SLIP C DECISION SUMMARY
MINNESOTA POLLUTION CONTROL AGENCY
SITE REMEDIATION UNIT 2

Site Name:	Slip C
Address:	Duluth, Minnesota 55802
SR /AI Number:	SR0001012/AI187253
Project Manager:	Steven M. Schoff
Technical Analyst:	Mike Bares

STATEMENT OF PURPOSE

This Decision Summary presents the selected remedial action for the Slip C section of the St. Louis River Area of Concern (SLRAOC) and summarizes the facts and determinations made by the Minnesota Pollution Control Agency (MPCA) in approving the selected response actions. The response actions were designed to minimize or remove exposure to sediment contaminants that bioaccumulate in the food chain to levels that are protective of human health and the environment.

SITE BACKGROUND AND HISTORY

Slip C is an approximate 12-acre active shipping slip in the Duluth Harbor basin located at the far northwestern corner of Superior Bay within the inner portion of the Duluth Harbor and is the northernmost slip in a series of slips located in the eastern side of Rice's Point. It is located near the mouth of the St. Louis River in the Duluth Superior-Harbor within the boundaries of the SLRAOC. Historical releases of contaminants resulted in sediment contaminated with lead, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), mercury, cadmium, copper, zinc and other metals. Due to these releases, the MPCA identified the Slip C as a "Remedial Action Area" for the SLRAOC.

The Duluth-Superior Harbor, which connects to Lake Superior, has a long history of serving the manufacturing and shipping needs for the Duluth-Superior Region and has been home to significant historical heavy industry including paper mills, coal gasification plants, and steel processing. The Duluth-Superior port remains active in the transportation of iron ore, coal, limestone, and grain, and is the largest port on the Great Lakes in terms of shipping volume.

The Slip C and surrounding area is highly industrialized as it has been for over a century. Current Slip tenants include a trucking company and a mineral production company on the northern side of Slip C and a timber company along the southern side. Meetings held on June 13-June 15, 2017 between the MPCA and current tenants indicated that the mineral production company is the main user of Slip C and has large ships making regular deliveries of salt and other commodities. Current use of Slip C by the other owners is limited with no large vessels with deep draft using their docks at this time and with no future plans for that use.

SITE HISTORY

Slip C has undergone several physical modifications since European settlement of the area. The area encompassing the northern section of the Duluth Harbor was initially marshland. Modern development of the harbor began after 1861. Construction of the Duluth Ship Canal was started in 1870, thereby providing a Duluth entry into the harbor from Lake Superior.

The U.S. Army Corps of Engineers Maritime Museum in Duluth retains several historical photos of Slip C and harbor development over time.

DESCRIPTION OF CONTAMINANTS

The MPCA conducted an investigation of sediment quality in Slip C in 2014 and 2015. Based on this study, which indicated contaminated sediments are located in an approximated 6.4-acre area in the Head of the 12-acre slip, Slip C has been identified as a Remedial Action Area for the SLRAOC where remedial action to mitigate contaminated sediments is needed. Contaminants present include lead, PAHs, mercury, zinc, cadmium, and PCBs. The MPCA estimates the volume of contaminated sediment to be about 34,000 cubic yards. Slip C is a high priority for remedial action in the SLRAOC based on:

- Exceedance of the mid-point Sediment Quality Target (SQT) for lead over a 6.4-acre area of the 12-acre slip.
- Presence of bio-accumulating contaminants, including PAHs, mercury, and PCBs that contribute to fish advisories in the SLRAOC.
- Large continuous area of bioactive zone sediments and benthic habitat impacted by contaminants.
- Presence of exposed contaminated sediments vulnerable to erosion and re-suspension in the slip.
- High potential for continued development of this area for commercial use.

Detailed investigations at Slip C identified sediments contaminated with PAHs, cadmium, lead, nickel, and zinc. MPCA completed a Sediment Remedial Investigation (Sediment RI Report) in 2015. The Sediment RI Report identified lead and PAHs as the driving contaminants of concern (COCs) for Slip C.

Contaminated sediment was generally identified in the southwestern half of Slip C and considered to present a high likelihood of significant effects to benthic invertebrate communities from exposure to contaminated sediments at Slip C.

PAHs

All Intervals							
Compound	Number of samples	Number of detections	Max Concentration (µg/kg)	% SSV Exceedances	% Level 1 SQT Exceedances	% Midpoint SQT Exceedances	% Level 2 SQT Exceedances
Acenaphthene	101	69	2600	0%	70%	32%	17%
Acenaphthylene	101	62	2140	0%	96%	15%	9%
Anthracene	101	72	6880	0%	51%	7%	4%
Benzo(a)anthracene	101	74	12200	NE	52%	13%	8%
Benzo(a)pyrene	101	75	10100	NE	49%	10%	2%
Chrysene	101	76	14200	NE	50%	14%	8%
Dibenz(a,h)anthracene	101	69	2030	NE	43%	16%	12%
Fluoranthene	101	77	25700	0%	46%	15%	9%
Fluorene	101	71	2090	0%	22%	8%	3%
2-Methylnaphthalene	101	64	695	1%	36%	9%	4%
Naphthalene	101	66	744	8%	5%	2%	2%
Phenanthrene	101	76	19400	0%	51%	20%	14%
Pyrene	101	80	22300	0%	55%	22%	13%
Total PAH 13	101	101	114234	NE	48%	6%	2%
PAH 34 ESB	12	12	3.12	ESB 34 > 1.0			
				25%			

Notes:
µg/kg – micrograms per kilogram
NE – not established

Lead

Interval (meters)	0.0 – 0.15	0.15 – 0.5	0.5 – 1.0	>1.0	573 feet amsl	All Intervals
Number of samples	25	24	23	51	20	101
Number of detections	25	24	23	51	20	101
Max Concentration (mg/kg)	208	186	186	382	41.8	382
% SSV Exceedances	0%	0%	0%	4%	5%	2%
% Level 1 SQT Exceedances	68%	79%	74%	24%	0%	48%
% Midpoint SQT Exceedances	28%	46%	48%	14%	0%	25%
% Level 2 SQT Exceedances	12%	21%	22%	8%	0%	12%

The MPCA did not conduct fish tissue or other biological studies specifically for Slip C; however, the Minnesota Department of Health (MDH) placed fish consumption advisories for mercury and PCBs for the water bodies that comprise the SLRAOC. Completing remedial actions that eliminate or significantly reduce the exposure of benthic organisms to legacy contaminated sediments in Slip C will contribute to meeting the SLRAOC goals for this beneficial use indicator.

As identified in the St. Louis River Remedial Action Plan (RAP, 2016) and later verified in the Final Sediment RI Report Slip C, dated November 2015, slip C is contributing to the beneficial impairments to the SLRAOC:

1) Restrictions on dredging
2) Fish consumption advisory

3) Degradation of the benthos environment

As recommended by the RAP, areas that are contributing to river sediment impairments should be addressed through remedial activities. In addition, the St. Louis River, including the Duluth/Superior Harbor, is listed as impaired water on the Clean Water Act 303(d) list for bioaccumulative toxins. Toxins include mercury, PCBs, and pesticides (DDT, dioxin, etc.). According to the MPCA, it is recommended by many programs that biotoxins be reduced within the St. Louis River estuary and harbor. Removing or isolating the contaminated sediments from the surface water/sediment interface will help in the reduction of the impaired water resulting from bioaccumulative toxins in the SLRAOC.

Risk to human health

Slip C is within an active harbor surrounded by commercial properties. Exposure from contaminated sediments to the public is limited given the depth to sediments within Slip C. No public swimming or wading is permitted or practical, and Slip C does not serve as a public water supply. All information to date indicates that the proposed future use of Slip C is consistent with the current use. The major contaminants, lead and PAHs, are generally non-volatile and not emitted from the waters of Slip C; therefore, the only remaining pathway for human exposure to contamination from Slip C is fish consumption. The relatively small size and consistent deep water does not provide significant high quality fish habitat; however, fish consumption advisories are in effect for selected fish species in the SLRAOC due to elevated concentrations of PCBs and mercury found in fish tissue (MDH, 2000). There is a potential that contaminated sediments in Slip C are contributing bioaccumulative contaminants into the fish food chain and contributing to the overall impaired use in the SLRAOC. In summary, risk to human health from contaminated sediments in Slip C is low.

Ecological risks

The depth to which benthic and other higher trophic level organisms can penetrate sediment varies, but for water depths of greater than 2.5 meters at the nearby St. Louis River Interlake Duluth Tar Superfund Site, the maximum potential penetration depth was estimated to be 0.5 meters, with the majority of the activity within the upper 15 centimeters. Accounting for the root penetration of aquatic plants increases the depth of penetration of all flora and fauna up to a depth of 1.0 meter or greater. Where water depths are less than 2.5 meters, higher trophic level organisms have the potential to penetrate the sediment to a depth of 1.0 meter or greater. Root penetration by aquatic plants has the potential to increase the maximum depth that burrowing benthic organisms can penetrate to approximately 1.0 meter. Deeply rooted shallow water and emergent aquatic and terrestrial plant roots can penetrate and be exposed at 1.0 meter or greater. Since post remedy water depths in Slip C will be greater than 2.5 meters the sediment interval of greatest relevance for ecological exposure is the top 0.5 meters. It should be noted that no recent investigation of Slip C has found the presence of aquatic plants growing in the sediment.

There are limited pathways by which ecological receptors might be exposed to contaminants in the sediments at Slip C. Direct environmental exposure pathways include direct contact with contaminated sediments or water by benthic invertebrates and fish, and ingestion of sediments by sediment dwelling organisms and fish, which feed on invertebrates living in sediment. Indirect exposure pathways include ingestion of invertebrates by fish, or fish, which have bioaccumulate sediment contaminants in their tissues.

The limited screening ecological risk assessment prepared for the detailed investigation was conducted by comparing the sediment chemistry results with the Level 1 and Level 2 SQTs (Crane et al, 2000). SQTs are contaminant values that represent a level of protection of sediment-dwelling organisms. Level 1

SQTs identify chemical concentrations, which will provide a high level of protection for designated water uses, specifically for aquatic life. By comparison, a lower level of protection for designated water uses will be provided by the Level 2 SQTs. Therefore, goals of the SQTs developed for the protection of sediment dwelling organisms are:

- Level 1 SQTs are intended to identify contaminant concentrations below which harmful effects on sediment dwelling organisms are unlikely to be observed.
- Level 2 SQTs are intended to identify contaminant concentrations above which harmful effects on sediment-dwelling organisms are likely to be frequently or always observed.

Based on a comparison of the available analytical data and SQT values, the contaminants detected in Slip C sediments exceeding the SQT values are considered a risk to the benthic community and the larger ecological environment, where they are found in the top meter of sediment.

SELECTION AND DESCRIPTION OF REMEDY

As the MPCA staff evaluated potential remediation options for Slip C, the following remedial action objectives (RAOs) were established that should be accomplished by the remediation project.

1) Minimize or remove exposure to sediment contaminants that bioaccumulate in the food chain and contribute to fish consumption advisories.
2) Minimize or remove exposure of the benthic organisms to contaminated sediments above the preliminary sediment cleanup goals.
3) Preserve water depth to enable the current use of Slip C.
4) Enhance deep-water aquatic habitat if conditions allow, in a manner that contributes to the removal of BUIs.
5) Minimize or remove human exposure to contaminated sediments above sediment cleanup goals.

A Focused Feasibility Study (FFS) was completed in 2016 to evaluate alternatives to remediate contaminated sediments that represent a risk to the aquatic community that was identified in the 2015 Remedial Investigation. Alternatives were identified and screened to determine if they meet the RAOs. The following alternatives were evaluated in this FFS:

Alternative 1: No Action –The No Action Alternative reflects the site conditions described in the baseline risk assessment and remedial investigation. The No Action Alternative included within this FFS does not include any treatment or engineering controls, institutional controls (ICs), or monitoring. There are no costs associated with the No Action Alternative. A No Action Alternative applied to Slip C would not meet criteria for protection of human health and the environment, but is included as an alternative for comparison purposes.

Alternative 2: Monitoring and Institutional Controls – This alternative does not provide any immediate improvement to protectiveness but is included as a possible placeholder to be used as an interim response. An interim response may be required should funding sources be unavailable until a later date or be distributed based on-site prioritization. The monitoring and ICs alternative would consist of evaluating trends in sediment chemical concentrations, sediment toxicity, and COC bioaccumulation

within aquatic organisms (i.e., benthic organisms) over time. ICs appropriate for maintaining protectiveness of human and environmental health would be implemented, if applicable, until sufficient contaminant degradation, transformation, isolation, or other natural recovery processes reduce Site-related risks to acceptable levels; however, natural recovery of contaminated sediments is not anticipated within a reasonable time frame at Slip C, or should an alternative remedy be implemented. The estimated total present value cost for Alternative 2 is $330,000.

Alternative 3: Cap and Armor – This alternative would consist of constructing a 0.95-meter thick cap (sand plus armor; 3.1 feet) over approximately 6.4 acres with sediment concentrations exceeding the cleanup level (CUL; Midpoint SQTs) for COCs. Prior to cap construction, a limited amount of sediment "grading" may be conducted to prevent excessive gradients and/or excessively shallow areas after cap construction. Armoring will be completed across the entire cap to prevent scouring due to prop wash as Slip C is actively used and the entire slip is subjected to intense wave action. Approximately 22,000 cubic yards of sand and 10,000 cubic yards of appropriately sized armor material will be used for the cap and armoring. Following cap construction, ICs will be implemented to protect the capped area. The estimated total present value cost for Alternative 3 is $5,100,000.

Alternative 4: 1-Meter Dredge, Cap, and Armor – This alternative would consist of dredging 1.0 meter (3.3 feet) of sediments exceeding the CUL, in a 6.4-acre area, and capping. Total cap thickness will be 0.95-meter, sand plus armor. The dredged sediments would be transported by barge to a staging area, stabilized with amendment materials as needed, transported by roadway, and disposed of at an off-site landfill. The benefits of dredging 1.0 meter prior to cap placement would be offsetting draft loss due to capping. Armoring will be completed across the entire cap to prevent scouring due to prop wash as Slip C is actively used. Total dredge sediment volume is anticipated to be 34,000 cubic yards. Approximately 22,000 cubic yards of sand and 10,000 cubic yards of appropriately sized armor material will be used for the cap and armoring. Following cap construction, ICs would be implemented to protect the capped area. The estimated total present value cost for Alternative 4 is 11,000,000.

Alternative 5: Dredge with Thin-Layer Cover – This alternative would consist of complete removal of all sediments exceeding the CUL in a 6.4-acre area. The dredged sediments would be transported by barge to a staging area, stabilized with amendment materials as needed, transported by roadway, and disposed of at an off-site landfill. Following sediment removal, a 0.15-meter (0.5 feet) thin-layer sand cover would be placed to reduce surface concentration of dredge residuals through mixing of the upper sediment layer. The total dredge volume is anticipated to be 120,000 cubic yards (including over dredge); however, this volume may increase based on pre-design vertical delineation results. ICs and a long-term monitoring program would not be implemented following completion of remedy construction if complete removal of contaminated sediments were achieved. The estimated total present value cost for Alternative 5 is $19,000,000.

The FFS included a comparative analysis to identify and compare advantages and disadvantages of each of the alternatives. This evaluation was done using the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) remedy selection criteria in general accordance with United States Environmental Protection Agency (EPA) guidelines for feasibility studies (EPA, 1990) which divides criteria into three groups.

1. **Threshold Criteria**, which relate to federal statutory requirements that each alternative must satisfy in order to be eligible for selection and including:
    - Overall protection of human health and the environment in both short and long term
    - Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) under federal, state, or local environmental laws and regulations.

2. **Primary Balancing Criteria**, which are the technical criteria upon which the detailed analysis is based on, including:
    - Long-term effectiveness and permanence
    - Reduction of toxicity, mobility, or volume through treatment
    - Short-term effectiveness
    - Implementability
    - Costs
3. **Modifying Criteria based on state agency and community acceptance.**

THRESHOLD CRITERIA

The three active alternatives each would be designed to meet threshold criteria. Alternatives 3, 4, and 5 would eliminate, reduce, or control exposure to contaminated sediment and would be designed to meet RAOs for protecting human health and the environment. Alternatives 1 and 2 do not meet the threshold criteria, but were carried forward for evaluation as required for analysis under the NCP.

BALANCING CRITERIA

Long-term effectiveness and permanence

Alternatives 3, 4, and 5 are effective because they can maintain the desired level of protection of public health, welfare, and the environment in the long-term. However, contaminated sediment would remain in place under Alternatives 3 and 4, requiring long-term operation and maintenance (O&M) and ICs to assure long-term effectiveness. Therefore, they are not as permanent for protecting the aquatic environment with-in Slip C.

Reduction of toxicity, mobility, or volume through treatment

Treatment of contaminated sediments to reduce toxicity, mobility, or volume is not a major component of any of the evaluated alternatives. The types of contaminants present, semi volatile organic compounds and heavy metals, are very difficult to remove or destroy in aquatic sediment; therefore, no feasible options for in-site treatment were identified through the 2016 Feasibility Study screening process. Alternatives 4 and 5, which include the addition of a solidification agent to dredged sediment as a means to bind excess free water, would indirectly, result in reducing contaminant mobility, but in turn, large amounts of contaminated water requiring treatment and discharge would be generated and off-site landfill disposal would be required.

Short-term risks

Each of the three active Alternatives would involve some short-term risks during construction because they require varying amounts of dredging/ capping that will result in resuspension of contaminated sediments. Construction activities would involve direct short-term adverse effects to aquatic habitat and biota in Slip C, including displacement of fish and smothering of benthic organisms. These effects would occur during remedy construction and during the recovery period thereafter. Alternative 3 likely would present somewhat less adverse effects since contaminated sediment would be capped and not dredged though limited leveling of sediments would occur. The construction plans would be designed to contain suspended sediment and to limit these impacts to within the construction boundaries. Benthic organisms would be expected to be re-established for all alternatives within several growing seasons.

Short-term adverse effects to surface water may also occur during dredging and capping/habitat restoration activities. Surface water control structures have shown that they are reliable in minimizing these short-term adverse effects.

Additional short-term environmental impacts related to on land storage and treatment of contaminated sediment, contaminated water treatment, and transport to disposal facilities are associated with Alternatives 4 and 5. These two alternatives could also increase the risk of compromising the stability of Slip C dock walls both during dredging operations and after construction is complete. This concern increases significantly with Alternative 5, the total dredging option.

Implementability

Dredging, capping, restoration, surface water control structures, as well as monitoring and O&M, that would be required under Alternatives 3, 4, and 5 are all technically feasible and implementable from an engineering perspective. These technologies have been implemented successfully at other sediment sites and could be readily implemented at Slip C.

Dredging contaminated sediment with significant debris may pose additional but not insurmountable difficulties (Alternatives 4 and 5). In addition, there are concerns with the stability of the dock walls during dredging activities required for Alternatives 4 and 5. There would be a higher risk to the stability of the dock walls under a total removal scenario (Alternative 5). Therefore, the total removal scenario would likely provide the lowest achievement of the implementability criterion.

Implementability also includes administrative feasibility of the remedy associated with the involvement and approvals needed from multiple State and Federal agencies and other stakeholders. Both Alternatives 4 and 5 will require more coordination with other regulatory agencies than Alternative 3, as no off-site disposal will be required for Alternative 3. Permits for capping, however, would be required for Alternatives 3 and 4.

In summary, Alternative 3 appears to be the easiest of the three active alternatives to implement since it would have the lowest level of concern of damaging or decreasing dock wall stability, no off-site disposal, no contaminated sediment staging, and less overall coordination with other regulatory agencies.

Cost effectiveness

Cost estimates developed for each alternative are included in the remedy descriptions of the FFS. The cost estimates include capital costs (including both direct and indirect costs), annual O&M costs, and net present value of capital and O&M costs. Several factors that could greatly affect cost could not be reasonably estimated during this FFS and are not included in the estimated costs. These factors, which should be evaluated during final design, include:

Dock wall stability

The risks of damaging or decreasing stability of dock walls is expected to increase as dredging volume increases as described in Alternatives 4 and 5. Capping the sediment would have less risk of damage to the walls but assessment of the walls will still need to be performed.

Sediment traps or other means of limiting incoming sediment

This will be evaluated in the design phase of the project. If sediment traps are installed, long-term maintenance such as sediment removal will be required. Costs for installation and/or maintaining these sediment traps are not included. At least one storm sewer was identified in the remedial investigation that drains into Slip C.

In summary, Alternative 3 provides the most cost effective option of the three active Alternatives, as removal, treatment, and off-site disposal is required for Alternatives 4 and 5 and is significantly more expensive than Alternative 3.

MODIFYING CRITERIA

The modifying criteria, which includes state agency and community support and acceptance, were evaluated during the public notice period in July and August 2017 and at a public open house meeting held on July 20, 2017. Feedback received from stakeholders and the public during this period was limited with no current landowners attending the public meeting. MPCA actively engaged Slip C landowners in meetings on July 13, 14, and 15th, with face-to-face meetings and did not receive any negative comments in regards to proposed Alternative 3.

Comparative Analysis Summary

The comparative analysis presented in the FFS indicates that Alternatives 3, 4, and 5 are each expected to be protective of human health and the environment. The FFS also indicates that Alternative 3 would be the lowest cost option and likely would be easier to implement and would have less short-term impact to the environment associated with it.

Based on the information provided in the FFS report and on input provided by adjacent property owners, comments from the public meeting and other stakeholders, the MPCA staff has selected Alternative 3 as the preferred option for remediation of contaminated sediment in Slip C. Some of the primary reasons for Selecting Alternative 3 as the preferred option are summarized below.

- Alternative 3 is protective of human health and the environment, and, with adequate long-term maintenance, it provides the same level of protection and long-term effectiveness as Alternative 4 and 5 but half the cost of Alternative 4 and over three times less than Alternative 5. Alternative 3 and 4 would require long term monitoring and maintenance of remaining contaminated sediment and the protective cap.
- Alternative 3 does not require bringing contaminated sediment to the surface for disposal off-site. Moving contaminated sediment off site for disposal would involve the following challenges and increased costs:
    - Need to dewater and stabilize contaminated sediment before transport
    - Need to secure property near site for staging area for dewatering and treatment
    - Costly water treatment and water disposal during treatment
    - Monetary and environmental costs associated with shipping and landfill disposal
    - Would produce more greenhouse gases due to truck and material handling
- Alternative 3 reduces the risk of compromising the stability of dock walls that might be associated with the deeper dredging required for both Alternatives 4 and 5.
- Alternative 3, even with the addition of an approximately 3 foot cap, still allows for maintaining an adequate bathymetry for current uses of Slip C.
- Primary stakeholders, including adjacent property owners support Alternative 3, which will not affect the current uses of Slip C.
- If future use of Slip C requires dredging to seaway depth, landowners could remove the cap material and contaminated sediment if such action is economically feasible. MPCA oversight of this action would be required to ensure the action protects human health and the environment.

DETAILED DESCRIPTION OF ALTERNATIVE 3: Sediment Capping and Armoring

In general, Alternative 3 will cap contaminated sediments within Slip C without the need to remove sediment for off-site disposal. The remedial design will allow shallow depths to preserve the stability of Slip C dock walls. Layers of appropriately sized armor material will be placed over the cap in areas, as needed, to protect it from erosion. Some major components of Alternative 3 are:

Surface water control during remedy implementation

Surface water control structures such as silt curtains, absorbent booms, water filled dams, or sheet piling will be necessary to isolate suspended sediment and turbidity in Slip C during capping. If water quality standards are exceeded outside of the work area, additional BMPs may be necessary.

Environmental and physical monitoring during remedy implementation

Environmental and physical monitoring is necessary during remedial actions. Types of monitoring may include: bathymetry, borrow material, air quality, and surface water. The types of monitoring would be specified in the design documents.

Cap construction

Alternative 3 includes capping to minimize potential of aquatic organisms being exposed to contaminated sediment. Capping material used will provide suitable substrate for the benthic community. The FFS provides for installation of a 0.8-meter-cap consisting of an isolation zone (IZ) of 0.5 meters and a potentially bioactive zone (PBAZ) of 0.3 meters. The IZ is the portion of the cap that is applied directly over the contaminated sediments and is designed to isolate and attenuate contaminants from the new PBAZ. The PBAZ is the area within the cap above the IZ where biological activity may potentially be present post remedy. The final design thickness and material specifications for the IZ will be based on pore water transport and attenuation modeling conducted during the remedial design process. The PBAZ will be constructed of a sandy material and will become the new benthic substrate suitable for supporting deep-water aquatic organisms. Additional armoring material will be added to protect the cap from physical forces in Slip C and potentially provide hard substrate habitat. Final specifications will be approved in the remedial design document.

Long-term operation, maintenance, and monitoring

Contaminated sediments will remain in-place; therefore, long-term operation, maintenance and monitoring of the cap and the PBAZ will be necessary. Potential maintenance costs include cap repair and replacement, which are included in the FFS cost estimates for Alternative 3. The need for sediment traps or other means of limiting incoming sediment to maintain appropriate water depth that may be required will be evaluated in the design phase of this project. If sediment traps are implemented, sediment removal and additional long-term maintenance of these traps will be required.

Institutional controls

Institutional controls will be necessary to maintain the cap integrity because contaminated sediments will remain in-place with this alternative. Institutional controls may include restrictions on dredging, boat depths, boat use that may erode cap materials, and large vessel anchoring.

PUBLIC COMMENTS AND RESPONSES

On July 20, 2017, the MPCA held an open house for public review and comment on Slip C's five clean-up alternatives. The MPCA published a request for comments on July 5, 2017 and accepted public

comments through August 4, 2017. The MPCA reviewed each comment letter received, and categorized and summarized the significant comments, criticisms, and new relevant information in aggregate along with the MPCA staff's response to those comments. The summarized comments and responses are provided in the table presented below.

Summary of public comments and MPCA responses

Prefers Alternative Five Dredge with thin layer cover
Comment: Email message-Would prefer that MPCA follow a clean-up course to remove all contamination from the Slip and cover it with clean material as described in Alternative 5. Alternatives 3 and 4 do provide protection against pollutants, but do not remove the contaminants from the estuary.
Response: The MPCA appreciates your comments in regards to the proposed clean up of Slip C. However, Alternative 3 is a more cost-effective remedy that protects human health and the environment.
Prefers removal and off-site disposal of all contaminated material.
Comment: Prefers a remedy that keeps the full length of the Slip available for future maritime use without added barriers and is an ideal way to clean-up the Slip to remove and dispose of contaminated material where feasible.
Response: The MPCA understands the desire to remove contaminated material from the Slip. Current Slip Tenants raised no objections to the proposed Alternative 3. This clean-up Alternative will not affect the current use of the Slip and will be protective of human health and the environment.

MPCA site decision

The selected response actions are consistent with the Minnesota Environmental Response and Liability Act, Minn. Stat. §§ 115B.01 to .18, and are not inconsistent with the Federal Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 et seq and the National Contingency Plan, 40 C.F.R Part 300. I have determined the selected response actions are protective of public health, welfare, and the environment.

Kathryn J. Sather

Kathryn J. Sather
Division Director
Remediation Division

9/28/17

Date