CONESTOGA-ROVERS & ASSOCIATES

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Operation, Maintenance, and Monitoring Manual

102nd Street Landfill Site
Niagara Falls, New York

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Executive Summary

The following report describes the Operation, Maintenance, and Monitoring (OM&M) requirements for the 102nd Street Landfill Site (Site) located in Niagara Falls, New York. The 22.1-acre Site is jointly owned by Occidental Chemical Corporation (OCC) (15.6 acres) and Olin Corporation (Olin) (6.5 acres). Both OCC's and Olin's responsibilities at the Site are currently handled by Conestoga-Rovers & Associates (CRA), under the direct supervision of Glenn Springs Holdings, Inc. (GSH), an affiliate of OCC.

The Remedial Action (RA) system components that require OM&M are described in this report are as follows:

- A landfill cap
- A perimeter slurry wall
- An aqueous phase liquid (APL) collection and discharge system
- A non-aqueous phase liquid (NAPL) recovery system
- Post-RA system performance monitoring
- A perimeter fence
- Shallow water environment monitoring

A post-RA system performance monitoring program that includes groundwater quality, groundwater level, and NAPL presence monitoring has been established to monitor the effectiveness of the RA system components. All monitoring activities will be performed in accordance with the Health and Safety Plan (HASP) and the Quality Assurance Project Plan (QAPP) developed for the OM&M activities at the Site. Each component of the monitoring program shall be reassessed annually to determine the need for any modifications. The post-closure care and monitoring will be performed for a minimum of 30 years. The formal start of the OM&M activities was April 2002; therefore, the OM&M is anticipated to continue until at least 2032.

Water levels will be measured in ten overburden monitoring wells and ten piezometers to ensure an inward gradient exists across the slurry wall. Additional water levels will be measured at three bedrock wells. Water levels will be measured quarterly. Groundwater samples will be collected and analyzed from ten overburden and three bedrock monitoring wells. Samples will be collected and analyzed semiannually through 2011, and once every year thereafter. A Quality Assurance/Quality Control (QA/QC) evaluation will be performed by GSH/Olin on all analytical results to determine if the data are acceptable for use in the respective program components. The data will be used to determine the effectiveness of the

containment system by comparing concentrations of chemicals in the groundwater outside the slurry wall over time.

NAPL presence monitoring will be conducted at eight NAPL recovery wells on a quarterly basis. If, during monitoring, more than 3 gallons of NAPL (6 inches deep in the 12-inch diameter well) are present in a NAPL recovery well, the NAPL will be removed for off-Site disposal in accordance with all applicable Federal and New York State Regulations.

The overburden groundwater level inside the slurry wall and along the APL collection trench will be lowered to an elevation of 562.6 feet above mean sea level (AMSL) to create an inward gradient for the Site. This elevation is approximately 1 foot below the average water level in the Niagara River adjacent to the Site. The APL will be transferred to the Love Canal Treatment Facility (LCTF) via a forcemain and treated at the LCTF. Treated effluent will be discharged to the City of Niagara Falls sanitary sewer system in accordance with the OCC Love Canal discharge permit. After the initial dewatering of the APL collection trench, the gradient established by the APL collection trench will be maintained by level-controlled pumping at each wet well. A series of four wet wells (WW-1 through WW-4) are present along the southern perimeter of the slurry wall, which direct APL to the LCTF. The estimated flow rate to maintain the steady state groundwater level is 2,800 gallons each week. Individual pump flow rates at each wet well, total flow, and APL levels in the Site's wet wells will be monitored through the LCTF control system.

Site requirements include routine inspections, sampling, scheduled preventative maintenance, unscheduled maintenance in response to inspection reports or component failures, and record keeping.

An OM&M Report form will be completed by GSH/Olin and submitted to the New York State Department of Environmental Conservation (NYSDEC) annually. The report will be entitled "Site Management Periodic Review Report" and will contain the completed Operations and Maintenance Report Form, a list of monitoring events, a summary of RA system operation parameters, a description of inspections and maintenance performed during the previous year, and institutional and engineering controls certification.

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594000-30K-06C	As-Built APL Wet Well Details
594000-30K-08	As-Built APL Collection System Section and Details
594000-30K-09	As-Built Slurry Wall Profile
594000-10S-01	As-Built Site Details
594000-10S-02	As-Built Capping System and Bulkhead Section and Details
594000-10U-01	As-Built Master Site Grading Plan
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Glossary

AMSL	Above Mean Sea Level
ANRP	Accelerated NAPL Recovery Program
APL	Aqueous Phase Liquid
CRA	Conestoga-Rovers & Associates
DO	Dissolved Oxygen
DOT	New York State Department of Transportation
EPA	Environmental Protection Agency
GCL	Geosynthetic Clay Liner
GSH	Glenn Springs Holdings, Inc.
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
LCTF	Love Canal Treatment Facility
LLDPE	Linear Low Density Polyethylene
mL/min	milliliters per minute
NAPL	Non-Aqueous Phase Liquid
NYSDEC	New York State Department of Environmental Conservation
OM&M	Operation, Maintenance, and Monitoring
Olin	Olin Corporation
OU	Operable Unit
OCC	Occidental Chemical Corporation
ORP	Oxidation-Reduction Potential
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RA	Remedial Action
Site	102nd Street Landfill Site
VOC	Volatile Organic Compound

Section 1.0 Introduction

This plan describes the Operation, Maintenance, and Monitoring (OM&M) Manual for the 102nd Street Landfill Site (Site) located in Niagara Falls, New York. The purpose of the OM&M Manual is to provide the detailed OM&M requirements for the various components of the Remedial Actions (RA) that have been implemented at the Site and to ensure that the components continue to function as intended. The Site covers approximately 22.1 acres and consists of two separate properties owned by Occidental Chemical Corporation (OCC) (15.6 acres) and Olin Corporation (Olin) (6.5 acres). The Site is bordered by the Niagara River to the south, Buffalo Avenue to the north, Griffon Park to the west, and privately owned land to the east. A perimeter fence restricts Site access. Authorized vehicular traffic access is provided from Buffalo Avenue by fence gates. A layout of the Site is presented on Figure 1.

The facility is jointly owned by OCC and Olin, with remedial responsibility assigned to Glenn Springs Holdings, Inc. (GSH). Conestoga-Rovers & Associates (CRA) has been retained by GSH to operate the Site. The contacts primarily responsible for the operation and maintenance activities are presented in Table 1.1.

1.1 Scope of OM&M Manual

This Manual is organized as follows:

Section 1.0	Introduction - a brief description of the OM&M Manual
Section 2.0	Site Description - a description of the Site, the RA components, and the equipment and materials used in the construction of the Site RA
Section 3.0	Monitoring and Testing – instructions for Site monitoring and testing requirements, including groundwater sample collection, water-level measurements, non-aqueous phase liquid (NAPL) measurements, quality control and quality assurance procedures, decontamination procedures for monitoring and testing equipment, and sample packaging and shipping procedures
Section 4.0	Operation of Site Remedial Systems – instructions for operating the Site remedial system, including start-up operation, NAPL pumping, and system controls and instrumentation
Section 5.0	Site Maintenance and Inspections – instructions for maintaining the Site systems, including cap maintenance, pump maintenance, wet well and forcemain maintenance, maintenance of erosion controls and swales, maintenance of cap vegetation (mowing), semiannual Site inspections, and shallow water environment area (Embayment Area) inspections
Section 6.0	Records and Reports – requirements for keeping records and producing annual reports

Section 2.0 Site Description and Remedial System Components

The 102nd Street Landfill Site is located in the City of Niagara Falls, New York and covers approximately 22 acres of land. The Site is bordered by the Niagara River to the south, Buffalo Avenue to the north, Griffon Park to the west, and privately owned land (the Belden Site) to the east.

Site access is restricted to authorized vehicular traffic from Buffalo Avenue by fence gates.

The RAs performed at the Site consisted of three Operable Units (OU). The components of OU-1 and OU-2 that require operation and maintenance and are described in this document as follows:

- A landfill cap
- A perimeter slurry wall
- An aqueous phase liquid (APL) collection and discharge system
- A NAPL recovery system
- Post-RA system performance monitoring
- A perimeter fence
- Shallow water environment monitoring

OU-3, which consisted of the abandonment and relocation of a 42-inch storm sewer that traversed the Site, has no operation and maintenance or monitoring requirements. Therefore, OU-3 is not covered in this manual.

The installed RA system components are described in the following sections. Replacement components should be the same or equivalent to the RA system components described below. Information and manuals from the vendors of the equipment used at the Site are stored in the Love Canal Treatment Facility (LCTF) control room.

2.1 Landfill Cap

The landfill cap was placed over the Site to reduce the infiltration of precipitation into the landfill, to prevent erosion of landfill materials, and to eliminate direct human contact with the landfilled materials. The landfill cap was extended over the perimeter slurry wall to limit infiltration of precipitation into the groundwater collection system. The landfill cap consists of the following layers, in descending order:

- Vegetative cover
- 6-inch topsoil layer
- 18-inch select cover fill layer
- 8-ounce, non-woven, needle-punched geotextile
- Drainage net (geonet) that drains into a surface drainage collection system
- Geomembrane layer
- Prefabricated geosynthetic clay liner (maximum permeability of $1x10^{-9}$ cm/s)
- Compacted common clayey fill with top 12 inches free of sharp objects and deleterious material

The vegetative cover was established by hydroseeding the topsoil with a mixture of grass seeds, fertilizer, organic mulch (straw), inoculants, and water. The vegetative cover was established in two distinct seeding areas. The area inside the slurry wall was seeded with the following mixture:

- White Clover 5 pounds/acre
- "Lancer" Perennial Pea 20 pounds/acre
- Annual Ryegrass 30 pounds/acre
- "Climax" Timothy Grass 30 pounds/acre
- "Pizza" Orchard Grass 10 pounds/acre
- "Bounty" Smooth Bromegrass 10 pounds/acre
- Redtop 5 pounds/acre

Perimeter areas (Griffon Park and the Anczok easement) were seeded with the following mixture:

- "Triple Crown" Perennial Rye 48 pounds/acre
- Kentucky Bluegrass 25 pounds/acre

- Creeping Red Fescue 24 pounds/acre

The geotextile used in the cap is Evergreen Technologies TG700, which provides a separation between the select fill layer and the geonet. Rolls of the geotextile were overlapped and heat bonded to provide a continuous layer.

The high density polyethylene (HDPE) geonet used in the cap is Polynet 3000, manufactured by National Seal Company. The geonet provides drainage for the cap layers above the geomembrane. Rolls of geonet were overlapped and attached together with plastic ties to provide a continuous drainage layer.

The geomembrane used in the cap is a 40-mil smooth linear low density polyethylene (LLDPE) liner material, manufactured by National Seal Company. The geomembrane provides a low permeability layer to restrict surface water from percolating into the landfill. Rolls of geomembrane were overlapped and fused together with a double hot wedge to provide a continuous barrier layer. An extrusion welder was used in areas where fusion welding could not be used. Seams were tested with positive air pressure or with a vacuum box.

The geosynthetic clay liners (GCL) used in the cap are Claymax 200 and Bentomat ST, both manufactured by Cetco. The GCL consisted of a layer of granular bentonite sandwiched between two layers of woven geotextile. The GCL also provides a low permeability layer to restrict surface water from percolating into the landfill. Rolls of GCL were overlapped 12 inches to provide a continuous barrier layer.

A 12-foot wide light duty gravel access road was constructed to allow access from the center gate from Buffalo Avenue to the wells and wet wells at the Site. The access road alignment is shown on Plan 594000-10U-01 and a cross-section of the access road is shown on Plan 594000-10S-01.

2.2 APL Collection and Discharge System

The APL collection and discharge system is designed to create an inward gradient in the groundwater table across the slurry wall. The inward gradient will be created and maintained by pumping groundwater from four wet wells installed in the groundwater collection trench. The system consists of 2,300 feet of perimeter collection drain, four wet wells, seven inline clean-outs, pumps, forcemain piping, seven forcemain cleanout manholes, electrical conduit, control and electrical wiring, controls, and instrumentation. A plan view of the APL collection and discharge system is presented on Plan 594000-30K-01, APL collection system details are shown on Plan 594000-30K-08, and the APL collection system Piping and Instrumentation Diagram (P&ID) is presented on Plan 59400-25J-02. The collected groundwater is pumped via

forcemain to a wet well at the Love Canal from which it is pumped to and treated at the LCTF located north of the Site. Treated effluent is discharged under permit to the City of Niagara Falls sanitary sewer.

2.2.1 Wet Wells and Manholes

Four wet wells are located at low points in the APL collection system. The 6-foot by 6-foot square wet wells were constructed of precast concrete. The wet wells were equipped with hinged manhole covers (Bilco Model No. JD-2 AL) for access. Each wet well has a collection sump that extends 5 feet below the collection pipe invert entering the wet well. Each wet well is equipped with a platform located approximately 8 feet below the top of the wet well for access to the pump casing, flow meter, and water level transmitter. Typical wet well details are shown on Plan 594000-30K-06C.

Seven inline collection drain cleanouts are installed along the collection drain to accommodate cleaning of the pipe, as necessary. Inline cleanout locations are shown on Plan 594000-30K-01. A typical inline collection drain cleanout detail is shown on Plan 594000-30K-08.

Seven forcemain cleanout manholes are installed along the forcemain alignment. Forcemain cleanout manhole locations are shown on Plan 594000-30K-01. The 6-foot by 6-foot square forcemain cleanout manholes were constructed of precast concrete and were equipped with Neenah R-1792 HL frames and covers and Neenah R-1982W aluminum steps for maintenance access. A forcemain cleanout manhole detail is shown on Plan 594000-30K-08.

A meter manhole is installed in the northwest corner of the Site along the forcemain alignment. The 6-foot by 6-foot square meter manhole is constructed of precast concrete and is equipped with a 3.5-foot by 3.5-foot cover and Neenah R-1982W aluminum steps for maintenance access. A meter manhole detail is shown on Plan 594000-30K-08.

2.2.2 Groundwater Collection Trench

The 24-inch wide collection trench consists of 6 inches of washed stone bedding, a 6-inch diameter perforated HDPE collection drain pipe, and washed stone backfill to the preconstruction grade. The entire trench stone backfill is wrapped in woven geotextile fabric. The depth of the collection pipe varies along the trench alignment. The collection pipes are sloped toward the wet wells.

2.2.3 Pumps, Forcemain, and Miscellaneous Plumbing

Each wet well is equipped with a stainless steel electric submersible pump that pumps the collected groundwater by forcemain to a wet well at Love Canal. The wet well pumps are

Grundfos Model Redi-Flow4 10E8. The pumps are installed inside a 6-inch diameter steel casing. The pumps discharge to a 1-inch diameter stainless steel pipe that rises out of the pump casing to the top of the wet well. A Flowdata, Inc., EC Series gear-driven flow meter is installed in each pipe. Another flow meter (totalizer) is installed in the meter manhole (Flowdata, Inc., BR-3000 Series).

The forcemain consists of two separate designs; one for within the limits of the slurry wall and the second for outside the slurry wall. Within the slurry wall, there are two 2-inch diameter HDPE pipes installed side-by-side. Only one forcemain pipe is used; the second pipe is for backup in the event that the first pipe becomes inoperable. A quick-connect system to switch from the first to the second pipe is located in each of the wet wells. The forcemain outside of the slurry wall consists of two 2-inch diameter HDPE carrier pipes inside an 8-inch diameter HDPE containment pipe. The transition from the separate 2-inch diameter pipes to the combined 2-inch pipes in the 8-inch containment pipe occurs at the meter manhole where the forcemain crosses the slurry wall. The forcemain alignment is shown on Plan 594000-30K-01.

A typical wet well layout showing the submersible pump and forcemain connections is presented on Plan 594000-30K-06C.

2.2.4 Conduits and Wiring

The wet well pumps are connected to the metering building by power, control, and instrumentation cables. The cables are installed through 2-inch diameter HDPE conduits that were buried in a shallow trench with the two forcemains. Cables inside the wet wells are installed in Plastibond conduits. The conduit alignments are shown on Plan 594000-30K-01.

2.2.5 Controls and Instrumentation

The flow meters in the wet wells and meter manhole send flow data to the metering station located near the northwest corner of the Site. High and low water levels used to turn the pumps on and off are measured by Kotron Sentinel II RF level transmitters, manufactured by Magnetrol. The high and low water pumping levels are programmed into the control system, which can be operated manually or automatically. The controls and meters in the meter station can be monitored remotely.

A 36-inch wide by 48-inch high by 12-inch deep locking NEMA 4X enclosure is mounted to the top of each wet well. The enclosures contain the electrical controls for the APL collection and discharge system.

2.3 NAPL Recovery System

A NAPL recovery system is installed at the Site. The system consists of eight NAPL recovery wells from which NAPL will be pumped if a recoverable amount has accumulated (NR-1 through NR-5, NR-7, NR-8, and NR-10). Each NAPL recovery well consists of a 12-inch diameter, type 304 stainless steel casing, a 10-foot long type 316 stainless steel well screen with No. 20 slots, a sand filter pack, bentonite and grout seals, and a concrete pad at the ground surface. The NAPL is shipped off Site for incineration after it is recovered. NAPL recovery well locations are shown on Plan 594000-30K-01 and details are shown on Plan 594000-30K-06.

2.4 Slurry Wall

A perimeter soil-bentonite slurry wall, designed to reduce groundwater inflow from off-Site areas to the perimeter collection drain, is installed along the perimeter of the Site beyond the groundwater collection trench alignment. The 3-foot wide slurry wall is keyed a minimum of 36 inches into the underlying native clay/till confining unit and is capped with 24 inches of clay and the landfill cap. The low permeability layer of the cap and the slurry wall create a continuous barrier to groundwater migration through the landfilled materials. The slurry wall alignment is shown on Plan 594000-30K-01, and slurry wall profiles are shown on Plan 594000-30K-09.

2.5 Monitoring Wells and Piezometers

Three types of monitoring wells are installed at the Site for use in post-RA system performance monitoring. These include ten post-closure overburden monitoring wells (PCM-01 through PCM-06, PCM-07R, and PCM-08 through PCM-10), three post-closure bedrock monitoring wells (PCBM-01 through PCBM-03), and ten overburden piezometers (PZ-01, PZ-02, PZ-03R, PZ-04 through PZ-08, PZ-09R and PZ-10). All three types were installed with 2-inch diameter, schedule 5, type 304 stainless steel riser pipes, 2-inch diameter continuous wrapped wire-wound type 304 stainless steel well screen with No. 6 slots, a sand filter pack, bentonite and grout seals, and a concrete pad at the ground surface. All wells are installed to 2 feet above ground surface with cast iron protective casings, stainless steel inner caps, and locking outer caps. Post-closure overburden monitoring wells and piezometers are installed 6 inches into the clay/till unit. Post-closure bedrock monitoring wells are installed with 10-inch diameter type 304 stainless steel overburden casings installed 18 inches into the clay/till unit and 6-inch diameter, schedule 10, type 304 stainless steel casings installed 2 feet into bedrock. Monitoring well details, locations, and elevations are shown on Plan 594000-30K-06.

2.6 Perimeter Fence

A 6-foot high chain link fence is installed along the Site perimeter as shown on Plan 594000-10U-01. The Site can be accessed through a traffic gate from Buffalo Avenue. The fence is topped with three strands of barbed wire.

Section 3.0 Monitoring and Testing

Monitoring at the Site, including sample collection, sample analyses, and reporting tasks must be completed to ensure the integrity and evaluate the performance of the RA system components and to meet monitoring requirements. Monitoring will be required for groundwater and NAPL at the Site. The collection of accurate data and representative samples is important for the successful operation of the RA systems at the Site. If the data collected are inaccurate and the samples are not representative, incorrect decisions will be made regarding system operations, and the RA systems will not work properly. The following sections describe methods that, when followed, will ensure the collection of accurate data and representative samples.

3.1 Groundwater Monitoring

A groundwater monitoring program has been established to monitor the effectiveness of the slurry wall, landfill cap, and APL collection system.

The groundwater monitoring program consists of water level monitoring and groundwater quality monitoring. The data collected are used to evaluate the performance of the APL collection and discharge system and the slurry wall and to determine the necessity for implementing contingency measures. The data also are used to determine when operation of the APL collection and discharge system may cease, subject to New York State Department of Environmental Conservation (NYSDEC) approval.

The wells where samples will be collected and measurements will be made are shown on Plan 594000-30K-01. This well network will be evaluated annually to assess whether each location provides useful information and to revise the network, as required.

3.1.1 Water Level Monitoring

Water level monitoring consists of the measurement of water levels in monitoring wells to determine groundwater elevations. Water levels in 20 monitoring wells and piezometers (PZ-01, PZ-02, PZ-03R, PZ-04 through PZ-08, PZ-09R, and PZ-10 inside the slurry wall and PCM-01 through PCM-06, PCM-07R, and PCM-08 through PCM-10 outside the slurry wall) will

be measured to ensure the water levels inside the slurry wall are lower than the water levels outside the slurry wall (i.e., an inward gradient exists). Additional water level monitoring locations include PCBM-01 through PCBM-03, NR-01 through NR-05, NR-07, NR-08, and NR-10. Hydraulic monitoring locations are shown on Plan 594000-30K-01 and are listed in Appendix C. Water level monitoring is conducted on a quarterly basis. The method for measuring water levels accurately is described in Section 3.3. Since August 2003, the hydraulic monitoring program has been and will continue to be reassessed every 5 years (2003, 2008, 2013, etc.) to determine the suitability of the program and any need for modifications, until water level monitoring is no longer required.

Water level data will be converted to elevations and listed in tabular form for each round of data collected.

In the event that water level monitoring indicates that the inward hydraulic gradients across the slurry wall and/or vertical upward gradient across the clay/till are not adequate, the APL collection system pumping level controls will be adjusted to achieve the target and minimum head difference. The minimum head difference across the slurry wall is 1 foot, and the minimum upward gradient across the clay/till is 1½ feet. The water level monitoring program may be reassessed annually.

3.1.2 Groundwater Quality Monitoring

Groundwater quality monitoring consists of the collection of water samples from ten overburden monitoring wells (PCM-01 through PCM-10) and three bedrock monitoring wells (PCBM-01 through PCBM-03), and the analysis of these samples to determine the concentrations of Site-specific indicators in the groundwater. The samples will be analyzed for the parameters listed in Table 3.1. All of these monitoring wells are located outside of the slurry wall as shown on Plan 594000-30K-01. Groundwater samples will be collected annually.

Upon receipt of validated groundwater quality monitoring data, the data will be evaluated by GSH and Olin to determine if the data are acceptable for use in the monitoring program.

The groundwater quality monitoring will be one of the data sets used to monitor the performance of the groundwater collection system and to determine the effectiveness of the slurry wall with respect to its design criteria and the Record of Decision requirements that an inward gradient be maintained across, and that the NAPL plume be contained by, the slurry wall.

Since August 2003, the program has been and will continue to be reassessed to determine the suitability of the sampling locations, monitoring frequency, and monitoring parameters and to

determine the suitability of the program. Recommendations for changes to the program including the installation or abandonment of wells may be made based on the results of monitoring or other pertinent information. The program will be reassessed every 5 years (2003, 2008, 2013, etc.) until groundwater quality monitoring is no longer required.

3.1.3 Groundwater Monitoring Contingency Plan

The groundwater monitoring program will monitor the performance of the groundwater collection system and slurry wall with respect to its design criteria and requirements. If the system is not performing as designed after the time needed to substantially attain steady-state conditions, contingency actions will be required.

3.2 Sampling Plan

The proper collection of water levels, groundwater samples, and NAPL presence information requires that a consistent set of procedures be followed for each well every time water levels and/or groundwater samples are obtained. Following these procedures will result in the collection of good quality data that are representative of conditions at the Site.

The following sections describe the procedures for measuring water levels, sampling groundwater, and checking NAPL presence at the Site. Procedures and protocols outlined below will be performed in conjunction with those presented in the Site-Specific Health and Safety Plan, Glenn Springs Holdings, Inc., Western New York Sites (HASP) and the Quality Assurance Project Plan (QAPP) contained in Appendix A of this OM&M Manual. The HASP and the QAPP must be read by personnel before performing any sampling activities at the Site.

3.2.1 General Sampling Procedures

The following activities must <u>not</u> be done while sampling:

- Do not smoke.
- Do not use bug repellents.
- Do not use wasp/hornet spray near a well.
- Do not use aftershaves, cologne, or astringents.
- Be aware of wind direction. Do not run vehicle or small engines (such as generators or air compressors) upwind of a well being sampled.
- Be aware of traffic fumes and nearby activities. Suspend sampling if traffic fumes are noted.
- Do not handle or pour gasoline or other fuels near a well being sampled.

3.2.2 General Health and Safety

Apply the following health and safety rules during collection of groundwater samples:

- Read the HASP before going to the Site.
- Industrial quality work boots, nitrile gloves, and safety glasses are the minimum required personal protective equipment (PPE) for sampling. Respirators may be required also and should be on hand for use at all times.
- Do not eat or drink.
- Be aware of potential slip, trip, and fall hazards and uneven terrain.
- Be aware of hazards of working with portable machinery, electrically operated equipment, gasoline-powered equipment, and high-pressure air.
- Some heavy lifting is required – use proper lifting techniques.
- Some sampling takes place along roads. Be aware of moving vehicles.
- Use caution when opening protective covers on wells – wasps, hornets, or bees may be present.

3.3 Water Level Measurement

Water level measurements are required at all Site wells. In addition to providing information for determining groundwater flow directions, measuring water levels provides the following:

- Accurate data for area groundwater table maps
- An opportunity for the sampling team to become more familiar with the Site
- An opportunity to collect data about unusual circumstances such as wells that are damaged, dry, or inaccessible
- An opportunity to inventory well conditions and to perform minor maintenance such as lubricating locks and hinges, replacing lost or faded well tags, etc.

An electric water level tape will be used for water level measurements in the wells and piezometers at the Site.

Water levels in the wet wells and total flows from the wet well pumps will be recorded when water levels are measured. Wet well water level meter and flow meter readouts are housed in the meter station. Record the wet well water levels and flow data on the form in Appendix C.

3.4 Groundwater Sampling

3.4.1 Well Purging

Prior to sampling each well, the standing water in the well will be purged, utilizing the low-flow purging (LFP) method, so that representative, sediment-free water may be sampled.

Purging will be conducted with a peristaltic pump with dedicated Teflon tubing in each sampling well. During LFP, the pumping rate will be between 100 and 500 milliliters per minute (mL/min). The initial pumping will be conducted at a lower rate to limit drawdown in the well. During purging, groundwater levels are measured to maintain a maximum 0.4 foot (0.1 m) of drawdown. The pumping rate can be gradually increased during LFP. Pumping rate increases will be dependent on the drawdown and the stabilization of field parameters discussed below. Pumping rate adjustments may occur in the first 15 minutes of purging. After this time, the pumping rate should remain constant and flow rate adjustments should be avoided. During purging, the pumping rate and groundwater level will be measured at least every 10 minutes.

During LFP, stabilization of the purged groundwater is required to ensure the collection of representative groundwater samples from the formation and not from the stagnant water in the well casing. Field parameters including pH, temperature, specific conductance, oxidation-reduction potential (ORP), dissolved oxygen (DO), and turbidity will be monitored during LFP. The measurement of these field parameters is used to evaluate if stabilization of the purged groundwater has occurred prior to the collection of groundwater samples. The field measurements will be measured and recorded at 5-minute intervals. Groundwater stabilization is considered as having been achieved when three consecutive readings for each of the field parameters, taken at 5-minute intervals, are within the following limits:

- pH ±0.1 pH units of the average value of the three readings
- Temperature ±3 percent of the average value of the three readings
- Conductivity ±0.005 millisiemen per centimeter (mS/cm) of the average value of the three readings for conductivity <1 mS/cm and ±0.01 mS/cm of the average value of the three readings for conductivity >1 mS/cm
- ORP ±10 millivolts (mV) of the average value of the three readings
- DO ±10 percent of the average value of the three readings
- Turbidity ±10 percent of the average value of the three readings, or a final value of less than 5 nephelometric turbidity unit (NTU)

During LFP, field parameters are measured using a flow-through cell apparatus. At the start of LFP, the purge water is visually inspected for clarity prior to being connected to the

flow-through cell. If the purge water is turbid, LFP continues until the purge water is visually less turbid prior to being connected to the flow-through cell. Field parameters may be obtained using individual meters or a multiple meter unit; however, the use of a flow-through cell is preferred. All meters must be calibrated daily in accordance with the manufacturer's calibration instructions, and a calibration record must also be maintained.

Stabilization will be considered as being complete when the field parameters have stabilized as indicated in the above table. Purging will continue if stabilization does not occur until a maximum of 20-screen volumes have been removed. LFP causes groundwater to be drawn from a significant distance above or below the pump intake. The screen volume is based on screen length. After the removal of 20-screen volumes, purging will continue if the purged water remains visually turbid and appears to be clearing. Also, purging will continue if the field parameters vary only slightly outside of the stabilization criteria and appear to be approaching stabilization.

If the recharge to the well is insufficient to conduct LFP, the well will be pumped dry and allowed to recharge sufficiently for the collection of the groundwater sample volume. Wells that are purged dry are not required to meet the stabilization criteria detailed above.

3.4.2 Sampling

Groundwater samples will be collected immediately after well purging is completed. Samples are collected directly from the purging pump when possible, or an alternate device (i.e., pump or bailer) may be installed or used. If new sampling equipment is installed, the first few bails or discharge volumes should be discarded to allow acclimation of the sampling equipment with the groundwater.

Samples are typically collected from the pump or bailer with the discharged groundwater collected directly in the appropriate sample containers. The interior of the sample bottle or cap must not be touched or handled in any way. New gloves (i.e., disposable nitrile gloves or equivalent) should be worn for the collection of each sample. Caps from sample bottles must not be placed on the ground or in pockets to eliminate the possibility of cross-contamination.

Analytical requirements and sample containers are discussed in the QAPP (Appendix A).

Where a well will not yield the volume of water necessary to immediately fill all required sample containers, as many of the containers as possible will be filled, with the remainder filled as water begins to enter into the well. Samples for volatile organic compounds (VOCs) will be collected within 2 hours of completion of well purging.

3.4.3 Sampling Documentation

Documentation is a critical part of sampling. The accuracy of samples collected in the field can only be proven through the exhaustive use of field records. Field conditions, collection and handling of samples, and information about each sample collected will be recorded on the standardized forms or in a field book. These forms/records along with chain of custody documentation and shipping manifests provides a permanent record of all significant activities completed during a sample collection event. Complete all forms with a waterproof pen to prevent smudging if the forms get wet in the field. Once complete, sign and date the bottom of each form, and keep a copy at the LCTF.

3.4.4 Sample Containers, Preservation, and Labels

Required sample containers, sample preservation methods, and maximum sample holding times are summarized in Appendix A.

3.4.5 Packaging and Shipping

Groundwater sample containers will be packed in coolers on ice for shipment.

3.4.6 Handling of Materials Generated During OM&M Activities

PPE and sampling refuse (e.g., paper towels, used tin foil, tape, etc.) generated during the sampling activities will be containerized in plastic garbage bags and will be temporarily stored at the LCTF pending final disposal in accordance with all applicable Federal and New York State Regulations.

All groundwater extracted during monitoring activities will be collected and discharged to an on-Site wet well or to the Love Canal Landfill drum barn trench drain for treatment at the LCTF.

3.4.7 Equipment Cleaning Protocols

All equipment used for the collection of samples for chemical analysis including water level measuring devices and meters will be cleaned as follows.

- Wash in phosphate-free detergent
- Potable water rinse
- Deionized water rinse
- Air dry

3.5 NAPL Presence Monitoring

The eight NAPL recovery wells (NR-1 through NR-5, NR-7, NR-8, and NR-10) will be checked for NAPL quarterly from April through October. If more than 3 gallons of NAPL (6 inches deep in a 12-inch diameter well) are present in a NAPL recovery well during monitoring, the NAPL will be removed for off-Site disposal in accordance with the procedure detailed in Section 4.2 and in accordance with all applicable Federal and New York State Regulations. This is the minimum depth of NAPL required to allow removal.

Monitoring for NAPL shall be reassessed annually to determine the suitability of the monitoring or until NAPL monitoring is no longer required. NAPL monitoring will no longer be required when the recharge rate for a well is less than 1 gallon/year.

NAPL presence monitoring results shall be recorded on forms or in a field book. Once complete, the bottom of each form will be signed and dated and a copy will be kept at the CRA Niagara Falls office.

3.6 Evaluation of Monitoring Results

Upon receipt of groundwater data, all analytical results will be evaluated by GSH/Olin to determine if the data are acceptable for use in the respective monitoring programs. All data deemed to be acceptable, including quality assurance/quality control (QA/QC) results, will be entered into a computer database by the field staff. A data report of groundwater monitoring will be sent to NYSDEC following QA validation within 30 days of receipt (upon request). GSH and Olin will designate the data as approved or not approved for evaluating the various RA systems at the Site based on the validation report. Under no circumstances will raw data be sent to NYSDEC/Environmental Protection Agency (EPA).

The computer database will provide the required listing and summary tables of analyses, including a separate listing of QA/QC results. The database will be used to determine the presence of Site-related chemicals in off-Site groundwater. As additional data are generated, graphic representations of concentrations versus time may be prepared to demonstrate changes in groundwater chemical concentrations over time.

Hydraulic data will be converted into groundwater elevations and entered into a computer database. The water level data will be listed in tabular form for each round of data collected.

The evaluation of the hydraulic and water quality data will be used to determine whether corrective contingency measures are required and when the system operations can be terminated.

Section 4.0 Operation of Site Remedial Systems

The following sections provide instructions for operating the Site remedial systems, including NAPL recovery and system controls and instrumentation.

4.1 APL Collection and Discharge System Operation

The APL collection and discharge system consists of an APL collection trench, four wet wells, and a forcemain system. The APL accumulates in the collection trench and is transported via gravity to the wet wells. Once the APL level in the wet well reaches the setpoint, the wet well pump activates, and the APL is pumped from the wet well into the forcemain. The forcemain exits the Site in the northwest corner and extends north under Buffalo Avenue and the LaSalle Expressway to the Love Canal. The forcemain discharges APL to the Love Canal South Collector Tank (LCSCT). Once the level in the LCSCT reaches a set level as determined by the facility coordinator, the pumps are manually turned on. The APL is then pumped to the LCTF for treatment and is ultimately discharged under permit to the City of Niagara Falls sanitary sewer system.

The individual APL pumps in the APL collection wet wells operate on level control. Power to individual APL pumps is turned off automatically when the level in the wet well falls to the low-level elevation of the probe. Power to the APL pump is restored automatically when the level in the wet well rises to the high-level elevation of the probe. APL levels within each wet well, the flow rate from each wet well, and the total flow to the LCTF will be monitored at the LCTF. The LCTF can remotely control the wet well operation. All four wet well pumps' setpoints can be adjusted at the LCTF.

Leak detection for the APL discharge forcemain is provided in the on-Site Meter Chamber and in each off-Site manhole. If a leak is detected in any of these manholes, all four APL pumps will stop pumping automatically, and a remote message will be sent to the LCTF. Pumps will be restarted manually after the problem has been identified and corrected.

When the pumps shut down due to a high level in the LCSCT, the control system will alarm the operator via the process computer.

Level instrumentation in the LCSCT will also shut down the four 102nd Street Wet Well pumps when the LCSCT capacity is reached. Pumps will restart automatically after the tank level decreases to a set elevation.

A hand/off/auto switch is located in each wet well control panel. Under normal operating conditions, the switch will be in the auto position. This will allow the pump to run under normal operating conditions. For testing operations, the switch will be in the hand position. This will allow the pump to bypass the controls and locally operate. The manual setting on the wet well control panel will/will not override the pump shutdown commands from the process computer or forcemain leak detection system. For maintenance operations, the switch will be in the off position. A light located on each wet well control panel will show when the pumps are on.

A troubleshooting chart is presented in Appendix B.

4.2 NAPL Recovery System Operation

Each of the NAPL recovery wells will be monitored quarterly for the presence of NAPL, April through October. NAPL found during the monitoring will be removed if a well contains at least 3 gallons of NAPL (approximately 6-inch depth of NAPL in the 12-inch diameter wells). Monitoring will be accomplished by lowering an APL/NAPL interface probe into the well. If the NAPL depth exceeds 6 inches, the NAPL will be manually pumped out. NAPL will be removed with a mechanical well jerking pump via dedicated polyethylene tubing with a foot-valve. NAPL will be discharged into a storage tank and shipped off Site for disposal in accordance with all applicable Federal and New York State Regulations.

To minimize the volume of APL extracted with the NAPL, personnel will watch the NAPL discharge and when APL is observed in the discharge line, the operator will manually turn the pump off.

In addition to the quarterly removal of NAPL from the recovery wells, an accelerated NAPL recovery program has been initiated. The Accelerated NAPL Recovery Program (ANRP), implemented in 2004, is based on the results of the "NAPL Extraction Program Work Plan for Accelerated Recovery" dated December 2003. The purpose of the ANRP is to place dedicated recovery equipment at a high NAPL producing well to continuously remove NAPL. This program involved the continuous removal of NAPL from NR-02 through the use of a low flow, automated pump installed in the NR-02 well with daily measurements, while the remaining NR wells were monitored quarterly and NAPL removed as necessary.

Quarterly NAPL presence and removal data in 2010 indicated that NAPL presence in the vicinity of NR-02 may be diminishing, either due to a decrease in NAPL in the area of NR-02 (indicating a successful implementation of the recovery program), or possibly a result of creating a "deNAPLed" (absence of NAPL) area around NR-02 due to the long term pumping at this location and a decreased recharge rate of the NAPL. Due to the reduction in NAPL removed

from NR-02, the frequency of monitoring at NR-02 was reduced from continuous to weekly. Historic amounts of NAPL removed from NR-03, along with quarterly NAPL measurements during 2010, indicated that there may be sufficient NAPL present at NR-03 such that additional NAPL removal would be beneficial. Monitoring and continuous removal of NAPL from NR-03 (in addition to weekly removal from NR 02) began in May 2010. A low NAPL recharge rate at NR-03 resulted in the pumping frequency at this NR well being reduced from continuous to twice weekly (NAPL checks and pumping as necessary), and subsequently from twice weekly to its current weekly frequency as approved by the NYSDEC. Subsequently, the high recharge rate in NR-02 resulted in an increase in NAPL check and pumping frequency from weekly to its current twice weekly frequency as approved by NYSDEC.

The components of the accelerated NAPL recovery procedure include a mechanical well jerking pump, dedicated polyethylene tubing with a foot-valve, and NAPL collection tank. The accelerated NAPL recovery procedure is to place the foot valve well below the NAPL level. The pump is set at a discharge rate to insure that the foot valve remains below the NAPL level to minimize the amount of groundwater collected by the pump. Once the NAPL has been removed (personnel observe APL presence in the discharge line), the pump is turned off and disconnected. The tubing and foot valve are left in the well. The ANRP is only conducted from April to October to prevent freezing of the extraction lines.

Every 5 years, the collected NAPL will be recharacterized to determine if there are any changes in the NAPL. The most recent recharacterization sample was submitted in 2010, and the next recharacterization sample is due in 2015.

Section 5.0 Site Maintenance and Inspections

Site maintenance requirements will include routine Site inspections, scheduled preventative maintenance, unscheduled maintenance in response to inspection reports or component failures, and record keeping for maintenance activities. All system inspection and maintenance activities are to be performed in accordance with the HASP. Separate work plans will be written, if necessary, for unique or complex unscheduled maintenance tasks.

5.1 Site Inspections

5.1.1 Inspection Schedule

An outline of the inspection and preventative maintenance schedule for the landfill cap, APL collection and discharge system, NAPL recovery system, slurry wall, and surface water flow controls is presented in Table 5.1. This schedule may be revised as more experience with the particular maintenance requirements of the Site systems is acquired.

Any required maintenance shall be performed, as identified by the annual inspections, as soon as it is feasible to do so. Lower priority maintenance activities may be delayed for longer periods of time. High priority items include:

- Pump failures
- Forcemain repairs
- Power failures
- Perimeter fence repairs
- Erosion exposing multiple layers of the cap

5.1.2 Annual Inspections

The Site shall be inspected on an annual basis in the spring of each year, as scheduled by NYSDEC. Annual inspections will ensure that the remedial system components are functioning effectively as designed. Particular attention shall be given to the following system components:

Landfill Cap

- Access roads
- Surface structures
- Vegetated soil cover
- Ditches and culverts
- Perimeter fencing
- General surface conditions

APL Collection and Discharge System

- Manholes
- Wet wells
- Forcemains
- Pumps

NAPL Recovery System

- NAPL wells
- Well chambers
- NAPL pump and generator

Groundwater Monitoring System

- Groundwater monitoring wells
- Pumps, generator, and air compressor

Surface Water Flow Controls

- Swales/ditches
- Erosion controls

Shallow Water Environment

- Vegetation
- Eastern outfall structure
- General condition of the shallow water environment

The inspections will include an overall Site inspection along all access roads and perimeter security fencing. In areas that are inaccessible by vehicle, inspections will be performed on foot.

The annual inspection of the groundwater collection and discharge system will include visual observation of the manholes and wet wells to ensure that they are secure. The surface of the landfill cap must be inspected to ensure that the integrity of the cap is being maintained. The surface of the cap shall be inspected for signs of damage due to loss of vegetation, settlement, and erosion. The shallow water environment along the Niagara River shall also be inspected for signs of damage due to loss of vegetation.

The annual inspection results will be recorded on a log. All original logs will be kept on file at the LCTF.

5.1.3 Daily Inspections

The Site shall be inspected on a daily basis for potential general operational issues. The Site operator will inspect the Site and containment system.

5.2 Maintenance

Maintenance is required when inspections reveal a need to maintain one of the systems or when system components malfunction. If inspections reveal that non-emergency maintenance or response is required, the work shall be completed as soon as it is feasible in order to

eliminate further damage and the need for emergency repairs. If a situation requires immediate action, emergency RAs shall be initiated immediately. All replacement equipment must be of equal or better quality than the original components and, when possible, should be the same make and model as the original (see Section 2.0). All replacement materials must meet or exceed the RA construction specifications. A summary of potential areas that will require maintenance and the appropriate corrective actions is summarized in Table 5.2.

Unique or complex maintenance activities, including maintenance of the slurry wall, APL collection trench material, soil and landfill materials beneath the geomembrane layer of the cap, well installation or abandonment, electrical or control system repair, and any other maintenance activity not specifically covered by this OM&M Manual, will require an activity specific work plan and a HASP. Activity specific work plans and HASPs will be copies of the RA procedures and RA HASP modified to address the specific activity. Typical maintenance activities not requiring an activity specific work plan include the following:

Landfill Cap

1. Fertilizing and restoring the Site vegetative cover and removing/cutting weeds or bushes
2. Repairing Site access roads
3. Repairing surficial erosion and sloughing along the perimeter slopes unless erosion has occurred below the geomembrane liner
4. Cutting vegetative cover
5. Quarterly trimming around wells for well access
6. Repairing damage caused by burrowing animals, presence of deep-rooted weeds, or other vegetation
7. Repairing or replacing fencing, signs, and locks
8. Cleaning ditches and culverts

APL Collection and Discharge System

1. Cleaning manholes/wet wells and the APL collection drain and discharge forcemain
2. Securing and repairing access covers

Shallow Water Environment

1. Restoring vegetation

5.2.1 Landfill Cap

The purpose of the landfill cap is to reduce infiltration of precipitation into the landfill, prevent erosion of landfill materials, and eliminate direct human contact with the landfill materials. The layers of the cap work together to achieve these goals; therefore, each layer is necessary for the landfill cap system to function effectively. When a situation that may require maintenance is detected with the cap, it must be corrected as soon as it is feasible to do so.

5.2.1.1 Vegetative Cover

Visual indications that the vegetative cover may require maintenance include bare areas, dead or dying vegetation, and growth of weeds or bushes. When inspection reveals bare areas or dead or dying vegetation, the following actions shall be performed as soon as it is feasible to correct the situation:

1. Check for cracks in the soil from which water or gas may be escaping (if identified, a subsurface investigation of the geomembrane liner is necessary – see Section 5.2.1.3)
2. Till the topsoil
3. Reseed and mulch
4. Cover slopes with temporary erosion control (jute) mat

The vegetative cover shall be cut annually (in the spring) to remove all bushes and tall weeds to prevent their roots from penetrating the cap and damaging the geonet and geomembrane liner.

5.2.1.2 Cover Fill and Topsoil Layers

Visual indications that the cover fill and topsoil layers may require maintenance include washout and erosion, settlement, and standing water.

If the cap has been damaged by erosion or if a washout has occurred, the following actions shall be performed to correct the situation:

1. Recover the washed out soil to the extent practical
2. Backfill with recovered soil and additional soil to the original cover fill layer design thickness
3. Place a 6-inch thick layer of topsoil over the cover fill layer
4. Check the final elevation to ensure adequate drainage
5. Seed/mulch and cover slopes with erosion control (jute) mat

Settlement and standing water can be corrected either by regrading or by placing additional topsoil in the low areas and then reseeding.

Animal holes or burrows shall be corrected by performing the following actions:

1. Capture and remove the animals
2. Carefully excavate the area around the burrow and inspect the geomembrane liner (if the liner requires repair, follow the steps discussed in Section 5.2.1.3)
3. Replace the cover fill and topsoil layers to the original design thickness
4. Seed/mulch and cover slopes with erosion control (jute) mat

5.2.1.3 Geomembrane Liner Layer

If the geomembrane liner is punctured, the following steps shall be taken to repair it:

1. Carefully excavate the soil above the liner (do not use a mechanical excavator or backhoe)
2. Cover the puncture with a 40-mil LLDPE geomembrane patch that extends a minimum of 6 inches beyond the edges of the puncture
3. Seal the patch in place by extrusion welding it to the liner
4. Vacuum test the seam to ensure a complete seal
5. Record the results of the test and location and size of the patch
6. Replace the cover fill and topsoil layers to the original design thickness
7. Seed/mulch and cover slopes with erosion control (jute) mat

5.2.1.4 Groundwater Seeps

Groundwater seeps may occur where the groundwater path to the APL collection trench is blocked or restricted. Seeps may also occur if the APL collection drain is blocked and the collection trench is flooded. A groundwater seep will appear as a groundwater discharge from the landfill slopes. Corrective actions for leachate seeps require excavation below the geomembrane liner and will require an activity specific work plan and HASP.

5.2.1.5 Access Roads

Visual indications that Site access roads may require maintenance include washed out surface soils, potholes, puddles, and obstructions.

If the road surface is washed out, the following actions shall be taken as soon as it is feasible to do so:

1. Recover washed out gravel to the extent practical
2. Use recovered gravel to backfill the eroded areas to the original grade
3. Use new gravel to supplement the recovered material as necessary

When a puddle or pothole is detected, the following actions shall be taken as soon as it is feasible to do so:

1. Backfill with new gravel to original grade

If an object obstructs the access road, the following actions shall be taken as soon as possible:

1. Remove the obstruction
2. Place the obstruction in a secure area pending off-Site disposal in accordance with all applicable Federal and New York State Regulations

5.2.2 APL Collection Drain and Discharge Forcemain

The purpose of the APL collection system is to eliminate groundwater flow from on-Site to off-Site areas, to reduce groundwater flow from the overburden to the bedrock beneath the Site, and to reduce the concentration of chemicals in on-Site groundwater. The purpose of the forcemain system is to provide conveyance of the collected APL to the LCTF. All of the APL collection and discharge system components work together to achieve these goals; therefore, each component is necessary for the system to function effectively. When a situation requiring maintenance is detected with the APL collection and discharge system, it shall be corrected as soon as feasible.

5.2.2.1 Wet Well Pumps

If a wet well pump stops responding to the pump controls, the following actions shall be taken as soon as it is feasible to do so:

1. Attempt to operate the pump in manual mode
2. If it does not respond, shut down the pumping system
3. Disconnect the pump and drain it into the wet well

4. Wrap the pump in plastic sheeting
5. Install spare pump
6. Restart the pumping system
7. Clean and repair the damaged pump according to the manufacturer's instructions and store it for future use

If the pump cannot be repaired, the pump shall be replaced with a new one.

If the pump restarts frequently, the pumping rate shall be reduced or the distance increased between the high and low level probes, if possible.

5.2.2.2 APL Collection Drain

A visual indication of improper functioning of the APL collection drain is an increase in water level in some parts of the APL collection system or a decrease in discharge flow. This indicates that the collection drain or discharge forcemain is blocked or groundwater flow is restricted. The following items must then be checked to determine the cause of the increase in water level or the decrease in discharge flow:

1. Ensure pumps are running (see Section 5.3.2.1)
2. Ensure valves are open
3. Determine if the collection drain or forcemain are blocked (see Section 5.3.2.3 if the forcemain is blocked)

If the collection drain is blocked, the following actions shall be taken as soon as possible:

1. Pressure flush the drain sections that are plugged
2. Vacuum sediments and debris from affected wet wells

Pressures in the range of 500 to 1,000 pounds per square inch (psi) should be used to avoid damaging the collection drain and/or bedding. The material removed from downstream wet wells and manholes will be disposed of at an approved off-Site location in accordance with all applicable regulations.

5.2.2.3 Forcemain

A visible indication of situations that may require maintenance of the forcemain is a decrease in discharge flow. This indicates that the forcemain may be blocked or leaking.

If the discharge forcemain is blocked, the following actions shall be taken as soon as possible:

1. Shut down and lockout/tagout the pumping system
2. Use the quick connects in the manholes immediately upstream and downstream of the blockage to reroute the water flow to the secondary forcemain
3. Ensure new forcemain connections are intact and restart the pumping system
4. Drain the affected forcemain section
5. Pressure flush the blocked section of the primary forcemain as soon as feasible
6. Vacuum sediments and debris from the affected manholes

If the discharge forcemain is leaking, the following actions shall be taken as soon as possible:

1. Shut down and lockout/tagout the pumping system
2. Use the quick connects in the manholes immediately upstream and downstream of the leak to reroute the water flow to the secondary forcemain
3. Ensure new forcemain connections are intact and restart the pumping system
4. Drain the section of forcemain that is leaking
5. If the forcemain leak is on Site, excavate the forcemain at the leak
6. If the forcemain leak is off Site and where possible, pull the damaged forcemain out through the containment pipe from the nearest manhole
7. Reconstruct the primary forcemain to the original construction specifications
8. If leak is on Site, reconstruct the excavated cap to the original lines and grades

5.2.2.4 Manholes and Wet Wells

Visual indications that manholes and wet wells may require maintenance include cracks that allow groundwater to infiltrate, damaged or missing covers, and loose ladder rungs or safety platforms.

If significant groundwater is leaking through cracks on the inside of a manhole or wet well, the cracks shall be patched with cement mortar. While groundwater entry into the manhole or wet well is not an environmental concern, it does pose a health and safety concern if personnel need to enter the manhole/wet well to perform maintenance activities. If a cover is damaged or missing, it shall be replaced. If a ladder rung or safety platform is loose, cement mortar shall be used to reaffix the loose rung or safety platform supports to the inside of the manhole or wet well.

5.2.3 Shallow Water Environment

Visual indications that the shallow water environment vegetation may require maintenance include the presence of dead or dying vegetation and growth of invasive plant species. When inspection reveals dead or dying vegetation or the presence of invasive plant species, the following actions shall be performed as soon as it is feasible to correct the situation:

1. Inspect shallow water environment to determine if cause of dead or dying vegetation is evident
2. Remove all dead or invasive plant species by hand
3. Replant with wild celery

5.2.4 NAPL Recovery System

The purpose of the NAPL recovery system is to reduce the volume of NAPL beneath the Site. When a situation requiring maintenance is detected with the NAPL recovery system, it shall be corrected as soon as it is feasible to do so.

5.2.4.1 Accelerated NAPL Recovery

If the NAPL is not being removed by the mechanical well jerking pump with dedicated polyethylene tubing with a foot-valve, the following actions shall be taken as soon as feasible:

1. Make sure the tubing is correctly connected to the pump
2. Remove and inspect tubing and foot valve and replace as necessary

5.2.5 Groundwater Monitoring System

The purpose of the groundwater monitoring system is to monitor the groundwater quality outside the slurry wall. When a situation requiring maintenance is detected with the groundwater monitoring system, it shall be corrected as soon as it is feasible to do so. The groundwater monitoring is currently conducted using a peristaltic pump. No Site maintenance is required for the peristaltic pump. However, it may be necessary to replace the dedicated tubing periodically.

5.2.6 Other Site RA Systems

Other Site systems include perimeter fences, signage, and drainage ditches. When a situation requiring maintenance is detected with these systems, it shall be corrected as soon as feasible.

5.2.6.1 Perimeter Fence and Signs

Visual indications that the perimeter fence and signs may require maintenance include broken locks or gates, gaps in the fence, and missing or damaged signs.

If locks or gates are missing or damaged, they shall be replaced as soon as possible. If there are gaps in the fence, the damaged sections shall be repaired or replaced. If warning signs are damaged or missing, they shall be replaced.

5.2.6.2 Drainage Ditches and Swale Outlets

Visual indications that the Site drainage ditches may require maintenance include bare areas, dead or dying vegetation, ponding of water, and accumulation of obstructions or debris. When inspections reveal bare areas or dead or dying vegetation, an attempt will be made to determine the cause. If a cause is identified, the situation shall be corrected and the following actions shall be performed:

1. Till the topsoil
2. Reseed and mulch
3. Cover drainage ditch with erosion control (jute) mat

When ponding occurs, the following actions shall be performed to correct the situation:

1. Regrade the ditch or add topsoil
2. Reseed and mulch
3. Cover drainage ditch with erosion control (jute) mat

Any obstructions or debris accumulated in the drainage ditches shall be removed.

5.3 Disposal of Used Material and Waste

Material and waste containing Site-related chemicals shall be containerized and each container clearly labeled. The containers shall be shipped to a licensed off-Site disposal facility in accordance with all applicable Federal and New York State Regulations.

5.4 Maintenance Records

A record of all maintenance performed at the Site will be kept at the LCTF. The records will include a description of the work performed, who it was performed by, and comments that may arise.

The appropriate box on Form 1 (Appendix C) shall be checked when required maintenance activities are complete.

Section 6.0 Records and Reports

All field notes, field books, and completed standard forms will be stored at the LCTF. A copy of all chains of custody, shipping manifests for analytical samples, and analytical results will also be stored at the LCTF.

In accordance with Section X, Paragraph 35 of the Consent Decree entered October 1, 1999, OCC/Olin are required to submit "…an annual report for the Site, outlining the activities performed at the Site, including Site monitoring. The report shall describe the overall effectiveness of the RA in achieving RA objectives, including the operation of the leachate collection system and the maintenance of gradients." The annual report shall include a list of all monitoring events and the results of all water-level monitoring (including any changes in pumping-level controls to maintain inward ingredients across the slurry wall), all groundwater quality monitoring data, NAPL-presence monitoring data, and the findings from the shallow-water environment monitoring. The annual OM&M Report will be entitled "Site Management Periodic Review Report." The report will contain the completed Operations and Maintenance Report Form (see Appendix C), a list of monitoring events, a summary of RA system operation parameters, a description of inspections and maintenance performed during the previous year, and institutional and engineering controls certification. OCC and Olin shall submit these annual OM&M reports to EPA/NYSDEC by July 1 of every year.

In addition to the annual report, OCC/Olin shall submit copies of the groundwater quality monitoring data following each sampling round to USEPA/NYSDEC within 2 weeks of the completion of the QA/QC Officer's report as set forth in Appendix A hereto.

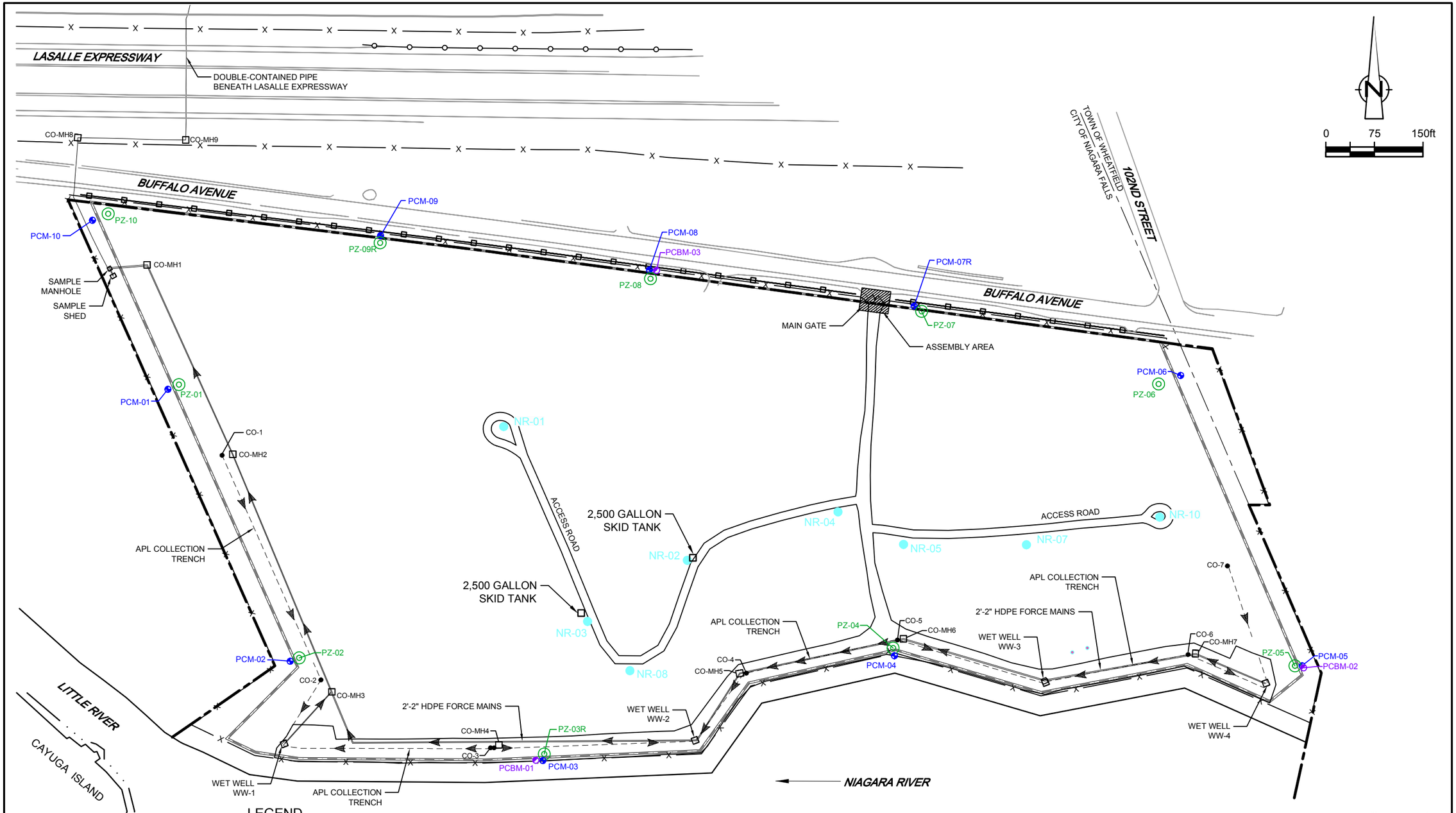

figure 1

SITE LAYOUT
OPERATION, MAINTENANCE AND MONITORING MANUAL
102ND STREET LANDFILL SITE
GLENN SPRINGS HOLDINGS, INC.
Niagara Falls, New York

TABLE 1.1

SITE CONTACT LIST
OPERATION, MAINTENANCE, AND MONITORING MANUAL
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

Site Operations:

Conestoga-Rovers & Associates (for GSH)

John Pentilchuk	Conestoga-Rovers and Associates	
- Project Manager	651 Colby Drive	
	Waterloo, Ontario, Canada N2V 1C2	
	Phone:	519-884-0510
	Cell:	519-572-5644
Dennis Hoyt	Conestoga-Rovers & Associates	
- Project Coordinator	2055 Niagara Falls Blvd., Suite 3	
	Niagara Falls, New York 14304	
	Phone:	716-297-6150
	Cell:	716-345-1978
Darrell Crocket	Conestoga-Rovers & Associates	
- Site Operator	805 - 97th Street	
	Niagara Falls, New York 14304	
	Phone:	716-297-6150
	Cell:	716-998-5804

Project Managers:

Glenn Springs Holdings, Inc. (for OCC)

Joseph Branch	Glenn Springs Holdings, Inc.	
- Western New York	7601 Old Channel Trail	
Operations Manager	Montague, MI 49437	
	Cell:	231-670-6809
	Fax:	231-894-4033
Clinton Babcock	Glenn Springs Holdings, Inc.	
- Western New York	5005 LBJ Freeway	
Operations Coordinator	Suite 1350	
	Dallas, TX 75244-6119	
	Phone:	972-687-7506
	Cell:	859-421-4233
	Fax:	972-687-7524

Olin Corporation

Curt Richards	Olin Corporation	
	3855 North Ocoee Street, Suite 200	
	Cleveland, TN 37312	
	Phone:	423-336-4007
	Fax:	423-336-4166

TABLE 1.1

SITE CONTACT LIST
OPERATION, MAINTENANCE, AND MONITORING MANUAL
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

Agency Contacts:

United States Environmental Protection Agency

Jennifer LaPoma
WNY Remediation Section, Region II
U.S. Environmental Protection Agency
290 Broadway, 20th Floor
New York, New York 10007-1866
Phone: 212-637-4280
Fax: 212-637-4284

New York State Department of Environmental Conservation

Brian Sadowski
New York State Dept. of Environmental Conservation
Division of Hazardous Waste Remediation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999
Phone: 716-851-7220
Fax: 716-851-7226

Gregory Sutton
New York State Dept. of Environmental Conservation
Division of Hazardous Waste Remediation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999
Phone: 716-851-7220
Fax: 716-851-7226

Stanley Radon
New York State Dept. of Environmental Conservation
Division of Hazardous Waste Remediation
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999
Phone: 716-851-7220
Fax: 716-851-7226

TABLE 3.1

SITE-SPECIFIC PARAMETERS - GROUNDWATER
OPERATION, MAINTENANCE AND MONITORING MANUAL
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

Parameter	*Estimated Quantification Level (µg/L)*	*Analytical Method Reference* [(1)]
Benzene	5	SW-846 8260
Chlorobenzene	5	SW-846 8260
2-Chlorotoluene	5	SW-846 8260
1,2-Dichlorobenzene	10	SW-846 8260
1,4-Dichlorobenzene	10	SW-846 8260
1,2,3-Trichlorobenzene	10	SW-846 8260
1,2,4-Trichlorobenzene	10	SW-846 8260
1,2,4,5-Tetrachlorobenzene	10	SW-846 8270
Phenol	10	SW-846 8270
2-Chlorophenol	10	SW-846 8270
4-Chlorophenol	10	SW-846 8270
2,4-Dichlorophenol	10	SW-846 8270
2,5-Dichlorophenol	10	SW-846 8270
2,4,5-Trichlorophenol	50	SW-846 8270
alpha-Hexachlorocyclohexane	10	SW-846 8082
beta-Hexachlorocyclohexane	10	SW-846 8082
gamma-Hexachlorocyclohexane	10	SW-846 8082
delta-Hexachlorocyclohexane	10	SW-846 8082
Mercury	0.10	SW-846 7470
Arsenic	50	SW-846 6010

Notes:

(1) Referenced from "Test Methods for Evaluating Solid Waste" USEPA Office of Solid Waste (SW-846), 3rd Edition, 1986 and subsequent revisions

USEPA United States Environmental Protection Agency

TABLE 5.1

ANNUAL INSPECTION AND PREVENTATIVE MAINTENANCE
OPERATION, MAINTENANCE AND MONITORING MANUAL
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

Item	*Inspect For*
1. **APL Collection and Discharge System**	
Manholes/Wet Wells	- cover on securely - condition of cover - condition of inside of manhole/wet well - condition of safety platform - flow unrestricted, manhole/wet well free of obstructions
2. **Landfill Cap**	
Vegetation and Topsoil	- erosion, bare areas, washouts, leachate seeps, dead/dying vegetation
Access Roads	- erosion, obstructions, potholes, puddles, debris
Perimeter Fence	- integrity of fence, gates, locks, placement and condition of signs
Drainage Ditches	- sediment build-up, erosion, condition of erosion protection, obstructions, dead/dying vegetation
3. **Shallow Water Environment (Embayment)**	
Vegetation	- dead or dying vegetation
City of Niagara Falls Outfall immediately east of Site	- debris accumulated in front of outfall

TABLE 5.2

POTENTIAL SITUATIONS THAT REQUIRE MAINTENANCE AND APPROPRIATE CORRECTIVE ACTIONS
OPERATION, MAINTENANCE AND MONITORING MANUAL
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

RA System Components	*Situations That Require Maintenance*	*Appropriate Corrective Actions*
APL Collection and Discharge System		
APL Collection Drain/Forcemain	Inward gradient not maintained in some areas around perimeter.	Check pump operation. Increase pump rate in nearest wet well. Decrease pump rate in other wet wells if necessary.
	Blockage in pipe restricting groundwater flow. Water level may not be maintained at desired elevations.	Pressure flush pipe sections that are plugged. Vacuum sediments and debris from manholes and wet wells.
	Decrease in discharge rate. Leak detected in off-Site manhole. Leaking forcemain.	Shut down pumping system. Use quick connects to reroute flow to secondary forcemain. Drain leaking pipe. If on Site, excavate forcemain and repair or replace. If off Site and when possible, pull the damaged forcemain out through the containment pipe from the nearest manhole and replace.
Slurry Wall	Leakage through slurry wall. Excessive flow in collection pipe.	Corrective action for slurry wall repair requires an activity specific work plan and health and safety plan.
Landfill Cap		
Cover Soils and Vegetation	Washout and erosion of vegetation, topsoil, or cover fill. Typically on steep slopes.	Take immediate action to prevent further erosion and to protect exposed geomembrane liner. Recover washed out soil. This material may be used to restore the eroded area. Backfill with additional soil to original cap design thickness. Re-seed. If seeding slopes, cover with erosion control (jute) mat.
	Bare areas. Dead/dying vegetation (potential for erosion).	Loosen and till topsoil. Re-seed and mulch as necessary. Cover with erosion control (jute) mat.
	Settlement of original cover. Standing water. Dry bare areas.	Assess size of settlement and potential impact to drainage or low permeability layers. Till topsoil and grade. Add additional topsoil if necessary. Check final elevation to ensure adequate drainage. Re-seed and mulch. Regrading of topsoil should be sufficient to correct minor ponding. Additional soil may be required for significant ponding. If seeding slopes, cover with erosion control (jute) mat.
	Weeds/bushes. Deterioration of desired vegetation. Potential penetration through cover if left unattended.	Remove all bushes and tall weeds. Re-seed as required. Cut vegetation annually (in spring) as a minimum.
	Animal holes/burrows. Safety hazard. Potential for soil cover erosion.	Capture and remove rodents. Excavate area carefully and inspect geomembrane liner. Seal any holes in liner. Replace soil as required. Seed and mulch. If seeding slopes, cover with erosion control (jute) mat.
Side Slopes	Leachate seeps.	Corrective action for leachate seeps requires an activity specific work plan and health and safety plan.
Access Roads	Washouts.	Recover washed out gravel. Use this material to restore the eroded area. Backfill to original grade.
	Potholes or puddles (potential safety hazard).	Backfill to original grade.
	Obstructions (safety hazard).	Remove obstruction. Place in secure area pending off-Site disposal.
NAPL Recovery System		
Pump and Control Box	Electric submersible pump not operating.	Check all electrical and control connections. Replace pump and/or control box with spare. Clean and repair damaged pump and/or control box.
Other Site Systems		
Gates and Locks	Vandalism. Site security.	Replace and secure locks as necessary. Ensure locks are operational.
Perimeter Fence	Forced entry or seasonal damage.	Repair or replace as needed.
Signs	Tampering or theft.	Repair or replace signs.

TABLE 5.2

POTENTIAL SITUATIONS THAT REQUIRE MAINTENANCE AND APPROPRIATE CORRECTIVE ACTIONS
OPERATION, MAINTENANCE AND MONITORING MANUAL
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

RA System Components	*Situations That Require Maintenance*	*Appropriate Corrective Actions*
Drainage Ditches	Sod drying out. Obstructions or debris.	Irrigate dry areas. Remove obstructions or debris which may affect flow.
	Sediment in ditch or swale. Smothering and killing of sod and interruption of normal surface water flow pattern.	Remove sediment and stockpile as topsoil for future repairs. Replace sod or re-seed and mulch if damaged.
Public Walkway	Potholes or puddles (potential safety hazard).	Backfill to original grade with asphalt patch.
	Obstructions (safety hazard).	Remove obstruction. Place in secure area pending off-Site disposal.
Other Unforeseen Problems		Record problem on Inspection Log. Notify GSH Project Manager for appropriate action.

Appendix A

Quality Assurance Project Plan for OM&M Activities

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Section 2.0 Monitoring Parameters 1

Section 3.0 QA Parameters 1

3.1 Field Blanks 1
3.2 Trip Blanks 1
3.3 Field Duplicates 1
3.4 Matrix Spikes and Matrix Spike Duplicates 2
3.5 Field Splits 2

Section 4.0 Chain-of-Custody Records 2

List of Tables
(Following Text)

Table A.1 Site-Specific Parameters - Groundwater

List of Attachments

Attachment A1 Sample Chain-of-Custody Forms

Section 1.0 Introduction

This appendix describes the Quality Assurance Project Plan (QAPP) for groundwater sampling and analyses during Operation, Monitoring, and Maintenance (OM&M) activities at the 102nd Street Landfill Site.

Section 2.0 Monitoring Parameters

The monitoring parameters for groundwater samples are listed in Table A.1. Parameter survey levels, analytical methods, sample preservation requirements, holding times, and sample bottle types are presented in Table A.1.

Section 3.0 QA Parameters

3.1 Field Blanks

Aqueous field blanks will be prepared in the field by pouring deionized water through the sample collection equipment (i.e., bladder pump) into appropriate sample bottles. The sample analyses performed on the field blank will be the same as the analyses performed on groundwater samples. Field blanks will be shipped to the analytical laboratory with the groundwater samples. They will be labeled as field blanks; they will not be submitted "blind". Field blanks will be collected at a rate of one blank for every 20 groundwater samples collected, which equates to one per sampling round.

3.2 Trip Blanks

Trip blanks (provided by the analytical laboratory in sealed containers) are shipped to the laboratory with the groundwater samples. One set of trip blanks will be shipped with each sample shipment and will be stored and shipped in the same cooler as the volatile organic compound (VOC) samples.

3.3 Field Duplicates

Field duplicate samples will be collected by filling two sets of sample bottles at a well instead of one. The sample bottles will be filled in the order listed as follows all VOC bottles first, including field duplicates, followed by all semi-volatile organic compound or pesticide bottles, followed by metals. Field duplicates will be stored and shipped with the other samples. The duplicates will be submitted to the analytical laboratory "blind". Sample personnel will create a

non-existent well name for the sample and will not use the same sampling time as any of the other samples collected. Sampling personnel will record on the sample collection sheet the sample identification of the duplicate and the sample identification of the groundwater sample it duplicates. Field duplicates will be collected at a rate of one duplicate for every 20 groundwater samples collected, which equates to one per sampling round.

3.4 Matrix Spikes and Matrix Spike Duplicates

Matrix spike and matrix spike duplicate (MS/MSD) samples will be collected by filling three sets of sample bottles at a well instead of one. The sample bottles will be filled in the order listed in FP-5 – Appendix B (i.e., all VOC bottles first, including field duplicates, followed by all SVOC bottles, followed by all pesticide bottles, followed by metals). MS/MSD samples will be stored and shipped with the other samples. The MS/MSD samples will be labeled as MS/MSD samples; they will not be submitted "blind". MS/MSD samples will be collected at a rate of one MS/MSD for every 20 groundwater samples collected, which equates to one per sampling round.

3.5 Field Splits

Any additional duplicate (split) samples requested by the Environmental Protection Agency (EPA) will be collected and submitted to EPA for analysis.

Section 4.0 Chain-of-Custody Records

Chain-of-custody records will be used. The sampler will complete and sign the chain-of-custody prior to shipping, retain the sampler's copies, place the remaining copies in a sealable plastic bag, place the bag in the cooler on top of the packed samples, and seal the cooler. A sample chain-of-custody is shown in Attachment 1.

Table A.1

Site-Specific Paramters, Groundwater
O&M Manual - QA/QC Requirements
102ND Street Landfill, Niagara Falls, New York

Parameter	*Survey Level (µg/L)*	*Analytical Method Reference*	*Sample Preservation*	*Maximum Holding Time*	*Container*
Benzene	5	SW-846 8260	Cool, 4°C, HCl to pH<2	14 days	40 ml Glass VOA Vials
Chlorobenzene	5	SW-846 8260	Cool, 4°C, HCl to pH<2	14 days	40 ml Glass VOA Vials
2-Chlorotoluene	5	SW-846 8260	Cool, 4°C, HCl to pH<2	14 days	40 ml Glass VOA Vials
1,2-Dichlorobenzene	10	SW-846 8260	Cool, 4°C, HCl to pH<2	14 days	40 ml Glass VOA Vials
1,4-Dichlorobenzene	10	SW-846 8260	Cool, 4°C, HCl to pH<2	14 days	40 ml Glass VOA Vials
1,2,3-Trichlorobenzene	10	SW-846 8260	Cool, 4°C, HCl to pH<2	14 days	40 ml Glass VOA Vials
1,2,4-Trichlorobenzene	10	SW-846 8260	Cool, 4°C, HCl to pH<2	14 days	40 ml Glass VOA Vials
1,2,4,5-Tetrachlorobenzene	10	SW-846 8270	Cool, 4°C	*	1 Liter Glass
Phenol	10	SW-846 8270	Cool, 4°C	*	1 Liter Glass
2-Chlorophenol	10	SW-846 8270	Cool, 4°C	*	1 Liter Glass
4-Chlorophenol	10	SW-846 8270	Cool, 4°C	*	1 Liter Glass
2,4-Dichlorophenol	10	SW-846 8270	Cool, 4°C	*	1 Liter Glass
2,5-Dichlorophenol	10	SW-846 8270	Cool, 4°C	*	1 Liter Glass
2,4,5-Trichlorophenol	50	SW-846 8270	Cool, 4°C	*	1 Liter Glass
alpha-Hexachlorocyclohexane	10	SW-846 8082	Cool, 4°C	*	1 Liter Glass
beta-Hexachlorocyclohexane	10	SW-846 8082	Cool, 4°C	*	1 Liter Glass
gamma-Hexachlorocyclohexane	10	SW-846 8082	Cool, 4°C	*	1 Liter Glass
delta-Hexachlorocyclohexane	10	SW-846 8082	Cool, 4°C	*	1 Liter Glass
Mercury	0.10	SW-846 7470	HNO_3 to pH of 2	28 days	500 ml HDPE
Arsenic	50	SW-846 6010	HNO_3 to pH of 2	180 days	500 ml HDPE

Notes:

* 7 days from collection to extraction; 40 days from extraction to analysis.
HDPE High Density Polyethylene.

Attachment A1

Sample Chain-of-Custody Form

CHAIN OF CUSTODY RECORD

CONESTOGA-ROVERS & ASSOCIATES	SHIPPED TO (Laboratory Name):	REFERENCE NUMBER:

SAMPLER'S SIGNATURE: ______________ PRINTED NAME: ______________

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. of Containers	PARAMETERS									REMARKS
TOTAL NUMBER OF CONTAINERS						HEALTH/CHEMICAL HAZARDS									

RELINQUISHED BY: ① ______________	DATE: TIME:	RECEIVED BY: ① ______________	DATE: TIME:
RELINQUISHED BY: ② ______________	DATE: TIME:	RECEIVED BY: ② ______________	DATE: TIME:
RELINQUISHED BY: ③ ______________	DATE: TIME:	RECEIVED BY: ③ ______________	DATE: TIME:

METHOD OF SHIPMENT: WAY BILL No.

White —Fully Executed Copy Yellow —Receiving Laboratory Copy Pink —Shipper Copy Goldenrod —Sampler Copy	SAMPLE TEAM: ______________ ______________	RECEIVED FOR LABORATORY BY: ______________ DATE: ________ TIME: ________

Nº CRA 23039

1001 (D) APR 28/97(NF) REV. 0 (F-15)

Appendix B

APL Discharge System Troubleshooting Chart

APL DISCHARGE SYSTEM

TROUBLESHOOTING CHART

PROBLEM

Leak detection alarm indicates a leak at one of the following chambers:

LDMH 8
LDMH 9
Metering Manhole
Love Canal Manhole

Automatic Response

Computer system shuts down all four Wet Well pumps and alerts operators at Love Canal of the type and location of the problem.

Operator Response

Check chamber where leak detection occurred. Rectify problem. Manually restart pumps.

PROBLEM

One pump shuts down and will not restart.

Automatic Response

Computer system alerts operators at Love Canal. Remaining pumps will keep operating. Due to the hydraulic connectivity between Wet Wells water levels will be maintained.

Operator Response

Check system electronics including level controls. Determine problem. Replace damaged components.

Appendix C

Annual Report Forms

ANNUAL OPERATION AND MAINTENANCE REPORT

102ND STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

YEAR: _____

MONITORING - Water Level Measurements

Month	*Day*	*Inspector*	*PCM-01*	*PZ-01*	*PCM-02*	*PZ-02*	*PCM-03*	*PZ-03R*
1st Qtr.								
2nd Qtr.								
3rd Qtr.								
4th Qtr.								

Month	*Day*	*Inspector*	*PCM-04*	*PZ-04*	*PCM-05*	*PZ-05*	*PCM-06*	*PZ-06*
1st Qtr.								
2nd Qtr.								
3rd Qtr.								
4th Qtr.								

Month	*Day*	*Inspector*	*PCM-07R*	*PZ-07*	*PCM-08*	*PZ-08*	*PCM-09*	*PZ-09R*
1st Qtr.								
2nd Qtr.								
3rd Qtr.								
4th Qtr.								

Month	*Day*	*Inspector*	*PCM-10*	*PZ-10*
1st Qtr.				
2nd Qtr.				
3rd Qtr.				
4th Qtr.				

FORM 1

ANNUAL OPERATION AND MAINTENANCE REPORT

102ND STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

YEAR: _____

GROUNDWATER - Quality Monitoring

Quarter	*Date Sample Taken*	*Inspector*	*Comments*
1st			
2nd			
3rd			
4th			

Results of analyses are attached.

NAPL PRESENCE - Monitoring

	Date	*Inspector*	*NR-01*		*NR-02*		*NR-03*	
			Depth of NAPL (ft)	*Gallons Removed*	*Depth of NAPL (ft)*	*Gallons Removed*	*Depth of NAPL (ft)*	*Gallons Removed*
1st Quarter								
2nd Quarter								
3rd Quarter								
4th Quarter								

	Date	*Inspector*	*NR-04*		*NR-05*		*NR-07*	
			Depth of NAPL (ft)	*Gallons Removed*	*Depth of NAPL (ft)*	*Gallons Removed*	*Depth of NAPL (ft)*	*Gallons Removed*
1st Quarter								
2nd Quarter								
3rd Quarter								
4th Quarter								

	Date	*Inspector*	*NR-08*		*NR-10*	
			Depth of NAPL (ft)	*Gallons Removed*	*Depth of NAPL (ft)*	*Gallons Removed*
1st Quarter						
2nd Quarter						
3rd Quarter						
4th Quarter						

FORM 1

ANNUAL OPERATION AND MAINTENANCE REPORT

102ND STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

YEAR: _____

OPERATION

APL COLLECTION AND DISCHARGE SYSTEM

APL Flow for Previous Year (gallons)	*APL Flow for Current Year (gallons)*

NAPL REMOVAL SYSTEM

	NAPL Removed for Previous Year (gallons)	*NAPL Removed for Current Year (gallons)*
NR-01		
NR-02		
NR-03		
NR-04		
NR-05		
NR-07		
NR-08		
NR-10		
Total		

Where was NAPL treated/disposed?

Facility _____ Date _____
Facility _____ Date _____
Facility _____ Date _____
Facility _____ Date _____
Facility _____ Date _____
Facility _____ Date _____

FORM 1

ANNUAL OPERATION AND MAINTENANCE REPORT

102ND STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

YEAR: _____

INSPECTION AND MAINTENANCE

Scheduled inspections performed:

	Date	***Inspectors***
DEC Inspection	_____	
Well Inspection	_____	

Was maintenance required?

Yes	***No***
☐	☐

What maintenance was required? Date Performed

_____
_____
_____
_____

Describe any maintenance activity that required an activity specific work plan and health and safety plan.

Form Completed By:

_____ _____ _____
NAME SIGNATURE DATE

FORM 1

ANNUAL OPERATION AND MAINTENANCE REPORT

102ND STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

YEAR: _____

Send completed copies of this form to the following for review:

Mr. Joseph Branch
Glenn Springs Holdings, Inc.
7601 Old Channel Trail
Montague, MI 49437

and

Mr. Curt Richards
Olin Corporation
3855 North Ocoee Street, Suite 200
Cleveland, TN 37312

After review is complete, send 5 copies to the following:

Chief-New York Remedial Branch
Emergency and Remedial Response Davison
U.S. Environmental Protection Agency - Region II
290 Broadway, 20th Floor
New York, NY 10007-1866
Attn: 102nd Street Landfill Superfund Site Manager

and

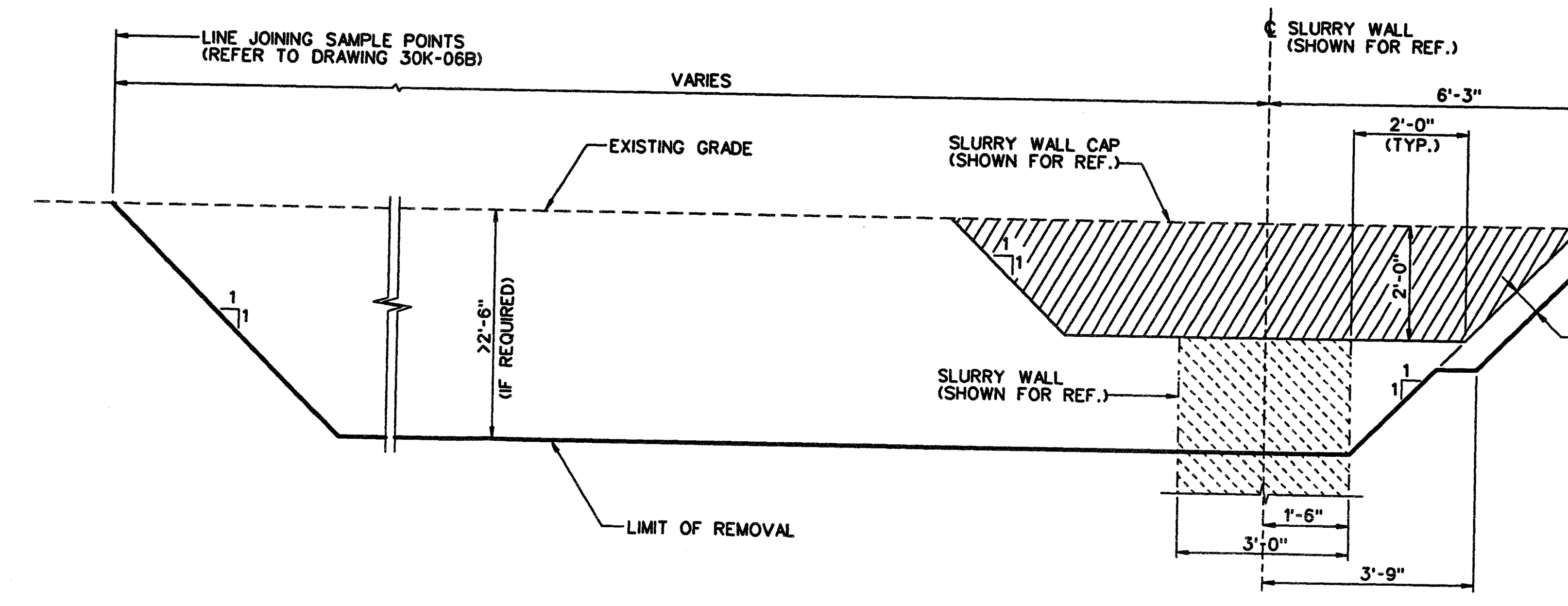
Mr. Brian Sadowski
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

and

Mr. Gregory P. Sutton
Regional Remediation Engineer
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

FORM 1

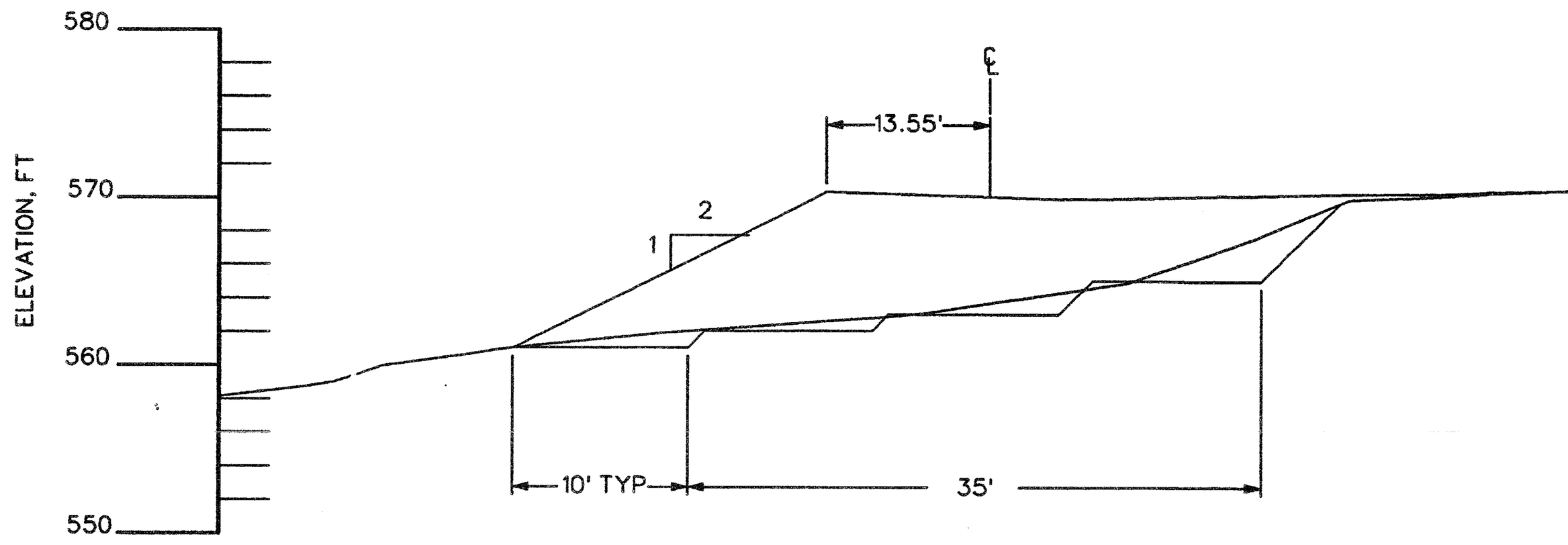
Reference Plans



TYPICAL PERIMETER SOILS SECTION

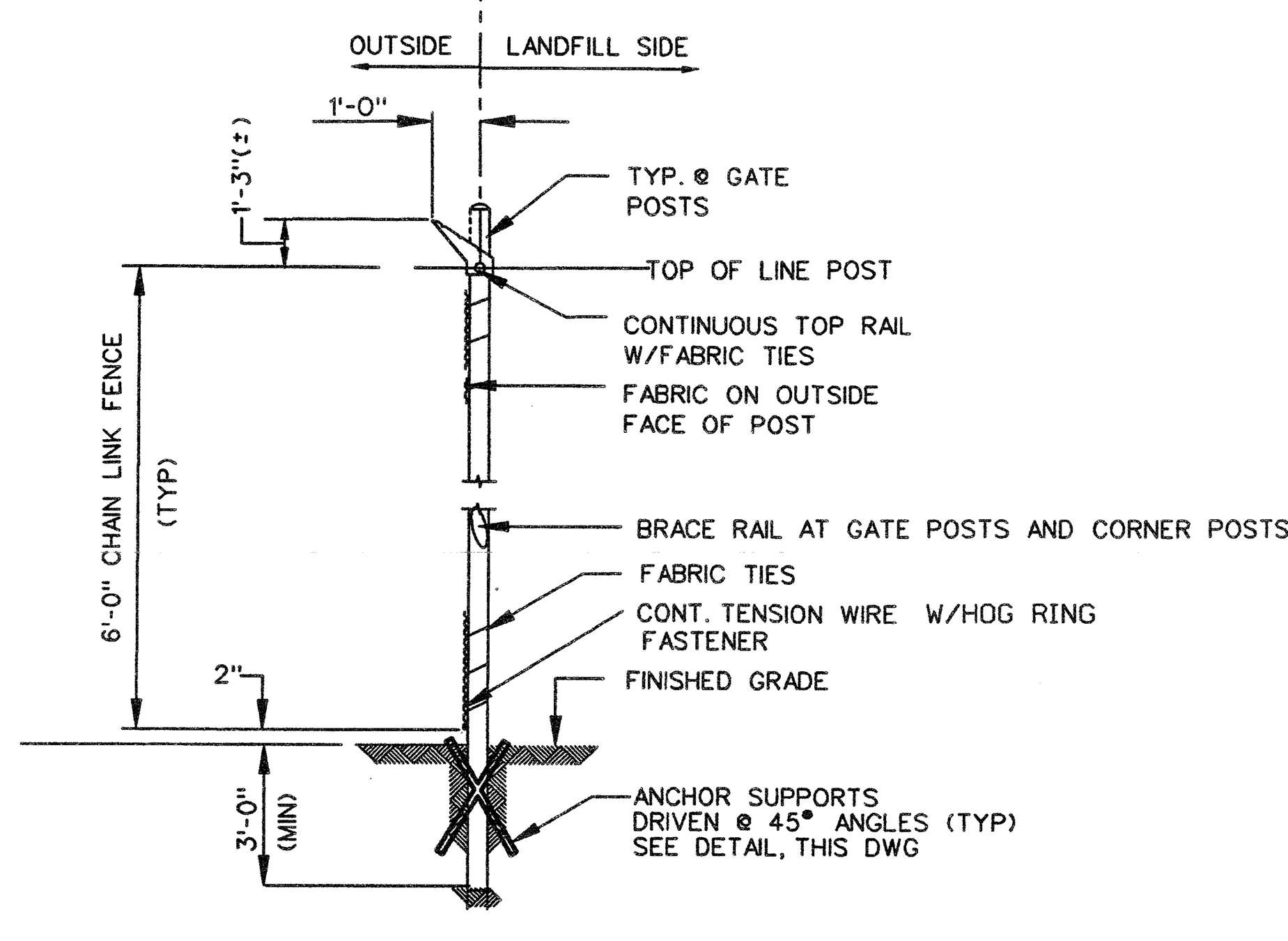
SCALE: 1"=2'

REFER TO DWG. 30K-06B FOR GRID COORDINATES AND DEPTHS



TYPICAL BULKHEAD CONSTRUCTION BENCH SECTION

NTS

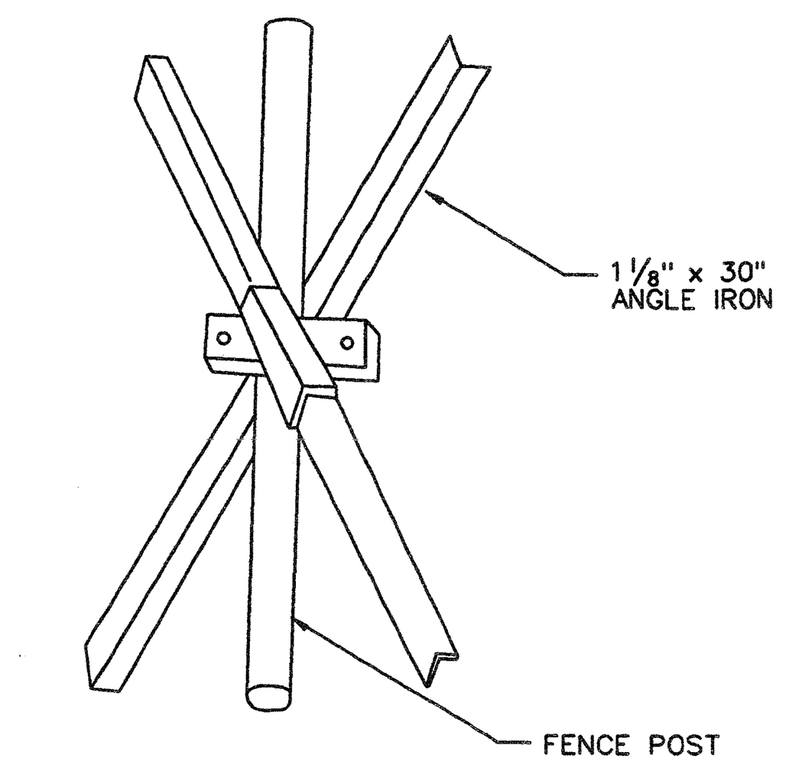


TYPICAL FENCE POST DETAIL

NTS

FENCING NOTES:

1. FOR LOCATION OF FENCING, SEE DWGS. 594000-30K-02 THROUGH 30K-05.
2. ALL FENCING MATERIAL SHALL BE AS SPECIFIED IN SPECIFICATION SECTION 02834.
3. DOUBLE SLIDE GATE FRAMES SHALL BE 1-1/2 INCH SCHEDULE 40 HOT DIP GALVANIZED STEEL PIPE WITH 1-1/2 INCH SCHEDULE 40 INTERMEDIATE POSTS AND 3/8 INCH DIA. POST RODS.
4. ALL HARDWARE SHALL BE MANUFACTURER'S STANDARD HARDWARE.
5. ALL CORNER, END AND GATE POSTS SHALL BE SET IN CONCRETE. OTHER POSTS SHALL BE ANCHORED AS PER FENCE ANCHOR DETAIL THIS DWG.
6. REFER TO DWGS. 30K-02 THROUGH -05 FOR FENCE LOCATIONS.



FENCE ANCHOR DETAIL

NTS

PERMANENT SEEDING MIXTURE AND NOTES

MIXTURE	"INSIDE SLURRY WALL" LB/ACRE
WHITE CLOVER	5
"LANCER" PERENIAL PEA	20
ANNUAL RYEGRASS	30
TIMOTHY	30
ORCHARD GRASS	10
SMOOTH BROMEGRASS	10
REDTOP	5
TOTAL	110

"PERIMETER AREAS"	LB/ACRE
TRIPLE CROWN PERENIAL RYE	48.12
KENTUCKY BLUE GRASS	24.68
CREEPING RED FESCUE	24.24

NOTES

1. USE ONE (1) 55 LB BAG OF SEED, THREE (3) 66.3 LB BAGS OF FERTILIZER, THIRTEEN (13) 50 LB BAGS OF MULCH, AND ½ BAG OF INNOCULAR. 1500 GALLONS OF WATER NEEDED.
2. PERIMETER AREAS INCLUDE GRIFFON PARK AND ANCZOK EASEMENT AREA.
3. SITE PREPARATION
   A. INSTALL NEEDED WATER AND EROSION CONTROL MEASURES AND BRING AREA TO BE SEEDED TO DESIRED GRADES.
   B. TOPSOIL TO BE A MINIMUM OF 6" THICK. TOPSOIL MATERIAL AND INSTALLATION TO BE IN ACCORDANCE WITH THE NY GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL (UESC).
   C. REMOVE ALL STONES OVER 1 INCH IN DIAMETER, STICKS AND FOREIGN MATTER FROM THE SURFACE.
   D. INCORPORATE LIME AND FERTILIZER IN TOP 2-4 INCHES OF TOPSOIL.
   E. SMOOTH AND FIRM THE SEEDBED.
4. PLANTING

   IF HYDROSEEDED, LIME AND FERTILIZER MAY BE APPLIED THROUGH THE SEEDER THEN ROLLING IS NOT PRACTICAL.
5. MULCHING

   MULCH ALL SEEDED AREAS IN ACCORDANCE WITH STANDARD AND SPECIFICATIONS FOR MULCHING ON PAGE 3.31 OF THE N.Y. GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL (UESC).
6. RESTRICT USE

   NEW SEEDINGS SHOULD BE PROTECTED FROM USE FOR ONE FULL YEAR TO ALLOW DEVELOPMENT OF A DENSE SOD WITH GOOD ROOT STRUCTURE.
7. SWALES

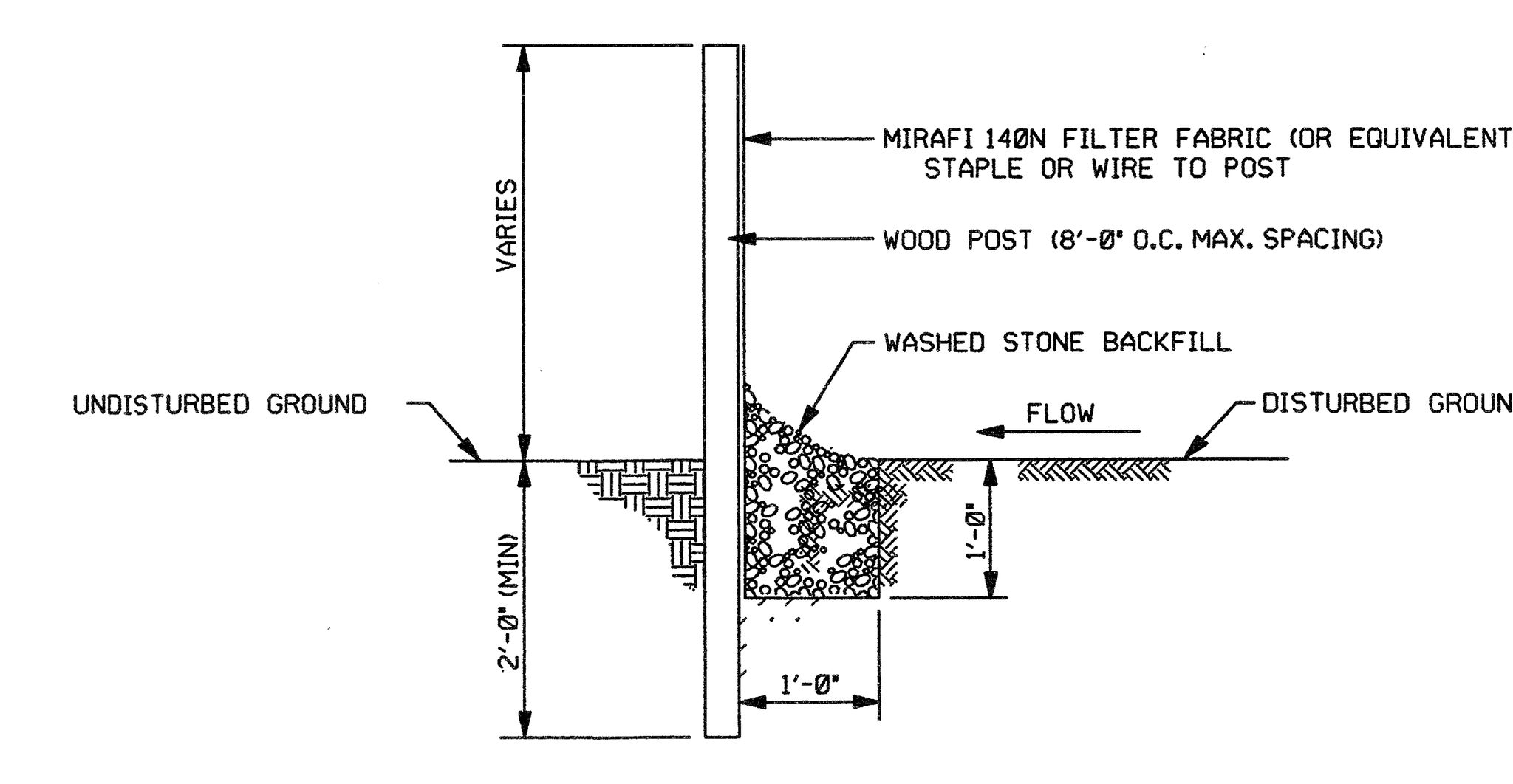
   THE ABOVE SEED MIXTURE IS COMPATIBLE WITH WATERWAYS. SWALES AND OUTLETS SHALL BE PROTECTED AGAINST EROSION BY VEGETATIVE MEANS AS SOON AFTER CONSTRUCTION AS PRACTICAL. VEGETATION MUST BE WELL ESTABLISHED BEFORE DIVERSIONS OR OTHER CHANNELS ARE OUTLETTED INTO THEM. USE EROSION CONTROL MATTING, OR SODDING OF CHANNELS TO PROVIDE EROSION PROTECTION AS SOON AFTER CONSTRUCTION AS POSSIBLE.

   SWALE CENTERS OR CRUCIAL AREAS MAY BE SODDED. REFER TO THE STANDARD AND SPECIFICATION FOR STABILIZATION WITH SOD ON PAGE 3.35 OF THE N.Y. GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL. BE SURE SOD IS SECURELY ANCHORED USING STAPLES OR STAKES.
8. MAINTENANCE

   FERTILIZE, LIME AND MOW AS NEEDED TO MAINTAIN DENSE PROTECTIVE VEGETATIVE COVER.

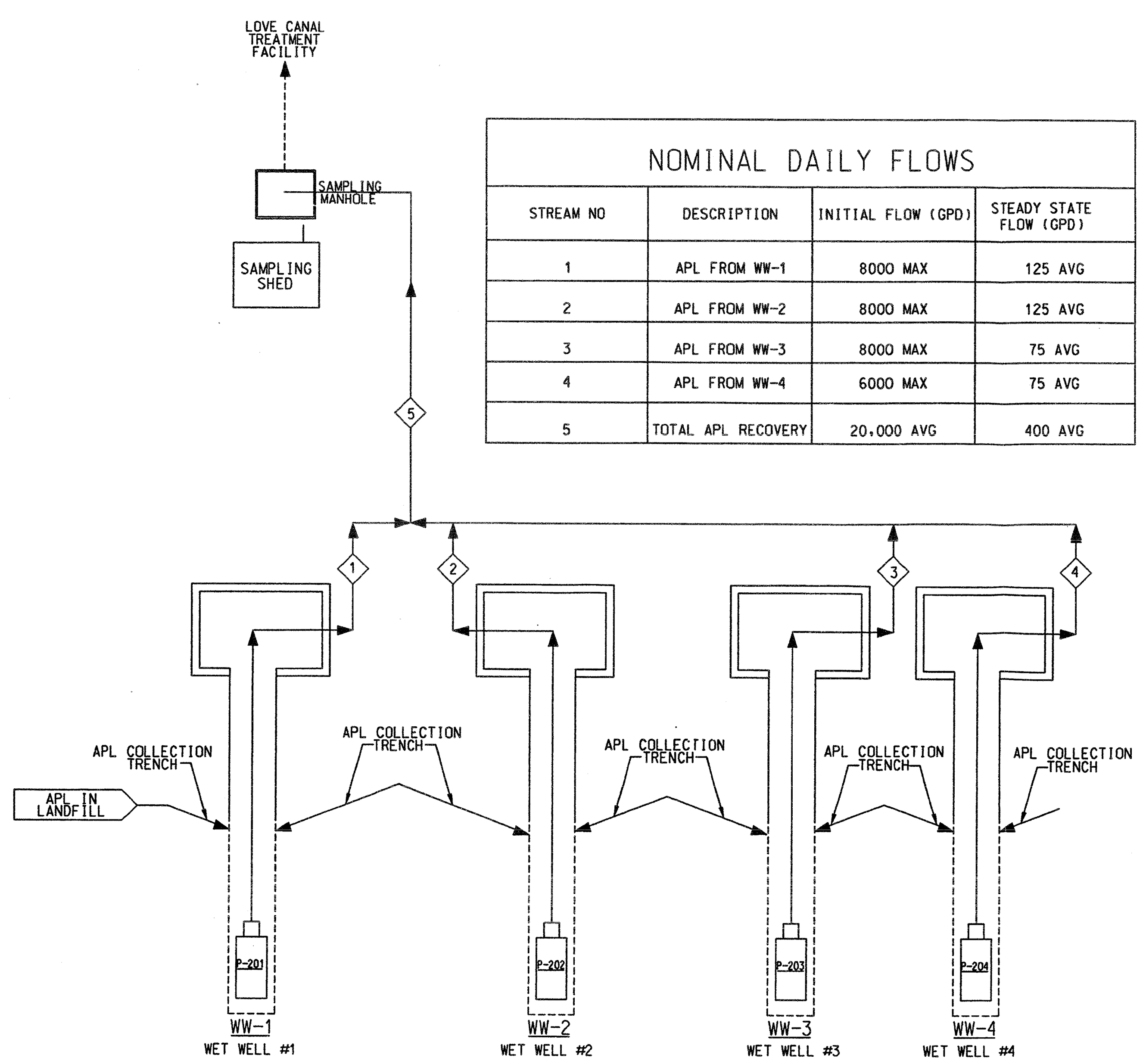
   SWALES SHALL NOT BE USED FOR ROADWAYS.

   IF RILLS DEVELOP IN THE BOTTOM OF A SWALE, PROMPT ATTENTION IS REQUIRED TO AVOID THE FORMATION OF GULLIES. EITHER HAY OR STRAW BALES, RIPRAP, EXCELSIOR OR FILTER FABRIC MAY BE USED DURING THE ESTABLISHMENT PHASE. SEE FIGURE 3.3, RILL MAINTENANCE MEASURES ON PAGE 3.27 OF THE N.Y. GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL. SPACING BETWEEN RILL MAINTENANCE BARRIERS SHALL NOT EXCEED 100 FEET.



TYPICAL SILT FENCE DETAIL

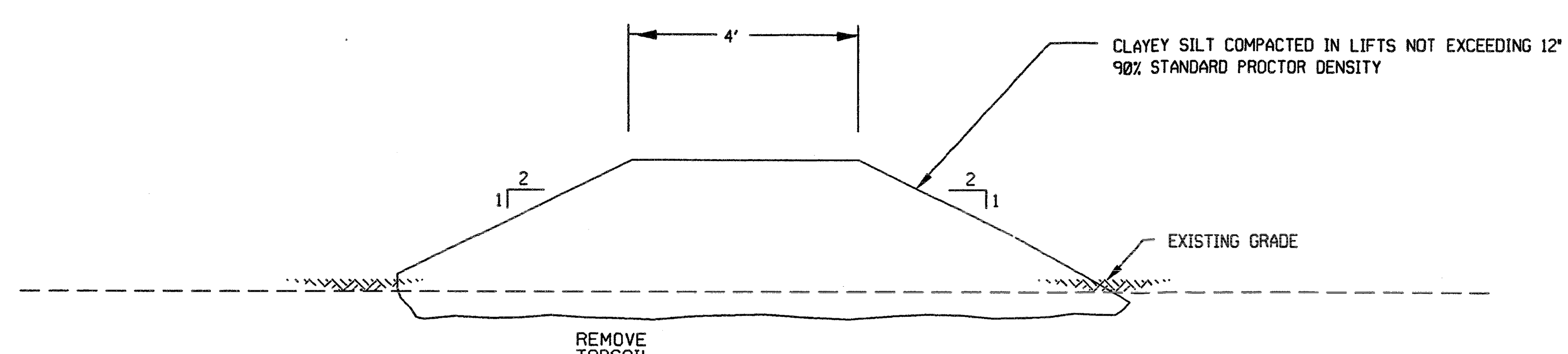
N.T.S.



NOMINAL DAILY FLOWS

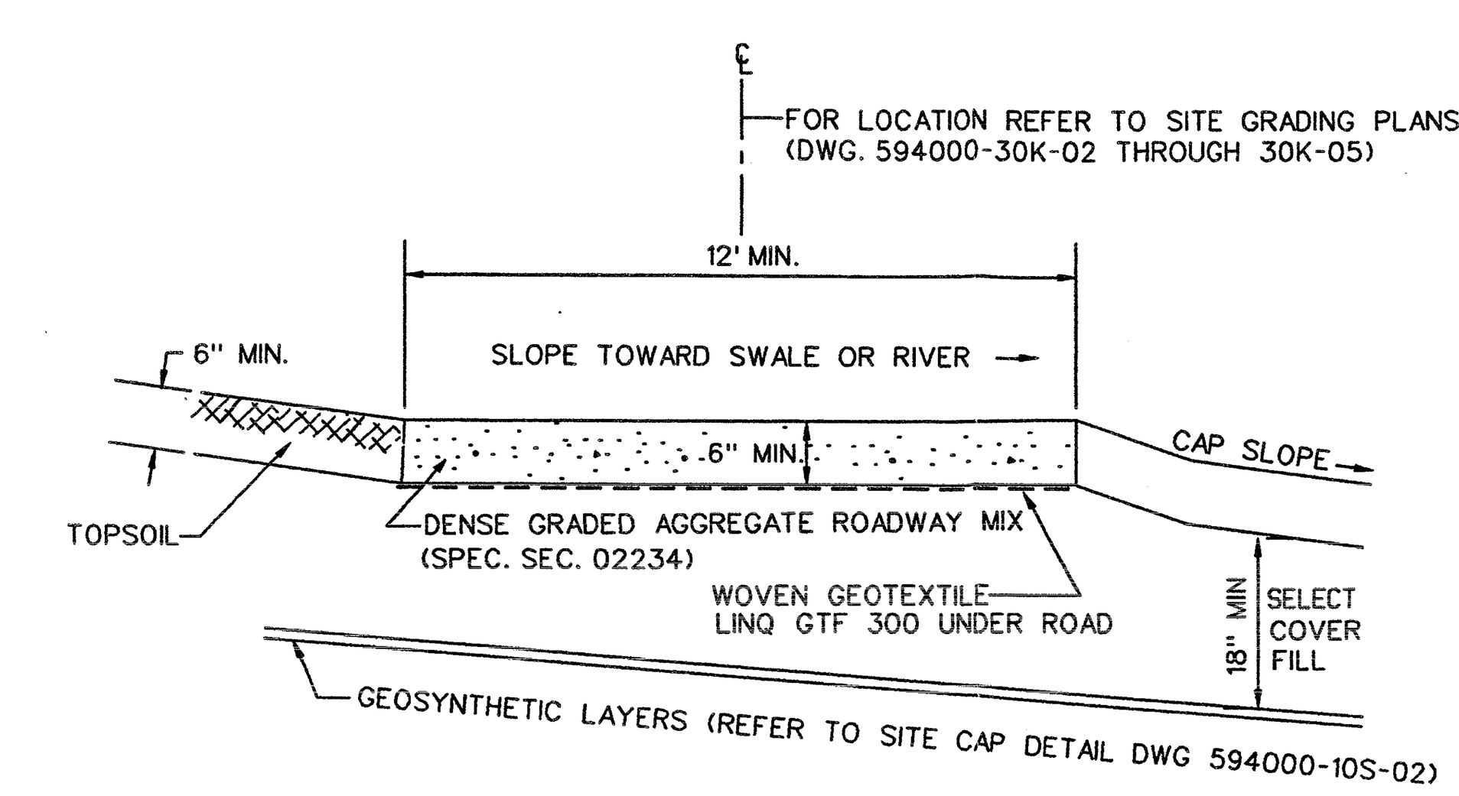
STREAM NO	DESCRIPTION	INITIAL FLOW (GPD)	STEADY STATE FLOW (GPD)
1	APL FROM WW-1	8000 MAX	125 AVG
2	APL FROM WW-2	8000 MAX	125 AVG
3	APL FROM WW-3	8000 MAX	75 AVG
4	APL FROM WW-4	6000 MAX	75 AVG
5	TOTAL APL RECOVERY	20,000 AVG	400 AVG

AQUEOUS PHASE LIQUID (APL) SYSTEM



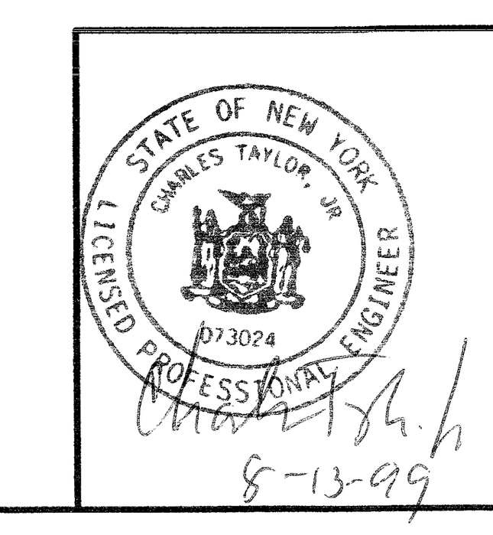
TYPICAL DIVERSION BERM/DIKE DETAIL

N.T.S.



LIGHT DUTY ACCESS ROAD DETAIL

NTS



REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED
A	10/29/93	ENGINEERING REPORT SUBMITTAL (PRELIMINARY/INTERMEDIATE)		
B	9/8/95	FINAL ENGINEERING REPORT (DRAFT SUBMITTAL)		
0	12/21/95	ISSUE FOR BIDS		
1	2/5/96	ISSUE FOR CONSTRUCTION		
2	1/19/98	AS-BUILT		
3	7/13/99	AS-BUILT, DELETED DETAILS		

DWG.NO.	REFERENCE DRAWINGS
594000-30K-02	SITE REMEDIATION PLAN - AREA 1
594000-30K-03	SITE REMEDIATION PLAN - AREA 2
594000-30K-04	SITE REMEDIATION PLAN - AREA 3
594000-30K-05	SITE REMEDIATION PLAN - AREA 4
594000-10S-02	CAPPING SYSTEM & BULKHEAD - SECTIONS AND DETAILS

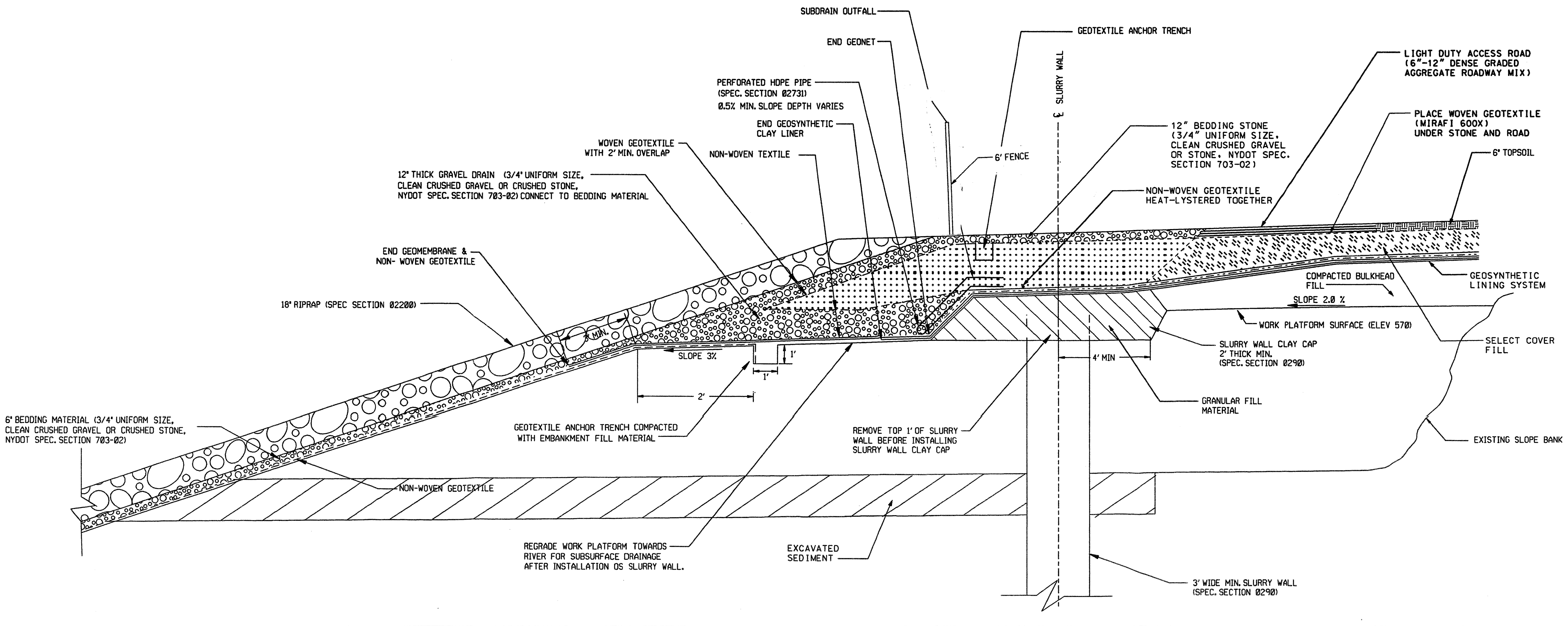
FLUOR DANIEL

DESIGNED BY: T. SZYMONIAK
CHECKED BY: S. LAWRENCE
SUPERVISOR: C. MARS
LEAD ENGR./SPEC.: C. TAYLOR
PROJECT: C. MARS
CLIENT: OXYCHEM/OLIN

OXYCHEM/OLIN
REMEDIAL DESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

AS-BUILT SITE DETAILS

DRAWING NUMBER: 594000-10S-01 | REV. 3



TYPICAL BULKHEAD DETAIL

N.T.S.

GENERAL NOTES

1. FIELD INSTALLATION AND TESTING OF GEOSYNTHETIC LAYERS SHALL BE AS RECOMMENDED BY THEIR RESPECTIVE MANUFACTURER(S) AND APPROVED BY THE CONSTRUCTION MANAGER. THE GEOSYNTHETIC LAYERS SHALL BE INSTALLED BY AN EXPERIENCED INSTALLER. ALL SUBMITTALS AND RESULTS OF TESTING DATA SHALL BE APPROVED BY THE CONSTRUCTION MANAGER PRIOR TO ANY MATERIALS ARRIVING ON THE SITE.

2. THE CONTRACTOR SHALL SUBMIT A QUALITY CONTROL AND FIELD TESING PLAN INCLUDING APPROPRIATE ASTM STANDARD METHODS AS RECOMMENDED BY THE GEOSYNTHETIC MANUFACTURER(S) FOR THE CONSTRUCTION MANAGERS APPROVAL.

3. THE WOVEN GEOTEXTILE ON BULKHEAD SHALL BE MIRAFI 700X.

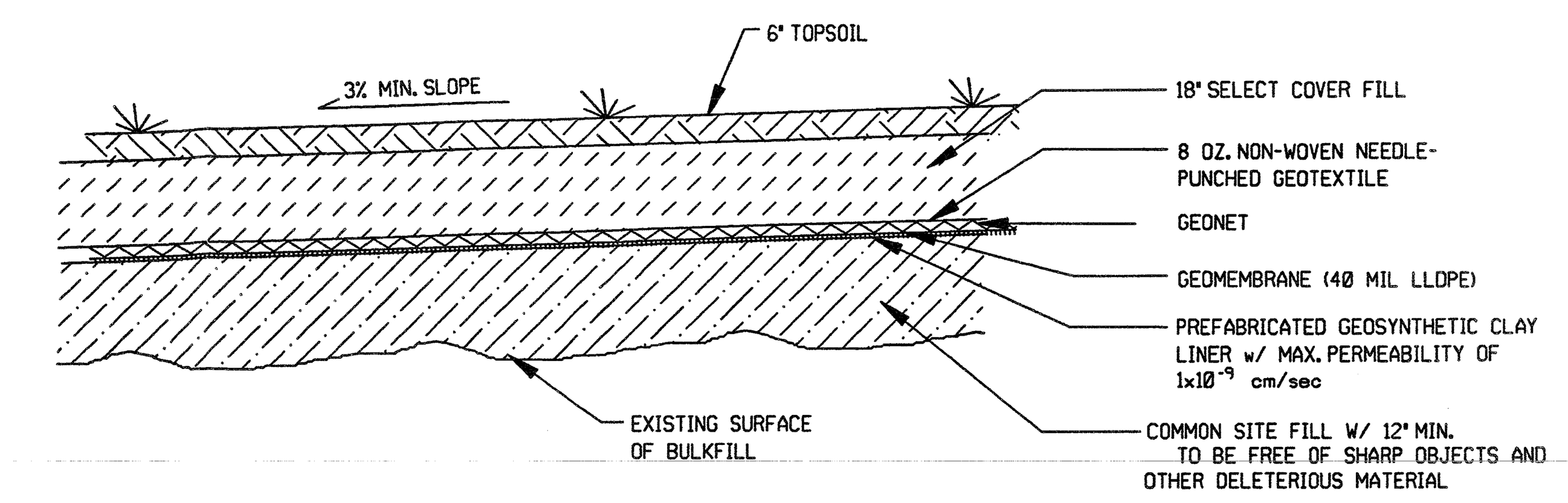
4. THE NON-WOVEN GEOTEXTILE SHALL BE EVERGREEN TECHNOLOGIES TG 700.

5. THE GEONET SHALL BE NATIONAL SEAL COMPANY POLY-NET 2000 OR EQUIVALENT HAVING A MINIMUM TRANSMISSIVITY OF $0.21X10^{-3}$ SQUARE METERS PER SECOND FOR EACH FOOT OF WIDTH FOR ALL SLOPES.

6. THE GEOMEMBRANE SHALL BE A MINIMUM 40 MIL THICK LLDPE. THE GEOMEMBRANE SHALL BE NATIONAL SEAL COMPANY LLDPE.

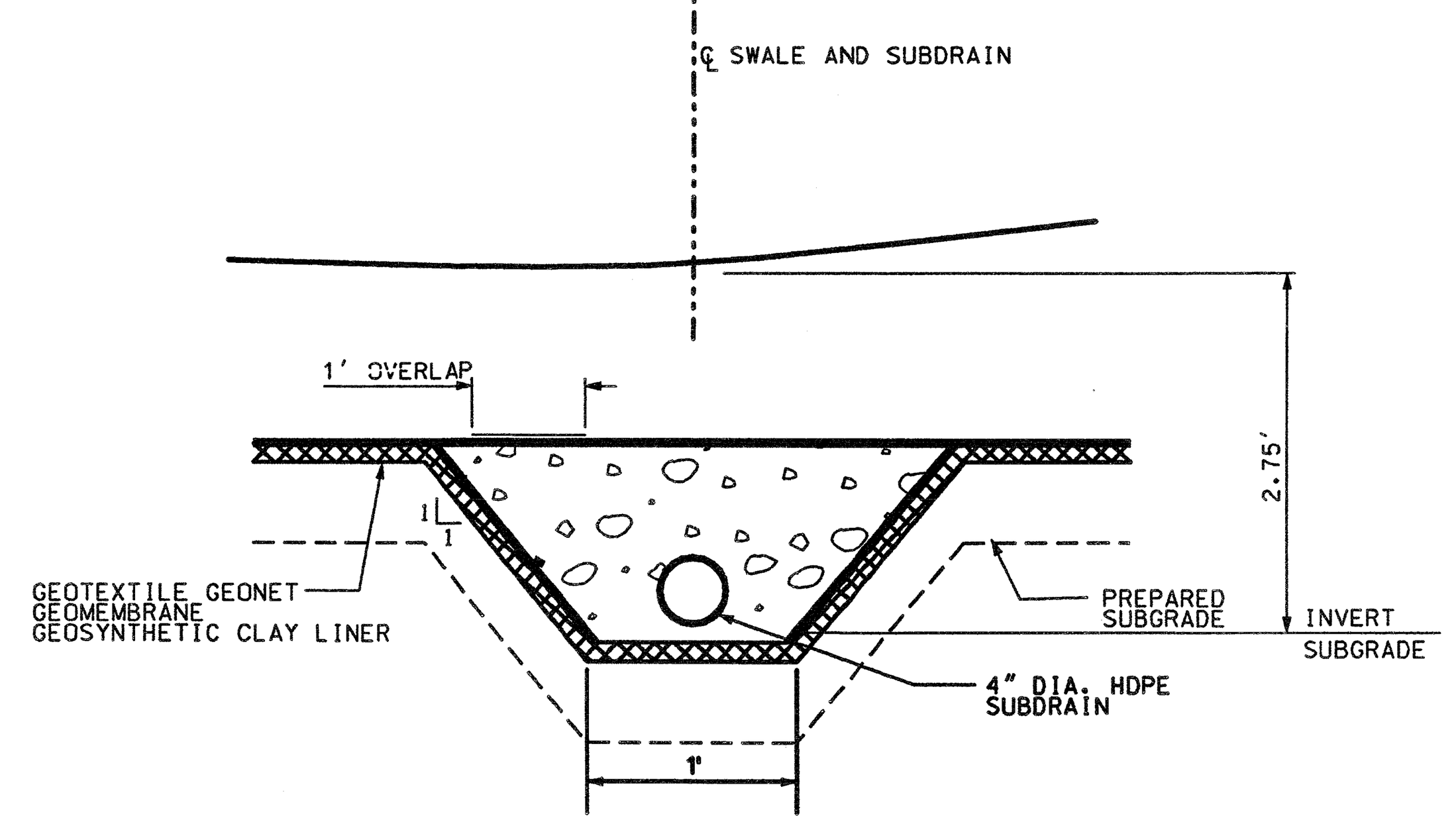
7. THE GEOSYNTHETIC CLAY LINER SHALL BE CLAYMAX 200R.

8. THE GEOSYNTHETIC CLAY LINER ON SLOPES GREATER THEN 10% SHALL BE BENTOMAT ST.



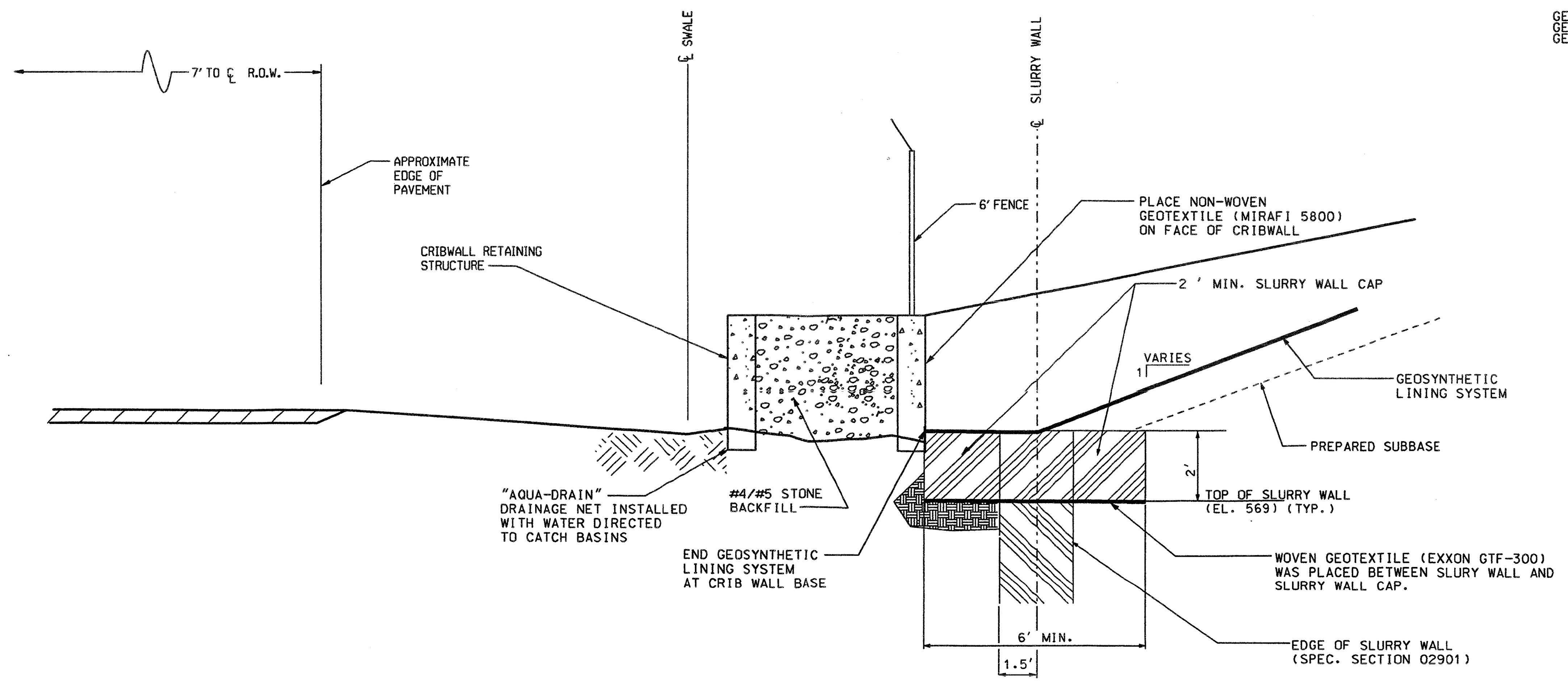
TYPICAL CAP DETAIL

NTS



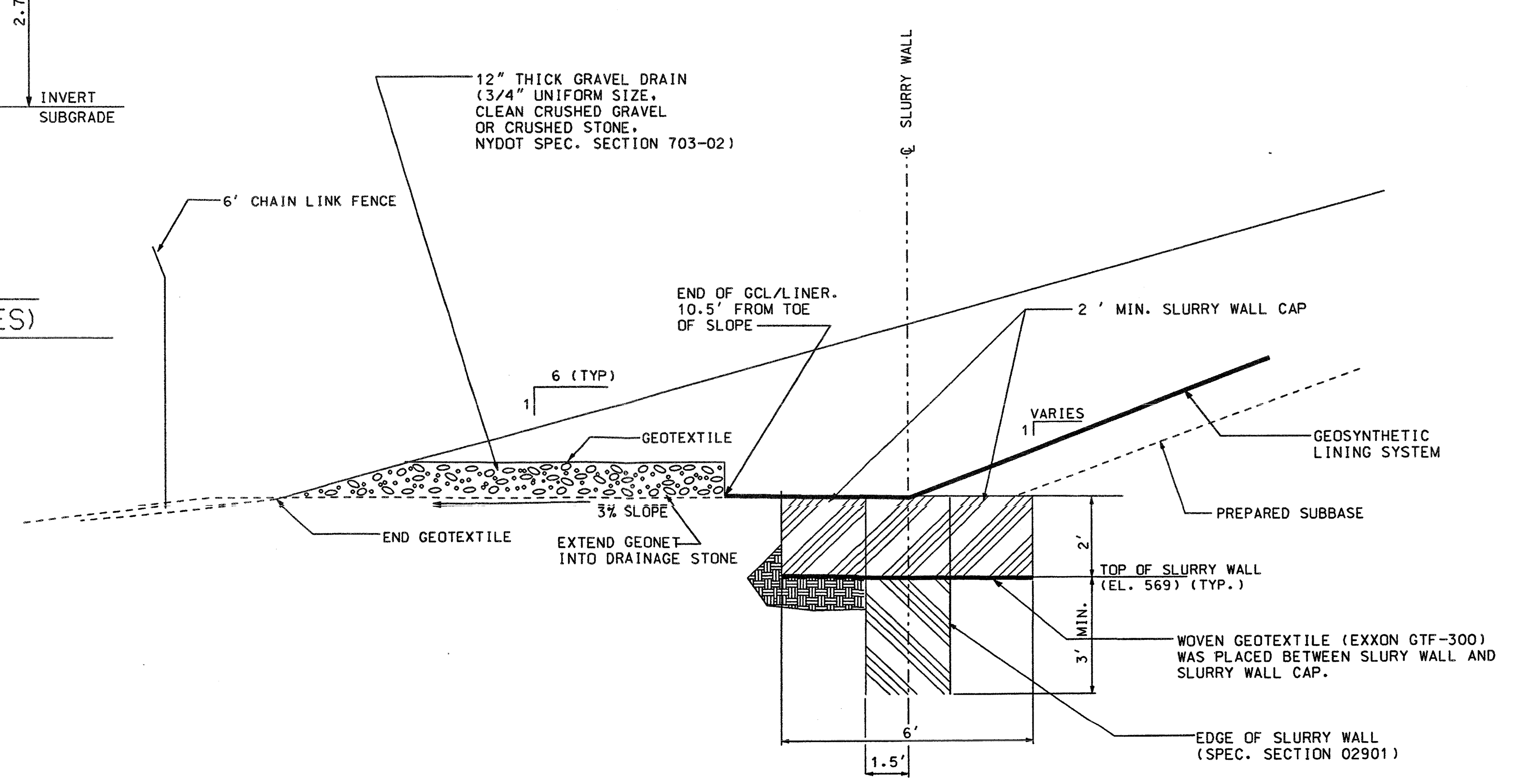
DRAINAGE TRENCH DETAIL
(TYPICAL BELOW ALL SURFACE SWALES)

NTS



TYPICAL LANDFILL/SLURRY WALL DETAIL
TOE AT BUFFALO AVENUE

NTS



TYPICAL LANDFILL/SLURRY WALL DETAIL

NTS

REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED	REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED
A	9/26/92	PRELIMINARY ISSUE FOR 30% DESIGN							
B	8/24/95	REVISED TITLE							
C	9/8/95	FINAL ENGINEERING REPORT (DRAFT SUBMITTAL)							
1	2/18/98	AS-BUILT							

DWG.NO.	REFERENCE DRAWINGS	DWG.NO.	REFERENCE DRAWINGS

FLUOR DANIEL

NOTICE: THIS DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF FLUOR DANIEL AND IS LENT TO THE BORROWER FOR HIS CONFIDENTIAL USE ONLY, AND IN CONSIDERATION OF THE LOAN OF THIS DRAWING, THE BORROWER PROMISES AND AGREES TO RETURN IT UPON REQUEST AND AGREES THAT IT SHALL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN FOR WHICH IT IS FURNISHED.

DESIGNED BY: L. ATTCITY
CHECKED BY: S. LAWRENCE
SUPERVISOR: C. MARS — RELEASE DATE
LEAD ENGR./SPEC.: C. TAYLOR — INITIALS
PROJECT: C.MARS — APP./DATE
CLIENT: OXYCHEM/OLIN — APP./DATE

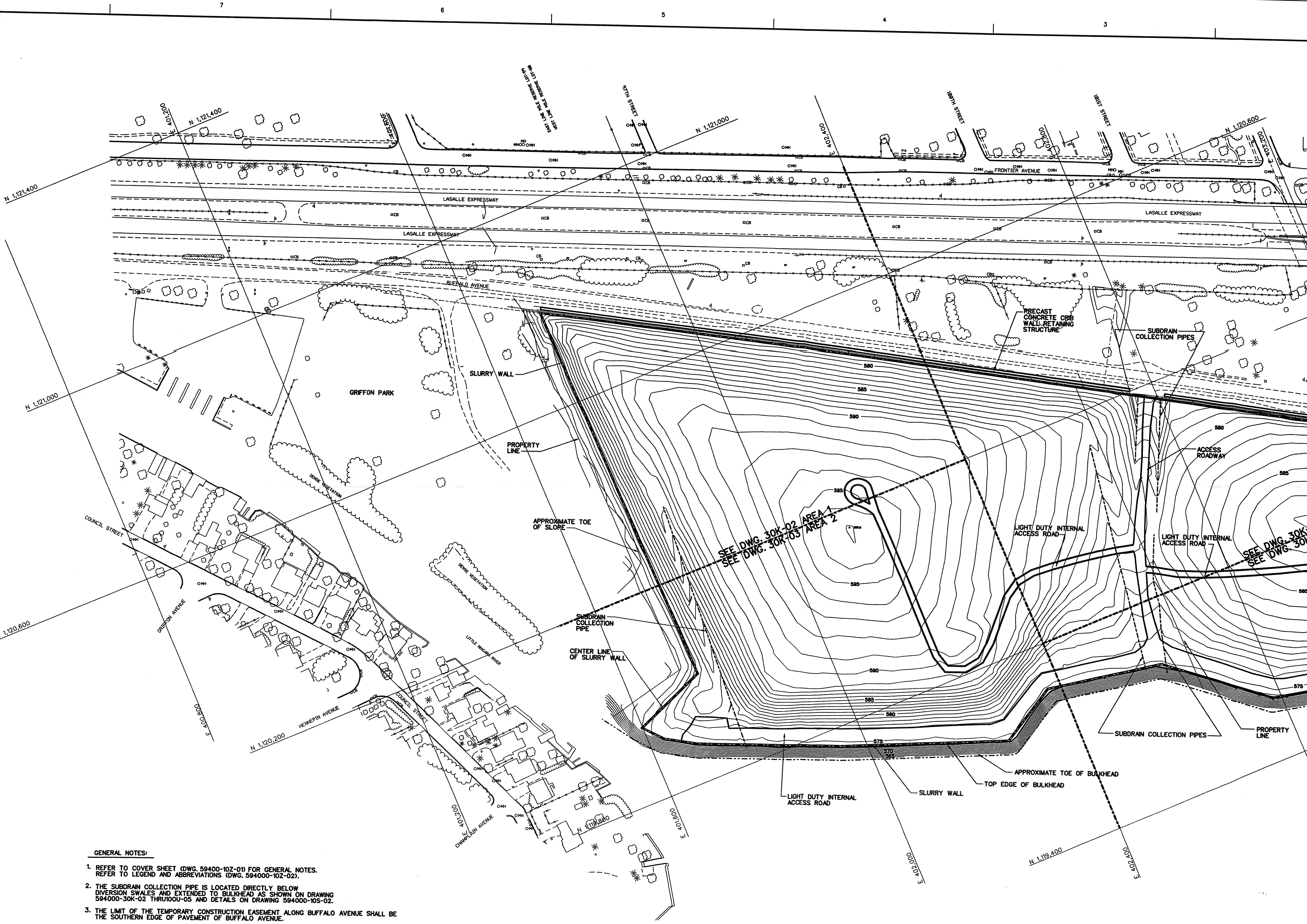
OXYCHEM / OLIN
REMEDIAL DESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

AS-BUILT
CAPPING SYSTEM AND BULKHEAD
SECTION AND DETAILS

SCALE: AS NOTED — DRAWING NUMBER: 594000-10S-02 — REV. 1

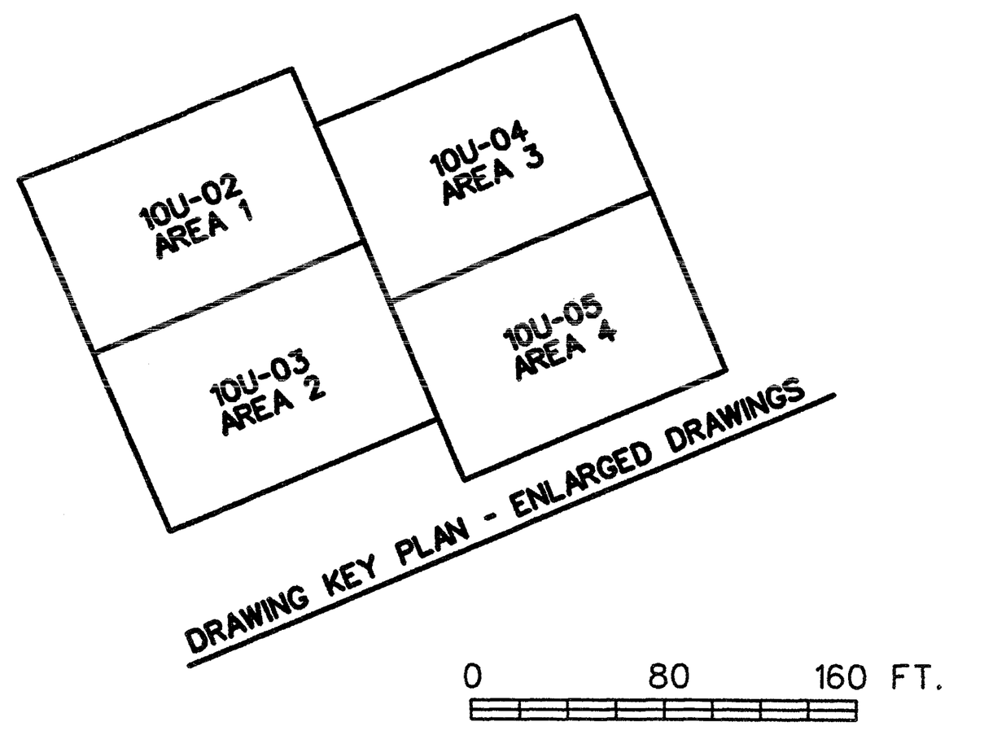
STATE OF NEW YORK — CHARLES TAYLOR, JR. — LICENSED PROFESSIONAL ENGINEER

SUB-CONTRACT PKG. — WRK. PKG. — DIST. CODE



GENERAL NOTES:

1. REFER TO COVER SHEET (DWG. 59400-10Z-01) FOR GENERAL NOTES. REFER TO LEGEND AND ABBREVIATIONS (DWG. 594000-10Z-02).
2. THE SUBDRAIN COLLECTION PIPE IS LOCATED DIRECTLY BELOW DIVERSION SWALES AND EXTENDED TO BULKHEAD AS SHOWN ON DRAWING 594000-30K-02 THRU100U-05 AND DETAILS ON DRAWING 594000-10S-02.
3. THE LIMIT OF THE TEMPORARY CONSTRUCTION EASEMENT ALONG BUFFALO AVENUE SHALL BE THE SOUTHERN EDGE OF PAVEMENT OF BUFFALO AVENUE.
4. THIS DRAWING REPRESENTS FINAL GRADING AND FENCE LINE AFTER THE REMEDIATION OF 102nd STREET LANDFILL SITE.
5. REFERENCE BENCH MARK USED: N22 (U.S.L.S), ON THE NORTH SIDE OF BUFFALO AVENUE IN THE WEST WALL OF HOUSE NO. 9818, 9 FEET SOUTH OF THE NORTHWEST CORNER OF THE HOUSE, IN THE CONRETE WATER TABLE, ABOUT 2-1/2 FEET HIGHER THAN GROUND. THE HORIZONTAL LINE OF A CROSS ON THE UNITED STATES LAKE SURVEY STANDARD DISK SET VERTICALLY. (176.038 METERS OR 5.77.551 FEET NGVD)



0 80 160 FT.

REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED
A	1/29/93	ENGINEERING REPORT SUBMITTAL (PRELIMINARY/INTERMEDIATE)	JTG	DRK
B	9/8/95	FINAL ENGINEERING REPORT (DRAFT SUBMITTAL)		
0	12/21/95	ISSUED FOR BIDS		
1	2/5/96	ISSUED FOR CONSTRUCTION		
2	6/7/96	REVISED SLURRY WALL LOCATION & CONTOURS IN S.E. CORNER		
3	8/27/96	REVISED CONTOURS IN WESTERN PORTION OF LANDFILL		
4	4/4/97	REVISED LANDFILL CONTOURS & ACCESS RD. LOCATION, REMOVED LOADOUT FACILITY		
5	4/23/97	REVISED OLIN LANDFILL CONTOURS	MCG	
6	4/24/97	REVISED OLIN LANDFILL CONTOURS- HIGH POINT @ EL. 587		
7	5/7/97	REVISED LANDFILL CONTOURS		
8	1/26/98	AS-BUILT		

DWG.NO.	REFERENCE DRAWINGS
594000-10S-02	CAPPING SYSTEM & BULKHEAD - SECTIONS AND DETAILS
594000-30K-02	SITE REMEDIATION PLAN - AREA 1
594000-30K-03	SITE REMEDIATION PLAN - AREA 2
594000-30K-04	SITE REMEDIATION PLAN - AREA 3
594000-30K-05	SITE REMEDIATION PLAN - AREA 4

FLUOR DANIEL

DESIGNED BY T. SZYMONIAK
CHECKED BY S. LAWRENCE
SUPERVISOR C.MARS
LEAD ENGR./SPEC. C. TAYLOR
PROJECT C. MARS
CLIENT OXYCHEM/OLIN

RELEASE DATE | INITIALS | APP.DATE | APP.DATE

OXYCHEM/OLIN
REMEDIALDESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

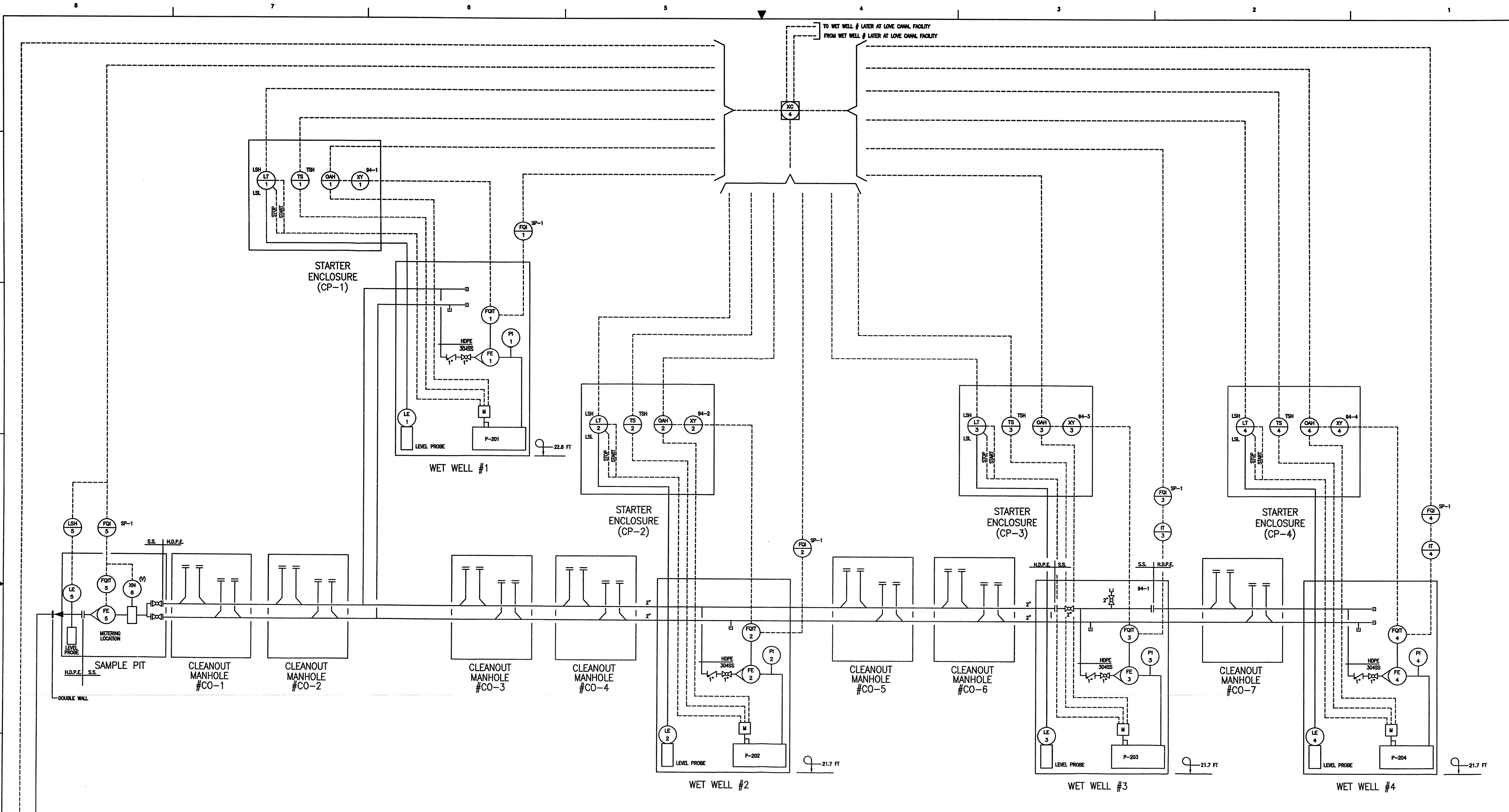
AS-BUILT MASTER SITE GRADING PLAN

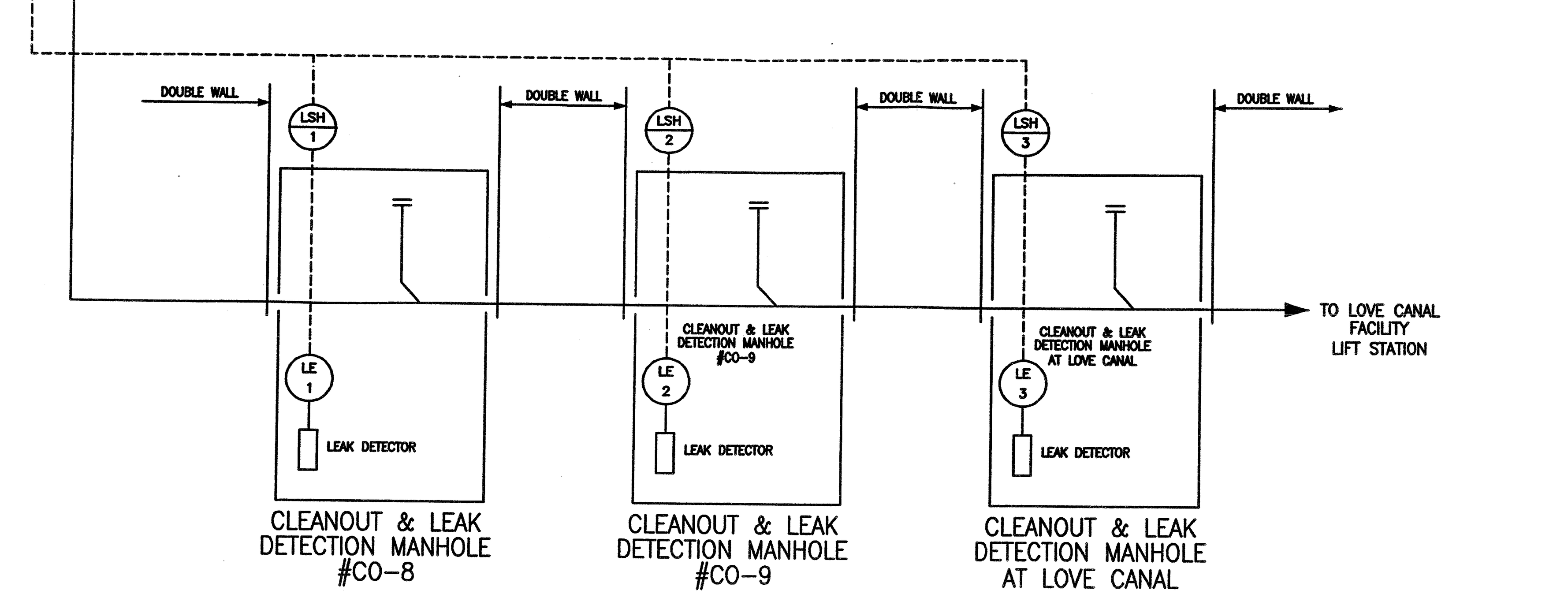
SCALE 1"=80' | DRAWING NUMBER 594000-10U-01 | REV. 8

MANUAL CHANGES MADE - YES ☐ NO ☐ DWG. FILE UPDATED - YES ☐ NO ☐ MODEL UPDATED - YES ☐ NO ☐ CADD DRAWING No. 10U01.DGN

STATE OF NEW YORK · CHARLES TAYLOR JR · LICENSED PROFESSIONAL ENGINEER
8-13-99

SUB-CONTRACT PKG. · WRK. PKG. · DIST. CODE





WET WELL #1	P-201 10 GPM @ 100 FT. 1/2HP,460,3ø	LEVEL PROBE LP-1
WET WELL #2	P-202 10 GPM @ 100 FT. 1/2HP,460,3ø	LEVEL PROBE LP-2
WET WELL #3	P-203 10 GPM @ 100 FT. 1/2HP,460,3ø	LEVEL PROBE LP-3
WET WELL #4	P-204 10 GPM @ 100 FT. 1/2HP,460,3ø	LEVEL PROBE LP-4
COMPOSITE SAMPLER	XN-5	

MANHOLE #8	LEAK DETECTOR LD-1
MANHOLE #9	LEAK DETECTOR LD-2
MANHOLE AT LOVE CANAL	LEAK DETECTOR LD-3
SAMPLE PIT	LEAK DETECTOR LD-4

NOTES:

1. LOW LEVEL IN WET WELLS CUTS POWER OFF TO THE APL PUMP IN THE WET WELL. HIGH LEVEL IN WET WELLS TURNS POWER ON TO THE APL PUMP IN THE WET WELL. HAND SWITCH IS ALSO PROVIDED TO OVERRIDE AUTOMATIC OPERATION OF APL PUMPS.
2. OFF AUTO HAND SELECTOR SWITCH ALLOWS MAINTENANCE BY-PASS OF LEVEL CONTROLS, MUST BE MANUALLY RETURNED TO THE AUTO POSITION.
3. IF ANY PUMP IS OPERATING AND THE PUMPS' ASSOCIATED FLOW METER REGISTERS LOW-LOW/NO FLOW OR IF ANY OF THE PUMP MOTORS HAVE AN OVERLOAD CONDITION A SIGNAL WILL BE SENT TO THE RTU CONTROLLER.
4. WHEN LIQUID IS DETECTED IN EITHER MANHOLE NO. 8, 9 OR MANHOLE AT LOVE CANAL OR THE SAMPLE PIT A SIGNAL WILL BE SENT TO THE RTU CONTROLLER.
5. ACTIVE LEVEL AND FLOW SIGNALS WILL BE SENT TO THE LOVE CANAL FACILITY VIA THE RTU CONTROLLER.
5. ACTIVE LEVEL AND FLOW SIGNALS WILL BE SENT TO THE LOVE CANAL FACILITY VIA THE RTU CONTROLLER.

KEY:

(V) MECHANICAL EQUIPMENT VENDOR SUPPLY.
O-A-H OFF-AUTO-HAND
CP STARTER ENCLOSURES
SP-1 SHED CONTROL PANEL

STATE OF NEW YORK · CHARLES TAYLOR, JR · LICENSED PROFESSIONAL ENGINEER

REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED	REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED
A	1-29-93	ENGINEERING REPORT SUBMITTAL (PRELIMINARY/INTERMEDIATE)	ACB JTG	DRK	4	3-21-97	ISSUED FOR APPROVAL		
B	09/08/95	FINAL ENGINEERING REPORT (DRAFT SUBMITTAL)	AFH	HLF	5	8-27-97	ISSUED FOR APPROVAL		
0	12/21/95	ISSUE FOR BIDS	DEG		6	12-7-97	REDRAWN; ISSUED FOR CONSTRUCTION		
1	2/5/96	ISSUED FOR CONSTRUCTION			7	2-17-99	AS BUILT, ISSUED FOR CLOSEOUT REPORT		
2	2/26/97	ISSUED FOR AGENCY REVIEW							
3	3/11/97	ISSUED FOR REVIEW							

DWG.NO.	REFERENCE DRAWINGS	DWG.NO.	REFERENCE DRAWINGS

FLUOR DANIEL
PROJECT #23594010

DESIGNED BY: A. BUMB/K. MCNELIS
CHECKED BY: S. LAWRENCE
SUPERVISOR: C. MARS
RELEASE DATE:
LEAD ENGR./SPEC.: C. TAYLOR
INITIALS:
PROJECT: C. MARS
APP.DATE:
CLIENT: OXYCHEM/OLIN
APP.DATE:

OXYCHEM/OLIN – REMEDIAL DESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

P & ID APL SYSTEM

SCALE: NONE
DRAWING NUMBER: 594000-25J-02
REV. 7

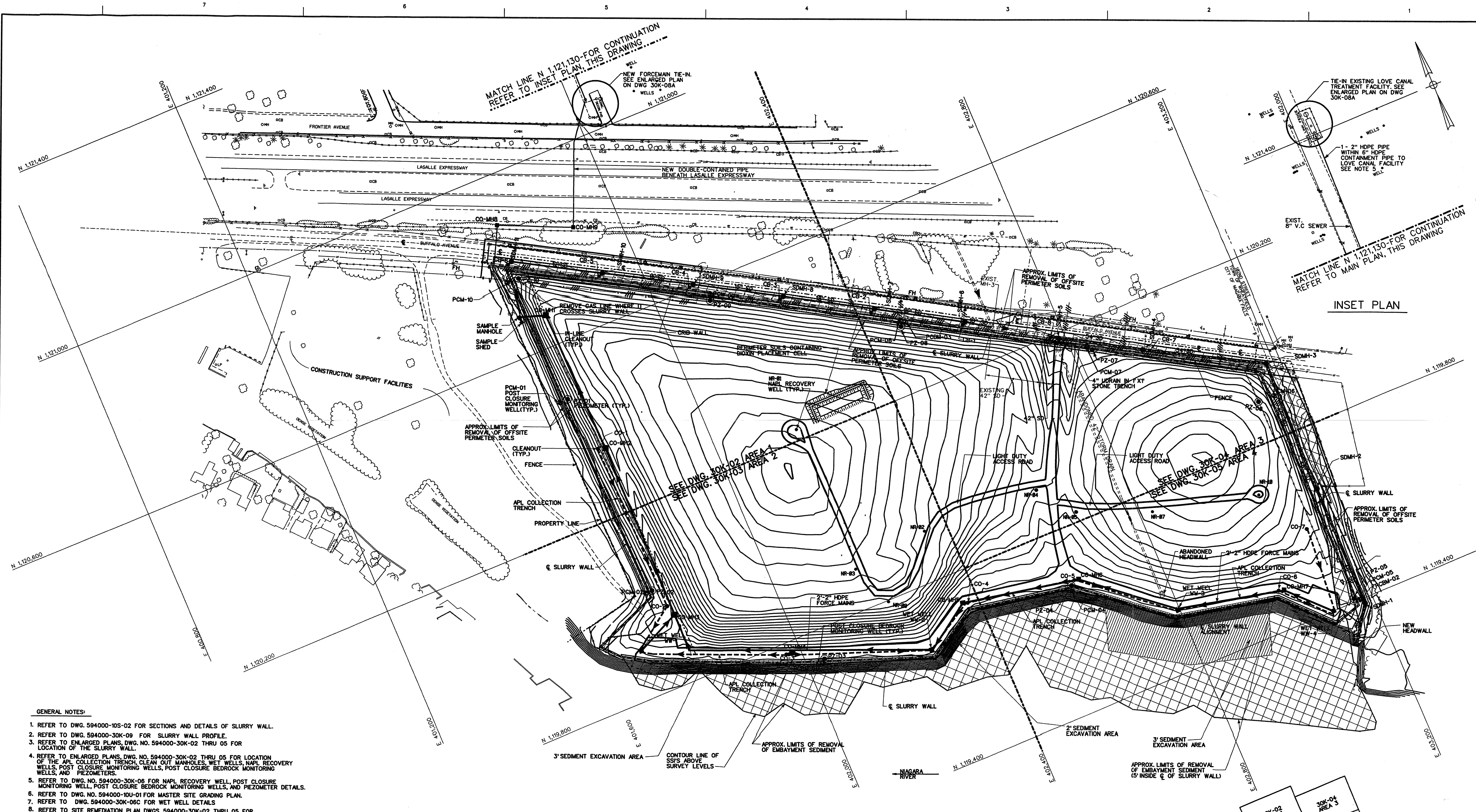
*DATE*TIME* MANUAL CHANGES MADE – YES ☐ NO ☐ DWG. FILE UPDATED – YES ☐ NO ☐ MODEL UPDATED – YES ☐ NO ☐ CADD DRAWING No. 25J02 DWG

DIST. CODE WRK. PKG. SUB-CONTRACT PKG.

FDANSIE.REF REV. 0

203\210\CHICAGO\10225J02.DWG

[64602336.Barb0067.142.GV30025914] Tuesday July 13 1999 12:51:27 PM EDT (@)

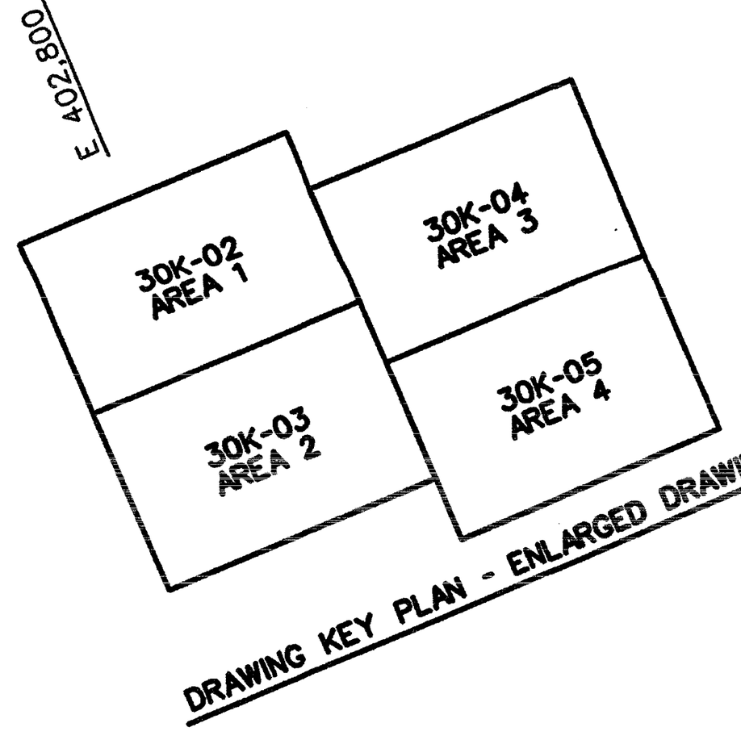


GENERAL NOTES:

1. REFER TO DWG. 594000-10S-02 FOR SECTIONS AND DETAILS OF SLURRY WALL.
2. REFER TO DWG. 594000-30K-09 FOR SLURRY WALL PROFILE.
3. REFER TO ENLARGED PLANS, DWG. NO. 594000-30K-02 THRU 05 FOR LOCATION OF THE SLURRY WALL.
4. REFER TO ENLARGED PLANS, DWG. NO. 594000-30K-02 THRU 05 FOR LOCATION OF THE APL COLLECTION TRENCH, CLEAN OUT MANHOLES, WET WELLS, NAPL RECOVERY WELLS, POST CLOSURE MONITORING WELLS, POST CLOSURE BEDROCK MONITORING WELLS, AND PIEZOMETERS.
5. REFER TO DWG. NO. 594000-30K-06 FOR NAPL RECOVERY WELL, POST CLOSURE MONITORING WELL, POST CLOSURE BEDROCK MONITORING WELLS, AND PIEZOMETER DETAILS.
6. REFER TO DWG. NO. 594000-10U-01 FOR MASTER SITE GRADING PLAN.
7. REFER TO DWG. 594000-30K-06C FOR WET WELL DETAILS
8. REFER TO SITE REMEDIATION PLAN DWGS. 594000-30K-02 THRU 05 FOR CHAIN LINK FENCE LOCATION.
9. REFER TO DWG. 594000-30K-06B FOR PLANS SHOWING REMOVAL/CONSOLIDATION OF PERIMETER SOILS FOR AREAS 1 THRU 4 RESPECTIVELY.
10. REFER TO DWGS. 594000-30K-03 AND 05 FOR DELINEATION OF THE LIMITS OF REMOVAL OF OFFSHORE SEDIMENT.
11. REFER TO DWG. 594000-10Z-02 FOR LEGEND & ABBREVIATIONS.

LIST OF EXISTING UTILITIES

UTILITY	OWNING UTILITY/AGENCY
1. CITY WATER	CITY OF NIAGARA FALLS, NEW YORK
2. GAS	NATIONAL FUEL GAS CORPORATION
3. TELEPHONE	NEW YORK TELEPHONE
4. POWER	NIAGARA MOHAWK POWER CORPORATION
5. CABLE TV	NIAGARA FRONTIER CABLE TELEVISION
6. STORM SEWER	CITY OF NIAGARA FALLS AND TOWN OF WHEATFIELD, NY



REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED
A	01/29/93	ENGINEERING REPORT SUBMITTAL (PRELIMINARY/INTERMEDIATE)	JTG	DRK
B	6/3/94	DELETED CURTAN WALL, ADDED OPTIONAL SLURRY WALL ALIGNMENT, ADDED NOTES 15 & 16 : ISSUED FOR REVIEW AND COMMENT-RELOCATION OF UNDERGROUND UTILITIES AND REMOVAL/CONSOLIDATION OF PERIMETER SOILS		
C	09/08/95	FINAL ENGINEERING REPORT (DRAFT SUBMITTAL)		
0	12/21/95	ISSUE FOR BID		
1	02/05/96	ISSUED FOR CONSTRUCTION		
2	6/7/96	REVISED SLURRY WALL LOCATION IN SE CORNER		
3	3/12/97	STORM SEWER AS-BUILTS		
4	8/13/97	ADDED STORM SEWER CB-8 W/TIE IN TO SDMH-5 AND 4" UDRAIN W/TIE IN TO CB-8		
5	1/28/98	AS-BUILT		

DWG.NO.	REFERENCE DRAWINGS
594000-10S-01	SITE DETAILS
594000-10S-02	CAPPING SYSTEM & BULKHEAD - SECTIONS AND DETAILS
594000-10U-01	MASTER SITE GRADING PLAN
594000-30K-02	SITE REMEDIATION PLAN - AREA 1
594000-30K-03	SITE REMEDIATION PLAN - AREA 2
594000-30K-04	SITE REMEDIATION PLAN - AREA 3
594000-30K-05	SITE REMEDIATION PLAN - AREA 4
594000-30K-06	APL, NAPL AND MONITORING WELLS AND MISC. DETAILS
594000-30K-06B	MASTER SITE REMIDIATION PLAN - EXCAVATION DEPTH OF PERIMETER SOILS
594000-30K-06C	APL WET WELL DETAILS
594000-30K-09	SLURRY WALL PROFILE

FLUOR DANIEL

DESIGNED BY: U. KUMTHEKAR/A. BUMB
CHECKED BY: S. LAWRENCE
SUPERVISOR: C. MARS
RELEASE DATE:
LEAD ENGR./SPEC.: C. TAYLOR
INITIALS:
PROJECT: C. MARS
APP.DATE:
CLIENT: OXYCHEM/OLIN
APP.DATE:

OXYCHEM/OLIN
REMEDIAL DESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

AS-BUILT
MASTER SITE REMEDIATION PLAN

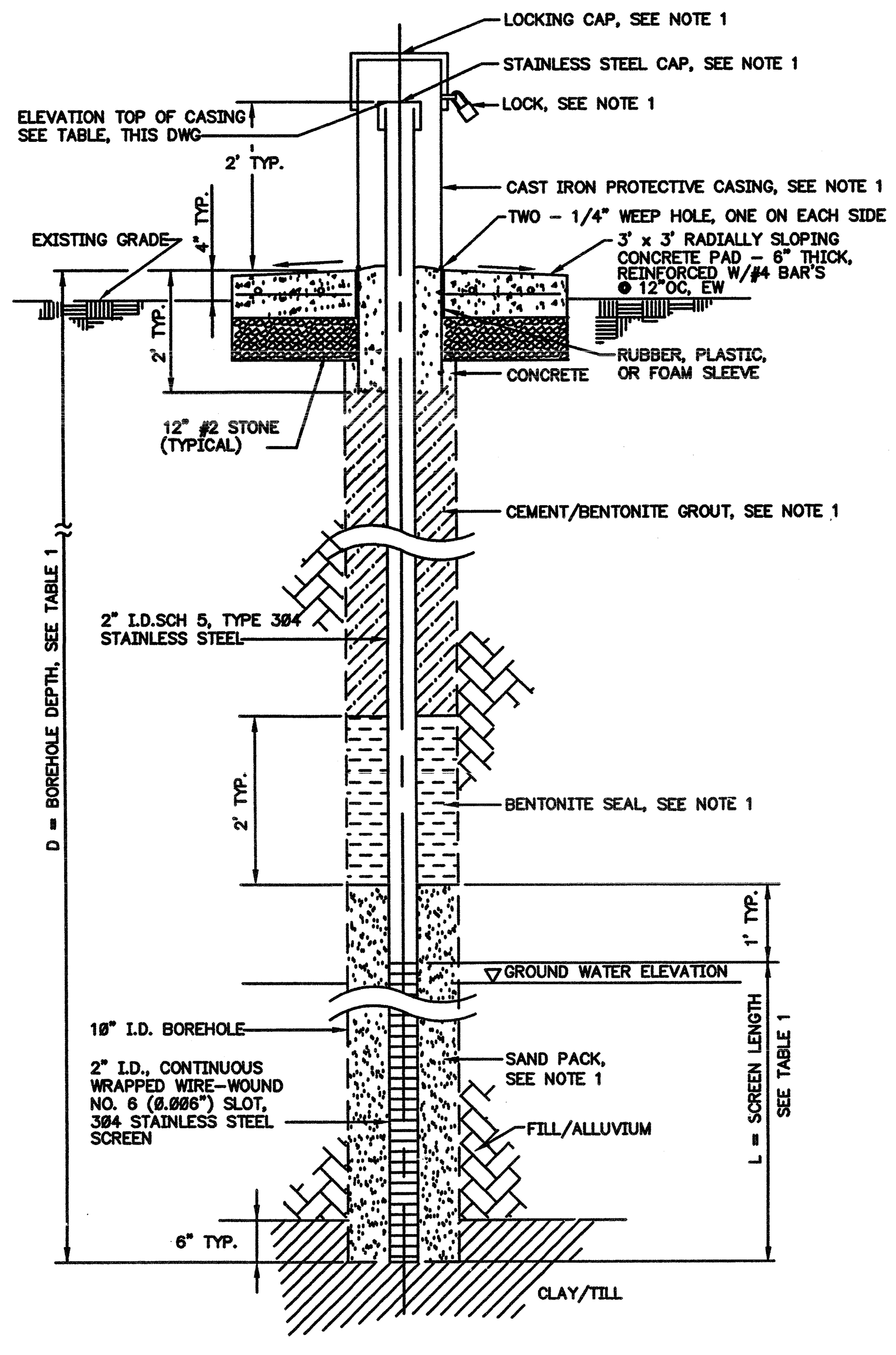
SCALE: 1"=80'
DRAWING NUMBER: 594000-30K-01
REV.: 5

STATE OF NEW YORK · CHARLES TAYLOR, JR · 073024 · LICENSED PROFESSIONAL ENGINEER
8-13-99

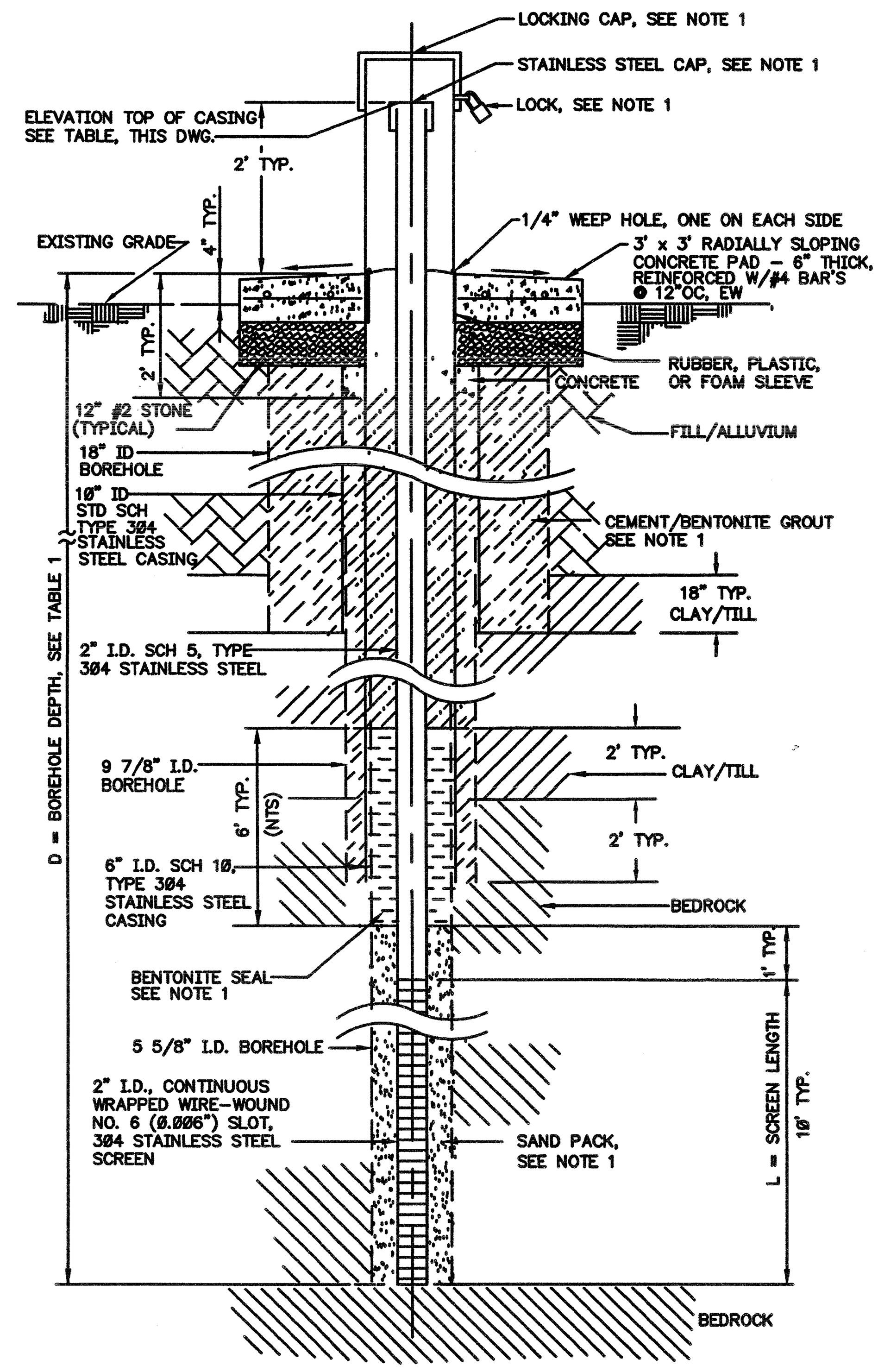
MANUAL CHANGES MADE - YES ☐ NO ☐ DWG. FILE UPDATED - YES ☐ NO ☐ MODEL UPDATED - YES ☐ NO ☐ CADD DRAWING No. 30K01.DGN

SUB-CONTRACT PKG. WRK. PKG. DIST. CODE

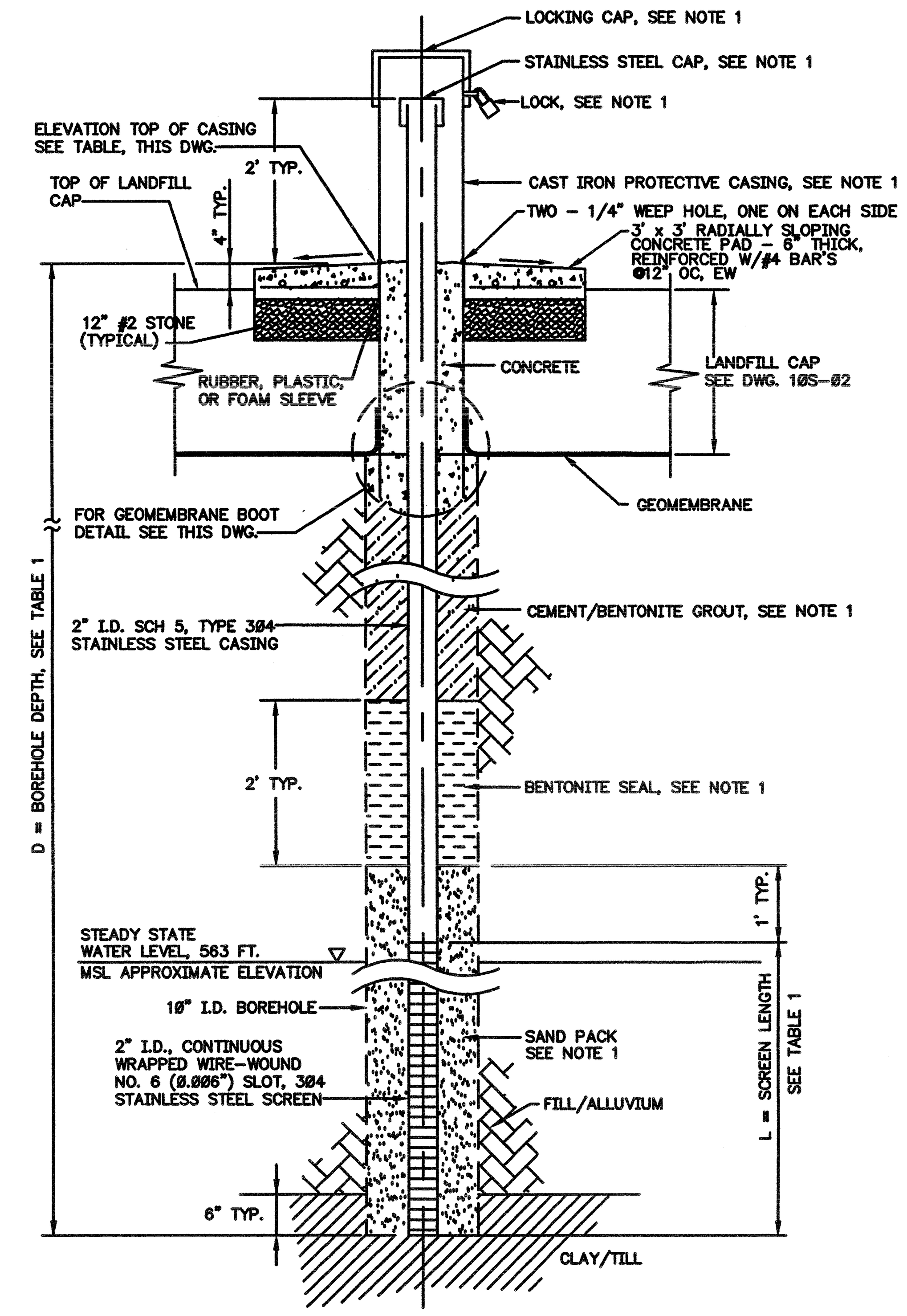
07/13/99 02:25PM



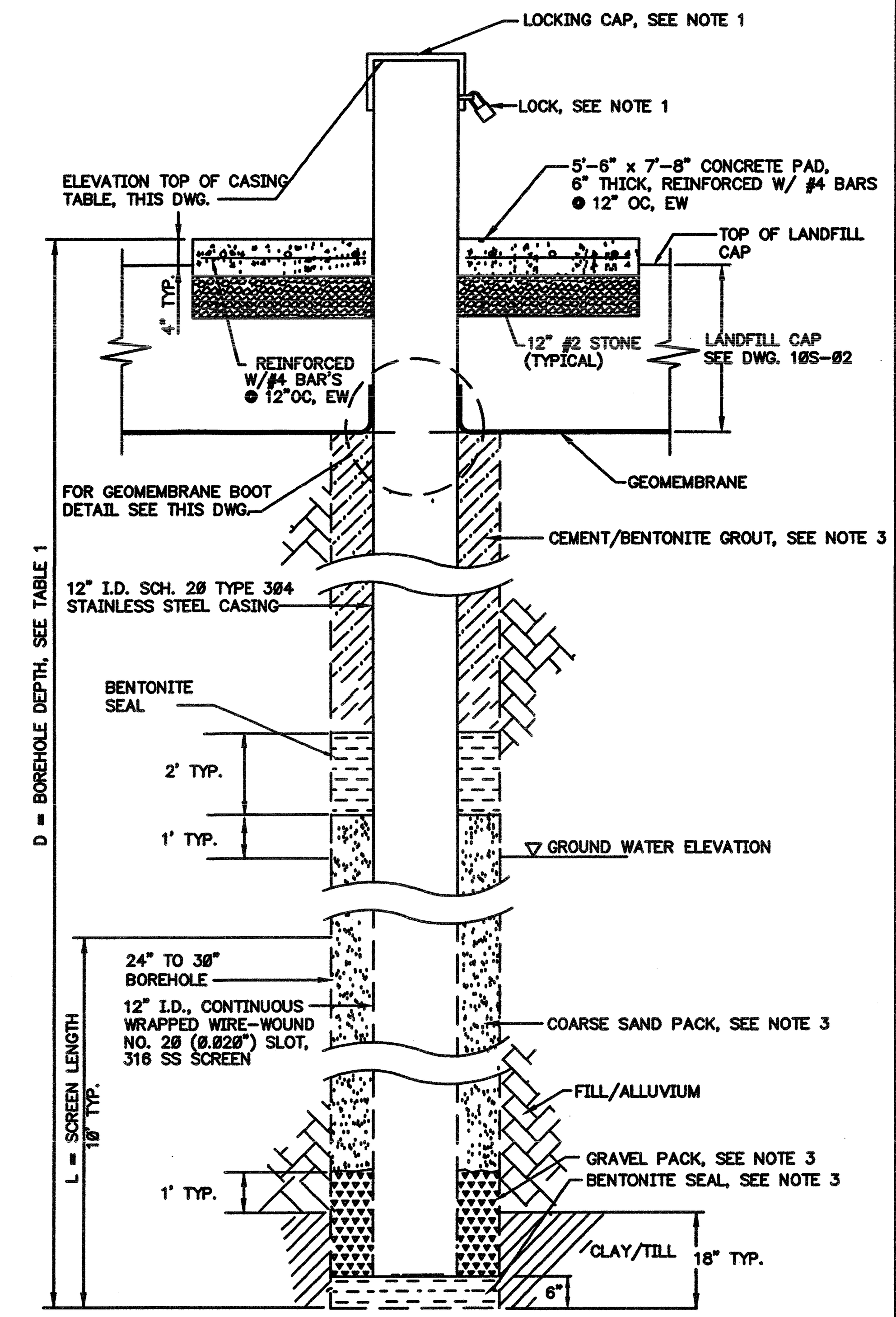
POST CLOSURE MONITORING WELL (PCM) DETAIL
PCM-01 THROUGH PCM-08
N.T.S.



POST CLOSURE BEDROCK
MONITORING WELL (PCBM) DETAIL
PCBM-01 THROUGH PCBM-03
N.T.S.



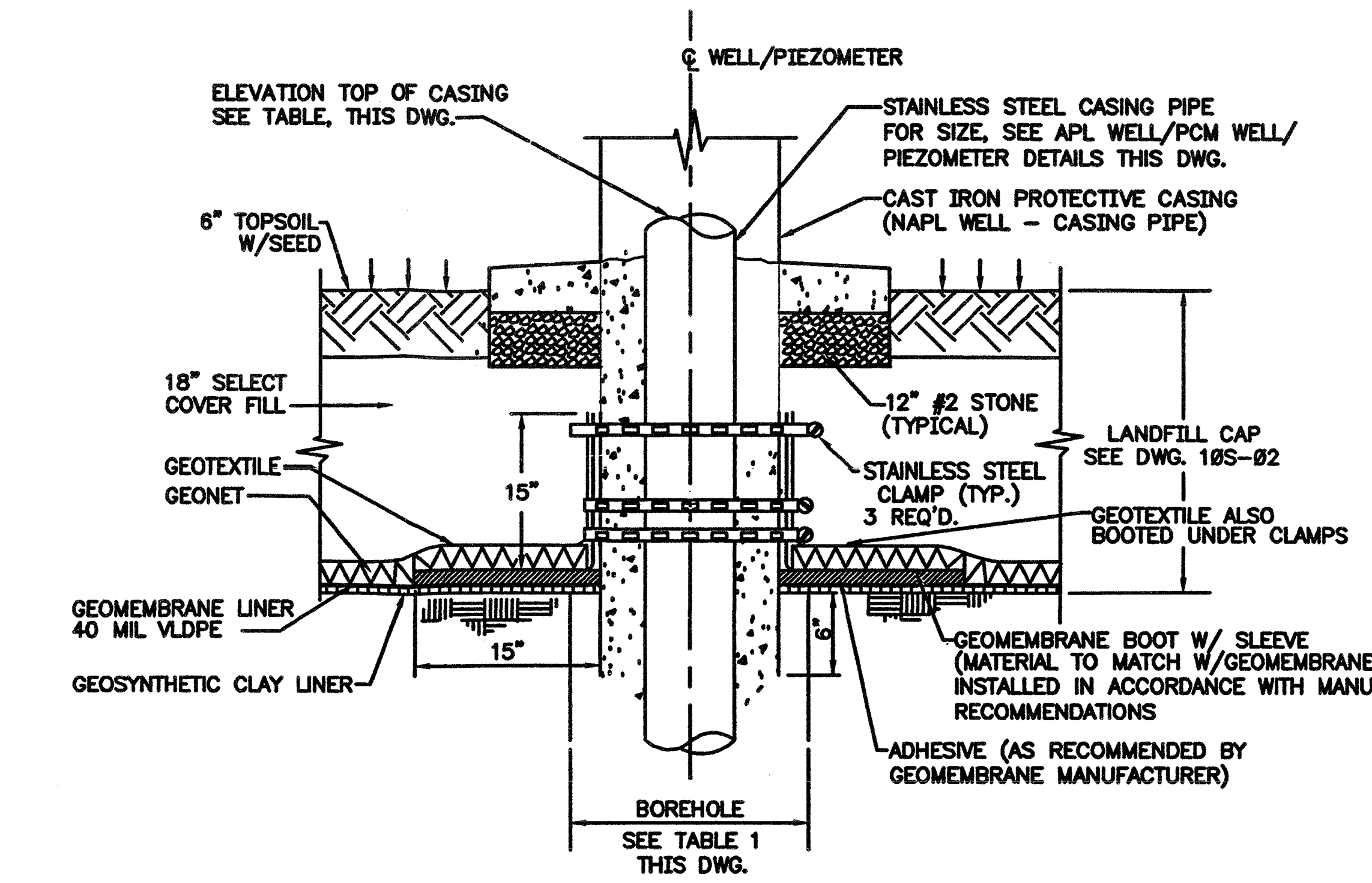
PIEZOMETER (PZ) DETAIL
PZ-01 THROUGH PZ-08
N.T.S.



TYPICAL NAPL RECOVERY WELL (NR) DETAIL
N.T.S.

TABLE-1 AS-BUILT LOCATIONS AND ELEVATIONS OF WELLS						
WELL NO.	NORTHING	EASTING	TOP OF CASING (FT)	BOTTOM OF WELL (FT)	DEPTH OF WELL (FT)	SCREEN LENGTH (FT)
PZ-1	1120480.04	401744.70	582.21	549.64	32.57	5
PZ-2	1120019.49	401749.66	577.92	548.43	23.49	15
PZ-3	1119734.85	402039.66	576.68	545.63	31.05	18
PZ-4	1119675.07	402599.63	576.96	545.63	31.33	25
PZ-5	1119408.08	403159.94	576.87	550.50	26.37	10
PZ-6	1119889.99	403136.05	584.66	564.05	20.61	5
PZ-7	1120136.09	402843.12	579.10	564.80	14.30	5
PZ-8	1120346.01	402477.59	580.99	565.38	15.61	5
PZ-9	1120560.13	402114.84	580.67	566.28	14.39	4
PZ-10	1120765.29	401746.09	581.65	561.56	20.09	10
PCM-1	1120479.99	401725.13	578.24	549.05	29.19	10
PCM-2	1120020.44	401735.99	577.24	547.90	29.34	18
PCM-3	1119726.56	402034.23	576.81	545.15	31.66	18
PCM-4	1119663.44	402595.79	575.73	545.74	29.99	25
PCM-5	1119403.24	403170.10	575.93	550.00	25.93	13
PCM-6	1119888.87	403172.47	580.25	566.50	13.75	5
PCM-7	1120148.17	402835.70	578.80	557.63	21.17	8
PCM-8	1120359.15	402481.45	579.32	564.43	14.89	5
PCM-9	1120570.20	402119.41	578.99	567.87	11.12	4
PCM-10	1120765.54	401719.85	579.40	556.39	23.01	15
PCBM-1	1119728.99	402023.91	576.75	519.72	57.03	10
PCBM-2	1119397.40	403171.17	576.03	519.20	56.83	10
PCBM-3	1120351.74	402490.71	580.24	517.01	63.23	10
NR-1	1120225.50	402179.30	597.30	547.02	50.28	10
NR-2	1119909.60	402350.20	589.73	539.25	50.48	10
NR-3	1119890.80	402179.40	591.70	543.47	48.23	10
NR-4	1119900.20	402610.40	582.39	543.93	38.46	10
NR-5	1119821.10	402672.30	581.55	538.70	42.85	10
NR-7	1119756.60	402828.40	587.21	546.18	41.03	10
NR-8	1119797.00	402217.80	592.31	538.73	53.58	10
NR-10	1119700.20	403057.10	587.87	550.73	37.14	10

NOTE: NR-6 AND NR-9 WERE NOT INSTALLED SINCE NAPL WAS NOT FOUND IN THE AREA AFTER THREE DRILLINGS



TYPICAL GEOMEMBRANE BOOT DETAIL
N.T.S.

GENERAL NOTES:

1. FOR SITE REMEDIATION PLANS SEE DWGS. 30K-02 THRU -05.
2. FOR SITE GRADING PLANS SEE DWGS. 10U-02 THRU -05.
3. ALL CONCRETE SURFACES TO BE BROOM FINISHED.

NOTES - WELL INSTALLATION

1. MATERIALS AND INSTALLATION FOR POST CLOSURE MONITORING WELLS AND PIEZOMETERS SHALL BE AS SPECIFIED IN SECTION 02011.
2. FOR LOCATION OF POST CLOSURE MONITORING WELLS, WET WELLS, NAPL RECOVERY WELLS AND PIEZOMETERS SEE SITE REMEDIATION PLAN DWGS. 30K-02 THRU 30K-05.
3. MATERIALS AND INSTALLATION FOR NAPL RECOVERY WELLS SHALL BE AS SPECIFIED IN SECTION 02012.

REV.	DATE	REVISION DESCRIPTION	DES. / CHK.	APPROVED
A	01/29/93	ENGINEERING REPORT SUBMITTAL (PRELIMINARY/INTERMEDIATE)	ACB / JG	DRK
B	09/08/95	FINAL ENGINEERING REPORT (DRAFT SUBMITTAL)		JG
0	12/21/95	ISSUED FOR BID		
1	2/5/96	ISSUED FOR CONSTRUCTION		
2	3/21/97	REVISED WET WELL DTL., WW-1 DATA (TABLE 1) & WELL INSTL. NOTES		
3	1/21/98	AS-BUILT		

DWG.NO.	REFERENCE DRAWINGS
594000-30K-02	SITE REMEDIATION PLAN - AREA 1
594000-30K-03	SITE REMEDIATION PLAN - AREA 2
594000-30K-04	SITE REMEDIATION PLAN - AREA 3
594000-30K-05	SITE REMEDIATION PLAN - AREA 4

FLUOR DANIEL

DESIGNED BY: A. BUMB/U. KUMTHEKAR
CHECKED BY: S. LAWRENCE
SUPERVISOR: C. MARS
RELEASE DATE:
LEAD ENGR./SPEC.: C. TAYLOR
INITIALS:
PROJECT: C. MARS
APP.DATE:
CLIENT: OXYCHEM / OLIN
APP.DATE:

OXYCHEM / OLIN
REMEDIAL DESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

AS-BUILT
APL, NAPL AND MONITORING WELLS
AND MISC. DETAILS

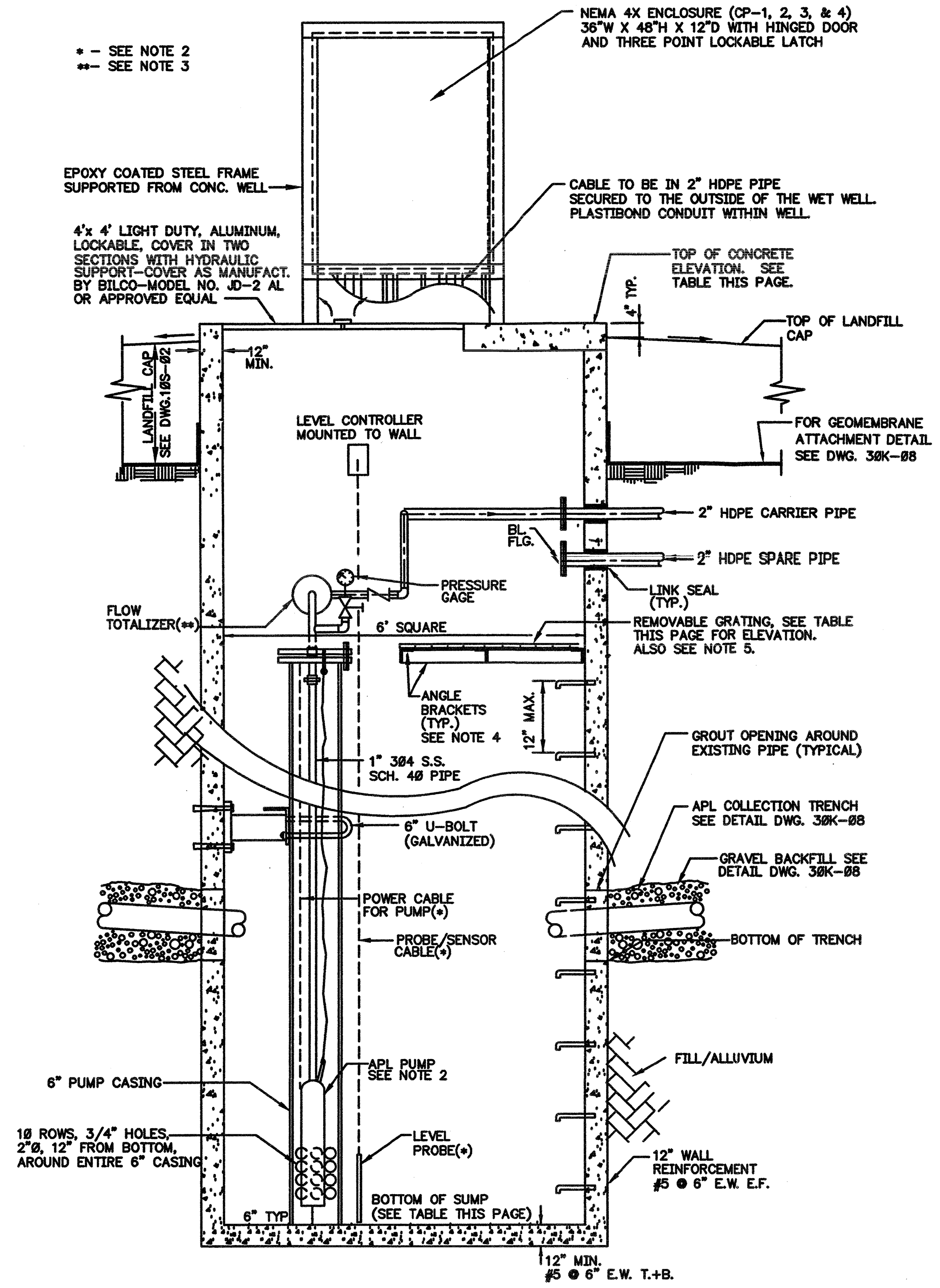
SCALE: AS NOTED | DRAWING NUMBER: 594000-30K-06 | REV. 3

STATE OF NEW YORK — CHARLES TAYLOR, JR — 073024 — LICENSED PROFESSIONAL ENGINEER
8-13-99

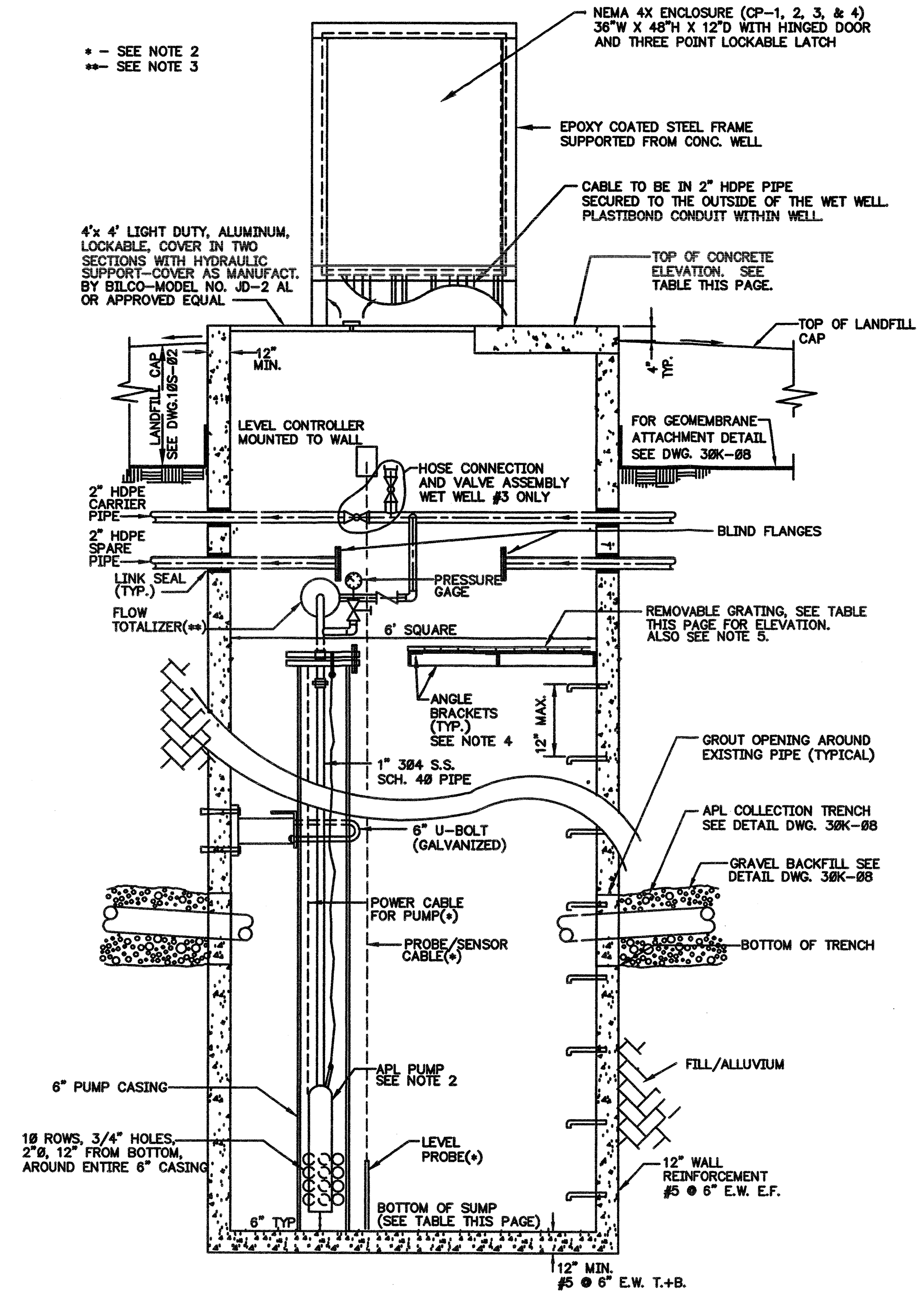
MANUAL CHANGES MADE - YES ☐ NO ☐ DWG. FILE UPDATED - YES ☐ NO ☐ MODEL UPDATED - YES ☐ NO ☐ CADD DRAWING No. 30K06.DWG 1/21/98

SUB-CONTRACT PKG. WRK. PKG. DIST. CODE

07/13/99 10:54A

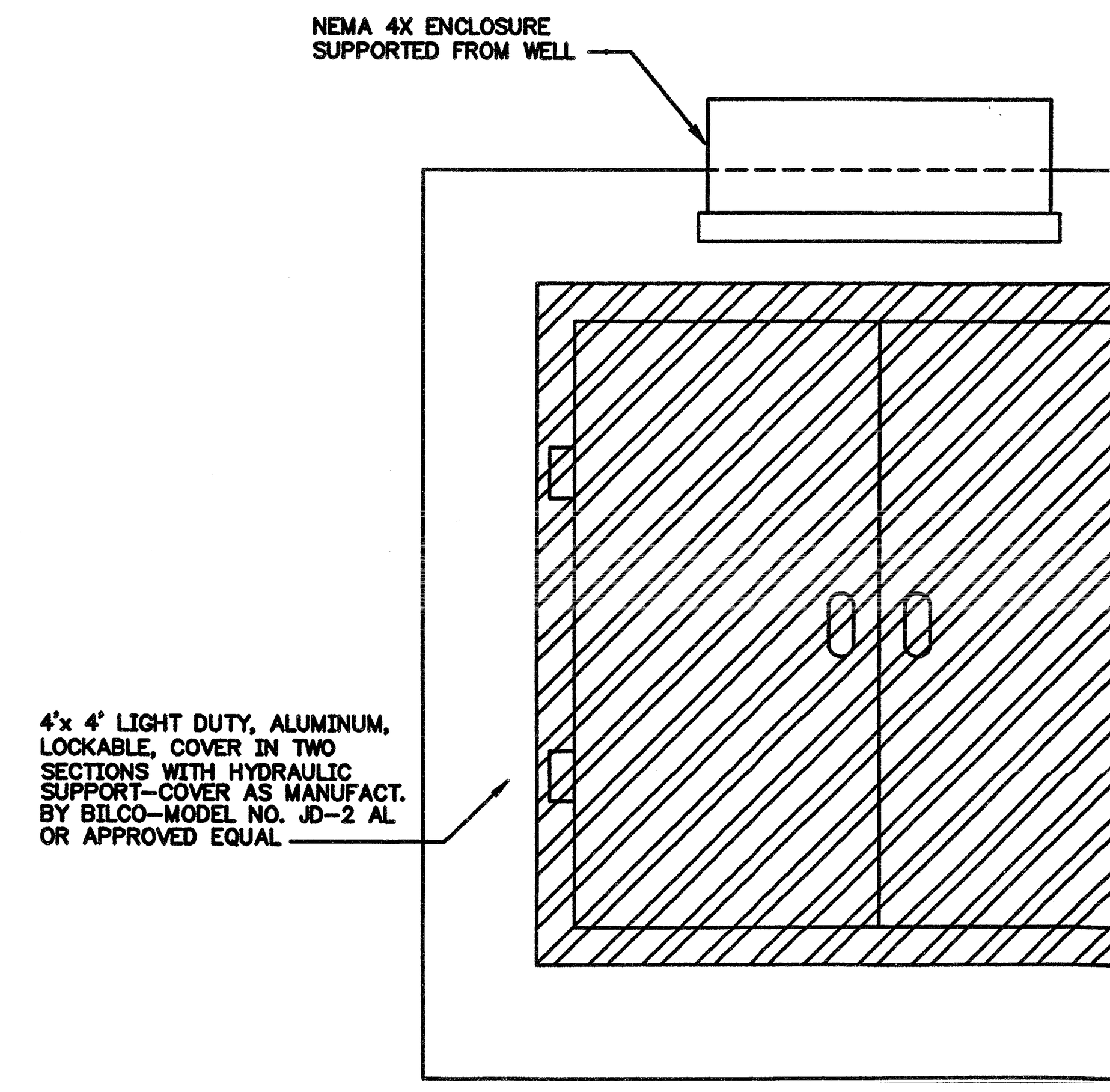


TYPICAL WET WELL DETAIL
WET WELL WW-1 AND WW-4
N.T.S.

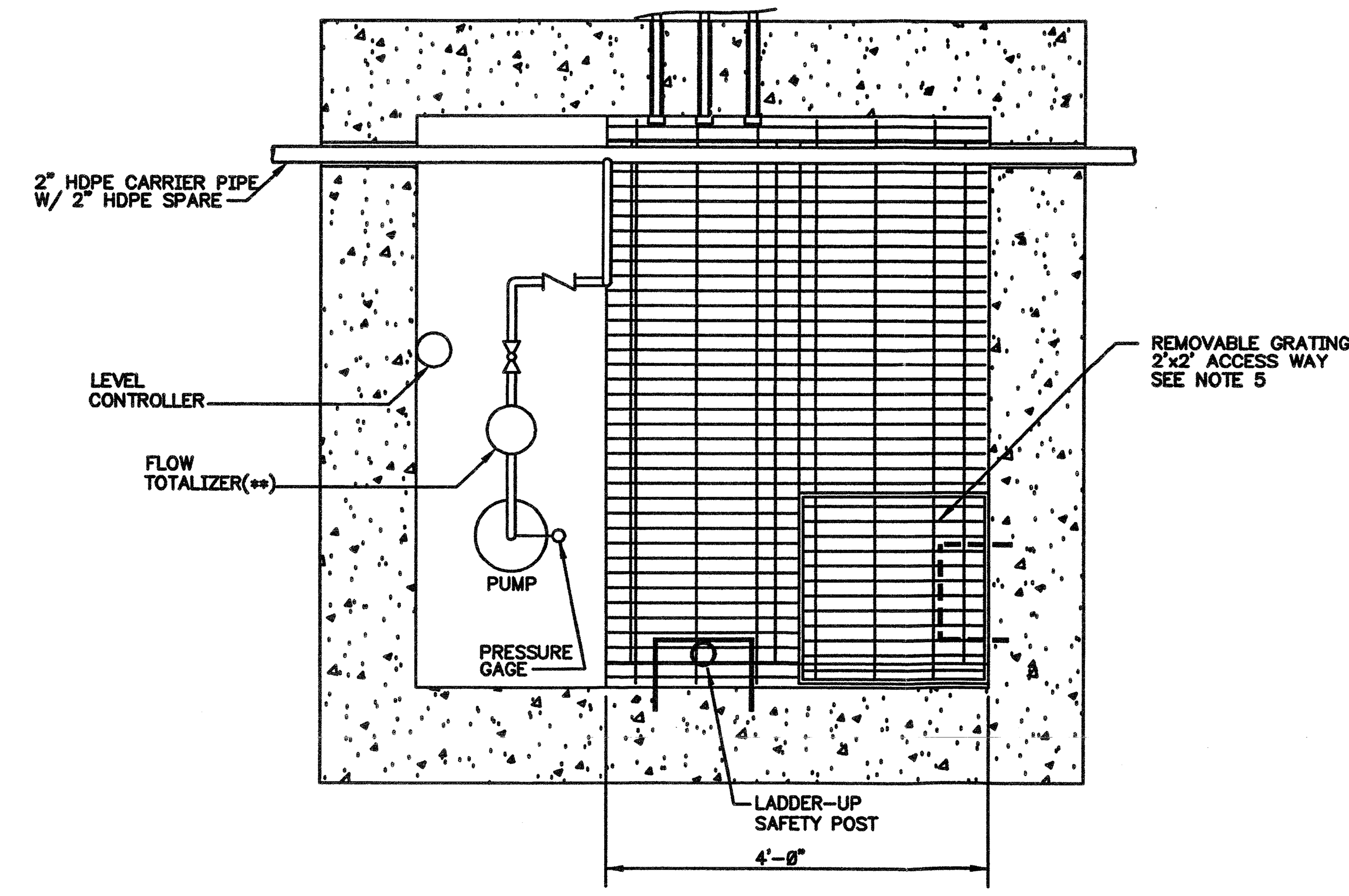


TYPICAL WET WELL DETAIL
WET WELL WW-2 AND WW-3
N.T.S.

	TOP OF CONCRETE	GRATING	BOTTOM OF WELL
WW-1	575.80	567.80	553.90
WW-2	575.48	567.43	553.68
WW-3	575.62	567.62	553.72
WW-4	575.97	567.97	554.17



TYPICAL WET WELL PLAN
EXTERIOR
N.T.S.



TYPICAL WET WELL PLAN
INTERIOR
(WW-2 & 3 SHOWN, WW-1 & 4 SIMILAR)
N.T.S.

GENERAL NOTES:

1. FOR SITE REMEDIATION PLANS SEE DWGS. 30K-02 THRU -05.
2. ALL CONCRETE SURFACES TO BE BROOM FINISHED.

NOTES – WET WELL INSTALLATION

1. FOR LOCATION OF WET WELLS SEE SITE REMEDIATION PLAN DWGS. 30K-02 THRU 30K-05.
2. FOR APL PUMP AND ACCESSORIES AND CONTROLS, SEE EQUIPMENT DATA SHEETS.
3. FOR VALVES AND FLOW TOTALIZER SEE INSTRUMENT SPECIFICATIONS. VALVES WILL HAVE 18 INCH STEM EXTENSIONS.
4. 3" x 2" x 1/2" LLV GALVANIZED BRACKET. ATTACH BRACKETS TO WALL WITH 3/4" DIAMETER HILTI KWIK BOLTS AT 12" ON CENTER.
5. PROVIDE 1 1/2" GALVANIZED GRATING. PROVIDE 1/2" CLEARANCE BETWEEN EDGE OF GRATING AND WALLS.

REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED
A	2/27/97	ISSUED FOR REVIEW	GK	
B	3/11/97	ISSUED FOR REVIEW	GK	
0	3/21/97	ISSUED FOR APPROVAL	GK	
1	1/20/98	AS-BUILT		

DWG.NO.	REFERENCE DRAWINGS
594010-10S-02	CAPPING SYSTEM & BULKHEAD – SECTIONS AND DETAILS
594010-30K-02	SITE REMEDIATION PLAN – AREA 1
594010-30K-03	SITE REMEDIATION PLAN – AREA 2
594010-30K-04	SITE REMEDIATION PLAN – AREA 3
594010-30K-05	SITE REMEDIATION PLAN – AREA 4
594010-30K-08	APL COLLECTION SYSTEM – SECTIONS AND DETAILS

FLUOR DANIEL

DESIGNED BY: G. KURYLEC
CHECKED BY: S. LAWRENCE
SUPERVISOR: C. MARS
LEAD ENGR./SPEC.: C. TAYLOR
PROJECT: C. MARS
CLIENT: OXYCHEM / OLIN

OXYCHEM / OLIN
REMEDIAL DESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

AS-BUILT APL WET WELL DETAILS

SCALE: AS NOTED | DRAWING NUMBER: 594000-30K-06C | REV. 1

MANUAL CHANGES MADE – YES ☐ NO ☐ DWG. FILE UPDATED – YES ☐ NO ☐ MODEL UPDATED – YES ☐ NO ☐ CADD DRAWING No. 30K06C.DWG 1/20/98

STATE OF NEW YORK – CHARLES TAYLOR – LICENSED PROFESSIONAL ENGINEER

DIST. CODE | VRK. PKG. | SUB-CONTRACT PKG.

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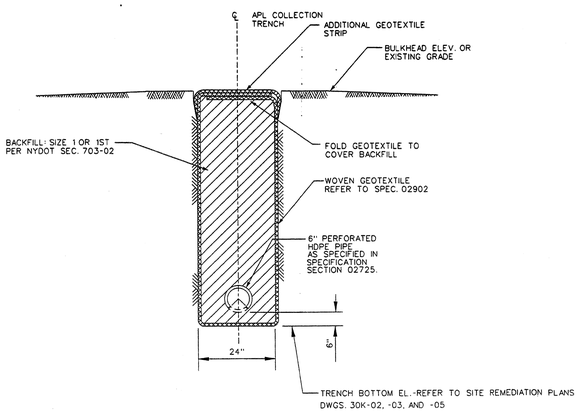
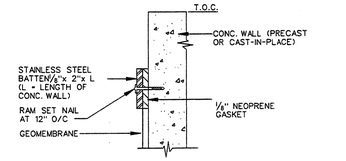


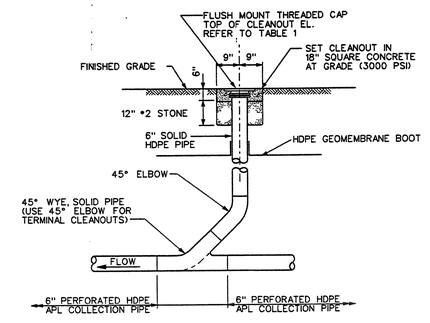
APL COLLECTION TRENCH - TYPICAL SECTION

CONSTRUCTION USING BIO-POLYMER TECHNIQUE (WITHIN LANDFILL) NTS.



GEOMEMBRANE ATTACHMENT DETAIL

N.T.S.



(REF. DWG. 30K-02, 30K-03 AND 30K-05)

TYPICAL CLEANOUT DETAIL APL COLLECTION TRENCH

(WITHIN LANDFILL) N.T.S.

TABLE -1

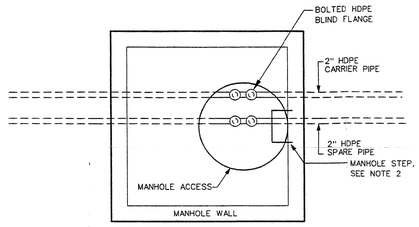
TOP OF CLEANOUT ELEVATION

CO •	NORTHING	EASTING	TOP OF CLEANOUT EL.
CO 1	1119976.07	401764.73	577.93
CO 2	1120350.80	401762.54	581.42
CO 3	1119776.23	401967.46	575.51
CO 3	1119774.09	401972.45	575.45
CO 4	1119727.87	402375.94	575.39
CO 5	1119683.30	402610.16	575.44
CO 5	1119683.36	402611.60	575.50
CO 6	1119487.11	403014.81	575.31
CO 6	1119486.06	403017.76	575.51
CO 7	1119590.03	403124.18	579.54

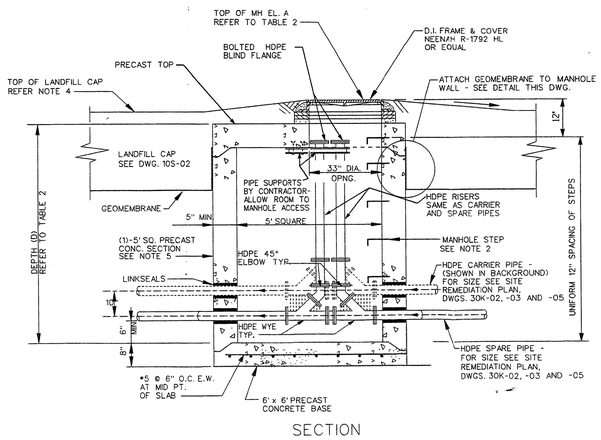
TABLE -2

IN LINE CLEANOUT MANHOLES

CO-MH •	COORDINATES EAST	NORTH	TOP OF MH EL. (A)	DEPTH (D)
CO-MH 1	401770.55	112068.47	585.07	6'-3"
CO-MH 2	401777.89	1120348.75	583.97	6'-3"
CO-MH 3	401775.31	1119951.61	577.33	6'-4"
CO-MH 4	401981.06	1119774.87	575.81	6'-2"
CO-MH 5	402366.46	1119731.53	575.66	6'-3"
CO-MH 6	402619.63	1119681.68	575.82	6'-2"
CO-MH 7	403026.11	1119484.11	576.12	6'-3"



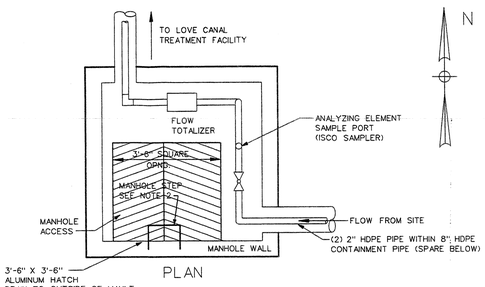
PLAN VIEW



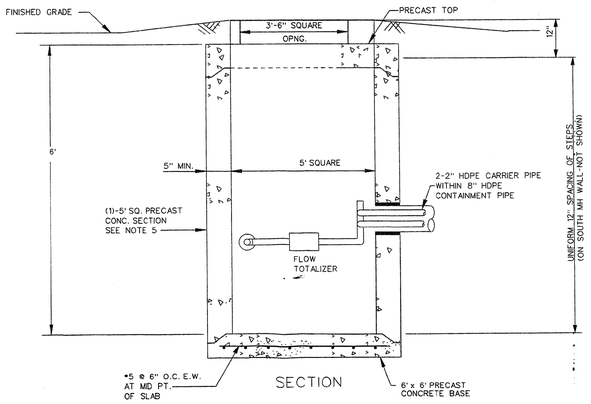
SECTION

INLINE CLEANOUT MANHOLE DETAIL (WITHIN LANDFILL)

N.T.S.



PLAN

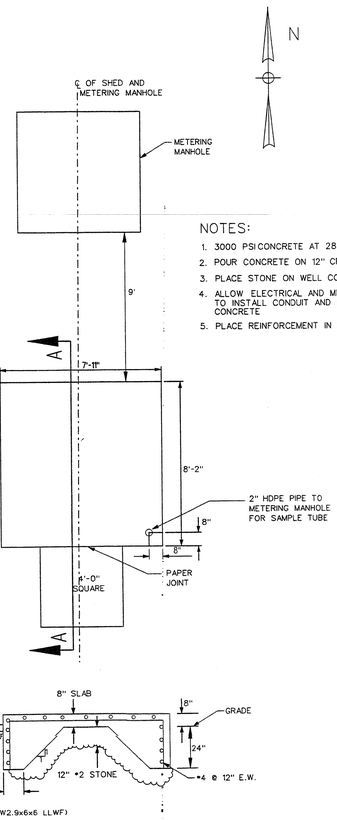


SECTION

SANITARY SEWER METER AND SAMPLING MANHOLE DETAIL

(LKG. NORTHEAST)

N.T.S.



SECTION A-A

SAMPLING SHED FOUNDATION PLAN

NOTES:

1. 3000 PSI CONCRETE AT 28 DAYS SHALL BE USED
2. POUR CONCRETE ON 12" CRUSHED STONE
3. PLACE STONE ON WELL COMPACTED SUBBASE
4. ALLOW ELECTRICAL AND MECHANICAL CONTRACTORS TO INSTALL CONDUIT AND PIPE PRIOR TO POURING CONCRETE
5. PLACE REINFORCEMENT IN CENTER OF SLABS

GENERAL NOTES: INLINE CLEANOUT MANHOLE DETAIL

1. OPENINGS FOR PIPE IN PRECAST BASE AND RISER UNITS SHALL BE PREFORMED. THE CONTRACTOR SHALL FURNISH THE FABRICATOR WITH ANGLES BETWEEN CENTER LINES, THE INVERT ELEVATIONS AND THE SIZE OF ALL PIPES. HOLES SHALL BE SIZED TO ACCOMODATE LINK SEAL.
2. MANHOLE STEPS SHALL BE NEENAH R-1982W, ALUMINUM OR APPROVED EQUAL.
3. REFER TO SITE REMEDIATION PLANS (DWGS. 30K-02, 03, AND 05) FOR LOCATIONS, INVERT ELEVATIONS AND PIPE SIZES.
4. FOR TOP OF LANDFILL CAP ELEVATIONS AT INLINE CLEANOUT MANHOLES, SEE TABLE 2 THIS DWG.
5. PRECAST REINFORCED CONCRETE CHAMBER SHALL CONFORM TO ASTM C478.
6. CAST STEEL SLEEVES INTO MANHOLES.

REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED
A	1/29/93	ENGINEERING REPORT SUBMITTAL (PRELIMINARY/INTERMEDIATE)	JTG	DRK
B	8/24/95	REVISED TITLE		
C	9/8/95	FINAL ENGINEERING REPORT (DRAFT SUBMITTAL)		
D	12/21/95	ISSUED FOR BID		
1	2/5/95	ISSUED FOR CONSTRUCTION		
2	3/21/97	REVISED IN LINE C.O. DTL., TABLE 2 & ADDED SAN MH DTL.	GZK	
3	8/20/97	REVISED CLEANOUT SCHEDULES AND SAN. MH DTL. ADDED VARIOUS DETAILS.	MCG	
4	12/12/97	REVISED SANITARY SEWER AND SAMPLING MANHOLE DETAIL. ADDED SAMPLING SHED DETAL.		
5	1/20/98	AS-BUILT		

DWG.NO.	REFERENCE DRAWINGS	DWG.NO.	REFERENCE DRAWINGS
594010-10U-07	FORCE MAIN ROUTING PLAN		
594010-30K-08A	FORCE MAIN DETAILS		
594010-30K-02	SITE REMEDIATION PLAN - AREA 1		
594010-30K-03	SITE REMEDIATION PLAN - AREA 2		
594010-30K-04	SITE REMEDIATION PLAN - AREA 3		
594010-30K-05	SITE REMEDIATION PLAN - AREA 4		

FLUOR DANIEL

DESIGNED BY	A. BUMB/U. KUMTHEKAR
CHECKED BY	S. LAWRENCE
SUPERVISOR	C. MARS
LEAD ENGR./SPEC.	C. TAYLOR
PROJECT	C. MARS
CLIENT	OXYCHEM/OLIN
RELEASE DATE	
INITIALS	
APP.DATE	
APP.DATE	

OXYCHEM/OLIN
REMEDIALDESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

AS-BUILT APL COLLECTION SYSTEM SECTIONS AND DETAILS

SCALE | DRAWING NUMBER 594000-30K-08 | REV. 5

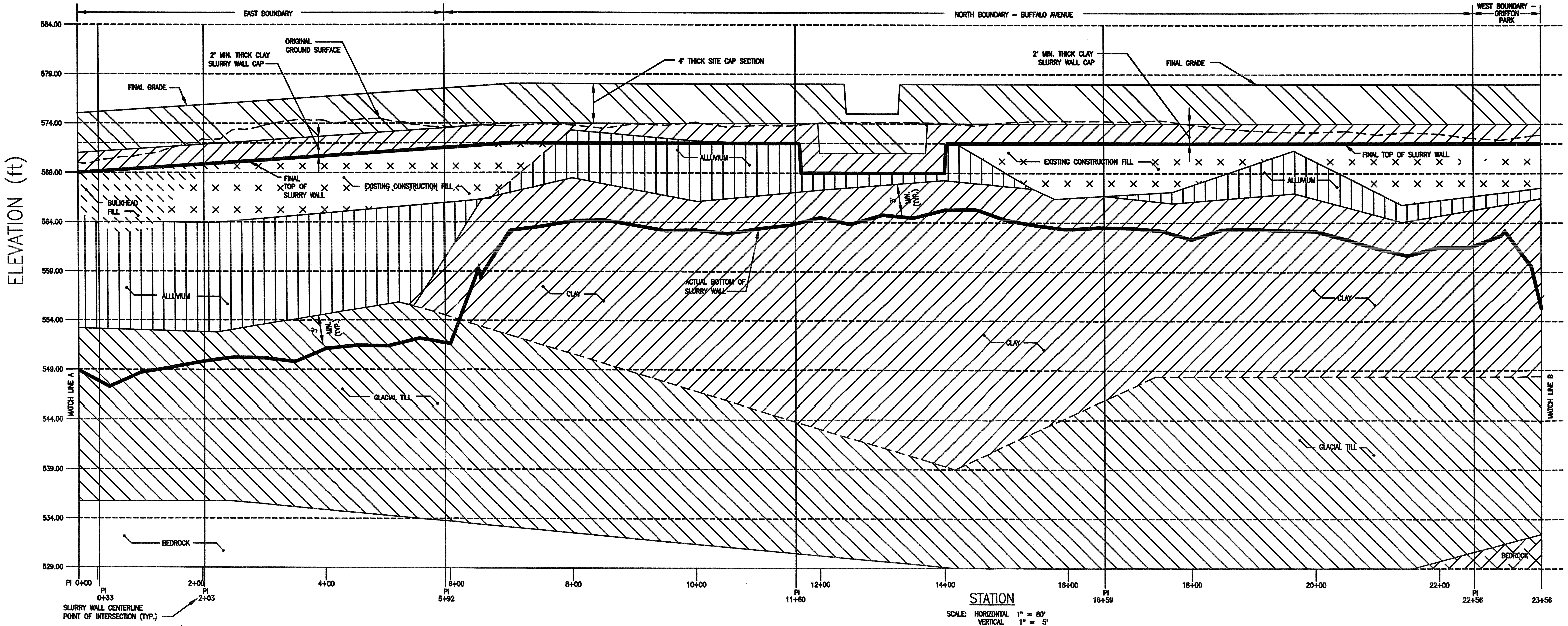
MANUAL CHANGES MADE - YES ☐ NO ☐ DWG. FILE UPDATED - YES ☐ NO ☐ MODEL UPDATED - YES ☐ NO ☐ CADD DRAWING No. 30K08.DGN

STATE OF NEW YORK CHARLES TAYLOR 073024 LICENSED PROFESSIONAL ENGINEER

5-13-99

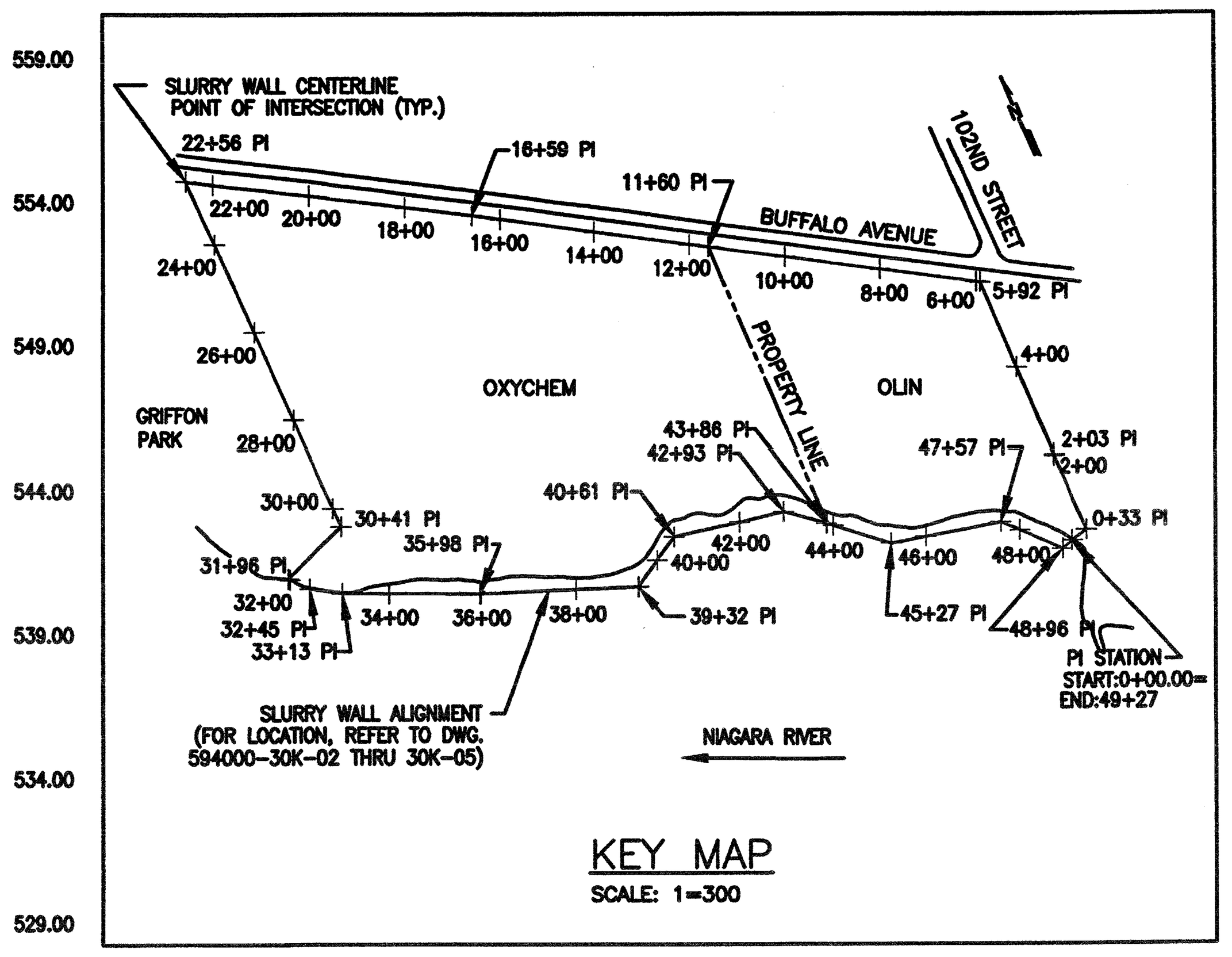
SUB-CONTRACT PKG. WRK. PKG. DIST. CODE

REDUCED PRINT SCALES 1=1 1/2" 1/4" 1/8"



NOTES:

1. DATA CONCERNING SUBSURFACE CONDITIONS HAS BEEN OBTAINED FROM BORINGS PERFORMED DURING THE PREDESIGN FIELD ACTIVITIES. BORING LOGS ARE INCLUDED IN APPENDIX A OF THE PREDESIGN FIELD ACTIVITIES REPORT.
2. A TWO FOOT THICK MIN. CLAY SLURRY WALL CAP IS TO BE INSTALLED ON TOP OF THE SLURRY WALL ALONG ITS ENTIRE LENGTH.
3. SLURRY WALL WILL BE KEYED INTO THE UNDERLYING GLACIAL TILL/CLAY A MINIMUM OF 3 FEET BELOW ANY WEATHERED ZONE.



KEY MAP
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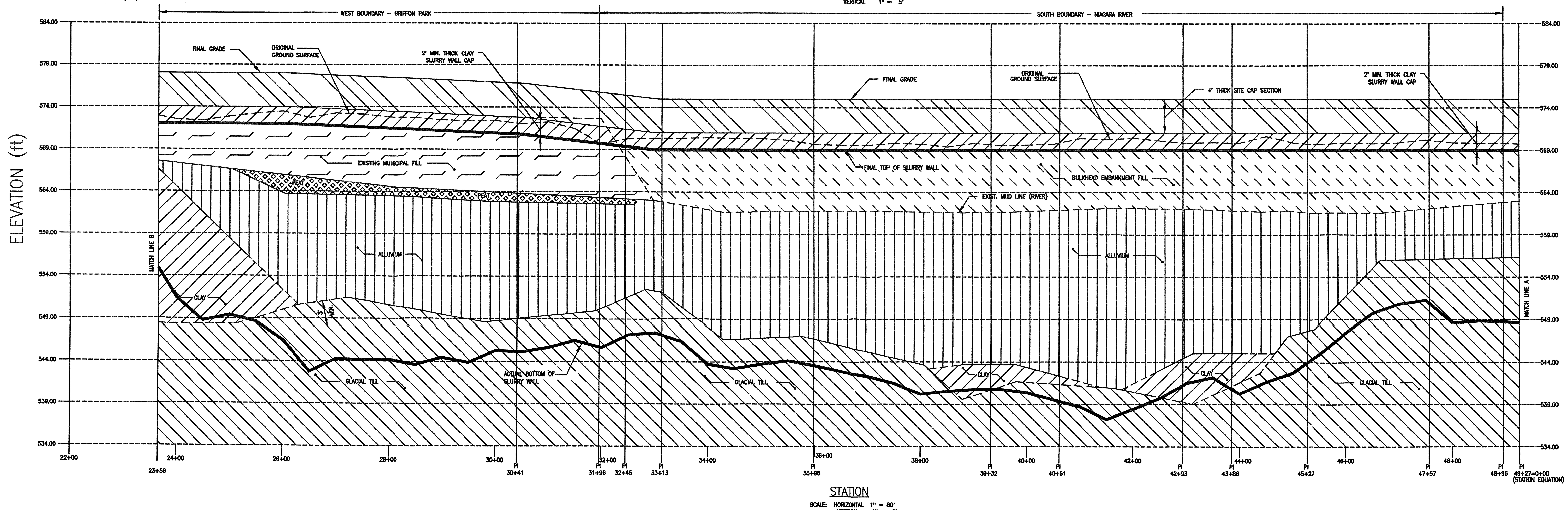

0 40 80 FT.
UNLESS NOTED OTHERWISE

REV.	DATE	REVISION DESCRIPTION	DES. CHK.	APPROVED
A	01/28/93	ENGINEERING REPORT SUBMITTAL (PRELIMINARY/INTERMEDIATE)		
B	08/08/95	ENGINEERING REPORT SUBMITTAL (FINAL)	FGS	DRK
0	12/21/95	ISSUE FOR BIDS		
1	2/5/96	ISSUED FOR CONSTRUCTION		
2	2/19/98	AS-BUILT		

DWG.NO.	REFERENCE DRAWINGS	DWG.NO.	REFERENCE DRAWINGS

FLUOR DANIEL

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DESIGNED BY: G. KURYLEC
CHECKED BY: S. LAWRENCE
SUPERVISOR: C. MARS
LEAD ENGR./SPEC.: C. TAYLOR
PROJECT: C. MARS
CLIENT: OXYCHEM / OLIN

OXYCHEM / OLIN
REMEDIAL DESIGN
102nd STREET LANDFILL SITE
NIAGARA FALLS, NEW YORK

AS-BUILT SLURRY WALL PROFILE

SCALE: AS NOTED
DRAWING NUMBER: 594000-30K-09
REV. 2

MANUAL CHANGES MADE - YES ☐ NO ☐ DWG. FILE UPDATED - YES ☐ NO ☐ MODEL UPDATED - YES ☐ NO ☐ CADD DRAWING No. 30K09B.DWG 2/5/96

SUB-CONTRACT PKG.
WRK. PKG.
DIST. CODE