5 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

The following analysis compares alternatives relative to each other using the seven evaluation criteria to support selection of a preferred remedial alternative. The analysis is designed to provide decision makers with information to aid in the selection of a remedial alternative that best meets the statutory requirements for remedial actions.

As discussed in the RI Report – Revision 0 (NRT, 2008) and summarized herein, previous remedial actions significantly reduced the toxicity, mobility, and volume of affected media. The sediments (including surficial sediment) in the Wisconsin River have high concentrations of PAHs in a relatively small area. The PAH concentrations are stable, likely due to the protective environment of sand and cobbles. Neither the area nor concentrations of PAHs have significantly changed from the 2000 sediment survey. Further there have been no reported observations of sheens in the area. These conditions need to be recognized as part of the comparative analysis.

5.1 Overall Protection of Human Health and the Environment

Alternative 1 is not protective of human health and the environment in comparison to Alternatives 2 through 4a/b and therefore will no longer be considered in this analysis.

Alternative 2 through 4 are protective of human health and the environment. The time frames for achieving protection are discussed in Section 5.5, below. Each Alternative 2 through 4a/b, if implemented, will achieve and maintain protection of human health and the environment.

Alternative 4, is more extensive in remediation work, but would result in fugitive volatile organic emissions to the community through the excavation, dredging, and disposal of affected soil and sediment.

5.2 Compliance with ARARs

Alternatives 2 through 4a/b comply with and attain chemical-specific ARARs identified in Table 1. Alternatives 3a/b and 4a/b will meet the requirements of the action-specific ARARs.

5.3 Long-Term Effectiveness and Permanence

Alternatives 2 through 4a/b are all effective in the long term. Given the low magnitude of residual risk associated with the soil adjacent to the pond and extent of soil remediation already completed at the site, the additional soil removal included under Alternative 4 does not result in greater long-term effectiveness or permanence. As discussed in Section 4.5.3, Alternatives 4a/b have the potential for groundwater concentrations to re-bound after the groundwater extraction system is discontinued - as a result reliance on groundwater extraction offers less permanence. The armor layer over the affected area of Wisconsin River bed that is included in Alternative 4b would further enhance long term performance and permanence of the sand cover by addressing potential scour concerns.

5.4 Reduction of Toxicity, Mobility, and Volume through Treatment

Previous remedial actions on soils and groundwater (Section 1.2.8) significantly reduced the toxicity, mobility, and volume of affected media.

Alternatives 2 through 4a/b benefit from natural processes that will reduce the toxicity or mobility of affected media. Alternatives 3a/b reduce the toxicity of the surface sediment by removing the exposure pathway through placement of a sand cover on the affected sediment in the pond. Alternative 3b reduces the mobility of PAH contamination more than 3a because activated carbon is added to the sand cover which will sequester PAHs.

Alternatives 4a/b reduces the toxicity of affected sediment through excavation and disposal of sediment in the pond – not through treatment. Alternatives 4a/4b also reduces the toxicity of the surface sediment by removing the exposure pathway through placement of a sand layer on the affected sediment in the pond and the river. Alternative 4b includes an armor layer that does not further reduce the toxicity, mobility, or volume but enhances the long term performance of the sand cover.

Alternative 4a/b also removes affected soil from the Site for disposal. Based on the groundwater monitoring results, this area does not appear to be influencing the groundwater plume; therefore, a limited removal/landfill disposal does not reduce toxicity, mobility, or volume through treatment. The groundwater extraction system and ex-situ treatment system included in Alternatives 4a/b reduces mobility compared to MNA options, but offers no better treatment and may impede natural processes. As a result of the characteristics of the aquifer (sandy), a large volume of water will need to be extracted to remove an appreciable amount of contaminants for an extended period (assumed to be 30 years for cost purposes

but attainment of PRGs cannot be reliable predicted). This compares to a similar timeframe on the order of 40 to 115 years for natural system recovery as estimated by the groundwater analytical modeling.

5.5 Short-Term Effectiveness

The use of institutional controls as part of Alternative 2 through 4 will minimize risk to human health receptors. Alternative 3 will disrupt the benthic community and water quality in the short-term. Alternative 2 has the least adverse short term effects while Alternative 4 has the most including disruption of the aquatic habitat and local community due to traffic congestion, road blockage, noise and dust.

Alternative 4 will reduce toxicity of surface sediment but eliminates the benthic community in Pfiffner Pioneer Park Pond and adversely affects the benthic community in the Wisconsin River during sand cover placement and may result in adversely affecting water column quality.

Approximate timeframes to construct/implement the remedial alternatives are summarized below:

Alternative	Soil	Groundwater	Wisconsin River Sediment	Pfiffner Pioneer Park Sediment
Alternative 2	GIS Registry Completion	40 to 115years plus GIS Registry Completion	--	--
Alternative 3a/b	GIS Registry Completion	40 to 115 years plus GIS Registry Completion	--	3 days
Alternative 4a/b	2 Months plus as GIS Registry Completion	40 to 115years plus GIS Registry Completion	< 1 week days (Alt 4a) < 2 weeks days (Alt 4b)	1 month

Given that the current exposure pathways do not present a human health risk outside of the generally acceptable risk ranges ($1x10^{-6}$ to $1x10^{-4}$) and there is minimal exposure areas compared to the larger system for benthic invertebrates, the extended construction exposures of Alternative 4a/4b must be considered in evaluating the net benefit of the removal actions.

5.6 Implementability

Alternative 2 and 3a/b are readily implemented.

Alternative 4a/b is more difficult to implement compared to Alternative 2 and 3a/b due to the relatively deep excavation compared to the area of the excavation in the vicinity of Pfiffner Pioneer Park Pond and the uncertainty regarding the volume of water which may require management to maintain dewatered conditions. Alternative 4a/b requires closure of Crosby Avenue which will reduce access to the park and the Art Museum for approximately 2 months, and require an agreement with the City of Stevens Point; therefore requires consideration of administrative implementability. To implement soil removal, a temporary sheet pile shoring system and management of groundwater (dewatering) will increase the construction duration and difficulty (and cost) of excavation.

Alternative 4 also requires a pump test to evaluate the pumping rate, number of wells, and location of wells to achieve an adequate radius of influence and drawdown. Existing subsurface utilities may also interfere with installation of the conveyance system. The groundwater extraction system is labor intensive (requires routine monitoring and maintenance) and provides little appreciable mass removal.. The additional labor effort must be considered in evaluating the net benefit of implementing a groundwater extraction system, given that the plume is stable well defined. .

Placing sand cover/armor in the Wisconsin River makes Alternative 4a/b more difficult to implement than Alternative 3, considering the small area and swift current.

5.7 Cost

Table 4 summarizes the costs for each alternative. The present worth costs for the Alternatives are:

Alternative 2: $982,000

Alternative 3a: $1,198,000

Alternative 3b: $1,213,000

Alternative 4a: $8,009,000

Alternative 4b: $8,048,000

Alternatives 4a/b have the greatest potential for increases due to the potential for greater volumes of water, community disturbance, overall construction implementability issues that may arise, and long term maintenance costs.

5.8 Summary

Based on the above comparison, Alternative 3 is the recommended alternative due to the effectiveness, implementability and overall protection of human health and the environment. In addition, Alternative 3 is cost effective for the overall net benefit.

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