

DESIGN BASIS MEMORANDUM

Heartland Port Authority of Central Missouri
Site Concept Design
Jefferson City & Callaway County, Missouri

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By: Hanson Professional Services Inc.

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1. Project Contacts

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2. Project Description

The Heartland Port Authority of Central Missouri (HPA) was created in 2018 with the intent to promote economic growth through the development of marine transportation infrastructure in central Missouri. The Missouri River is under-utilized for waterborne transportation and can provide opportunities to reduce the strain on the aging highway system while providing a cost effective, environmentally friendly, and commercially viable transportation option for agricultural commodities, raw materials, and manufactured goods. The HPA commissioned a study in 2018 (conducted by Cambridge Systematics and Hanson) to evaluate the market feasibility, develop concept plans, and study the economic effects of a proposed central Missouri multimodal port.

The HPA project involves the development of a public port near Jefferson City, at the interface of Cole and Callaway Counties. In 2018, the project considered two sites for port development: one site on the north side of the river at an existing facility owned by OCCI Inc. (North Site 1), and the other site on the south side of the river, between the U.S. National Guard facility and the Algoa Correctional Center (South Site). The location of the two sites is shown below in Figure 1.

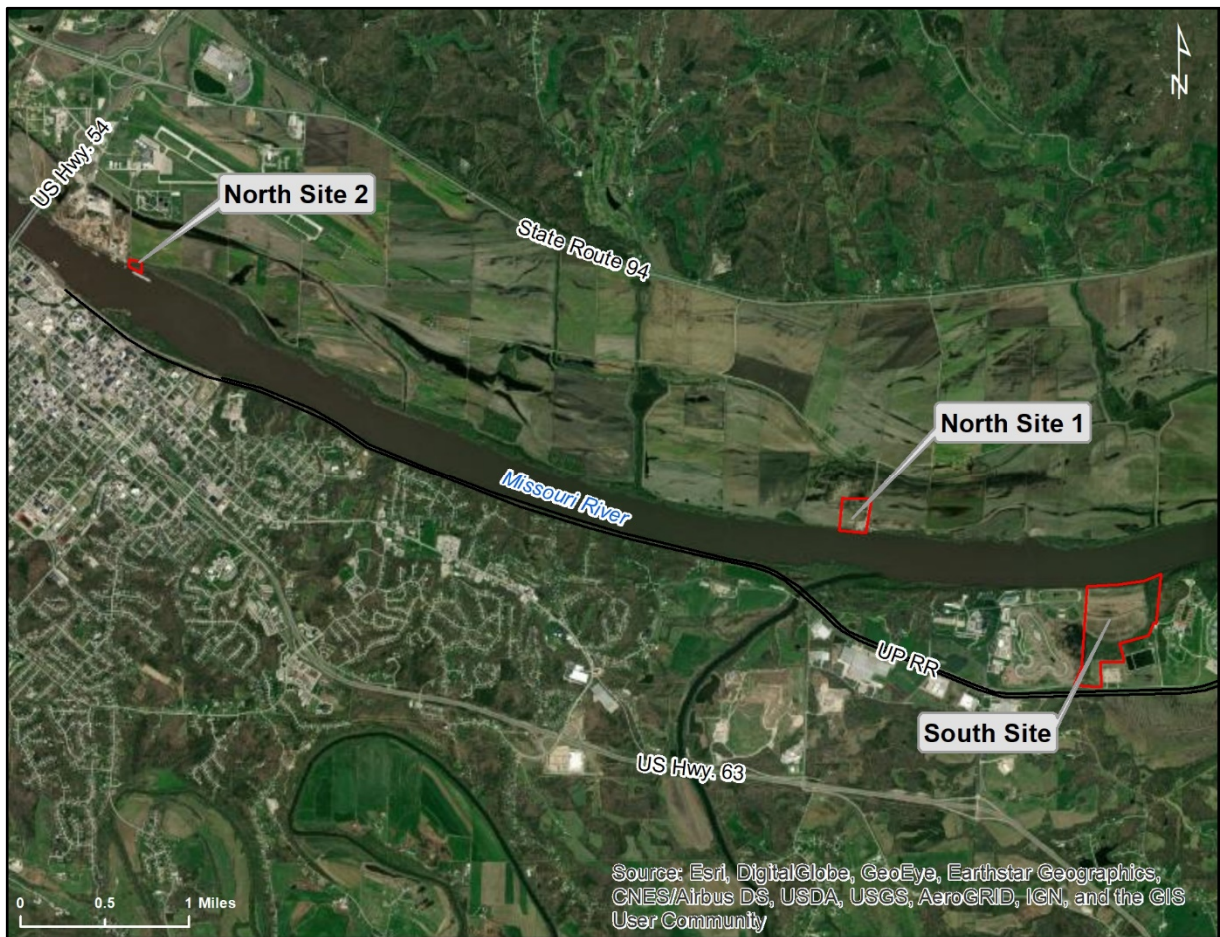


Figure 1 – Project Sites

As part of the current effort, a third location is being considered on the north side of the river, adjacent to an existing Capital Sand Company facility (North Site 2); this location is also shown in Figure 1 above. However, due to the relatively small size of North Site 2 and corresponding operational limitations, it is

unlikely to be developed and is excluded herein. Note that the Capital Sand Company facility has existing infrastructure assets immediately adjacent to North Site 2, such as an approximately 12,000 square-foot metal building and a small-scale truck-to-barge grain transload system. It may be feasible for the HPA to contract with Capital Sand Company for use of these assets; however, evaluation of these assets and/or the feasibility of such an agreement is outside the current scope of services.

The project team is currently gathering desktop information and conducting field-based studies for the three sites; the team is also engaging in initial agency scoping outreach efforts. Current efforts are being funded through a capital improvement grant from the State of Missouri, administered by the Missouri Department of Transportation (MoDOT). The HPA is also a recipient of a US Department of Agriculture Rural Business Development grant. Development of port facilities is anticipated to be funded by a combination of the preceding grants, additional grants obtained in the future, and other potential public/private partnerships.

Currently, the HPA is planning a phased approach to port development. Due to existing infrastructure already in place and the relatively shorter timeline anticipated for obtaining necessary permits, initial port development is anticipated to occur at North Site 1. If demand for port services at North Site 1 exceeds initial development capacity and depending on commodity type(s), either a second phase of port development will occur at North Site 1 or an initial phase of development will occur at the South Site. Other circumstances or information unknown at this time may result in the South Site being developed first.

3. Existing Site Descriptions & Constraints

North Site 1 (see Figure 2) would occupy approximately 20 acres on the north side of the Missouri River in an unincorporated portion of Callaway County. The existing land use is both agricultural and industrial; site features include a storage area, cell/dock structure, access road, barge un/loading equipment, and various construction equipment owned by OCCI Inc., a local civil construction contractor.

North Site 1 is only known to be used by OCCI when needed for specific projects. Currently, no agreement is in place between the HPA and OCCI for use of North Site 1. An agreement will need to be established between the HPA and OCCI prior to development. Further, the entirety of North Site 1 is located within the Missouri River floodway, which will limit the development potential, particularly related to permanent structures located within the floodway. For example, a large-scale agri-bulk transload facility is not likely feasible at North Site 1, because construction of grain storage bins within the floodway is not likely permissible. Further, constructing the grain storage bins outside of the floodway is not likely economically feasible for the HPA, due to the cost associated with constructing the necessary conveyance system to move agri-bulk products between the riverfront and storage bins located outside of the floodway.



Figure 2 – North Site 1

The South Site (see Figure 3) is located on the south side of the Missouri River within the incorporated limits of Jefferson City and encompasses approximately 120 acres. The South Site is a relatively undeveloped parcel with an existing road (Range Road) on the north part of the site. A Missouri River tributary named Rising Creek traverses the South Site in a southwest-to-northeast orientation. Although not envisioned as part of initial South Site development, future railroad access (via the Union Pacific Railroad’s line that is just south of the site) is feasible. The HPA does not currently own the South Site. Prior to development of the South Site, the HPA will need to acquire the property, which is currently owned by the State of Missouri.

Unlike North Site 1, only a relatively small portion (about 12 acres) of the South Site near the riverfront is located within the Missouri River floodway. Thus, the South Site has less restrictive port development options related to permanent structures. Additional site development constraints include potential wetlands, potential cultural resources, in-river structures (revetment and dikes) owned and installed by the US Army Corps of Engineers (USACE), and the proximity of the navigation channel to the in-river structures and riverbank at the South Site.



Figure 3 – South Site

4. Site Concept Considerations

The objective of the HPA is to develop an operational port facility as quickly as possible with limited available funding. Currently, initiating port development at North Site 1 appears to be the most expeditious and fiscally feasible means of attaining the HPA’s objective.

In 2020, the HPA commissioned the team of Decision Innovation Solutions and Mercator to complete a comprehensive market study to refine the cursory market study undertaken as part of the 2018 study. This study indicated the commodity with the highest likelihood of benefiting from a port facility in the Jefferson City area was bulk agricultural products (agri-bulk). These commodities would be inbound to the port facility via truck and outbound via barge. Most other commodities identified, primarily dry bulk and break bulk, would be inbound to the port facility via barge and outbound via truck. Shipping containers, both inbound and outbound, were considered in site planning. Near-term commodity volumes identified in the comprehensive market study are as follows:

- Inbound to Jefferson City (annually)
 - Dry Bulk – 22,100 Metric Tons (MT)
 - Break Bulk – 12,500 MT
 - Containers – 1,500 lifts

- Outbound from Jefferson City (annually)
 - Agri-Bulk – 170,300 MT
 - Containers – 1,200 lifts

The commodity volumes identified in the comprehensive market study and summarized above are not guaranteed, and it may take years for the forecast volumes to be attained. Thus, the conceptual site plans reflect a phased approach to port development – as initial infrastructure approaches capacity, other development phases should be implemented to increase capacity. This approach will help minimize the risk of the HPA expending limited funds on infrastructure that could be underutilized.

5. Proposed Concept Plans

Proposed concept plans consider the previously discussed site constraints and reflect a phased port development approach. The first phase of development is currently proposed for North Site 1 and is shown in Figure 4. Note, full-size versions of the proposed concept plans are attached to this Design Basis Memorandum (DBM).

The North Site 1 Phase 1 Concept Plan consists of the following:

- Improved aggregate access road to accommodate increased truck traffic
- Improved aggregate work area and temporary storage/lay-down area
- New truck scale
- New truck-to-barge agri-bulk transload facility
 - Aggregate loop road
 - Truck dump pit
 - Conveyor system with throughput of about 200 tons per hour
 - In-river cell structure
 - In-river dolphin structure or pipe pile
- Existing cell/dock structure
 - Crane needed to transload break bulk and/or containers from barge to truck (potential to use OCCI's crane to be determined)
 - Excavator with clamshell needed to transload dry bulk from barge to truck

Although not shown in Figure 4 and depending on anticipated activity level, the HPA may need to establish a barge fleeting area (a “parking lot” on the river for barges). A likely location is “Fleeting Site A,” as identified in the aforementioned 2018 feasibility study, which has a capacity of about 48 barges. Fleeting Site A is located on the south side of the river, roughly halfway between North Site 1 and the South Site. Due to varying river levels and the frequency with which major debris floats downriver, traditional anchor systems are not likely well-suited for barge fleeting on the Missouri River and deadman structures onshore will likely be used to “anchor” the proposed barge fleet in place. If demand for barge fleeting is expected to be low initially, establishment of the barge fleeting site may be delayed to a future phase. However, the construction cost of two deadman structures is included herein as part of Phase 1 (see Section 6 for construction cost information), noting this construction may be delayed to a later phase.

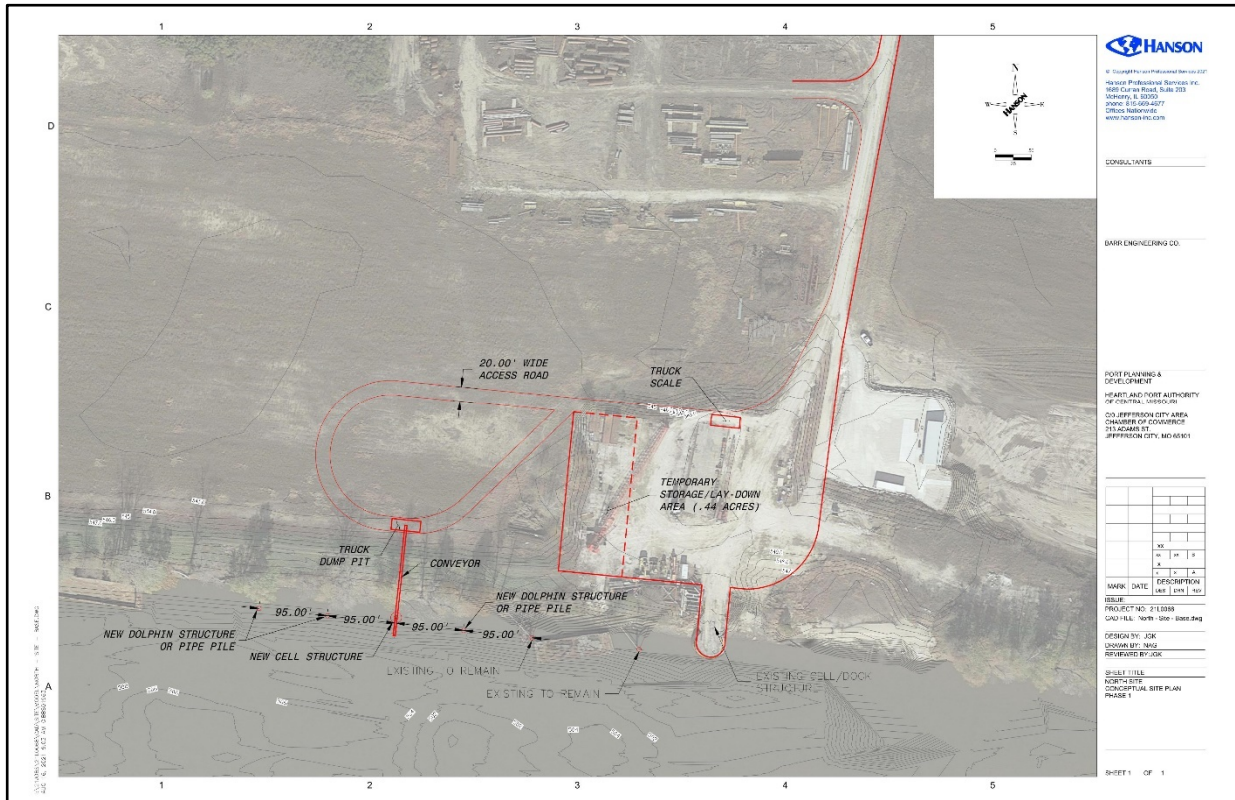


Figure 4 – North Site 1 Phase 1

The next phase of port development will depend on North Site 1 infrastructure demand. If demand for the existing dock area has exceeded capacity or is expected to exceed capacity soon, North Site 1 Phase 2 is likely next. If demand for the agri-bulk transload infrastructure has exceeded capacity or is expected to exceed capacity soon, South Site Phase 1 may proceed next. For purposes of presenting the concept plans in this DBM, North Site 1 Phase 2 is assumed to be next.

The North Site 1 Phase 2 Concept Plan (see Figure 5) consists of the following:

- Expanded dock area
 - Sheet pile dock extended westward from the existing cell/dock structure to create a 100-foot-long dock face
 - In-river dolphin structure or pipe pile
 - Continue to use crane to transload break bulk and/or containers from barge to truck
 - Continue to use excavator with clamshell to transload dry bulk from barge to truck

If a dock area larger than that shown in North Site 1 Phase 2 is needed, it may be feasible to further extend the dock area eastward. However, the riverfront area east of the existing cell/dock structure is not owned by OCCI. Thus, coordination and an agreement between the HPA and that landowner (Capital Sand Company) will be required prior to eastward expansion of the existing dock area.

Additional access road and/or work area surface improvements may be required in Phase 2. However, due to the uncertainty regarding post-Phase 1 truck activity levels at North Site 1 and the associated unknown longevity of the Phase 1 access road improvements, additional access road and/or work area improvements are currently excluded from Phase 2 but may be needed. Further, improvements to

County Roads 4033, 4035, and 4038 may be needed to accommodate increased truck traffic; however, said improvements are currently excluded herein.



Figure 5 – North Site 1 Phase 2

As indicated in Section 4 above, agri-bulk commodity volumes were forecast by the comprehensive market study to far exceed the volume of all other potential commodities. For that reason, the first phase of port development at the South Site focuses on agri-bulk.

The South Site Phase 1 Concept Plan (see Figure 6) consists of the following:

- New concrete access road from Cortez Drive with bridge over Rising Creek
- New truck scale(s)
- New large-scale truck-to-barge agri-bulk transload facility
 - Storage bins (capacity TBD)
 - Truck dump pit(s)
 - Conveyor system
 - In-river cell structure
 - In-river dolphin structure or pipe pile (x2)

The size, throughput, capacity, etc. of the agri-bulk transload facility should be determined in the future, when anticipated demand is more fully understood and quantifiable.

Note, the agri-bulk transload facility, and more specifically the storage structure(s), is set back from the river due to limitations on the development of structures within the Missouri River floodway. Also,

three existing river structures (dikes) are located along the South Site riverfront. One dike must be removed to implement the concept plan as shown.

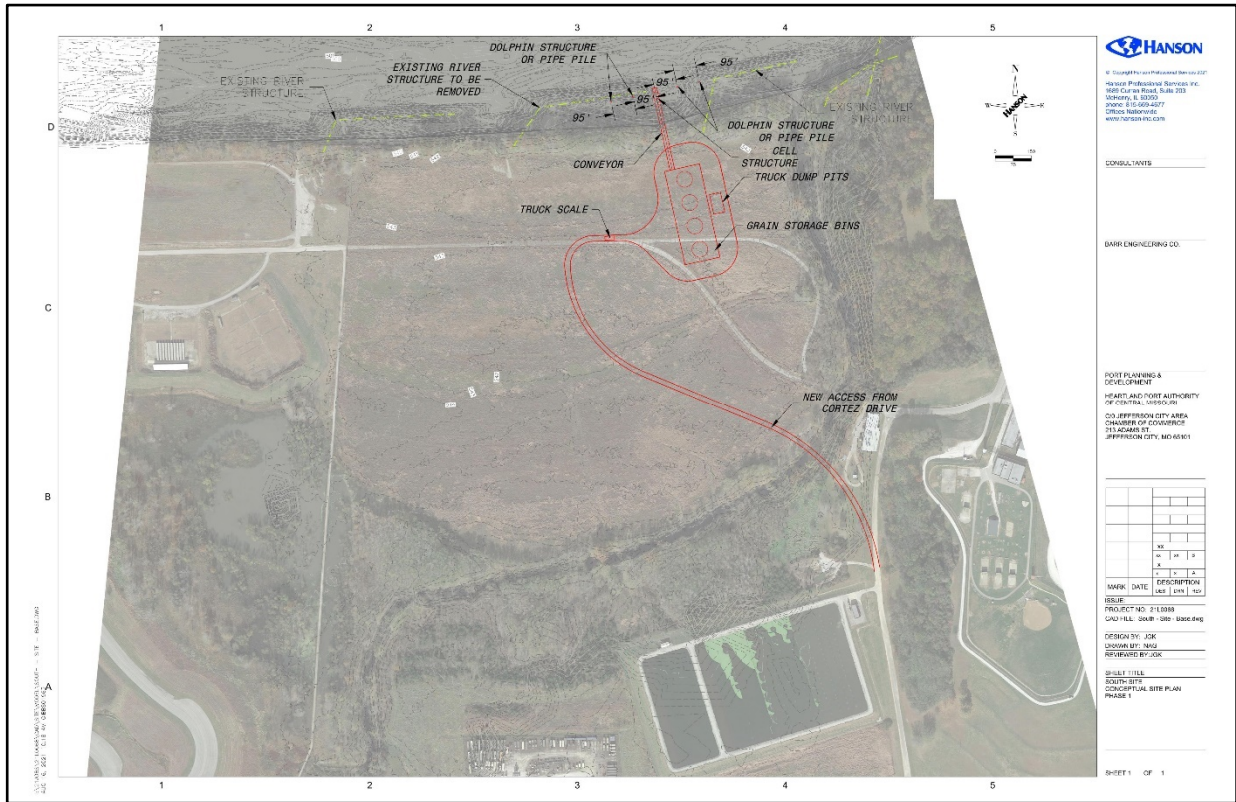


Figure 6 – South Site Phase 1

Further development of the South Site will likely be warranted when demand for the dock area at North Site 1 has exceeded capacity or is expected to exceed capacity soon. This development could result from the inability to expand the North Site 1 dock area eastward, significant demand for a dock structure on the south side of the Missouri River, a combination of those two factors, or some other factors unknown at this time.

The South Site Phase 2 Concept Plan (see Figure 7) consists of the following:

- Extended concrete access roads
- New aggregate storage/lay-down area
- New work area (mostly aggregate surfaced with some concrete surfaced portions)
- New dock area
 - Sheet pile dock with 200-foot-long face
 - In-river dolphin structure or pipe pile (x2)
 - Crane and/or excavator, depending on anticipated commodities

Note, removal of a second of the three currently existing dikes will be required to implement the concept plan as shown.

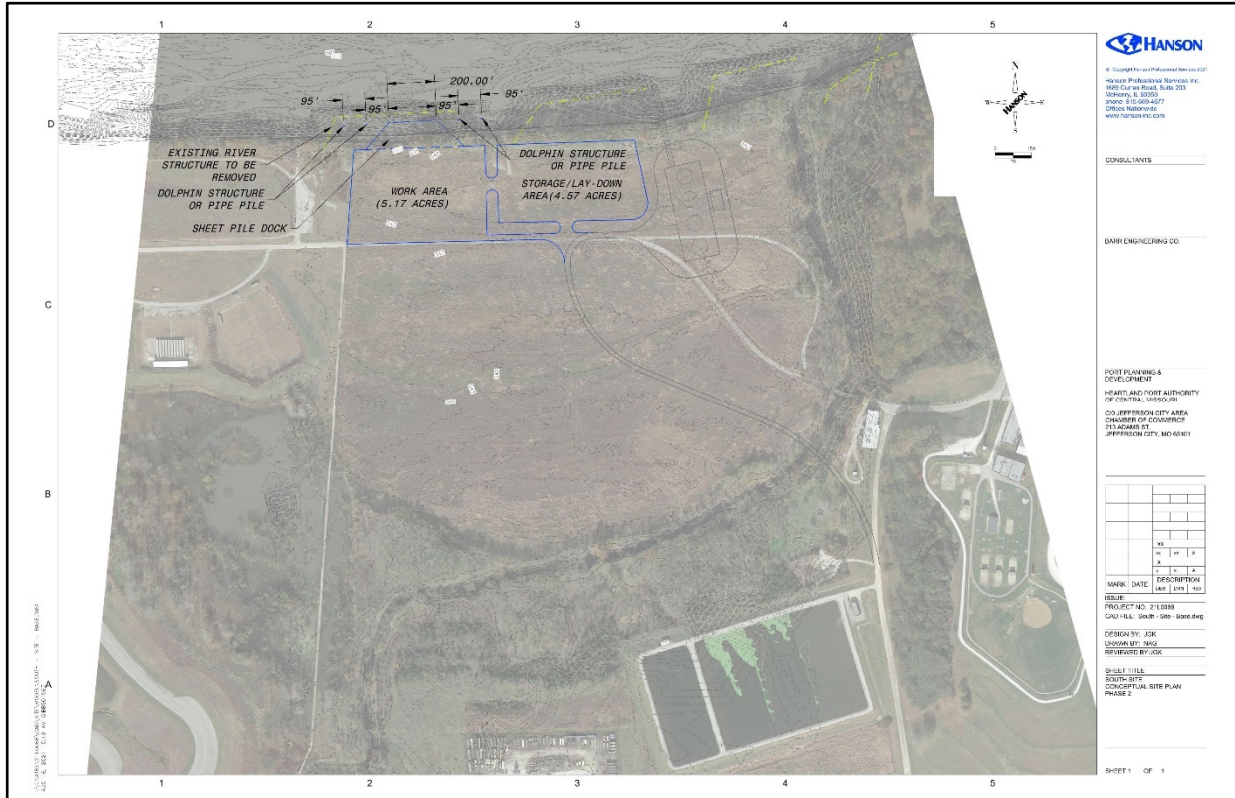


Figure 7 – South Site Phase 2

6. Engineer’s Opinion of Probable Construction Cost

Budgetary Engineer’s Opinions of Probable Construction Cost (OPCC) are provided below. Currently, the costs are based on a 5% conceptual design; at this level of engineering effort, costs are typically in the +/- 35-40% range. Thus, the estimates should be considered Rough Order of Magnitude (ROM) Costs. The level of confidence in the costs presented herein is based on the details known at the time of developing this DBM. As more details are determined and more engineering is completed, the OPCC’s should become more accurate.

The OPCC’s for Phases 1 and 2 of North Site 1 development are provided on the following pages. As shown, the total OPCC for Phase 1 is about \$3.9M and Phase 2 is about \$3.1M. Each OPCC total includes a 35% contingency to help account for unknown factors and assumptions that are being made at this time due to missing, unavailable, and/or unknown information.

Note, due to the multitude of uncertainties regarding South Site development timing and scope, an OPCC for potential South Site development is not feasible at this time.



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 Date: 8/12/2021
 Checked By: SLG
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 Project: Heartland Port Authority
 Hanson Project No.: 21L0068

Rev. B

Engineer's Opinion of Probable Construction Costs - North Site 1 Phase 1

Engineering, Permitting, and Construction Management						
Item#	Item	Quantity	Unit	Unit Cost (USD)	Total (USD)	Notes
1	Engineering Design	6	Percent	---	\$ 189,375	Typically 6% of Civil/Site Construction Cost
2	Geotechnical Investigations & Report	1	LS	\$30,000	\$ 30,000	Allowance
3	Construction Management	6	Percent	---	\$ 189,375	Typically 6% of Civil/Site Construction Cost
4	Survey	1	LS	\$5,000	\$ 5,000	Allowance for Additional/Pickup Survey
5	Material Testing	1	Percent	---	\$ 31,562	Typically 1% of Civil/Site Construction Cost
6	Construction & Stormwater Permitting	1	LS	\$275,000	\$ 275,000	Allowance (see Note 4)
Engineering, Permitting, and Construction Management Total					\$ 720,311	
Civil/Site/Infrastructure						
Item#	Item	Quantity	Unit	Unit Cost (USD)	Total (USD)	Notes
1	Mobilization	5	Percent	---	\$ 111,331	Typically 5% of Civil/Site Construction Cost
2	Clearing and Grubbing	889	SY	\$5	\$ 4,444	Clear existing ground for conveyor corridor; includes vegetation and topsoil removal only.
3	Tree Removal	1	LS	\$5,000	\$ 5,000	Additional cost (beyond the clearing and grubbing cost) to remove trees near riverfront; allowance.
4	Access Road Grading	5,200	SY	\$10	\$ 52,000	Grading/resurfacing of existing access road from County Road 4038 with approx. 3" of fill (see Note 5).
5	Work Area Grading	8,389	SY	\$10	\$ 83,889	Grading/resurfacing of existing work/storage area with approx. 3" of fill.
6	Temp. Storage/Lay-Down Area - Grading/Fill	1,400	CY	\$28	\$ 39,206	Grading & fill required to extend existing work area westward.
7	Temp. Storage/Lay-Down Area - Surface	731	SY	\$25	\$ 18,264	Top layer of existing work area westward extension; same elevation as existing work area.
8	Aggregate Loop Road - Grading/Fill	5,494	CY	\$28	\$ 153,844	Grading & fill required to support new aggregate loop road for truck access to agri-bulk transload.
9	Aggregate Loop Road - Driving Surface	1,911	SY	\$25	\$ 47,778	Top layer of new aggregate loop road; same elevation as existing work area.
10	Culvert 12" RCP	120	LF	\$85	\$ 10,200	Drainage of truck loop infield (assume 2 pipes).
11	Culvert End Section RCP 12"	4	EA	\$500	\$ 2,000	Drainage of truck loop infield (assume 2 pipes).
12	Truck Scale & Testing Equipment	1	LS	\$225,000	\$ 225,000	Assumes agri-bulk will need to be weighed & quality tested on-site.
13	Truck Dump Pit	1	LS	\$225,000	\$ 225,000	
14	Conveyor System	155	LF	\$2,000	\$ 310,000	200 tons/hour order-of-magnitude rate
15	Tripod Dolphin Structure	3	LS	\$175,000	\$ 525,000	Pipe piles; used to facilitate barge un/loading operations.
16	Cell Structure	1	LS	\$225,000	\$ 225,000	12' to 15' diameter
17	Deadman Structure	2	LS	\$150,000	\$ 300,000	Structure along shoreline to "anchor" barge fleet (see Note 7).
18	Construction Contingency	35	Percent	---	\$ 818,285	Unknowns/assumptions
Civil/Site/Infrastructure Total					\$ 3,156,242	

Total Engineer's Opinion of Probable Construction Cost: \$ 3,876,554

- NOTES: 1.) 2021 Dollars.
 2.) Excludes site acquisition/lease costs.
 3.) Excludes cost associated with acquiring/use of crane & excavator.
 4.) Permitting cost assumptions are estimates based on information provided from agencies. These could change based on actual agency requirements. Assumed - Phase I ESA (Phase II ESA not required), no additional wetland delineation needed, traffic study, hydraulic modeling, cultural resources delineation, USACE permitting, T&E consultation, FAA permit, SPCC plan, SWPPP, construction air permit needed but operation permit will not be needed, coordination with MoDOT concerning permitting and permits for bringing in equipment, and local permitting. Also included 3 months of stormwater inspections for SWPPP during construction.
 5.) Excludes improvements to County Roads 4033, 4035, and 4038.
 6.) Assumes sufficient electricity on-site.
 7.) Assumes siting deadman structures will be allowed by property owner. It may be feasible to postpone establishing a barge fleeting area to a future phase.



Calculated by: JGK
 Date: 8/12/2021
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 Date: 8/12/2021
 Project: Heartland Port Authority
 Hanson Project No.: 21L0068

Rev. B

Engineer's Opinion of Probable Construction Costs - North Site 1 Phase 2

Engineering, Permitting, and Construction Management						
Item#	Item	Quantity	Unit	Unit Cost (USD)	Total (USD)	Notes
1	Engineering Design	6	Percent	---	\$ 153,524	Typically 6% of Civil/Site Construction Cost
2	Geotechnical Investigations & Report	1	LS	\$30,000	\$ 30,000	Allowance
3	Construction Management	6	Percent	---	\$ 153,524	Typically 6% of Civil/Site Construction Cost
4	Survey	1	LS	\$5,000	\$ 5,000	Allowance for Additional/Pickup Survey
5	Material Testing	1	Percent	---	\$ 25,587	Typically 1% of Civil/Site Construction Cost
6	Construction & Stormwater Permitting	1	LS	\$125,000	\$ 125,000	Allowance (see Note 4)
Engineering, Permitting, and Construction Management Total					\$ 492,636	
Civil/Site/Infrastructure						
Item#	Item	Quantity	Unit	Unit Cost (USD)	Total (USD)	Notes
1	Mobilization	5	Percent	---	\$ 90,255	Typically 5% of Civil/Site Construction Cost
2	Clearing and Grubbing	904	SY	\$5	\$ 4,522	Clear existing ground for conveyor corridor; includes vegetation and topsoil removal only.
3	Tree Removal	1	LS	\$5,000	\$ 5,000	Additional cost (beyond the clearing and grubbing cost) to remove trees near riverfront; allowance.
4	Sheet Pile Dock - Structure	1	LS	\$1,200,000	\$ 1,200,000	Extend existing dock structure westward with steel sheet piles.
5	Sheet Pile Dock - Grading/Fill	7,729	CY	\$28	\$ 216,417	Grading & fill required to support sheet pile dock extension.
6	Sheet Pile Dock - Operating Surface	1,167	SY	\$25	\$ 29,167	Aggregate top layer of sheet pile dock extension to match adjacent areas.
7	Tripod Dolphin Structure	2	LS	\$175,000	\$ 350,000	Pipe piles
8	Construction Contingency	35	Percent	---	\$ 663,376	Unknowns/assumptions
Civil/Site/Infrastructure Total					\$ 2,558,737	

Total Engineer's Opinion of Probable Construction Cost: \$ 3,051,373

- NOTES: 1.) 2021 Dollars.
 2.) Excludes site acquisition/lease costs.
 3.) Excludes cost associated with acquiring/use of crane & excavator.
 4.) Permitting cost assumptions are estimates based on information provided from agencies. These could change based on actual agency requirements. Assumed that no additional work would be needed for Phase I ESA, wetland delineation, traffic study, cultural resources, or SPCC. Additional hydraulic modeling will be needed, USACE permitting, T&E consultation, FAA permit, SWPPP, construction air permit needed but operation permit will not be needed, coordination with MoDOT concerning permitting and permits for bringing in equipment, and local permitting. Also included 3 months of stormwater inspections for SWPPP during construction.
 5.) Excludes improvements to County Roads 4033, 4035, and 4038.
 6.) Assumes sufficient electricity on-site.