MICRON SEMICONDUCTOR FABRICATION
CLAY, NY

USACE/NYSDEC JOINT PERMIT APPLICATION
PERMIT APPLICATION APPENDIX
VOLUME III

FINAL PUBLIC COMMENT VERSION

APPLICATION NO: LRB-2000-02198

July 7, 2025

Ver. 6.00

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Appendix K

Youngs Creek Qualitative Evaluation Results

RAMBOLL

ENVIRONMENT
& HEALTH

Tom Behm
Micron
tbehm@micron.com

RE: Micron – Qualitative Environmental Survey of Youngs Creek

Dear Mr. Behm:

From December 12 and December 21, 2023, Ramboll Americas Engineering Solutions, Inc. (Ramboll) conducted a qualitative environmental survey of Youngs Creek within the proposed Micron Site in the Town of Clay, New York (the Site; **Figure 01**), as requested by the New York State Department of Environmental Conservation (NYSDEC) and the United States Fish & Wildlife Service (USFWS). Additional characterization of Youngs Creek was requested in separate comment letters from these agencies on Onondaga County's Notice of Positive Declaration, Availability of Draft Scope and Public Scoping Session regarding Micron's proposed semiconductor fabrication project in Clay, New York. The additional characterization request included a desktop review and performing field studies to obtain information on the physical, biological and chemical characteristics of streams on the Site. In order to determine the need and scope for a quantitative survey, a desktop review and qualitative survey was conducted that focuses on characterizing the Youngs Creek system and identifies the potential of the creek to support fish and other biological communities.

Results from the survey will be incorporated into the Existing Conditions section of the Draft Environmental Impact Statement (DEIS) that is currently under development for the project. The information included in this letter report will be used as the framework for conducting the quantitative survey, which will focus on the water quality, benthic macroinvertebrate and fish communities within the Youngs Creek system. The following attachments are provided in this letter report:

1. Site Figures
2. Historical Aerial Imaging
3. Environmental Resource Mapper
4. Field Sheets for Rapid Assessment of Habitat Conditions
5. Photograph Log

Methodology

Desktop Evaluation

Ramboll compiled and evaluated available historical aerial images (**Attachment 1**), online environmental resources (**Attachment 2**), historic topographic maps, previous field evaluations (e.g., wetland delineation; **Figure 02**), and recent unmanned aerial vehicle (UAV) imagery as part of the desktop assessment. These data were used to identify the extent of the project area (e.g., the on-site portions of Youngs Creek and its tributaries) and the partitioning of these aquatic features into "study reaches" based on natural break points within and along the Youngs Creek system. Segregating the stream habitats into reaches provides the greatest clarity to the descriptions to be incorporated into the working DEIS and can help inform potential future quantitative environmental surveys that will focus on additional characterization of the biological communities that may inhabit the stream features.

Data and information reviewed as part of the desktop review included the following:

- National Wetland Inventory (NWI) Maps, as presented in the NWI Wetland Mapper. *https://www.fws.gov/wetlands/Data/Mapper.html* (USFWS 2023)
- New York State Freshwater Wetland (NYSFW) Maps and mapped streams, as presented in the NYSDEC Environmental Resource Mapper. *http://www.dec.ny.gov/gis/erm/* (NYSDEC 2023)
- Micron Semiconductor Fabrication Facility (Clay, NY), Aquatic Resources Supplemental Delineation Report (Ramboll 2023)
- Historical Aerial Photograph Imagery obtained from United States Geological Survey (USGS) Earth Explorer (USGS 2023) *https://earthexplorer.usgs.gov/*.
- Historic Topographic Mapping obtained from USGS topoView (USGS 2023) *https://ngmdb.usgs.gov/topoview/viewer/#15/43.1964/-76.1504.*

Qualitative Field Survey

Ramboll conducted an environmental field survey of Youngs Creek and its associated tributaries within the confines of the Micron property. Ramboll conducted field surveys of Youngs Creek and its tributaries on December 12, 14, 15, and 21. Field surveys were focused on streams identified during previous wetland delineation efforts and with adjoining features having a continuous surface connection to Youngs Creek. The survey entailed accessing the Youngs Creek stream continuum in multiple areas and documenting visual observations of the stream habitats on NYSDEC's Field Sheets for Rapid Assessment of Habitat Conditions in Low and High Gradient Streams, which are available in NYSDEC's Division of Water 2021 document, Standard Operating Procedure: Biological Monitoring of Surface Waters in New York State. Field sheets were completed at representative locations for each study reach to support characterization of the environmental conditions and quality of the Youngs Creek system. The habitat scoring conducted for each reach will support the development of a "baseline" environmental condition of the stream and tributaries, which in turn will support the overall assessment of project impacts, if any, on the stream features.

Interpretation of habitat assessment results is based on the calculation of Habitat Model Affinity (HMA) scores, as described in NYSDEC's Division of Water 2021 document Standard Operating Procedure: Biological Monitoring of Surface Waters in New York State (NYSDEC 2021). HMA scores are based on

comparison to a reference condition habitat model developed by Tran et al. (2010). The calculated HMA scores fall into broader habitat condition categories which include: natural, altered, moderately altered, and severely altered.

The information included in this letter report will be used as the framework for conducting the quantitative survey, which will focus on water quality and the benthic macroinvertebrate and fish communities within the Youngs Creek system.

Results

Desktop Evaluation

The Aquatic Resources Supplemental Delineation Report (Ramboll 2023), which summarized wetland and stream delineation activities within the Site, identified one perennial, four intermittent, and 20 ephemeral streams (**Table 1**). These streams are depicted on **Figure 2** as P1, IS1-4a and ES1-21. Stream Survey Forms that provide the observed physical characteristics (e.g., bed width, bank height, substrate) were completed and used in conjunction with onsite observations to complete the NYSDEC's Field Sheets for Rapid Assessment of Habitat Conditions in Low and High Gradient Streams. The majority of Youngs Creek, as depicted in historic and current published mapping reviewed, has been identified as wetland habitat (**Figure 2**). It appears that Youngs Creek on the project site has been historically altered from past human activities (agricultural, residential and transportation/utility corridors) and beaver activity.

Table 1: Previously delineated stream resources within the Micron Site.

Stream ID	*Cowardin Classification/Flow Regime*	*Length (LF)*	*OHW Width (LF)*
IS1	Intermittent/Riverine Stream Bed (R4SB)	1,411	10
IS2	Intermittent/Riverine Stream Bed (R4SB)	1,532	25
IS3	Intermittent/Riverine Stream Bed (R4SB)	1,355	70
IS4	Intermittent/Riverine Stream Bed (R4SB)	337	5
IS4A	Intermittent/Riverine Stream Bed (R4SB)	150	2
ES1	Ephemeral/Riverine, Ephemeral (R6)	144	3
ES2	Ephemeral/R6	239	1
ES3	Ephemeral/R6	257	1
ES4	-	-	
ES5	Ephemeral/R6	143	4
ES6	Ephemeral/R6	324	6
ES7	Ephemeral/R6	237	4
ES8	Ephemeral/R6	1,045	2
ES8a	Ephemeral/R6	134	3
ES9	Ephemeral/R6	260	2
ES10	Ephemeral/R6	398	4
ES11	Ephemeral/R6	490	2
ES12	Ephemeral/R6	193	3
ES13	Ephemeral/R6	30	3
ES14	Ephemeral/R6	57	3
ES15	Ephemeral/R6	298	2
ES16	Ephemeral/R6	430	5
ES17	-	-	
ES18	-	-	
ES19	Ephemeral/R6	149	3
ES20	Ephemeral/R6	795	5
ES21	Ephemeral/R6	209	3
PS1 (Young's Creek)	Perennial/Upper Perennial Unconsolidated Bottom (R3UB)	120	20
TOTALS		**10,737**	OHW=Ordinary High Water

*Source - Aquatic Resources Supplemental Delineation Report (Ramboll 2023)

Based on the desktop review described above and from pre-survey reconnaissance level observations, Youngs Creek within the project area was partitioned into 5 study reaches. Reaches are shown in **Figure 2** and described below.

Reach 1: This reach consists of the headwaters and tributaries of Youngs Creek located in the southeast portion of the project area. Habitat assessments were conducted at nine locations which included ephemeral and intermittent streams previously identified during wetland and stream delineation efforts. These tributaries have been historically impacted by agricultural and residential activities.

Reach 2: This reach is perennial in nature and is continuously flooded by beaver activity. The reach is physically separated from downstream reaches by a beaver dam, which is located as shown in **Figure 2**. Based on historical aerial images (**Attachment 1**), this reach of Youngs Creek had minor alterations due to agricultural activities. Based on aerial imagery and historic topographic maps, this reach has been historically flooded. Four representative sampling locations were selected for habitat assessment within Reach 2.

Reach 3: This reach is physically separated from downstream reaches by a utility right-of-way access road and from upstream reaches by a beaver dam. The reach was historically channelized by agricultural activities prior to 1952. The historic drainage channel now consists of a series of beaver dams which has diffused channel flow through a wetland area. Four representative sampling locations were selected for habitat assessment within Reach 3.

Reach 4: The northern reach of Youngs Creek is physically separated from upstream reaches by a utility right-of-way access road. The stream is diffuse and runs through a large emergent wetland complex. Historically, this area was altered by agricultural activities, including the channelization and diversion of surface flows to tributaries to the west of the main channel as shown in the 1976 historical image (**Attachment 1**) and historic topographic mapping. Due to the lack of a defined channel within Reach 4, two representative locations were selected for habitat assessment.

Reach 5: This reach consists of tributaries of Youngs Creek located in the northwest portion of the Site. Locations include intermittent streams previously identified during wetland and stream delineation efforts. Based on historical aerial images (**Attachment 1**), these tributaries have been impacted by agricultural activities, including channelization prior to 1972. Habitat assessments were conducted at three representative sampling locations along the two tributaries within this reach.

Qualitative Field Survey Summary

Ramboll biologists conducted the qualitative habitat assessment of Youngs Creek and associated tributaries on December 12, 14, 15 and 21, 2023. A total of 22 locations were assessed during the field survey. Assessments were completed using the NYSDEC's Field Sheets for Rapid Assessment of Habitat Conditions in Low Gradient Streams due to the low gradient, nominal flows, and relatively quiescent conditions observed. Field sheets and photographs of each location are provided in **Attachment 3** and **Attachment 4**, respectively.

Table 2 provides the summary of habitat conditions observed for each location. A habitat assessment for location T-R1-06 was not completed due to a lack of a defined stream channel at that location.

Table 2: Results of the rapid assessment of habitat condition in low gradient streams and calculated habitat condition.

Station Name	*Date*	*Delineated Steam*	*Epifaunal Substrate/ Available Cover*	*Pool Substrate Characterization*	*Pool Variability*	*Sediment Deposition*	*Channel Flow Status*	*Channel Alteration*	*Channel Sinuosity*	*Bank Stability*	*Vegetative Protection*	*Riparian Vegetative Zone Width*	*Habitat Model Affinity*
T-R1-01	12/12/2023	Tributary	10	13	8	4	15	15	5	20	20	20	Natural
T-R1-02	12/12/2023	Tributary	5	6	3	1	5	16	8	18	20	20	Moderate
T-R1-03	12/12/2023	Tributary	5	11	8	3	18	9	5	18	18	16	Altered
T-R1-04	12/12/2023	Tributary	9	7	4	7	6	13	8	18	20	20	Moderate
T-R1-05	12/12/2023	Tributary	7	11	2	2	6	5	2	10	12	20	Severe
T-R1-06	12/14/2023	Tributary	--	--	--	--	--	--	--	--	--	--	--
T-R1-07	12/14/2023	Tributary	6	6	2	1	1	14	6	20	20	20	Severe
T-R1-08	12/14/2023	Tributary	6	6	1	3	1	6	6	20	20	20	Severe
T-R1-09	12/14/2023	Tributary	6	6	2	2	0	16	8	20	20	20	Moderate
YC-R2-01	12/12/2023	Youngs Creek	6	11	1	5	18	18	6	20	20	20	Altered
YC-R2-02	12/15/2023	Youngs Creek	6	13	12	5	20	16	8	20	20	20	Natural
YC-R2-03	12/14/2023	Youngs Creek	6	15	12	5	20	16	8	20	20	20	Natural
YC-R2-04	12/14/2023	Youngs Creek	6	13	10	5	20	19	10	20	20	20	Natural
YC-R3-01	12/15/2023	Youngs Creek	15	12	10	8	20	11	6	20	20	20	Natural
YC-R3-02	12/15/2023	Youngs Creek	12	11	8	8	20	11	8	20	20	20	Natural
YC-R3-03	12/15/2023	Youngs Creek	11	11	5	6	20	11	8	20	20	20	Altered
YC-R3-04	12/15/2023	Youngs Creek	16	15	13	13	20	10	8	20	16	16	Natural
YC-R4-01	12/15/2023	Youngs Creek	10	11	5	5	5	11	6	20	20	20	Moderate
YC-R4-02	12/15/2023	Youngs Creek	11	6	0	5	5	11	6	20	20	20	Moderate
T-R5-01	12/21/2023	Tributary	11	11	8	8	10	16	10	20	20	20	Natural
T-R5-02	12/21/2023	Tributary	8	8	8	5	8	13	8	20	20	20	Altered
T-R5-03	12/21/2023	Tributary	13	10	10	8	10	16	10	20	20	20	Natural

Reach 1: This reach consisted of seven ephemeral and two intermittent (T-R1-01 and T-R1-03) stream locations (**Figure 2**). The ephemeral stream locations were observed to have moderately to severely altered habitat conditions. These streams were observed to go dry in September (**Attachment 4;** Photos 5,6,11,12,19,20,25,26) and being ephemeral in nature are not expected to support macroinvertebrate and fish communities. Habitat capable of supporting sustained populations of fish and aquatic macroinvertebrates was not observed at ephemeral stream locations. Habitat conditions observed at the intermittent stream locations are considered natural or altered. Habitat conditions within the intermittent stream locations are likely suitable for the colonization of fish and macroinvertebrates associated with streams.

Reach 2: Although habitat conditions throughout this reach were generally assessed as natural, epifaunal substrate and available cover for the colonization of macroinvertebrates and fishes are limited due to high sedimentation rates within the beaver pond area. Emergent vegetation was present throughout the reach and was dominated by arrow arum (*Peltandra virginica*), which inhabits shallow water areas of ponds, lakes, streams, and rivers, we well as wetlands and wet woodlands. The reach is flooded due to a beaver dam located downstream and has no defined stream channel, resulting in the reach functioning primarily as wetland habitat as shown in **Figure 2** and **Attachment 4** (Photos 26 through 34).

Reach 3: Similar to Reach 2, this reach is heavily impacted by beaver activity. Several beaver dams were located along the historical agricultural channel, which has diffused the stream flow through a wetland dominated by reed canary grass (*Phalaris arundinacea*). A perennial channel is located at the downstream end of the reach, near the right-of-way access road (**Figure 2**). Epifaunal substrate and available cover for the colonization of macroinvertebrates and fishes are limited within this reach due to the lack of a defined channel, low water conditions and high sedimentation rates of organic material (**Attachment 4**; Photos 35 through 42).

Reach 4: No defined channel of Youngs Creek was observed in this reach downstream (north) of the utility right-of-way access road. Stream flow disperses through a wetland area dominated by common reed (*Phragmites australis*), cattail (*Typha latifolia*) and reed canary grass (**Figure 2**; **Attachment 4**; Photos 43 through 46). Although water levels within the wetland area were approximately 2 feet deep during the habitat assessment, water levels are likely lower during drier conditions. Habitat within this reach was not considered suitable for the colonization of fish and macroinvertebrates.

Reach 5: This reach consists of two intermittent tributary streams located in the northwest section of the Site (**Figure 2**). Habitat conditions within these streams is suitable for limited colonization of fish and macroinvertebrate communities. Habitat for these communities is limited and potentially inviable during dry periods due to low water depths or absence of water under these conditions (**Attachment 4**; Photos 44 through 58).

Conclusions and Recommendations

The majority of the Youngs Creek system within the Site has been altered by historic agricultural, utilities, road corridors and recent beaver activities. Channelization, draining and ponding of the creek has diffused or flooded the main channel of Youngs Creek as mapped on the Environmental Resource

Mapper, resulting in a system functioning primarily as a wetland habitat (**Figure 2**). Stable stream habitat that may support fish and macroinvertebrate colonization was observed in previously delineated intermittent streams (**Figure 2**). A limited quantitative assessment of the macroinvertebrate and fish communities in select stream reaches within the Youngs Creek system of the Site is recommended. It is recommended that the quantitative assessment focuses on the intermittent tributaries and the perennial portion of Youngs Creek where benthic macroinvertebrate and fish communities may be present.

References

Ramboll. 2023. Micron Semiconductor Fabrication Facility (Clay, NY), Aquatic Resources Supplemental Delineation Report

NYSDEC. 2021. Division of Water 2021 document, Standard Operating Procedure: Biological Monitoring of Surface Waters in New York State.

NYSDEC. 2023. New York State Freshwater Wetland (NYSFW) Maps and mapped streams, as presented in the NYSDEC Environmental Resource Mapper. http://www.dec.ny.gov/gis/erm/

Tran, C.P., R.W. Bode, A.J. Smith, and G. S. Kleppel. 2010. Land-use proximity as a basis for assessing stream water quality in New York State (USA). Ecological Indicators 10:727-733.

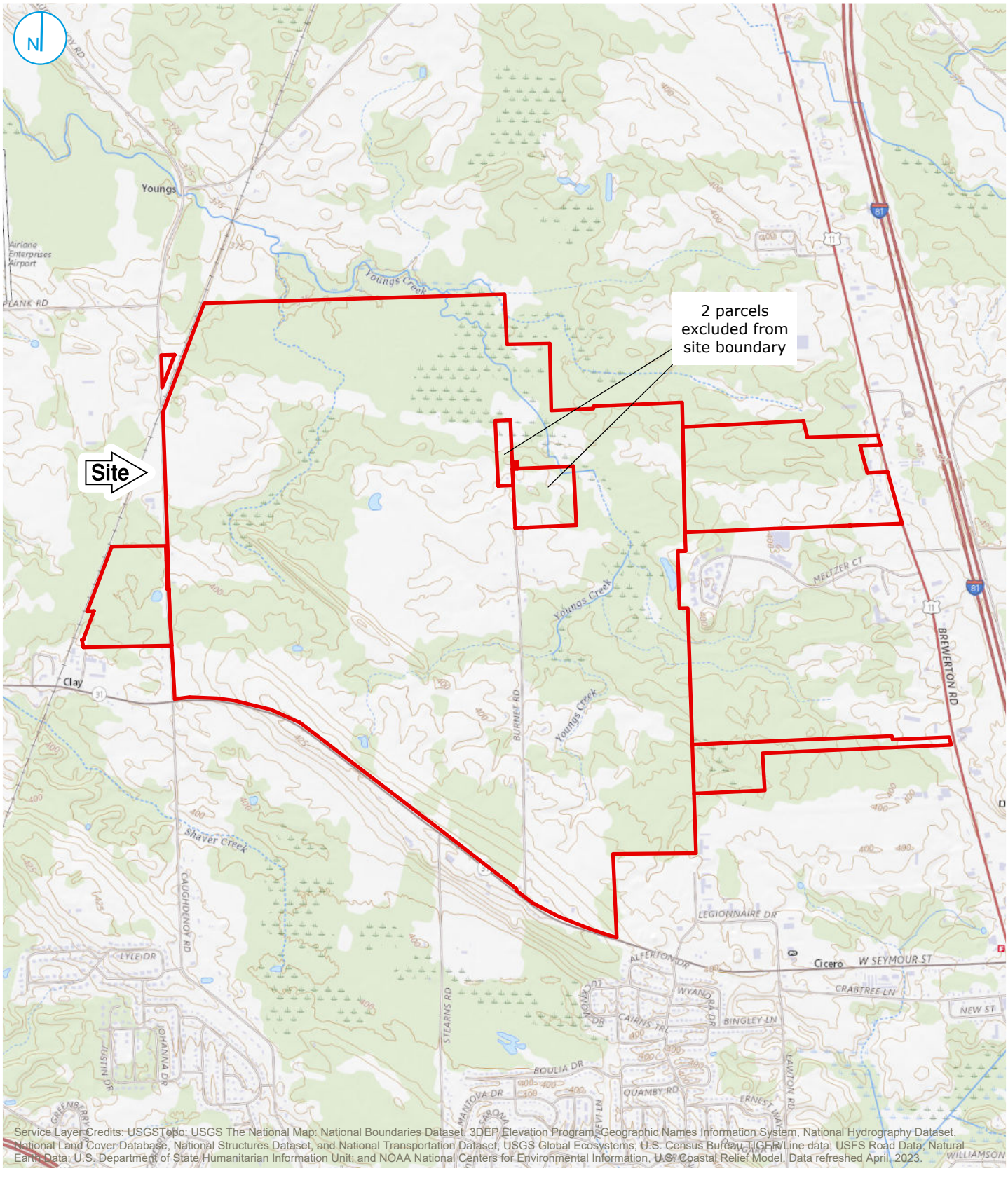
USFWS. 2023. National Wetland Inventory (NWI) Maps, as presented in the NWI Wetland Mapper. https ://www.fws.gov/wetlands/Data/Mapper.html.

USGS. 2023. Historical Aerial Photograph Imagery obtained from United States Geological Survey (USGS) Earth Explorer. *https://earthexplorer.usgs.gov/*.

USGS. 2023. Historic Topographic Mapping obtained from USGS topoView. *https://ngmdb.usgs.gov/topoview/viewer/#15/43.1964/-76.1504.*

RAMBØLL

FIGURES



PROJECT: 1940071270 | DATED: 12/8/2023 | DESIGNER: SSOULE
C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\Micron\PRO\White_Pine_Micron\White_Pine_Micron.aprx\Figure_01-Site_Location

Map Scale: 1:24,000 | Map Center: 76°8'53"W 43°11'26"N



KEY MAP (not to scale)

0 1,000 2,000 Feet

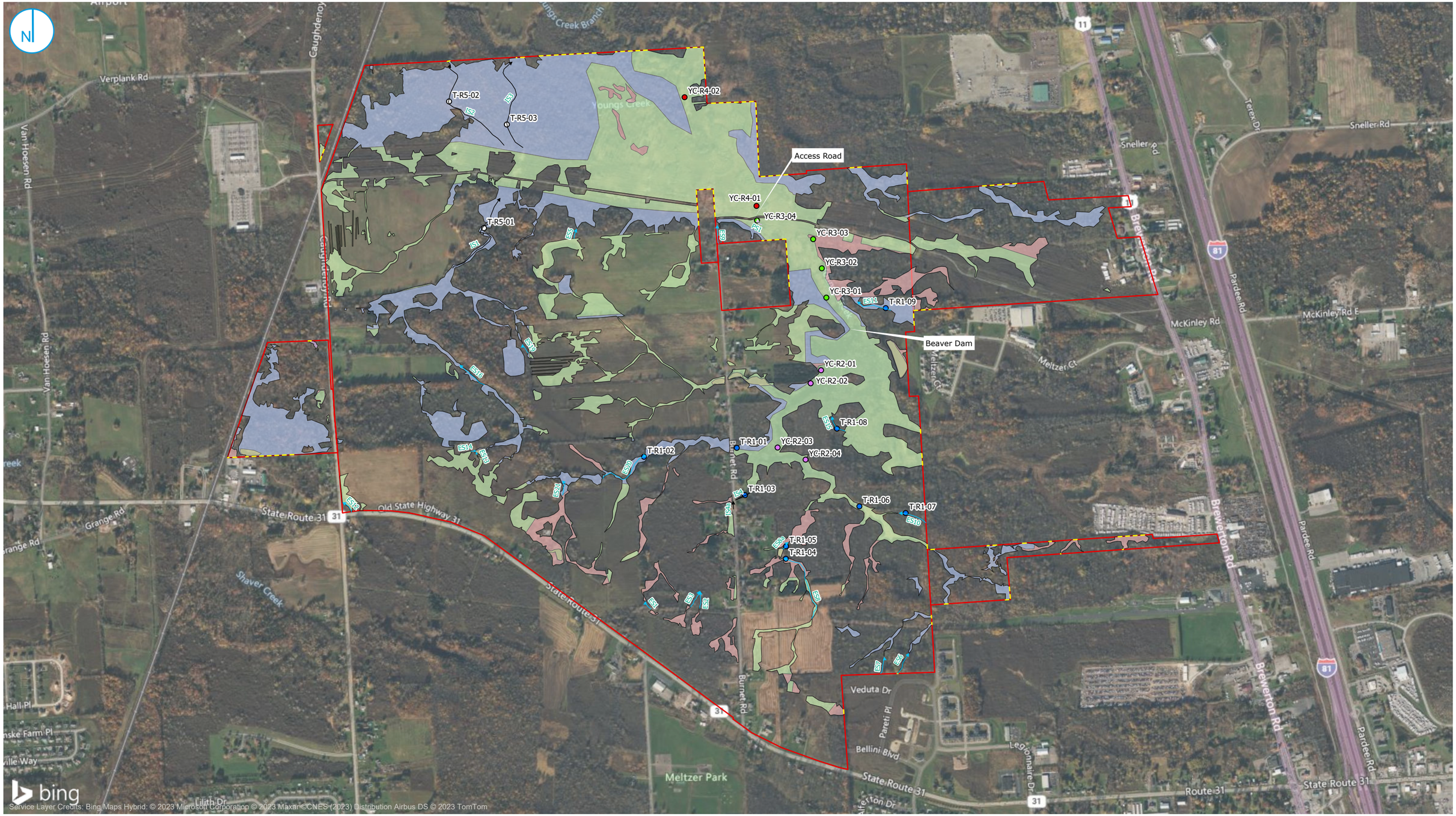
SITE LOCATION

Micron Semiconductor Fabrication Facility
Clay, New York

FIGURE 01

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL



PROJECT: 1950100716-001 | DATED: 1/4/2024 | DESIGNER: SSOULE

C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\Micron\PRO\White_Pine_Micron\White_Pine_Micron.aprx\Figure_02-Youngs_Creek_Habitat

Stream Assessment Location
- Reach 1
- Reach 2
- Reach 3
- Reach 4
- Reach 5

Delineated Stream Flow Direction
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Wetland Delineation Boundaries

Wetland Cover Type
- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Open Water (POW)
- Palustrine Shrub Scrub (PSS)
- Palustrine Unconsolidated Bottom (PUB)

- Wetland Extends Beyond Site Boundary
- Site Boundary/Limits of JD Request

0 600 1,200 Feet

YOUNGS CREEK HABITAT ASSESSMENT

Micron Semiconductor Fabrication Facility
Clay, New York

FIGURE 02

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

ATTACHMENT 1
HISTORICAL AERIAL IMAGING

5-7-58 1 52 CS-VKX

7543 0 KODAK AEROGRAPHIC SAFETY FILM 1A

7543 1 KODAK AEROGRAPHIC SAFETY FILM 1A

7543 2 KODAK AEROGRAPHIC S



USGS science for a changing world

USGS
science for a changing world



KODAK SAFETY FILM
5 6 5 7
Ca640
SAg 83
f=88,36
Ca640
SAg 83
f=88,36
GS--SWCI

5-6 -72

1 63



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USGS
science for a changing world

FS160 1/ 360 f/4.0 FF2.0 EC+2/3* SP- v/h.02875 00% dt0l8.9 ds012 26.7V -60mb ER00 CAM5281

1: 28800

04-25-03

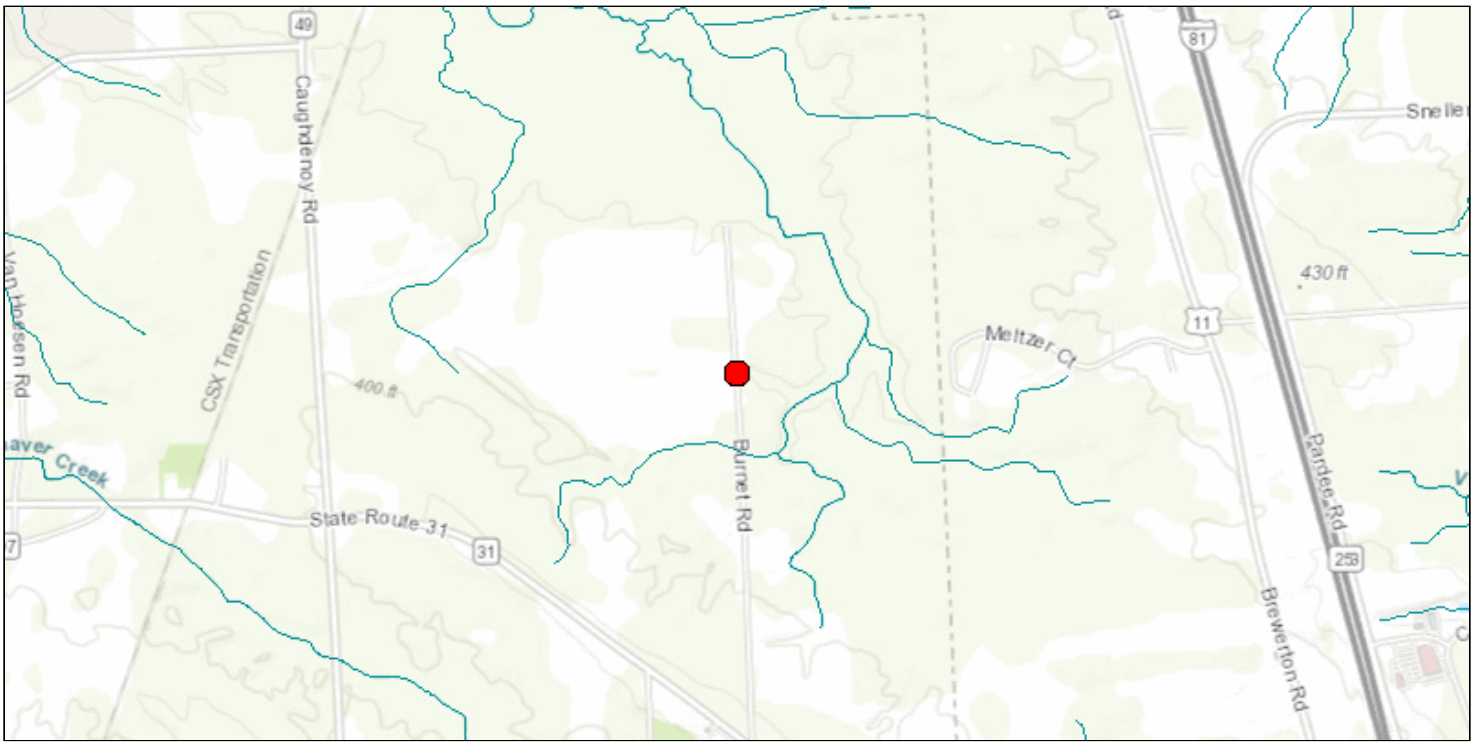
NYS_Y3 DOT 162

86

NW6 MK061 016 -0037 43-12-58N 076-08-01W 5023m 14:28:36 04-25-2003 45.4

ATTACHMENT 2
ENVIRONMENTAL RESOURCE MAPPER

Environmental Resource Mapper



The coordinates of the point you clicked on are:

UTM 18	**Easting:**	406788.49875274836	**Northing:**	4782596.763676624
Longitude/Latitude	**Longitude:**	-76.1471278114065	**Latitude:**	43.19040268100736

The approximate address of the point you clicked on is:
8668 Burnet Rd, Clay, New York, 13041

County: Onondaga
Town: Clay
USGS Quad: BREWERTON

Freshwater Wetlands Checkzone

This location is in the vicinity of one or more Regulated Freshwater Wetlands.

Rare Plants and Rare Animals

This location is in the vicinity of Bats Listed as Endangered or Threatened -- Contact NYSDEC Regional Office

National Wetands Inventory

Attribute: PUBFh
Type: Freshwater Pond
Acres: 0.23542293092239608

For more information about the National Wetands Inventory wetlands visit **http://www.fws.gov/wetlands/**

If your project or action is within or near an area with a rare animal, a permit may be required if the species is listed as endangered or threatened and the department determines the action may be harmful to the species or its habitat.

If your project or action is within or near an area with rare plants and/or significant natural communities, the environmental impacts may need to be addressed.

The presence of a unique geological feature or landform near a project, unto itself, does not trigger a requirement for a NYS DEC permit. Readers are advised, however, that there is the chance that a unique feature may also show in another data layer (ie. a wetland) and thus be subject to permit jurisdiction.

Please refer to the "Need a Permit?" tab for permit information or other authorizations regarding these natural resources.

Disclaimer: If you are considering a project or action in, or near, a wetland or a stream, a NYS DEC permit may be required. The Environmental Resources Mapper does not show all natural resources which are regulated by NYS DEC, and for which permits from NYS DEC are required. For example, Regulated Tidal Wetlands, and Wild, Scenic, and Recreational Rivers, are currently not included on the maps.

Print Preview

ATTACHMENT 3
FIELD SHEETS FOR RAPID ASSESSMENT OF HABITAT CONDITIONS

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/12/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R1-01
Collectors: CCN, RPC, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 (4) 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/12/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R1-02 (ES20)
Collectors: CCN, RPC, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 18 17 **(16)**	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 **(8)** 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE____(LB)	Left Bank 10 **(9)**	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank 10 **(9)**	8 7 6	5 4 3	2 1 0
	9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE____(LB)	Left Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	SCORE____(LB)	Left Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank **(10)** 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/12/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R1-03 (IS4)
Collectors: CCN, RPC, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/12/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R1-04 (ES8)
Collectors: RPC, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 (4) 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/12/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R1-05 (ES8a)
Collectors: RPC, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank 10 9	8 7 6	(5) 4 3	2 1 0
SCORE____(RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
SCORE____(RB)	Right Bank 10 9	8 7 (6)	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/14/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R1-07 (ES10)
Collectors: CCN, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/14/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R1-08 (ES15)
Collectors: CCN, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/14/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R1-09 (ES11)
Collectors: CCN, RPC, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 (0)

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/12/2023

Stream Name: Youngs Creek
4-letter Identifier/Station Number: YC-R2-01
Collectors: CCN, RPC, KWB
Biological Sample: Y (N)
Site Type: Screening Intensive (Multi-Site)

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/15/2023

Stream Name: Youngs Creek
4-letter Identifier/Station Number: YC-R2-02
Collectors: CCN, NJT
Biological Sample: Y (N)
Site Type: Screening Intensive (Multi-Site)

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	(20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 18 17 **(16)**	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 **(8)** 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE____(LB)	Left Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE____(LB)	Left Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	SCORE____(LB)	Left Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank **(10)** 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/14/2023

Stream Name: Youngs Creek
4-letter Identifier/Station Number: YC-R2-03
Collectors: CCN, KWB
Biological Sample: Y (N)
Site Type: Screening Intensive (Multi-Site)

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	(20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 18 17 **(16)**	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 **(8)** 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE____(LB)	Left Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE____(LB)	Left Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	SCORE____(LB)	Left Bank **(10)** 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank **(10)** 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/14/2023

Stream Name: Youngs Creek
4-letter Identifier/Station Number: YC-R2-04
Collectors: CCN, KWB
Biological Sample: Y (N)
Site Type: Screening Intensive (Multi-Site)

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	(20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
	SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/15/2023

Stream Name: Youngs Creek
4-letter Identifier/Station Number: YC-R3-01
Collectors: CCN, NJT
Biological Sample: Y (N)
Site Type: Screening Intensive (Multi-Site)

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	(20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/15/2023

Stream Name: Youngs Creek
4-letter Identifier/Station Number: YC-R3-02
Collectors: CCN, NJT
Biological Sample: Y (N)
Site Type: Screening Intensive (Multi-Site)

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	(20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/15/2023

Stream Name: Youngs Creek
4-letter Identifier/Station Number: YC-R3-03
Collectors: CCN, NJT
Biological Sample: Y (N)
Site Type: Screening Intensive (Multi-Site)

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	(20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/15/2023

Stream Name: Youngs Creek
4-letter Identifier/Station Number: YC-R3-04 (PS1)
Collectors: CCN, NJT
Biological Sample: Y (N)
Site Type: Screening Intensive (Multi-Site)

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	(20) 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/21/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R5-01 (IS1)
Collectors: CCN, RPC, KWB
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/21/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R5-01 (IS2)
Collectors: CCN, NJT
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
	SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
	SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

18.4 FIELDSHEET FOR RAPID ASSESSMENT OF HABITAT CONDITION IN LOW GRADIENT STREAMS

New York State Department of Environmental Conservation
Field Sheet for Rapid Assessment of Habitat Condition (Low Gradient)

12/21/2023

Stream Name: Youngs Creek Tributary
4-letter Identifier/Station Number: T-R5-01 (IS3)
Collectors: CCN, NJT
Biological Sample: Y (N)
Site Type: (Screening) Intensive Multi-Site

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e. logs/snags that are not new fall and not transient)	30 – 50% mix of stable habitat; well-suited for full colonization potential, adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10 – 30 % mix of stable habitat; habitat availability less than desirable, substrate frequently disturbed or removed.	Less than 10 % stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderated deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constructions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long time.
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion; mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion potential during floods.	Unstable, many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9.Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation very high vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE____(LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE____(RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Note: determine left or right side by facing downstream.

ATTACHMENT 4
PHOTOGRAPH LOG

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
1	12/12/2023

Description

Looking upstream at T-R1-01.

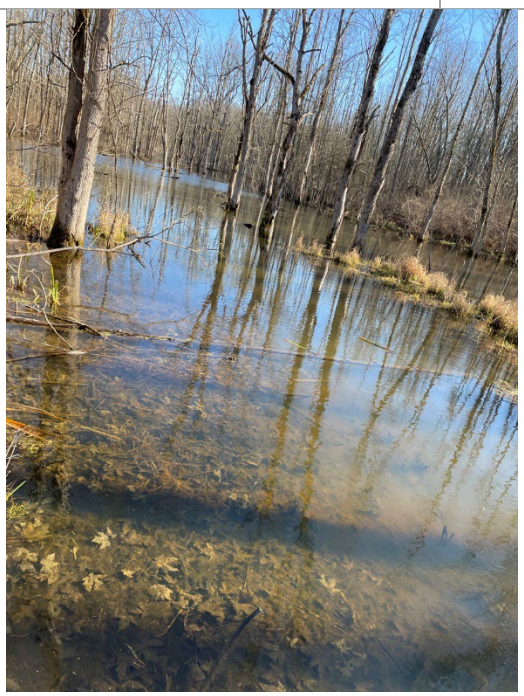


Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
2	12/12/2023

Description

Looking downstream at T-R1-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
3	12/12/2023	

Description

Looking upstream at T-R1-02 (ES20).

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
4	12/12/2023	

Description

Looking downstream at T-R1-02 (ES20).

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
5	9/20/2023	

Description

Looking upstream at ES20 near T-R1-02 during dry conditions.

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
6	9/20/2023	

Description

Looking downstream at ES20 near T-R1-02 during dry conditions.

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
7	12/12/2023

Description

Looking upstream at T-R1-03 (IS4).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
8	12/12/2023

Description

Looking downstream at T-R1-03 (IS4).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
9	12/12/2023

Description

Looking upstream at T-R1-04 (ES8).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
10	12/12/2023

Description

Looking downstream at T-R1-04 (ES8).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
11	9/21/2023

Description

Looking downstream at ES8 near T-R1-04 during dry conditions.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
12	9/21/2023

Description

Looking upstream at ES8 near T-R1-04 during dry conditions.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
13	12/12/2023

Description

Looking upstream at T-R1-05 (ES8a).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
14	12/12/2023

Description

Looking downstream at T-R1-05 (ES8a).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
15	12/14/2023

Description

Looking upstream at T-R1-06.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
16	12/14/2023

Description

Looking downstream at T-R1-06.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
17	12/14/2023

Description

Looking upstream at T-R1-07 (ES10).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
18	12/14/2023

Description

Looking downstream at T-R1-07 (ES10).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
19	9/21/2023	

Description

Looking downstream at ES10 near T-R1-07 during dry conditions.

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
20	9/21/2023	

Description

Looking upstream at ES10 near T-R1-07 during dry conditions.

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
21	12/14/2023

Description

Looking upstream at T-R1-08 (ES15).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
22	12/14/2023

Description

Looking downstream at T-R1-08 (ES15).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
23	12/14/2023

Description

Looking upstream at T-R1-09 (ES11).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
24	12/14/2023

Description

Looking downstream at T-R1-09 (ES11).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
25	9/8/2023

Description

Looking upstream at ES11 near T-R1-09 during dry conditions.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
26	9/8/2023

Description

Beaver dam located between reach 2 and reach 3.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
27	12/12/2023

Description

Looking upstream at YC-R2-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
28	12/12/2023

Description

Looking downstream at YC-R2-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
29	12/15/2023

Description

Looking upstream at YC-R2-02.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
30	12/15/2023

Description

Looking downstream at YC-R2-02.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
31	12/14/2023

Description

Looking upstream at YC-R2-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
32	12/14/2023

Description

Looking downstream at YC-R2-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
33	12/14/2023

Description

Looking downstream at YC-R2-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
34	12/14/2023

Description

Looking upstream at YC-R2-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
35	12/15/2023

Description

Looking downstream at YC-R3-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
36	12/15/2023

Description

Looking upstream at YC-R3-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
37	12/15/2023

Description

Looking upstream at YC-R3-02.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
38	12/15/2023

Description

Looking downstream at YC-R3-02.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
39	12/15/2023

Description

Looking downstream at YC-R3-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
40	12/15/2023

Description

Looking upstream at YC-R3-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
41	12/15/2023

Description

Looking downstream at YC-R3-04 (P1).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
42	12/15/2023

Description

Looking upstream at YC-R3-04 (P1).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
43	12/15/2023

Description

Looking downstream at YC-R4-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
44	12/15/2023

Description

Looking upstream at YC-R4-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
45	12/15/2023

Description

Looking downstream at YC-R4-02.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
46	12/15/2023

Description

Looking upstream at YC-R4-02.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
47	12/15/2023

Description

Looking downstream at YC-R5-01 (IS1).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
48	12/15/2023

Description

Looking upstream at YC-R5-01 (IS1).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
49	9/14/2023

Description

Looking upstream at IS1 near YC-R5-01 during dry conditions.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
50	9/14/2023

Description

Looking downstream at IS1 near YC-R5-01 during dry conditions.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
51	12/15/2023

Description

Looking downstream at YC-R5-02 (IS2).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
52	12/15/2023

Description

Looking upstream at YC-R5-02 (IS2).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
53	9/15/2023

Description

Looking upstream at IS2 near YC-R5-02.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
54	9/15/2023

Description

Looking downstream at IS2 near YC-R5-02.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
55	12/15/2023

Description

Looking downstream at YC-R5-03 (IS3).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
56	12/15/2023

Description

Looking upstream at YC-R5-03 (IS3).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
57	9/15/2023

Description

Looking upstream at IS3 near YC-R5-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
58	9/15/2023

Description

Looking downstream at IS3 near YC-R5-03.



Appendix L

Youngs Creek Quantitative Assessment Results

RAMBOLL

ENVIRONMENT
& HEALTH

Micron Semiconductor Fabrication Facility (Clay, NY)

Quantitative Environmental Survey of Youngs Creek Report

Project name	**Micron Semiconductor Fabrication Facility (Clay, NY)**
Client	**Micron New York Semiconductor Manufacturing, LLC**
Project no.	**1950100687; DEC ID 7-3124-00575**
Recipient(s)	**Kevin Balduzzi (NYSDEC); Ian Drew (USFWS)**
From	**Ramboll Americas Engineering Solutions, Inc.**
Document type	**Report**
Date	**June 28, 2024**
Prepared by	**Christopher C. Nack**
Checked by	**Mike Rondinelli**
Approved by	**Kenneth P. Lynch**

In their reviews of the September 2023 Draft State Environmental Quality Review Act (SEQRA) Proposed Scope and Full Environmental Assessment Form (FEAF) and Addendum documents for the proposed Micron Semiconductor Fabrication project (Project) in Clay, New York, the New York State Department of Environmental Conservation (NYSDEC) and United States Fish and Wildlife Service (USFWS) indicated that the Draft Environmental Impact Statement (DEIS) should include a biological survey of Youngs Creek in support of the assessment of the Project's potential upstream and downstream impacts to aquatic resources. Accordingly, in December 2023, Ramboll conducted a qualitative environmental survey of Youngs Creek within the proposed Project site limits that qualitatively characterized the quality of the habitats associated with the Youngs Creek system and identified reaches that potentially support benthic macroinvertebrate and fish communities. The results of this qualitative survey were presented in a letter report to NYSDEC and USFWS dated February 26, 2024 (Ramboll 2024). To fully address agency comments regarding characterization of biological communities within the Youngs Creek system, a follow-on quantitative survey was conducted from June 5 through June 7, 2024 that focused on the reaches identified as potentially supporting benthic macroinvertebrates and fishes. This report summarizes the activities conducted during the quantitative biological sampling and presents and describes the results of the survey.

Quantitative Field Survey Methods

As discussed above, Ramboll conducted biological sampling of fish and aquatic macroinvertebrates along multiple sections of Youngs Creek and its associated tributaries within the confines of the Micron property (Table 1; Figures 1-1b). Field surveys focused on perennial and intermittent reaches of Youngs Creek and adjoining features having a continuous surface connection to Youngs Creek. Sampling locations were identified based on information provided in the *Micron Semiconductor Fabrication Facility (Clay, NY), Aquatic Resources Supplemental Delineation Report* (Ramboll 2023) and the *Qualitative Environmental Survey of Youngs Creek* technical memorandum prepared in February 2024 (Ramboll 2024). Site images were taken during the biological survey and are provided in Attachment 1.

Table 1: Sample locations with associated midpoint geographic coordinates.

Sample Location	Latitude, Longitude	Cowardin Classification/Flow Regime
T-R1-01	43.1878, -76.1463	Palustrine Emergent Wetland (PEM)
T-R1-03	43.1861, -76.1464	Intermittent/Riverine Stream Bed (R4SB)
T-R5-01	43.1957, -76.1591	Intermittent/Riverine Stream Bed (R4SB)
T-R5-02	43.2003, -76.1591	Intermittent/Riverine Stream Bed (R4SB)
T-R5-03	43.1999, -76.1579	Intermittent/Riverine Stream Bed (R4SB)
YC-R2-01a	43.1918, -76.1410	Palustrine Emergent Wetland (PEM)
YC-R2-01	43.1908, -76.1422	Palustrine Emergent Wetland (PEM)
YC-R2-03	43.1891, -76.1444	Palustrine Emergent Wetland (PEM)
YC-R3-04	43.1960, -76.1455	Perennial/Upper Perennial Unconsolidated Bottom (R3UB)

The survey entailed accessing the Youngs Creek stream continuum at the locations in Table 1 and conducting backpack electroshocking of fish, dip netting for benthic macroinvertebrates and collecting water quality data. Sampling generally followed the NYSDEC's Division of Water 2021 document, *Standard Operating Procedure: Biological Monitoring of Surface Waters in New York State (SOP #103-04 (ny.gov)*. Water quality data were collected at the various sampling locations with a Horiba U52-2M Multimeter and included the following parameters: water temperature (°C), dissolved oxygen (mg/L), conductivity (uS/cm), turbidity (NTU), and pH (Table 2).

Approximately 75-meters of stream was sampled for fish at each reach location. All collected fish were identified to species in the field. Fish counts (Table 3) were recorded and the lengths of up to 25 representative fish were measured to the nearest millimeter (mm) for each species (Table 4) and recorded on field datasheets (Attachment 2). Representative fish collected during the electroshocking were imaged and are provided in Attachment 1. Tissue samples were collected and transferred to the NYSDEC for tissue contaminant analysis as part of the License to Collect and Possess (LCP) requirements (Table 5). The NYSDEC provided materials needed for the fish to be transferred. Each fish sample transferred to the NYSDEC for tissue analysis was imaged (Attachment 1).

Benthic macroinvertebrates sampling was conducted by "net jabbing" of the available habitat (banks, submerged aquatic vegetation, woody debris and substrates) and "net sweeping" the surrounding water to capture dislodged organisms. Benthic macroinvertebrate sampling was conducted for at least 5 minutes at each sampling reach. Organisms were identified to the lowest taxonomic level possible in the field and returned to the sample location (Table 6). Types of habitats sampled and organisms observed were recorded on field datasheets (Attachment 2).

Quantitative Field Survey Results

Water Quality

Water quality measurements are provided in Table 2. Dissolved oxygen at the sample reaches ranged from 0.51 mg/L to 7.35 mg/L. Oxygen levels were generally low throughout the Youngs Creek system during the biological survey, with the ponded wetland locations (YC-R2-01a, YC-R2-01 and YC-R2-03) having the lowest levels observed (0.51-6.52 mg/L). The highest dissolved oxygen was observed (7.35 mg/L) at the perennial stream portion of Youngs Creek within the site. Temperature (°C) at the sample

reaches ranged from 18.09 to 26.71 and pH ranged from 5.70 to 8.35. Temperature was highest in the ponded wetland location (YC-R2-01a, YC-R2-01).

Table 2: Water quality at each sampling location.

Location	Temperature (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	Turbidity (NTU)	pH
T-R1-01	24.40	4.60	0.825	24.8	5.70
T-R1-03	21.81	4.47	0.596	80.5	8.03
YC-R2-01a	26.71	6.52	0.501	64.8	7.95
YC-R2-1	26.16	2.80	0.451	162	7.54
YC-R2-03	19.66	0.51	0.583	102	7.32
YC-R3-04	24.22	7.35	0.852	0	7.44
T-R5-01	18.09	6.60	0.503	0	8.11
T-R5-03	18.50	6.47	0.511	0	8.35

Fish Community

A total of 196 fish, represented by six species (Table 3), were collected during the biological survey. Fish were collected at seven of the eight selected sites. Note that location T-R5-02, located within an intermittent stream, was not sampled due to the location being dry during the sampling period. The fish community at all locations collectively was dominated brook stickleback (77%) and central mudminnow (18%). Brook stickleback were present at six of the seven stream reaches where fish were collected. Fish communities consisted of forage species only except at the perennial stream location (YC-3-04), where two juvenile northern pike and two green sunfish were observed. One large dead smallmouth bass (*Micropterus dolomieu*) was observed at location YC-R2-01. The smallmouth bass observation was attributed to great blue heron (*Ardea herodias*) activity since the smallmouth bass had damage consistent with bird feeding and was located under a great blue heron rookery. The largest fish collected was a central mudminnow (115 mm) at location YC-R2-03. Mean lengths (in mm) and length ranges at each sample reach are provided in Table 4. A total of 20 tissue samples consisting largely of composite fish were transferred to the NYSDEC following each day of sampling. Tissue sample data are provided in Table 5. In general, fishes recorded at the stream system locations are generally typical of those inhabiting lentic habitats (i.e., ponds, lakes, wetlands) and/or low gradient streams or rivers.

Table 3: Fish species and counts from each stream reach location.

Common Name	Scientific Name	T-R1-01	T-R1-03	YC-R2-01a	YC-R2-1	YC-R2-03	YC-R3-04	T-R5-01	T-R5-03
Northern Pike	*Esox lucius*	--	--	--	--	--	2	--	--
Central Mudminnow	*Umbra limi*	--	--	--	1	2	32	--	--
Brook Stickleback	*Culaea inconstans*	--	6	19	45	51	28	2	--
Creek Chub	*Semotilus atromaculatus*	--	--	--	2	--	--	--	--
Golden Shiner	*Notemigonus crysoleucas*	3	--	1	--	--	--	--	--
Green Sunfish	*Lepomis cyanellus*	--	--	--	--	--	2	--	--

Table 4: Mean fish length (mm) for each species at each stream reach location. Size range is shown in parentheses.

Common Name	Scientific Name	T-R1-01	T-R1-03	YC-R2-01a	YC-R2-1	YC-R2-03	YC-R3-04	T-R5-01	T-R5-03
Northern Pike	*Esox lucius*	--	--	--	--	--	101.5 (93-110)	--	--
Central Mudminnow	*Umbra limi*	--	--	--	98	102.5 (97-108)	89.2 (75-115)	--	--
Brook Stickleback	*Culaea inconstans*	--	55.7 (52-59)	25.4 (17-33)	28.2 (18-50)	24.9 (18-29)	24.8 (17-28)	55.5 (55-56)	--
Creek Chub	*Semotilus atromaculatus*	--	--	--	21.5 (21-22)	--	--	--	--
Golden Shiner	*Notemigonus crysoleucas*	64.3 (59-67)	--	18	--	--	--	--	--
Green Sunfish	*Lepomis cyanellus*	--	--	--	--	--	67.5 (55-80)	--	--

Table 5: Tissue samples collected for the NYSDEC with associated fish lengths (mm) and sample weight (g). For composite samples, the length range is provided.

Sample Name	Location	Species	Number	Length (mm)	Weight (g)
ATRU01331	T-R1-01	Golden Shiner	3	59-67	7.0
ATRU01382	T-R5-01	Brook Stickleback	2	55-56	3.0
ATRU01383	YC-R2-03	Brook Stickleback	51	18-28	5.2
ATRU01384	YC-R2-03	Central Mudminnow	2	97-108	23.7
ATRU01385	T-R1-03	Brook Stickleback	3	52-57	4.7
ATRU01386	T-R1-04	Brook Stickleback	3	54-59	4.7
ATRU01387	YC-R2-01a	Brook Stickleback	19	17-33	2.8
ATRU01388	YC-R2-01	Creek Chub	2	21-22	0.1
ATRU01389	YC-R2-01	Brook Stickleback	2	41-50	7.2
ATRU01390	YC-R2-01	Brook Stickleback	43	18-32	12.2
ATRU01391	YC-R2-01	Central Mudminnow	1	98	10.2
ATRU01392	YC-R3-04	Brook Stickleback	28	17-28	4.2
ATRU01393	YC-R3-04	Green Sunfish	2	55-80	12.2
ATRU01394	YC-R3-04	Central Mudminnow	2	105-115	31.2
ATRU01395	YC-R3-04	Northern Pike	2	93-110	8.2
ATRU01396	YC-R3-04	Central Mudminnow	1	97	11.2
ATRU01397	YC-R3-04	Central Mudminnow	2	80-81	13.2
ATRU01398	YC-R3-04	Central Mudminnow	1	112	15.2
ATRU01399	YC-R3-04	Central Mudminnow	2	86-87	15.2
ATRU01400	YC-R3-04	Central Mudminnow	2	78-81	12.2

Benthic Macroinvertebrate Community

A total of 276 benthic macroinvertebrate individuals were collected and identified during the sampling period (Table 6). The most abundant organisms observed were fingernail clams (21.0%), Chironomidae

(midge) larvae (14.9%), Amphipoda (scuds) (13.8%) and water boatmen (11.6%). The macroinvertebrate community observed was consistent with those typically inhabiting low energy steams and wetland or ponded habitats (lentic habitats).

Table 6: Macroinvertebrates collected at each stream reach location.

Scientific Name	Common Name	T-R1-01	T-R1-03	YC-R2-01a	YC-R2-1	YC-R2-03	YC-R3-04	T-R5-01	T-R5-03
Oligochaeta	Worms	--	5	--	--	--	--	--	8
Hirudinea	Leech	--	2	1	--	1	2	--	--
Mollusca	--	--	--	--	--	--	--	--	--
Sphaerium	Fingernail clam	5	2	20	25	5	--	1	--
Stagnicola	Common pond snail	2	2	--	--	--	--	1	--
Planorbella	Rams-horn snail	--	5	5	20	--	--	--	--
Pseudosuccinea	Fluke snail	--	--	--	--	--	--	3	2
Crustacea	--	--	--	--	--	--	--	--	--
Cambaridae	Crayfish	--	--	1		--	--	--	--
Amphipoda	Scud	--	10	20	5	3	--	--	--
Isopoda	Aquatic pillbug	--	10	--	--	5	--	--	--
Arthropoda	--	--	--	--	--	--	--	--	--
Dolomedes triton	Six-spotted fishing spider	--	--	--	1	--	--	--	--
Diptera	--	--	--	--	--	--	--	--	--
Chironomidae	Midges	--	18	--	20	--	--	3	--
Tipulidae	Crane flies	--	--	--	--	--	--	1	--
Simuliidae	Black flies	--	--	--	--	--	3	--	--
Ephemeroptera	Mayflies	--	--	--	1	--	--	--	--
Odonata	Dragonflies/damselflies	--	--	--	--	--	2	2	--
Coleoptera	--	--	--	--	--	--	--	--	--
Dytiscidae	Diving beetle	4	--	3	--	--	--	1	--
Other larvae	--	--	--	3	2	--	--	--	--
Megaloptera	--	1	--	--	--	--	--	--	--
Hemiptera	--	--	--	--	--	--	--	--	--
Corixidae	Water boatmen	--	2	5	15	5	5	--	--
Lethocerus	Giant water bug	--	--	2	2	1	--	--	--
Gerridae	Water strider	--	--	2	--	--	--	--	--
Nepidae	Water scorpion	--	--	--	--	--	1	--	--

Conclusions

The fish and benthic macroinvertebrate communities documented in the sampled reaches within the Youngs Creek system were consistent with those often associated with low energy streams and shallow ponded habitats (lentic habitats). Fish communities were dominated by brook stickleback and central mudminnow, both of which are tolerant of hypoxic or low oxygen conditions (Klinger et al. 1982; Stewart et al. 2007) such as those observed within the ponded wetland area (YC-R2-01 and YC-R2-03). Communities consisted solely of insectivorous forage species at all locations except for the perennial stream portion (YC-R3-04) of the Youngs Creek system, where juvenile northern pike and green sunfish were observed. Location YC-R3-04 was unique compared to other locations, with higher dissolved oxygen levels and reduced abundances of duckweed (*Lemna perpusilla*) and sago pondweed (*Stuckenia pectinata*), aquatic surface-oriented plants that often form floating mats on ponded surface water features (see photos in Attachment 1). As noted in the *Qualitative Environmental Survey of Youngs Creek* conducted in December 2023 (as document in Ramboll 2024), the perennial portion of Youngs Creek (YC-R3-04) is separated from the ponded wetland area to the south by a series of beaver dams that significantly restrict fish movements upstream.

References

Klinger, S.A., Magnuson, J.J. and Gallepp, G.W. 1982. Survival mechanisms of the central mudminnow (*Umbra limi*), fathead minnow (*Pimephales promelas*) and brook stickleback (*Culaea inconstans*) for low oxygen in winter. Environmental Biology of Fishes, 7, pp.113-120.

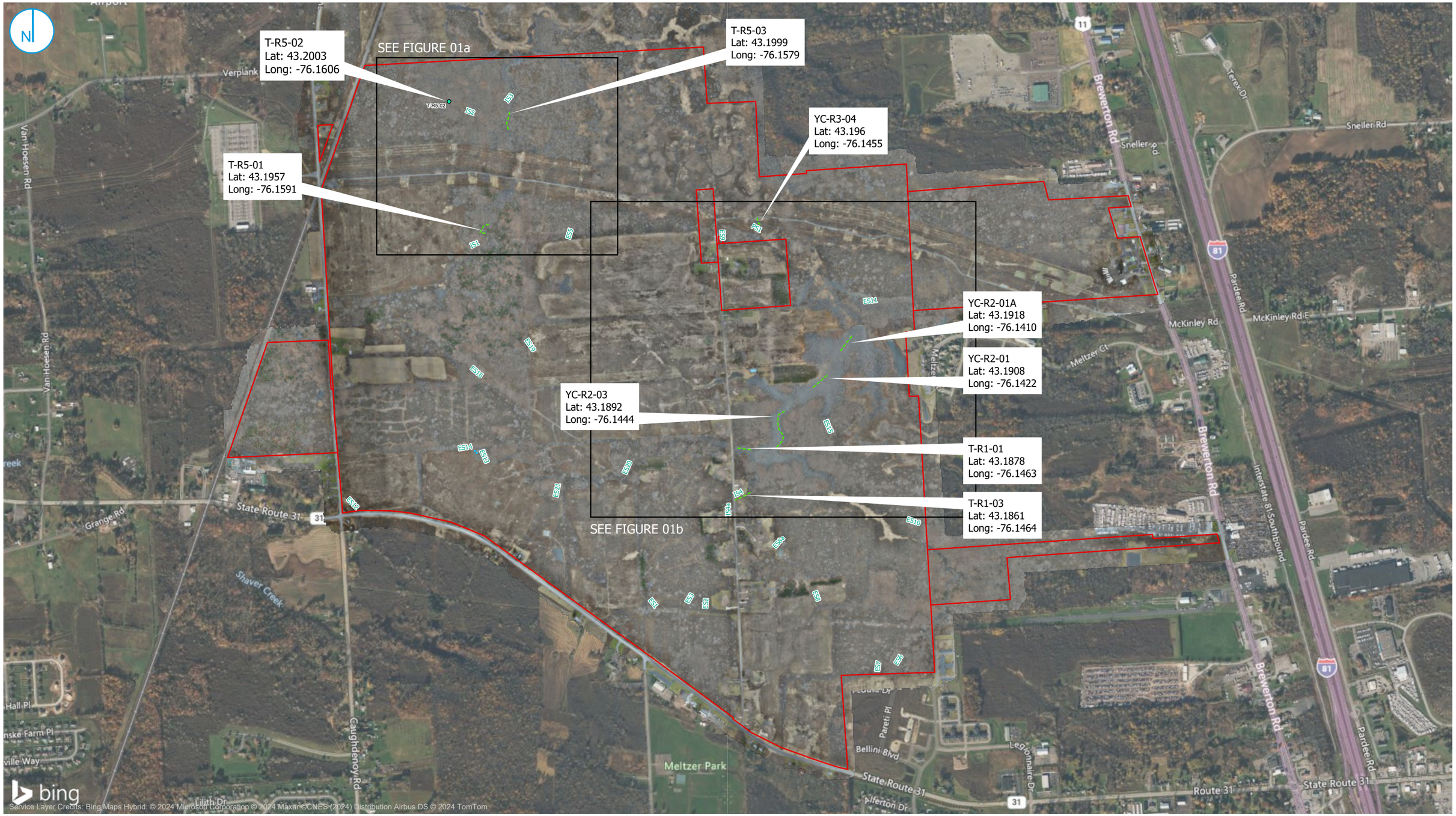
Ramboll. 2023. Micron Semiconductor Fabrication Facility (Clay, NY), Aquatic Resources Supplemental Delineation Report.

Ramboll. 2024. Micron Semiconductor Fabrication Facility (Clay, NY), Qualitative Environmental Survey of Youngs Creek. Technical memorandum dated February 26, 2024.

Stewart, D.B., Reist, J.D., Carmichael, T.J., Sawatzky, C.D. and Mochnacz, N.J., 2007. Fish life history and habitat use in the Northwest Territories: brook stickleback (*Culaea inconstans*). Can. Manuscr. Rep. Fish. Aquat. Sci, 2799, p.38.

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FIGURES



PROJECT: 1950100716-001 | DATED: 6/20/2024 | DESIGNER: SSOULE
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- Assessment Location
- Delineated Stream Flow Direction
  - Ephemeral Stream
  - Intermittent Stream
  - Perennial Stream
- Approximate Centerline of Survey Extent
- Site Boundary / Limits of JD Request

Notes
- Site aerial imagery collected by Ramboll on 01/02/2024.

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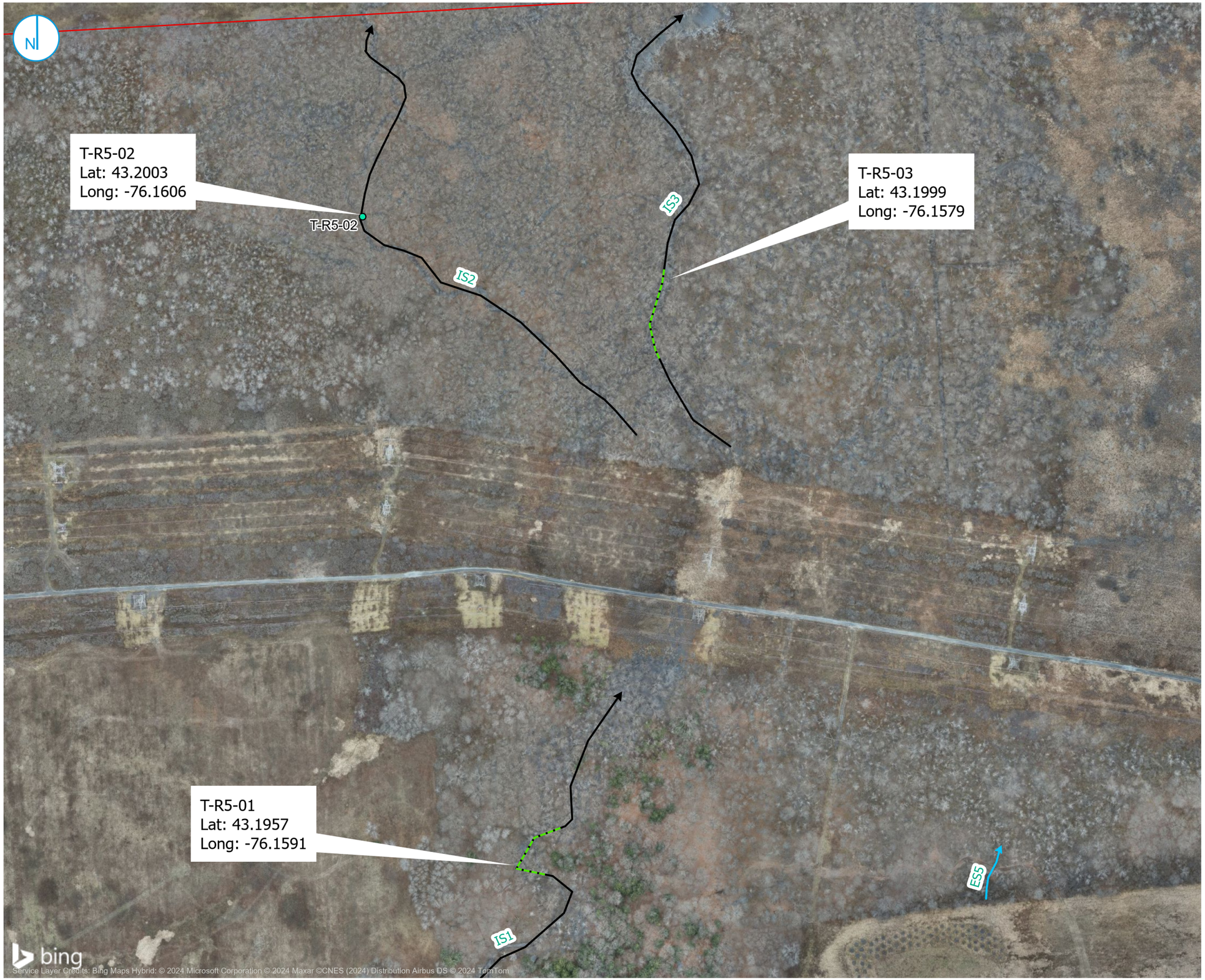
YOUNGS CREEK QUANTITATIVE ASSESSMENT

Micron Semiconductor Fabrication Facility
Clay, New York

FIGURE 01

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL



Assessment Location
Approximate Centerline of Survey Extent

Delineated Stream Flow Direction
Ephemeral Stream
Intermittent Stream
Site Boundary / Limits of JD Request

Notes
- Site aerial imagery collected by Ramboll on 01/02/2024.

0 125 250
Feet

YOUNGS CREEK QUANTITATIVE ASSESSMENT
WEST

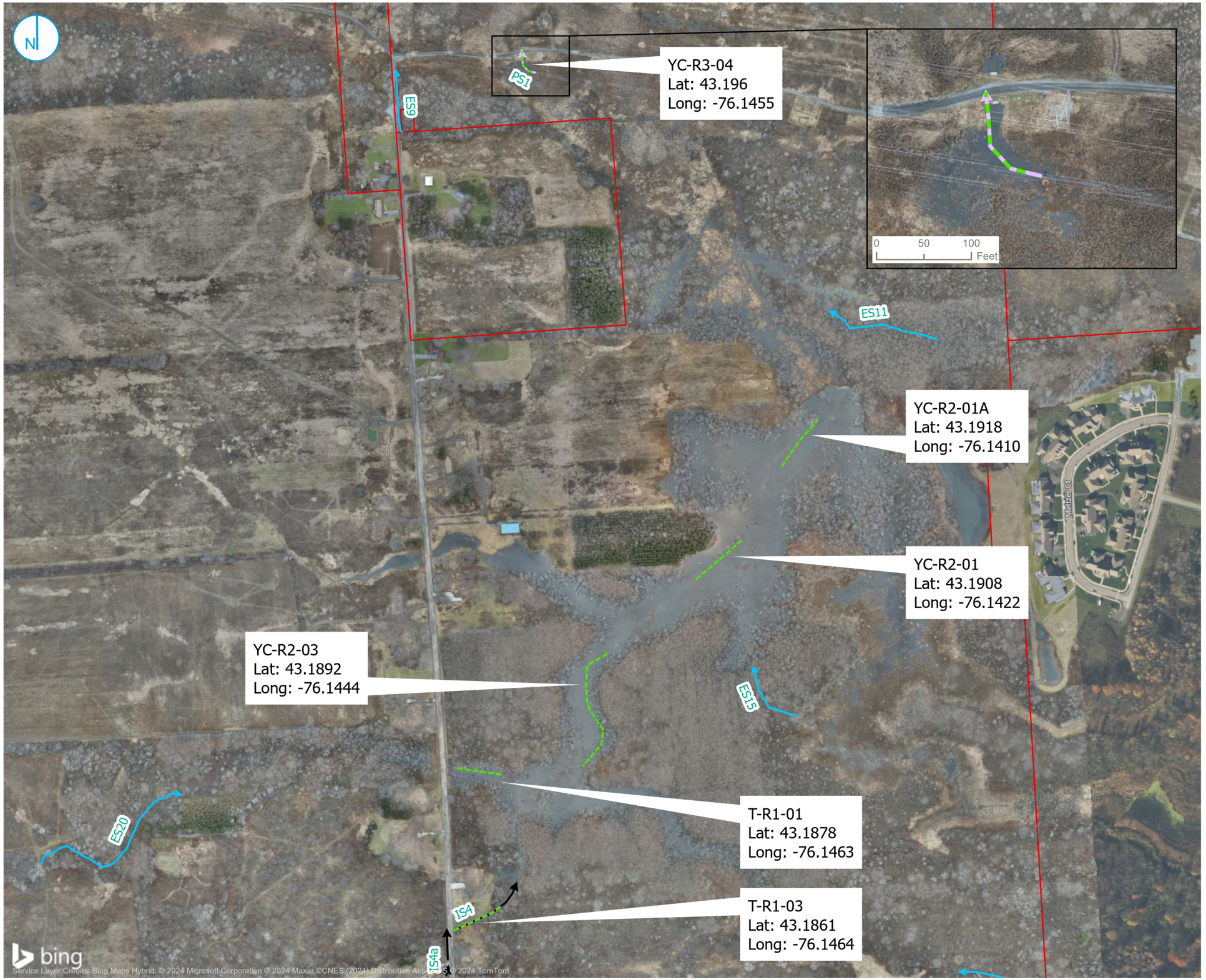
Micron Semiconductor Fabrication Facility
Clay, New York

FIGURE 01a

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1950100716-001 | DATED: 6/18/2024 | DESIGNER: SSOULE



Approximate Centerline of Survey Extent

Delineated Stream Flow Direction

- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Site Boundary / Limits of JD Request

Notes

- Site aerial imagery collected by Ramboll on 01/02/2024.

0 200 400
Feet

YOUNGS CREEK QUANTITATIVE ASSESSMENT EAST

Micron Semiconductor Fabrication Facility
Clay, New York

FIGURE 01b

RAMBOLL AMERICAS
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PROJECT: 1950100716-001 | DATED: 6/18/2024 | DESIGNER: SSOULE

ATTACHMENT 1
PHOTOGRAPH LOG

SAMPLING LOCATIONS

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
1	6/5/2024	
Description		
Looking upstream at T-R1-01.		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
2	6/5/2024	
Description		
Looking downstream at T-R1-01.		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
3	6/6/2024	
Description		
Looking upstream at T-R1-03 (IS4).		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
4	6/6/2024	
Description		
Looking downstream at T-R1-03 (IS4).		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
5	6/6/2024	

Description

Looking upstream at YC-R2-01a.

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
6	6/6/2024	

Description

Looking downstream at YC-R2-01a.

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
7	6/6/2024

Description

Looking upstream at YC-R2-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
8	6/6/2024

Description

Looking downstream at YC-R2-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
9	6/7/2024

Description

Looking upstream at YC-R2-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
10	6/7/2024

Description

Looking downstream at YC-R2-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
11	6/5/2024

Description

Looking downstream at YC-R3-04 (P1).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
12	6/5/2024

Description

Looking upstream at YC-R3-04 (P1).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
13	6/7/2024	
Description		
Looking upstream at T-R5-01 (IS1).		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
14	6/7/2024	
Description		
Looking downstream at T-R5-01 (IS1).		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
15	6/7/2024

Description

Looking upstream at T-R5-02 (IS2).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
16	6/7/2024

Description

Looking downstream at T-R5-02 (IS2).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
17	6/7/2024

Description

Looking upstream at T-R5-03 (IS3).



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
18	6/7/2024

Description

Looking downstream at T-R5-03 (IS3).



REPRESENTATIVE FISH

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
1	6/5/2024	
Description		
Central mudminnow collected at YC-R3-04.		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
2	6/5/2024	
Description		
Green sunfish collected at YC-R3-04.		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
3	12/14/2023

Description

Northern Pike collected at YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
4	6/6/2024

Description

Brook stickleback collected from T-R1-03.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
5	12/14/2023

Description

Brook stickleback and central mudminnow collected at YC-R2-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
6	6/5/2024

Description

Golden shiners and tadpoles collected at T-R1-01.



TISSUE SAMPLES

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
1	6/5/2024	
Description		
ATRU01331: Golden shiner from T-R1-01.		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
2	6/6/2024	
Description		
ATRU01386: Brook stickleback from T-R1-03.		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
3	6/6/2024	
Description		
ATRU01285: Brook stickleback from T-R1-03.		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:	
4	6/6/2024	
Description		
ATRU01387: Brook stickleback from YC-R2-01a.		

Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
29	6/6/2024

Description

ARTU01391: Central mudminnow from YC-R2-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
6	6/6/2024

Description

ATRU01390: Brook stickleback from YC-R2-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
7	6/6/2024

Description

ATRU01389: Brook stickleback from YC-R2-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
8	6/6/2024

Description

ATRU01388: Creek chub from YC-R2-01.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
9	6/7/2024

Description

ARTU01384: Central mudminnow

ARTU01383: Brook stickleback

Tissue samples from YC-R2-03.

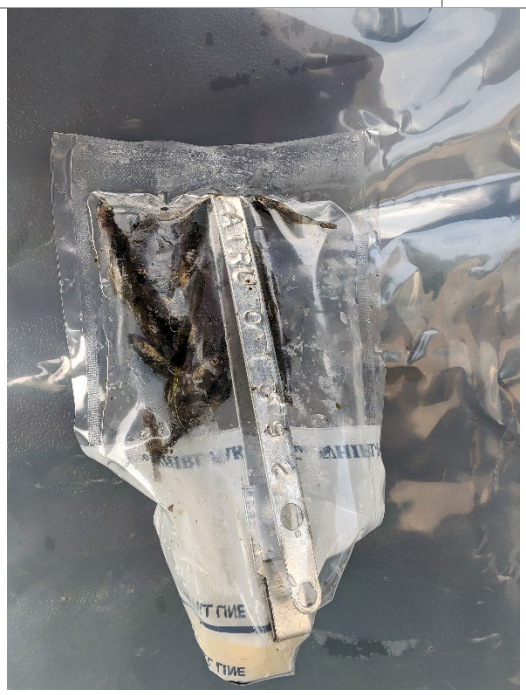


Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
10	6/5/2024

Description

ARTU01392: Brook stickleback from YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
11	6/5/2024

Description

ARTU01393: Green sunfish from YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
12	6/5/2024

Description

ATRU01394: Central mudminnow from YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
13	6/5/2024

Description

ATRU01395: Northern pike from YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
14	6/5/2024

Description

ATRU01396: Central mudminnow from YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
15	6/5/2024

Description

ATRU01397: Central mudminnow from YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
16	6/5/2024

Description

ATRU01398: Central mudminnow from YC-R3-04.

.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
17	6/5/2024

Description

ATRU01399: Central mudminnow from YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
18	6/5/2024

Description

ATRU01400: Central mudminnow from YC-R3-04.



Client Name:	Site Location:	Project No.
Micron Technology	White Pine Commerce Park, Onondaga County, NY	1161164|1950100716

Photo No.	Date:
19	6/7/2024

Description

ATRU01382: Brook stickleback from T-R5-01.



ATTACHMENT 2
FIELD DATASHEETS

FISH SAMPLING FIELD DATASHEETS

FISH SAMPLING FIELD DATA SHEET (FRONT)

page ____ of ____

STREAM NAME T-R1-01	LOCATION Young's creek, clay, onondaga co
STATION # _____ RIVERMILE _____	STREAM CLASS Beaver Pond
LAT _____ LONG _____	RIVER BASIN Oneida
STORET #	AGENCY Kleinfelder
GEAR electroshocking	INVESTIGATORS IM, CCM, NJT
FORM COMPLETED BY	DATE 6/5/24 TIME 11:13 (AM) PM / REASON FOR SURVEY Monitoring

SAMPLE COLLECTION	**How were the fish captured?** ☒ back pack ☐ tote barge ☐ other _____ **Block nets used?** ☒ YES ☐ NO **Sampling Duration** Start time 1115 End time 1207 Duration _____ **Stream width (in meters)** 5 Max 15 Mean 4
Water Quality	Temperature (F) 24.4 Turbidity 2418 PH 5.70 DO 4.60 Conductivity 1825uS ORP 110
GENERAL COMMENTS	

SPECIES	TOTAL (COUNT)	LENGTH (mm) (25 SPECIMEN MAX SUBSAMPLE)					ANOMALIES*							
							D	E	F	L	M	S	T	Z
Golden Shiner	3	67	67	59										
							7g ATRU01331							

FISH SAMPLING FIELD DATA SHEET (FRONT)

STREAM NAME Young's Creek	LOCATION T. R1 - 03
STATION # _____ RIVERMILE _____	STREAM CLASS
LAT _____ LONG _____	RIVER BASIN Okanogan
STORET #	AGENCY Ecology
GEAR Electrofishing.	INVESTIGATORS IM, CCN, NJT
FORM COMPLETED BY	DATE 6/6/24 TIME 3:31 AM (PM) / REASON FOR SURVEY Regulatory

SAMPLE COLLECTION	**How were the fish captured?** ☒ back pack ☐ tote barge ☐ other _____ **Block nets used?** ☐ YES ☑ NO **Sampling Duration** Start time 3:31 End time 4:15 Duration 44 **Stream width (in meters)** Max 2.5 Mean 2
Water Quality	Temperature (F) 21.81 Turbidity 805 000 ... DO 4.49 pH 8.03 Conductivity 0.505
GENERAL COMMENTS	

SPECIES	TOTAL (COUNT)	LENGTH (mm) (25 SPECIMEN MAX SUBSAMPLE)					ANOMALIES*							
							D	E	F	L	M	S	T	Z
Brook Stickleback		55(1)	59(1)	54(1)	52(2)	57(2)								
(1) 4.7g - ATRU 01386		57(2)												
(2) 4.9g - ATRU 01385														

FISH SAMPLING FIELD DATA SHEET (FRONT)

page ____ of ____

STREAM NAME YC-M-01a	LOCATION Yorys Creek
STATION # _____ RIVERMILE _____	STREAM CLASS
LAT _____ LONG _____	RIVER BASIN
STORET #	AGENCY
GEAR	INVESTIGATORS JM, CCN, NJT, RPC
FORM COMPLETED BY	DATE 06-06-24 TIME 11:00 (AM) PM / REASON FOR SURVEY

SAMPLE COLLECTION	**How were the fish captured?** ☒ back pack ☐ tote barge ☐ other _____ **Block nets used?** ☐ YES ☒ NO **Sampling Duration** Start time 11:00 am End time 12:00 pm Duration 1 hr **Stream width (in meters)** Max _____ Mean _____
Water Quality	Temperature (F) 26.71 Turbidity 64.8 DO 8.52 pH 7.95 Conductivity 0.501 ORP 161
GENERAL COMMENTS	

SPECIES	TOTAL (COUNT)	LENGTH (mm) (25 SPECIMEN MAX SUBSAMPLE)					ANOMALIES*							
							D	E	F	L	M	S	T	Z
Golden Shiner	1	18												
Stickleback	19	27	26	25	25	25								
① 8.8g - ATRU01387		26	24	27	26	17								
		28	29	22	26	25								
		24	33	24	21									

FISH SAMPLING FIELD DATA SHEET (FRONT)

page ____ of

STREAM NAME YC-RJ-01	LOCATION Youngs Creek, Clay, Onondaga Co
STATION # _____ RIVERMILE _____	STREAM CLASS
LAT _____ LONG _____	RIVER BASIN Oneida
STORET #	AGENCY
GEAR	INVESTIGATORS JM, CCN, NJT, RPC
FORM COMPLETED BY	DATE 06-06-24 TIME 9:05 AM PM / REASON FOR SURVEY Regulatory

SAMPLE COLLECTION	**How were the fish captured?** ☒ back pack ☐ tote barge ☐ other _____ **Block nets used?** ☐ YES ☒ NO **Sampling Duration** Start time 9:10 End time 10:00 Duration 50 min **Stream width (in meters)** Max _____ Mean _____
Water Quality	Temperature (F) 76.16 Turbidity 162 DO 2.30 pH 7.54 Conductivity 0.451 ORP 152
GENERAL COMMENTS	

SPECIES	TOTAL (COUNT)	LENGTH (mm) (25 SPECIMEN MAX SUBSAMPLE)					ANOMALIES*							
							D	E	F	L	M	S	T	Z
Central Mudminnow	1	98												
① 10.2g-ATRU01391														
Brook Stickleback	45	41	50	26	26	22								
① 7.2g-ATRU01390		30	26	30	19	25	If not labeled as #1, all fish are in bag #2							
② 12.2g-ATRU01389		32	26	29	30	30								
		30	27	22	25	25								
		18	14	25	27	29								
Creek Chub	2	22	21											
① 0.1g-ATRU01388														

FISH SAMPLING FIELD DATA SHEET (FRONT)

page ____ of ____

STREAM NAME YC-R2-03	LOCATION Yonnes Creek, Clay, Onondaga Co		
STATION # _____ RIVERMILE _____	STREAM CLASS		
LAT _____ LONG _____	RIVER BASIN		
STORET #	AGENCY		
GEAR	INVESTIGATORS IM, CCN, WST		
FORM COMPLETED BY	DATE 06-07-24 TIME 9:00 AM PM	REASON FOR SURVEY	

SAMPLE COLLECTION	**How were the fish captured?** ☒ back pack ☐ tote barge ☐ other _____ **Block nets used?** ☐ YES ☒ NO **Sampling Duration** Start time 8:50 End time 9:45 Duration 55 mins **Stream width (in meters)** Max 15m Mean 10m	
Water Quality	Temperature (F) 19.66°C DO 0.51 Conductivity 0.583 Turbidity 102 pH 9.32 ORP -92	
GENERAL COMMENTS		

SPECIES	TOTAL (COUNT)	LENGTH (mm) (25 SPECIMEN MAX SUBSAMPLE)					ANOMALIES*							
							D	E	F	L	M	S	T	Z
Cat (Mottled)	2	105	97											
① 23.7g – ATRU0384														
Brook Stickleback	51	27	25	27	26	27								
① 5.2g – ATRU0383		23	23	25	24	22								
		25	25	25	17	25								
		23	25	23	21	27								
		29	25	25	24	18								

FISH SAMPLING FIELD DATA SHEET (FRONT)

page ____ of

STREAM NAME VC-R3-04	LOCATION Young Creek, Cly, Onondaga Co.
STATION # _____ RIVERMILE _____	STREAM CLASS Wetland area
LAT _____ LONG _____	RIVER BASIN Oneida
STORET #	AGENCY Ramboll
GEAR	INVESTIGATORS JM, CCN, NJT
FORM COMPLETED BY	DATE 6/5/24 TIME 1:45 AM (PM) / REASON FOR SURVEY Regulatory

SAMPLE COLLECTION	**How were the fish captured?** ☒ back pack ☐ tote barge ☐ other _____ **Block nets used?** ☐ YES ☒ NO **Sampling Duration** Start time 1:45 End time 3:45 Duration 1hr **Stream width (in meters)** Max 4 Mean 2.5
Water Quality	Temperature (F) 24.22 Turbidity 0 NTU DO 7.35 pH 7.44 Conductivity 0.852 ORP 101
GENERAL COMMENTS	Shocker setting: frequency 60, voltage 200, cycle 40

SPECIES	TOTAL (COUNT)	LENGTH (mm) (25 SPECIMEN MAX SUBSAMPLE)					ANOMALIES*							
							D	E	F	L	M	S	T	Z
Central Mudminnow	32	78	81	86	87	80								
① 0.2g – ATRU01400		81	112	97	100	85	⑤ 11.2g – ATRU01396							
② 15.2g – ATRU01399		115	105	99	97	84	⑥ 31.2g – ATRU01394							
③ 13.2g – ATRU01397		84	75	104	83	82								
④ 15.2 – ATRU01398		92	78	82	88	82								
Northern Pike	2	10	9											
⑦ 8.2g – ATRU01395														
Green Sunfish	2	55	80											
⑧ 12.2g – ATRU01393														
Brook Stickleback	28	28	28	25	27	26								
⑨ 4.2g – ATRU01392 all in one sample bag		26	20	22	23	25								
		20	25	25	22	17								
		28	22	27	27	27								
		28	23	27	24	28								

FISH SAMPLING FIELD DATA SHEET (FRONT)

STREAM NAME	Young Creek	LOCATION	T-R5-01
STATION # _____	RIVERMILE _____	STREAM CLASS	S
LAT _____	LONG _____	RIVER BASIN	
STORET #		AGENCY	
GEAR		INVESTIGATORS	IM, CN NJT
FORM COMPLETED BY		DATE 10/05 TIME 06-02-14 (AM) PM	REASON FOR SURVEY

SAMPLE COLLECTION	**How were the fish captured?** ☒ back pack ☐ tote barge ☐ other _____ **Block nets used?** ☐ YES ☒ NO **Sampling Duration** Start time 10:45 End time 11:15 Duration _____ **Stream width (in meters)** Max 1m Mean 0.75m
Water Quality	Temperature (F) 18.09 Turbidity 0 DO 6.6 pH 8.11 Conductivity 0.503 ORP 127
GENERAL COMMENTS	

SPECIES	TOTAL (COUNT)	LENGTH (mm) (25 SPECIMEN MAX SUBSAMPLE)					ANOMALIES*							
							D	E	F	L	M	S	T	Z
Brook stickleback		55	56											
① 3.0g – ATRU21382														

FISH SAMPLING FIELD DATA SHEET (FRONT)

page ____ of ____

STREAM NAME	LOCATION T-R5-03	
STATION # _____ RIVERMILE _____	STREAM CLASS	
LAT _____ LONG _____	RIVER BASIN	
STORET #	AGENCY	
GEAR	INVESTIGATORS	
FORM COMPLETED BY	DATE 6-17-24 TIME _____ AM PM	REASON FOR SURVEY

SAMPLE COLLECTION	**How were the fish captured?** ☒ back pack ☐ tote barge ☐ other _____ **Block nets used?** ☐ YES ☒ NO **Sampling Duration** Start time 11:45 End time 12:15 Duration 30 **Stream width (in meters)** Max 2 Mean 1.5
Water Quality	Temperature (F) 18.50 Turbidity 0 DO 6.47 pH 8.35 Conductivity 0.591 ORP 147
GENERAL COMMENTS	

SPECIES	TOTAL (COUNT)	LENGTH (mm) (25 SPECIMEN MAX SUBSAMPLE)					ANOMALIES*							
							D	E	F	L	M	S	T	Z

BENTHIC MACROINVERTABRATE FIELD DATASHEETS

Macroinverebrate Field Datasheet (double sided when printed).

River Stream:	Youngs Creek			
Sample Location:	T-RI-01			
Date:	6/5/14			
Sample Type:	D-net			
Investigators:	CCN, TM, NST			
Sampled Habitat:	☑ Benthic Substrate ☑ Woody Debris ☑ Stream Bank ☒ Aquatic Vegetation ☐ Other _____			
	Taxon Count	*Genus (when applicable)*	Count	Total
Ephemeroptera	III			
Plecoptera				
Trichoptera				
Coleoptera				
Dytiscidae Diving Beetle	III	Dytiscidae		
Megaloptera				
	1			
Other Diptera				
Chiro. Larvae				

Pupae				
Other Insecta				
Mollusca				
Snail	II	Stagnacola		
Muscolera Fingernail clams	III	~~Arcotera~~ Sphaerium		
Crustacea				
Nemertea				
Platyhelminthes				
Oligochaeta				
Hirudinea				
Sample Processing Notes				

Macroinverebrate Field Datasheet (double sided when printed).

River Stream:	T-R1-03			
Sample Location:				
Date:	06-06-24			
Sample Type:	Macroinvert Wet			
Investigators:	I.M., C.N., A.T.			
Sampled Habitat:	☒ Benthic Substrate ☒ Woody Debris ☒ Stream Bank ☒ Aquatic Vegetation ☐ Other _____			
	Taxon Count	*Genus (when applicable)*	Count	Total
Ephemeroptera				
Plecoptera				
Trichoptera				
Coleoptera				
Megaloptera				
Other Diptera				
Chiro. Larvae			18	

Pupae				
Other Insecta				
Mollusca				
		Stagnhorn Snail (Planorbella)	5	
		Pond Snail - Stagnacola	2	
		Finger nail Clam (~~Crustacea~~) Sphaerium	2	
Crustacea				
Nemertea				
Platyhelminthes				
Oligochaeta				
		general	5	
Hirudinea				
		Leech	2	

Sample Processing Notes

Heminiptera water boatman (Corixidae 2

Isopoda general 10

Amphipoda general 10

Macroinverebrate Field Datasheet (double sided when printed).

River Stream:	YC-R2-01a			
Sample Location:				
Date:	06-06-24			
Sample Type:	Macroinvert net			
Investigators:	IM, CCN, TJN			
Sampled Habitat:	❑ Benthic Substrate ☑ Woody Debris ❑ Stream Bank ❑ Aquatic Vegetation ❑ Other _____			
	Taxon Count	*Genus (when applicable)*	Count	Total
Ephemeroptera				
Plecoptera				
Trichoptera				
Coleoptera				
		Dytiscidae (Dytiscidae)	3	
		Coleoptera (larvae)	3	
Megaloptera				
Other Diptera				
Chiro. Larvae				

Pupae				
Other Insecta				
Mollusca				
		Ramshorn snail (Planorbella)	5	
		Fingernail clam ~~(Musculium)~~ Sphaerium	20	
Crustacea				
		Crayfish ~~(Faxonius)~~ (Cambaridae)	1	
Nemertea				
Platyhelminthes				
Oligochaeta				
Hirudinea				
		Leech	1	
Sample Processing Notes				

Hemiroptera — Water Boatman (Corixidae) 5
Water Strider (Gerridae) 2
Giant Water Bug (Lethocerus) 2

Amphipoda — Amphipods 80

Macroinverebrate Field Datasheet (double sided when printed).

River Stream:	YC-R2-01			
Sample Location:	Youngs Creek, Cayuga, Onondaga Co			
Date:	06-06-21			
Sample Type:	Macroinverts			
Investigators:	IM, CCN, NJT, RPC			
Sampled Habitat:	☐ Benthic Substrate ☐ Woody Debris ☒ Stream Bank ☒ Aquatic Vegetation ☐ Other _____			
	Taxon Count	*Genus (when applicable)*	Count	Total
Ephemeroptera				
larvae			1	
Plecoptera				
Trichoptera				
Coleoptera				
Beetle larva			11	
Megaloptera				
Other Diptera				
Chiro. Larvae			20	

Pupae				
Other Insecta				
Amphipods			5	
6-Spotted Fishing Spider		Dolomedes tritan	1	
Mollusca				
fingernail Clam		~~Musculium~~ Sphaerium	25	
Snails -		Planorbella + Tributvis	20	
Crustacea				
Nemertea				
Platyhelminthes				
Oligochaeta				
Hirudinea				
Leech			1	

Sample Processing Notes

Giant Water Bug (Lethocerus) 2

Hemiptera water boatmen (Corixidae) 15

Macroinverebrate Field Datasheet (double sided when printed).

River Stream:	Youngs Creek			
Sample Location:	YC-RS-04			
Date:	06-05-24			
Sample Type:	Macroinver - Diprat			
Investigators:	IM, NST, CCH			
Sampled Habitat:	☒ Benthic Substrate ☐ Woody Debris ☒ Stream Bank ☒ Aquatic Vegetation ☐ Other _____			
	Taxon Count	*Genus (when applicable)*	Count	Total
Ephemeroptera				
Plecoptera				
Trichoptera				
Coleoptera				
Giant Water bug		Lethocerus	1	
Megaloptera				
Other Diptera				
Simuliidae		Simuliidae	III	
Chiro. Larvae				

Pupae				
Other Insecta				
Hemiptera (Corixidae)		Corixidae	IIII	
Isopods			IIII	
Mollusca		Musculeum Sphaerium	IIII	
Crustacea				
Nemertea				
Platyhelminthes				
Oligochaeta				
Hirudinea				
Leeches			II	

Sample Processing Notes

Amphipods III

Odonata-Damsel (Zygoptera) II

Heteroptera I

Water scorpion (Nepidae)

Macroinverebrate Field Datasheet (double sided when printed).

River Stream:				
Sample Location:	T-RS-01			
Date:	06-07-21			
Sample Type:	Macroinvert net			
Investigators:	JM, CCN, NJT			
Sampled Habitat:	☒ Benthic Substrate ☒ Woody Debris ☒ Stream Bank ☐ Aquatic Vegetation ☐ Other _____			
	Taxon Count	*Genus (when applicable)*	Count	Total
Ephemeroptera				
Plecoptera				
Trichoptera				
Coleoptera				
		diving beetle (Dytiscidae) larvae	3	
Megaloptera				
Other Diptera				
		Tipulidae	1	
Chiro. Larvae				



Pupae				
Other Insecta				
		Odonata	2	
Mollusca				
		Pseudosuccinia	3	
		Pond snail (Stagnocola)	1	
		Fingernail clam (~~Musculium~~ Sphaerium)	1	
Crustacea				
Nemertea				
Platyhelminthes				
Oligochaeta				
Hirudinea				
Sample Processing Notes				

Macroinverebrate Field Datasheet (double sided when printed).

River Stream:				
Sample Location:	T-RS-03			
Date:	06-02-24			
Sample Type:	Macroinvert net			
Investigators:	[illegible]			
Sampled Habitat:	☒ Benthic Substrate ☐ Woody Debris ☒ Stream Bank ☐ Aquatic Vegetation ☐ Other _____			
	Taxon Count	*Genus (when applicable)*	Count	Total
Ephemeroptera				
Plecoptera				
Trichoptera				
Coleoptera				
Megaloptera				
Other Diptera				
Chiro. Larvae				

Pupae				
Other Insecta				
Mollusca				
		Lebadosuccinea(?)	2	
Crustacea				
Nemertea				
Platyhelminthes				
Oligochaeta				
			7	
Hirudinea				
Sample Processing Notes				

Amphipoda 13

Isopoda Carabidae 1

Macroinverebrate Field Datasheet (double sided when printed).

River Stream:	YC-R2-03			
Sample Location:	Young Creek			
Date:	06-07-24			
Sample Type:	Handnet + net Grab			
Investigators:	IM, CCN, NJT			
Sampled Habitat:	☒ Benthic Substrate ☒ Woody Debris ☒ Stream Bank ☐ Aquatic Vegetation ☐ Other _____			
	Taxon Count	*Genus (when applicable)*	Count	Total
Ephemeroptera				
Plecoptera				
Trichoptera				
Coleoptera				
Megaloptera				
Other Diptera				
Chiro. Larvae				

Pupae				
Other Insecta				
Mollusca				
		Ramshorn Snails (Planorbella)	3	
		Pseudosuccinea	13	
Crustacea				
Nemertea				
Platyhelminthes				
Oligochaeta				
		general	2	
Hirudinea				
Sample Processing Notes				

Amphipods (General) 17

Isopoda (General) 7

Hemiptera giant water bug, (Lethocerus) 4

Appendix M

Clean Water Act Section 404(b)(1) Analysis

Intended for
USACE

Document type
Joint Permit Application – Appendix M(404(b)(1) Analysis)

Date
April 19, 2024 (Revised June 7, 2024)(Revised January 2025)

Joint Permit Application Appendix M (404(b)(1) Analysis)

Micron Semiconductor Fabrication Facility (Clay, NY)



RAMBOLL
Bright ideas.
Sustainable change.

Joint Permit Application Appendix M (404(b)(1) Analysis)

Micron Semiconductor Fabrication Facility (Clay, NY)

Project name	**Micron Semiconductor Fabrication (Clay, NY)**
Project no.	
Recipient	**Micron New York Semiconductor Manufacturing, LLC**
Document type	**404(b)(1) Analysis**
Version	
Date	**April 19, 2024 (Revised June 7, 2024) (Revised January 2025)**

Ramboll
333 West Washington Street
Syracuse, NY 13202
USA

T 315-956-6100
F 315-463-7554
https://ramboll.com

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1. Summary

The U.S. Environmental Protection Agency (USEPA) developed Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230) (Guidelines) to implement Section 404(b)(1) of the Clean Water Act. Pursuant to § 230.10 of the Guidelines, an applicant for a U.S. Army Corps of Engineers (USACE) permit under Section 404 of the Clean Water Act must demonstrate that the proposed action is the least environmentally damaging practicable alternative (LEDPA).[1]

Specifically, applicants must demonstrate that there is no "practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem" and which "does not have other significant adverse environmental consequences." (40 C.F.R. § 230.10(a)). The Guidelines consider an alternative practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." (40 C.F.R. § 230.10(a)(2)).

Micron New York Semiconductor Manufacturing, LLC (Micron), a Delaware limited liability company (LLC) and wholly owned subsidiary of Micron Technology, Inc., proposes to invest $100 billion to build the largest semiconductor fabrication facility in the history of the United States on the White Pine Commerce Park, a 1,400± acre industrial park located in Clay (Onondaga County), New York (the Project).

Micron is submitting a Joint Permit Application (JPA) to the USACE and New York State Department of Environmental Conservation (NYSDEC) to request authorization for Project-related discharges into regulated "Waters of the United States" and NYS Freshwater Wetlands, respectively.

This portion of the JPA was prepared to support Micron's compliance with Section 404(b)(1) Guidelines of the Clean Water Act. The following information is presented below and should be reviewed together with other elements of the JPA:

- Project Summary
- Micron's Project Purpose and Need Statement
- Geographic Area of Review for Alternative Project Sites
- Alternative Project Sites (Micron's site selection screening criteria)
- Alternative Project Layouts (Micron's onsite screening criteria)
- Evaluation of Alternative Sites and Onsite Layouts (based on "practicability")
- Least Environmentally Damaging Practicable Alternative (LEDPA)

In addition to satisfying the Section 404(b)(1) Guidelines, the USACE conducts a public interest review process under 33 CFR § 320.4 that balances foreseeable benefits and detriments. The USACE public interest review provision states, "a permit will be granted unless the district engineer determines that it would be contrary to the public interest." *Id.* § 320.4(a)(1). The USACE evaluation includes consideration of "the relative extent of the public and private need for the proposed [project]." *Id*. § 320.4(a)(2)(i). It is understood that the USACE determines how much weight to give each factor by its relevance to the specific proposal. To support the USACE evaluation, Micron has included information identifying anticipated positive benefits to the United

[1] It is understood that compensatory mitigation cannot be used to mitigate down to an alternative to meet the LEDPA. Micron's proposed mitigation plan to comply with 33 C.F.R. Part 332 is provided as a separate exhibit to the Joint Permit Application ("JPA").

States, New York State, and the local community that would result from implementation of the Project.[2] This evaluation also includes a summary of the significant efforts and resources expended by New York State and Onondaga County to advance the White Pine Commerce Park and attract Micron to the region.

[2] The NYSDEC permit issuance criteria also includes a balancing of the economic and social need of the Project against the loss of wetland functions, values and benefits.

2. Introduction

Pursuant to the 404(b)(1) Guidelines, Micron has developed this alternatives analysis to evaluate the practicableness of several offsite and onsite alternatives considered to the proposed semiconductor manufacturing campus to be located at White Pine Commerce Park in the Town of Clay, New York. The White Pine Commerce Park is a ± 1,400-acre industrial park that has been assembled on land that is owned by the Onondaga County Industrial Development Agency (OCIDA) (the Project Site). The Project Site was previously the subject of a Generic Environmental Impact Statement review process for a similar use, before Micron's consideration of the site.[3] Micron will lease and ultimately purchase the White Pine Commerce Park to implement the Project (see Section 2.1.3).

2.1 Overview of the Proposed Action (Including Purpose and Need)

2.1.1 Project Purpose

The overall Project purpose within the meaning of 40 C.F.R. § 230.3(l) is to construct and operate four state-of-the-art, advanced semiconductor fabrication facilities (Fabs), on a single, unified site in New York State (NYS) to efficiently meet market demand and ensure competitiveness in the worldwide semiconductor market. The Project also seeks to fulfill U.S. national security objectives as set forth in the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) of 2021[4] and the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act of 2022 (CHIPS Act), as well as the economic objectives outlined in the NYS "Green CHIPS" Program, which further seeks to incentivize semiconductor manufacturing and economic development in NYS in an environmentally-sustainable manner.[5]

Following passage of the CHIPS Incentive Program authorized by the NDAA, President Biden signed the CHIPS Act into law on August 9, 2022. The CHIPS Act authorizes approximately $280 billion in new funding to increase domestic research and manufacturing of semiconductors in the United States. The CHIPS Act is intended to boost American semiconductor research, development, and production, ensuring U.S. leadership in the technology that forms the foundation of everything from automobiles and household appliances to defense systems. While the United States invented semiconductors, today it produces only about 10% of the world's supply—and none of the most advanced chips. Instead, the U.S. relies on Asia for 75% of global production. The CHIPS Act aims to reverse this dichotomy by driving American competitiveness, making U.S. supply chains more resilient, and supporting national security by ensuring access to key technologies.[6] The CHIPS Act will unlock hundreds of billions of dollars more in private sector semiconductor investment across the country, including production essential to national defense and other critical sectors. The law will also contribute to the advancement of the scientific and technological capabilities of the United States.

[3] To support OCIDA's efforts to obtain the SEMI-NY "qualified" site designation for its site, OCIDA prepared a Generic Environmental Impact Statement ("GEIS") to assess potential environmental and socio-economic impacts associated with full build-out of the original 300-acres by a yet to be determined semiconductor company. The GEIS, which was prepared pursuant to New York's State Environmental Quality Review (SEQR) process, was released in April 2002. The 2002 document identified the White Pine Commercial Park as the preferred Onondaga County location for future semiconductor manufacturing. OCIDA completed additional SEQR documentation related to build-out of the site in 2012/13 (Generic Environmental Impact Statement) and 2021 (Supplemental Generic Environmental Impact Statement) to assess potential impacts on the enlarged site.

[4] The CHIPS Incentives Program, authorized by Title XCIX—Creating Helpful Incentives to Produce Semiconductors for America of the William M. (Mac) Thornberry National Defense Authorization Act ("NDAA") for Fiscal Year 2021 (Pub. L. 116-283, referred to as the CHIPS Act or Act), as amended by the CHIPS Act of 2022 (Division A of Pub. L. 117-167). The NDAA created the program, and the CHIPS Act of 2022 funded the program.

[5] https://esd.ny.gov/green-chips

[6] The White House, "FACT SHEET: One Year after the CHIPS and Science Act, Biden-Harris Administration Marks Historic Progress in Bringing Semiconductor Supply Chains Home, Supporting Innovation, and Protecting National Security," August 9, 2023.

The semiconductor industry is critical to the resilience of the U.S. economy. Semiconductors are an essential component in consumer electronics, automobiles, industrial processes, critical infrastructure, artificial intelligence (AI), and data centers—to name just a few important uses. Semiconductors are also a critical input into modern defense systems, and their secure design and reliable availability is necessary for national security (CHIPS Program Office [CPO], 2023a, p. 15).

According to the Semiconductor Industry Association, the U.S. global market share of semiconductor production has fallen from 37% in 1990 to 12% in 2020 (SIA, 2022). To address this decline, and to make a meaningfully increase in the ability of the U.S. to meet its own and the world's increasing demand for semiconductors, the federal government, New York State, and Onondaga County are seeking to expand U.S. chip manufacturing by supporting projects that provide access to safe, secure, and domestically produced chips.

As the world's fourth-largest semiconductor company and the only memory and storage manufacturer based in the U.S., Micron has been approved for federal funding under the CHIPS Act. In its October 2022 announcement, Micron indicated it would invest over $100 billion to build the largest semiconductor fabrication facility in the history of the United States on the 1,400-acre site located in Clay (Onondaga County), New York in furtherance of the CHIPS Act and Green CHIPS Program objectives.

2.1.2 Project Need

The need for the Project, as well as for the overall CHIPS Act, is to reduce U.S. reliance on foreign production of both leading edge and older generation microelectronics. The Project will result in significant public interest benefits to the nation and region. The purpose of the Project is supported by the national security and public interest goals of the U.S. as embodied in the federal CHIPS Act, which aims to expand domestic memory chip manufacturing capacity and restore U.S. leadership in semiconductor manufacturing. Companies receiving funding under the CHIPS Act are subject to restrictions on where they can manufacture certain advanced chips, which incentivizes the increased domestic production. In addition, the purpose for Micron is to advance its leading-edge position in the development and manufacturing of DRAM (dynamic random access memory) and NAND (Not And) memory chips.

The Project will reduce economic and national security risks by:

- Building domestic capacity
- Establishing a dynamic and collaborative network for semiconductor research and innovation centers
- Improving competitiveness and strengthening regional supply-chain industries

In particular, as the largest memory chip manufacturer in the United States, Micron plays a unique and significant role in domestic production of essential leading-edge memory chips and high-volume components of the semiconductor industry.

Additionally, Micron's investment will be beneficial to the region's economy;[7] enhancing job growth in Central New York by promoting advanced manufacturing in the region.

[7] https://esd.ny.gov/micron

An economic impact study by REMI, Inc.[8] projects that the Project will generate significant economic growth for New York State including:

- Creation of 50,000 permanent New York jobs (70% in Central NY) by 2055, including 9,000 high paying company jobs
- Creation of nearly 12,000 annual jobs to support continuous onsite construction as Micron completes the original build-out and future new technology retrofits from 2025-2044
- Creation of 40,000 additional jobs from suppliers, contractors and other businesses supporting the proposed chip manufacturing facility
- $9.6 billion annually in real GDP impact from 2025-2055
- $16.7 billion annually in real output impact from 2025-2055
- $17.2 billion in total New York State government revenue (spanning 2025-2055)
- $31 billion in Micron construction spending, with 5,600 related jobs on average at federal prevailing wage for the initial 20 years (2025-2044)

Micron's economic model supports the short-term manufacture of 13,000 DRAM wafers per week starting in 2028, increasing to 52,000 wafers per week by 2041, which requires four 600,000 square-foot (sq ft) fabs. Micron arrived at a forecast of 52,000 wafers per week and associated fab sq ft estimates through its annual long-range planning process that is part of its Sales & Operations Planning (SNOP) process. Micron forecasts the overall market growth based on market intelligence, macro trends from new technologies such as AI, virtual reality, 5G wireless proliferation, and many other factors. It then determines the product mixes and bits per wafer to determine how many wafers are required to meet market demand for DRAM, which in turn determines the number and size of the fabs required to meet this demand.

According to the National Institute of Standards and Technology (NIST) report titled *Vision for Success – Commercial Fabrication Facilities*, "Unlike logic chips, memory products are standardized and often interoperable: A memory chip from one company can typically substitute for a memory chip from another. These features generally increase the resiliency of the memory market, as memory customers willing to pay the prevailing market price can often source their products from any memory producer in the market. Memory chipmakers must thus compete largely on price and operate at lower margins relative to logic chipmakers. U.S. memory producers will therefore need to reach sufficient scale to benefit from the economies of scale enjoyed by larger clusters in East Asia." (CPO, 2023c).

One of the most important factors for cost-efficiency, as highlighted above, is scale of co-located cleanrooms on one campus. This scale creates several key advantages, including higher fab equipment utilization, reduced infrastructure costs, creating a workforce ecosystem for the specialized labor required for chip manufacture, a co-located supplier ecosystem, and other utility- and operational-related efficiencies. Accordingly, there is a global trend towards construction of efficient mega-fabrication facilities (megafabs). Of major semiconductor campuses, 82% have more than two fabrication facilities (fabs) of cleanroom space (1.2M sq ft or greater) on a single site, and 55% have more than three fabs (1.8M sq ft or greater). Of the semiconductor fabrication campuses that have been built in the last 20 years, 72% were built with more than three fabs to take advantage of increasingly necessary efficiencies of scale. Without the ability to build four co-located Fabs, the Project would incur an estimated additional cost of $3.04B-$3.7B and thus would not be able to ensure ongoing economic viability given the competitive landscape of the memory chip market.

[8] Regional Economic Models, Inc. "Economic and Fiscal Impact of Establishing a Semiconductor Manufacturing Facility in Onondaga County, new York," September 29,2022.

With the ability to accommodate an appropriate footprint for 2.4 M sf of cleanroom and ancillary support buildings over approximately 1,000 acres, and located in close proximity to the utility, transportation, and human resources infrastructure necessary to capture economies of scale, the White Pine Commerce Park has been identified as a location suitable for the four co-located Fabs necessary to achieve Micron's U.S. manufacturing goals in an economically viable and cost competitive manner. Accordingly, Micron proposes to lease, and ultimately purchase, the White Pine Commerce Park from OCIDA, and to construct and operate a 4-Fab semiconductor manufacturing campus at that location.

2.1.3 Project Description

Micron's proposed semiconductor manufacturing facility will be built-out over an approximately 16-year period. Semiconductor wafer fabrication processing is known to be one of the most complex manufacturing systems. The production of a memory chip requires hundreds of processing steps; in addition, multiple products are processed simultaneously in a Fab. The Project will include the construction of four Fabs. Micron expects that the Fabs will be built in sequence, with construction of each Fab starting as the preceding Fab is being built out and operations begun. This process will result in continuous construction activities on the site over an approximately 16-year period, with a significant portion of that construction occurring inside the previously constructed Fab buildings. Each Fab is expected to occupy approximately 1.2 million square feet (sf) (approximately 27.6 acres) of land. The proposed campus and associated activities under consideration will also have ancillary onsite elements including the following:[9]

- Electrical substation and duct bank[10]
- Natural gas meter station
- Central utility buildings (CUBs)
- Water and wastewater pre-treatment and storage
- Industrial gas and material storage areas
- Access/egress (including construction/operation phase access to NYS Route 11[11])
- Parking
- Wastewater pump station (pump house)
- Stormwater management
- Offices
- Green areas, landscaping
- Material staging and laydown areas (for construction of subsequent Fabs)

Construction of the Project would begin in 2025, with Fabs 1 and 2 operational by 2030. Fabs 3 and 4 would be operational by 2041. The Project will require over $100 billion of investment over the next 20+ years, with the first phase investment of $20 billion planned by the end of this decade. Production output will ramp up in the latter half of the decade to meet industry demand trends. Micron's proposed phasing plans on the White Pine Commerce Park (including limits of disturbance (LOD), staging and laydown areas, and construction compound) are illustrated in the figures below. **Figures 1 and 2 (attached)** illustrate Phase 1, which is inclusive of Phase 1A (Fab 1) and 1B (Fab 2), respectively, as well as the necessary adjacent staging and laydown areas, and construction compound. The construction compound, which represents the long-term construction hub for full build-out of the Project, consists of the project management

[9] Due to the continuous construction activities, the project includes the need for clearing/grubbing, and grading, as well as construction material staging and laydown areas (for current and subsequent phases).

[10] National Grid is coordinating the submission of an Article VII application to New York State's Public Service Commission ("PSC"). The application will cover encroachments on New York State Freshwater Wetlands within the proposed electric transmission and duct bank alignment. Encroachments on federal jurisdictional wetlands for this Project element are included in the Micron Project JPA.

[11] Access to NYS Route 11 was recommended by the New York State Department of Transportation as part of Micron's proposed Phase 1 plans.

(engineering, planning and construction delivery) and contractor trailers, offices, storage, and parking for the Project.

Figures 3 and 4 (attached) illustrate Phase 2, which is inclusive of Phase 2A (Fab 3) and Phase 2B (Fab 4), as well as the necessary adjacent staging and laydown areas, and construction compound.

In addition, several Project elements will be located offsite but proximate to the main campus. These elements consist of the following:

- Family care and healthcare center (addressed in a separate permit)
- Rail Spur (to support construction and reduce traffic impacts) (see Section 2.1.3.3 and **Figure 5 (attached)**)
- Infrastructure (water, sewer, natural gas, telecommunications).[12]

Additionally, Micron and the State of New York have announced an historic $500 million investment in community and workforce development over the 20-year construction period. Micron will invest $250 million in line with its commitment to the Green CHIPS Community Investment Fund. An additional $250 million is expected to be invested, with $100 million from New York, and additional support from other local, state, and national partners. This fund is intended to expand and train the workforce in the region, including providing support for disadvantaged and underemployed populations.

The Project will implement a Green CHIPS Sustainability Plan designed to mitigate the Project's greenhouse gas emissions and environmental impact, which is expected to include utilizing 100% purchased renewable electricity, aspiring to construct its buildings to achieve LEED Gold status, and committing to meeting greenhouse gas emission targets and reporting obligations.

2.1.3.1 Main Campus Components

Chip manufacturing is a complex process, which requires specific material inputs and flow distances, which ultimately dictate site design. The semiconductor industry utilizes a minimum flow-weighted distance (min-distance) layout. In min-distance layout design, manufacturing inputs and processes are located close to each other to minimize the total distance of the material flow. Table 1 identifies the main campus Project components and provides supporting documentation as to their locations and required proximity to other components on the White Pine Commerce Park.

[12] Offsite water, sewer, and natural gas extensions to support the Project will be coordinated by the Onondaga County Water Authority (OCWA), Onondaga County Department of Water Environment Protection (OCDWEP), and National Grid, respectively. Based on discussions with the USACE, authorizations for off-site utility alignment encroachments on federal jurisdictional wetlands will be requested using the Nationwide Permit Program and Pre-Construction Notifications (PCNs), as applicable. In regard to telecommunications, Micron proposes to use existing fiber-optic lines located on the campus serving the cell tower north of NYS Route 31 and the existing fiber-optic lines located along Caughdenoy Road.

Table 1. Summary of Main Campus Project Components

Micron Campus Component (Quantity)	Total Building Area (SF)	Description
Fabrication Buildings (4)	4.8M	Each fab would include four stories and would house advanced manufacturing facilities within an approximately 1.2M sf (27.5 acres) footprint, including 600,000 sf of cleanroom space. The completed Micron Campus would total 2.4M sf of cleanroom space within a total fab building footprint of 4.8M sf once fully built out in 2041. For each fab, operations would include raw material receiving, memory chip manufacturing, and final product storage and shipping. All buildings on the Micron Campus would have loading docks for deliveries associated with their functions. Manufacturing operations would commence upon completion of construction and equipment installation and testing
Administration Buildings (4)	478,000	Four administration buildings would be approximately 119,500 sf each, located south of the probe buildings (see cell below) for each fab. These buildings would provide office space supporting the anticipated 2,000 manufacturing employees per fab at the Micron Campus. All buildings on the Micron Campus would have loading docks for deliveries.
Probe Buildings (4)	730,400	Four Probe Buildings of 182,600 sf (4.2 Acres) each, with each probe building supporting a corresponding Fab, approximately 85,000 sf on the upper floor of each probe building would be cleanroom space, resulting in a total cleanroom space of 340,000 sf. The total building footprint would be 730,400 sf. The probe buildings conduct electrical testing on the manufactured chips before they are shipped from the Micron Campus.
Central Utilities Buildings (4)	1.8M	Each fab would have one dedicated Central Utility Building (CUB), for a total of four CUBs on the Micron Campus. The CUBs house the systems required for delivering the utilities necessary to produce the chips, including HVAC, electrical transmission equipment, water purification and recycling, and chemical/specialty gas delivery systems. Each CUB would be approximately 441,210 sf (10.1 acres) that would consist of multiple individual utility plant modules to house the heating, cooling, compressed air, electrical equipment, and emergency generators that would serve the surrounding buildings associated with each fab. The combined footprint of all four CUBs would total 1.8 million sf (41.3 acres).
Electrical Yards and Substations (4)	700,000	A total of four electrical yards and substations, one for each fab, would be constructed on the north side of the fabs. These electrical yards and substations would supply the electrical needs for full operations. At construction completion, the total footprint for all four facilities combined would be 700,000 sf (16.1 acres).

Micron Campus Component (Quantity)	Total Building Area (SF)	Description
Hazardous Process Materials Buildings (8)	2.1M	A total of four water facilities would be constructed on-campus (one for each fab) to ensure incoming water meets Micron's high-purity specifications for manufacturing, provide treatment for on-site reuse, and ensure the outgoing wastewater meets quality requirements for pre-treatment and at the water treatment and renewal facility. these facilities would have a cumulative building footprint of 2.46 M sf (56.5 acres).
Water and Wastewater Treatment (WWT) Facilities (4)	2.46M	A total of four water facilities would be constructed on-campus (one for each fab) to ensure incoming water meets Micron's high-purity specifications for manufacturing, provide treatment for on-site reuse, and ensure the outgoing wastewater meets quality requirements for pre-treatment and at the water treatment and renewal facility. these facilities would have a cumulative building footprint of 2.46 M sf (56.5 acres).
Bulk Gas Yards (4)	1.88M	Four approximately 455,000-sf (10.5 acre) bulk gas yards with 185-foot-tall columns and cold box units would be constructed north of the fab buildings. The gas yards would be used to isolate oxygen, argon, and nitrogen from the ambient air for use in the fabrication process, which is more efficient than trucking in gases to the Micron Campus. At construction completion the building footprint for all four facilities would total 1.88 M sf (43.2 acres).
Industrial Wastewater Facility (1)	216,554	The industrial wastewater facility would provide an alternative collection area if incoming treated water from the WWPT does not temporarily meet specifications or if outgoing water chemistry or volume exceeds Micron's standards for delivery to the offsite OCWRC facility. At construction completion, the building footprint for this facility would be 216,554 sf (5 acres).
Biological Wastewater Treatment Facility (4)	731,808	The four biological treatment facilities (BIO) would remove dissolved organic contaminants and nutrients from wastewater prior to sending the water to the OCWRC WWTP. At construction completion, the building footprints for these facilities would total approximately 731,808 sf (16.8 acres).
Backflow Prevention Building (2)	15,000	Two 7,500-sf (0.2 acre each) utility buildings would be constructed on the Micron Campus. The first backflow prevention building would be located at the southwest corner where OCWA water mains enter the site near the intersection of NYS Route 31 and Caughdenoy Road, supporting fabs 1 and 2. The second backflow prevention building would be constructed on the southeast corner of the Micron Campus to support fabs 3 and 4. Each building would ensure that site water cannot flow into the OCWA water mains.
Structured (4) and Surface (4) Parking and Access Driveways	1.36M	A total of 11,600 parking spaces, four bus stops, and seven access driveways would be constructed on the Micron Campus. This would include four 500-space surface parking lots south of the Administrative Office and Probe buildings, and four structured parking areas with 2,400-space capacity each, built below the Administration Office and Admin/Probe Buildings. A total of 8.19M sf (188 acres) of new impervious area associated with

Micron Campus Component (Quantity)	Total Building Area (SF)	Description
		paved surface parking and site access roadways would be constructed on campus.
Rooftop Solar Energy	N/A	Micron would install approximately 4 MW of solar panels on the roofs of the parking garages, WWT, and BIO buildings on the Micron Campus.
Ingress and Egress Roads		Construction access to the Micron Campus site would be gained from seven locations over the Project duration: three from Caughdenoy Road in the vicinity of the Rail Spur Site, three from NYS Route 31, and one from U.S. Route 11 on the east that would traverse land area within the Town of Cicero. During the first year of construction, the site would be accessed by the three entrances: off Caughdenoy Road, the existing intersection at Burnet Road, and NYS Route 31. As construction phasing progresses from west to east and fab operations begin, some of the construction access roads would eventually become permanent employee access driveways into the Micron Campus. Micron would implement maintenance and protection of traffic plans to ensure safety during various phases of construction.
Stormwater Management Practice Areas (15)	2.9M	Stormwater management practice areas (SMP) would be constructed throughout the Micron Campus to treat and detain stormwater runoff from approximately 645 acres of newly created impervious surfaces. SMPs would include wet extended detention ponds (labeled as SMP 01, 03, 11, 12, 13, 14, 15, and 17 in **Figure 7 (attached)**), and filtration bioretention (labeled as SMP 02, 05, 07, 08, 09, 10, and 16). Construction of SMPs would progress as the campus is developed according to the construction phasing plan. The SMPs would be sized according to hydrologic and hydraulic modeling conducted for the site. At construction completion, the footprint of the SMPs would be 2.9M sf (66.6 acres).

2.1.3.2 Family Care/Healthcare Center Site Components

Micron proposes the construction and operation of a Family Care/Healthcare Center located on a 30.2-acre parcel on Caughdenoy Road, approximately three-quarters of a mile north of the Micron Campus. Any potential wetland impacts associated with the Family Care/Healthcare Center site will be addressed in a separate permit application.

2.1.3.3 Rail Spur Components

As illustrated in **Figure 5 (attached),** a CSX rail line is located contiguous to the western site property boundary of the White Pine Commerce Park and traverses the site in the northwest corner. Micron is coordinating with CSX to construct a rail spur on land proximal to the White Pine Commerce Park and connect the spur tracks to CSX's existing adjacent commercial rail line.

The Rail Spur would be constructed on an approximately 38-acre parcel on the west side of Caughdenoy Road, adjacent to the Micron Campus and CSX line. The Rail Spur would be used to deliver construction aggregate, prefabricated construction materials, and operational materials used in production to the Micron Campus as a mitigation measure to reduce traffic, air, climate change and community character impacts from construction and operation of the Project.

A preliminary site plan is provided as **attached Figure 5**. The site includes federally regulated wetlands, but no NYS regulated wetlands. A site plan shown in **Figure 6 (attached)** was previously planned and submitted, but subsequently amended to relocate site development in order to further avoid wetland impacts. In collaboration with the USACE, Micron amended the site plan to relocate several site features such as the proposed emergency stockpile and southern access road, to minimize anticipated wetland impacts. This site amendment led to the avoidance of approximately 7 acres of federal wetlands.

The rail spur would be constructed to have multi-function use, which would include an emergency stockpile for construction aggregate and a structure for unloading freight cars. It will have access to Caughdenoy Road and take advantage of existing quarries near the CSX line to supply construction aggregate. The CSX line connects to the Port of Oswego, which is an ice-free port and can accommodate Seawaymax Class freighters 12 months out of the year, as well as to the existing multi-modal inland port located in the Town of Dewitt.

The rail cars can carry 4.8 times as much construction aggregate compared to dump trucks and are 2.5 times more fuel efficient, resulting in the elimination of thousands of truck trips and truck emissions on area roads Due to these factors, it is crucial for the rail spur and associated structures to be constructed as soon as possible after appropriate environmental review and permitting, in advance of most of the construction of the Micron Campus.

2.2 Project Requirements

The decision to invest $100 billion in a multi-year, multi-phase advanced manufacturing Project requires a commensurate level of due diligence. To develop a viable and sustainable project, it is essential to identify, evaluate, and choose a site that is capable of providing the necessary land, infrastructure, and workforce to accommodate the Project. Equally critical is that the location be part of a community that can support the substantial Project workforce. Given the extensive demands of such an endeavor, as well as the need for expedited development and construction given the Project's significance for national security, it was imperative to select a practicable site that fulfills these requirements.

In recent years, the trend in semiconductor manufacturing has shifted towards the construction of multi-Fab facilities, comprising multiple Fabs on a single site. This trend, first introduced in Asia and Europe and now proposed in the United States, seeks to achieve economies of scale by clustering multiple Fabs within a single central site, thus realizing the logistical, managerial, and economic advantages of such consolidation, including access to a robust and centralized workforce pipeline; an established ecosystem of supply chain partners; reliable infrastructure to support electricity, water and other utility requirements; and reduced operational downtimes during expansions and modifications.

Micron's site selection criteria reflected an intent to identify a single site that had the ability to accommodate a fully built-out facility in terms of talent/labor availability and quality, suitable infrastructure, reasonable acquisition cost, and other key factors such as transportation access and government support, with particular emphasis on the following key factors:

- **Site Compatibility:** A site available for purchase that is 1,000+ acres in size so that it can accommodate multiple state-of-the-art Fabs in a single location. A site that has access to utility infrastructure capable of serving at the required capacities for the operation.
- **Talent Availability:** A site proximate to a specialized labor force with experience in the industry and the education and skill profile to support high-tech manufacturing operations.
- **Business/Operating Environment:** A low-risk business/operating environment that will positively support the development of the Project, low start-up costs (i.e., utilities, land, etc.), and an incentives package commensurate with the level of investment, quality of jobs, Project-specific needs, and growth potential associated with this Project.

2.2.1 Infrastructure Needs

A threshold requirement, as set forth below, is the commercial availability of a parcel of sufficient size to accommodate manufacturing infrastructure sufficient to achieve Micron's goal of producing 52,000 wafers per week (on average over the life of the project). To achieve this production capacity requires the construction of 2.4M square feet of clean room space, along with supporting infrastructure such as central utility buildings, bulk and specialty gas storage, waste handling buildings and associated site infrastructure as detailed in Table 1 above. Accordingly, Micron requires land sufficient to accommodate approximately 1000 acres of overall development as depicted in the proposed site plan – **Figure 7 (attached).**

Given the competitiveness and cost sensitivity of the DRAM market, Micron sought to meet the aforementioned production goals by constructing its Fabs and supporting infrastructure on a single site of sufficient size to accommodate all such infrastructure. The proposed approach is consistent with a growing industry trend to co-locate multiple fabs on a single site to achieve economies of scale and efficient supply chain and feedstock management in addition to minimizing total project footprint and environmental effects (other, older chip manufacture locations in the State tend to include only a single fab with ancillary facilities). Recent examples of such co-location include developments in Texas and Arizona that are currently in construction. In the case of the Proposed Project, Micron concluded that its minimum single site footprint requirements would be 1,000 or more acres to provide for a layout and design that adheres to current industry best practices established in high-scale manufacturing.

The need for a large, contiguous parcel of land and significant, redundant, and resilient transportation and utility infrastructure are the site selection criteria that are often the most challenging in terms of identifying qualifying sites. In Table 2, Micron identifies minimum size and baseline infrastructure needs ("Musts and Wants") necessary to qualify a site for further consideration.[13] Practicability factors (i.e., "Musts) are identified.

[13] Table 2 identifies Micron's site selection criteria; a list of "musts and wants" to facilitate their site selection process and which focus on the adequacy of a site to meet project objectives including time-to-market. From a 404(b)(1) perspective, it is understood that the inability of a site to meet certain site selection criterion does not eliminate it from consideration if that criterion can subsequently and practicably be provided in consideration of logistics, costs, and existing technology. For instance, with community support, a site can be rezoned, or a use variance obtained to meet development needs. Other criteria are identified as "musts" by Micron, which means that the site must meet that criterion to be a practicable site for further consideration. The inability for a site to meet these "musts" is a 404(b)(1) practicability factor that can eliminate a site from further consideration based on the logistics, costs, and technology that would be required to resolve the deficiency. For example, the amount of reliable power supply required to meet project objectives is a Micron "must" and a 404(b)(1) practicability factor.

Table 2. Minimum Project Needs (Acreage and Infrastructure) & Practicability Factors

Site Selection Criteria	Justification
1. Site availability	Potential sites must be available for acquisition.
2. Parcel size - minimum of 1,000 acres of contiguous land	Sufficient parcel size is essential to accommodate the necessary size of the manufacturing buildings to meet the production goals while maintaining adequate spacing between the buildings, space needed for supporting utilities, and ancillary structures. The parcel also cannot be irregularly shaped. This land requirement ensures that all facility components can be efficiently integrated and operated on a single campus reducing the need for multiple utility or other site connections that would make the facility uncompetitive with its peers. The contiguous nature of the land also allows for seamless expansion and significant operational efficiency (explained in greater detail in the Reduced Scale Manufacturing Alternative section), reducing product transportation time between different parts of the facility and facilitating easier management and oversight. The scale and efficiencies required of this project are essential to DRAM manufacturing.
3. Topography, and Other Site Conditions Feasible for Construction of Project	Relatively flat topography with ground conditions that can support a fab foundation and parcel shape that would facilitate efficient layout. If the site's topography and geotechnical makeup require a substantial import and/or export of fill material to accommodate the proposed development, proximate access to rail transport or other cost effective transportation access (such as barge transport) is required to provide a cost-effective means of transporting large volumes of materials while avoiding significant cost and environmental impacts of transport of large amounts of fill by truck.
4. Zoning	Potential sites must be zoned or readily able to be zoned to accommodate the proposed manufacturing use.
5. Potential sites must be within 20 miles of an interstate highway.	Interstate highway access is required to facilitate the transportation of materials and products.
6. Adequate water supply capacity	The proposed facility requires access to substantial water resources, starting with an initial requirement of 11.08 million gallons per day (MGD) for first fab and scaling up to 48 MGD at full build-out. Potential sites must have ready access to these amounts of water supply, or an economically reasonable route to connect to adequate water supplies.
7. Adequate electricity supply capacity	The proposed facility, when fully constructed would require 2437 MW from highly resilient and non-intermittent resources. This includes dual feed electrical service and high sensitivity to voltage fluctuations, ensuring a stable and continuous power supply essential for the facility's operations. Any disruption in power could significantly impact the manufacturing process, leading to substantial financial losses and operational inefficiencies. Therefore, proximity to robust power infrastructure is non-negotiable, requiring existing or a reasonably cost-effective route to provide transmission-level service at 345 kV or higher throughout the site, and with available land for dedicated substations and transformers either on-site or adjacent to it.

Site Selection Criteria	Justification
8. Adequate natural gas supply capacity	Natural gas is required in semiconductor manufacturing to provide for process and other combustion-based heating. The facility's natural gas usage for Fab 1 is projected to reach up to 2.2 billion SCF/year, with an average usage of 0.25 billion SCF/year at the start of production, scaling up to 1.7 billion SCF/year at full build-out. Peak usage for all four fabs would scale up to 9.7 billion SCF/year at full build-out. Potential sites must have ready access to these quantities of natural gas, or an economically reasonable route to connect to adequate natural gas supplies.
9. Access to renewable energy sources	Access to renewable energy is important given Micron's commitment to reviewing green hydrogen and other future technologies when they become available. Availability of renewable or carbon free energy sources through the ability to enter into direct power purchase agreements for renewable energy is needed.
10. Adequate wastewater treatment and pre-treatment capacity	At full build out wastewater discharge would amount to an average daily discharge of up to 28.6 MGD. Potential sites must have ready access wastewater treatment facilities with adequate capacity, or an economically reasonable plan to expand existing or build new wastewater treatment plants to accommodate the site's discharges.
11. Proximity to airports	Proximity to air transportation is needed to support the efficient movement of personnel and critical components to the facility. Potential sites must be located within 30 miles of a domestic commercial airport and 50 miles of an international commercial airport.
12. Specialized workforce availability	The area's population and workforce must be sufficient to support the development and maintenance of a specialized labor force in sufficient numbers who are capable of supporting advanced manufacturing processes and equipment.
13. Proximity to learning institutions for research and development, training, and innovation	Proximity to higher education institutions, military bases, technical colleges, and sources of technical direct-labor, including universities, military bases, and technical colleges play a pivotal role in providing skilled labor, continuous education and training programs that keep the workforce familiar and comfortable with the latest technological advancements. Proximity to learning institutions facilitates partnerships for research and development, ensuring that the domestic workforce remains at the forefront of technological innovation.
14. Minimize impacts on waterbodies and wetlands	Preference for a site with minimal or no wetlands or water bodies, or that provides the ability to avoid, minimize or mitigate wetland and surface water impacts.
15. No floodplains on site	Avoid Climate Informed Science Floodplain, 100-year floodplain, or 500-year floodplain.

2.2.2 Infrastructure Resiliency and Climate Risk

Apart from the baseline infrastructure needs outlined above, manufacturing disruption stands out as one of the semiconductor industry's top vulnerabilities. The global semiconductor industry and its supply chains have a heightened sensitivity to weather-related risks (i.e., floods, droughts, tornado, wind, fire, earthquakes, etc.). This sensitivity has prompted a preference for locations outside of areas where Fabs have historically been located, which are concentrated in regions

prone to severe weather events, droughts, and natural disasters, thereby carrying an increased risk of disruption (i.e., decreasing the reliability of power supplies). Consequently, the assessment of climate-related risks and the resilience of both infrastructure and operations became pivotal factors in Micron's site selection process, ultimately driving the focus towards New York State and the White Pine Commerce Park.

2.3 Basis for Selected Site

In the late 1990s, New York State initiated an economic development endeavor to pinpoint locations that could entice the semiconductor industry to locate to the State. This endeavor culminated in the identification of thirteen sites in New York that could be suitable for the semiconductor and nanotechnology industries. In 1998, following New York's identification of the Clay Business Park, also known as White Pine Commerce Park, as one of these viable sites, Onondaga County embarked on a multi-year initiative to secure, expand, enhance, and promote the White Pine Commerce Park for potential use by semiconductor and nanotechnology industry businesses. In doing so, Onondaga County's primary objective was to proactively prepare the site to accommodate semiconductor chip manufacturers. While community-based economic benefits are transferable to any location upon which this Project is located, site and infrastructure-based project costs and practicability are not. Due to the decades-long efforts by Onondaga County, New York State, and their partners, the White Pine Commerce Park is uniquely qualified to support the land and infrastructure-intensive semiconductor industry due, in large part, to its critical, substantial onsite attributes, which include the following:

- 1,400-acres of contiguous, County-owned land
- 2400 MW of low or zero emission electrical power located proximate to the site[14]
- 12 MGD of water capacity available with capacity to expand to 48 MGD for combined Fabs 1 through 4[15]
- Existing redundant feeds for the aforementioned power and water
- Increased operational resiliency due to decreased climate risk compared to other regions.

In addition, an existing CSX rail line is located contiguous to the western Site property boundary and traverses the Site in the northwest corner. The proximity of rail affords an environmental impact reduction opportunity (i.e., traffic, mobile air emissions, etc.) for Micron to transport the significant quantities of material necessary to construct the phased Project, which otherwise would be transported via the public road system.[16]

[14] The New York Independent System Operator (NYISO) is the organization responsible for managing New York's electric grid. The NYISO divides New York State into Control Area Load Zones. The White Pine Commerce Park is located in Zone C. Zone C produces an extensive amount of surplus energy (12,336 Gigawatt hours ["GWh"] in 2022), the most in the state, as well as 41% of all zero-emission energy in the state (NYISO Gold Book 2023 Report). The White Pine Commerce Park is adjacent to National Grid's Clay Substation and proximal to zero-emission generating facilities in Oswego County; both key considerations for reliability as well limiting capital cost for infrastructure to connect to resources.

[15] OCWA's existing water infrastructure has capacity to meet the needs of Micron's Fab 1, which includes tapping into the existing 54-inch diameter line that traverses the White Pine Commerce Park and can provide up to 12 MGD. To meet the needs for Phase 1 (Fabs 1 and 2), which requires approximately 17 MGD, OCWA proposes to install a 42-inch diameter line within its existing easement, which extends from the OCIDA-owned parcel on the southside of NYS Route 31, opposite the Project site, westward to OCWA's terminal reservoir site, near Great Northern Mall. The new 42-inch line will provide the required redundancy and resiliency required by Micron. In addition, OCWA has initiated previously approved improvements to its Farrell Pump Station, which will increase water flow within the existing system. OCWA proposes to install a second, parallel 54-inch diameter water main within its existing Eastern Branch easement, which extends from OCWA's Lake Ontario WTP to the site within OCWA's existing easement. The future phase (Fabs 3 and 4) will be supported by additional planned OCWA system improvements. Micron continues to promote water minimization and recycling to further reduce full build-out water needs.

[16] Micron proposes to construct a Rail Spur adjacent to the White Pine Commerce Park to connect to the existing CSX rail line to facilitate the import of fill for construction. The primary goal of this project is to significantly reduce construction phase truck traffic and associated impacts of importing select fill. It is forecasted that the Project (regardless of the site) will require over 4,000,000 cubic yards (cy) (Phases 1A and 1B) and 9,000,000 cy (full build-out) of engineered fill material to support the required foundations. For perspective, 4,000,000 cy equates to approximately 6 million tons or 260,000 truck trips (based on a typical 23-ton truck).

The substantial prior investment in and advancement of the White Pine Commerce Park and appropriate zoning by the Town of Clay accelerates Micron's ability to support the primary natural security goal of the CHIPS Act and Green Chips Act to expedite semiconductor manufacturing in the U.S.

The White Pine Commerce Park is owned by Onondaga County and is managed by OCIDA on behalf of the County. OCIDA's mission is to foster economic development, growth, and overall prosperity for the residents of Onondaga County by employing available incentives, rights, and powers in an efficient and collaborative manner. In pursuit of its objective to cultivate a modern, technology-driven economy within Onondaga County, OCIDA actively participated in various New York State initiatives aimed at attracting the semiconductor and nanotechnology industries to the region. This process gained momentum following the federal enactment of the CHIPS Act in August 2022.

The strategic planning for the development of the White Pine Commerce Park occurred in conjunction with Onondaga County's involvement in the state's pre-CHIPS Act business attraction programs and played a pivotal role in advancing the site for semiconductor manufacturing. The collaboration between the county and the state to identify, choose, and develop the site reached its culmination when Micron selected the site in October 2022 for its proposed $100 billion multi-Fab facility, heralding a new era in semiconductor manufacturing in the U.S. The pre-CHIPS Act initiatives to develop sites in New York State to accommodate semiconductor manufacturing, summarized below, consisted of the CHIP FAB 98/SEMI-NY program and Project Rhino.

In short, because of the decades-long Project development efforts by state and local government entities in New York to identify suitable semiconductor facility sites, Micron was able to identify the White Pine Commerce Park as a suitable Project location (see Section 3.1).

3. Alternatives Analysis

3.1 Offsite Alternatives Previously Considered

Semiconductor manufacturing demands a large developable site with convenient transportation access as well as access to reliable sources of, and capacity to meet, water and electricity needs. Sites capable of meeting these extensive requirements are not widely available due to the inherent challenges in satisfying all three needs.

Micron's site selection and evaluation process followed a structured approach that involved the elimination of sites that could not meet specific Project prerequisites. Minimum parcel size and infrastructure requirements were considered alongside additional site selection factors such as transportation accessibility, workforce development, time-to-market (permitting and approvability), climate-related risks, place enhancement (livability), advanced manufacturing ecosystem (including the supply chain), and availability of incentives, among various other technical and socioeconomic factors.

As explained above, Micron's Project development team took full advantage of the extensive site evaluation process that had been initiated by New York State and Onondaga County over twenty years ago and which continued to be adapted, updated, and advanced to the present. The initiatives undertaken over this more than twenty-year period aimed to identify and promote sites suitable for development by the semiconductor industry.

3.1.1 New York State CHIP FAB 98/SEMI-NY Program

Citing the surging global demand for computer chips, the Governor's Office for Regulatory Reform (GORR) and the New York Urban Development Corporation, operating as Empire State Development (ESD), unveiled a plan in late 1997 aimed at attracting semiconductor chip manufacturers to New York State. This initiative, known as CHIP FAB 98,[17] focused on the following objectives:

- Identifying the needs of microchip manufacturers (i.e., industry "musts and wants")
- Compiling information on New York State sites regarding water availability, power supply, educational institutions, access to air transport, permitting regulations, and other criteria that contribute to a site's suitability for microchip manufacturing

In 1998, SEMI-NY, another New York State initiative, was introduced to draw the semiconductor industry to the state. It sought to identify and promote "qualified" sites that aligned with the conceptual profiles of the semiconductor industry. To support this program, New York State, through ESD, engaged Industrial Design Corporation, Inc. (IDC) to prepare a semiconductor manufacturing industry profile, which would outline the specific requirements of a "qualified" site intended for promotion to the semiconductor industry. IDC was chosen for this task due to their extensive experience in the targeted industry.

[17] The CHIP FAB '98 program focused on identifying "qualified sites", to be marketed to the semiconductor industry. The SEMI-NY program, which continued after 1998, focused on advancing qualified sites to "shovel-ready" status.

In 1998, the established criteria encompassed:

- 200 or more contiguous acres access to water at a rate of 3 MGD at 80 pounds per square inch (psi)
- Access to a wastewater conveyance and treatment system with capacity to manage flows of 2.4 MGD
- Continuous access to electrical service from two separate sources at 115 kV or 20 MW
- Natural gas at least 2,000 cubic feet per minute (cfm) at 8 psi
- Available workforce to perform skilled labor
- Proximity to academic institutions, which provide vocational resources, is preferred
- Must be surrounded by infrastructure that allows for transportation ease of access

The State's prequalification process resulted in IDC's winnowing of an initial group of 55 potential state-wide sites down to 13 sites, which substantially met industry requirements. The original 13 CHIP FAB 98/SEMI-NY sites and their status are identified in Table 3.

Table 3. Summary of Original CHIP FAB 98/SEMI-NY Sites

Site Name	County/Municipality	Acreage	Status (2023)
Wemple Road	Albany/Bethlehem	395	Protected Open Space[18]
Aurelius Industrial Park	Cayuga/Aurelius	220	Developed[19]
IBM – East Fishkill	Dutchess/East Fishkill	460	Developed[20]
Nanocenter	Oneida/Marcy	434	See below
Luther Forest	Saratoga/Malta	1100	See below
Sterling Park	Erie/Orchard Park	200	Developed[21]
North American Center	Erie/West Seneca	300	Partially Developed[22]
Eagles Landing	Monroe/Henrietta	200+	Developed[23]
RIT	Monroe/Henrietta	340	Partially Developed[24]
Airport Industrial Park	Niagara/Niagara Falls	220	Developed[25]
Town of Clay (White Pine Commerce Park)	Onondaga/Clay	340[26]	See below
Crystal Run Road	Orange/Wallkill	220	Developed
Rensselaer Tech Park	Rensselaer/North Greenbush	200+	Developed[27]

[18] https://www.townofbethlehem.org/934/Proposition-2-on-the-back-of-the-Nov-8-2
[19] https://images1.loopnet.com/d2/SV6ShqHZxGm9hD4lPCymSoAlGDEepTPEMhW4jvYbmS4/document.pdf
[20] https://ipark84.com/
[21] https://www.acquestdevelopment.com/showcase/portfolio/100003/sterling-business-park-orchard-park-ny
[22] https://www.pyramidbrokerage.com/listings/north-america-drive-west-seneca-ny-b5600/
[23] https://www.buckprop.com/wp-content/uploads/36-01_Eagles-Landing-All-Availabilities.pdf
[24] https://www.rit.edu/fa/park
[25] https://www.niagaracountybusiness.com/patriot-airport-industrial-park
[26] Subsequent to the original acquisition of 340 acres, Onondaga County purchased additional adjacent lands to increase the site to its current 1400+ acre configuration (see Section 3.1.4).
[27] https://techpark.rpi.edu/

Following their designation as "qualified sites," ten of the original thirteen sites had either undergone complete or substantial development, rendering them unsuitable for the semiconductor industry, or had become otherwise unavailable for development. By the spring of 2000, three out of the original thirteen sites had announced the successful completion of all pre-permitting requirements, earning them a "Shovel-Ready" designation:[28] Luther Forest, Marcy Nanocenter, and the White Pine Commerce Park sites. In 2012, the Science, Technology & Advanced Manufacturing Park (STAMP) site, covering 1,250 acres in Genesee County, was added to the list of marketable sites in New York State that remained available to the semiconductor industry for development.

3.1.2 New York State Project Rhino Evaluation

In 2017, the New York State Economic Development Council (NYSEDC) engaged Newmark Knight Frank (NKF) to perform "a strategic evaluation of the four sites that New York State had targeted for semiconductor manufacturing to understand each location's competitive positioning to attract semiconductor plants." [29] The evaluation became known as "Project Rhino," and served as an update to evaluations conducted in support of CHIP FAB 98/SEMI-NY.

For Project Rhino, NKF conducted a site search for a hypothetical semiconductor company, which assumed current market, facility, and operational needs; 108 relevant location criteria were evaluated, and the results provided an overall score and ranking for each site and community. The primary criteria included: site quality and suitability, workforce and community alignment, economic development and regulatory context, incentive capacity and capability, and utilities (capacity, quality, and reliability).

The aforementioned four New York State sites were included in the evaluation and benchmarked against six other competing locations around the country that NKF identified as possessing or pursuing semiconductor investments.

The Project Rhino evaluation resulted in recommendations and rankings. While all four New York State sites remained New York State "qualified sites" for the semiconductor industry regarding capacity, quality, and reliability of utility infrastructure, only the White Pine Commerce Park and Marcy Nanocenter sites ranked the highest nationally among the ten sites based on their utility access and development readiness. The Project Rhino findings significantly increased the attractiveness of the White Pine Commerce Park for business development in both Onondaga County and New York State.

3.1.3 New York State Green CHIPS Program

To reinforce the establishment of a sustainable semiconductor ecosystem in New York, the State introduced the Green CHIPS Program in 2022, aiming to strike a balance between economic opportunity and environmental sustainability. This program is designed to reduce the construction and operational costs of chip Fabs in New York, which, in turn, is expected to draw significant investments and job opportunities, solidifying New York's position as a leader in the domestic reshoring of semiconductor manufacturing. These efforts are also geared toward addressing supply chain shortages and enhancing national security.

[28] New York State's Shovel-Ready designation establishes that the applicant (i.e., site owner, economic development organization) has worked proactively with the State to identify and address major permitting issues prior to a business expressing interest in the location. The identification and acquisition of permits based on a developer site plan would be necessary to initiate construction (i.e., site plan approval, air permit, wetland permit, etc.).

[29] The four key industrial sites consisted of: the White Pine Commerce Park (Onondaga County), STAMP site (Genesee County), Marcy Nanocenter (Oneida County), and Luther Forest Technology Campus (Saratoga County). These four sites are what remained of the original thirteen SEMI-NY qualified sites, with the other 9 sites eliminated from consideration over the years due to non-semiconductor development; or lack of available undeveloped lands, infrastructure, or land control.

With up to $10 billion in economic incentives for environmentally friendly "Green CHIPS" semiconductor manufacturing, this legislation complements the federal CHIPS Act, further amplifying the attractiveness of the White Pine Commerce Park.

3.1.4 Elimination of Alternative Qualified New York State Sites

As additional investment (land purchases, infrastructure) was made at the White Pine Commerce Park, project feasibility studies continued at the other three New York State semiconductor industry qualified sites. Successful business attraction efforts by the State and localities have resulted in the development or partial development of the remaining three sites, which reduced available acreage and infrastructure capacities, and eliminated them from further consideration by Micron. A summary of the current, remaining development potential at these sites is provided below.

Luther Forest (Saratoga County)

Saratoga County's bid for a chip manufacturing plant was spearheaded by the Saratoga Economic Development Corporation (SEDC). In the mid-1990s, SEDC began laying the foundations for the establishment of a semiconductor manufacturing plant in Saratoga County. They identified a site in Luther Forest, in the towns of Malta and Stillwater. The Luther Forest site was evaluated by IDC and became one of the thirteen pre-qualified sites marketed by New York State to the semiconductor industry.

In 2008, Saratoga County was successful in attracting Advanced Micro Devices (AMD), one of the world's leading semiconductor manufacturers, to establish a manufacturing presence on the Luther Forest site. Today, a corporate successor (GlobalFoundries) continues manufacturing operations on the 1,110-acre site.

The remaining land at the Luther Forest industrial park was held under option for GlobalFoundries[30] and in 2023, GlobalFoundries, purchased the last of approximately 800 acres available at the site. In its press release,[31] GlobalFoundries indicated that the land purchase supports its plan to expand its footprint in the state to meet semiconductor needs. The company has plans to eventually build a second manufacturing facility in the park.

With the purchase of the remaining land by GlobalFoundries, the Luther Forest site is no longer available for development by other companies, such as Micron.

Marcy Nanocenter (Oneida County)

Located in Upstate New York, the Marcy Nanocenter at SUNY Polytechnic Institute is a 434-acre greenfield campus developed for semiconductor & advanced technology manufacturing facilities. In 1998, IDC (and New York State) selected the site as one of the thirteen pre-qualified sites for nanotechnology development. In 1999, Mohawk Valley EDGE took on the role as site applicant, taking the lead role in developing the site.

In 2013, the State University of New York's College of Nanoscale Science and Engineering (CNSE) announced plans to establish three semiconductor manufacturing plants on the Marcy Nanocenter site. In September 2019, EDGE announced that Wolfspeed, a U.S. semiconductor company based in Durham, NC, had selected the Marcy Nanocenter site to build its new manufacturing facility. Wolfspeed has indicated its long-term goal to continue to grow and expand its manufacturing footprint at the Marcy Nanocenter site.

[30] The site was held under option by GlobalFoundries at the time of Micron's site evaluation.

[31] https://gf.com/gf-press-release/globalfoundries-completes-purchase-of-800-acres-adjacent-to-new-york-manufacturing-facility/

Wolfspeed's development on the 434-acre Marcy Nanocenter site restricts future development to approximately 130-acres remaining on the site.[32] In addition to the Wolfspeed development, additional acreage has been committed to stormwater management, infrastructure, compensatory wetland mitigation (required by USACE permit), and town-required development buffers.

With the development of the Marcy Nanocenter by Wolfspeed, the site no longer has sufficient acreage and infrastructure to meet Micron's Project needs and objectives.

STAMP Site (Genesee County)

The 1,250-acre STAMP site is located in the Town of Alabama, Genesee County, New York. Recent investments managed by the Genesee County Economic Development Center (GCEDC) include projects by Plug Power and Edwards Vacuum. These developments have resulted in a reduction of remaining available acreage (540 acres)[33] at the STAMP site, which constitutes less than 50% of Micron's land needs and makes it unsuitable to accommodate the multiple Fabs that Micron has proposed at the White Pine Commerce Park site. In addition, as summarized in Table 4, the site does not have sufficient electric and water infrastructure to support Micron's objectives. Regarding wastewater, the GCEDC is responding to separate legal challenges from the Seneca Nation and Orleans County (see below).

3.1.5 Onondaga County Investment and Micron Site Selection

From 1991 to the present day, Onondaga County, through various government entities, has undertaken substantial planning and made significant investments in the development and promotion of the White Pine Commerce Park, with the semiconductor industry identified as the primary and most advantageous development target.

In 1991, OCIDA and the City of Syracuse Chamber of Commerce initiated an Industrial Park Feasibility Study to identify potential locations for industrial businesses in Onondaga County.[34] Among the two sites identified as suitable for large-scale industrial usage, the White Pine Commerce Park emerged as the preferred choice for purchase. This decision was based on its proximity to National Grid's Caughdenoy electric substation, excellent highway access, and its Industrial zoning designation. Between 1991 and 1999, the County acquired seven properties, constituting the original 340± acre White Pine Commerce Park. Since then, as discussed below, OCIDA and Onondaga County have committed substantial resources to enhance the site's readiness for large-scale industrial occupants by acquiring additional parcels that have significantly enlarged the Project site.

In pursuit of attracting a semiconductor company to the site, Onondaga County encountered recurring criticism from site selectors and potential companies, emphasizing that the 300-acre site was insufficient for the contemporary needs of the semiconductor industry. Consequently, Onondaga County expanded the White Pine Commerce Park on multiple occasions, ultimately reaching its current size of approximately 1,400 acres. Beyond mere size, addressing essential Project requirements, such as access to an adequate, reliable supply of electricity and water, wastewater treatment, and an adequate natural gas supply, further narrows the pool of available, sustainable, and practical sites. Combining the acreage and infrastructure prerequisites with the demands for access to multi-modal transportation and labor resources often presents multiple challenges for other potential sites that might otherwise meet the acreage requirement. Sites that genuinely meet Micron's site selection criteria are notably unavailable or do not exist, further underscoring Micron's choice of the White Pine Commerce Park.

[32] https://marcynanocenter.com/wp-content/uploads/2021/07/Marcy-Nanocenter-Parcel-2.pdf

[33] https://www.gcedc.com/wnystamp

[34] Clay Business Park, Draft Generic Environmental Impact Statement, September 2012.

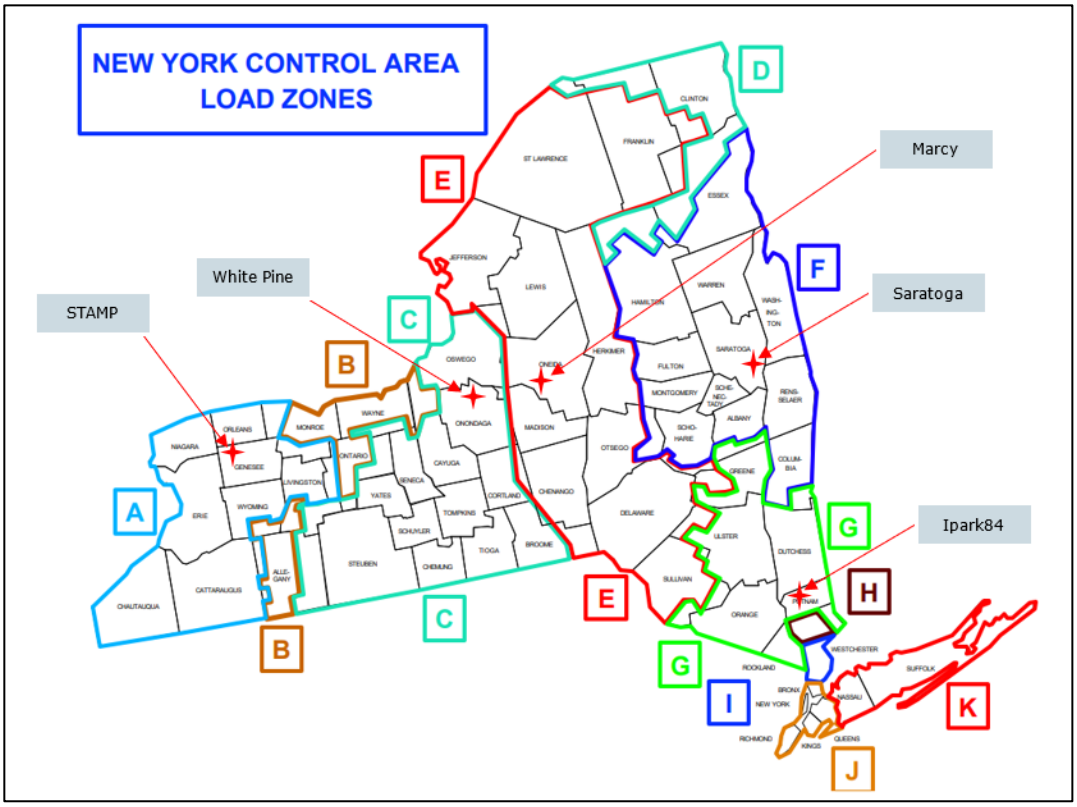
3.1.6 Statewide Energy Resource Assessment and Alternatives Analysis for Semiconductor Manufacturing

Since its inception, New York State has been characterized by abundant and resilient energy and water resources. These resources were critical to the early economic growth and vitality of the State and the United States. Initially, these resources were a catalyst for the first westward corridor of commerce developed along the Erie Canal and later were important components that facilitated the industrial revolution and the post-war economy of the State.

As the next era of economic growth and transition arrives in New York, abundant clean energy resources and the infrastructure to support it remain essential catalysts for economic growth because they are critical to meet the needs of new sectors like semiconductor manufacturing. These requirements are exceptional by comparison to any earlier benchmark witnessed by other energy intensive industries that have resided in the State, whether they be metals, advanced manufacturing, or chemicals.

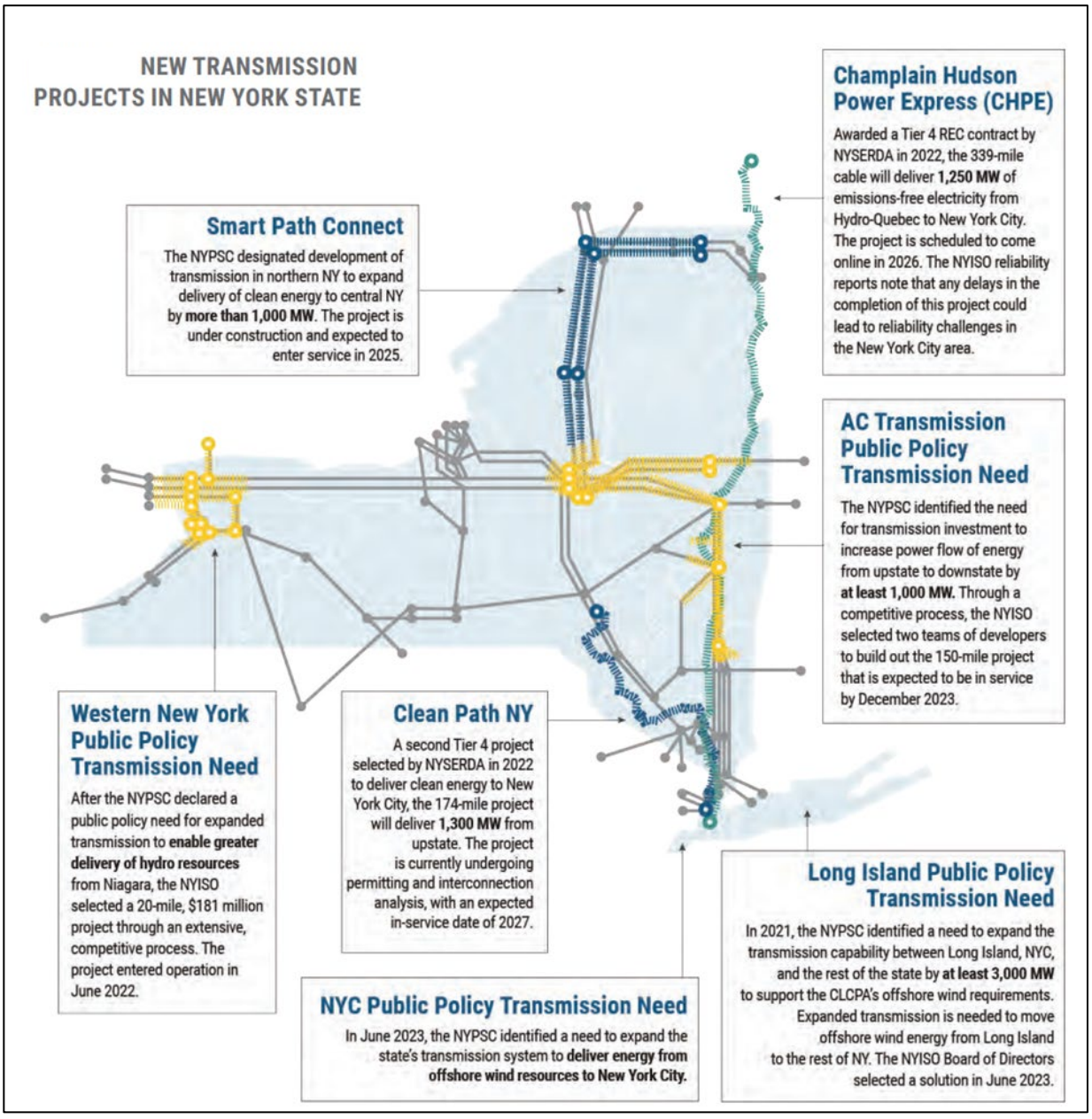
This resource assessment explains the access and availability of energy and both the locational advantages and constraints to accessing energy that exist across the State.

New York organizes and controls its electrical transmission infrastructure in 11 unique regions that are labeled as Zones (A-K) (see illustration below[35]) and operated by the New York Independent System Operator (NYISO). The capacity characteristics of these zones are influenced by the physical location and proximity of electricity generation, and the transmission and distribution to end users or consumers.



[35] New York Control Area Load Zone Map (source: NYISO).

Power generation is highly dependent on the proximity to the prime mover that creates electricity (i.e., Hydro – large to medium rivers, Wind – elevation and average wind speed, combustion turbines – natural gas pipelines, nuclear – cooling water resources). Often these resources do not correlate to the large population centers where electricity is needed, so transmission networks are built to move electricity from the energy resource to the location of the energy need. Over time, generation assets are improved to maintain efficiency, retired due to economic considerations, or closed due to regulatory changes at the state or federal level. Transmission is also modified and altered to meet growing requirements and concentration of energy needs in certain areas. The illustration below[36] shows the New York transmission network, and the many changes recommended to meet the State's future energy needs, as identified in a recent planning document.



[36] New York Transmission Network and Recommended Projects (source: NYISO Power Trends 2023 Report)

End user needs are multi-dimensional. First, the overall electricity demand is increasing due to several factors: the use of more electronic devices in work and at home, conversion to electrified heat pumps from oil/gas boilers to heat buildings and homes, transition to Electric Vehicles (EVs), data acquisition, and various connected electronic devices. Second, increases in electricity demand are also driven by the sentiment or desire by consumers to source energy from climate friendly, low or non-emitting generation resources. This leads to increased demand for EVs and heat pumps, with the goal to power these devices with zero greenhouse gas emission energy sources such as hydro, wind, and solar. The state goal to transition from GHG emission electricity sources such as natural gas to non-GHG sources is mandated in the recently enacted Climate Leadership and Community Protection Act (CLCPA). In the private sector, Environmental, Social, and Governance (ESG) commitments to achieve net zero climate goals have also led to an increased demand in electricity generated by zero emission sources.

Fundamentally, the dynamic evolution of the energy supply chain creates variability, where there are areas with abundant or even significantly higher amounts of generation and corresponding transmission to move the energy tens if not hundreds of miles away. New York State has the diversity in the types of generation, as well as the concentration of energy production and capacity. This condition makes siting for new industries with significant, reliable energy demand, at all hours of the day, particularly challenging. Few potential project sites (especially undeveloped "greenfield" locations) have the potential to meet the needs assessment for these industrial end users. This paired with the additional criteria for clean energy and access to reliable power generation and transmission infrastructure further reduces the list of potential sites.

Micron is representative of the type of end user that requires significant power demand, perhaps the single largest end user in one location anywhere in the state once the campus is fully built. The current energy requirement for the first two Fabs is projected to be 1,200 MW or 9,986 GWh of annual need (1,200 MW x 365 days x 24 hrs x 95% load factor). Utilizing information from the NYISO 2023 Gold Book,[37] which includes an extract of actual 2022 data of all power production and corresponding consumption by zone, we can perform the following assessments for each zone:

1. Have specific sites been identified that are being marketed specifically for semiconductor production?
2. Is there a localized surplus or deficit of electricity?
3. Would the control area zone be able to intrinsically supply the facility with local resources?

The energy assessment by zone and the evaluation against the above criteria is summarized below.

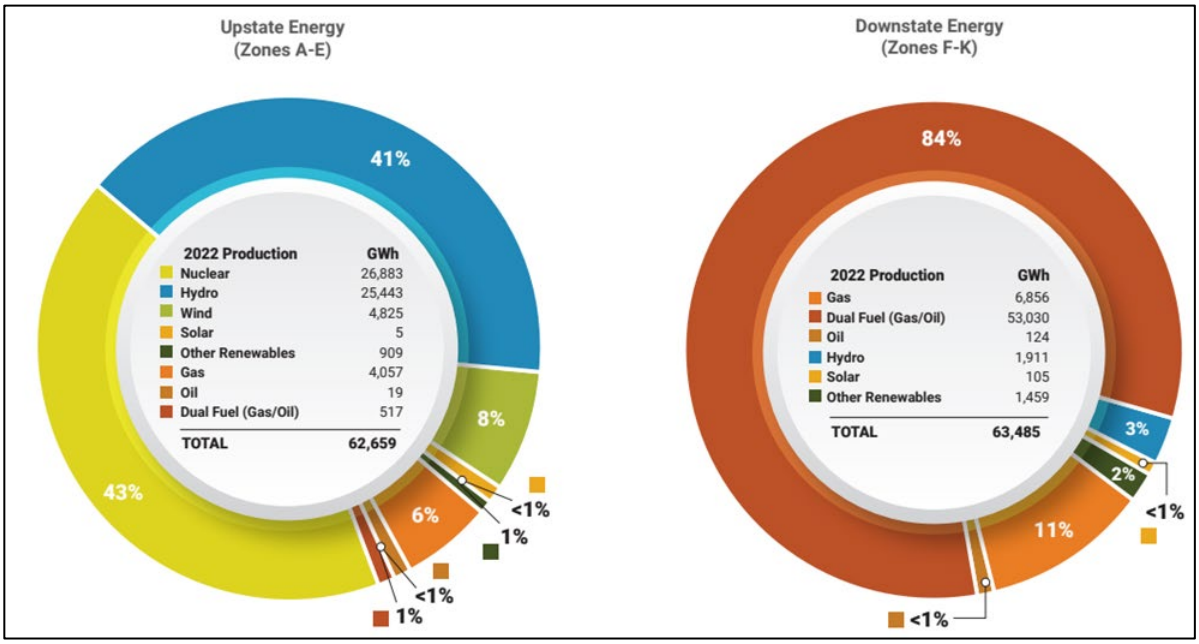
2022 Zonal Summary Production vs Consumption (GWh)

	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone H	Zone J	Zone K
Power Production by Zone	16,805	5,237	27,701	8,984	3,177	14,852	11,707	367	25,127	10,463
Consumption by Zone	14,687	9,616	15,365	5,884	7,357	11,935	9,325	2,902	49,740	20,095
Differential	2,118	(4,379)	12,336	3,100	(4,180)	2,917	2,382	(2,535)	(24,613)	(9,632)
1 NYS Semi Technology Parks	STAMP		White Pine		Marcy	Saratoga	Ipark 84			
2 Localized Surpluss or Deficit	Surplus	Deficit	Surplus	Surplus	Deficit	Surplus	Surplus	Deficit	Deficit	Deficit
3 Micron Suitability @ 1,200 MW	Fail		Pass		Fail	Fail	Fail			

[37] https://www.nyiso.com/documents/20142/2226333/2023-Gold-Book-Public.pdf/c079fc6b-514f-b28d-60e2-256546600214

While there are five well identified technology parks located across New York State, only four parks reside in zones that have energy surpluses to be made available for a new facility and, of those, **only the White Pine Commerce Park has the capability to meet Micron's requirements**. Capability for the site includes: adequate capacity, nearby energy supply with the ability to convey to the site, ability to expand substation infrastructure, and ability to access clean energy via the existing transmission system. Moreover, the primary east/west and north/south transmission link connecting to significant low/non-emission power production in Oswego County is located at the Clay Station across the street from the White Pine Commerce Park, limiting the number of additional transmission/substation infrastructure upgrades that would be needed to accommodate the Project.

Micron, like many other members of this advanced manufacturing sector, has made ambitious goals for use of non-GHG, renewable energy. An example is Micron's commitment to source 100% renewable energy across U.S. operations by 2025. Upstate New York's energy production (Zones A-E) is dominated by zero emission resources (see illustration below[38]); over 92%, which makes location in upstate New York very attractive when compared to many other regions of the State.



[38] 2022 Energy Production (GWh) by Fuel Source for Upstate and Downstate New York (source: NYISO Power Trends 2023 Report)

In summary, based on the NYSISO 2023 Gold Book data (see illustrations below), the following conclusions can be made regarding the suitability of the White Pine Commerce Park compared to other areas of New York State for availability of the required zero-emission energy:

- **White Pine Commerce Park (Zone C)**
  - In 2022, Zone C consumed 15,365 GWh of energy, yet produced 27,701 GWh which means it had a net surplus of 12,336 GWh that it exported to other energy capacity zones in the state.
- **Proximity to energy resources is a key consideration for reliability as well limiting capital cost for infrastructure to connect to resources. The White Pine Commerce Park is located in northern Onondaga County (5 miles to the border of Oswego County).**
- 21% of all power produced in NYS is generated in Oswego County.
- 93% of all power produced in Zone C is generated in Oswego County.
- 41% of all zero-emission energy in NYS is generated in Zone C.
- 38% of all zero-emission energy in NYS is generated in Oswego County.
- **STAMP** (Zone A)
- In 2022, Zone A consumed 14,687 GWh of energy, yet produced 16,805 GWh which means it had a net surplus of only 2,118 GWh that it exported to other energy capacity zones in the state.

2022 Name Plate Capability Megawatt (MW)
By Zone

Sum of Name Plate	Column La										
Row Labels	A	B	C	D	E	F	G	H	J	K	Grand Total
Battery	20			20		20					60
Fly Wheel						20					20
Kerosene							22		70	18	109
Methane (Bio Gas)	28	13	43	6	11	15					117
Natural Gas	541	251	1,706	388	236	3,648	5,073		10,206	4,181	26,231
No. 2 Fuel Oil									300	1,247	1,547
No. 6 Fuel Oil			1,804								1,804
Refuse (Solid Waste)	50					14	9	60		136	269
Sunlight			40			60				54	154
Uranium		614	2,923								3,537
Water	3,105	64	108	1,149	374	1,451	83				6,333
Wind	340	7	914	678	602						2,541
Grand Total	**4,085**	**949**	**7,538**	**2,241**	**1,223**	**5,228**	**5,187**	**60**	**10,576**	**5,637**	**42,723**
Percent of Total	10%	2%	18%	5%	3%	12%	12%	0%	25%	13%	100%

2022 Actual Production in Gigawatt Hours (GWh)
By Zone

Sum of Net GWH	Column La										
Row Labels	A	B	C	D	E	F	G	H	J	K	Grand Total
Battery	-			-		(3)					(3)
Fly Wheel						(9)					(9)
Kerosene							1		1	0	2
Methane (Bio Gas)	123	86	226	43	53	53					583
Natural Gas	441	58	3,940	93	12	13,938	11,497		25,125	9,326	64,430
No. 2 Fuel Oil									2	120	122
No. 6 Fuel Oil			47								47
Refuse (Solid Waste)	140					66	28	367		944	1,545
Sunlight			5			33				73	110
Uranium		5,045	21,838								26,883
Water	15,266	48	368	7,532	1,715	773	181				25,883
Wind	835	-	1,277	1,315	1,398						4,825
Grand Total	**16,805**	**5,237**	**27,701**	**8,984**	**3,177**	**14,852**	**11,707**	**367**	**25,127**	**10,463**	**124,419**
Percent of Total	14%	4%	22%	7%	3%	12%	9%	0%	20%	8%	100%

3.1.7 Presentation of Alternatives Information

An alternatives comparison matrix is provided below to present and compare the main practicability parameters that were considered during the evaluation. In accordance with USACE 404(b)(1) guidance, an alternative needs to fail only one practicability factor to be eliminated during the screening process.

Table 4. Offsite Alternatives Comparison Matrix (Based on Publicly Available Information)

Practicability Category	Factor	White Pine Commerce Park (Applicant's Preferred)	Luther Forest	Marcy Nanocenter[39]	STAMP[40]
Available	Available for Acquisition	YES	NO Owned by private company for its use (GlobalFoundries) The site was held under option by GlobalFoundries at the time of Micron's site evaluation	YES	YES
Logistics					
	Electric Infrastructure (2344 MW) (low or zero emission production resources) Climate risk: low	YES 2400+ MW of redundant, resilient, low or zero emission power; extensive surplus power in NYISO Zone C Climate risk: low	Site is not available	NO 400 MW of redundant power service Climate risk: low	NO 45-kV transmission system at site boundary serving 600-MW substation under construction at STAMP Substantial investment (time and capital) would be necessary to upgrade infrastructure.[41] Such a time investment is inconsistent with the CHIPS Act National Security needs. In addition, the substantial on- and off-site improvements would result in additional environmental impacts not quantified or

[39] https://marcynanocenter.com/marcy-nanocenter-projects/parcel-2/

[40] https://www.gcedc.com/stampinfrastructure

[41] 115 kV line further reduces available developable acreage as buildings cannot be constructed over proposed line (source: https://www.gcedc.com/documents/stamp/STAMP.SimpleMap.pdf)

Practicability Category	Factor	White Pine Commerce Park (Applicant's Preferred)	Luther Forest	Marcy Nanocenter[39]	STAMP[40]
					evaluated by the site sponsor. Climate risk: low
	Water Infrastructure (22 MGD [initial] to 48 MGD [full build-out])	YES 12 MGD currently available at site (Fab 1); 22 MGD ready through Fab 1 & 2; 48 MGD available through Fab 4	Site is not available	YES Two separate 24" water mains with 48.5 MGD capacity connected to site via 4 transmission mains	NO 1 MGD water capacity (2023) 1.5 MGD water capacity expansion funded for 2024-25 construction Scalable expansions to 7 MGD total capacity ready-to-bid Sewer main extension (Orleans County to Genesee County) is currently under legal challenge[42]
	Natural Gas Infrastructure (MCF/M – 1,000 CF/Month – 1,187 MCF/M by start of production; 7,119 MCF/M at maximum capacity)	YES Applicant's projected MCF/M is 18,439 to 113,443 MCF/Month, 453,773 MCF/Month at maximum production for all 4 Fabs with a maximum 65% utilization factor. A 16-inch diameter, 124 pounds per square inch gauge (psig) distribution natural gas direct line to the site approximately 3 linear miles is presently at 90% design by the serving	Site is not available	NO 2" natural gas main extension (3.5 miles, at 80 psi); upgrades available to reach 210 psi (Insufficient)	YES 24" transmission line at site boundary; 12" distribution line ready-to-bid; 1,000 MCF/HR distribution line funded for 2024-25 construction

[42] Asserting rights over the Iroquois National Wildlife Refuge, the Tonawanda Seneca Nation has filed a lawsuit against the federal government in U.S. District Court over the U.S. Fish and Wildlife Service's approval of a right-of-way for an industrial wastewater pipeline through the Iroquois National Wildlife Refuge to the STAMP site (https://www.thebatavian.com/howard-owens/seneca-nation-sues-wildlife-service-over-approval-of-stamp-pipeline/637470) Orleans County has filed a similar suit (https://www.thebatavian.com/tom-rivers/orleans-county-files-suit-over-wny-stamp-sewer-line/636456)

Practicability Category	Factor	White Pine Commerce Park (Applicant's Preferred)	Luther Forest	Marcy Nanocenter[39]	STAMP[40]
		utility. The source is a natural gas transmission line. The utility will provide a 30-psig regulated service termination for the Applicant's onsite distribution and the Applicant will provide end-use pressure reduction to 20 psig.			
	Sufficient Parcel Size (1400+ Acres)	YES 1400 acres	NO 800 acres remaining Site is not available	NO 130 acres remaining (insufficient acreage to construct 2 to 4 Fabs)	NO 540 non-contiguous acres remaining[43] (insufficient acreage to construct 2 to 4 Fabs; the 310 contiguous acres[44] is insufficient to construct 2 Fabs)
Existing Technology	Topography and Other Site Conditions Feasible for Construction of Project	YES	Site is not available	YES With use of engineered retaining walls	YES
Cost	Site Development and Operational Cost Impacts	Optimal	Site is not available	Site is not available	Estimate +$500M additional infrastructure cost for water, electrical, municipal, and industrial waste expansions not studied due to other factors eliminating this site.

[43] The STAMP site is characterized by approximately 122 acres of wetlands (delineation completed in 2010/2011) and 33,900 linear feet of streams, ditches and drainage ways (https://iapps.courts.state.ny.us/nyscef/ViewDocument?docIndex=Ct74j7ewnnfxJ4Yyatnw9Q== ; page 137)

[44] https://www.gcedc.com/documents/stamp/STAMP.SimpleMap.pdf

As summarized in Table 4, Micron selected the White Pine Commerce Park because (a) it was the only previously identified semiconductor development site that was large enough, and (b) it already had the critical infrastructure in place to serve the Project (e.g., power, water). The identified alternative sites fail the practicability analysis based on their inability to meet identified critical factors in terms of size and water, electricity, and natural gas needs. Even if these sites were large enough and had sufficient utility infrastructure, they are also not practicable alternatives for Micron because investment in those sites to construct baseline needs would: (a) be far more expensive, (b) add significant time to the development schedule that is inconsistent with the goal of the CHIPS Act to expeditiously develop new semiconductor manufacturing capacity consistent with national security needs, and (c) involve additional environmental impacts, surface disturbance, carbon footprint, etc. in comparison to the preferred site where such assets are already available.

3.1.8 Intersection of Micron Site Selection Efforts with the White Pine Commerce Park

In his post-selection remarks, Micron's CEO, Sanjay Mehrotra, concluded:

> "Micron selected the Onondaga County, New York site based on its multiple advantages including leading higher education institutions, access to talent traditionally underrepresented in technology jobs and a significant military population aligned with Micron's commitment to veteran hiring. It also offers availability of water and clean, reliable power to enable a project of this scale while achieving our long-term environmental goals.
>
> The area has much to offer for future Micron employees and families, including urban and outdoor lifestyles, an affordable cost of living and a strong local school system. New York provides partnership opportunities with local K-12 education programs, community colleges and institutions for top engineering and technical talent.
>
> The state has a long history of semiconductor development and manufacturing, providing promising opportunities to collaborate on R&D initiatives with organizations like the Albany NanoTech Complex and the U.S. Air Force Research Laboratory."

Ultimately, as a private enterprise, Micron's White Pine Commerce Park selection decision was based on the availability of a site that was assembled with semiconductor manufacturing in mind and has the resources needed to achieve its purpose, including the availability of the necessary water and renewable, reliable power required to expeditiously develop a sustainable Project at this location.

3.1.9 Updated Site Search to Identify Other Potential Alternatives

As outlined above, the development of a potential site to accommodate the production needs and infrastructure necessary to construct and operate a project with the required cleanroom square footage takes many years of site analysis, site acquisition, and infrastructure assessment to find any practicable site. The development of the White Pine Commerce Park site over the past 20 years led to its identification as the only site in NY likely suitable for Micron's needs.

In 2024, Micron conducted an additional property search for potential sites that could serve as alternatives for the proposed Project. Of all sites researched, all property types were included, including previous industrial-use sites. The result of the large site search produced 15 sites as listed in Table 5.

Table 5. Large Site Search 500+ acres

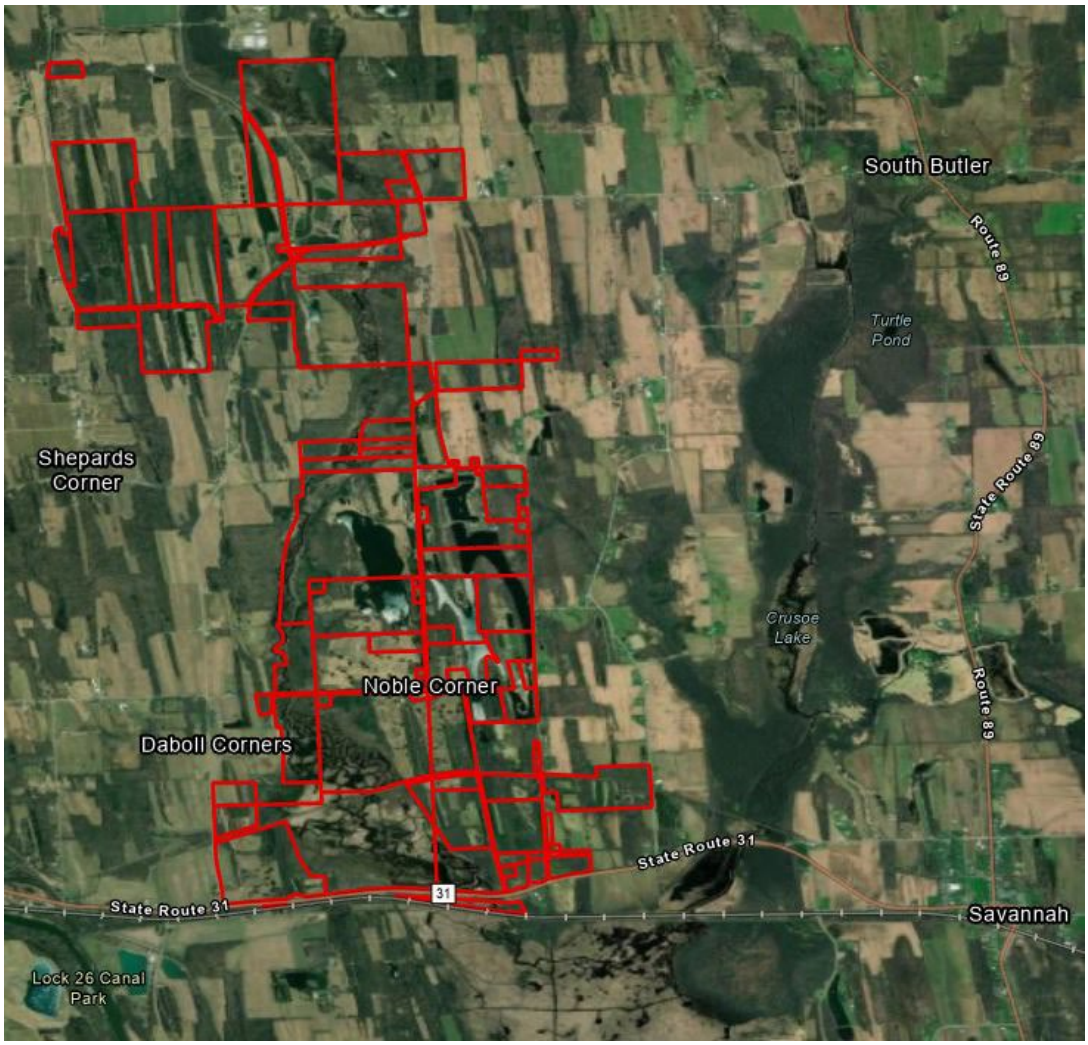
Acres	Price	Street Address	City	State	Zip	County
3929	$39,000,000	Attitude Adjustment Rd	Savannah	NY	13146	Wayne
539	$889,900	147 South Albion Rd	Altmar	NY	13302	Oswego
600	$1,349,900	North Greenbush Rd	Erin	NY	14838	Chemung
604.83	$1,250,000	452 North St	Greene	NY	13778	Broome
579	$841,000	491 Kibbie Lake Rd	Constantia	NY	13044	Oswego
836	5,500,000	Steges Road & Route 55	Eldred	NY	12732	Sullivan
638	3,999,999	204 Twomey Road	West Winfield	NY	13491	Herkimer
607	6,495,000	976 Rt 13	Williamstown	NY	13493	Oswego
1217	5,950,000	4147 Creek Road	Chaffee	NY	14030	Cattaraugus
540	Unpriced	Route 98	Batavia	NY	14020	Genesee
615	589,900	Route 11	West Monroe	NY	13167	Oswego
759.3	1,850,000	1032 Bogtown Road	Salem	NY	12865	Washington
558	9,750,000	225 Route 22	Pawling	NY	12564	Dutchess
668	6,900,000	509 Boy Scout Road	Maryland	NY	12116	Otsego
600	595,000	Castine Road	Champlain	NY	12919	Clinton

Using the above available parcel listing survey, Micron identified three sites, including the White Pine Commerce Park, available for purchase that were 1,000 acres or greater. As noted in Sections 2.1.2 and 2.2.1, splitting production at two or more non-contiguous locations does not meet Micron's site selection criteria and therefore a split-site approach was not deemed a viable alternative given current market trends to meet the Project's purpose and need.

Each of the 3 remaining sites were evaluated against Micron's 15 site selection criteria detailed in Table 2 above and the results are included in Table 6 below. As demonstrated, the most influential criteria were access to sufficient dependable electrical capacity (2437 MW – only available in New York State Energy Load Zone C) and requirement for a contiguous non-irregular parcel shape.

Savannah Site

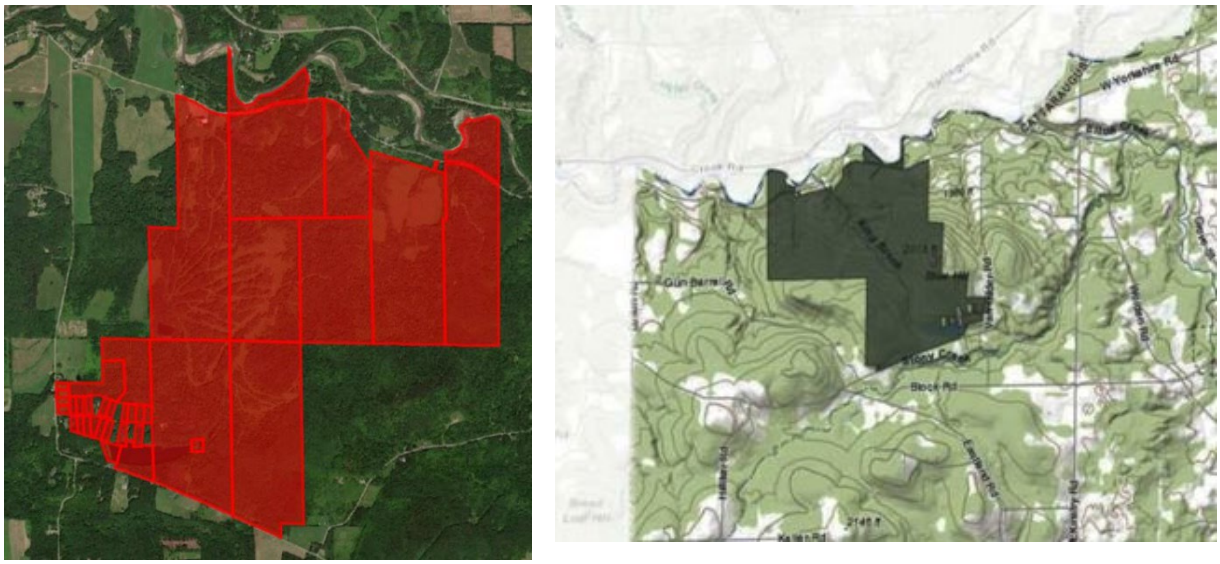
While the Savannah site is not located in the dependable electrical capacity NYISO Zone C, and therefore does not qualify per the site selection criteria, it is also an amalgamation of multiple tax parcels. The non-contiguous, irregular shape of the property is shown in the figure below.



Savannah Site Tax Parcels

Chaffee Site

While the Chaffee Site shows contiguous tax parcels, the site changes over 800 feet of elevation as it is a former Ski resort. The tax parcels and topography are shown in the following figure. Additionally, as of the October 2024 real estate search conducted by Micron, the Chaffee parcel was available for sale. Since that time, the New York State Department of Environmental Conservation has purchased this property to support the State's 30 x 30 Land Conservation Initiative.



Chaffee Site Tax Parcel and Topography

Of the three sites, only one (White Pine Commerce Park) was located in a New York State Energy Load Zone that could ensure dependable energy supply that met above the selection criteria. In addition to electrical availability, the WPCP fulfilled the majority of Micron's site selection criteria while the alternative sites included numerous characteristics that did not meet Micron's site selection requirements. Therefore, Micron does not believe these sites are practicable alternatives per the gating functions explained above. Because the Chaffee and Savannah sites are not to be considered practicable alternatives they are not included in further consideration of ecological effects.

In short, based on size, market availability, and available energy load alone, no other sites were available in New York State, including both greenfield and brownfield sites. As a result of the review, as summarized below, no suitable alternative sites other than White Pine Commerce Park were identified for semiconductor production to achieve the project Purpose and Need.

Table 6. Site Alternative Screening

Site Selection Criteria Number				
	Parcel ID	76111-00-115772	4.003-1-22	048.-01-01.0 (one of many)
	Parcel Address	Attitude Adjustment Rd Savannah, NY	4147 Creek Road Chaffee, NY	White Pine Commerce Park Clay, NY
	County	Wayne	Cattaraugus	Onondaga
	Parcel Acreage	3929	1217	1,413
1	**Available for purchase**	Y	N	Y
2	**1000+ Acres (Y/N)**	Y	Y	Y
3	**Shape/Top Needed for Layout**	Multiple Parcels, not contiguous	Elevation too steep, previous ski mountain	One contiguous parcel
4	**Industrial Zoning (Y/N)**	No	No	Y
5	**Within 20 miles of interstate highway (Y/N)**	Yes	Yes	Yes
	Proximity to Rail Services	Approximately 25 miles to Finger Lakes Railway in Auburn NY	18 miles to Buffalo Southern Railroad - Springville station (handles freight services)	Approx 15 miles to CSX Transportation DeWitt Yard
11	**Proximity to airport within 30 miles**	No	No	Yes
	Property Class, Site, Zoning	920-Priv Hunt/Fish, Res1, AR-agricultural residential		
	NYISO Power Zone	B	A	C
6	**Adequate Water Capacity**	N-The Savannah Water Department's permitted water withdrawal is up to 150,000 GD on a monthly and annual avg basis	N- no NYSDEC permitted withdrawal report, so likely don't meet the 100,000 GD threshold that requires permitting	Y-OCWA has a permitted water withdrawal capacity of 42 MGD.
7	**Adequate Electric Transmission Lines**	Yes	Yes	Yes

8	**Adequate Natural Gas Capacity**	NYSEG service available	N- Chaffe Gas Recovery, landfill gas power plant, provides Natural Gas to Chaffee NY- annual generation of 41.4 GWh/ 143.7 million SCF	National Grid- nearby Carr Street Generating Station generated approx 172.6 GWh annually (approx 600,000,000 SCF), and CH Resources Syracuse generates 10.8 GWh annually(36,000,000 SCF)
10	**Adequate Wastewater Capacity**	Sav. WWTP permitted to treat 36 MGD of wastewater, 60MGD during peak times	Springville Sewage Treatment Plant has a permitted capacity of 1.5 MGD.	Permitted capacity of Onondaga County Water Environment Protection facility is 84 MGD.
9	**Access to Renewable Energy**	NYSEG generates and distributes electricity- including from renewable energy sources, approximately 5% via wind and solar.	Chaffee Gas Recovery facility converts landfill gas into energy- for a renewable power source	NYSEG generates and distributes electricity- including from renewable energy sources, approximately 5% via wind and solar.
	Distance to City	Approximately 43 miles to closest large city (Syracuse)(or ~36 mi to Oswego).	Approximately 35 miles to Buffalo, 80 miles to Rochester	Approximately 15 miles to Syracuse
	Wastewater Treatment Facility/Sewer Treatment Plant Distance	Approximately 3 miles to Savannah WWTP, 2 miles to Clyde Sewage Treatment Plant	Approximately 10 miles to Springville Sewage Treatment Plant	Approximately 10 miles to the Onondaga County Water Environment Protection facility
12	**Specialized Workforce Available**	No	No	Yes
13	**Proximity to Learning Institutions**	Approximately 30 miles to Finger Lakes Community College, 25 miles to Cayuga Community College.	Erie Community College South Campus is 25 miles away, approximately 40 miles to BOCES in Buffalo.	BOCES is approximately 10 miles away, Onondaga Community College is 15 miles away, Syracuse University and SUNY ESF are approximately 20 miles away.
14	**Wetlands Present**	Yes	Yes	Yes
15	**Floodplains Present**	Yes	No	No

3.1.10 Rail Spur Site Alternatives

The existing Rail Spur site was selected for the following reasons; conformance to each selection criteria is necessary to be a practicable site to meet Micron objectives:

- Contiguous the CSX existing rail line
- Proximal to the White Pine Commerce Park
- Willing seller
- Minimum parcel size of 25-30 acres under common ownership

Micron selected the identified parcel due to its ability to meet all the requirements. There were no commercially available parcels that were contiguous or adjacent to White Pine Commerce Park, thereby enabling use of a conveyance belt system to move material from the spur to the main campus site to minimize truck traffic impacts. Potential parcels further northeast and southwest along the existing CSX rail line move further away from the WPCP (i.e., not contiguous/adjacent), which would not be consistent with Micron's Rail Spur objective to reduce truck traffic on the public road network through use of the rail supply and conveyor delivery for site construction. Any other site along the rail line is too distant to practically utilize a conveyance system and would require additional transportation via truck traffic. Also, the proposed Rail Spur site is the only location that would allow timely construction to provide offroad material delivery in advance of main site construction. Impacts to federal jurisdictional wetlands are illustrated and summarized in **Figure 5 (attached)**, which is a realignment of the original Rail Spur site design to further avoid wetland impacts. See **attached Figure 6** – Original Rail Spur Design. [45]

3.2 Onsite Alternatives Considered (Alternative Layouts)

3.2.1 Facility Description

Micron selected the White Pine Commerce Park in Clay (Onondaga County), New York to develop its semiconductor manufacturing facility campus (Micron Campus or Campus). The Micron Campus is an approximately 1,400-acre assemblage of land located in an area of the Town of Clay bordered by NYS Route 31 to the south, Caughdenoy Road to the west, a series of National Grid overhead power lines to the north (although the site extends approximately 100 feet beyond [north of] the power lines), and the Town of Clay/Town of Cicero boundary line to the east. The majority of the Micron Campus is contained within the Town of Clay, Onondaga County, New York and is accessible from I-481 to the west and I-81 to the east, both from interchanges along NYS Route 31.

Micron intends to acquire the White Pine Commerce Park from OCIDA and construct its campus. As previously described (Section 2.1), the Project will be built-out over an approximately 20-year period with four Fabs. It is expected that the Fabs will be continuously built-out and construction on the next Fab will be in sequence as the prior Fab finishes build-out. The Micron Campus would comprise approximately 1,400-acres, consisting of the area previously evaluated by the County.[46]

[45] No New York State Freshwater wetlands were identified by the NYSDEC on the Rail Spur site.

[46] To support OCIDA's efforts to obtain the SEMI-NY "qualified" site designation for its site, OCIDA prepared a Generic Environmental Impact Statement ("GEIS") to assess potential environmental and socio-economic impacts associated with full build-out of the original 300-acres by a yet to be determined semiconductor company. The GEIS, which was prepared pursuant to New York's State Environmental Quality Review ("SEQR") process, was released in April 2002. The 2002 document identified the White Pine Commerce Park as the preferred Onondaga County location for future semiconductor manufacturing. OCIDA completed additional SEQR documentation related to build-out of the site in 2012/13 (Generic Environmental Impact Statement) and 2021 (Supplemental Generic Environmental Impact Statement) to assess potential impacts on the enlarged site.

Each Fab building is expected to cover approximately 1.2 million sf (27.5 acres) of land and contain:

- Approximately 600,000 sf of cleanroom space
- 290,000 sf of cleanroom support space
- 250,000 sf of administrative space

Each set of two Fabs will be supported by:

- Approximately 470,000 sf of central utility buildings
- 200,000 sf of warehouse space
- 200,000 sf of product testing space housed in separate buildings

The Micron Campus will also have ancillary onsite electrical substations, water and wastewater treatment and storage, stormwater management facilities, industrial gas storage, and parking, as well as offsite energy (natural gas and electricity), telecommunications, water, wastewater utility, and Rail Spur improvements.

The activities under consideration as described in this evaluation are based upon proposed onsite, full build-out improvements (Fabs 1-4 and ancillary structures). Due to the continuous construction activities, the limits of disturbance include the need for clearing/grubbing, and grading, as well as construction material staging and laydown areas for current and subsequent phases. Areas, which appear as undeveloped space for the initial construction phase are committed to material staging and laydown areas (and ultimately build-out) in the subsequent phase.

3.2.2 Process Layout Summary

Micron's production objectives and phasing as well as current trends in industry operational efficiencies have a significant impact on how the 1,400-acre campus will be programmed. As discussed, semiconductor wafer fabrication processing is known to be one of the most complex manufacturing systems. A memory chip requires hundreds of processing steps and multiple products are processed simultaneously in a Fab. Each step requires specific processing machines (or tools). Therefore, hundreds of different types of tools and large flows between the tools are required to process wafers.

To maximize manufacturing efficiencies, semiconductor manufacturing utilizes a minimum flow-weighted distance (min-distance) layout. In a min-distance layout design, machines or workstations with high flow rates are allocated close to each other to minimize the total distance of the material flow. The min-distance approach creates efficient site layouts, which maximize the use of space – both internal and external. Maintaining efficient process flows through the manufacturing steps (fabrication to packaging) is represented on the site by close-fitting manufacturing elements (e.g., Fab, CUB, gas yard, material storage, etc.) and by having the 4 Fabs close to each other as they will be connected to allow efficient material flow between them. Each respective phase is represented by a replicated, independent layout. Synergies are afforded by shared supporting facilities, which are located around the center core or spine of the manufacturing process. These elements include administrative, ultra-pure water (UPW) purification, wastewater treatment/recycling, stormwater management, warehousing, and parking.

A summary of the Wastewater Treatment Plant (WWTP)/UPW) systems and their location needs is provided below.

- The centralized WWTP building is designed to house all the water and wastewater treatment systems. These systems consist of the Ultrapure Make-Up Water System, the Wastewater Reclamation Systems, and the Wastewater Treatment Systems. Centralized WWTP 1 and 2 buildings are built for Fab 1 and Fab 2 and are situated in ideal locations to support the sequential build out of the first two Fabs.
- Likewise, centralized WWTP 3 and WWTP 4 buildings are built for Fabs 3 and 4, respectively, and are located just north of the main campus. These buildings cannot be located far from their respective Fabs. In addition, the buildings are proposed to be located such that they do not interfere with any underground utilities or allocated easements.
- WWTPs 3 and 4 will have a projected 20% larger footprint than WWTPs 1 and 2 to accommodate projected increased utility usage. The migration in technology equates to reductions in line widths or dimensions of the chip, that in turn will require additional water usage to keep the process clean. The future water reclamation plants will need to be larger to achieve projected Fab recycle rates.
- WWTPs 3 and 4 need to be constructed and operated in ideal locations to reduce risk of potential manufacturing stoppages due to construction impacts. The proposed locations offer the most efficient and shortest routing of services using the existing conveyance system to storage location, Fab, and biological treatment plant (see arrow in illustration, below).



- WWTPs 1 and 2, and WWTPs 3 and 4 need to be closer to each other, respectively, to enhance the efficiency of redundant trains and systems. Furthermore, the UPW systems need to be located in each WWTP, so the travel distance must be kept to a minimum to avoid potential contamination.
- Commitment of staging and laydown areas is necessary to support the phased construction of the Project and needs to be located near the construction area. The relocation of WWTPs 3 and 4 to a proposed staging and laydown area (location illustrated above) or to an area east of Fab 4 would still impact delineated wetlands (no reduction/avoidance benefit).
- The proposed wastewater pump house conveys final treated wastewater to the POTW. Consequently, the pump house is located at the northwest corner of the WPCP to ensure proximity to the POTW (OCDWEP's Oak Orchard facility). Thus, WWTP buildings need to be located reasonably close to the wastewater pump house to reduce or to avoid requiring energy for pumping.
- WWTP buildings were planned to accommodate all these stated considerations and thus are located in the appropriate locations. Moving these buildings from these desired locations will cause long-term inefficiencies for operations of the Fabs.
- Warehouse space has been located offsite to minimize impact to wetlands in the northeast corner of the site plan.

Ultimately, this industrial-driven process layout results in an intense and compressed site configuration, which makes maximum use of the available space.

3.3 Evaluation of Alternatives (for Practicability)

3.3.1 Full Build-Out (4 Fabs)

To accommodate the operational requirements noted above, and future growth flexibility within the available acreage, Micron evaluated six onsite programming options including the preferred option (see attached **Figures 7 through 12**). As illustrated in the figures and summarized below, each layout results in a tightly fitted site with minimal remaining open space and programming flexibility. Adding to these constraints is the need to plan the preceding phase to accommodate the subsequent phase (including reservation of construction staging/laydown areas). What might appear as an open area during Phase 1 (Fabs 1 and 2) is committed to the construction and operational requirements of Phase 2 (Fabs 3 and 4). The following are specific, key factors that affect the layout:

- There are a few reasons why 4 Fabs, each 600,000 sf, will be built rather than one giant 2.4M sf cleanroom. First, the cost per sf of cleanroom is very high with construction expected to be in the tens of billions of dollars and this is a 20-year project. Thus, Micron is building out the cleanroom square footage in line with the market growth. It would not be economically viable to build 2.4M sf of cleanroom 15+ years ahead of when it is needed. Additional reasons for building modularly are listed below.
- Automated Material Handling System (AMHS) links: The AMHS system consists of robots that run along the ceiling to carry the product from step to step in the production flow. Micron connects the Fabs with "links" which are elevated, enclosed rectangular hallways between the buildings. It allows people to walk between the Fabs but more importantly, to carry product between the Fabs. The shorter the links are, the better. **These links can constrain the output of the Fab**, which is one of the most critical metrics for the success of the business. That is why it is important for the Fabs to be built next to each other and at the same elevation.
- Utility buildings need to be close to the Fabs to reduce the length of the utility lines and the sizes of the systems to deliver the required pressures. Keeping these utility lines short also reduces the energy needed to deliver the utilities.
- There needs to be different access points for delivery of chemicals and truck traffic vs. employee/visitor access.
- Fab 1 needs to be on the west side of the site to minimize the electrical line length from the substation to the first Fab. These lines are extremely expensive and globally constrained due to global electrification initiatives and the Ukraine war.
- Surface parking is minimized through construction of parking garages.
- Gas Plants are necessary because semiconductor manufacturing requires a steady supply of nitrogen, argon, and oxygen gas. It is more efficient to pull those gases out of the air using these plants rather than truck transport. While these gas plants create additional footprint, it results in a substantial reduction in truck trip generation volumes, reducing traffic impacts, road impacts, cost, and greenhouse gas emissions from truck usage.
- Construction laydown space is required for each Fab, and that is planned to go to the west of each Fab as the Micron campus is built out.

A summary of the practicability of each option is provided below.

Option 1 (Preferred Option (see Figure 7)

- Preferred and recommended layout.
- Sufficient space is reserved for construction laydown area of Fabs 3 and 4.
- Utilities layout and routing is optimized from Utility Buildings (CUB, HPM, WWT) for distance and distribution.
- Automated Material Handling Systems (AMHS) layout for cross-Fab transfers is most efficient for distance & speed.
- Fabs are in linear layout for best flow.
- All Fabs are near utilities buildings.
- WWTPs 1 and 2 are in ideal locations for sequential build-out of the first two Fabs.
- Trestle system will allow for efficient routing of services to and from the WWTP.
- WWTPs 3 and 4 will be expected to be 20% larger to accommodate projected utility usage.
- WWTPs 3 and 4 are in ideal locations to reduce risk of potential manufacturing stoppages due to construction impacts. Plan offers the most efficient and shortest routing of services using existing conveyance systems to storage locations, Fabs, and biological treatment plant; in addition, WWTPs 3 and 4 need to be closer to WWTPs 1 and 2 to maintain redundancy.
- UPW system located in WWTPs – travel distance must be kept to a minimum to avoid contamination.

Option 2 (see Figure 8)

The Option 2 layout is based on keeping Fab 1 in same location and shifting Fabs 2-4 in the southeast direction. Practicability impacts (additional US dollar costs are highlighted in red) consist of:

- Fab distance is furthest apart
- Distance between Fabs increases and the connection is no longer linear (requires turns and bends of AMHS, which cause bottlenecks/congestion and increased travel times between Fabs 1↔2, 3↔4) resulting in increased AMHS/construction CapEx[47] ~$40M - $50M
- Design breaks unified probe operations resulting in increased AMHS CapEx and probe[48] OpEx[49]. $20M + 20 Head Count (HC)($2.9M)
- AMHS inefficiencies caused will reduce the amount of process tool sharing increasing total capex at build out. ~$200M
- Wafter Out Per Week (WOPW)[50] impact due to increased delivery times =-2%-3% ($208M/year)
- Fab 2 is further from Wastewater Treatment (WWT)
- Insufficient construction laydown area for Fabs 3 & 4

Option 3 (see Figure 9)

The Option 3 layout is based on shifting the four 600,000 sf Fabs in southeast direction. In addition:

- Fabs are closest together for fastest cross-Fab AMHS
- Fabs are in linear layout for best flow
- AMHS layout and transfer efficiency is maintained
- Utilities layout and routing optimization is maintained
- All Fabs are near utilities buildings

[47] Capital Expenditure (CapEx) – Includes equipment purchases and infrastructure investments.

[48] Wafer probing is a method for developing and producing semiconductors that test each wafer electrically. Non-linear design results in inefficiencies and increased costs.

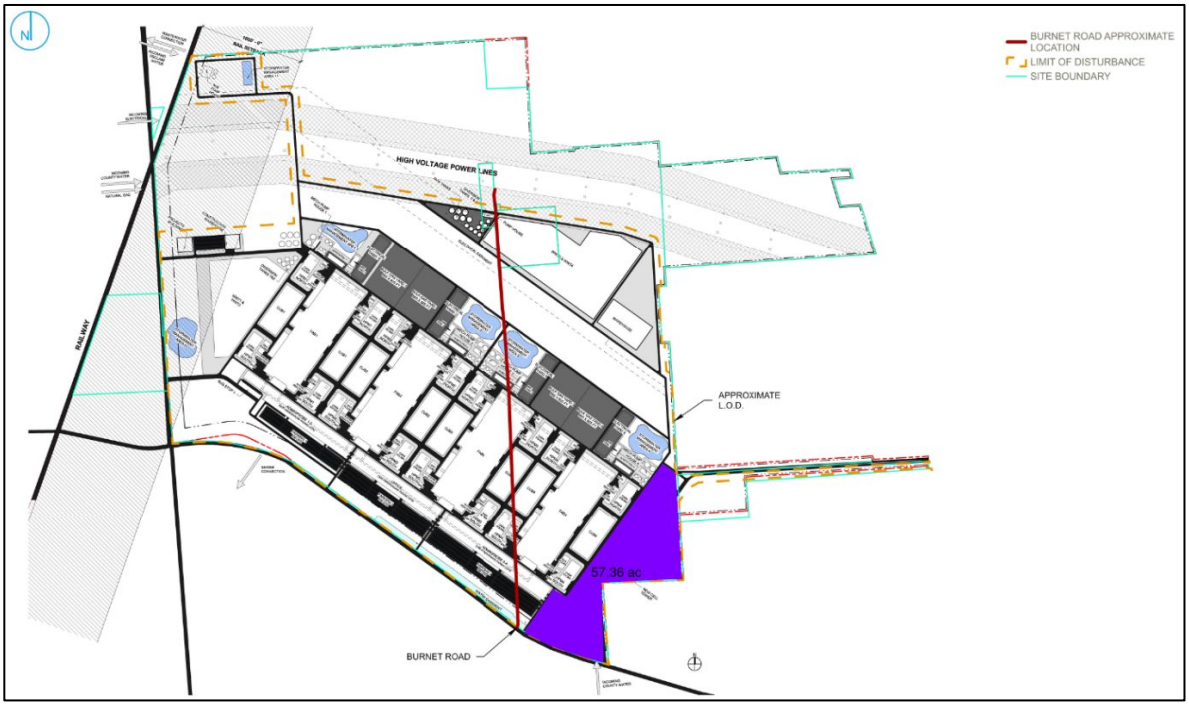
[49] Operational Expenditure (OpEx) – Includes expenses that a business incurs through its normal business operations.

[50] Wafer Out Per Week (WOPW) – Increased costs due to unfixed inefficiencies associated with producing memory chips (inefficiencies result in decreased output of chips/week).

Practicability impacts consist of:

- Insufficient construction laydown area for Fabs 3 & 4
- Insufficient space for projected utility growth
- Insufficient storm water management space allocation
- Requires underground storm water holding tanks with mechanical pumps, which results in increased costs and risk of mechanical failure, and decreased energy efficiency.

As illustrated on the Phasing Plans (attached **Figures 1 through 4**), the Laydown/Staging areas for each Phase is approximately 190 acres. These staging and laydown areas migrate from west to east as each phase (1A, 1B, 2A, 2B) is constructed. In addition, the statically located construction compound (owner, engineer, and contractor trailers; additional parking) required for each phase and located in the southeast portion of the site requires approximately 113 acres. Moving the Project to the southeast to avoid impacts on WOTUS located in the northwest, as illustrated in Option 3 (**Figures 9 and 16 (attached)**), would significantly reduce the available acreage available for these required areas and results in insufficient space for staging/laydown and the construction compound required to construct Fabs 3 and 4. As illustrated below, the available area for staging/laydown and the construction compound is approximately 57 acres, significantly less than the 303 acres (190 + 113) necessary to facilitate construction.



In addition, while not shown on Option 3, biological treatment facilities would expand the LOD around the Pump House, which would significantly reduce any avoidance benefit implied by the Option 3 illustration.

Option 4 (see Figure 10)

The Option 4 layout is based on keeping Fabs 1-2 in same location as Option 1 and shifting Fabs 3-4 in southeast direction. In this option, all the Fabs are near utilities buildings, which is preferred. However, the following practicability impacts were identified (additional US dollar costs are highlighted in red):

- Fab distance is furthest apart.
- Distance between fabs increases and the connection is no longer linear resulting in increased AMHS/construction CapEx. ~$40M - $50M
- Design breaks unified probe operations resulting in increased AMHS CapEx and probe OpEx. $20M + 20HC ($2.9M)
- AMHS inefficiencies caused will reduce the amount of process tool sharing increasing total CapEx at build out. ~$400M
- WOPW impact due to increased delivery times =-3%-5% ($332.8M/year)
- Insufficient construction laydown area for Fabs 3 & 4.

Option 5 (see Figure 11)

The Option 5 layout is based on rotating the layout of Fabs 3-4. In this option, all the Fabs are near utilities buildings, which is preferred. However, the following practicability impacts were identified (additional US dollar costs are highlighted in red):

- Different orientation of Fabs is worst for bends and congestion.
- The non-linear alignment of the Fabs essentially eliminates useful cross Fab transportation connection. It is a non-workable solution driving CapEx and OpEx impacts.
- Tool sharing will be eliminated resulting in fractional tool purchases (Including EUV[51]). $1B
- AMHS/Construction additional CapEx required ~ $150M
- Design breaks unified Probe operations resulting in increased AMHS CapEx and probe OpEx. $35M + 20HC ($2.9M)
- WOPW impact due to increased delivery times =-7%-10% ($707.2M/year).

Option 6 (see Figure 12)

The Option 6 layout is based on rotating the layout of Fabs 2-3. In this option, all the Fabs are near utilities buildings, which is preferred. However, the following practicability impacts were identified (additional US dollar costs are highlighted in red):

- The non-linear alignment of the Fab essentially eliminates useful cross Fab transportation connection. It is a non-workable solution driving CapEx and OpEx impacts.
- Tool sharing will be eliminated resulting in fractional tool purchases (Including EUV). ~$1.5B
- AMHS/Construction additional CapEx required. ~ $207M
- Design breaks unified probe operations resulting in increased AMHS CapEx and probe OpEx. $20M + 20HC ($2.9M)
- WOPW impact due to increased delivery times =-10%. ($832M/year)

As illustrated in the site programming options, the size of the White Pine Commerce Park is minimally sufficient in terms of available land to meet Micron's development and operational objectives. Slight shifts in the operational configuration result in consequential adverse impacts on Micron's ability to operate efficiently including, as summarized below, additional annual costs. As a result, Micron identifies Option 1 as its preferred Site Master Plan (SMP).

[51] Extreme ultraviolet (EUV) light is used in microchip lithography to print patterns onto silicon wafers.

Table 5. Summary of Onsite Alternative Layout Costs

Alternative	Annual Additional Costs	Causes
Option 1 (Preferred)	Baseline	
Option 2	**+0.25B** (estimate)	• Distance and non-linear connections between Fabs • Design breaks • Reduced process tool sharing • Reduction in Wafer Output Per Week (WOPW) (increased delivery times)
Option 3	No increase; Option 1 layout shifted to southeast	
Option 4	**+$0.47B** (estimate)	• Distance and non-linear connections between Fabs • Design breaks • Reduced process tool sharing • Reduction in WOPW (increased delivery times)
Option 5	**+$1.2B** (estimate)	• Non-linear alignment eliminates useful cross-Fab transportation connection • Tool sharing eliminated • Additional CAPEX required for AMHS construction • Design breaks • Reduction in WOPW (increased delivery times)
Option 6	**+$2.12B** (estimate)	• Non-linear alignment eliminates useful cross-Fab transportation connection • Tool sharing eliminated • Additional CAPEX required for AMHS construction • Design breaks • Reduction in WOPW (increased delivery times)
		Source: Micron

3.3.2 The 2 Fab Alternative

Consistent with the incentives available under the CHIPS Act, Micron needs to scale up U.S. production to grow within the market, which is projected to double in the next 10 years. Consequently, Micron needs a location to build at least two Fabs over the next 10 years and two additional Fabs over the next 20 years. Micron proposes to construct the initial two of four Fabs at the onset of construction activities. As previously illustrated on **Figure 4 (attached)**, to facilitate construction of the initial two Fabs and planning for the subsequent two additional Fabs, the extent of disturbance of the initial phase would require a limits of disturbance boundary extending east of Burnet Road.

Construction of the additional two Fabs would be initiated within the identified 16-year development window. While a two Fab scenario could be viewed as a "reduced scale" project, it is neither consistent with Micron's objectives to construct and operate fewer than four Fabs on the White Pine Commerce Park, nor consistent with industry trends seeking to cluster multiple Fabs on a single site to achieve economies of scale and managerial and economic advantages in this highly competitive and rapidly changing industry sector. Economies of scale are extremely important to the industry. One example of such economies of scale is evidenced by the co-location of suppliers. Suppliers will locate supply depots and human capital close to semiconductor clusters such as a 4-Fab mega campus. Co-location improves operational efficiency through better delivery performance for critical spares and materials and provides significant benefits from collaboration on engineering.

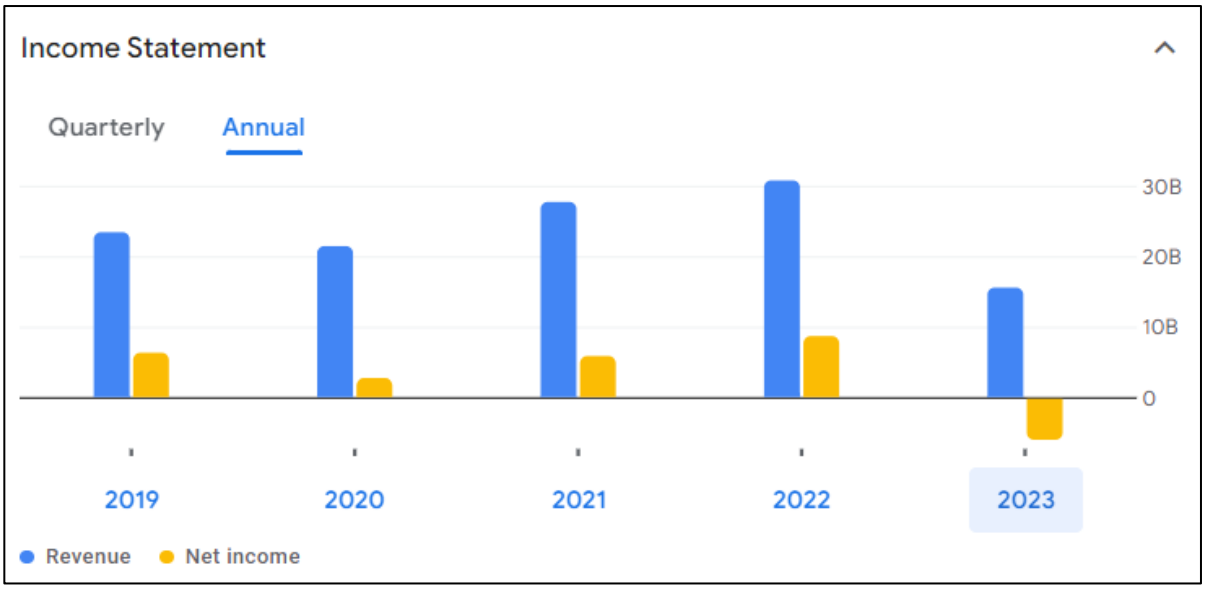
Most importantly, the Reduced Scale alternative would incur significantly higher costs per unit of DRAM produced than the full scale four-fab alternative. This is measured in terms of Capital Asset Utilization (CAU), which determines how well a fab uses its installed production capacity. Building only two fabs would decrease CAU by 6.7 percent due to reduced operational efficiency, which would lead to an approximately $2.5 billion increase in equipment costs to achieve the same output efficiency as a four-fab facility, driving up the cost per unit basis in a manner that would be likely to reduce cost competitiveness relative to the market. The higher cost arises from using equipment with excess capacity for the non-constrained workstations, leading to inefficiency and wasted capacity, which contributes to unnecessary expenses that would cause the facility to be at a competitive disadvantage with peer facilities worldwide. Co-location of multiple fabs increases CAU because as scale increases the percentage of wasted capacity declines

There are certain fixed costs (and the associated benefits from those expenditures) inherent to establishing a new site (such as building utility and transportation infrastructure improvements) that are diluted by having a decreased scale. Micron's need for four Fabs is based on the following cost drivers:

- Memory is a commodity that is built to standards (such as JEDEC[52]) and pin-compatible, which allows Micron's customers to swap out Micron's products the same way a photographer can swap out different brands of SD cards in their camera. When selling a commodity, the best way to influence profits is to tightly control costs.
- The industry is cyclical and goes through periods where manufacturers lose money. This phenomenon can be seen by the graph below.[53] Micron's net income was ***negative*** $5.83B in 2023 and has continued to lose money in the first quarter of Fiscal 2024. Thus, costs to construct and operate our Fabs are what drive our economic viability.

[52] The JEDEC memory standards are the specifications for semiconductor memory circuits and similar storage devices promulgated by the Joint Electron Device Engineering Council (JEDEC) Solid State Technology Association, a semiconductor trade and engineering standardization organization.

[53] https://www.google.com/finance/quote/MU:NASDAQ?hl=en

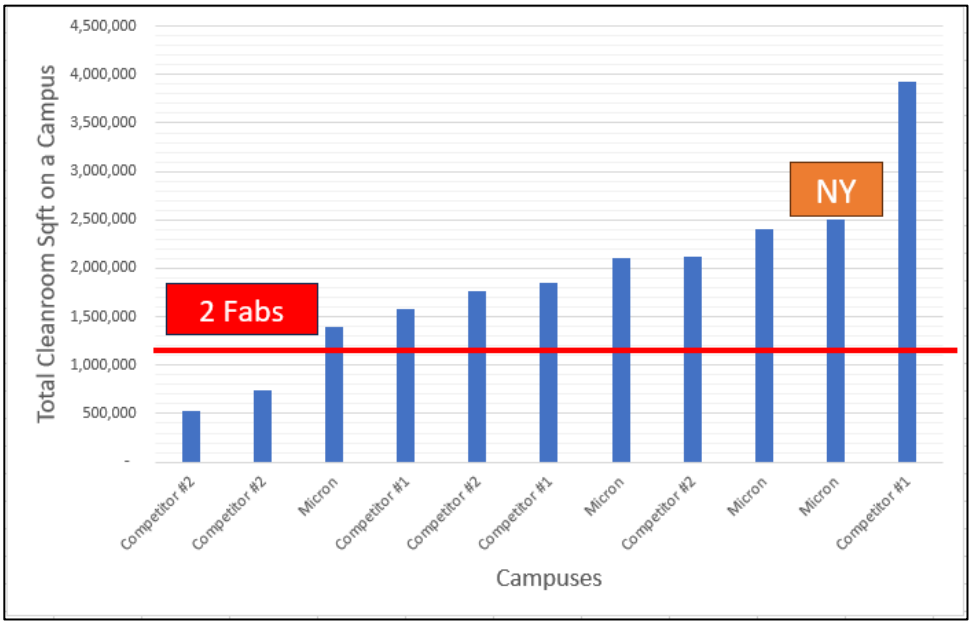


- Cost impacts from reduced scale alternative:
  - Electrical: Each Fab will use ~250MW, which requires very large copper cables from the substation to the Fabs. The cost of this infrastructure is +$5k/linear foot ($50M total for short runs) and is projected to remain high as the world electrifies transportation and builds out renewable energy solutions. Additional electrical-related considerations include:
- The Clay substation is located on the west side of Caughdenoy Road, directly across from the White Pine Commerce Park, minimizing the cost of electrical infrastructure.
- Lightning strikes resulting in the loss of power can be very impactful to a semiconductor manufacturer's business. Indeed, one of the most damaging events to a semiconductor operation is a loss of power, even a short loss measured in seconds. For example, in 2019, one of Micron's competitors was impacted by a 13-minute power outage due to a lightning strike on their electrical infrastructure.[54] The outage impacted approximately 25% of the company's output for the quarter, resulting in a financially material event for the company estimated at **+$250M**. The Clay substation has the size, reliability, and redundancy necessary for Micron's semiconductor operations. In the last five years, National Grid has invested **$150M** in lightning protection at the Clay substation. If Micron built some of the Fabs elsewhere, adding lightning protection would potentially require an additional investment of **$150M.**
- Water: Existing water mains extend through White Pine Commerce Park, so there are minimal costs associated with relocating and increasing pumping capacity. Fabs 1 and 2 can use the existing infrastructure, saving approximately **$548M.** In addition, new mains will extend through existing rights-of-way, thus reducing the cost of procuring land for a new line (approximately **$2M**).
- Wastewater: Micron will tap into a previously planned expansion of Onondaga County's Oak Orchard Treatment Plant, at a cost of approximately **$500M**. If Micron built Fabs 3 and 4 elsewhere, it would likely require a significant Micron investment to support a municipal expansion of the POTW. In addition, like the water infrastructure, existing wastewater infrastructure will be expanded at the County's Oak Orchard Treatment Plant for Micron's needs. Lines for all four Fabs will extend through the same rights-of-way. Building Fabs 3 and 4 elsewhere would add cost to procuring additional land for the right-of-way (approximately **$2M**).
- Municipal: Micron can rely on a previously planned municipal sewer expansion resulting in an approximate savings of approximately **$500M.**

[54] https://www.anandtech.com/show/14596/toshiba-western-digital-nand-production-partially-halted-by-power-outage

- Capital equipment: The Capital Asset Utilization (CAU) increases with co-located scale. Thus, only building two Fabs would result in an operational efficiency tax that would be in the billions of dollars. CAU measures the utilization of the equipment, weighted by cost. CAU increases with the cleanroom square footage. It would be approximately 6.7% lower with two Fabs than four Fabs. To achieve the output required for market growth, Micron would have to spend approximately **$2.5B** more to achieve the same output with the reduced scale alternative because the equipment would not run as efficiently.
- Supplier Ecosystem: Suppliers co-locate their supply chains and people based, in part, on the scale of the operation they are serving. By reducing the scope to two Fabs, Micron would likely see a decrease in the co-location benefits from the supplier ecosystem
  - **Total estimated cost impact: $3.04B to $3.7B. This cost impact will make the 2-Fab alternative impracticable and unable to meet the needs of the Project.**

As illustrated below, evidence that creating campuses the size of what is proposed can be seen from existing campuses around the world. **82% of the campuses have more than 2 Fabs of cleanroom space (1.2M sf) and 55% have more than 3 Fabs (1.8M sf). 72% of these campuses were started in the last twenty years**, while the semiconductor industry has existed for over 50 years, showing that modern campuses are built with a similar scale as the Proposed project.



New York State, Onondaga County, and the Town of Clay have prepared the White Pine Commerce Park for development and, while Micron is avoiding and minimizing impacts to the extent practicable (e.g., avoiding wetlands in northern portion of site), reducing the Project footprint to two Fabs would not fully take advantage of the considerable infrastructure advantages, cost savings, and practicability of the site in terms of access to energy, water, transportation, and other resources necessary for semiconductor manufacturing.

In addition to the cost impacts of developing a second site for Fabs 3 and 4, there would likely be some additional environmental impacts on that site from having to run the additional utility lines and for the footprint of Fabs at the second site. As shown in Table 4, there is no available site that is large enough for 2 Fabs, another reason that the 2 Fab alternative is not practicable. As stated in Section 3.1.7, STAMP is the closest in size at 310 available acres, but +350 acres are needed for 2 Fabs. In addition, a 115kV line extends across the remaining 310 acres, prohibiting development over the portion of the site where the line is buried.

In summary, due to the lack of other available sites, the cost of developing another greenfield, and the hyper cost-sensitive nature of the industry, a 2 Fab alternative is not practicable.

3.4 Least Environmentally Damaging Practicable Alternative (LEDPA)

Information presented in this evaluation and relied upon to screen offsite and onsite alternatives is summarized below. The summary lists critical considerations, including Project purpose, logistics, costs, and technology, upon which environmental consequences to waters of the US were balanced.

Offsite

- New York State completed a comprehensive multi-year site selection process to identify and evaluate sites suitable for semiconductor manufacturing. New York State presented the sites that it identified as substantially meeting the semiconductor industry needs to the semiconductor industry.
- Over time, many of the sites identified by New York State have been developed or have otherwise become unavailable.
- Micron relied on the New York State's comprehensive site selection process to identify suitable sites in the state; what was offered to Micron by New York State was based on this previously completed process.
- Large sites (1,400+ acres) are integral to current market requirements, but more importantly, sites of sufficient size need to be located proximal to infrastructure that can meet the significant energy and water requirements of the industry; the infrastructure requirements significantly reduce the availability of practicable alternative sites of comparable size.
- Even if parcels of land could be compiled to achieve the size requirement in a reasonable period of time and at a reasonable cost, the development of the requisite water and power infrastructure takes years and significant capital to site, plan, and construct.
- The industrial-zoned White Pine Commerce Park is located adjacent to the National Grid Clay substation and OCWA 54-inch water line, a factor that makes it uniquely suited to Micron's needs.
- None of the alternative sites met the practicability factors required to meet Micron's Project objectives.
- Exhaustive project site searches conducted over decades by various New York and local government entities failed to identify another suitable project site apart from the White Pine Commerce Park.
- Any "greenfield" location of suitable size obviously would have resulted in far greater environmental impacts to bring in adequate infrastructure than the White Pine Commerce Park.
- A further site search was performed by Micron after its initial selection of the White Pine site, to determine if any new alternative sites were available for the Project. No new practicable alternatives were identified.

Onsite

- Broad location of delineated wetland boundaries (a substantial portion of these wetlands were unmapped, low quality, and emerging over time due to site inactivity; i.e., long established agricultural land converting to wetlands).
- Micron proposes to build four Fabs on the White Pine Commerce Park to fully capture benefits of the site and achieve operational efficiencies; the clustered Fab design requires accessory elements resulting in a dense layout that also reduces environmental impacts associated with the Project. Sequential construction phasing needs to account for future phase site programming (in-line Fab orientation), as well as construction laydown and staging areas; lands required for subsequent phases are committed to such use in Phase 1 (due to manufacturing flow requirements; see below).
- Use of underground parking (below buildings) to reduce Project footprint and impacts on WOTUS.
- WWTP and UPW location requirements (see Section 3.2.2).

The following tables provide a quantitative assessment of each option's encroachment on federal jurisdictional wetlands and streams (Waters of the US).[55] The data corresponds to jurisdictional wetland boundaries illustrated on **attached Figure 13**; encroachments on an option-by-option basis are presented on **attached Figures 14 to 19**.[56]

[55] In addition to federal wetland designations, New York State's Freshwater Wetlands Act requires the New York State Department of Environmental Conservation ("NYSDEC") to map state-regulated wetlands. Mapping is done to identify those wetlands that meet the limits set forth in the State law. Consequently, the NYSDEC also regulates a portion of the wetlands located within the main project campus. In regard to its mapped wetlands, the construction of Fabs 1 and 2 will impact portions of mapped Freshwater Wetland BRE-14, while the construction of Fabs 3 and 4 will encroach upon mapped Freshwater Wetland BRE-11. On February 14, 2024, the NYSDEC issued a jurisdictional determination regarding wetlands and associated buffers to be regulated under Article 24 of the Environmental Conservation Law. Figures and narrative describing the State regulated wetlands is provided in other components of the JPA. The NYSDEC has classified regulated freshwater wetlands according to their respective functions, values and benefits. Wetlands may be Class I, II, III or IV. Class I wetlands are the most valuable and are subject to the most stringent standards. Within the APE, BRE-14 and BRE-11 are classified as Class II and III, respectively. Standards of permit issuance are summarized in New York State implementing regulations (6 NYCRR § 663.5). Class II wetlands provide important wetland benefits, the loss of which is acceptable only in very limited circumstances. A permit shall be issued only if it is determined that the proposed activity satisfies a pressing economic or social need that clearly outweighs the loss of or detriment to the benefit(s) of the Class II wetland. Class III wetlands supply wetland benefits, the loss of which is acceptable only after the exercise of caution and discernment. A permit shall be issued only if it is determined that the proposed activity satisfies an economic or social need that outweighs the loss of or detriment to the benefit(s) of the Class III wetland.

[56] Although not illustrated as an SMP option, eliminating Micron's proposed use of underground parking (i.e., below buildings) would result in a significantly larger project footprint (>1400 acres) and additional impacts on WOTUS.

Table 7. Wetland Encroachments (Options 1 through 6)

Wetland ID/ Cowardin Classification	Federal Jurisdictional Acreage	Impacts on Federal Jurisdictional Wetlands (Acres)[57]					
		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
W1_PEM	5.75	5.75	5.75	5.75	5.75	5.75	5.75
W1_PFO	10.55	10.55	10.55	10.55	10.55	10.55	10.55
W1_POW	0.03	0.03	0.03	0.03	0.03	0.03	0.03
W1_PSS	2.01	2.01	2.01	2.01	2.01	2.01	2.01
W2_PEM	12.35	5.63	5.85	5.13	5.85	5.85	5.85
W2_PFO	25.66	21.21	20.72	16.80	20.72	20.72	20.72
W2_POW	0.19	0.19	0.19	0.19	0.19	0.19	0.19
W2_PSS	0.33	0.00	0.00	0.00	0.00	0.00	0.00
W3_PEM	5.47	4.65	5.01	2.56	5.01	5.01	5.01
W3_PFO	0.49	0.49	0.49	0.00	0.49	0.49	0.49
W5_PEM	2.39	2.39	2.39	2.39	2.39	2.39	2.39
W5_PFO	0.21	0.21	0.21	0.21	0.21	0.21	0.21
W5_POW	0.31	0.31	0.31	0.31	0.31	0.31	0.31
W5_PSS	4.84	4.84	4.84	4.84	4.84	4.84	4.84
W6a_PFO	0.38	0.38	0.38	0.38	0.38	0.38	0.38
W11_PEM	17.57	17.57	17.57	17.57	17.57	17.57	17.57
W11_PFO	1.32	1.32	1.32	1.32	1.32	1.32	1.32
W11_POW	0.24	0.24	0.24	0.24	0.24	0.24	0.24
W11_PSS	0.07	0.07	0.07	0.07	0.07	0.07	0.07
W12_PEM	0.20	0.20	0.20	0.20	0.20	0.20	0.20
W12_PSS	0.30	0.30	0.30	0.30	0.30	0.30	0.30

[57] All encroachments are permanent unless noted as Temporary ("T").

Wetland ID/ Cowardin Classification	Federal Jurisdictional Acreage	Impacts on Federal Jurisdictional Wetlands (Acres)[57]					
		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
W13_PEM	0.43	0.43	0.43	0.43	0.43	0.43	0.43
W13_PSS	0.38	0.38	0.38	0.38	0.38	0.38	0.38
W14_PSS	0.35	0.35	0.35	0.35	0.35	0.35	0.35
W26_PEM	0.81	0.81	0.81	0.81	0.81	0.81	0.81
W26_PSS	0.49	0.49	0.49	0.49	0.49	0.49	0.49
W28_PFO	0.49	0.49	0.49	0.49	0.49	0.49	0.49
W29_PFO	1.08	1.08	1.08	1.08	1.08	1.08	1.08
W34_PEM	77.37	54.48	67.43	67.42	67.43	67.43	67.43
W34_PFO	15.17	11.64	11.79	11.79	11.79	11.79	11.79
W34_POW	0.93	0.93	0.93	0.93	0.93	0.93	0.93
W34_PSS	16.24	9.31	10.03	10.03	10.03	10.03	10.03
W35_PEM	92.77	3.14	0.83	1.25	0.83	0.83	0.83
W35_PFO	87.32	25.92	12.35	15.74	12.35	12.35	12.35
W35_PSS	1.77	0.00	0.00	0.00	0.00	0.00	0.00
W40_PEM	0.88	0.88	0.88	0.88	0.88	0.88	0.88
W49_PFO	16.61	8.42	14.97	14.97	14.97	14.97	14.97
W49_POW	0.40	0.40	0.40	0.40	0.40	0.40	0.40
W49_PSS	0.26	0.09	0.26	0.26	0.26	0.26	0.26
W53_PEM	0.35	0.00	0.00	0.00	0.00	0.00	0.00
W53_PFO	4.43	0.00	0.00	0.00	0.00	0.00	0.00
W54_PEM	6.45	0.00	0.00	0.00	0.00	0.00	0.00
W54_PSS	1.81	0.00	0.00	0.00	0.00	0.00	0.00
W55_PFO	4.71	0.00	0.00	0.00	0.00	0.00	0.00
W61_PFO	1.61	1.43	0.73	0.73	0.73	0.73	0.73

Wetland ID/ Cowardin Classification	Federal Jurisdictional Acreage	Impacts on Federal Jurisdictional Wetlands (Acres)[57]					
		Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
W61_PSS	0.36	0.36	0.29	0.29	0.29	0.29	0.29
W62_PSS	0.95	0.95	0.39	0.39	0.39	0.39	0.39
W63_PSS	0.33	0.33	0.21	0.21	0.21	0.21	0.21
W69_PSS	0.07	0.07	0.07	0.07	0.07	0.07	0.07
W70_PEM	0.23	0.23	0.18	0.18	0.18	0.18	0.18
W70_PFO	0.15	0.15	0.15	0.15	0.15	0.15	0.15
W71_PEM	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Totals:	**425.88**	**201.1284**	**204.37**	**200.59**	**204.37**	**204.37**	**204.37**

PEM = Palustrine emergent; PSS = Palustrine scrub-shrub; PFO=Palustrine forested; PUB = Palustrine unconsolidated bottom open water.
al wetland boundaries on the three Serog properties have been d

Table 8. Stream Encroachments (Options 1 through 6)

Stream ID	Cowardin Classification / Flow Regime	Length (LF) / OHW[58] Width (LF)	Impacts on Federal Jurisdictional Streams (LF)					
			Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
IS1	Intermittent/Riverine Stream Bed (R4SB)	1,411 / 10	1411	1411	983	1411	1411	1411
IS2	Intermittent/Riverine Stream Bed (R4SB)	1,532 / 25	833	0	629	0	0	0
IS3	Intermittent/Riverine Stream Bed (R4SB)	1,355 / 70	207	0	0	0	0	0
IS4	Intermittent/Riverine Stream Bed (R4SB)	337 / 5	337	337	337	337	337	337
IS4A	Intermittent/Riverine Stream Bed (R4SB)	150 / 2	150	150	150	150	150	150
ES6	Ephemeral/R6	324 / 6	321	321	321	321	321	321
ES8	Ephemeral/R6	1,045 / 2	1,045	1045	1045	1045	1045	1045
ES8a	Ephemeral/R6	134 / 3	134	134	134	134	134	134
ES11	Ephemeral/R6	490 / 2	466	490	490	490	490	490
ES15	Ephemeral/R6	298 / 2	298	298	298	298	298	298
ES16	Ephemeral/R6	430 / 5	431	430	430	430	430	430
ES20	Ephemeral/R6	795 / 5	795	795	795	795	795	795
ES21	Ephemeral/R6	209 / 3	209	209	209	209	209	209
PS1 (Youngs Creek)	Perennial/Upper Perennial Unconsolidated Bottom (R3UB)	120 / 20	0	0	0	0	0	0
RD4A	Intermittent/Riverine Stream Bed (R4SB)	72 / 2	72	72	72	72	72	72
RD4B	Intermittent/Riverine Stream Bed (R4SB)	8 / 2	8	8	8	8	8	8
Total		**8,712**	**6,717**	**5,701**	**5,902**	**5,701**	**5,701**	**5,701**

[58] Ordinary High Water

As summarized in this section, the ability for further flexibility (including further consequential avoidance and minimization of impacts on "waters of the US") is impracticable based on the following:

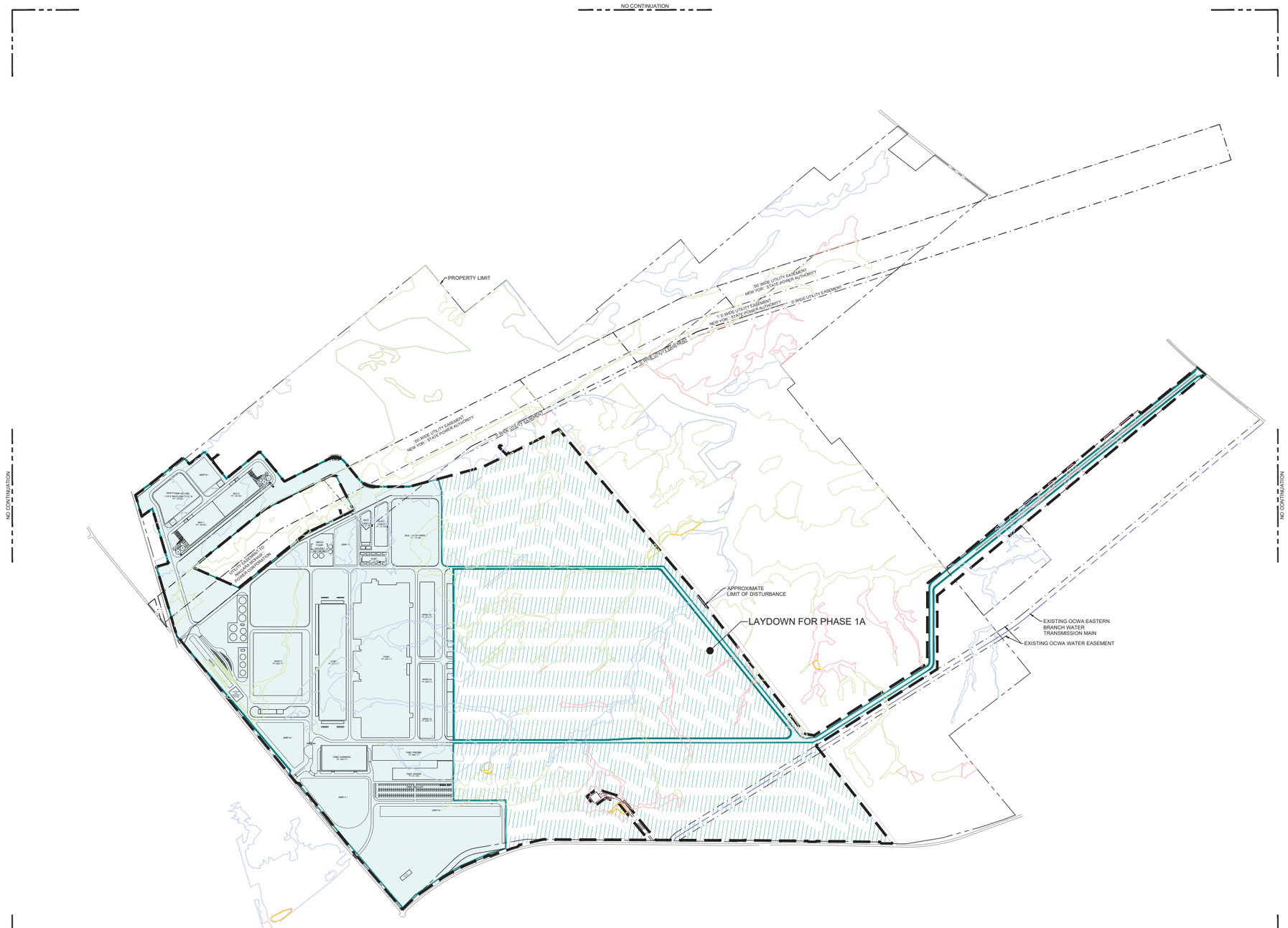
- The lack of other sites that are suitable as semiconductor manufacturing sites as identified and evaluated by New York State over the past twenty years
- The lack of additional available, contiguous land proximal to the White Pine Commerce Park
- The presence of additional state and federal wetlands surrounding the site (including avoided areas under and north of existing powerlines)
- The need for Micron to maintain operational efficiencies to meet and sustain the Project need, purpose, and objectives

Furthermore, the scope of this Project is extraordinary, requiring substantial commitments of land and infrastructure. The White Pine Commerce Park is unique in its capacity to meet Project requirements; a unique development readiness established through years of focused State, local, and utility investment in infrastructure proximal to the site. The establishment of such unique new infrastructure (energy, water, highway) at an alternative, yet-to-be-identified site is impractical, cost prohibitive to create, and inconsistent with the CHIPS Act and Micron's pressing national security schedule objectives.

Notwithstanding the national security considerations, the Project, as outlined in Section 2.1, satisfies a pressing economic or social need that clearly outweighs the loss of or detriment to the benefits of the wetland. In addition, as summarized in Section 3.1, there are no practicable offsite alternatives. Furthermore, the data summarized in Sections 3.3 and 3.4 indicates that five alternative onsite options (Options 2 through 6) are impracticable and would result in significant adverse impacts to Micron's ability to meet the Project purpose and need, with no or *de minimis* reductions on impacts to WOTUS.[59] As a result, Micron identifies Option 1 as the LEDPA.

[59] Option 1 has less or similar impacts on WOTUS in comparison to Options 2 through 6, including no impacts on perennial streams.

FIGURES



0 400 800 1200

1" :400:- S□□:: = F□□□

OWNER / DEVELOPER

Micron

6360 South Federal Way
Post Office Box 6
Boise, ID 83716
P: +1.208.368.4000
www.micron.com

ARCHITECTURAL CONSULTANT

Jacobs

2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.235.5000
www.Jacobs.com

CIVIL & STRUCTURAL CONSULTANT

Jacobs

2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.235.5000
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2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.235.5000
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CONTRACTOR

PROJECT ADDRESS

KEY PLAN

CONSTRUCTION

- PHASE 1A
- PHASE 1B
- PHASE 2A
- PHASE 2B
- PHASE 1A- CONSTRUCTION SUPPORT AREA
- PHASE 1B- CONSTRUCTION SUPPORT AREA
- PHASE 2A- CONSTRUCTION SUPPORT AREA
- PHASE 2B- CONSTRUCTION SUPPORT AREA

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B	12.13.24	ISSUE FOR PERMIT	TE
A	10.11.24	ISSUE FOR PERMIT	TE

Revisions

PROJECT TITLE

YANKEE

PROJECT PHASE

DESIGN

DRAWING TITLE

SITE - CIVIL
PHASED WETLAND DISTURBANCE
PHASE 1A

DESIGNED:	Drawn:	CHECKED:
DATE:	JOB NO.: D3802800	SCALE:

DRAWING NO.

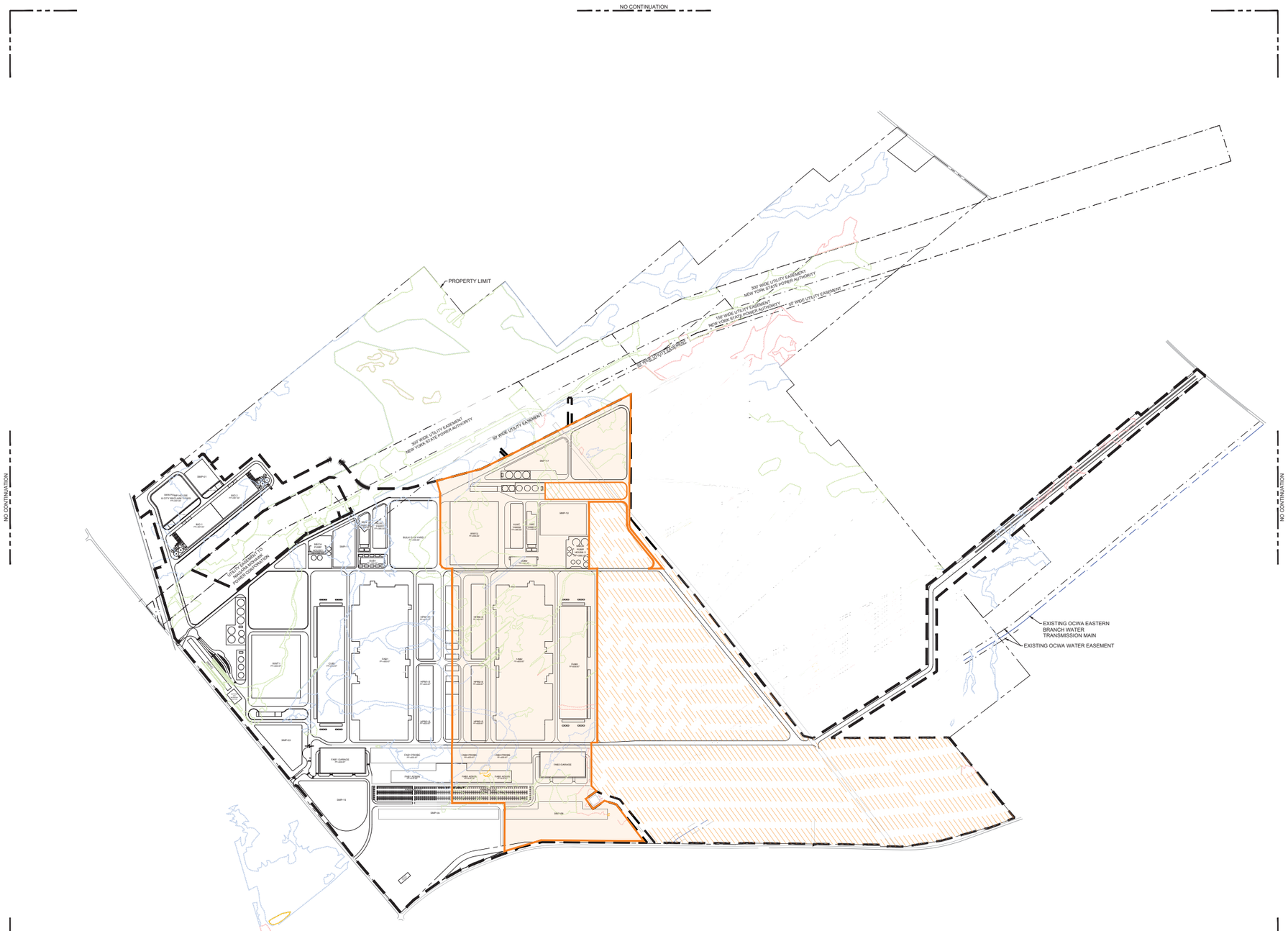
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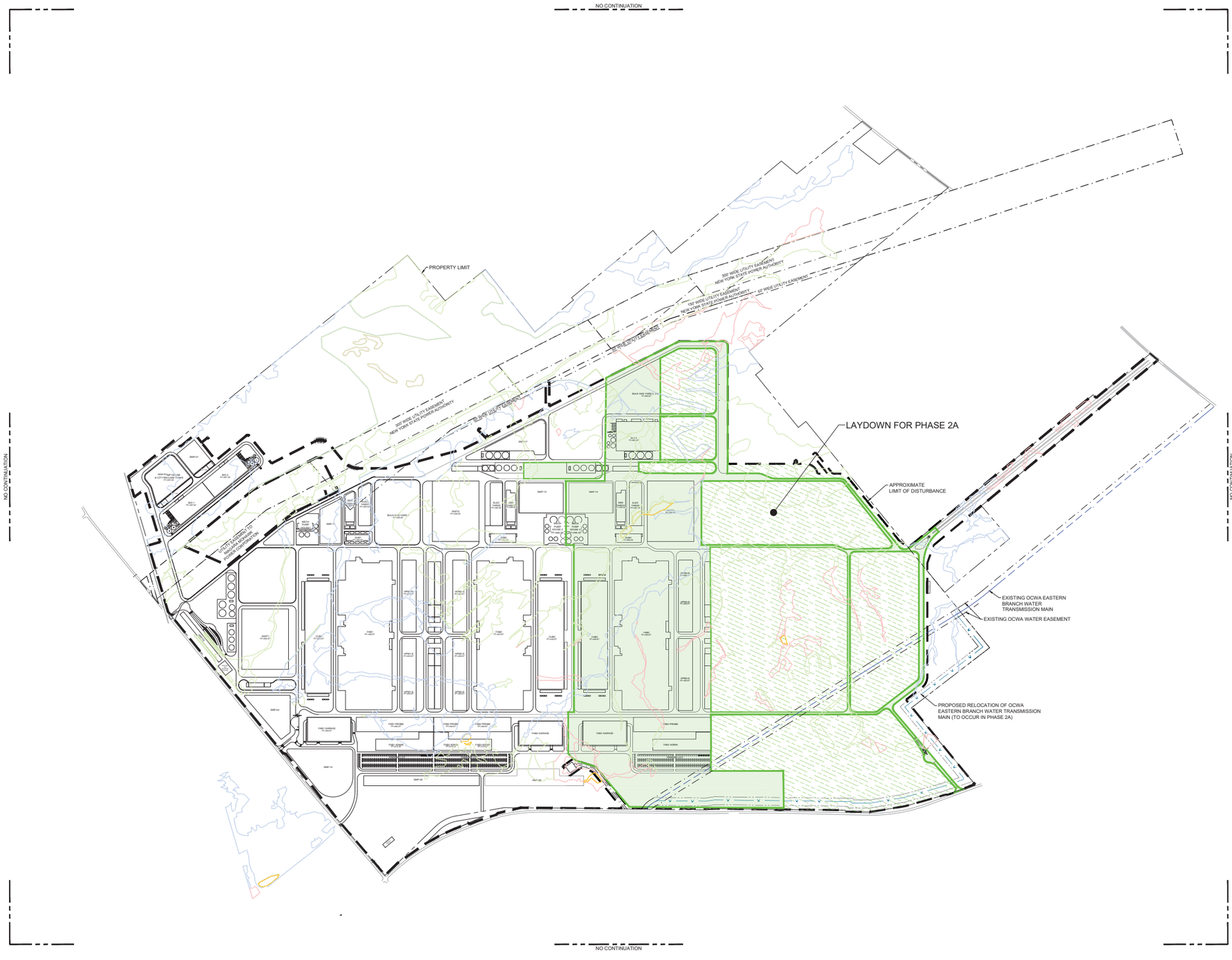
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PERMIT DRAWINGS
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SHEET: ---

SIZE: E


NO CONTINUATION
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NEW YORK STATE POWER AUTHORITY
50' WIDE UTILITY EASEMENT
100' WIDE UTILITY EASEMENT
NEW YORK STATE POWER AUTHORITY
50' WIDE UTILITY EASEMENT
50' WIDE UTILITY EASEMENT
NEW YORK STATE POWER AUTHORITY



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Micron

8360 South Federal Way
Post Office Box 6
Boise, ID 83716
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www.micron.com

ARCHITECTURAL CONSULTANT

Jacobs

2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.235.5000
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Jacobs

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- PHASE 2A- CONSTRUCTION SUPPORT AREA
- PHASE 2B- CONSTRUCTION SUPPORT AREA

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C	12.13.24	ISSUE FOR PERMIT	TS
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Revisions

PROJECT TITLE
YANKEE

PROJECT PHASE
DESIGN

DRAWING TITLE
SITE - CIVIL
PHASED WETLAND DISTURBANCE
PHASE 2A

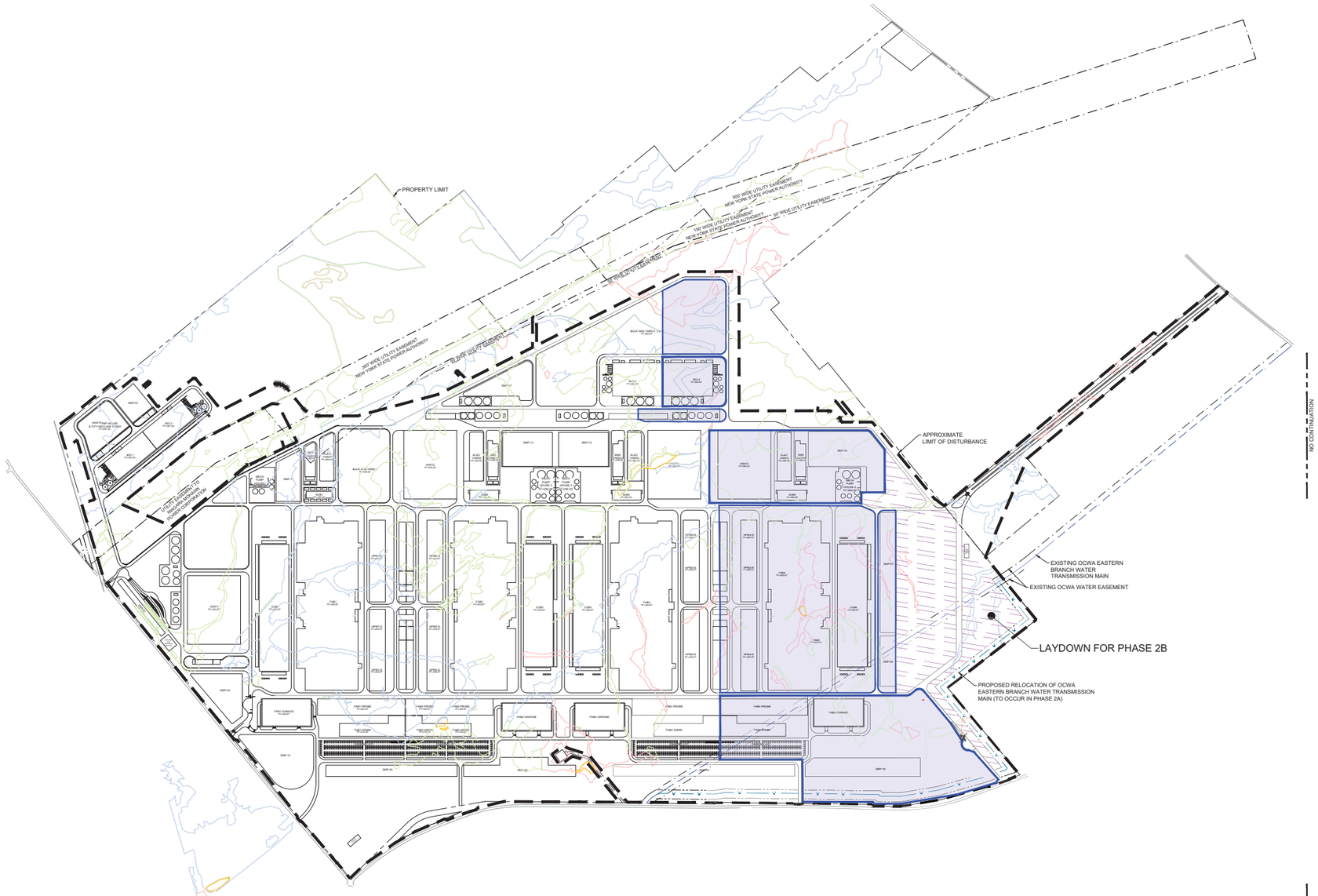
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SHEET: ---- SIZE: E

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NO CONTINUATION

NO CONTINUATION

NO CONTINUATION

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Post Office Box 6
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www.micron.com

ARCHITECTURAL CONSULTANT

2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.228.5000
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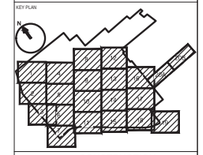
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PROJECT ADDRESS

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- PHASE 1B
- PHASE 2A
- PHASE 2B
- PHASE 1A- CONSTRUCTION SUPPORT AREA
- PHASE 1B- CONSTRUCTION SUPPORT AREA
- PHASE 2A- CONSTRUCTION SUPPORT AREA
- PHASE 2B- CONSTRUCTION SUPPORT AREA

REV	DATE	DESCRIPTION	ISSUED BY
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A	10.01.24	ISSUE FOR PERMIT	TS

Revisions

PROJECT TITLE
YANKEE

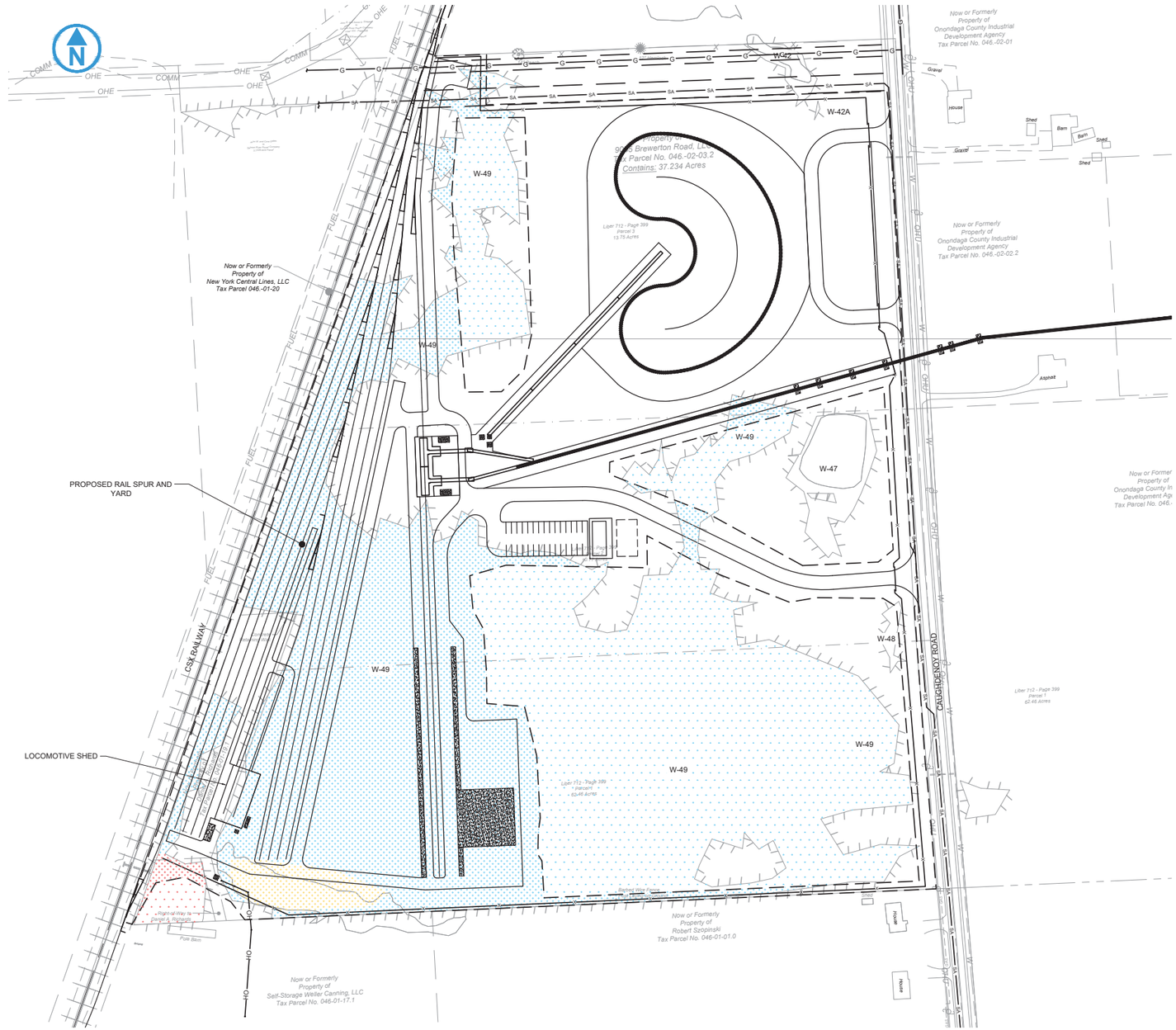
PROJECT PHASE
DESIGN

DRAWING TITLE
SITE - CIVIL
PHASED WETLAND DISTURBANCE
PHASE 2B

DESIGNED:	DRAWN:	CHECKED:
DATE:	JOB NO.: D3802800	SCALE:

DRAWING NO.: PMTC0-0513 REV: C

PERMIT DRAWINGS NOT FOR CONSTRUCTION SHEET: --- SIZE: E



LEGEND

- WETLAND BOUNDARY
- CLEARING LIMITS
- FEDERAL WETLAND DISTURBANCE - PFO
- FEDERAL WETLAND DISTURBANCE - POW
- FEDERAL WETLAND DISTURBANCE - PSS
- FEDERAL WETLANDS TO REMAIN - PFO

100 0 100 200
SCALE IN FEET

OWNER / DEVELOPER

Micron

ARCHITECTURAL CONSULTANT

RAMBOLL

1940105898

CIVIL & STRUCTURAL CONSULTANT

RAMBOLL

MECHANICAL & ELECTRICAL CONSULTANT

RAMBOLL

CONTRACTOR

PROJECT ADDRESS

8625 CAUGHDENOY ROAD, CLAY, NY 13069

KEY PLAN

REV	DATE	DESCRIPTION	ISSUED BY
A	01/24/2025	UPDATED WETLAND DISTURBANCE LIMITS	MP

Revisions

PROJECT TITLE

RAIL SPUR DESIGN

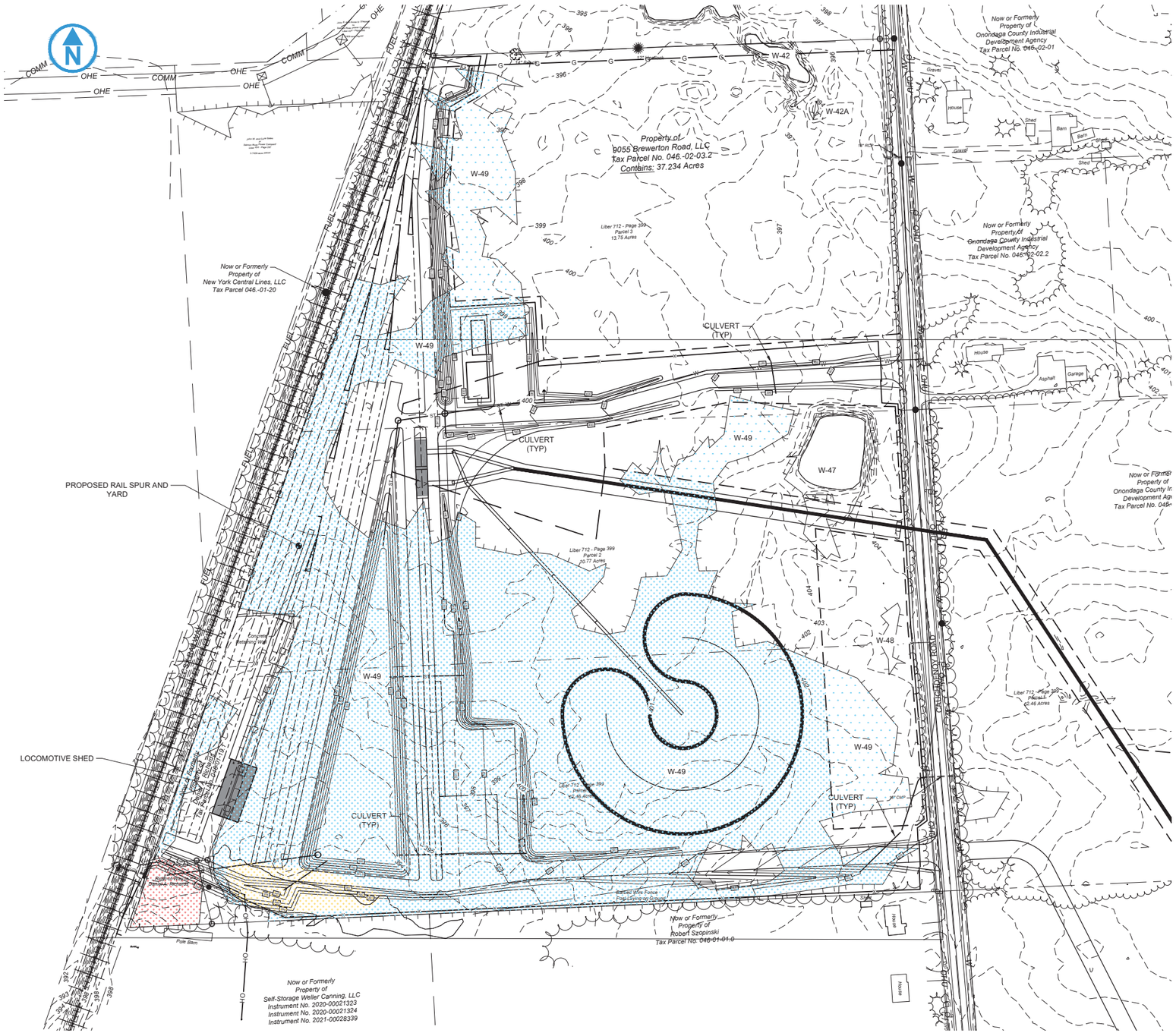
PROJECT PHASE

DRAWING TITLE

RAIL SPUR SITE FEDERAL WETLAND ENCROACHMENTS CURRENT PLAN

DESIGNED : M. PARRISH	DRAWN : C. ERICKSON	CHECKED : Z. HENDERSON
DATE : NOV. 26, 2024	JOB NO. : 1940105898	SCALE : AS NOTED

MICRON DRAWING NO. DE_SIT_B100_C_CVIL_L00_RAM_A	SHEET NO. FIG. 5	REV. A
WETLANDS PLAN	SHEET: OF	SIZE D



LEGEND

- WETLAND BOUNDARY
- CLEARING LIMITS
- FEDERAL WETLAND DISTURBANCE - PFO
- FEDERAL WETLAND DISTURBANCE - POW
- FEDERAL WETLAND DISTURBANCE - PSS
- FEDERAL WETLANDS TO REMAIN - PFO

TABLE OF WETLAND DISTURBANCE AREAS - RAIL SPUR SITE

WETLAND ID/ COWARDIN CLASS.	FEDERAL JURISDICTIONAL ACREAGE	ENCROACHMENT ACREAGE
W42-PUB	-	-
W42A-PUB	-	-
W47-PEM	-	-
W47-PFO	-	-
W48-PEM	-	-
W49-PFO	16.61	15.30
W49-POW	0.40	0.40
W49-PSS	0.26	0.26
TOTAL	17.27	15.96

100 0 100 200
SCALE IN FEET

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

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PRELIMINARY
NOT FOR
CONSTRUCTION
DATE: 05/16/2024

CLIENT
MICRON

NO.	DATE	REVISION	MCP INT.

DESIGNER / PROFESSIONAL ENGINEER RESPONSIBLE
MARK C. PARRISH, PE

DESIGNED BY M. PARRISH
CHECKED BY Z. HENDERSON
DRAWN BY C. ERICKSON
PROJECT NO. 1950100687
DATE ----

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
333 W. WASHINGTON STREET, SYRACUSE, NY 13202
315-956-6100
RAMBOLL

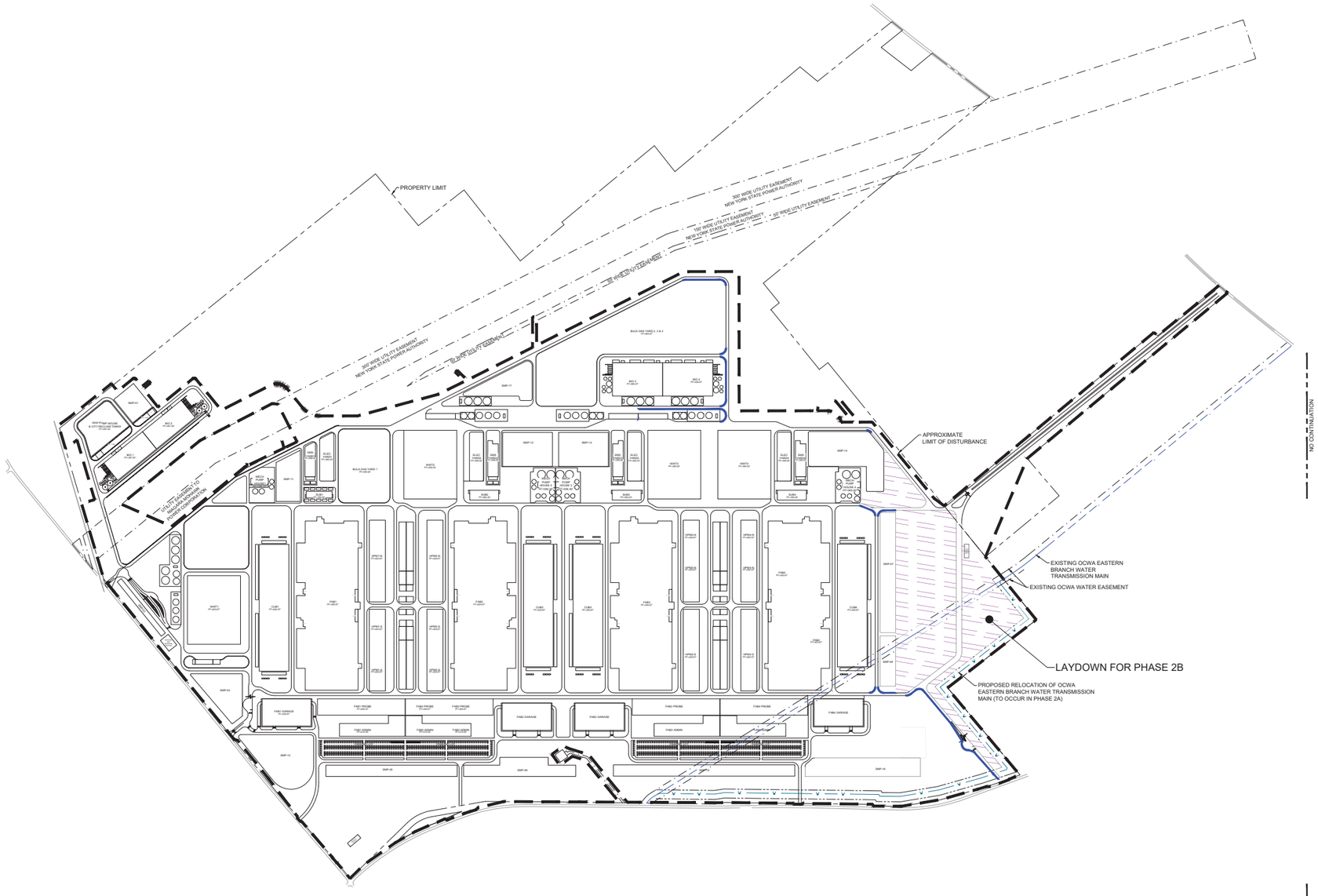
PROJECT
RAIL SPUR AND AGGREGATE CONVEYANCE/STOCKPILE FACILITIES
ADDRESS
TOWN OF CLAY, NEW YORK

SHEET DESCRIPTION
RAIL SPUR SITE FEDERAL WETLAND ENCROACHMENTS ORIGINAL PLAN

FIG. 6

SAVED: 5/21/24 1:37 PM
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NO CONTINUATION



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8360 South Federal Way
Post Office Box 6
Boise, ID 83716
P: +1.208.368.4000
www.micron.com

ARCHITECTURAL CONSULTANT
Jacobs
2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.228.5000
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Jacobs
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2020 S.W. Fourth Ave, 3rd Floor
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KEY PLAN

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- PHASE 1A
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- PHASE 2A
- PHASE 2B
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- PHASE 2B-CONSTRUCTION SUPPORT AREA

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C	10.11.24	ISSUE FOR PERMIT	TS
B	10.04.24	ISSUE FOR PERMIT	TS
A	10.01.24	ISSUE FOR PERMIT	TS

Revisions

PROJECT TITLE
YANKEE

PROJECT PHASE
DESIGN

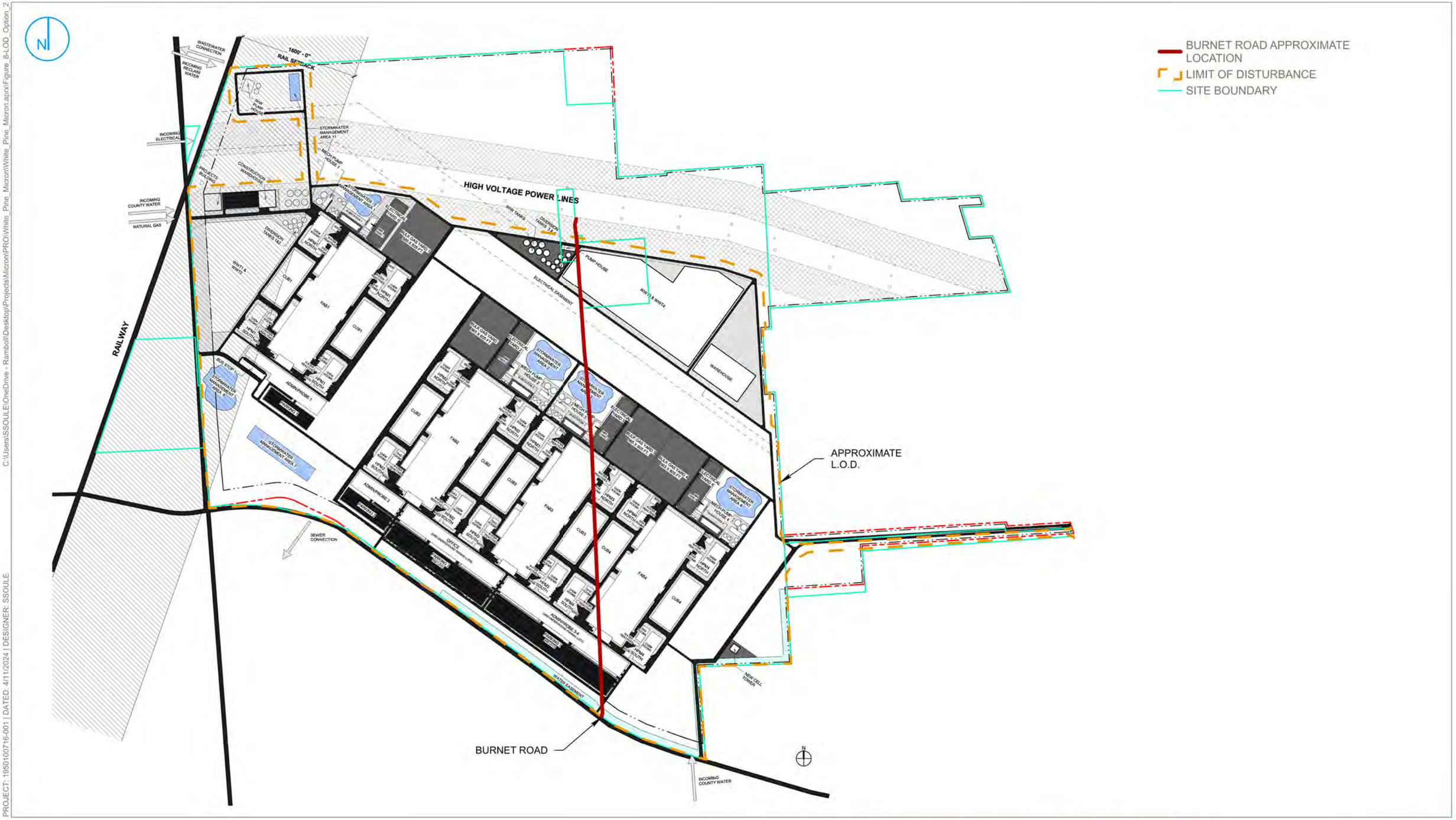
DRAWING TITLE
OPTION 1

DESIGNED:	DRAWN:	CHECKED:
DATE:	JOB NO.: D3802930	SCALE:

DRAWING NO.: FIG. 7 — REV: C

PERMIT DRAWINGS
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PROJECT: 1950100716-001 | DATED: 4/11/2024 | DESIGNER: SSOULE

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 2

0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd

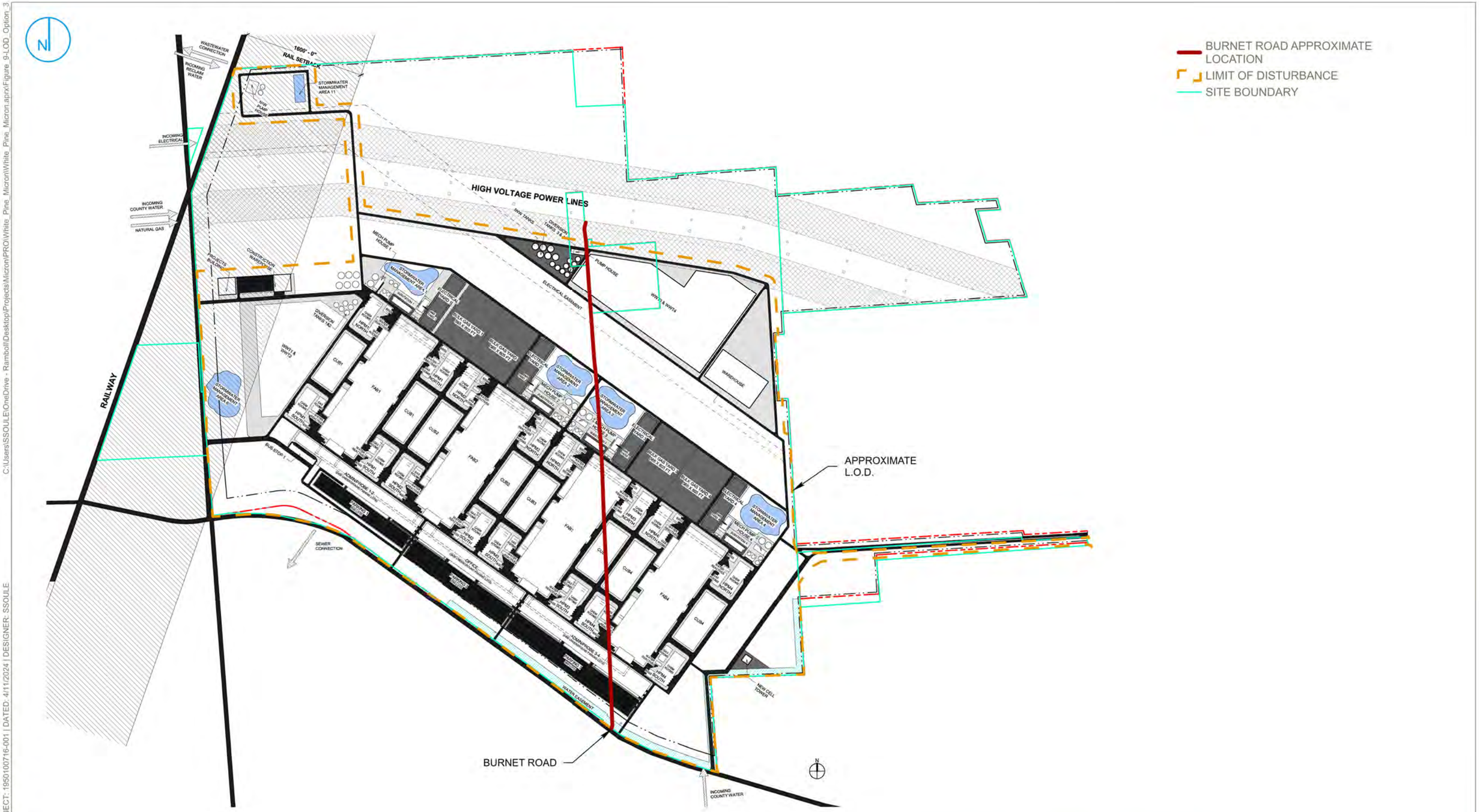
Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 8

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\MicronPRO\White_Pine_Micron\White_Pine_Micron.aprx\Figure_9-LOD_Option_3



PROJECT: 1950100716-001 | DATED: 4/11/2024 | DESIGNER: SSOULE

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 3

0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd

Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 9

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY



C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\Micron\PRO\White_Pine_MicronWhite_Pine_Micron.aprxFigure_10-LOD_Option_4

PROJECT: 1950100716-001 | DATED: 4/11/2024 | DESIGNER: SSOULE

0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 4

Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 10

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL



PROJECT: 1950100716-001 | DATED: 4/11/2024 | DESIGNER: SSOULE

C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\Micron\PRO\White_Pine_MicronWhite_Pine_Micron.aprxFigure_11-LOD_Option_5

0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 5

Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 11

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\Micron\PRO\White_Pine_MicronWhite_Pine_Micron.aprxFigure_12-LOD_Option_6



PROJECT: 1950100716-001 | DATED: 4/11/2024 | DESIGNER: SSOULE

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 6

0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd

Micron Campus
Town of Clay
Onondaga County, New York

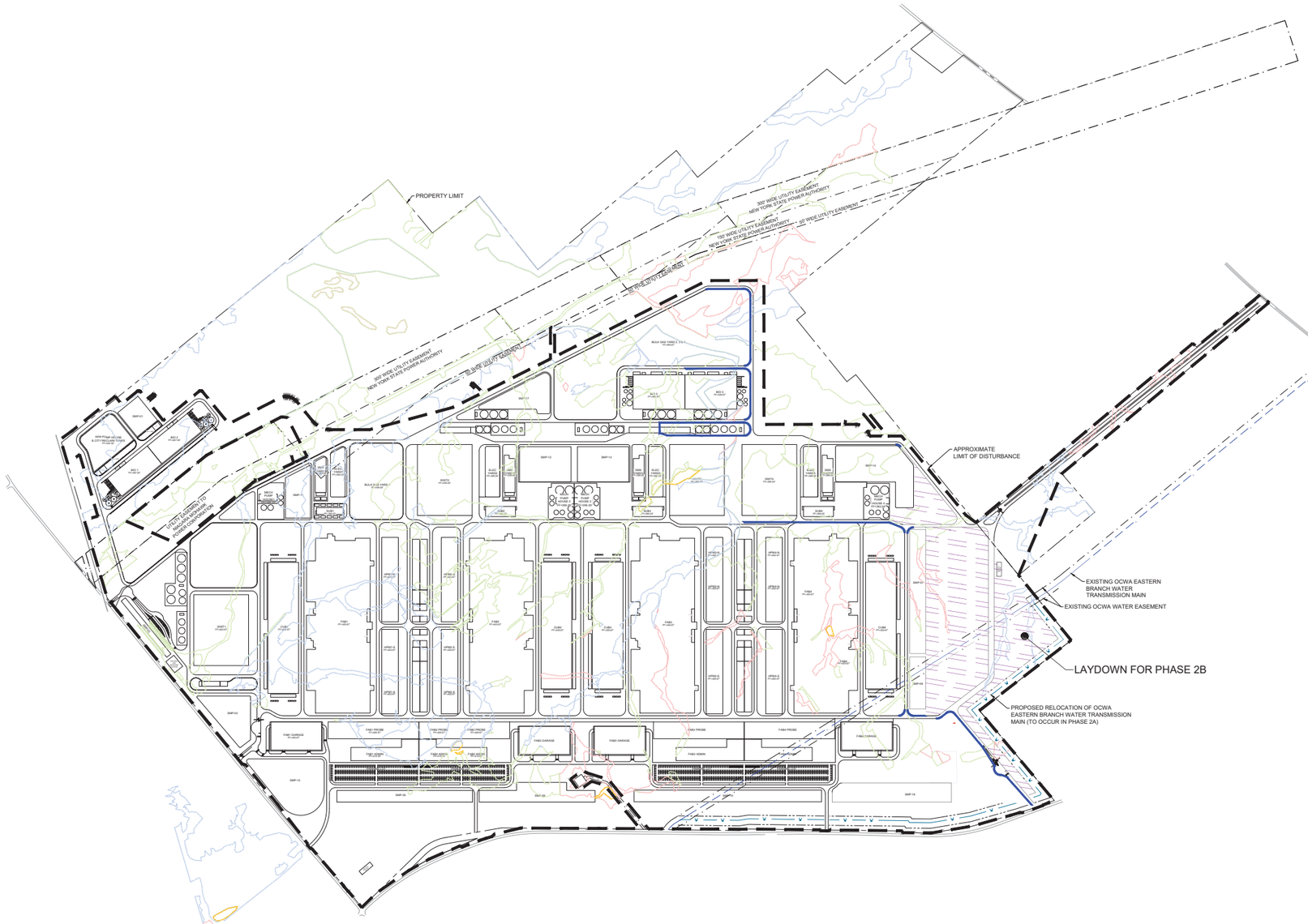
FIGURE 12

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL


W3
W11
W2
W2
W11
W4a
W31
W1
W2
W5
W1
W9
W71
W9
W2
W11
W11
W1
W34
W40
W34
W34
W14
W13
W34
W12
W29
W34
W54
W61
W34
W28
Burnet Rd
Burnet Rd
Burnet Rd
Burnet Rd
Youngs Creek
Youngs Creek
Youngs Creek
Meltzer Dr
Matterson
Caughdenoy Rd
Caughdenoy Rd
State Route 31
State Route 31
State Route 31
State Route 31
Old State Highway 31
Old State Highway 31
Shaver Creek
Shaver Creek
Grace Evangelical Covenant
Pareti Pl

NO CONTINUATION



0 400 800 1200
1"=400' - Scale in Feet

OWNER / DEVELOPER
Micron
8360 South Federal Way
Post Office Box 6
Boise, ID 83716
P: +1.208.368.4000
www.micron.com

ARCHITECTURAL CONSULTANT
Jacobs
2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.228.5000
www.Jacobs.com

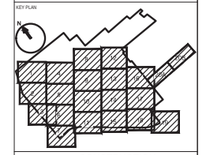
CIVIL & STRUCTURAL CONSULTANT
Jacobs
2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.228.5000
www.Jacobs.com

MECHANICAL & ELECTRICAL CONSULTANT
Jacobs
2020 S.W. Fourth Ave, 3rd Floor
Portland, OR 97201
P: +1.503.228.5000
www.Jacobs.com

CONTRACTOR

PROJECT ADDRESS

KEY PLAN



CONSTRUCTION

- PHASE 1A
- PHASE 1B
- PHASE 2A
- PHASE 2B
- PHASE 1A- CONSTRUCTION SUPPORT AREA
- PHASE 1B- CONSTRUCTION SUPPORT AREA
- PHASE 2A- CONSTRUCTION SUPPORT AREA
- PHASE 2B- CONSTRUCTION SUPPORT AREA

REV	DATE	DESCRIPTION	ISSUED BY
C	10.11.24	ISSUE FOR PERMIT	TS
B	10.04.24	ISSUE FOR PERMIT	TS
A	10.01.24	ISSUE FOR PERMIT	TS

Revisions

PROJECT TITLE
YANKEE

PROJECT PHASE
DESIGN

DRAWING TITLE
OPTION 1 WITH WETLANDS

DESIGNED:	DRAWN:	CHECKED:
DATE:	JOB NO.: D3802600	SCALE:

DRAWING NO.
FIG. 14

REV
C

PERMIT DRAWINGS
NOT FOR CONSTRUCTION

SHEET:

SIZE
E



0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd.

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 2 WITH WETLANDS

Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 15

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1950100716-001 | DATED: 6/4/2024 | DESIGNER: SSOULE | C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\Micron\PRO\White_Pine_Micron_ShelbyWhite_Pine_Micron.aprx\Figure_15-LOD_Option_2_Wetlands



PROJECT: 1950100716-001 | DATED: 6/4/2024 | DESIGNER: SSOULE C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\Micron\PRO\White_Pine_Micron_ShelbyWhite_Pine_Micron.aprx\Figure_16-LOD_Option_3_Wetlands

0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd.

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 3 WITH WETLANDS

Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 16

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL



BURNET ROAD APPROXIMATE LOCATION
LIMIT OF DISTURBANCE
USACE JURISDICTION UNDETERMINED

USACE JURISDICTIONAL FEATURES
- PEM WETLANDS
- PFO WETLANDS
- POW WETLANDS
- PSS WETLANDS
- PUB WETLANDS
- STREAMS

0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd.

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 4 WITH WETLANDS

Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 17

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd.

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 5 WITH WETLANDS

Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 18

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

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BURNET ROAD APPROXIMATE LOCATION
LIMIT OF DISTURBANCE
USACE JURISDICTION UNDETERMINED

USACE JURISDICTIONAL FEATURES
- PEM WETLANDS
- PFO WETLANDS
- POW WETLANDS
- PSS WETLANDS
- PUB WETLANDS
- STREAMS

0 600 1,200 Feet

Notes
- Site plan drawn by Exyte Singapore Pte Ltd.

APPROXIMATE LIMITS OF DISTURBANCE
OPTION 6 WITH WETLANDS

Micron Campus
Town of Clay
Onondaga County, New York

FIGURE 19

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.
A RAMBOLL COMPANY

RAMBOLL

PROJECT: 1950100716-001 | DATED: 6/4/2024 | DESIGNER: SSOULE C:\Users\SSOULE\OneDrive - Ramboll\Desktop\Projects\Micron\PRO\White_Pine_Micron_ShelbyWhite_Pine_Micron.aprx\Figure_19-LOD_Option_6_Wetlands