

10.0 ALTERNATIVES

10.1 INTRODUCTION

This Alternatives Analysis presents and describes the Original Design (Alternative 1, Maximum Degradation Alternative), the Proposed Design (Alternative 2, Minimum Degradation Alternative), and a Non-Degradation Alternative (Alternative 3) considered by Republic Services, Inc. (Republic) for construction of the passive drainage system (PDS) at Carbon Limestone landfill (site). Because this project is mandated by the OhioEPA to control groundwater on the site, an off-site alternatives analysis was not performed, and therefore not included in this section.

GENERAL SITE CHARACTERISTICS

There were several land use classes identified within the proposed PDS. They include strip mining ponds, wetlands, developed lands, deciduous forests, and an agricultural field. The following section provides a brief description of each land use type:

- The strip mining ponds are open water areas which dominate the western PDS. Water levels in these areas fluctuate drastically, as they are manually maintained under the current pumping system. Perpetual maintenance to control these water levels is necessitating the construction of the PDS.
- Developed lands consist predominantly of access roads traversing the site to provide access to the active landfill. Access roads are present throughout the majority of the eastern PDS as well as the northern portion of the western PDS. These access roads are comprised of crushed limestone and are relatively wide to accommodate heavy equipment.
- Wetlands within the proposed PDS system are comprised of both emergent and scrub/shrub vegetative strata. Vegetation within emergent wetlands is largely dominated by common reed (*Phragmites australis*, FACW). Other common herbaceous wetland vegetation includes narrow-leaf cattail (*Typha angustifolia*, OBL), common honeywort (*Ceratophyllum demersum*, OBL), and woolgrass (*Scirpus cyperinus*, FACW). Woody vegetation dominating the scrub/shrub wetlands includes black willow (*Salix nigra*, FACW) and sandbar willow (*Salix exigua*, OBL).
- Mixed deciduous/coniferous upland forests exist in fragmented portions along both the eastern and western PDS areas. Dominant species within these areas include black locust (*Robinia pseudoacacia*, FACU), black walnut (*Juglans nigra*, FACU), black cherry (*Prunus serotina*, FACU), white pine (*Prunus strobus*, FACU), and Morrow's honeysuckle (*Lonicera morrowii*, FACU).
- An approximately 11-acre cornfield lies within the northern portion of the eastern PDS. This area lies directly west of the landfill's main office and is actively cultivated for growing and harvesting field corn (*Zea mays*).

On-Site Water Resources

Water resources on the site are comprised of 10 streams, 23 wetlands, and 11 ponds. Watershed boundaries exist within both the eastern and western PDS drainage systems. All waters south of these watershed boundaries (illustrated in red shading on Figure 5) drain the site via a manual pumping system. Ultimately, all waters on the site drain to an unnamed tributary to the Mahoning River. This unnamed tributary flows northeast and drains into the Mahoning River in Lawrence County, Pennsylvania approximately 1.5 miles downstream of the Site. A wetland delineation and jurisdictional waters assessment was conducted for the project area by Civil & Environmental Consultants, Inc. (CEC) in 2011 and 2012 (Appendix A). The U.S. Army Corps of Engineers (Corps), Pittsburgh District and Ohio

Environmental Protection Agency (OEPA), Northeast district visited the site and verified the locations and boundaries of these waters on March 29, 2012.

Wetlands

A total of 23 wetland areas totaling 8.28 acres were identified and delineated within the original study area. The wetlands range in size from 0.004 acres to 2.97 acres. In general, these wetlands have been established within abandoned strip mined ponds where invasive plant species have established an aggressive vegetative monoculture. Consequently, these wetlands are of low quality and serve limited function or value to wildlife and water quality. CEC evaluated on-site wetlands using the OhioEPA *Ohio Rapid Assessment Method for Wetlands (ORAM) version 5.0* (Appendix C). Nine of these wetlands, totaling approximately 2.334 acres, were identified as isolated wetlands; and therefore jurisdiction was not claimed on these wetlands by the Corps. Isolated wetlands are considered jurisdictional by the OhioEPA.

Streams

The PDS project lies within hydrologic unit code (HUC) 05030103. The on-site streams include ephemeral, intermittent, and perennial streams. Both the eastern and western PDS areas drain offsite to an unnamed tributary to the Mahoning River. Water volumes currently draining the western PDS are contingent upon pumping schedules regulated by the landfill. The major source of hydrology for the eastern PDS is a sedimentation pond within the northeastern portion of the landfill. Discharge volumes for this sedimentation pond are also regulated by the landfill and therefore highly variable.

Being that the on-site streams originate and exist in a highly industrialized setting, water quality is relatively low. According to *Ohio Water Quality Standards* (Chapter 3745-1, Ohio Administrative Code 2002, this unnamed tributary to the Mahoning River has a protected aquatic life designation of Warmwater Habitat (WWH). This unnamed tributary flows 1.7 miles through its 2,487-acre catchment area to its confluence with the Mahoning River just across the state border in Lawrence County, Pennsylvania. CEC evaluated on-site streams using either the OhioEPA's *Primary Headwater Habitat Evaluation Index* or the *Qualitative Habitat Evaluation Index*, pursuant to qualifying criteria. Additional information regarding the onsite streams is located in CEC's Wetland and Stream Delineation Report presented in Appendix C.

During CEC's Wetland and Stream Delineation, 10 streams, totaling 5,846 feet were identified within the project area. Of the 5,846 feet of streams surveyed, 4,016 feet were perennial, 1,772 were intermittent, and 58 feet were ephemeral. A Jurisdictional Determination performed by the Corps and OEPA verified these streams and their classifications on March 29, 2012.

Ponds

In addition to wetlands and streams, 11 ponds totaling approximately 4.91 acres were identified within the study area. Excluding Open Water S, all of the on-site ponds are features created by historic strip mining

The following sections of this report consider the parameters for alternatives outlined in Section 10 of the OhioEPA Section 401 Water Quality Certification Permit Application.

10.2 ALTERNATIVE 1 – ORIGINAL DESIGN, MAXIMUM DEGRADATION ALTERNATIVE

10.2.a) *Provide a detailed description of any construction work, fill, or other structures to occur or to be placed in or near the surface water. Identify all substances to be discharged, including the cubic yardage of dredged or fill material to be discharged to the surface water.*

The proposed Alternative 1 – Original PDS Design, Maximum Degradation Alternative was designed into two different drainage systems, an eastern and a western PDS. The eastern PDS lies within a canyon-like feature created from historic limestone mining operations. Open water ponds, emergent and scrub/shrub wetlands, and mining spoil piles dominate the area. The western PDS contains areas of abandoned strip pits, areas of agricultural fields, upland shrub habitat, and upland deciduous forest. Historic land use at the site is dominated by strip mining for limestone. The proposed project lies within a highly industrialized property owned and operated by Carbon Limestone landfill.

The majority of the proposed impacts would result from excavating the PDS and the two sedimentation ponds at the terminal ends of both systems. The construction work for Alternative 1 would involve extensive excavation to establish the gradient required to naturally drain the site. The average depth of excavation along the eastern and western PDS ranges from 20 to 40 feet, with a maximum excavation depth of approximately 105 feet on the western PDS. Under Alternative 1, the western PDS would be approximately 12,750 feet in length, and the eastern PDS would be approximately 7,450 feet in length. The earthwork required for the construction of Alternative 1 would include approximately 723,005 cubic yards of cut material and 29,498 cubic yards of fill material.

10.2.b) *Describe the magnitude of the proposed lowering of water quality. Include the anticipated impact of the lowering of water quality on aquatic life and wildlife, including threatened and endangered species (include written comments from Ohio Department of Natural Resources and U.S. Fish and Wildlife Service), important commercial or recreational sport fish species, other individual species, and the overall aquatic community structure and function. Include a Corps of Engineers approved wetland delineation.*

Aquatic Impacts

Alternative 1, initially considered by Republic, would result in substantial wetland and stream impacts. Grading and disturbance from PDS alignments were proposed before a complete wetland and stream delineation had been completed. The original design is one which reflects the most straightforward and cost efficient design for constructing the PDS, barring attempts to avoid aquatic resources.

The Original Design as shown on Figure 2, impacts a large PEM/PSS wetland to the east of the service road bordering the eastern side of the western PDS. The original design included developing this wetland into the sedimentation pond at the downstream end of the PDS. Additional wetland impacts were also proposed for the southern end of the western PDS. Construction of Alternative 1 would have resulted in approximately 14.81 acres of wetland impacts and 4,637 linear feet of stream impacts. Please refer to the impact tables on Figure 2 for detailed impacts to the individual wetlands, streams, and open water ponds.

Threatened and Endangered Species

Please refer to Appendix B for correspondence between CEC, the Ohio Department of Natural Resources (ODNR), and the U.S. Fish & Wildlife Service (USFWS). Correspondence with these agencies did not identify any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife

areas, nature preserves, parks or forests, national wildlife refuges, or other protected natural areas within the site.

The project area was identified as potential habitat for the Indiana bat (*Myotis sodalis*), a federally endangered species. Through project planning and modifications to the project's schedule, potential impacts to the Indiana bat will be avoided by performing winter clearing of trees (October 1 through April 30).

The project area was also identified as potential habitat and/or lying with the range of the following species:

- Bald eagle (*Haliaeetus leucocephalus*), state threatened bird
- Black bear (*Ursus americanus*), state endangered mammal
- Northern harrier (*Circus cyaneus*), state endangered bird
- Eastern massasauga (*Sistrurus catenatus*), state endangered and federal candidate snake
- Mitchell's satyr (*Neonympha mitchellii*), federally endangered butterfly
- Northern monkshood (*Aconitum noveboracense*), federally threatened plant

Due to lack of records, proposed activities of for project, or individual characteristics of the species, the project is not anticipated to impact any of the species listed above. Please refer to Appendix B for additional information regarding threatened and endangered species.

Corps Approved Wetland Delineation

Please refer to Appendix A for a Wetland and Stream Delineation Report for the site and a Jurisdictional Determination letter from the U.S. Army Corps of Engineers, Pittsburgh District.

10.2.c) *Include a discussion of the technical feasibility, cost effectiveness, and availability. In addition, the reliability of each alternative shall be addressed (including potential recurring and maintenance difficulties that could lead to increased surface water degradation.)*

Economics

Republic will not receive any economic benefit from installation of the PDS, except the nominal amount of fuel to operate the pumps which drain the site. As a requirement from the Ohio EPA, Carbon Limestone must install the PDS concurrent with its Phase II/III expansion project. The Phase II/III landfill expansion project will have the following economic benefits to Poland Township, Mahoning County, and the surrounding areas:

- The landfill expansion will maintain 50 full-time landfill jobs for 14.1 years
- Carbon Limestone will make annual contributions totaling \$60,000 to the Capital Fund of Poland Township for 14.1 years:
 - \$15,000 to the Poland Township Police Department
 - \$15,000 to the Poland Township road Department
 - \$15,000 to Western Reserve Fire Department
- Mahoning Township, PA will receive \$15,000 on an annual basis for 14.1 years

Additionally, based upon actual waste acceptance rates from 2008, Mahoning County, Ohio received \$1,724,415 associated with their statutory fees and also received an additional \$114,762 for waste

generated more than 175 miles away from the county. Using these actual fees from 2008 it is estimated that Mahoning County, OH could receive a total of \$1,839, 178 per year for 14.1 years totaling \$25,932, 410.

Technical Feasibility

The major technical feasibility issues associated with construction of the PDS at Carbon Limestone landfill include: extensive topographic grading challenges, balancing post construction site drainage, and excavating in thick layers of subsurface rock. Although the technical feasibility issues are substantial, there are no issues that would render the construction technically infeasible.

The investment by Republic to construct the OEPA mandated PDS at the site is projected to cost approximately \$5,000,000 dollars for all aspects of design and construction. An additional investment of approximately \$500,000 dollars is anticipated for mitigation requirements. Because the PDS is mandated by the OhioEPA, a cost to benefit analysis was not performed for the proposed PDS project.

10.2.d) *For regional sewage collection and treatment facilities, include a discussion of the technical feasibility, cost effectiveness and availability, and long-range plans outlined in state or local water quality management planning documents and applicable facility planning documents.*

There are no sewage projects associated with the PDS proposal, or any adjustments in sewage flows to wastewater treatment plants.

10.2.e) *To the extent that information is available, list and describe any government and/or privately sponsored conservation projects that exist or may have been formed to specifically target improvement of water quality or enhancement of recreational opportunities on the affected water resource.*

CEC is not aware of any conservation projects publically sponsored by federal, state, or local regulatory/resource protection agencies that specifically target improvements in water quality or enhancements of recreational opportunities upstream, on, or downstream of the site.

10.2.f) *Provide an outline of the costs of water pollution controls associated with the proposed activity. This may include the cost of best management practices to be used during construction and operation of the project.*

Any temporary or permanent impacts to on-site or off-site water quality from construction runoff will be minimized by the strict implementation of proper erosion and sedimentation controls. As a result of the installation of the PDS, surface water and groundwater collected on site will be retained in the settling ponds at the terminal ends of the PDS. These sedimentation ponds will be designed to a capacity to withstand peak discharge flows from the site.

10.2.g) *Describe any impacts on human health and the overall quality and value of the water resource.* The aquatic resources located on site appear to maintain marginal water quality, have no recreational value, and provide limited benefits to human health. The high degree of historic impacts to the site and its water resources have degraded the ability for these aquatic systems to provide valuable natural functions associated with human health.

10.2.h) *Describe and provide an estimate of the important social and economic benefits to be realized through this project. Include the number and types of jobs created and tax revenues generated and a brief discussion on the condition of the local economy.*

The original site plan for the PDS (Maximum Degradation Alternative) will support construction jobs in Ohio and neighboring Pennsylvania. The towns of Lowellville, Ohio and Bessemer, Pennsylvania and the surrounding communities in Mahoning County, Ohio and Lawrence County, Pennsylvania will benefit from construction of the PDS. It is estimated that construction of the PDS will take approximately 3 years to construct with an average of 15 construction jobs per day. Over the assumed 3-year construction period, the local wage tax revenue is estimated at \$131,000.

Due to the passive nature of the project, the PDS will function absent of any manual input. Therefore, it is unlikely that there will be any full-time positions will be generated to operate the PDS. There will also not be any financial benefit to Republic from installment of the PDS. The only financial benefit will result from converting the active pumping system to a passive drainage system. This benefit will likely be realized from costs no longer required to run the pumping system.

10.2.i) *Describe and provide an estimate of the important social and economic benefits that may be lost as a result of this project. Include the effect on commercial and recreational use of the water resource, including effects of lower water quality on recreation, tourism, aesthetics, or other use and enjoyment by humans.*

As the areas proposed for construction currently exist, there are no benefits to the public from recreation, tourism, aesthetics, or other use and enjoyment by the general public. No recreational opportunities exist within the project area, and therefore will not be adversely affected by the project. There will also not be any revenue or jobs lost as a result of converting the active pumping system to the PDS.

10.2.j) *Describe environmental benefits, including water quality, lost and gained as a result of this project. Include the effects on the aquatic life, wildlife, threatened or endangered species.*

The aquatic resources located on site have limited value and provide limited functions relating to environmental quality. The high degree of historic mining and the on-going operations of a landfill detract from the ability of these aquatic systems to provide valuable natural functions. Being that the majority of the aquatic resources within the site are hydrologically isolated from one another, construction of the PDS will connect these resources, essentially creating two stream-like systems that will add substantial length to connective (federally jurisdictional) waters.

There are no foreseen impacts to wildlife or threatened or endangered species from constructing the PDS. Coordination with the USFWS and ODNR, along with careful project planning will ensure that impacts to threatened and endangered species will be avoided. Please refer to Appendix B for coordination with the USFWS and ODNR regarding the project and concern for sensitive resources.

The losses and gains of various environmental health benefits for both alternatives considered for the PDS are discussed in detail in the Alternatives Analysis. Republic proposes to provide adequate mitigation for impacts to on-site jurisdictional waters via the Wetland and Stream Mitigation Plan located in Appendix C.

10.2.k) *Describe the mitigation techniques proposed (except for the Non-Degradation Alternative).*

Please refer to the Wetland and Stream Mitigation Plan provided in Appendix C.

10.3 ALTERNATIVE 2 – PROPOSED DESIGN, MINIMUM DEGRADATION ALTERNATIVE

10.3.a) *Provide a detailed description of any construction work, fill, or other structures to occur or to be placed in or near the surface water. Identify all substances to be discharged, including the cubic yardage of dredged or fill material to be discharged to the surface water.*

Alternative 2, the proposed PDS design Minimum Degradation Alternative was designed into two different drainage systems, an eastern and a western PDS. The eastern PDS lies within a canyon-like feature created from historic limestone mining operations. Open water ponds, emergent and scrub/shrub wetlands, and mining spoil piles dominate the area. The western PDS contains areas of abandoned strip pits, areas of agricultural fields, upland shrub habitat, and upland deciduous forest. Historic land use at the site is dominated by strip mining for limestone. The proposed project lies within a highly industrialized property owned and operated by Republic.

The majority of the proposed impacts would result from excavating the PDS and the two sedimentation ponds at the terminal ends of both systems. The construction work for Alternative 2 would involve extensive excavation to establish the gradient required to naturally drain the site. The average depth of excavation along the eastern and western PDS ranges from 20 to 40 feet, with a maximum excavation depth of approximately 105 feet on the western PDS. Under Alternative 2, the western PDS would be approximately 10,400 feet in length, and the eastern PDS would be approximately 7,380 feet in length. The earthwork required for the construction of Alternative 2 would include approximately 1,613,175 cubic yards of cut material and 12,741 cubic yards of fill material.

Under Alternative 2, the PDS will be constructed to meet the Ohio EPA required PDS installation. Groundwater levels will be naturally maintained through a gravity-fed drainage system which will replace the existing active pumping system. Essentially, two stream-like drainage features will be constructed around the eastern and northern/western perimeter of the site. These PDS drainages will properly drain the landfill to control groundwater levels and a seasonally high water table.

10.3.b) *Describe the magnitude of the proposed lowering of water quality. Include the anticipated impact of the lowering of water quality on aquatic life and wildlife, including threatened and endangered species (include written comments from Ohio Department of Natural Resources and U.S. Fish and Wildlife Service), important commercial or recreational sport fish species, other individual species, and the overall aquatic community structure and function. Include a Corps of Engineers approved wetland delineation.*

Aquatic Impacts

The proposed design is shown on Figure 3. This project alternative will impact 3.815 acres of wetlands, 1,378 linear feet of stream, and 2.43 acres of open water ponds. This design reflects the alternative which disturbs the least amount of both terrestrial and aquatic habitat, while still meeting the project's purpose and need. Reducing impacts to aquatic resources was the driving factor in the development of Alternative 2. The nature of the project precluded the avoidance of impacts to all wetlands and streams, however, these impacts were minimalized to the furthest extent practicable.

The greatest reduction in impacts was achieved by relocating the sedimentation pond of the western PDS. By relocating the sedimentation pond to the eastern side of a service road (please refer to Figure 3) wetland and stream impacts were reduced by 11.00 acres and 3,259 feet, respectively. Alternative 2 also minimized disturbance to Wetland R at the southern boundary of the western PDS. Pulling back grading

further to the north resulted in an approximate impact reduction of 0.19 acres to Wetland R. Cumulatively, construction of Alternative 2 – The Proposed Site plan, will result in impacts to 3.815 acres of wetlands and 1,378 linear feet of streams. This is a substantial decrease impacts from Alternative 1 – The Preferred Site design.

Threatened and Endangered Species

Please refer to Appendix B for correspondence between CEC, the Ohio Department of Natural Resources (ODNR), and the U.S. Fish & Wildlife Service (USFWS). Correspondence with these agencies did not identify any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, or other protected natural areas within the site.

The project area was identified as potential habitat for the Indiana bat (*Myotis sodalis*), a federally endangered species. Through project planning and modifications to the project's schedule, potential impacts to the Indiana bat will be avoided by performing winter clearing of trees (October 1 through April 30).

The project area was also identified as potential habitat and/or lying with the range of the following species:

- Bald eagle (*Haliaeetus leucocephalus*), state threatened bird
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- Northern harrier (*Circus cyaneus*), state endangered bird
- Eastern massasauga (*Sistrurus catenatus*), state endangered and federal candidate snake
- Mitchell's satyr (*Neonympha mitchellii*), federally endangered butterfly
- Northern monkshood (*Aconitum noveboracense*), federally threatened plant

However, due to lack of records, the proposed activities of the project, or the individual characteristics of the species, the project is not anticipated to impact any of the species listed above. Please refer to Appendix B for additional information regarding threatened and endangered species.

Corps Approved Wetland Delineation

Please refer to Appendix A for a Wetland and Stream Delineation Report for the site and a Jurisdictional Determination letter from the U.S. Army Corps of Engineers, Pittsburgh District.

10.3.c) *Include a discussion of the technical feasibility, cost effectiveness, and availability. In addition, the reliability of each alternative shall be addressed (including potential recurring and maintenance difficulties that could lead to increased surface water degradation.)*

Economics

Carbon Limestone will not receive any economic benefit from installation of the PDS, except the nominal amount of fuel to operate the pumps which drain the site. As a requirement from the Ohio EPA, Carbon Limestone must install the PDS concurrent with its Phase II/III expansion project. The Phase II/III landfill expansion project will have the following economic benefits to Poland Township, Mahoning County, and the surrounding areas:

- The landfill expansion will maintain 50 full-time landfill jobs for 14.1 years

- Carbon Limestone will make annual contributions totaling \$60,000 to the Capital Fund of Poland Township for 14.1 years:
 - \$15,000 to the Poland Township Police Department
 - \$15,000 to the Poland Township road Department
 - \$15,000 to Western Reserve Fire Department
- Mahoning Township, PA will receive \$15,000 on an annual basis for 14.1 years

Additionally, based upon actual waste acceptance rates from 2008, Mahoning County, Ohio received \$1,724,415 associated with their statutory fees and also received an additional \$114,762 for waste generated more than 175 miles away from the county. Using these actual fees from 2008 it is estimated that Mahoning County, OH could receive a total of \$1,839, 178 per year for 14.1 years totaling \$25,932, 410.

Alternative 2, the Proposed Site design, has resulted in approximately \$10,500 in additional costs to Republic for design efforts to minimize impacts to the wetlands and streams within the proposed PDS system. The overall economic benefit to the community and the cost of constructing the original design for the PDS system does not differ between these two alternatives.

Technical Feasibility

The major technical feasibility issues associated with construction of the PDS at Carbon Limestone landfill include: extensive topographic grading challenges, balancing post construction site drainage, and excavating in thick layers of subsurface rock. Although the technical feasibility issues are substantial, there are no issues that would render the construction technically infeasible.

The investment by Republic to construct the OEPA mandated PDS at Carbon Limestone landfill is projected to cost approximately \$5,000,000 dollars for all aspects of design and construction. An additional investment of approximately \$500,000 dollars is anticipated for mitigation requirements. Because the PDS is mandated by the OhioEPA, a cost to benefit analysis was not performed for the proposed PDS project.

10.3.d) *For regional sewage collection and treatment facilities, include a discussion of the technical feasibility, cost effectiveness and availability, and long-range plans outlined in state or local water quality management planning documents and applicable facility planning documents.*

There are no sewage projects associated with the PDS proposal, or any adjustments in sewage flows to wastewater treatment plants.

10.3.e) *To the extent that information is available, list and describe any government and/or privately sponsored conservation projects that exist or may have been formed to specifically target improvement of water quality or enhancement of recreational opportunities on the affected water resource.*

CEC is not aware of any conservation projects publically sponsored by federal, state, or local regulatory/resource protection agencies that specifically target improvements in water quality or enhancements of recreational opportunities upstream, on, or downstream of the site.

10.3.f) *Provide an outline of the costs of water pollution controls associated with the proposed activity. This may include the cost of best management practices to be used during construction and operation of the project.*

Any temporary or permanent impacts to on-site or off-site water quality from construction runoff will be minimized by the strict implementation of proper erosion and sedimentation controls. As a result of the installation of the PDS, surface water and groundwater collected on site will be retained in the settling ponds at the terminal ends of the PDS. These sedimentation ponds will be designed to a capacity to withstand peak discharge flows from the site.

10.3.g) *Describe any impacts on human health and the overall quality and value of the water resource.*

The aquatic resources located on-site appear to maintain marginal water quality, have no recreational value, and provide limited benefits to human health. The high degree of historic impacts to the site and its water resources have degraded the ability for these aquatic systems to provide valuable natural functions associated with human health.

10.3.h) *Describe and provide an estimate of the important social and economic benefits to be realized through this project. Include the number and types of jobs created and tax revenues generated and a brief discussion on the condition of the local economy.*

The proposed site plan for the PDS (Minimum Degradation Alternative) will support construction jobs in Ohio and neighboring Pennsylvania. The towns of Lowellville, Ohio and Bessemer, Pennsylvania and the surrounding communities in Mahoning County, Ohio and Lawrence County, Pennsylvania will benefit from construction of the PDS. It is estimated that construction of the PDS will take approximately 3 years to construct with an average of 15 construction jobs per day. Over the assumed 3-year construction period, the local wage tax revenue is estimated at \$131,000.

Due to the passive nature of the project, the PDS will function absent of any manual input. Therefore, it is unlikely that there will be any full-time positions will be generated to operate the PDS. There will also not be any financial benefit to Republic from installment of the PDS. The only financial benefit will result from converting the active pumping system to a passive drainage system. This benefit will likely be realized from costs no longer required to run the pumping system.

10.3.i) *Describe and provide an estimate of the important social and economic benefits that may be lost as a result of this project. Include the effect on commercial and recreational use of the water resource, including effects of lower water quality on recreation, tourism, aesthetics, or other use and enjoyment by humans.*

As the areas proposed for construction currently exist, there are no benefits to the public from recreation, tourism, aesthetics, or other use and enjoyment by the general public. No recreational opportunities exist within the project area, and therefore will not be adversely affected by the project. There will also not be any revenue or jobs lost as a result of converting the active pumping system to the PDS.

10.3.j) *Describe environmental benefits, including water quality, lost and gained as a result of this project. Include the effects on the aquatic life, wildlife, threatened or endangered species.*

The aquatic resources located on site have limited value and provide limited functions relating to environmental quality. The high degree of historic mining and the on-going operations of a landfill detract from the ability of these aquatic systems to provide valuable natural functions. Being that the majority of the aquatic resources within the site are hydrologically isolated from one another, construction of the PDS will connect these resources, essentially creating two stream-like systems that will add substantial length to connective (federally jurisdictional) waters.

There are no foreseen impacts to wildlife or threatened or endangered species from constructing the PDS. Coordination with the USFWS and ODNR, along with careful project planning will ensure that impacts to threatened and endangered species will be avoided. Please refer to Appendix B for coordination with the USFWS and ODNR regarding the project and concern for sensitive resources.

The losses and gains of various environmental health benefits for both alternatives considered for the PDS are discussed in detail in the Alternatives Analysis. Republic proposes to provide adequate mitigation for impacts to on-site jurisdictional waters via the Wetland and Stream Mitigation Plan located in Appendix C.

10.3.k) *Describe the mitigation techniques proposed (except for the Non-Degradation Alternative).*

Please refer to the Wetland and Stream Mitigation Plan provided in Appendix C.

10.4 ALTERNATIVE 3, NON-DEGRADATION ALTERNATIVE, MANUAL PUMPING TO CONTROL GROUNDWATER

Based upon the functioning requirements of the project, and the location of wetlands and streams within the proposed PDS, a non-degradation design for a PDS was not feasible. The non-degradation alternative to constructing the PDS is the continuation of the mechanical pumping system currently employed at the site. However, because the OhioEPA is mandating the installation of a *passive* drainage system at Carbon Limestone landfill, the current active system does not satisfy the principle purpose of the project, and therefore is not considered a viable alternative for the project.

10.5 COMPARISON OF ALTERNATIVES

Alternative 1, the Original Design, represents the most efficient and cost-effective design for the installation of the PDS. Alternative 2, the Proposed Design, represents the project design team’s effort to avoid and minimize impacts to wetlands and streams to the furthest extent practicable, while still satisfying the project’s purpose and need. The table below presents a comparison of the original design and the proposed design for various environmental criteria.

COMPARISON OF ALTERNATIVES			
Criterion	Original Design (Alternative 1)	Proposed Design (Alternative 2)	Resulting change
Wetland Impacts	14.81 acres	3.815 acres	10.995 acres (74% decrease)
Stream Impacts	4,637 linear feet	1,378 linear feet	3,259 feet (70% decrease)
Open Water Pond Impacts	1.43 acres	2.43 acres	0.12 acres (8% increase)

As demonstrated above, significant reductions in impacts to wetlands and streams were made possible by redesigning the PDS under Alternative 2.

10.6 CONCLUSION

The Preferred Design (Alternative 2) represents the alternative which avoids and minimizes aquatic impacts to the furthest extent practicable, while still meeting the project’s purpose and need. As illustrated on the attached figures, the identified wetlands and streams lie within the area required for construction. Based upon the proposed project and location of aquatic resources relative to the project area, a Non-Degradation Design Alternative was not evaluated for this analysis.

The wetlands, streams, and ponds that will be altered and disturbed as a result of the project will still function in some capacity for wildlife habitat and water filtration. However, because the PDS will need to be available for routine maintenance, the project will not qualify for mitigation credit. Additionally, the on-site wetlands, streams, and ponds do not substantially contribute to natural water filtration and significant habitat for wildlife due to their function as historic strip mining ponds and connecting drainage ways.

Carbon Limestone is proposing to construct at least 6.88 acres of wetland mitigation and 2,067 linear feet of stream mitigation to offset these proposed aquatic resource impacts. The existing wetland and stream mitigation area will be beneficial in that the wetland will feature greater plant diversity than the original wetlands being removed, while providing enhanced wildlife habitat and a varied food supply for numerous wildlife species. It is expected that the overall quality of the wetland mitigation site will be superior to that of the 3.815 acres that will be disturbed. The 3.81 acres of impacted wetlands also includes Wetland D, which was inadvertently disturbed during previous construction activities on the site (refer to Figure 3). Additionally, the stream mitigation will more than compensate for the 1,378 linear feet of stream being affected for installation of the PDS. A detailed description of the mitigation plan is presented in Appendix C.