City of
Waukegan
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Waukegan, Illinois 60085
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(847) 599-2500

August 29, 2008

Ms. Suzi Schmidt
Chair
Lake County Board
18 North County Street
10th Floor
Waukegan, Illinois 60085

Re: Request for Lake County Brownfield Fund Intergovernmental Effort
Waukegan Lakefront--Waukegan Harbor Slip 3 Re-Use Plan

Dear Ms. Schmidt:

The City of Waukegan requests the County's review of the following project for consideration for use of Lake County Brownfield Funds during this application period:

Environmental Construction of Re-use Plan for Indoor
Boat Storage on Former Harbor Slip 3 PCB Containment Cell
Waukegan, IL.
Waukegan's North Harbor Redevelopment Area

This application addresses the 13 points of information requested in the County's application guidance.

1. Name of Local Government

City of Waukegan
100 N. Martin Luther King Jr. Ave.
Waukegan, Illinois 60085

Contact:

John Moore, P.E.
City Engineer
Office 847-625-6854
Facsimile 847-406-3141
John.Moore@ci.waukegan.il.us

2. Public/Private Partners in Project

The City of Waukegan is highly engaged in an aggressive, well planned predevelopment phase for redevelopment of Waukegan's Lakefront. The Lakefront revitalization will have far-reaching

economic and environmental benefits for Waukegan and its neighboring municipalities, the County, and the region. Since the City adopted its Lakefront and Downtown Master Plan, we have seen considerable and effective progress in addressing environmental conditions in targeted redevelopment areas.

Waukegan Harbor, while serving certain industries, will see increased utilization in recreational and marina-related commercial uses. As Waukegan's lakefront redevelopment plan adds residential and commercial uses, the need for recreational boating and marina services has and will continue to increase. Several key harbor related projects are near implementation stage, including:

- The Waukegan Port District is securing financing for construction of floating docks and related improvements in its marina.
- The City of Waukegan and the Federal Economic Development Administration (EDA) will undertake the lowering of a water supply line that passes beneath the harbor.
- In June 2007, the City entered into Project Agreement with USEPA for Remedial Design of Harbor Dredging Project. Unfortunately, USEPA declined to sign the Project Agreement for the Environmental Dredge of Waukegan Harbor in the form proposed by the City. The City continues to work with its congressional delegation to find a solution to the harbor.

The City's existing marina operators are also key partners in this process. These important local businesses are striving to find compatible lakefront land areas for indoor and outdoor boat storage and maintenance services.

The County is an important partner in this effort. The City of Waukegan has made effective use of four prior County-sponsored Brownfield grants awarded in 2002, 2003, 2005, and 2007 for lakefront sites. The Phase II Environmental Site Assessment Report relating to the July 2005 County Brownfield Grant within the South Lakefront Development District was completed in May 2008. Of this original $100,000 grant only $25,000 was expended.

The City has informed and sought feedback and input from numerous stakeholders including government agencies, private developers, and the community using forums, town meetings, and public visioning sessions. This process will continue throughout the planning and redevelopment work efforts.

1. Narrative Description of Development/Redevelopment/Renovation Project

Former Slip 3 Re-Use Plan for Indoor Boat Storage

In 2005 the County awarded a Brownfield grant providing funding assistance to design and construct environmental containment improvements for an indoor boat storage facility on the former Slip 3 PCB containment cell. In September 2007 the City submitted a revised Basis of Design Memorandum for Alteration of Slip No. 3 Containment Cap -- Waukegan Harbor (to accommodate boat storage facility) for final approval by IEPA and USEPA (Attachment A). The revised Design addressed comments by USEPA dated 8/6/07 and IEPA dated 8/24/07 (see

attachments B and C). Legal counsel for the City and EPA are negotiating the final terms of an agreement that will authorize Larsen Marine to redevelop Slip 3 as a boat storage facility. The County's 2005 grant has been critical to these efforts.

During 1991 and 1992, PCB contaminated sediment from Waukegan Harbor was dredged as part of the Outboard Marine Corporation (OMC) Superfund Site work. During this prior project, dredged sediments were managed by thermal treatment (PCBs > 500 ppm) and via placement in a constructed containment cell (PCBs < 50 ppm). The dredged sediment having PCB concentrations between 50 and 500 ppm was placed within a containment unit constructed within the Waukegan Harbor's Boat Slip No. 3. Earlier USEPA documents refer to the Slip No.3 containment as a temporary measure, anticipated to be further addressed by OMC during further site wide remedial measures. In December 2000, OMC permanently closed its Waukegan Lakefront manufacturing plants, declared bankruptcy and has not sought re-organization.

Slip No. 3 was permanently isolated from the Inner Harbor by constructing a double-walled, braced, and soil-backfilled sheet pile cutoff wall around it. After the slip was isolated, a PCB-containment cell was built in the former slip by constructing an impermeable clay slurry wall with a minimum thickness of three feet around the slip with the slurry wall keyed 3.5 feet into the underlying clay till. Sediments from Slip No. 3 with PCB concentrations in excess of 500 ppm were removed from the former slip and treated on-site. The Upper Harbor was dredged and contaminated sediments removed to a 50 ppm PCB cleanup level. The dredged materials (50 to 500 ppm levels) were placed in the newly-constructed Slip No. 3 containment cell. A groundwater extraction well system was installed to maintain an inward hydraulic gradient.

Figure 1--Former Slip No. 3 PCB Sediment Containment Cell Proposed for Indoor Boat Storage Re-Use

Attachment D presents engineering plans including two alternatives for developing a safe and protective re-use plan for the Slip 3 sediment containment cell area. This type of innovative re-use of this lakefront brownfield site and former disposal site places an underutilized, un-

developable parcel back into compatible, productive marina-related use. Attachment A also contains several drawings and renderings of the Slip 3 indoor boat storage re-use concepts and Engineer's Cost Estimates. As noted above, with the assistance of the 2005 County Grant the City has taken this concept to 90% level of design for final approval by EPA.

The County Brownfield Grant would specifically assist in conducting the following tasks for this Brownfield redevelopment site:

- Construct new engineered environmental containment features that would facilitate the subsequent boat storage facility construction. *Brownfield Grant funds would not be utilized for civil, infrastructure, or boat storage building construction.*

1. Anticipated Cost of Remediation/Cleanup Efforts

Table 1 defines the anticipated County Brownfield Grant work efforts and budget for re-use of the approximate 3-acre lakefront property.

Table 1
County Grant/Matching Expenditure Estimate

Task	Estimated Cost:
Modify Slip 3 groundwater treatment/extraction system	$ 28,000
Remove existing Slip 3 Cap	$ 51,000
Disposal/relocation of surcharge below cap (3000 cy)	$ 30,000
Off-site disposal of PCB-impacted surcharge as <50 ppm solid waste (300 cy)	$ 13,500
Install new membrane cap & Drainage layer	$ 167,250
Project/Construction Management	$ 25,000
Total Estimate	**$ 314,750**
Matching/Contributing Funds	**$ 214,750**
County Grant Request	**$ 100,000**

2. Total Project Costs

Total project costs for planning, designing and constructing an indoor boat storage facility on the former Slip 3 PCB containment cell are preliminarily estimated as outlined in Table 2.

Table 2
Preliminary Estimate of Total Project Costs

Task	Units Installed	Cost
Remove Topsoil and Cover Sand	1,800 yd^3 topsoil 5,200 yd^3 sand	$ 59,000
Remove Liner & Surcharge Sand[1]	10,300 yd^3 14,000 tons	$ 466,000
Install H-Piles & Tie Rods[2]	61 H-Piles 9 Tie-Rods	$ 224,000
Piping, Well Vaults & Harbor Rock	2 vault (12 yd^3 TSCA) 300 tons	$ 60,000
Install Grade Beams	210 yd^3 concrete (27 yd^3TSCA)	$ 87,000
Install Geogrid, Geonet & Liner	32,000 ft^2 grid 94,000 ft^2 net & liner	$ 229,000
Earthwork & Place Stone	CA4 1,030 Tons CA6 3,775 tons	$ 86,000
Concrete Slab & Asphalt Paving	1,520 yd^3 concrete 3,980 yd^2 asphalt	$ 444,000
Restoration & Seeding	n/a	$ 11,000
TOTAL		$ 1,666,000
Engineering Oversight		$ 42,000
	Total with Oversight	$ 1,708,000

3. Amount of County Brownfield Funds Requested

The City requests **$100,000** of County Brownfield Funds for this project.

4. Detail of Other Local Funds to be Used as Part of Project

The City will contribute TIF monies and/or Home Rule Sales Tax Revenue available for the Lakefront Redevelopment work. Property owner/developer contributions to the total project work are also anticipated.

5. State/Federal Funding

At present, State and Federal funding has not been granted for this project.

6. Location of Property

Figure 1 shows the location of the property. Slip 3 is located on Sea Horse Drive between Larsen Marine and National Gypsum.

7. Listing of Contaminants

Contaminants on the property are detailed in the "Basis of Design Memorandum (Attachment A), USEPA memorandum dated 8/6/2007 (Attachment B), and IEPA letter dated 8/24/2007 (Attachment C).

8. Copies of Engineering Studies

Attachment A provides the engineering study completed to date.

9. County Funds to be Reimbursed if Provided for Phase I and/or II Studies and Project Completion is Not Finalized.

The City believes that this project will be completed and that such data collected by this project will be beneficial to the overall lakefront redevelopment.

10. County Brownfield Funds to be Contributed on a Reimbursement Basis

The City effectively manages several reimbursement-type grant programs and has a demonstrated proficiency in administratively tracking and documenting eligible reimbursement costs.

The City of Waukegan appreciates the County's careful review and consideration of this Brownfield Grant request. We would be pleased to discuss the project and answer any questions the County's Community & Economic Development Committee may have related to this Brownfield Grant request. Please do not hesitate to contact Ms. Robin Schabes at 847/856-6425

Sincerely,

Richard Hyde
Mayor, City of Waukegan

Attachment A
Attachment B
Attachment C
Attachment D

CC: Noelle Kischer, Planning Department
R. Schabes, Director of Downtown & Lakefront Redevelopment
J. Moore, City Engineer
G. Gibson, Asst. County Administrator

Attachment A

Basis of Design Memorandum
For Alteration of Slip No. 3 Containment Cap

Basis of Design Memorandum
Alteration of Slip No. 3 Containment Cap
Outboard Marine Corporation Superfund Site

On June 23, 2005, the City of Waukegan (City) and the United States Environmental Protection Agency (USEPA) entered into a Supplemental Consent Decree in the matter of "**United States of America, and People of the State of Illinois, Plaintiffs v. Outboard Marine Corporation, Defendant, and the City of Waukegan, Illinois, Defendant-Intervenor**" (Civil Action No. 88-C-8571)("Supp. Consent Decree"). Under the Supp. Consent Decree the City assumed certain responsibilities for the operation and maintenance of three containment cells at the Outboard Marine Corporation (OMC) Superfund Site ("Site"). The Supp. Consent Decree also contemplated the City's exercise of an Option Agreement and the redevelopment of the Site consistent with remedial measures approved by USEPA. Paragraph 51 of the Supp. Consent Decree further provides that the City may lease portions of the Site to third parties. On September 30, 2005, by exercise of the Option Agreement, the City took title to the Site, including the portion of the Site contiguous to the Waukegan Harbor commonly known as "Slip No. 3".

The City at the time of entering into the Supp. Consent Decree and continuing afterwards has had discussions with Larsen Marine Service (Larsen) on the possibility of leasing Slip No. 3 from the City for the purpose of placing a dry rack storage facility near their existing marina operations at the north end of Waukegan Harbor. This Basis of Design Report addresses a conceptual design (30% design) for the construction of a 130-foot wide by 240-foot long dry rack storage building on top of the existing Slip No. 3 Containment on the west side of the current Larsen operation.

1.0 Background

Prior to the remedial action at Waukegan Harbor (prior to 1989), Larsen operated their Marina business from Slip No. 3 the northernmost existing slip off the main harbor at Waukegan. Slip No. 3 was also the location of the outfall pipe from the Outboard Marine Corporations (OMC's) aluminum engine casting operation and contained more than 90% of the mass of polychlorinated biphenyls in Waukegan Harbor. Since complete removal of the sediments in Slip No. 3 was infeasible, a partial removal was completed for subsequent treatment to substantially reduce the mass. The residual PCB in Slip No. 3 along with the sediment from the upper Waukegan Harbor were enclosed in the Slip as a permanent contained location with protective barriers to prevent contact with ground water, surface water, and soil. This area is known as the Slip No. 3 Containment.

The construction sequence for the Slip No. 3 Containment included the following steps:

1. Slip No. 3 was isolated from the remainder of the Upper Harbor by constructing a double sheet pile wall (two walls twenty-feet apart) across the mouth of Slip No.

3, Picture #1 and backfilling the area between the two walls with a bentonite-sand mixture.

2. The sediment containing the largest part of the PCB mass (approximately 85%) in Slip No. 3 was removed for treatment on other parts of the OMC property, Picture #2.
3. A three foot wide soil-bentonite wall constructed from native sand at the site was installed along the northern, western and southern perimeters of Slip No. 3 and tied into the backfill between the two sheet pile walls across the mouth of the Slip, thus preventing the unrestricted interchange of ground water inside and outside of the containment area (the bottom of Waukegan Harbor is an impermeable glacial till formation known locally as the Chicago hardpan).
4. Approximately thirty thousand cubic yards of sediment (a silt and sand mix) was hydraulically dredged from the Upper Harbor and placed into Slip No. 3 (at completion of the dredging the sediment from the Upper Harbor filled Slip No. 3 to within two to three feet below ground surface, Picture #3).
5. A clean sand cover was spread on the sediment starting at the outside edge and progressing inward as the sediment consolidated and would support the sand cover, Picture #4. Once the sand cover extended across the entire surface of the slip at original grade, additional surcharge sand was moved on top of the cover to accelerate the consolidation of the sediment.
6. Two years after placing the surcharge cover, settlement was complete and the surcharge cover was graded to form the present topographic configuration of the Slip No. 3 containment.
7. A 60-mil HDPE liner, geogrid drain layer, protective geotextile, 18-inches of sand barrier layer and six-inches of topsoil was then placed over the contoured surcharge sand.
8. Two recovery wells were installed in the containment immediately after placement of the sand cover and have operated with a water treatment plant to keep the ground water elevation inside of the containment lower than the outside ground water level since completion of the containment in 1991.

The present topography of the Slip No. 3 Containment Cell is shown on Sheet 1 of 5, 30% Design Package.

During the hydraulic dredging operation, the sediment was deposited near the east end of Slip No. 3 and water was withdrawn for treatment near the west end of the containment. The dredging operation caused the sandier fraction of the sediment to be deposited in the east end of the containment near the double steel sheet pile cutoff wall with the finer organic silt in the west end of the containment.

The surcharge fill consolidated the deposited sediment until significant settlement was completed. An additional surcharge effect from dewatering the containment continues to secure the sediment.

The containment design for the cover that was placed over the graded surcharge sand was based on the following criteria in the approved Remedial Action Plan[1]:

1. The top of the containment cell will be at least 2-feet above the monthly mean 100-year lake level (40 CFR 761.75).
2. Containment cell cover design shall comply with the RCRA regulations, as outlined in 40 CFR 264.310.
3. A topsoil cover, if used, will be a minimum of 6-inches thick.
4. The slope of the cover will be between one and five percent.
5. The cover will have a surface drainage diversion system around the perimeter of the cap.
6. The drainage layer below the top of the cap will have a hydraulic conductivity of greater than 1×10^{-2} cm/sec.
7. If a topsoil cover is used, the drainage layer will be overlain by a filter media.
8. The bottom layer will be located two feet below ground surface and will have a slope of at least two percent.
9. The bottom layer will consist of a synthetic liner with a minimum of 40-mil thickness.

2.0 Proposed Alteration to Slip No. 3 Cap

Larsen proposes to install a 130-foot wide by 240-foot long dry rack boat storage building on top of Slip No. 3 containment for use in their Marina operations. The dry rack storage building would have a center aisle 55-feet wide with steel racks on each side of the aisle for storage of 30-35 foot long powerboats. The boat rack is likely to be tall enough to stack four boats (final decision to be made in later stage of the design). The building would be a steel frame building with the columns supported on spread footings and with a grade beam between the footings to carry the backside of the boat racks and the sidewall of the building. The steel racks that support the stacked boats would require another footing along the length of the building aisle. Typical pictures of a dry rack storage facility are shown on Picture 5.

The boats are taken in and out of the rack system using a large forklift truck capable of picking boats up to 20,000 pounds and with a boom that allows for placement in the water at up to –12 feet below grade. The forklift with the boat places a load on the dual wheel rear (non-steering) axle of the forklift that is equivalent to a loaded semi-truck (40,000 pounds). A picture of a typical forklift for dry rack storage is shown on Picture 5.

The property of Slip No. 3 is within the area of the 100-year flood elevation of the City and will have a floor slab elevation of 584 feet (NAD_{88}). A plan view of the building on the Slip No. 3 site is shown on Sheet 2 of 5. The top of the steel sheet pile wall is at 584.5 feet (NAD_{88}) and is approximately the same elevation as the proposed building floor slab. At the sheet pile wall the armor rock that was installed in 1991 to provide wave attenuation will be removed to elevation 571 feet (NAD_{88}) at two locations to allow

[1] Canonie Environmental, "Appendix I-11, Design and Analysis Report", February 1991

for lowering of the boats into the water even at the lowest water levels ever recorded in Lake Michigan. The wave attenuation rock will be removed over a 100-foot wide and a 50-foot wide area to allow for multiple launching tie-off locations to facilitate launching and retrieval operations. The location of the launching and retrieval areas is shown on Sheet 2 of 5. A cross-section of the wall showing the wave attenuation rock that will be removed is shown on Sheet 3 of 5.

An analysis of the stability of the sheet pile walls that contain Slip No. 3 is included in Appendix A. The wall, under the present conditions and without the slide resisting effects of the toe rock, is adequate for the structural system of the front wall face and the tieback system. The stresses in the sheet pile wall are well below the allowable stresses for steel bulkhead design even without the toe rock.

An initial analysis of a likely building support system is based on the sediment and sand cover classifying as loose sand. The analysis is also based on an assumed perimeter column load of 100,000 pounds per column and a boat rack with 20,000-pound boats stacked four high. A seven-foot square spread footing keeps the bearing pressure at less than 2000 pounds per square foot the prescribed load for loose sand as specified in the 2003 International Building Code. The rack footing closest to the aisle would spread its load to a grade beam with a three foot wide footing to maintain a similar bearing capacity. A preliminary estimate of settlement indicates that the immediate settlement when the load is added could be up to ½ inch (the load would consist of the racked boats and snow load on the roof). Based on preliminary analysis, the foundation on the drawings are shown as spread footings bearing on the ground at 42-inches below grade for frost protection and with a grade beam between columns to carry the load of the sidewalls and the boat rack. The preliminary analysis of the bearing capacity and settlement are enclosed in Appendix A.

To investigate the soil conditions under the building, a sampling program is proposed to collect information on the density and characteristics of the consolidated sediment at a location on the east and west ends of the proposed building. Each soil boring will be advanced continuously from just below the existing HDPE liner until contact with the glacial till and will be sampled to determine density, water content, and grain size. The sampling plan is presented in Appendix B. Soil sampling for the areas of the Slip No. 3 containment outside of the original Slip No. 3 sheet pile wall are not proposed, since many soil borings were taken in this area during design of the soil-bentonite wall and are available for use in design of the building footings.

After completing the soil-sampling program, the conceptual footing design shown on the drawings will be modified to support the building loads. If settlement of a spread footing is too great in the areas of sediment fill to meet the tolerance requirements for the building and storage rack system, the footings may have to be supported on displacement piles (H-piles or open end pipe piles) that do not bring sediment to the surface.

The area to the west of the proposed building would be developed as a gravel yard area for surface storage of boats during the off-season and parking during the boating season.

The area would maintain a pitch centered on the entrance to the rack storage building at 584.5 that will allow the liner on top of the Slip No. 3 containment to slope at the minimum slope towards the soil-bentonite walls on either side of the containment.

The recovery wells will remain at their present locations with the well top elevation lowered into a concrete vault at each location. The vault will be designed to sustain the load of the operations in the dry-rack storage building with the cast-iron lid highway load rated to support the loaded forklift. The electric and piping in the vaults will be rerouted under the new liner to a new treatment plant location near the power source at the west end of the containment. Electric power to the well vaults will be above the new liner system and clean water from the treatment plant will discharge through a new pipe to CB-A at the upstream end of the perimeter drainage system. The locations of these features and the plan for the well vault are shown on Sheet 2 of 5 and Sheet 4 of 5.

The new HDPE liner/drainage grid/geotextile cover will be installed to slope from the center of the altered slip sand cover to the soil-bentonite wall top at a consistent slope of approximately 2%. Within the building footprint, there will be no liner. The building system will perform the infiltration limiting effects of the liner. The HDPE liner will be attached to the building at the perimeter grade beam with a stainless steel batten strip, as shown on Sheet 4 of 5.

Larsen may wash the hulls of the boats prior to racking the boats. The plan shows a series of floor drains for the purpose of capturing the wash water. Since these drains will be under the floor without the benefit of underlying liner, the conceptual design is to double enclose the drain lines with the discharge to the storm drainage system. Larsen will also install electric, water and natural gas service to the building. The electric and natural gas will be installed above the liner with the water service installed in a sleeve below the liner to maintain freeze protection for the water supply.

3.0 Investigation of the Sand Cover

The alteration of the cap of the Slip No. 3 Containment to allow for placement of the boat dry rack storage facility should all occur within the surcharge sand that was placed above normal grade at the site. The sand was taken from a large stockpile of sand that was on the former GM coke plant site adjacent to the Upper Harbor. The source of the sand was a United State Army Corps of Engineers dredging program in the entrance channel of Waukegan Harbor (out in the Lake) that was completed in the early 1970's. It is expected that the sand may contain some PCB's at concentrations less than 1ppm, but not the same concentration as the sediment that was placed into the cell from the Upper Harbor (the sediment from the upper harbor included all of the sediment in the harbor with concentrations of PCB greater than 50ppm).

To confirm the PCB concentration of the sand cover and to verify that sediment will not be in the area that will be excavated to lower the cap on the containment cell, a series of soil cores will be collected and analyzed for PCBs. The sample locations are shown on

Sheet 2 of 5. The details of the sampling program and the sampling procedures are presented in Appendix B.

4.0 Basis of Design

The basis of design for the alteration of Slip No. 3 containment for use as a dry rack boat storage facility is centered on four basic design parameters:

1. Provide a new cap that meets the original design criteria or provides equivalent function.
2. Provide a foundation support system for the dry rack storage building that will meet the load and settlement criteria without removal of the sediment from the containment.
3. Identify the surcharge/cover sand as a separate material from the sediment and keep alterations in the surcharge/cover sand or above, including building foundations.
4. Maintain the integrity of the existing recovery well, treatment system and water level monitoring system

4.1 Cap design criteria

The altered Slip No. 3 containment will directly meet most of the previous cap design criteria. The major variation is the use of the building envelope to perform as the upper impermeable liner under the building footprint. The building provides a dual envelope; with the building roof shedding rainwater to down drains that will be directly piped to the perimeter storm water drain system. The floor slab of the building acts as the secondary envelope to prevent surface water from entering the containment. The floor slab will be constructed using PVA additive in the concrete to reduce shrinkage and temperature cracking of the floor slab. If an expansion cold joint has to be incorporated into the final design of the floor slab, the joint will be placed on the high point in the floor drain slope and will be sealed with a waterproof mastic compound.

Compliance with the original design criteria are presented in Table 1

Table 1
Cap Design Criteria

Design Criteria	Means of Compliance
Cap 2-feet above 100-year mean lake level	Low point of cap liner to remain at present elevation on the top of the soil-bentonite wall
Compliance with RCRA regulations	Building provides equivalent permeability less than or equal to the permeability of the bottom liner (glacial till). It also provides long-term minimization of migration of liquids through the closed containment and

	will function with minimum maintenance and will be resistant to erosion and abrasion.
6-inches of topsoil cover where required	Most of the topsoil cover will be removed and replaced with gravel or paved surfaces
Slope of 1-5%	Slope of liner will be 1-2% minimum on west end of containment
Surface drainage ditch around perimeter	Existing surface drainage and surface water storm drain around perimeter will remain in-place.
Drainage layer permeability > 10^{-2} cm/sec	New drainage layer may consist of gravel fill over protective layer that provides drainage of full gravel layer with a permeability of more than 10^{-2} cm/sec
Drainage layer covered with filter layer	Topsoil likely used only around the edges of containment. Filter layer will be present.
Cover two feet below ground surface	To maintain slope cover over liner at center of containment on west end of containment may have 1.5 feet of cover (combined gravel and paving). However, cover will be drainable layer in its entirety, will not be subject to freeze-thaw, and will have a hard non-erosive surface layer.
Synthetic liner at least 40-mil	Synthetic liner where used outside of building footprint will be 60-mil HDPE or LDPE.

4.2 Foundation Support System

The probable design criteria will be a settlement limitation of ½ inch differential settlement between footings for a light steel frame structure supporting the loads of snow and stored boats. The floor slab and outside flatwork concrete for the forklift operation will be designed to support an AASHTO H-20 loading (the loading from a semi-truck). The slab will be 6-8 inches thick with appropriate reinforcing and will bear on a gravel sub base layer that will also act as the drain layer for the cap (see above).

If test results from soil borings taken in the sediment indicate unacceptable settlement with only a spread footing bearing in the surcharge sand, an alternate foundation using displacement piles may have to be used on some of the footings.

4.3 Separation of Surcharge/Cover Sand from Sediment

PCB content will identify the surcharge/cover sand. Sand removed from the surcharge/cover area will be managed in accordance with the requirements of the Illinois Environmental Protection Act. Sand having concentrations less than 1 ppm may be

reused on the Site with the concurrence of the Illinois Environmental Protection Agency (IEPA) and USEPA. Color content will be recorded during investigative sampling to determine if visual factors may be used to delineate the surcharge/cover sand from the underlying sediment.

The design testing will be supplemented during the implementation of the alteration to include additional testing to properly classify sand removed from below the original HDPE liner with the following expected classifications:

1. Less than 1 ppm PCB, may be eligible for reuse on the Site with the concurrence of IEPA and USEPA
2. Equal to or greater than one and less than 50ppm, disposal in a Subtitle D solid waste landfill.
3. Equal to or greater than 50ppm, disposal in a TSCA-approved landfill.

4.4 Existing Recovery Well, Treatment and Monitoring System

Recovery well vaults will be designed to allow for safe, manned access with appropriate ventilation to access the electrical and piping in the vault. The vault will be designed for the AASHTO highway loadings including selection of a manhole that meets the H-20 load requirements.

The treatment plant will be moved to the new location shown on Sheet 2 of 5 with a new floor drain discharge overflow into the containment area and a new power supply and drain line installed. Drainage of treated water will be to the storm sewer pipe on the south side of the containment cell. Pipes from the recovery well to the water treatment facility will be installed under the new HDPE liner and electrical will be installed over the top of the liner in the sub base/drainage layer.

Some of the piezometers and monitoring wells will be changed from exposed to flush-mount covers to allow for surface storage or parking uses of the altered Slip No. 3 cap. No other change is proposed for the water level and water quality monitoring system.

Photograph 1

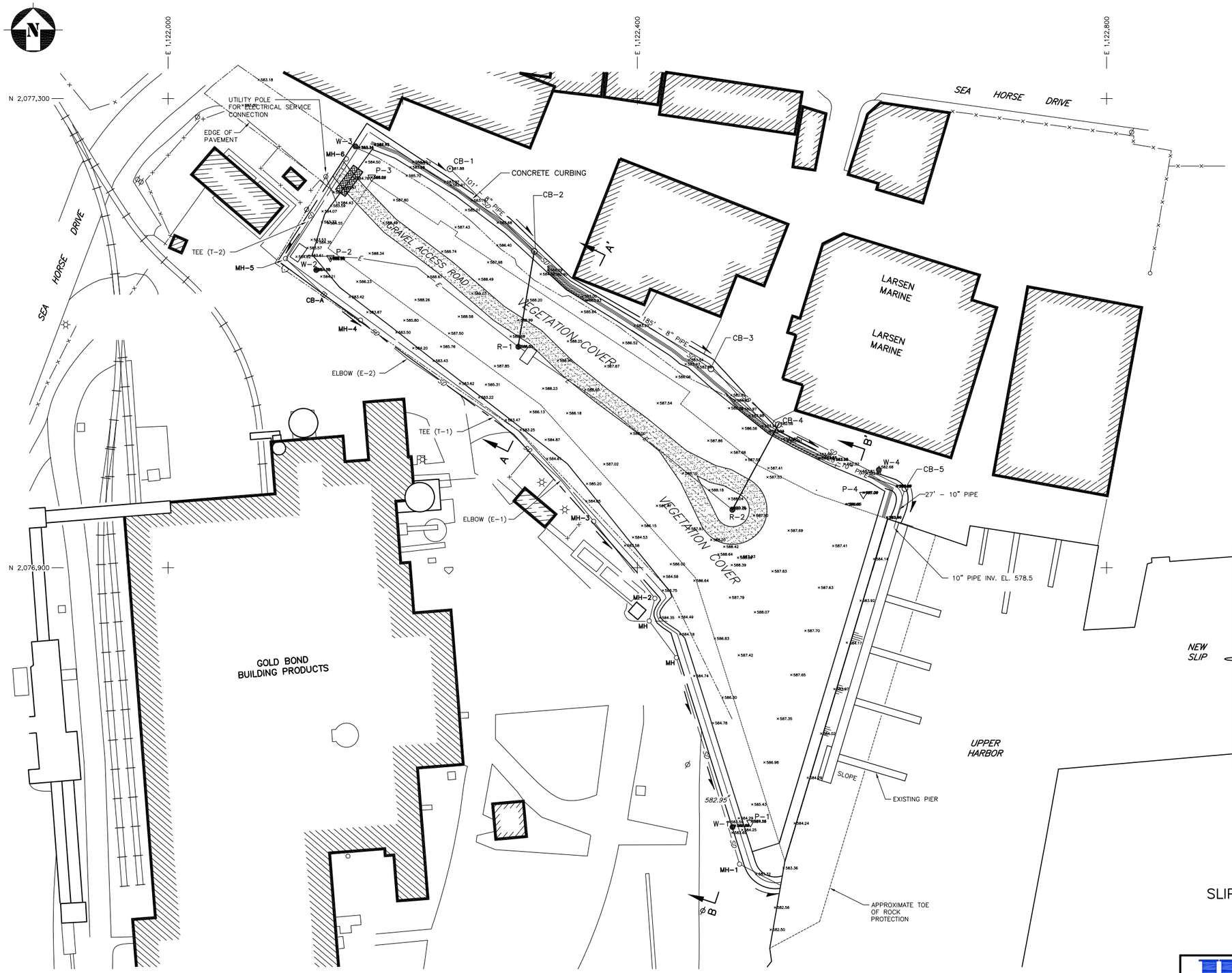
Photograph 2

Photograph 3

Photograph 4

Photograph 5

DRAWING NUMBER 06-001-D1



LEGEND:

- FENCE
- RAILROAD
- UTILITY POLE
- LIGHT POLE
- SOIL BENTONITE WALL
- SOIL BENTONITE WALL WITH PROTECTIVE CONCRETE CAP
- CB — CATCH BASIN
- R-1 — RECOVERY WELL
- P-1 — PIEZOMETER
- W-1 — MONITORING WELL
- E — POWER LINE (UNDERGROUND)
- DIRECTION OF FLOW
- SD — STORM DRAIN
- MH — MANHOLE (4' DIAMETER)
- PROPERTY LINE (APPROXIMATE)

NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
2. COORDINATES ARE REFERENCED TO ILLINOIS STATE PLANE EAST ZONE.

SCALE
40 0 40 80 FEET

EXISTING SITE PLAN
SLIP No. 3 CONTAINMENT CELL ALTERATION
PREPARED FOR
CITY OF WAUKEGAN

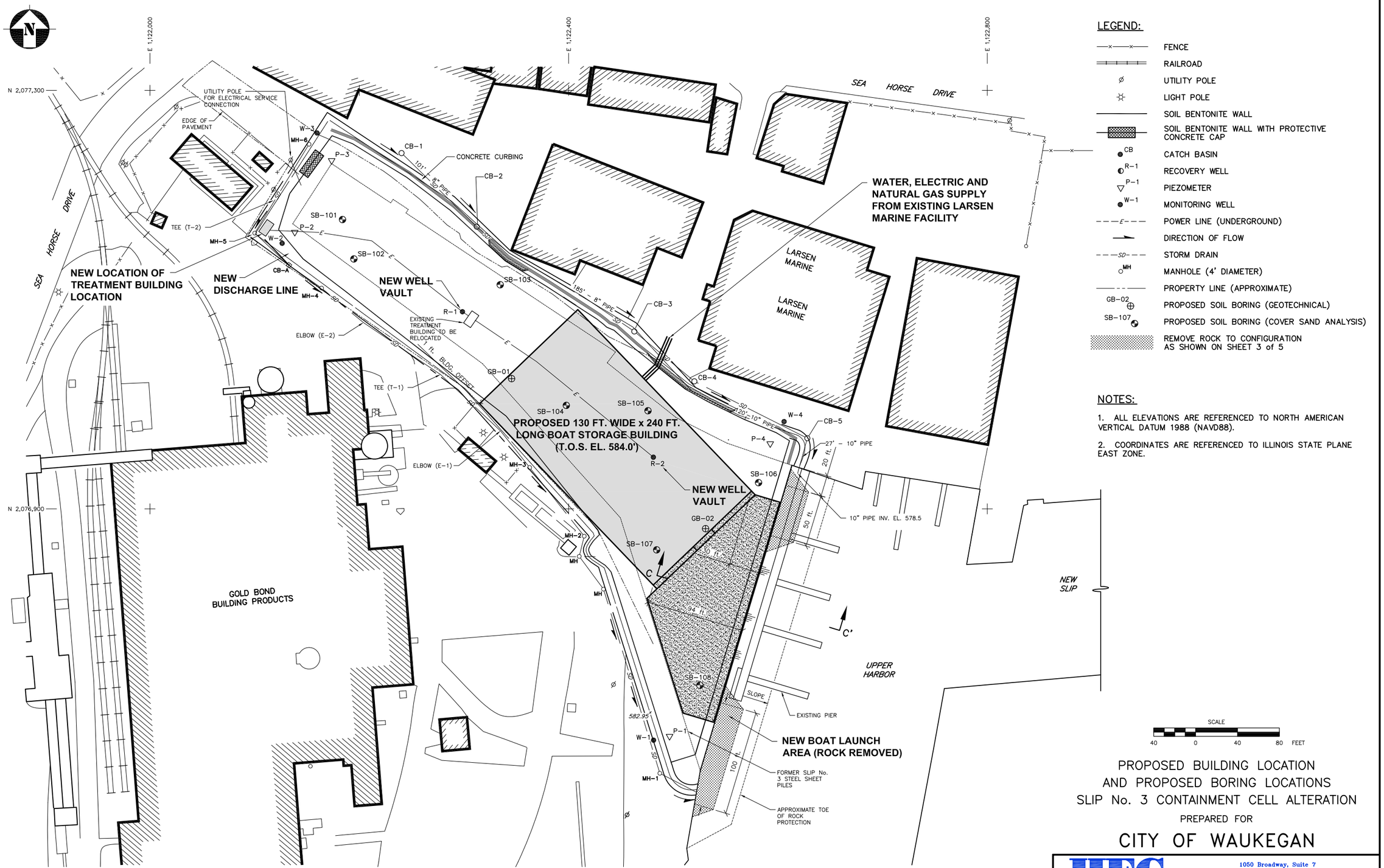
No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
△			M_A_M		

REFERENCE:
– CANONIE ENVIRONMENTAL SERVICES CORP. RECORD OF CONSTRUCTION DRAWING No. 87-126-E84.

HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES™ Company
1050 Broadway, Suite 7
Chesterton, Indiana 46304
Phone: (219) 926-5508 · Fax: (219) 926-8446

DATE:	04-19-06	SHEET 1 of 5	DRAWING NUMBER	△
SCALE:	AS SHOWN		06-001-D1	

DRAWING NUMBER 06-001-D4



LEGEND:

- FENCE
- RAILROAD
- UTILITY POLE
- LIGHT POLE
- SOIL BENTONITE WALL
- SOIL BENTONITE WALL WITH PROTECTIVE CONCRETE CAP
- CB — CATCH BASIN
- R-1 — RECOVERY WELL
- P-1 — PIEZOMETER
- W-1 — MONITORING WELL
- E — POWER LINE (UNDERGROUND)
- DIRECTION OF FLOW
- SD — STORM DRAIN
- MH — MANHOLE (4' DIAMETER)
- PROPERTY LINE (APPROXIMATE)
- GB-02 — PROPOSED SOIL BORING (GEOTECHNICAL)
- SB-107 — PROPOSED SOIL BORING (COVER SAND ANALYSIS)
- REMOVE ROCK TO CONFIGURATION AS SHOWN ON SHEET 3 of 5

NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
2. COORDINATES ARE REFERENCED TO ILLINOIS STATE PLANE EAST ZONE.

SCALE
40 0 40 80 FEET

PROPOSED BUILDING LOCATION AND PROPOSED BORING LOCATIONS SLIP No. 3 CONTAINMENT CELL ALTERATION

PREPARED FOR

CITY OF WAUKEGAN

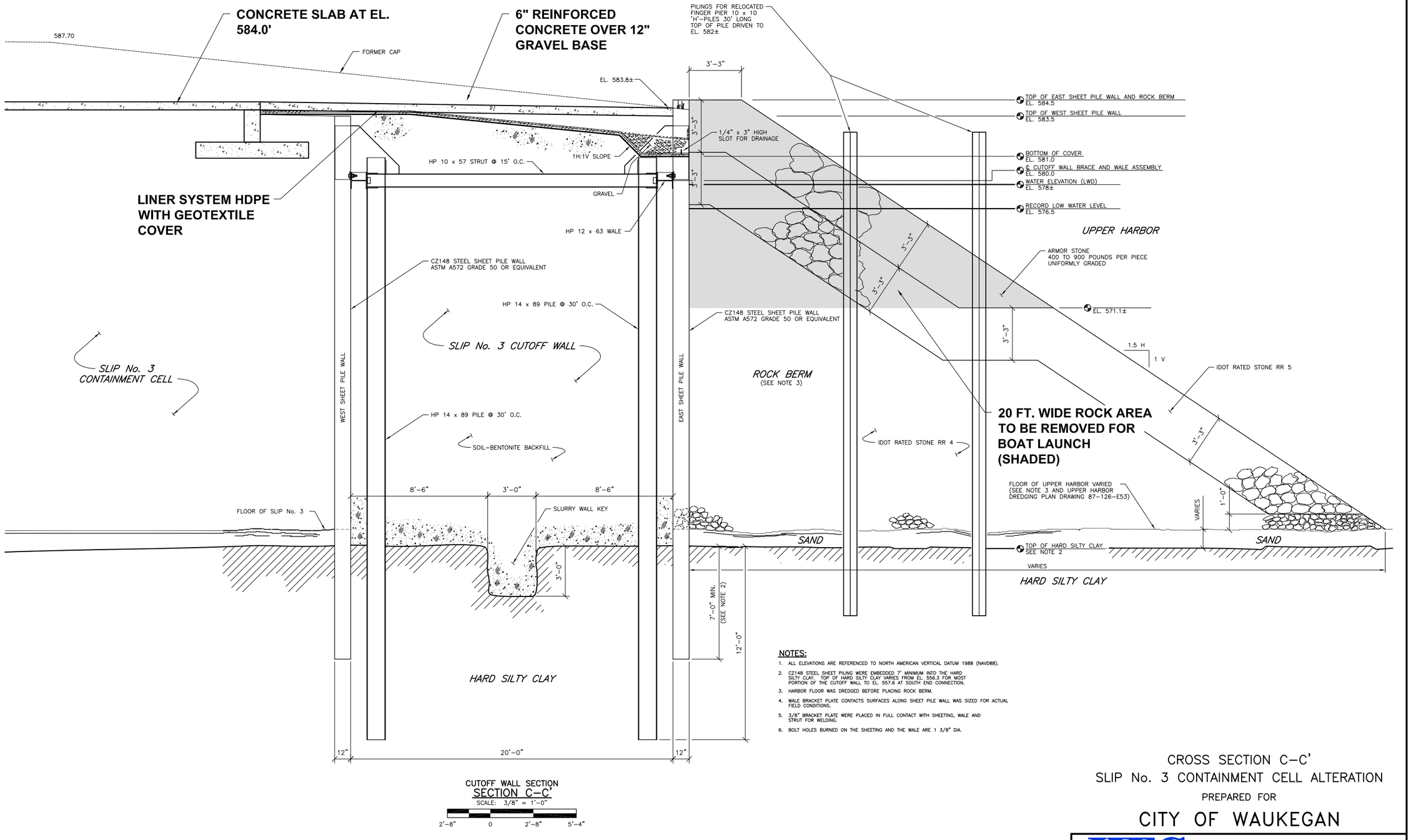
No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
△			M_A_M		

REFERENCE:
– CANONIE ENVIRONMENTAL SERVICES CORP. RECORD OF CONSTRUCTION DRAWING No. 87-126-E84.

HEC
1050 Broadway, Suite 7
Chesterton, Indiana 46304
Phone: (219) 926-5508 · Fax: (219) 926-8446
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES™ Company

DATE:	04-19-06	SHEET 2 of 5	DRAWING NUMBER	△
SCALE:	AS SHOWN		06-001-D4	

DRAWING NUMBER 06-001-D3



CUTOFF WALL SECTION
SECTION C-C'
SCALE: 3/8" = 1'-0"

2'-8" 0 2'-8" 5'-4"

NOTES:

1. ALL ELEVATIONS ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
2. CZ148 STEEL SHEET PILING WERE EMBEDDED 7' MINIMUM INTO THE HARD SILTY CLAY. TOP OF HARD SILTY CLAY VARIES FROM EL. 556.3 FOR MOST PORTION OF THE CUTOFF WALL TO EL. 557.6 AT SOUTH END CONNECTION.
3. HARBOR FLOOR WAS DREDGED BEFORE PLACING ROCK BERM.
4. WALE BRACKET PLATE CONTACTS SURFACES ALONG SHEET PILE WALL WAS SIZED FOR ACTUAL FIELD CONDITIONS.
5. 3/8" BRACKET PLATE WERE PLACED IN FULL CONTACT WITH SHEETING, WALE AND STRUT FOR WELDING.
6. BOLT HOLES BURNED ON THE SHEETING AND THE WALE ARE 1 3/8" DIA.

CROSS SECTION C-C'
SLIP No. 3 CONTAINMENT CELL ALTERATION
PREPARED FOR
CITY OF WAUKEGAN

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
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REFERENCE:
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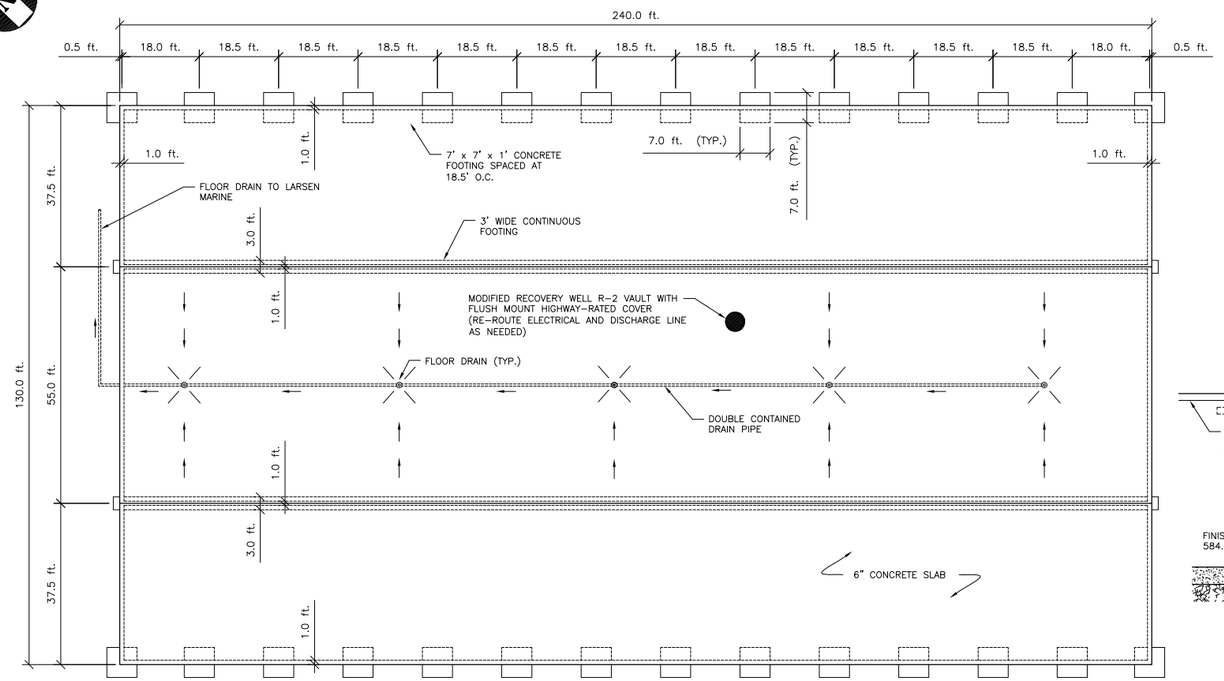
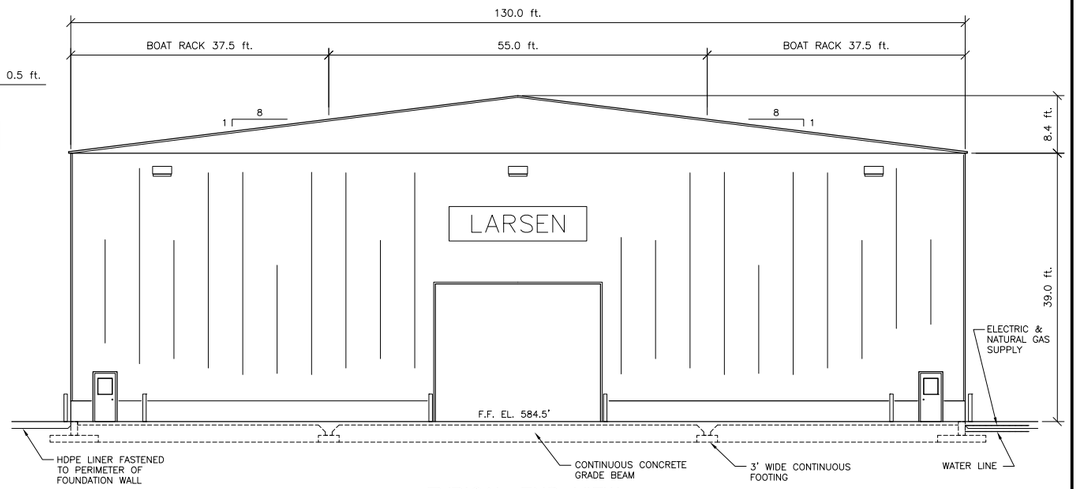
DATE:	04-20-06	SHEET 3 of 5	DRAWING NUMBER 06-001-D3	△
SCALE:	AS SHOWN			

DRAWING NUMBER 06-001-D5

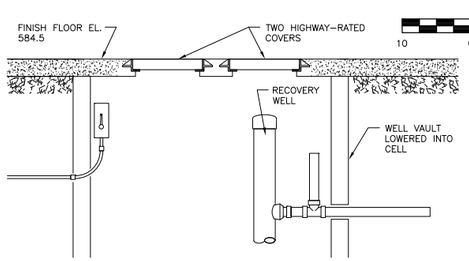


FOUNDATION PLAN
BOAT STORAGE FACILITY

SCALE
16 0 16 32 FEET

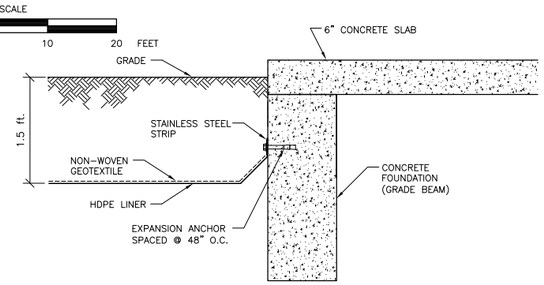


TYPICAL END VIEW
BOAT STORAGE FACILITY



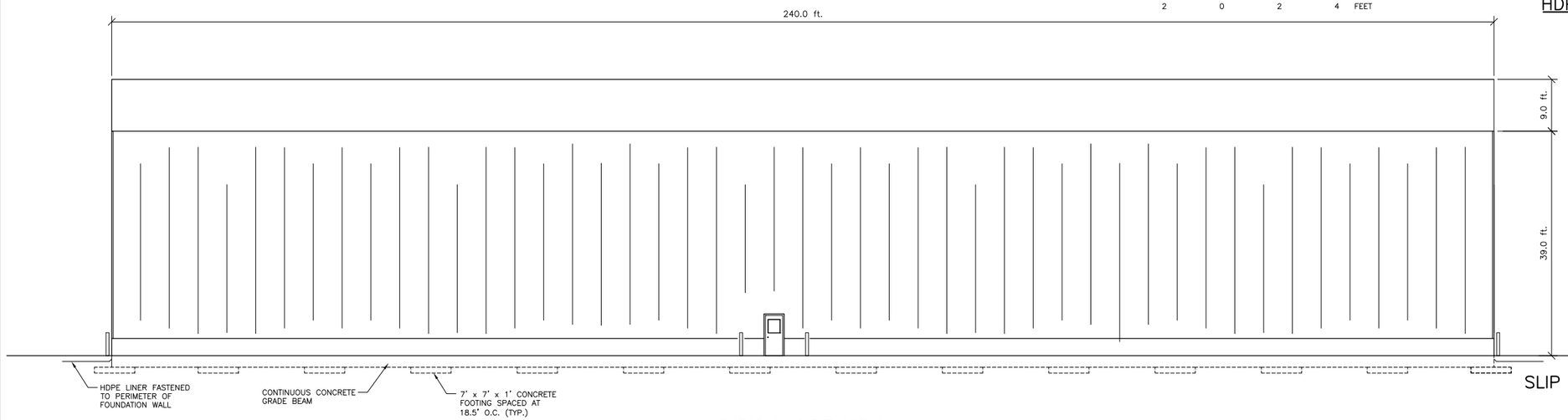
LOWERED WELL VAULT INSIDE BUILDING

SCALE
2 0 2 4 FEET



HDPE LINER/FOUNDATION SEAL DETAIL

SCALE
1 0 1 2 FEET



TYPICAL SIDE VIEW
BOAT STORAGE FACILITY

SCALE
10 0 10 20 FEET

NOTES:

1. WATER SUPPLY DOUBLE-PIPED IN CONTAINMENT AREA TO CONTAIN LEAK AND ALLOW FOR FUTURE MAINTENANCE.
2. ELECTRIC AND NATURAL GAS SUPPLY ABOVE LINER.

BOAT STORAGE FACILITY
PLAN AND ELEVATIONS
SLIP No. 3 CONTAINMENT CELL ALTERATION
PREPARED FOR
CITY OF WAUKEGAN

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
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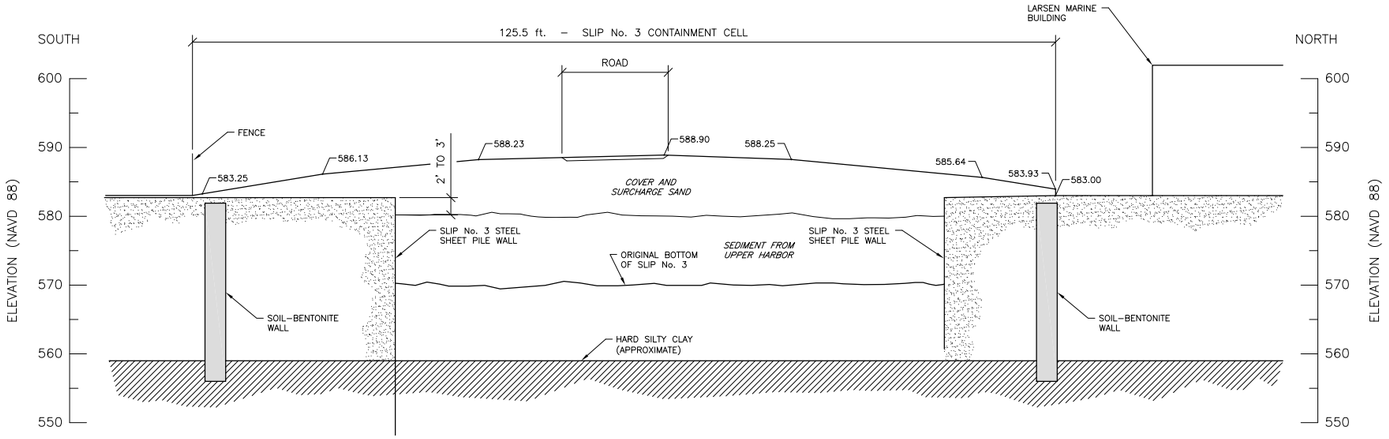
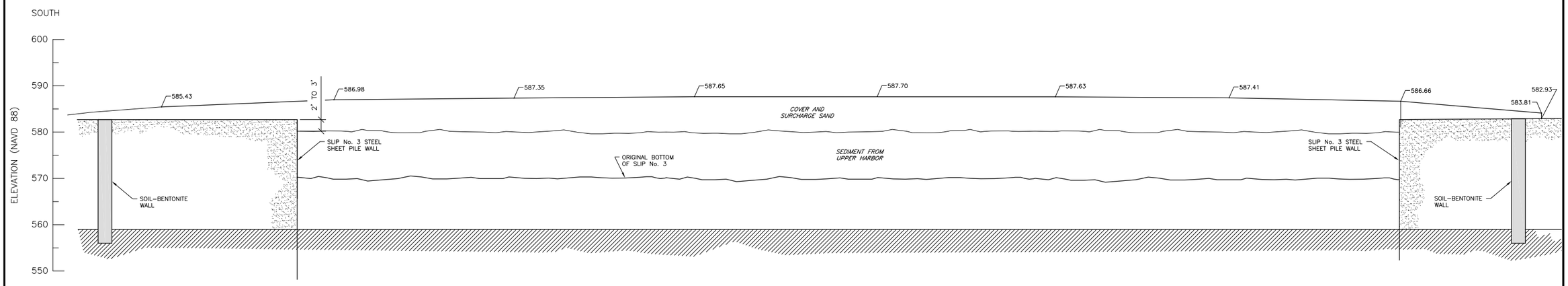
DATE:	05-03-06	SHEET 4 of 5	DRAWING NUMBER 06-001-D5	△
SCALE:	AS SHOWN			

DRAWING NUMBER 06-001-D2



CROSS SECTION A–A' (LOOKING WEST)



CROSS SECTION B–B' (LOOKING WEST)

HORIZONTAL SCALE
10 0 10 20 FEET

VERTICAL SCALE
10 0 10 20 FEET

CROSS SECTION A–A AND B–B'
SLIP No. 3 CONTAINMENT CELL ALTERATION

PREPARED FOR

CITY OF WAUKEGAN

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
△			M__A__M		

REFERENCE:
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DATE:	04–20–06	SHEET 5 of 5	DRAWING NUMBER	△
SCALE:	AS SHOWN		06–001–D2	

Attachment B

Design addressed comments by USEPA
Dated August 6, 2007

MEMORANDUM CH2MHILL

Review of 90% Design – Slip 3 Containment Alteration/Boat Storage Re-Use
OMC Plant 2, Waukegan, Illinois
WA No. 018-RICO-0528, Contract No. EP-S5-06-01

TO: Kevin Adler/USEPA

COPIES: Jewelle Keiser/CH2M HILL, Milwaukee

FROM: Jim Schneider/CH2M HILL, Denver

DATE: August 6, 2007

PROJECT NUMBER: 348138.PR.01

This memorandum summarizes our review of the "90% Design Submittal" (dated June 2007) drawings for constructing boat storage facilities at the Slip 3 site at Waukegan Harbor, Illinois. We also briefly reviewed the following accompanying documents to understand the project and the site conditions:

- Specification Section 02621, *Geocomposite Drainage Layer*
- Specification Section 02700, *Polyethylene Geomembrane Liner*
- A technical memorandum (TM) entitled *Waukegan Harbor Slip 3 – Field Sampling Results* (dated June 22, 2007)

The following comments address only the aspects of the proposed work as they relate to the containment of the PCB-impacted sediments. The review does not offer any opinion as to the adequacy of the foundation or structural design concepts.

General Comments

1. The basic concepts presented in the drawings appear to be reasonable, assuming that the characterization of the contamination provided in the TM is accurate. We have very few comments on the submittal; most relate to the need to provide details such that the new 60-mil HDPE lining – together with the other structural elements such as the grade beams – will provide a continuous primary containment barrier. Specifically, the drawings provide no detail regarding attachment of the HDPE lining to the various penetrations under the building (e.g., monitoring well, piling, etc.). It is unclear how the HDPE lining will act as a continuous primary containment without such connections.

2. The concept presented in the *Basis of Design Memorandum, Alteration of Slip No. 3 Containment Cell, Outboard Marine Corporation Superfund Site* dated November 20, 2006 discussed roof downspout drains. In a comment on that document, it was asked if the downspout drains would be able to reach the peripheral drainage system with

adequate cover and still not extend into the contaminated sediments. The present drawings do not address roof drainage. How will it be managed to prevent infiltration into the containment cell?

Specific Comments

1. **Sheet 4. Note 11.** This states that the topsoil and sand will be stockpiled at the City of Waukegan property location on Sheet 1. There is no proposed location identified on Sheet 1.

2. **Sheet 8.**

   a. The area under the building is shaded and noted to be the "60-MIL HDPE LINER." Presumably the remainder of the area enclosed within the slurry walls and the east sheet pile wall will also be provided with a 60-mil HDPE lining; the details on Sheet 13 imply this. This should be clarified.

   b. Is there any slope the HDPE liner under the building? Where will drainage from the geocomposite drainage layer be discharged?

3. **Sheet 10. Detail 3. Note 6.** This states that the HDPE liner under the interior floor slab is not welded to the grade beam. It should be to provide a continuous primary lining.

4. **Sheet 11. Detail 7.** The lowered Well Vault (R-1) is not called out on Sheet 6. Should this be Detail 8 (on Sheet 7)? In addition, the liner to well vault penetration detail (Detail 17 on Sheet 13) should be called out to show how the HDPE will be connected to the vault to provide a continuous primary lining.

5. **Sheet 11. Detail 9.** How is the HDPE connected to the steel casing to provide a continuous primary lining?

6. **Sheet 11. Detail 10.** It is not clear where this detail applies. If within the building, how is the HDPE connected to the concrete to provide a continuous primary lining?

7. **Sheet 12. Detail 13.**

   a. Special care will have to be taken to protect the HDPE liner from potential puncture damage where it crosses the slurry wall; the specifications should discuss removal of rocks or other objects as needed to protect the liner here.

   b. In Section B, provide a boot-type penetration for both conduits (or some other method to provide a continuous primary lining).

   c. In Section A and the plan view, the specifications should discuss how the 12-inch-diameter steel pipe is placed to minimize the potential for void formation in the slurry wall backfill. The seep collar is a good idea; the specifications should call for careful tamping of the backfill around the collar and beneath the pipe.

8. **Sheet 13. Detail 15.** The use of the Polylock strip is a convenient method to connect to the concrete, but has limited structural strength. Provision should be made to provide some amount of slack in the liner, or to otherwise accommodate potential differential settlement between the soil and the grade beam. The grade beams are pile-supported

and therefore unlikely to settle very much, while the fill is not pile-supported and may settle differentially relative to the grade beams.

9. **Sheet 13. Detail C.** HDPE is the least puncture-resistant of the commonly used geomembranes. A method to protect the HDPE liner from puncture where it is located above the protective concrete panels should be provided.

Attachment C

IEPA Comment Letter
Dated August 24, 2007

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 – (217) 782-3397
JAMES R. THOMPSON CENTER, 100 WEST RANDOLPH, SUITE 11-300, CHICAGO, IL 60601 – (312) 814-6026

ROD R. BLAGOJEVICH, GOVERNOR DOUGLAS P. SCOTT, DIRECTOR

August 24, 2007

Mr. John Moore, P.E., City Engineer
Waukegan City Hall – Engineering Department
100 North Martin Luther King Jr. Avenue
Waukegan, Illinois 60085

Re: Alteration to Slip 3, Proposed Boat Storage Facility
July 6 2007 Alteration Design
OMC Superfund Site
Waukegan, Illinois

Dear Mr. Moore,

The purpose of this letter is to transmit Illinois EPA's comments on the proposed alteration to Slip 3 of the OMC Superfund Site in Waukegan, Illinois to construct a boat storage facility to be used by Larsen Marine.

Slip 3 was constructed to provide a containment cell for TSCA level contaminated dredge sediment from the harbor in excess of 50 ppm and up to 500 ppm PCB. Therefore, the contaminated material below the surcharge sand should be handled, including proper worker PPE and exposure precautions, and disposed of in accordance with TSCA 40 CFR 761.

Although the limited sampling performed to determine whether the surcharge sand could be visually distinguished from the underlying contaminated sediment provided in this report shows no results above 50 ppm PCBs, a similar set of data collected in 2004 for a preliminary treatability screening shows 2 values above 50 ppm PCBs. It should be noted that PCB was the only parameter requested, PCB breakdown components, which have the potential to have their own toxic properties, were not.

It is possible that there are zones within Slip 3 that contain materials at or below 50 ppm PCB. When the harbor sediment was originally dredged to place into Slip 3, it is likely some over-dredging occurred that may have included material that tested below 50 ppm PCB, the use of surcharge sand may have had a similar effect, and, through time, there could be some breakdown of PCB. However, there is some data that indicates that there is still material within the containment cell at or above 50 ppm PCB. And, as the harbor was contaminated with sediment containing from 50 to 500 ppm and above PCB, it is possible there are zones containing materials that are closer to the higher limit.

Since the exposure to contaminated materials within Slip 3 will be limited and no excavation is planned below the surcharge sand, the costs to handle and dispose of this material in accordance with TSCA regulations should not significantly affect the total costs of this project.

If there are any questions concerning this letter, please do not hesitate to contact me at 217-785-8725.

Sincerely,

Erin J. Rednour

Erin Rednour, Project Manager
Illinois Environmental Protection Agency
Bureau of Land
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Attachment D

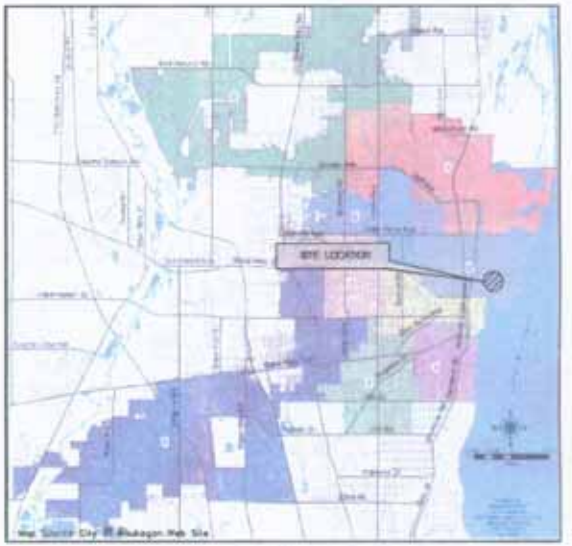
Containment Alteration/Boat Storage
Re-Use Waukegan Harbor Slip 3 Site

CITY OF WAUKEGAN

CONTAINMENT ALTERATION / BOAT STORAGE RE-USE
WAUKEGAN HARBOR SLIP 3 SITE

100% DESIGN SUBMITTAL
OCTOBER 2007

PROJECT AERIAL MAP



SITE LOCATION MAP

DRAWING INDEX

SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE

COVER SHEET

PREPARED FOR

CITY OF WAUKEGAN

NO.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	APP'D BY
2	10-07	ISSUED FOR CONSTRUCTION	HEC		
1	8-07	ISSUED FOR BID	HEC		

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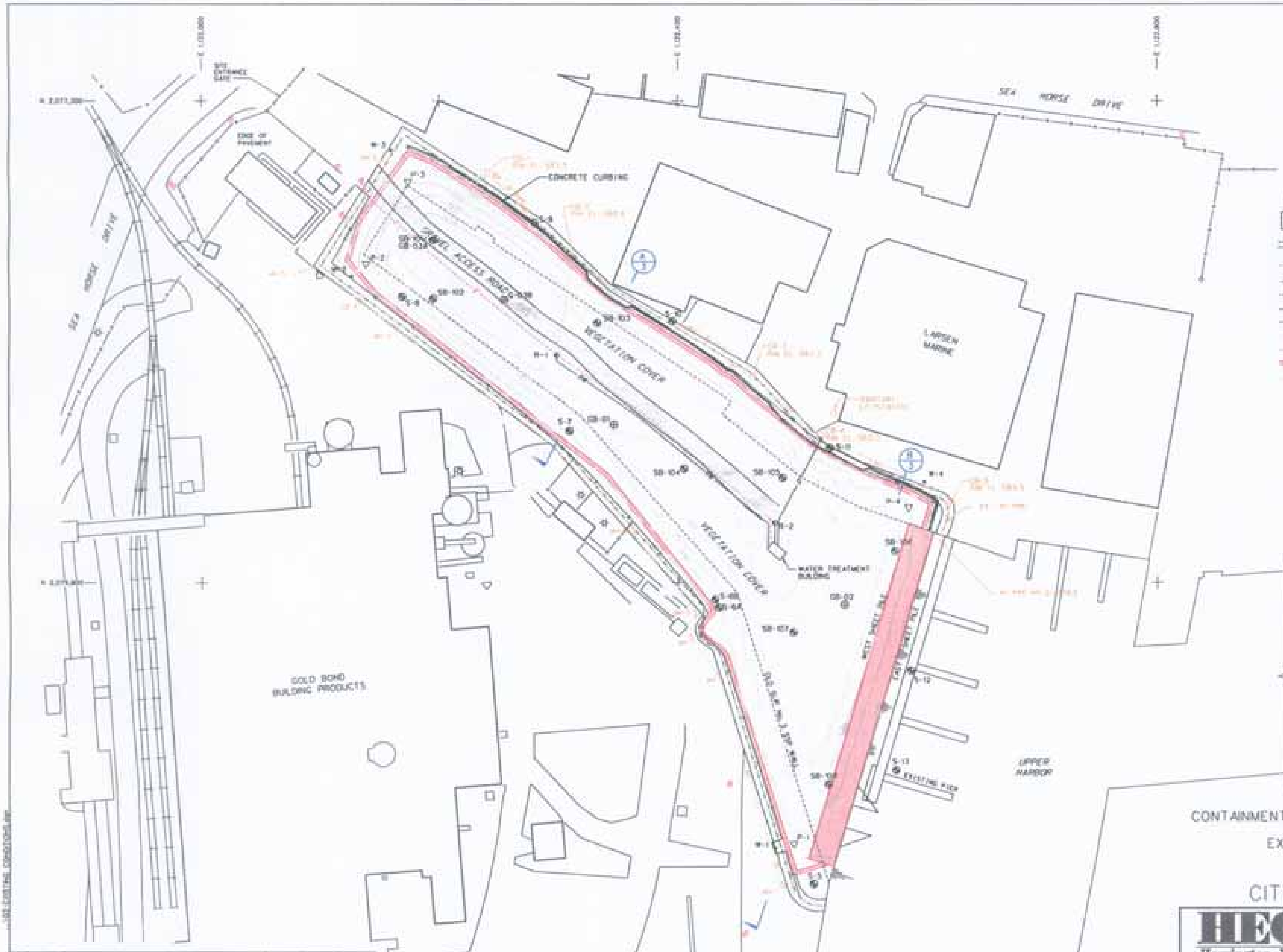
A HARD HAT SERVICES Company

DATE: 08-23-07
SCALE: AS SHOWN

SHEET 1 of 13

DRAWING NUMBER
06-001-0



LEGEND:

- EXISTING BUILDING
- RAILROAD
- PROPERTY LINE (APPROX)
- FENCE
- SLIP No. 3 SHEET PILING
- RAW WATER TO TREATMENT BUILDING
- TREATED WATER DRAIN TO EXISTING CATCH BASIN
- STORM DRAIN
- ELECTRICAL
- SOIL BENTONITE WALL
- SURFACE CONTOUR
- PIEZOMETER
- MONITORING WELL
- RECOVERY WELL
- MANHOLE
- CATCH BASIN
- UTILITY POLE
- LIGHT POLE
- SOIL BORING
- GEOTECHNICAL SOIL BORING

NOTES:

1. EXISTING GROUND ELEVATION COUNTOURS ARE BASED ON TOPOGRAPHIC DATA PRODUCED BY THE CITY OF WAUKEGAN USING A GPS SURVEY CONDUCTED IN 2006.
2. VERTICAL DATUM IS NAVD 88.
3. HORIZONTAL DATUM IS ILLINOIS STATE PLANE COORDINATE SYSTEM.
4. ABOVE-GRADE WELL COVERS TO BE MODIFIED AS IN DETAIL 10 SHEET 11.

0 40 80
SCALE IN FEET

SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
EXISTING CONDITIONS PLAN
PREPARED FOR
CITY OF WAUKEGAN

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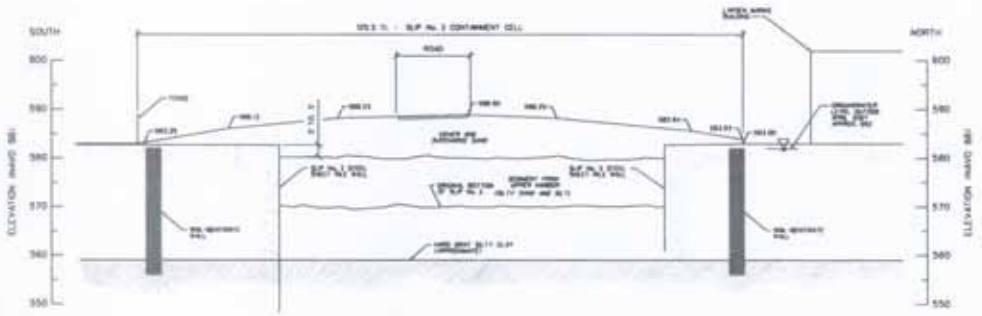
A BARR BAY SERVICES Company

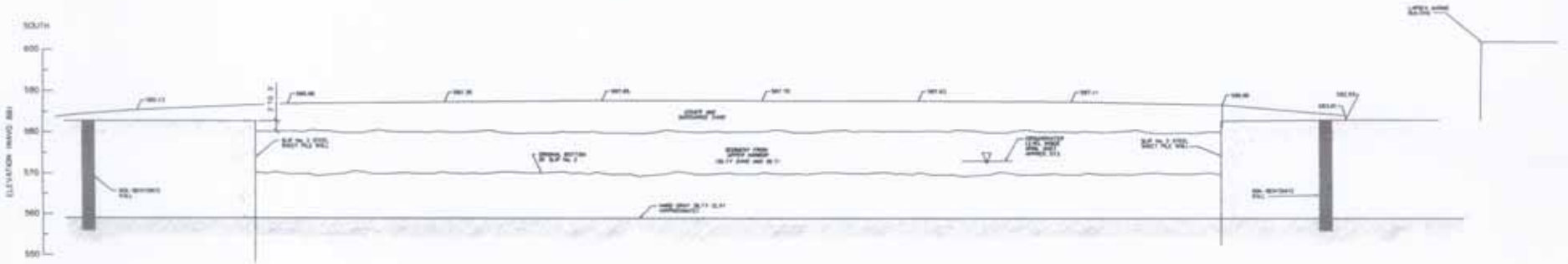
DATE: 08-23-07	SHEET 2 of 13	DRAWING NUMBER 06-001-D	△		
SCALE: AS SHOWN					

No.	DATE	ISSUE / REVISION	DWN BY	CHK'D BY	APD BY
△	10-07	ISSUED FOR CONSTRUCTION	HEC		
△	8-07	ISSUED FOR BID	HEC		

REFERENCE:
CANONIE ENVIRONMENTAL SERVICES CORP. RECORD OF CONSTRUCTION DRAWING No. 87-04-04.



EXISTING CROSS SECTION A/2



EXISTING CROSS SECTION B/2

SCALE IN FEET

SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
EXISTING CONDITIONS CROSS SECTIONS

PREPARED FOR
CITY OF WAUKEGAN

No.	DATE	ISSUE / REVISION	DWN. BY	CH'D BY	APP'D BY
2	10-07	ISSUED FOR CONSTRUCTION	HEC		
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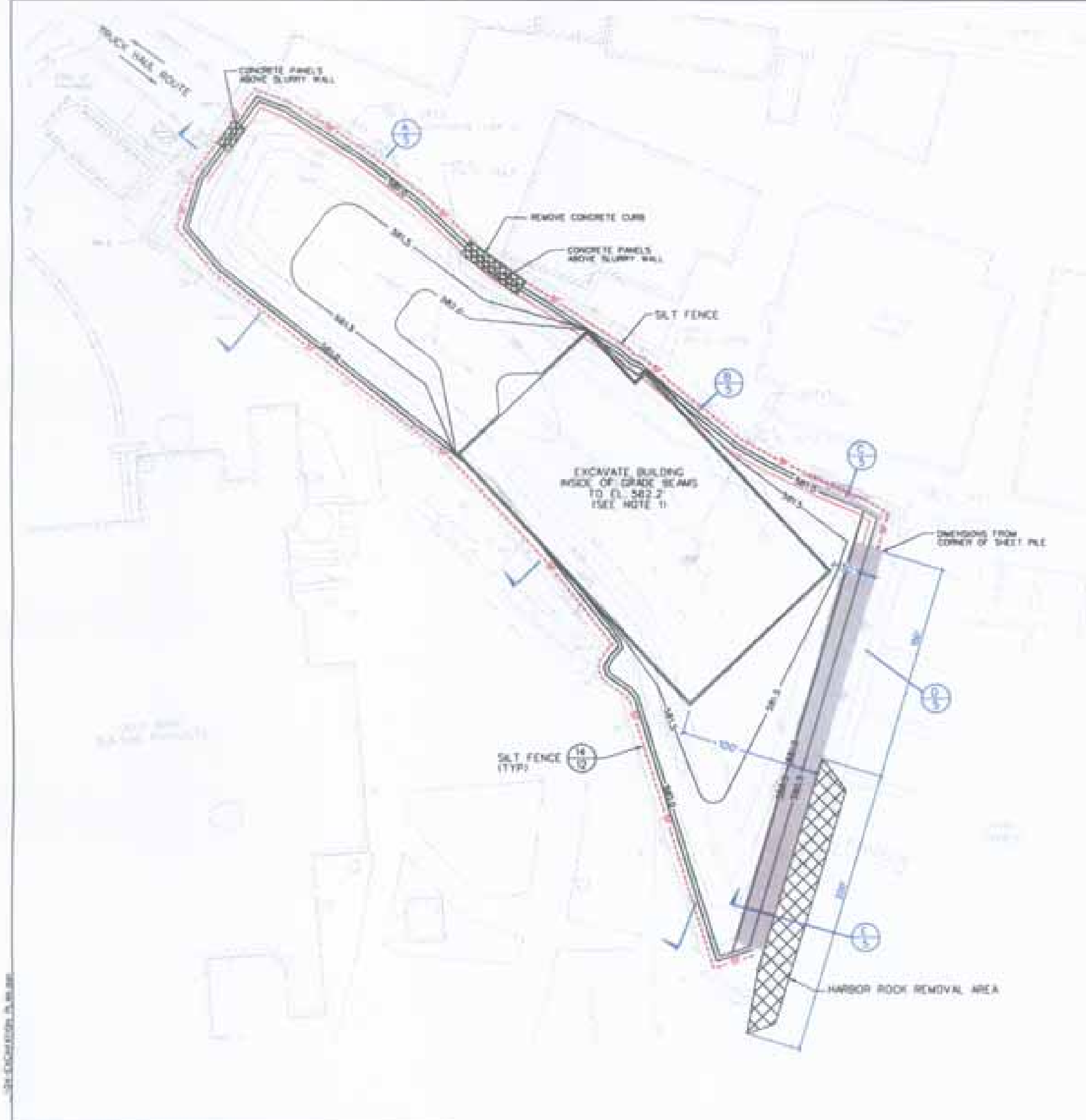
DATE: 08-23-07
SCALE: AS SHOWN
SHEET 3 of 13
DRAWING NUMBER 06-001-0



NOTES:

1. GRADE BEAMS FOR BUILDING FOUNDATION LOCATED AROUND PERIMETER OF BUILDING. SEE FOUNDATION/SLAB PLAN FOR DIMENSIONED LOCATION OF GRADE BEAMS. OVEREXCAVATE IN AREA OF GRADE BEAMS AS NECESSARY FOR FORMWORK. BOTTOM OF GRADE BEAMS AT ELEVATION 581.33. EXCAVATE 4-INCHES LOWER AT TRENCH DRAIN.

2. CONTRACTOR WILL VERIFY ALL UTILITY LOCATIONS PRIOR TO COMMENCING EXCAVATION.

3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED PRIOR TO BEGINNING OF ANY EXCAVATION WORK. SILT FENCES SHALL BE IN ACCORDANCE WITH ILLINOIS NRCS DETAIL 620 SHOWN ON SHEET 12.

4. ALL WORK WILL BE CONDUCTED SO AS TO PREVENT THE SPREAD OF MATERIAL EXCAVATED FROM BELOW THE EXISTING LINER. THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE ADOPTED. THIS SEQUENCE MAY BE COMPLETED IN PHASES COVERING SEVERAL PARTS OF THE WORK AREA IN TURN.
   A) INSTALL EROSION CONTROL MEASURES.
   B) EXCAVATE COVER SOILS DOWN TO DRAINAGE LAYER / EXISTING LINER.
   C) REMOVE AND DISPOSE OF DRAINAGE LAYER/LINER.
   D) EXCAVATE PCB-CONTAINING SOIL FROM BELOW THE LINER. STOCKPILE (AS NEEDED) WITHIN THE AREA FROM WHICH THE LINER HAS BEEN REMOVED.
   E) LOAD PCB-CONTAINING MATERIAL FOR TRANSPORT. TRUCKS SHALL NOT ENTER AREAS WHERE EXISTING LINER HAS BEEN REMOVED.

5. SOIL EXCAVATED FROM ABOVE THE EXISTING LINER MUST NOT CONTACT MATERIAL FROM BENEATH THE EXISTING LINER. SOIL FROM ABOVE THE EXISTING LINER MAY BE TEMPORARILY STOCKPILED ATOP THE EXISTING LINER AND COVER SOILS.

6. SOIL EXCAVATED FROM BELOW THE EXISTING LINER MAY NOT BE STOCKPILED ON TOP OF THE EXISTING LINER SYSTEM OR ON UNDISTURBED AREAS. MATERIAL EXCAVATED FROM BELOW THE LINER MUST BE LOADED INTO LINED TRUCKS AND TRANSPORTED TO THE APPROVED DISPOSAL LOCATION.

7. ALL STOCKPILES OF MATERIAL EXCAVATED FROM BELOW THE EXISTING LINER MUST BE COVERED NIGHTLY WITH POLYETHYLENE SHEETING. THE SHEETING MUST BE WEIGHTED TO PREVENT EXCESSIVE LIFTING DUE TO WINDS.

8. EXCAVATION GRADES SHOWN ON THIS DRAWING WERE DESIGNED TO ACHIEVE MINIMUM SLOPES OF 1% OR GREATER.

9. SILT FENCE SHALL ALSO BE INSTALLED AROUND EACH CATCH BASIN WHERE EXCAVATION EXTENDS BEYOND EXISTING SWALE.

10. SILT FENCE FABRIC SHOULD CONFORM TO THE AASHTO M288 96 SILT FENCE SPECIFICATION. THE POSTS USED TO SUPPORT THE SILT FENCE FABRIC SHOULD BE A HARDWOOD MATERIAL WITH FOLLOWING MINIMUM DIMENSIONS: 2" SQUARE (NOMINAL) BY 4' LONG. PLACE POSTS NO MORE THAN 4' APART. SILT FENCE FABRIC SHOULD BE ATTACHED TO THE WOODEN POSTS WITH STAPLES, WIRE, ZIP TIES, OR NAILS.

11. TOPSOIL AND SAND ABOVE LINER SHALL BE REMOVED AND STOCKPILED AT CITY OF WAUKEGAN PROPERTY LOCATION ON SHEET 1. TOPSOIL SHALL BE REMOVED AND STOCKPILED SEPARATELY FROM SAND LAYER.

12. LEAVE EXISTING CONCRETE PANELS OVER SLURRY WALL IN PLACE.

13. EXCAVATION OF SOIL BELOW ELEVATION 581.0' SHALL BE CONSIDERED TSCA MATERIAL AND MUST BE HANDLED, TRANSPORTED, AND DISPOSED OF AT A TSCA-APPROVED LANDFILL, IN ACCORDANCE WITH TSCA 40 CFR 761.

SCALE IN FEET: 0 — 40 — 80

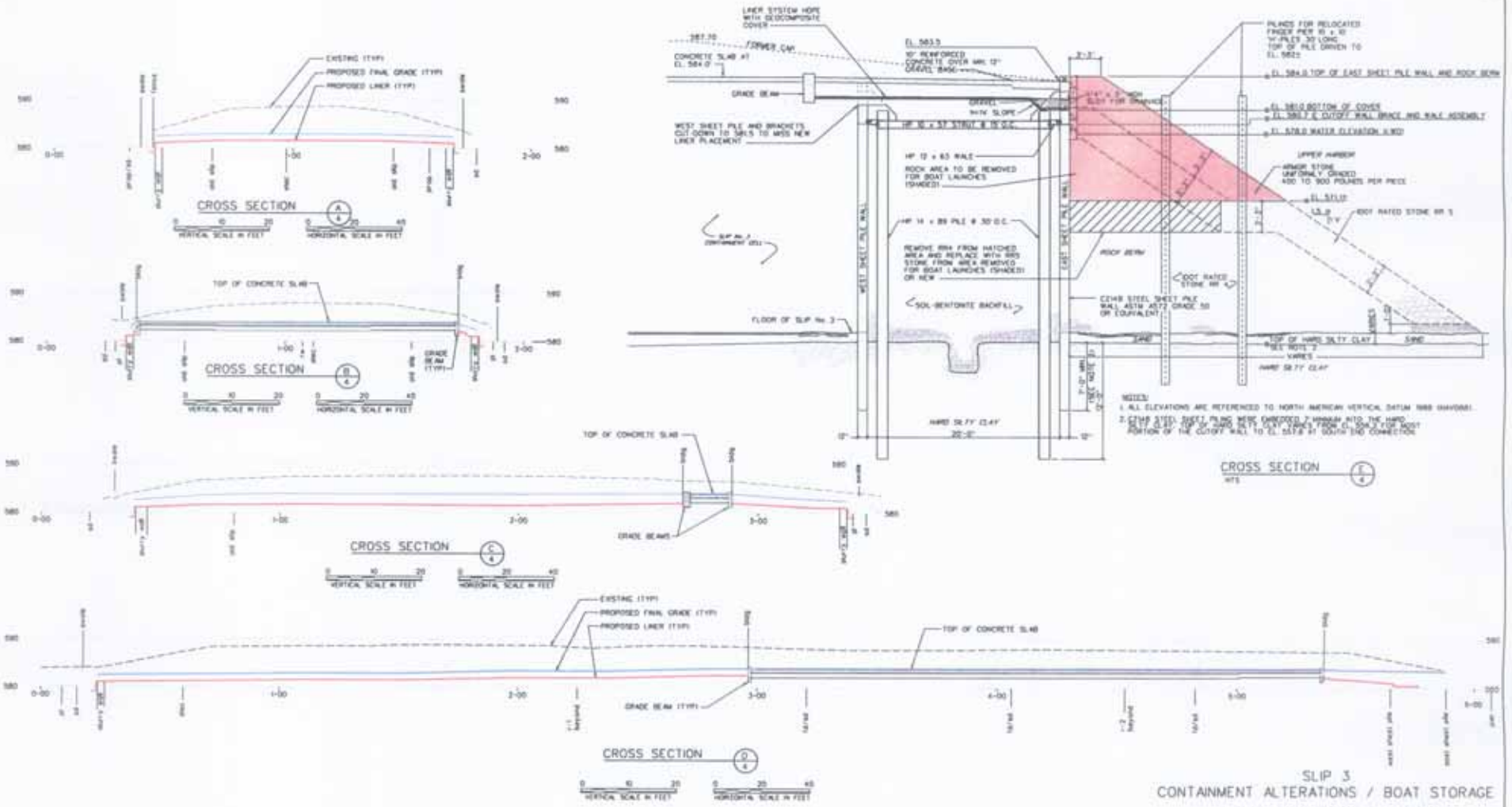
SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
EXCAVATION PLAN

PREPARED FOR
CITY OF WAUKEGAN

HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company

DATE:	08-23-07	SHEET 4 of 13	DRAWING NUMBER		
SCALE:	AS SHOWN		06-001-D		△

No.	DATE	ISSUE / REVISION	DRN. BY	CK'D BY	APD BY
△	10-07	ISSUED FOR CONSTRUCTION	HEC		
△	8-07	ISSUED FOR BID	HEC		



SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
EXCAVATION CROSS SECTIONS

PREPARED FOR

CITY OF WAUKEGAN

No.	DATE	ISSUE / REVISION	DWN. BY	CKD BY	APD BY
2	10-07	ISSUED FOR CONSTRUCTION	HEC		
1	8-07	ISSUED FOR BID	HEC		

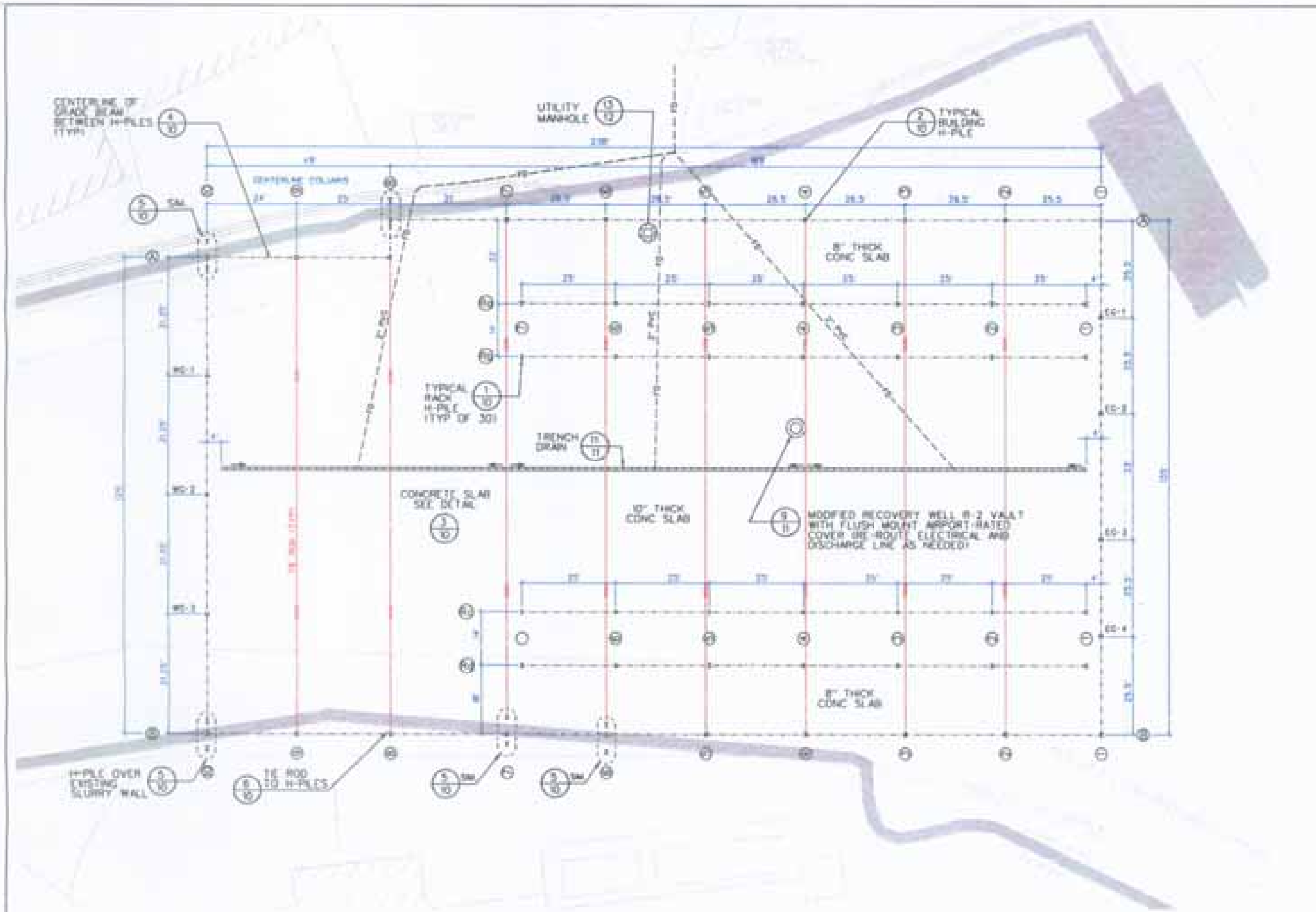
REFERENCE: LANDMARK ENVIRONMENTAL SERVICES CORP. RECORD OF CONSTRUCTION DRAWING No. 97-105-E&S

HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company
1550 Broadway, Suite 1
Chesterton, Indiana 46304
Phone: (219) 926-5506 Fax: (219) 926-5510

DATE: 08-23-07
SCALE: AS SHOWN

SHEET 5 of 13

DRAWING NUMBER 06-001-D



GENERAL NOTES:

1. COORDINATES ARE IN THE ILLINOIS STATE PLANE COORDINATE SYSTEM.
2. BUILDING LAYOUT AND COLUMN LOCATIONS PROVIDED BY LARSEN MARINE SERVICES.
3. ELEVATIONS ARE IN NAVD 1988.
4. H-PILES SHALL BE DRIVEN AT LEAST 5-FEET INTO GLACIAL TILL (DEFINED AS FIVE-FEET OF PENETRATION AFTER NO FURTHER PENETRATION IS POSSIBLE WITH A VIBRATORY HAMMER).
5. H-PILES SHALL BE DRIVEN ON LINE WITH NO VARIATION FROM LINE OF MORE THAN 2-INCHES. ALL DIMENSIONS AND COORDINATES SHOWN ARE FROM H-PILE CENTERLINES.
6. PIPING AND ELECTRICAL CONDUITS SHALL BE INSTALLED ABOVE THE BUILDING TIE-RODS.

STRUCTURAL NOTES:

1. STRUCTURAL STEEL H-PILE(S) SHALL MEET THE REQUIREMENTS OF ASTM A992.
2. WELDS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF A WS WELDING STANDARDS USING E70XX ELECTRODE.
3. STEEL STUDS SHALL COMPLY WITH ASTM A108, GRADE DESIGNATION 1010 THROUGH 1020 AND AWS D1.5.
4. STRUCTURAL BOLTS SHALL BE ASTM A325 GRADE.
5. HIGH STRENGTH STEEL TIE RODS SHALL BE GALVANIZED GRADE 75.
6. CONCRETE SHALL HAVE A 28-DAY UNCONFINED COMPRESSIVE STRENGTH OF 4000 PSI.
7. GRADE BEAM SHALL USE FIBER REINFORCED CONCRETE 1.5 LB MINIMUM / CU YDS.
8. COARSE AGGREGATE FOR CONCRETE SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 1 1/2 INCH AND MEET THE REQUIREMENTS OF ASTM C33.
9. CONCRETE SLAB ON GRADE EXPOSED OUTSIDE SHALL CONTAIN 5% AIR ENTRAINMENT.
10. CONCRETE REINFORCING STEEL SHALL BE GRADE 60.
11. CHAIRS SHALL BE USED DURING SLAB-ON-GRADE POURS TO POSITION REINFORCING IN THE UPPER HALF OF THE SLAB.
12. SLAB ON GRADE SHALL BE SEPARATED FROM INTERIOR H-PILES AND GRADE BEAM BY COMPRESSIBLE MEDIUM.
13. BASE COARSE GRAVEL SHALL MEET THE GRADATION REQUIREMENTS OF ILLINOIS DOT CA-6, AND THE QUALITY REQUIREMENTS OF ILLINOIS DOT 704.1.
14. WHERE GRADE BEAM CROSSES SLURRY WALL, BACKFILL WITH SAND CONTAINING 10% BENTONITE BY WEIGHT BELOW LINER.
15. EXPANDING WATERSTOP VOLCLAY WATERSTOP-RX OR EQUAL SHALL BE INSTALLED AT COLD JOINTS IN SLAB / GRADE BEAM AND AROUND H-PILE PENETRATIONS.

CABLE WALL H-PILE CENTER LOCATIONS

PILE	NORTHING	EASTING
WC-1	N 2,077,072.97	E 1,122,383.08
WC-2	N 2,077,051.55	E 1,122,360.31
WC-3	N 2,077,030.15	E 1,122,337.58
EC-1	N 2,076,910.47	E 1,122,557.87
EC-2	N 2,076,893.00	E 1,122,539.10
EC-3	N 2,076,870.36	E 1,122,515.07
EC-4	N 2,076,852.90	E 1,122,496.51

BUILDING H-PILE CENTER LOCATIONS

PILE	NORTHING	EASTING
A1-1	N 2,076,927.95	E 1,122,578.24
A1-2	N 2,076,946.53	E 1,122,558.77
A1-3	N 2,076,965.81	E 1,122,540.60
A1-4	N 2,076,985.11	E 1,122,522.43
A1-5	N 2,077,004.41	E 1,122,504.27
A1-6	N 2,077,023.71	E 1,122,486.11
A1-7	N 2,077,042.99	E 1,122,467.94
A1-8	N 2,077,065.57	E 1,122,448.69

BUILDING H-PILE CENTER LOCATIONS (CONT.)

PILE	NORTHING	EASTING
A2-8	N 2,077,058.71	E 1,122,439.41
A2-9	N 2,077,076.91	E 1,122,422.28
A2-10	N 2,077,094.39	E 1,122,405.63
B-1	N 2,076,835.42	E 1,122,477.94
B-2	N 2,076,853.99	E 1,122,460.16
B-3	N 2,076,873.29	E 1,122,442.30
B-4	N 2,076,892.58	E 1,122,424.14
B-5	N 2,076,911.88	E 1,122,405.97
B-6	N 2,076,931.17	E 1,122,387.80
B-7	N 2,076,950.47	E 1,122,369.64
B-8	N 2,076,973.04	E 1,122,348.39
B-9	N 2,076,991.25	E 1,122,331.26
B-10	N 2,077,008.72	E 1,122,314.81

RACK H-PILE CENTER LOCATIONS

PILE	NORTHING	EASTING
Ra-1	N 2,076,915.78	E 1,122,557.47
Ra-2	N 2,076,933.99	E 1,122,540.34
Ra-3	N 2,076,952.20	E 1,122,523.21
Ra-4	N 2,076,970.39	E 1,122,506.07
Ra-5	N 2,076,988.60	E 1,122,488.94
Ra-6	N 2,077,008.81	E 1,122,471.80
Ra-7	N 2,077,025.01	E 1,122,454.66
Rb-1	N 2,076,906.18	E 1,122,547.28
Rb-2	N 2,076,924.39	E 1,122,530.15
Rb-3	N 2,076,943.60	E 1,122,513.01
Rb-4	N 2,076,960.80	E 1,122,495.88
Rb-5	N 2,076,979.00	E 1,122,478.74
Rb-6	N 2,076,997.21	E 1,122,461.61
Rb-7	N 2,077,015.41	E 1,122,444.47

RACK H-PILE CENTER LOCATIONS (CONT.)

PILE	NORTHING	EASTING
Rc-1	N 2,076,860.28	E 1,122,498.50
Rc-2	N 2,076,878.47	E 1,122,481.36
Rc-3	N 2,076,896.67	E 1,122,464.23
Rc-4	N 2,076,914.87	E 1,122,447.09
Rc-5	N 2,076,933.07	E 1,122,429.95
Rc-6	N 2,076,951.28	E 1,122,412.82
Rc-7	N 2,076,969.48	E 1,122,395.68
Rd-1	N 2,076,850.67	E 1,122,488.31
Rd-2	N 2,076,868.87	E 1,122,471.17
Rd-3	N 2,076,887.08	E 1,122,454.03
Rd-4	N 2,076,905.28	E 1,122,436.90
Rd-5	N 2,076,923.48	E 1,122,419.76
Rd-6	N 2,076,941.68	E 1,122,402.62
Rd-7	N 2,076,959.88	E 1,122,385.49

No.	DATE	ISSUE / REVISION	DWN BY	CKD BY	APD BY
2	10-07	ISSUED FOR CONSTRUCTION	HEC		
1	8-07	ISSUED FOR BID	HEC		

SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
FOUNDATION / SLAB PLAN
AND H-PILE LOCATIONS

PREPARED FOR

CITY OF WAUKEGAN

HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company

DATE: 08-23-07	SHEET 6 of 13	DRAWING NUMBER 06-001-D
SCALE: AS SHOWN		

LEGEND:

- FD — FLOOR DRAIN
- R-2 — RECOVERY WELL AND VAULT
- 2" PVC SCH 40 ELECTRICAL CONDUIT WITH 3#6 WIRE FROM TREATMENT PLANT TO EACH WELL (ABOVE NEW LINER)
- 1½" — PIPE 1½" DIA HDPE LINE BUTT WELDED ENCLOSED IN A 4" PVC SCH 40 CONDUIT CARRIER PIPE RUNNING TO TREATMENT BUILDING (ABOVE NEW LINER)
- 2" — 2" HDPE TREATED WATER DISCHARGE PIPE FROM RELOCATED TREATMENT BUILDING TO EXISTING CATCH BASIN (CB-1) GRAVITY DRAIN

NOTES:

1. MAINTAIN EXISTING POWER FED FROM POLE WITH NEW UNDERGROUND FEED TO RELOCATED TREATMENT BUILDING.
2. HDPE PIPE SHALL BE SDR 17.
3. BUILDING DOWNSPOUTS TO BE INSTALLED NO MORE THAN 18" BELOW GRADE AND UNDER SUPERVISION OF THE CITY OF WAUKEGAN.

0 40 80
SCALE IN FEET

SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
MECHANICAL AND ELECTRICAL PLAN

PREPARED FOR

CITY OF WAUKEGAN

No.	DATE	ISSUE / REVISION	DRN. BY	CK'D BY	APP'D BY
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HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company

DATE: 08-23-07
SCALE: AS SHOWN
SHEET 7 of 13
DRAWING NUMBER 06-001-0

N

LEGEND:

SLURRY WALL

NOTE:

1. LINER MATERIAL TO BE SMOOTH 60-MIL HDPE.
2. LINER WITHIN BUILDING FOOTPRINT FASTENED TO GRADE BEAMS AS SHOWN IN DETAIL 15, SHEET 17.
3. REMOVE ROCKS AND OTHER OBJECTS FROM SURFACE PRIOR TO PLACING LINER TO MINIMIZE RISK OF LINER PUNCTURE.
4. LINER INSIDE BUILDING PLACED AT ELEVATION 582.2 AND SEPARATED FROM LINER OUTSIDE BUILDING BY GRADE BEAM.

0 40 80
SCALE IN FEET

SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
TOP OF LINER PLAN

PREPARED FOR

CITY OF WAUKEGAN

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
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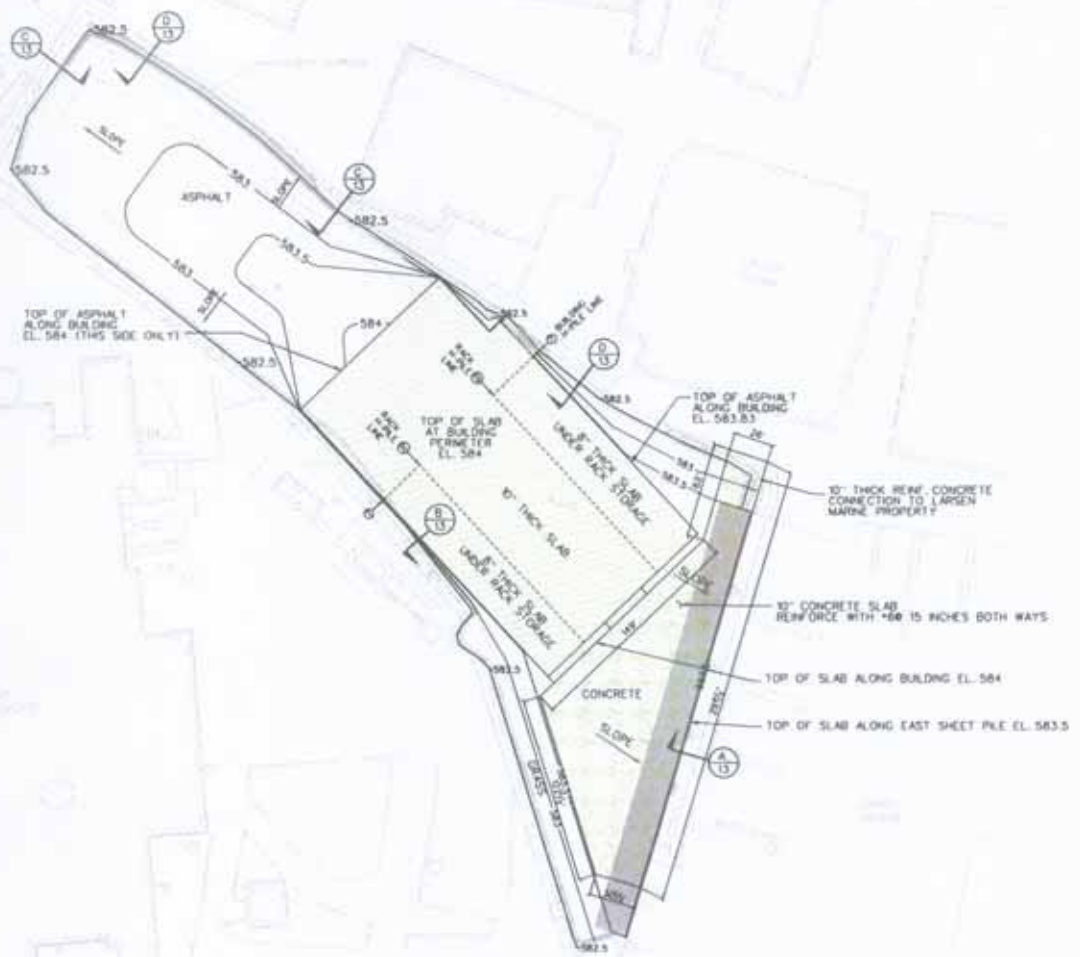
HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company

DATE: 08-23-07
SCALE: AS SHOWN
SHEET 8 of 13
DRAWING NUMBER 06-001-0



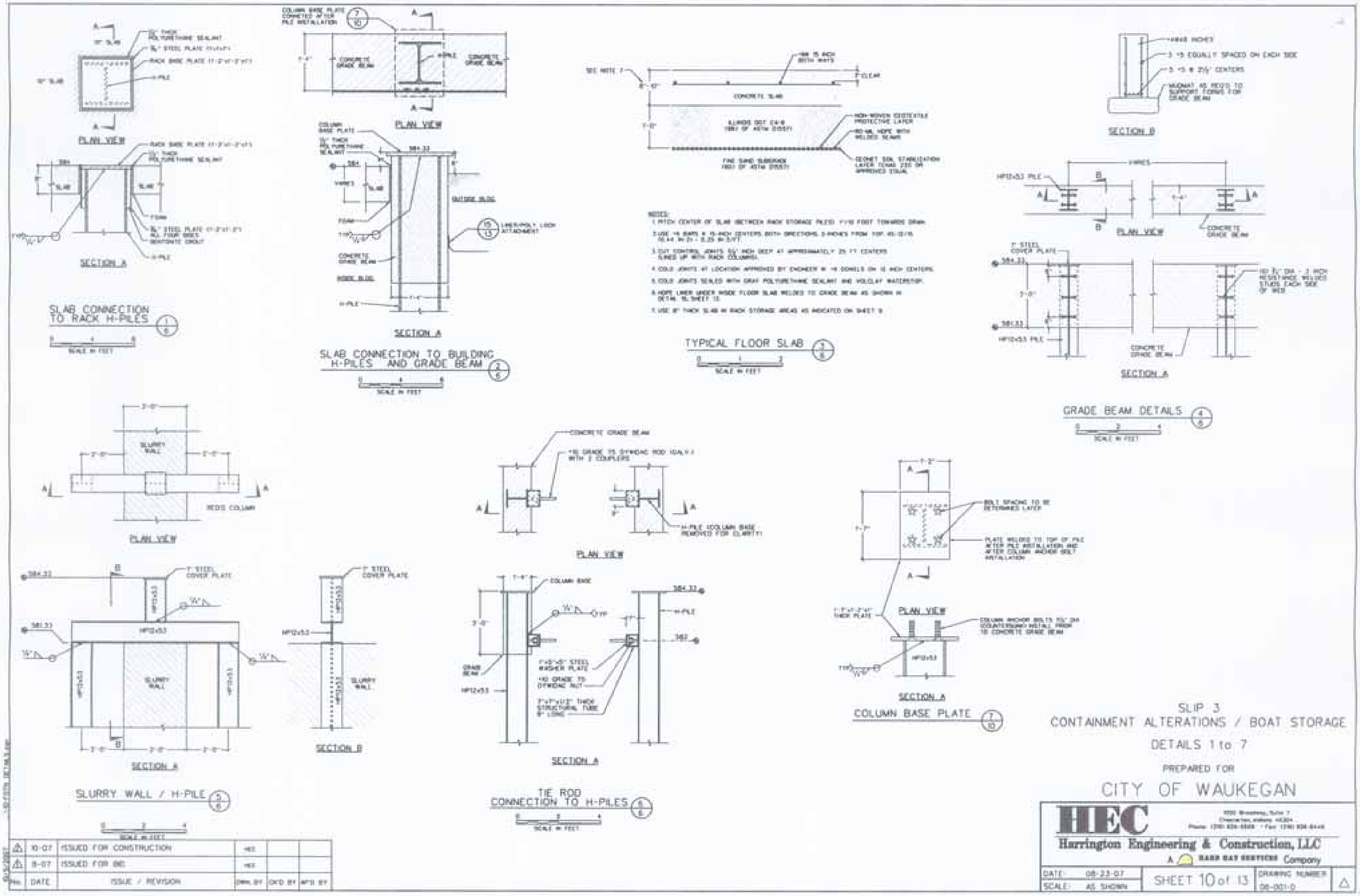
NO.	DATE	ISSUE / REVISION	DRN. BY	CK'D BY	APP'D BY
2	10-07	ISSUED FOR CONSTRUCTION	HEC		
1	8-07	ISSUED FOR BID	HEC		

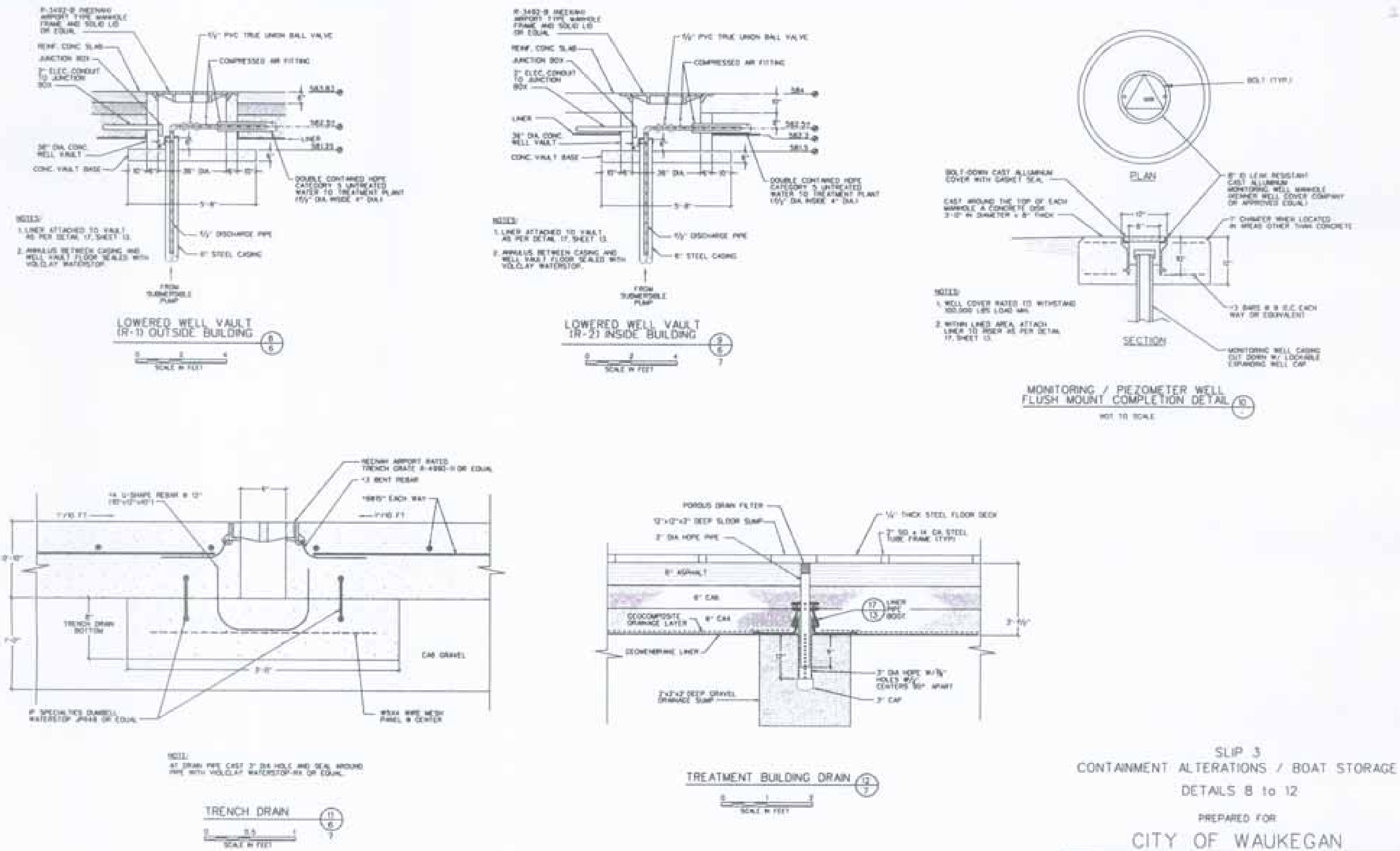
SCALE IN FEET

SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
FINISHED SURFACE PLAN
PREPARED FOR
CITY OF WAUKEGAN

HEC
Harrington Engineering & Construction, LLC
A Baird Hat Services Company
4202 Broadway, Suite 7
Phone: (219) 838-5500 Fax: (219) 838-8414

DATE: 08-23-07
SCALE: AS SHOWN
SHEET 9 of 13
DRAWING NUMBER 06-001-0


SLAB CONNECTION TO RACK H-PILES
SLAB CONNECTION TO BUILDING H-PILES AND GRADE BEAM
TYPICAL FLOOR SLAB
NOTES:
1. PITCH CENTER OF SLAB (BETWEEN RACK STORAGE PILES) 1"/10 FOOT TOWARDS DRAIN.
2. USE #4 BARS @ 15-INCH CENTERS BOTH DIRECTIONS 3-INCHES FROM TOP. [illegible]
3. CUT CONTROL JOINTS 1¼ INCH DEEP AT APPROXIMATELY 25 FT CENTERS (LINED UP WITH RACK COLUMNS).
4. COLD JOINTS AT LOCATION APPROVED BY ENGINEER W/ #6 DOWELS ON 12 INCH CENTERS.
5. COLD JOINTS SEALED WITH GRAY POLYURETHANE SEALANT AND VOLCLAY WATERSTOP.
6. HDPE LINER UNDER INSIDE FLOOR SLAB WELDED TO GRADE BEAM AS SHOWN IN DETAIL 15, SHEET 13.
7. USE 8" THICK SLAB IN RACK STORAGE AREAS AS INDICATED ON SHEET 9.
GRADE BEAM DETAILS
SLURRY WALL / H-PILE
TIE ROD CONNECTION TO H-PILES
COLUMN BASE PLATE
SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
DETAILS 1 to 7
PREPARED FOR
CITY OF WAUKEGAN
HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company
DATE: 08-23-07
SCALE: AS SHOWN
SHEET 10 of 13
DRAWING NUMBER 08-001-D
10-07 ISSUED FOR CONSTRUCTION HEC
8-07 ISSUED FOR BID HEC
No. DATE ISSUE / REVISION DWN BY CHD BY APD BY



SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
DETAILS 8 to 12

PREPARED FOR

CITY OF WAUKEGAN

HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company

DATE:	08-23-07	SHEET 11 of 13	DRAWING NUMBER
SCALE:	AS SHOWN		06-001-D

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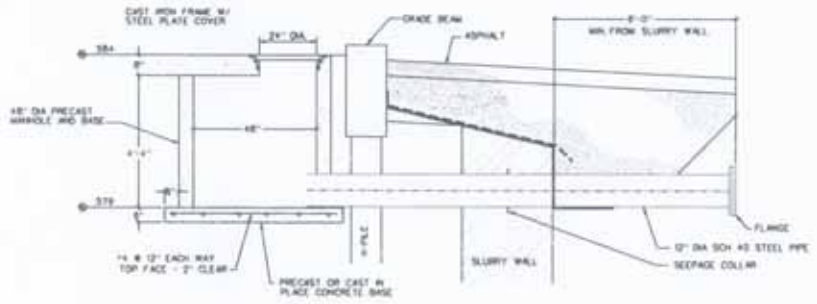
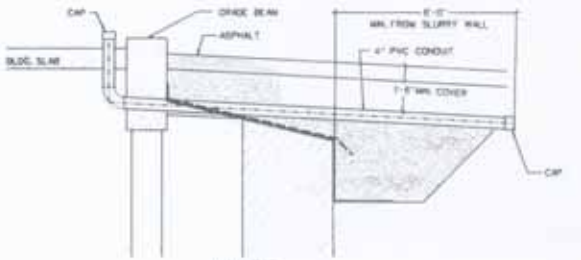
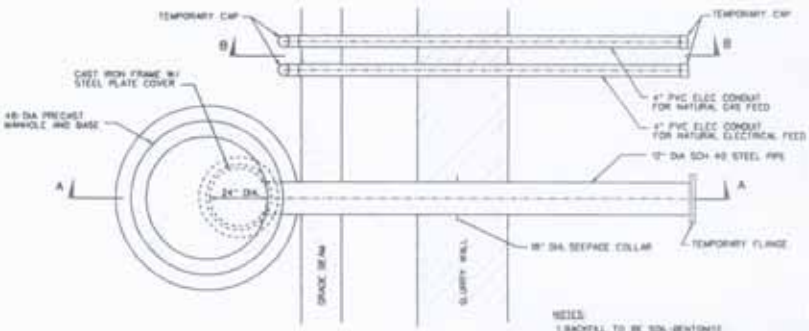
△	10-07	ISSUED FOR CONSTRUCTION	HEC		
△	8-07	ISSUED FOR BID	HEC		



SECTION A



SECTION B

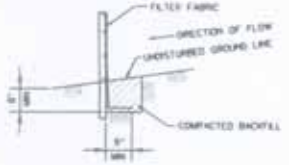


PLAN VIEW

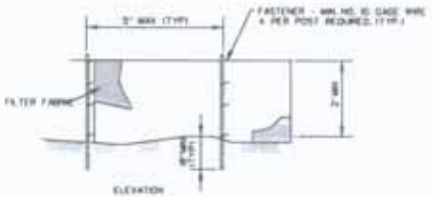
NOTES:
1. BACKFILL TO BE SOIL-BENTONITE MIXTURE CONTAINING AT LEAST 10% BENTONITE BY WEIGHT.
2. PENETRATIONS OF HDPE LINER BY PIPE AND CONDUIT SHALL BE AS SHOWN IN DETAIL 17, SHEET 13.

UTILITY VAULT (13/6/7)

NOT TO SCALE



FABRIC ANCHOR DETAIL



ELEVATION

NOTES:
1. TEMPORARY SEDIMENT FENCE SHALL BE INSTALLED PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED. THEY SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND REMOVED IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
2. FILTER FABRIC SHALL MEET THE REQUIREMENTS OF CLASS 1, WITH EQUIVALENT OPENING SIZE OF 40 LEAST 30 FOR NONWOVEN AND 50 FOR WOVEN.
3. FENCE POSTS SHALL BE EITHER WOOD POST WITH A MINIMUM CROSS-SECTIONAL AREA OF 3.0 SQ.IN. OR A STANDARD STEEL POST.

SILT FENCE (14/4)

NOT TO SCALE

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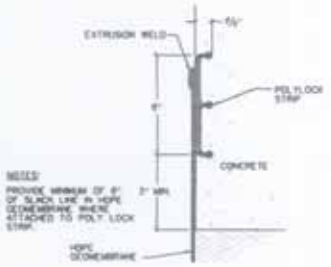
SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
DETAILS 13 & 14

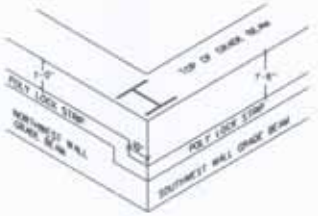
PREPARED FOR
CITY OF WAUKEGAN

HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company

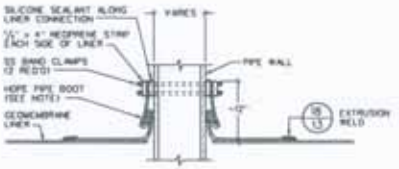
DATE: 08-23-07
SCALE: AS SHOWN
SHEET 12 of 13
DRAWING NUMBER 06-001-0



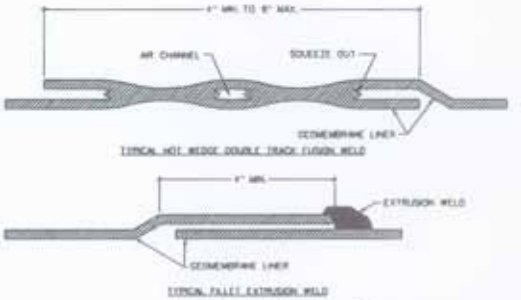
POLY LOCK ATTACHMENT (15/9)
NTS



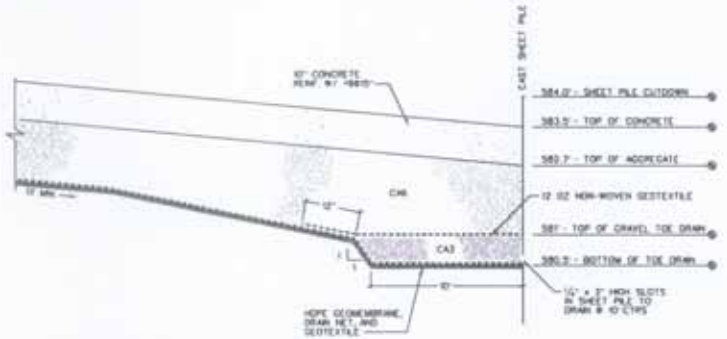
POLY LOCK LOCATION ON BEAM (16/9)
NTS



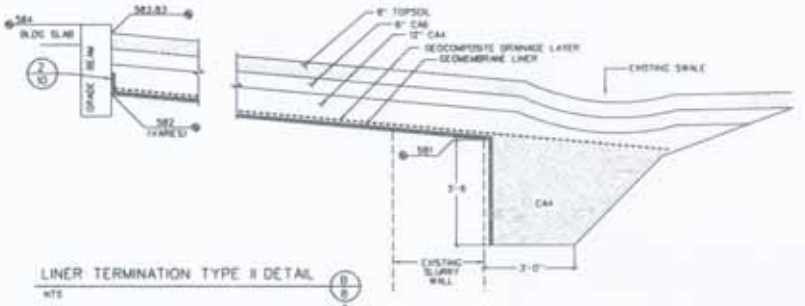
GENERAL DETAIL OF LINER PENETRATION - CIRCULAR PENETRATIONS (17/11)
NTS



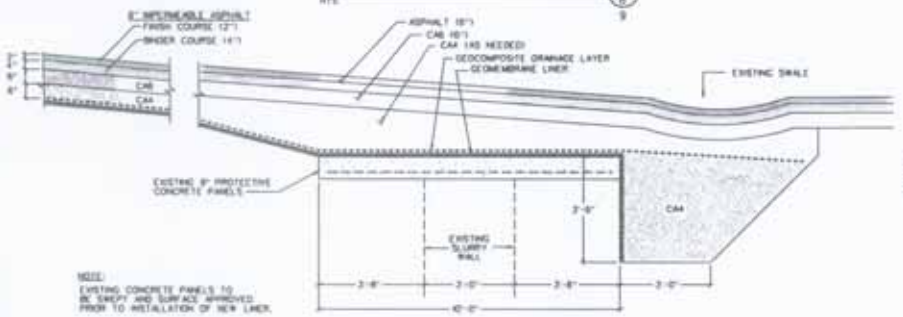
LINER WELD DETAILS (18/13)
NTS



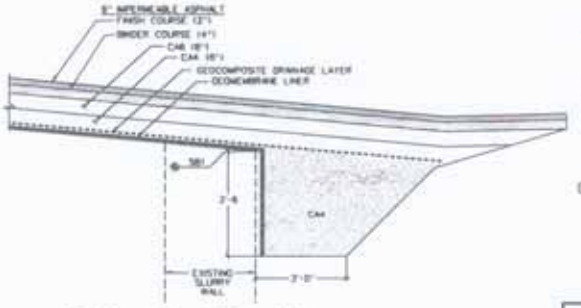
LINER TERMINATION TYPE I DETAIL (A/9)
NTS



LINER TERMINATION TYPE II DETAIL (B/9)
NTS



LINER TERMINATION TYPE III DETAIL (C/9)
NTS



LINER TERMINATION TYPE IV DETAIL (D/9)
NTS

GENERAL NOTES:

1. THE DRAINAGE LAYER CONSIST OF A GEONET DRAINAGE LAYER WITH A GEOTEXTILE HEAT BONDED TO THE UPPER SIDE. THE GEONET SHALL MEET THE FOLLOWING SPECIFICATIONS:
   - A) BI-PLANAR STRUCTURE
   - B) MINIMUM TRANSMISSIVITY 8.5 GAL/MIN/FT
   - C) THICKNESS: 5MM
   - D) MINIMUM TENSILE STRENGTH 45 LB/IN
2. THE GEOTEXTILE, PRIOR TO ADHESION, SHALL MEET THE FOLLOWING SPECIFICATIONS:
   - A) MINIMUM WIRES PER AREA 12 OZ./SQUARE YARD
   - B) MINIMUM GRAB TENSILE 170 LBS.
   - C) MINIMUM PUNCTURE STRENGTH 90 LBS.
3. THE GEOCOMPOSITE SHALL MEET THE FOLLOWING SPECIFICATIONS:
   - A) MINIMUM WIRES PER AREA 8 OZ./SQUARE YARD
4. GEOMEMBRANE LINER SHALL BE 60-MIL HDPE MEETING THE FOLLOWING SPECS:

SLIP 3
CONTAINMENT ALTERATIONS / BOAT STORAGE
DETAILS 15 to 18, A, B, C, & D

PREPARED FOR
CITY OF WAUKEGAN

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2	10-07	ISSUED FOR CONSTRUCTION	HEC		
1	8-07	ISSUED FOR BID	HEC		

HEC
Harrington Engineering & Construction, LLC
A HARD HAT SERVICES Company

DATE: 08-23-07
SCALE: AS SHOWN
SHEET 13 of 13
DRAWING NUMBER 06-001-D