

Final Wetland Mitigation and Monitoring Plan
for the Timber Shores Family Camping & Beach Resort
EGLE Permit No. HPB-KN1S-878JM

September 7, 2022

This Final Wetland Mitigation and Monitoring Plan (Mitigation Plan) has been prepared as required in the permit for the Timber Shores project issued by the Michigan Department of Environment, Great Lakes, & Energy (EGLE) referenced above. The Mitigation Plan contains the information required in the EGLE permit as listed on page 14 of the permit.

I. Wetland Mitigation Goals and Objectives

The proposed wetland mitigation is restoration (hereafter referred to in this plan as “wetland restoration”) of 1.13 acres of wetlands in four adjacent sites that were previously filled for the construction of the original Timber Shores Resort in the 1960s. The goal of the wetland restoration is to excavate the old fill material and restore wetland on the 1.13 acres.

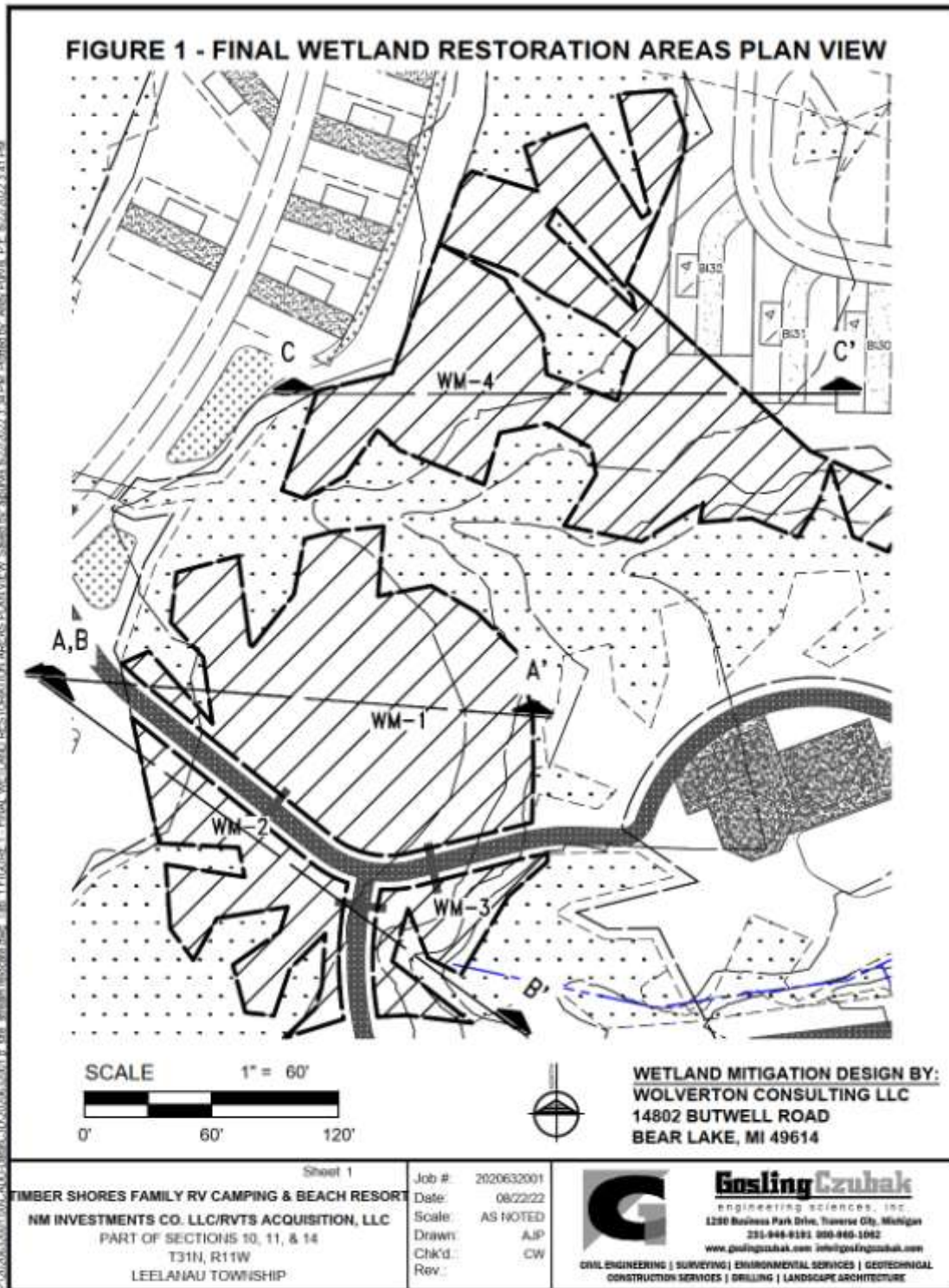
The objectives to attain this goal are as follows:

- a). Excavate the old fill material that is approximately three feet in depth down to the grade of the adjacent, existing wetlands.
- b). Create a rough, undulating grade of +/- one foot from the uppermost elevation of the saturated soil encountered in the excavation.
- c). Organic topsoil from the previously existing wetland, if encountered in the removal of the old fill, will be left in place to provide seed bank and substrate for planting native vegetation.
- d). The restored wetland will be planted as soon as possible following excavation with an herbaceous seed mix of at least 14 native species of wetland vegetation; installation of live stakes of five native shrub species; and planting of four species of native wetland trees (all species of plants are specified later in this plan).
- e). The objective is to restore forested wetland type on the 1.13 acres containing a mix of native wetland vegetation, i.e., herbaceous plants, shrubs, and trees.

The wetlands that will be unavoidably impacted by the Timber Shores project are in 31 separate areas as shown on the project plans and comprise a total of 0.41-acre of wetland. The impact areas are primarily forested or shrub wetlands located within the proposed recreation pond (0.12-acre) and along the proposed campground roads (0.29-acre). The wetland restoration will mitigate for the wetlands unavoidable impacted at a replacement ratio of 2.77:1.

II. Characterization of the Existing Conditions at the Proposed Wetland Restoration Sites

The wetland restoration is in four sites near each other (Figure 1.) A walking path is proposed to divide wetland restoration sites 1, 2, and 3 for campers to use for nature walks. Existing wetland separates wetland restoration site 4 from the other three sites.



The topography of the wetland restoration areas is flat because the fill was placed in the wetlands in the 1960s to create camping sites, which need to be level. Soil borings indicate that the fill is approximately three feet in depth and is comprised of bank run sand and gravel.

The soil borings indicated that saturated soil exists when the approximate grade of the adjacent wetlands is reached. Therefore, it is expected that excavation to remove the old fill down to the saturated soil will result in attaining wetland hydrology by the substrate being saturated to within one foot of the soil surface for a minimum of 30% of the growing season.

The existing vegetation on the wetland restoration sites is a mixture of small trees, shrubs, and herbaceous vegetation being comprised of upland (i.e., non-wetland) species. The wetland delineation conducted in 2019 and verified by EGLE identified the wetland restoration sites as upland.

Figure 1 on the previous page shows the information required by the EGLE permit for the wetland restoration sites. Figures 2 and 3 on the following page shows typical cross sections of the wetland restoration sites.

III. Proposed Wetland Restoration Design

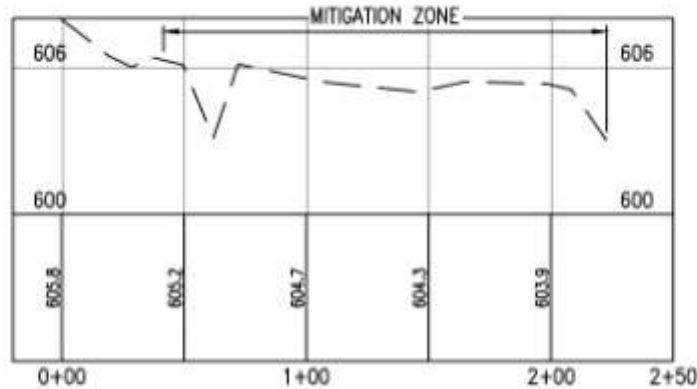
Source of Hydrology

As previously described, the source of hydrology for the restored wetlands will be soil saturated by groundwater encountered at the elevation of the existing, adjacent wetlands once the old fill is removed. Periodic inputs of surface water from precipitation or seasonal input from snow melt will temporarily be retained in the wetlands but will percolate into the near-surface groundwater table in the sandy soils of the site. **Due to the high reliability of groundwater on this property and its relatively stable elevation, the likelihood of success in attaining the desired wetland hydrology is high.**

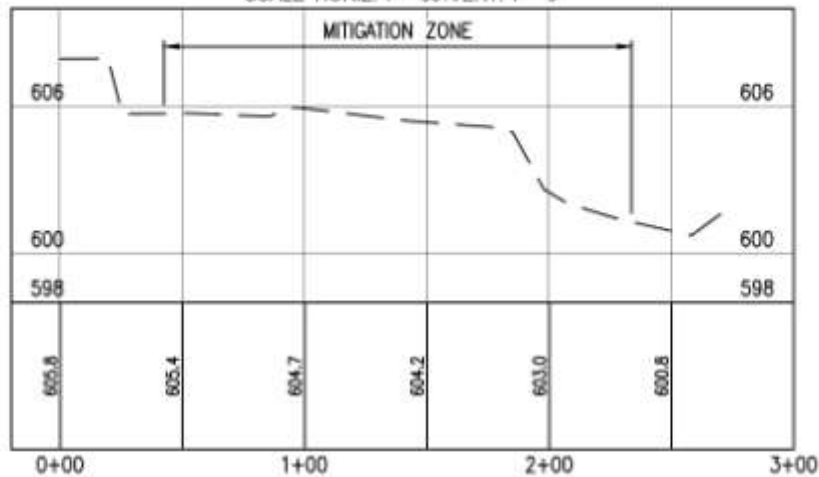
Soil Amendments

Soil amendment (e.g., adding topsoil from off-site sources) is not proposed and was agreed upon by EGLE. The utilization of wetland topsoil from the 31 impact areas is not feasible due to the logistics of gathering and hauling small amounts of topsoil from many very small sites to the wetland restoration areas. Also, the timing of placing the wetland donor soils in the restoration areas would not conform to a sensible timeline for establishing the restored wetlands. Hauling in topsoil from off-site sources is undesirable due primarily to the strong likelihood that non-native or invasive species of plants would contaminate the wetland restoration areas. The saturated soils that exist at the bottom of the restoration areas are expected to provide the hydrologic regime and substrate for establishment of the herbaceous layer of obligate (OBL) and facultative wetland (FACW) native plant species to be seeded on the restoration sites.

FIGURE 2 - WETLAND RESTORATION AREAS #1, #2 & #3



A-A': WETLAND MITIGATION AREA #1
SCALE HORIZ. 1" = 60'/VERT. 1" = 6'



B-B': WETLAND MITIGATION AREA #2 & #3
SCALE HORIZ. 1" = 60'/VERT. 1" = 6'

WETLAND MITIGATION DESIGN BY:
WOLVERTON CONSULTING LLC
14802 BUTWELL ROAD
BEAR LAKE, MI 49614

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Sheet 2
TIMBER SHORES FAMILY RV CAMPING & BEACH RESORT
NM INVESTMENTS CO. LLC/RVTS ACQUISITION, LLC
PART OF SECTIONS 10, 11, & 14
T31N, R11W
LEELANAU TOWNSHIP

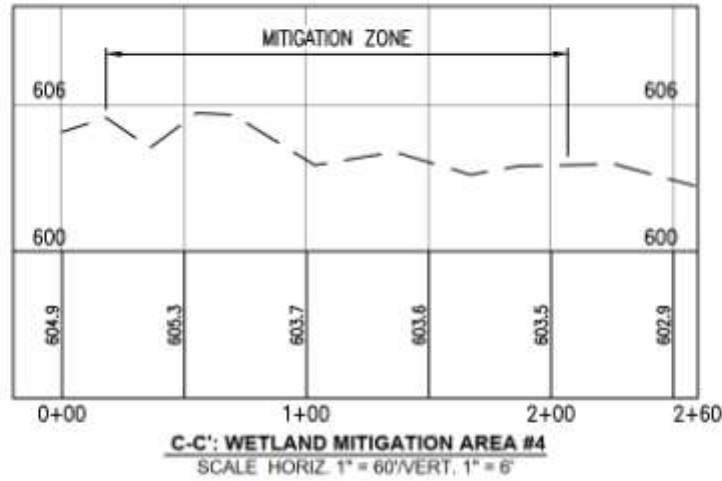
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Date: 08/22/22
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Drawn: AJP
Chk'd.: CW
Rev.:



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FIGURE 3 - WETLAND RESTORATION AREA #4



WETLAND MITIGATION DESIGN BY:
WOLVERTON CONSULTING LLC
14802 BUTWELL ROAD
BEAR LAKE, MI 49614

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Sheet 3	Job #: 2020632001	 Gosling Czuhak engineering sciences, inc. 1280 Business Park Drive, Tawas City, Michigan 231-944-8191 800-960-1062 www.goslingczuhak.com info@goslingczuhak.com
TIMBER SHORES FAMILY RV CAMPING & BEACH RESORT	Date: 08/22/22	
NM INVESTMENTS CO. LLC/RVTS ACQUISITION, LLC	Scale: AS NOTED	
PART OF SECTIONS 10, 11, & 14	Drawn: AJP	
T31N, R11W	CHK'd: CW	
LEELANAU TOWNSHIP	Rev.:	CIVIL ENGINEERING SURVEYING ENVIRONMENTAL SERVICES GEOTECHNICAL CONSTRUCTION SERVICES DRILLING LANDSCAPE ARCHITECTURE

Wetland Vegetation Establishment

Wetland vegetation will be established in the wetland restoration areas by seeding native wetland herbaceous plants, installing live stakes of shrubs, and planting or live staking wetland tree species as specified in Table 1, Table 2, and Table 3.

Note: the wetland seed mix, live stakes, and trees will be obtained by Timber Shores and provided to the landscape contractor to install in the wetland restoration areas.

The herbaceous seed mix will be obtained from Ernst Conservation Seeds (www.ernstseed.com). The seed mix is named **Specialized Wetland Mix for Shaded OBL-FACW Areas – ERNMX-137**. The specifications are for this seed mix to be applied at a rate of 20 pounds per acre when applied with a cover crop (10 pounds per acre of Barnyard grass). A total of 23 pounds of this seed mix is to be applied evenly in all four wetland restoration areas. Cost for the native wetland seed mix is \$54.44 per pound for a total seed cost of \$1,252.12 (2022 cost list). Twelve (12) pounds of Barnyard grass seed (*Echinochloa crusgalli*) is also required. Ernst Conservation Seeds indicated that the ERNMX-137 seed mix is available for spring 2023. The seed order (and live stakes as described below) will be made in early spring prior to the start of construction. Table 1 gives the species of wetland plants in the specified seed mix ERNMX-137.

Table 1. Species of Herbaceous Wetland Vegetation to be Planted in the Wetland Restoration Areas at Timber Shores (Ernst seed mix ERNMX-137).

Common Name	Scientific Name	Wetland Indicator	Quantity (% in seed mix)
Fox sedge	<i>Carex vulpinoidea</i>	OBL	35.00%
Virginia wildrye	<i>Elymus virginicus</i>	FACW	20.00%
Blunt broom sedge	<i>Carex scoparia</i>	FACW	14.00%
Lurid sedge	<i>Carex lurida</i>	OBL	12.20%
Hop sedge	<i>Carex lupulina</i>	OBL	5.00%
Blue vervain	<i>Verbena hastata</i>	FACW+	4.00%
Awl sedge	<i>Carex stipata</i>	OBL	2.20%
Star sedge	<i>Carex intumescens</i>	FACW+	2.00%
Oxeye sunflower	<i>Heliopsis helianthoides</i>	UPL	2.00%
Eastern bur reed	<i>Sparganium americanum</i>	OBL	1.00%
Nodding beggar's tick	<i>Bidens cernua</i>	OBL	0.50%
Fringed sedge	<i>Carex crinita</i>	FACW+	0.50%
Woolgrass	<i>Scirpus cyperinus</i>	OBL	0.50%
Boneset	<i>Eupatorium perfoliatum</i>	FACW+	0.30%
Great blue lobelia	<i>Lobelia siphilitica</i>	FACW+	0.30%

Woody native wetland plants will be seedlings and live stakes (live stakes are stems of certain species of trees or shrubs that have been cut in the dormant season and will root and grow when properly installed in the wetland soil). All trees and shrubs will be installed

on a spacing of approximately 8 feet by 8 feet, which provides a spacing of about 50 square feet per tree/shrub or 984 trees and shrubs in the 1.13-acre wetland restoration area. Thus, 1,000 trees and shrubs will be planted in the wetland restoration areas. Except as noted in this plan, species of trees and shrubs will be mixed when planted to attain a diversity of woody plants in the wetland.

Live stakes of the shrub species listed in Table 2 will be obtained from Ernst Conservation Seeds (www.ernstseed.com). Live stakes are to be two feet in length and must be soaked in rooting hormone prior to installation and inserted at least 16" into the ground. The 2022 cost of 2-foot-long live stakes is \$1.00 each.

Table 2. Species of Wetland Shrubs to be Planted in the Wetland Restoration Areas at Timber Shores (live stakes).

Common Name	Scientific Name	Wetland Indicator	Quantity
Buttonbush	<i>Cephalanthus occidentalis</i>	OBL	100
Red-osier dogwood	<i>Cornus sericea</i>	FACW	100
Pussy willow	<i>Salix discolor</i>	FACW	100
Sandbar willow	<i>Salix exigua</i>	OBL	100
Silky willow	<i>Salix sericea</i>	OBL	100

The wetland trees to be planted are in the form of transplants (American larch and Balsam fir) and live stakes (Sycamore and Peach-leaved willow). American larch and Balsam fir have been procured from Cold Spring Farm in Freesoil, Michigan for pick up in early spring 2023.

Table 3. Species of Wetland Trees to be Planted in the Wetland Restoration Areas at Timber Shores.

Common Name	Scientific Name	Wetland Indicator	Quantity
American larch	<i>Larix laricina</i>	FACW	200
Balsam fir	<i>Abies balsamea</i>	FACW	100
Sycamore*	<i>Platanus occidentalis</i>	FACW	100*
Peach-leaved willow*	<i>Salix amygdaloides</i>	FACW	100*

*Sycamore and peach-leaved willow trees to be planted as live stakes obtained from Ernst Conservation Seeds.

Wetland Planting Plan

The landscape contractor shall apply the native wetland seed mix (ERNMX-137) and nursery crop (i.e., barnyard grass) as directed by Ernst Conservation Seeds prior to the installation of the wetland live stakes and trees. Two tools will be provided by the wetland consultant for Timber Shores for the installation of the live stakes to ensure that the live stakes are installed to the proper depth in the saturated soil (i.e., 16"). Trees shall be installed with tree bars or grub hoes to ensure the roots are fully extended into the saturated soil.

Table 4 shows the quantities of wetland trees, live stakes, and seed mix to be planted in each of the four wetland restoration areas. The landscape contractor shall separate the trees, live

stakes, and seed mix needed for each wetland restoration area prior to beginning the installation of these materials to ensure proper distribution and mixing of species is obtained.

Table 4. Quantities of Seed Mix, Live Stakes, and Trees to be Planted in Each Wetland Restoration Area.

	WM-1	WM-2	WM-3	WM-4
Restoration Area Size	17,908 sq.ft. 0.41-acre	5,734 sq.ft. 0.13-acre	2,869 sq.ft. 0.07-acre	22,859 sq.ft. 0.52-acre
ENNMX-137 Seed Mix	8.2 lbs.	2.6 lbs.	1.4 lbs.	10.5 lbs.
Barnyard Grass	4.1 lbs.	1.3 lbs.	0.7 lb.	5.2 lbs.
Live Stakes	254	81	43	322
Trees	109	35	19	137

Wildlife Habitat Structures

The EGLE permit requires a minimum of six (6) wildlife habitat structures consisting of at least three (3) types to be placed per acre in the wetland restoration areas. Five types of structures are specified in the EGLE permit. Of the five types of structures specified, the only types appropriate for the wetland to be restored for this project are tree stumps, logs, and snags. Seven (7) wildlife habitat structures are required to be placed in the 1.13 acres of restored wetland.

Tree stumps are to be laid horizontally within the wetland and shall be a minimum of 6 feet long (log and root ball combined) and 12 inches in diameter. One or two tree stumps will be installed in the restored wetlands.

Logs laid horizontally shall be a minimum of 10 feet in length and at least 6 inches in diameter. Three or four logs will be installed in the restored wetlands.

Snags are either whole trees that are left standing or whole trees that are installed upright in the wetland. Snags must be a minimum of 20 feet tall above the ground surface and a minimum of 12 inches diameter at breast height. Existing trees growing on the old fill areas may be suitable for use as snags in the restored wetland. The project wetland consultant will locate and flag potential trees to be left as snags during the excavation of the old fill. If no trees are present that meet the specifications for snags, snags will be obtained from the site and installed in the restored wetland. Two or three snags will be used to meet this EGLE permit requirement.

All wildlife habitat structures (i.e., tree stumps, logs, and snags) will be placed after excavation is completed and prior to seeding and planting of trees and shrubs.

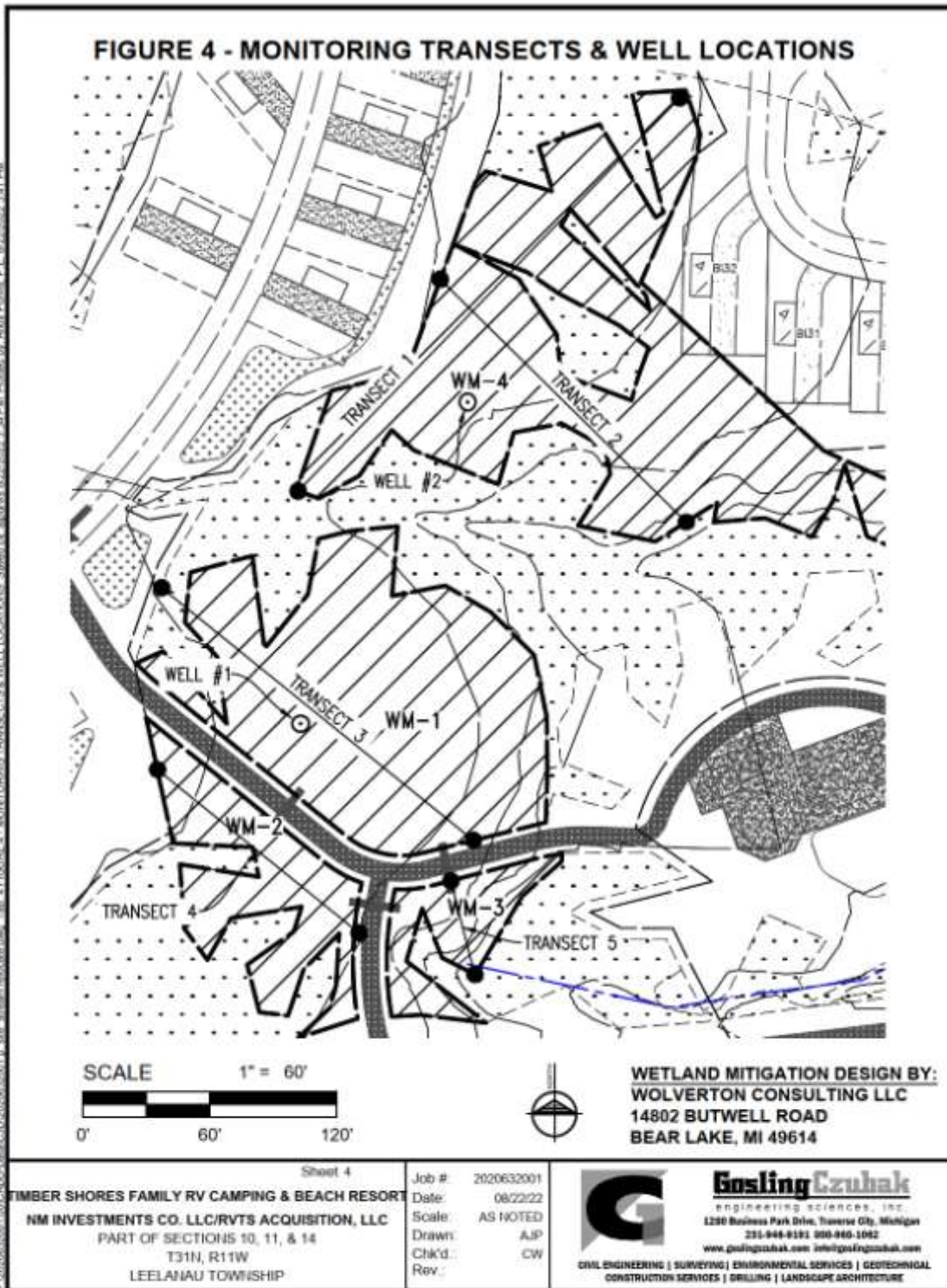
Wetland Construction Schedule, Sequence, and Details

The sequence to be followed for the restoration of the 1.13-acres of wetlands is as follows:

1. Surveying and staking of the limits of the old fill to be removed. Using the survey of the wetland boundaries from the wetland delineation approved by EGLE, the boundaries of the wetland/old fill will be staked.

2. The wetland consultant will identify and flag any trees to be left as snags per the requirements of the EGLE permit (up to three needed).
3. A pre-bid meeting will be held at the site to review all aspects of the wetland restoration project with potential contractors, the project wetland consultant, and project engineers.
4. Due to the length of the boundaries of the fill areas to be removed (3,302 feet) and the fact that the restoration sites are flat with minimal grade changes, installation of soil erosion control fencing is not proposed for the following reasons:
 - a. Installation of silt fencing at the edge of the excavation would not serve any reasonable purpose due to the low probability of any runoff from the construction area into the adjacent wetland (due to flat topography and only about three feet of old fill to be removed).
 - b. The limits of the construction will be clearly staked and flagged as described in item 1. above.
 - c. Installation of silt fencing would be extremely difficult, given the existing vegetation on the sites and the extensive roots inhibiting proper trenching-in of the bottom of the silt fencing and would probably cause more damage than not having the silt fencing in place at all.
 - d. The old fill is only about three (3) feet deep on average, is sandy or gravelly soil, and the likelihood of any erosion into the adjacent wetlands from the proposed excavation is very unlikely.
5. Excavation of the old fill will commence either in the early spring or late fall to provide the proper timing for installation of wetland seed and woody plants. The first step will be to remove existing woody vegetation from the restoration sites in preparation for the removal of the old fill.
6. Seeding and planting will be done as soon as excavation and placement of wildlife habitat structures is completed and approved by the project wetland consultant for seeding and planting. Installation of the native wetland seed mix and cover crop (barnyard grass) will be followed by the installation of the live stakes and trees.
7. Two wetland hydrology monitoring wells will be installed in the wetland restoration areas at the locations specified on Figure 4. Due to the nature of the soils in the wetland restoration areas (i.e., highly permeable sandy and gravelly soils with reliable levels of groundwater) two wetland hydrology monitoring wells are sufficient to document the presence of “wetland hydrology” in the restoration sites.

Surveyors will determine the elevation of the ground surface and the top-of-casing for each of the monitoring wells so that groundwater elevations can be accurately provided



in relation to the ground surface and demonstrate the attainment of the wetland hydrology performance standard.

Trained personnel will take readings of the water table elevation on at least a monthly basis during the growing season. The groundwater elevation readings will be provided to the consultant responsible for the annual wetland monitoring for inclusion in the Annual Wetland Monitoring Report.

8. Signs will be installed at appropriate spacing along the boundary of the restored wetlands to educate people about the restoration. Signs shall include the following:

Wetland Restoration Area
These wetlands were restored by removal of fill placed in the 1960s as part of the restoration for the Timber Shores project.
Please do not enter or disturb the area.

IV. Wetland Monitoring

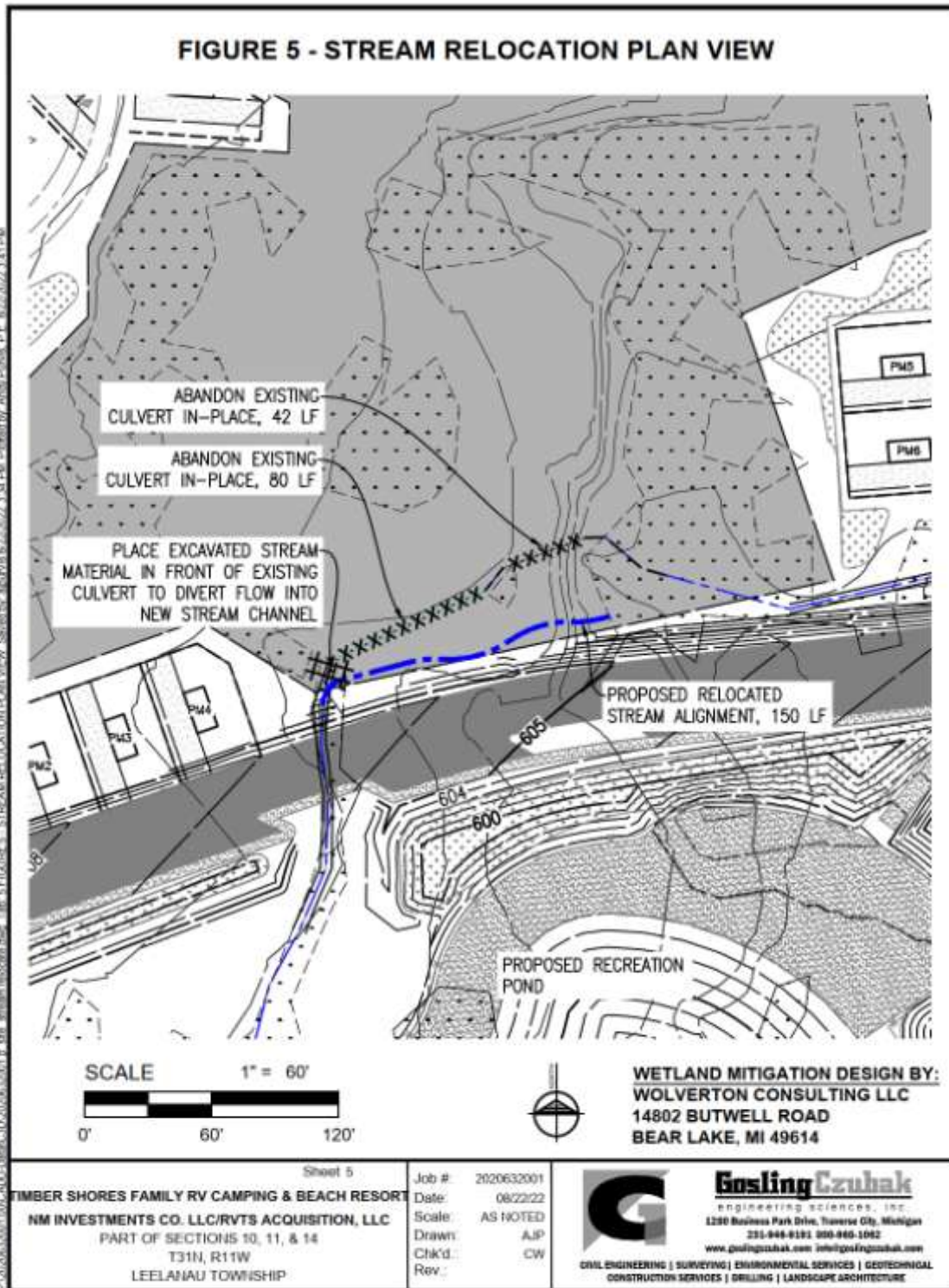
Vegetation sampling transects as shown in Figure 4 will be marked at each end with steel stakes extending at least four (4) feet above the ground surface for visibility as the vegetation grows in the site. The transect number/letter will be marked on each stake with a paint pen. Vegetation sampling plot locations will be located on each transect and will be located at 60-foot intervals and marked by 60-inch-long fiberglass driveway markers. Herbaceous wetland vegetation will be sampled using a one-meter square quadrat centered on the fiberglass plot stake and woody vegetation will be sampled in a 30-foot radius (60-foot diameter) circular plot with the center of the circular plot being the fiberglass plot stake.

The first plot on each transect will be located 30 feet from the end of the transect to ensure that the 30-foot radius woody vegetation plot just reaches the end of the transect. Plots are spaced at 60-foot intervals so the 30-foot radius woody vegetation plots to just touch on the transect. The last plot on each transect may or may not reach the end of the transect and partial plots should not be used.

Each plant species within the one-meter-square quadrats and woody species within the 30-foot radius circular plot are to be sampled and recorded as specified in the EGLE permit.

V. Stream Mitigation

During the review of the project, EGLE requested that two segments of the small stream north of the proposed recreation pond be “daylighted” as mitigation for the enclosure of the stream segments in the 1960s.. During the construction of the original Timber Shores Resort in the 1960s, two 15-inch diameter culverts were installed to enclose segments of the small stream so that campsites could be constructed over the stream. The two existing culverts are shown on Figure 5 and are 80 lineal feet and 42 lineal feet in length.



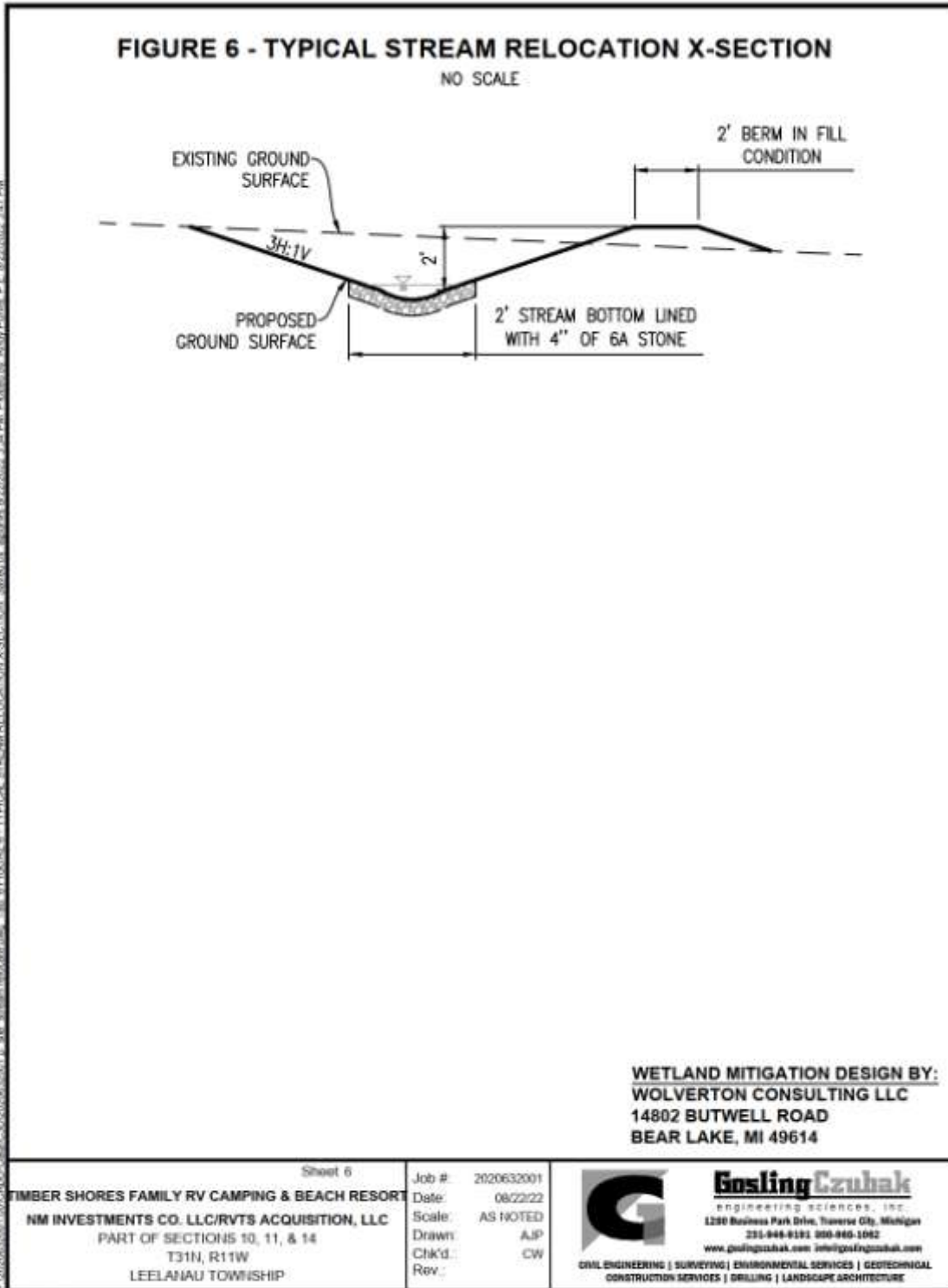
Analysis of the culvert locations by the wetland consultant and engineer in the field determined that excavation of the old fill, which is about five or six feet in depth, and removal of the two long culverts and creation of a new stream channel would result in the removal of several very large trees (32" diameter Eastern white pine and several 16"-18" diameter Northern white cedars) and an excavation for the new stream channel of about 32' to 40' top width. For these reasons a less damaging alternative to "daylighting" the stream was evaluated.

The alternative proposed is to relocate the stream channel just south of the existing stream course north of the proposed main access road to the resort (Figure 5). The proposed location will preserve the aesthetics of the large old-growth trees that will be visible from the main access road and will be much less disruptive to the landscape. The total length of the proposed stream relocation is 150 lineal feet. The two existing culverts presently enclose a total of 122 lineal feet of the stream and two open segments that total 57 lineal feet for a total length of 179 lineal feet from the upstream end of the longer culvert to the downstream confluence of the existing stream channel with the wetland.

The new stream channel has been designed with stable side slopes and provides a bottom width that will promote good streamflow with slight meanders in the channel (Figure 6). The stream bottom will be lined with washed stone to provide a stable substrate. Proper soil erosion control techniques will be employed to reduce erosion into the new channel.

The upstream end of the existing west culvert will be permanently blocked with concrete sacks or other method to prevent streamflow through the existing culvert and all streamflow will go into the new channel. The new channel will be constructed from the downstream end to the upstream end and not opened to streamflow until the stream banks are stabilized with vegetation. The upstream end of the new stream channel will be blocked with sandbags which can be removed when the channel is ready for flow.

This stream mitigation project will result in a substantial increase of open stream channel without the substantial disruption to the large trees and landscape that removing the existing culverts would cause. No wetland impacts will result from the stream relocation project. The downstream end of the new stream channel will end at the wetland boundary and water will be allowed to flow into the existing wetland much as the existing stream does.



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VI. Site Ownership and Provisions for Long-Term Protection of the Site

The Timber Shores Family RV Camping & Beach Resort is owned by NM Investment Company, LLC and RVTS Acquisition, LLC and is the permittee for the EGLE permit for the project. Documentation of ownership and title will be provided as required by the EGLE permit for the Conservation Easement which will encompass the wetland restoration areas and will protect the areas within the Conservation Easement in perpetuity.

Any occurrence of invasive plant species will be noted during the wetland restoration monitoring period and appropriate measures will be taken to remove or control the invasive species. Due to the low occurrence of invasive wetland species at the site presently and the fact that off-site topsoil is not being placed in the wetland restoration areas, the probability of the establishment of any invasive wetland plant species is low.

Because the wetland restoration areas will have signage discouraging public entry into the wetlands (which is not likely to be a problem anyway) and campers are usually "nature-conscious" human threats to the restored wetlands or deposition of trash are not expected.