Existing Condition Inspection and Re-Use Report

Upper Harbor Terminal

City of Minneapolis, Minnesota

SEH No. MNPLS 130299 | 4.00

June 30, 2015

Prepared for the:
Minneapolis Community Planning and Economic Development Department
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Historical Consultants

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I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minneapolis.

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Elizabeth Gales has served as Hess Roise's lead historian for this report and the primary author for the information contributed by Hess Roise. Penny Petersen assisted with research. Principal Charlene Roise was the project manager and assisted with content and editing.

SEH

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Existing Condition Inspection and Re-Use Report

Upper Harbor Terminal

Prepared for City of Minneapolis, Minnesota - CPED

1.0 INTRODUCTION

The Upper Harbor Terminal (UHT) is a 48-acre industrial property located approximately 2 miles from downtown Minneapolis along the west bank of the Mississippi River, between Lowry Avenue and the Camden Bridge in North Minneapolis. SEH has completed an analysis of the various buildings and structures that currently exist at the Upper Harbor Terminal facility and has evaluated the feasibility of reuse of those facilities. Hess, Roise and Company evaluated the historic character of the site and whether the reuse options meet the Secretary of the Interior's Standards for the Treatment of Historic Properties.

The Upper Harbor Terminal site is equipped for intermodal transfer of a variety of bulk commodities including grain, aggregate, coal, fertilizer, and petroleum products, and comprises a number of buildings and structures for storing and handling these materials, including concrete domes, loading and conveyance structures, a large concrete warehouse building, outdoor storage areas, a riverwall, barge mooring cells, and an open area for storage of dredging materials.

The Upper Harbor Terminal was constructed by the City of Minneapolis beginning in 1968 and took over two decades to reach its present form. Throughout its history, the site has played a role in the industrial use along the Upper Mississippi River. The terminal was included in a historic survey of the Upper Mississippi Harbor Development in 2007. The survey found that a potential Upper Harbor Historic District exists on both sides of the river. The district is eligible for listing in the National Register of Historic Places. The Upper Harbor Terminal is a contributing resource to the potential National Register district. It is also individually eligible for designation as a Minneapolis Landmark.

The Upper Harbor Terminal continues to play a role in the storage and transfer of commodities today. However, the U.S. Army Corps of Engineers is closing the Upper Saint Anthony Falls Lock and the resulting loss of barge business above Saint Anthony Falls further impacts the terminal business that was already in decline and struggling to be viable.

The city's long-term plans for the "Above the Falls" area have led the City to shape a new vision for the Upper Harbor Terminal. This report is one of the many steps taken by the City to evaluate the opportunities along the river.

The most recent study in the Upper Harbor Terminal Redevelopment Strategy planning effort was completed in 2014. The study evaluated redevelopment potential of the Upper Harbor

Terminal site, while balancing the desire to incorporate park lands, a parkway, and trails throughout the site. The need to conduct this feasibility study of reusing the existing buildings and structures for other future uses and the implications of such work on the historical nature of the facility was identified in that report.

Several related plans and studies and adopted policy documents have informed the City's strategy for the Upper Harbor Terminal site. A list of plans, studies, policy documents include the following:

- Upper Harbor Terminal Redevelopment Strategy (2014)
- Above the Falls Master Plan Update (2013)
- Above the Falls Regional Park Master Plan (2013)
- 2030 Regional Parks Policy Plan (2013)
- RiverFIRST: A Park Design Proposal and Implementation Framework for the Mississippi Upper Riverfront (2012)
- Above the Falls Policy Review and Implementation Study (2010)
- Upper Mississippi Harbor Development Architectural/Historical Survey (2007)
- Upper Harbor Terminal Redevelopment Study (2004)

The goals of this study are:

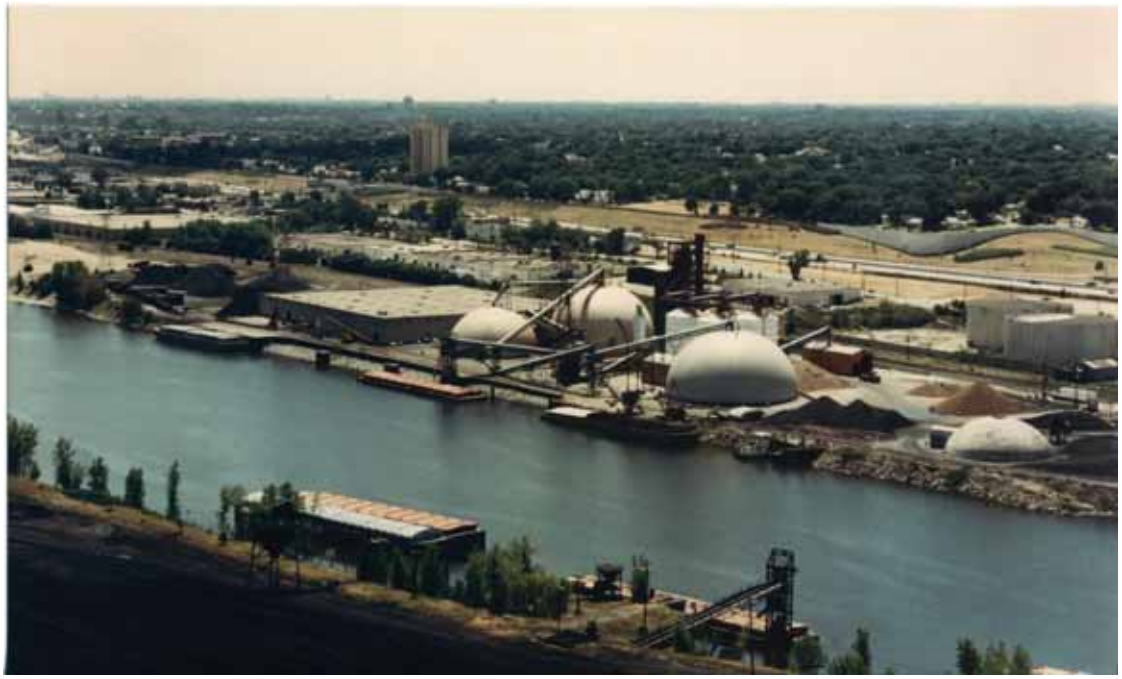
- To prepare a summary of the existing structural conditions of the buildings and facilities;
- To prepare a summary of potential reuse options and high-level cost estimates;
- To develop recommendations for preservation priorities following the Secretary of the Interior's Standards.

This study consisted of records review, visual review and limited testing of the facilities by structural, geotechnical, and environmental engineers. Historical consultants reviewed historical records, previous architectural/historical surveys, and also conducted an oral history interview with staff at the terminal.

2.0 HISTORICAL OVERVIEW

The Upper Harbor Terminal was constructed in multiple phases over twenty years.[1] Planning for the terminal began in 1964 and focused on a twenty-one-acre parcel owned by the city in north Minneapolis. The parcel was bounded by Dowling Avenue North, Thirty-third Avenue North, Second Street North, Washington Avenue North, and the river. The site was level and had room for expansion, adequate drainage, and excellent access to rail and roadways. Consultant Merlin H. Berg developed a preliminary layout for the site. He anticipated demand for storage and transfer of many different kinds of commodities ranging from newspaper, twine, and wire to coal, salt, and fertilizer. Additional land would be needed if demand grew

[1] For a detailed history of the Upper Harbor Terminal and the events leading up to its construction, please see: Erin Hanafin Berg and Charlene Roise, Hess, Roise and Company, "Upper Mississippi Harbor Development Architectural/Historical Survey, Minneapolis, Minnesota," October 2007, available in the City of Minneapolis Community Planning and Economic Development Department, Minneapolis, Minnesota. Excerpts from the report are used here to document the development of the Upper Harbor Terminal.



Historic photo of the Upper Harbor Terminal, ca. 1990, looking southwest
(source: River Services, Inc.)

and if a warehouse, tanks, and elevators were constructed. Berg recommended that the city acquire adjacent parcels to extend the site.[2]

The first company to manage the terminal was the Northern Waterways Terminals Corporation, which had previously leased ten acres of the municipal terminal at Bohemian Flats, under the Washington Avenue Bridge. The company agreed to undertake the initial capital improvements to the site, receiving reimbursement from the city, at a depreciated rate, only if the company's lease was terminated. Northern Waterways commissioned the construction of a 3,000 square-foot office building, a scale and scale house, and a barge dock. The office and barge dock were completed in 1968 at a cost of about $200,000. The scale and scale house were built shortly thereafter. Architecture and engineering firm Toltz, King, Duvall, Anderson and Associates (TKDA) designed both buildings. Northern Waterways also installed roadways and fencing so vacant land could be used for open commodity storage. In 1969, TKDA was hired to plan the remainder of the Upper Harbor Terminal site. The plans called for developing the site in three additional stages, adding buildings and acquiring more land to diversify the kinds of commodities that could be stored and transferred at the terminal.[3]

The second phase of the Upper Harbor Terminal's development was completed in 1971 with the construction of a 110,000 square-foot warehouse and another barge dock. Additional facilities were added gradually in several phases over the next sixteen years as the master plan took shape. Asphalt tanks, dykes, and docks were built at both ends of the terminal site in the early to mid-1970s. A grain handling facility was built in the mid-1970s, with a four-silo elevator, overhead and underground conveyors, a rail dump, and a riverfront load-out tower. Between 1982 and 1987, four thin-shell concrete storage domes were erected to store fertilizer. The construction method, which used inflated fabric membranes that were sprayed

[2] Ibid., 15-19.
[3] Ibid., 19.

Historic photo showing Parcel 2 through 5, ca. 1990, looking south;
downtown Minneapolis is in the background
(source: River Services, Inc.)

with insulation and concrete, reinforced with rebar, was a recent invention. Vital infrastructure, such as roadways and railroad spurs, office and accessory structures, and open storage areas, also took shape over the years.[4]

New construction at the terminal often coincided with a change in the companies that managed the property. The Upper Harbor Terminal has been managed by six companies over its thirty-eight-year history. Northern Waterway Terminals, which had operated the original municipal terminal since 1949, declared bankruptcy in 1973. The city engineer's office took over operation of both terminals for what proved to be a very expensive year—the facilities (and the city) lost approximately $500,000. The Bolander Conlan Terminal Corporation leased the Upper Harbor facility from the city from 1975 until the company was purchased in 1979 by Con-Agra, which assumed the lease. Late in 1982, Con-Agra sued the city over a number of issues and, when the lawsuit was decided in the city's favor, Con-Agra's contract was terminated. Packer River Terminals, which also operated a barge terminal facility in South Saint Paul, ran the Upper Harbor Terminal from 1983 to 1991. This contract, too, ended with a lawsuit: the company claimed that a two-year drought, which greatly reduced revenues, permitted the company to withhold rent payments. Although the lawsuit resulted in a favorable judgment for Minneapolis, it required that the city find a new operator for the Upper Harbor Terminal. River Services, Inc. has operated the Upper Harbor Terminal since 1991.[5]

In 2007, the Upper Harbor Terminal was included in an intensive-level architectural/historical survey of the Minneapolis riverfront. The survey area ranged between the Northern Pacific Railway Bridge (Bridge #9) below Saint Anthony Falls to the Soo Line Railway Bridge near

[4] Ibid.
[5] Ibid., 21.

Historic photo showing Parcels 1 and 2, ca. 1990, looking north
(source: River Services, Inc.)

the city's northern boundary. Properties on both sides of the river were surveyed, as well as resources located in the river itself. The survey identified resources that have already been listed in the National Register of Historic Places, like the Saint Anthony Falls Historic District. It also found other properties to be eligible for listing in the National Register, including the potential Upper Harbor Historic District. The district is a 1.5-mile section of the harbor development that has intact buildings, structures, and objects. Properties that contribute to the historic significance of the district include the Northern Pacific Railroad Bridge, Huron Cement Terminal, American Iron and Supply Company, Northside Garage Barge Dock, Riverside Station Power Plant Terminal, and the Upper Harbor Terminal.[6]

[6] Ibid., 22.

Within the terminal, the following buildings, structures, objects, and sites were inventoried in the survey. The retaining wall between the North and South Docks, and the storm sewer outfall wall at Dowling Avenue North were not inventoried.

SHPO Inventory No.	Description	Date
HE-MPC-9244	Office Building	1968
HE-MPC-9245	Scale House	1968
HE-MPC-9246	Truck Scale	1968
HE-MPC-9247	Scale House	1983
HE-MPC-9248	Truck Scale	1983
HE-MPC-9249	North Mooring Cell	ca. 1982
HE-MPC-9250	North Dock (Dock #1)	1968
HE-MPC-9251	Loading Area Mooring Cells (3)	1974
HE-MPC-9252	South Dock (Dock #2)	1971
HE-MPC-9253	Petroleum Dock	1974
HE-MPC-9254	Warehouse / Loading Docks	1971
HE-MPC-9255	Shipping/Receiving Building	ca. 1985
HE-MPC-9256	Load-Out Tower	ca. 1975
HE-MPC-9257	Conveyor	ca. 1975, 1984
HE-MPC-9258	Rail Dump	ca. 1976
HE-MPC-9259	4 Bins, Elevator Tower	ca. 1978
HE-MPC-9260	Truck Dump / Hoist	ca. 1978
HE-MPC-9261	Control Building	ca. 1978
HE-MPC-9262	4 Dust Tanks	ca. 1978
HE-MPC-9263	Small dome (1,800 ton capacity)	1982
HE-MPC-9264	Dome (12,000 ton capacity)	1987
HE-MPC-9265	Dome (8,000 ton capacity)	1984
HE-MPC-9266	Dome (16,000 ton capacity)	1984
HE-MPC-9267	Load-out Shelter (adj. to 9264)	1987
HE-MPC-9268	Load-out Shelter (adj. to 9265/9266)	1984
HE-MPC-9269	Truck / Rail Dump	ca. 1978
HE-MPC-9270	Asphalt Tanks (2)	ca. 1975
HE-MPC-9271	Dyke Wall	ca. 1975
HE-MPC-9272	Boiler Shed	ca. 1975
HE-MPC-9273	Petroleum Pumping Spout	ca. 1975
HE-MPC-9274	Petroleum Pumping Spout	ca. 1975
HE-MPC-9275	Truck Staging Area	ca. 1985
HE-MPC-9276	Rail and Roadway System	1968-1991
HE-MPC-9277	Rail and Roadway System	1968-1991
HE-MPC-9278	Rail Scale Shed	1991
HE-MPC-9279	Open Commodity Storage Area	1968-1986
HE-MPC-9280	Open Commodity Storage Area	1968-1986
HE-MPC-9281	Open Commodity Storage Area	1968-1986
HE-MPC-9282	Open Commodity Storage Area	1968-1986
HE-MPC-9283	Open Commodity Storage Area	1968-1986

Since the survey report was completed in 2007, the asphalt tanks (HE-MPC-9270), dyke wall (HE-MPC-9271), and petroleum pumping spouts (HE-MPC-9273, HE-MPC-9274) have been removed.

3.0 SECRETARY OF THE INTERIOR'S STANDARDS FOR THE TREATMENT OF HISTORIC PROPERTIES

The Secretary of the Interior, through the National Park Service, is responsible for establishing standards and guidelines related to historic properties. The National Park Service has outlined four approaches to maintenance and repair, known as the "Treatment Standards."[7] The appropriate standard for a given property is determined by considering a variety of factors, including why the property is significant, its condition, current and future uses, and available funding. At some properties, more than one treatment standard might be justified to address different elements of the property. In any event, a record of the rationale for selecting the standard(s) and thorough documentation of the work that is subsequently completed should be retained for future reference.

The National Park Service provides an overview of the Treatment Standards:

> The Standards for the first treatment, *Preservation*, require retention of the greatest amount of historic fabric, along with the property's historic form, features, and detailing as they have evolved over time. The *Rehabilitation* Standards acknowledge the need to alter or add to a historic property to meet continuing or new uses while retaining the building's historic character. The *Restoration* Standards allow for the depiction of a property at a particular time in its history by preserving materials from the period of significance and removing materials from other periods. The *Reconstruction* Standards establish a limited framework for re-creating a vanished or non-surviving property with new materials, primarily for interpretive purposes.[8]

More specifically:

> **Preservation** is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.
>
> **Rehabilitation** is defined as the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.
>
> **Restoration** is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

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[7] Information on the Treatment Standards is available from a variety of National Park Service sources including its website, www.nps.gov, from which the following quotations were obtained.

[8] Kay D. Weeks and Anne E. Grimmer, *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings* (Washington, D.C.: U.S. Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services, 1995), 2.

> **Reconstruction** is defined as the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.[9]

The Treatment Standards are the industry standards for the historic preservation. The standards will be applied to the re-use options for each structure type in the next section.

4.0 EXISTING CONDITIONS

4.1 Technical Review

A structural review of the buildings and facilities at Upper Harbor Terminal was conducted in October and November 2014. A geotechnical review was also conducted specifically for the riverwall elements. The technical review/inspection was primarily visual, with hammer sounding of accessible portions of concrete structures. No finishes were removed, and no manlifts were used; inspection was from the ground. No roofs were inspected, except the roof elements of the storage domes. Buildings which were locked (many of the small outbuildings) were inspected from the outside, using windows where possible. Original construction plans of most of the facilities were available for review.

The following buildings and structures were reviewed. They are listed with serial identifying numbers assigned by the Minnesota State Historical Preservation Office (SHPO) for reference, as listed on Page 6 of this report. The last two digits of these identifiers are used to identify the structures in an aerial photograph which is attached to this report as Figure 1, following the body of the report.

4.2 Re-use and Opinion of Costs

Following the Technical Review, this report details repair options on three levels for most of the structures:

1. Do nothing
2. Mothball or stabilize; stop further degradation
3. Reuse/Upgrade to an assumed use or uses.

For the latter two options, we have estimated a cost (at a very approximate level) to perform the work, for each structure. This report assumes reasonable uses for structures where they seem to exist, but the proposed “upgrade” improvements will not completely prepare the structures for new use. There is a wide range of potential treatments (and costs) that might be needed, so it was not possible to provide thorough estimates. Therefore, although the “upgrade” improvements would be important steps towards reuse, in all cases additional improvements and costs would be needed to fully support a reuse.

[9] Ibid., 16, 60, 116, 164.

One overall site option which is only briefly alluded to within this report is the possibility of using part of the site and its structures as a museum or memorial to itself and river shipping in Minneapolis. In the unlikely event this is contemplated, the cost associated with it for most of the structures is the Mothball option. Where this is not true (specifically, the Elevator Tower, Load-out Tower and Conveyors, and Underground Conveyors, due to safety and liability concerns), this report notes otherwise.

For some non-structural portions of the site (specifically, oil and asphalt piping) we deviate from the Do Nothing/Mothball/Upgrade gradation and simply make a recommendation, with associated cost.

4.3 Detailed Findings

4.3.1 Domes

HE-MPC-9263	Small dome (1800 ton capacity)
HE-MPC-9264	Dome (12,000 ton capacity)
HE-MPC-9265	Dome (8,000 ton capacity)
HE-MPC-9266	Dome (16,000 ton capacity)

The four domes on the site are a proprietary design which utilized a canvas hemisphere anchored to a concrete ring beam foundation and then inflated. Foam was sprayed onto the inside surface of the canvas; then concrete was applied (shotcreted) onto the foam insulation. Reinforcing details are not available; neither is concrete thickness or strength. However, Mike Weyandt of River Services states that the domes have significant reinforcing based on his observations during their construction.

Based on visual observation, and hammer sounding of the bottom 6 feet or so of the walls, the domes are all structurally in good condition. However, the canvas (which now functions as a roof membrane and serves to protect the foam from ultraviolet degradation) is in very poor condition, with large areas torn or missing entirely. Consequently, the foam insulation is also in poor condition.

The floors of the domes are dirt, and carry vestiges of whatever has been stored in them: fertilizer, urea, salt, and other commodities.

Options

Do Nothing

Based on the poor condition of the canvas roof covering, the option of doing nothing carries a penalty of further and accelerating degradation of the foam insulation beneath the canvas. It also increases the probability of water being held next to the concrete shell, which may begin to degrade its structural properties and reduce the longevity of the shell. If this option is considered, we recommend testing a sample of foam to determine whether it holds water, and checking the condition of the concrete immediately beneath the foam at each dome. We estimate this to cost $2000 per dome.

Mothball

To adequately protect the structure from further degradation, it is necessary to re-roof the shells. If it is necessary to do this in a historically sensitive manner, then canvas sheets will

need to be fabricated and adhered to the foam. In either event, the foam will need to be evaluated and at least filled in to provide a smooth stable surface; it may need to be removed and replaced entirely.

Mothball Option Cost Estimate

For each dome, this figure assumes half the surface area requires new polyurethane foam at $7.00 per square foot; and a welded-seam sheet membrane roof (PVC, TPO, or similar) priced at $10.00 per square foot. While canvas would be more historically accurate, it would be far more expensive and provide less protection. It is felt that a sheet membrane roof provides an acceptable substitute with regard to the Secretary of the Interior's Standards.

	Area	Foam	Sheets	Total
Dome 63 (1800 ton cap.) 90' OD?	8,900 sf	$32,000	$89,000	$121,000
Dome 64 (12,000 ton) 132' OD, 66' tall	27,370 sf	$96,000	$274,000	$370,000
Dome 65 (8,000 ton) 107' OD, 53.5' tall	17,984 sf	$63,000	$180,000	$243,000
Dome 66 (16,000 ton) 122' OD, 75' tall	28,746 sf	$101,000	$288,000	$389,000
				$1,123,000

There are other options than sheet membranes; for instance, there are liquid-applied membranes with felt layers between the liquid. These roof types may or may not be suitable for roofs this large, but they are somewhat less expensive, costing approximately $8 per square foot rather than the $10 per square foot assumed above (a savings of roughly $150,000 over all the domes). Further study is needed before we can recommend this system, but it may be an option.

Upgrade

Two generalizations may be made about domes and thin-shell structures: they are affected significantly by holes and interruptions to their geometry; and their analysis, already difficult, is made far more so by such openings. Thus analysis of the domes and design of modifications is beyond the ability of many engineers, and can be expected to be time-consuming and expensive. If such openings are contemplated to be created, information such as the strength and location of reinforcing bars, and the strength and thickness of the concrete, will need to be gathered, probably by sampling and testing of the actual in-place materials: concrete cores taken and tested, reinforcing located and its size determined. In the event this is done, such openings in general will need to be reinforced with significant concrete edge beams which will need to be integrated with the insulation and canvas covering. These reinforcing beams (as well as the openings) may affect the historic integrity of the domes. In addition, depending on the results of testing and structural analysis, it may be found necessary to reinforce the domes, most likely by adding more concrete to the interior using shotcrete; or possibly by the use of a structural steel framework designed to prevent collapse in the event the dome fails. The cost estimates assume an inner shell of shotcrete is added for the "Upgrade" option.

The floors of the domes are dirt, and carry vestiges of whatever has been stored in them: fertilizer, urea, salt, and other commodities. Any upgrade would probably require removal of contaminated soil, and placement of a concrete floor. Most potential uses would also require the availability of utilities such as electricity, water, data, and gas; and any but seasonal use would also require heating and ventilation.

Upgrade Option Cost Estimate

For each dome, this figure assumes a 4” lightly reinforced concrete floor slab (at $4.00 per square foot), a few rather arbitrary openings designed and built, and 4” of reinforced shotcrete placed inside the existing domes ($40/square foot). Each Slab option includes $10,000 for testing and remediation of contaminated soil. These figures do not include bringing in utilities, nor lighting or finishes (basically, what would be needed to make the spaces habitable year-round). This may be assumed at roughly $10,000 per dome. Another cost not included is some kind of acoustic treatment, which may be found necessary depending on the use to which a dome may be put. At the precision used for cost estimating in this report, a figure of $10,000 per dome may be used for this too. Both of these additions may affect the historical integrity of the domes; the degree to which they affect it may depend on the permanence of the installation; see below. The totals below include $20,000 per dome to account for these costs.

	Floor Area	4” Slab	Openings	Shotcrete	Habitation	Total
Dome 63: 90’ OD?	6,362 sf	$36,000	$100,000	$356,000	$25,000	$512,000
Dome 64: 132’ OD, 66’ tall	13,273 sf	$65,000	$100,000	$1,095,000	$25,000	$1,280,000
Dome 65: 107’ OD, 53.5’ tall	8,659 sf	$45,000	$100,000	$720,000	$25,000	$885,000
Dome 66: 122’ OD, 75’ tall	11,000 sf	$64,000	$100,000	$1,150,000	$25,000	$1,324,000
						$3,921,000

Applying the Secretary of Interior’s Standards

The Do Nothing option does not meet the Treatment Standards because it has the potential to cause further physical damage to the domes. The Mothball option meets the Preservation Standards and would sustain the appearance of the materials, design, and historic integrity of the domes. The Upgrade option appears to meet the Rehabilitation Standards, but the number, location, and size of new openings could harm the historic integrity. Openings should be carefully considered on an individual basis for each dome. New construction inside the domes would generally meet the standards if the new construction can be removed without permanently damaging the domes. Any interior alterations should be reviewed on a case-by-case basis.

4.3.2 Load-out Shelters

HE-MPC-9267	Load-out Shelter (adj. to 9264)
HE-MPC-9268	Load-out Shelter (adj. to 9265/9266)

The Load-out Shelters are wood framed structures with light plywood sheathing, attached to some of the domes. They are intended to provide shelter when loading or unloading trucks. The sheathing is weathered and beginning to decay along the bottom edge. Aside from minor damage from occasional impacts from loading equipment (typically front-end loaders), the shelters are in relatively good condition structurally.

The shelters are of light construction and are uninsulated.

Like the domes, the floors of the Load-out Shelters are dirt mixed with whatever commodities have been stored in the adjacent domes.

Options

Do Nothing

The option of doing nothing carries little penalty. Eventually the shingle roofs will begin to leak, hastening decay inside the buildings; and the lower portions of the wall sheathing are beginning to decay. But for the next 10 or so years, the shelters should not need significant investment to remain in usable condition.

Mothball

To adequately protect the structures from further degradation, it will at some point become necessary to re-shingle the roof and re-sheath the walls. Cost includes shingles at $3.00 per square foot and plywood sheathing at $3.50 per square foot.

Mothball Option Cost Estimate

	Roof Area	Shingles	Wall Area	Sheathing	Total
Shelter 67	2880 sf	$8,700	4368 sf	$15,300	$24,000
Shelter 68	6100 sf	$18,300	4620 sf	$16,200	$34,500
					$58,500

Upgrade

The shelters are of light construction, are uninsulated, and would require doors, windows, insulation, and utilities if year-round occupied use is contemplated. Taken together with the domes, they could be used as unheated storage space.

Like the domes, the floors of the Load-out Shelters are dirt mixed with whatever commodities have been stored in the adjacent domes. Any upgrade would probably require removal of contaminated soil, and placement of a concrete floor.

Upgrade Option Cost Estimate

For each shelter, this figure assumes a 4” lightly reinforced concrete floor slab (at $4.00 per square foot), Framing of the large openings, with personnel doors and windows added (taken

at $10,000 per shelter), and insulation and plywood inner sheathing ($4.50/square foot). Each Slab option includes $5,000 for testing and remediation of contaminated soil. The Totals also include bringing in utilities, heat, lighting and finishes. This may be assumed at roughly $15,000 per shelter.

	Floor Area	4" Slab	Wall Area	Sheathing	Habitation	Total
Shelter 67	2,880 sf	$16,500	4368 sf	$19,700	$15,000	$61,200
Shelter 68	6,100 sf	$29,400	4620 sf	$20,800	$15,000	$75,200
						$136,400

Applying the Secretary of Interior's Standards

Both the Do Nothing and Mothball options meet the Preservation Standards and would sustain the materials, design, and historic integrity of the load-out shelters. The Upgrade option appears to meets the Rehabilitation Standards, although the design and materials for the personnel doors and windows would need to be reviewed to confirm they do no damage the historic character of the shelters.

4.3.3 Warehouse

HE-MPC-9254 Warehouse / Loading Docks
HE-MPC-9255 Shipping/Receiving Building

The warehouse is a large (301 feet by 358 feet) precast concrete building with a large loading dock on the river side. It currently is mostly empty, with a small shop and an office mezzanine used by River Services on the northeast corner. The building is in good condition structurally, with minor chipping of the corners of many of its columns, but otherwise no significant damage or deterioration. As far as we have been able to determine (through conversation with John McPhillips, a local roofing contractor), it was last roofed in the late 1970's (by McPhillips).

On the north wall of the Warehouse is a very small booth named the Shipping/Receiving Building. It is used to log trucks in and out. It is in relatively good condition.

The Loading Dock on the east (river) side of the Warehouse is an open-air dock constructed about four feet above the surrounding ground. Aside from some cracking of the slab, it is in good condition generally, with no undue wear or settlement.

The foundation of the Loading Dock functions as a deadman to anchor tiebacks which are part of the structure of the sheet pile Riverwall nearby. This is an important consideration if demolition of the Loading Dock is considered; the riverwall adjacent to the Warehouse depends on the Loading Dock foundation for stability.

Options

Do Nothing

Although the roof is aging, it appears to be aging well. Thus, the option of doing nothing may be feasible for a few years. However, within a relatively short time, we would expect to see increasing leaks and resulting water damage. If nothing is done immediately, the building should be watched carefully for signs of roofing failure.

Mothball

With no particularly pressing structural issues, the primary requirement to mothball this building is to replace the roof. While the existing roof is believed to be a Built-Up Roof, a replacement is more likely to be a PVC or TPO welded-seam membrane. The building measures 358 feet by 301 feet; at a cost of $15 per square foot, a new roof is estimated to cost $1,620,000.

Upgrade

There are many possible uses for this building, and consequently many possible upgrades and costs. We investigate three basic ideas.

1. Stripe and sign for surface parking. Estimated cost $80,000. This includes entrance and exit gates and mechanical ventilation, but does not include improving the pavement outside the Warehouse.
2. Construct a second floor to increase parking area available. For a steel-framed concrete deck, cutting footings through the existing floor, we estimate a cost of $30 per square foot or $3,250,000 over the entire building, plus approximately $50,000 for mechanical ventilation.
3. Construct steel framing above roof, bearing on existing columns, to carry solar panels. Assumed to be held back one bay from the edge, 4.0 psf steel weight at $4.00 per square foot over (200 feet x 280 feet) results in an estimated cost of $900,000. To this should be added roughly $100,000 for roof penetrations. This does not include the cost of the solar panels themselves.

Applying the Secretary of Interior's Standards

The Do Nothing option does not meet the Treatment Standards because it has the potential to cause further physical damage to the building if the roof is in poor condition. The Mothball option meets the Preservation Standards and would sustain the materials, design, and historic integrity of the warehouse. The large open space in the warehouse is one of the character-defining features of the building. Upgrade option No. 1 for adding parking to the space would meet the Rehabilitation Standards. Upgrade option No. 3 might also meet the Rehabilitation Standards depending on the visibility of the solar panels. Upgrade option No. 2 will not meet any of the Treatment Standards because the extra floor will structurally and visually change the character of the open space.

4.3.4 Grain Bins, Elevator Tower and Control Building

HE-MPC-9259 4 Bins, Elevator Tower
HE-MPC-9261 Control Building

The grain bins comprise four cylindrical corrugated steel bins with conical roofs. They are served by a loading conveyor system above, and an unloading conveyor system in trenches below. The bins are in good condition structurally, with no damage or distress noted. The myriad of bolts used to assemble the corrugated metal panels are lightly rusting but show no loss of section.

The Elevator Tower is a very tall diagonally braced steel frame serving to support elevator equipment for the grain bins. It comprises about nine levels, with an open stairway ascending the height of the tower. Constructed of weathering steel, it has the characteristic blush of rust but is otherwise in very good condition. Functionally this tower is more a machine than a building.

The Control Building is a small painted CMU (concrete masonry unit) building housing the electrical apparatus controlling the Elevator Tower and conveyors serving the Grain Elevators. Structurally the building is in fair to poor condition, with a few holes noted in the outer CMU face shells. The building is accessed by concrete stairs on the river side, which are also in poor condition, with spalls and bent railing. There are intact windows on the river (east) wall, and a boarded up window on the north wall.

Options

*Do Nothing/Mothball*The grain bins comprise four cylindrical corrugated steel bins with conical roofs. As they are in good condition, the Do Nothing option is quite feasible and recommended. The Mothball option in this case is non-existent, as there is nothing that needs to be done to the bins to preserve them.

Grain Bins: Upgrade

Any Upgrade option for the Grain Bins depends on the intended use the bins are being upgraded to; one possible use is as grain storage for a brewery. Aside from possible maintenance and repair of the conveyor systems (which may or may not be required), we envision no cost for this option either. If the bins were to be used as occupied space, we estimate structural work of approximately $20,000 per bin to cut and reinforce openings, and add doors and windows. To this should be added insulation, interior finish, and utilities (electricity, gas, communications, heat and air conditioning). Grain bins such as this have been used occasionally as occupied space; they tend to be somewhat cold, and noise (echo) can be an issue. The interior fit-out must take into account the fact that the shell represents a vapor barrier on the outside, contrary to general practice in this part of the country.

Tower Do Nothing/Mothball

The Elevator Tower is a very tall diagonally braced steel frame serving to support elevator equipment for the grain bins. As with the Grain Bins, it is in good condition, so the Do Nothing option, structurally, is quite feasible. However, unlike the grain bins, it can be expected to attract “urban adventurers” and thus has significant liability attached to it. It will require some kind of significant fence or other security to dissuade unauthorized after-hours access. Thus, to “Mothball” the tower will require roughly $10,000 for fencing and surveillance cameras, with ongoing security monitoring expense.

Tower Upgrade

Functionally this tower is more a machine than a building, and thus any change of use is difficult to envision. Owing to its height, it could serve as a sign structure, or as an overlook with a commanding view of the river both up and down stream. Either of these Upgrades will require only minimal expenditure beyond the security fencing. Use as an overlook would require perhaps an additional $10,000 in railing and safety upgrades. Use as a sign structure requires no additional expense.

Control Building: Do Nothing/Mothball

The Control Building is a small painted CMU (concrete masonry unit) building housing the electrical apparatus controlling the Elevator Tower and conveyors serving the Grain Elevators. The Do Nothing option for this small building will result in gradual degradation of the building. This is probably feasible for a few years, but considering the expense and importance of the electrical apparatus inside the building, we recommend, as a Mothball option, that the roof be replaced, the walls and windows repaired, and the access stair in front be replaced. The estimated cost of this work is $10,000.

Control Building Upgrade

If this building is to serve some purpose other than housing the conveyor controls, the biggest cost will be removing those controls (once the recommended Mothball work is performed). This cost is estimated at $10,000; it may be considerably more than that if the controls contain hazardous waste; it may be substantially less than that if they are saleable.

Dust Tanks

The Dust Tanks are four cyclone tanks capturing dust, located near the Grain Bins. They are in reasonably good condition, so the Do Nothing option is feasible and recommended. There is no significant work required to Mothball them, so this option does not exist. The most feasible Upgrade option for these tanks is probably to dismantle and sell them; as they probably have positive value, this option carries no cost.

Applying the Secretary of Interior’s Standards

Grain Bins – The Do Nothing option for the grain bins meets the Preservation Standards. If the bins were used for something other than storage, then it is probable that the Upgrade option would not meet the Rehabilitation Standards. Cutting windows and doors, and adding significant insulation to the interior would destroy character-defining features of the bins. Although other grain bins have been converted for office or residential use, those reuses are generally acknowledged as not meeting the Treatment Standards.

Tower – The Do Nothing and Mothball options for the tower meet the Preservation Standards. If new security measures are added, the work should not permanently damage the materials on the tower. The Upgrade option for the viewing platform will meet the Rehabilitation Standards. The Upgrade option for the signage may meet the Rehabilitation

Standards depending on the size of the signage and how it physically impacts the metal cladding on the exterior of the tower.

Control Building – The Do Nothing option does not meet the Treatment Standards because it has the potential to cause further physical damage to the building if the roof is in poor condition. The Mothball option meets the Preservation Standards by protecting the character-defining features of the building. The Upgrade option meets the Rehabilitation Standards. The removal of the electric controls would meet the standards if the building is adapted to a new use.

Dust Tanks – The Do Nothing and Upgrade options do not meet any of the Treatment Standards.

4.3.5 Office Building

HE-MPC-9244 Office Building

The Office Building is a small brick structure built in 1968; it is the first building constructed on the site. The structure itself is in fair condition. The brick exterior is in good condition, but the building has several broken windows. The weathering steel trim around the top of the walls is in poor condition with significant corrosion, and should probably be replaced.

Options

Do Nothing

There is extensive water damage visible inside the building, so the roof is apparently in poor condition. Thus, the Do Nothing option for this building carries substantial risk of further degradation and is not recommended.

Mothball

Mothballing this building requires replacing the roof and windows and cleaning out water-damaged interior walls and finishes. We estimate a cost of $25,000 for this work.

Upgrade

Presumably any intended use of this building will be similar to its previous use, as an office building. Thus, to upgrade to a functional level involves replacing walls and interior finishes removed in the mothballing, at an estimated cost of $10,000. In addition, the weathering steel flashing comprising the parapet is in poor condition. Whether this needs to be replaced is an open question, but if so will cost approximately $10,000. It is not clear whether the building's original mechanical equipment is still functional. If not, a rough number of $10,000 would be needed to replace it.

Applying the Secretary of Interior's Standards

The Do Nothing option does not meet the Treatment Standards because it has the potential to cause further physical damage to the building if the roof is in poor condition. The Mothball option meets the Preservation Standards by protecting the character-defining features of the building. The Upgrade option meets the Rehabilitation Standards. If the steel flashing is replaced, it would need to be replaced in kind to comply with the standards.

4.3.6 Riverwalls, Mooring Cells, and Shoreline

The Riverwall comprises four distinct stretches of sheetpile structure: Dock #1 (the South dock, 202 feet long); Dock #2 (the North dock, 205 feet long); 604 feet of wall with riverside fill (shoreline) between Docks #1 and #2; and to the north a Storm Sewer Outfall Wall. In addition, along the shoreline between Docks #1 and #2 are three earth-filled sheetpile Mooring Cells, A, B, and C; and an additional mooring cell known as the North Mooring Cell, immediately in front of the Storm Sewer Outfall Wall.

These features were inspected and examined in more detail than the remaining structures on the site, reflecting both their central importance to the function of the Upper Harbor Terminal, and the inadequacy of the simple visual inspection used for most of the other structures. An extensive geotechnical investigation was performed, followed by computations to evaluate Docks #1 and #2.

A review/inspection of the riverwall, Docks 1 and 2, and mooring cells was conducted from the water on November 4, 2014 and from land on November 6, 2014. As part of the evaluation of the waterfront features, computations were completed to evaluate the design of Docks #1 and #2 for sheet pile penetration, sheet pile section, and tie-back anchor adequacy. Computations were conducted with aid of the U.S. Army Corps of Engineers sheet pile wall computer program, “CWALSHT”.

In addition, six (6) soil borings were conducted along the river wall and dock area to aid in assessing the robustness of the dock designs along with subsurface conditions. The scope of work for the borings and testing was developed by SEH geotechnical staff. The soil borings were conducted during the period of December 8 – 11, 2014 by Braun Intertec of Bloomington, MN under contract with the City of Minneapolis. Logs of the soil borings, the results of geotechnical laboratory tests, and a boring location map are included in Braun’s report which is attached as Appendix B to this report.

Results of Review and Investigations

Soil Conditions

Soil conditions along the waterfront were investigated with the aid of six SPT soil borings and typically consist of 5 to 15 feet of sandy fill overlying 20 to 25 feet of coarse alluvium (sand), which overlies 10 to 20 feet of fine-grained alluvium, which overlies glacial till.

The sandy fill is typically a silty sand. A creosote-like odor was detected in the fill in Borings ST-101, ST-102 and ST-103. Please be aware that environmental sampling and testing was not conducted for these borings, and the description of the odor is based on Braun’s experience characterizing such odors without the aid of environmental testing.

The coarse alluvium varied from poorly-graded to well-graded sand and was generally medium dense. The fine-grained alluvium is typically lean clay with a firm to stiff consistency based on SPT blow counts. One UU strength test was conducted on Shelby tube samples of the fine-grained alluvium and indicates that the alluvium is stiff. The glacial till is typically sandy lean clay with a firm to very stiff consistency, but also contains layers of clayey or silty sand till. Layers of coarse alluvium also exist within the glacial till.

North Mooring Cell

The North Mooring Cell is located immediately riverward of the Storm Sewer Outfall Wall. Its condition is noted as fair and it may be continued to be used as intended. Please refer to the “Existing Condition Table.” It likely has at least minor corrosion issues, since the nearby Storm Sewer Outfall Wall has significant corrosion issues due to fertilizer off-loading activities

immediately adjacent thereto. The life expectancy of the cell is on the order of 30 years given the possible corrosion issues. Given the cell's location immediately adjacent to the storm sewer outfall, no estimate has been provided to provide access for fishing or any other purpose at this location.

Storm Sewer Outfall Wall

The Storm Sewer Outfall Wall is located at the waterfront and is in line with the alignment of Dowling Avenue. No design documents or record drawings of this wall are available. The condition is rated as poor. Portions of the wall have experienced significant corrosion due to nearby fertilizer off-loading activities. The future life-expectancy of this project feature is on the order of 20-years, given the level of corrosion observed. This wall will likely require reconstruction in order to maintain its purpose as a riverwall.

An Engineer's Opinion of Probable Cost to remove and replace the Storm Sewer Outfall Wall is included in Appendix A. The cost does not include provisions for improvement or replacement of the storm sewer pipes.

Dock #1

Dock #1 was constructed in 1968. It is 202 feet long and consists of tied-back PZ-27 sheet pile. Original construction drawings indicate a MZ-27 designation, which is an old U.S. Steel designation. Hot-rolled sheet pile manufacturers changed to a uniform "PZ" designation in the early 1980's. The sheet pile are 42 feet long and embedded 20 feet below the mudline. The tie-backs are on 7.5-foot centers and consist of 2½-inch diameter, 36 ksi, steel rods upset to 3¼-inches at the connections to the sheet pile wall and the concrete deadmen. The tips of the Dock #1 sheet pile terminate in firm to stiff clay alluvium.

Soil borings ST-1 and ST-2 were conducted at the dock and, based on odors detected during the test, indicate that some of the soil fill material landward of the dock wall is likely contaminated.

Dock #1 was rated in "good" condition. The sheeting appeared vertical. Ultrasonic thickness measurements of the sheeting indicated thicknesses of 0.30 to 0.35-inch, which is slightly less than the 0.375-inch thickness indicated on catalog cuts for PZ-27 sheet pile. It is recommended that the tie-back rods be inspected by potholing at a minimum of three locations. If the tie-back rods are in good condition, the future life expectancy of the dock is on the order of 40 years or greater. Table 1 summarizes the analysis of the dock wall. Table 3 provides a cost estimate to install timber fenders at Dock #1 and Dock #2 similar to those that were installed with the original construction, and a separate cost estimate to install code-compliant railing along the both docks and the seawall.

Table 1 – Dock #1

Results of Analysis	
Actual Penetration Below Mudline:	20 feet
Required Penetration Below Mudline:	13 feet
Actual Sheet Pile Section Modulus:	30.2 cubic inches
Required Sheet Pile Section Modulus:	12.5 cubic inches
Computed Sheet Pile maximum Deflection:	0.38-inch
Allowable Sheet Pile maximum Deflection:	1 inch
Computed Anchor Stress:	8,663 psi
Allowable Anchor Stress:	20,000 psi
Computed Anchor Block Ultimate Resistance:	17,778 lb/ft
Computed Force on Anchor Block:	5,660 lb/ft

Dock #2

Dock #2 was constructed in 1971. It is 205 feet long and consists of tied-back PZ-38 sheet pile. Original construction drawings indicate a MZ-38 designation, which is an old U.S. Steel designation. Hot-rolled sheet pile manufacturers changed to a uniform “PZ” designation in the early 1980’s. The sheet pile are 52 feet long and embedded 24 feet below the mudline. The tie-backs are on 6-foot centers and consist of 2½-inch diameter, 36 ksi, steel rods upset to 3¼-inches at the connections to the sheet pile wall and the concrete deadmen. The tips of the Dock #2 sheet pile terminate in medium dense silty sand till.

Dock #2 was rated as in “good” condition. The sheeting appeared vertical. Ultrasonic thickness measurements of the sheeting flange indicated thicknesses of 0.40 to 0.44-inch, which is slightly less than the 0.5-inch thickness indicated on catalog cuts for PZ-38 sheet pile. It is recommended that the tie-back rods be inspected by potholing at a minimum of three locations. If the tie-back rods are in good condition, the future life expectancy of the dock is on the order of 40 years or greater. Table 2 summarizes the analysis of the dock wall. Table 3 provides a cost estimate to install timber fenders at Dock #1 and Dock #2 similar to those that were installed with the original construction, and a separate cost estimate to install code-compliant railing along the both docks and the seawall.

Table 2 – Dock #2

Results of Analysis	
Actual Penetration Below Mudline:	24 feet
Required Penetration Below Mudline:	12 feet
Actual Sheet Pile Section Modulus:	46.8 cubic inches
Required Sheet Pile Section Modulus:	26.7 cubic inches
Computed Sheet Pile maximum Deflection:	0.70-inch
Allowable Sheet Pile maximum Deflection:	1 inch
Computed Anchor Stress:	10,807 psi
Allowable Anchor Stress:	20,000 psi
Computed Anchor Block Ultimate Resistance:	34,370 lb/ft
Computed Force on Anchor Block:	8,826 lb/ft

Riverwall between Docks #1 and #2

The riverwall is approximately 604 feet long and likely consists of cantilevered PZ-32 sheet pile. There are no record drawings available for the wall. However, the driving width and flange thickness of the sheet pile match that of a PZ-32.

The riverwall was rated as in “good/fair” condition. The sheeting generally appeared vertical, except in an approximately 20-foot run between mooring cell C and Dock #1 where there was a slight bow (2 inches out of alignment) at the top of the wall. Ultrasonic thickness measurements of the sheet pile flange indicated thicknesses of 0.40 to 0.42-inch, which is slightly less than the 0.5-inch thickness indicated on catalog cuts for PZ-32 sheet pile. A C-channel steel cap exists at the top of the sea wall. The cap is generally pitted and has more severe corrosion at some isolated locations. With the C-channel cap replaced, the life expectancy of the riverwall is on the order of 40 years or greater.

An Engineer’s Opinion of Probable Cost to remove and replace the existing channel cap is included in Table 3. An Engineer’s Opinion of Probable Cost to install code-compliant guardrail along the seawall and at Docks #1 and #2 is also included in Table 3.

Three (3) Mooring Cells between Docks #1 and #2 (Cells A, B and C).

The three mooring cells located between Docks #1 and #2 were constructed in 1974. Original construction drawings indicate that the cells are 18’ 3-5/8” in diameter. The drawings do not note the type of sheet pile used to construct the cells, but (based on dimensions on the as-built drawings) it appears that PS28 sheets were used. PS28 sheet pile has a thickness of 3/8-inch, and a driving width of 15 inches.

In general, the mooring cells are in fair condition. Additionally, Cell “C” supports substantial bulk product unloading paraphernalia (the Load-out Tower) which would either need to be removed or isolated from public access.

The concrete caps at the top of the cells are somewhat complicated by five (5) embedded anchorages connected by rebar to an 8-inch thick bottom slab located just above the River’s low water level, approximately 9 feet below the cap. The purpose of the bottom slab is to provide pull-out resistance for the mooring pipes. The top slab is 12-inches thick. Both slabs are reinforced with #5 bars, both ways, top and bottom.

An Engineer’s Opinion of Probable Cost to repair the cells and bring them into compliance with current codes for recreational use is provided in Table 3. The cost to remove the cells is included in the City’s estimate to demolish the UHT facilities.

River Shoreline between Docks #1 & #2 and North of Dock #1.

The river shoreline between Docks #1 & #2 and North of Dock #1 is generally covered with concrete rubble consisting of slabs and other concrete debris. The existing condition of the shoreline is not consistent with use as a park space or the RiverFIRST vision. This report does not include a cost to remove the rubble or otherwise improve the shoreline to some form of aesthetically pleasing appearance and/or park usage. As with any work in or near the water, this will be subject to both Army Corps of Engineers and Minnesota DNR permitting, and will likely require extensive mitigation to reduce sedimentation into the river. Because of these factors, an accurate cost estimate is difficult to create.

Options

Do Nothing

The Do Nothing option is structurally feasible for the mooring cells and most of the riverwall, with the exception of the Storm sewer outfall wall; but the City has liability since the walls are currently unprotected by railing.

Mothball

Mothballing these structures requires replacing the storm sewer outfall wall, and adding safety guardrail to walls 1 and 2. We estimate a cost of $428,000 and $264,000 respectively for this work. The detailed cost estimates are included in Appendix A “Cost to Mothball Riverwall Elements”

Upgrade

The likely use of the mooring cells and docks is as public fishing and boating docks. They are suitable for use either as small boat anchor points (although it is probably not feasible to use them as docks to disembark from boats onto shore, due to their height) or as fishing piers. They probably cannot be used for both purposes simultaneously. Removing and replacing the top slab would be arduous and relatively expensive. It would be more cost effective to seal cracks that exist in the concrete top slab.

The following issues will need to be addressed if the cells are to remain:

1. Repair or replace bridges.
2. Install Code-compliant guardrail on bridges and around perimeter of cells.
3. Patch various small holes (due to previously attached equipment) which allow infill to escape.
4. Seal cracks in concrete slabs.
5. Replace fenders and install tie points if desired to allow use by small boats.
6. Remove or isolate bulk product unloading tower and paraphernalia at Cell “C”.

Alternatively, the cells can be removed if this is compatible with the historic context of the UHT site. See below.

To upgrade to this use, in addition to the railing considered as part of the Mothball cost, requires replacing bridges to the mooring cells, replacing a channel cap on a portion of the riverwall between the docks, and adding timber fenders to the docks and mooring cells. The approximate cost of this work is $550,000. An additional enhancement would be to add a floating dock and ramp, which would allow pleasure boats to dock and their passengers to come ashore. This adds approximately $50,000, depending on the size of dock. It also carries an ongoing maintenance expense for taking the dock out of the water at freeze-up and re-installing it every spring.

Another potential use for the docks is as a mooring site for a restaurant/bar, swimming pool, or other amenity on a barge. This will require that utilities (electricity, gas, communication, water, sewer, etc.) be brought to the moored barge. This cost will depend on the actual function of the amenity on the barge, and should be considered as part of the cost of establishing the amenity. In other words, we do not recommend that these utilities be made available as part of a City project.

One other potential action is to demolish the riverwalls. This report in general has not explored demolition or its cost. However, with respect to the riverwalls it is important to

recognize the difficulty inherent in demolishing them, as it affects far more than just the walls. If the walls are demolished, the fill retained behind them, which is believed to be contaminated, will need to be removed and taken off site. Then, new fill will need to be imported to reconstruct a riverbank, which will involve significant time and expense to gain permits through the Corps of Engineers and Minnesota DNR, since fill is being placed in the waterway. We do not estimate the cost for this work in this report, but it will be significant. Furthermore, the space needed to construct stable slopes may extend close to, if not into, nearby structures such as the Loading Dock, rendering them useless or requiring further demolition.

Summary

In summary, most of the riverwalls are in good condition, with the exception of a wall acting as a storm sewer outfall near the north end of the site. This section of wall is corroded and in poor condition, presumably from contact with fertilizer and salt stockpiled nearby. Many of the walls use tieback rods anchored in deadmen for support. The mooring cells in general are in fair condition, with buckled sheet pile, cracked concrete, and general wear and tear commensurate with their use as something to bounce barges off of. Both the cells and riverwalls had timber fender systems, which are nearly completely missing.

The condition of the buried portions of the tiebacks are unknown. We recommend that several of the tiebacks be excavated and inspected to confirm their condition.

Applying the Secretary of Interior's Standards

The Do Nothing and Mothball options meet the Preservation Standards by protecting the character-defining features of the mooring cells and riverwalls. The storm sewer outlet is not an important historic feature of the site since it most likely predated construction of the terminal. Repairing the storm sewer outlet will not harm the historic character of the riverwalls or mooring cell. The Upgrade option should meet the Rehabilitation Standards, but the designs for new bridges and guardrails should have an industrial appearance and may need extra review on a case-by-case basis.

Demolishing the riverwall does not meet any of the Treatment Standards, and probably imperils the historic classification of the entire site since it is such a central feature of the site.

4.3.7 Scales, Scale Buildings, and Boiler Shed

HE-MPC-9245	Scale House
HE-MPC-9246	Truck Scale
HE-MPC-9247	Scale House
HE-MPC-9248	Truck Scale
HE-MPC-9278	Rail Scale Shed
HE-MPC-9272	Boiler Shed

The older scale house (HE-MPC-9245) was built at the same time and in the same architectural style as the Office Building. Like the Office Building, the brick exterior is in good condition but the building has many broken and boarded windows, with extensive water damage visible inside.

The scale adjacent to this scale house is in good condition.

The other scale house (HE-MPC-9247) was originally constructed in 1983 and has been recently re-sided with vinyl siding. It is considerably smaller than the older scale house. It appears to be in good condition.

The scale adjacent to this smaller scale house suffers from numerous spalls and potholes in its driving surface slab, but is otherwise in good condition.

The site inventory lists a rail scale shed which was not found and consequently was not inspected.

The Boiler Shed is not a scale building but is included in this listing because it is near the other truck scale buildings. It is a corrugated metal building which was apparently used to provide steam required to render heavier grades of oil flowable. There were at one time large asphalt tanks to the south of the scale area The tanks are gone, and the area where the tanks were was recently used by a tenant of the City for leaf processing in the fall.

The Boiler Shed is of very light construction and is in very poor condition, with damage to the walls in numerous places and a generally dilapidated appearance.

Options

Mothball Scale Houses

Mothballing the older Scale House building requires replacing the roof and cleaning out water-damaged interior walls and finishes. We estimate a cost of $10,000 for this work. The other scale house (HE-MPC-9247) was originally constructed in 1983 and has been recently re-sided with vinyl siding. It is considerably smaller than the older scale house. It appears to be in good condition. Mothballing the newer Scale House requires no work, due to the recent re-siding. We recommend the Do Nothing option for this building.

Upgrade Scale Houses

Presumably any intended use of either of the Scale House buildings will be similar to their previous use, as an office building, gatehouse, or scale house (if the Port continues to function as a commodity handling facility). Thus, to upgrade the older Scale House building to a functional level involves replacing walls and interior finishes removed in the mothballing, at an estimated cost of $5000. This work was recently done to the smaller, newer scale house, and so no further upgrade is anticipated. It is not clear whether either building's original mechanical equipment is still functional. If not, a rough number of $5000 would be needed to replace it in each building.

Scales

The scales adjacent to these scale houses are in good condition and we recommend the Do Nothing option. There is nothing to the Mothball option for these structures except for minor maintenance (lubrication and cleaning) on the scaleworks inside the pit. The only realistic Upgrade option for this pit is to take it out of service by removing the scaleworks and either removing the pit or filling it with sand or flowable fill. We estimate the cost of this as $5000.

The site inventory lists a rail scale shed which was not found and consequently was not inspected.

Boiler Shed

The Boiler Shed is a corrugated metal building. The Boiler Shed is in very poor condition, with damage to the walls in numerous places and a generally dilapidated appearance. We do not recommend the Do Nothing option for this building as it is an eyesore. As a "Mothball" option, we recommend it be demolished, and the piping to the building should be removed or plugged with flowable fill. We estimate the cost for this work at $20,000 (most of which is associated with the piping).

Applying the Secretary of Interior's Standards

Scale House (HE-MPC-9245) – The Do Nothing option does not meet the Treatment Standards because it has the potential to cause further physical damage to the building. The Mothball option meets the Preservation Standards by protecting the character-defining features of the building. The Upgrade option meets the Rehabilitation Standards.

Scale House (HE-MPC-9247) – The Do Nothing option meets the Preservation Standards.

Scales – The Do Nothing and Mothball options for both scales meet the Preservation Standards. The Upgrade options would meet the Rehabilitation Standards if the metal plates were fixed closed. Completely removing the scale components and erasing the appearance of the scales by filling in the openings with concrete will not meet the standards.

Boiler Shed – The Do Nothing option does not meet the Treatment Standards if it has the potential to cause further physical damage to the building. The Mothball option also does not meet the standards since it proposes to demolish the building.

4.3.8 Conveyors and Associated Structures

HE-MPC-9256	Load-Out Tower
HE-MPC-9257	Conveyor
HE-MPC-9258	Rail Dump
HE-MPC-9260	Truck Dump / Hoist
HE-MPC-9262	4 Dust Tanks
HE-MPC-9269	Truck / Rail Dump

The Load-out Tower is located on a sheet pile cell in the river; it was used to access barges moored along the shore. A complex conveyor system runs between this Tower, the three southernmost Domes, and the Grain Elevator and Bins. The Load-out Tower appears to be in good condition generally.

The Conveyor System comprises numerous trussed conveyor belt structures between the Load-out Tower, the Grain Bins, the Domes, and the Elevator Tower. They are generally in good condition structurally. In a few locations, different conveyors are supported by two-leg bents with diagonal braces running up to the conveyor trusses. Many of these diagonals are field welded in an ad hoc manner; however, they show no distress and seem to be functioning adequately. One or two legs of the support bents have been damaged by vehicle impact; if the conveyors are contemplated to be used for a long period of time, these supports should be repaired or replaced.

In addition to the fixed conveyor system, there are several large portable conveyors on site. We did not inspect these in any detail as they are considered equipment rather than structures.

The Rail Dump comprises a wood shed over a concrete pit covered with steel grating, which at the time of inspection was being used to shelter the Port's aging yard locomotive, which has since been sold. The shed is an open-ended wood structure, generally in fair condition. Its wood sheathing is weathered and in poor condition, with the bottom several inches showing decay in many areas. We were unable to access the pit, but viewed through the grating, it appeared to be in reasonably good condition structurally, with no distress visible.

The Truck Dump/Hoist is essentially a pair of structures: another open shed near the North Dock along the river; and a grated pit flanked by two stout steel frames to tip trucks for unloading. Both the shed and pit appear to be in good shape structurally, with no distress or damage noted.

The Dust Tanks are four cyclone tanks used for capturing dust, located near the Grain Bins. They and their supporting frames appear to be in good condition structurally. (No photo)

The Truck / Rail Dump is similar to and near the Rail Dump. Like the Rail Dump, it is an open-ended wood shed in fair condition, with very weathered wood and transite (cement board) sheathing. This building is served by a fixed conveyor for loading trucks.

Options

Conveyors: Upgrade

The most likely use of the conveyor assemblage is as an aerial walkway overlooking the site. To render the conveyors suitable for this use involves adding safety railing and enclosures, and probably removing at least some of the motors and controls. Depending on how much of the current system is contemplated to be re-used for this function, and how much effort was expended (e.g. painting), costs could vary between $30,000 and $100,000.

Dump Structures: Do Nothing/Mothball

For these three structures, the Do Nothing option invites further slow degradation; but it will be many years before they are in danger of structural failure. As it is difficult to imagine a realistic re-use of these buildings, we recommend the Do Nothing option. If instead it is desired to Mothball one or more of these structures, they should be re-sided and probably re-roofed. We estimate this cost at $10,000 each.

Dump Structures: Upgrade

As we can envision no use for these structures other than the function they currently serve, the only realistic Upgrade expense would be that to demolish the structures: approximately $5000 per structure.

Applying the Secretary of Interior's Standards

Conveyors – The Upgrade option meets the Rehabilitation Standards. New safety railings should be industrial in character and may require extra review on a case-by-case basis.

Dump Structures – The Do Nothing option meets the Preservation Standards. The Mothball option may meet the Preservation Standards if new siding matches the existing siding in appearance and style. The Upgrade option does not meet any of the Treatment Standards.

Load-out Tower Options

Do Nothing/Mothball

Like the Elevator Tower, the Load-out Tower and its complex of conveyor spans can be expected to attract "urban adventurers" and thus has significant liability attached to it. Thus,

we do not consider the Do Nothing option to be viable. It will require some kind of significant fence or other security to dissuade unauthorized after-hours access. Thus, to “Mothball” the tower and conveyors will require roughly $20,000 for fencing and surveillance cameras, with ongoing security monitoring expense.

Load-out Tower Upgrade

Functionally this tower is more a machine than a building, and thus any change of use is difficult to envision. Owing to its height, it could serve as a sign structure, or as an overlook with a view of the river both up and down stream; however, if the much taller Elevator Tower is used for either of these functions, it is unlikely that the Load-out Tower would be useful doing the same thing. Either of these Upgrades will require only minimal expenditure beyond the security fencing. As with the Elevator Tower, use as an overlook would require perhaps an additional $10,000 in railing and safety upgrades. Use as a sign structure requires no additional expense.

Applying the Secretary of Interior’s Standards

Load-out Shelter – The Do Nothing and Mothball options for the load-out tower meet the Preservation Standards. If new security measures are added, the work should be reversible and not permanently damage the materials on the tower. The Upgrade option for using the tower as an overlook will meet the Rehabilitation Standards. The Upgrade option for the signage may meet the Rehabilitation Standards depending on the size of the signage and how it visually impacts the tower.

4.3.9 Underground Conveyors

There is a system of underground conveyors serving the Grain Bins, Elevator Tower, and possibly other structures. There are numerous access hatches covered with steel or concrete covers which serve this underground system, in addition to concrete stairs down into it located between the Control Building and the Elevator Tower. We do not possess a map of this system. The access hatches and stair access, which are visible from the ground, appear to be in good condition; but we did not inspect the tunnels themselves as confined space entry was not included in our scope of work.

Options

Do Nothing

We do not recommend the Do Nothing option due to the liability it carries, again largely from urban adventurers attempting to access the tunnels.

Mothball

The conveyor tunnels will require some kind of significant fence or other security to dissuade unauthorized after-hours access. Thus, to “Mothball” the tunnels will require roughly $10,000 for locking hatch covers, fencing and surveillance cameras, with ongoing security monitoring expense.

Upgrade

The only realistic future use for these tunnels that we can envision, aside from the function they currently fulfill, is as part of a museum or interpretive center memorializing the Port (which is unlikely). If for some reason the public is to be admitted to these tunnels, they will probably require significant safety upgrades (railing, lighting, fencing, access). The biggest expense is probably to provide ADA access, which presumably would be required. We estimate the cost of this work at $50,000. Since this idea is not under serious consideration, we recommend that the tunnels be demolished or filled with flowable fill, at an approximate cost of $20,000.

Applying the Secretary of Interior’s Standards

The Mothball option meets the Preservation Standards. The Upgrade option to allow access to the tunnels may meet the Rehabilitation Standards. The design for new railings, lighting, fencing, and ADA access would need to be reviewed to make sure the new components complement the industrial character of the site. The Upgrade option to demolish the underground conveyors would meet the Treatment Standards.

4.3.10 Underground Asphalt Piping and Petroleum Dock

HE-MPC-9253

There is a system of underground asphalt piping which apparently served the tanks previously located west of the rail corridor, running to the Boiler Shed; and another system running between tanks previously located on the south end of the site and the Petroleum Dock on the river. We do not possess a map of this system, and did not inspect or locate it. Since this piping no longer serves a purpose, it should ultimately be removed.

The Petroleum Dock is a low rock riprap pier jutting into the river at the south end of the site. It was apparently used to transfer petroleum and asphalt products between barges and the tanks previously located on the southern end of the site. It is low enough to the water that it probably inundates during floods. It is only marginally useful to boaters due to its rough walking surface, and probably poses more of a hazard to boaters than any purpose it may currently serve.

For both of these elements, we do not consider the Do Nothing option to be feasible, due to potential environmental liability. We recommend that the piping be removed; we recommend that the Petroleum Dock be removed from the river. The approximate cost of this work is estimated at $30,000 for removal of the Petroleum Dock, $5,000 for the removal of the petroleum pipelines, $10,000 for removal of the steam pipeline, and another $20,000 for required testing within the trenches of these pipelines, as well as beneath previously removed above-ground pipelines and tanks. If this testing finds spilled hydrocarbon or other contamination, obviously, the cost increases dramatically.

Applying the Secretary of Interior's Standards

The proposed option to remove underground piping on the west and south sides of the site meets the Rehabilitation Standards. The physical integrity of the petroleum dock is very poor and since the neighboring tanks were removed, the dock has poor historic integrity. Removing the dock should not negatively impact the historic integrity of the property.

4.4 Summary and Conclusions

In general, the structures within the Upper Harbor Terminal are in fair to good condition for the specialized uses they currently serve. While it is structurally feasible to re-purpose most of the structures, the cost for any individual structure will depend on the specific use to which the structure might be put. Rough costs for some assumed uses are detailed for each structure or set of structures in the preceding paragraphs, and are summarized in Section 5.0 of the report.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 Technical/Environmental Perspective

In the table below, we summarize the the risk of the Do Nothing option, and the costs to Mothball and Upgrade each structure (based on an assumed future use as indicated within the report). The Upgrade cost assumes the Mothball work has been done; thus, the total cost to Upgrade is the sum of the two costs. These costs do not include the cost to bring in heat, necessary to allow year-round use. Refer to the write-up for each individual structure.

The Engineering Cost given is a similarly rough cost estimate associated with Upgrading the structure. It assumes that clear decisions have been made as to what comprises "upgrading;" in other words, it does not include further studies. For most of the structures, the Engineering Cost will vary between 5 and 15 percent of construction cost. For this report, we have used approximately 10 percent.

Structure	Description	Do Nothing Risk	Mothball Cost	Upgrade Cost	Engineering Cost	Total
DOMES						
HE-MPC-9263	Dome 90' OD?	Degradation	$121,000	$517,000	$65,000	$703,000
HE-MPC-9264	Dome 132' OD, 66' tall	Degradation	$370,000	$1,285,000	$160,000	$1,815,000
HE-MPC-9265	Dome 107' OD, 53'-6" tall	Degradation	$243,000	$890,000	$115,000	$1,248,000
HE-MPC-9266	Dome 122' OD, 75' tall	Degradation	$389,000	$1,324,000	$170,000	$1,883,000
HE-MPC-9267	Load-out Shelter at 9264	None	$24,000	$61,200	$8000	$93,200
HE-MPC-9268	Load-out Shelter at 9265/66)	None	$34,500	$75,200	$11,000	$120,700
WAREHOUSE						
HE-MPC-9254	Warehouse / Loading Docks	None	$1,620,000	$80,000	$170,000	$1,870,000
	Second Parking Level		$1,620,000	$3,300,000	$500,000	$5,420,000
	Rooftop Solar Racking		$1,620,000	$1,000,000	$260,000	$2,880,000
HE-MPC-9255	Shipping/Receiving Building	None	Not quantified	Not quantified		
GRAIN BINS, ELEVATOR TOWER, and CONTROL BUILDING						
HE-MPC-9259	4 Bins, Elevator Tower	None	$10,000	$90,000	$10,000	$110,000
HE-MPC-9261	Control Building	Degradation	$10,000	$10,000	$3000	$23,000
OFFICE						
HE-MPC-9244	Office Building	Degradation	$25,000	$30,000	$6000	$61,000
RIVERWALL (see Section 2 of this report)		Liability	$692,000	$550,000	$125,000	$1,367,000
HE-MPC-9249	North Mooring Cell					Not broken out

Structure	Description	Do Nothing Risk	Mothball Cost	Upgrade Cost	Engineering Cost	Total
HE-MPC-9250	North Dock (Dock #1)					Not broken out
HE-MPC-9251	Loading Area Mooring Cells (3)					Not broken out
HE-MPC-9252	South Dock (Dock#2)					Not broken out
	Wall between North and South Docks					Not broken out
	Storm sewer outfall wall					Not broken out
SCALE BUILDINGS						
HE-MPC-9245	Scale House	Degradation	$10,000	$5000	$2000	$17,000
HE-MPC-9246	Truck Scale	None	N.A.	(demo)$5000	$1000	$6000
HE-MPC-9247	Scale House	None	N.A.	N.A.		
HE-MPC-9248	Truck Scale	None	N.A.	(demo)$5000	$1000	$6000
HE-MPC-9278	Rail Scale Shed		Not found			
HE-MPC-9272	Boiler Shed	Eyesore	(demo) $5000	N.A.	$3000	$8000
CONVEYORS						
HE-MPC-9256	Load-Out Tower	Liability	$5000	$10,000	$5000	$20,000
HE-MPC-9257	Conveyor	Liability	$15,000	$50,000	$10,000	$75,000
HE-MPC-9258	Rail Dump	None	$10,000	N.A.	$5000	$15,000
HE-MPC-9260	Truck Dump / Hoist	None	$10,000	N.A.	$5000	$15,000
HE-MPC-9262	4 Dust Tanks	None	N.A.	$0		$0
HE-MPC-9269	Truck / Rail Dump	None	$10,000	N.A.	$2000	$12,000
	Underground Conveyors	Liability	$10,000	$50,000	$6000	$65,000
	Underground Piping	Liability	$65,000	N.A.	$7000	$72,000
	Roadway	Liability	$180,000	N.A.	$30,000	$210,000

5.1.2 Preservation Perspective

The Upper Harbor Terminal has been identified as eligible for local designation and for listing in the National Register of Historic Places as part of a potential Upper Harbor Historic District. The storage domes at the terminal may also be individually eligible for historic designation. For properties that are eligible for listing, or are already listed, the Secretary of the Interior's Standards for the Treatment of Historic Properties are helpful in making decisions regarding the properties. The standards can be applied to individual components within the terminal, as well as the terminal as a whole.

The Secretary of the Interior has developed four treatment types, which are summarized in Section 3.0 and applied to the individual structure recommendations in Section 4.0. The treatments should be applied to the Upper Harbor Terminal as a cultural landscape, which is defined as "a geographic area (including both cultural and natural resources and the wildlife

or domestic animals therein), associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values."[10]

In the Guidelines for the Treatment of Cultural Landscapes that are associated with the Secretary of the Interior's Standards, each of the Treatment Standards is applied to cultural landscapes in detail to explain what changes could be made and still maintain historic character and integrity. Of the four treatments, Preservation and Rehabilitation appear to be the most relevant for the future uses of the Upper Harbor Terminal. The first step in applying the Treatment Standards is identifying the features of the cultural landscape that are important to the historic character of the property during its period of significance. The period of significance for the Upper Harbor Terminal begins in 1968 when the office building, scale house, riverwalls, and docks were constructed. The period ends in 1990 when the development of the terminal was complete.

Character-Defining Features

The Secretary of the Interior describes a character-defining feature as "a prominent or distinctive aspect, quality, or characteristic of a cultural landscape that contributed significantly to its physical character."[11] In cultural landscapes, the site is first analyzed for spatial organization and land patterns, and then several categories of individual features are considered: topography; vegetation; circulation; water features; and buildings, structures, site furnishings, and objects.

Spatial Organization and Land Patterns

The Upper Harbor Terminal contains eleven legally platted parcels that have been simplified into nine real estate tax parcels. From a planning perspective, the parcels have been grouped into seven anticipated development parcels. Parcels 1 through 5 correspond to five tax parcels and to development parcels 1 through 5. Parcel 6 includes two tax parcels (6A and 6B). The strip of land between Washington Avenue and I-94 has five legally platted parcels that comprise two tax parcels, but are all grouped into Parcel 7 for planning purposes. Overall, the terminal property is roughly rectangular, with a longer north-south dimension. The Mississippi River is on the east side of the terminal and Interstate 94 is on the west side. These two transportation corridors run north-south and were part of the rationale behind selecting the terminal's location. The river and the interstate also restricted the terminal from expanding to the east or west. Privately owned industrial properties surround the terminal on the north, south, and west sides. Much of the land along the river – Parcels 3 and 4, and part of Parcel 1 – was historically an open area used to store bulk commodities, such as sand, salt, coal, and lumber. The commodities were arranged in piles, which changed in size and location as material was delivered to, or removed from, the site. As such, they were transitory features of the vernacular landscape. Permanent buildings and structures occupied Parcels 2, 5, and part of Parcel 1, all of which are located next to the river. Parcel 6, which also had permanent buildings and structures, is west of Parcels 1 through 5 and is separated from them by the Canadian Pacific rail corridor. Parcel 7 is west of Parcel 6 and on the west side of Washington Avenue North. A large parking lot covering most of these parcel was used by truck drivers queuing to enter the terminal.

Structures have been removed from some of the parcels, which has compromised historic character. On Parcel 5, a large asphalt plant run by Trumbull Asphalt was removed after 1990. Part of a dock that carried asphalt to barges is extant but is in poor condition. Large

[10] Charles A. Birnbaum and Christine Capella Peters, *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (Washington, D.C.: U.S. Department of the Interior, 1996), 4.
[11] Ibid., 4.

asphalt tanks also occupied most of Parcel 6, along with the office building, scale houses, and truck scales. The tanks were removed after 2007.

Topography

Historically, the topography of the Upper Harbor Terminal was relatively flat. Riverwalls and docks were constructed along the Mississippi River in the late 1960s and the grade was leveled for commodities storage and the construction of storage buildings and structures. Parcels 2, 3, and 5 are currently level. Parcels 1 and 4 have level sections but also have large mounds of concrete, dirt, or brush. The grade of the terminal rises on the west side of Parcels 2 through 5 and screens the rail corridor. To the west of the rail corridor, the north end of Parcel 6 is flat to accommodate scale houses and truck scales. An embankment runs along the west edge of the parcel along Washington Avenue North, and shields the terminal from view from the street. Changes have been made to the grade of Parcel 6 in the area once occupied by the asphalt plant. Parcel 7 has raised embankments, but also holds a level parking area.

Vegetation

The Upper Harbor Terminal is an industrial site with a utilitarian landscape. The current vegetation is mostly volunteer in nature and includes native grasses, wildflowers, shrubs, and trees. Most of the vegetation is concentrated along the riverbank on the east side of the site, along the railroad tracks, and along Washington Avenue North. Small clusters of plantings are also located near buildings and structures.

Circulation

The historic circulation patterns for the Upper Harbor Terminal are extant. The Mississippi River is on the east edge of the terminal and was used for barge traffic. Several roads serve the site including First Street North, Second Street North, Washington Avenue North, and Interstate 94, which run north-south along the west edge of the terminal. Dowling Avenue North and Thirty-third Avenue North provide east-west access to the terminal. A Canadian Pacific railroad corridor with multiple tracks runs north-south through the site and separates Parcels 1 through 5 (east of the rail corridor) from Parcels 6 and 7 (west of the corridor).

Water Features

The Mississippi River forms the east boundary of the Upper Harbor Terminal. One of the terminal's primary functions was the transshipment of bulk commodities between river and land-based transit, so the barge docking and unloading/loading facilities were crucial components of the terminal's operation. The river's edge is characterized by historic riverwalls and docks, with concrete riprap along the shoreline north and south of the riverwalls. Mooring cells in the river next to the riverwalls also date from the period of significance.

Buildings, Structures, Site Furnishings, and Objects

Several buildings and structures were constructed during the period of significance and most are extant. A concrete storage dome with a load-out shelter is located on Parcel 1. A warehouse, grain elevator, control building, three concrete domes with load-out shelters, dust tanks, conveyors, and truck/rail dumps occupy most of Parcel 2. An office building, two scale houses, and two truck scales are located on the north end of Parcel 6. A boiler shed on the parcel is a remnant of a larger asphalt tank operation that was removed after the period of significance. Asphalt tanks were also situated on Parcel 5 during the period of significance but have since been demolished. Detailed descriptions of the existing buildings and structures are in Section 4.0 above.

Concrete and rebar cubes measuring roughly 3′ on each side are historic objects located throughout the site. The cubes are movable and are used for a variety of purposes. They can be stacked to serve as retaining walls around commodities. They are lined up to delineate roads and drive lanes, or arranged around fire hydrants to protect them. They were also used as ballast on barges when they were unloaded.

High-voltage power lines that run across the site pre-date the terminal. The lines, which are owned by Xcel Energy, are supported by five steel-lattice towers. One sits near the grain elevator complex on Parcel 2, another is south of the warehouse on Parcel 2, and the third is on Parcel 3 near Thirty-third Avenue North. The fourth tower is on Parcel 4, north of Thirty-fourth Avenue North. The fifth tower is located on Parcel 5 and is just north of Thirty-third Avenue North.

Implementing the Secretary of the Interior's Standards

The Guidelines for the Treatment of Cultural Landscapes explain that "a treatment is a physical intervention carried out to achieve a historic preservation goal – it cannot be considered in a vacuum. There are many practical and philosophical variables that influence the selection of a treatment for a landscape." Some of these variables include "existing physical conditions, historic value, proposed use, long and short term objectives, operational and code requirements, . . . and anticipated capital improvement, staffing and maintenance costs."[12]

Of the four Treatment Standards, Preservation and Rehabilitation appear to be the most applicable to the Upper Harbor Terminal. The Restoration and Reconstruction standards are linked to specific periods in a property's history and are often used for museum properties. A combination of both Preservation and Rehabilitation can be used on a historic property, especially one as complex as the Upper Harbor Terminal. The details of maintaining or adaptively reusing the landscape and the structures should be reviewed to confirm that they meet the standards.

Preservation

Preservation is "the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property."[13] The Preservation Standards emphasize maintaining, protecting, and repairing historic materials and character-defining features. They allow for "limited replacement in kind" of features that are deteriorated, but do not cover new additions.[14]

Applying the Preservation Standards to the terminal would include maintaining the existing character-defining features (spatial organization and land patterns; topography; vegetation; circulation; water features; and buildings, structures, furnishings, and objects) essentially as is. Repairs should be done using in-kind materials.

Many of the treatment options described in Section 4.0 conform to the Preservation Standards.

Rehabilitation

Rehabilitation is "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which

[12] Ibid., 6.
[13] Ibid., 18.
[14] Ibid., 23.

convey its historical, cultural, or architectural values."[15] The Rehabilitation Standards are similar to the Preservation Standards, but are more flexible about adapting properties to meet current needs.

The best way to preserve historic properties is to keep them in service either for their historic use or a new function. The Rehabilitation Standards allow alterations that "do not radically change, obscure, or destroy character-defining spatial organization and land patterns or features and materials." Deteriorated historic materials can be replaced, sometimes using substitute materials if they have essentially the same appearance as the historic materials.[16] Non-historic alterations can be left as is—but if plans call for removing or changing altered areas, the historic appearance of those areas should be returned, to the extent that is practical. Additions and new construction are allowed as long as their design and placement are compatible with the character of the historic property. They can feature modern designs and materials, but their scale, massing, coloration, placement, and other aspects should make the new structures subordinate to the historic property, which should remain the focal point.

Some areas of the Upper Harbor Terminal are particularly suitable for new construction. Parcels 5 and 6, for example, historically held large asphalt tanks, which were demolished after the end of the period of significance. The land is now vacant, which is not a historic condition, so appropriately designed new buildings in this area would be welcome. Ideally, the scale should be similar to that of the demolished asphalt tanks, although some deviation could be considered in the context of the overall facility. In this instance, the north end of Parcel 6 is the most sensitive; particular care should be taken to maintain an appropriate setting for the historic office building and older scale house.[17]

While the vernacular industrial landscape of the terminal should be retained as much as possible, changes can be made to the topography, vegetation, circulation, and water features to accommodate new uses and address accessibility, safety, and environmental issues. In some cases, changes might not be visible, like removing the existing underground conveyor systems or remediating contaminated soil if historic topographical conditions are subsequently returned. New circulation systems, including roads and sidewalks, can be added if they respect historic circulation patterns and the historic systems continue to provide an organizational framework that reinforces the site's original operations.

Mitigation Measures

When changes must be made to a historic property, those planning to make the changes should consider a variety of options and select alternatives that avoid or minimize damage to important historic elements of the property. This is not always possible, however, given the many factors that influence such decisions.

To compensate for demolishing a character-defining feature or making alterations that do not meet the Secretary of the Interior's Standards, appropriate mitigation measures should be established and implemented. Changes major or minor could not only affect an individual building or location but have bigger ramifications for the historic district as a whole, so the scope of the mitigation should be commensurate to the total impact.

Mitigation can be an end product of a consultation process required by Section 106 of the National Historic Preservation Act or Chapter 138 of the Minnesota statutes. Because

[15] Ibid., 48.
[16] Ibid., 51.
[17] Ibid., 53, 59.

Chapter 138 is only invoked if a property is officially listed in the National Register of Historic Places, it does not apply to the Upper Harbor Terminal. Section 106 review, though, would be triggered for projects involving federal funding or licensing (such as some Corps of Engineers permits). The Section 106 process requires an extensive consideration of alternatives with the participation of the responsible federal agency, the State Historic Preservation Office, and others before accepting an adverse effect and identifying appropriate mitigation. The Upper Harbor Terminal is not designated as a historic landmark by the Minneapolis Heritage Preservation Commission (HPC), but mitigation could also be required if the Commission determined that the district met the registration criteria for a local historic district. In the absence of a Section 106 or HPC requirement, mitigation is voluntary.

MHPR or HAER Documentation

A common form of mitigation is historic documentation of the property. The Minnesota Historic Properties Record (MHPR) and the Historic American Engineering Record (HAER) are two programs that document the existing and historic conditions of properties with photographs, a written report, and sometimes measured drawings. There are several levels of documentation, depending on the significance of the resource and the extent of the impact. Photographs are typically large-format black-and-white negatives and contact prints, but the MHPR allows 35mm-format photographs in some situations. Reports can be a simple outline format or a more extensive narrative. All of the materials included in a documentation set must meet archival standards.

The HAER program is overseen by the National Park Service and is part of the Heritage Documentation Programs (HDP). The Historic American Building Survey (HABS) and the Historic American Landscape Survey (HALS) are also part of the HDP. Historic documentation for HAER is placed in a special collection in the Library of Congress. The records are made available to the public through electronic and hardcopy formats. The MHPR program is the Minnesota version of HDP with similar historic documentation standards. The MHPR records are archived at the library of the Minnesota Historical Society.

Documentation studies should be completed before properties are altered or destroyed. More information on the requirements for HAER documentation is at the HDP website: http://www.nps.gov/hdp/index.htm. Information on the MHPR program is on the Minnesota State Historic Preservation Office's website: http://www.mnhs.org/shpo/review/mhprguidelines.php.

The cost of producing HAER or MHPR documentation depends on the scope of work. A simple outline-format MHPR can be less than $5,000, while a "Level I" HAER study of a major landmark that includes measured drawings can run into six figures.

Interpretation

In addition to historic documentation, interpretation is important to communicating the significance of historic properties to the public. As with mitigation, interpretation should encompass the history of the entire site, whether parts of the terminal or the entire site are reused.

Large-scale examples of interpreting former industrial sites include Gasworks Park in Seattle, Washington, and areas of the Ruhr Valley in the state of North-Rhine Westphalia in Germany. Waterpower Park, just downriver from the Upper Harbor Terminal, provides information on the importance of the industries on and around Hennepin Island, particularly waterpower and hydroelectricity, to the growth of Minneapolis in the nineteenth and early twentieth centuries.

Interpretation can be integrated into historic buildings, structures, and landscapes even if these features do not continue their historic functions. It can also utilize items salvaged from the property. In addition to standard museum-type exhibits, interpretation can be accomplished creatively through landscape design, art installations, and other nontraditional means.

5.2 Recommendations

Recommendations for future reuse of the Upper Harbor Terminal are organized into two categories. The near-term recommendations focus on immediate structural needs to maintain the property. The mid- to long-term recommendations address how changes would either maintain or destroy the property's historic character.

5.2.1 Near Term

Structural

We recommend that steps be taken to preserve the structures through the efforts listed as "Mothball" in Section 3 of this report. This will maintain options while the City considers what use to make of the site. Should the site be abandoned by its current tenant or otherwise become unoccupied, it also is important to take steps to protect the public and mitigate liability to the City by erecting railing along the riverwall and placing security fence around certain of the structures which might otherwise attract "urban explorers" to the site.

Once consensus has been reached as to an appropriate use for the site, any structures to be retained should be slated for work to repurpose them for their intended use.

5.2.2 Mid- to Long-Term

Retaining National Register Status

To retain the Upper Harbor Terminal's eligibility for local designation and listing in the National Register of Historic Places, the adaptive reuse plans for the Upper Harbor Terminal must conform to the Secretary of the Interior's Standards for the Treatment of Historic Properties. A property listed in the National Register may qualify for financial incentives including grants from the Minnesota Historical Society and historic tax credits from Minnesota and the federal government. The funding can be used for repair and to assist with plans for adaptive reuse.

To retain National Register status, the existing buildings and structures on Parcels 1, 2, and 6 should be preserved or rehabilitated. The buildings and structures can be repurposed with new uses, but the character-defining features should be repaired and protected (see Section 4.0). Pipes, conveyors, scales, and other lines that are connected to the structures but concealed underground may be removed. New construction may occur on Parcels 5 and 6, which historically had large structures that have since been removed. The size and scale of the new construction should relate to the size and scale of the asphalt tanks that once occupied both parcels. On Parcel 6, the historic office building and scale house should be preserved. Parcel 7 is located between Interstate 94 and Washington Avenue, and holds a historic parking area. The parcel appears to be secondary compared to the other parts of the terminal and could accommodate new construction. The parking area may also be expanded, but some green space should be maintained.

Parcels 1, 3, and 4 have historically been used as largely open areas that house commodities. To retain National Register eligibility, they should continue to remain open space. They may be reused as parking areas and green space. The topography may be altered from the existing conditions, but should retain a relatively flat grade.

The Mississippi River is an important character-defining feature of the terminal, and the visual relationship between the site and the river is one of the most important features of the property. The existing riverwalls, docks, and mooring cells should be preserved or rehabilitated. They are important to retaining the topography of the site and are structurally linked to the warehouse. Future reuse for the terminal should incorporate active use of the river, which would help preserve a sense of the historic relationship between the Upper Harbor Terminal and the Mississippi River.

The existing plantings throughout the Upper Harbor Terminal have no intentional design and appear to be voluntary. The design of new landscaping and the selection of plantings should respect the property's industrial character and have an irregular pattern. The existing concrete cubes should be reused unless health and safety concerns preclude this. If the cubes cannot be repurposed, similar cubes could be fabricated for functional and decorative purposes, creating a physical link between past and future uses.

The existing circulation systems at the Upper Harbor Terminal should be preserved and rehabilitated. Streets and roads should be repaired. The north-south rail corridor should remain in place and be used for some form of transportation, but sidewalks and streets may be added that respect the historic circulation patterns. If the rail corridor becomes inactive in the future, this corridor could be adapted for new functions, with the introduction of appropriate new materials as necessary.

Not Retaining National Register Status

If the City of Minneapolis concludes that it must make substantial changes to its property in the Upper Harbor Terminal that do not conform to the Secretary of the Interior's Standards and that compromise the terminal's historic character, the terminal will no longer qualify for historic designation. As noted in Section 5.1.2, if the proposed work involves federal funds or licenses, a Section 106 review will be triggered, requiring a consultation process with the federal agency, the Minnesota SHPO, and others. Also, the Minneapolis HPC could determine that the property should be considered for local landmark status. The Section 106 and HPC processes could result in modifications to the proposed scope or requirements for mitigation. For example, some of the buildings and structures may need to be preserved, like the concrete domes.

The potential Upper Harbor Historic District is much larger than the Upper Harbor Terminal, and other parts of the district are owned by private parties. Independently from the City, these owners might make changes that damage the historic character of the terminal and compromise its eligibility for historic designation.

List of Figures

Figure 1 – Site Keymap
Figure 2 – ALTA Survey Parcel 1
Figure 3 – ALTA Survey Parcel 2
Figure 4 – ALTA Survey Parcels 3 and 4
Figure 5 – ALTA Survey Parcel 5
Figure 6 – ALTA Survey Parcels 6 and 7

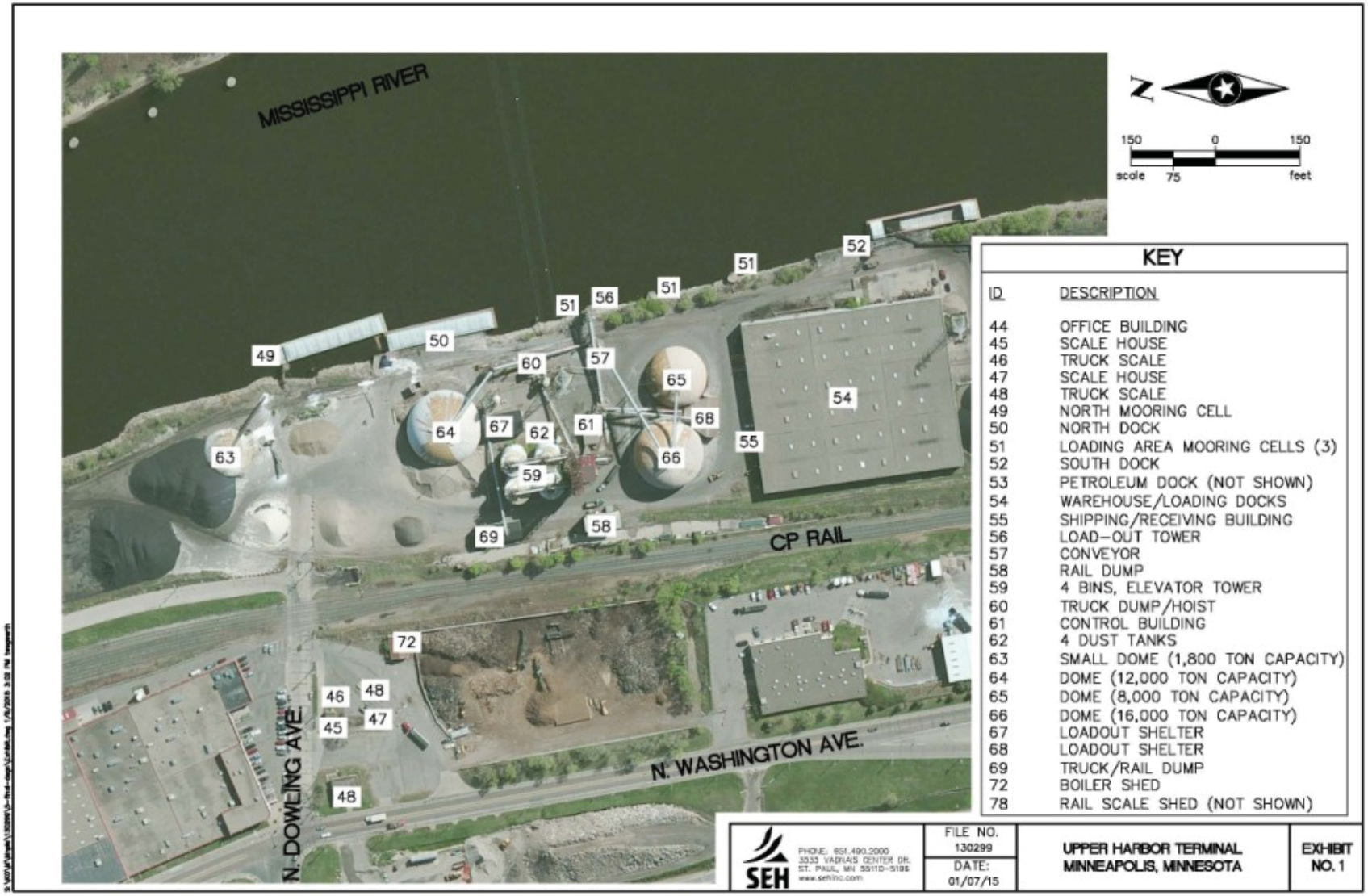

Figure 1 – Site Keymap

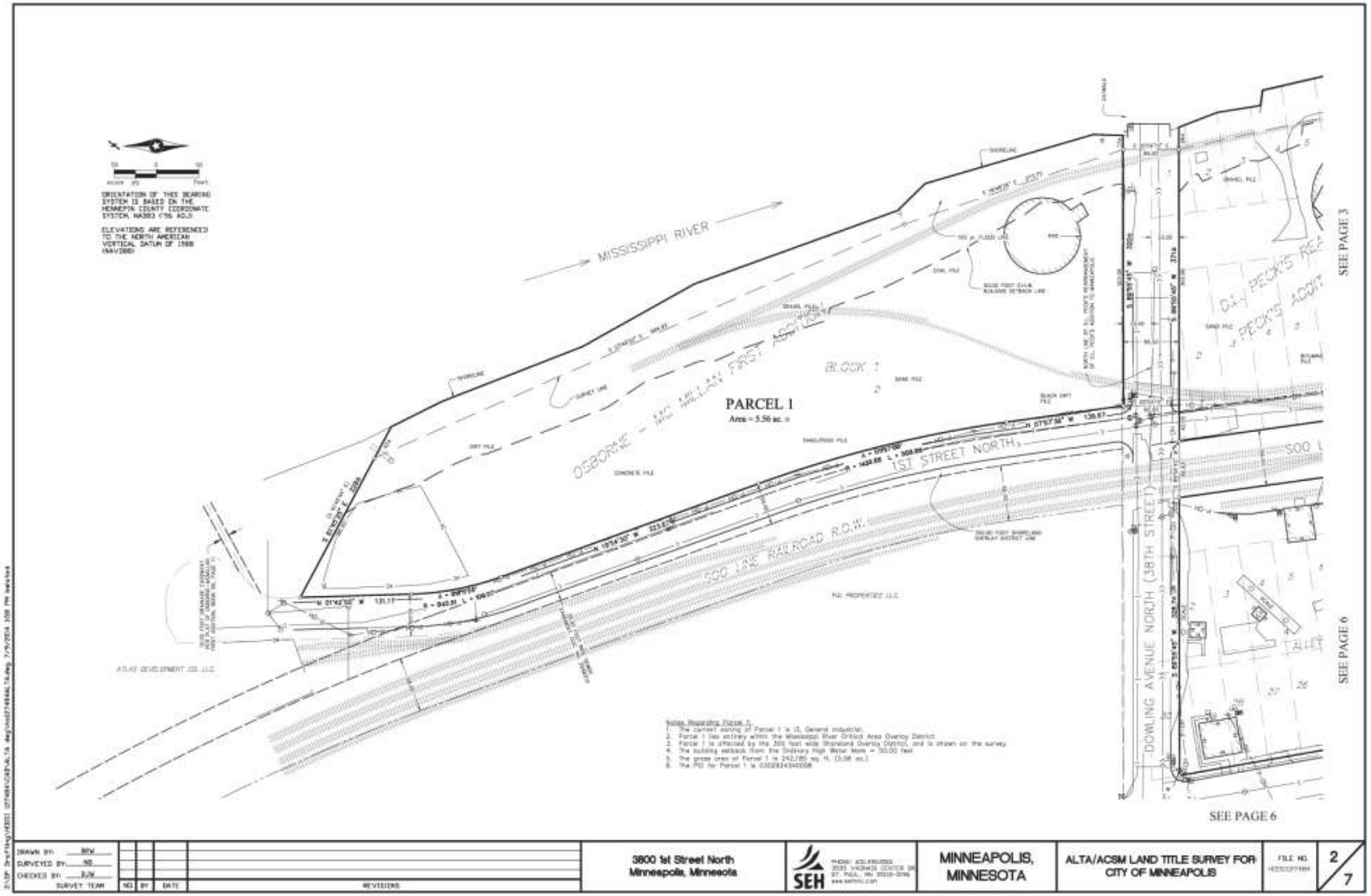

Figure 2 – ALTA Survey Parcel 1

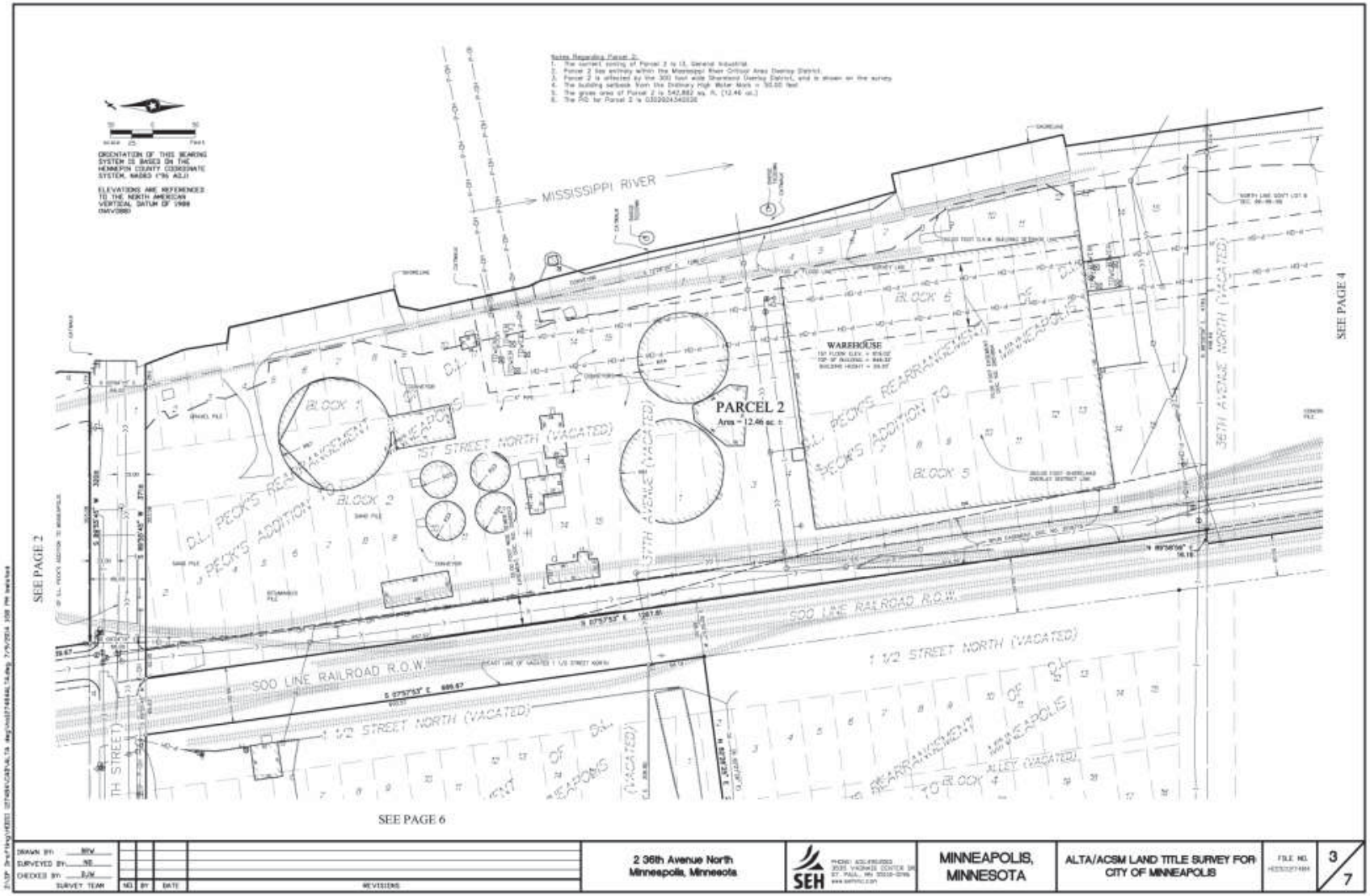

Figure 3 – ALTA Survey Parcel 2

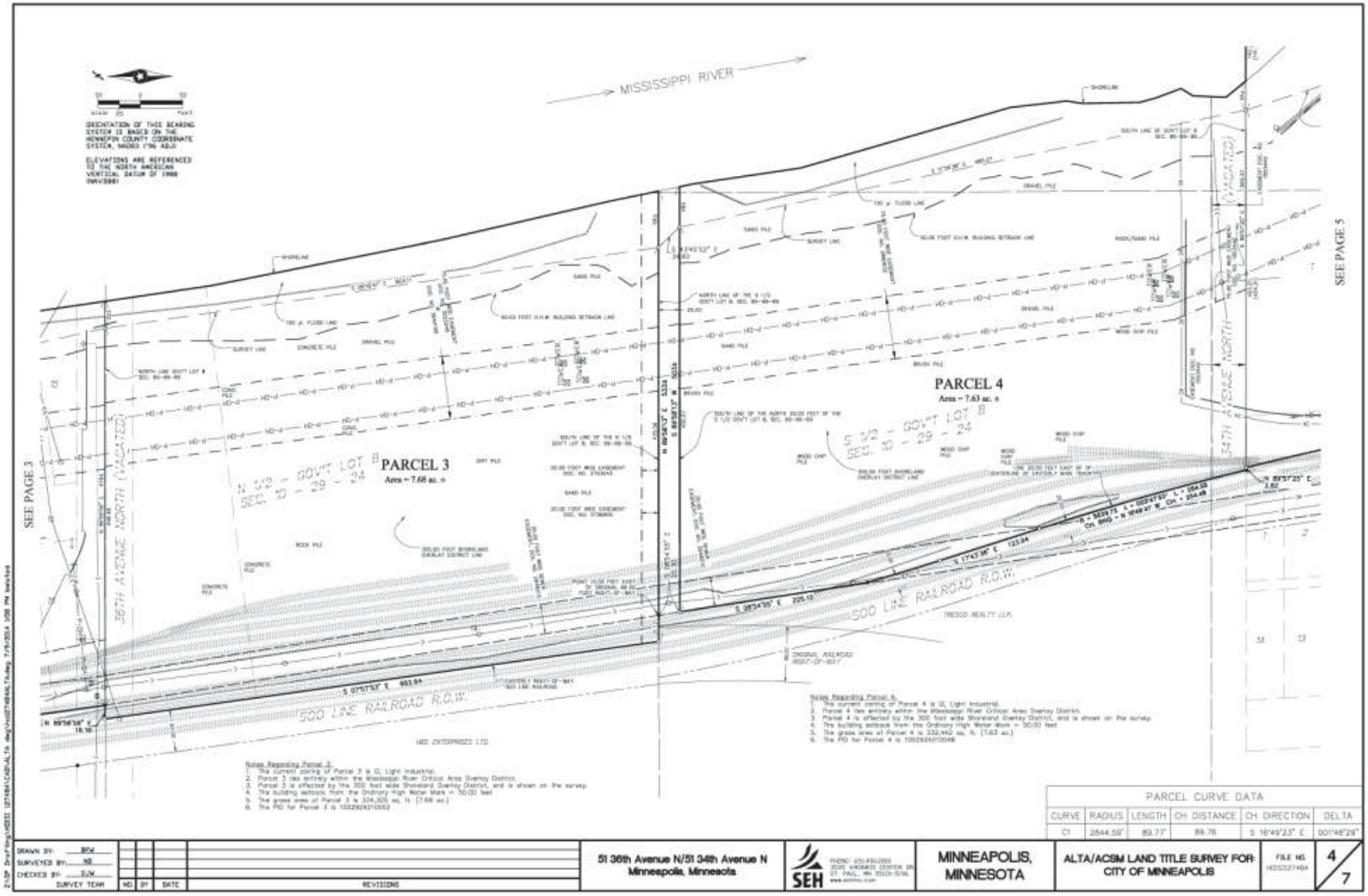

Figure 4 – ALTA Survey Parcels 3 and 4

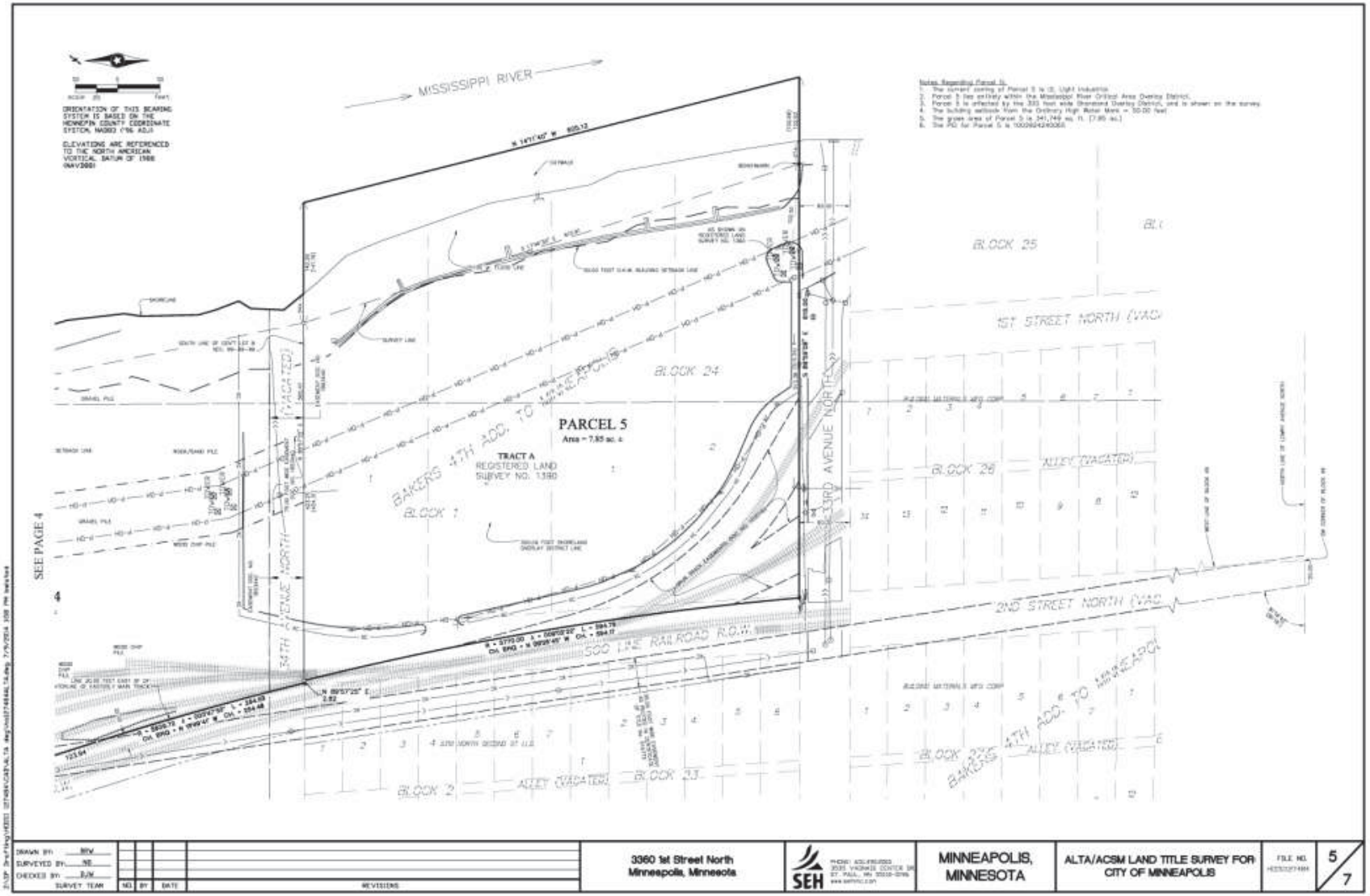

Figure 5 – ALTA Survey Parcel 5

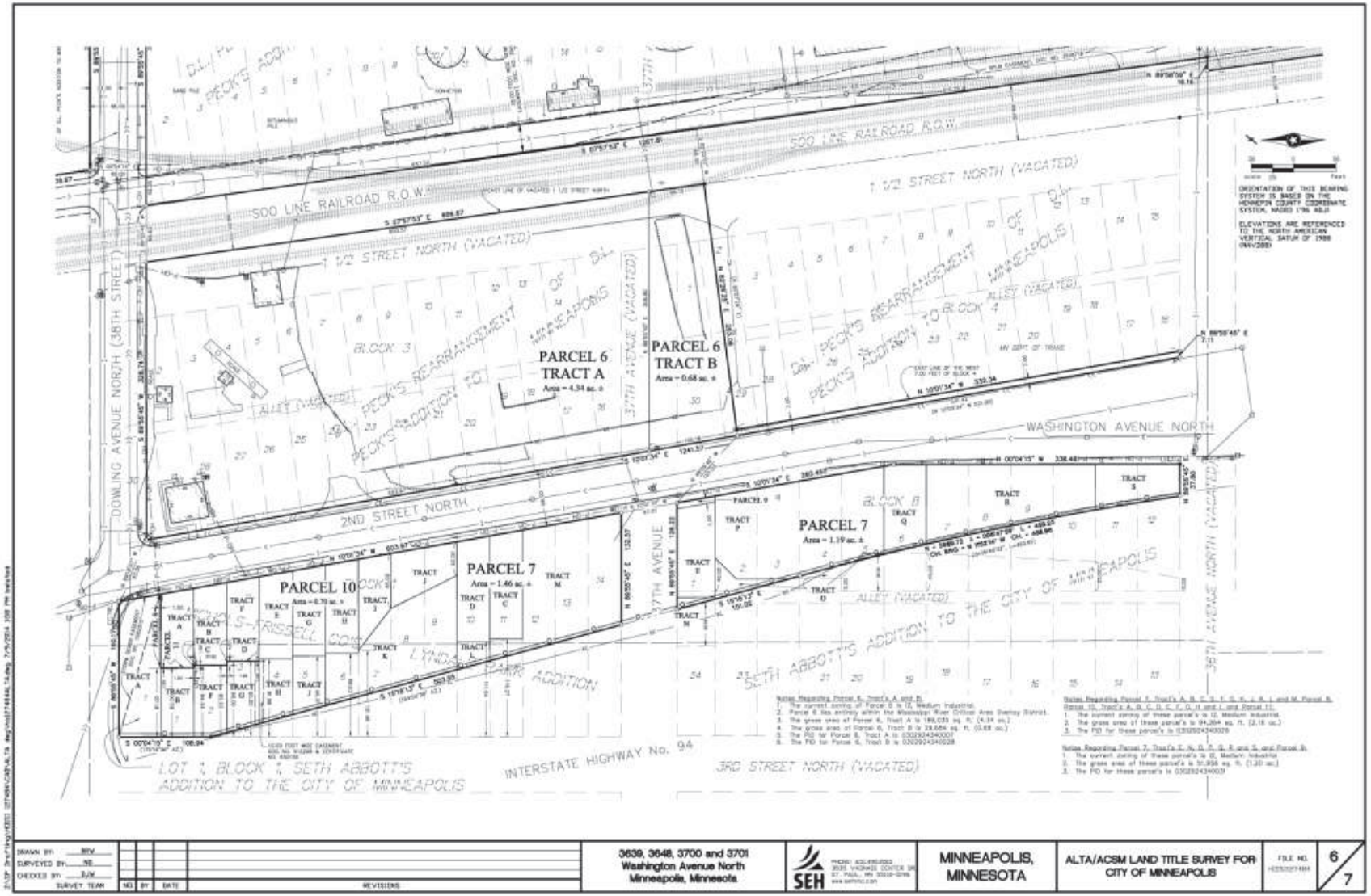

Figure 5 – ALTA Survey Parcels 6 and 7

Appendix A

Cost Estimate for Riverwalls and Mooring Cells

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Table A-1- Engineer's Opinion of Probable Cost for Seawalls and Mooring Cells

	Units	Quantity	Unit Price	Cost
Replace Storm Sewer Outfall Wall				
Remove Existing Sheet Piling (PZ-27)	VLF	2133.33	$11.10	$23,680
Install New Sheet Piling (40-ft long)	SF	3200	$40.00	$128,000
Excavation (Contaminated)	CY	926	$50.00	$46,296
Replacement Backfill (Class 5 Agg.)	CY	926	$24.00	$22,222
New Bituminous Surface	TN	235	$65.00	$15,243
Miscellaneous Items	LS	1	$25,000	$25,000
Mob/Demob	LS	1	$25,000	$25,000
Contingency (20%)				$57,088
E & D (15%)				$42,816
Construction Admin (15%)				$42,816
ITEM TOTAL				**$428,162**

Assumptions:

1) Existing mobile equipment and storage items have been removed

2) No improvements/renovations to existing storm sewer

Replace Seawall Steel Cap				
Torch Cut Existing Cap	LF	906	$6.00	$5,436
Remove Existing Cap	LS	1	$5,000.00	$5,000
Saw Cut Pavement	LF	604	$1.50	$906
New Steel Cap (Bent Plate)	LBS	16960	$2.50	$42,400
New Cap Connections	LF	604	$32.50	$19,630
New Cap Paint	LF	604	$4.00	$2,416
Bit Pavement Patch	SF	302	$20.00	$6,040
Mob/Demob	LS	1	$10,000.00	$10,000
Contingency (20%)				$18,366
E & D (15%)				$13,774
Construction Admin (15%)				$13,774
ITEM TOTAL				**$137,742**

Assumptions:

1) Existing conveyor system and ancillary equipment has previously been removed

Seawall Guardrail				
Code-Compliant Guardrail	LF	1174	$150.00	$176,100
Contingency (20%)				$35,220
E & D (15%)				$26,415
Construction Admin (15%)				$26,415
ITEM TOTAL				**$264,150**

Assumptions:

1) Existing conveyor system and ancillary equipment has previously been removed

	Units	Quantity	Unit Price	Cost
Mooring Cell Repair & Access				
Misc. Welding, Conc. Crack Seal, Fenders	EA	3	$10,000	$30,000
Access Bridges	EA	2	$9,000	$18,000
Code-Compliant Guardrail	LF	200	$150	$30,000
Treated Timber Fenders	LF	270	$31	$8,370
Drill & Counter-sink for bolts	EA	414	$15	$6,210
S.S. Expansion Bolts (1")	EA	414	$45	$18,630
Lag Screws (3/4")	EA	414	$2	$621
Marine work platform/barge & Tug	Day	6	$2,000	$12,000
Marine Mobilization	LS	1	$10,000	$10,000
Shore Crane & Operator	Day	6	$2,000	$12,000
General Mob/Demob	LS	1	$15,000	$15,000
Contingency (20%)				$32,166
E & D (15%)				$24,125
Construction Admin (15%)				$24,125
ITEM TOTAL				**$241,247**

Assumptions:

1) Existing conveyor system and ancillary equipment has previously been removed
2) Existing bulk materials handling tower and peripheral equipment and structures have been removed at Cell "C"
3) No access bridge required at Cell "C"

Docks #1 & #2 Fender Replacement				
Treated Timber Fenders	LF	1000	$31	$31,000
Drill & Counter-sink for bolts	EA	343	$15	$5,145
S.S. Expansion Bolts (3/4")	EA	343	$34	$11,662
Lag Screws (1/2")	EA	686	$1	$686
Marine work platform/barge & Tug	Day	10	$2,000	$20,000
Marine Mobilization	LS	1	$10,000	$10,000
Shore Crane & Operator	Day	10	$2,000	$20,000
General Mob/Demob	LS	1	$10,000	$10,000
Contingency (20%)				$21,699
E & D (15%)				$16,274
Construction Admin (15%)				$16,274
ITEM TOTAL				**$162,740**

Assumptions:

1) Existing conveyor system and ancillary equipment has previously been removed

Appendix B

Braun Intertec Soil Report

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GEOTECHNICAL SERVICES

Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

Prepared for

City of Minneapolis

Professional Certification:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Ronald A. Shaffer, PE
Associate –Senior Engineer
License Number: 12115
January 27, 2015

Project B14-08798

Braun Intertec Corporation

Braun Intertec Corporation
11001 Hampshire Avenue S
Minneapolis, MN 55438

Phone: 952.995.2000
Fax: 952.995.2020
Web: braunintertec.com

January 27, 2014 Project B14-08798

Mr. Abdulkadir Jama
City of Minneapolis
Community Planning and Economic Development
105 Fifth Avenue South
Minneapolis, Minnesota 55401

Re: Geotechnical Services
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

Dear Mr. Jama:

We have completed the soil borings and laboratory testing requested by Short Elliott Hendrickson, Inc. (SEH) for the Minneapolis Upper Harbor Terminal located at the above reference address in Minneapolis, Minnesota.

Scope of Services

Our work was completed in general accordance with our Proposal for Geotechnical Services to the City of Minneapolis, dated October 31, 2014. We received authorization to proceed on November 7, 2014.

For the project, our scope of services included the following:

- Clearance of public and private utilities.
- Performing six standard penetration test (SPT) borings to a nominal depth of 50 feet.
- Perform two offset borings to collect a Shelby tube sample from each boring.
- Laboratory soil testing as requested by SEH.
- Preparation of this factual soil boring report including, logs of the test borings and laboratory test.

Documents Provided

SEH provided us with a set of plans denoting the boring locations selected by SEH for the SPT borings completed for this report.

Boring Locations and Elevations

The SPT borings were denoted as ST-1 through ST-6. The borings were performed at the locations surveyed and staked by SEH. Ground surface elevations at the boring locations were estimated from the site survey and were provided by SEH.

Drilling and Sampling

Standard Penetration Test Borings

The SPT borings were drilled with a truck-mounted core and auger drill equipped with hollow-stem auger in accordance with ASTM D 1586. During drilling, penetration test samples were taken at 2 1/2-foot intervals. A 140-pound autohammer was used for the penetration tests. Actual sample intervals and corresponding depths are shown on the boring logs. The Shelby tube samples were taken in accordance with standard practices.

Sample Storage

Representative soil samples will remain in our Minneapolis office for a period of 60 days to be available for your examination.

Log of Boring Sheets

Log of Boring sheets for our SPT borings are attached to this report. The logs identify and describe the geologic materials that were penetrated, present the results of penetration resistance tests, laboratory tests performed on penetration test samples, and groundwater measurements.

Strata boundaries were inferred from changes in the penetration test samples and the auger cuttings. The strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may also occur as gradual rather than abrupt transitions.

Soil Classification

The geologic materials encountered were visually and manually classified in accordance with ASTM Test Method D 2488. A chart explaining the classification system is attached.

Laboratory Testing

Laboratory testing was performed on samples recovered from the borings as requested by SEH. Laboratory testing performed included moisture content tests, mechanical sieve analyses, Atterberg Limit determination, and unconfined-undrained triaxial testing. The tests were performed in accordance with ASTM procedures.

The test results are shown or noted on the right side of the Log of Boring Sheets, across from the associated sample and the attached grain size accumulation curves.

Groundwater Observations and Borehole Abandonment

The drillers checked for groundwater as the penetration test borings were advanced. The borings were typically checked again for the presence of groundwater after auger withdrawal. The boreholes were then backfilled with bentonite grout after completion in accordance with Minnesota Department of Health regulations. Soil cuttings and additional mud rotary fluid was containerized, sampled and characterized for transport and disposal. The surface pavement was restored with a bituminous cold patch.

Groundwater Fluctuations

Groundwater measurements were made under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. It should be noted that the observation period was relatively short, and groundwater can be expected to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

General

Thank you for making Braun Intertec your geotechnical services provider for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please call Robert Lee at 952.995.2319 or Ron Shaffer at 952.995.2234.

Sincerely,

BRAUN INTERTEC CORPORATION

Debra Mikelson for

Robert P. Lee, EIT
Staff Engineer

Ronald A. Shaffer

Ronald A. Shaffer, PE
Associate Principal – Senior Engineer

c: Ann Calvert; City of Minneapolis
Ron Farmer; SEH, Inc.

Attachments:
Log of Boring Sheets (ST-101 through ST-106)
Grain Size Accumulation Curves (10 sheets)
Atterberg Limits Results (1 sheet)
Unconsolidated-Undrained Triaxial Test Results (4 sheets)
Descriptive Terminology

Appendix

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LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-101**

LOCATION: See attached sketch.

DRILLER: J. Chermak | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/10/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
0.0	PAV	9 inches of bituminous over 8 1/2 inches of aggregate base.					
1.4	FILL	FILL: Silty Sand, fine- to medium-grained, possible creosole-like odor, dark brown, moist.	26				
		Poorly Graded Sand layer, with trace Gravel at 5 feet.	21				An open triangle in the water level (WL) column indicates the depth at which groundwater was observed while drilling. Groundwater levels fluctuate.
			17				
9.0	SP-SM	POORLY GRADED SAND with SILT, fine-grained, trace roots, dark gray, wet, loose. (Alluvium)	8	▽			
12.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, brown, waterbearing, medium dense. (Alluvium)	13*				*Switched to mud rotary drilling method.
			17		17	4	
			12				
			12				
			21				
			18				
			15				
		Trace Gravel at 29 feet.	15				
32.0		Cobbles and Gravel at 31 feet.					

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LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-101 (cont.)**

LOCATION: See attached sketch.

DRILLER: J. Chermak | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/10/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
32.0	CL	LEAN CLAY, gray, wet, with Sand seams, medium to rather stiff. (Alluvium)	6				No recovery.
			10		32		LL=47 PI=26
			11				
		3 inches of Poorly Graded Sand at 40 feet.	12		37		
			6		29		LL=35 PI=12
47.0			TW				No recovery.
		END OF BORING.					
		Water observed at a depth of 12 1/2 feet while drilling.					
		Water observed at 10 feet with 15 feet of hollow-stem auger in the ground.					
		Boring collasped to a depth of 15 feet.					
		Boring immediately backfilled with bentonite grout.					

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LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-102**

LOCATION: See attached sketch.

DRILLER: J. Chermak | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/11/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
0.0							
0.9	PAV	11 inches of aggregate base.					
	FILL	FILL: Silty Sand, fine- to medium-grained, shredded wood, trace Gravel, possible creosole-like odor, brown to dark brown, moist.	35				
			23				
			23				
10.0				▽			
10.5	FILL	FILL: Lean Clay, trace Gravel, gray, wet.	22				
	SP	POORLY GRADED SAND, fine- to medium-grained, light brown to brown, waterbearing, medium dense. (Alluvium)	15*				*Switched to mud rotary drilling method.
			24		20	5	
			23				
			14				
			13				
			14				
27.0							
	SW-SM	WELL-GRADED SAND with SILT, fine- to coarse-grained, trace Gravel, brown, waterbearing, medium dense to very dense. (Alluvium)	17		12	6	
			74				
31.0	CL						

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LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-102 (cont.)**

LOCATION: See attached sketch.

DRILLER: J. Chermak | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/11/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
32.0		LEAN CLAY, Poorly Graded Sand seams, gray, wet, medium to stiff. (Alluvium) *(continued)*	15				No recovery.
		4 inches of gray Poorly Graded Sand layer at 35 feet.	10				
		Layer of Fat Clay at 37 feet.	12		37		LL=53 PI=34
		Silt and Poorly Graded Sand seams at 40 feet.	7				
			11		32		
			8				
			12		31		
51.0			10				
		END OF BORING.					
		Water observed at a depth of 10 feet while drilling.					
		Water observed at 13 feet with 15 feet of hollow-stem auger in the ground.					
		Boring immediately backfilled with bentonite grout.					

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LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-103**

LOCATION: See attached sketch.

DRILLER: J. Uremovich | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/10/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
0.0							
0.3	PAV	3 inches of bituminous.					
2.5	FILL	FILL: Fibrous wood, possible creosole-like odor.					
5.0	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace fibrous wood, with Gravel, dark brown, moist, possible creosole-like odor.					
9.0	SW-SM	WELL-GRADED SAND with SILT, fine- to coarse-grained, with Gravel, brown, moist, medium dense. (Alluvium)	15		5	6	
			13				
17.0	SP-SM	POORLY GRADED SAND with SILT, fine- to medium-grained, brown, moist to waterbearing, medium dense. (Alluvium)	11		8	7	
			16				*Switched to mud rotary drilling method.
			11	▽			
22.0	CL-ML	SILTY CLAY, gray, wet, rather stiff to stiff. (Alluvium)	15		24		LL=23 PI=4
			10				
25.0	SM	SILTY SAND, fine- to medium-grained, gray, waterbearing, medium dense. (Alluvium)	15				
27.5	SP-SM	POORLY GRADED SAND with SILT, fine- to coarse-grained, brown, waterbearing, medium dense. (Alluvium)	15				
29.0	CL	SANDY LEAN CLAY, trace Gravel, gray, wet, rather stiff. (Alluvium)	12		25		
	CL	LEAN CLAY, with Silt seams, gray, wet, rather soft to rather stiff. (Alluvium)	11		30		

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BRAUN INTERTEC

LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-103 (cont.)**

LOCATION: See attached sketch.

DRILLER: J. Uremovich | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/10/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
32.0		LEAN CLAY, with Silt seams, gray, wet, rather soft to rather stiff. (Alluvium) *(continued)*	10				
			10				
			5				
			10				
42.0							
	CL	SANDY LEAN CLAY, trace Gravel, gray, wet, rather stiff to very stiff. (Glacial Till)	9		16		
			28		24		LL=27 PI=10
47.0							
	SP-SM	POORLY GRADED SAND with SILT, fine- to coarse-grained, with Gravel, gray, waterbearing, medium dense. (Glacial Outwash)	30				
49.0							
	CL	SANDY LEAN CLAY, with Gravel, gray and reddish brown, wet. (Glacial Till)	*		15		Estimated between 20 and 30 BPF.
51.0		END OF BORING.					
		Water observed at a depth of 15 feet while drilling.					
		Boring immediately backfilled with bentonite grout.					

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LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-104**

LOCATION: See attached sketch.

DRILLER: J. Uremovich | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/1/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
0.0	PAV	12 inches of Concrete slab.					
1.0	FILL	FILL: Poorly Graded Sand with Silt, fine-grained to medium-grained, trace Gravel, Silty Sand layers, light brown to brown, dry to moist.	33				
			9				
9.0	FILL	FILL: Silty Sand, fine- to medium-grained, trace Gravel, dark brown, moist.	7				
12.0	FILL	FILL: Poorly Graded Sand, with Gravel, brown, moist.	9				
15.0	SP	POORLY GRADED SAND, fine- to coarse-grained, with Gravel, brown to grayish brown, moist to waterbearing, loose to medium dense. (Alluvium)	9	▽			
			8				*Switched to mud rotary drilling method.
			15				
			15		13	4	
			13				
			26				
			17				
32.0							

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\08798.GPJ BRAUN_V8_CURRENT.GDT 1/27/15 14:26

BRAUN INTERTEC

LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-104 (cont.)**

LOCATION: See attached sketch.

DRILLER: J. Uremovich | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/1/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
32.0	CL	LEAN CLAY, with Silt and Silty Sand lenses, gray, wet, moist to stiff. (Alluvium)	13				
			11		34		LL=38 PI=19
			12				No recovery.
			7				
42.0	CL-ML	SANDY SILTY CLAY, trace Gravel, gray, wet, very stiff. (Glacial Till)	18		15		LL=21 PI=7
			23				
47.0	SC	CLAYEY SAND, fine- to medium-grained, trace Gravel, gray, wet, dense. (Glacial Till)	40		19		
49.0	SM	SILTY SAND, fine-grained, gray, wet, medium dense. (Glacial Till)	30				
52.0	CL	SANDY LEAN CLAY, trace Gravel, gray, wet, very stiff. (Glacial Till)	22				
			28		14		
57.0	SP-SM	POORLY GRADED SAND with SILT, grayish brown, waterbearing, medium dense. (Glacial Outwash)	25				
		Lean Clay inclusions.	25				*Water observed at a depth of 17 feet while drilling.
61.0		END OF BORING.*					Boring immediately backfilled with bentonite grout.

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\08798.GPJ BRAUN_V8_CURRENT.GDT 1/27/15 14:26

BRAUN INTERTEC

LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-105**

LOCATION: See attached sketch.

DRILLER: J. Uremovich | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/8/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
0.0							
0.3	PAV	3 inches of bituminous.					
	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace Gravel, dark brown, moist.					
4.0							
	FILL	FILL: Silty Sand, fine- to medium-grained, with Gravel, dark brown, moist.	27				
7.5							
	SW-SM	WELL-GRADED SAND with SILT, fine- to coarse-grained, with Gravel, brown to grayish brown, moist to waterbearing, medium dense. (Alluvium)	16				
			14				
			11				
			20	▽	5	5	
			20				*Switched to mud rotary drilling method.
19.0							
	SW	WELL-GRADED SAND, fine- to coarse-grained, with Gravel, brown to grayish brown, waterbearing, medium dense. (Alluvium)	25		14	4	
			17				
			22				
			13				
			17				

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\08798.GPJ BRAUN_V8_CURRENT.GDT 1/27/15 14:26

BRAUN INTERTEC

LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-105 (cont.)**

LOCATION: See attached sketch.

DRILLER: J. Uremovich | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/8/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
32.0		WELL-GRADED SAND, fine- to coarse-grained, with Gravel, brown to grayish brown, waterbearing, medium dense. (Alluvium) *(continued)*	17				
			15				
			16				
			19				
41.0		END OF BORING.					
		Water observed at a depth of 17 feet while drilling.					
		Boring immediately backfilled with bentonite grout.					

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\08798.GPJ BRAUN_V8_CURRENT.GDT 1/27/15 14:26

BRAUN INTERTEC

LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-106**

LOCATION: See attached sketch.

DRILLER: J. Uremovich | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/10/14** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
0.0	FILL	FILL: Silty Sand, fine- to medium-grained, with cinders and Gravel, black and brown, moist.					
2.0	FILL	FILL: Well-Graded Sand with Silt, fine- to coarse-grained, with Gravel, dark brown, moist.					
			18		4	8	
			19				
			16				
			18				
14.0	SW-SM	WELL-GRADED SAND with SILT, fine- to coarse-grained, with Gravel, brown, waterbearing, medium dense. (Alluvium)		▽			
			18				*Switched to mud rotary drilling method.
			11				An open triangle in the water level (WL) column indicates the depth at which groundwater was observed while drilling. Groundwater levels fluctuate.
			18				
			23				
			12				
			18		13	6	
			14				

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\08798.GPJ BRAUN_V8_CURRENT.GDT 1/27/15 14:26

BRAUN INTERTEC

LOG OF BORING

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal on the Mississippi River
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: **ST-106 (cont.)**

LOCATION: See attached sketch.

DRILLER: J. Uremovich | METHOD: 3 1/4" HSA, Autohammer | DATE: **12/10/14** | SCALE: **1" = 4'**

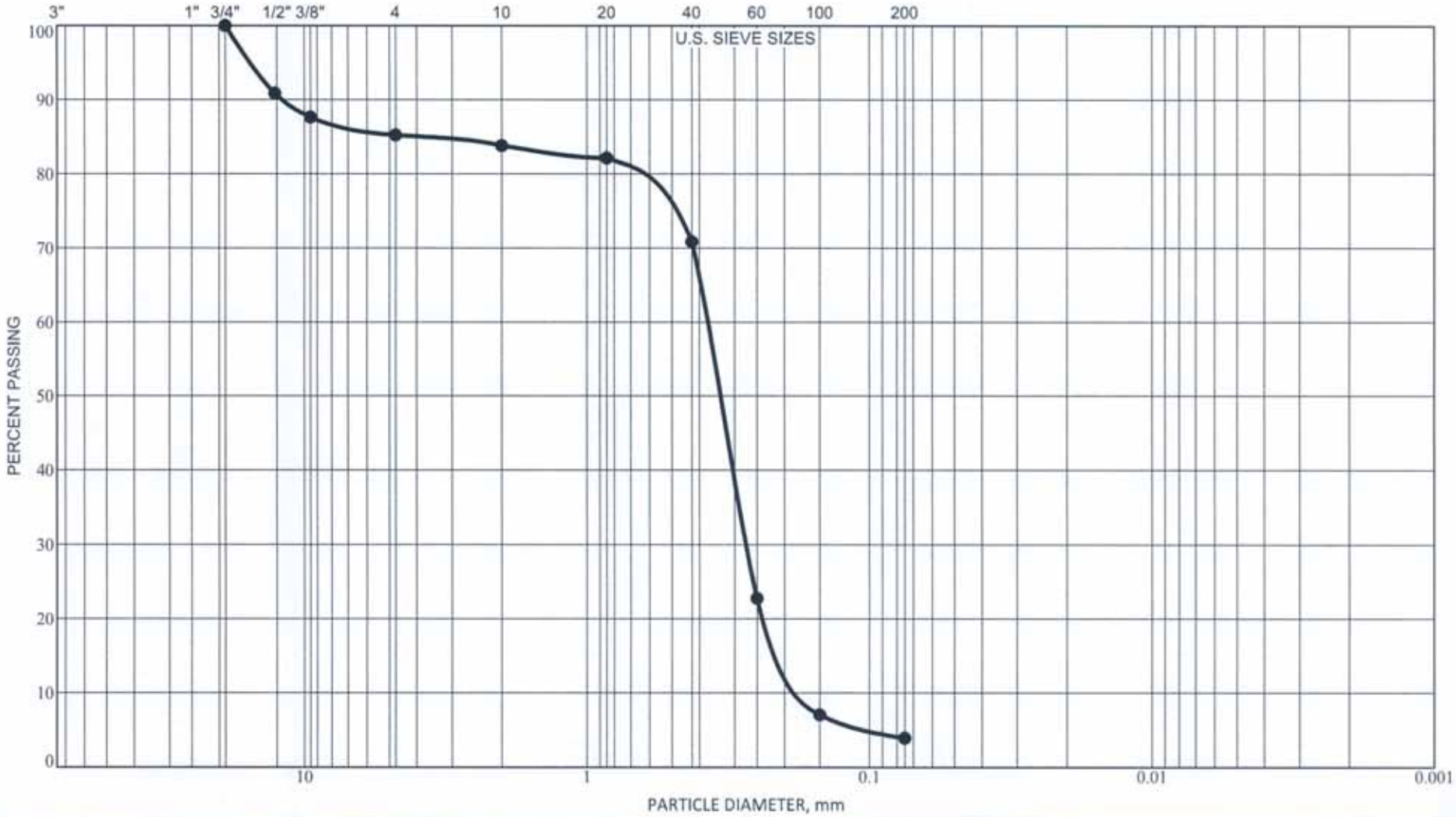
(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	P200 %	Tests or Notes
32.0		WELL-GRADED SAND with SILT, fine- to coarse-grained, with Gravel, brown, waterbearing, medium dense. (Alluvium) *(continued)*	16				
34.0	CL	LEAN CLAY, with Silt Lenses, gray, wet, rather stiff to very stiff. (Alluvium)	9		35		LL=37 PI=17
			24				
38.5	SP-SM	POORLY GRADED SAND with SILT, fine-grained, gray, waterbearing, medium dense. (Alluvium)	19				
42.0	CL	LEAN CLAY, with Silt and Silty Sand lenses, gray, wet, medium. (Glacial Till)	7		29		LL=35 PI=13
			8				
			8		32		
51.0			8				
		END OF BORING.					
		Water observed at a depth of 15 feet while drilling.					
		Boring immediately backfilled with bentonite grout.					

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2014\08798.GPJ BRAUN_V8_CURRENT.GDT 1/27/15 14:26

GRAIN SIZE ACCUMULATION CURVE (ASTM)

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-101 DEPTH: 15.0'

GRAVEL	14.7%
SAND	81.3%
FINES	3.9%

D60=0.377
D30=0.271
D10=0.165

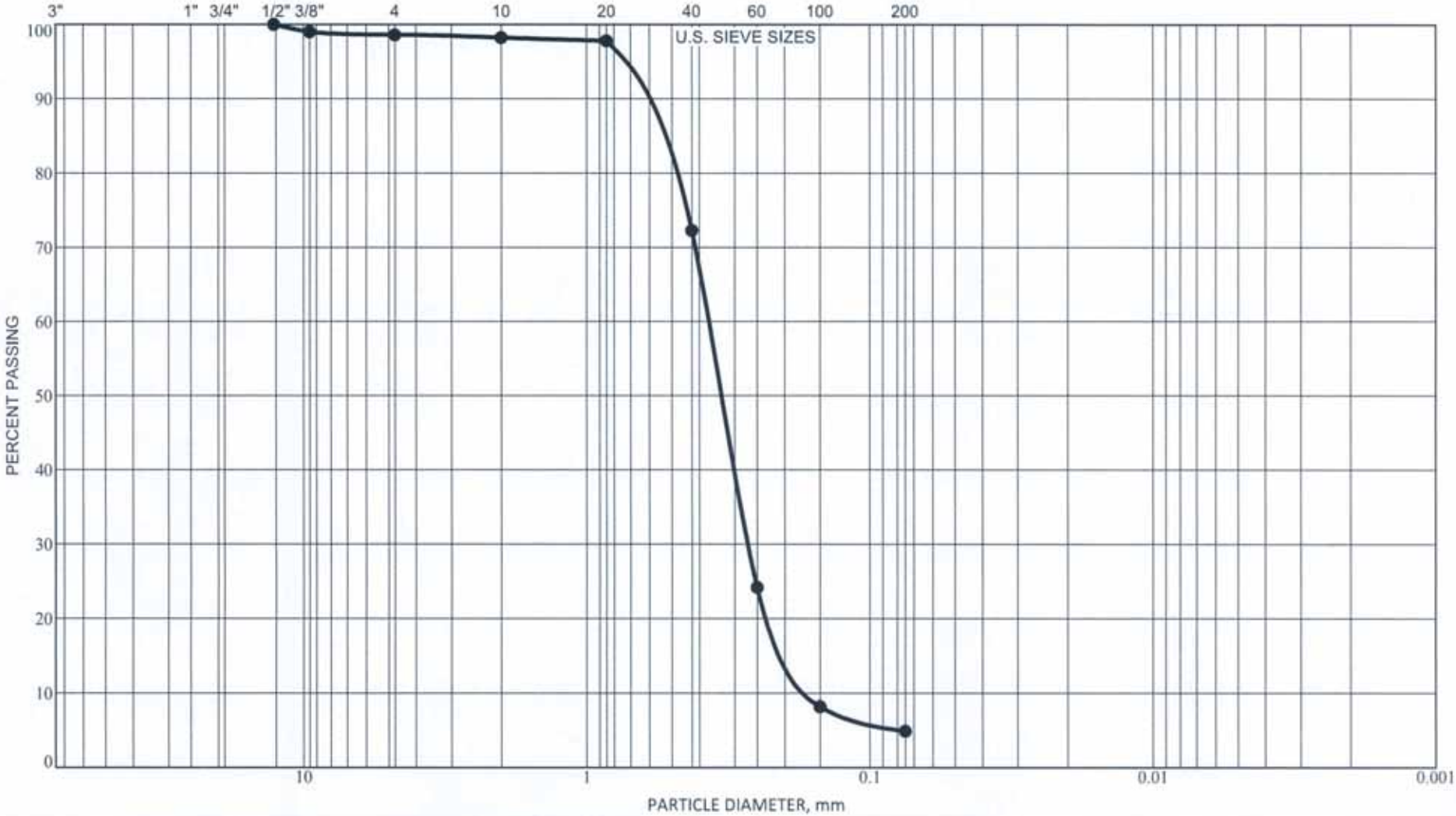
Cu=2.3
Cc=1.2

CLASSIFICATION:
POORLY GRADED SAND(SP)

GS ASTM N:\GINT\PROJECTS\X-GEO\LAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-102 DEPTH: 15.0'

GRAVEL	1.4%
SAND	93.7%
FINES	4.9%

D60=0.371
D30=0.267
D10=0.159

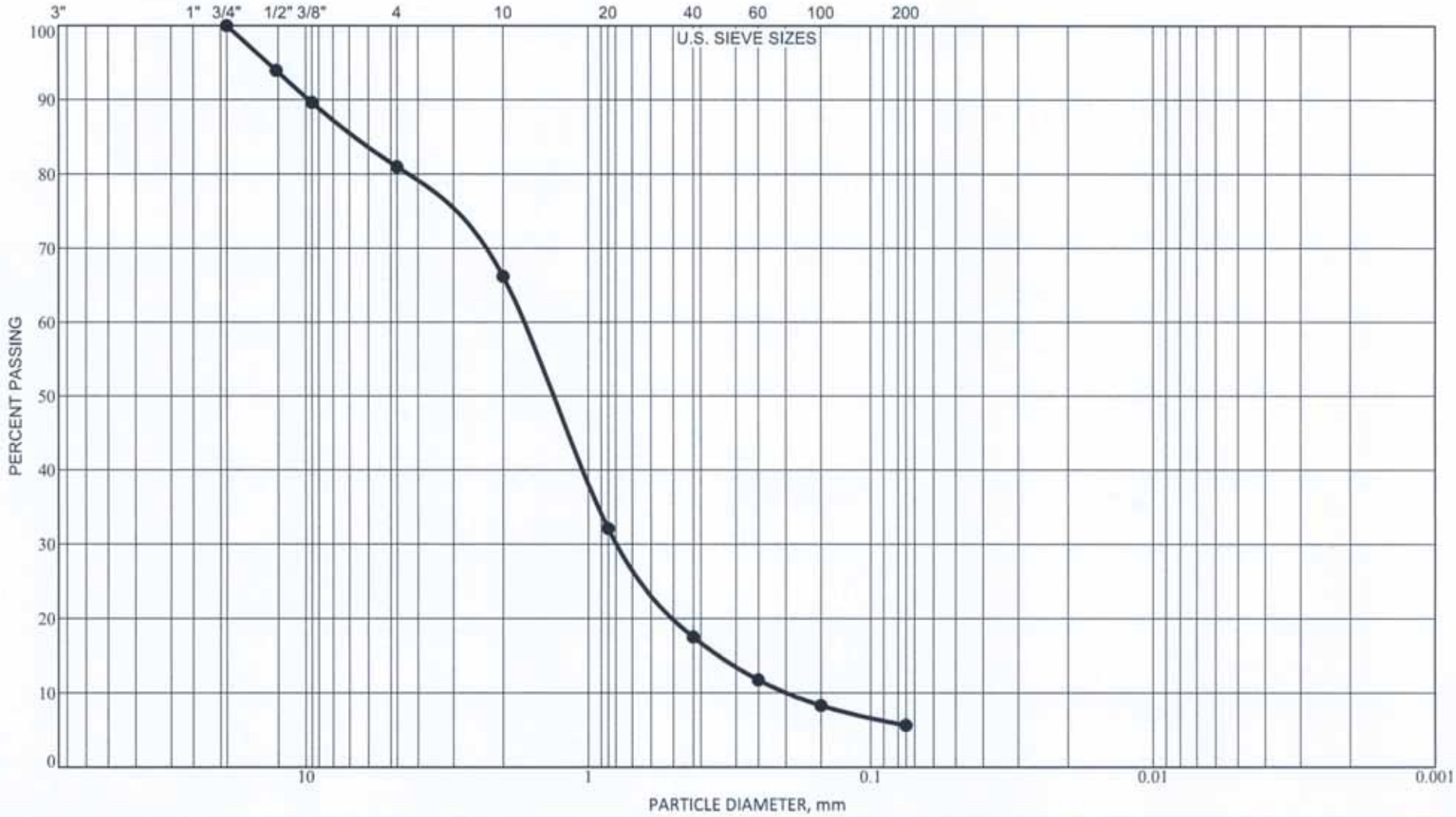
Cu=2.3
Cc=1.2

CLASSIFICATION:
POORLY GRADED SAND(SP)

GS ASTM N:\GINT\PROJECTS\V-GEOLAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-102 DEPTH: 27.5'

GRAVEL	19.0%
SAND	75.4%
FINES	5.6%

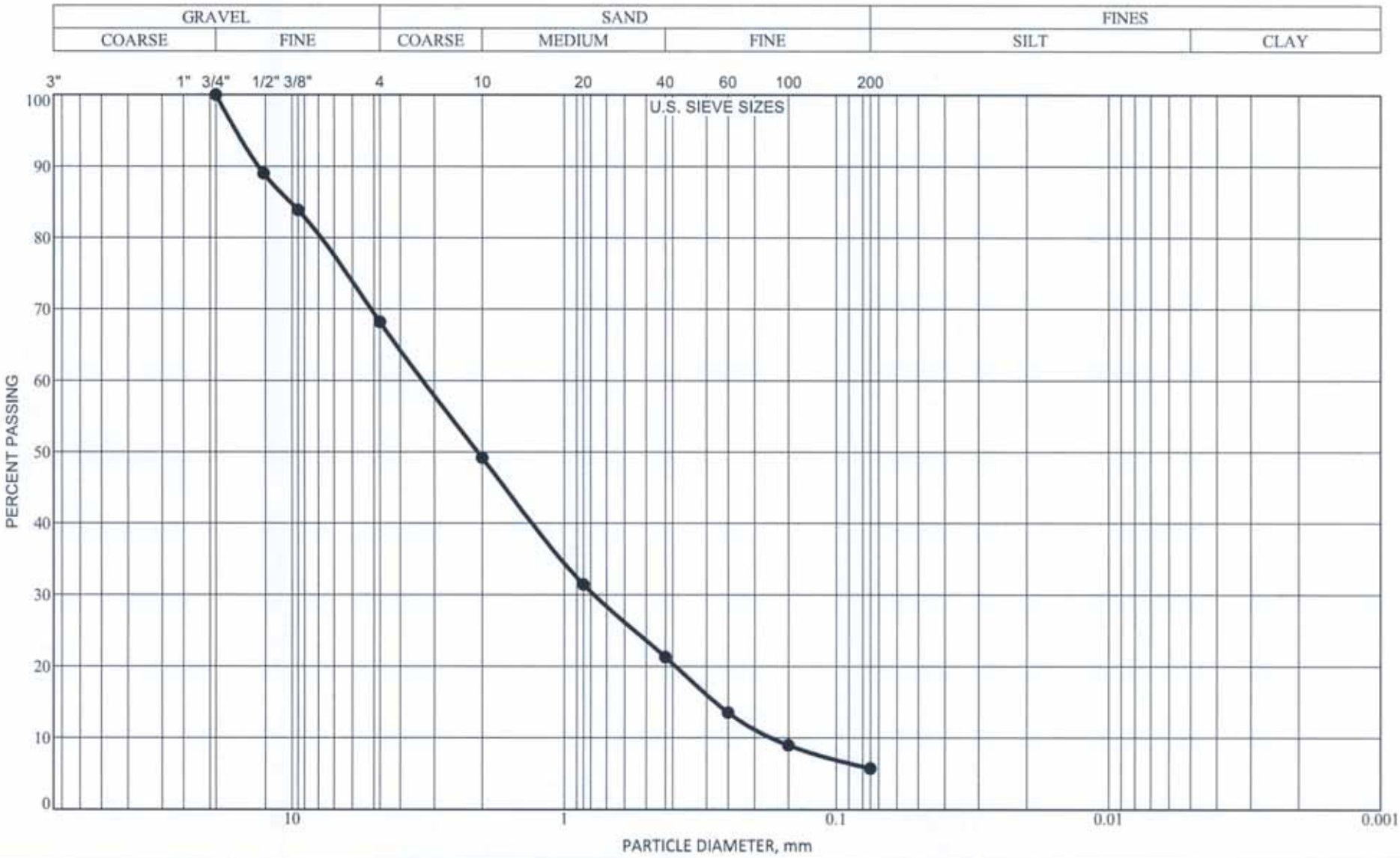
D60=1.711
D30=0.769
D10=0.193

Cu=8.9
Cc=1.8

CLASSIFICATION:
WELL-GRADED SAND with SILT and GRAVEL(SW-SM)

GS ASTM N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-103 DEPTH: 5.0'

GRAVEL	31.8%
SAND	62.5%
FINES	5.8%

D60=3.268
D30=0.770
D10=0.168

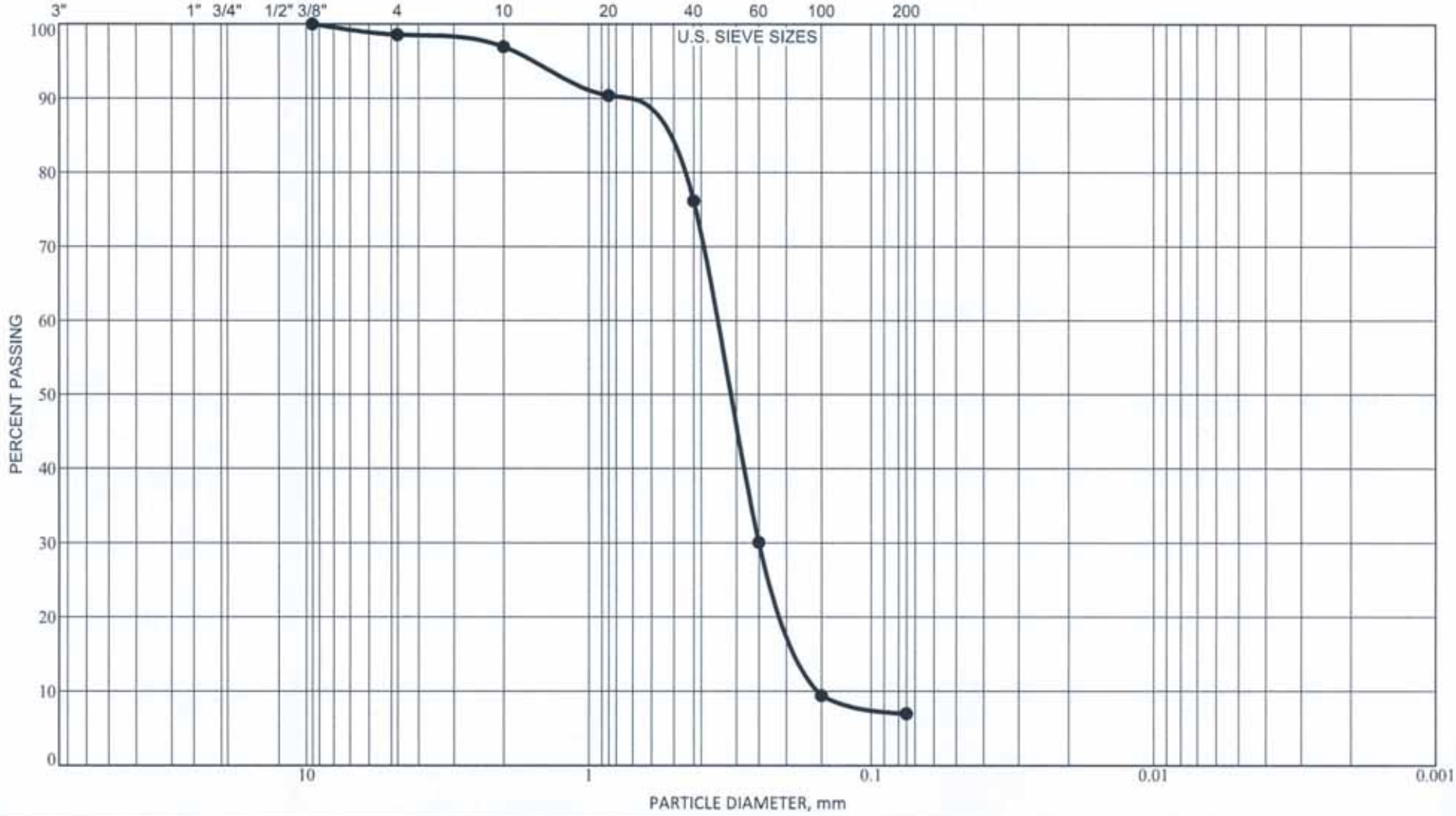
Cu=19.4
Cc=1.1

CLASSIFICATION:
WELL-GRADED SAND with SILT and GRAVEL(SW-SM)

GS ASTM N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-103 DEPTH: 10.0'

GRAVEL	1.4%
SAND	91.6%
FINES	7.0%

D60=0.353
D30=0.249
D10=0.152

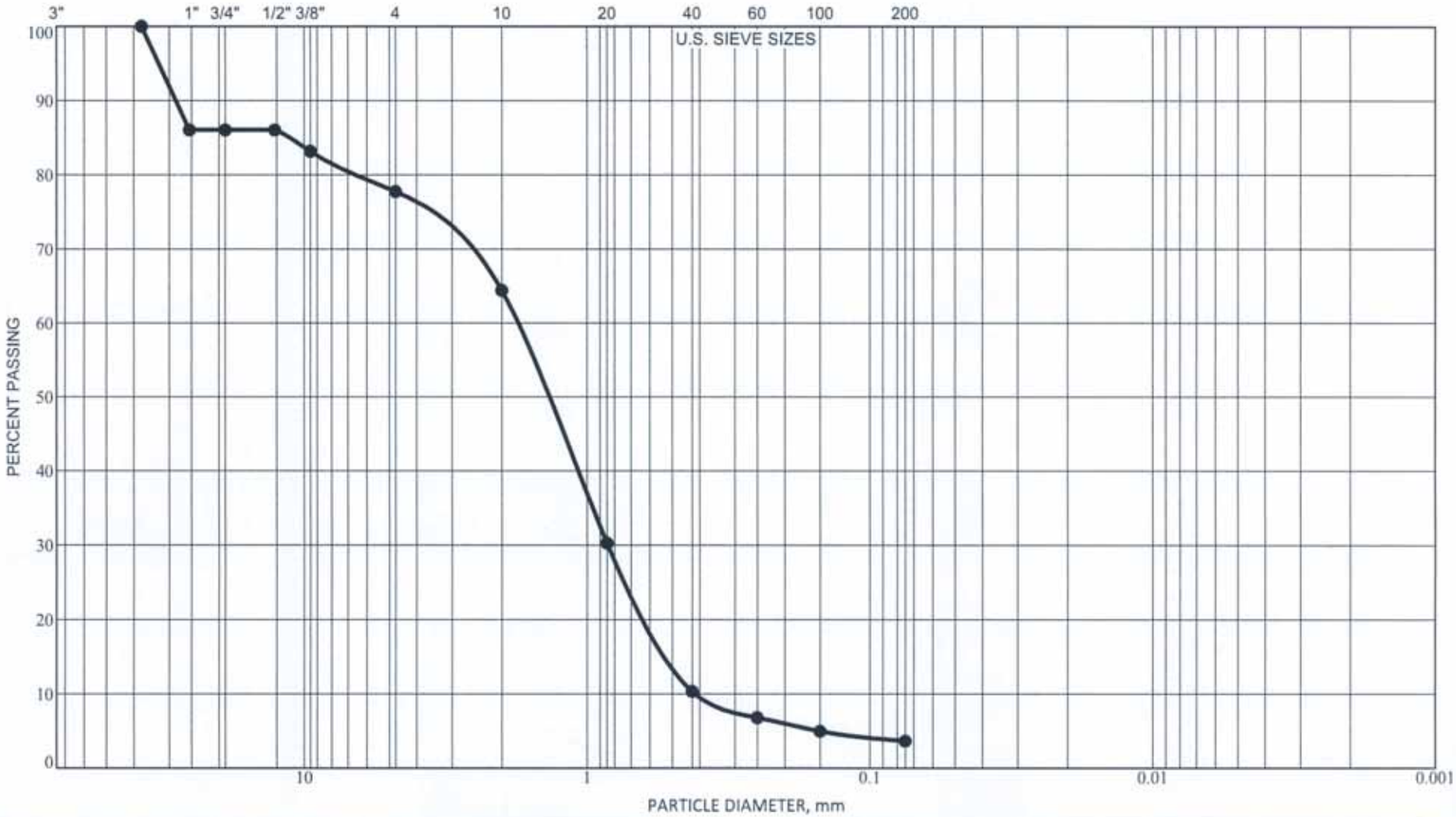
Cu=2.3
Cc=1.2

CLASSIFICATION:
POORLY GRADED SAND with SILT(SP-SM)

GS ASTM N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-104 DEPTH: 22.5'

GRAVEL	22.3%
SAND	74.1%
FINES	3.7%

D60=1.789
D30=0.842
D10=0.403

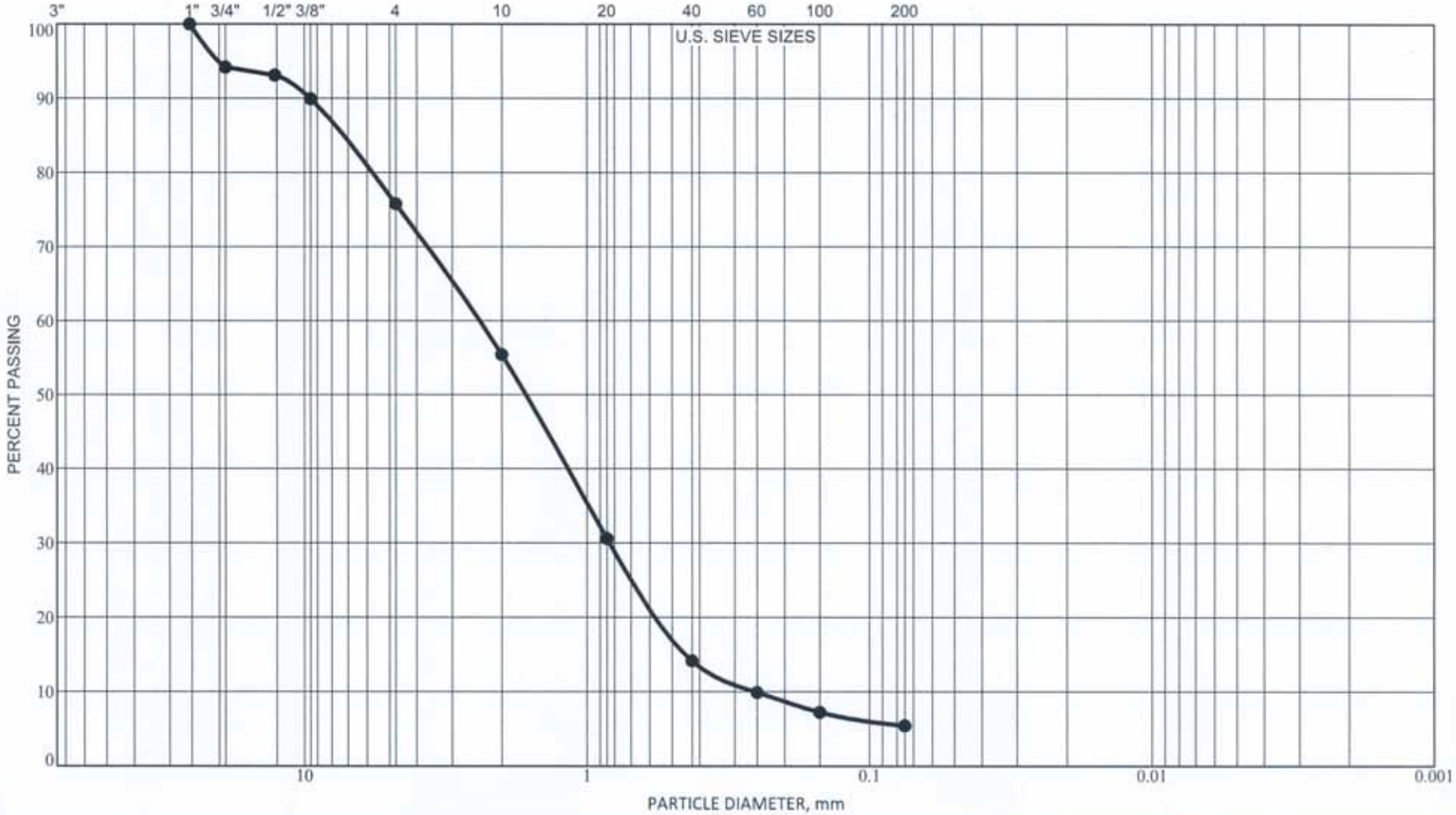
Cu=4.4
Cc=1.0

CLASSIFICATION:
POORLY GRADED SAND with GRAVEL(SP)

GS ASTM N:\GINT\PROJECTS\X-GEOLAB\L-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-105 DEPTH: 15.0'

GRAVEL	24.2%
SAND	70.4%
FINES	5.4%

D60=2.428
D30=0.829
D10=0.253

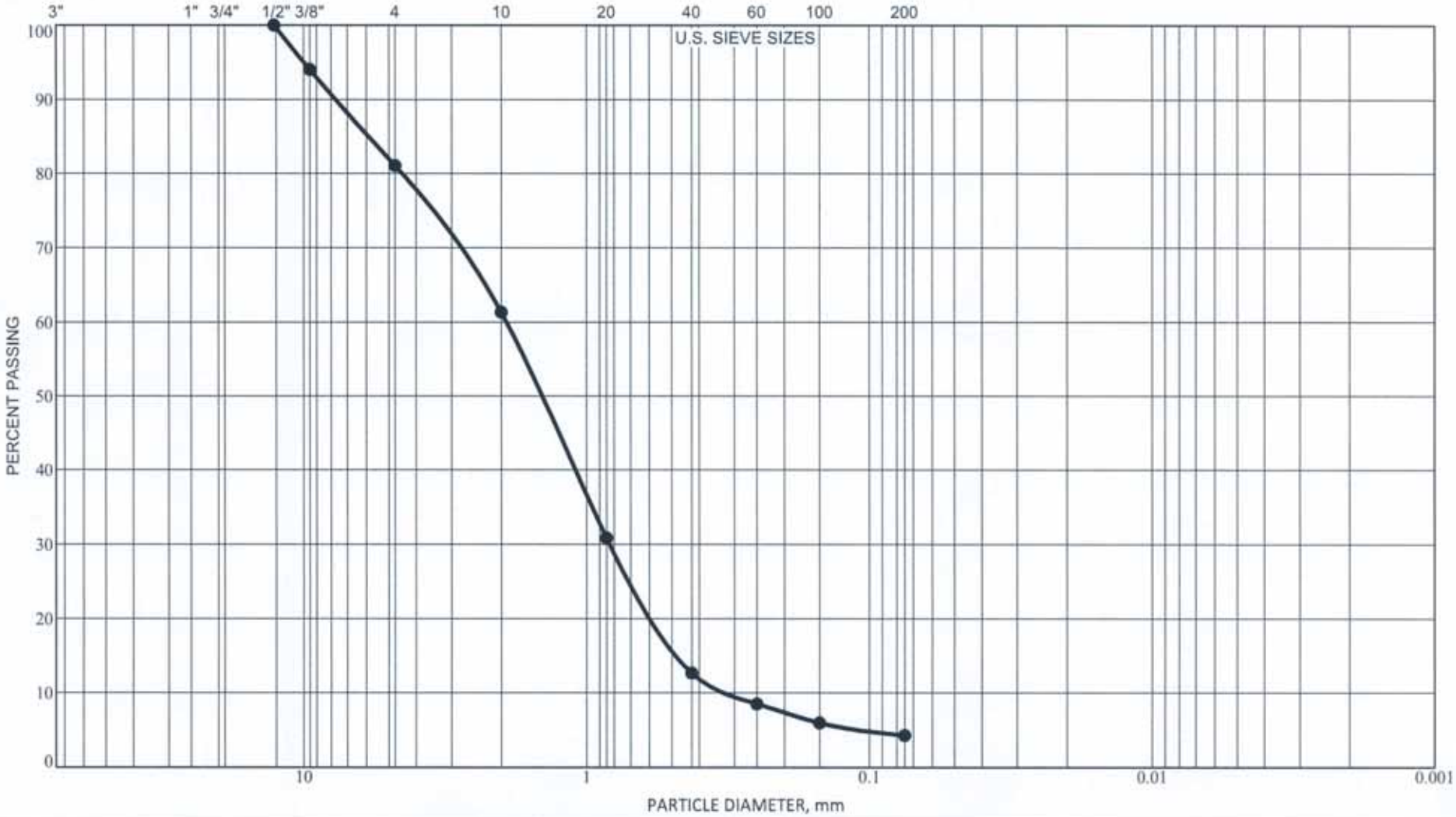
Cu=9.6
Cc=1.1

CLASSIFICATION:
WELL-GRADED SAND with SILT and GRAVEL(SW-SM)

GS ASTM N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-105 DEPTH: 20.0'

GRAVEL	18.9%
SAND	76.8%
FINES	4.3%

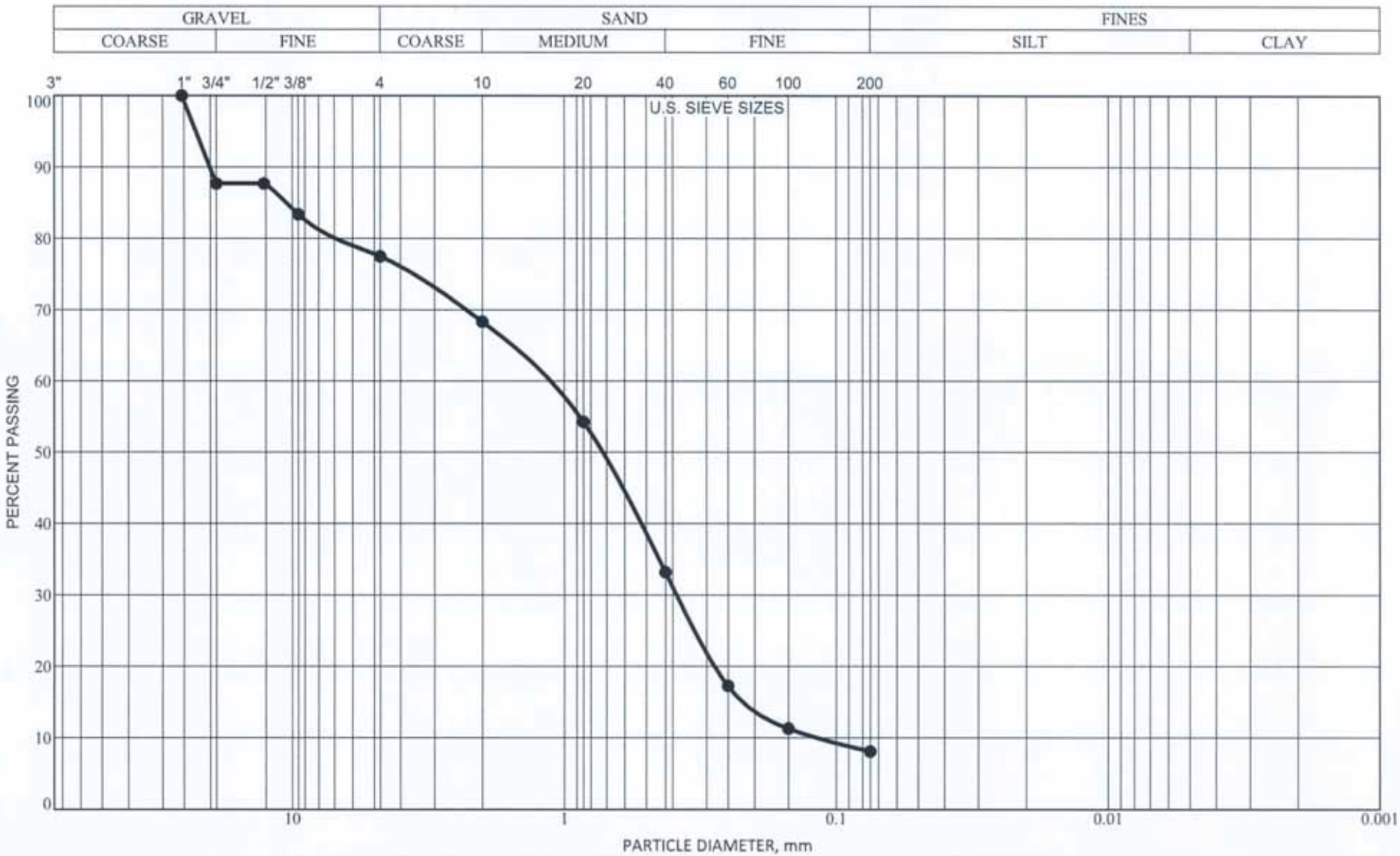
D60=1.925
D30=0.822
D10=0.302

Cu=6.4
Cc=1.2

CLASSIFICATION:
WELL-GRADED SAND with GRAVEL(SW)

GS ASTM N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-106 DEPTH: 5.0'

GRAVEL	22.5%
SAND	69.4%
FINES	8.1%

D60=1.204
D30=0.382
D10=0.113

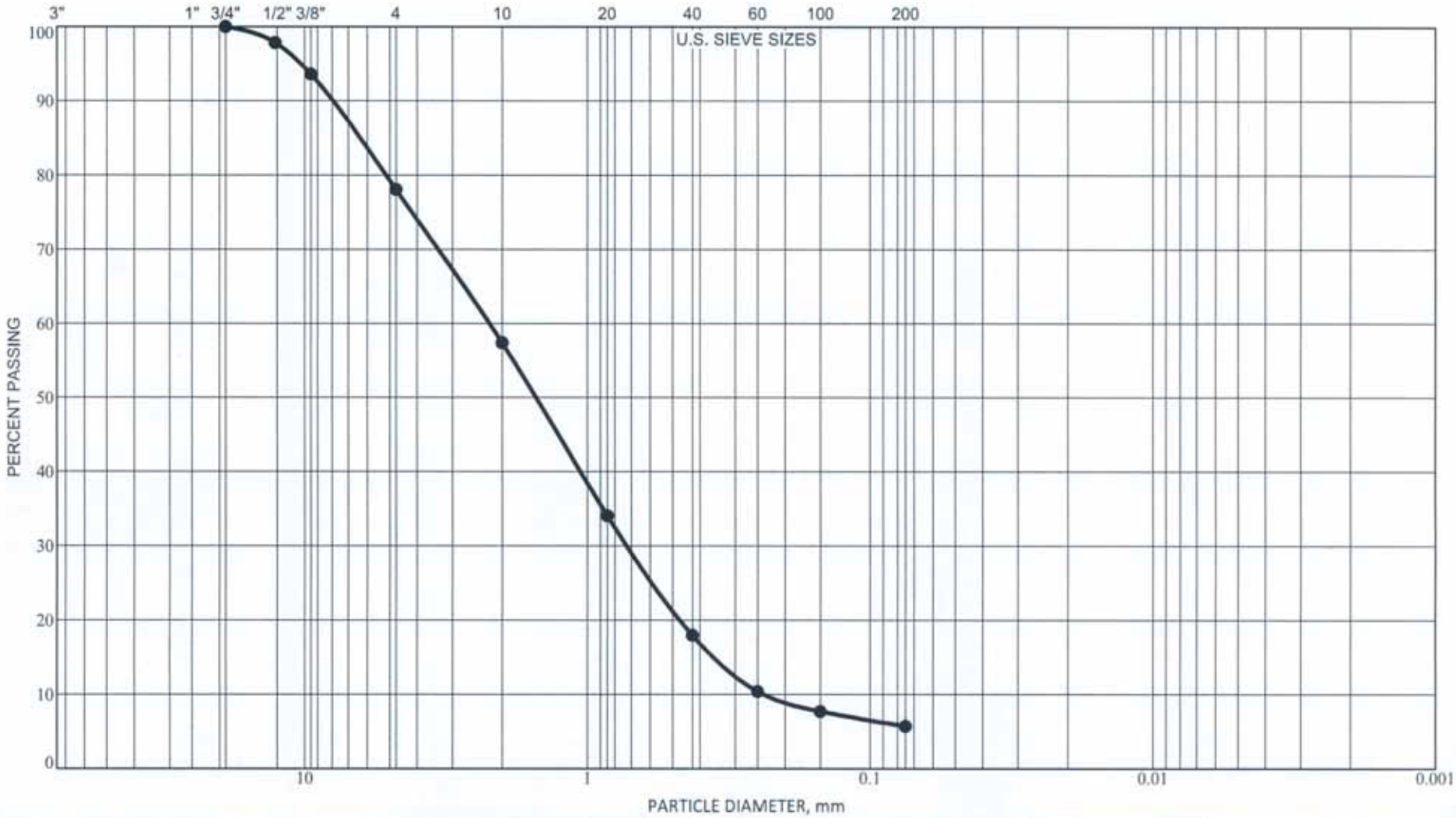
Cu=10.7
Cc=1.1

CLASSIFICATION:
WELL-GRADED SAND with SILT and GRAVEL(SW-SM)

GS ASTM N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32

GRAIN SIZE ACCUMULATION CURVE (ASTM)

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

BORING: ST-106 DEPTH: 27.5'

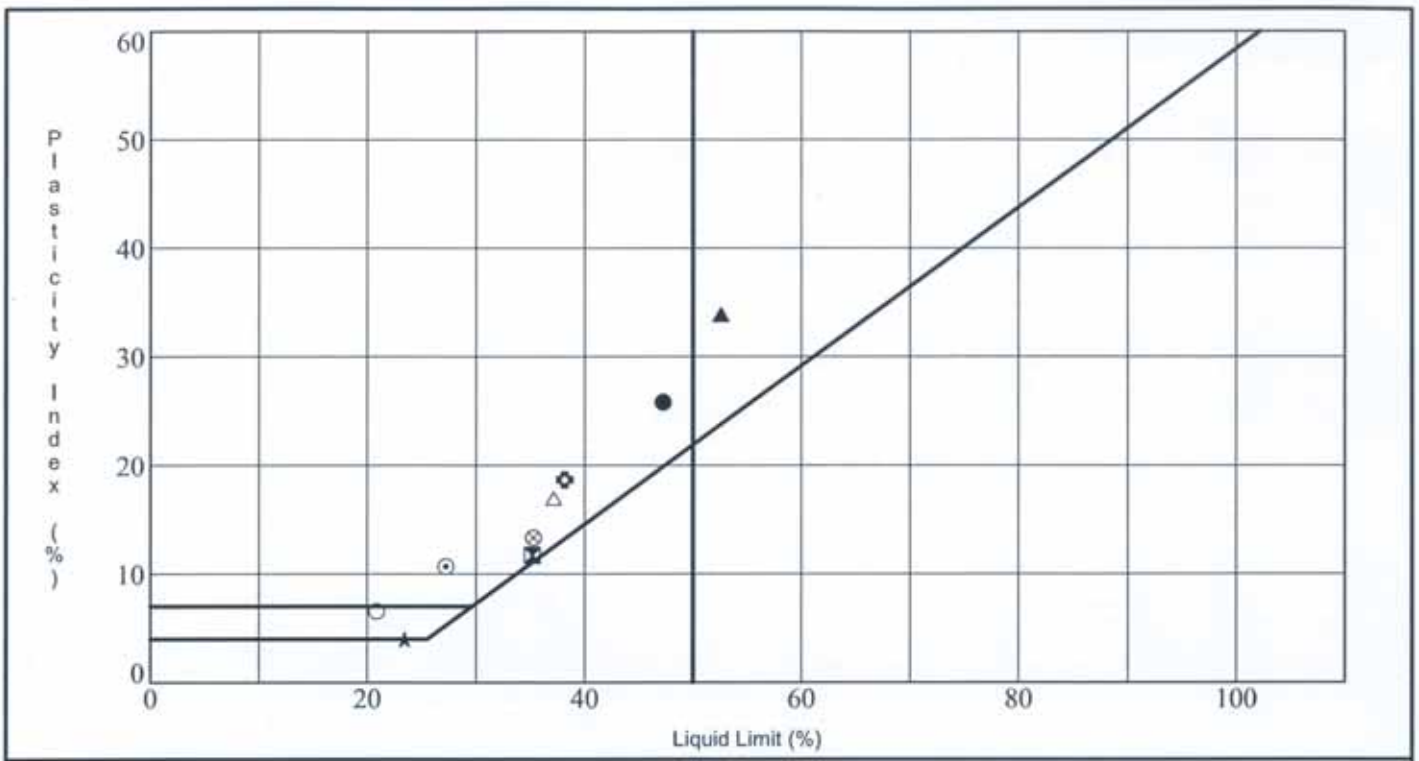
GRAVEL	21.9%
SAND	72.4%
FINES	5.7%

D60=2.229
D30=0.714
D10=0.231

Cu=9.6
Cc=1.0

CLASSIFICATION:
WELL-GRADED SAND with SILT and GRAVEL(SW-SM)

GS ASTM N:\GINT\PROJECTS\X-GEOLAB\L-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32



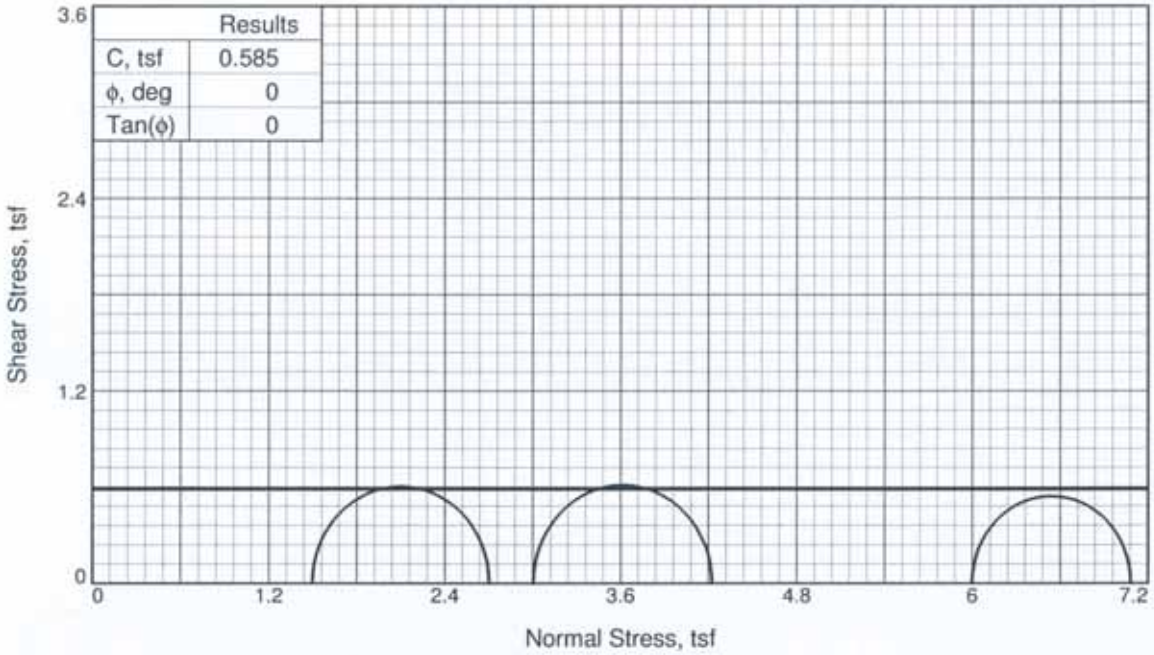
	Specimen Identification		LL	PL	PI	Fines	Classification
●	ST-101	35.0'	47	21	26		
⧗	ST-101	42.5'	35	23	12		
▲	ST-102	37.5'	53	19	34		
★	ST-103	17.5'	23	19	4		
⊙	ST-103	45.0'	27	17	10		
✿	ST-104	35.0'	38	19	19		
○	ST-104	42.5'	21	14	7		
△	ST-106	35.0'	37	20	17		
⊗	ST-106	42.5'	35	22	13		

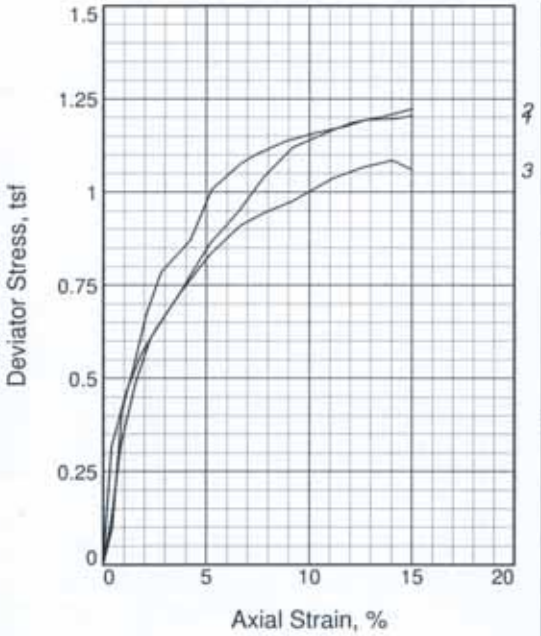
Braun Project B14-08798
GEOTECHNICAL EVALUATION
Minneapolis Upper Harbor Terminal
3750 Washington Avenue North
Minneapolis, Minnesota

ATTERBERG LIMITS RESULTS

BRAUN INTERTEC

ATTERBERG LIMITS N:\GINT\PROJECTS\X-GEOLAB\1-GINT FILES\AX PROJECTS GEO LAB\B14-08798.GPJ BRAUN_V8_CURRENT.GDT 1/2/15 10:32





Sample No.		1	2	3
Initial	Water Content, %	35.6	32.0	33.3
	Dry Density, pcf	86.6	90.4	89.2
	Saturation, %	99.7	98.0	99.0
	Void Ratio	0.9830	0.8993	0.9242
	Diameter, in.	1.425	1.417	1.422
	Height, in.	2.793	2.803	2.792
At Test	Water Content, %	35.6	32.0	33.3
	Dry Density, pcf	86.6	90.4	89.2
	Saturation, %	99.7	98.0	99.0
	Void Ratio	0.9830	0.8993	0.9242
	Diameter, in.	1.425	1.417	1.422
	Height, in.	2.793	2.803	2.792
Strain rate, %/min.		1.00	1.00	1.00
Back Pressure, tsf		0.00	0.00	0.00
Cell Pressure, tsf		1.50	3.00	6.00
Fail. Stress, tsf		1.20	1.22	1.08
Ult. Stress, tsf		1.20	1.22	1.06
σ_1 Failure, tsf		2.70	4.22	7.08
σ_3 Failure, tsf		1.50	3.00	6.00

Type of Test:
Unconsolidated Undrained
Sample Type: Thinwall
Description: FAT CLAY, brown (CH)

Assumed Specific Gravity= 2.75
Remarks: UU Triax ASTM D 2850

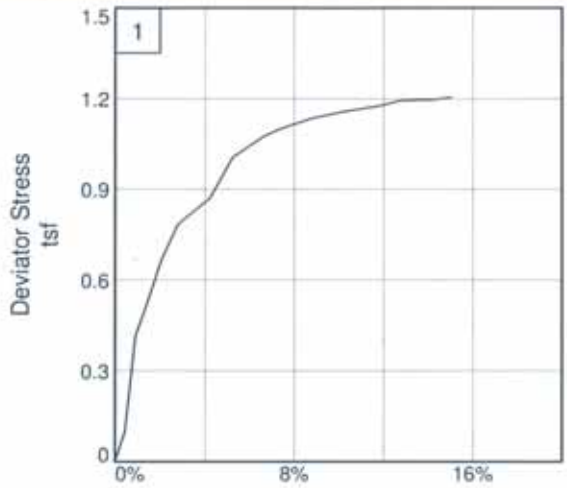
Client:

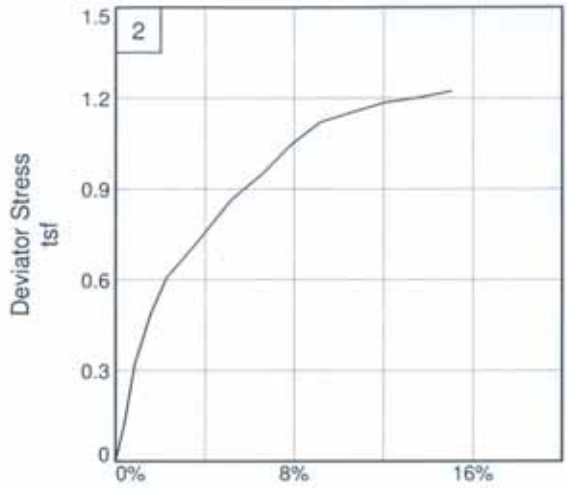
Project: Minneapolis Upper Harbor Terminal
3750 Washington Avenue North, Minneapolis, MN
Sample Number: ST-103 **Depth:** 37-39'

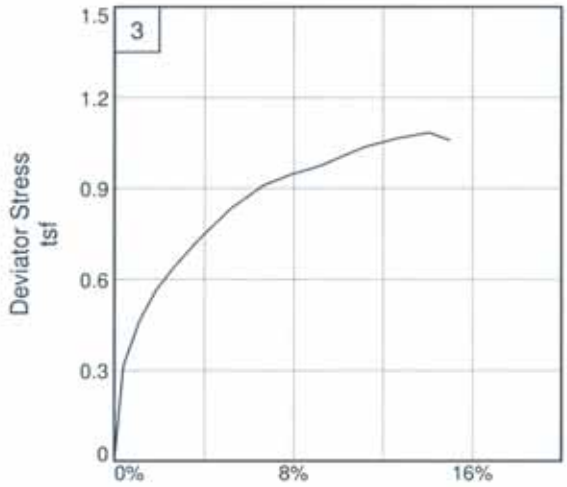
Proj. No.: B14-08798 **Date Sampled:**

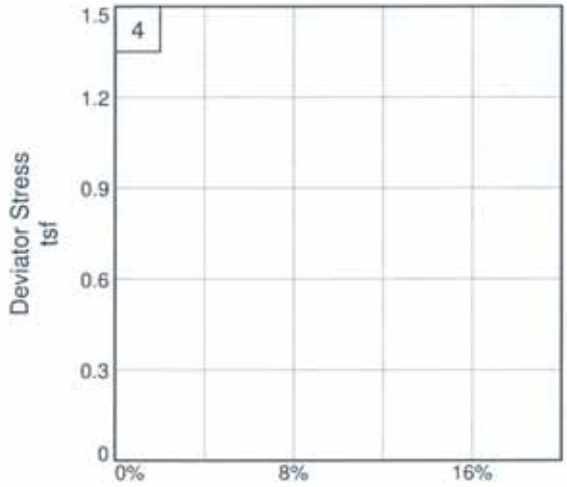
BRAUN™
INTERTEC

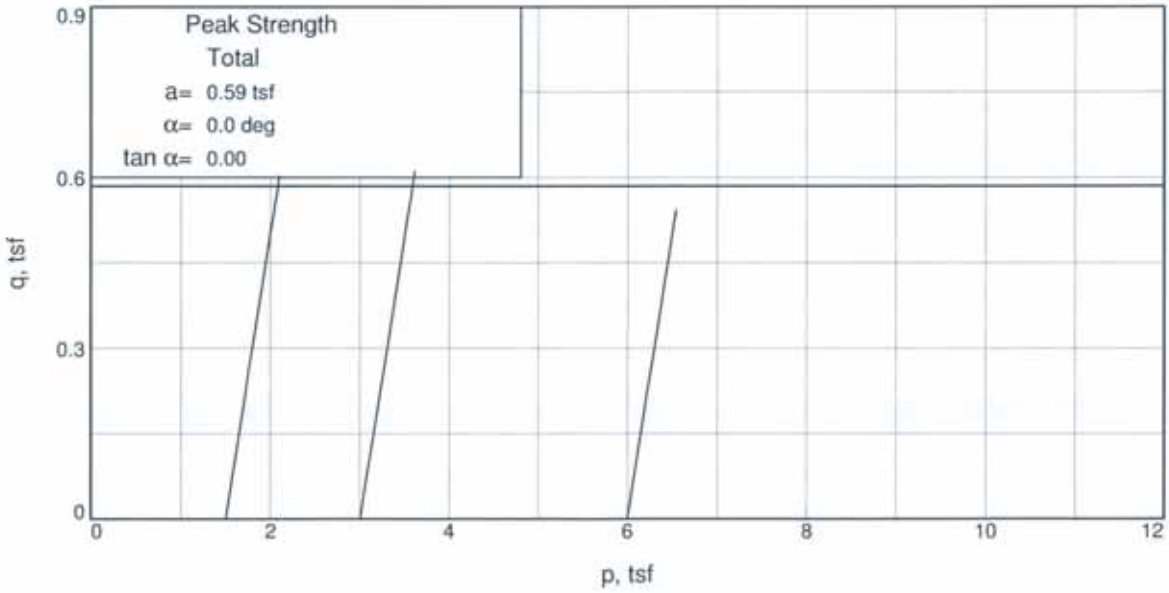
Figure 3











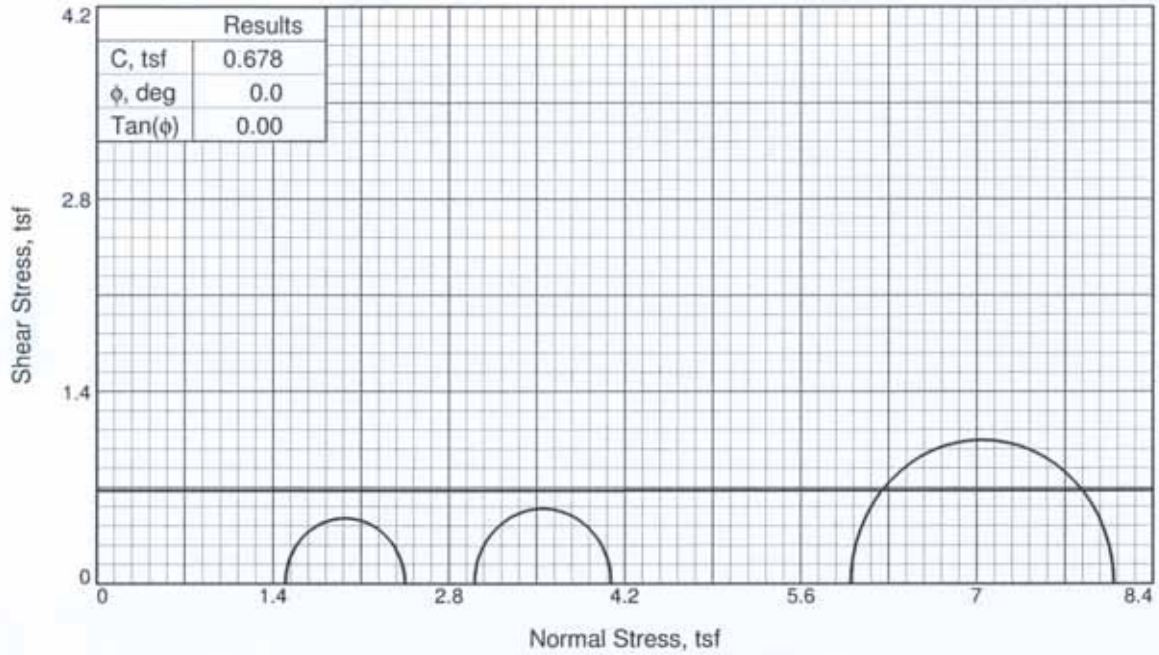
Client:

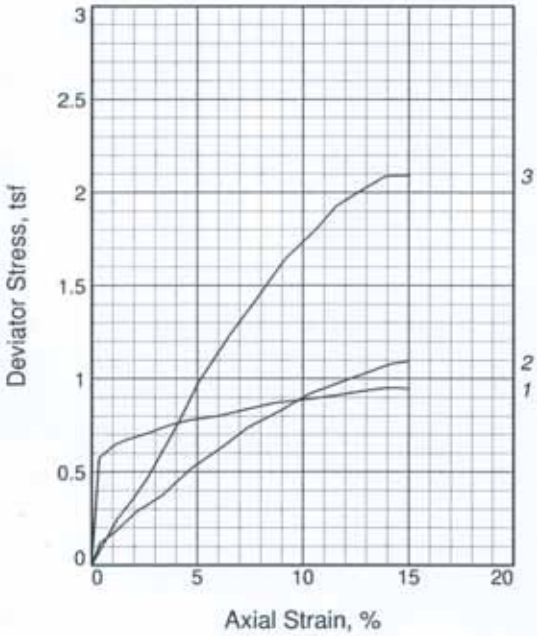
Project: Minneapolis Upper Harbor Terminal

Depth: 37-39' **Sample Number:** ST-103

Project No.: B14-08798 **Figure** 4

Braun Intertec





Sample No.		1	2	3
Initial	Water Content, %	27.8	30.3	27.8
	Dry Density, pcf	97.7	94.0	97.9
	Saturation, %	99.7	99.7	100.0
	Void Ratio	0.7757	0.8457	0.7729
	Diameter, in.	1.396	1.409	1.415
	Height, in.	2.818	2.780	2.803
At Test	Water Content, %	27.8	30.3	27.8
	Dry Density, pcf	97.7	94.0	97.9
	Saturation, %	99.7	99.7	100.0
	Void Ratio	0.7757	0.8457	0.7729
	Diameter, in.	1.396	1.409	1.415
	Height, in.	2.818	2.780	2.803
Strain rate, %/min.		1.00	1.00	1.00
Back Pressure, tsf		0.00	0.00	0.00
Cell Pressure, tsf		1.50	3.00	6.00
Fail. Stress, tsf		0.95	1.09	2.09
Ult. Stress, tsf		0.95	1.09	2.09
σ_1 Failure, tsf		2.45	4.09	8.09
σ_3 Failure, tsf		1.50	3.00	6.00

Type of Test:
Unconsolidated Undrained
Sample Type: Thinwall
Description: LEAN CLAY, brown (CL)

Assumed Specific Gravity= 2.78
Remarks: UU Triax ASTM D 2850

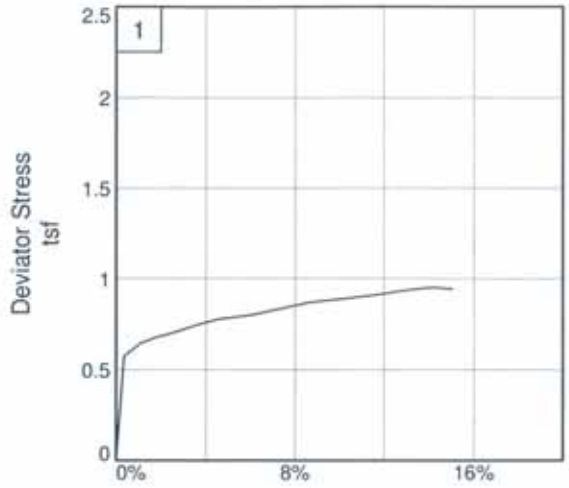
Client:

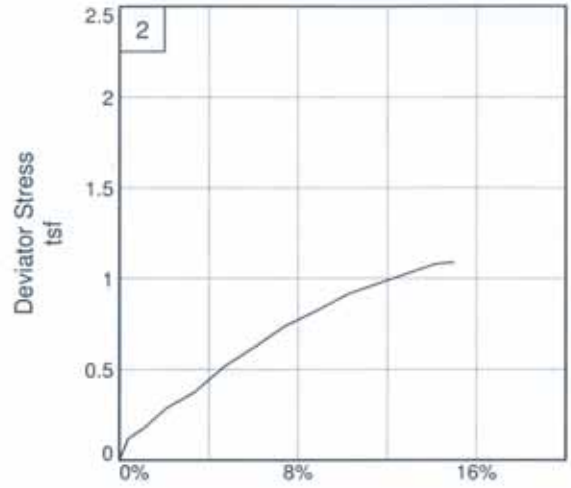
Project: Minneapolis Upper Harbor Terminal
3750 Washington Avenue North, Minneapolis, MN
Sample Number: ST-102 **Depth:** 42-44'

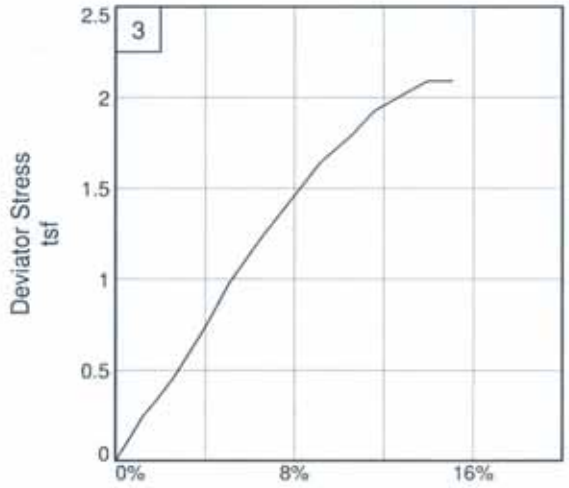
Proj. No.: B14-08798 **Date Sampled:**

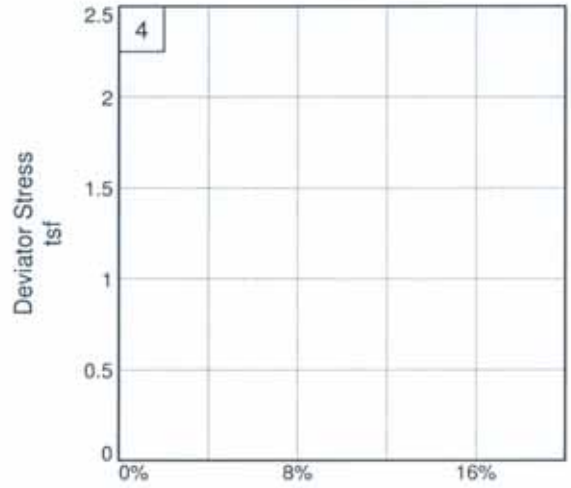
BRAUN™
INTERTEC

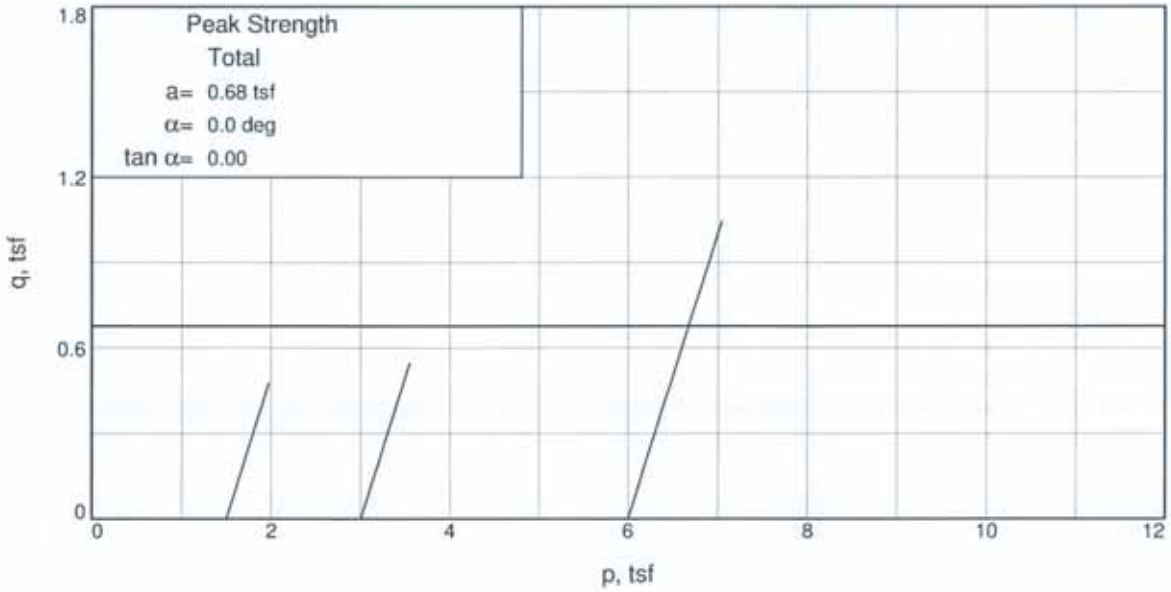
Figure 1











Client:

Project: Minneapolis Upper Harbor Terminal

Depth: 42-44' **Sample Number:** ST-102

Project No.: B14-08798 **Figure** 2

Braun Intertec

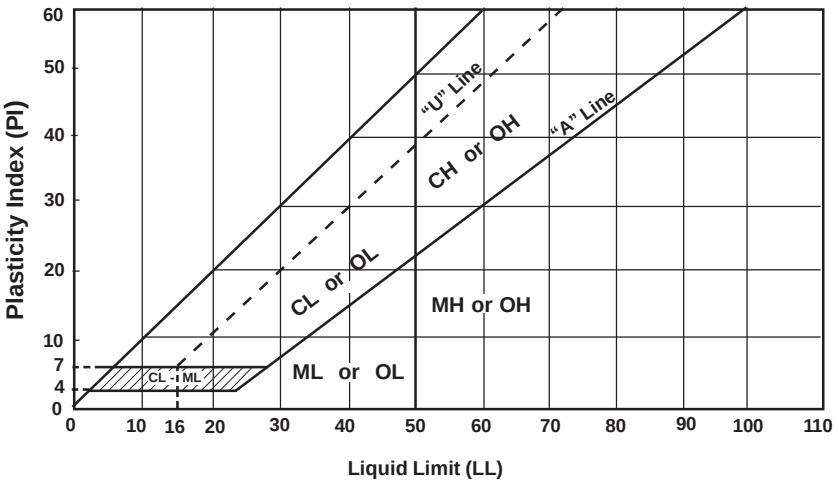
BRAUN INTERTEC

Descriptive Terminology of Soil

Standard D 2487 - 00
Classification of Soils for Engineering Purposes (Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [a]				Soils Classification	
				Group Symbol	Group Name [b]
Coarse-grained Soils more than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels 5% or less fines [e]	$C_u \geq 4$ and $1 \leq C_c \leq 3$ [c]	GW	Well-graded gravel [d]
			$C_u < 4$ and/or $1 > C_c > 3$ [c]	GP	Poorly graded gravel [d]
		Gravels with Fines More than 12% fines [e]	Fines classify as ML or MH	GM	Silty gravel [d f g]
			Fines classify as CL or CH	GC	Clayey gravel [d f g]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands 5% or less fines [i]	$C_u \geq 6$ and $1 \leq C_c \leq 3$ [c]	SW	Well-graded sand [h]
			$C_u < 6$ and/or $1 > C_c > 3$ [c]	SP	Poorly graded sand [h]
		Sands with Fines More than 12% [i]	Fines classify as ML or MH	SM	Silty sand [f g h]
			Fines classify as CL or CH	SC	Clayey sand [f g h]
Fine-grained Soils 50% or more passed the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line [j]	CL	Lean clay [k l m]
			PI < 4 or plots below "A" line [j]	ML	Silt [k l m]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay [k l m n]
				OL	Organic silt [k l m o]
	Silts and clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay [k l m]
			PI plots below "A" line	MH	Elastic silt [k l m]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay [k l m p]
				OH	Organic silt [k l m q]
Highly Organic Soils		Primarily organic matter, dark in color and organic odor		PT	Peat

a. Based on the material passing the 3-in (75mm) sieve.
b. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.
c. $C_u = D_{60} / D_{10}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
d. If soil contains ≥15% sand, add "with sand" to group name.
e. Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
f. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
g. If fines are organic, add "with organic fines" to group name.
h. If soil contains ≥ 15% gravel, add "with gravel" to group name.
i. Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
j. If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
k. If soil contains 10 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
l. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
m. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
n. PI ≥ 4 and plots on or above "A" line.
o. PI < 4 or plots below "A" line.
p. PI plots on or above "A" line.
q. PI plots below "A" line.



Laboratory Tests

DD	Dry density, pcf	**OC**	Organic content, %
WD	Wet density, pcf	**S**	Percent of saturation, %
MC	Natural moisture content, %	**SG**	Specific gravity
LL	Liqiuid limit, %	**C**	Cohesion, psf
PL	Plastic limit, %	∅	Angle of internal friction
PI	Plasticity index, %	**qu**	Unconfined compressive strength, psf
P200	% passing 200 sieve	**qp**	Pocket penetrometer strength, tsf

Particle Size Identification

Boulders ..... over 12"
Cobbles ..... 3" to 12"
Gravel
Coarse ..... 3/4" to 3"
Fine ..... No. 4 to 3/4"
Sand
Coarse ..... No. 4 to No. 10
Medium ..... No. 10 to No. 40
Fine ..... No. 40 to No. 200
Silt ..... < No. 200, PI < 4 or below "A" line
Clay ..... < No. 200, PI ≥ 4 and on or above "A" line

Relative Density of Cohesionless Soils

Very loose ..... 0 to 4 BPF
Loose ..... 5 to 10 BPF
Medium dense ..... 11 to 30 BPF
Dense ..... 31 to 50 BPF
Very dense ..... over 50 BPF

Consistency of Cohesive Soils

Very soft ..... 0 to 1 BPF
Soft ..... 2 to 3 BPF
Rather soft ..... 4 to 5 BPF
Medium ..... 6 to 8 BPF
Rather stiff ..... 9 to 12 BPF
Stiff ..... 13 to 16 BPF
Very stiff ..... 17 to 30 BPF
Hard ..... over 30 BPF

Drilling Notes

Standard penetration test borings were advanced by 3 1/4" or 6 1/4" ID hollow-stem augers unless noted otherwise, Jetting water was used to clean out auger prior to sampling only where indicated on logs. Standard penetration test borings are designated by the prefix "ST" (Split Tube). All samples were taken with the standard 2" OD split-tube sampler, except where noted.

Power auger borings were advanced by 4" or 6" diameter continuous-flight, solid-stem augers. Soil classifications and strata depths were inferred from disturbed samples augered to the surface and are, therefore, somewhat approximate. Power auger borings are designated by the prefix "B."

Hand auger borings were advanced manually with a 1 1/2" or 3 1/4" diameter auger and were limited to the depth from which the auger could be manually withdrawn. Hand auger borings are indicated by the prefix "H."

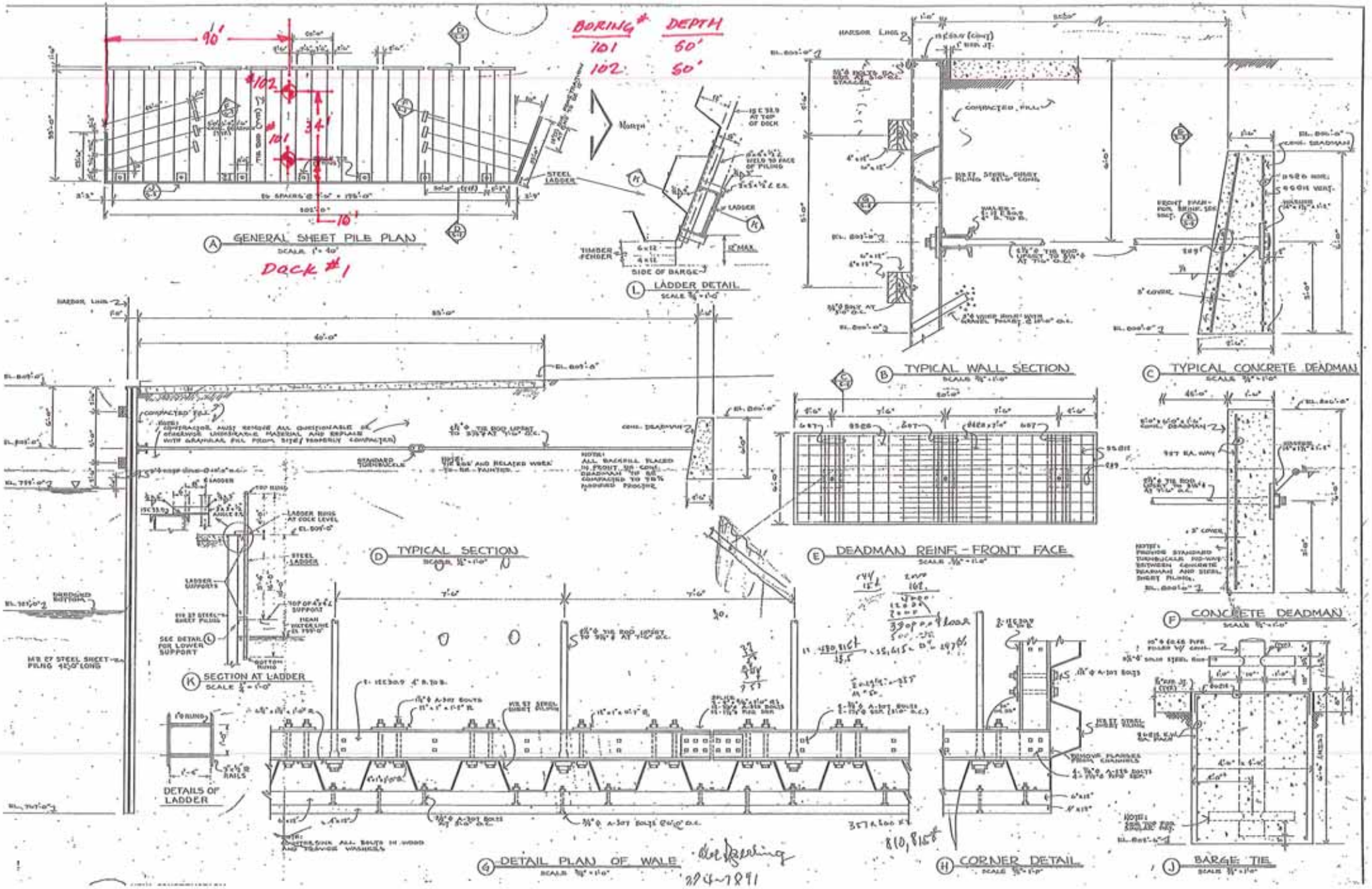
BPF: Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments and added to get BPF. Where they differed significantly, they are reported in the following form: 2/12 for the second and third 6" increments, respectively.

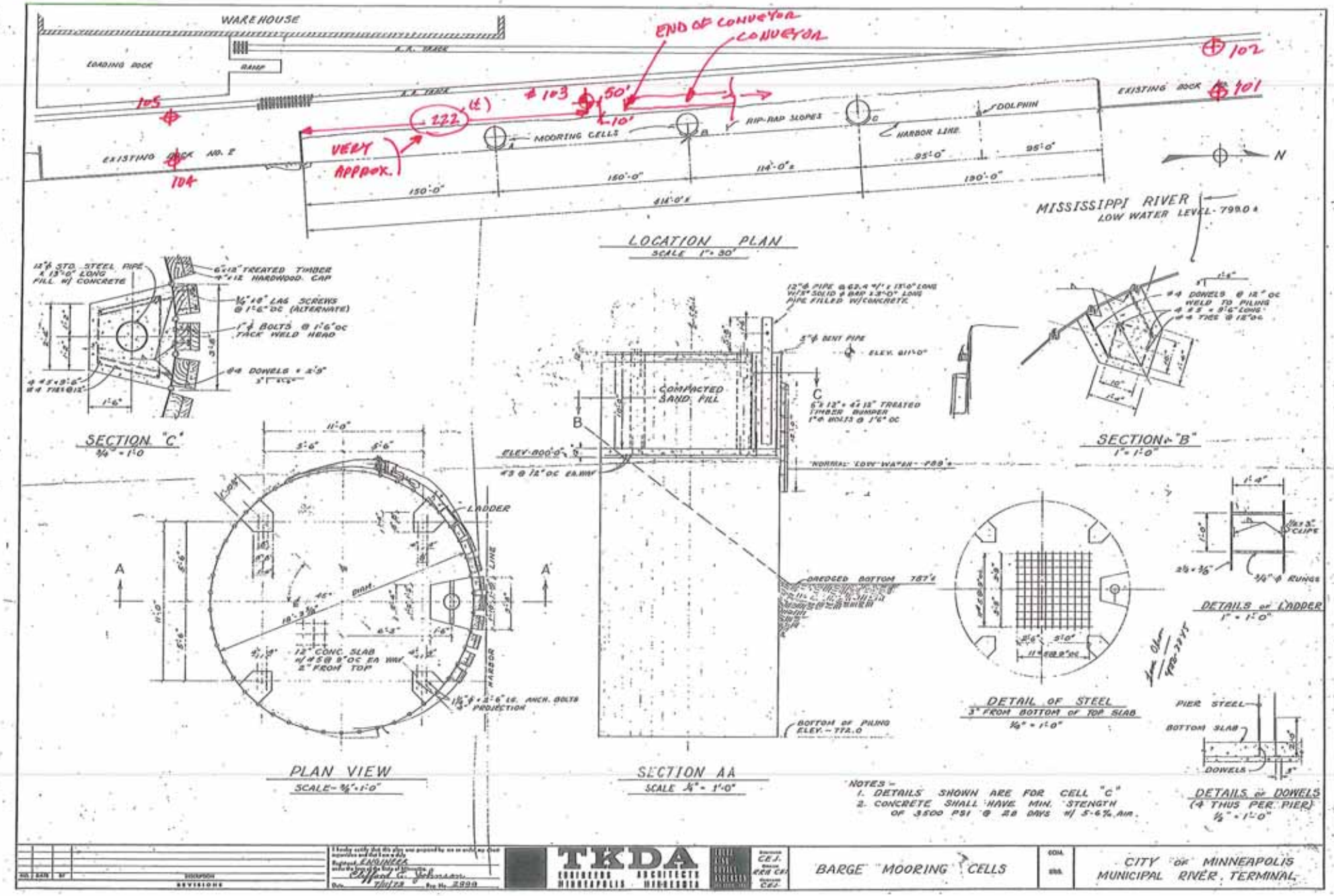
WH: WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WR: WR indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

TW indicates thin-walled (undisturbed) tube sample.

Note: All tests were run in general accordance with applicable ASTM standards.


BORING # DEPTH
101 50'
102 50'
90'
34'
10'
#102
#101
NORTH
STEEL LADDER
A GENERAL SHEET PILE PLAN
SCALE 1" = 40'
DOCK #1
L LADDER DETAIL
SCALE
TIMBER FENDER
SIDE OF BARGE
HARBOR LINE
COMPACTED FILL
B TYPICAL WALL SECTION
SCALE
C TYPICAL CONCRETE DEADMAN
SCALE
D TYPICAL SECTION
SCALE
E DEADMAN REINF. - FRONT FACE
SCALE
F CONCRETE DEADMAN
SCALE
K SECTION AT LADDER
SCALE
DETAILS OF LADDER
G DETAIL PLAN OF WALE
SCALE
H CORNER DETAIL
SCALE
J BARGE TIE
SCALE



NOTES -
1. DETAILS SHOWN ARE FOR CELL "C"
2. CONCRETE SHALL HAVE MIN. STENGTH OF 3500 PSI @ 28 DAYS W/ 5-6% AIR.

NO.	DATE	BY	DESCRIPTION
			REVISIONS

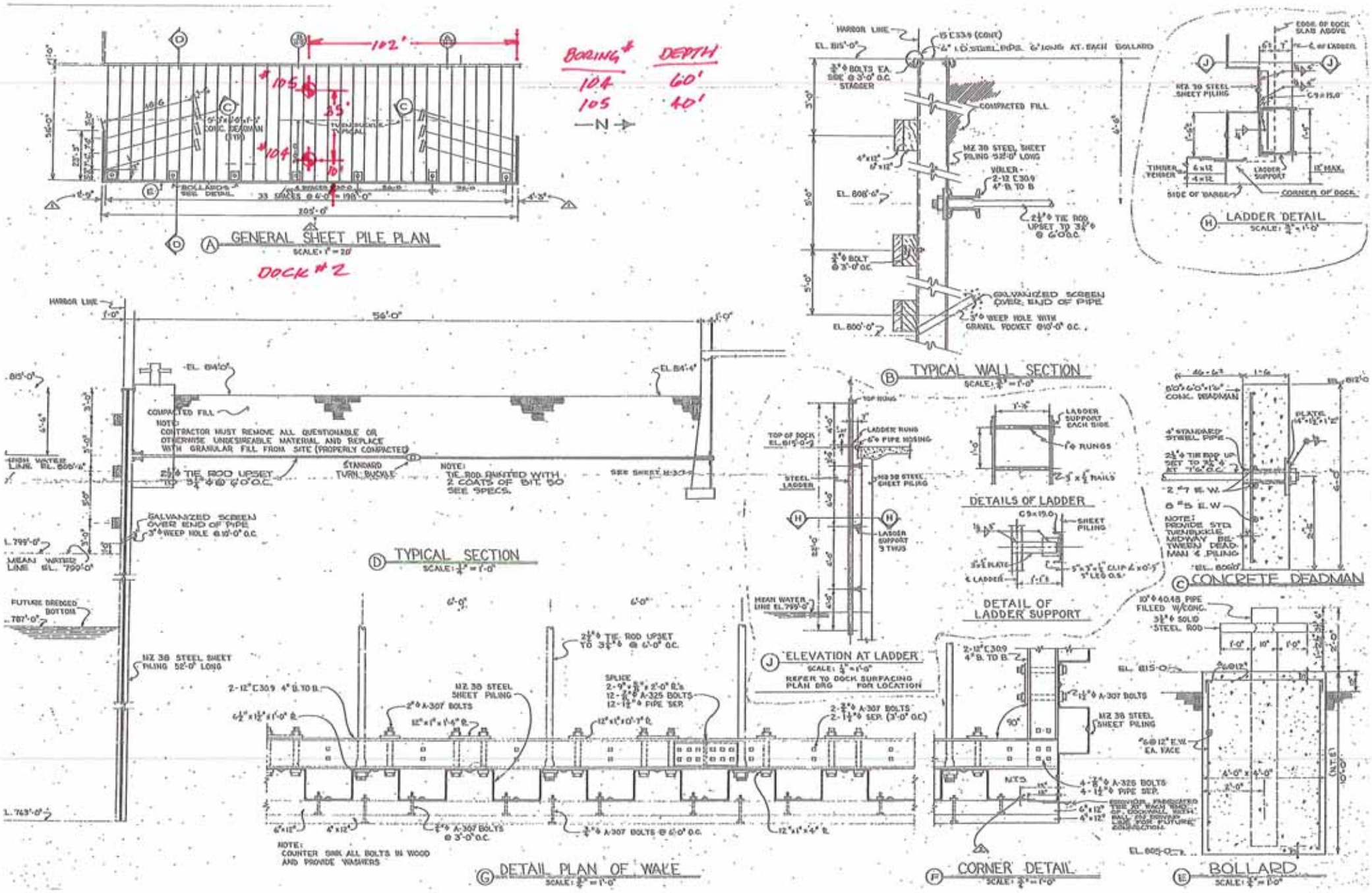
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered ENGINEER under the laws of the State of Minnesota.
Clifford C. Johnson
Date 7/6/78 Reg. No. 2999

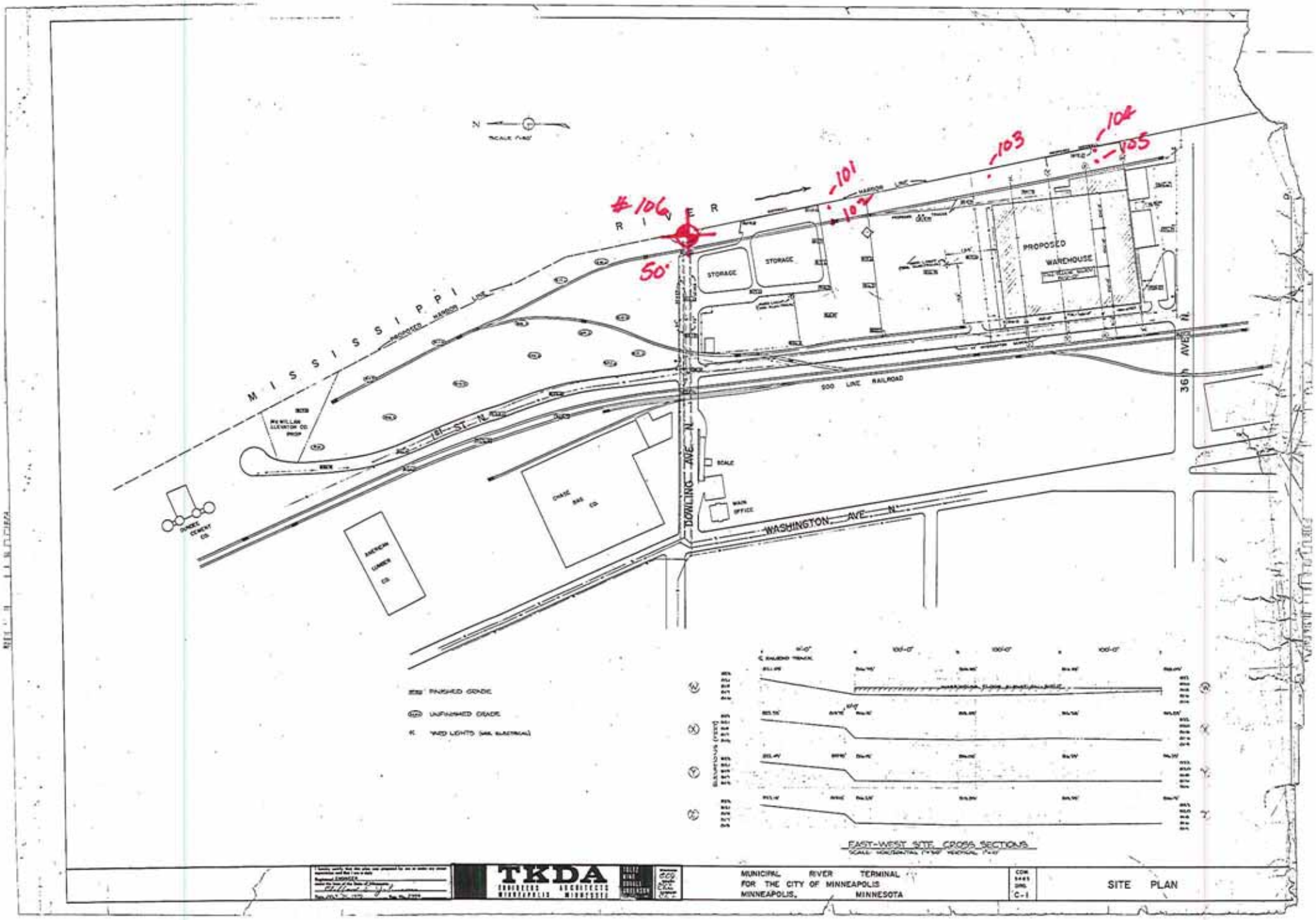
TKDA
ENGINEERS ARCHITECTS
MINNEAPOLIS MINNESOTA

Designed CEJ.
Drawn KEB CEJ
Reviewed CEJ.

BARGE "MOORING" CELLS

CITY OF MINNEAPOLIS
MUNICIPAL RIVER TERMINAL


GENERAL SHEET PILE PLAN
SCALE: 1" = 20'
DOCK #2
BORING # DEPTH
104 60'
105 40'
N
102'
33 SPACES @ 6'-0" = 198'-0"
205'-0"
BOLLARDS SEE DETAIL
TYPICAL WALL SECTION
SCALE: 1/4" = 1'-0"
HARBOR LINE
EL. 815'-0"
COMPACTED FILL
MZ 38 STEEL SHEET PILING 52'-0" LONG
2-12" C30.9 4" B. TO B.
EL. 808'-0"
2 1/4" ϕ TIE ROD UPSET TO 3 1/4" ϕ @ 6'-0" O.C.
GALVANIZED SCREEN OVER END OF PIPE
3" ϕ WEEP HOLE WITH GRAVEL POCKET @10'-0" O.C.
EL. 800'-0"
LADDER DETAIL
SCALE: 3/4" = 1'-0"
EDGE OF DOCK SLAB ABOVE
TIMBER FENDER
LADDER SUPPORT
12" MAX.
SIDE OF BARGE
CORNER OF DOCK
TYPICAL SECTION
SCALE: 1/4" = 1'-0"
56'-0"
EL. 814'-0"
EL. 814'-4"
COMPACTED FILL
NOTE: CONTRACTOR MUST REMOVE ALL QUESTIONABLE OR OTHERWISE UNDESIREABLE MATERIAL AND REPLACE WITH GRANULAR FILL FROM SITE (PROPERLY COMPACTED)
2 1/4" ϕ TIE ROD UPSET TO 3 1/4" ϕ @ 6'-0" O.C.
STANDARD TURN BUCKLE
NOTE: TIE ROD PAINTED WITH 2 COATS OF BIT. SO SEE SPECS.
SEE SHEET H-3
HIGH WATER LINE EL. 806'-4"
GALVANIZED SCREEN OVER END OF PIPE
3" ϕ WEEP HOLE @ 10'-0" O.C.
EL. 799'-0"
MEAN WATER LINE EL. 799'-0"
FUTURE DREDGED BOTTOM
787'-0"
MZ 38 STEEL SHEET PILING 52'-0" LONG
EL. 763'-0"
ELEVATION AT LADDER
SCALE: 1/4" = 1'-0"
REFER TO DOCK SURFACING PLAN DRG FOR LOCATION
TOP OF DOCK EL. 815'-0"
LADDER RUNG
6" ϕ PIPE HOSING
STEEL LADDER
MZ 38 STEEL SHEET PILING
LADDER SUPPORT 3 THUS
MEAN WATER LINE EL. 799'-0"
DETAILS OF LADDER
LADDER SUPPORT EACH SIDE
1" ϕ RUNGS
2 x 1/2" NAILS
DETAIL OF LADDER SUPPORT
SHEET PILING
CONCRETE DEADMAN
SCALE: 1/4" = 1'-0"
8'0" x 6'0" x 1'6" CONC. DEADMAN
4" STANDARD STEEL PIPE
2 1/4" ϕ TIE ROD UPSET TO 3 1/4" ϕ AT 7'-6" O.C.
2 #7 E.W.
8 #5 E.W.
NOTE: PROVIDE STD. TURNBUCKLE MIDWAY BETWEEN DEADMAN & PILING
EL. 806'0"
DETAIL PLAN OF WALE
SCALE: 1/4" = 1'-0"
2 1/4" ϕ TIE ROD UPSET TO 3 1/4" ϕ @ 6'-0" O.C.
MZ 38 STEEL SHEET PILING
2-12" C30.9 4" B. TO B.
2" ϕ A-307 BOLTS
SPLICE 2-9" x 3/8" x 2'-0" B.'s 12-3/4" ϕ A-325 BOLTS 12-1 1/2" ϕ PIPE SEP.
2-3/4" ϕ A-307 BOLTS 2-1 1/2" ϕ SEP. (3'-0" O.C.)
3/4" ϕ A-307 BOLTS @ 3'-0" O.C.
3/4" ϕ A-307 BOLTS @ 6'-0" O.C.
NOTE: COUNTER SINK ALL BOLTS IN WOOD AND PROVIDE WASHERS
CORNER DETAIL
SCALE: 1/4" = 1'-0"
2-12" C30.9 4" B. TO B.
1 1/2" ϕ A-307 BOLTS
MZ 38 STEEL SHEET PILING
4-3/4" ϕ A-325 BOLTS 4-1 1/2" ϕ PIPE SEP.
BOLLARD
SCALE: 1/4" = 1'-0"
10" ϕ 40.48 PIPE FILLED W/CONC.
3 1/2" ϕ SOLID STEEL ROD
EL. 815'-0"
#6 @ 12" E.W. EA. FACE
EL. 805'-0"


N
SCALE 1"=40'
MISSISSIPPI
RIVER
#106
50'
101
102
103
104
105
STORAGE
STORAGE
PROPOSED
WAREHOUSE
DOWLING AVE. N.
36th AVE. N.
WASHINGTON AVE. N.
SOO LINE RAILROAD
SCALE
MAIN OFFICE
CHASE BAG CO.
AMERICAN CEMENT CO.
DUNDEE CEMENT CO.
McMILLAN ELEVATOR CO. PROP.
FINISHED GRADE
UNFINISHED GRADE
YARD LIGHTS (MIN. ELECTRICAL)
EAST-WEST SITE CROSS SECTIONS
TKDA
ENGINEERS ARCHITECTS
MINNEAPOLIS MINNESOTA
MUNICIPAL RIVER TERMINAL
FOR THE CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA
C-1
SITE PLAN

Appendix C

Environmental Review

Environmental Review

SEH completed a limited Environmental Assessment for the City of Minneapolis to help inform the feasibility of preserving and /or reusing existing buildings and structures at the Upper Harbor Terminal (UHT). The location of the project area is presented on Exhibit No. 1.

Summary of Previous Environmental Assessments

To evaluate potential environmental costs associated with potential re-use options of the UHT site, SEH completed a file review of previous reports provided for the parcel, provided by the City.

ENVIRONMENTAL ASSESSMENT/EVALUATION, UPPER HARBOR RIVER TERMINAL FACILITY, MINNEAPOLIS, MN, STS, APRIL 27, 1993 (THE APRIL STS REPORT).

STS completed an environmental assessment/evaluation of the Upper Harbor River Terminal Facility. The purpose of this report was to identify current on-site conditions and potential environmental concerns for the site. STS made the following observations:

Two four million gallon aboveground storage tanks (ASTs) containing asphalt cement oil and one 70,000 gallon AST with varying contents were present as part of Barton Enterprises Asphalt terminal. Fuel oil #2 was primarily stored in the 80,000 gallon AST, with waste oil rarely stored in the tank. All of the tanks were surrounded by dikes to contain spills.

The site has a history of railroad freight including machinery and palletized anti-freeze. An operating petroleum storage/transfer facility in good condition was also noted on-site. Materials commonly used on-site included salt, coal, grain, fertilizer, and steel coils.

The April STS report concluded potential groundwater petroleum contamination on the property from Camden Truck Station #90930. The adjacent site was an open leak site (#4477) at the time of the report. Electrical transformers and switches on-site were identified as possibly containing PCBs. The devices appeared in good condition.

ENVIRONMENTAL ASSESSMENT, ANDERSON BROTHERS CONSTRUCTION OF BRAINERD SITE AT UPPER HARBOR RIVER TERMINAL, MINNEAPOLIS, MN, STS, MAY 19,1993 (THE MAY STS REPORT).

STS completed an environmental assessment with soil exploration and analytical sampling on the southern end of the Upper Harbor River Terminal in the parcel occupied by Anderson Brothers Construction of Brainerd. At the time, Intex Crushers operated out of the southernmost portion of the parcel.

Site reconnaissance identified two three million gallon asphalt cement ASTs and a network of pipes used to transfer material from barges to tanks located on the property. The tanks were coated in foam material that was in poor condition. Stained soil was discovered near the piping. Smaller areas of staining were noted near motor vehicles and equipment used on-site. The contamination appears to be confined to the upper 1 inch of soil in stained areas on-site. The owner of the tenant occupying the site at the time, Mr. Mattson, discussed multiple small spills of asphalt cement from the piping with the STS Representative on-site. One additional 500 gallon diesel fuel AST was noted near the Intex building.

Six soil borings were completed to a depth of 14-18 feet below ground surface (bgs). Nine soil samples were collected from the borings and submitted to Interpoll Laboratories for analysis of Polycyclic Aromatic Hydrocarbons (PAHs). One soil sample returned with PAHs above lab detection limits. The contaminated soil was located 4.5-5.5’ bgs and was not present at 7’ bgs in the same soil boring. The contamination was not further delineated.

ABOVEGROUND STORAGE TANK CLOSURE SAMPLING, 3750 WASHINGTON AVENUE NORTH, MINNEAPOLIS, MN, PINNACLE ENGINEERING, JUNE 10, 2013 (THE PE REPORT).

Two 4 million gallon ASTs containing asphalt materials were removed from the site by site occupant Organic Technologies, Inc. (OTI). Aboveground piping and other components within the containment area were also disposed of by OTI. An underground pipe system remains in place.

PE conducted two soil borings per tank site to depths of six to eight feet bgs. One analytical sample was submitted to Environmental Science Corp. (ESC) per soil boring and analyzed for Diesel Range Organics (DRO), Polycyclic Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), and Volatile Organic Compounds (VOCs).

DRO was detected in levels below regulatory standards in SB-1-2.5-5 and above the Minnesota Pollution Control Agency's Reuse of Unregulated Fill guideline (100 milligrams per kilogram) in SB-4-0-2.5 at 340 mg/kg. Low levels of TPH were detected in SB-1-2.5-5, SB-2-4-5, and SB-4-0-2.5. 1,2,4-Trimethylbenzene, 1,2,3-Trimethylbenzene, and 1,3,5-Trimethylbenzene were detected below regulatory limits in SB-4-0-2.5.

PE recommended OTI notify the MPCA of a petroleum release to the environment. After notification, the MPCA responded concluding that this release was a non-tank release and therefore does not require investigation.

Recommendations

The purpose of this file review is to identify potential environmental concerns and identify potential future environmental remediation actions.

The previous environmental assessments were performed by STS over 20 years ago. Based on the age of the reports and the multiple past/current tenants, SEH recommends the completion of a Phase I Environmental Site Assessment (ESA) to identify any potential Recognized Environmental Conditions (RECs) on-site. A Phase II ESA may be required if the Phase I identifies any RECs on the site.

Based on PE's verification soil sampling after the decommissioning of the two ASTs and associated piping without accord for regulatory standards, SEH recommends UHT complete a Limited Site Investigation (LSI). The LSI would determine the presence of contaminated soil impacted by materials previously contained in the ASTs. The LSI would include soil sampling in the area of the former ASTs and piping in accordance with the table below from MPCA guidance document 4-17.

Table C-1 – MPCA AST Verification Sampling

Tank Size and Type	Number of Samples	Sample Location
Vertical tank less than or equal to 12' diameter	1 sample	2 feet below the tank
Vertical tank greater than12' diameter	Divide tank diameter by 12' and round up to nearest whole number	2 feet below the tank
Horizontal tank 10,000 gallons or less	1 sample	2 feet below the center of tank
Horizontal tank greater than 10,000 gallons	2 samples	2 feet below each end of the tank
Transfer Area(s)	1 sample in each area if there is more than one transfer area	2 feet below the loading rock
Piping or Areas of Visible Contamination	Take soil headspace samples 2 feet under the following areas: pipe fittings, joints, and any other area where contamination is present or	

Tank Size and Type	Number of Samples	Sample Location
	likely to be present. Submit soil samples with a headspace reading greater than zero for laboratory analyses.	
Soil Analytical Requirements		
For samples collected from areas with visible or known contamination:	Refer to Guidance Document 4-04 *Soil Sample Collection and Analysis Procedures* for the required analyses.	
For verification samples collected from areas with no visible contamination:	Perform the following analyses based on tank content and/or sample location: • Gasoline tank samples must be analyzed for GRO (Gasoline Range Organics) and BTEX (benzene, toluene, ethyl benzene and xylenes). • Other petroleum tank samples must be analyzed for DRO • Transfer area samples must be analyzed for GRO, DRO and BTEX unless gasoline was never stored at the facility, then only DRO is required.	

Hazardous Materials Assessment

A limited Hazardous Waste Assessment was conducted on January 8, 2014 by SEH. In keeping with the scope of a limited Hazardous Materials Assessment, no soil or groundwater testing was conducted, nor were building materials tested for the presence of lead or asbestos. Structures and areas of the property were given a risk level of perceived environmental concerns based on current use and observed environmental conditions. This ranking does not refer to the site's ability to be remediated/reused, etc. nor the cost associated with such. Not all buildings or areas of the property were accessible due to locked entry or health and safety concerns.

Air testing of the structures and areas of the site was completed with a10.6 eV bulb MiniRAE Photoionization detector calibrated on-site at the beginning of the day. Ambient air was monitored using a GasAlert Quattro 4-gas confined space meter and determined to be in compliance with regulatory limits. The presence of ammonia was tested in the storage domes using ammonia Dräger colorimetric tubes. Air levels of ammonia were below regulatory limits. There appears to be no air quality issue that would impact reuse.

The limited Hazardous Waste Assessment identified a number of structures with a 'HIGH' level of environmental concern. The storage domes (HE-MPC-9263, HE-MPC-9264, HE-MPC-9265, HE-MPC-9266) and load-out shelters (HE-MPC-9267, HE-MPC-9268) are being used for the storage of urea agricultural fertilizer with no barriers to prevent chemical tracking from storage dome to load-out shelter.

Additional structures with a 'HIGH' level of concern include the warehouse (HE-MPC-9254), the control shed adjacent to the grain elevator (HE-MPC-9259), and boiler shed (HE-MPC-9272). In these structures petroleum products were stored in a variety of sized and typed containers with existing petroleum spills noted during the limited Hazardous Waste Assessment. Additionally, these structures were observed as containing specialty waste items such as large appliances, light fixtures with ballasts and lamps, electrical panels, and/or hydraulic systems.

A variety of material stockpiles were observed on the UHT parcel. Uncovered and unlined stockpiles of coal refuse, reclaimed bituminous asphalt, shredded tires, and intact tires suggest that the ground surface of the site may be impacted by industrial activities. Additional stockpiles of brush and construction materials (such as sand and gravel) of an unknown origin were viewed on-site.

Structures that contain moderate environmental concerns or structures that were not able to be accessed were given a ‘MEDIUM’ risk assessment. Structures given a MEDIUM risk assessment level include the control building (HE-MPC-9261), truck dump/hoist (HE-MPC-9260), load-out tower (HE-MPC-9256), office building (HE-MPC-9244), scale house (HE-MPC-9245), and truck scales (HE-MPC-9246, HE-MPC-9248). These structures were observed as containing specialty waste items such as light fixtures with ballasts and lamps, electrical panels, and/or hydraulic systems.

Structures that pose a ‘LOW’ environmental risk assessment include many of the structures associated with the river wall (HE-MPC-9249, HE-MPC-9250, HE-MPC-9251, HE-MPC-9252). These structures contained no visible hazardous waste concerns. Other structures that had limited environmental concerns include conveyor systems (HE-MPC-9257), dust tanks (HE-MPC-9262), truck/ rail dump (HE-MPC-9269), scale house (HE-MPC-9247), shipping/ receiving building (HE-MPC-9255). The rail scale shed (HE-MPC-9278) was not observed and may have been removed prior to the assessment.

Conclusions

Based on the age and the incomplete geographic coverage of previous reports, SEH recommends the completion of a Phase I Environmental Site Assessment to identify possible historic and existing sources of contamination. Additionally, SEH recommends an LSI to determine if soil contamination exists in the location of the former ASTs on-site. Further, a complete hazardous material assessment and asbestos survey would provide insight into the subject property’s reusability of existing structures.

Appendix D

Comparison Matrices

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Upper Harbor Terminal Engineering Input

City of Minneapolis Department of Community Planning & Economic Development

SEH I.D.	I.D.	Description	Hess-Roise Location	SEH Parcel	Date Built	Roof Condition	Struct. Condition	Structural/Geotechnical Issues	Environmental Issues
DOMES									
63	HE-MPC-9263	Small dome (1800 ton capacity)	F	1	1982	Poor	Good	Canvas and insulation in very poor condition.	
64	HE-MPC-9264	Dome (12,000 ton capacity)	E	2	1987	Poor	Good	Canvas and insulation in very poor condition.	
65	HE-MPC-9265	Dome (8,000 ton capacity)	E	2	1984	Poor	Good	Canvas and insulation in very poor condition.	
66	HE-MPC-9266	Dome (16,000 ton capacity)	E	2	1984	Poor	Good	Canvas and insulation in poor condition.	
67	HE-MPC-9267	Loadout Shelter (adj. to 9264)	E	2	1987	Fair	Fair	Sheathing in poor condition. Difficult to winterize.	
68	HE-MPC-9268	Loadout Shelter (adj. to 9265/9266)	E	2	1984	Fair	Fair	Sheathing in poor condition. Difficult to winterize.	
WAREHOUSE									
54	HE-MPC-9254	Warehouse / Loading Docks	D	2	1971	Fair	Good	Columns chipped, abraded	
55	HE-MPC-9255	Shipping/Receiving Building	D	2	ca. 1985	Fair	Good		
GRAIN ELEVATORS and CONTROL BUILDING									
59	HE-MPC-9259	4 Bins, Elevator Tower	E	2	ca. 1978	Good	Good	Minor rust at fasteners	
61	HE-MPC-9261	Control Building	E	2	ca. 1978	Poor	Poor	Holes in CMU walls.	
OFFICE									
44	HE-MPC-9244	Office Building	G	6	1968	Poor	Fair	Mold, water damage	
RIVERWALL									
49	HE-MPC-9249	North Mooring Cell	F	1	ca. 1982	n.a.	Fair	No design information. Possible corrosion. The fender systems have extensive damage or have been removed.	
50	HE-MPC-9250	North Dock (Dock #1)	E	2	1968	n.a.	Good	Design is robust. Sheet pile thickness appears slightly less than installed for PZ-27. Fender system has been removed. Fender system bolt holes need to be closed. Tie-rods should be exposed and inspected. Contamination noted in wall backfill (ST-1 and ST-2).	
51	HE-MPC-9251	Loading Area Mooring Cells (3)	E	2	1974	n.a.	Fair	Miscellaneous holes in sheeting from previous attachments: some lost infill evident. Bent sheeting (minor) from barge impacts. Cell B infill has subsided up to 2 inches. The fender systems have extensive damage or have been removed. Bridges in poor condition.	
52	HE-MPC-9252	South Dock (Dock#2)	D	2	1971	n.a.	Good	Design is robust. Sheet pile thickness is slightly less than as installed for PZ-38. Fender system has been removed. Fender system bolt holes need to be closed. Tie-rods should be exposed and inspected.	
		Retaining wall between North and South Docks			??	n.a.	Good/Fair	No design documents. Measured Sheet pile thickness is slightly less than as installed for PZ-32 Sheet Pile. Steel cap is corroded. Contamination in wall backfill (Boring ST-3).	
53	HE-MPC-9253	Petroleum Dock	A	5	1974	n.a.			
		Storm sewer outfall wall	F	1		n.a.	Poor	No design information. Sheet piling corroded. Steel cap corroded.	
		Shoreline north of docks	F	1		n.a.	Poor	Randomly placed concr. rubble riprap. Woody vegetation.	
		Shoreline between docks	E	2		n.a.	Poor	Randomly placed concr. rubble riprap. Woody vegetation.	
SCALE BUILDINGS									
45	HE-MPC-9245	Scale House	G	6	1968	Poor	Poor	Broken, boarded windows. Mold, water damage visible on south wall inside.	

Upper Harbor Terminal Engineering Input

City of Minneapolis Department of Community Planning & Economic Development

SEH I.D.	I.D.	Description	Hess-Roise Location	SEH Parcel	Date Built	Roof Condition	Struct. Condition	Structural/Geotechnical Issues	Environmental Issues
46	HE-MPC-9246	Truck Scale	G	6	1968	n.a.	Good		
47	HE-MPC-9247	Scale House	G	6	1983	Good	Good		
48	HE-MPC-9248	Truck Scale	G	6	1983	n.a.	Good	Slab has significant spalling under wheel lines.	
78	HE-MPC-9278	Rail Scale Shed	D	2	1991	Fair	Fair	Sheathing in poor condition.	
72	HE-MPC-9272	Boiler Shed	G	6	ca. 1975	Poor	Poor	Very light construction in poor shape.	
CONVEYORS									
56	HE-MPC-9256	Load-Out Tower	E	2	ca. 1975	n.a.	Good		
57	HE-MPC-9257	Conveyor	E	2	1975, 1984		Good	Some supports are damaged slightly.	
58	HE-MPC-9258	Rail Dump	E	2	ca. 1976	Fair	Fair	Sheathing in poor condition.	
60	HE-MPC-9260	Truck Dump / Hoist	E	2	ca. 1978				
62	HE-MPC-9262	4 Dust Tanks	E	2	ca. 1978	Fair			
69	HE-MPC-9269	Truck / Rail Dump	E	2	1988	Fair			
UNDERGROUND CONVEYORS								Not surveyed	
UNDERGROUND ASPHALT PIPING								Not surveyed	
RAIL								Not surveyed	
ROADWAY									
							Poor	Port of Minneapolis Drive needs to be re-aligned and re-paved--very poor condition.	
MATERIAL STOCKPILES			FECBA	1, 2, 3, 4, 5	n. a.				

Upper Harbor Terminal Engineering Input

City of Minneapolis Department of Community Planning & Economic Development

SEH I.D.	I.D.	Description	Hess-Roise Location	SEH Parcel	Potential Re-uses	Preserved	Rehabilitated	Restored	Reconstructed	Risk; work needed	Cost
DOMES											
63	HE-MPC-9263	Small dome (1800 ton capacity)	F	1	Park food vendors/rental concessions/market (farmer's, craft)					Unknown (proprietary) design structurally.	
64	HE-MPC-9264	Dome (12,000 ton capacity)	E	2	Picnic Shelter, playground, performance space, climbing wall						
65	HE-MPC-9265	Dome (8,000 ton capacity)	E	2	Manufacturing						
66	HE-MPC-9266	Dome (16,000 ton capacity)	E	2	Performance space						
67	HE-MPC-9267	Loadout Shelter (adj. to 9264)	E	2	None						
68	HE-MPC-9268	Loadout Shelter (adj. to 9265/9266)	E	2	None						
WAREHOUSE											
54	HE-MPC-9254	Warehouse / Loading Docks	D	2	Parking, manufacturing, market (farmer's, craft, flea), warehouse, aquaponics					Excess roof capacity 5 psf.	
55	HE-MPC-9255	Shipping/Receiving Building	D	2							
GRAIN ELEVATORS and CONTROL BUILDING											
59	HE-MPC-9259	4 Bins, Elevator Tower	E	2	Brewery (hops and grain storage). Zipline from elevator tower.						
61	HE-MPC-9261	Control Building	E	2	Small office, restroom					Not handicap accessible	
OFFICE											
44	HE-MPC-9244	Office Building	G	6	Office						
RIVERWALL											
49	HE-MPC-9249	North Mooring Cell	F	1	Houseboat mooring, fishing					Need to replace fenders.	
50	HE-MPC-9250	North Dock (Dock #1)	E	2	Pleasure boat dockage, Houseboat mooring, Fishing.					Need to replace fenders.	
51	HE-MPC-9251	Loading Area Mooring Cells (3)	E	2	Houseboat mooring, fishing					Need to replace fenders.	
52	HE-MPC-9252	South Dock (Dock#2)	D	2	Pleasure boat dockage, Houseboat mooring, Fishing.					Need to replace fenders.	
		Retaining wall between North and South Docks			Pleasure boat dockage, Houseboat mooring. Shoreline access (fishing, canoeing)					Need to replace fenders and clean up riprap.	
53	HE-MPC-9253	Petroleum Dock	A	5	Probably none						
		Storm sewer outfall wall	F	1	Storm sewer outfall					Need to replace steel cap	
		Shoreline north of docks	F	1	Shoreline access (fishing, canoeing)					Need to clean up riprap.	
		Shoreline between docks	E	2	Shoreline access (fishing, canoeing)					Need to clean up riprap.	
SCALE BUILDINGS											
45	HE-MPC-9245	Scale House	G	6	Park entrance building						
46	HE-MPC-9246	Truck Scale	G	6	None						
47	HE-MPC-9247	Scale House	G	6	Ticket booth						
48	HE-MPC-9248	Truck Scale	G	6	None						
78	HE-MPC-9278	Rail Scale Shed	D	2							
72	HE-MPC-9272	Boiler Shed	G	6	None						
CONVEYORS											
56	HE-MPC-9256	Load-Out Tower	E	2							
57	HE-MPC-9257	Conveyor	E	2	Slide, zipline.						
58	HE-MPC-9258	Rail Dump	E	2							
60	HE-MPC-9260	Truck Dump / Hoist	E	2							

Upper Harbor Terminal Engineering Input

City of Minneapolis Department of Community Planning & Economic Development

SEH I.D.	I.D.	Description	Hess-Roise Location	SEH Parcel	Potential Re-uses	Preserved	Rehabilitated	Restored	Reconstructed	Risk; work needed	Cost
62	HE-MPC-9262	4 Dust Tanks	E	2							
69	HE-MPC-9269	Truck / Rail Dump	E	2							
UNDERGROUND CONVEYORS											
UNDERGROUND ASPHALT PIPING											
RAIL											
ROADWAY											
MATERIAL STOCKPILES			FECBA	1, 2, 3, 4, 5							