

## 5.0 ANTIDEGRADATION ANALYSIS

In accordance with Section 404(b) (1) Guidelines (40 CFR 230.10), a Section 404 permit can only be issued for a “least environmentally damaging practicable alternative” for the Project. Therefore, an alternative analysis is required for the Section 404 permit request to demonstrate that impacts to regulated aquatic resources have been avoided and minimized to the maximum extent practicable.

Ohio EPA also requires an alternatives analysis as part of the Section 401 WQC application. According to OAC 3745-1-05, known as the "Antidegradation Rule," an analysis of the following three alternatives that were considered during the project planning process that would avoid impacts to the aquatic resources must be completed:

- 1) Preferred Design Alternative, including mitigative techniques;
- 2) Minimum Degradation Alternative, including mitigative techniques; and,
- 3) Non-Degradation Alternative.

According to the USACE, it is understood that the alternatives analysis required for the Section 401 WQC should satisfy the Section 404(b) (1) alternative analysis requirements.

### 5.1 PROJECT DESCRIPTION

Apex proposes to expand the Apex Sanitary Landfill in order to continue to provide necessary solid waste management services to southeastern Ohio. The project purpose and need for the landfill expansion is presented in Section 1.2.

The Apex Sanitary Landfill located in Springfield Township, Jefferson County, and German Township, Harrison County, Ohio. The proposed contiguous lateral expansion project area (the site) is located south of the existing permitted waste limits. The project is also located south of the town of Amsterdam (see Attachment 1C for site location map). Construction start date is anticipated to be January of 2018 and after issuance of the CWA Section 401/404 Permit.

An alternatives analysis was prepared to present practicable alternatives to wetland and stream encroachments at the site. An alternative is considered practicable if it is capable of being implemented after consideration of construction cost, existing technology, and logistics. Regulations require a demonstration that there are no other site designs that would eliminate wetland or other jurisdictional water impacts or have fewer impacts and still fulfill the basic project purpose and need (Section 2.1).

After extensive evaluation and site planning, Apex incorporated site design changes that ultimately led to the selection of a landfill development alternative that has reduced environmental impacts from the original (preferred) site configuration. The site design changes included a reduction in the total surface area occupied by the landfill and the total cubic yards of airspace potentially available for waste disposal.

The design criteria listed below were considered during siting and the preliminary design of the proposed landfill expansion. The following components of the project are essential for the economic viability of the project and to achieve the project purpose and need:

1. The proposed landfill must meet the waste disposal needs of the local Jefferson-Belmont Regional Waste Authority for approximately 15 years that includes both the local waste disposal needs and the transfer station waste needs. Based on the proposed AMDWR of 10,000 tons per day (3.1 million tons per year), the minimum capacity of the waste disposal area must be at least 61.1 million cubic yards to provide for 15 years of waste disposal service. To achieve this waste disposal volume, the proposed landfill expansion must be located adjacent to the existing landfill to permit a contiguous expansion and a contiguous new unit with vertical expansion.
2. The project area must be of sufficient size to include landfill operation support facilities such as access roads, sedimentation ponds, and soil borrow and soil stockpile areas.
3. The proposed landfill must comply with siting criteria established in the Ohio Administrative Code (OAC) regarding setback distances including, but not limited to:

property lines (300 feet), domiciles (1,000 feet), and surface waters (200 feet); the surface water setback would not apply to waters that are authorized to be filled under Section 404 and 401 Clean Water Act permits and/or an Ohio Isolated Wetland Permit.

4. The landfill expansion must be constructed in a location that will be accessible to the existing landfill infrastructure to economically and properly handle and manage the solid waste. Existing infrastructure includes the landfill leachate piping and storage, landfill gas management system, operational buildings and scale house, roads, rail line, soil borrow and stockpile areas, and a groundwater monitoring well network.
5. The proposed landfill should be located in an area that reduces environmental and socioeconomic impacts to the region.
6. Availability of adequate transportation routes to and from the landfill.

#### 5.1.1 Maximum Degradation Alternative/Preferred Design (Original Site Plan)

The preferred design is the maximum degradation alternative and represents the Original Site Plan. This site layout was developed to maximize acreage available for landfill expansion. The Original Site Plan was designed to meet solid waste disposal needs, siting criteria, economic and engineering constraints, and regulatory requirements specified in the project purpose and need (see Section 1), and design criteria, while optimizing available landfill capacity and the operational life of the landfill. The Maximum Degradation Alternative/Preferred Design is presented as Drawing 6B-1 in Attachment 6B-1.

#### 5.1.2 Minimum Degradation Alternative/Proposed Site Plan

The Proposed Site Plan represents the Minimum Degradation Alternative was designed to meet solid waste disposal needs, siting criteria, economic and engineering constraints, and regulatory requirements specified in the project purpose, need, and design criteria, while reducing wetland impacts overall and reducing impacts to the higher-quality wetlands at the site.

The layout of the Minimum Degradation Alternative/Proposed Site Plan is presented as Drawing 6B-2 in Attachment 6B-2

### 5.1.3 Non-Degradation Alternative

The Non-Degradation Alternative was evaluated to determine if the project purpose and need could be met while avoiding stream and wetland impacts (Attachment 6B-3). The Non-Degradation Alternative has negligible environmental impact compared with the Original Site Plan (Maximum Degradation Alternative), and the Proposed Site Plan/Minimum Degradation Alternative/Proposed Site Plan, but does not provide an economically viable landfill alternative that meets the project purpose and need. The layout of the Non-Degradation Alternative is presented as Drawing 6B-3 in Attachment 6B-3.

## **5.2 AVOIDANCE**

### 5.2.1 Onsite Avoidance

The avoidance of all onsite water features is described in the non-degradation alternative described in Section 5.1.3. The proposed landfill footprint would need to be drastically reduced in size from the proposed approximately 61.1 million cubic yards of landfill airspace capacity and a site life expectancy of approximately 15.8 years to 4.7 million cubic yards of landfill airspace capacity and a site life expectancy of approximately 1.2 years (Attachment 6B-3). By avoiding all impacts to jurisdictional waters, this option does not provide an economically viable landfill alternative that meets the project purpose and need.

### 5.2.2 Offsite Alternatives

Offsite alternatives are not considered viable options for the location of the landfill expansion for several reasons: (1) the economic feasibility of the project is based on the efficient continuous use of Apex's substantial investment in infrastructure and human resources at the existing Apex Sanitary Landfill facility, thus requiring the new landfill unit to be located adjacent to the

existing landfill; (2) transportation of waste to remote facilities would create a financial hardship on the communities served by the existing landfill and create an environmental impact associated with trucking operations; and (3) the proximate location of the new landfill would require ongoing continuous care of the existing unit when it is closed, including environmental security and oversight.

There are no other municipal waste landfills within the Jefferson-Belmont Regional Solid Waste Authority. The closest out-of-district landfills are the American Landfill, Inc., and Kimble Sanitary Landfill located approximately 28 miles northwest and 46 miles west of Apex Sanitary Landfill, respectively. Both of these out-of-district landfills are located in the Stark-Tuscarawas-Wayne Joint Solid Waste Management District. These landfills charge disposal fees for out-of-district waste on the order of \$2/ton. The additional cost associated with transporting waste received by the Apex Sanitary Landfill to the American Landfill Inc. and the Kimble Sanitary Landfill is approximately \$20/ton or \$600,000 per day. Although the American Landfill Inc. and the Kimble Sanitary Landfill have site life capacities that could support receiving waste from areas serviced by the Apex Sanitary Landfill, the cost of transporting solid waste that would be generated by the closure of the Apex Sanitary Landfill is not an economically viable option.

The proposed site is properly zoned for this land use and is adjacent to the existing landfill. Expansion of the landfill on an adjacent property is preferable to developing a new “green” site, because of the potential environmental and socioeconomic impacts and economic costs associated with landfill development operations. An estimated general cost for land purchase, infrastructure, design, permitting, and construction of a comparable landfill at a new “green” site would be in the ball park of \$108,000,000.

The preferred landfill design considered the various ranking scheme criteria for landfill siting in OAC 3745-27-07(H) including the following:

- Not located within 1,000 feet of state or national parks
- Not located above federal sole source aquifer
- Not located above 100 gallons per minute aquifer

- Not located within 15 feet of uppermost aquifer system
- Not located within 5 year travel time to public water supply well
- Not located within an area of potential subsidence due to an underground mine
- Not located within 1,000 feet of a water supply well
- Not located within 300 feet of the property line
- Not located within 1,000 feet of a domicile
- Not located in sand/gravel quarry or un-reclaimed limestone quarry (this does not include excavations of limestone or sandstone resulting from the construction of the proposed lateral expansion of the Apex Sanitary Landfill facility; limestone will only be excavated as a result of the landfill and an exemption request has been included with the solid waste application (CEC 2011)).

Thus, onsite expansion provides the most practicable alternative and therefore, offsite alternatives are not considered further in this analysis.

### **5.3 MINIMIZATION**

#### **5.3.1 Maximum Degradation Alternative/Preferred Design (Original Site Plan)**

This Maximum Degradation Alternative/Preferred Design has been designed to minimize impacts to jurisdictional waters to the greatest practicable extent possible while accomplishing the overall project need. Under the Original Site Plan, the proposed limit of disturbance encompasses approximately 325 acres (Drawing 6B-1). The southeastern portion of the landfill expansion area extends into an adjacent property. At the time this alternative was developed, Apex was considering purchasing the adjacent property for landfill development. This design provides approximately 110 million cubic yards of landfill airspace capacity and a site life expectancy of approximately 28.4 years, based on the receipt of 3.1 million tons of waste per year.

Under the Original Site Plan (Drawing 6B-1), approximately 20.91 acres of wetlands and 6,680 linear feet of intermittent stream and ephemeral streams would be impacted. Additionally,

approximately 5.83 acres of open water areas in un-reclaimed mine strip pits would also be filled.

### 5.3.2 Minimum Degradation Alternative/Proposed Site Plan

The Minimum Degradation Alternative was designed to meet solid waste disposal needs, siting criteria, economic and engineering constraints, and regulatory requirements specified in the project purpose, need, and design criteria while reducing wetland and stream impacts overall and reducing impacts to the higher-quality wetlands at the site.

Under the Minimum Degradation Alternative/Proposed Site Plan (Drawing 6B-2), the proposed limit of disturbance encompasses a total of approximately 219 acres which includes:

- Approximately 171 acres of the landfill footprint (78 percent),
- Approximately 1.4 acres of sediment ponds (<1 percent), and
- Approximately 46.6 acres of perimeter road/berm (21 percent).

The Minimum Degradation Alternative/Proposed Site Plan provides approximately 61.1 million cubic yards of landfill airspace capacity and a site life expectancy of approximately 15.8 years, based on the receipt of 3.1 million tons of waste per year.

The Minimum Degradation Alternative/Proposed Site Plan would impact approximately 13.92 acres of wetlands, 4,301 linear feet of intermittent stream and ephemeral stream, and approximately 4.54 acres of open water areas in un-reclaimed strip mine pits (see Section 6, Drawing 6B-2). Apex will mitigate wetland and stream losses under the Minimum Degradation Alternative through a combination of Stream + Wetlands Foundation's In-Lieu Fee Program (see letter in Attachment 7A); the onsite restoration, enhancement and preservation of streams (see Section 7) and/or Stream + Wetlands Foundation's In-Lieu Fee Program (Attachment 7A); and best management practices (BMPs) during construction (see Sections 5.9 and 5.10).

### 5.3.3 Non-Degradation Alternative

Under the Non-Degradation Alternative (see Section 6, Drawing 6B-3), the proposed limit of disturbance encompasses approximately 20 acres. This design provides approximately 4.7 million cubic yards of landfill airspace capacity and a site life expectancy of 1.2 years, based on the receipt of 3.1 million tons of waste per year.

Under the Non-Degradation Alternative, no water resources are proposed to be impacted. This alternative does not provide an economically viable landfill alternative that meets the project purpose and need. The layout of the Non-Degradation Alternative is presented as Attachment 6B-3.

## 5.4 MAGNITUDE OF THE PROPOSED LOWERING OF WATER QUALITY

### 5.4.1 Maximum Degradation Alternative/Preferred Design (Original Site Plan)

#### Impacts to Wetlands

Under the Original Site Plan, approximately 20.91 acres of wetlands would be filled as a result of the landfill expansion (see Section 6, Drawing 6B-1). All of the wetlands are under the jurisdiction of the Ohio EPA, but only Wetlands E, H, P, and R are USACE jurisdictional waters (see Section 3, Table 5). Table 10 summarizes the wetlands proposed to be impacted under the Original Site Plan:

<b>Wetland ID</b>	<b>Hydrologic Status<sup>1</sup></b>	<b>USFWS Classification<sup>2</sup></b>	<b>ORAM Category<sup>3</sup></b>	<b>Total Acreage Onsite</b>	<b>Total Proposed Impacts</b>	<b>% of Wetlands Avoided</b>
B	Isolated	PEM/PAB/POWZx	Modified 2	2.21	1.33	40
C	Isolated	PAB/POWZx/PSS	Modified 2	0.05	0.05	0
D	Isolated	PAB/POWZx	Modified 2	0.58	0.58	0
E	Connected/ Adjacent	PEMB	1	0.01	0.00	100
F	Isolated	PEM/PSSB	1	0.05	0.05	0
G	Isolated	PEM/PABZx	Modified 2	1.13	1.05	7
H <sup>4</sup>	Connected/ Abutting	PAB/POWZx/PEM1	2	7.06	6.73	0
M	Isolated	PAB/POWZx	1	0.60	0.60	0
N	Isolated	PAB/POWZx	Modified 2	0.44	0.44	0
O	Isolated	PAB/POWZx	Modified 2	0.20	0.20	0
P	Connected/ Abutting	PEM/PSS/PFO/PAB/ POW-C/Zh	2	7.86	7.86	0
Q	Isolated	PEM/PAB/POWZx	Modified 2	1.82	1.82	0
R	Connected/ Abutting	PEM	2	0.18	0.18	0
S	Isolated	PEM	2	0.02	0.02	0
<b>TOTAL</b>	--	--	--	<b>22.21</b>	<b>20.91</b>	<b>6</b>

<sup>1</sup>The determinations of hydrologically connected/adjacent wetlands outlined in this alternatives analysis were based on the boundary delineations and agency field inspection conducted on November 15, 2010, May 19, 2011, and July 18, 2011. A final USACE JD Determination was issued on September 21, 2012 (Attachment 4A).

<sup>2</sup> Cowardin L.M. et al., 1979

<sup>3</sup> Based on CEC's interpretation of the 2001 Ohio EPA ORAM Manual.

<sup>4</sup> The offsite portion of Wetland H was delineated by interpretation of aerial photography.

## Impacts to Streams

Under the Original Site Plan, a total of approximately 6,680 linear feet of streams would be impacted as a result of the landfill footprint and/or areas of disturbance needed for landfill construction (Attachment 6B-1). These impacts consist of filling 5,305 linear feet of intermittent stream and 1,375 linear feet of ephemeral stream (see Section 3, Table 6). Perennial streams will not be impacted as a result of the Original Site Plan. The Ohio EPA has jurisdiction over all of these streams. The USACE has jurisdiction over streams 1A, 1B, 1C, 1D, a portion of 2A, 2B, 2C, 3A, 3B, 3C, and 3D. Table 11 summarizes the streams proposed to be impacted under the Original Site Plan:

<b>Stream ID</b>	<b>Stream Type</b>	<b>HHEI Classification<sup>1</sup></b>	<b>Total Linear Feet Onsite</b>	<b>Total Proposed Impacts</b>	<b>% of Streams Avoided</b>
Stream 1A	Intermittent/ Ephemeral	Class II	637	637	0
Stream 1B	Intermittent	Class II	338	338	0
Stream 1C	Intermittent	Class II	113	113	0
Stream 1D	Intermittent	Class II	1,821	1,821	0
Stream 1E	Ephemeral	Class I	380	380	0
Stream 2A	Ephemeral	Class I	732	732	0
Stream 2B	Ephemeral	Class I	131	131	0
Stream 2C <sup>2</sup>	Intermittent	Class II	2,878	2,528	0
Stream 3A	Intermittent/ Ephemeral	Class II/Class I	474	0	100
Stream 3B	Ephemeral	Class I	257	0	100
Stream 3C	Ephemeral		39	0	100
Stream 3D	Ephemeral		68	0	100
<b>TOTAL</b>	--	--	<b>7,868</b>	<b>6,680</b>	<b>15</b>

<sup>1</sup> See HHEI forms in Waters Delineation Report and Addendum, Attachments 3A and 3B for detailed explanation.

<sup>2</sup> The offsite portion of Stream 2C was delineated by interpretation of aerial photography.

Impacts to Open Water

Under the Original Site Plan, approximately 5.83 acres of open water strip mine pits would be filled as a result of the landfill expansion. All of the open waters (OP), except OP-8 (0.96 ac.), are isolated waters and therefore only under the jurisdiction of the Ohio EPA (see Section 3, Table 7). Table 12 summarizes the open water proposed to be impacted under the Original Site Plan:

<b>Table 12 Summary of Open Water Characteristics – Maximum Degradation Alternative/ Preferred Design (Original Site Plan)</b>				
<b>Open Water ID</b>	<b>Wetland Association</b>	<b>Total Acreage Onsite</b>	<b>Total Proposed Impacts</b>	<b>% of Open Water Avoided</b>
OP-1	None	2.94	0	100
OP-4	Wetland B	0.79	0.09	89
OP-5	Wetland N	0.24	0.24	0
OP-6	Wetland N	0.18	0.18	0
OP-7	Wetland O	0.07	0.07	0
OP-8	Wetland R	0.96	0.96	0
OP-9	Wetland Q	1.75	1.75	0
OP-10	Wetland Q	0.77	0.77	0
OP-11	Wetland D	0.09	0.09	0
OP-12	None	1.37	1.37	0
OP-13	None	0.16	0.16	0
OP-14	None	0.04	0.04	0
OP-15	None	0.11	0.11	0
<b>TOTAL</b>	<b>--</b>	<b>9.47</b>	<b>5.83</b>	<b>38</b>

### Impacts to Surface Water Flow Patterns

Under the Original Site Plan, surface water flow patterns in and surrounding Streams 1A through 1E, 2A, 2B, and 2C would be impacted. The proposed landfill design under this alternative would require surface water collected from precipitation be retained within sedimentation ponds located along the southern boundary of the landfill. Surface water flow patterns over the majority of the site have been previously altered due to strip mining activities.

This alternative proposes to ultimately fill Streams 1A, 1B, 1C, 1D, 1E, 2A, 2B, and 2C and portions of Wetlands P and H which surround these streams. The watershed acreage to both Wetlands P and H and to Streams 1A, 1B, 1C, 1D, 1E, 2A, 2B, and 2C would be decreased.

### Impacts to Water Quality

Streams 1 and 3A were assigned HHEI scores of 44 and 49, respectively. These scores indicate that these streams are of moderate quality and are classified as Class II intermittent streams. These streams however, all formed in sediments from strip mining and are currently down-cutting and transporting eroded mine sediments downstream.

HHEI scores (17 and 18) for Streams 2 and 3A, 3B, 3C and 3D indicate that these streams are classified as lower quality, Class I ephemeral streams. Given the on-going erosion of mining sediments and the relatively low quality of the ephemeral streams, the proposed streams impacts are not anticipated to substantially affect the quality of downstream waters.

Wetlands H and P are relatively large systems and likely provide some water quality benefits to downstream waters as the result of sediment stabilization, sediment removal, and pollutant transformation. Therefore, some loss of water quality functions would occur by filling these wetlands. These wetlands, however, are largely formed on eroded soils from past strip mining operations. In some areas, the wetlands are dominated by large stands of cattail, including the invasive narrow leaf cattail (*Typha angustifolia*). Small portions of the wetlands appear to have reduced hydroperiods resulting from surface and subsurface drainage by down-cutting of

adjacent stream channels. These unstable conditions lower the quality of the wetlands and their associated water quality functions.

Impacts to onsite or offsite water quality will be reduced by the implementation of the Stormwater Pollution Prevention Plan for the landfill expansion (CEC 2015c), which will stipulate the use of Best Management Practices (BMPs) throughout the development of the site. Sedimentation within nearby streams is not anticipated to be an issue given the number, size and locations of the three sedimentation ponds (0.30, 0.46 and 0.66 acre) that will be constructed throughout the landfill facility. The clearing of vegetation to construct of the landfill and retention of run-off in sediment ponds has the potential to increase water temperatures within the streams and lower dissolved oxygen concentrations.

#### Impacts to Aquatic Communities

During CEC's waters/streams delineation and assessment performed at the site, fish or stream salamanders were not observed within the limits of the investigation and proposed expansion area. The indigenous macrofauna inhabiting the impacted streams, wetlands, and strip mine ponds would be lost or displaced under the Original Site Plan. The instream habitat, vegetation, substrates, and associated small, immobile or sedentary organisms within the intermittent stream reaches, wetlands, and strip mine ponds will be lost within the impact areas. There is no evidence that the vegetation or organisms within these habitats are rare or unique or serve as critical food resources to organisms outside the impact area. Therefore, impacts to aquatic communities under the Original Site Plan are expected to be localized and minimal.

#### Impacts to Threatened and Endangered Species

The site is within the ranges of the Indiana bat (*M. sodalis*), a federally-listed endangered species, and the northern long-eared bat (*M. septentrionalis*) a federally-listed threatened species. As previously noted, CEC conducted a mist-netting survey for Indiana bats within the project area in 2008 and submitted a report of their findings to the USFWS. Indiana bats were not captured as a part of that survey, and no open portals were observed. Concurrence was

received from the USFWS that the project was not likely to adversely affect the Indiana bat. This area was permitted to be cleared year-round by both the USFWS and the USACE.

The project area has since been updated, and some of the new project area falls outside of the area previously surveyed. Follow-up consultation with the USFWS in 2011 indicated that an additional survey would need to be conducted on the additional proposed forested areas within the expansion's project area (Attachment 4D-1). As a result, an Indiana Bat mist-netting survey was conducted in June of 2012 and that report is provided in Attachment 4D-2. During the mist-netting survey, one lactating adult female northern long-eared bat was captured (Attachment 4D-2). Additionally, a cave and portal (winter hibernacula) survey was conducted on December 3 and 4, 2015 and the results of the survey are included as Attachment 4D-3. The results of USFWS concurrence and/or any additional recommendations will be forwarded to the Ohio EPA and USACE upon receipt. No cave or mine portals were found within the expansion's proposed limit-of-disturbance.

Approximately 179 acres of forested habitat would be impacted under the Maximum Degradation Alternative/Original Site Plan. Therefore, the impact of the Maximum Degradation Alternative Site Plan on threatened and endangered species, specifically Indiana and northern long-eared bats, are considered to be moderate due to a reduction in potential Indiana and northern long-eared bat habitat. Once the mist-netting report (2012) and recent winter hibernacula survey reports are formally reviewed by the USFWS, the results of USFWS concurrence and/or any additional recommendations will be forwarded to the Ohio EPA and USACE upon receipt.

#### 5.4.2 Minimum Degradation Alternative/Proposed Design

The total area of proposed disturbance for the proposed site plan is approximately 219 acres (Drawing 6B-2 in Section 6). This alternative affects minimized impacts to aquatic resources as compared with the original site plan, but would provide approximately 61,100,000 cubic yards of landfill airspace and extend the life of the landfill by approximately 15.8 years.

Impacts to Wetlands

Under the Minimum Degradation Alternative/Proposed Site Plan, approximately 13.92 acres of interpreted jurisdictional wetlands would be filled as a result of the landfill expansion. All of the wetlands are under the jurisdiction of the Ohio EPA, but only Wetlands E, H, P, and R are USACE jurisdictional waters (see Section 3, Table 5). Table 13 summarizes the wetlands proposed to be impacted under the Minimum Degradation Alternative/Proposed Site Plan:

<b>Wetland ID</b>	<b>Hydrologic Status<sup>1</sup></b>	<b>USFWS Class.</b>	<b>ORAM Category<sup>2</sup></b>	<b>Total Acreage Onsite</b>	<b>Total Proposed Impacts</b>	<b>% of Wetlands Avoided</b>
B	Isolated	PEM/PAB/POWZx	Modified 2	2.21	1.28	26
C	Isolated	PAB/POWZx/PSS	Modified 2	0.05	0.00	100
D	Isolated	PAB/POWZx	Modified 2	0.58	0.58	0
E	Connected/ Adjacent	PEMB	1	0.01	0.01	0
F	Isolated	PEM/PSSB	1	0.05	0.05	0
G	Isolated	PEM/PABZx	Modified 2	1.13	0.00	100
H	Connected/ Abutting	PAB/POWZx/PEM1	2	3.15	3.13	0.6
M	Isolated	PAB/POWZx	1	0.60	0.60	0
N	Isolated	PAB/POWZx	Modified 2	0.44	0.38	14
O	Isolated	PAB/POWZx	Modified 2	0.20	0.00	100
P	Connected/ Abutting	PEM/PSS/PFO/PAB/ POW-C/Zh	2	7.86	5.89	25
Q	Isolated	PEM/PAB/POWZx	Modified 2	1.82	1.82	0
R	Connected/ Adjacent	PEM	2	0.18	0.18	0
S	Isolated	PEM	2	0.02	0.00	100
<b>TOTAL</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>18.30</b>	<b>13.92</b>	<b>24</b>

<sup>1</sup>The determinations of hydrologically connected/adjacent wetlands outlined in this alternatives analysis were based on the boundary delineations and agency field inspection conducted on November 15, 2010, May 19, 2011, and July 18, 2011. A final USACE JD Determination was issued on September 21, 2012 (Attachment 4A).

<sup>2</sup> Based on CEC's interpretation of the 2001 Ohio EPA ORAM Manual.

Impacts to Streams

Under the Minimum Degradation Alternative/Proposed Site Plan, a total of approximately 4,301 linear feet of jurisdictional streams would be impacted as a result of the landfill footprint and/or areas of disturbance needed for landfill construction. These impacts consist of filling 2,895 linear feet of intermittent stream and 1,406 linear feet of ephemeral stream. Perennial streams will not be impacted as a result of the Minimum Degradation Alternative/Proposed Site Plan. The Ohio EPA has jurisdiction over all of these streams. The USACE has jurisdiction over streams 1A, 1B, 1C, 1D, a portion of 2A, 2B, 2C, 3A, 3B, 3C, and 3D (see Section 3, Table 6). Table 14 summarizes the streams proposed to be impacted under the Minimum Degradation Alternative/Proposed Site Plan:

<b>Stream ID</b>	<b>Stream Type</b>	<b>HHEI Classification<sup>1</sup></b>	<b>Total Linear Feet Onsite</b>	<b>Total Proposed Impacts</b>	<b>% of Streams Avoided</b>
Stream 1A	Intermittent	Class II	505	505	0
	Ephemeral		132	132	0
Stream 1B	Intermittent	Class II	338	338	0
Stream 1C	Intermittent	Class II	113	113	0
Stream 1D	Intermittent	Class II	1,821	1,056	42
Stream 1E	Ephemeral	Class I	380	0	100
Stream 2A	Ephemeral	Class I	732	668	9
Stream 2B	Ephemeral	Class I	131	131	0
Stream 2C	Intermittent	Class II	637	608	5
Stream 3A	Intermittent	Class II	363	275	24
	Ephemeral	Class I	111	111	0
Stream 3B	Ephemeral	Class I	257	257	0
Stream 3C	Ephemeral		39	39	0
Stream 3D	Ephemeral		68	68	0
<b>TOTAL</b>	<b>--</b>	<b>--</b>	<b>5,627</b>	<b>4,301</b>	<b>24</b>

<sup>1</sup> See HHEI forms in Waters Delineation Report and Addendum, Attachments 3A and 3B for detailed explanation.

### Impacts to Open Water

Under the Minimum Degradation Alternative/Proposed Site Plan, a total of approximately 4.54 acres of open water would be filled as a result of the landfill footprint and/or areas of disturbance needed for landfill construction. All of the open water (OP) except OP-8 (0.96 ac.) are isolated waters and therefore only under jurisdiction of the Ohio EPA (see Section 3, Table 7). Table 15 summarizes the open water proposed to be impacted under the Minimum Degradation Alternative/Proposed Site Plan:

<b>Table 15 Summary of Open Water Characteristics - Minimum Degradation Alternative/Proposed Site Plan</b>				
<b>Open Water ID</b>	<b>Wetland Association</b>	<b>Total Acreage on Onsite</b>	<b>Total Proposed Impacts</b>	<b>% of Open Water Avoided</b>
OP-1	None	2.94	0	100
OP-4	Wetland B	0.79	0.06	92
OP-5	Wetland N	0.24	0.24	0
OP-6	Wetland N	0.18	0.17	5
OP-7	Wetland O	0.07	0	100
OP-8	Wetland R	0.96	0.96	0
OP-9	Wetland Q	1.75	1.75	0
OP-10	Wetland Q	0.77	0.77	0
OP-11	Wetland D	0.09	0.09	0
OP-12	None	1.37	0.19	86
OP-13	None	0.16	0.16	0
OP-14	None	0.04	0.04	0
OP-15	None	0.11	0.11	0
<b>TOTAL</b>	<b>--</b>	<b>9.47</b>	<b>4.54</b>	<b>52</b>

### Impacts to Surface Water Flow Patterns

Under the Minimum Degradation Alternative, surface water flow patterns in and surrounding Streams 1A, 1B, 1C, 1D, 2A, 2B, 2C, 3A, 3B, 3C, and 3D would be impacted. The proposed

landfill design under this alternative requires that surface water collected from precipitation be retained onsite in three sedimentation ponds located along the eastern and western boundary of the landfill. It is noted that surface water flow patterns over the majority of the site have been previously altered due to strip mining activities. As shown in Drawing 6B-2 (see Section 6), drainage from the three constructed sedimentation ponds in the southern portion of the site will be directed towards adjacent stream and wetlands to minimize dewatering of these tributaries and wetlands. These stormwater sedimentation ponds have been designed to be in compliance with OAC 3745-27-08 (D)(3). Sedimentation ponds will be inspected for sedimentation buildup and dredged when necessary to control potential buildup of sediment and outfalls and riser outlet structures will be inspected for erosion or other signs of wear and will be maintained as necessary.

This alternative proposes to ultimately fill in Streams 1A, 1B, 1C, 1D, 2A, 2B, 2C, 3A, 3B, 3C, and 3D and portions of Wetlands P and H which surround these streams. The watershed acreage to both Wetlands P and H and Streams 1A, 1B, 1C, 1D, 2A, 2B, 2C, 3A, 3B, 3C, and 3D would be decreased.

### Impacts to Water Quality

As discussed previously, the onsite streams were of moderate Class II intermittent (HHEI scores of 32-51) to lower quality Class I ephemeral (HHEI scores of 12-24) streams. The intermittent Class II streams have all formed in sediments from strip mining and are currently down-cutting and transporting eroded mine sediments downstream. Given the on-going erosion of mining sediments and transportation of mine sediments downstream, in addition to the low quality of the ephemeral streams, the proposed stream impacts are not anticipated to substantially affect the quality of downstream waters.

Wetlands P and H are relatively large wetland systems that likely provide some water quality benefits to downstream waters. The impacts to water quality with regards to the onsite wetland systems are similar to those for the Original Site Plan (see Section 5.4.1).

In addition, impacts to onsite or offsite water quality will be reduced by the implementation of the Stormwater Pollution Prevention Plan (CEC, 2015b) for the landfill expansion, which will stipulate the use of Best Management Practices (BMPs) throughout the development of the site. Due to the three sedimentation ponds within the landfill facility, sedimentation within nearby streams is not anticipated to be an issue. The clearing of vegetation and construction of the landfill and retention of run-off in sediment ponds has the potential to increase water temperatures within the streams and lower dissolved oxygen concentrations.

Impacts to onsite or offsite water quality will be reduced through the construction of onsite stream mitigation which would improve channel stability by restoring and enhancing segments of Goose Creek which would minimize ongoing erosion and sedimentation issues from past strip mining activities (see Section 7.2). The mitigation plan also proposes to restore 15 acres of riparian buffers along Goose Creek by planting native trees which would serve to improve water quality. These riparian buffers are expected to provide natural filtration of pollutants and nutrients, reduce erosion and sedimentation and ultimately tree and shrub cover would help to lower surface water temperatures and dissolved oxygen concentrations.

### Impacts to Aquatic Communities

During CEC's jurisdictional waters/streams assessment performed at the site, fish or stream salamanders were not observed within the limits of the investigation and proposed expansion area. The indigenous macrofauna inhabiting impacted streams, wetlands, and strip mine ponds would be lost or displaced under the Minimum Degradation Alternative/Proposed Site Plan. The instream habitat, vegetation, substrates, and associated small, immobile or sedentary organisms within these intermittent stream reaches will be lost within the impact areas. As previously discussed, the onsite aquatic resources provide no evidence they are rare or unique or serve as critical or unique food resources to organisms outside the impact area. Therefore impacts to aquatic communities under the Minimum Degradation Alternative are expected to be localized and minimal.

## Impacts to Threatened and Endangered Species

The site is within the ranges of the Indiana bat (*M. sodalis*), a federally-listed endangered species, and the northern long-eared bat (*M. septentrionalis*) a federally-listed threatened species. As previously discussed in Section 4, CEC conducted a mist-netting survey for Indiana bats within the project area in 2008 and submitted a report of their findings to the USFWS. Indiana bats were not captured as a part of that survey, and no open portals were observed. Concurrence was received from the USFWS that the project was not likely to adversely affect the Indiana bat. This area was permitted to be cleared year-round by both the USFWS and the USACE.

The project area has since been updated, and some of the new project area falls outside of the area previously surveyed. Follow-up consultation with the USFWS in 2011 indicated that an additional survey would need to be conducted on the additional proposed forested areas within the expansion's project area (Attachment 4D-1). As a result, an Indiana Bat mist-netting survey was conducted in June of 2012 and that report is provided in Attachment 4D-2. During the mist-netting survey, one lactating adult female northern long-eared bat was captured (Attachment 4D-2). Additionally, a cave and portal (winter hibernacula) survey was conducted on December 3 and 4, 2015 and the results of the survey are included as Attachment 4D-3. The results of USFWS concurrence and/or any additional recommendations will be forwarded to the Ohio EPA and USACE upon receipt. No cave or mine portals were found within the expansion's proposed limit-of-disturbance.

Approximately 118 acres of forested habitat would be impacted under the Minimum Degradation Alternative/Proposed Site Plan. Therefore, the impact of the Minimum Degradation Alternative Site Plan on threatened and endangered species, specifically Indiana and northern long-eared bats, are considered to be moderate due to a reduction in potential Indiana and northern long-eared bat habitat. Once the mist-netting report (2012) and recent winter hibernacula survey reports are formally reviewed by the USFWS, the results of USFWS concurrence and/or any additional recommendations will be forwarded to the Ohio EPA and USACE upon receipt.

### 5.4.3 Non-Degradation Alternative

Implementation of the Non-Degradation Alternative would result in no impacts to onsite waters. Thus, impacts to aquatic sites, biota, functions, or economic values are not expected to occur.

## 5.5 TECHNICAL FEASIBILITY AND COST EFFECTIVENESS

The technology to complete the project using either the Preferred Design/Maximum Degradation Alternative or the Minimum Degradation Alternative/Proposed Site Plan is proven and readily available to the applicant. The engineering principles, landfill system components and environmental control systems used in the landfill system design are used at other similar facilities throughout the United States and have been proven to be effective and reliable. This facility proposes to utilize the best available technology for landfill construction. Standard civil engineering principles were used to develop the site excavation and grading plan to provide a stable landfill structure.

### 5.5.1 Maximum Degradation Alternative/Preferred Design (Original Site Plan)

The Original Site Plan is the most technically feasible and cost-effect alternative that maximizes the landfill airspace capacity (110 million cubic yards) and has a life expectancy of approximately 28.4 years. The footprint of plan will disturb approximately 325 acres. Under this option, the project cost to Apex to permit, construct, and operate the landfill expansion is estimated on the order of \$308,000,000. This includes the cost of engineering, environmental permitting, site preparation, landfill liner and cap systems, and post-closure maintenance and monitoring.

### 5.5.2 Minimum Degradation Alternative/Proposed Site Plan

The Minimum Degradation Alternative/Proposed Site Plan provides approximately 61.1 million cubic yards of landfill airspace capacity and a site life expectancy of approximately 15.8 years. Under the Proposed/Minimum Degradation Alternative, impacts have been reduced from the

Preferred/Maximum Degradation Alternative while still remaining an economically viable landfill alternative that meets the project purpose and need. The proposed limit of disturbance encompasses a total of approximately 219 acres. Under this option, the project cost to Apex to permit, construct, and operate the landfill expansion is estimated on the order of \$171,080,000. This includes the cost of engineering, environmental permitting, site preparation, landfill liner and cap systems, and post-closure maintenance and monitoring.

### 5.5.3 Non-Degradation Alternative

The Non-Degradation Alternative provides for approximately 4.7 million cubic yards of landfill airspace capacity and a site life expectancy of 1.2 years. The limit of disturbance encompasses approximately 20 acres. Under this option, the project cost to Apex to permit, construct, and operate the landfill expansion is estimated on the order of \$13,160,000. This includes the cost of engineering, environmental permitting, site preparation, landfill liner and cap systems, and post-closure maintenance and monitoring. While this alternative would not impact water resources, this option does not provide an economically viable landfill capacity that meets the project purpose and need.

## 5.6 ECONOMIC CONSIDERATIONS

The following table summarizes the alternatives and associated social and economic considerations and benefits.

**Table 16  
Social and Economic Justification**

Criterion	Maximum Degradation Alternative (Original Site Plan) <sup>1</sup>	Minimum Degradation Alternative/Proposed Site Plan <sup>1</sup>	Non-Degradation Alternative <sup>1</sup>
Development Description	- 110 million yards <sup>2</sup> - 28.4 yr. life expect. - 325 acre footprint	- 61.1 million yards <sup>2</sup> - 15.8 yr. life expect. - 219 acre footprint	- 4.7 million yards <sup>2</sup> - 1.2 yr. life expect. - 20 acre footprint
Estimated Construction Cost	\$308,000,000	\$171,080,000	\$13,160,000
New and Continued Permanent Jobs	100	100	100
Est. Payroll \$/yr	\$10,695,000	\$10,695,000	\$10,695,000
Est. Payroll \$ over Site Life <sup>2</sup>	\$303,600,000	\$168,636,000	\$12,972,000
Est Payroll Taxes \$/yr	\$2,139,000	\$2,139,000	\$2,139,000
Est Payroll Taxes \$ over Site Life <sup>2</sup>	\$60,720,000	\$33,727,200	\$2,594,400
New Temporary Jobs (seasonal) <sup>3</sup>	10	10	10
Est. Temporary Payroll \$/yr <sup>3,4</sup>	\$624,000	\$416,000	\$208,000
Est. Temporary Payroll \$ over Site Life <sup>2,3</sup>	\$111,809,032	\$6,559,381	\$504,568
Est. Temporary Payroll Taxes \$/yr	\$124,800	\$83,200	\$41,600
Est Temporary Payroll Taxes \$ over Site Life <sup>2</sup>	\$2,361,806	\$1,311,876	\$100,914
Other Tax \$	\$600,000	\$400,000	\$300,000
Revenue Generated \$/yr	\$71,300,000	\$71,300,000	\$71,300,000
Revenue Generated \$ over Site Life <sup>3</sup>	\$2,024,000,000	\$1,124,440,000	\$86,480,000
Local Taxes Generated \$/yr	\$5,115,000	\$5,115,000	\$5,115,000
Local Taxes Generated \$ over Site Life <sup>2</sup>	\$145,200,000	\$80,652,000	\$6,204,000
State Taxes Generated \$/yr	\$19,685,000	\$19,685,000	\$19,685,000

<b>Table 16 Social and Economic Justification</b>			
Criterion	Maximum Degradation Alternative (Original Site Plan) <sup>1</sup>	Minimum Degradation Alternative/Proposed Site Plan <sup>1</sup>	Non-Degradation Alternative <sup>1</sup>
State Taxes Generated\$ over Site Life <sup>2</sup>	\$558,800,000	\$310,388,000	\$23,876,000
County Unemployment Rate	Harrison County – 5.4% - Ohio Department of Job and Family Services, October 2015 Jefferson County – 6.3% - Ohio Department of Job and Family Services, October 2015		
County Poverty Rate	Harrison County – 18.4%- The Ohio Poverty Report January 2015, Ohio Development Services Agency Jefferson County – 16.6%- The Ohio Poverty Report January 2015, Ohio Development Services Agency		
Median Household Income	Harrison County - \$39,002- U.S. Census Bureau (2009-1013) Jefferson County - \$40,577 - U.S. Census Bureau (2009 – 2013)		
Environmental Benefit	Implementation of the Minimum Degradation Alternative/Proposed Site Plan would result in a lowering of the water quality of the streams and wetlands onsite; however, proposed offsite mitigation would compensate for impacts to water quality. Best construction management practices would be implemented to minimize impacts.  The Non-degradation Alternative would not impact the onsite stream; therefore, environmental benefits of the onsite stream would not be lost.		
Social Benefit			
Recreational Benefit	N/A		

<sup>1</sup> Assumes 10,000 tons per day.

<sup>2</sup> Assumes the following estimates of site life based on the airspace capacity associated with each alternative: Original Site Plan– 28.4 years, Proposed Site Plan-Minimum Degradation Alternative – 15.8 years, Non-Degradation Alternative – 1.2 years.

<sup>3</sup> Assumes for every 100 jobs in the waste industry, an additional 57 jobs are created that supply goods and services to the waste industry based on the 1995 report and analysis by Dr. David L. Passmore of the Center of Trade, Technology, and Economic Growth at The Pennsylvania State University.

<sup>4</sup> Based on 160/day per employee.

<sup>5</sup> Based on assumption of 20% of the temporary payroll.

Under the Original Site Plan, the Maximum Degradation Design would create 100 new and continued permanent jobs with estimated payroll at approximately \$10.7 million a year and approximately 10 temporary construction jobs with payroll estimated at approximately \$416,000 per year. The Original Site Plan would result in the generation of an estimated \$5.1 million in local taxes and an estimated \$19.7 million in state taxes annually. Over the life of site, the Original Site Plan would result in the generation of \$145.2 million in local and \$558.8 million in state taxes.

Under the Minimum Degradation Alternative/Proposed Design would create 100 new and continued permanent jobs with estimated payroll at approximately \$10.7 million a year and approximately 10 temporary construction jobs with payroll estimated at approximately \$416,000. The Proposed Site Plan would result in the generation of an estimated \$5.1 million in local taxes and an estimated \$19.7 million in state taxes annually. Over the life of site, the Proposed Site Plan would result in the generation an estimated \$80.7 million in local and \$310.4 million in state taxes. Further economic benefits under the Minimum Degradation Alternative are summarized in the social and economic justification in Table 16.

According to the 2015 Ohio Development Services Agency, The Ohio Poverty Report and the Ohio Department of Job and Family Service's county statistical and demographic data profile, Harrison County has a poverty rate of 18.4% and an unemployment rate of 5.4%, while Jefferson County has a poverty rate of 16.6% and an unemployment rate of 6.3%. Both primary and secondary job creation, expenditures for materials and services, and tax revenues derived from the construction and operation of either the preferred or proposed landfill expansions will provide economic benefits to the local economy.

Although the Non-Degradation Alternative would avoid impacts to the onsite streams and wetlands, the environmental benefits of this design scenario do not outweigh the adverse economic consequences. Given the location of the wetlands and streams within and adjacent to the proposed site, landfill expansion that attempted to completely avoid wetlands and streams would not be able to provide the required airspace capacity or site life expectancy to make the project viable and practicable. Factoring in the development costs and Apex Sanitary Landfill's expected rate of return, the Non-Degradation Alternative does not satisfy the project purpose or need and is neither viable nor practicable from a development perspective. Additionally, the Jefferson-Belmont Regional Solid Waste Authority, surrounding areas, and transfer stations are relying on the Apex Sanitary Landfill to provide up to 15.8 years of landfill life to help meet their future solid waste management needs.

## **5.7 CUMULATIVE IMPACT**

The aquatic resources located onsite provide marginal to moderate water quality and have limited resource value. The high degree of past disturbances from strip mining activities to the site have degraded the ability of the onsite aquatic systems to provide significantly valuable natural functions associated with, or protective of, human health. In addition, the non-isolated wetlands and streams have developed in the mine spoils. Many of the wetlands are dominated by monotypic stands of narrow leaf cattail (*Typha angustifolia*).

The various environmental benefits lost or gained for each of the development alternatives addressed in this application are discussed in detail in Section 5.4. Although construction pursuant to either the Original Site Plan or the Minimum Degradation Alternative/Proposed Site Plan would result in a loss of onsite upland habitat, terrestrial flora, and terrestrial fauna, the loss of onsite jurisdictional wetland and streams, the Minimum Degradation Alternative/Proposed Site Plan substantially reduces aquatic impacts while meeting the project purpose and need. The unavoidable impacts to wetlands and streams will be off-set by mitigation projects in excess of the impact acreage, which will restore and/or replace streams and wetlands at an equivalent or higher ecological value (see Section 7). Best management practices, including onsite sediment and stormwater ponds will help mitigate water quality impacts during construction and operation of the landfill expansion, and will serve as a source of hydrology for downstream waters (see Sections 5.9 and 5.10).

## **5.8 INDIRECT IMPACTS**

Apex has operated the existing sanitary landfill from 2005 until present and is in substantial compliance with the applicable provisions of Chapter 3704, 3734, 3714, and 6111 of the Revised Code. Apex has operated the site in substantial compliance with the rules, permits, and other authorizations issued by the Ohio EPA. Apex has addressed and corrected any violation notices promptly and completely, and implements operational changes as necessary to maintain full compliance.

Under both the Maximum Degradation/Preferred Design and the Minimum Degradation Alternative/Proposed Site Plan, indirect impacts are not anticipated because Best Management Practices (BMPs) will be utilized during construction activities as outlined in Sections 5.9, 5.10, and the SPPP (CEC 2015c). The proposed landfill design under these alternatives would require surface water collected onsite from precipitation be retained within sedimentation/stormwater ponds located along the southern boundary of the landfill. Drainage from the constructed sedimentation ponds will be directed to towards adjacent stream and wetlands to maintain the hydrology of these tributaries and wetlands. These stormwater sedimentation ponds have been designed to be in compliance with OAC 3745-27-08 (D)(3).

Under the Non-Degradation Alternative, all onsite wetlands and streams would be avoided and stormwater control structures would be in place, thus no indirect impact to wetlands would be anticipated.

## **5.9 CONSTRUCTION STORMWATER MANAGEMENT PLANS**

Stormwater management features have been designed in accordance with OAC 3745-27-08 (D)(3) for sanitary landfill facility construction. The construction of the three stormwater sedimentation ponds will meet the following requirements:

- (i) Minimum storage volume shall be provided based on either the calculated runoff from a 10-year/24-hour storm event, or 0.125 acre-feet per year (for each acre of disturbed area within the upstream drainage area) multiplied by the scheduled frequency of pond clean-out (in years), whichever is greater; and
- (ii) The principal spillway shall safely discharge the flow from a 10-year/24-hour storm event. The inlet elevation of the emergency spillway shall be designed to provide flood storage, with no flow entering the emergency spillway, for a 25-year/24-hour storm event, with allowance provided for the flow passed by the principal spillway during the event; and

- (iii) The combination of the principal and emergency spillways shall safely discharge the flow from the 100-year/24-hour storm event using non mechanical means. The embankment design shall provide for no less than 1-foot net freeboard when flow is at the design depth, after allowance for embankment settlement.

Apex has an existing National Pollution Discharge Elimination System (NPDES) permit for stormwater discharges and has modified the permit associated with the proposed construction activities (CEC 2015d). A Stormwater Pollution Prevention Plan (SWPPP) will list BMPs to be implemented throughout the duration of construction. The BMPs will consist of erosion controls such as silt fencing, temporary seeding or mulching and road construction/road stabilization.

## **5.10 POST-CONSTRUCTION STORMWATER MANAGEMENT**

The proposed expansion was been designed in accordance with OAC- 3745-27 and with state of the practice design principles and materials for the construction, operation, closure, and maintenance of the facility through the post-closure care period. The proposed sedimentation ponds will serve as the post-construction stormwater management feature for the proposed landfill expansion.