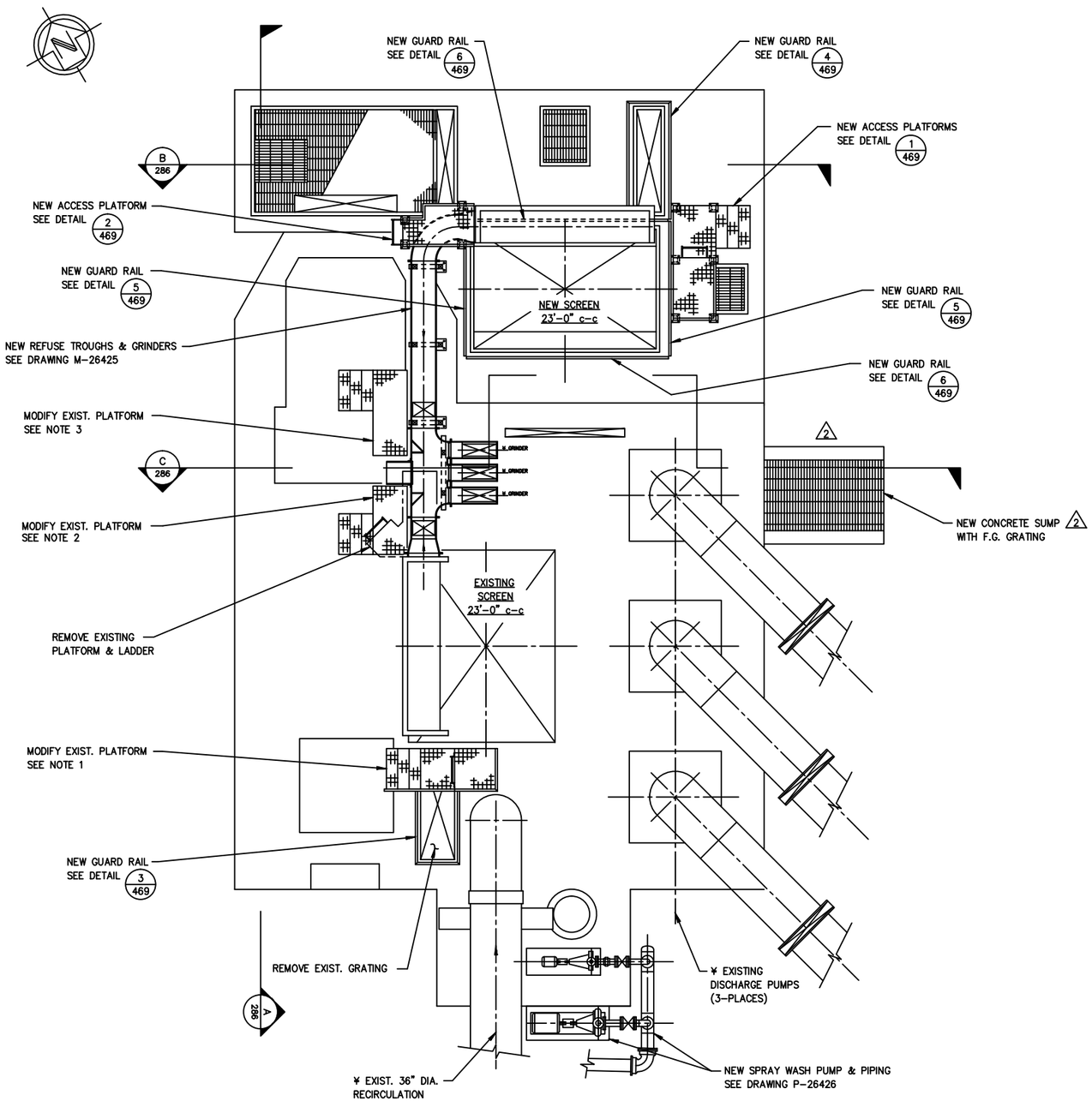
Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	–	–	–	–	–	G-38184	1

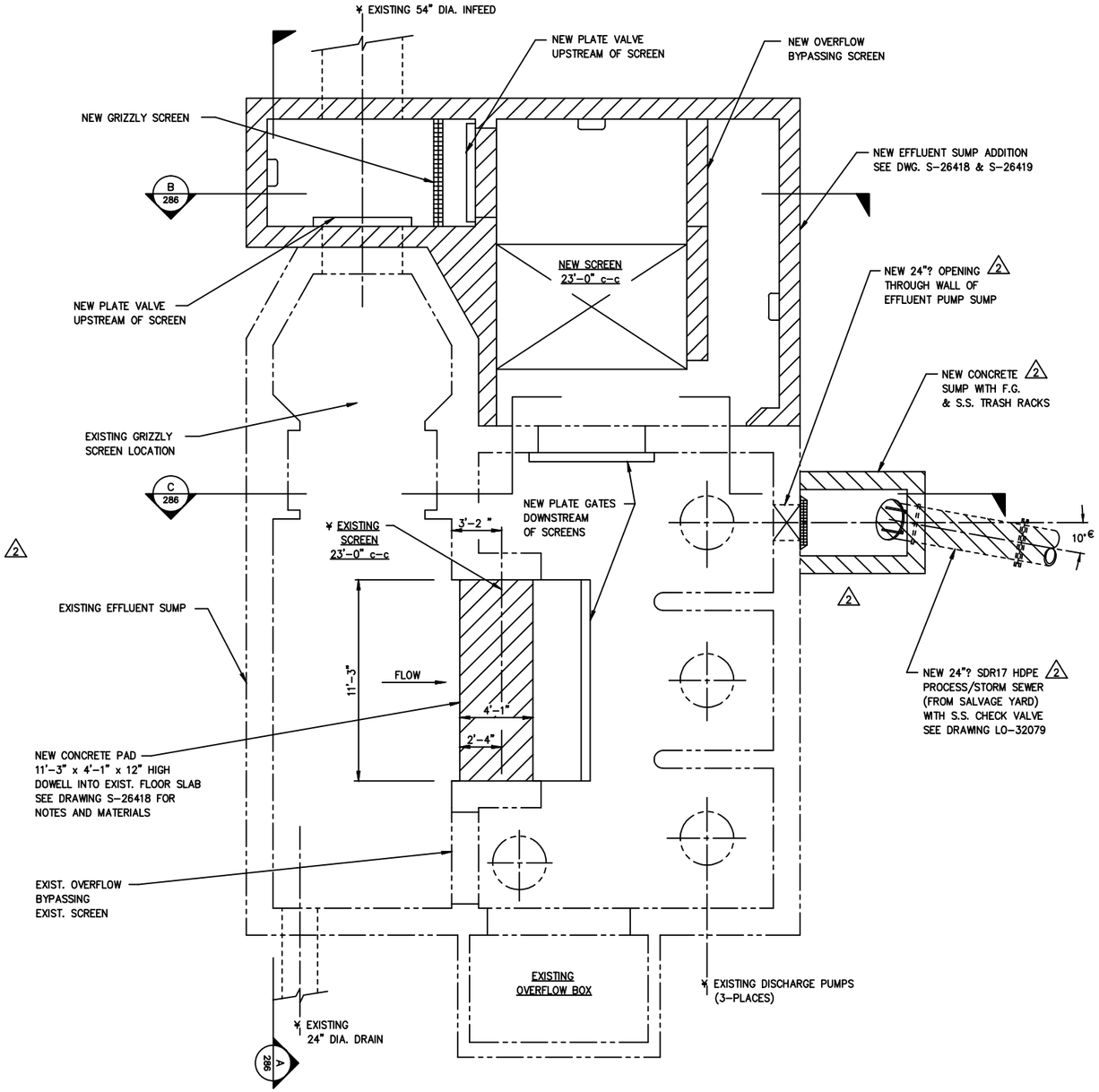
WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	–	–	–	–


ACID SEWER
R8 ACID SUMP W/ H2SO4 FLOOR DRAINS (OUT OF SERVICE)
PU
(0GPM)
2-(0GPM) CLO×2 *STORAGE TANK FLUSH (OUT OF SERVICE)
4-(0GPM) PU TURGI ACID SUMP (OUT OF SERVICE)
6-(0GPM) PU R8 CLO×2 *ABS TOWER (OUT OF SERVICE)
(0GPM) A
202-(0GPM) K5 WL VENT SCRUBBER SPENT ACID FROM CLEANING (OUT OF SERVICE)
8-(0GPM) PU K5 DD FILTRATE (OUT OF SERVICE)
10-(0GPM) PU K5 EX FILTRATE (OUT OF SERVICE)
(300GPM) B
R8 CLO×2 *ABS TOWER (WHEN NO.3 CLO×2 *STORAGE ON LINE)
NO.3 CLO×2 SULFURIC ACID STORAGE TANK FOR SEWER OVERFLOW NEUTRALIZATION (OUT OF SERVICE) (OUT OF SERVICE)
35-(0GPM)
14-(0GPM)
13-(0GPM) K4 DD FILTRATE (OUT OF SERVICE)
12-(0GPM) K4 EX FILTRATE (OUT OF SERVICE)
(2,720GPM) C
265-(0GPM)
SULFURIC ACID UNLOAD SUMP
DEMINERALIZER SPENT ACID
K4 WL VENT SCRUBBER SPENT ACID FROM CLEANING (OUT OF SERVICE)
25-(0GPM) RECYCLED ACID FILTRATE FLOW (OUT OF SERVICE)
PU
TURPENTINE DECANTER CONDENSATE (OUT OF SERVICE)
22-(100 GPM INTERMITTENT FLOW)
20-(0GPM)
(100 GPM INTERMITTENT) D
18-(0GPM)
TURPENTINE STORAGE TANK CONDENSATE (OUT OF SERVICE)
16-(0GPM) UTILITIES TANK SUMP PUMP (OUT OF SERVICE)
EVAP. COND. PROCESS FROM K6S (OUT OF SERVICE)
200-(0GPM)
27-(0GPM) HARDWOOD DIGESTER HEATER CONDENSATE (OUT OF SERVICE)
CONSERVATION VENT TO ATMOSPHERE AND VACUUM BREAKER (±2 psig)
29-(0GPM) PU K6S EFFLUENT (OUT OF SERVICE)
31-(0GPM) PU K6S GRITS (OUT OF SERVICE)
VENT TO K7 SEALED SEWER (OUT OF SERVICE)
CONSERVATION VENT TO ATMOSPHERE AND VACUUM BREAKER (±2 psig)
(100 GPM INTERMITTENT) E
ACID SEWER (CALC.)
LADY ISLAND SULFRIC ACID STORAGE TANK VENT
SCRUBBER/FOAM SHOWER CONSERVATION VENT TO ATMOSPHERE AND VACUUM BREAKER (±2 psig)
199-(0GPM)
MIX BOX
CLARIFIER
PRIMARY CLARIFIER BC
(2,200 - 8,300 GPM)
ASB
U
COLUMBIA RIVER
(2,200 - 8,200 GPM)
MOD/NORS/TAIL RACE
CHEMICAL UNLOADING NORTH EAST CORNER 20% H2O2 S.S. (OUT OF SERVICE)
50% CAUSTIC STORAGE (OUT OF SERVICE)
38 (0GPM)
36-(0GPM)
35-(0GPM) K4/R8 FLOOR DRAINS W/D NAOH & FLOOR DRAINS (OUT OF SERVICE)
37-(20 GPM) SECONDARY FIBER (HSF)
40-(0GPM) BLEACHED HARD WOOD HI DENSITY STOCK (OUT OF SERVICE)
K4 POST O×2 WASHERS (OUT OF SERVICE)
43-(0GPM)
(20 GPM) F
44
42-(0GPM) CLO×2 *STORAGE TANKS/PUMPS (OUT OF SERVICE)
SULFURIC ACID UNLOAD METHANOL UNLOAD
49-(25 GPM)
(50 - 2,000 GPM) G
539
50A
48
47-(0GPM) DD WASHER FILTRATE (OUT OF SERVICE)
MOD PULP MILL BLEACHED SW K6 BP K6 DIGESTER (OUT OF SERVICE)
45-(0GPM)
SW WASHERS
MILL/WELL WATER HEADER PURGE INTER-TIE (0-2000 GPM)
NORS
CHEST 26, 29, 30A (OUT OF SERVICE)
56-(0GPM)
HYPO FOR PAPER MACHINES
54-(5 GPM)
HYPO FOR WATER TREATMENT (OUT OF SERVICE)
50-(0GPM)
(50 - 2,050 GPM) H
57
55
53
PARKING LOT 203 (0GPM)
58, 59, 60 BLEACHED STOCK (OUT OF SERVICE)
62-(0GPM)
R8 CHLORATE STORAGE & UNLOAD (OUT OF SERVICE)
60-(0GPM)
(50 - 4,050 GPM) I
63
61
59-(10 GPM) UTILITIES SULFURIC ACID STORAGE METHANOL STORAGE (OUT OF SERVICE)
MILL/WELL WATER HEADER PURGE INTER-TIE (0-2000 GPM)
MILL/WELL WATER HEADER PURGE INTER-TIE (0-2000 GPM)
65-(0GPM) PULP DRYER (OUT OF SERVICE)
66
67-(0GPM) NO.3 & 9 PAPER MACHINES (OUT OF SERVICE)
68
69-(0GPM) NO.10 PAPER MACHINE (DOWN) CHINE STORAGE (OUT OF SERVICE)
(50 - 6,050 GPM) J
70
11N
72-(0GPM) NO.11 PAPER MACHINE NORTH (OUT OF SERVICE)
71-(6,000 GPM)
11S
NO.11 PAPER MACHINE
73
A-SEWER (TAILRACE?)
KEMIRA FENNOSIZE AS 1000
74-(0GPM)
75-(0GPM) CENTRAL ADDITIVES SIZE CASTIC W ALUM (OUT OF SERVICE)
POLY AMMONIUM PHOSPHATE
76
77-(50 GPM) CENTRAL ADDITIVES
190-(0GPM)
191-(0GPM) SULFURIC ACID
192
193-(0GPM) DEFOAMER
194
195-(0GPM) SULFURIC ACID (TRUCKED)
194B
78
K6
#4 EVAPORATORS
80 (0GPM)
81-(0GPM) WEAK BLACK LIQUOR STORAGE (OUT OF SERVICE)
82
83-(180 GPM) #5 POWER BOILER
NORTH #4 RECOVERY TURNPIKE (OUT OF SERVICE)
84
88-(0GPM)
86-(10 GPM)
UTILITIES 50% CAUSTIC TANK
50% CAUSTIC TO #5 SCRUBBER #2 TUB (OUT OF SERVICE)
(110 GPM) C
89
87
85-(0GPM) OUTSIDE BLACK LIQUOR TANK NORTH 50% BLACK LIQUOR TANK (OUT OF SERVICE)
SCALEGUARD PLUS 60119 (OUT OF SERVICE)
90
618 N
91-(0GPM) TURPENTINE STORAGE CONTAINMENT (OUT OF SERVICE)
#3 RECOVERY (OUT OF SERVICE)
92
93-(0GPM) #3 EVAPORATORS (OUT OF SERVICE)
94
(110 GPM) O
122
#3 POWER BOILER
LIQUID OXYGEN (OUT OF SERVICE)
123
129
128-(20 GPM)
127
126-(0GPM)
125
124-(10 GPM) BLOW TANK DEFOAMER OXIDIZED WHITE LIQUOR OXIDIZED WHITE LIQUOR (OUT OF SERVICE)
130
STEAM PLANT
132-(10 GPM)
133
131-(0GPM) BOILER FEED WATER CHEMICAL STORAGE
(150 GPM) P
134
K6
135-(0GPM) PONNINGEN FILTERS
136
NO.7 PAPER MACHINE SCOTTS HOLE (OUT OF SERVICE)
134-(0GPM)
133-(0GPM)
NO.9 PAPER MACHINE (OUT OF SERVICE)
139
140-(10 GPM) PDC TANKS CLAY TANKS AMRES HP-100 TANKS (OUT OF SERVICE)
141 (190 GPM)
(950 GPM) Q
162
(2,100 - 8,050 GPM) 163
(1,140 GPM)
K
78
170
172-(10 GPM) TOTE STORAGE
171-(10 GPM) STOREROOM TOTE STORAGE
172
#20 PAPER MACHINE MACHINE SHOP (OUT OF SERVICE)
#20 PAPER MACHINE (OUT OF SERVICE)
#20 PAPER MACHINE BROKE TANK (OUT OF SERVICE)
20 PM
180 (0GPM)
179-(0GPM)
178
177-(0GPM)
176
175-(0GPM)
174-(0GPM)
#20PM HYPO (OUT OF SERVICE)
R
SOUTH PROPANE STATION
PECO DOCK DOCK WHAREHOUSE
202-(0GPM)
184
EFFLUENT PUMP
S
(2,200 - 8,200 GPM)
204-(0GPM)
WILL II UNITIZER
201-(0GPM)
SALVAGE AREA
183-(10 GPM)
182-(10G GPM) DEEP WELL BACK FLUSH
50% BLACK LIQUOR STORAGE TANKS (OUT OF SERVICE)
100 (0GPM)
101-(0GPM) HLL CHEMICAL UNLOADING (OUT OF SERVICE)
102
105
104-(0GPM) CRYSTALIZER BLOW HEAT EVAPORATORS (OUT OF SERVICE)
103-(0GPM) STRIPPER FEED TANK SOAP SYSTEM (OUT OF SERVICE)
106
107-(0GPM) HARDWOOD BLOW TANK (OUT OF SERVICE)
108
(0GPM) M
116
#2 EVAPORATORS #5 EVAPORATORS #1 RECOVERY FURNANCE (OUT OF SERVICE)
110-(0GPM)
350-(0GPM)
NORTH/SOUTH INSIDE BLACK/WHITE LIQUOR TANK (OUT OF SERVICE)
120
121-(0GPM) HARDWOOD DIGESTER (OUT OF SERVICE)
LIME KILN CAUSTICIZING (OUT OF SERVICE)
110 (0GPM)
111-(0GPM) #4 CONCENTRATOR (OUT OF SERVICE)
112
112-(0GPM) SOUTH #4 RECOVERY FURNANCE (OUT OF SERVICE)
ACID CLEANING #4 DISSOLVER SCRUBBER #5 UTILITY SCRUBBER (OUT OF SERVICE)
114
115-(0GPM) #3 CONCENTRATOR (OUT OF SERVICE)
K7
#3 GREEN LIQUOR CLAIRIFIER #4 GREEN LIQUOR CLAIRIFIER (OUT OF SERVICE)
150 (0GPM)
151-(0GPM) MANDIA DISCHARGER (OUT OF SERVICE)
152
153-(0GPM) HARD WOOD WASHERS (OUT OF SERVICE)
154
157
156-(0GPM) MANDIA BLOW TANK (OUT OF SERVICE)
155-(0GPM) KRAFT MILL DIGESTER PITS (OUT OF SERVICE)
158
161-(820 GPM) KRAFT MILL HOT WATER TANK
K7
WOODMILL GRITS
159
160-(125 GPM)
159-(10 GPM) CHEMICAL WASTE STORAGE
160
VENT FROM ACID SEWER (OUT OF SERVICE)
VENT TO ATOMSPHERE
VENT TO NCG HEADER (OUT OF SERVICE)
AREAS NOT CONNECTED TO MILL SEWER:
#11 WAREHOUSE
UNITIZER
CONVERTING
PRINTING
YARD SHOPS
LEGEND
FIBER
UTILITIES
PM11
PM20
LADY ISLAND
CHEM REACTIVITY HAZARD MNMG
REVISIONS REQUIRE MANAGEMENT OF CHANGE
D O C U M E N T
REFERENCE DRAWINGS
I-28489
F-29271A
I-37336
G-38184
DRAWING TITLE
CAMAS MILL SEWER MIX POINT FLOW DIAGRAM
NO | DATE | REVISIONS | BY
15 | 07/31/15 | CRHE UPDATE | BJJ
16 | 10/07/16 | MOC-CRHM UPDATE | BJJ
17 | 02/16/17 | MOC(498220)-CRHM UPDATE (DAN WAGNER) | PJB
18 | 08/29/18 | CAM TRANSITION UPDATES (MULT. MOCs) | MJH
12 | 04/15/14 | GENERAL UPDATE | BJJ
13 | 05/02/14 | GENERAL UPDATE | BJJ
14 | 12/29/14 | GENERAL UPDATE | BJJ
Georgia-Pacific
CAMAS MILL
Camas, Washington 98607
JOB TITLE
CPS MILL SEWERS
SCALE NONE | DESIGNED BY T. Gregson | DRAWN BY B. Jaynes | APPROVED T. Gregson | DATE 08/27/04 | PROJECT NO. 197408
WO NO. | IP NO. | ACCT. NO. 5010 | DEPT. 5010 | SECT. | SUB-SECT. | EQUIPMENT NO.
DRAWING NO. F-38208
REV. 18



PLAN VIEW – ABOVE ELEVATION 31'-6"

SCALE: 1" = 1'-0"



PLAN VIEW – BELOW ELEVATION 31'-6"

SCALE: 1" = 1'-0"

NOTES:

1. REMOVE EXISTING 24" WIDE x 48" LONG SECTION OF PLATFORM SOUTH OF STAIRS AND MODIFY AS DESCRIBED IN NOTE 2. THE REMAINING STAIRS, DOOR ACCESS PLATFORM AND DRIVE ACCESS PLATFORM ARE TO BE MODIFIED AS NEEDED TO RAISE THEM 12" IN ELEVATION, WITH THE ADDITION OF (1)– NEW STEP AND A HANDRAIL ON THE SOUTH SIDE FROM THE DRIVE ACCESS PLATFORM FRAME TO THE FACE OF THE NEW STAIR. NEW GUARD RAIL IS TO BE STRUCTURAL TUBING 1 " x 1 " x .125" WALL. ALL NEW STEEL TO BE GALVANIZED MILD STEEL.
2. RE-USE THE EXISTING PLATFORM DESCRIBED IN NOTE 1 AND MODIFY AS NEEDED TO RAISE PLATFORM 12", WITH THE ADDITION OF LEGS ON THE NORTH END OF PLATFORM AND (3)–STEPS, 30" WIDE x 8" TREAD. ALL NEW STEEL TO BE GALVANIZED MILD STEEL, CONSTRUCTION OF MODIFICATIONS TO BE SIMILAR TO EXISTING STRUCTURE.
3. RE-USE THE EXISTING PLATFORM TAKEN FROM THE SOUTH SIDE OF REFUSE BUNKER AND MODIFY AS NEEDED TO RAISE PLATFORM 12", WITH THE ADDITION OF LEGS ON THE NORTH END OF PLATFORM AND (3)–STEPS, 30" WIDE x 8" TREAD. ALL NEW STEEL TO BE GALVANIZED MILD STEEL, CONSTRUCTION OF MODIFICATIONS TO BE SIMILAR TO EXISTING STRUCTURE.

REFERENCE DRAWINGS	DRAWING TITLE
S-26418	GENERAL ARRANGEMENT – PLAN VIEWS
S-26419	
M-26425	
M-26469	
P-26426	
LO-32079	

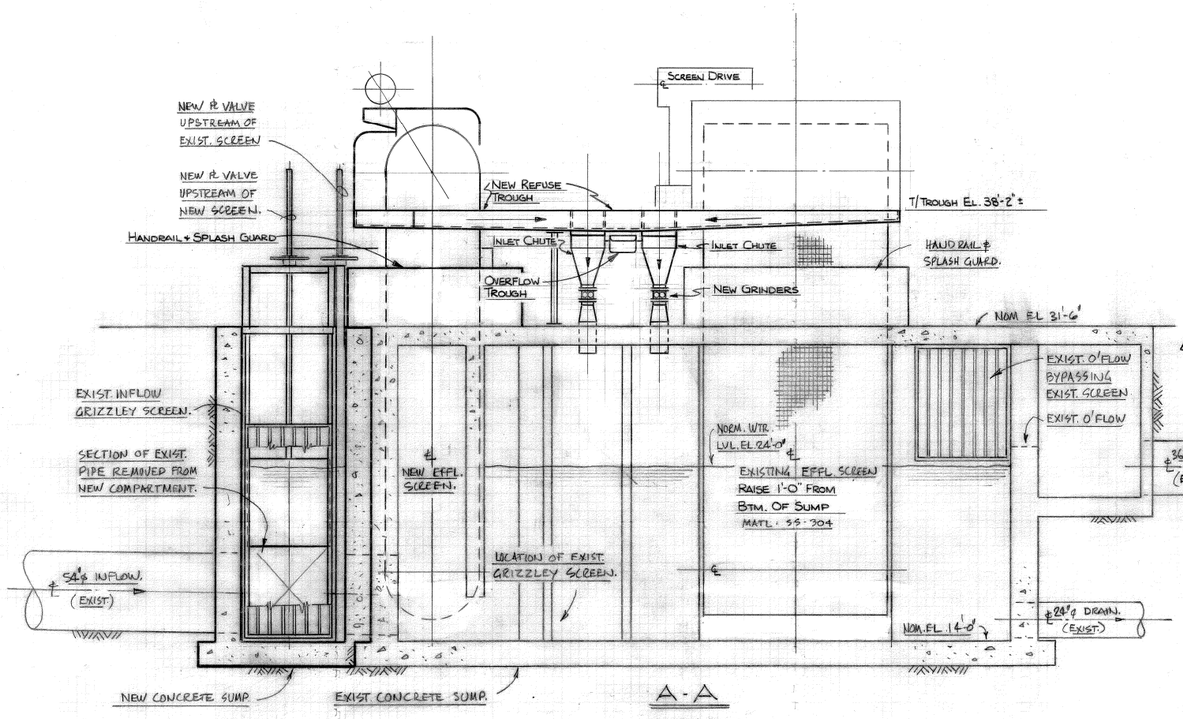
NO	DATE	REVISIONS	BY
0	2/02/90	RELEASED FOR BID	CS
1	07/14/98	UPDATE BORDER	SY
2	9/29/00	ADDED NEW SEWER LINE & SUMP	CS
3	09/15/03	UPDATE BORDER INFORMATION	WJJ
4	09/28/05	REPLACE DRAWING BORDER	WJJ
5	05/02/08	REVISE BORDER INFORMATION	WJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: MILL EFFLUENT SCREENS

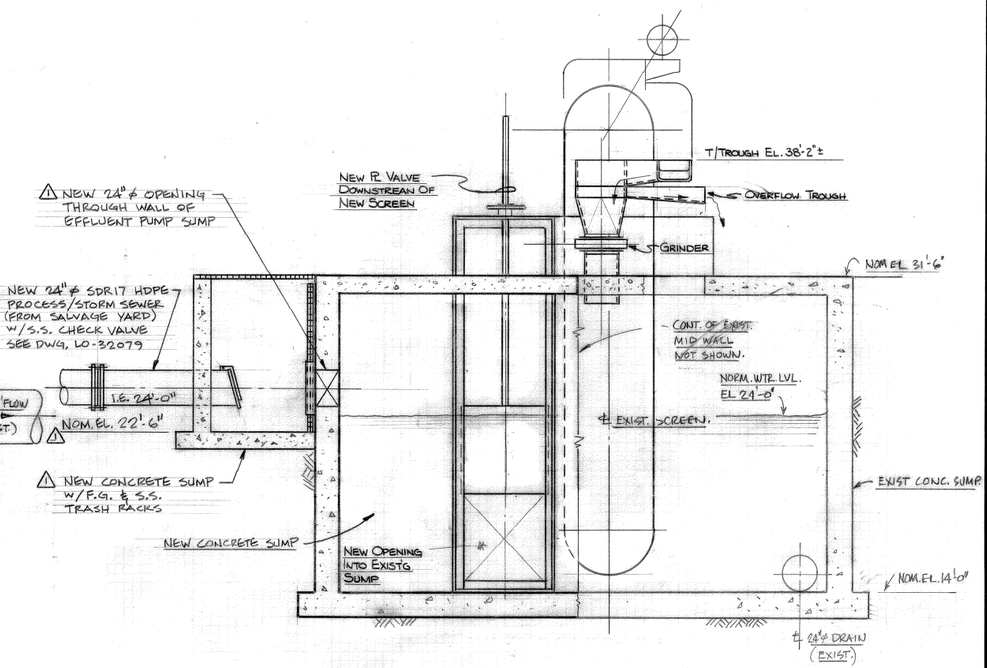
SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
i"=1'-0"	–	C.SHEPPICK	–	02/01/90	–	M-26279	5

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
05-1146	2-9000	–	EFF	19	42	–



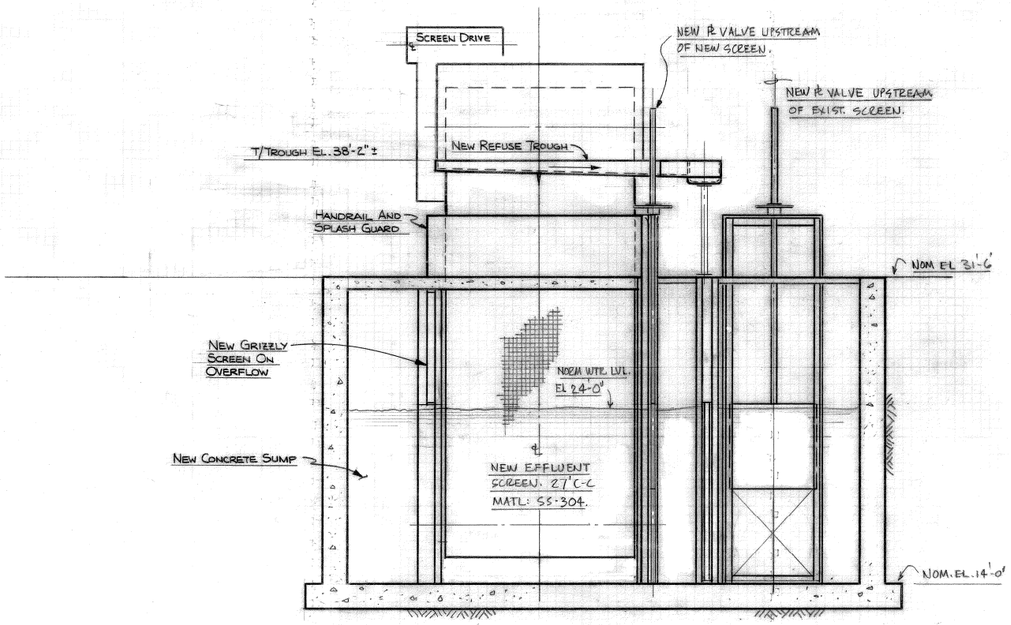
A - A

LOOKING EAST.



C - C

LOOKING SOUTH



B - B

LOOKING SOUTH

DRAWING TITLE

MILL EFFL. SCREENS - G.A. SECTIONS A-A B-B & C-C

REFERENCE DRAWINGS	NO	DATE	REVISIONS	BY
M-26279	1	10/2/00	ADDED NEW CONCRETE SUMP	CS
LO-32079	2	9/16/03	UPDATE BORDER	BJ
	3	5/5/08	UPDATE BORDER	

Georgia-Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: MILL EFFL. SCREENS.

WO NO.	DRAWN BY	DATE	APPROVED	SCALE	DRAWING NO.	REV.
	RJD	OCT 89		1/4" = 1'-0"	M-26286	3
EWA NO. 5-1146	AR/ACCT. NO. 5-1695	DEPT. E & R.	SECTION	SUB-SECT.		

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	ELEM	MILL	SCH. 40 SS BUBBLE TUBE	–
2	1	XMTR	ROSEMOUNT	3051S1CD3A2F12A1AD2E5L4M5BC	239539
3	1	ROT	KYTOLA	LH5CL	91965
4	1	REGULATOR	FAIRCHILD	30232	221984
5	1	SOLV	ASCO	8300D64U	_
6	1	VALVE	BFV CENTERLINE	24" LUG STYLE 150#	_
7	1	CONT	FOXBORO	M40PNEU STABILOG CONT.	_
8	1	XMTR	FOXBORO	13A-MS2, STYLE E, 0-250"H2O	239517

EFFLUENT PUMP STATION
PANELMATE MMI
PROCESSOR 0415EPLC04

LI 89007 A

EFFLUENT PUMP STATION
FIELD I/O CAB. 89915

1/4" SST TUBING

FI 89007 A

AS SET AT 15 PSIG

LIT 89007 A (H) — RED (+), BLK (–) — LIT89007A

LIT 89007 C — AS

TO PRIMARY CLARIFIER AT LADY ISLAND

54" 54"

PUMP #1 M, PUMP #2 M, PUMP #3 M — 36" each

A/O 24" — LV 89007 — AS

EL. 31'-6"

15'-0"

OVERFLOW TO SLOUGH

EL. 17'-3"

EFFLUENT PUMP SUMP

EL.14'-0"

3.25'

LOC: RIVER BANK S. OF #20 PM WET END REF DWG E-26568

LRC 89007 B — 20 PSIG — 120VAC IP — SEE NOTE 2

EV 89007

PLC / FOXBORO

S — Y82 / Y82C — EV89007

ENERGIZE BYPASS VALVE

I/P 89007 — RED, BLK — I/P89007

INSTR AIR SET AT 20 PSIG

+24VDC COMMON

TB1

RED +WX265, BLK –WX265 — 250Ω

1 / 2 (PV) / 3 (RTN) / 4 (COM) / (SHLD) / 5

ANALOG INPUT — AC, AR

PROC# 0415-EPLC03
BASE : 0
SLOT : 2
ADDR : WX265
TYPE : ANALOG INPUT
DWG : E-32495

TS4 — Y82-2 — 2 — Y82-A2 — 120VAC OUTPUT (A2, A3)

PROC# 0415-EPLC03
BASE : 0
SLOT : 10
ADDR : Y82
TYPE : 120VAC OUPUT
DWG : E-32499

TBN — Y82C-2 — 2

TB1

RED +WY277, BLK –WY277 — 33 (PV) / 34 (COM) / (SHLD)

ANALOG OUTPUT — CC, CR

PROC# 0415-EPLC03
BASE : 0
SLOT : 2
ADDR : WY277
TYPE : ANALOG OUTPUT
DWG : E-32495

EFFLUENT PUMP STATION
FIELD I/O CAB. 89915

PLC	LI-89007A	LIT-89007C
4-20 MADC= 6,400-32,000	4-20 MADC= 6,400-32,000 3.25-15.0 FT	0-11.75 FT= 0-141 IN = = 3-15 PSI

NOTE:
1. WAS CEO #101 FILE 1248
2. PNEU B/U LRC

LOC: EFFLUENT PUMP STATION ELECTRICAL ROOM

SHT 1 OF 4

CALIBRATION				
LIT-A	LIC-A	LRC-B	I/P	LV
0-11.75 FT= 0-141 IN = 4-20 MADC	4-20 MADC= 3.25-15 FT	3-15 PSIG= 3.25-15 FT	4-20 MADC= 3-15 PSIG	3-15 PSIG= 0-100% OPEN

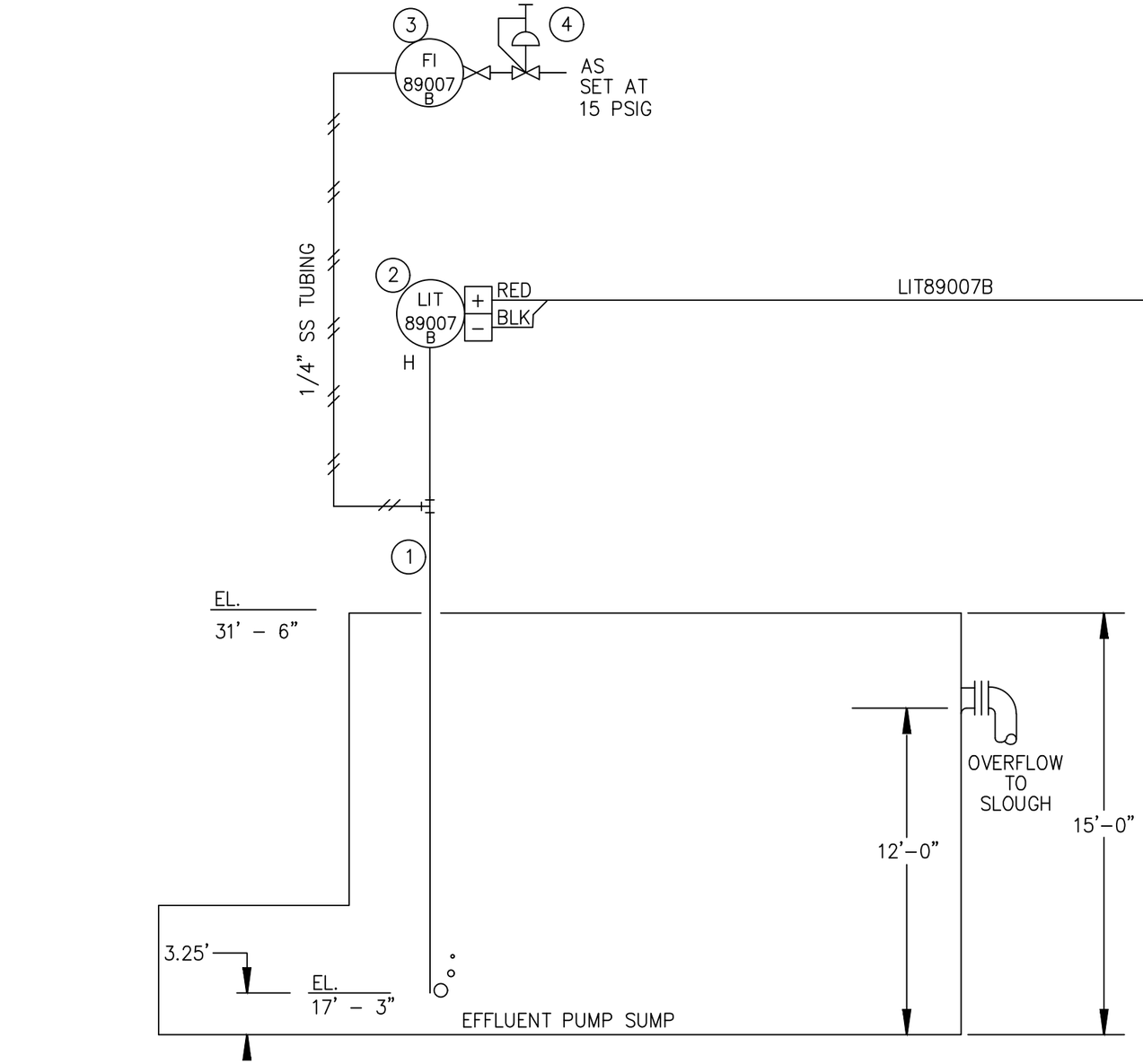
REF. DWGS	NO	REVISIONS	DATE	APD
F-26402	19	REVISE BORDER	9/05	_
CEO 24087	20	UPDATE BORDER INFO.	5/08	WJJ
E-32495	21	ADD FT IN CAL SECTION	11/12	PJB
E-32499	22	UPDATED BORDER & TITLE	3/18	ERW

Georgia-Pacific
CAMAS MILL
Camas, WA 98607

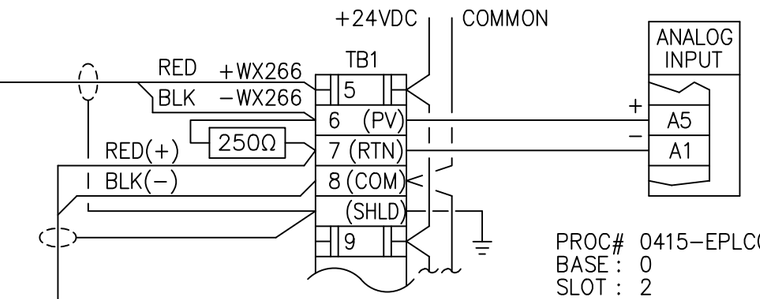
EFFLUENT PUMPS SUMP – LEVEL SHT 1 OF 4

DSGN P. ROETHIG	DWN R. OVERBAY	APVD _	DATE 8/05/83
WO# 90-81363	PROJ# _	IP# 2-4863	ACCT. 0415
DEPT. UT	SECT. 20	SUB-SECT. 02	LD 89007-1 REV. 22

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	ELEM	MILL	SCH. 40 SS BUBLE TUBE	–
2	1	XMTR	ROSEMOUNT	1151DP5S22M1–B3	74–31–562
3	1	ROTAM	KYTOLA	LH5CL	74–25–413
4	1	RGLTR	FAIRCHILD	30232	46–71–250
5	1	INDICATOR	ACTION	V509–S–U	74–15–201



NOTE:
WAS 89006



PROC# 0415–EPLC03
BASE : 0
SLOT : 2
ADDR : WX266
TYPE : ANALOG INPUT
DWG : E–32495

LSH89007

HIGH LEVEL SWITCH
TO LOOP DWG
LD89007–3

EFFLUENT PUMP STATION
PANELMATE MMI
PROCESSOR 0415–EPLC04

LI
89007
B

EFFLUENT PUMP STATION FIELD I/O CAB. 89915

LOCATION: RIVER BANK S. OF #20 PM

LOCATION: EFF. PUMP STATION ELECTRICAL ROOM

SHT 2 OF 4

CALIBRATION				
LIT–B	PLC	LI–89007B		
0–141"= 4–20 MADC	4–20 MADC= 6,400–32,000	4–20 MADC= 6,400–32,000 3.25–15.0 FT		

REF. DWGS	NO	REVISIONS	DATE	APD
F–26402	18	UPDATED BORDER & TITLE	3/18	ERW
E–32670	17	UPDATE BORDER INFO.	5/08	WJJ
	16	CHANGE BORDER	9/05	SY
	15	CHG TITLE BLK & REC IS	5/00	JEM

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EFFLUENT PUMPS SUMP – LEVEL SHT 2 OF 4

DSGN _	DWN RJO	APVD PGR	DATE 3/27/90
WO# 90–81363	PROJ# _	IP# 2–9000	ACCT. 0415
DEPT. UT	SECT. 20	SUB–SECT. 02	LD 89007–2 REV. 18

EFFLUENT PUMP STATION
PANELMATE MMI
PROGRAM 0415-EPLC04

LAH
89007
A

1
LSH
89007
B

LOAD:
10?

–	1	-1 BLK	TO TB1-8
+	2	+2 RED	TO TB1-7
	3		
	4		
1-NC	5		
1-NO	6	LSH-6	LSH89007
1-C	7	LSHC-7	
2-NC	8		
2-NO	9		
2-C	10		
	11		
	12		
	G		

SEE SHT 2

SHOWN WITH NO 120 VAC POWER
CONTACTS SWITCH WHEN LSH IS POWERED UP

120 VAC
CB AC14
(FED FROM I/O CAB. UPS)

AC14
ACN
G

TB
GRY 25 GRY
WHT 26 WHT

TUNNEL J-BOX
CAB. 89913

(EXIST)
20 PAIR
CABLE

TB
GRY 25 GRY/WHT
WHT 26 WHT/GRY
0276H/LSHC-25
0276/LSH-26

ROLL RAMP J-BOX
CAB. 89914

REUSE EXISTING
CABLE TO RECONNECT
TO CAB 89914

TB
LSHC-25 25 WHT
LSH-26 26 BLK

PR 13

24 PAIR
CABLE

TB
WHT 25 GRY
BLK 26 WHT

#2 FIN
RM, J-BOX
CAB. 89912

20 PAIR
CABLE

CABLE TERMINATION
CAB. 89911
EAST END OF
SUB #9 COMPLEX

EFFLUENT PUMP STATION FIELD I/O CABINET 89915
EFFLUENT PUMP STATION ELECTRICAL ROOM

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	SWITCH	RIS	ET-1215-LZ	90-25602

DEMINERALIZER PLC
SEE NOTE 1

25 PR CABLE

OPERATOR DISPLAY LAL89007

LOGIC MANAGER MODULE		
UCN: 15	NODE: 13	
TYPE	SLOT	PLC ADD
DI	42	2573

OPERATOR DISPLAY LI89007

LOGIC MANAGER MODULE		
UCN: 15	NODE: 13	
TYPE	SLOT	PLC ADD
AI	23	4468

4PB/UTILITES PLC

OPERATOR DISPLAY LAH89007

LOGIC MANAGER MODULE		
UCN: 15	NODE: 11	
TYPE	SLOT	PLC ADD
DI	76	2612

HIGH

GRY/WHT
0276H/LSHC-F112
TBP2-F112
1A
SEE EXTERNAL LADDER
DWG. 2320-270-E-0291

WHT/GRY
0276/LSH-112
TB2
112
0276/LSH-112 0276/LSH-5
5

HIGH

RACK 3
SLOT K
ADDRESS 0276
MODULE TYPE
24 VDC
INPUT

NOTE:

1. REFER TO LD 89045 FOR DETAILS OF HOW THIS ALARM IS COMMUNICATED FROM THE EFFLUENT PLC.

LOC: STM PLANT INSTR RACK ROOM – DCS CAB. NO. 80996

SHT 3 OF 4

CALIBRATION				REF. DWGS
LAH	PLC-LAL			I-26569
12'-0" DEEP= 15.915 mADC= 74.47% INPUT	8' DEEP= 10.468 mADC= 16,749 CNTS			E-32671 LD89045

REF. DWGS	NO	REVISIONS	DATE	APD
E-32495	18	CHANGE BORDER	9/05	SY
F-26402	19	UPDATE BORDER INFO.	5/08	WJJ
CEO 24087	16	REV LSH WIRES, PWR & CAB	5/00	ERW
I-26623	17	CHG HWY MD, ADD LMM	6/00	JEM

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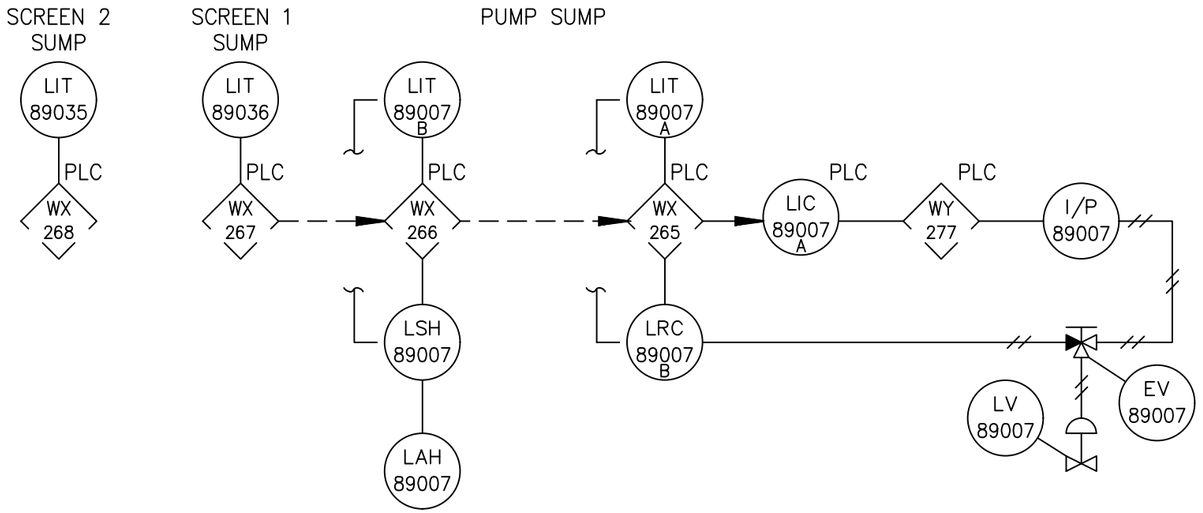
EFFLUENT PUMPS SUMP – LEVEL SHT 3 OF 4

DSGN _	DWN RJO	APVD PGR	DATE 3/27/90
WO# 90-81363	PROJ# _	IP# 2-9000	ACCT. 0415
DEPT. UT	SECT. 20	SUB-SECT. 02	LD 89007-3 REV. 20



SIMPLIFIED "LOOP" DIAGRAM

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.

DIFF. LEVEL "	PLC OUT NORTH	PLC OUT SOUTH	VRAM	PLC VALUE	CONTROL ACTION
30.0	NA	NA	NA	NA	TRANSMITTER MAXIMUM
24.0	C93	C83	V224	4357	SET HIGH ALARM
10.0	NA	NA	V223	1816	RESET HIGH ALARM
10.0	Y35	Y51	V223	1816	CHANGE SCREEN SPEED FROM SLOW TO FAST
6.0	NA	NA	V222	1089	CHANGE SCREEN SPEED FROM FAST TO SLOW
5.0	Y34	Y50	V221	908	START SCREEN AT SLOW SPEED
7.2	Y33	Y49	V220	363	STOP PUMP IF LESS THE 2" FOR
					6 CONTINUOUS MIN.
0.0	NA	NA	NA	0	STOP SYSTEM

EXP: 5"DIFF/141"*32000−6400=908

SUMP LEVEL "	SUMP LEVEL '	XMTR HEAD "	mADC	M−40 % SCALE	INPUT VALUE	CONTROL ACTION
180.0	15.00	141.0	20.000	100%	32000	TRANSMITTER MAXIMUM
144.0	12.00	105.0	15.915	80%	25464	OVERFLOW POINT & ALARM
132.0	11.00	93.0	14.553	73%	23285	HIGH LEVEL ALARM
129.0	10.75	90.0	14.213	72%	22740	RESET HIGH LEVEL ALARM
120.0	10.00	81.0	13.191	67%	21106	START THIRD PUMP
114.0	9.50	75.0	12.511	63%	20017	RE−START SECOND PUMP
108.0	9.00	69.0	11.830	60%	18928	NORMAL LEVEL CONTROL SETPOINT
102.0	8.50	63.0	11.149	57%	17838	STOP THIRD PUMP
99.0	8.25	60.0	10.809	55%	17294	RESET LOW LEVEL ALARM
96.0	8.00	57.0	10.468	53%	16749	LOW LEVEL ALARM
90.0	7.50	51.0	9.787	50%	15660	STOP SECOND PUMP
39.0	3.25	0.0	4.000	22%	6400	TRANSMITTER MINIMUM

EXP: %LEVEL/SPAN * 32000−6400=INPUT VALUE
EXP: 69"/141"*25600 +6400 =18928

IT−89039, IT−89040, IT−89041, GRINDER #1,#2,#3 MOTOR CURRENT

MOTOR AMPS	SIGNAL CURRENT	SIGNAL RANGE	PLC VALUE	VRAM	FUNCTION
50	20.0	100%	32000		
15	8.8	30%	14080	V151	JAMMED, STARTED REV. CYCLE
0	4.0	0%	6400		
	0		0		

EFFLUENT PUMP PLC CONTROL POINTS

CALIBRATION				

REF. DWGS	NO	REVISIONS	DATE	APD
F−26402	5	UPDATE BORDER	9/03	
	6	REVISE DWG. TITLE	9/05	SY
	7	UPDATE BORDER INFO.	5/08	WJJ
	8	UPDATED BORDER & TITLE	3/18	ERW

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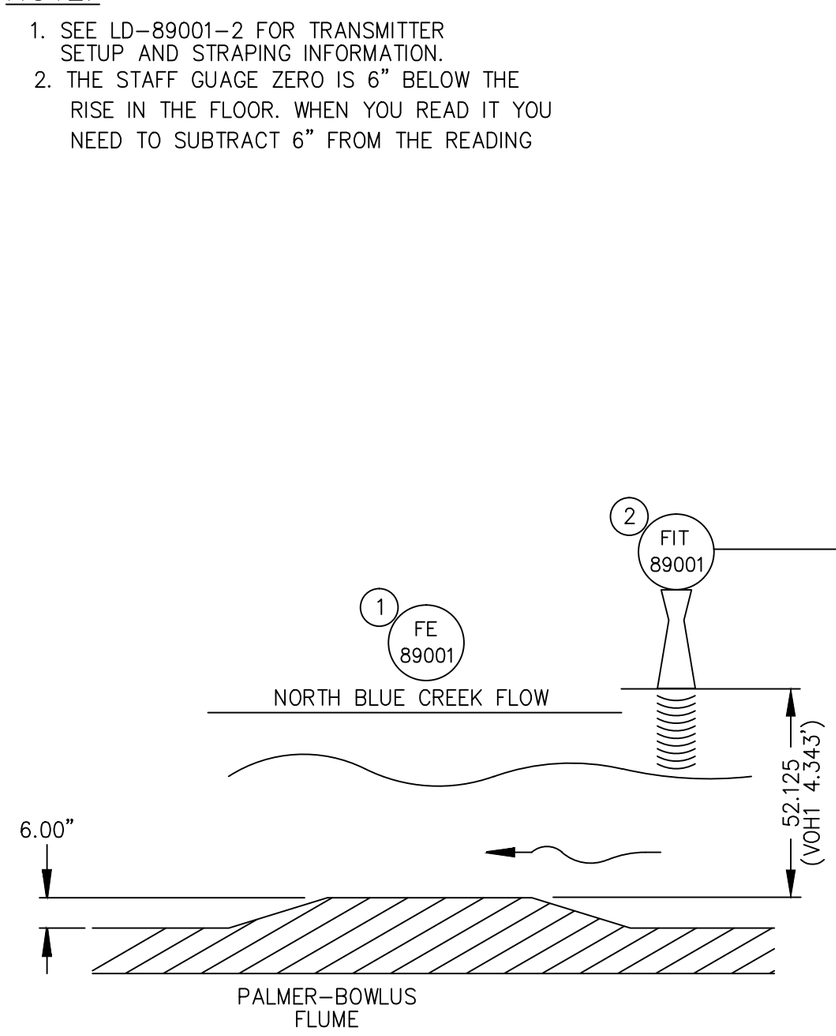
EFFLUENT PUMPS SUMP − LEVEL SHT 4 OF 4

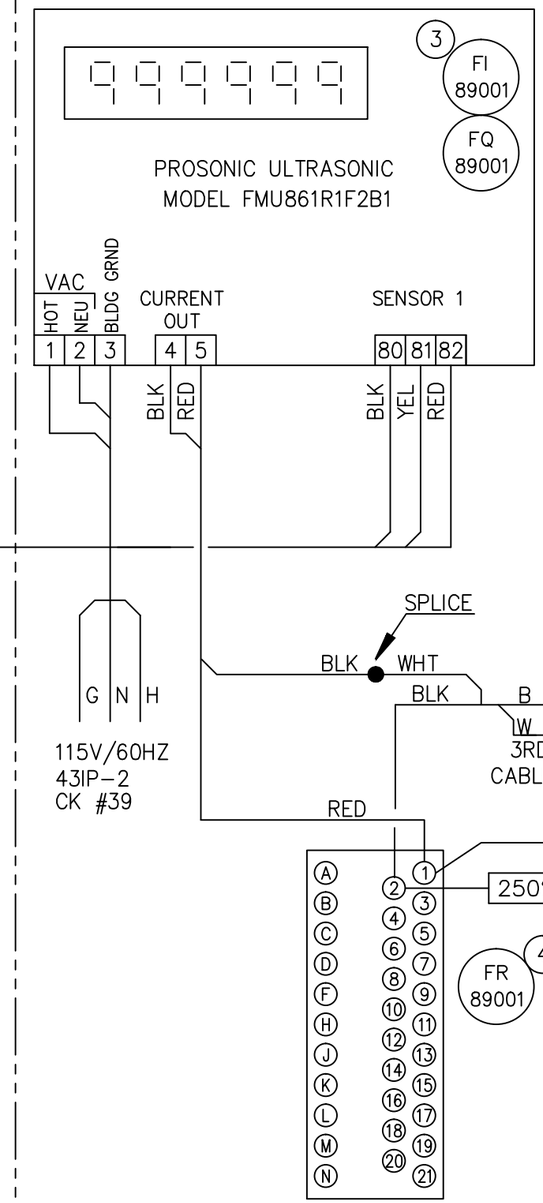
DSGN JEM	DWN DNH	APVD JEM	DATE 1/31/98
WO# _	PROJ# _	IP# _	ACCT. 0415
DEPT. UT	SECT. 20	SUB−SECT. 02	LD 89007−4	REV. 8

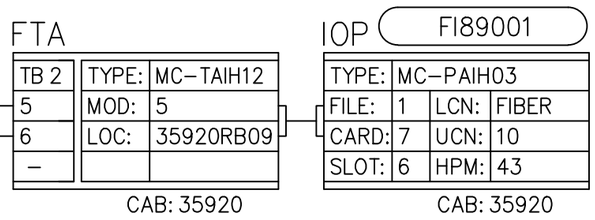
NOTE:

1. SEE LD-89001-2 FOR TRANSMITTER SETUP AND STRAPING INFORMATION.
2. THE STAFF GUAGE ZERO IS 6" BELOW THE RISE IN THE FLOOR. WHEN YOU READ IT YOU NEED TO SUBTRACT 6" FROM THE READING

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	ELEM	MILL	60" PALMER-BOWLUS	EXISTING
2	1	XMTR	ENDRESS	FDU-80QN1A	96-26627
3	1	IND	ENDRESS	FMU861R1F2B1	96-26627
4	1	REC	YOKOGAWA	436024-2	74-25-266







LOC: IN MAN HOLE JUST WEST OF MULTI-STAGE TOWER.

LOC: PANEL MOUNTED JUST WEST OF MULIT STAGE TOWER IN A FIBER GLASS PANEL

K5 4TH FLOOR RACK ROOM

CALIBRATION				
FE	FIT	FI	FQ	
0-26.27MGD= 0-32" H«2°O=	0-32" H«2°O= 4-20 MADC	4-20 MADC= 0-26.27 MGD	READING= GALLONS X 1000	

REF. DWGS	NO	REVISIONS	DATE	APD
LD-89001-2	10	MOVE FTA CARD	05/10	AJH
	11	UPDATE VOH1 DIM	8/10	PJB
	8	ADD HPM	3/07	SMR
	9	UPDATE BORDER INFO.	5/08	WJJ

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NORTH BLUE CREEK - FLOW-SHEET 1 OF 2

DSGN P.J.Baker	DWN P.J.Baker	APVD RPB / PJB	DATE 01/28/83
WO 96-26043	EWO _	IP/AR _	ACCT. 0415
DEPT. _	SECT. 20	SUB-SECT. 02	LD 89001-1 REV. 11

NEW PLASTI FAB PALMER BOWLUS FLOW METER AT K5 FOR
BLUE CREEK THIS IS A 5' FLUME
Q=4.989(Ha+0.1260)^2.0707 (SHORT EQUATION)
Q=.1032674+.2962093*H+8.353348*H^2−3.636144*H^3+1.662419*H^4
−0.2330094*H^5−0.05627315*H^6+0.0236941*H^7−0.002280874*H^8

Q= CUBIC FT/SEC Ha= HEAD IN FEET

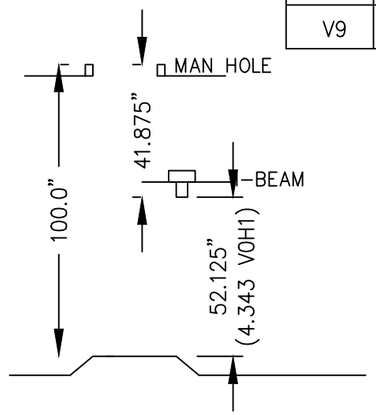
METER	% Ma OUT	HEAD IN INCHES	HEAD IN FEET	WIDTH IN FEET	CUBIC FEET PER SEC	GPM	MGD	STRAPS
0.000	4.000	0.000	0.000	5.000	0.103	46.35	0.07	1
3.125	4.500	1.000	0.083		0.184	82.56	0.12	
6.250	5.000	2.000	0.167		0.369	165.67	0.24	2
9.375	5.500	3.000	0.250		0.649	291.24	0.42	
12.500	6.000	4.000	0.333		1.015	455.58	0.66	3
15.625	6.500	5.000	0.417		1.461	655.71	0.94	
17.188	6.750	5.500	0.458		1.712	768.42	1.11	4
18.750	7.000	6.000	0.500		1.981	889.24	1.28	
20.313	7.250	6.500	0.542		2.268	1017.95	1.47	5
21.875	7.500	7.000	0.583		2.572	1154.38	1.66	
23.438	7.750	7.500	0.625		2.893	1298.38	1.87	6
25.000	8.000	8.000	0.667		3.230	1449.82	2.09	
26.563	8.250	8.500	0.708		3.584	1608.62	2.32	7
28.125	8.500	9.000	0.750		3.954	1774.71	2.56	
29.688	8.750	9.500	0.792		4.340	1948.02	2.81	8
31.250	9.000	10.000	0.833		4.742	2128.54	3.07	9
32.813	9.250	10.500	0.875		5.160	2316.24	3.34	10
34.375	9.500	11.000	0.917		5.594	2511.15	3.62	11
35.938	9.750	11.500	0.958		6.045	2713.26	3.91	12
37.500	10.000	12.000	1.000		6.511	2922.63	4.21	13
39.063	10.250	12.500	1.042		6.994	3139.29	4.52	14
40.625	10.500	13.000	1.083		7.493	3363.30	4.84	15
42.188	10.750	13.500	1.125		8.009	3594.72	5.18	16
43.750	11.000	14.000	1.167		8.541	3833.63	5.52	17
45.313	11.250	14.500	1.208		9.090	4080.10	5.88	
46.875	11.500	15.000	1.250		9.656	4334.22	6.24	
48.438	11.750	15.500	1.292		10.239	4596.08	6.62	18
50.000	12.000	16.000	1.333		10.840	4865.78	7.01	
51.563	12.250	16.500	1.375		11.459	5143.41	7.41	19
53.125	12.500	17.000	1.417		12.095	5429.07	7.82	
54.688	12.750	17.500	1.458		12.750	5722.85	8.24	
56.250	13.000	18.000	1.500		13.423	6024.87	8.68	20
57.813	13.250	18.500	1.542		14.114	6335.22	9.12	21
59.375	13.500	19.000	1.583		14.824	6654.01	9.58	22
60.938	13.750	19.500	1.625		15.553	6981.33	10.05	23
62.500	14.000	20.000	1.667		16.302	7317.30	10.54	24
64.063	14.250	20.500	1.708		17.070	7662.01	11.03	25
65.625	14.500	21.000	1.750		17.858	8015.56	11.54	26
67.188	14.750	21.500	1.792		18.665	8378.05	12.06	27
68.750	15.000	22.000	1.833		19.493	8749.59	12.60	
70.313	15.250	22.500	1.875		20.341	9130.27	13.15	28
71.875	15.500	23.000	1.917		21.210	9520.20	13.71	
75.000	16.000	24.000	2.000		23.010	10328.17	14.87	29
78.125	16.500	25.000	2.083		24.895	11174.33	16.09	
81.250	17.000	26.000	2.167		26.867	12059.48	17.37	30
84.375	17.500	27.000	2.250		28.928	12984.48	18.70	
87.500	18.000	28.000	2.333		31.079	13950.25	20.09	31
93.750	19.000	30.000	2.500		35.664	16008.02	23.05	
100.000	20.000	32.000	2.667		40.640	18241.52	26.27	32

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.

CALIBRATION USED FOR TABLE
FLUME TRUE WIDTH ---------- 60.0"
PROBE DISTANCE FROM BOTTOM OF TRANSMITTER TO BOTTOME OF FLUME ---58.125"=
58.125" − 6" TOP OF FLAT=52.125=4.343 (V0H1)

DEFINITION:
STRAP POINT NO.'S ARE A SEQUENCE OF POINTS SELECTED
TO BE USED BY FT89001 TO GENERATE THE EXPONENTIAL
CALIBRATION CURVE RELATING FLOW RATE TO THE LEVEL OF
LIQUID IN THE FLUME.
THIS IS A PALMER BOWLUS TYPE FLUME AND THE EQUATION USED
TO CALCULATE THE FLOW IS:
Q=.1032674+.2962093*H+8.353348*H^2−3.636144*H^3+1.662419*H^4
−0.2330094*H^5−0.05627315*H^6+0.0236941*H^7−0.002280874*H^8
Q= CUBIC FT/SEC Ha= HEAD IN FEET

	H0	H1	H2	H3	H4	H5	H6	H7	H8	H9
V0		4.343	----	0	FDU−80 80	0.0	26.27	5	1.833	205
V1	1	0	0	0	0	167.23	167.23	167.23	1	1
V2	M. CURVE 3	0	0	0.000	0700	1	----	MAX MGD 26.27	0.00	3.000
V3	0.000	59	28	0	0	3	20	1	----	----
V4	----	----	----	----	----	----	----	----	----	----
V5	----	----	----	----	----	----	----	----	80	----
V6	----	----	----	----	----	----	----	----	----	1
V7	0	19	25	80	0	55	120	110	101	COUNTER
V8	FLOW 2	1	0	FEET 1	MGAL/D 18	US−GAL 6	0	0	COUNTER	----
V9	E	E---	E---	E---	0	0	519	----	----	



LOC: WEST SIDE OF K5 MULTI STAGE TOWER.

CALIBRATION				

REF. DWGS	NO	REVISIONS	DATE	APD
LD−89001−1	10	UPDATE straps	10/16	PJB
	7	UPDATE BORDER	9/03	WJJ
	8	UPDATE BORDER INFO.	5/08	WJJ
	9	UPDATE CAL INFO	8/10	PJB

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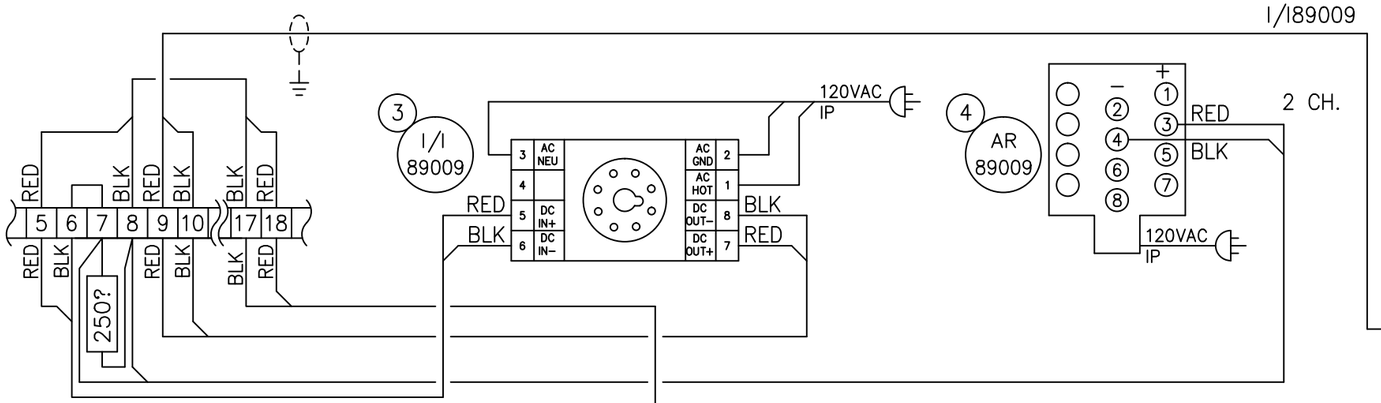
NORTH BLUE CREEK − FLOW−SHEET 2 OF 2

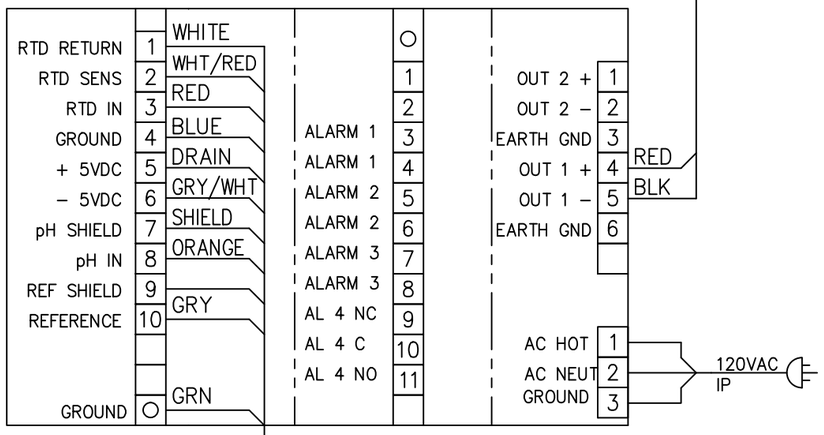
DSGN P. J. Baker	DWN P. J. Baker	APVD RPB / PJB	DATE 10/11/96
WO 96−26043	EWO _	IP/AR _	ACCT. 0415
DEPT. _	SECT. 20	SUB−SECT. 02	LD 89001−2 REV. 10

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	ELECTRO	ROSEMONT	3900-01-10	959784
2	1	XMTR	ROSEMONT	56-03-22-30-HT-99SQ11022	239407
3	1	CONV	WILKERSON	MM4300 (ACTION 4380-0000)	non-stocked
4	1	RCDR	YOKOGAWA	436104-2/R1	239288



S. BLUE CREEK PH CABINET 89901
NORTH SIDE OF FINISHING BUILDING

LOC: WEST SIDE OF SOUTH OUTFALL PONDS



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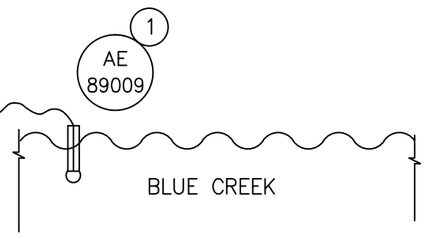
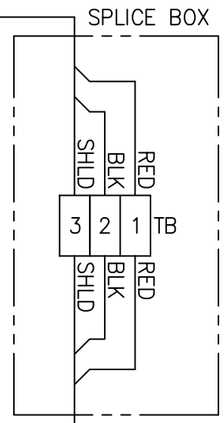


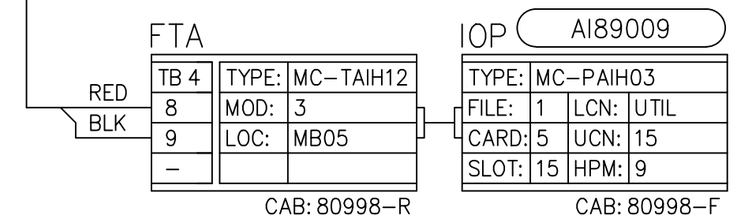
LOCATION: IN BLUE CREEK ACCROSS FROM THE FINISHING ROOM IN OPEN CHANNEL.

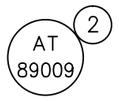
SPLICE BOX



PEER TO PEER INTERLOCK	
FROM	AI89009.PVLOFL
TO	4PB/UTIL PLC
ADDRESS	2703
POINT	L11_LOG1
PURPOSE	-

PEER TO PEER INTERLOCK	
FROM	AI89009.PVHIFL
TO	4PB/UTIL PLC
ADDRESS	2701
POINT	L11_LOG1
PURPOSE	-





NOTE:
89009T IS FROM THE COMBINED
DRAWINGS OF 89009-1 & 89009-2.

CALIBRATION				
AE	AT	AR	AI	
-410 TO 410 MV =0-14 PH	0-14 PH= 4-20 MADC	4-20 MADC =0-14 PH	4-20 MADC =0-14 PH	

REF. DWGS	NO	REVISIONS	DATE	APD
12-28-0007	20	UPDATE XMTER	6/12	PJB
	17	UPDATE PH PROBE	8/05	PJB
	18	UPDATE BORDER INFO.	5/08	WJJ
	19	UPDATE BOM 2-3-4	6/12	PJB

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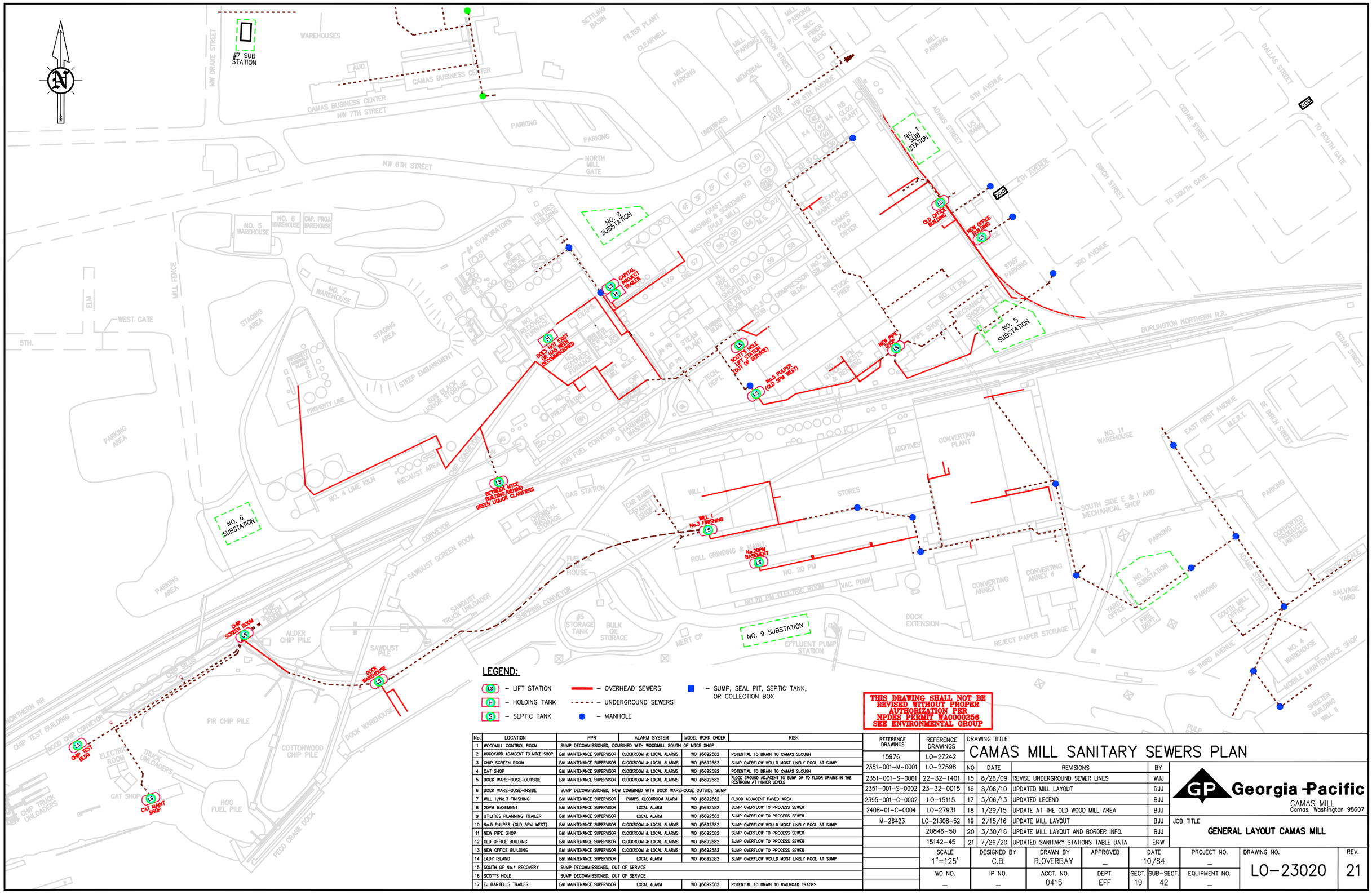
SOUTH BLUE CREEK PH

DSGN D.M. PAINE	DWN WGA	APVDJEB/EJK	DATE 08/29/90
WO 89-2565	EWO _	IP/AR C-8828	ACCT. 0415
DEPT. _	SECT. _	SUB-SECT. _	LD 89009 REV. 20



LEGEND:

- (LS) – LIFT STATION
- (H) – HOLDING TANK
- (S) – SEPTIC TANK
- – OVERHEAD SEWERS
- – UNDERGROUND SEWERS
- – MANHOLE
- – SUMP, SEAL PIT, SEPTIC TANK, OR COLLECTION BOX

THIS DRAWING SHALL NOT BE REVISED WITHOUT PROPER AUTHORIZATION PER NPDES PERMIT WA0000256 SEE ENVIRONMENTAL GROUP

No.	LOCATION	PPR	ALARM SYSTEM	MODEL WORK ORDER	RISK
1	WOODMILL CONTROL ROOM	SUMP DECOMMISSIONED, COMBINED WITH WOODMILL SOUTH OF MTCE SHOP			
2	WOODYARD ADJACENT TO MTCE SHOP	E&I MAINTENANCE SUPERVISOR	CLOCKROOM & LOCAL ALARMS	WO #5692582	POTENTIAL TO DRAIN TO CAMAS SLOUGH
3	CHIP SCREEN ROOM	E&I MAINTENANCE SUPERVISOR	CLOCKROOM & LOCAL ALARMS	WO #5692582	SUMP OVERFLOW WOULD MOST LIKELY POOL AT SUMP
4	CAT SHOP	E&I MAINTENANCE SUPERVISOR	CLOCKROOM & LOCAL ALARMS	WO #5692582	POTENTIAL TO DRAIN TO CAMAS SLOUGH
5	DOCK WAREHOUSE-OUTSIDE	E&I MAINTENANCE SUPERVISOR	CLOCKROOM & LOCAL ALARMS	WO #5692582	FLOOD GROUND ADJACENT TO SUMP OR TO FLOOR DRAINS IN THE RESTROOM AT HIGHER LEVELS
6	DOCK WAREHOUSE-INSIDE	SUMP DECOMMISSIONED, NOW COMBINED WITH DOCK WAREHOUSE OUTSIDE SUMP			
7	WILL 1/No.3 FINISHING	E&I MAINTENANCE SUPERVISOR	PUMPS, CLOCKROOM ALARM	WO #5692582	FLOOD ADJACENT PAVED AREA
8	20PM BASEMENT	E&I MAINTENANCE SUPERVISOR	LOCAL ALARM	WO #5692582	SUMP OVERFLOW TO PROCESS SEWER
9	UTILITIES PLANNING TRAILER	E&I MAINTENANCE SUPERVISOR	LOCAL ALARM	WO #5692582	SUMP OVERFLOW TO PROCESS SEWER
10	No.5 PULPER (OLD 5PM WEST)	E&I MAINTENANCE SUPERVISOR	CLOCKROOM & LOCAL ALARMS	WO #5692582	SUMP OVERFLOW WOULD MOST LIKELY POOL AT SUMP
11	NEW PIPE SHOP	E&I MAINTENANCE SUPERVISOR	CLOCKROOM & LOCAL ALARMS	WO #5692582	SUMP OVERFLOW TO PROCESS SEWER
12	OLD OFFICE BUILDING	E&I MAINTENANCE SUPERVISOR	CLOCKROOM & LOCAL ALARMS	WO #5692582	SUMP OVERFLOW TO PROCESS SEWER
13	NEW OFFICE BUILDING	E&I MAINTENANCE SUPERVISOR	CLOCKROOM & LOCAL ALARMS	WO #5692582	SUMP OVERFLOW TO PROCESS SEWER
14	LADY ISLAND	E&I MAINTENANCE SUPERVISOR	LOCAL ALARM	WO #5692582	SUMP OVERFLOW WOULD MOST LIKELY POOL AT SUMP
15	SOUTH OF No.4 RECOVERY	SUMP DECOMMISSIONED, OUT OF SERVICE			
16	SCOTTS HOLE	SUMP DECOMMISSIONED, OUT OF SERVICE			
17	EJ BARTELLS TRAILER	E&I MAINTENANCE SUPERVISOR	LOCAL ALARM	WO #5692582	POTENTIAL TO DRAIN TO RAILROAD TRACKS

REFERENCE DRAWINGS	REFERENCE DRAWINGS
15976	LO-27242
2351-001-M-0001	LO-27598
2351-001-S-0001	22-32-1401
2351-001-S-0002	23-32-0015
2395-001-C-0002	LO-15115
2408-01-C-0004	LO-27931
M-26423	LO-21308-52
	20846-50
	15142-45

DRAWING TITLE

CAMAS MILL SANITARY SEWERS PLAN

NO	DATE	REVISIONS	BY
15	8/26/09	REVISE UNDERGROUND SEWER LINES	WJJ
16	8/06/10	UPDATED MILL LAYOUT	BJJ
17	5/06/13	UPDATED LEGEND	BJJ
18	1/29/15	UPDATE AT THE OLD WOOD MILL AREA	BJJ
19	2/15/16	UPDATE MILL LAYOUT	BJJ
20	3/30/16	UPDATE MILL LAYOUT AND BORDER INFO.	BJJ
21	7/26/20	UPDATED SANITARY STATIONS TABLE DATA	ERW

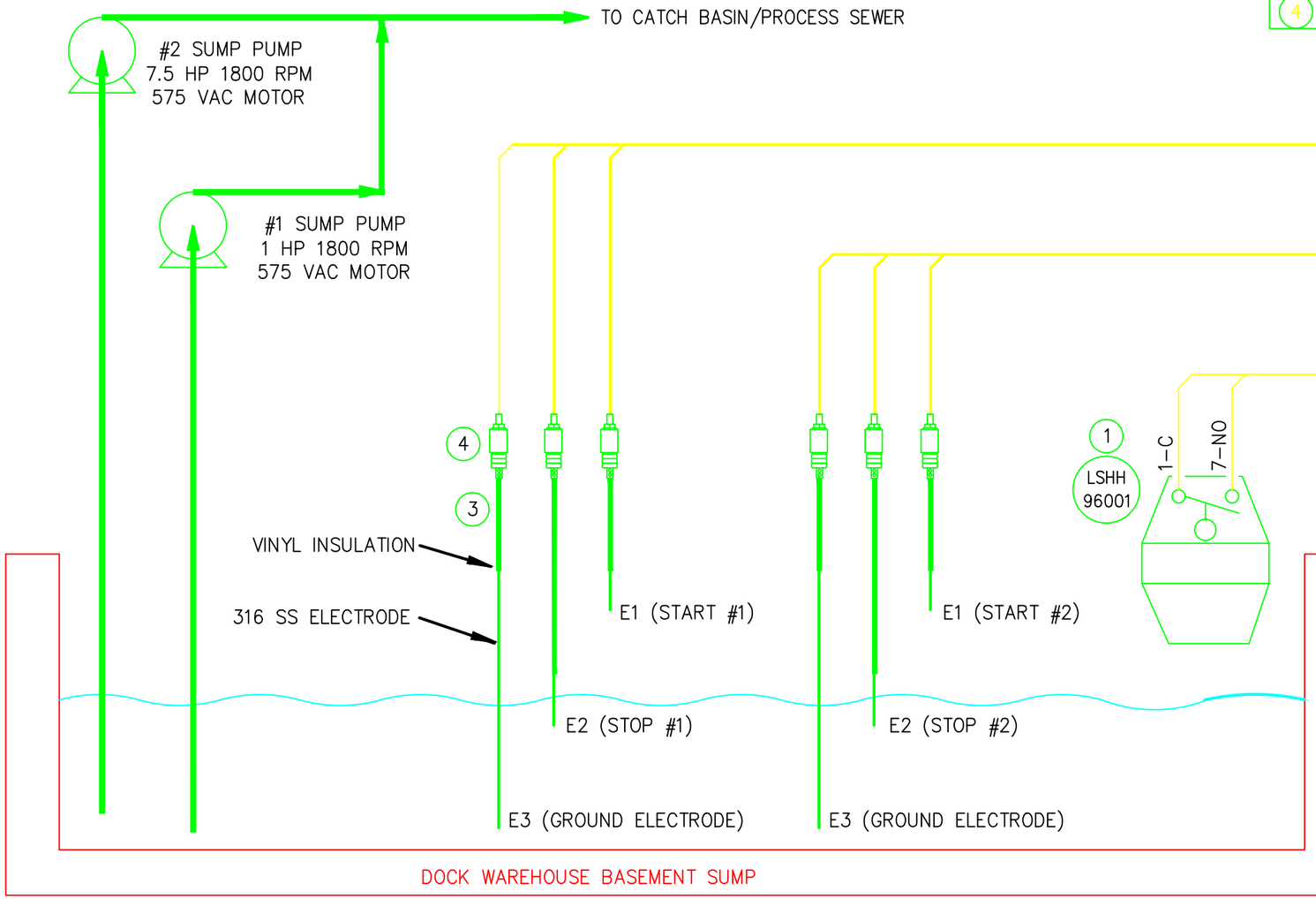
Georgia-Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE
GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
1"=125'	C.B.	R.OVERBAY	_	10/84	_	LO-23020	21

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
_	_	0415	EFF	19	42	_

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	3	SWITCH	RECO	250, FLOAT	67-11-180
2	1	LIGHT	FED SIGNAL	131DST W/AMBER LENS	58-65-100
3	6	HOLDER	OMRON	BS-1S1 SUS304	972791
4	6	ELECTRODE	OMRON	F03-01 SUS316 W/VINYL	972804



LSHH	LSHH
CONTACTS CLOSE AT 2'-9" ON INCREASE	CONTACTS OPEN AT 2"-0" ON DECREASE

LOC: BOTTOM OF DOCK WAREHOUSE BASEMENT RAMP

CALIBRATION			
#1 PUMP E1	#1 PUMP E2	**#2 PUMP E1**	**#2 PUMP E2**
PUMP STARTS AT 2'-6" ON INCREASE	PUMP STOPS AT 6" ON DECREASE	**PUMP STARTS AT 2'-9" ON INCREASE**	**PUMP STOPS AT 6" ON DECREASE**

REF. DWGS	NO	REVISIONS	DATE	APD
E-29578	5	ADD ELECTRODES	7/12	**SMR**
LD96002	2	ADD RTU 96002	3/02	BQ
	3	CHANGE BORDER	9/05	SY
	4	UPDATE BORDER INFO.	5/08	WJJ

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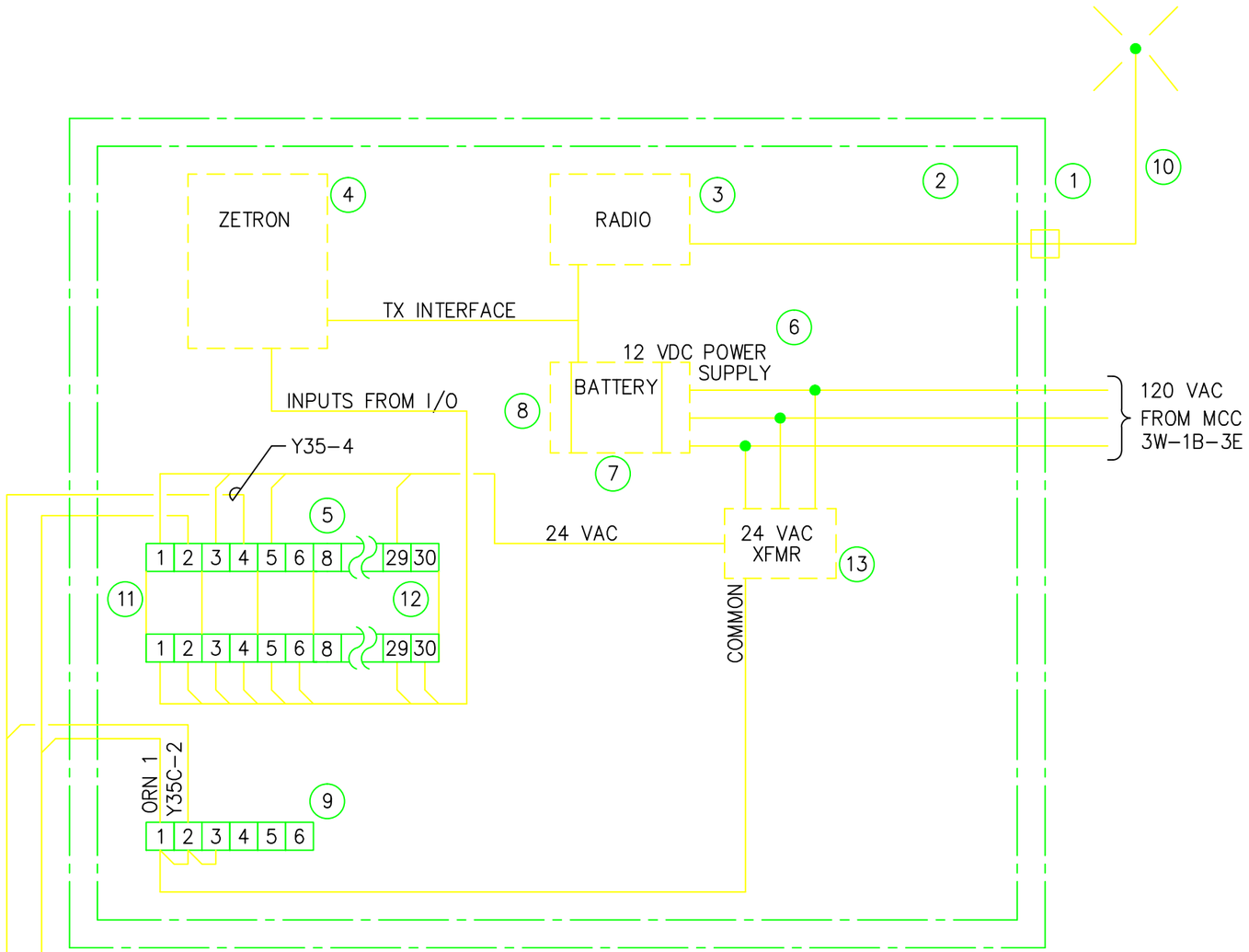
DOCK WAREHOUSE BASEMENT DRAINAGE SUMP - LEVEL

DSGN KAC	DWN KAC	APVD KAC/RPB	DATE 06/27/95
WO 95-06577	EWO _	IP/AR _	ACCT. 0943
DEPT. SHIP	SECT. 20	SUB-SECT. 02	LD 96001	REV. 5

LD96001 07/12/12 05:15:21



ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	ENCL	HOFFMAN	A-24H2008GQRLP	UL
2	1	PANEL	ZETRON	415-0010	–
3	1	RADIO	MOTOROLA	M34XVC20F3AA	–
4	1	CONT	ZETRON	1716, 901-9261	–
5	1	COND	OPTO-22	G4PB16T	–
6	1	PWR SPLY	VOLGEN	SX30V-15S	–
7	1	BATTERY	INTERSTATE	PC1270, 12V 7AH	–
8	1	CHARGER	ZETRON	702-9748B, P5-124480	–
9	1	TERM	ZETRON	401-0105	–
10	1	ANTENNA	–	–	–
11	3	MODULE	OPTO-22	–	–
12	1	MODULE	OPTO-22	G4-ODC5R	–
13	1	XFMR	REVERE	RT 2420	–

PLUG IN MODULE INPUT 0 (TYPICAL)

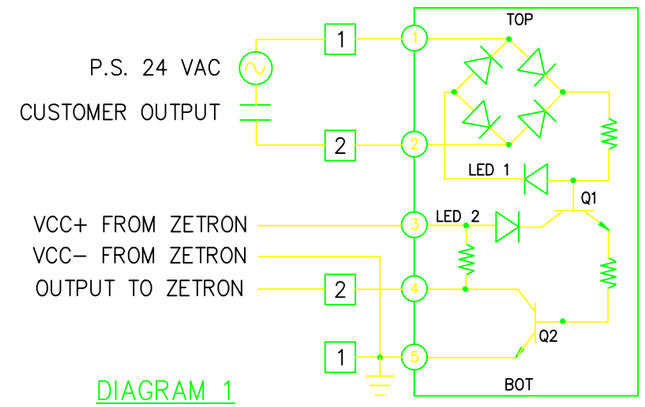


DIAGRAM 1

See Chris
at Day wireless
360-256-9444, 360-423-3690
Zetron 425-820-6363

NOTIFY CLOCKROOM/MERT
BEFORE WORKING ON RTU.
UNIT WILL ALARM

CALIBRATION				

REF. DWGS	NO	REVISIONS	DATE	APD
E-29578	4	REVISE RELAYS	7/12	SMR
LD-96001	5	ADD STORM WTR TK ALM	10/12	ERW
1934-34-25-0015	2	UPDATE BORDER INFO.	5/08	WJJ
	3	REVISE CONTINUATION	7/12	SMR

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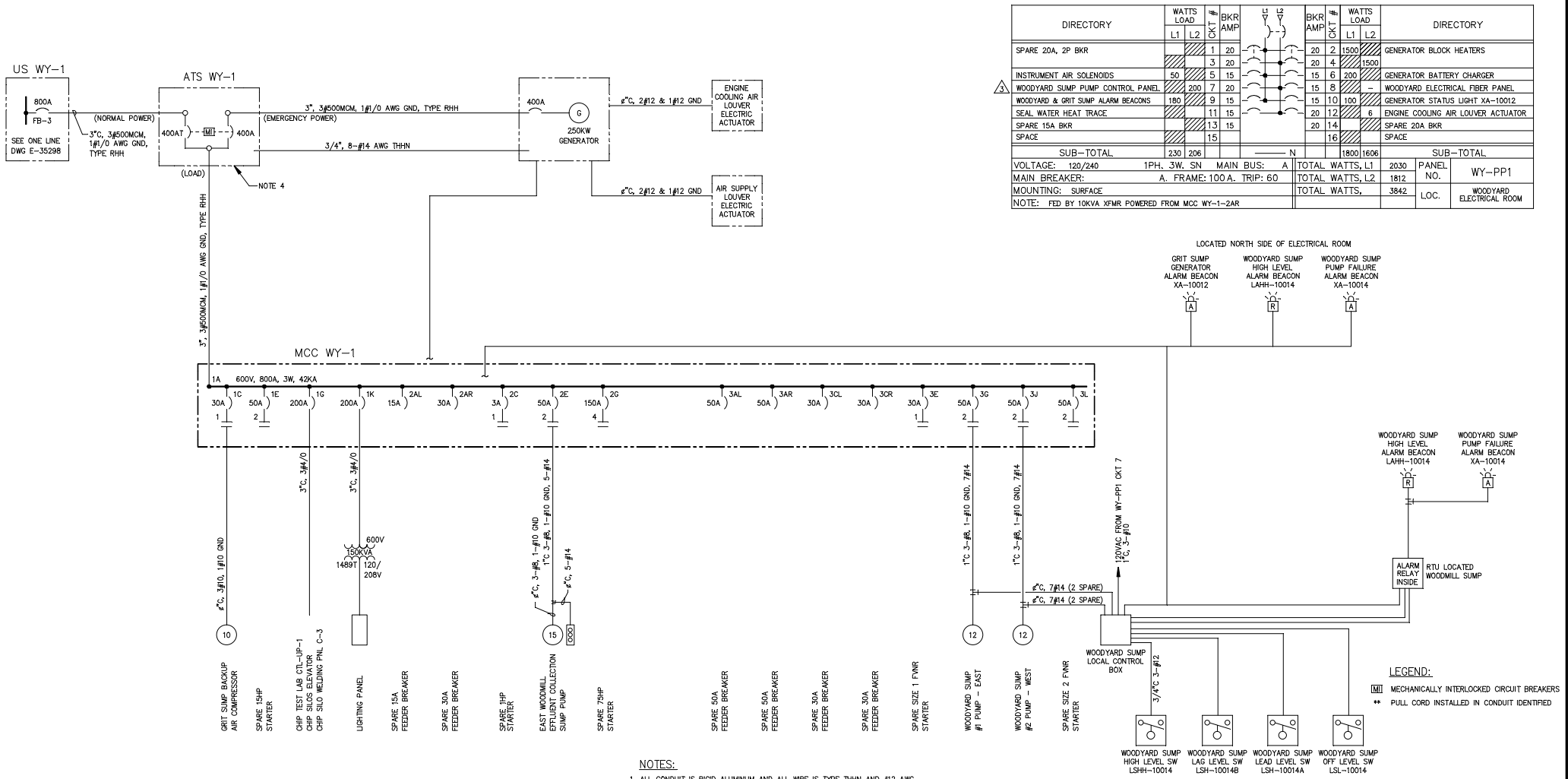
DOCK WAREHOUSE SUMP & STORM WATER TANK ALARM RTU

DSGN MEP	DWN MEP	APVD	DATE 3/08/02
WO 02-06514	PROJ/IP _		ACCT. 0943
DEPT. SHIP	SECT. 20	SUB-SECT. 02	LD 96002 REV. 5

11/05/12 13:40:14 LD96002.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1



DIRECTORY	WATTS LOAD L1	WATTS LOAD L2	CKT #	BKR AMP		BKR AMP	CKT #	WATTS LOAD L1	WATTS LOAD L2	DIRECTORY
SPARE 20A, 2P BKR			1	20		20	2	1500		GENERATOR BLOCK HEATERS
			3	20		20	4		1500	
INSTRUMENT AIR SOLENOIDS	50		5	15		15	6	200		GENERATOR BATTERY CHARGER
3 WOODYARD SUMP PUMP CONTROL PANEL	180	200	7	20		15	8		–	WOODYARD ELECTRICAL FIBER PANEL
WOODYARD & GRIT SUMP ALARM BEACONS	180		9	15		15	10	100		GENERATOR STATUS LIGHT XA-10012
SEAL WATER HEAT TRACE			11	15		20	12		6	ENGINE COOLING AIR LOUVER ACTUATOR
SPARE 15A BKR			13	15		20	14			SPARE 20A BKR
SPACE			15				16			SPACE
SUB-TOTAL	230	206			N			1800	1606	SUB-TOTAL

VOLTAGE: 120/240 1PH, 3W, SN MAIN BUS: A	TOTAL WATTS, L1	2030	PANEL NO. WY-PP1
MAIN BREAKER: A. FRAME: 100 A. TRIP: 60	TOTAL WATTS, L2	1812	
MOUNTING: SURFACE	TOTAL WATTS,	3842	LOC. WOODYARD ELECTRICAL ROOM
NOTE: FED BY 10KVA XFMR POWERED FROM MCC WY-1-2AR			

LEGEND:

MI MECHANICALLY INTERLOCKED CIRCUIT BREAKERS

** PULL CORD INSTALLED IN CONDUIT IDENTIFIED

NOTES:

1. ALL CONDUIT IS RIGID ALUMINUM AND ALL WIRE IS TYPE THHN AND #12 AWG UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL ROUTE POWER AND CONTROL IN CONDUIT UNDERGROUND TO GRIT PUMP RELATED SERVICES OUTDOORS. REFER TO DETAIL A ON DWG. E-35315 FOR UNDERGROUND DUCT BANK DETAILS.
3. LOCATE GENERATOR STATUS ALARM LIGHT & SIGN AT NORTHEAST CORNER OF WOODYARD ELECTRICAL ROOM.
4. AUTOMATIC TRANSFER SWITCH USES CIRCUIT BREAKER FRAMES FOR SWITCHING. NORMAL POWER CB IS SERVICE ENTRANCE RATED WITH TRIP FUNCTIONS. EMERGENCY POWER CB HAS NO TRIP UNITS. NORMAL AND EMERGENCY POWER SWITCHING BREAKERS ARE MECHANICALLY AND ELECTRICALLY INTERLOCKED TO PREVENT PARALLELING OF POWER SOURCES.
5. LOCATE GRIT SUMP HI-LEVEL OVERFLOW ALARM LIGHT & SIGN AT NORTHEAST CORNER OF WOODYARD ELECTRICAL ROOM.
6. REFERENCE LOOP DWG 10008 FOR GRIT SUMP LEVEL CONTROL OF SUMP PUMPS.

REFERENCE DRAWINGS	DRAWING TITLE
E-33860	WOODYARD MCC WY-1 POWER ONE-LINE DIAGRAM

NO	DATE	REVISIONS	BY
E-34032 TO E-34035	11/28/01	SWAPPED UNITS 2C & 2E, REV'D PNL SCHEDULE	ERW
LD 10008	1/29/03	UPDATED FOR WOODMILL DEMO PROJECT	PRK
LD 10009	9/15/04	ADDED MCC SECT 3 & WOODYARD SUMP CKTS	ERW
LD 10016	4/8/05	ADDED SECOND BEACON AT GRIT PUMP HOUSE	PJB
5	09/15/05	CHANGE DRAWING BORDER	WJJ
6	3/19/08	REVISE FOR GRIT SUMP REMOVAL	SMR
7	05/02/08	UPDATE DRAWING BORDER	WJJ

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JOB TITLE: GRIT PUMPS BACKUP POWER

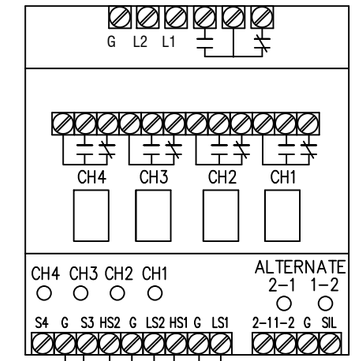
SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	E.R.WARD	E.R.WARD	_	08/31/01	_	E-33861	7

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
01-28900	2-1947	_	WM	19	35	_

ITEM	QTY	DESCRIPTION	MANUFACTURE	MODEL NUMBER	REFERENCE NO.

WOODYARD SUMP PUMP CONTROL PANEL
REF DWG E37279

NOTE: LSHH-10014 ON INPUT CH3 ENERGIZES RELAY AR5



57 56 55 54 53 52 51 50

WOODYARD SUMP PUMPS 115 VAC CONTROL POWER
L1
N

TO ALARM RELAY LD10016

15A
H 115VAC FROM POWER PANEL
N WY-PP1 CKT 7

15A
H 115VAC FROM POWER PANEL
N WY-PP1 CKT 9

XS-10014A PUMP 1 FAIL — AR1 AR2 — 60 61

XS-10014B PUMP 2 FAIL — AR3 AR4 — 62 63

LSHH-10014 HI LEVEL ALARM — AR5 — 64 65

12 VDC

TO RTU LD10016

LOC: WOODYARD ELECTRICAL ROOM

WOODYARD SUMP HIGH LEVEL ALARM

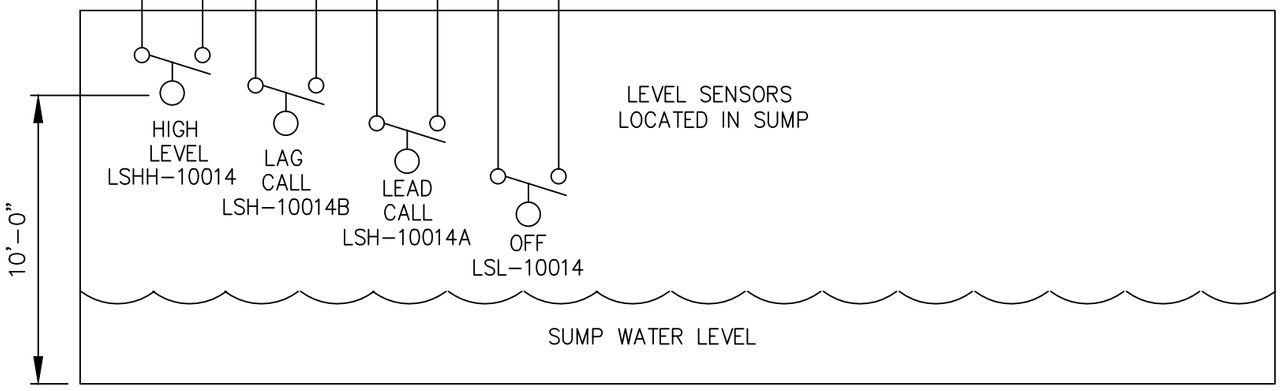
R
H N

WOODYARD SUMP PUMP TROUBLE ALARM XA-10014

A
H N

FRM ALM RELAY LD10016

LOC: AT WOODYARD SUMP



LOC: WOODYARD AREA S.W. OF WOODYARD ELECTRICAL ROOM

WOODYARD SUMP HIGH LEVEL ALARM

R
H N

WOODYARD SUMP PUMP TROUBLE ALARM XA-10014

A
H N

LOC: MOUNTED OUTSIDE NORTH FACE WOODYARD ELECTRIC RM

CALIBRATION				
LSHH	LSH-B	LSH-A	LSL	
NO CONTACTS CLOSE AT 10'-0"" INCR.	NO CONTACTS CLOSE INC LVL START #2 PUMP	NO CONTACTS CLOSE INC LVL START #1 PUMP	NC CONTACTS OPEN DEC LVL STOP PUMPS	

REF. DWGS.	NO	REVISION	DATE	APD
LD10016	5	HIGH LVL WAS 56"	3/08	DKS
E-33861	6	UPDATE BORDER	5/08	WJJ
E-37279	3	CHANGE BORDER	9/05	SY
	4	CORRECT WIRING	3/08	SMR

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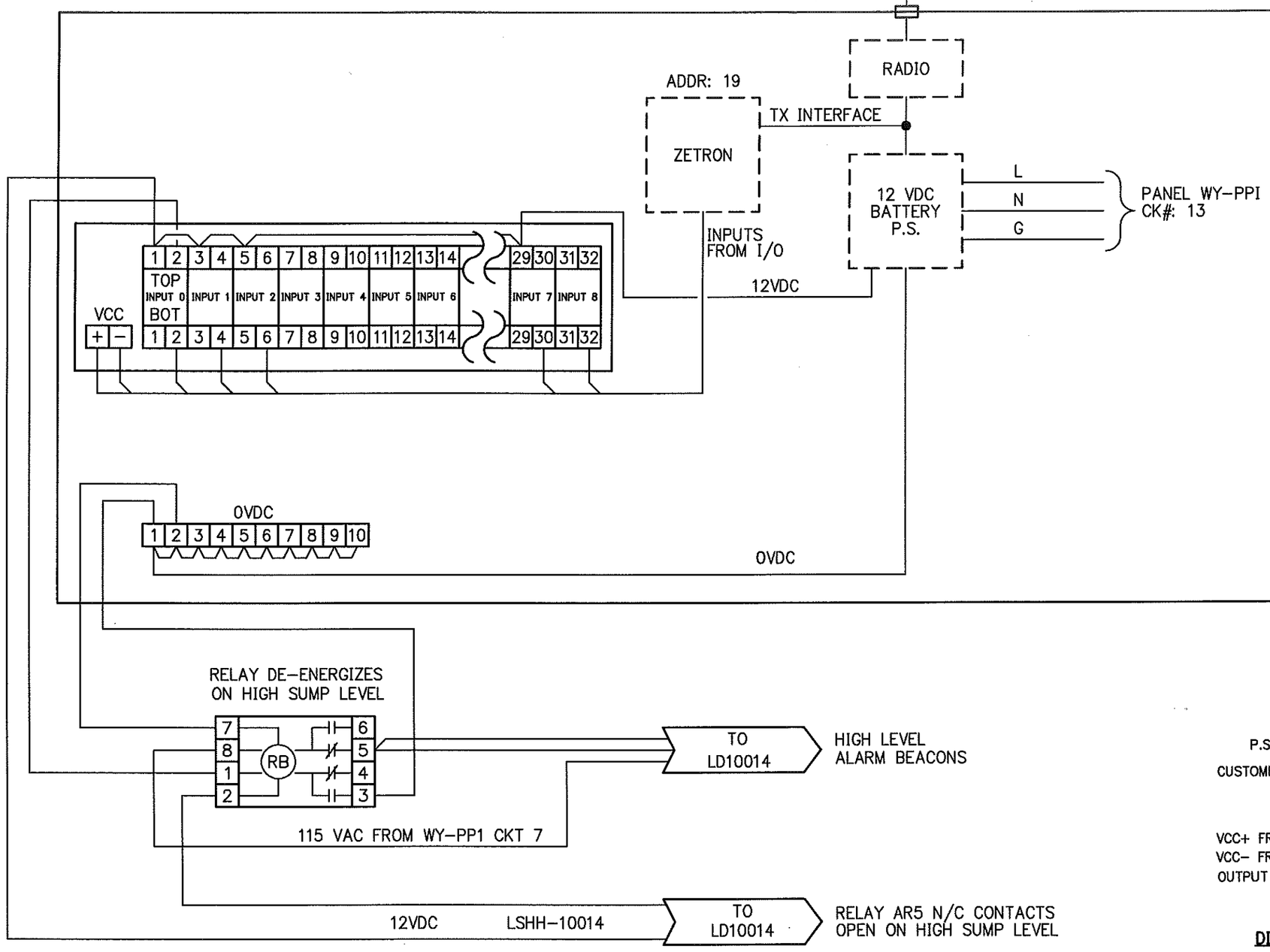
WOODYARD SUMP STATUS - ALARM

DSGN. E.R.WARD	DWN. E.R.WARD	APVD.	DATE: 09/15/04
W.O. _	ACCT. _		SCALE: NONE
DEPT. WM	SECT. 20	SUB-SECT. _	LD10014 REV. 6

LD10014 05/02/08 06:17:21

ITEM	QTY	DESCRIPTION	MANUFACTURE	MODEL NUMBER	REFERENCE NO.



PLUG IN MODULE INPUT 0 (TYPICAL)

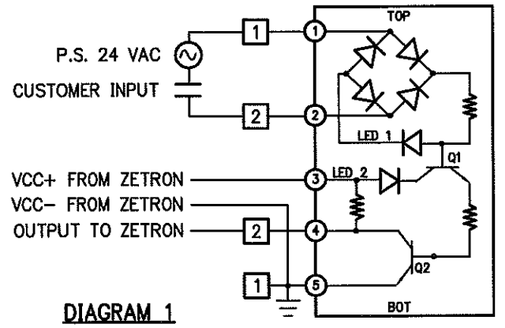


DIAGRAM 1

CALIBRATION				

REF. DWGS.	NO	REVISION	DATE	APD
E-33861	1	PRELIMINARY	2/05	KTL
E-37279	2	RECORD ISSUE	5/05	PJB
LD10014	3	REVISE WIRING	3/08	SMR
	4	UPDATE THE BORDER	5/08	WJJ

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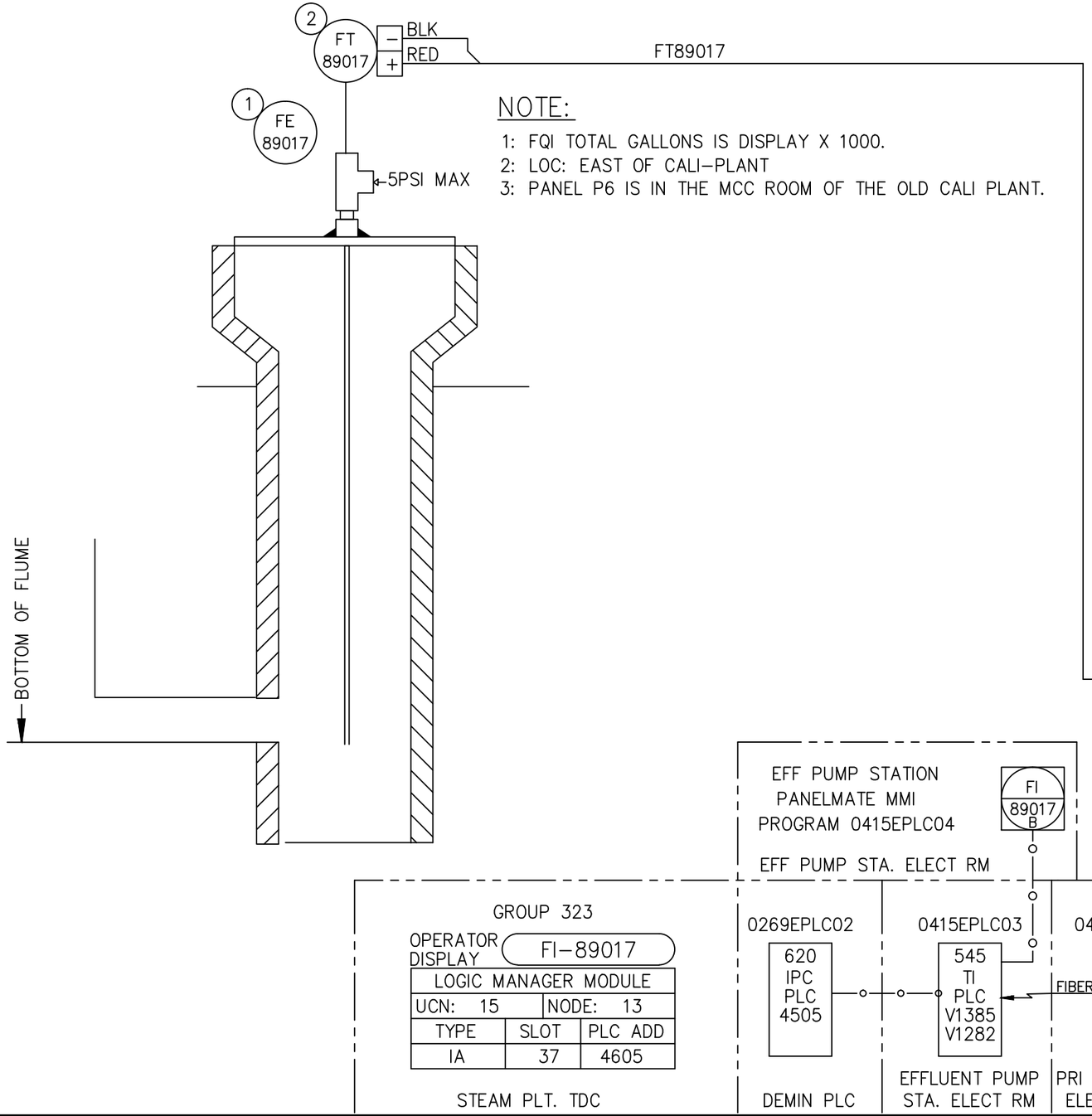
GRIT SUMP AREA RTU

DSGN. K LICHY	DWN. K LICHY	APVD: RPB / MRH	DATE: 02/11/05
W.O. 566524	ACCT. 0306		SCALE: NONE
DEPT. WM	SECT. _	SUB-SECT. _	LD10016	REV. 4

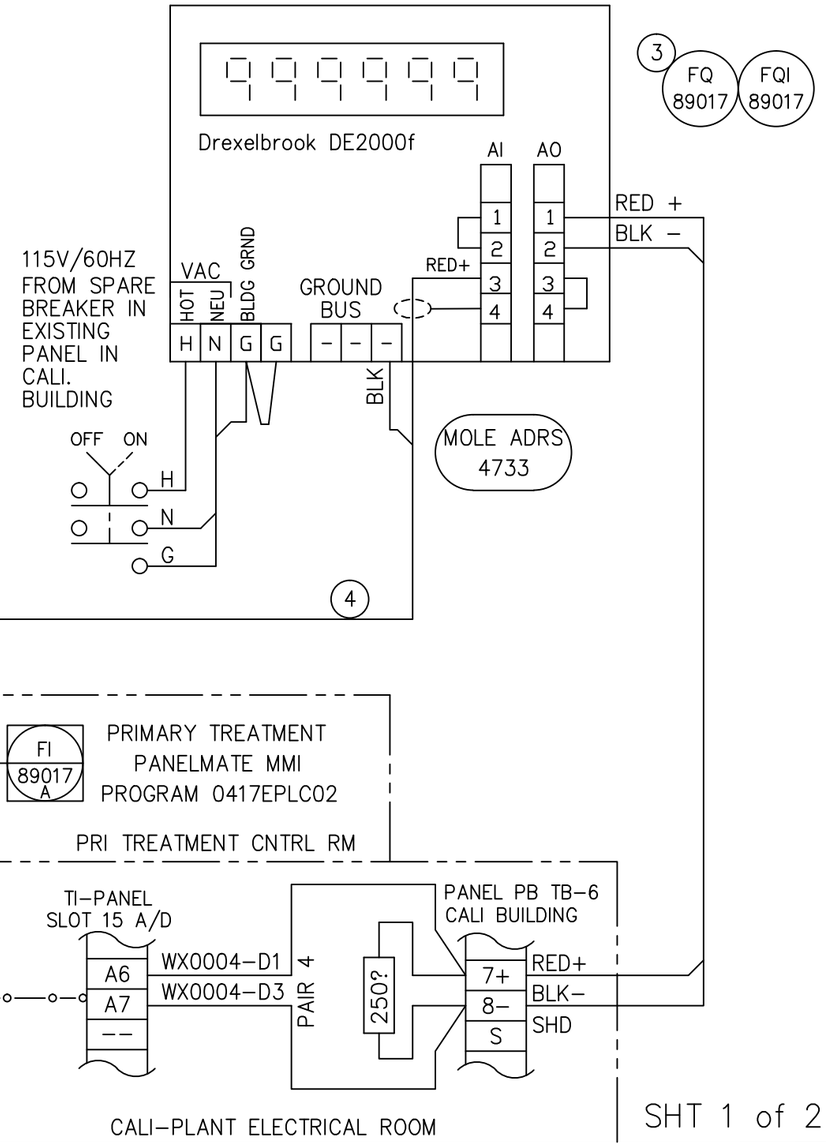
LD10016 05/02/08 06:16:21



NOTE:

1: FQI TOTAL GALLONS IS DISPLAY X 1000.
2: LOC: EAST OF CALI–PLANT
3: PANEL P6 IS IN THE MCC ROOM OF THE OLD CALI PLANT.

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	PIPE	BUBBLE PIPE	MILL	–
2	1	XMTR	ROSEMOUNT	1151DP4S22S1M1B	74–31–553
3	1	INDCTR	DREXELBROOK	601–2000–207, DE2000F	94–14722
4	1	CABLE	–	150' 2 COND. SHIELDED	–



SHT 1 of 2

CALIBRATION				
FE	FT	FQ	FI–89017	FI–89017A & B
0–25" H«2"O	0–25" H«2"O= 4–20 MADC	4–20 MADC= 0.00–67.251MGD	4–20 MADC= 0–4095 0.00–67.25 MGD	4–20 MADC= 6,400–32,000 0.00–67.25 MGD

REF. DWGS	NO	REVISIONS	DATE	APD
	13	INSTALL NEW FLOW METER	4/99	PJB
C–4863/24107	15	UPDATE BORDER	9/03	WJJ
C–4863/24108	16	UPDATE BORDER INFO.	5/08	WJJ
	14	UPDATE PLC WIRING	5/02	PJB

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EFFLUENT CLARIFIER OUTFALL – FLOW

DSGN L.R. CLARK	DWN M. LUCAS	APVD LRC	DATE 10/17/94
WO 94–19014	EWO _	IP/AR 2–0400	ACCT. 0416
DEPT. EFF	SECT. 20	SUB–SECT. 02	LD 89017–1 REV. 16

LD89017–1 05/02/08 13:13:21

CLARIFIER DISCHARGE FLOWMETER FT-89017 CALIBRATION

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.

METER %	Ma OUT	HEAD IN INCHES	HEAD IN FEET	WIDTH IN FEET	CUBIC FEET PER SEC	GPM	MGD	STRAP
0.000	4.000	0.000	0.000	8.000	0.000	0.000	0.000	1.000
2.000	4.320	0.500	0.042	8.000	0.194	87.066	0.125	
4.000	4.640	1.000	0.083	8.000	0.591	265.138	0.382	
6.000	4.960	1.500	0.125	8.000	1.133	508.594	0.732	
8.000	5.280	2.000	0.167	8.000	1.799	807.406	1.163	
10.000	5.600	2.500	0.208	8.000	2.575	1155.535	1.664	
12.000	5.920	3.000	0.250	8.000	3.451	1548.788	2.230	2.000
14.000	6.240	3.500	0.292	8.000	4.420	1984.017	2.857	
16.000	6.560	4.000	0.333	8.000	5.478	2458.740	3.541	
18.000	6.880	4.500	0.375	8.000	6.619	2970.926	4.278	
20.000	7.200	5.000	0.417	8.000	7.840	3518.873	5.067	
22.000	7.520	5.500	0.458	8.000	9.137	4101.126	5.906	
24.000	7.840	6.000	0.500	8.000	10.508	4716.420	6.792	3.000
26.000	8.160	6.500	0.542	8.000	11.950	5363.640	7.724	
28.000	8.480	7.000	0.583	8.000	13.461	6041.795	8.700	
30.000	8.800	7.500	0.625	8.000	15.039	6749.996	9.720	
32.000	9.120	8.000	0.667	8.000	16.682	7487.436	10.782	
34.000	9.440	8.500	0.708	8.000	18.389	8253.382	11.885	
36.000	9.760	9.000	0.750	8.000	20.157	9047.162	13.028	4.000
38.000	10.080	9.500	0.792	8.000	21.986	9868.155	14.210	
40.000	10.400	10.000	0.833	8.000	23.875	10715.789	15.431	
42.000	10.720	10.500	0.875	8.000	25.822	11589.532	16.689	
44.000	11.040	11.000	0.917	8.000	27.825	12488.886	17.984	
46.000	11.360	11.500	0.958	8.000	29.885	13413.387	19.315	
48.000	11.680	12.000	1.000	8.000	32.000	14362.598	20.682	5.000
50.000	12.000	12.500	1.042	8.000	34.169	15336.110	22.084	6.000
52.000	12.320	13.000	1.083	8.000	36.391	16333.535	23.520	7.000
54.000	12.640	13.500	1.125	8.000	38.666	17354.505	24.990	8.000
56.000	12.960	14.000	1.167	8.000	40.992	18398.676	26.494	9.000
58.000	13.280	14.500	1.208	8.000	43.370	19465.716	28.031	10.000
60.000	13.600	15.000	1.250	8.000	45.797	20555.312	29.600	11.000
62.000	13.920	15.500	1.292	8.000	48.275	21667.165	31.201	12.000
64.000	14.240	16.000	1.333	8.000	50.801	22800.989	32.833	13.000
66.000	14.560	16.500	1.375	8.000	53.375	23956.513	34.497	14.000
68.000	14.880	17.000	1.417	8.000	55.998	25133.474	36.192	15.000
70.000	15.200	17.500	1.458	8.000	58.667	26331.622	37.918	
72.000	15.520	18.000	1.500	8.000	61.383	27550.718	39.673	16.000
74.000	15.840	18.500	1.542	8.000	64.146	28790.529	41.458	
76.000	16.160	19.000	1.583	8.000	66.954	30050.834	43.273	17.000
78.000	16.480	19.500	1.625	8.000	69.807	31331.420	45.117	
80.000	16.800	20.000	1.667	8.000	72.705	32632.079	46.990	18.000
82.000	17.120	20.500	1.708	8.000	75.647	33952.612	48.892	
84.000	17.440	21.000	1.750	8.000	78.633	35292.828	50.822	19.000
86.000	17.760	21.500	1.792	8.000	81.662	36652.541	52.780	
88.000	18.080	22.000	1.833	8.000	84.735	38031.571	54.765	
90.000	18.400	22.500	1.875	8.000	87.850	39429.745	56.779	
92.000	18.720	23.000	1.917	8.000	91.007	40846.892	58.820	20.000
94.000	19.040	23.500	1.958	8.000	94.207	42282.851	60.887	
96.000	19.360	24.000	2.000	8.000	97.447	43737.463	62.982	
98.000	19.680	24.500	2.042	8.000	100.730	45210.573	65.103	
100.000	20.000	25.000	2.083	8.000	104.053	46702.033	67.251	21.000

CALIBRATION USED FOR TABLE

FLUME TRUE WIDTH ..... 96.0"
PROBE DISTANCE FROM BOTTOM OF FLUME ..... 0.016"

DEFINITION:
STRAP POINT NO.'S ARE A SEQUENCE OF POINTS SELECTED TO BE USED BY FT-89017 TO GENERATE THE EXPONENTIAL CALIBRATION CURVE RELATING FLOW RATE TO THE LEVEL OF LIQUID IN THE FLUME.

EQ FROM "FLOW METER ENGINEERING HAND BOOK" BY "L.K. SPINKS"
page 299
1 TO 8 FOOT PARSHALL MEASURING FLUMES

Qsf= 4LHa^1.522*L^0.026
WHERE
Qsf= Cu.Ft/sec
L=Length of crest of weir (in feet)
Ha=Head of crest in feet

Clarified pond Flume
MGD=Qsf*60*60*24*7.480

SHT 2 of 2

CALIBRATION				

REF. DWGS	NO	REVISIONS	DATE	APD
	7	UPDATE BORDER	9/03	WJJ
	8	UPDATE BORDER INFO.	5/08	WJJ
	5	CHG FLOW METER	4/99	PJB
	6	CHG TITLE BLK& REC IS.	6/00	JEM

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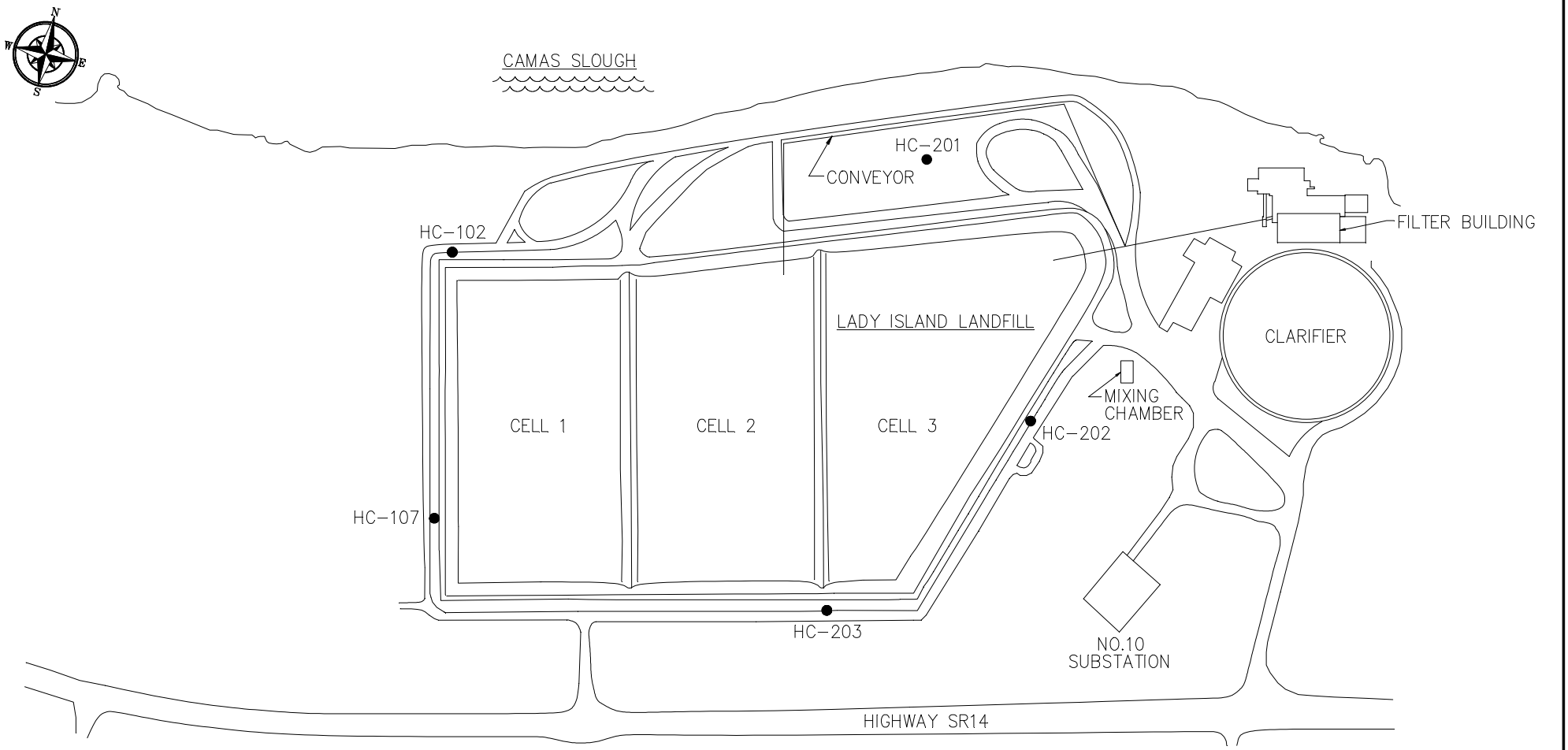
EFFLUENT CLARIFIER OUTFALL - FLOW

DSGN L.R. CLARK	DWN M. LUCAS	APVD LRC	DATE 10/17/94
WO 94-19014	EWO _	IP/AR 2-0400	ACCT. 0416
DEPT. EFF	SECT. 20	SUB-SECT. 02	LD 89017-2 REV. 8

LD89017-2 05/02/08 13:17:21



100 FT
SCALE: 1"=100'

THIS DRAWING SHALL NOT BE REVISED WITHOUT PROPER AUTHORIZATION PER WAC 173-350 SEE ENVIRONMENTAL GROUP

REFERENCE DRAWINGS	DRAWING TITLE
LO-31951	LADY ISLAND GROUND WATER MONITORING WELL LOCATIONS

NO.	DATE	REVISIONS	BY
8	04/26/06	REVISE AUTHORIZATION STAMP	WJJ
9	12/19/06	UPDATE LAYOUT	WJJ
10	05/02/08	UPDATE LAYOUT AND BORDER INFO.	WJJ
11	10/23/09	REVISE TEXT	WJJ
5	09/08/00	REMOVE CALI BUILDING TEXT	WJJ
6	10/18/00	ADD AUTHORIZATION STAMP	WJJ
7	09/17/03	UPDATE BORDER INFORMATION	WJJ

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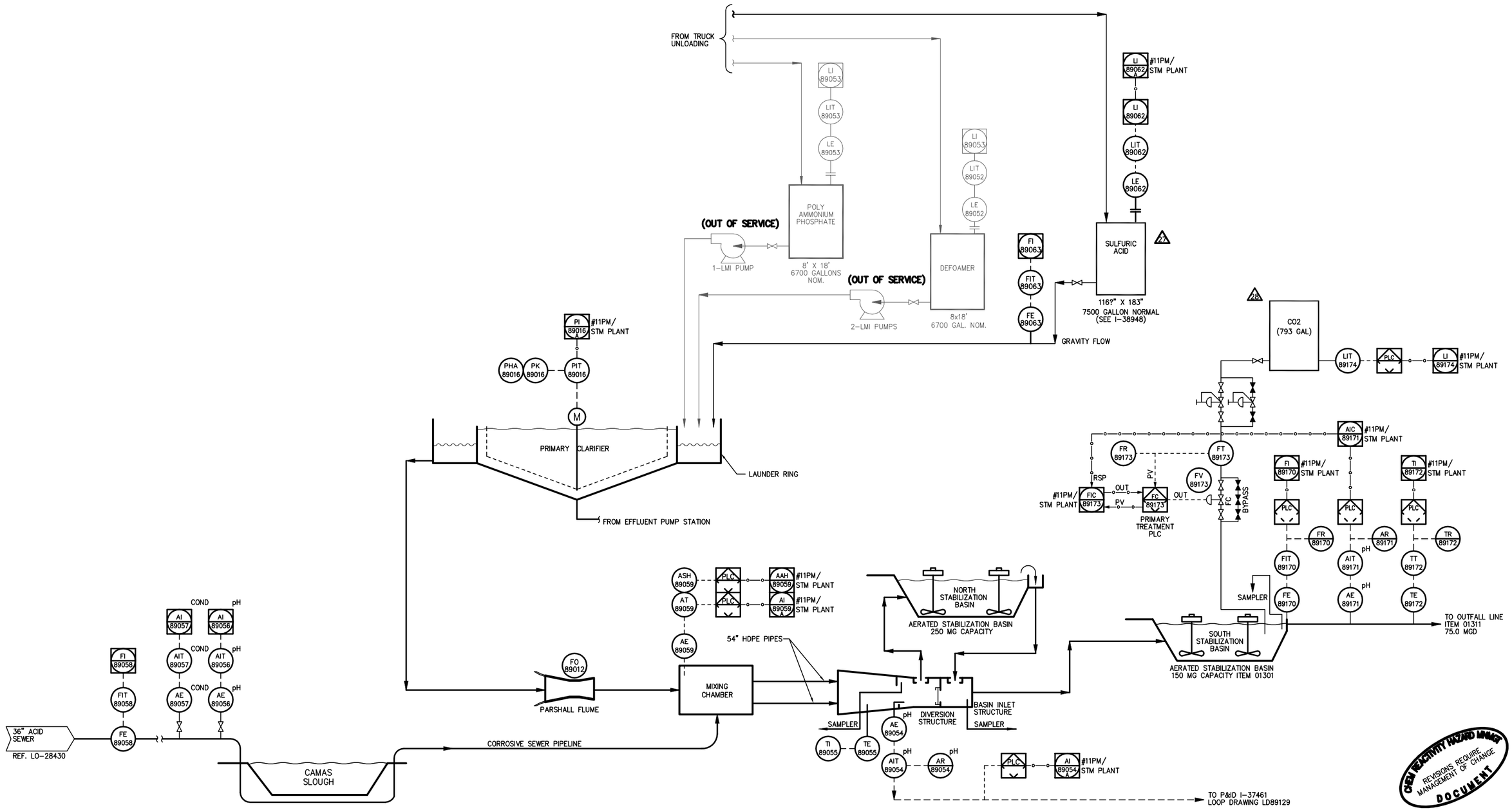
JOB TITLE: LADY ISLAND LANDFILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	FILE NO.	DRAWING NO.	REV.
1"=100'	–	D.BENNETT	–	01/20/93	–	2395	001-C-0011	11

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECTION	EQUIPMENT NO.
–	C-9500	–	EFF	19 42	–



INTERLOCK NOTES:

1. VALVE 89160 CLOSES ON LOW WATER FLOW.

NOTES:

1. ⚠WI OPERATING PROCEDURE MANUAL VALVE REF.
2. * HYDROSTATIC RELIEF VALVE
3. MAXIMUM TEMP 110° F. MINIMUM TEMP -20° F.

-/-/- : FLOW FIGURES
STOCK : USGPM/% CONSISTENCY (BD)/ BONE DRY TONS/DAY
LIQUID : USGPM/% SOLIDS/°F
STEAM : LBS PER HR/ PSIG/°F
GAS : ACFM/H+2°O/°F

MANUAL VALVES
NORMALLY OPEN
NORMALLY CLOSED
CHECK VALVE
THROTTLING VALVE

SOLENOID VALVES
3 WAY VALVE - NC PORT VARIES
4 WAY VALVE - NC PORT VARIES
CONTROL VALVES
THROTTLING
ON-OFF
STRAINER
SAFETY RELIEF VALVE

SPECTACLE BLANKS
NORMALLY OPEN
NORMALLY CLOSED
FILTER
OILER
STEAM OUT
CLEAN OUT

NEW \ EXIST INTERFACE
SPECIFICATION CHANGE
MAJOR FLOW LINE
SECONDARY FLOW LINE
FUTURE FLOW LINE
PIPE IDENTIFIER
PNEUMATIC SIGNAL
CAPILLARY TUBE
ELECTRICAL WIRING
SOFTWARE LINK
HOSE

EXPANSION JOINT
RUPTURE DISC-PRESSURE
LOCAL MOUNTED INSTRUMENT
BACK-PANEL MOUNTED INSTRUMENT
PANEL MOUNTED INSTRUMENT

SHARED DISPLAY BLIND NO OPERATOR ACCESS
SHARED DISPLAY DISTRIBUTED SYSTEM
SUPERVISORY COMPUTER FUNCTION
PLC PROCESS FUNCTION
ELECTRICAL INTERLOCK

V - VENDOR SUPPLIED INSTRUMENTS
E - EXISTING INSTRUMENTS
E/R - EXISTING RELOCATED INSTRUMENTS
ORIFICE
FLOW NOZZLE & VENTURI
FLOW THRU INSTRUMENT
WELL
PRESSURE CONNECTION WITH DIAPHRAGM SEAL

INSTRUMENT DESIGNATIONS	
1st LETTER	2nd & SUBSEQUENT LETS
A-ANALYZER (PH, COND)	A-ALARM
B-BURNER; BRIGHTNESS	C-CONTROL
D-DENSITY; DIFFERENTIAL	D-DRIVE
E-VOLTAGE	E-PRIMARY ELEMENT
F-FLOW	F-RATIO (FRACTION)
H-HAND	G-GAUGE; GLASS
I-CURRENT	H-HIGH
K-TIME; CONSISTENCY	I-INDICATOR
L-LEVEL	L-LOW
M-MOISTURE; HUMIDITY	O-ORIFICE
P-PRESSURE	P-PRESSURE
S-SPEED	Q-QUANTITY; TOTAL
T-TEMPERATURE	R-RECORDER
W-WEIGHT; TORQUE	S-SAFETY; SWITCH
Y-EVENT; STATE	T-TRANSMITTER
Z-POSITION	V-VALVE; DAMPER
	Y-RELAY

CHEM TEC/CHMTY HAZARD MNMGT
REVISIONS REQUIRE MANAGEMENT OF CHANGE
DOCUMENT

REFERENCE DRAWINGS	DRAWING TITLE
LO-28436	WASTE WATER SECONDARY TREATMENT P&ID
I-31384	
I-37461	
LD-89023-3	
LD-89129	

NO	DATE	REVISIONS	BY
26	3/26/09	UPDATE BORDER INFORMATION	WJJ
27	8/05/09	ADD SULFURIC ACID, CHANGE NUTRIENTS	DG
28	9/09/19	ADDED CO2 TANK ADDITION FOR pH CTRL SP1955	ERW
29	4/10/20	RENAMED P&ID, SP1955 RECORD ISSUE MOC# 573650	ERW
23	4/20/06	ADDED TANK LEVEL INDICATOR	KLH
24	9/18/06	REMOVED PHOSPHORIC ACID TO I-38532	DKS
25	12/19/06	UPDATE BORDER INFORMATION	WJJ

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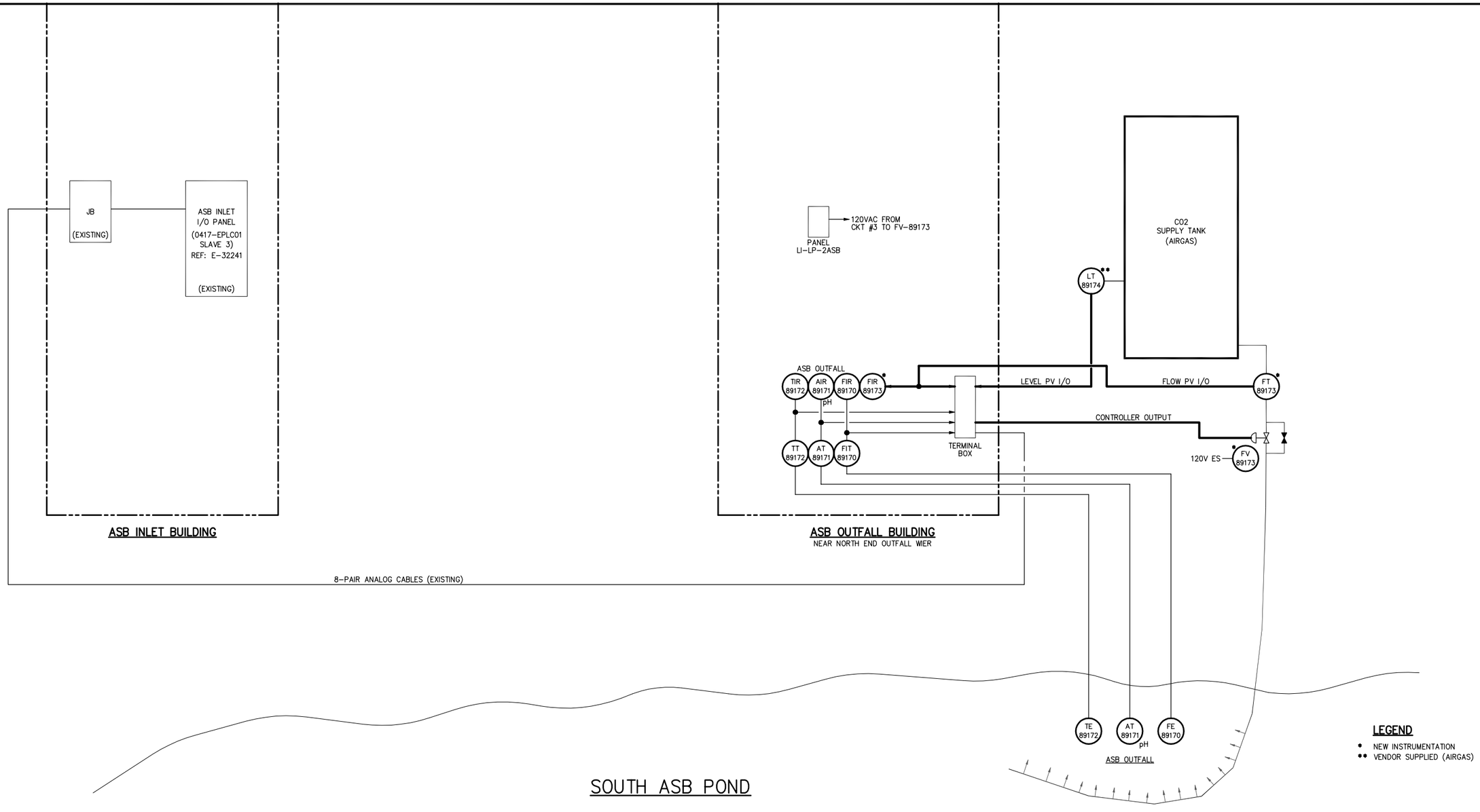
JOB TITLE
WASTE WATER TREATMENT

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	K.GILLAS	M.LUCAS	KKG	07/26/90	_	P&ID-26666	29

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
93-89110	2-0241	0416	EFF	20		_

04/10/20 14:48:11 P&ID26666.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1



REFERENCE DRAWINGS	DRAWING TITLE: SECONDARY TREATMENT ASB OUTFALL pH CONTROL BLOCK DIAGRAM			
E-45857				
E-32241	NO	DATE	REVISIONS	BY
	1	9/09/19	CONVERTED FROM SULFURIC ACID TO CO2	ERW
	2	2/17/20	RELEASED FOR CONSTRUCTION	ERW
	3	4/10/20	RECORD ISSUE SP1955	ERW

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JOB TITLE: **ASB OUTFALL pH CONTROL**

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	E.R. WARD	E.R. WARD	_	2/10/19	SP1955	I-45932	3

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT	EQUIPMENT NO.
5560275	42627190958	0418	UT	20	35	_

03/10/20 10:21:15 I45932.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	ELCTRD	ROSEMOUNT	3900-01-10	959784
2	1	XMTR	ROSEMOUNT	56-03-22-30-HT-99SQ11022	239407
3	1	RCDR	E&H	RSG35-2H99/0-8	1304876

LOC: WEST SIDE OF SOUTH OUTFALL PONDS

AT 89171 (2)

RTD RETURN	1	WHITE			OUT 2 + 1
RTD SENS	2	WHT/RED			OUT 2 − 2
RTD IN	3	RED			EARTH GND 3
GROUND	4	BLUE	ALARM 1	3	OUT 1 + 4 — RED
+ 5VDC	5	DRAIN	ALARM 1	4	OUT 1 − 5 — BLK
− 5VDC	6	GRY/WHT	ALARM 2	5	EARTH GND 6
pH SHIELD	7	SHIELD	ALARM 2	6	
pH IN	8	ORANGE	ALARM 3	7	
REF SHIELD	9		ALARM 3	8	
REFERENCE	10	GRY	AL 4 NC	9	
			AL 4 C	10	AC HOT 1
			AL 4 NO	11	AC NEUT 2 — 120VAC IP
GROUND		GRN			GROUND 3

15

AE 89171 (1)

15

NORTH WEIR

AR 89171 (3)

RED — BLK RED — CH.1 (16 15 14 13 12 11) — 120VAC IP

LOC: ASB OUTFALL BUILDING

PANEL P1 ASB OUT BLDG

BLK 2+ — WHT
BLK 2− — BLK
2S — SHD

PANEL P2 ASB IN BLDG

2+ — WX243+
2− — WX243−
2S

250Ω

PANEL P2 ASB IN BLDG

243+
243−
S

545 TI PLC RMT

PROC# 0417-EPLC01
SLAVE: 3
SLOT : 8
ADDR : WX243
TYPE : ANALOG INPUT
DWG : E-32241

AI 89171 C

EFF PUMP STATION
PANELMATE MMI
PROGRAM 0415EPLC04

EFF PUMP STA. ELECT RM

ASB OUTFALL EFFLUENT pH PV TO AC89171
REF: LD89171-2

FIBER

GROUP 323

OPERATOR DISPLAY: AI89171

LOGIC MANAGER MODULE		
UCN: 15	NODE: 13	
TYPE	SLOT	PLC ADD
IA	34	4602

STEAM PLANT SHARED DISPLAY

0269EPLC02

620 IPC PLC 4516 4602

DEMINERALIZER RACK ROOM

0415EPLC03

545 TI PLC V1382 V1279

EFFLUENT PUMP STA. ELECT ROOM

FIBER

0417EPLC01

545 TI PLC V502

PRI TREATMENT ELECT ROOM

AI 89171 B

PRI TREATMENT
PANELMATE MMI
PROGRAM 0417EPLC02

PRI TREATMENT CONTROL ROOM

SHT 1 OF 2

NOTES:

1. LOCATED INFROUNT OF N. WEIR
2. PANEL P1 IS IN ASB OUTFALL BUILDING
3. PANEL P2 IS IN ASB INFALL BUILDING
4. PANEL P6 IS IN THE MCC ROOM OF THE OLD CALI PLANT.

CALIBRATION				
AE	AT	AR	AI89171	AI-89171B&C
−410 TO 410 MV =0−14 PH	0−14 PH= 4−20 MADC	4−20 MADC= 0−14 PH	4−20 MADC= 0−4095= 0−14 pH	4−20 MADC= 6,400−32,000= 0−14 pH

REF. DWGS
I-26666
LD89045-3

NO	REVISIONS	DATE	APD
15	CHG XMTER AND PROBE	6/12	PJB
16	GENERAL UPDATE	1/19	ERW
17	REPLACED RECORDER	9/19	ERW
18	UPDATED FOR SP1955	2/20	ERW

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ASB OUTFALL EFFLUENT − pH

DSGN E.R. WARD	DWN E.R. WARD	APVD _	DATE 2/10/20
WO# 5560275	PROJ# SP1955	IP# _	ACCT. 0418
DEPT. UT/EFF	SECT. 20	SUB-SECT. 02	LD 89171-1 REV. 18

02/10/20 14:51:05 LD89171-1.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.

OPERATOR DISPLAY — AC89171 — AIC 89171

HW EXPERION C300			
CTRL TAG:	C_11PMSD_107		
AREA:	11PM UTL	ADDR:	107
BLOCK:	PIDA	IO LINK:	1
SETPOINT:	LSP		
INPUT #1:	AI89171A		
INPUT #2:	–		
OUTPUT:	FC89173.RSP		

AI 89171 A

C300 PEER TO PEER COMMUNICATIONS		
FROM: C_11PMUTL_107		TO PLC: 041701
TYPE	DATA SOURCE	PLC ADDRESS
AI	AR041701AI_01.23	V3045

ASB OUTLET EFFLUENT pH PV FROM AT–89171
REF: LD89171–1

AC89171.OP TO CO2 FLOW FC89173.RSP
REF: LD89173–2

#11PM UTILTIES EXPERION SYSTEM

SHT 2 OF 2

CALIBRATION					REF. DWGS	NO	REVISIONS	DATE	APD
AT	AI89171A				P&ID–26666	1	RECORD ISSUE SP1955	4/20	ERW
0–14 PH= 4–20 MADC	4–20 MADC= 0–14.0 pH (FP)				LD89173–2				

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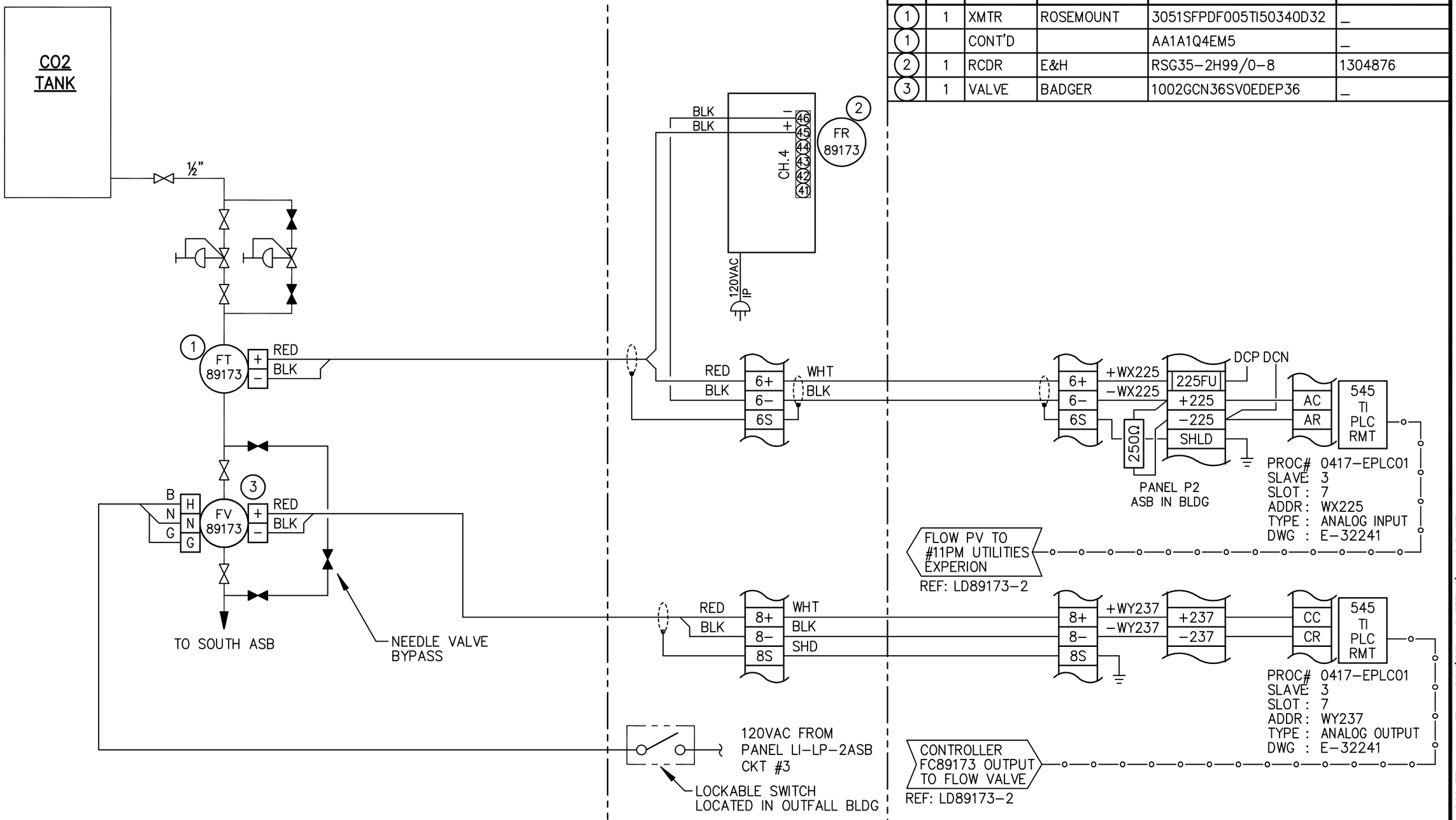
ASB OUTFALL EFFLUENT – pH

DSGN E.R. WARD	DWN E.R. WARD	APVD _	DATE 2/10/20
WO# 5560275	PROJ# SP1955	IP# _	ACCT. 0418
DEPT. UT/EFF	SECT. 20	SUB-SECT. 02	LD 89171–2 REV. 1

04/10/20 13:25:46 LD89171–2.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	XMTR	ROSEMOUNT	3051SFPDF005TI50340D32	_
1		CONT'D		AA1A1Q4EM5	_
2	1	RCDR	E&H	RSG35-2H99/0-8	1304876
3	1	VALVE	BADGER	1002GCN36SV0EDEP36	_



SHT 1 OF 2

CALIBRATION				
FT	FV	TR	PLC-INPUT	
0-50#/HR = 4-20mA	4-20 MADC= 0-100% OPEN	4-20 MADC= 0-50#/HR	1-5VDC = 0-50#/HR	

REF. DWGS	NO	REVISIONS	DATE	APD
P&ID-26666	1	RECORD ISSUE SP1955	4/20	ERW
E-31169				
E-35665				

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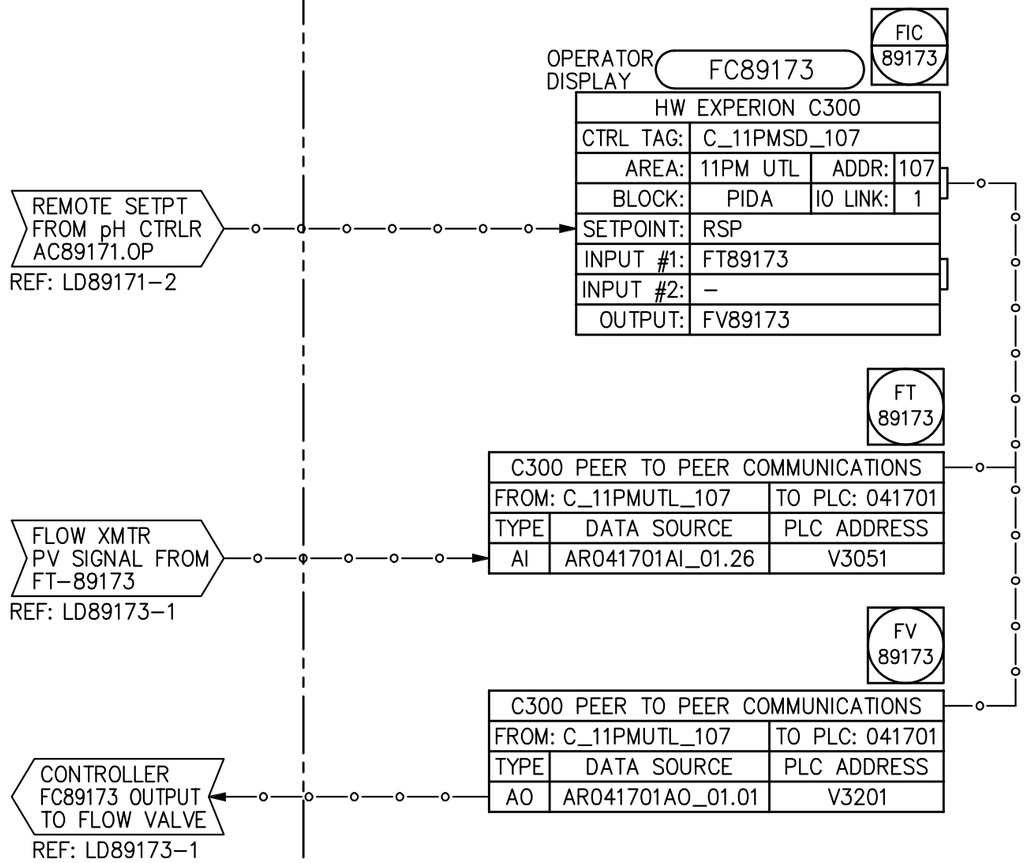
ASB OUTFALL CO2 ADDITION – FLOW

DSGN E.R. WARD	DWN E.R. WARD	APVD _	DATE 9/10/19
WO# 5560275	PROJ# SP1955	IP# 42627190958	ACCT. 0418
DEPT. UT	SECT. 20	SUB-SECT. 02	LD 89173-1	REV. 1

04/10/20 10:42:45 LD89173-1.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.



SHT 2 OF 2

CALIBRATION					REF. DWGS	NO	REVISIONS	DATE	APD
FT	FV				P&ID–26666	1	RECORD ISSUE SP1955	4/20	ERW
0–50#/HR = 4–20mA	4–20 MADC= 0–100% OPEN				E–31169				
					LD89171–2				

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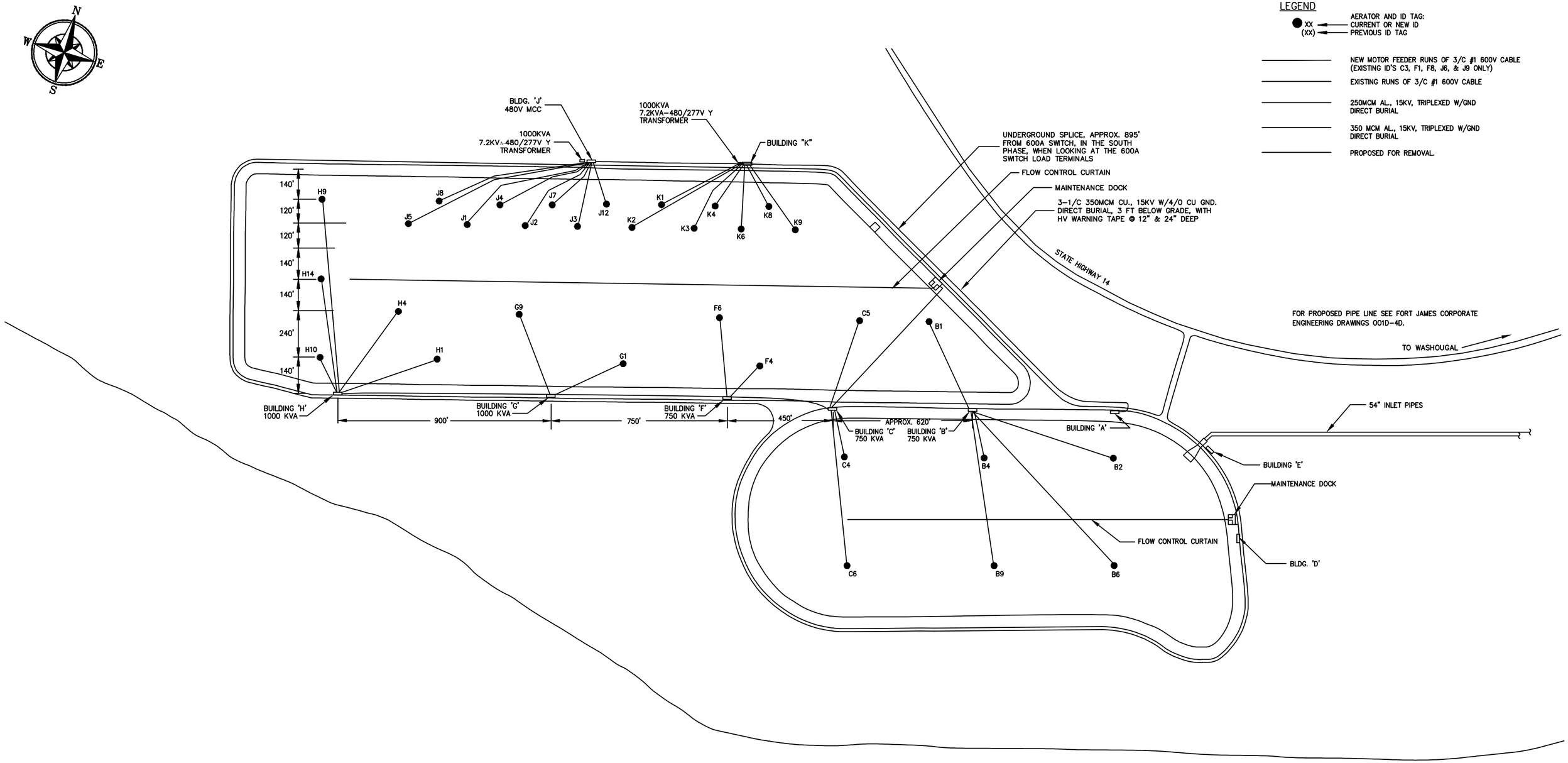
ASB OUTFALL CO2 ADDITION – FLOW			
DSGN E.R. WARD	DWN E.R. WARD	APVD _	DATE 9/10/19
WO# 5560275	PROJ# SP1955	IP# 42627190958	ACCT. 0418
DEPT. UT	SECT. 20	SUB–SECT. 02	LD 89173–2	REV. 1

04/10/20 12:53:08 LD89173–2.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1



REFERENCE DRAWINGS
E-27616
E-27617
E-27618
E-27619
LO-31416
E-25187
42684
42686
001D-004D

DRAWING TITLE

ASB ELECTRICAL LAYOUT

NO	DATE	REVISIONS	BY

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JOB TITLE
SEC. TREATMENT STABILIZATION BASINS

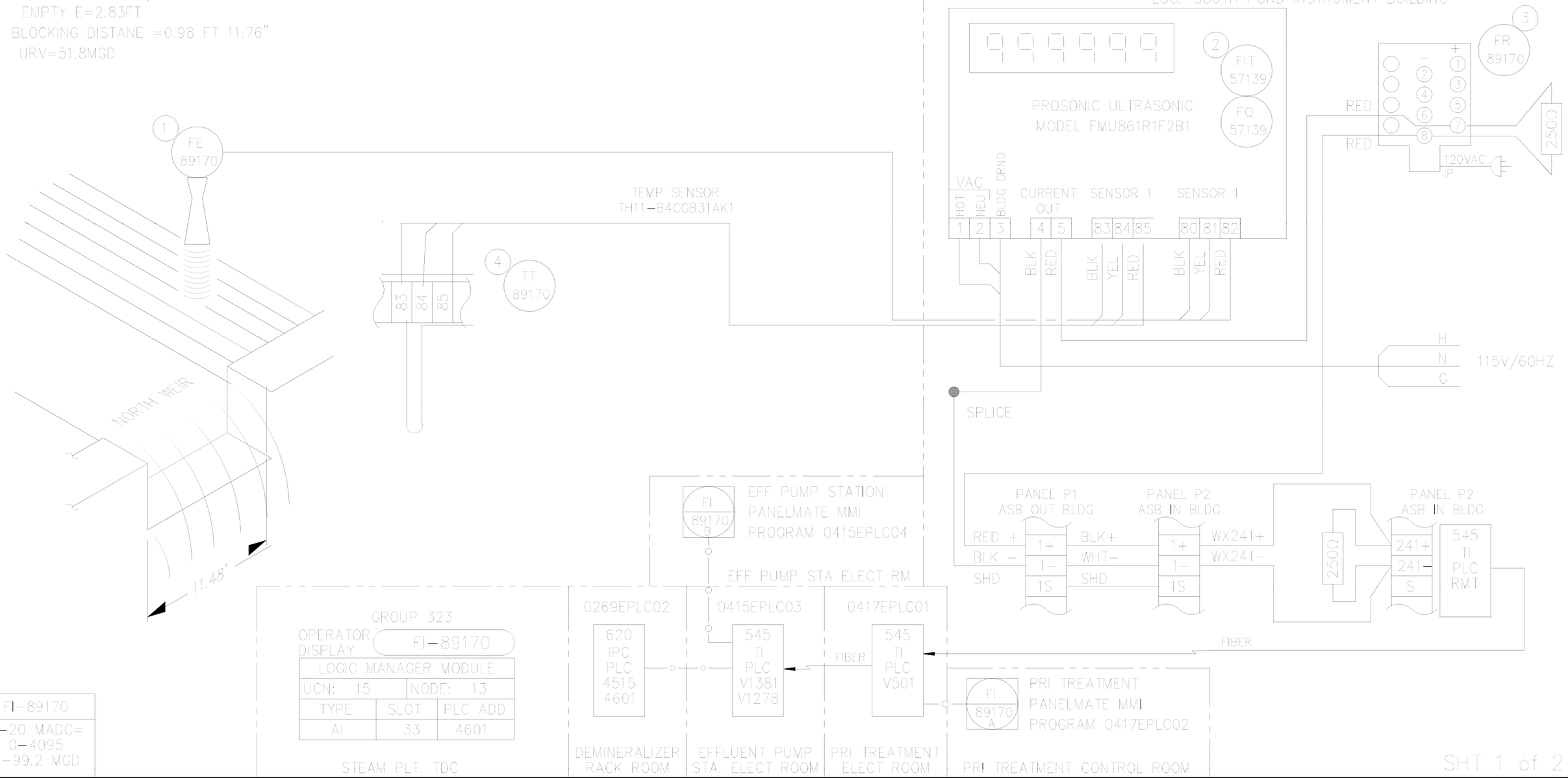
SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
1"=200'	L. Young	B. Javens	–	08/19/09	–	E-38955	0

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	–	EFF	19	40	–

NOTES:

1. SEE SHEET 2 FOR EQUATION AND OPERATION NOTES.
2. TYPE FLUME/WEIR
   UJITS MGAL/DAY
   CURVE RECTW TO/5H
   EMPTY E=2.83FT
   BLOCKING DISTANE =0.98 FT 11.76"
   URV=51.8MGD

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	SENSOR	ENDRESS	FMU90N21CA112BA1A	1280785
2	1	XMTR	ENDRESS	FDU91-QN4AA	1280786
3	1	RCDR	YEW	43602	74-25-266
4	1	temp	ENDRESS	TH11-B4CGB31AK1	1280786



SHT 1 of 2

CALIBRATION				
FE	FIT	FQ	FR	FI-89170A & B
0-51.8 MGD 0-20.0" H«2°O=	0-20.0" H«2°O= 4-20 MADC	4-20 MADC= 0-51.8 MGD	4-20 MADC= 0-100 %	4-20 MADC= 6,400-32,000 0-51.8 MGD

REF. DWGS	NO	REVISIONS	DATE	APD
LD-89171-2	12	UPDATE BORDER	9/03	WJJ
E-27467	13	CHG XMTER MODEL	06/06	PJB
	14	UPDATE BORDER INFO.	5/08	WJJ
	15	CHG METER TO NEW MODEL	7/18	PJB

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ASB OUTFALL EFFLUENT LINE - FLOW

DSGN P.J. Baker	DWN P.J. Baker	APVD _	DATE 04/18/96
WO 5168128	EWO _	IP/AR _	ACCT. 0418
DEPT. EAR	SECT. 20	SUB-SECT. 02	LD 89170-1 REV. 15

9/29/18 14:27:16 LD89170-1.dwg

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.

Listed Parameters:
? Input: Sensor 1
? Sensor Selection: Auto
? Detected Sensor: FDU91
? Type: Flume/Weir
? Flow Unit: mgal/d
? Curve: RectWTO/5H
? Width: 11.48 ft
? Empty E: 2.83 ft
? URV: 51.8 MGD

Directions on Initial Setup

Directions on Initial Setup
? Directions on Initial Setup
? Menu Button, (Flow Highlighted) Push Enter, (Flow Highlighted) Push Enter, (Flow 1 Highlighted) Push Enter,
? (Basic Setup Highlighted) Push Enter, Trans should automatically see the FDU91 Sensor, push enter

? (With type highlighted) push enter, scroll to flume/weir,
? push enter, (With units highlighted) push enter,
? scroll to mgal/d, push enter,
? (Curve highlighted) push enter, scroll to
? ?RectWTO/5H?, Push enter, (Width highlighted)
? push enter, enter the width value of 11.48 ft, push enter. Then enter the URV; 51.8MGD. Now it should be working fine.
? On our setup, we were able to do an empty calibration;
? where they drained the lake down to below the weir knife,
? so that?s when we did the empty calibration, and the sensor saw 2.83 ft for its Empty E value. If you?re setting this up and not able to drain the lake, then you?ll
? want to input that value for the Empty E.
? Offset Adjustments; NOTE: The Endress Hauser technician
? said we should never have to make any offset adjustments,
? especially when we were able to perform the empty E calibration.
? But if someone wanted to make a change; you can either change the ?empty E? value, which adjusts the zero value in distance.
? Or there is a correction factor adjustment, which adjusts the flow MGD value;
? Under Flow 1 menu, extended cal, theres a correction factor option,
? that will adjust the flow MGD value. But again, the tech said we should never have to do this.
? Monthly Cal; The tech said the best way to check the sensor/transmitter is running correctly is to do a ruler check from the top of the water to the sensor. In the flow menu,
? there is a distance value (from top of water to sensor)
? and this is where you would check your measured value with.

ATE

ZOOM
1

The flow computer will use all three weirs
The chart will show the calculations

Thes three weirs were built at different levels and widths. The South weir being at the "0" plane and with the other two ref. to it.
The middle weir being .300" lower then the south.
The North weir being .348" lower then the south.

You will need to subtract these readings from each weir before doing the calculation and then adjust for the difference in Width.

Total each together for the total outfall in mgd.

DISCHARGE FROM THIS RECTANGULAR WEIR =:

Q=3.33(L−.2H)H^1.5
Q=QFS, L=WIDTH OF FLUME IN FEET
H=HEAD OF WATER OVER WEIR IN FEET
MDG=CFS*0.64632
this unit is an ultra sonic device and measures from the top down. at the north weir only.

LOC: WEST SIDE OF SOUTH OUTFALL PONDS.

SHT 2 of 2

CALIBRATION				

REF. DWGS	NO	REVISIONS	DATE	APD
LD-89170-1	9	UPDATE VO/HO DATA	12/12	PJB
	10		9/18	PJB
	11	UPDATE TABLE	12/07	PJB
	8	UPDATE BORDER INFO.	5/08	WJJ

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CAMAS MILL
Camas, WA 98607

ASB OUTFALL EFFLUENT LINE – FLOW

DSGN P. J. Baker	DWN P. J. Baker	APVD PJB	DATE 07/12/96
WO 96-00684	EWO _	IP/AR _	ACCT. 0418
DEPT. _	SECT. 20	SUB-SECT. 02	LD 89170-2	REV. 11

LD89170-2 12/09/2012

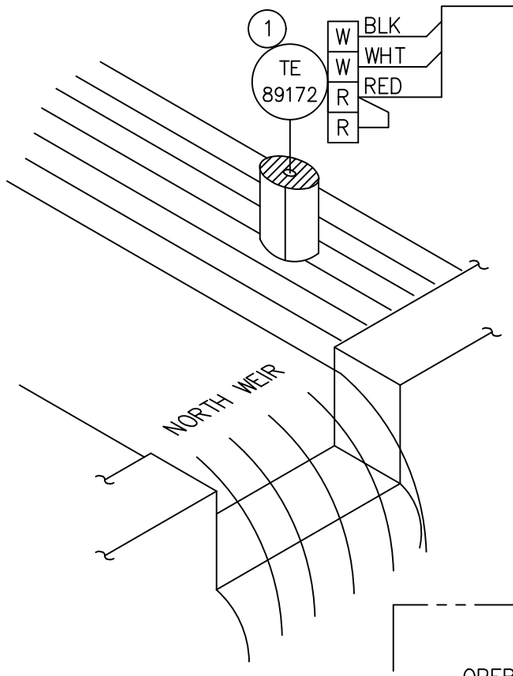
NOTE 1:

1: THERE IS ONLY ONE TEMPERATURE TRANSMITTER FOR ALL THREE OUTFALLS, AND IT IS LOCATED IN THE NORTH WEIR AT THE SAME LOCATION AS THE BUBBLE PIPE.
2. PANEL P1 IS IN ASB OUTFALL BUILDING
3. PANEL P2 IS IN ASB INFALL BUILDING
4. PANEL P5 IS IN THE NORTH WEST END OF THE AMMONIA BUILDING
5. PANEL P6 IS IN THE MCC ROOM OF THE OLD CALI PLANT.

TEMPERATURE, PRMTA-1BANS0240000, BARE SENSOR HIGH ACCURACY

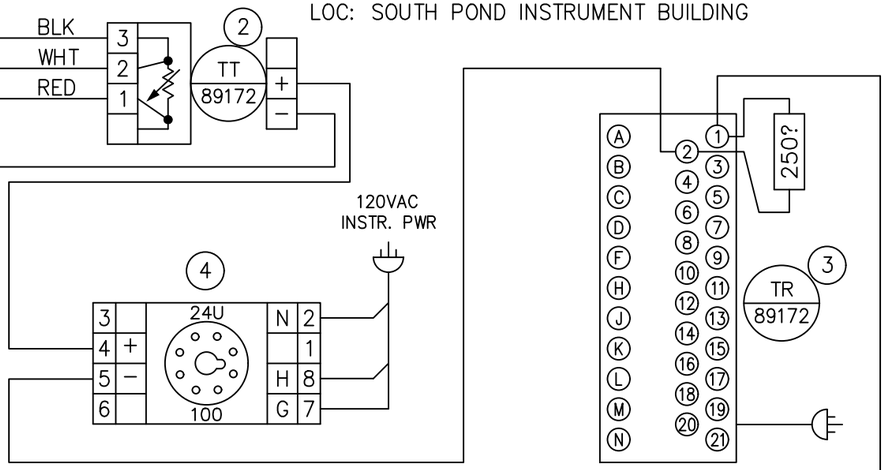
ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	ELEM	FOXBORO	PRMTA-1BANS0240000	1148238
2	1	XMTR	ROSEMOUNT	3144D1E5B4M5	74-31-979
3	1	RCDR	YOKOGAWA	SRHD-200*E/SCO	74-25-266
4	1	PS	ACOPIAN	24U100	74-20-420

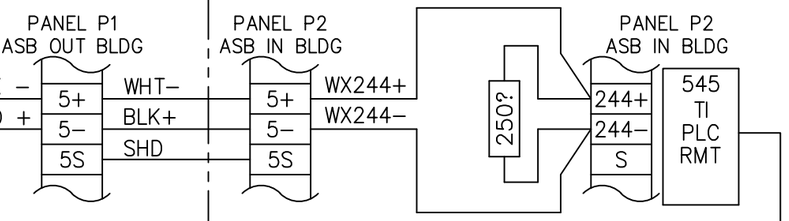
LOC: WEST SIDE OF SOUTH OUTFALL PONDS



MOLE ADRS 4737

LOC: SOUTH POND INSTRUMENT BUILDING





PROC# 0417-EPLC01
SLAVE: 3
SLOT : 8
ADDR : WX244
TYPE : ANALOG INPUT
DWG : E-32241

EFF PUMP STATION
PANELMATE MMI
PROGRAM 0415EPLC04

TI 89172 B

EFF PUMP STA. ELECT RM

GROUP 323

OPERATOR DISPLAY TI-89172

LOGIC MANAGER MODULE		
UCN: 15	NODE: 13	
TYPE	SLOT	PLC ADD
IA	35	4603

0269EPLC02
620 IPC PLC 4515 4603

0415EPLC03
TI PLC V1383 V1280

FIBER

0417EPLC01
545 TI PLC V503

FIBER

TI 89172 B
PRI TREATMENT
PANELMATE MMI
PROGRAM 0417EPLC02

DEMINERALIZER RACK ROOM
EFFLUENT PUMP STA. ELECT ROOM
PRI TREATMENT ELECT ROOM
PRI TREATMENT CONTROL ROOM
STEAM PLT. TDC

TI-89172
4-20 MADC= 0-4095 30°-100° F

CALIBRATION				
TE	TT	TR	INT	TI-89172A & B
30°-100° F= 99.57?-114.67?	99.57?-114.67? 30°-100° F= 4-20 MADC= 1-5 VDC	1-5 VDC= 30°-100° F	4-20 MADC= 0-1000 CPM	4-20 MADC= 6,400-32,000 30°-100° F

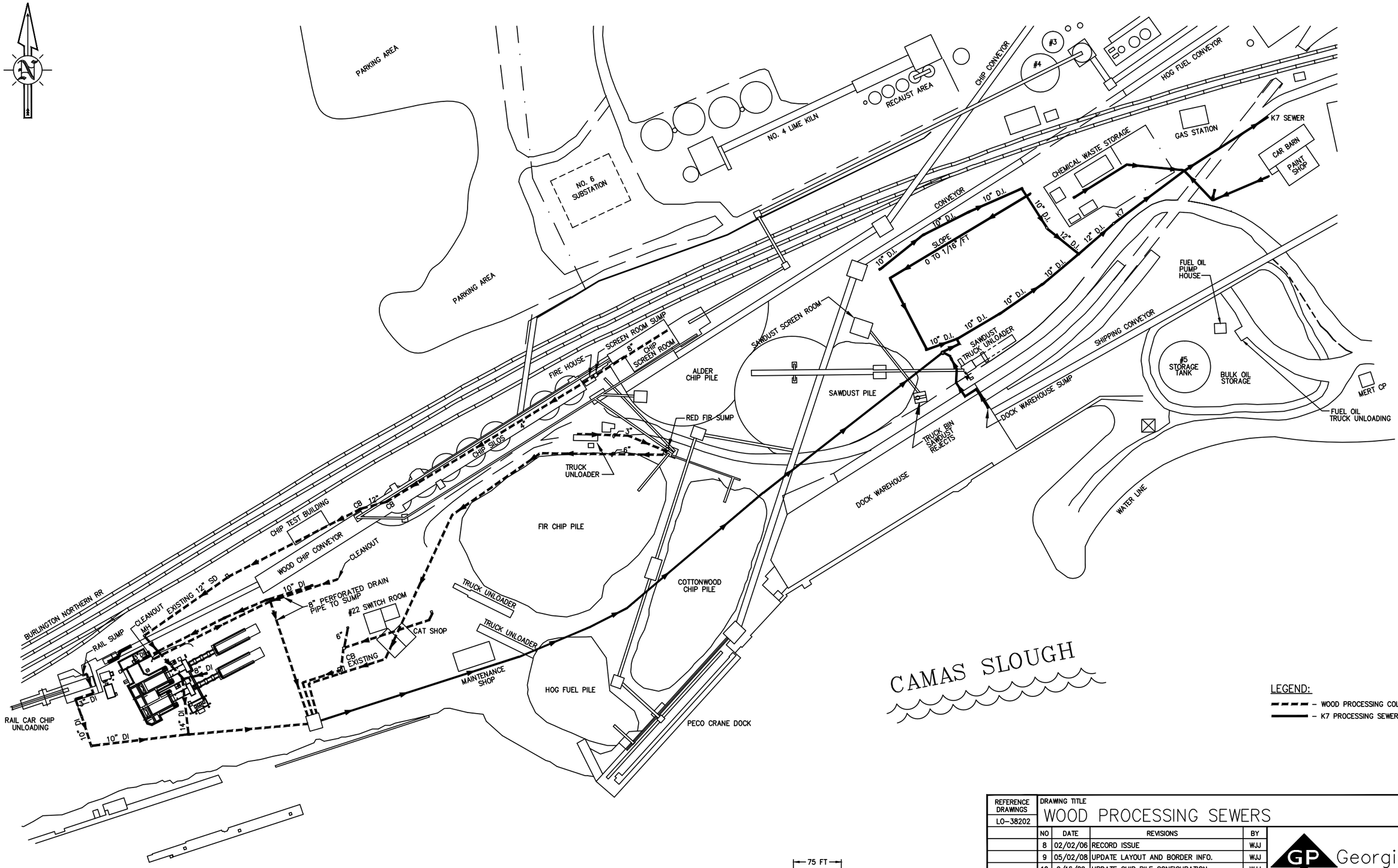
REF. DWGS	NO	REVISIONS	DATE	APD
	16	CHG XMTR CALB.-TRAX 545676	12/18	Sjv
	13	UPDATE CAL	1/04	KLH
	14	UPDATED PLC ADDR	1/10	ERW
	15	GO TO FOXBORO TEMP PROBE	1/16	PJB

Georgia Pacific
CAMAS MILL
Camas, WA 98607

ASB OUTFALL EFFLUENT - TEMPERATURE

DSGN P.J.Baker	DWN P.J.Baker	APVD PJB	DATE 04/18/96
WO 96-00684	EWO _	IP/AR _	ACCT. 0418
DEPT. _	SECT. 20	SUB-SECT. 02	LD 89172	REV. 16

01/01/2016 11:15:54 LD89172.dwg PJBAKER MS SCALE 1=1



LEGEND:

– – – – WOOD PROCESSING COLLECTION

——— K7 PROCESSING SEWERS

REFERENCE DRAWINGS	DRAWING TITLE
LO–38202	WOOD PROCESSING SEWERS

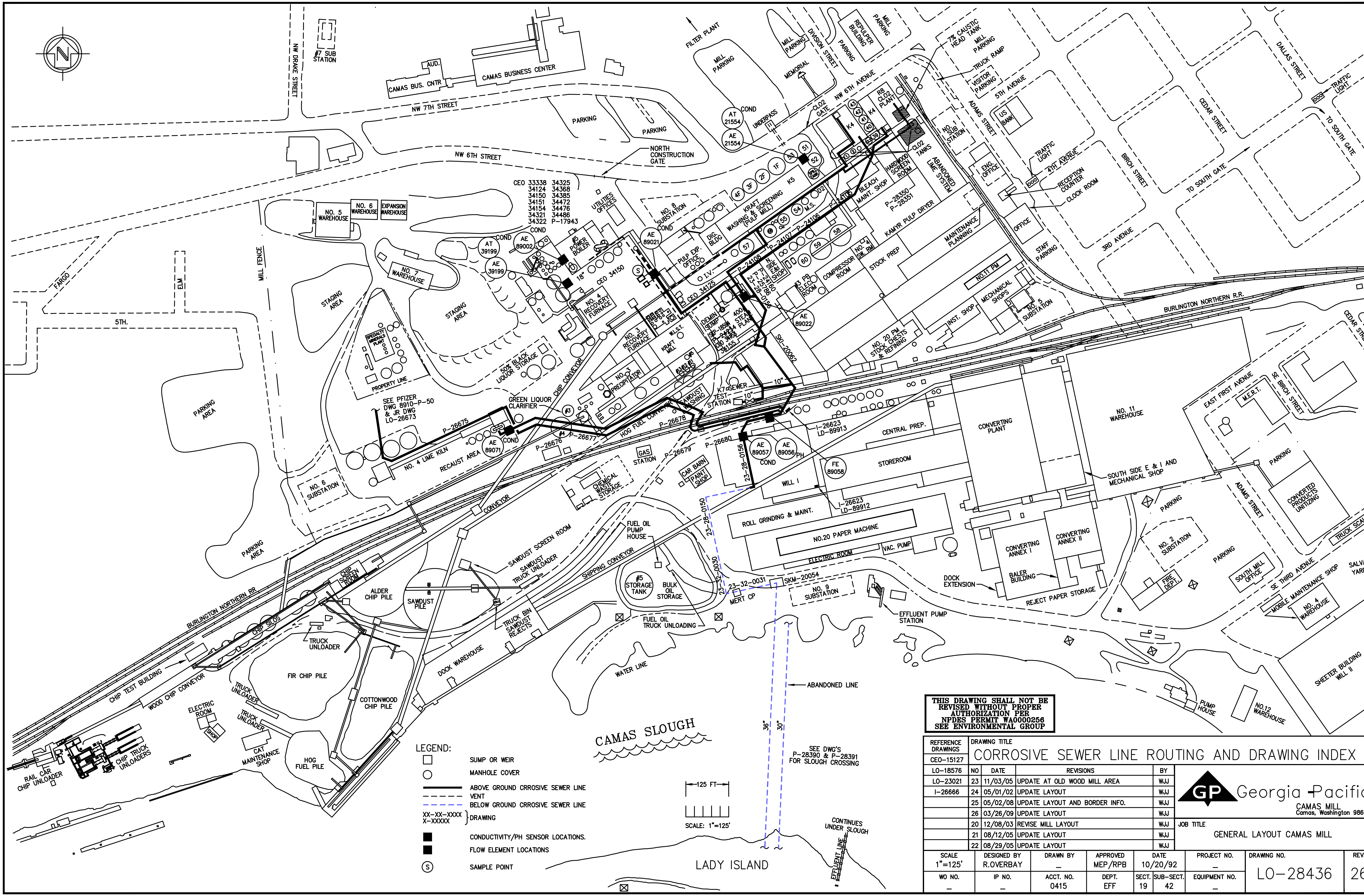
NO	DATE	REVISIONS	BY
8	02/02/06	RECORD ISSUE	WJJ
9	05/02/08	UPDATE LAYOUT AND BORDER INFO.	WJJ
10	9/16/09	UPDATE CHIP PILE CONFIGURATION	WJJ
4	10/14/05	ADD TRUCK TIPPERS AND ELECTRIC ROOM	WJJ
5	10/31/05	ADD SUMP & 8" LINE AT THE CHIP SILOS	WJJ
6	11/01/05	ADD SCREEN ROOM SUMP & RED FIR SUMP	WJJ
7	01/24/06	ADD 3" SUMP DISCHARGE	WJJ

Georgia Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: GENERAL LAYOUT CAMAS MILL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
1"=75'	–	B. Javens	–	08/12/05	–	LO–38236	10

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB–SECT.	EQUIPMENT NO.
–	–	–	ENV	19	42	–



THIS DRAWING SHALL NOT BE REVISED WITHOUT PROPER AUTHORIZATION PER NPDES PERMIT WA0000256 SEE ENVIRONMENTAL GROUP

REFERENCE DRAWINGS	NO	DATE	REVISIONS	BY
CEO-15127				
LO-18576				
LO-23021	23	11/03/05	UPDATE AT OLD WOOD MILL AREA	WJJ
I-26666	24	05/01/02	UPDATE LAYOUT	WJJ
	25	05/02/08	UPDATE LAYOUT AND BORDER INFO.	WJJ
	26	03/26/09	UPDATE LAYOUT	WJJ
	20	12/08/03	REVISE MILL LAYOUT	WJJ
	21	08/12/05	UPDATE LAYOUT	WJJ
	22	08/29/05	UPDATE LAYOUT	WJJ

DRAWING TITLE
CORROSIVE SEWER LINE ROUTING AND DRAWING INDEX

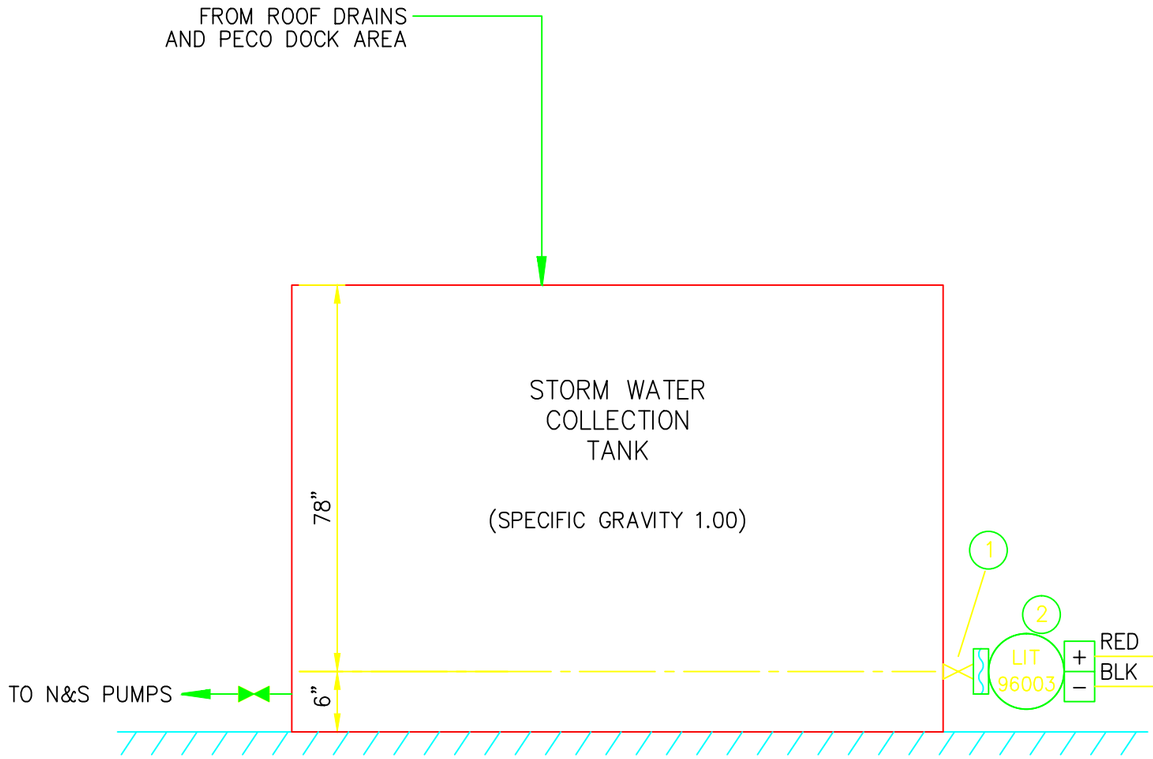
GP Georgia-Pacific
CAMAS MILL
Camas, Washington 98607

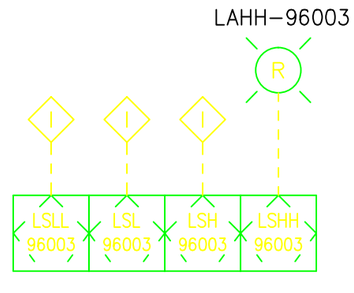
JOB TITLE
GENERAL LAYOUT CAMAS MILL

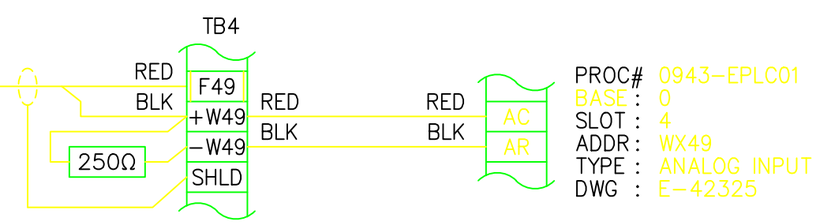
SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
1"=125'	R.OVERBAY	–	MEP/RPB	10/20/92	–	LO-28436	26

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
–	–	0415	EFF	19	42	–

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	1	VALVE	INDU-TECH	LT-3110, 3"	000305
2	1	XMTR	ROSEMOUNT	3051CD2A22A1AS1E5M5	677137







NOTES

1. SEE LD96003-3 FOR LEVEL SWITCH SETPOINTS.

CONTINUOUS MONITORING
REVISIONS REQUIRE ENVIRONMENTAL MANAGEMENT OF CHANGE
SYSTEM DOCUMENT

SHT 1 OF 3

LOC: DOCK WAREHOUSE BASEMENT FLOOR WEST END

LOC: DOCK WHSE STORM WATER COLLECTION CONTROL CAB. 96901

CALIBRATION				
LIT	LI			
0-78" WC= 4-20 MADC	1-5VDC = 0-78"			

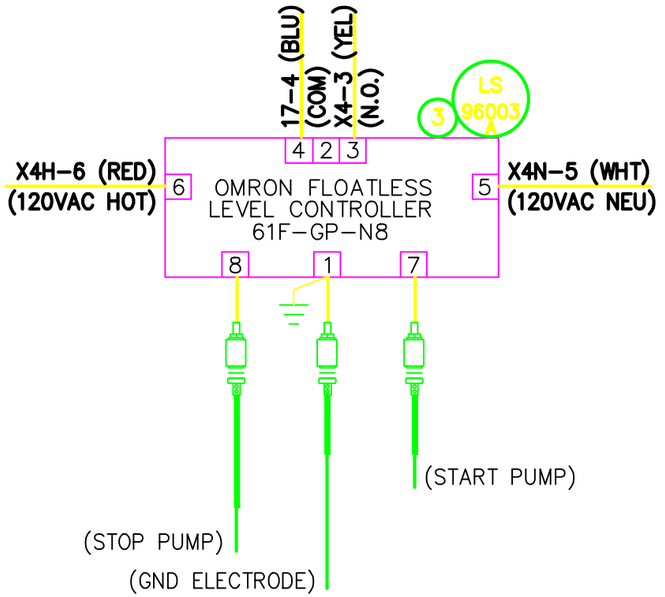
REF. DWGS	NO	REVISIONS	DATE	APD
E-42323	1	MADE SHEET 1 OF 3	11/12	ERW
M-42326	2	RECORD ISSUE	3/13	ERW
E-42327				

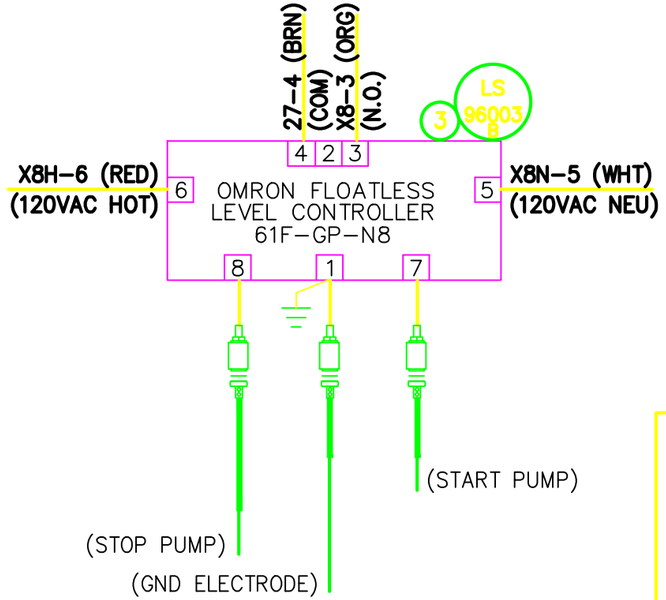
Georgia-Pacific
CAMAS MILL
Camas, WA 98607

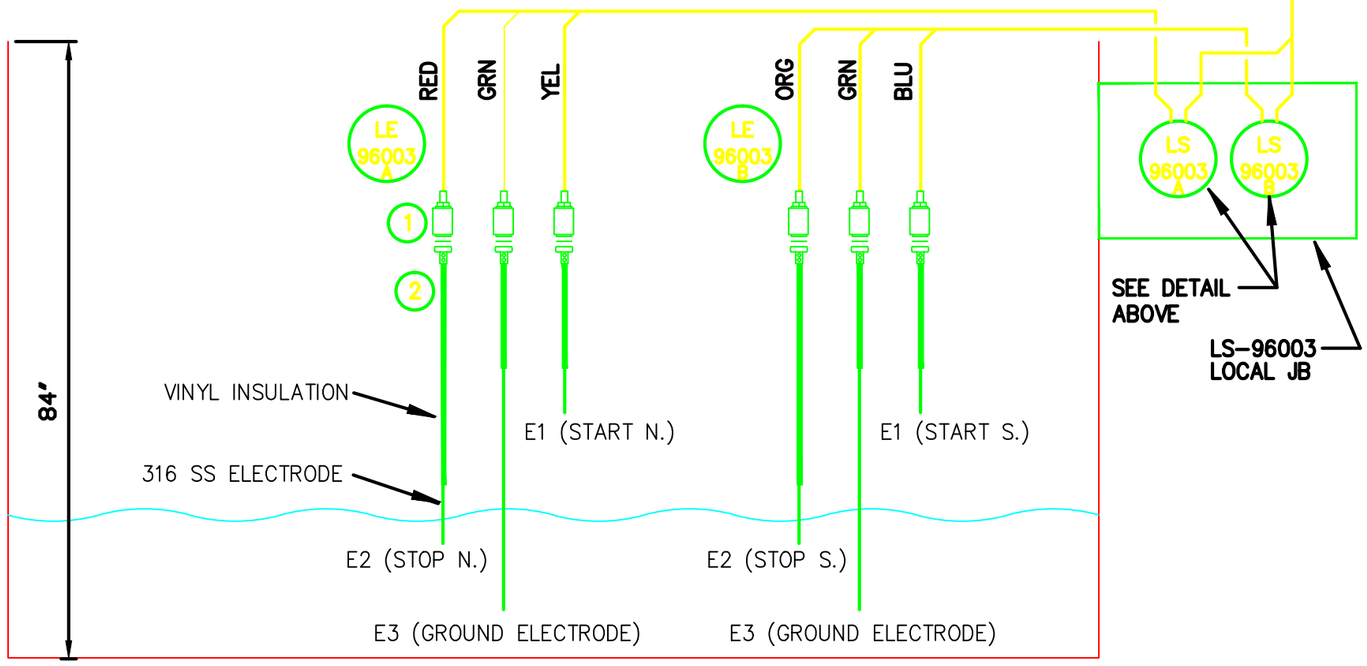
DOCK WHSE STORM WATER COLLECTION TANK - LEVEL

DSGN E.R. WARD	DWN E.R. WARD	APVD _	DATE 9/17/12
WO 3314675	PROJ/IP 42628400939		ACCT. 0943
DEPT. SHIP	SECT. 20	SUB-SECT. 02	LD 96003-1 REV. 2

03/29/13 09:51:06 LD96003-1.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1

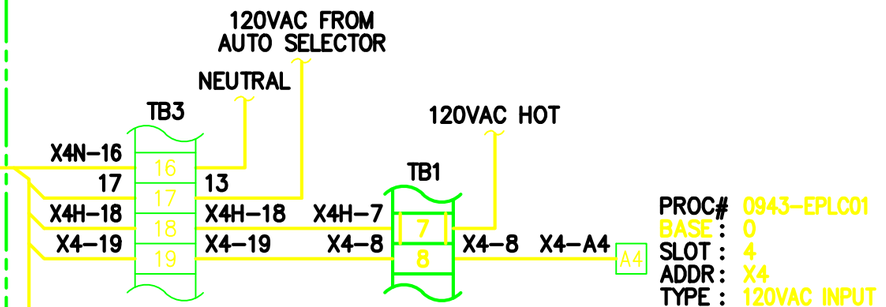


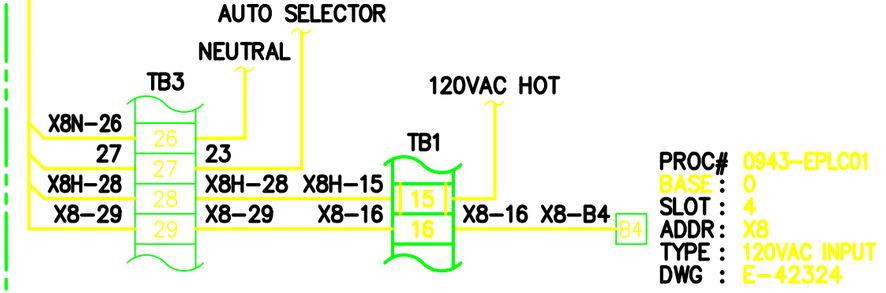


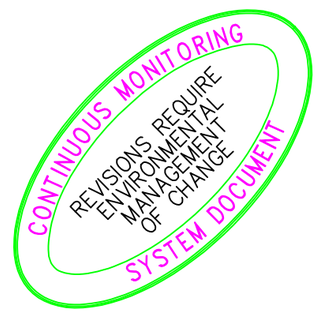


LOC: DOCK WAREHOUSE BASEMENT FLOOR WEST END

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.
1	6	HOLDER	OMRON	BS-1S1 SUS304	972791
2	6	ELECTRODE	OMRON	F03-01 SUS316 W/VINYL	972804
3	2	CNTRLR	OMRON	61F-GP-N8 120VAC	231726







SHT 2 OF 3

LOC: DOCK WHSE STORM WATER COLLECTION CONTROL CAB. 96901

CALIBRATION				
N. PUMP E1	N. PUMP E2	**S. PUMP E1**	**S. PUMP E2**	
PUMP STARTS AT 38" ON INCREASE	PUMP STOPS AT 12" ON DECREASE	**PUMP STARTS AT 41" ON INCREASE**	**PUMP STOPS AT 12" ON DECREASE**	

REF. DWGS	NO	REVISIONS	DATE	APD
E-42323	**1**	**RECORD ISSUE**	**3/13**	**ERW**
M-42326				
E-42327				

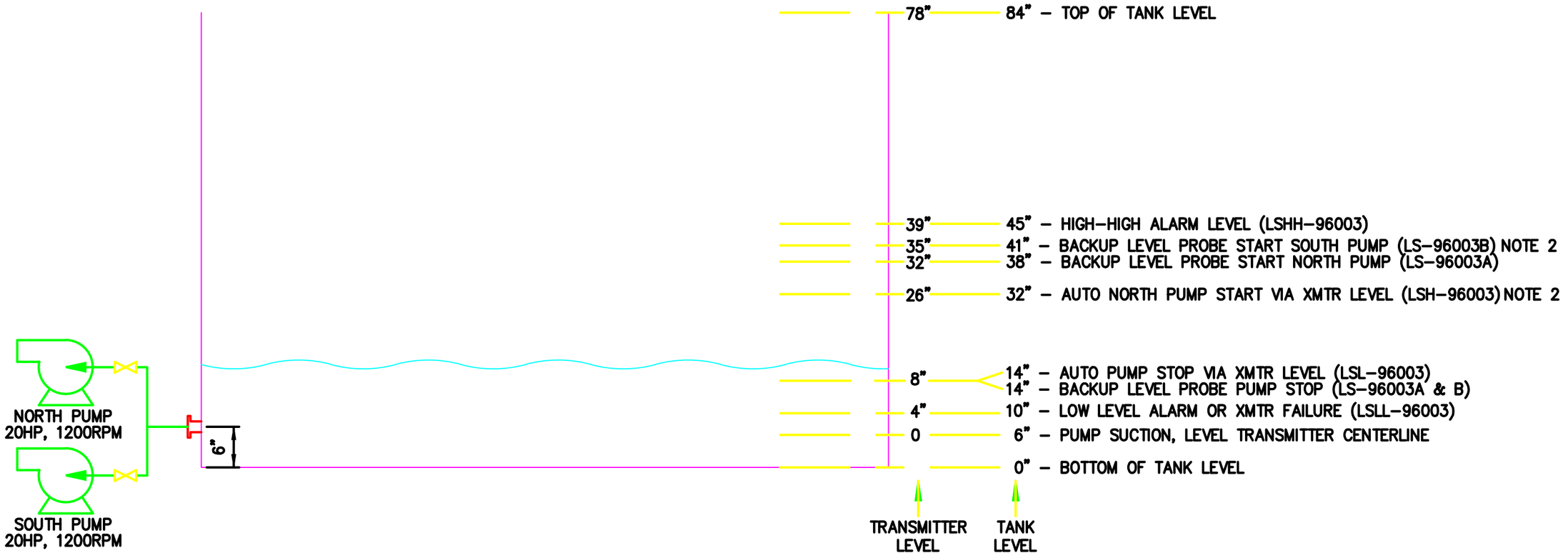
Georgia-Pacific
CAMAS MILL
Camas, WA 98607

DOCK WHSE STORM WATER COLLECTION TANK - LEVEL

DSGN E.R. WARD	DWN E.R. WARD	APVD _	DATE 11/14/12
WO 3314675	PROJ/IP 42628400939		ACCT. 0943
DEPT. SHIP	SECT. 20	SUB-SECT. 02	LD 96003-2 REV. 1

03/29/13 09:38:43 LD96003-2.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1

ITEM	QTY	DESC.	MANUFACTURER	MODEL NUMBER	REFERENCE NO.



DOCK WAREHOUSE STORM WATER COLLECTION TANK LEVEL CONTROL SETPOINTS

NOTES

1. PUMP STARTERS ARE INTERLOCKED SO ONLY ONE PUMP AT A TIME CAN RUN.
2. SOUTH PUMP WILL START AS BACKUP IF NORTH PUMP IS NOT RUNNING.
3. HIGH LEVEL SWITCHES LS–96003A OR LS–96003B OR LSHH–96003 WILL BROADCAST A HIGH LEVEL ALARM TO THE CLOCK ROOM.

CONTINUOUS MONITORING
REVISIONS REQUIRE ENVIRONMENTAL MANAGEMENT OF CHANGE
SYSTEM DOCUMENT

LOC: DOCK WAREHOUSE BASEMENT FLOOR WEST END

CALIBRATION				

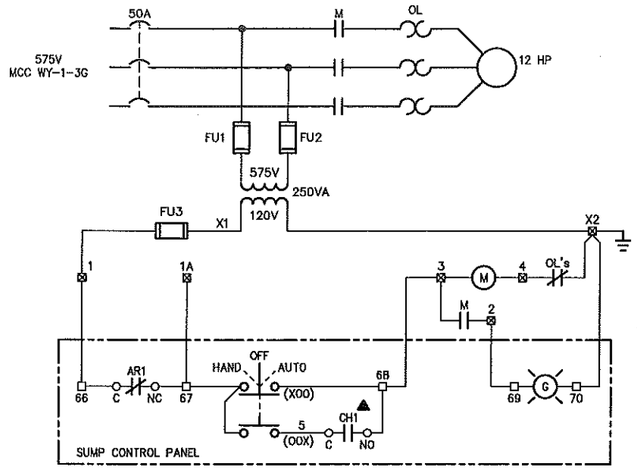
REF. DWGS	NO	REVISIONS	DATE	APD
LD96003–1, –2	1	RECORD ISSUE	3/13	ERW
E–42327	2	ADDED LO–LO LVL ALARM	5/13	ERW
	3	REV PER MOC 434039	11/15	ERW

Georgia-Pacific
CAMAS MILL
Camas, WA 98607

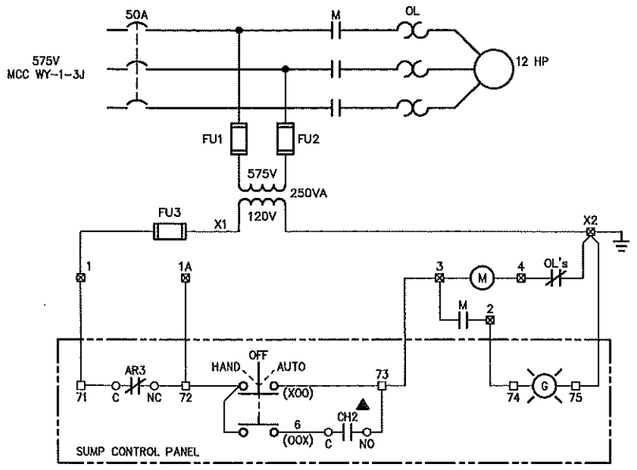
DOCK WHSE STORM WATER COLLECTION TANK – LEVEL

DSGN E.R. WARD	DWN E.R. WARD	APVD _	DATE 11/14/12
WO 3314675	PROJ/IP 42628400939		ACCT. 0943
DEPT. SHIP	SECT. 20	SUB–SECT. 02	LD 96003–3	REV. 3

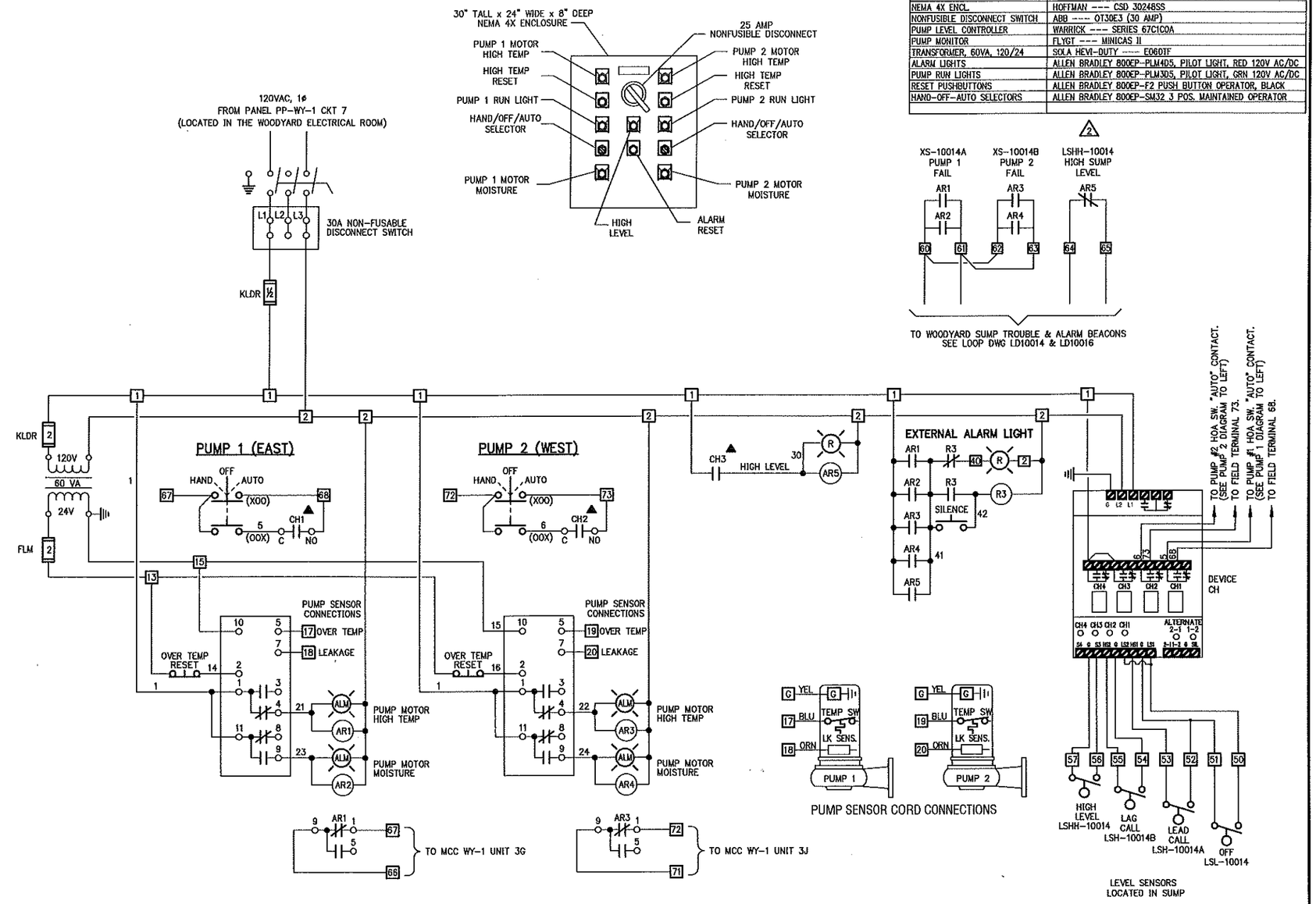
11/13/15 17:20:47 LD96003–3.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1



WOODYARD SUMP #1 PUMP – EAST



WOODYARD SUMP #2 PUMP – WEST



WOODYARD SUMP CONTROL PANEL

MAJOR COMPONENT LIST

DESCRIPTION	MANUF. AND PART NO.
NEMA 4X ENCL.	HOFFMAN --- CSD 30248SS
NONFUSIBLE DISCONNECT SWITCH	ABB ---- QT30EJ (30 AMP)
PUMP LEVEL CONTROLLER	WARRICK --- SERIES 67C1C0A
PUMP MONITOR	FLYGT --- MINICAS II
TRANSFORMER, 60VA, 120/24	SOLA HEVI-DUTY ---- E060TF
ALARM LIGHTS	ALLEN BRADLEY 800EP-PLM4D5, PILOT LIGHT, RED 120V AC/DC
PUMP RUN LIGHTS	ALLEN BRADLEY 800EP-PLM3D5, PILOT LIGHT, GRN 120V AC/DC
RESET PUSHBUTTONS	ALLEN BRADLEY 800EP-F2 PUSH BUTTON OPERATOR, BLACK
HAND-OFF-AUTO SELECTORS	ALLEN BRADLEY 800EP-SM32 3 POS. MAINTAINED OPERATOR

LEGEND:

- □ TERMINAL AT SUMP CONTROL PANEL
- ⊠ TERMINAL AT MCC
- ▲ CONTACT LOCATED IN LEAD/LAG LEVEL CONTROLLER DEVICE "CH"

NOTES:

1. MCC WY-1 AND POWER PANEL PP-WY-1 ARE LOCATED IN THE WOODYARD ELECTRICAL ROOM.
2. SEE DWG E-33860 FOR MCC WY-1 CIRCUIT SCHEDULE.

REFERENCE DRAWINGS: E-33860, E-33861, E-35295, LD10013, LD10014

DRAWING TITLE: WOODYARD SUMP ELEMENTARY WIRING DIAGRAM

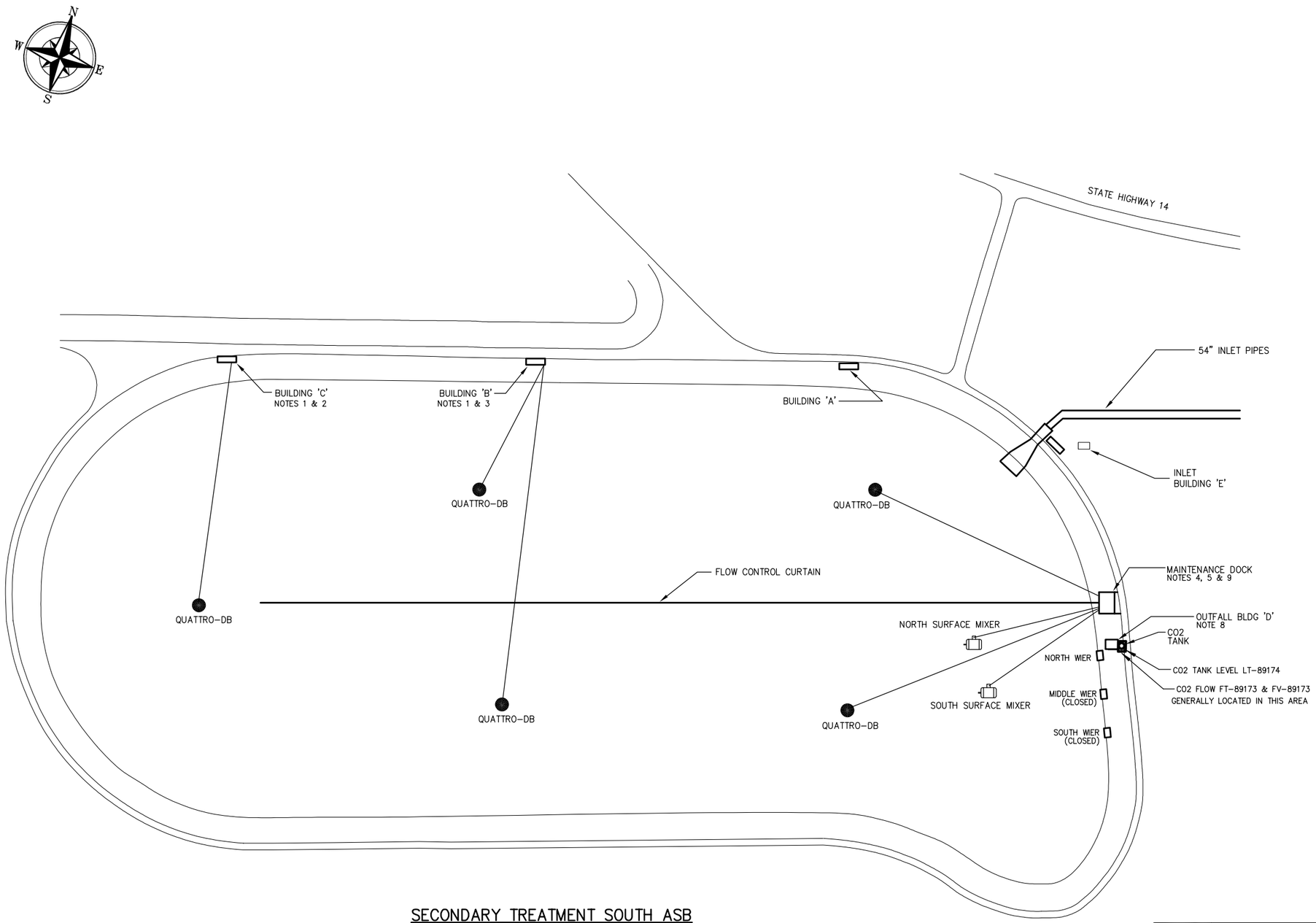
NO	DATE	REVISIONS	BY
1	11/01/04	RECORD ISSUE	ERW
2	3/19/08	REVISE ALARM BEACON WIRING	SMR

Georgia-Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE: ELECTRICAL WOODMILL DEMOLITION

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
NONE	E.R. WARD	E.R. WARD	PAK	8/30/04		E-37279	2

WO NO.	IP NO.	ACCT. NO.	DEPT.	SECTION	EQUIPMENT NO.
–	–	0306	ADD	19 31	–



SECONDARY TREATMENT SOUTH ASB

LEGEND

- QUATTRO-DB ULTRASONIC TRANSDUCER
- SURFACE MIXER AERATOR, 5HP, 460VAC, 3ø
  AERATION INDUSTRIES AIRE-O2 POLARIS MODEL 510-1194

NOTES

1. ULTRASONIC ALGAE CONTROL SYSTEM PROVIDED FROM HYDRO BIOSCIENCE.
2. SINGLE QUATTRO-DB ULTRASONIC TRANSDUCER SYSTEM IS MOUNTED IN A JUNCTION BOX LOCATED AT BUILDING C. ULTRASONIC TRANSDUCER IS DRIVEN FROM A POWER SUPPLY POWERED BY 120VAC FROM THE LOCAL LIGHTING PANEL "C" CIRCUIT# 8 (REG DWG E-42679).
3. DUAL QUATTRO-DB ULTRASONIC TRANSDUCER SYSTEM IS MOUNTED IN A JUNCTION BOX LOCATED AT BUILDING B. ULTRASONIC TRANSDUCER IS DRIVEN FROM A POWER SUPPLY POWERED BY 120VAC FROM THE LOCAL LIGHTING PANEL "B" CIRCUIT# 8.
4. DUAL QUATTRO-DB ULTRASONIC TRANSDUCER SYSTEM IS MOUNTED IN A JUNCTION BOX LOCATED AT MAINTENANCE DOCK. ULTRASONIC TRANSDUCER IS DRIVEN FROM A POWER SUPPLY POWERED BY 120VAC FROM THE LOCAL LIGHTING PANEL "LI-LP-1SBH" CIRCUIT# 4 (REF DWG E-35665).
5. SURFACE MIXER AERATORS ARE CONTROLLED BY INDIVIDUAL SIZE FVNR STARTERS LOCATED ON THE NORTH WALL OF THE SOUTH ASB MAINTENANCE DOCK (AKA BOAT HOUSE). 480VAC, 3ø POWER IS SOURCED FROM DISTRIBUTION PANEL LI-DP-1SBH, CIRCUITS 14, 16, 18 (REF DWG E-35665).
6. NORTH OUTFALL WIER CONTAINS THE FOLLOWING ENVIRONMENTAL MONITORING EQUIPMENT: FLOW (LD89170); pH (LD89171); & TEMPERATURE (LD89172). THIS LOCATION IS PLANNED TO ALSO HAVE THE FOLLOWING FUTURE INSTRUMENTATION: FT-89173, FV-89173 & LT-89174 FOR pH CONTROL VIA CO2 FLOW ADDITION.
7. (DELETED)
8. THE OUTFALL BUILDING 'D' CONTAINS THE FOLLOWING COMPONENTS: A MULTI-VARIABLE RECORDER, FLOW TRANSMITTER FT-89170, TEMPERATURE TRANSMITTER TT-89172, POWER PANEL LI-LP-2ASB, AND TERMINAL INTEFACE TO PLC I/O FOR UPSTREAMING ANALOG SIGNALS TO THE STEAM PLANT DCS VIA THE PRIMARY TREATMENT AND EFFLUENT PUMP STATION PLCS.
9. THE SOUTH ASB BOATHOUSE (MAINT. DOCK) CONTAINS THE FOLLOWING COMPONENTS: POWER PANELS LI-DP-1SBH (480V, 3ø) AND LI-LP-1SBH (120/240V, 1ø).
10. THE ASB INLET BUILDING 'E' CONTAINS THE PLC I/O BASE FOR INPUTING THE REMOTE ANALOG SIGNALS TO THE PRIMARY TREATMENT PLC 041701 (REF DWG E-32241).

REFERENCE DRAWINGS

DRAWING TITLE

SEC TREATMENT SOUTH ASB ALGAE & pH CONTROL LAYOUT

NO	DATE	REVISIONS	BY
1	2/15/19	ADD FUTURE ITEMS FOR ASB OUTFALL pH CTRL PROJ.	ERW
2	2/20/20	REV'D LADY ISLAND OUTFALL pH CTRL PROJ. SP1955	ERW
3	4/17/20	RECORD ISSUE SP1955	ERW

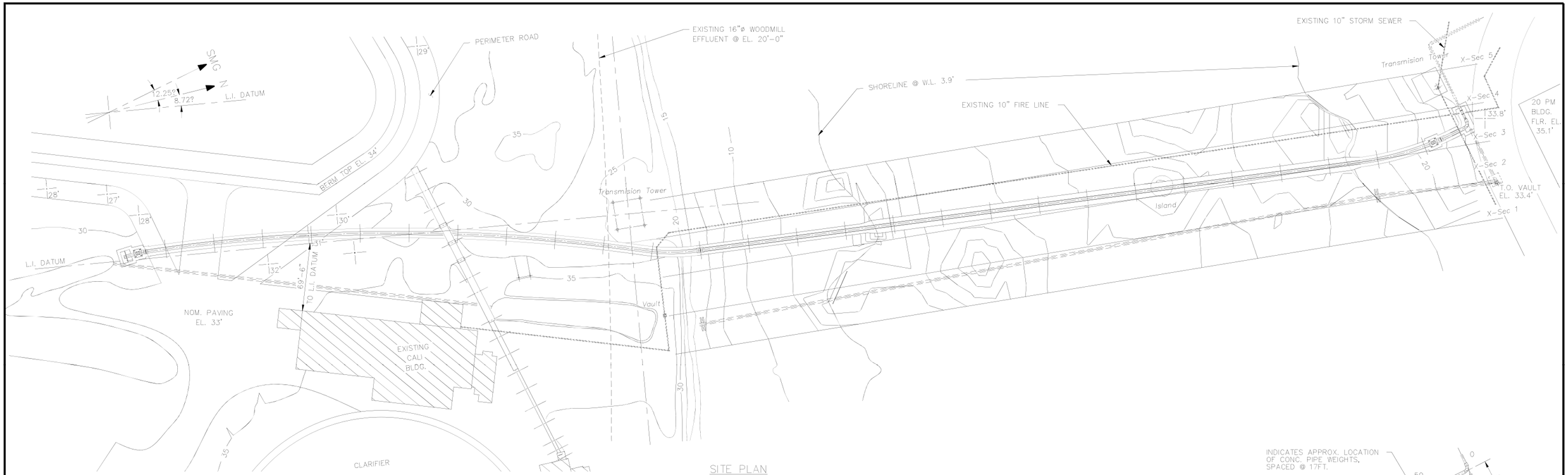
Georgia-Pacific
CAMAS MILL
Camas, Washington 98607

JOB TITLE
ASB ALGAE CONTROL

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	PROJECT NO.	DRAWING NO.	REV.
1"=100'	E.R. WARD	E.R. WARD	_	12/21/18	SP1916	E-45857	3

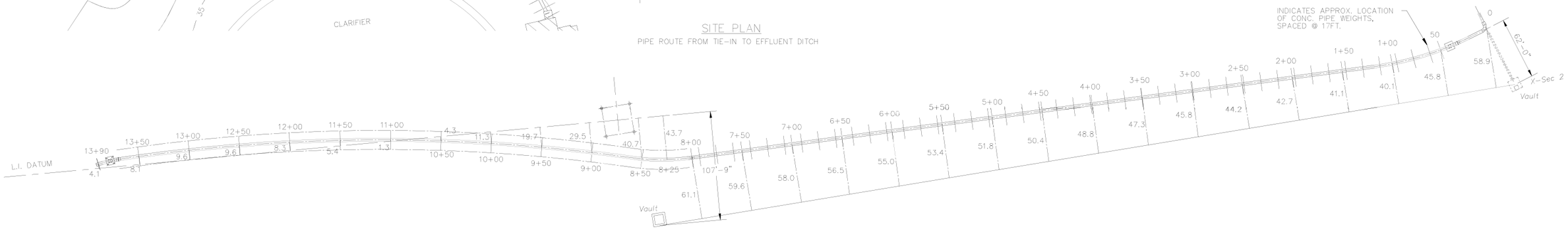
WO NO.	IP NO.	ACCT. NO.	DEPT.	SECT.	SUB-SECT.	EQUIPMENT NO.
5196357	42627101180	0418	EFF	19	40	_

04/17/20 11:51:42 E45857.dwg ED WARD (IDEAL SYSTEMS) MS PLOT 1=1



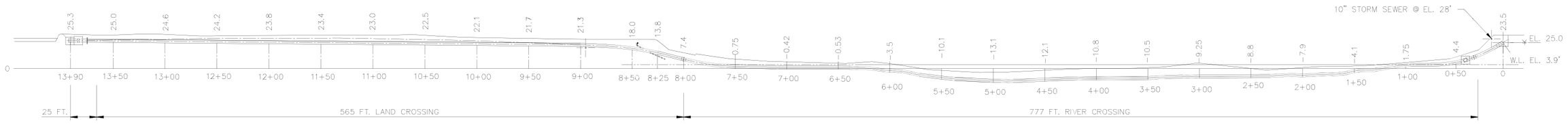
SITE PLAN

PIPE ROUTE FROM TIE-IN TO EFFLUENT DITCH



ROUTE PLAN

SHOWING OFFSETS FROM KNOWN DATUM LINES

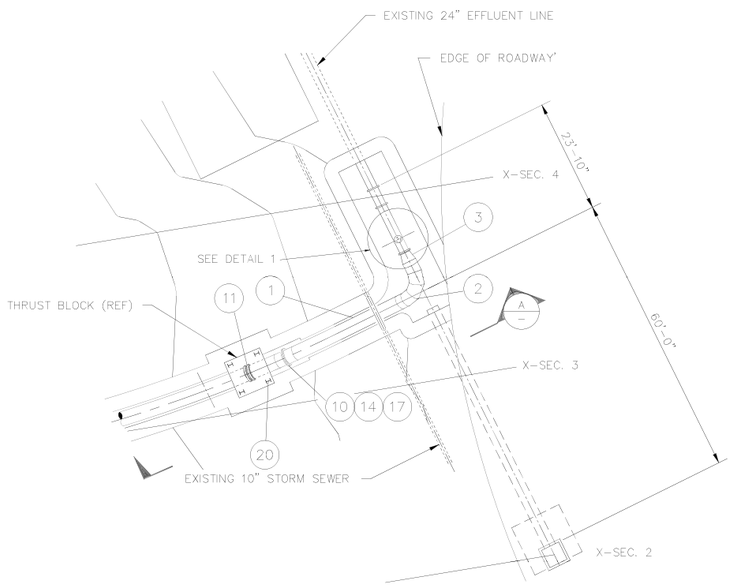


INVERT ELEVATION

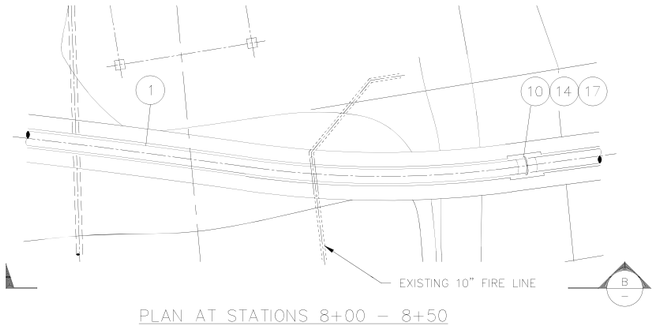
SHOWING B.O.P. ELEVATIONS FROM MILL DATUM

REFERENCE DRAWINGS	DRAWING TITLE						
P-28391	36"ø ACID SEWER CROSSING TO LADY ISLAND						
	NO	DATE	REVISIONS	BY	JAMES RIVER CORPORATION CAMAS MILL Camas, Washington 98607		
	0	9-3-92	ISSUED FOR CONSTRUCTION	BKC			
	1	9-9-92	REV'D ELS, RMV'D FITTING @ STN. 8+25				
			MODIFIED INVERT UNDER SLOUGH				
			REISSUED FOR CONSTRUCTION	BKC			
	2	9-11-92	ADDED EXISTING PIPE INTERFERENCES,		JOB TITLE		
			REISSUED FOR CONSTRUCTION	BKC	ACID SEWER		
	3	11/06/92	RECORD ISSUE	DDM			
SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	EQUIP. NO.	DRAWING NO.	REV.
1"=50'	C. Dirksen	C. Dirksen	B.K.C	8-25-92		P-28390	3
WO NO.	EWO NO.	AR/ACCT. NO.	DEPT.	SECTION	SUB-SECT.		
	92-90305	2-9920	EFF				

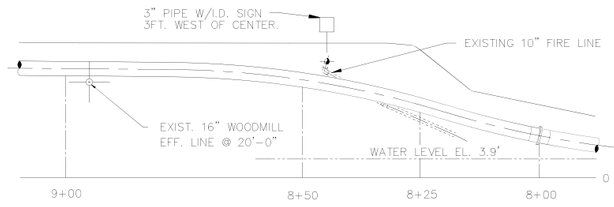
P28390 11/06/92 11:12:43



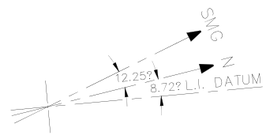
PLAN AT STATIONS 0 TO 0+50



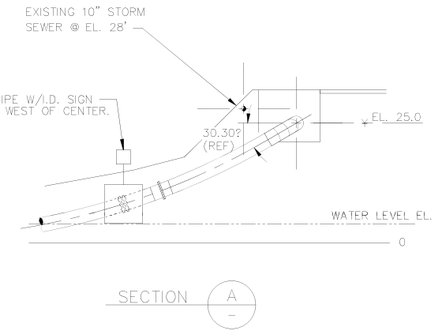
PLAN AT STATIONS 8+00 – 8+50



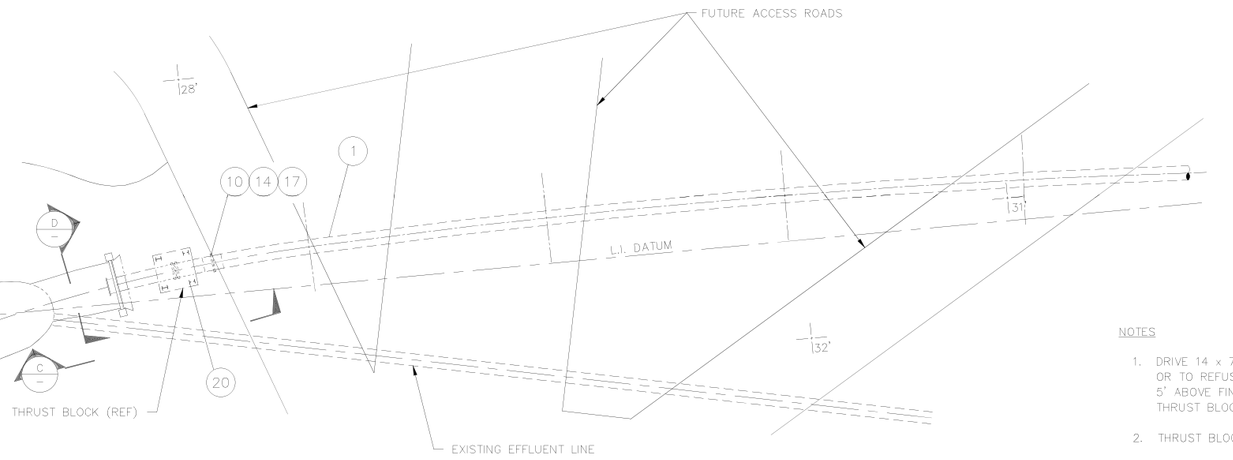
SECTION B



LIST OF MATERIALS			
ITEM	QTY	DESCRIPTION	PROVIDER
1	1500'	PIPE: 36"ø x 2.118 WALL POLYETHYLENE	IND. PLASTICS
2	1	90? ELL: 63" R, 82" C-E, MITERED, POLY	IND. PLASTICS
3	1	36" x 24" CONC. REDUCER W/STUB END, POLY	IND. PLASTICS
4	20'	PIPE: 24" ø x 1.412 WALL POLYETHYLENE	IND. PLASTICS
5	5	24" POLY STUB END W/SS BACKING FLANGE	IND. PLASTICS
6	10'	PIPE: 12"ø x .75 WALL POLYETHYLENE	IND. PLASTICS
7	1	12" POLY STUB END W/SS BACKING FLANGE	IND. PLASTICS
8	1	12" BLIND FLANGE	IND. PLASTICS
9	1	PRECAST MANWAY x 36" LG. (MIN) W/C.I. COVER	PIPE, INC.
10	6	36" POLY STUB END W/SS BACKING FLANGE	IND. PLASTICS
11	4	36" ø POLY THRUST-RING FITTING	IND. PLASTICS
12	1	36" 150#-DRILLED POLY-FLANGED STUB END	IND. PLASTICS
13	1	POLY SHEET: 12' x 8' x 2" THK.	IND. PLASTICS
14	96	STUD BOLT: 1 "ø x 18" LG. W/4 NUTS SS	IND. PLASTICS
15	40	STUD BOLT: 11"ø x 15" LG. W/4 NUTS SS	IND. PLASTICS
16	12	HEX. BOLT: ?"ø x 6" LG. W/HEX. NUT A193	IND. PLASTICS
17	3	36" 150# GASKET GYLON BLUE	IND. GASKET
18	2	24" 150# GASKET GYLON BLUE	IND. GASKET
19	1	12" 150# GASKET GYLON BLUE	IND. GASKET
20	8	PILING: W14 x 73 x 40' LG.	ADV. AMER. DIVING
21	47	PIPE WEIGHT: 18" W x 7,000 lb. CONCRETE	ADV. AMER. DIVING
22	15	12" ø MIN. x 40' WOOD DOWNSTREAM PILINGS	ADV. AMER. DIVING



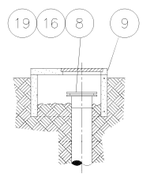
SECTION A



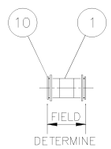
PLAN AT STATIONS 12+00 – 13+90
AFTER BACKFILL & CUT MADE TO EXISTING DITCH

NOTES

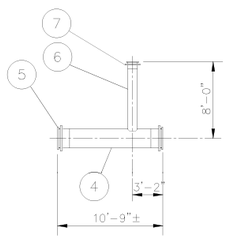
1. DRIVE 14 x 73 PILES FOR THRUST BLOCKS TO 25' BELOW GRADE OR TO REFUSAL. ALLOW TWO PILES ON NORTH END TO EXTEND 5' ABOVE FINISH GRADE. TRIM ALL OTHERS 6" BELOW TOP OF THRUST BLOCK.
2. THRUST BLOCKS TO HAVE #6 REBAR ON 12" CENTERS AROUND PIPE.
3. PLACE PIPE WEIGHTS AT 17' INTERVALS IN UNDERWATER SECTION.
4. DRIVE 12"ø PILINGS BUTT FIRST AT 50' INTERVALS BETWEEN STATIONS 1+00 & 7+50. DRIVE TO 25' BELOW GRADE OR TO REFUSAL. CUT OFF TOPS 1' ABOVE TOP OF INSTALLED PIPE.



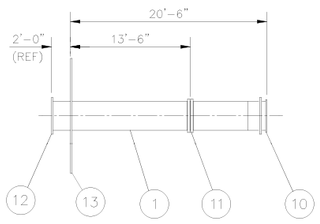
DETAIL 1
1"=1'-0"



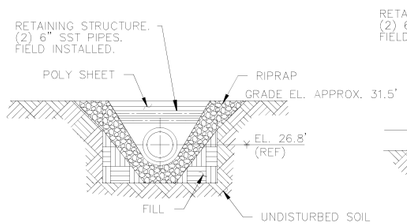
DETAIL: TIE-IN PUP
?"=1'-0"



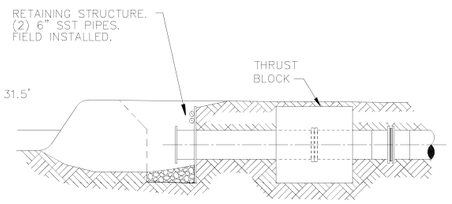
DETAIL: CUSTOM FITTING AT STATION 0
?"=1'-0"



DETAIL: CUSTOM FITTING AT STATION 13+90
?"=1'-0"



SECTION D
?"=1'-0"



SECTION C
?"=1'-0"

REFERENCE DRAWINGS	DRAWING TITLE: 36"ø ACID SEWER LINE DETAILS			
P-28390				
SKM-20054	NO	DATE	REVISIONS	BY
	0	9-10-92	ISSUED FOR CONSTRUCTION	BKC
	1	11/06/92	RECORD ISSUE	DDM

JAMES RIVER CORPORATION
CAMAS MILL
Camas, Washington 98607

JOB TITLE: ACID SEWER

SCALE	DESIGNED BY	DRAWN BY	APPROVED	DATE	EQUIP. NO.	DRAWING NO.	REV.
?"=1'-0"	C. Dirksen	C. Dirksen	B.K.C.	8-25-92		P-28391	1
WO NO.	EWO NO. 92-90305	AR/ACCT. NO. 2-9920	DEPT. EFF	SECTION	SUB-SECT.		

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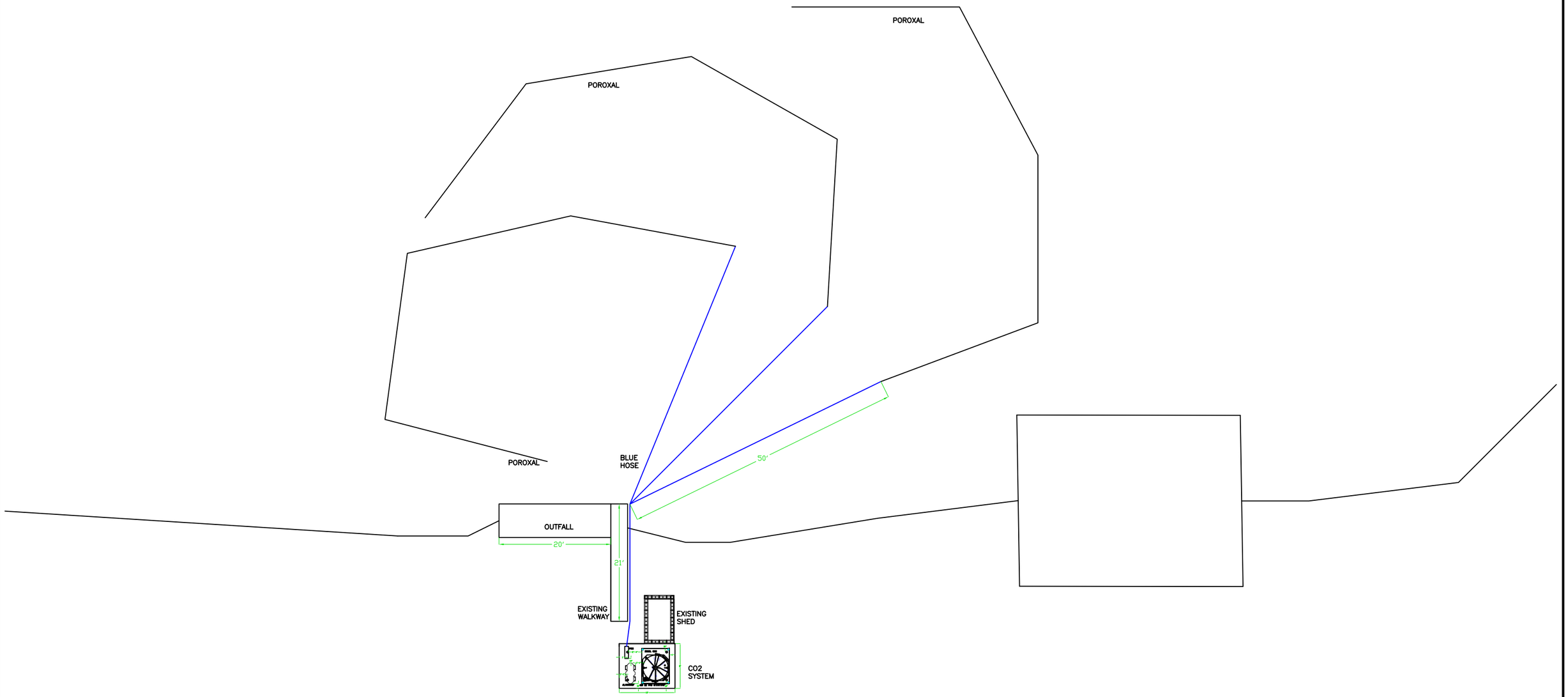

REV	DATE		DWN	CHK	APVD
1	04/02/19	ADDED POND AND POROXAL	JJC		
0	03/27/19	DRAWING CREATION	JJC		

DATE 03/27/19 | DRAWN BY J. CROSIER
JOB No. | APPRD. / D.A.
COMPUTER FILE GP CAMAS CO2 LAYO

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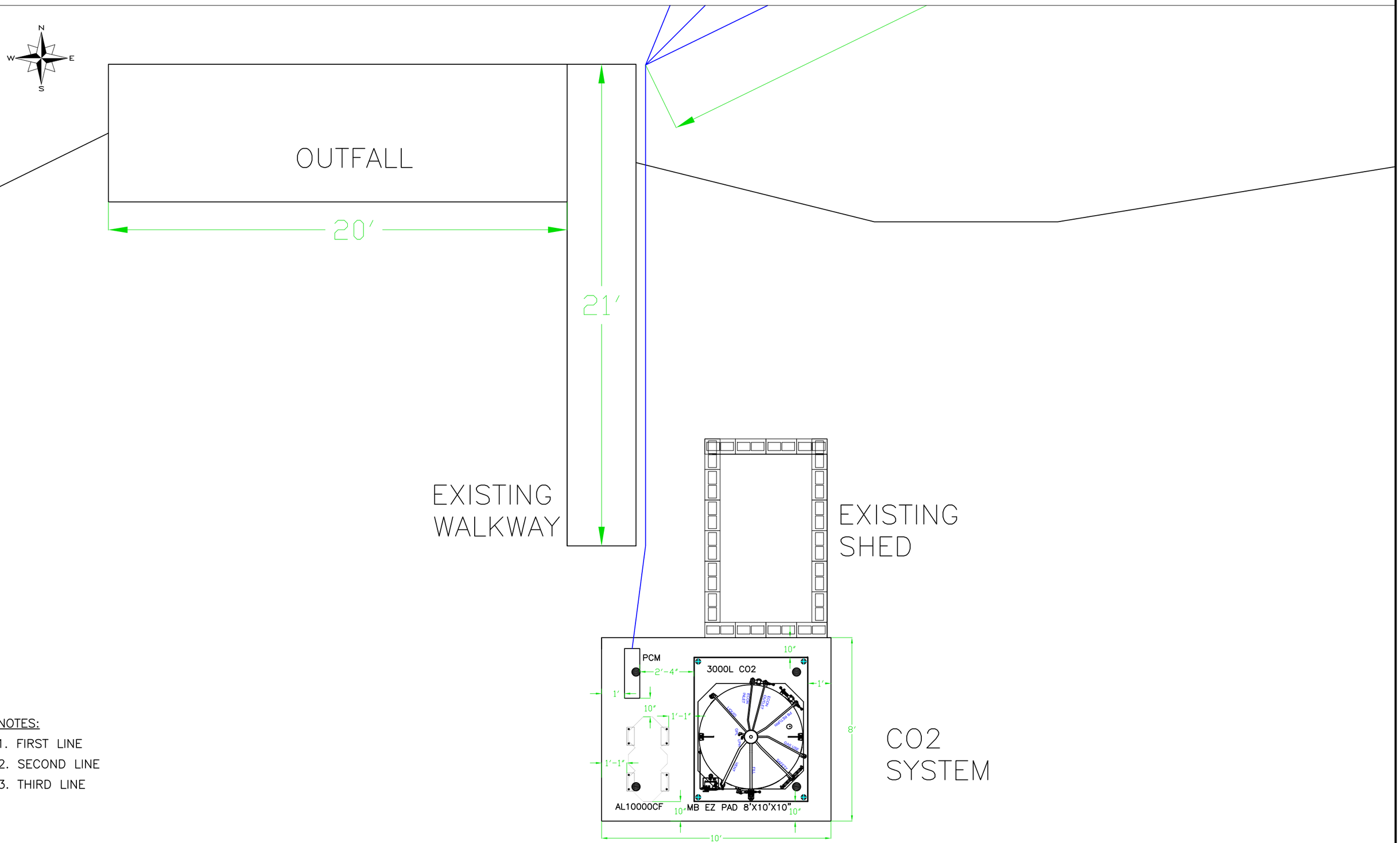
Airgas® an Air Liquide company

SITE LAYOUT
6,000 LB CO2
GEORGIA PACIFIC
CAMAS, WA

PAGE: 1 OF 1 | REV. No. 1
DWG. No. CSA–2019063



NOTES:

1. FIRST LINE
2. SECOND LINE
3. THIRD LINE

REV	DATE		DWN	CHK	APVD
1	04/02/19	ADDED POND AND POROXAL	JJC		
0	03/27/19	DRAWING CREATION	JJG		

DATE 03/27/19 | DRAWN BY J. CROSIER
JOB No. ---- | APPRD. / D.A. ----
COMPUTER FILE GP CAMAS CO2 LAYO----

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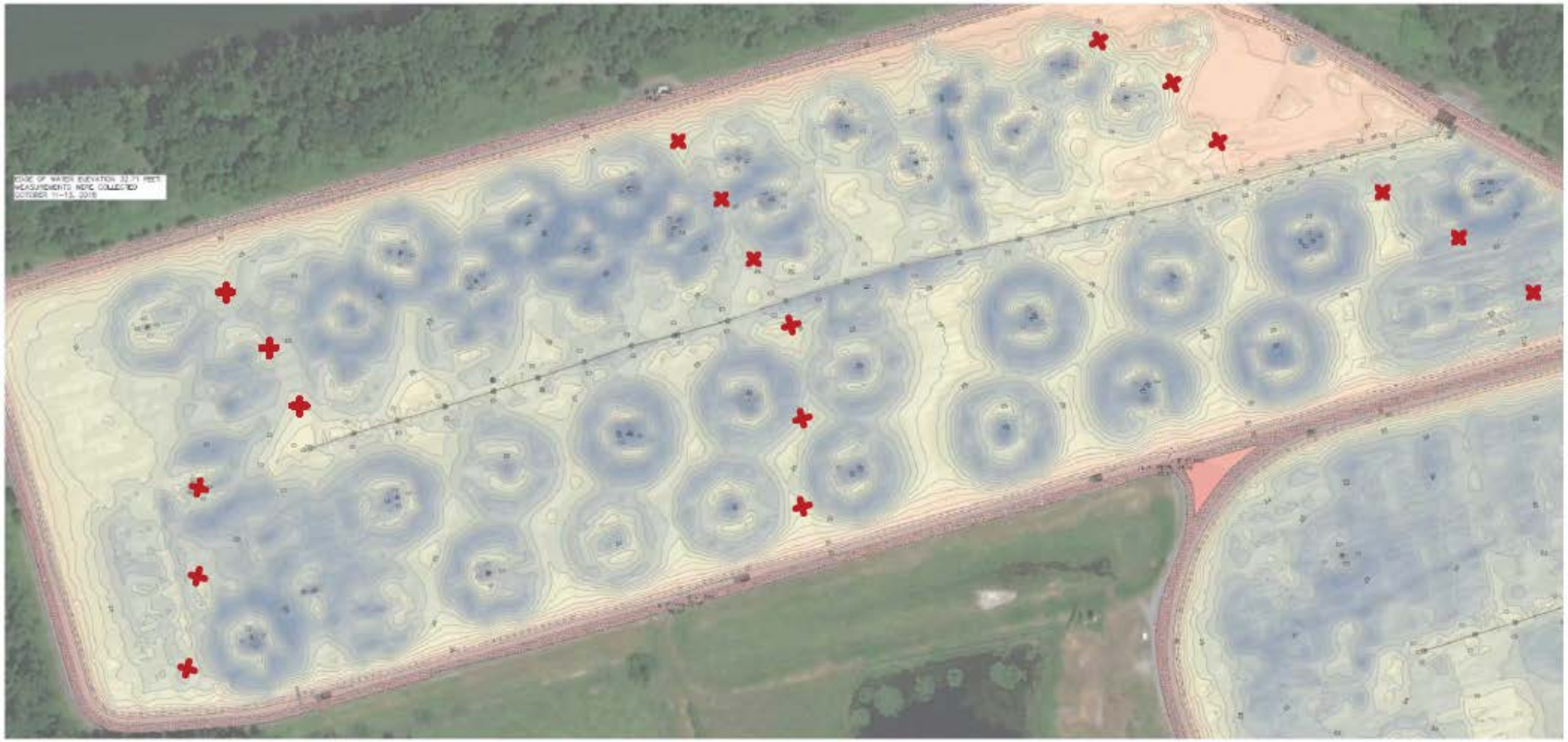
EXTRA PAGE
6,000 LB CO2
GEORGIA PACIFIC
CAMAS, WA

PAGE: X OF X | REV. No. 1
DWG. No. CSA–2019063

Figure C-3 Baseline Monitoring Sample Locations – ASB 1



Imagery and contours represent sludge surface elevation in North Pond, from Statewide Land Surveying, Inc. "ASB Sludge Surveys". For Georgia-Pacific, Camas Mill, November 2018.

Notes:

✖ Denotes proposed sample locations (approximate)- sample locations are intended to be accessible from shore.

Figure C-4 Periodic Monitoring Sample Locations – ASB 1

Imagery and contours represent sludge surface elevation in North Pond, from Statewide Land Surveying, Inc. "ASB Sludge Surveys". For Georgia-Pacific, Camas Mill, November 2018.

Notes:

✖ Denotes proposed sample locations (approximate)- sample locations are intended to be accessible from shore.