Structural Condition Assessment
River Terminal Dock Structure
Hartsville, Tennessee

PowerCom Industrial Center

Four Lake Regional Industrial Development Authority

May 17, 2016

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May 17, 2016

Mr. Charly Lyons, Executive Director
Tennessee Central Economic Alliance
c/o Four Lake Authority
702 McMurry Blvd.
Hartsville, TN 37074

RE: Structural Condition Assessment
River Terminal Dock Structure
PowerCom Industrial Center
Hartsville, Tennessee

Dear Mr. Lyons:

Hanson Professional Services Inc. (Hanson) is pleased to submit this report regarding our structural condition assessment of the dock structure for the PowerCom Industrial Center River Terminal located adjacent to the Cumberland River near Hartsville, Tennessee. This service was performed in accordance with Hanson's Professional Service Agreement PSA C-13L0097A dated October 12, 2015.

Neither construction drawings nor a geotechnical report were made available for the existing structure. Therefore, this investigation was performed based on Hanson's visual observations and data obtained by an underwater dive investigation. Structural calculations and detailed analysis have not been performed, consistent with the aforementioned PSA.

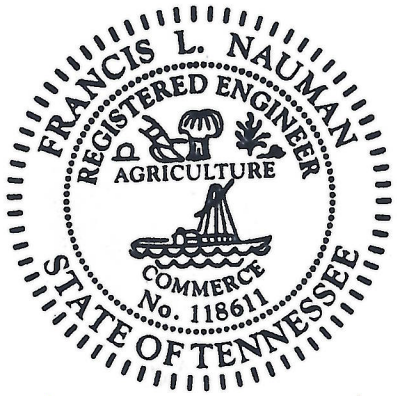
We hope the information presented provides sufficient documentation regarding our structural condition assessment of the dock structure for the PowerCom Industrial Center River Terminal. Hanson appreciates the opportunity to work for you on this project. If you have any questions or we can be of further service, please do not hesitate to contact Greg Kelahan, at (314) 942-5296 or gkelahan@hanson-inc.com, or Francis L. Nauman, P.E., at (815) 209-2557 or flnauman@hanson-inc.com.

Sincerely,

HANSON PROFESSIONAL SERVICES INC.

Francis L. Nauman 5/17/16

Francis L. Nauman, P.E.
Senior Structural Engineer



Lisc. Exp. Date 10/31/17

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Table of Contents

1. INTRODUCTION

Hanson Professional Services Inc. (Hanson) was retained by Four Lake Regional Industrial Development Authority (Owner) to perform a visual structural condition assessment of a dock structure, adjacent infrastructure (sheet pile cells and retaining wall structures), and bank stabilization. These items will be referred to herein as the facility. The assessment also included an underwater inspection and structural evaluation. No structural analyses or calculations were prepared as part of Hanson's services.

It is our understanding the dock structure at the PowerCom Industrial Center was originally constructed in the 1970's. Therefore, the dock structure is approximately 46 years old.

Neither construction drawings nor a geotechnical report were made available for the existing dock structure. Therefore, this investigation was performed based on Hanson's visual observations and data obtained by an underwater dive investigation. This visual investigation was purely intended to assist the Owner in evaluating the structural condition of the dock structure.

2. FIELD OBSERVATIONS

On December 22, 2015, Francis L. Nauman from Hanson met with Carlos Araya, Cy Le Boeuf and Steven Panter, all from Mainstream Commercial Divers, Inc., (Mainstream) at the site to observe the physical condition of the dock structure. The above water investigation was performed by Hanson, and the underwater investigation was performed by Mainstream at the same time. Photos taken by Hanson during the investigation are included in Appendix A. The underwater inspection report (Diver's Report) prepared by Mainstream is included in Appendix B.

The dock structure is located approximately five miles southeast of Hartsville, Tennessee, along the north shoreline of a slack water area at approximately River Mile 284.1 of the Cumberland River. The dock structure consists of a concrete mat, which appeared to be approximately 4 feet thick. Because drawings were not available, Hanson was unable to determine if the concrete mat is supported by piles or supported on grade. The dock is approximately 100 feet long by 100 feet wide. No construction joints or inlets were observed in the concrete mat. See Photos 1 - 7 for the general configuration of the dock.

The north and west sides, as well as a majority of the east side of the dock structure are bordered by soil. The west half of the south side of the dock consists of a concrete face (likely the edge of the thickened mat) on top of interlocking "Z" shaped steel sheet piles. At the time of the inspection, the top of the sheet piles along the west half of the south face of the dock was approximately 2.5 feet below the water surface. The east half of the south face of the dock consists of interlocking "Z" shaped steel sheet piles. At the time of the inspection, the water surface was approximately 4.75 feet below the top of the dock. The southernmost section of the dock along the east face is approximately 15 feet long and consists of interlocking "Z" shaped steel sheet piles. The remainder of the exposed east face of the dock consists of concrete (likely the edge of the concrete mat). Scour has occurred along the southeast corner of the dock, exposing steel piles that could possibly be part of a grid of piles that support the concrete mat. In addition, no evidence was found during our investigation to indicate the steel sheet piles were tied back in any way.

The remainder of the slack water area north shoreline is protected by small stone riprap. Many trees of varying sizes are growing through the stone riprap bank protection. See Photos 8 and 9 for the general condition of the shoreline in this area.

Seven (7) cell structures are located along the west side of the slack water area. The cells consist of interlocking steel "plate" type sheet piles. Hanson arbitrarily numbered the cells with Cell 1 at the northwest corner of the slack water area and Cell 7 at the southwest corner. Cells 1 through 6 are partial circle cells, while Cell 7 appeared to be a complete circle cell. However, the complete cell could not be verified because a concrete pad covered a portion of the cell, and the interior of Cell 7 was covered with a concrete cap. The depth of water adjacent to Cells 1 through 6 varied from 9.1 feet to 10.6 feet, and the steel sheet piles extended approximately 2 feet above the waterline. The depth of water adjacent Cell 7 varied from 0 to 10.1 feet, with a maximum exposed height above water of approximately 7 feet. No evidence was found during our investigation to indicate the steel sheet piles were tied back in any way. The shoreline along the southwest corner of the slack water area consists of unprotected embankment. See Photos 10 - 12 for the general configuration of Cells 1 through 7.

The east shoreline of the slack water area is mainly unprotected. The southeast corner of the slack water area shoreline appears to be protected by small stone riprap. Many trees of varying sizes are growing along the shoreline. Photos 13 - 16 show the east shoreline of the slack water area.

The shoreline upstream and downstream of the slack water area, in general, appears to be unprotected. Many trees of varying sizes are growing along the shoreline. The Cumberland River generally flows east to west near the site, with flows controlled by lock and dam structures both upstream and downstream from the project site. Photos 16 and 17 show the shoreline in the southeast (upstream) and southwest (downstream) corners of the slack water area.

Temporary barriers are in place along the south and east edges of the dock area and behind the cells along the west face of the slack water area. Temporary barriers are also located along the shoreline downstream (west) of the slack water area. There are two types of temporary barriers at the site. One type of temporary barrier consists of precast concrete "L" shaped barriers. The other type consists of a steel truss barrier comprised of wide flange members for the vertical post, angle members for the diagonal members, and rods for the horizontal rails. The base of the steel truss members is supported by wide flange beams that bear directly on the concrete mat. These temporary barriers were not inspected and their condition was not included in this report. See Photos 18 and 19 showing the typical configuration of the steel and concrete barriers.

3. FINDINGS

3.1 Concrete Mat

The concrete mat itself appeared to be in relatively good condition. However, there does not appear to be any construction joints in the concrete mat. There were some cracks visible on the top surface of the concrete, but they all appeared to be relatively tight with minimal horizontal or vertical separation. In general, these cracks were spaced relatively far apart.

The top surface of the concrete mat was slightly uneven. No survey shots were taken; however, on the day of the site visit, water was ponding on top of the concrete mat. Part of the mat was covered with water with a maximum depth of approximately 1 inch, while other parts were free of standing water.

The face and top edge of the concrete mat along the west half of the south side had some spalls with exposed reinforcement bars, delaminations, and scaling of the concrete.

The soil underneath the concrete mat at the southeast corner of the dock was scoured, as previously stated. The scoured area was approximately 8.5 feet wide (east - west direction) and 27 feet long (north - south direction) by a maximum depth of 2 feet.

3.2 Steel Sheet Piles at Dock

The interlocking "Z" shaped steel sheet piles were in relatively good condition. No splits or separations were observed in the steel sheet piles during the site visit. However, a hole approximately 3 feet high by 2 feet wide appeared to be torch cut through the steel sheet piles. This hole was located along the south face of the dock near the southeast corner. The approximate location of the hole is shown on the Plan and Profile Sheet provided in the Diver's Report.

The interlocking "Z" shaped steel sheet piles along the south face near the southeast corner of the dock were covered by two steel flat plates that were welded to the "Z" shape steel sheet piles. Hanson suspects these steel flat plates were installed sometime after the dock was originally constructed. These plates may have been installed to repair damage to the original interlocking "Z" shaped steel sheet piles at that location. The flat plates covered a section of the original sheet piles that was approximately 3 feet wide and extend from the top of the dock down to at least the riverbed.

The Diver's Report indicated the steel sheet piles vary in thickness from 0.310 to 0.390 inches, with a maximum pitting of 0.050 inches. It should be noted the maximum pitting does not occur at the same location as the minimum thickness. The Diver's Report also indicated less than 3 percent of the exposed surface area of the sheet piles was affected by surface corrosion. The steel sheet piles didn't appear to have any significant lean in them.

One large tree (12 to 18 inches in trunk diameter) was noted growing next to the north end of the interlocking "Z" shaped steel piles along the east face of the dock.

3.3 Cellular Retaining Walls along the West Face of the Slack Water Area

The steel "plate" type sheet piles were in fair condition. No splits or separations were observed in the steel sheet piles during the site visit. The Diver's Report indicated the steel sheet piles for the cell walls vary in thickness from 0.320 to 0.390 inches. No pitting was documented for these cells. The Diver's Report also indicated less than 3 percent of the exposed surface area of the cell walls was affected by surface corrosion. The Diver's Report indicated Cells 1 through 6 leaned towards the east (towards the water), ranging from 1.9 to 4.5 degrees, and Cell 7 leaned 1.7 to 2.3 degrees. The degree of lean of the sheet piles was obtained by using a 2-foot long smart level on the portion of wall above the waterline. However, the lean is likely less at the streambed than it is at the top of the sheet pile.

The concrete cap on top of Cell 7 had hairline cracks but appeared to be in relatively good condition. The concrete cap did not appear to have settled and no significant voids were detected by sounding the concrete with a hammer. During the site visit, it was noted that sometime in the past trees were allowed to grow behind Cells 1 through 6, with only stumps remaining.

3.4 Slack Water Area Shoreline

The slack water area shoreline had eroded immediately east of the dock. This area was approximately 20 feet long by 20 feet wide. The slack water area shoreline had also eroded immediately south and west of Cell 7. This area was approximately 50 feet long by 30 feet wide. The shoreline had eroded and left an exposed soil vertical face.

4. RECOMMENDED REPAIRS

The dock structure, adjacent infrastructure (sheet pile cells and retaining wall structures), and bank stabilization were in fair to good condition. Because existing drawings and geotechnical reports were unavailable, a structural evaluation of the dock was not addressed in this report. However, it appeared that the facility is in need of some repairs.

Hanson recommends the following repairs be performed to the River Terminal Dock Structure. In addition, Hanson recommends an area 10 feet wide (east - west direction) and 30 feet long (north - south direction) at the southeast corner of the dock structure be limited to light material storage or equipment no heavier than a conventional pickup truck. This corresponds with a previously described scour area.

4.1 Concrete Mat Repair

- Structural Repair of Concrete
  - Remove all unsound concrete, corrosion, and marine growth.
  - Supplement deteriorated or damaged reinforcement bars, if required.
  - Clean existing reinforcement bars.
  - Form and place concrete.

- Fill Scour Hole Under Southeast Corner of Concrete Mat
  - Core drill through concrete mat.
  - Form perimeter edges of concrete mat.
  - Place controlled low-strength material (flowable fill)

- Patch Existing Sheet Pile Hole
  - Grind existing edges of the hole flush.
  - Install and weld reinforcement plate to the existing sheet piles.

The proposed usage of the dock is unclear at this time. Therefore, the ponding of water on the top of the concrete mat has not been addressed. If the uneven surface is unacceptable to the Owner/User, then a concrete leveling slab may need to be placed over the top of the existing concrete mat. At that time, the Owner/User can determine the concrete thickness, jointing configuration, and reinforcement requirements.

4.2 Repair of Steel Sheet Piles at Dock

Hanson suspects the original sheet piles were specified to be 3/8 inch thick (0.375 inch). Therefore, there is a maximum thickness reduction of approximately 17 percent. Because the exact configuration and material used in the construction of the sheet piles are unknown, a structural evaluation was not addressed in this report.

The exact conditions of the possible previous damages to the sheet piles along the south face of the dock, near the southwest corner, is unknown and cannot be evaluated at this time.

- Tree Removal
    - Tree to be cut flush with the existing ground line.

4.3 Repair of Cellular Retaining Walls

Hanson suspects the original sheet piles were specified to be 3/8 inch thick (0.375 inch). Therefore, there is a maximum thickness reduction of approximately 15 percent. Because the exact configuration and material used in the construction of the sheet piles are unknown, a structural evaluation was not performed.

Normal installation tolerance for sheet piles is ¼ inch per foot of lean, which equates to a lean of approximately 1.2 degrees. Therefore, the maximum actual lean in Cells 1 through 6 is nearly 4 times the normal allowance for installation. Hanson suspects the sheet piles were likely driven within tolerance (or relatively close) and were pushed laterally by the trees that grew behind them at the top of the retaining walls. The actual lean of Cell 7 along the southwest side is 2.3 degrees towards the east (inward). If rocks were encountered during the driving of the sheet piles and no construction oversight was provided, it is possible this cell was driven to its current configuration.

- In the future, all saplings should be removed before they are allowed to grow and cause further damage to the sheet pile retaining wall.

4.4 Slack Water Area Shoreline Stabilization

- Tree Removal
    - Remove all trees and samplings in the areas that have been eroded.

- Riprap
    - Prepare base for the placement of riprap bedding.
    - Place properly sized riprap bedding.
    - Place properly sized riprap.

5. OPINION OF PROBABLE CONSTRUCTION COST (PRELIMINARY ORDER-OF-MAGNITUDE)

Concrete Mat Repair

Structural Repair of Concrete

• Structural Repair of Concrete: 70 SF @ $300/SF =		$21,000

Fill Scour Hole under Southeast Corner of Concrete Mat

• Core Drill Concrete Mat: 5 - 6" dia. holes @ $200/EA =		$ 1,000
• Form Perimeter Edges of Concrete Mat: 1 Lump Sum =		$ 1,000
• Place Flowable Fill: 10 CY @ $300/CY =		$ 3,000

Patch Existing Sheet Pile Hole

• Patch Existing Sheet Pile Hole: 1 Lump Sum =		$16,000
	Subtotal	$42,000

Repair of Steel Sheet Piles at Dock

Tree Removal

• Tree Removal: 1 - 18" dia. Tree @ $1,500 =		$ 1,500
	Subtotal	$ 1,500

Shoreline Stabilization

Tree Removal

• Tree Removal (several small trees): 1 Lump Sum @ $1,500 =		$ 1,500
• Riprap: 210 SY @ $100/SY =		$21,000
	Subtotal	$22,500
	Total	**$66,000**

It should be noted, our opinion of probable construction cost is a preliminary order-of-magnitude estimate. This opinion of probable construction cost was generated to give the owner a general idea how much each repairs may cost. Hanson has not included costs for all items that may be necessary or desirable (such as a concrete leveling slab, repairs/replacement of sheet pile walls if the reduced thickness or lean are found to be unacceptable).

Appendix A

Photos

Photo 1 – South Elevation of Dock (West Half)

Photo 2 – South Elevation of Dock (East Half)

Photo 3 – Looking South Across Dock

Photo 4 – Looking East Along South Edge of Dock

Photo 5 – Looking West Along South Edge of Dock

Photo 6 – Looking North at Southeast Corner of Dock

Photo 7 – Looking Southwest at Southeast Corner of Dock

Photo 8 – Looking East along the North Shoreline, East of Dock

Photo 9 – Looking North along the North Shoreline, East of Dock

Photo 10 – Retaining Wall Cells 1 - 3 (Cell 1 is Shown on the Right End)

Photo 11 – Retaining Wall Cells 2 - 7 (Cell 7 is Shown on the Left End)

Photo 12 – Unprotected Shoreline North and Northwest of Cell 7

Photo 13 – East Shoreline (Looking East)

Photo 14 – East Shoreline (Looking North)

Photo 15 – East Shoreline (Looking South)

Photo 16 – Southeast Corner (Looking North)

Photo 17 – Southwest Corner (Looking North)

Photo 18 – Typical Steel and Concrete Temporary Barriers

Photo 19 – Typical Steel and Concrete Temporary Barriers

Appendix B

Underwater Inspection Report
By Mainstream Commercial Divers, Inc.

HANSON PROFESSIONAL SERVICE, INC.

POWER COM INDUSTRIAL CENTER

RIVER TERMINAL DOCK INSPECTION

HARTSVILLE, TN

Prepared for:

Hanson Professional Services, Inc.
Rockford, IL

Prepared by:

Mainstream Commercial Divers, Inc.

322 C.C. Lowry Drive, Murray, KY 42071
Office: (270)753-9654 Fax: (270)753-0165
www.mainstreamdivers.com

Inspection Date: December 22, 2015

HANSON PROFESSIONAL SERVICE, INC.
POWER COM INDUSTRIAL CENTER
RIVER TERMINAL DOCK INSPECTION
HARTSVILLE, TN
INSPECTION PERFORMED: DECEMBER 22, 2015

INTRODUCTION

Mainstream Commercial Divers Inc. was contracted by Hanson Professional Service, Inc to conduct a visual/tactile inspection of the underwater portion of the dock terminal located at the Power Com Industrial Center on the Cumberland River at mile marker 284 on the right descending bank. The underwater inspection was performed on December 22, 2015 and concluded that same day. The water elevation was approximately 454.77' above mean sea level according to the river gauge located at Carthage, TN at approximately 0800 on the morning of the inspection. Frank Nauman with Hanson Professional Service, Inc. instructed the dive crew to only inspect the structure below the water surface and that anything above the water surface he would inspect and include in his report. At the beginning of the inspection the crew reported to Frank that there was a scoured area located at the northeast corner of the dock along the water's edge. Frank asked the crew to help him map out the scoured area and that he would include this in his report. Along with the visual/tactile inspection, Frank requested ultra sonic thickness readings to be taken on random sheet piles. MCDI personnel took readings on approximately every third outer belly on the Z sheet portions of the dock terminal and on the center sheets of each cell. Thickness readings were taken utilizing a Cygnus Ultrasonic Steel Thickness Reader that was tested prior to use on a 0.500" thick mild steel calibration block and on a steel sheet pile at the site which was also measured with a micrometer for comparison.

DESIGN/ METHOD

The dock consisted of seven interconnected sheet pile cells that extended from the south (rivers side) toward the north. At the north end, the dock turned 90 degrees and extended toward the east for approximately 100' before turning back toward the north for approximately 15'. The dock portion that extended west to east was composed of Z type sheet piles with a concrete slab covering the entire length. For approximately the first 60' of this portion of the dock, beginning at the west end of the dock, the concrete slab contained a vertical concrete face that extended down in front of the sheet piles and stopped approximately 2' to 3' below the water surface. (See Drawing). The cell

designed portion of the dock (extending north to south) was primarily on land and the tops of the cells were covered so it was unknown if these were full or just partial cells (See photo 1 and photo 6). To perform the underwater inspection, Mainstream Commercial Divers, Inc. utilized a 25' work/dive boat equipped with the Association of diving contractors (ADC) compliant commercial diving equipment. The dive inspection crew utilized underwater inspection tools along with topside camera to assist with the inspection. The dive crew that performed the level 1 underwater visual/tactile inspection was comprised of the following personnel:

Carlos Araya (Dive supervisor)

Cy Le Boeuf (Dive Inspector)

Steven Panter (Diver Inspector/Tender).

INSPECTION

The crew began the underwater inspection at the northeast corner of the dock terminal working toward the south (see drawing). At the first inner flange, there was a 12" - 18" diameter tree growing next to the first sheet pile. In this area, there was also the scoured area (previously mentioned above) noted that appeared to extend behind the first sheet pile which created a gap between the concrete cap and the ground at the north side of the first sheet pile (see photo's 2 and 3). The diver continued with the inspection and reported that all of the Z sheets along the east wall extended down into the mud line and appeared to be in good condition. As the diver made his way along the Z sheet pile wall, traveling approximately three outer flanges toward the west from the southeast corner, the diver located a 3' tall x 2' wide opening through the Z sheet that appeared to have been cut utilizing a torch. The diver noted that there appeared to be a significant void behind the sheet piles. Inspecting the void, the diver found that he was able to extend a gauge rod approximately 8' straight in before hitting what appeared to be an H pile. The diver then angled the gauge rode a couple of degrees to the west and was able to extend the gauge rod in a total of 23' before hitting an obstruction. The void was believed to be associated with the scoured area that was observed from the outside of the sheet pile wall at the northeast corner of the dock terminal. At the fourth and fifth sheet piles there was a welded steel plate that extended across the two sheets covering the inner flange. The steel plate extended all the way from the water surface, down, extending into the mud line. At the 12th outer flange from the east corner, the face of the concrete slab began which extended down the front of the sheet piles ending approximately 2' to 3' below the water surface (see photo 4). Directly below the cap, the Z sheets continued across to the west corner where the cell designed portion of the dock terminal began. Throughout this portion of the dock, the diver did not report any significant defects associated with the sheet piles. The diver reported light to medium bio-fouling covering the exposed

portions of the sheet piles. Also, there were isolated areas of surface corrosion with minor section loss observed primarily near the bottom of the sheet piles. Throughout the exposed portions of the Z sheet piles, there was less than 3% of the total surface area affected by the surface corrosion. The diver took ultra sonic steel thickness readings at the first outer flange and thereafter on random sheet piles throughout the dock inspection. Up to four readings were taken at each location (above the water surface, water surface, mid water and just above the mud line). Pit gauge readings were also taken if the diver observed any section loss (see drawing for the pit gauge readings). The steel thickness readings taken on the sheet piles ranged between 0.310" to 0.390" (See Drawing). The water depth across the dock terminal portion extending east to west ranged from approximately 6.7' of depth to approximately 11.2' of depth (see drawing).

At the west corner (where the cell designed portion of the dock began) the first cell of the wall that extended north to south was connected to the Z sheet (east to west) portion of the loading dock. Each cell that made up this portion of the dock terminal contained between 11 and 35 sheet piles with the last cell (the seventh cell) being the largest diameter and located at the south end of the dock terminal (see photo 5). The diver reported light to medium bio fouling with isolated areas of section loss primarily noted near the bottom of the sheet piles. Throughout the exposed portion of the cells, less than 3% of the total surface area of the sheet piles was affected with surface corrosion. Ultra sonic steel thickness reading were also taken throughout this portion of the dock on the center sheet of each cell with the exception of the last cell (furthest south cell) which had three sets of readings taken (see drawing). Up to four readings were taken at each location on the cells, (above the water surface, water surface, mid-water, and just above the mud line). Pit depth readings were also taken if the diver observed any significant section loss (see drawing for pit gauge readings). The ultra sonic thickness readings taken on the cells ranged between 0.320" to 0.390" (See Drawing). Top side personnel placed a digital level on each of the cells. The degree of lean ranged from 1.9˚ to 4.5˚ with the cells generally leaning toward the east (toward the bay). The diver reported that all of the interlocks appeared to be together and appeared to be in good condition. The water depth across the dock terminal portion extending north to south ranged from approximately 9.1' of depth to approximately 10.6' of depth (see drawing).

End of Document

Photo 1: Cell designed portion of the dock terminal.

Photo 2: Z Sheet pile wall (northeast corner)

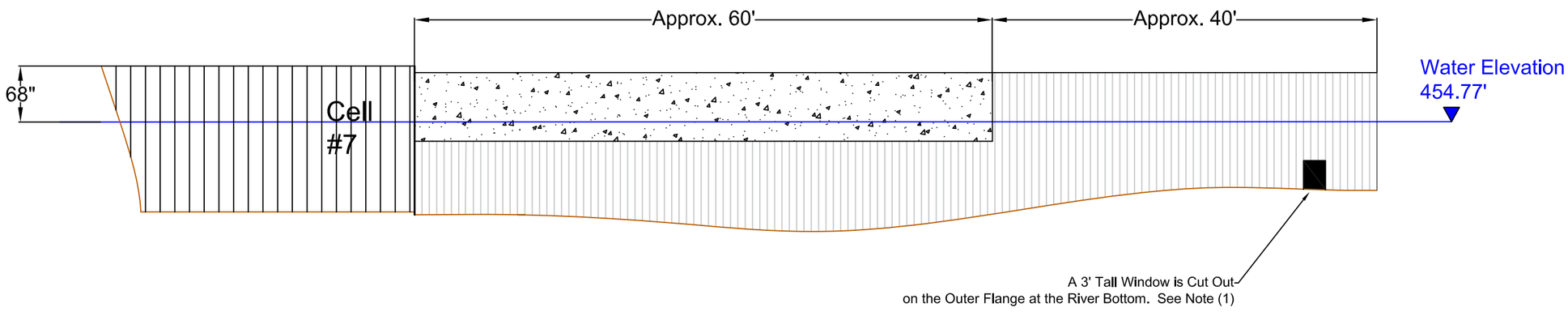
Photo 3: Void at the northeast corner

Photo 4: Concrete cap over Z- sheet pile wall

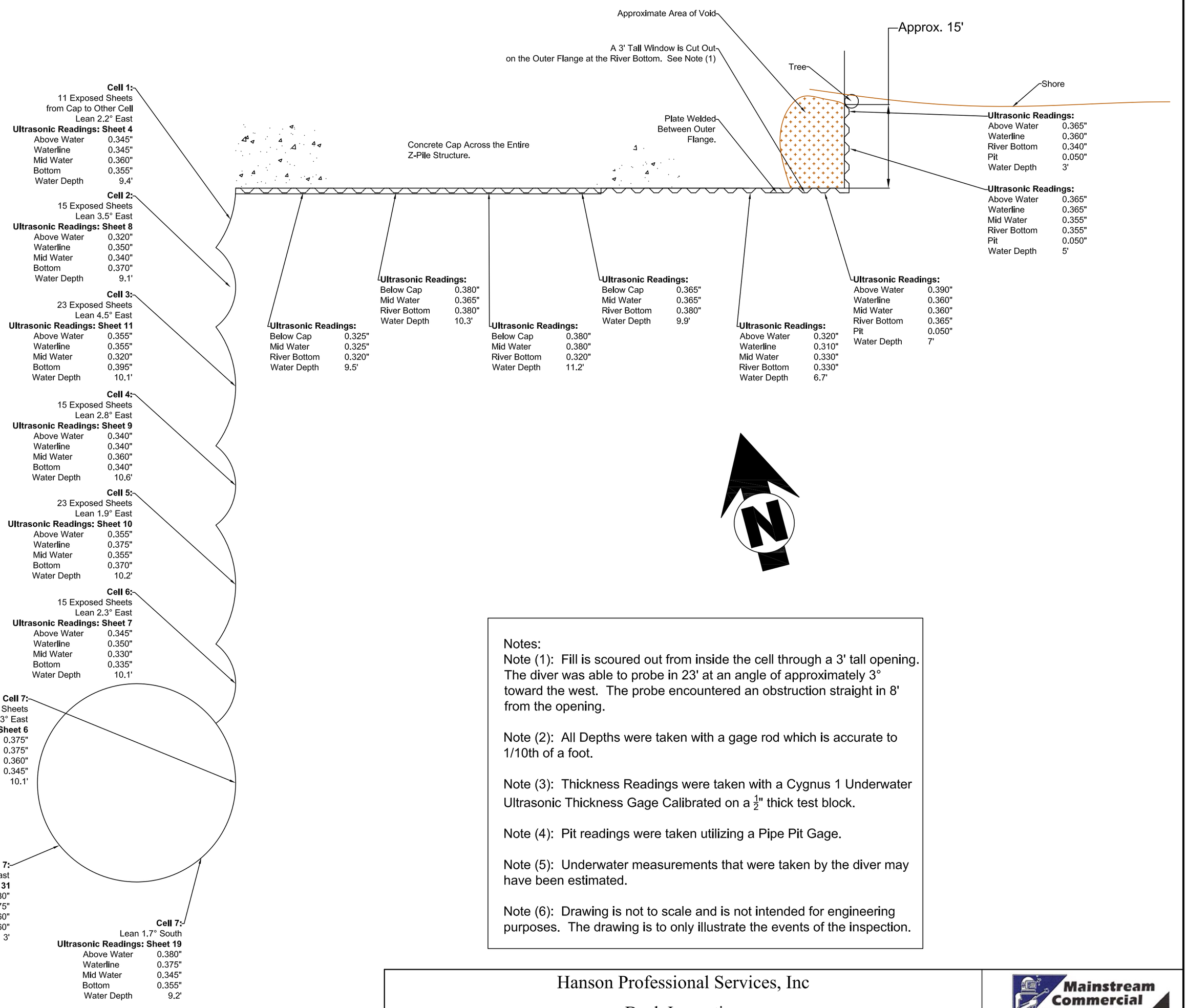
Photo 5: Looking south toward the 7th cell

Photo 6: Google Aerial Photo of Dock Structure.

PROFILE



PLAN



Notes:

Note (1): Fill is scoured out from inside the cell through a 3' tall opening. The diver was able to probe in 23' at an angle of approximately 3° toward the west. The probe encountered an obstruction straight in 8' from the opening.

Note (2): All Depths were taken with a gage rod which is accurate to 1/10th of a foot.

Note (3): Thickness Readings were taken with a Cygnus 1 Underwater Ultrasonic Thickness Gage Calibrated on a $\frac{1}{2}$" thick test block.

Note (4): Pit readings were taken utilizing a Pipe Pit Gage.

Note (5): Underwater measurements that were taken by the diver may have been estimated.

Note (6): Drawing is not to scale and is not intended for engineering purposes. The drawing is to only illustrate the events of the inspection.

Hanson Professional Services, Inc

Dock Inspection

Hartsville, TN

Mainstream Commercial Divers, Inc.
322 C.C. Lowry Drive, Murray, KY 42071
Office: (270) 753-9654 Fax: (270) 753-0165

Date of Inspection: December 22, 2015

Water Elevation 454.77 Feet Above Mean Sea Level
According to the Cumberland River Gage at Carthage, TN

Scale: Not to Scale

Drawn by: K.W.H.

Checked by: D.C.F.

DWG
1 of 1