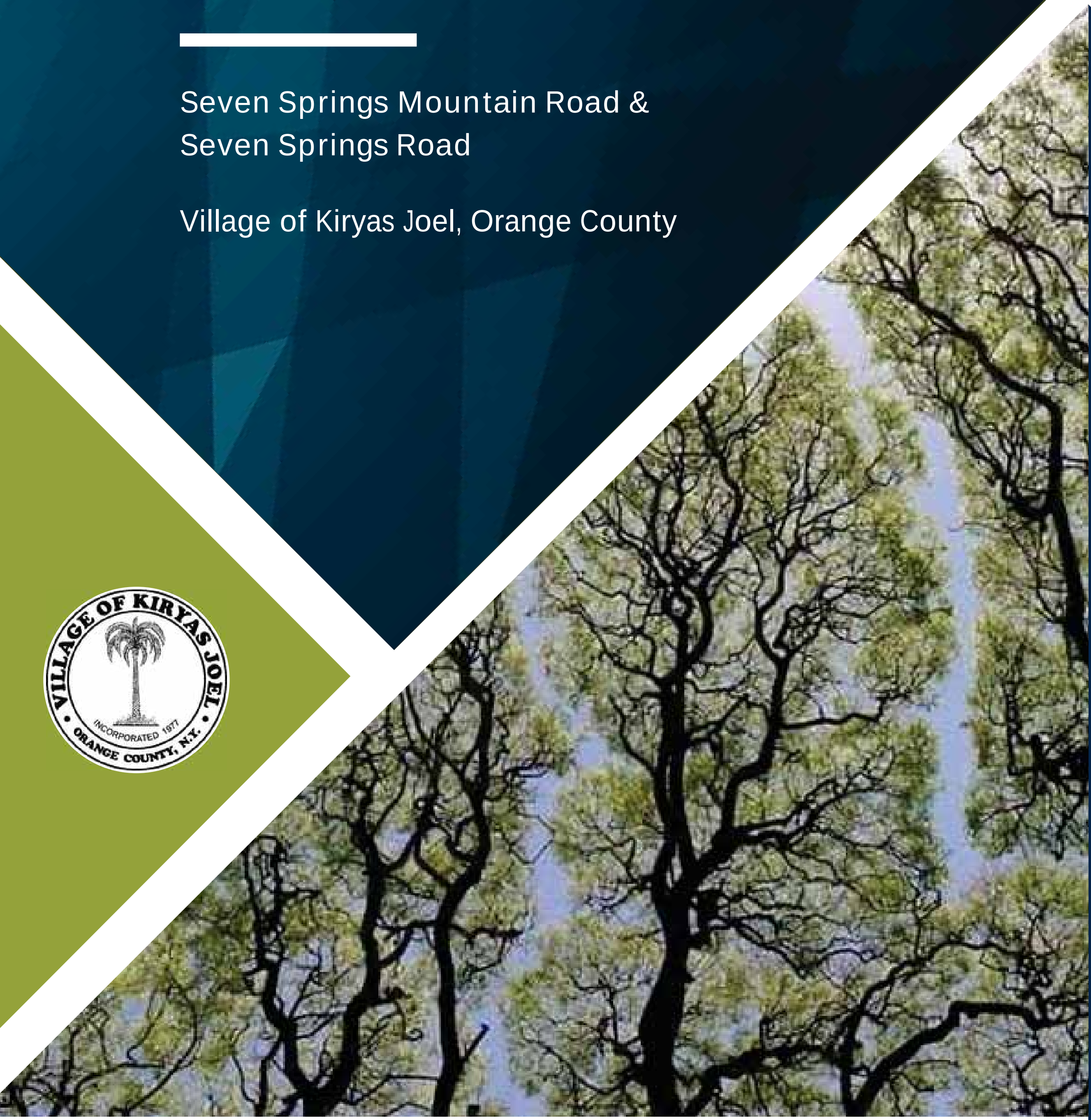
DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE KARLSBURG ACRES DEVELOPMENT

Seven Springs Mountain Road &
Seven Springs Road

Village of Kiryas Joel, Orange County



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DRAFT ENVIRONMENTAL IMPACT STATEMENT

FOR THE

KARLSBURG ACRES DEVELOPMENT

Seven Springs Mountain Road & Seven Springs Road

VILLAGE OF KIRYAS JOEL, ORANGE COUNTY

Project Sponsor: Bakertown Road II Holding LLC, Seven Springs Corp., Eastgate Estates LLC, Lipa Oppenheim, & Mendel Oppenheim

Lead Agency: Village of Kiryas Joel Planning Board
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Date Accepted by Lead Agency: __________
Online Access:
Public Comment Period:
Public Hearing:

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition/Denotation
AMSL	Above Mean Sea Level
BMPs	Best Management Practices
dBA	A-weighted Decibels
DEIS	Draft Environmental Impact Statement
EAF	Environmental Assessment Form
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
GIS	Geographic Information Systems
GPS	Global Positioning System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historical Places
NYNHP	New York Natural Heritage Program
NYSDEC	New York State Department of Environmental Conservation
NYSOPRHP	New York State Office of Parks, Recreation, and Historic Preservation
SEQR	State Environmental Quality Review Act
SHPO	State Historic Preservation Office
SPDES	State Pollutant Discharge Elimination System
SPHINX	State Preservation Historical Information Network Exchange
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service

Acronym/Abbreviation	Definition/Denotation
USGS	United States Geological Survey

FIRMS/ORGANIZATIONS INVOLVED IN THE PREPARATION OF THE DEIS

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1.0 EXECUTIVE SUMMARY

Project Site Description

The Project site is located to the northwest of the Village of Kiryas Joel / Town of Palm Tree, Orange County, New York. The Project is bounded by Seven Springs Road, Seven Springs Mountain Road, and Karlsburg Road. The Project site is primarily vacant, forested land with some commercial development along Karlsburg Road, and is bordered by residential development to the south, forested land to the north, and rural residential development to the east and west. Historical aerial photography dating to 1965 show the property as an undeveloped woodlot.

Description of Proposed Action

The proposed action involves the construction of a 608-unit subdivision within the existing community of Kiryas Joel. The proposed action will include the construction of 82 new buildings including 80 residential buildings, one public shul, and one commercial building. The proposed action will include parking to service all proposed facilities as well as public utilities including water, sewer, storm sewer, electric, and gas services.

Purpose, Need, and Benefit

The purpose of this Proposed Action is to construct multi-family housing that meets the growing needs of the Village of Kiryas Joel Community. The development will provide more parking and include all public utilities necessary for the families in the community.

Regulatory Process

The SEQR process was recently initiated for the proposed Karlsburg Acres Development. The basic purpose of SEQR is to incorporate the consideration of environmental factors into the existing planning, review, and decision-making processes of state, regional, and local government agencies at the earliest possible time. To accomplish this goal, SEQR requires a determination of whether a proposed action may have a significant impact on the environment, and if it is determined that the action may have a significant adverse impact, prepare or request an Environmental Impact Statement (EIS). It was the intention of the State Legislature that protection and enhancement of the environmental, human, and community resources should be given appropriate weight with social and economic considerations. Accordingly, it is intended that a suitable balance of social, economic, and environmental factors be incorporated into the planning and decision-making processes of state, regional, and local agencies. However, it is not the intention of SEQR that environmental factors be the sole consideration in decision-making.

The SEQR process for the proposed Karlsburg Acres Development has included or will include the following actions:

- Preparation of Parts 1, 2, and 3 of a Full Environmental Assessment Form (EAF);
- Issuance of a Positive Declaration;
- Preparation of a Draft Scoping Document;
- Public Scoping Process;
- Issuance of Final Scoping Document;
- Preparation of the Draft Environmental Impact Statement (DEIS);
- Notice of completion of DEIS and notice of public hearing and comment period;
- Public hearing on DEIS (must be held at least 14 days after public notice is published);
- A minimum 30-day public comment period on the DEIS;
- Revisions to the DEIS as necessary to address substantive/relevant comments received;
- Preparation of Final EIS (FEIS);

- Filing notice of completion of FEIS;
- 10-day consideration period; and
- Issuance of Findings Statement.

Opportunities for detailed agency and public review in relation to this specific action will continue to be provided throughout the SEQR process. This DEIS, along with a copy of the public notice, will be distributed for review and comment to the public and agencies. In addition to a public comment period (during which time written comments will be accepted), a duly noticed public hearing concerning the DEIS will be organized and held, in accordance with SEQR requirements. Additionally, a 2005 amendment to SEQR, (Chapter 641 of the NYS Laws of 2005; "Ch. 641") requires every Environmental Impact Statement be posted on a publicly accessible internet website. A DEIS is to be posted as soon as it is accepted and remain posted until the FEIS is accepted. The FEIS should be posted when completed and must remain posted until one (1) year after all final approvals have been issued for the Project that is the subject of the FEIS. In accordance with this amendment to SEQR, the DEIS will be posted to: https://www.cscos.com/karlsburgacresdevelopment/.

Interested and Involved Agencies

Involved agencies are public bodies that undertake, fund, or approve a proposed action. The following agencies were determined to be involved:

- NYS Department of Environmental Conservation (NYSDEC);
- Orange County Department of Public Works, Division of Environmental Facilities and Services;
- Orange County Department of Health, Division of Environmental Health;
- Village of Kiryas Joel Department of Public Works; and
- Village of Kiryas Joel Board of Appeals.

Interested Agencies

Interested agencies are public bodies not undertaking, funding or approving the proposed action but may wish to participate in the process because of expertise or concerns. The following agencies were determined to be interested:

- Orange County Department of Planning;
- Town of Monroe;
- Town of Palm Tree;
- Village of Kiryas Joel Board of Trustees;
- Kiryas Joel Fire Department;
- Kiryas Joel Village Union Free School District; and
- State Historic Preservation Office (SHPO).

Summary of Potential Impacts

In accordance with requirements of the SEQR process, potential impacts arising from the proposed action were evaluated with respect to an array of environmental, social and cultural resources. The analysis of potential impacts is summarized in Table 1.

Table 1. Summary of Potential Environmental Impacts.

Topic	Potential Impacts	
	Construction	*Operation*
Geology, Soils, and Topography	• Potential blasting due to shallow bedrock; and • Regrading the site for development (net export volume of 86,000 cubic yards).	• None anticipated.
Water Resources	*Streams* • Stream impacts can be found in the wetland delineation report. *Wetlands* • Wetland impacts can be found in the wetland delineation report. *Groundwater* • None anticipated. *Floodplains and Floodways* • None anticipated. *Stormwater* • Construction will disturb more than one acre and result in additional stormwater runoff.	*Streams* • None anticipated. *Wetlands* • None anticipated. *Groundwater* • None anticipated; a SWPPP will be implemented to ensure minimal impacts. *Floodplains and Floodways* • None anticipated. *Stormwater* • Increase with the increased impervious area.
Climate and Air Quality	• Potential emissions from heavy equipment, deliveries, worker mobilization; and • Air Quality Assessment (Appendix A) indicates no adverse impacts due to emissions.	• Potential emissions from (1) vehicles and (2) heat and power; and • Air Quality Assessment (Appendix A) indicates no adverse impacts due to emissions.
Vegetation and Wildlife	*Vegetation* • Permanent impacts due to cutting / clearing, stump and root system removal, and blasting activities; and • Approximately 32 acres of vegetation will be removed. *Fish and Wildlife* • Minimal incidental injury and mortality (construction activities and vehicles / machinery); • Earth-moving activities may result in silt and sedimentation impacts, particularly when working in and around the	*Vegetation* • Permanent conversion of entire 42-acre site (including 32 acres of wildlife habitat) to built environment. *Fish and Wildlife* • Minimal incidental injury and mortality, i.e. from traffic; and • Somewhat significant habitat disturbance / loss due to permanent conversion of wildlife habitat. *Threatened and Endangered Species* • None anticipated.

Topic	Potential Impacts	
	Construction	*Operation*
	water resources mapped on site; • Approximately 32 acres of wildlife habitat (forest, vernal pool, stream) will be lost; and • Displacement of species, particularly due to loss of breeding habitat, will be minimal. *Threatened and Endangered Species* • Potential bat roosting trees will be lost; with tree clearing confined to winter months, no adverse impacts are anticipated.	
Aesthetic/Visual Resources	• Removal of vegetation and soil disturbance; and • Impact will cease with completion of construction and landscaping.	• No significant impacts as the development will not contrast with existing landscape; and • Night-lighting will be used but will not result in a significant adverse impact per project design.
Historic, Cultural, and Archaeological Resources	*Architectural Resources* • None anticipated. *Historic and Architectural Resources* • Non anticipated.	*Architectural Resources* • None anticipated. *Historic and Architectural Resources* • None anticipated.
Open Space and Recreation	• None anticipated.	• None anticipated.
Traffic and Transportation	• Traffic will increase slightly with construction activities; no significant impacts anticipated.	• Traffic Analysis indicated that no significant impacts are anticipated.
Noise and Odor	*Noise* • Construction activities (blasting and rock removal, traffic, machinery) will increase ambient noise levels, but will likely go unnoticed against traffic and construction in surrounding areas. *Odor* • None anticipated.	*Noise* • None anticipated. *Odor* • None anticipated.
Documented Environmental Conditions	• Minor temporary impacts to air and water quality, noise, solid waste generation, and natural communities.	• None anticipated

Topic	Potential Impacts	
	Construction	*Operation*
Land Use and Zoning	• Temporary adverse impacts to air quality, dust, noise, and vibrations due to construction activities.	• Land use will change at the Project Site; however, proposed land use is consistent with goals of the community and adjacent land use
Public Health and Community Services	• Temporary adverse impacts to air and water quality, noise, solid waste generation, volatile vapors, and carbon monoxide emissions.	• No significant noise or traffic impacts are anticipated; and • Increase in use of surrounding amenities (for water use, etc.); the project has been designed to service the public to the maximum extent practicable, and with minimal adverse impacts.

Summary of Mitigation Measures

The Project will include various measures to avoid, minimize and/or mitigate potential environmental impacts, as described in Table 2.

Table 2. Summary of Measures to Avoid, Minimize, and/or Mitigate Impacts

Topic	Proposed Avoidance/Mitigation Measures
Geology, Soils, and Topography	*Blasting* • Adhere to Blast Monitoring and Safety Plan. *Erosion and Grading* • Adhere to Erosion and Sediment Control Plan, in accordance with the NYSDEC stormwater design manual; and • Employ applicable NYSDEC BMPs.
Water Resources	*Surface Water* • Compensatory mitigation will be necessary for stream impacts, preferably via in-lieu fee program credits; the details of stream impacts can be found in the wetland delineation report. *Wetlands* • Compensatory mitigation will be necessary for wetland impacts, preferably via in-lieu fee program credits; the details of wetland impacts can be found in the wetland delineation report. *Stormwater* • Adhere to SWPPP conditions, in accordance with NYSDEC SPDES General Permit for stormwaters discharges from construction activities – Permit No. GP-0-20-001.
Climate and Air Quality	• Not applicable (no significant impacts).
Vegetation and Wildlife	*Vegetation*

Topic	Proposed Avoidance/Mitigation Measures
	• Adhere to comprehensive sediment erosion control plan; • Employ BMPs and maintain a clean work area during construction activities; • Seed temporarily disturbed areas; and • No vegetation mitigation during operation beyond lawn maintenance. *Fish and Wildlife* • Adhere to comprehensive sediment erosion control plan, and SWPPP conditions, in accordance with NYSDEC SPDES General Permit for stormwater discharge from construction activities – Permit No. GP-0-20-001; and • Employ BMPs. *Threatened and Endangered Species* • Restrict tree cutting to between October 15 and March 31; and • Adhere to "Dark Sky" initiatives for lighting, and use minimal lighting necessary to ensure security and safety.
Aesthetic/Visual Resources	• Restrict clearing to work area and maintain existing landscape surrounding Project Site to reduce view of site; and • Adhere to "Dark Sky" initiatives for lighting and use minimal lighting necessary to ensure security and safety.
Historic, Cultural, and Archaeological Resources	• Not applicable (no significant impacts).
Open Space and Recreation	• Not applicable (no significant impacts).
Traffic and Transportation	*As supported in the Traffic Impact Study:* • Incorporate recommended traffic control and lanes at each intersection; • Apply appropriate clearing and grading for minimum stopping distance (250 feet), plan for traffic signal in central driveway and potentially in north driveway; • Land dedication strip along Seven Springs Road to the Village for turn lanes, sidewalks, and road widening; • Roadway connection to adjacent East Gate Development for regular and emergency access; • Land dedication for traffic signal at Seven Springs Mountain Road and Seven Springs Road; • Widen intersection at Seven Springs Mountain Road and Karlsburg Road for right and left turn lanes and additional requirements for traffic signal installation; • Realign intersection at Seven Springs Mountain Road (C.R. 44) and Mountain Road to a standard "T" intersection and signalize with appropriate turn lanes and accommodations.

Topic	Proposed Avoidance/Mitigation Measures
Noise and Odor	*Noise* • Implementing BMPs for sound abatement during construction, including use of appropriate mufflers and limiting hours of construction; • Notifying landowners of certain construction sound impacts in advance; • Provide advance notice to all neighbors prior to blasting and limiting such activities to the hours of 8 AM to 4 PM Monday to Friday; and • No noise impacts are anticipated during operation. *Odor* • Not applicable (no significant impacts).
Documented Environmental Conditions	• Not applicable (no significant impacts).
Land Use and Zoning	• Not applicable (no significant impacts).
Public Health and Community Services	• Specific mitigation measures are currently being finalized via coordination with the Orange County Sewer District No. 1 for required improvements to the Lower Interceptor mains north of the Daj Pump Station.

Alternatives

As required by 6 N.Y.C.R.R. § 617.9, alternatives to the Project "that are feasible, considering the objectives and capabilities of the project sponsor" will be evaluated; the specific alternatives that will be analyzed are: Alternative Project Location; Alternative Project Design and Scale; and No Action Alternative.

Alternative Project Location

The Alternative Project Location considers the feasibility of carrying out the proposed project at a similar alternative location. The proposed Project Site was strategically chosen based on the prime location of available land directly adjacent to existing residential development, namely the East Gate Development within the Village of Kiryas Joel. Connection between the proposed and existing residential developments will promote convenience and connectivity within the community which can only benefit its residents.

As such, the Alternative Project Location option is not practicable and will not be considered.

Alternative Project Design and Scale

The Alternative Project Design and Scale considers a variation in the proposed project design, as well as the size and scope of the proposed project. The proposed project has been designed to suit the landscape and acreage offered by the Project Site, as well as offer solutions to the needs of the Village of Kiryas Joel. Diverting from the ideal project design would likely result in a loss proposed project benefits, i.e. supplementing the critical housing need, increasing proximity to goods and services, and incorporating public transportation needs. Therefore, the Alternative Project Design and Scale option is not practicable and will not be considered.

No Action Alternative

The No Action Alternative showcases the Project Site as it currently exists with no proposed development; this scenario is considered to establish a baseline that will help assess both the benefits and impacts associated with feasible alternatives.

The No Action alternative would result in abandonment of the proposed Project. This action would not be consistent with the goals of the project sponsors nor the needs of the community. This Project helps to address a critical housing need in the Village of Kiryas Joel; this critical housing need is a demand that is generally not met in surrounding communities. Much of the housing in the surrounding communities is not ideal because of the lack of community services provided in a walkable community setting, such as easy proximity to goods and services, public transportation and sufficient pedestrian facilities and shared transportation services that only come in a more densely populated area. Under the No Action Alternative, no water, sewer, traffic or community service demand would be generated and no additional tax revenue would be generated. The site would continue to have development potential. Under the No Action Alternative, none of the benefits discussed above would accrue to the area. Consequently, the No Action Alternative is not considered practicable and will not be considered.

Irreversible and Irretrievable Commitment of Resources

An irreversible commitment results in environmental changes that cannot, at a future date, be altered to restore the environment to its pre-construction state. Resources include not only the commitment of labor, fiscal resources and materials, but also natural and cultural resources committed as a result of Project construction, operation and maintenance.

Construction of the Project will result in the short- and long-term commitment of natural resources, including structural steel, gravel, concrete and wood. Although there will be an irretrievable commitment of some natural resources, this will not be a significant impact on the availability of these materials.

Additionally, the construction, operation and maintenance of the Project will require the irreversible commitment of human and fiscal resources to design, build, operate and maintain the facilities. Human resources will also be committed by governments during the planning, environmental reviews and permitting associated with the Project. The commitment of human resources will not strain local resources.

Project construction, operation and maintenance will also require the irretrievable commitment of energy resources, including those derived from petroleum products, for use during construction and operation (in the forms of traffic, equipment, utilities, etc.).

Although this will be an irretrievable commitment of resources, it will not be a significant amount and will not impact the local energy supply. Further irreversibly and irretrievably committed resources include utility services, water and sewer services, vegetation loss / habitat conversion, and soils and topography modification.

Growth-Inducing Impacts

Growth-inducing aspects are direct or indirect economic impacts from construction projects. Direct or indirect economic impacts from projects can remove growth impairments such as establishment of essential public services, new access to an area of construction or construction of additional housing in the surrounding area. As discussed in further detail later in Section 8.0 of this DEIS, the Village Population will be increased.

The proposed Project includes 14 multi-family housing buildings ranging from 15 to 38 units. Assuming that each unit has 5.60 residents (the Village average[1]), even if each resident were new to the area, this would increase the Village population by only up to 1,277 people. The Village has adequate infrastructure to support new residents without a burden to existing services.

The Project has the ability to increase density and foot traffic within the already dense community. Increased investment such as this will create spin-off development that will overall raise property values and increase the quality of life for the residents of Kiryas Joel.

Options for housing are needed within Orange County. This Project introduces a space where families are able to work, live, and play. This project, like all residential development

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[1] http://quickfacts.census.gov/qfd/states/36/3611000.html accessed June 2, 2016

projects, could also have the effect of causing increases in surrounding commercial activity to meet local demands for goods and services. If the project is not built, then residents of Kiryas Joel will continue to seek suitable housing in the Village, or in nearby communities so that they can remain close to Kiryas Joel. This demand for housing has caused an increase in housing costs in Kiryas Joel, and would eventually create more demand on community services as housing becomes more affordable.

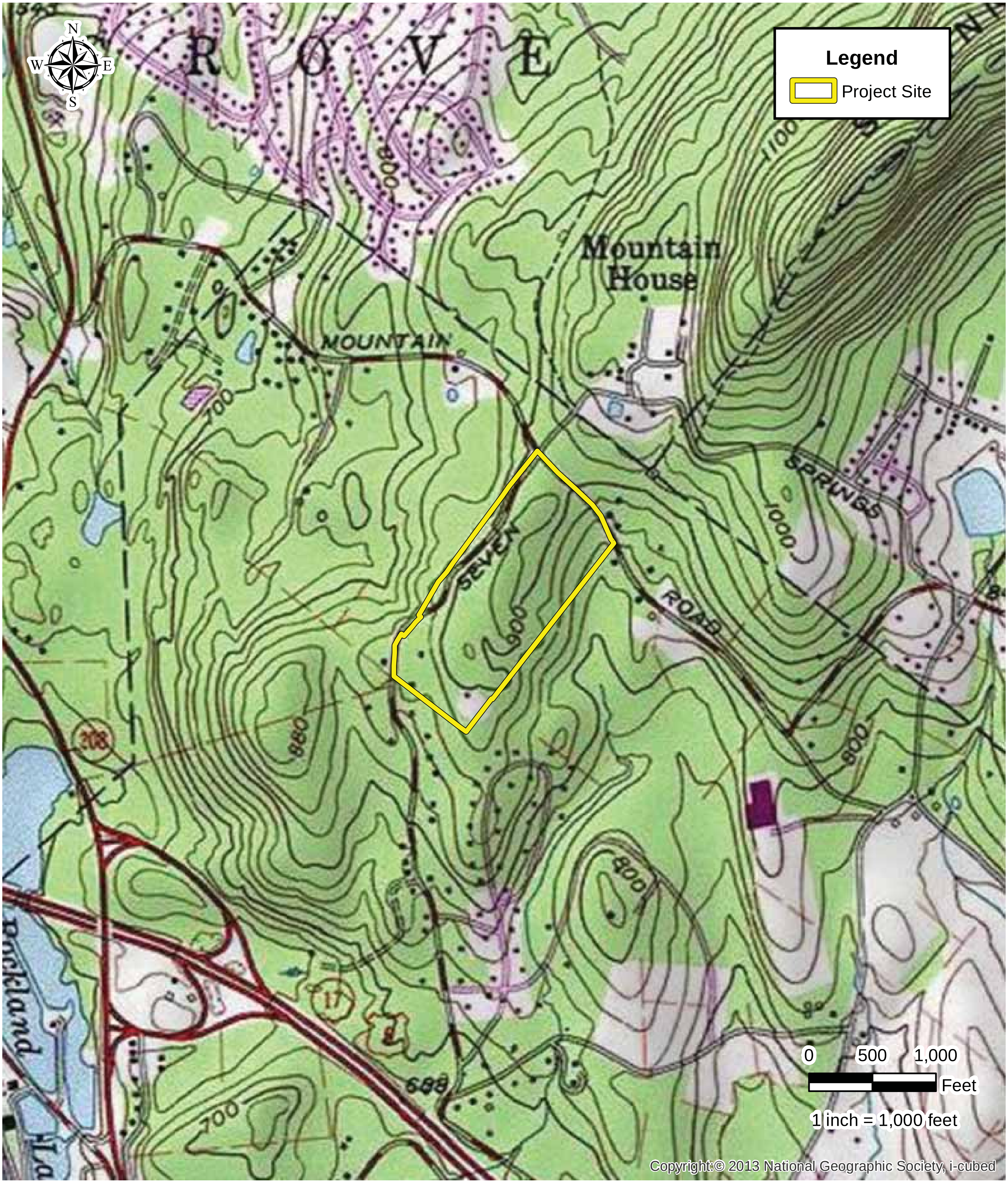
2.0 DESCRIPTION OF PROPOSED ACTION

2.1 SITE DESCRIPTION

The Project site is located in the Village of Kiryas Joel, Orange County, New York. The Project site consists of six parcels, SBL(s): 1-1-18, 1-1-20, 1-1-21, 1-1-22.1, 1-1-22.2, 1-1-23, encompassing 41.24 acres of land. The Project is bounded by Seven Springs Road in the Town of Monroe, and Seven Springs Mountain Road and Karlsburg Road in the Village of Kiryas Joel, Town of Palm Tree. The Project site is primarily vacant, forested land (See Figure 1).

The project site is zoned R - Residential District which generally allows for residential dwellings, village hall, village fire and police stations, public parks, playgrounds and other recreation facilities, public parking, essential services, public and private schools, and places of worship or religious observance and instruction. The Project site is not located in any special use districts. Land uses in the vicinity of the Project include residential development to the south, forested land to the north, and rural residential development to the east and west. There is some commercial development along Karlsburg Road.

There are existing utilities near the Project site; however, the Project will require expansions of all public utilities including water, sewer, storm sewer, electric, and gas services to accommodate the Project.



Sources: Created by C&S Engineers, Inc.

Figure 1 | Site Location Map

Karlsburg Acres Development Project Site
Town of Palm Tree, Orange County, NY

2.2 DETAILED DESCRIPTION OF THE PROPOSED ACTION

The proposed action involves the construction of a 608-unit subdivision within the existing community of Kiryas Joel, as shown on Figure 2 – Design Plans. The proposed action will include the construction of 82 new buildings including 80 residential buildings varying in size, one 6,000 sq. ft. public shul, and one 18,000 sq. ft. commercial building. The shul and commercial building will be located along Seven Springs Mountain Road. The proposed action will include approximately 454 new parking spaces to service all proposed facilities, as well as public utilities including water, sewer, storm sewer, electric, and gas services. The project involves the construction of approximately four new roads through the development, connections from Seven Springs Mountain Road and Seven Springs Road, and some realignment of Seven Springs Road to the north. There will be a public walkway easement from Karlsburg Road. A water supply main will be extended from adjacent supply to the Project. A main line sewer extension with private laterals will be required for the Project as well.

The Project is not anticipated to be phased construction. Construction is anticipated to last 36 months. The Project may result in placement of fill in surface water resources on site. Ecological Solutions, LLC prepared a wetland delineation on site, and the findings are represented in an April 19, 2023 letter report. The Project will require on-site tree removal on the majority of the 41.24-acre Project site.

Sources: Created by C&S Engineers, Inc.

Figure 2 | Design Plans

Karlsburg Acres Development Project Site
Town of Palm Tree, Orange County, NY

2.3 PROJECT PURPOSE, NEED, AND BENEFITS

The purpose of this Proposed Action is to construct multi-family housing that meets the growing needs of the Village of Kiryas Joel community. The development will provide more parking and include all public utilities necessary for the families in the community. Multi-family housing also has the environmental benefit of reducing the length of roads and utilities which need to be constructed over that which would be required for the same number of single-family homes.

REVIEWS, APROVALS, AND OTHER COMPLIANCE DETERMINATIONS

In addition to the Lead Agency's responsibility to comply with State Environmental Quality Review Act (SEQR) regulations and requirements, implementation of the Project will take place following funding procurement and certain ministerial approvals from local and state agencies. The approvals that are expected to be required are listed in Table 3.

Table 3. Approvals for the Karlsburg Acres Development

Agency	**SEQR Status**	**Description of Approval Required or Project Interest**
Village of Kiryas Joel Planning Board	Lead Agency	Administration of SEQR review process, including acceptance of EIS documents and issuance of findings, Site Plan Approval
NYSDEC	Involved Agency	SPDES Construction Permit
Orange County Department of Public Works, Division of Environmental Facilities and Services	Involved Agency	Orange County Sewer District No.1 Main Permit
Orange County Department of Health, Division of Environmental Health	Involved Agency	Water Main Extension Approval

Agency	SEQR Status	Description of Approval Required or Project Interest
Village of Kiryas Joel Department of Public Works	Involved Agency	Building Permit
Village of Kiryas Joel Board of Appeals	Involved Agency	Variance Approval
Orange County Department of Planning	Interested Agency	239M Municipal Review
Town of Monroe	Interested Agency	Project Interest
Town of Palm Tree	Interested Agency	Project Interest
Village of Kiryas Joel Board of Trustees	Interested Agency	Project Interest
Kiryas Joel Fire Department	Interested Agency	Project Interest
Kiryas Joel Village Union Free School District	Interested Agency	Project Interest
State Historic Preservation Office	Interested Agency	Provide technical review and comments relative to Section 14.09 of the State Historic Preservation Act and Section 106 of the National Historic Preservation Act

2.4.1 SEQR Process

The SEQR process was recently initiated for the proposed Karlsburg Acres Development. The basic purpose of SEQR is to incorporate the consideration of environmental factors into the existing planning, review, and decision-making processes of state, regional, and local government agencies at the earliest possible time. To accomplish this goal, SEQR requires a determination of whether a proposed action may have a significant impact on the environment, and if it is determined that the action may have a significant adverse impact, prepare or request an Environmental Impact Statement (EIS).[2] It was the intention of the State Legislature that protection and enhancement of the environmental, human, and community resources should be given appropriate weight with social and economic considerations in determining public policy, and that those factors be considered together in reaching decisions on proposed actions. Accordingly, it is intended that a suitable balance of social, economic, and environmental factors be incorporated into the planning and decision-making processes of state, regional, and local agencies. However, it is not the intention of SEQR that environmental factors be the sole consideration in decision-making.[3]

The SEQR process for the proposed Karlsburg Acres Development has included or will include the following actions:

- Preparation of Parts 1, 2, and 3 of a Full Environmental Assessment Form (EAF);
- Issuance of a Positive Declaration;
- Preparation of a Draft Scoping Document;
- Public Scoping Process;
- Issuance of Final Scoping Document;
- Preparation of the Draft Environmental Impact Statement (DEIS);
- Notice of completion of DEIS and notice of public hearing and comment period;
- Public hearing on DEIS (must be held at least 14 days after public notice is published);
- A minimum 30-day public comment period on the DEIS;
- Revisions to the DEIS as necessary to address substantive/relevant comments received;
- Preparation of Final EIS (FEIS);

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[2] 6 New York Codes, Rules, and Regulations (NYCRR) Part 617.1(c).
[3] 6 NYCRR Part 617.1(d).

- File notice of completion of FEIS;
- 10-day consideration period; and
- Issuance of Findings Statement.

2.4.2 Agency and Public Review

Opportunities for detailed agency and public review in relation to this specific action will continue to be provided throughout the SEQR process. This DEIS, along with a copy of the public notice, will be distributed for review and comment to the public and to the agencies and parties listed below. In addition to a public comment period (during which time written comments will be accepted), a duly noticed public hearing concerning the DEIS will be organized and held, in accordance with SEQR requirements. Additionally, a 2005 amendment to SEQR, (Chapter 641 of the NYS Laws of 2005; “Ch. 641”) requires every Environmental Impact Statement be posted on a publicly accessible internet website. A DEIS is to be posted as soon as it is accepted and remain posted until the FEIS is accepted. The FEIS should be posted when completed, and must remain posted until one (1) year after all final approvals have been issued for the Project that is the subject of the FEIS. In accordance with this amendment to SEQR, the DEIS will be posted to: https://www.cscos.com/karlsburgacresdevelopment/.

The Recipients of this DEIS (in either digital [CD] or printed format) are as follows:

- Village of Kiryas Joel Planning Board
- NYSDEC
- Orange County Department of Public Works, Division of Environmental Facilities and Services
- Orange County Department of Health, Division of Environmental Health
- Village of Kiryas Joel Department of Public Works

- Village of Kiryas Joel Board of Appeals
- Orange County Department of Planning
- Town of Monroe
- Town of Palm Tree
- Village of Kiryas Joel Board of Trustees
- Kiryas Joel Fire Department
- Kiryas Joel Village Union Free School District
- State Historic Preservation Office

3.0 EXISTING CONDITIONS, POTENTIAL IMPACTS, AND MITIGATION MEASURES

3.1 GEOLOGY, SOILS, AND TOPOGRAPHY

3.1.1 Existing Conditions

3.1.1.1 Geology

According to the Surficial Geologic Map of New York State, Lower Hudson Sheet, the Project Site is comprised of poorly sorted till of variable texture and variable thickness. The till is relatively impermeable. The surficial geology in the vicinity of the Project Site, particularly the Hudson Highlands, is the result of periods of glacial advance and retreat in New York State.

According to the Geologic Map of New York State, Lower Hudson Sheet, the Project Site is underlain by sandstones, shales and conglomerates of the Undifferentiated Lower Devonian and Silurian Rocks (Ds) of the Lower Devonian Period.

Immediately north of the Project Site is the Schunemunk Mountain range. The range is characterized by exposed and shallow bedrock which formed during the Middle Devonian period approximately 382 and 392 million years ago. The bedrock is characterized as puddingstone and is a grayish-purple to grayish-red, thin to very thick-bedded, cross-bedded, conglomerate. Within the conglomerate, it is interbedded with grayish-purple to grayish-red sandstone, thin-bedded, medium-gray sandstone, and greenish-gray and grayish-red shale with mudcracks.

3.1.1.2 Soils

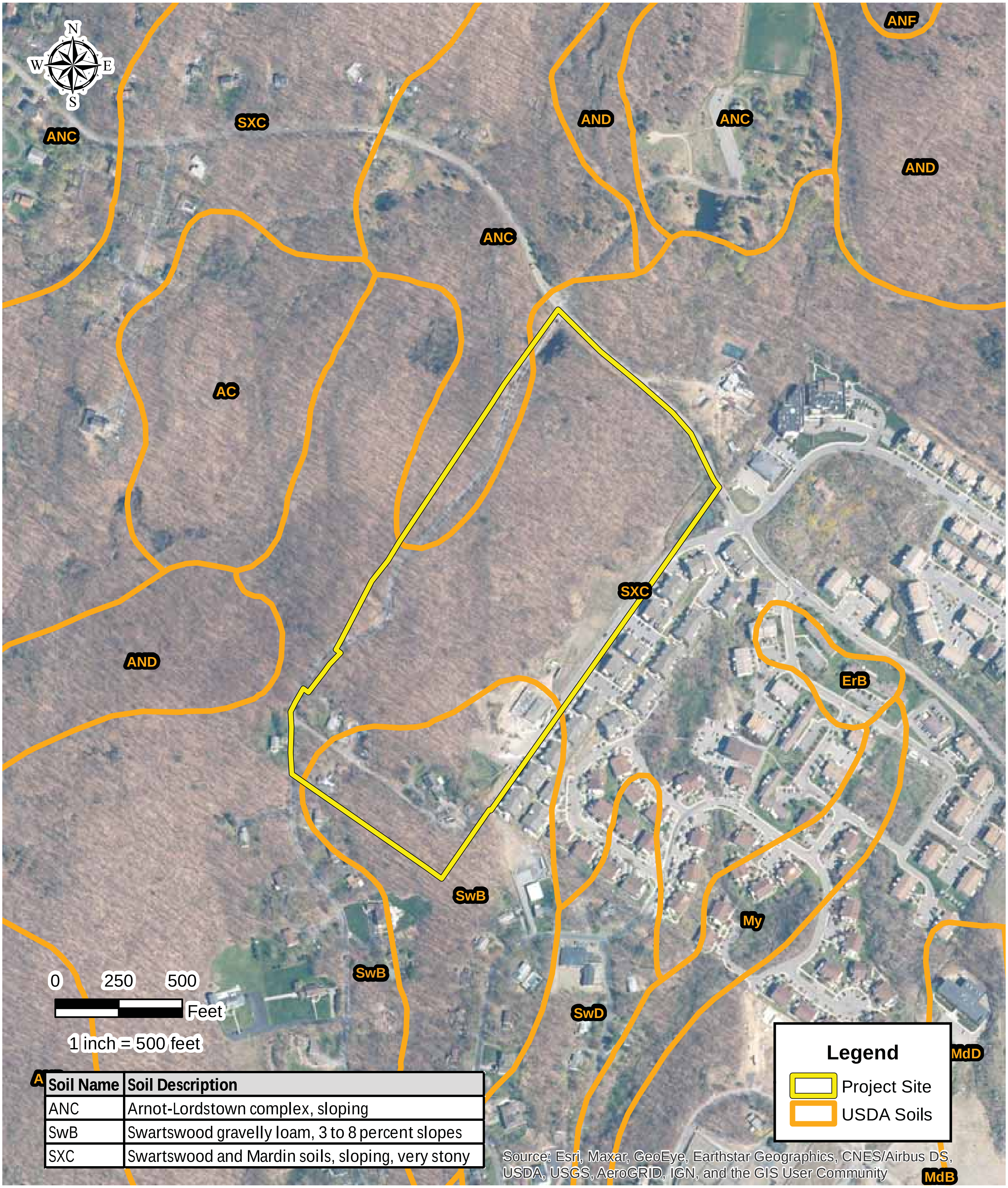
According to the United States Department of Agriculture (USDA) Web Soil Survey, soils on the Project Site consist of primarily Swartswood and Mardin soils (SXC) across the site, with lesser amounts of Swartswood gravelly loam (SwB) in the southernmost five acres, and Arnot-Lordstown complex (ANC) along an acre of Seven Springs Road. These soils are well drained to somewhat excessively drained. Swartswood and Mardin soils are characterized as well drained, very stony soils found on hills and till plains with slopes of 8 to 15 percent. The soil is not prime farmland. Swartswood gravelly loam is gravelly loam found on hills and till plains that is farmland of statewide importance. Arnot-Lordstown complex is channery silt loam typically located over shallow bedrock found on hills, ridges and benches. Shallow bedrock is encountered at 10-40 inches. The soil, with slopes of eight to 15 percent is not prime farmland.

The following depths to seasonal high water table are typical of the predominant soils (See Figure 3 – USDA NRCS Soil Survey Map):

- Swartswood and Mardin soils – 13 to 24 inches
- Swartswood gravelly loam – 23 to 31 inches
- Arnot-Lordstown complex – more than 80 inches

None of the soils located on the Project Site are particularly susceptible to erosion, however erosion and sediment controls will be used during construction to ensure no erosion occurs.

According to the Geologic Map of New York, NYS Museum and Science Service, the local bedrock units mapped underlying the Project Site include the Wappingers Group (OEw).



Soil Name	Soil Description
ANC	Arnot-Lordstown complex, sloping
SwB	Swartswood gravelly loam, 3 to 8 percent slopes
SXC	Swartswood and Mardin soils, sloping, very stony

Sources: Created by C&S Engineers, Inc.

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Figure 3 | USDA NRCS Soil Survey Map

Karlsburg Acres Development Project Site
Town of Palm Tree, Orange County, NY

Soil Borings

A geotechnical investigation was conducted to analyze the subsurface soil, rock, and groundwater conditions within the Project Site (Appendix B). The information produced in this study is used to better design the proposed project according to geologic conditions within the site. As part of the investigation, fifteen soil borings were drilled to refusal on apparent bedrock on January 24 and 25, 2023. Results indicated shallow bedrock throughout with an average depth to refusal of four feet. Of the fifteen borings, six yielded depths of three feet or less, with seven borings yielding depths of 3.5 to five feet. Only two borings met refusal deeper than 5 feet – a location in the southwest portion of the site went fifteen feet deep and a location in the west-middle portion of the site met refusal at 6.5 feet. Although it is possible for refusal to be met against subsurface boulders or detached bedrock, it is more than likely that the soil borings hit the restrictive bedrock layer at each location. Bedrock is composed of hard sandstone and medium-hard shale.

To construct the proposed project in the most efficient and structurally feasible design practicable, structural design will conform to the geology of the site. Buildings will be terraced based on topography of the site. Due to the shallow bedrock throughout the Project Site, rock removal and potential blasting activities would be required for grading purposes; these activities will be minimized to the extent feasible. Per project design, proposed residential and commercial structures will be terraced according to the topographical patterns on site.

The Wappingers Group is a sedimentary rock unit that is found widely across the Hudson Valley. It is composed of limestone, dolomite, and shale. These units were originally formed from horizontal accumulations of fine-grained sands, silts, and mud in shallow water environments.

The NYS Unique Geologic Landforms project is a joint venture between the NYS DEC and the New York State Museum – Office of the State Geologist. This project identifies and inventories over 600 New York State unique land formations such as cliffs, dunes, waterfalls, erratic rocks, gorges, glacial features, and caves. No unique geological features are mapped within the project site.

The National Natural Landmarks (NNL) Program recognizes and encourages the conservation of sites that contain outstanding biological and geological resources. NNLs are designated by the Secretary of the Interior to recognize some of the best examples of these resources in the nation. This project does not possess, nor is it adjacent to, any designated resources.

3.1.1.3 Topography

Topography on the Project Site slopes to the northwest. Elevation ranges from 840 feet above mean sea level (amsl) near Karlsburg Road and Seven Springs Mountain Road on the eastern boundary of the Project Site to approximately 940 feet amsl in the northern corner of the Project Site.

Based on topographic mapping, approximately 44% of the Project Site features slopes of greater than 15%.

3.1.2 Potential Impacts

3.1.2.1 <u>Construction</u>

As part of construction, the project site will be regraded. A grading plan has been provided in the plan set. The proposed buildings are terraced on the site, following existing topographical patterns with a grade change of one story from front to back to allow basement access on one side and first floor access on the other. Buildings also include step foundations to conform to site grading. The grading plan includes a net export volume of 86,000 cubic yards. Due to the shallow nature of the soil on the site, blasting is anticipated during construction. The proposed development includes multiple retaining walls of varying lengths along the property lines to reduce the overall amount of grading and ensure no grading extends off the property. The combined total length of the walls is approximately 1,700 linear feet. On the west side of the site, the wall extends approximately 325 linear feet and varies in height from 2 feet to 15 feet with an average height of 10 feet. The wall on the east side of the property extends approximately 210 linear feet and height ranges from 1 foot to 17 feet with an average height of 10 feet, and on the south side of the site, the wall extends approximately 1,168 linear feet and height ranges from 1 foot to 23 feet. In addition to the perimeter walls, the design provides for several internal retaining walls including a 6-foot wall between lots 57-62 and lots 47-52 and an 8-foot wall between lots 31-40 and 19-28. Smaller 2- to 4-foot-high landscaping walls may be required in various other locations for individual parking areas and playgrounds.

Generally, the on-site sedimentary rocks (Wappingers Group) are weathered near the surface and manual removal techniques can be used to remove this material during construction. If shallow bedrock is encountered and cannot be removed manually, standard blasting techniques can be used to remove this rock. Based on the current site layout, and the existing site-specific data on the depth to bedrock as described in the geotechnical report, blasting may be required to remove shallow bedrock. Any blasting that is conducted will be in accordance with the site-specific blasting plan.

Figure 4 depicts the current slopes of the project site based on a topographical survey completed by a licensed land surveyor. The percentages of the slopes in each category to be disturbed are shown in Table 4 below.

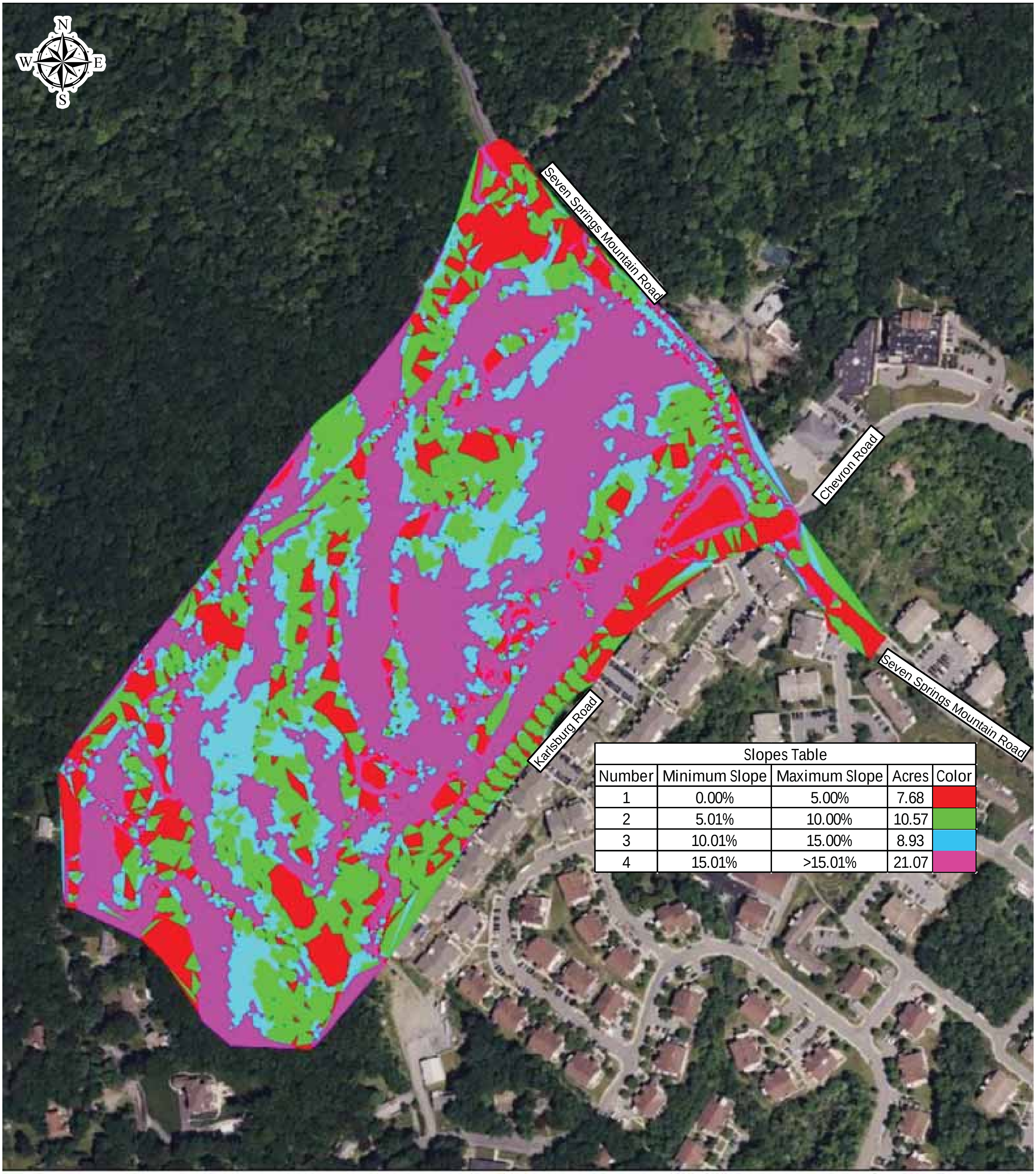
Table 4. Project Site Slope Information

Percent Slope (%)	Acreage within work limits
0-5	7.68
5.01 – 10	10.57
10.01 – 15	8.93
15.01+	21.07

As presented, a significant portion of earthwork will occur on (moderately or steeply) sloped portions of the property.

Blasting may be required in multiple areas on the site. A blasting plan must be established in accordance with the New York State regulations including NYCRR 39 & 29, CFR 1910, and all OSHA requirements. In addition, the Town will review and approve the blasting permit application.

Although the soils found on the Project Site are not highly erosive in nature, any soil disturbance has the potential for erosion if not properly mitigated. Best Management Practices (BMPs) described in the New York Guidelines for Urban Erosion and Sediment Control will be designed to control soil erosion impacts.



Slopes Table				
Number	Minimum Slope	Maximum Slope	Acres	Color
1	0.00%	5.00%	7.68	(red)
2	5.01%	10.00%	10.57	(green)
3	10.01%	15.00%	8.93	(blue)
4	15.01%	>15.01%	21.07	(pink)

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Figure 4 | Slopes Map

Karlsburg Acres Development Project Site
Town of Palm Tree, Orange County, NY

As a part of the SWPPP, the contractor will be required to stabilize all land disturbing activities within 7 days. Additionally, all erosion and sedimentation devices will be inspected at least once per week and immediately following any rain event. Repairs will be made as soon as practicable should any deficiencies be noted.

Erosion and sediment controls will be installed prior to site disturbance when feasible and must be maintained until the completion of the project. The controls must be replaced if the effectiveness is reduced to 50% or less and cleanout is not an option. In addition to all control measures presented on the plans, the contractor will be responsible for providing any additional measures deemed necessary to prevent sediment transport offsite.

3.1.2.2 Operation

No additional impacts are expected during operation.

3.1.3 Proposed Mitigation

Construction on Land with Shallow Depth to Bedrock:
As described above, the majority of the site has a shallow depth to bedrock due to the site location at the toe of the Schunemunk Mountain Range. Because of this, the proposed construction would likely have some impact on land. If bedrock is encountered during the construction process, mechanical techniques will be used to remove the rock to the proposed depths. Mechanical techniques include the use of large excavation equipment and / or pneumatic hammers to break apart and crush the rock. These techniques will result in temporary noise, dust, and vibrations that will quickly dissipate.

If mechanical techniques are not sufficient for removal of the bedrock, blasting may be required. The impacts from blasting will be mitigated to the greatest extents practicable by adhering to a blast monitoring and safety plan.

The elements of such a program include, but are not limited to the following:

- Precise engineering determination of the depth and location of on-site blasting.
- All blasting activities will be conducted by a Class A New York State Licensed blaster who is licensed to supervise and complete all types of explosives detonation.
- Obtain all necessary permits.
- Prior to any blasting activities, a pre-blast survey will be conducted of all structures within 500 feet of the actual blast site. The pre-blast surveys will include inspection and documentation of the existing conditions with video or photographic documentation. Once blasting is completed a post blast survey will also be conducted to verify that the blasting did not impact nearby structures.
- The blasting contractor will be limited to completing the individual blasts weekdays between the hours of 8:00 A.M. and 5:00 P.M. No blasting will be allowed on Saturday, Sunday or holidays.
- All neighbors within 500 feet of the outer limits of the blast area shall be advised by a writing delivered to each such neighbor (or posted upon the neighbor's front door if delivery cannot be personally accomplished) 24 hours in advance of the proposed schedule for blasting.
- Use of adequate and properly placed blasting mats to minimize rock lift and debris during blasts as necessary.
- The blasting contractor will be responsible for any damage or injury to any persons, property or structures as a result of his handling, storage, or use of the explosives.
- Although the New York State licensed blaster is directly responsible for the safety of the blasting operation at all times a site safety officer will be assigned to

coordinate activities between the blaster, other site workers (if present), and nearby residents.

Erosion Control:

To address concerns regarding erosion off site resultant from construction, an erosion and sediment control plan consistent with the NYSDEC stormwater design manual will be developed for the site to control erosion and dust during construction. All erosion and sediment control measures, including installation of a stabilized construction entrance, silt fence, diversion swales and check dams will be installed before any other construction begins on the site. These measures will remain in place throughout construction and will be monitored regularly for compliance with the NYSDEC Best Management Practices.

Grading:

The site grading has been carefully designed to minimize to balance cut and fill volumes to the greatest extent practicable. Approximately 86,000 CY of material will be exported for use off site. The material will be hauled via dump truck to a location within the Village limits.

3.2 WATER RESOURCES

3.2.1 Existing Conditions

3.2.1.1 Surface Waters

The site occurs within two distinct United States Geological Survey (USGS) Hydrologic Unit Code (HUC) 8-digit watersheds. The site occurs in both the Hackensack-Passaic watershed (USGS Cataloging Unit: 02030103) and the Hudson-Wappinger watershed (USGS Cataloging Unit: 02020008). The Hackensack-Passaic watershed encompasses over

725,725 acres and includes parts of New Jersey and New York. The Hudson-Wappinger watershed occupies 604,086 acres across New York State.

Reference mapping is reviewed for the project area including the USGS topographical map, National Wetland Inventory (NWI), NYSDEC Freshwater Wetland Maps, NYSDEC stream classification maps, and Federal Emergency Management Agency (FEMA) floodplain maps. The predominant surface water features in the vicinity of the project site depicted by reference mapping consist of several lakes and ponds including the Orange-Rockland Lakes, Monroe Ponds, Cromwell Lake, and Coronet Lake. Mapping depicts a tributary in the southeastern portion of the site, and a small freshwater wetland in the northeast corner of the site.

On site surficial features are identified by completion of a formal stream delineation. The Project may result in placement of fill in surface water resources on site. Ecological Solutions, LLC prepared a wetland delineation on site, and the findings are represented in an April 19, 2023 letter report (hereinafter "Wetland Report").

Streams in the State of New York are protected by Article 15 Use and Protection of Waters. Streams are given classifications that designate the level of protection afforded to each waterbody. Each waterbody identified within the AOI is classified according to Article 15. The waterbody classification categories are AA, A, B, C or D depending on their designated level of protection. Waters with classifications A, B, and C may also have a standard of (T), indicating that it may support a trout population, or (TS), indicating that it may support trout spawning (TS). Streams with a designation of C(T) or higher are considered "protected" waters of New York State. The on-site stream is identified as Waters Index Number 860-95 in New York State regulation and provided a Class C with C water quality standard designation.

NYSDEC indicates that this waterway is part of the Ramapo River and Mahwah River Drainage Basins. Specifically, the waterway is a tributary to the Ramapo River. The Classification of C indicates that it is not considered a “protected” waterway of the state. Navigable waterways are also protected under Article 15 Use and Protection of Waters. Navigable waters is defined in 6 NYCRR 608.1 as all lakes, rivers, streams and other bodies of water that are navigable in fact or upon which vessels with a capacity of one or more persons can be operated notwithstanding interruptions to navigation by structures, shallows, rapids or other obstructions, or by seasonal variations in capacity to support navigation. The waterway is not considered navigable due to its shallow depth and inability to support a vessel.

3.2.1.2 Wetlands

Wetlands are afforded protection under Section 404 of the Clean Water Act as Waters of the United States. The United States Army Corps of Engineers regulates the discharge of fill material into these protected resources. The method for identification and delineation of federally regulated wetlands is defined in the 1987 Corps of Engineers Wetland Delineation Manual[4] (hereinafter referred to as the USACE Manual) and 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0[5]. The NYSDEC regulates wetlands under Article 24 Freshwater Wetlands Act across New York State that are in excess of 12.4 acres or greater, or are identified as unique resources and have significant value (i.e. habitat for endangered species). The NYSDEC regulates all potential impacts to these resources and within 100 feet beyond the regulated boundary. State wetlands use the 1995 NYSDEC

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[4] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual: Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

[5] Environmental Laboratory. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0), Vicksburg, MS.

Freshwater Wetlands Delineation Manual to identify regulatory boundaries of these resources[6]. Reference mapping depicts a freshwater wetland in the northeast corner of the project site. The wetland report prepared for the project identified a resource in the northeast corner of the site.

3.2.1.3 Groundwater

The project is located within the footprint of a sole source aquifer (SSA). The project site overlays the Ramapo River Basin Aquifer System. The United States Environmental Protection Agency (EPA) indicates that SSA resources supply at least 50 percent of the drinking water for its services area, and there are no reasonably available alternative drinking water sources should the aquifer become contaminated (See Figure 5 – U.S. EPA Sole Source Aquifer (SSA) Map).

NYSDEC identifies primary and principal aquifers across New York State. Primary aquifers are “highly productive aquifers presently utilized as sources of water supply by major municipal water supply systems." Principal aquifers as “aquifers known to be highly productive or whose geology suggests abundant potential water supply, but which are not intensively used as sources of water supply by major municipal systems at the present time.” The project site is not located over a NYSDEC mapped primary or principal aquifer.

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[6] New York State Department of Environmental Conservation. 1995. New York State Freshwater Wetlands Delineation Manual.

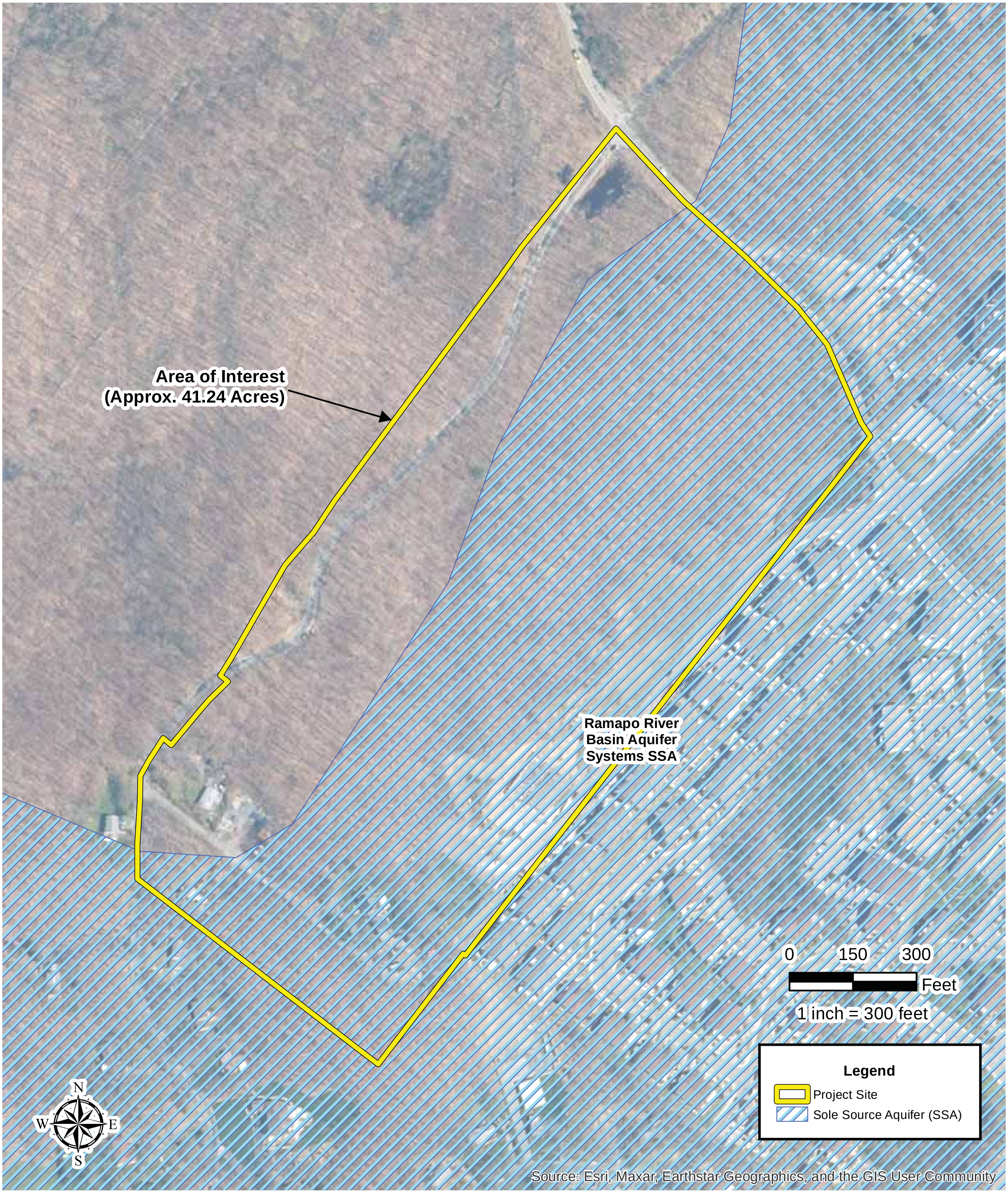

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Figure 5 | U.S. EPA Sole Source Aquifer (SSA) Map

Karlsburg Acres Development Project Site

Town of Palm Tree, Orange County, NY

3.2.1.4 Floodplains and Floodways

Floodplains are defined by Executive Order 11988, Floodplain Management, as “the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.” Floodplains are often discussed in terms of 100-year flood or base flood. The 100-year flood is a flood having a 1% chance of occurring in any given year. Floodplains can also be discussed in terms of a 500-year flood, a flood having a 0.2% chance of occurring in any given year. A floodway is a watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing surface water elevation more than a designated height. Often, communities regulate floodway development to ensure that there are no increases in upstream flood elevations.

The Federal Emergency Management Agency (FEMA) is responsible for mapping known floodplains and publishing these maps as Flood Insurance Rate Maps (FIRMs). The Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) is reviewed for the AOI. The FIRM depicted in Figure 6 shows no flood zones within the AOI.

One flood zone, Zone AE is located immediately adjacent to the eastern corner of the site. Zone AE represents areas with base flood elevations determined. Given the information included above, the proposed project would not result in a significant encroachment to the base floodplain.

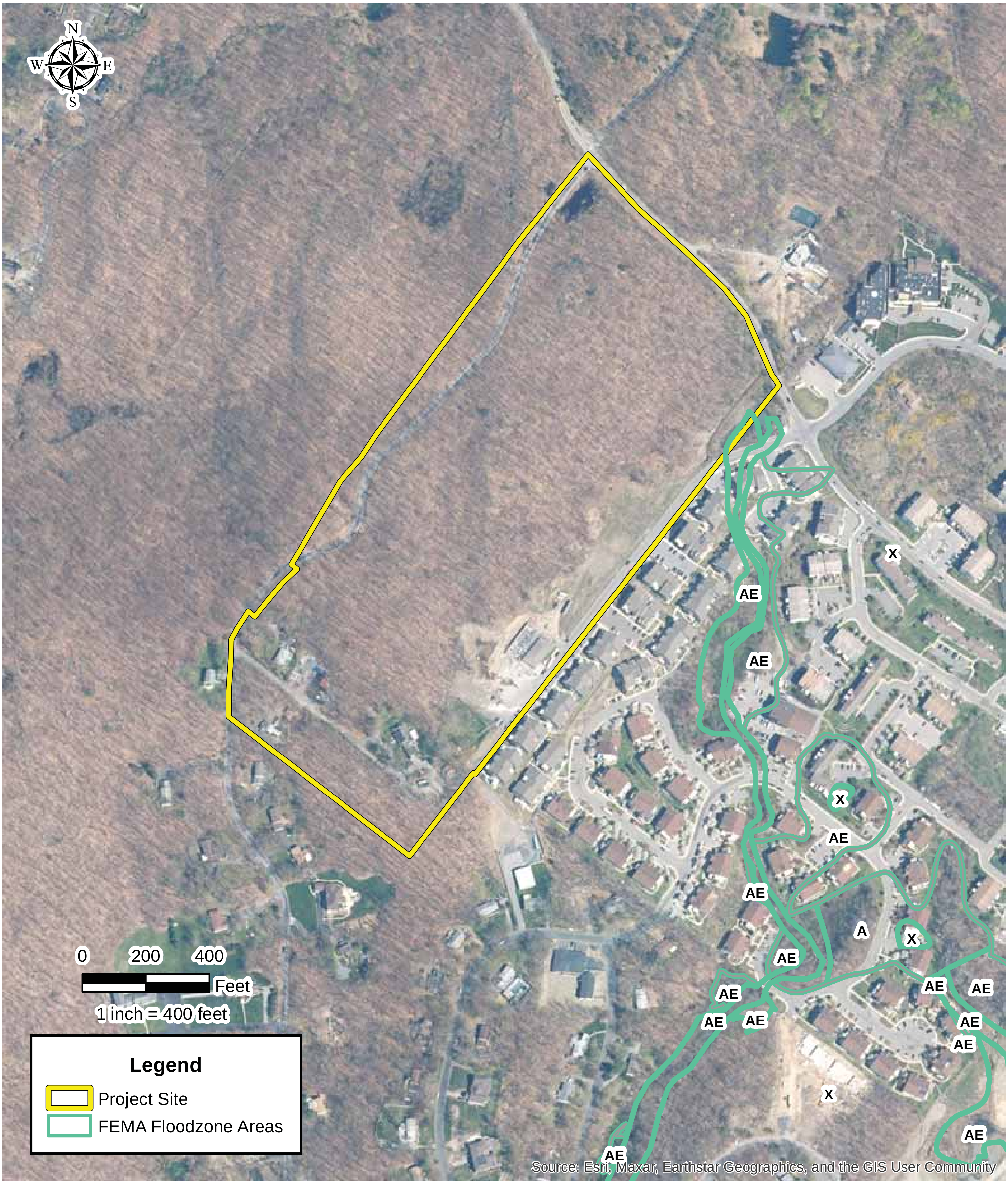

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Figure 6 | FEMA Floodzone Areas Map

Karlsburg Acres Development Project Site
Town of Palm Tree, Orange County, NY

3.2.1.5 Stormwater

New York State stormwater regulations mandate that the owner or operator of a construction project that will involve soil disturbance of one or more acres must obtain coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity. Soils disturbance will exceed the one-acre threshold; therefore, coverage under NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, General Permit Number GP-0-20-001, effective January 29, 2020 through January 28, 2025 is required. A complete SWPPP will be prepared to mitigate onsite soil disturbances, erosion & sediment control; as well as stormwater quality and quantity controls.

3.2.2 Potential Impacts

3.2.2.1 Construction

3.2.2.1.1 Surface Waters

The proposed project may impact surface waters mapped on site. Waterway impacts will occur as a result of the project and permits under Section 404 of the Clean Water Act will be required. The proposed project will be coordinated with the USACE and NYSDEC and will receive necessary approvals prior to construction, including any Nationwide Permits and associated requirements necessary to comply with federal and state regulations.

All necessary permits will be obtained prior to construction. Construction activities will be completed consistent with both the NYSDEC and USACE applicable conditions as outlined in permits to be received from both agencies.

3.2.2.1.2 Wetlands

A wetland delineation report was prepared for the project site. The proposed project will result in direct impacts to the wetland identified in the northeastern portion of the project site. This activity will require authorization from the United States Army Corps of Engineers under Section 404 of the Clean Water Act. The proposed project will be coordinated with the USACE and NYSDEC and will receive necessary approvals prior to construction, including any Nationwide Permits and associated requirements necessary to comply with federal and state regulations.

All necessary permits will be obtained prior to construction. Construction activities will be completed consistent with both the NYSDEC and USACE applicable conditions as outlined in permits to be received from both agencies.

3.2.2.1.3 Groundwater

The project is located within the footprint of the Ramapo sole source aquifer. No adverse impacts to the aquifer are anticipated during construction. The proposed action is larger than one acre in size and therefore will require a SWPPP. A SWPPP ensures that both runoff quality and quantity from a proposed action will have no negative impact on the site or surrounding sites. Where practicable, compliance with a SWPPP can provide improved water quality and discharge when compared to pre-developed conditions.

3.2.2.1.4 Floodplains and Floodways

Project activities will occur outside regulated floodplain and floodway areas. No impacts to these resources will occur during construction.

3.2.2.1.5 Stormwater

The Project's construction will disturb more than one acre and create additional stormwater runoff during construction. The Clean Water Act states that storm water discharges associated with an industrial activity from a point source, including through a separate municipal storm sewer system, is unlawful unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. In New York State, the NYSDEC administers the NPDES through the SPDES program. According to the SPDES General Permit, construction sites or common plans of development, that result in soil disturbance of one or more acres that are not classified single family residential or agricultural, are subject to permitting requirements.

During construction, stormwater will be managed in accordance with the site-specific SWPPP required by the SPDES General Permit. Once available during construction, stormwater will be directed to the on-site stormwater management facilities which allow for infiltration and overflow into the Village's storm sewer system.

3.2.2.2 Operation

3.2.2.2.1 Surface Waters

No impacts to surface waters will occur during operation of this project.

3.2.2.2.2 Wetlands

No impacts to wetlands will occur during operation of this project.

3.2.2.2.3 Groundwater

The project is located within the footprint of the Ramapo sole source aquifer. No adverse impacts to the aquifer are anticipated during project operations as a result of the following:

1. For the proposed action, the SWPPP will be designed in accordance with state and local requirements and will include post-construction stormwater management practices which limit off-site discharges to rates less than or equal to existing rates. These practices will also provide treatment for the initial surface runoff, or the “first flush” which is the most contaminated runoff if left untreated. Currently, infiltration is the preferred treatment practice for the site. Infiltration replenishes ground water, has a small surface footprint, and uses the existing soil profile to provide natural treatment of the water. It is our belief that with both water quality and water quantity managed and treated to pre-development conditions, runoff from the proposed action will not have a negative impact.
2. Water supply for this project will rely upon the Village of Kiryas Joel Municipal Water Supply. This water supply comes from groundwater wells installed within the aquifer. The anticipated use of groundwater from this project is not expected to result in adverse impacts to the aquifer or groundwater supply.
3. The project does not involve use or disposal of hazardous materials, or the bulk storage of petroleum or chemical products that could potentially contaminate local groundwater supplies.
4. In addition, no change in drainage patterns is anticipated as a result of this project.

3.2.2.2.4 Floodplains and Floodways

No impacts to floodplains and floodways will occur as a result of this project.

3.2.2.2.5 Stormwater

Storm water runoff flows are expected to increase as positive drainage and the percent of impervious areas grow beyond existing conditions as a result of site development and operations. As such, portions of the stormwater volume which previously may have percolated to groundwater, evaporated, or been taken up by vegetation may be directed to the municipal storm sewer system or adjacent land areas. As noted in the geotechnical report, the site is situated on shallow bedrock and as such, many runoff reduction techniques are not appropriate to use on site as they would have higher potential for failure or fissuring of bedrock. Runoff will be reduced across the development by using a series of dry swales and bioretention areas constructed using imported bioretention media. Pollutants associated with surface runoff will be reduced by providing subsurface water quality control units across the site to treat flows prior to discharge. The water quality units will treat for solids removal in addition to pollutants like phosphorus and nitrogen. Increased stormwater flows will be detained on-site using subsurface detention chambers which will release water into the municipal system at rates below the existing discharge rates off of the site. Following construction, the intention is for the on-site stormwater practices to provide increase treatment and decreased rates when compared to the existing site runoff.

3.2.3 Proposed Mitigation

3.2.3.1.1 Surface Water

Surface waters were delineated, and a wetland delineation report was prepared for the project. The need for compensatory mitigation will be based on the NYSDEC and USACE regulatory requirements. In the event compensatory mitigation is required, the preferred mitigation option would be to acquire credits from an approved in-lieu fee program. Suitable in-lieu fee programs occur near the project site and availability of credits is anticipated.

3.2.3.1.2 Wetlands

Wetlands were delineated, and a wetland delineation report was prepared for the project. The need for compensatory mitigation will be based on the NYSDEC and USACE regulatory requirements. In the event compensatory mitigation is required, the preferred mitigation option would be to acquire credits from an approved in-lieu fee program. Suitable in-lieu fee programs occur near the project site and availability of credits is anticipated.

3.2.3.1.3 Groundwater

No permanent impacts to groundwater resources will occur as a result of this project, and therefore no mitigation is required.

3.2.3.1.4 Floodplains and Floodways

No permanent impacts to floodplain and/or floodway resources will occur as a result of this project, and therefore no mitigation is required.

3.2.3.1.5 Stormwater

The Contractor shall meet all conditions of this SWPPP and all conditions within the NYSDEC SPDES General Permit for Stormwater discharges from Construction Activities - Permit No. GP-0-20-001 dated January 29, 2020. The contractor shall be responsible for all measures of the SWPPP including being responsible for any subcontractors who may implement the SWPPP.

3.3 CLIMATE AND AIR QUALITY

3.3.1 Existing Conditions

3.3.1.1 <u>Climatic Conditions</u>

In partnership with the Natural Resources Conservation Service (NRCS) National Water and Climate Center (NWCC), the PRISM Climate Group at Oregon State University produces continuous digital temperature and precipitation maps of the U.S., using the point data collected from NWCC substations. The data sets are created using the PRISM (Parameter-elevation Regressions on Independent Slopes Model) climate mapping system. PRISM data sets are recognized as the highest quality spatial climate data sets currently available and the maps produced from the PRISM system have undergone an extensive peer-review process. Based on the data collected between 2000 and 2021, the average daily maximum temperature for the Project site is 59.6°F, and the average daily minimum is 41.8°F. The average annual precipitation for the Project site between 2000 and 2021 is 50.8 inches.[7]

3.3.1.2 Air Quality

The NYSDEC Division of Air Resources publishes air quality data for New York State annually. The most recent summary of air quality data available for the state is the New York State Ambient Air Quality Report for 2020. Included in this report are the most recent ambient air quality data, as well as long-term air quality trends derived from data that have been collected and compiled from numerous state and private (e.g., industrial, utility) monitoring stations across the state. These trends are assessed and reported by NYSDEC regions. The Project site is located in NYSDEC Region 3, which encompasses Sullivan, Ulster, Dutchess, Orange, Putnam, Westchester, and Rockland Counties. There are eight monitoring stations/sites in Region 3; four stations are located in Orange County. The four Orange County stations are identified as Valley Central, Wakefern, Newburgh, and Walkill. Mt. Ninham in Putnam County monitors sulfur dioxide and ozone. Millbrook in Dutchess County measures sulfur dioxide and ozone. Belleayre Mountain in Ulster County measures sulfur dioxide, and the Rockland County site in Rockland County measures inhalable particulates and ozone. The Newburgh site measure inhalable particulates. The White Plains site in Westchester County measures inhalable particulates and ozone. Valley Central measures ozone, and the Wallkill site in Orange County measures lead.

[7] https://prism.oregonstate.edu/recent/ accessed December 14, 2022

The Clean Air Act requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. In 2020, all Region 3 sampling points were within the acceptable levels for all tested parameters.

According to the U.S. Environmental Protection Agency (USEPA) Toxic Release Inventory (TRI) Program website, there were approximately 811,031 lbs of on-site releases to the air in Orange County in 2012, with an average of 967 lbs released per square mile. These releases consisted of ammonia (75%), certain glycol ethers (13%), n-Butyl alcohol (12%), Xylene, Toluene and other toxic chemicals combine for 1%. The TRI data indicates that one large corporation occurs within 10 miles of the project. The facility is Nexans Energy USA Inc. and is not considered high risk according to the USEPA.

The NYSDEC and USEPA set NAAQS for criteria pollutants, such as ozone (O_3), carbon monoxide (CO), particulate matter (PM10 and PM2.5) nitrogen dioxide (NO_2), and sulfur dioxide. Ground level ozone is generated through the photochemical reaction between oxides of nitrogen (NO_x) and volatile organic compounds (VOCs). According to the USEPA Green Book, Orange County is currently in maintenance for PM-2.5 (2006).

3.3.2 Potential Impacts

3.3.2.1 Construction

Potential construction emissions were analyzed for the proposed project. A construction emissions inventory was conducted to determine the expected emissions associated with heavy equipment, deliveries, and worker mobilization, and an air quality assessment is completed (See Appendix A). The assessment indicates that the proposed project will not create significant adverse impacts relative to air quality during construction.

3.3.2.2 Operation

Operational emissions were also reviewed within the air quality assessment. The two primary sources of emissions are vehicles using the project site and from sources used to heat and power onsite structures.

According to the Traffic Impact Study completed for this project (dated September 7, 2022), the proposed project is not expected to significantly increase the number of vehicles traveling to and from the area (i.e. no increase over background growth); therefore, no significant increase in operational emissions from motor vehicles is anticipated. However, the proposed project will cause an increase in stationary emissions necessary to heat and power the various buildings.

Natural gas usage for the proposed buildings was calculated based on the total square footage of the proposed buildings multiplied by the typical heating value of 60 BTU per square foot, an efficiency of 90%, and the conservative estimate of the combustion sources operating half the year (4,380 hours per year). Electrical consumption of the proposed building was estimated based on an assumed watts per square foot, and emissions were calculated using regional emission factors from the EPA's Emissions & Generation Resource Integrated Database (eGrid2020, released on January 27, 2022) for the NPCC Upstate New York region. Anticipated emission increases of criteria pollutants during operations were calculated with the aforementioned assumptions for the proposed project. In summary, the proposed project is not anticipated to increase air emissions significantly. No adverse impacts to air quality are anticipated.

3.3.3 Proposed Mitigation

3.3.3.1 <u>Construction</u>

No impacts to air quality during construction are anticipated, and therefore no mitigation is necessary.

3.3.3.2 <u>Operation</u>

No impacts to air quality during project operations are anticipated, and therefore no mitigation is necessary.

3.4 VEGETATION AND WILDLIFE

3.4.1 Existing Conditions

3.4.1.1 <u>Vegetation</u>

3.4.1.1.1 Ecological Communities

In March 2014, the NYSDEC published a report entitled *Ecological Communities of New York State*[8], Second Edition (*Ecological Communities*) as part of the New York Natural Heritage Program inventory. The report is a revised and expanded version of the original 1990 version that lists and describes ecological systems, subsystems, and communities within New York State. The classification was developed to help assess and protect biological diversity of the state. An assessment of the vegetative cover types within the proposed project area was conducted consistent with the representative characteristics presented in *Ecological Communities*.

[8] Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2014. *Ecological Communities of New York State; Second Edition* [website]. Available at: https://www.nynhp.org/documents/39/ecocomm2014.pdf (Accessed September, 2022).

Based on review of aerial photography and information collected during site visits, the project site is primarily comprised of chestnut oak forest. It also contains a vernal pool, and an intermittent stream, portions of which are considered a ditch/artificial intermittent stream, as well as paved roads and urban exterior structures associated with residential development.

A formal assessment of ecological cover types present in the project area is discussed in detail in the *Rare, Threatened, and Endangered Species Habitat Assessment* produced by C&S staff, provided in Appendix C. Ecological cover types are also discussed in a *Technical Memorandum* produced by C&S staff, provided in Appendix D.

3.4.1.1.2 Significant Natural Communities / Rare Plant Species

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) online service was consulted for this project. The IPaC is used to obtain a USFWS Official Species List (See Appendix E) that identifies the potential presence of federally listed rare, threatened, and endangered species near a proposed action that may be affected by project activities. The USFWS Official Species List dated April 7, 2022 lists one plant, small whorled pogonia (*Isotria medeoloides*). Lastly and according to the IPaC system, there are no critical habitats located within the property and no other Federally threatened or endangered species, or environmentally-sensitive habitat areas were identified.

The NYSDEC Environmental Resource Mapper (ERM) website provides generalized locations of animal and plant species listed as endangered or threatened known to occur within the vicinity of an action. The ERM uses the New York Natural Heritage Program (NYNHP) Database with respect to rare species. It is an interactive mapping application that depicts NYNHP data with added buffering; the buffering is species dependent and is intended to depict precise locations of protected species and establish a range where each individual species may occur. The ERM (See Appendix E) indicates that the project is located in the vicinity of rare plants listed as endangered, threatened, or rare by New York State. Accordingly, NYNHP has been contacted in respect to rare, threatened, and endangered species.

The response from NYNHP, dated May 31, 2022, listed one ecological community, pitch-pine-oak-heath rocky summit within 1/3-mile northeast of the AOI, and two plants, glaucous sedge (*Carex glaucodea*) and green rock cress (*Borodinia missouriensis*), each within 250 yards north of the AOI.

3.4.1.1.3 Invasive Plant Species

An invasive species is an organism that has been purposefully or accidentally introduced outside its original geographic range, and is able to proliferate and aggressively alter its new environment, potentially causing harm to the economy, environment, or human health. Invasive plant species spread in several different ways. Dispersal mechanisms include wind, water, wildlife, vegetative reproduction, and human activity. Populations of invasive species typically establish most readily in places where the ground has been disturbed, thereby exposing the soil. Field surveys identified the following invasive species at the Project site: garlic mustard (*Alliaria petiolata*), purple loosestrife (*Lythrum salicaria*), Japenese stilt grass (*Microstegeum vimineum*), and honeysuckle (*Lonicera spp.*).

3.4.1.2 Fish and Wildlife

Fish and wildlife resources at the Project site were identified through analysis of existing data sources, correspondence with the NYNHP, and on-site field surveys conducted by C&S. Specific information on fish and wildlife resources at the site is presented below, organized into sub-sections focused on birds, mammals, reptiles and amphibians, fish, wildlife habitat, and threatened and endangered species. A complete list of wildlife species documented in the vicinity of the site, including scientific names, is included in Appendix E.

3.4.1.2.1 Birds

To determine the type and number of bird species present at the Project site, existing data sources were consulted. Sources of information included the following:

- USGS Breeding Bird Survey (BBS);
- USFWS;
- NYS Breeding Bird Atlas (BBA);
- Audubon Christmas Bird Count (CBC); and
- On-site observations

Based on existing data, on-site investigations, existing habitat conditions, and species range, it appears that approximately 130 avian species could use the Project site at some time throughout a given year. Details on the Project site's avian community are presented below:

<u>Breeding Birds</u>

The North American Breeding Bird Survey (BBS), overseen by the Patuxent Wildlife Research Center of the USGS, is a long-term, large-scale, international avian monitoring program that tracks the status and trends of North American bird populations. Each survey route is 24.5 miles long, with 3-minute point counts conducted at 0.5-mile intervals. During the point counts, every bird seen or heard within a 0.25-mile radius is recorded. The Westbrookvle (61013) is the nearest BBS survey route with recent data (2019); this route is approximately 24 miles northwest of the Project site. The most commonly observed species include red-winged blackbird (*Agelaius phoeniceus*), European starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), American crow (*Corvis* *brachyrhynchos*), house sparrow (*Passer domesticus*), barn swallow (*Hirundo rustica*), common grackle (*Quiscalus quiscula*), song sparrow (*Melospiza melodia*), mourning dove (*Zenaida macroura*), rock pigeon (*Columba livia*), and grey catbird (*Dumetella carolinesis*)[9].

The BBS also documented no state-listed threatened or endangered species. However, ten state-listed species of special concern sharp-shinned hawk (*Accipiter striatus)*, Cooper's hawk (*Accipiter cooperii)*, osprey (*Pandion haliaetus)*, horned lark (*Eremophila alpestris)*, golden-winged warbler (*Vermivora chrysoptera)*, yellow-breasted chat (*Icteria virens)*, vesper sparrow (*Pooecetes gramineus)*, and grasshopper sparrow (*Ammodramus savvanarum*). However, these species have generally been detected in very low numbers. No federally-listed endangered or threatened species were observed.

The NYS Breeding Bird Atlas (BBA) is a comprehensive, statewide survey that indicates the distribution of breeding birds in New York State. Point counts are conducted by volunteers within 5-km by 5-km survey blocks across the state[10]. The Project site is located within New York State BBA block 5657A. The number of species observed in the Atlas 2000 project (covering 2000-2005) totaled 79 different species. These species are very similar to that indicated by the BBS. No additional state and/or federally-listed endangered or threatened species were observed in the vicinity of the Project site during the Atlas 2000 project.[11]

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[9] US Department of the Interior, US Geological Survey, & Patuxent Wildlife Research Center. *The North American Breeding Bird Survey* [website]. Available at: https://www.pwrc.usgs.gov/BBS/index.cfm (Accessed August*, 2022*).

[10] McGowan, K. J., Corwin, K. J. 2008. The Second Atlas of Breeding Birds in New York State. Cornell University Press, Ithaca, NY.

[11] NYSDEC. 2014b. *New York State Breeding Bird Atlas* [website]. Available at: http://www.dec.ny.gov/animals/7312.html (Accessed April 18, 2014). Fish, Wildlife & Marine Resources, Albany, NY.

Wintering Birds

Most avian species present in the summer breeding season migrate south for the winter leaving only year-round species that are not seasonally displaced (e.g., black-capped chickadee [*Poecile atricapillus]*), and species that travel south from more northern climates to winter in New York (e.g., American tree sparrow [*Spizella arborea*], rough-legged hawk [*Buteo lagopus*], and snowy owl [*Bubo scandiacus*]). Data from the Audubon's Christmas Bird Count (CBC) provides an overview of the birds that inhabit the region during early winter. The primary objective of the CBC is to monitor the status and distribution of wintering bird populations across the Western Hemisphere. Counts take place on a single day during a three-week period around Christmas, when birdwatchers comb a 15-mile (24 km) diameter circle in order to tally up all bird species and individuals observed. The Project site lies within the Southern Orange count circle.

The number of wintering species observed in this count circle in 2021 totaled 109 unique species. The most common wintering bird species observed were Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), black vulture, common grackle, American crow, European starling, dark-eyed junco (*Junco hyemalis*), American robin, white-throated sparrow (*Zonotrichia albicollis*), and house sparrow. The CBC also documented two state-listed threatened species (northern harrier, and bald eagle [*Haliaeetus leucocephalus*]), and two state-listed species of special concern Cooper's hawk, and red-shouldered hawk (*Buteo lineatus*). No federally-listed endangered or threatened species were recorded.[12]

3.4.1.2.2 Mammals

Due to a lack of existing data regarding mammals at the Project site, the occurrence of mammalian species was documented through on-site field surveys and evaluation of

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[12] National Audubon Society. 2014. *Audubon Christmas Bird Count* [website]. Available at: http://netapp.audubon.org/CBCObservation/ (Accessed April, 2014).

available habitat. Field surveys documented the presence of three species at the Project site, through direct visual observation or signs of their occurrence such as tracks or scat. These species include whitetail deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), and woodchuck (*Marmota monax*). In addition, the project site provides suitable habitat for raccoon (*Procyon lotor*), muskrat (*Ondatra zibethicus*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), coyote (*Canis latrans*), various bats, and a variety of small mammals, such as squirrels, chipmunks, mice, voles, moles, and shrews. All of these species are common and widely distributed throughout New York State.

3.4.1.2.3 Reptiles and Amphibians

Reptile and amphibian presence at the Project site was determined primarily through review of *The Amphibians and Reptiles of New York State*[13]. This reptile and amphibian resource book is based on the New York State Amphibian and Reptile Atlas. The Atlas Project was a 10-year survey (1990 through 1999) designed to document the geographic distribution of the state's herpetofauna. Atlas data were collected and organized according to USGS 7.5-minute quadrangles.[14] Based on this data, along with documented species ranges and existing habitat conditions, it is estimated that approximately 22 reptile and amphibian species could occur in the vicinity of the Project site. Of these, one species, northern water snake (*Nerodia sipedone*), was documented on-site by C&S. Species not observed, but likely to occur in the area include leopard frog (*Rana pipiens*), American toad (*Bufo americanus*), northern dusky salamander (*Desmognathis fuscus*), red-spotted newt (*Notophthalmus viridescens*), northern two-lined salamander (*Eurycea bislineata*), northern redback salamander (*Plethodon cinereus*), northern slimy salamander (*Plethodon glutinosus*), brown snake (*Storeria dekays*), and common garter snake

[13] Gibbs, J.P., A.R. Breisch, P.K. Ducey, G. Johnson, J.L. Behler, and R.C. Bothner. 2007. The Reptiles and Amphibians of New York State. Oxford University Press. New York, NY.

[14] NYSDEC. 2007. New York State Amphibian and Reptile Atlas Data. Bureau of Wildlife, Albany NY. November 20, 2007.

(*Thamnophis sirtalis*). All of these species are common and widely distributed throughout New York State.

3.4.1.2.4 Fish

On site surveys for waterways resulted in the identification of one intermittent waterway within the project area. The NYNHP indicates that fauna occupying intermittent streams is limited to species that do not require a permanent supply of running water, and that inhabit the streambed only during the raining season or are pool specialists. No pools were identified within the portion of the stream that occurs in the project area. Fish are not anticipated within the project area given the onsite characteristics of the aforementioned waterway.

3.4.1.2.5 Wildlife Habitat

There are no New York State Wildlife Management Areas (WMAs) or Bird Conservation Areas (BCAs) within the Project site. The nearest State WMAs include the Bashakill WMA (located 21 miles northwest of the Project site), and the Baxtertown Woods WMA (located 19 miles northeast of the Project site). The Sterling Forest BCA is the closest BCA to the project site, and is located approximately 11 miles to the south. The Bashakill BCA occurs within the Bashakill WMA as well

As previously described, the Project site is dominated by chestnut oak forest, and also contains a vernal pool, and an intermittent stream. The value of these communities to various wildlife species is summarized below:

<u>Chestnut oak forest</u>

The forestland on-site is generally an open woodland, with medium sized trees. The diameter at breast height (dbh) of trees in this area range from 8 to 20 inches. The density of the understory shrubs is fairly sparse. The project parcel is relatively small; however, it should be noted that it is connected to a very large expanse of wooded area. The Project site provides habitat for avian wildlife species that utilize late successional forests, such as American goldfinch, American robin, Baltimore oriole, black-capped chickadee, blue jay, cedar waxwing, downy woodpecker, eastern bluebird, eastern phoebe, gray catbird, house finch, indigo bunting, mourning dove, northern cardinal, northern flicker, northern mockingbird, purple finch, red-bellied woodpecker, rose-breasted grosbeak, ruby-throated hummingbird, tufted titmouse, various warblers, and white-breasted nuthatch. Whitetail deer and eastern cottontail are typically found foraging in this type of habitat. In addition, many of the shrub species found in these areas produce berries, which provide food sources for birds and mammals such as raccoon, striped skunk, and opossum.

Vernal pool

The vernal pool community is inundated during the spring and fall seasons. Some standing water is observed in the summer months; however, emergent vegetation dominates this ecological community during the summer. These communities provide habitat for a few amphibians and reptiles including a large number of salamanders and frogs. Species assumed likely to occur in the area include bull frog, leopard frog, American toad, spring peeper (*Pseudacris crucifer*), red-spotted newt, northern two-lined salamander, and northern redback salamander. A northern water snake was observed in this community during field surveys.

Intermittent stream

The NYNHP indicates that fauna occupying intermittent streams is limited to species that do not require a permanent supply of running water, and that inhabit the streambed only during the raining season or are pool specialists. No pools were identified within the portion of the stream that occurs in the project area. The waterway in the project area provides habitat for amphibians including green frog (*Rana clamitans*) and northern two-lined salamander.

3.4.1.2.6 Threatened and Endangered Wildlife Species

The USFWS Official Species List dated April 7, 2022 lists two mammals, Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*), one reptile, bog turtle (*Glyptemys muhlenbergii*), and one insect, monarch butterfly (*Danaus plexippus*). Lastly and according to the IPaC system, there are no critical habitats located within the property and no other Federally threatened or endangered species, or environmentally-sensitive habitat areas were identified.

The ERM (See Appendix E) indicates that the project is in the vicinity of bats listed as endangered or threatened. Accordingly, NYNHP has been contacted in respect to rare, threatened, and endangered species. The response from NYNHP, dated May 31, 2022, listed two mammals, Indiana bat and northern long-eared bat, each within 1.5 miles of the project site.

3.4.2 Potential Impacts

3.4.2.1 <u>Construction</u>

3.4.2.1.1 Vegetation

Project construction will result in temporary and permanent impacts to vegetation at the Project site. All of the plant species observed at the Project site are common in New York State. Therefore, no plant species will be extirpated or significantly reduced in abundance because of construction activities.

Construction-related impacts to vegetation include cutting/clearing, removal of stumps and root systems, and increased exposure/disturbance of soil. Along with direct loss of (and damage to) vegetation, these impacts can result in a loss of wildlife food and cover, increased soil erosion and sedimentation, a disruption of normal nutrient cycling, and the introduction or spread of invasive plant species. Impacts to vegetation will result from site preparation, earth-moving, and excavation/backfilling activities associated with construction / installation of staging areas, access roads, foundations, buried utilities, lawns, and landscaping. In addition to the latter activities, impacts to vegetation may also result from potential blasting activities for grading purposes. These activities will result in disturbance of approximately 32 acres of vegetation primarily associated with chestnut oak forest habitat, as well as intermittent stream and vernal pool habitats.

3.4.2.1.2 Fish and Wildlife

Construction-related impacts to wildlife are anticipated to consist of limited incidental injury and mortality due to construction activity and vehicular movement, construction-related silt and sedimentation impacts on aquatic organisms, habitat disturbance / loss associated with clearing and earth-moving activities, and displacement of wildlife due to increased noise and human activities. Each of these potential impacts is described below:

<u>Incidental Injury or Mortality</u>

Incidental injury and mortality should be limited primarily to sedentary / slow-moving species such as small mammals, reptiles, and amphibians that are unable to move out of the area being disturbed by construction. If construction occurs during the nesting season, wildlife subject to mortality could also include the eggs and / or young offspring of nesting birds, as well as immature mammalian species that are not yet fully mobile. More mobile species and mature individuals should be able to vacate areas that are being disturbed by construction.

Silt and Sedimentation

Earth-moving activities (including foundation excavation and back-fill, installation of buried utilities, widening of existing roads, and construction of new access roads) may result in sediment and siltation impacts to aquatic habitat. These impacts are most likely to occur downslope of areas subject to significant earth-moving activity. Siltation and sedimentation of water bodies can adversely affect water quality and aquatic habitat. It can also interfere with the respiration of aquatic organisms and the survival of fish and amphibian eggs and larvae.

New York State stormwater regulations mandate that the owner or operator of a construction project that will involve soil disturbance of one or more acres must obtain coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity. The project is designed to minimize soil disturbance; however, coverage under NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity, General Permit Number GP-0-20-001, effective January 29, 2020 through January 28, 2025 is required. A complete SWPPP will be prepared to mitigate onsite soil disturbances, erosion & sediment control; as well as stormwater quality and quantity controls. The project will utilize erosion control methods under the SWPPP to avoid impacting aquatic resources downstream from the Project Site. Further, stormwater will be controlled and treated accordingly before being allowed to flow offsite.

Habitat Disturbance/Loss

Approximately 32 acres of chestnut oak forest habitat, vernal pool habitat, and intermittent stream will be lost as a result of the proposed project; the remainder of the project area contains paved roads and areas already cleared or developed, which currently provide minimal fish and wildlife habitat. The majority of the project site will be converted to residential development, with minimal acreage dedicated to mowed lawn and landscape space. Depending on the timing of construction activities, project construction may reduce the availability of stopover habitat for migratory birds at the project site, both directly, through the loss of habitat, and indirectly, by inducing avoidance of stopover habitat in response to visual and / or noise disturbance. However, it should be noted that ongoing residential construction activities have been taking place surrounding the proposed project location.

Displacement

Some wildlife displacement will also occur due to the noise and human activity associated with Project construction. The significance of this impact will vary by species and the seasonal timing of construction activities. Within New York State, peak breeding time for birds common to successional forest and grassland habitat occurs in late spring and early summer (i.e., May and June). If construction begins before the initiation of breeding activities, then most breeding birds would likely avoid nesting in active construction areas. If construction begins during the breeding season, then some breeding birds are expected to remain in the area, increasing their risk of construction-related injury or mortality, while others will likely relocate to similar habitats nearby, if available. Additionally, the areas surrounding the proposed Project Site have been subjected to ongoing residential construction efforts, particularly in recent years. Therefore, wildlife in and around the Project Site has likely habituated to noise and human activity associated with construction efforts, as well as residential land use. Significant impacts associated with wildlife displacement are not anticipated.

3.4.2.1.3 Threatened and Endangered Species

Below is a description of the project’s potential to impact species identified in the USFWS IPaC Resource List and the NYNHP list:

Indiana Bat

Indiana bats are listed as endangered at both the state and federal level, and many details of the species ecology are contained in the draft recovery plan prepared by USFWS[15]. These bats over-winter in caves and mines and migrate to summer habitat as early as mid-April in New York. Suitable winter habitat (hibernacula) includes underground voids such as caves or abandoned mines where winter temperature remains below 50° Fahrenheit (10°C) and above freezing, and are relatively stable. Suitable summer habitat for the Indiana bat consists of trees greater than 2.5 inches in diameter at breast height (dbh), with cracks, crevices, or exfoliating bark[16].

During summer, groups of females, their dependent pups, and occasional males form groups called maternity colonies. Maternity colonies may be spread among multiple trees with individual bats changing roosts every few days. Trees used by large portions of a maternity colony for all or part of the summer are termed primary roosts. Trees used by smaller numbers of bats for short periods of time are called alternate roosts. Primary roost trees are typically large dead or dying trees with exfoliating bark that usually receive direct sunlight for more than half the day; habitats most typical for primary roosts include riparian zones, bottomland and floodplain forests, forested wetlands, and upland communities at elevations less than 900 feet above mean sea level (North American Vertical Datum of 1988)[17]. Males tend to roost individually or in small numbers in trees with exfoliating bark, cracks, and crevices. Throughout the summer, Indiana bats forage in semi-open to closed (open understory) forested habitats, forest edges (i.e. fencerow,

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[15] U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp.

[16] U.S. Fish and Wildlife Service (USFWS). May 2017. Indiana Bat Project Review Fact Sheet, New York Field Office. 4 pp.

[17] U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp.

maintained right-of-way corridor), and riparian areas. Most bats leave their summer areas by October and return to the caves.

The USFWS IPaC and NYNHP (See Appendix E) both indicate that the project is within the range of Indiana bats. The 2007 draft recovery plan indicates that the nearest hibernacula is located within Ulster County, New York approximately 30-miles north of the AOI. The 2007 draft recovery plan also indicates that eight extant maternity colonies exist within Orange County, New York. The ERM indicates records (i.e. summer roosts, hibernacula) for Indiana bat within the vicinity of the project. The USFWS IPaC and NYNHP (See Appendix E) indicate that the project is within the range of Indiana bats. The 2007 draft recovery plan does not list hibernaculum for Indiana bat within Orange County; however, further correspondence with NYNHP staff confirmed that the survey year for Indiana bat hibernaculum that was reported in the NYNHP letter was 2011, after the draft recovery plan was released. Given that the project is within the range of the species, the possibility exists for this species to use the site during the summer months.

The project site consists of chestnut oak forest with an intermittent stream system in the eastern corner of the site. It is dominated by chestnut oak and red oak (both species ranging from 8 to 20-inch dbh), with an eastern hemlock (*Tsuga canadensis*) stand (14 to 16-inch dbh) in the northeastern portion of the site. Young shagbark hickory (*Carya ovata*), approximately 9 to 10-inch dbh, were sparsely scattered throughout the site. American beech (*Fagus grandifolia*) was also located throughout the site, ranging from 15 to 24-inch dbh with more mature trees. Five potential roost trees were identified by C&S staff during the April 12, 2022 site visit (See Appendix C and Appendix D). Two chestnut oak trees, each with approximately 24- inch dbh were identified in the northern and eastern portions of the AOI. Three shagbark hickory trees (9-inch, 10-inch, and 12-inch dbh) were identified in the central and southern portions of the AOI. The NYSGIS

Clearinghouse website indicates that minimal disturbance has occurred within the AOI since 1994.[18]

Given the habitat suitability, a detailed analysis of the site is completed relative to potential impacts to the species. The assessment is described in detail in the *Rare, Threatened, and Endangered Species Habitat Assessment, Karlsburg Acres Project Site* completed by C&S Engineers, Inc. and dated August 2022. C&S conducted formal habitat assessment for the project site including the potential for it to provide roosting and foraging habitat for Indiana bats. An experienced biologist traversed the site to identify trees and habitat patches that are biologically similar and suitable for use by roosting and foraging bats. Potential roost trees are surveyed as part of the walkover as well. Potential roosts are defined as any tree, regardless of health (live, partially dead, or dead), dbh, or surrounding landscape features (canopy closure, solar exposure, understory clutter, relative distance from edges, travel corridors, and water) that exhibits at least one roosting structure (exfoliating bark, cracks and crevices, or cavities). Individual trees may be considered suitable habitat when they exhibit preferred characteristics and are within 1,000 feet of other forested habitat.

The report resulted in identification of 31.47 acres of moderate roosting / high foraging habitat, 0.27 acre of low roosting / high foraging habitat, 0.16 acre of no roosting/high foraging habitat, and 9.34 acres of no roosting/no foraging habitat.

C&S completed an assessment of the percent forest cover within 2.5-miles of the project to identify whether removal of the habitat may result in adverse impacts to the species. National Land Cover Database (NLCD) 2019 data are initially used to identify forested

[18] New York State GIS Clearinghouse. N.D. *Discover GIS Data NY – View, Download, Connect* [website]. Available from: https://orthos.dhses.ny.gov (Accessed June 27, 2022).

lands near the project. The forest cover data is reviewed for accuracy using available aerial photography. Geographic Information System (GIS) specialists remove areas identified as forested by NLCD based on evidence of tree clearing. A final map is generated that identifies woody landcover within 2.5 miles of the project (See Appendix C). A 2.5-mile buffer around the project area occupies 14,327.02 acres. The analysis indicates that approximately 8,301.24 acres of forest/woody lands occur within 2.5-miles of the project site. Forested lands occupy 57.9% of the 2.5-mile buffer. The removal of 32.56 acres of land results in a net loss of 0.39% of the woody vegetation in the 2.5-mile buffer. The small percentage of habitat loss as a result of this project is not considered significant. However, in order to avoid direct take of bats that may be using the site during summer months, it is recommended that all tree-clearing activities on site occur during winter months. Alternately, any blasting activities should occur during summer months to avoid interference with hibernation.

<u>Northern long-eared bat</u>

The northern long-eared bat is listed as endangered at the state and federal level. The northern long-eared bat winters in caves and mines and migrates seasonally to summer roosts in dead and decadent trees. Northern long-eared bats are typically associated with mature interior forest[19] and tend to avoid woodlands with significant edge habitat[20]. They may most often be found in cluttered or densely forested areas including in uplands and at streams or vernal pools[21]. They may use small openings or canopy gaps as well. Some research suggests that northern long-eared bats forage on forested ridges and hillsides rather than in riparian or floodplain forests. Captures from New York suggest that

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[19] Carroll, S. K., T. C. Carter and G. A. Feldhamer. 2002. Placement of nets for bats: effects on perceived fauna. Southeastern Naturalist 1:193-198.

[20] Yates, M. and R. Muzika. 2006. Effect of forest structure and fragmentation on site occupancy of bat species in Missouri Ozark forests. Journal of Wildlife Management 70:1238-1248.

[21] Brooks, R. T. and W. M. Ford. 2005. Bat Activity in a Forest Landscape of Central Massachusetts. Northeastern Naturalist 12:447-462.

northern long-eared bats may also be found using younger forest types[22]. This species selects day roosts in dead or live trees under loose bark, or in cavities and crevices, and may sometimes use caves as night roosts[23]. They may also roost in buildings or behind shutters. A variety of tree species are used for roosting. The structural complexity of surrounding habitat and availability of roost trees may be important factors in roost selection[24]. Roosts of female bats tend to be large diameter, tall trees, and in at least some areas, located within a less dense canopy[25]. Northern long-eared bats hibernate in caves and mines where the air temperature is constant, preferring cooler areas with high humidity[26].

A site visit was conducted on April 12, 2022 to visually assess the suitability of the project habitat for northern long-eared bats. The site contains chestnut oak forest with an intermittent stream system in the eastern corner of the site. Five potential roost trees were identified by C&S staff during the April 12, 2022 site visit (See Appendix C and Appendix D). Two chestnut oak trees, each with approximately 24-inch dbh were identified in the northern and eastern portion of the AOI. Three shagbark hickory trees (9-inch, 10-inch, and 12-inch dbh) were identified in the central-southern portion of the

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22 New York Natural Heritage Program. 2016. *Online Conservation Guide for Myotis septentrionalis* [website]. Available from: http://www.acris.nynhp.org/guide.php?id=7407 (Accessed October 9, 2017).

23 U.S. Fish and Wildlife Service. 2013. 12-Month finding on a petition to list the eastern small-footed bat and the northern long-eared bat as threatened or endangered; Listing the northern long-eared bat as an endangered species; Proposed rule. Vol. 78 No.

24 Carter, T. C. and G. A. Feldhamer. 2005. Roost tree use by maternity colonies of Indiana bats and northern long-eared bats in southern Illinois. Forest Ecology and Management 219:259-268.

25 Sasse, D. B. and P. J. Pekins. 1996. Summer roosting ecology of northern long-eared bats (*Myotis septentrionalis*) in the White Mountain National Forest. Pp. 91-101 in Proceedings of the Bats and Forests Symposium of the British Columbia Ministry of Forest.

26 U.S. Fish and Wildlife Service. 2013. 12-Month finding on a petition to list the eastern small-footed bat and the northern long-eared bat as threatened or endangered; Listing the northern long-eared bat as an endangered species; Proposed rule. Vol. 78 No.

AOI. The NYSGIS Clearinghouse website indicates that minimal disturbance has occurred within the AOI since 1994[27].

The proposed project involves removal of the forested area within the project site. Proximity to existing hibernacula and presence of potential roost trees indicates that the site may be used by roosting bats during summer months. The ERM provides information regarding known occurrences of northern long-eared bat, indicating that the site is located in the vicinity of bats listed as threatened or endangered.

The northern long-eared bat was listed as endangered on April 1, 2023. Given the habitat suitability, a detailed analysis of the site is completed relative to potential impacts to the species consistent with that performed for Indiana bats.

The report resulted in identification of 31.47 acres of moderate roosting / high foraging habitat, 0.27 acre of low roosting / high foraging habitat, 0.16 acre of no roosting/high foraging habitat, and 9.34 acres of no roosting/no foraging habitat. The small percentage of habitat loss as a result of this project is not considered significant. However, in order to avoid direct take of bats that may be using the site during summer months, it is recommended that all tree-clearing activities on site occur during winter months. Alternately, any blasting activities should occur during summer months to avoid interference with hibernation.

In New York, a permit is required for the “take” of protected species under the Uniform Procedures Act that includes direct impact to the species as well as adverse modification to habitat. The NYSDEC considers impacts to “occupied” habitat as well as direct impacts

[27] New York State GIS Clearinghouse. N.D. *Discover GIS Data NY – View, Download, Connect* [website]. Available from: https://orthos.dhses.ny.gov (Accessed June 27, 2022).

to the species. NYSDEC defines occupied habitat as those areas within five (5) miles of a known hibernacula, or 1.5 miles from a documented summer occurrence. NYNHP identifies northern long-eared bat hibernaculum within 1.5 miles of the project AOI. The proposed project area is in occupied habitat, and therefore additional NYSDEC requirements are necessary. All tree clearing will occur during winter months as recommended by NYSDEC. Alternately, any blasting activities should occur during summer months to avoid interference with hibernation.

Bog Turtle

The habitat of bog turtles generally consists of small, open-canopy, herbaceous sedge meadows and fens. In the bog turtle's northern range, seepage or spring-fed emergent wetlands associated with streams are the primary habitat[28]. In New York, bog turtles typically inhabit open, early successional wetlands, including, wet meadows, or calcareous bogs dominated by sedges or sphagnum moss[29].

Ecological communities observed on site do not exhibit bog turtle habitat and are unlikely to support a bog turtle population. On site vernal pool/wetland habitat contain a shallow rock restrictive layer with dense leaf litter and approximately 2 to 3 inches of gravelly sandy loam soil. In addition, sediment and erosion control plans, and implementation of stormwater management practices, will be developed during the design of the proposed project and will be consistent with the NYS Department of Transportation Standard Specification for Temporary Soil and Erosion and Water Pollution Control, the New York State Stormwater Management Design Manual, and the NYS Guidelines for Urban Erosion and Sediment Control. Adherence to design standards, inspection and quality control

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[28] U.S. Fish & Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population; Recovery Plan.

[29] N.Y.S. Department of Environmental Conservation. 2008. *Bog Turtle Fact Sheet; Bog Turtle Clemmys muhlenbergii* [website]. Available at: https://www.nrc.gov/docs/ML0833/ML083380545.pdf (Accessed April 11, 2022).

during construction and periodic cleaning of erosion control features should minimize and mitigate the potential for erosion and sedimentation to impact downstream waters.

Based on the aforementioned information, no significant impacts to the bog turtle are anticipated as a result of the proposed project.

Monarch Butterfly

The monarch butterfly can be found in varying habitats, so long as milkweed (for breeding) and flowering plants (for nectar) are present. No milkweed plants were observed by C&S staff during either the April 12 or June 13 site visit. Further, the monarch butterfly is considered a candidate species and is not listed as threatened or endangered; therefore, requirements associated with potential presence of endangered or threatened species do not apply to this species.[30]

Small Whorled Pogonia

The USFWS Official Species List indicates that small whorled pogonia is federally listed as threatened. According to the New York Flora Association (NYFA), small whorled pogonia is extant in New York State, and is historically known to have occurred in Orange County[31]. This plant generally occurs in open, dry, deciduous woods (typically dominated by oaks) with acidic soils. In areas where there is relatively high shrub coverage or high sapling density, flowering appears to be inhibited. The majority of existing locations of this species have sparse to moderate ground cover, relatively open understory, and are usually located

30 U.S. Fish & Wildlife Service. N.D. *Danaus plexippus Overview* [website]. Available at: https://www.fws.gov/species/monarch-butterfly-danaus-plexippus (Accessed June 29, 2022).

31 New York Flora Association. 2010. *Endangered Small Whorled Pogonia Rediscovered in New York After Decades of Search* [website]. Available at: https://nyflora.org/endangered-small-whorled-pogonia-rediscovered-in-new-york-after-decades-of-search/ (Accessed April 19, 2022).

near breaks in the canopy. Small whorled pogonia is associated with chestnut oak forest habitats (that of the project AOI), among other ecological communities. [32]

The USFWS Official Species List indicated the potential presence of small whorled pogonia in the project area. The initial April 12, 2022 site visit indicated that the site contains potentially suitable habitat for small whorled pogonia. A second site visit involving a survey for small whorled pogonia was conducted on June 13, 2022, during the flowering season for the plant (generally flowering buds emerge in May and bloom in June[30]). C&S staff did not find any small whorled pogonia plants during the June 13, 2022 survey.

Glaucous sedge

Glaucous sedge is currently listed as threatened on the state level and is not listed at the federal level. This plant occurs primarily in the eastern portion of the state. It typically occurs in wet to mesic-dry deciduous forests and old fields, especially along the fringes of seasonally wet swamps and depressions. It also prefers clay or loam soils in calcareous woodland. It commonly grows along human and deer paths within forest habitats. [33]

The NYNHP species list indicated the presence of glaucous sedge within 250 yards north of the AOI. The initial April 12, 2022 site visit indicated that the AOI contains potentially suitable habitat for glaucous sedge. A second site visit involving a survey for glaucous sedge was conducted on June 13, 2022, during the fruiting season for the plant (June through July[32]). C&S staff did not find any glaucous sedge plants during the June 13, 2022 survey.

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[32] Wetland Studies & Solutions, Inc. N.D. *Field Notes; Endangered and Threatened Species Alert: Small Whorled Pogonia* [website]. Available from: https://newsletters.wetlandstudies.com/newsletters/may03/pogonia_0503.htm. (Accessed April 11, 2022).

[33] New York Natural Heritage Program. 2022. *Online Conservation Guide for Carex glaucodeai* [website]. Available at: https://guides.nynhp.org/glaucous-sedge/ (Accessed June 27, 2022).

Green rock cress

Green rock cress is currently listed as threatened at the state level and is not listed at the federal level. This plant is located throughout eastern New York. It typically prefers rocky upland habitats, particularly crevices of rock outcrops, ledges, and cliffs. It tends to be found in more open habitats with acidic, circumneutral, or calcareous conditions.[34]

The NYNHP species list indicated the presence of glaucous sedge within 250 yards north of the AOI and the initial April 12, 2022 site visit indicated that the AOI contains potentially suitable habitat for green rock cress. However, the dominant ecological community, chestnut oak forest, observed within the AOI is not typically associated with green rock cress. A second site visit involving a survey for green rock cress was conducted on June 13, 2022, during the fruiting season for the plant (June through July[33]). C&S staff did not find any glaucous sedge plants during the June 13, 2022 survey.

3.4.2.2 Operation

3.4.2.2.1 Vegetation

Project construction will result in permanent conversion of the 41.24-acre project site, the majority of which contains vegetated land, to unvegetated/built facilities (e.g., residential and associated buildings, roads, lawn and landscaping) at the Project site. It should be noted that for vegetation, permanent impacts include both conversion of natural communities to built facilities, and conversion of one vegetative community to another (e.g., successional shrubland to mowed lawn) for the life of the Project. This conversion will occur throughout the entire site. Other than minor disturbances associated with

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[34] New York Natural Heritage Program. 2022. *Online Conservation Guide for Borodinia missouriensis* [website]. Available at: https://guides.nynhp.org/green-rock-cress/ (Accessed June 27, 2022).

routine maintenance (e.g., mowing) and occasional repair activities, as needed, no additional disturbance to plants and vegetative communities are anticipated because of Project operation. Operation of the proposed project will support a residential community with minimal mowed lawn habitat. Vegetation within the proposed community will be that typical of a mowed lawn habitat and will be minimal by design.

3.4.2.2.2 Fish and Wildlife

Operational-related impacts to wildlife are anticipated to consist of habitat loss and displacement of wildlife due to increased noise and human activities. Each of these potential impacts is described below:

<u>Incidental Injury or Mortality</u>

Operation of the proposed project will support a residential community. Any risks of incidental injury or mortality will be those associated with this land use, i.e., traffic. Incidental injury and mortality should be limited primarily to sedentary/slow-moving species such as small mammals, reptiles, and amphibians that are unable to move out of the area being disturbed by operation. Nesting habitat will be limited per project design; any nesting that could occur during operation, i.e., in shrubs or trees within the residential development, may be impacted by operation, most likely related to people and vehicles in the community. However, these impacts are not likely to result in incidental injury or mortality. Operation of the proposed project will provide minimal natural habitat to support fish and wildlife species and should not result in significant incidental injury and mortality for those species inhabiting the proposed converted community.

Silt and Sedimentation

As discussed previously, siltation and sedimentation of water bodies can adversely affect water quality and aquatic habitat. It can also interfere with the respiration of aquatic organisms and the survival of fish and amphibian eggs and larvae. Earth-moving activities will cease post construction, minimizing sediment and siltation impacts to aquatic habitats. Per project design, no aquatic habitats will occur within the Project Site post construction; the intermittent stream will be altered to subsurface drainage and the vernal pool will be removed. Post construction, the Project Site will contain impervious development (buildings, paved roads, sidewalks, and parking areas) with small interspersed mowed lawn and landscaped areas; the Project Site will not contain exposed silt and sediment that would typically be subject to erosion. Therefore, the operation of the proposed project will not result in significant adverse impacts of sediment and siltation on aquatic habitats.

Habitat Disturbance/Loss

The site, the majority of which contains existing wildlife habitat, will be converted to built residential facilities and maintained lawns and landscaping. Therefore, existing wildlife habitat, in the forms of chestnut oak forest, a vernal pool, and an intermittent stream, currently on-site will be unavailable as wildlife habitat throughout the operational life of the residential development. The conversion of up to approximately 32 acres of undeveloped wildlife habitat at the project site to built communities and mowed lawns represents a somewhat significant loss of existing wildlife habitat (i.e., approximately 77% of the project site).

Displacement

Habitat alteration and disturbance resulting from the operation of the proposed residential development could make adjacent areas unsuitable or less suitable for nesting, foraging, resting, or other wildlife use. The true amount of wildlife habitat altered by the Project may extend beyond the functional project footprint, due to the increased human activity. With that said, in recent years, the land surrounding the Project Site has been increasingly developed with residential communities. Therefore, wildlife in and around the Project Site has likely habituated to noise and human activity associated with construction efforts. Significant impacts associated with wildlife displacement are not anticipated.

3.4.2.2.3 Threatened and Endangered Species

Indiana Bat and Northern long-eared bat

As discussed previously in Section 3.4.2.1.3, correspondence with NYNHP and USFWS IPaC indicates the potential for the Indiana bat the northern long-eared bat to use the Project Site with its current conditions; however, the Project proposes development of a residential community that does not incorporate Indiana bat or northern long-eared bat habitat. Operation of the proposed project will support several residential buildings and associated structures with surrounding impervious surfaces (paved roads, sidewalks, and parking areas), along with mowed lawn and landscaping. It is unlikely that the Project Site will be used by either bat species during operation.

Bog Turtle

As discussed previously, there is no suitable bog turtle habitat currently within the Project Site; likewise, the post construction conditions of the Project Site during operation will not support bog turtle habitat. Therefore, there will be no significant adverse impacts to bog turtle populations during operation.

Monarch Butterfly

The monarch butterfly can be found in varying habitats, so long as milkweed (for breeding) and flowering plants (for nectar) are present.[35] Suitable monarch butterfly habitat is not anticipated within the Project Site during operation; therefore, no significant adverse impacts to monarch butterfly populations are anticipated as a result of operation of the proposed project.

Small Whorled Pogonia, Glaucous sedge, and Green Rock Cress

During operation, the Project Site will contain residential buildings and associated structures, impervious areas (paved roads, sidewalks, and parking areas), and mowed lawn and landscaping. As such, suitable habitat for small whorled pogonia, glaucous sedge, and green rock cress will not be supported during operation of the proposed project, minimizing the likelihood of the latter species existing within the Project Site. Further, the initial April 12, 2022 site visit, as well as a second more detailed field survey for the latter three plants on June 13, 2022, did not yield any field observations of the plants within the Project Site. Operation of the proposed project is not anticipated to adversely impact small whorled pogonia, glaucous sedge, or green rock cress populations.

3.4.3 Proposed Mitigation

3.4.3.1 Vegetation

Vegetation will be cleared for construction, leaving soil exposed to the elements and subject to erosion. As such, a comprehensive sediment and erosion control plan will be developed and implemented to protect adjacent undisturbed vegetation and other ecological resources. Further mitigation will be employed through the use of best

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[35] U.S. Fish & Wildlife Service. N.D. *Danaus plexippus Overview* [website]. Available at: https://www.fws.gov/species/monarch-butterfly-danaus-plexippus (Accessed June 29, 2022).

management practices (BMPs) and maintaining a clean work area during construction. Following construction activities, temporarily disturbed areas will be seeded (and stabilized with mulch and/or straw if necessary) to reestablish vegetative cover in these areas.

Per project design, the Project Site will be cleared in its entirety for development purposes. Vegetation during operation will be limited to mowed lawn and landscaping, requiring minimal mitigation measures.

3.4.3.2 Fish and Wildlife

As previously discussed, construction-related impacts to fish and wildlife should be limited to incidental injury and mortality due to construction activity and vehicular movement, construction-related silt and sedimentation impacts on aquatic organisms, habitat disturbance/loss associated with clearing and earth moving activities, and displacement due to increased noise and human activities. Mitigation of impacts related to construction activity will be accomplished through planning and employment of BMPs during construction. To further mitigate for impacts on aquatic species, a comprehensive sediment and erosion control plan will be developed and implemented to protect adjacent undisturbed vegetation and other ecological resources.

Work is being designed to avoid construction within the floodplain to the maximum extent practicable. Where work within the floodplain is unavoidable, design and construction will be done consistent with the applicable regulations. Any work planned to take place within surface waters of the U.S. will be initiated only after review and approval has been completed by the appropriate regulatory agencies including NYSDEC Region 3 and the USACE New York District office. Any conditions imposed in the appropriate

Nationwide Permits and/or specific permit conditions will be carefully followed, including proper pre-construction notifications and reporting.

To avoid and minimize impacts to aquatic resources resulting from construction-related siltation and sedimentation, an approved sediment and erosion control plan and SWPPP will be implemented. Proper implementation of these plans will assure compliance with NYSDEC SPDES regulations and New York State Water Quality Standards.

3.4.3.3 Threatened and Endangered Species

Indiana Bat and Northern Long-Eared Bat

Both Indiana and northern long-eared bats roost under the bark or in crevices / cavities of living, dying, and dead trees. As indicated above in Section 3.4.2.1.3, roosting bats could be subject to mortality as a result of site clearing activities if construction occurs during the spring, summer, or fall when bats are active (i.e., not hibernating). To avoid mortality of protected bat species that could be roosting in trees at the Project site, tree cutting will be restricted to between October 15 and March 31, when Indiana and northern long-eared bat are hibernating off-site. It is anticipated that the tree cutting timeframe will be applied to trees greater than or equal to 5 inches diameter at breast height (dbh).

To minimize potential nighttime impacts associated with exterior lighting when the proposed facility is not in use, the minimum acceptable lighting to ensure security and safety will be used. In addition, all lighting fixtures associated with pedestrian pathways, roads, parking areas, and building exterior areas for the proposed facility will be "fully shielded" or fitted with opaque hoods, shields, louvers, shades, and/or other devices to ensure that all light generated by the light source is directed downward and not outward horizontally. The lighting fixtures will be consistent with the intent of various "Dark Sky" initiatives.

Bog Turtles, Small Whorled Pogonia, Glaucous Sedge, and Green Rock Cress

Field surveys conducted on April 12, and June 13, 2022 did not indicate a presence of bog turtle, small whorled pogonia, glaucous sedge, and green rock cress populations. Therefore, construction and operation of the proposed Project will not result in any additional significant impacts to threatened and endangered species. Consequently, no further mitigation measures are proposed.

3.5 VISUAL AND AESTHETIC RESOURCES

3.5.1 Existing Conditions

3.5.1.1 Visually Sensitive Resources

The visual study area was defined as the area within a one-mile radius[36] of the Project site. The "Study Area" encompasses approximately 4.28 square miles (2,741.79 acres) and includes portions of the Village of Kiryas Joel within the Town of Palm Tree, the Town of Blooming Grove, a portion of which includes the Village of Blooming Grove, the Village of Woodbury within the Town of Woodbury, as well as the Town of Monroe, which includes a very small portion of the Village of Monroe.

The Study Area is located within the eastern-central portion of Orange County. At this location, the Hudson Mohawk Lowland that makes up the central portion of the county transitions into the Ramapo Mountains and the Hudson Highlands, which occur within the New England Upland physiographic province and occupy the eastern third of the

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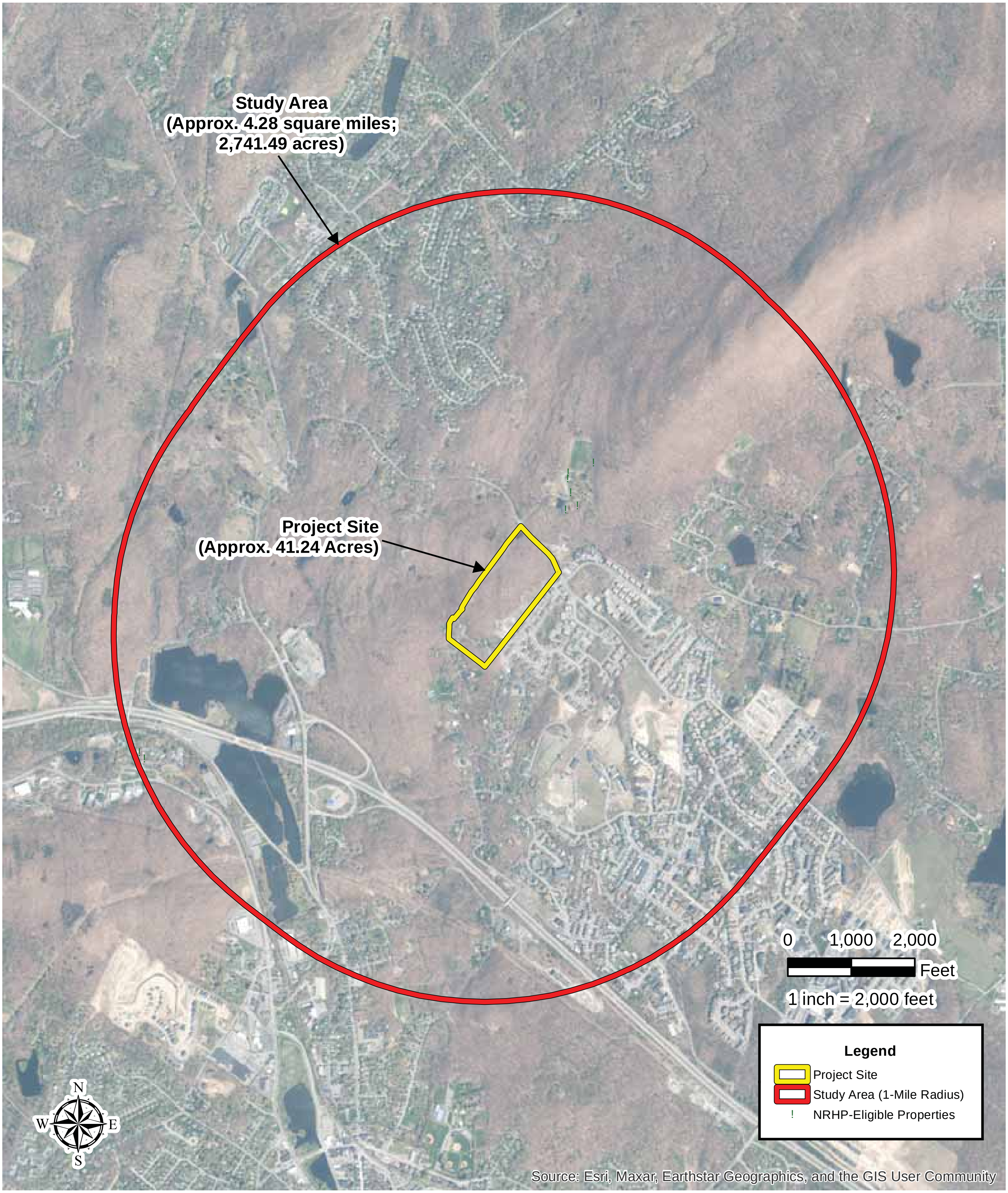
36 A 1.0-mile study area is typically used as an industry standard for visual assessments for projects such as buildings, communication towers, and/or electrical utility lines.

county[37]. The Study Area contains rolling topography with forest cover, a lake, a U.S. highway, and residential development. Elevations range from approximately 600 feet above mean sea level (amsl) in the northern portion of the Study Area to 1,300 feet amsl in the northeastern portion of the Study Area (North American Vertical Datum of 1988 [NAVD 88]). Topography varies throughout the Study Area.

As depicted in Figure 7 – Visual & Aesthetic Resources Map, land use within the Study Area includes residential uses as well as areas of forest cover, a lake, and a U.S. highway. High-density residential development occupies the northern, eastern, and southeastern portions of the Study Area; residential land in the eastern and southeastern portions of the Study Area is associated with the Village of Kiryas Joel and that in the northern portion of the Study Area is associated with the Village of South Blooming Grove. The northeastern, central, and western portions of the Study Area contain forest cover. U.S. Highway 6 runs within the southern boundary of the Study Area and Orange-Rockland Lake is located in the southwestern corner of the Study Area. Vegetation includes mature deciduous forest, mowed lawn, and landscape/streetscape plantings.

As stated in Section 2.1, the Project site is located along Seven Springs Road, Seven Springs Mountain Road, and Karlsburg Road. The Project Site is located on private property containing mature deciduous forest throughout the site, vernal pool habitat in the northern corner of the site, an intermittent stream system along the eastern boundary of the site, and residential land in the southern portion of the site; residential construction is also occurring along the eastern boundary of the site (current construction activities remain outside the project limits).

[37] USDA Soil Conservation Service (SCS). 1981. Soil Survey of Orange County, NY, October 1981.



Sources: Created by C&S Engineers, Inc.

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Figure 7 | Visual & Aesthetic Resources Map

Karlsburg Acres Development Project Site
Town of Palm Tree, Orange County, NY

Sites Listed on the State and/or National Register of Historic Places (NRHP)

A review was performed of the National Register of Historic Places (NRHP) and New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) website, in order to identify significant historic buildings and / or districts located within one mile of the proposed Project[38,39]). No NRHP-listed historic sites or districts occur within the Study Area. The NYSOPRHP Cultural Resource Information System (CRIS) database was also reviewed to identify NRHP-eligible properties[40] This database identifies 8 structures as NRHP-eligible within the Study Area, as illustrated in Figure 7 – Visual & Aesthetic Resources Map. The latter structures are also listed in Table 5.

State Parks

Review of the NYSOPRHP website indicates that there are no New York State Parks located within the Study Area.[41]

Urban Cultural Parks/Heritage Areas

The Study Area does not lie within a NYSOPRHP Heritage Area.[42]

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[38] National Register of Historic Places. N.D. *Historic Districts* [website]. Available at: http://www.nationalregisterofhistoricplaces.com/ districts.html (Accessed August, 2022).

[39] National Register of Historic Places. N.D. *State Listings* [website]. Available at: http://www.nationalregisterofhistoricplaces.com/state.html (Accessed August, 2022).

[40] NYSOPRHP. 2022. *CRIS System* [website]. Available at: https://cris.parks.ny.gov/ (Accessed August, 2022).

[41] NYSOPRHP. N.D. *State Parks* [website]. Available at: https://parks.ny.gov/parks/ (Accessed August, 2022).

[42] NYSOPRHP. N.D. *Heritage Areas* [website]. Available at: https://parks.ny.gov/historic-preservation/heritage-areas.aspx (Accessed August, 2022).

State Forest Preserves

New York State Forest Preserves occur within the Adirondack and Catskill Parks, neither of which are located within the Study Area.[43]

National Wildlife Refuges and State Wildlife Management Areas

Review of the U.S. Fish and Wildlife Service National Wildlife Refuge System website and the NYSDEC website indicate that no National Wildlife Refuges or State Wildlife Management Areas are located within the Study Area.[44,45]

National Natural Landmarks

Review of the National Park Service National Natural Landmarks Program website indicates that no National Natural Landmarks are located within the Study Area.[46]

National Parks, Recreation Areas, Seashores and/or Forests

Review of the National Park Service and U.S. Forest Service websites regarding National Park Service Lands and National Forests (respectively) indicates that no National Parks, Recreation Areas, Seashores or Forests are located within the Study Area.[47,48]

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[43] New York State Department of Environmental Conservation (NYSDEC). N.D. *New York's Forest Preserve* [website]. Available at: http:// www.dec.ny.gov/lands/4960.html (Accessed August, 2022).

[44] United States Fish and Wildlife Service. 2021. *Map of the National Wildlife Refuge System* [website]. Available at: https://www.fws.gov/media/map-national-wildlife-refuge-system (Accessed August, 2022).

[45] NYSDEC. N.D. *Wildlife Management Areas* [website]. Available at: http://www.dec.ny.gov/outdoor/7768.html (Accessed August, 2022).

[46] National Park Service (NPS). 2021. *National Natural Landmarks Directory* [website]. Available at: https://www.nps.gov/subjects/nnlandmarks/nation.htm (Accessed August, 2022).

[47] NPS. N.D. *Find a Park in NY* [website]. Available at: https://www.nps.gov/state/ny/index.htm (Accessed August 2022).

[48] United States Forest Service (USFS). N.D. *Find a Forest* [website]. Available at: https://www.fs.usda.gov/ (Accessed August, 2022).

National or State Designated Wild, Scenic and Recreational Rivers

Review of the National Wild and Scenic Rivers website and the NYSDEC Wild, Scenic and Recreational Rivers website indicates that no formally designated wild, scenic or recreational rivers are located within the Study Area[49,50]. The Nationwide Rivers Inventory (NRI) was also consulted, as it is somewhat equivalent to an eligible-for-listing designation, but did not include any rivers located within the Study Area.[51]

Sites, Areas, Lakes, Reservoirs or Highways Designated or Eligible as Scenic

There are no state or nationally designated scenic byways located within the Study Area.[52,53]

Scenic Areas of Statewide Significance

According to the NYS Department of State, there are no Scenic Areas of Statewide Significance within the Study Area.[54]

State or Federally Designated Trails

No state or federally designated trails are located within the Study Area. [55,56]

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49 National Wild and Scenic Rivers. N.D. *Wild & Scenic Rivers: New York* [website]. Available at: http://www.rivers.gov/new-york.php (Accessed August, 2022).

50 NYSDEC. N.D. *Wild, Scenic and Recreational Rivers* [website]. Available at: http://www.dec.ny.gov/permits/32739.html (Accessed August, 2022).

51 NPS. 2022. *Nationwide Rivers Inventory* [website]. Available at: https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm (Accessed August, 2022).

52 New York State Department of Transportation (NYSDOT). N.D. *New York State Scenic Byways* [website]. Available at: https://www. dot.ny.gov/scenic-byways (Accessed August, 2022).

53 United States Department of Transportation (USDOT). N.D. *America's Byways: New York (NY)* [website]. Available at: http://www. fhwa.dot.gov/byways/states/NY/maps (Accessed August, 2022).

54 New York State Department of State. N.D. *Scenic Areas of Statewide Significance* [website]. Office of Planning and Development. Available at: https://dos.ny.gov/scenic-areas-statewide-significance-sass (Accessed August, 2022).

55 NPS. 2021. *National Trails System: National Scenic Trails* [website]. Available at: https://www.nps.gov/subjects/nationaltrailssystem/national-scenic-trails.htm (Accessed August, 2022).

56 NYSOPRHP. N.D. *Trails* [website]. Available at: http://www.nysparks.com/recreation/trails/. (Accessed August, 2022).

Adirondack Park Scenic Vistas

No portion of the Adirondack Park is located within the Study Area.

Palisades Park

No portion of Palisades Park is located within the Study Area.

Locally Important Resources

In addition to the scenic resources of statewide significance listed above, the Study Area also includes areas that are regionally or locally significant, sensitive to visual impacts, and/or receive significant public/recreational use. There are no locally important resources located within the vicinity of the proposed project.

3.5.2 Potential Impacts

3.5.2.1 Construction

Visual impacts during construction will include removal of vegetation and soil disturbance on the Project site, as well as the addition of construction material and equipment to the Project site and local roads. Once construction activity and landscaping activities are complete, construction-related visual impacts will no longer occur.

3.5.2.2 Operation

Given the nature of the proposed facilities and the existing character of the Project site, it is not anticipated that this Project will contrast with the existing landscape. The proposed Project will simply be a continuation of existing residential development.

3.5.2.2.1 Night Lighting

No impacts from night lighting are anticipated during construction of the Project. It is anticipated that construction activities will be restricted to daytime hours and therefore no lighting during construction will be necessary.

The architectural design of the Project has not yet been finalized. Therefore, the precise effect of lighting cannot be determined at this time. It is anticipated that exterior lighting will be necessary for security and public safety (i.e., along pathways and roads, and in parking areas). However, low intensity lighting fixtures with appropriate deflection accessories will be selected to minimize significant dispersion of light from the facility.

3.5.3 Mitigation

Given the nature of the proposed activities and the existing character of the proposed Project site, it is anticipated that the potential visual impacts associated with the Project will be minimal. Clearing will be minimized to the work area and the existing landscape will remain around the project perimeter, thus reducing views of the site further.

To minimize potential nighttime impacts from exterior lighting when the proposed facility is in use, exterior lighting will be restricted to the minimum acceptable lighting to ensure security and safety. In addition, all lighting fixtures associated with pedestrian pathways, roads, parking areas, and building exterior areas for the proposed facility will be “fully shielded” or fitted with opaque hoods, shields, louvers, shades, and/or other devices to ensure that all light generated by the light source is directed downward and not outward horizontally. The lighting fixtures will be consistent with the intent of various “Dark Sky” initiatives (generally speaking; e.g., Dark Sky Society, 2020[57]).

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[57] The Dark Sky Society. 2020. *Guidelines for Good Exterior Lighting Plans* [website]. Available at: http://www.darkskysociety.org/handouts/LightingPlanGuidelines.pdf (Accessed August, 2022).

3.6 HISTORIC, CULTURAL, AND ARCHEOLOGICAL RESOURCES

3.6.1 Existing Conditions

Consultation with the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) and a review of the online Cultural Resources Information System (CRIS) database were conducted to determine whether previously reported cultural resources are located within or adjacent to the Project Site. There are no previously identified State/National Register of Historic Places (S/NRHP)-listed or NRHP-eligible sites located within or immediately adjacent to the Project Site.

3.6.1.1 Archeological Resources

The NYSOPRHP's online CRIS database was reviewed to identify previous projects and sites within the Project Site. According to CRIS, the area is identified as archeologically sensitive. CRIS indicates that one previous cultural resource survey partially overlaps with the Study Area. The *Stage 1A Literature Review and Sensitivity Analysis, Kiryas Joel and Municipal Park, Mountain Road (County Route 44) and Seven Springs Road, Town of Monroe, Orange County, New York* was completed in the northern portion of the site. There are no identified archeological sites within the Village of Kiryas Joel according to CRIS.

3.6.1.2 Historic and Architectural Resources

The NYSOPRHP's online CRIS database was reviewed to identify historic properties that are listed on, or have previously been determined eligible for listing on, the NRHP in the vicinity of the Project Site. There are no NRHP-listed or eligible properties within the

Project Site. There are 8 NRHP-eligible properties within 1-mile of the Project Site (Table 5).

Table 5. Historic Resources within 1 Mile of the Project Site.

Site Name	Status	Distance to Project site
Gonzaga Retreat Center -Gazebo – Springs Road	NRHP-eligible	0.3 mile
Gonzaga Retreat Center – Pondside Frame House, Garage, Cemetery - Springs Road	NRHP-eligible	0.1 mile
Gonzaga Retreat Center – Stone Pool House - Springs Road	NRHP-eligible	0.2 mile
Gonzaga Retreat Center – Frame House - Springs Road	NRHP-eligible	0.2 mile
Gonzaga Retreat Center -Hexagon Chapel - Springs Road	NRHP-eligible	0.2 mile
Gonzaga Retreat Center -Remote Stone Chapel, Cemetery - Springs Road	NRHP-eligible	0.3 mile
Old Museum Village of Smith's Clove - 1010 NY-17M 10950	NRHP-eligible	1.0 mile
Museum Village Old Smith's Clove - 1010 NY-17M 10950	NRHP-eligible	1.0 mile

There are no structures within the current project site. Site surveys did not identify the presence of prior structures as well.

3.6.2 Potential Impacts

3.6.2.1 Construction

3.6.2.1.1 Archeological Resources

Construction of the project will result in soil disturbance. No documentation of previous disturbance has been identified within the project area. To further evaluate the potential for archaeological resources to be present within the Project Site, an initial consultation request for the Project was submitted to NYSOPRHP via their on-line CRIS system on September 1, 2022. NYSOPRHP provided a response on September 2, 2022 (See Appendix F), which stated:

"Based upon this review, it is the opinion of the New York SHPO that no historic properties, including archaeological and/or historic resources, will be affected by this undertaking."

3.6.2.1.2 Historic and Architectural Resources

Construction of the Project will not require the demolition or physical alteration of any historically-significant buildings or other potential historic resources. Therefore, construction of the Project will not affect any significant historic-architectural resources.

As stated above, to further evaluate the potential for historical resources to be impacted by project activities, NYSOPRHP was consulted via their on-line CRIS system on September 1, 2022. NYSOPRHP provided a response on September 2, 2022 (See Appendix F), which stated:

"Based upon this review, it is the opinion of the New York SHPO that no historic properties, including archaeological and/or historic resources, will be affected by this undertaking."

3.6.2.2 Operation

3.6.2.2.1 Archeological Resources

No impacts to archaeological resources will occur as a result of Project operation.

3.6.2.2.2 Historic and Architectural Resources

No direct physical impacts to historic-architectural resources will occur as a result of the Project. Potential effects on historic properties resulting from the operation of the Project would be a change in a given historic property's visual setting. As it pertains to historic properties, setting is defined as "the physical environment of a historic property" and is one of seven aspects of a property's integrity, which refers to the "ability of a property to convey its significance".[58] There are no sites listed on or eligible for the NRHP located within or adjacent to the Project site. The nearest NRHP-eligible sites are associated with Gonzaga Park (located between approximately 0.1 and 0.3-mile from the Project Site), which have been identified as an NRHP-eligible. The area between Gonzaga Park and the project site is heavily wooded with mature vegetation. The vegetation acts as a visual screen between Gonzaga Park and the proposed development. The presence and operation of the Project will not have a significant effect on the visual setting associated with any historic properties.

3.6.3 Proposed Mitigation

Construction and operation of the proposed Project will not result in any significant impacts to identified historic or archeological resources. Consequently, no further mitigation measures regarding these resources are proposed.

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58 National Park Service (NPS). 1990. *How to Apply the National Register of Historic Places Criteria for Evaluation* [website]. National Register Bulletin No. 15. National Register Branch, National Park Service, U.S. Department of the Interior, Washington, D.C. Available at: http://www.nps. gov/nr/publications/bulletins/pdfs/nrb15.pdf (Accessed April, 2014).

3.7 OPEN SPACE AND RECREATION

3.7.1 Existing Conditions

The current Project site encompasses a 41.24-acre area and includes mature deciduous forest throughout the majority of the site, a vernal pool habitat in the northern corner of the site, a stream system in the eastern corner of the site, and residential development in the southern portion of the site. The site is immediately bordered by residential land to the east, southeast, and south, and deciduous forest to the north and west. The Project Site is private property without public access and is not designated as public open space. However, there are public open spaces and additional recreation facilities located within one mile of the Project Site. These are summarized in Table 6.

Table 6. Recreational facilities within 1 mile of the Project Site.

Site Name	Type of Recreation	Distance to Project
Gonzaga Park	Pedestrian/Picnic	0.2 mile
Orange Rockland Lake	Boating/Fishing/Swimming	0.6 mile
Town of Monroe O & R Park	Pedestrian/Picnic	0.9 mile
Smith Clove Dog Park	Pedestrian/Dog Park	0.9 mile
Pure Terror Scream Park	Haunted House/Attraction	0.9 mile
Museum Village of Old Smith's Clove Monroe	Cultural	1 mile

3.7.2 Potential Impacts

3.7.2.1 Construction

The Project Site is not publicly accessible and is not considered a public recreation area. Furthermore, the construction of the residential subdivision associated with the Project will not impede access to the open space and recreational resources identified in Table 6. Therefore, temporary activities associated with construction activities will not result in the loss of public open space or recreational resources. Additionally, safety and security measures such as construction fencing, construction gates, and signage will be utilized to protect the public from potential construction hazards at the Project site.

3.7.2.2 Operation

The Project site is private property and is not designated as public open space. As such, there will be no loss of public open space or recreational resources associated with long-term operation of the residential subdivision.

3.7.3 Proposed Mitigation

Since there will be no significant adverse impacts to the Project Site because of the proposed Project, no mitigation measures are proposed.

3.8 TRAFFIC AND TRANSPORTATION

3.8.1 Existing Conditions

A Traffic Impact Study (TIS) is prepared for the project by Colliers Engineering & Design CT, P.C. (Colliers) and is included as Appendix G. This study is prepared to identify current and future traffic operating conditions on the surrounding roadway network and to assess the potential traffic impacts of the proposed residential development.

The proposed mixed-use development will be accessed from one driveway connection via Karlsburg Road and two driveway connections from Seven Springs Road.

Seven Springs Road

Seven Springs Road is a two-lane roadway, which traverses in a generally north/south direction in the vicinity of the site. The roadway has a double yellow centerline with and no shoulders. The posted speed limit is 30 MPH.

Seven Springs Mountain Road (CR 44)

Seven Springs Mountain Road is a two-lane County roadway that generally traverses in an eastbound until its split with Mountain Road where it then traverses northbound until its termination as the western leg of a four-legged intersection with Forest Road/Schunnemunk Road opposite Seven Springs Road. The speed limit on this roadway is posted at 30 MPH. The intersection of Seven Springs Mountain Road (CR 44) and Mountain Road is planned to be improved by the County to form more of a standard "T" intersection with turning lanes.

Karlsburg Road

Karlsburg is a two-lane local roadway that begins at its intersection with Seven Springs Mountain Road opposite Chevron Road and currently terminates as a dead-end. This roadway has no posted speed limit, and serves existing residential uses.

Nickelsburg Road

Nickelsburg Road is a two-lane local roadway that begins at its intersection with Seven Springs Mountain Road and currently terminates at a dead-end cul-de-sac. This roadway has a double yellow centerline, no posted speed limit, and serves existing residential uses. It is planned to connect to the Forest Edge development, which in turn will connect to Forest Road.

<u>Mountain Road</u>

Mountain Road is a two-lane local roadway that begins at its intersection with Seven Springs Road and terminates at its intersection with Forest Road. This roadway has a double yellow centerline and white edge line, no, posted speed limit, and serves existing residential uses.

Traffic counts were completed for the TIS, and the results were compared to previous studies undertaken by Colliers and the New York State Department of Transportation (NYSDOT).

Based on this information, the Year 2022 Existing Traffic Volumes were established for the Weekday Peak AM and Friday Peak PM Hours at the following study area intersections.

- Seven Springs Mountain Road & Karlsburg Road
- Seven Springs Mountain Road & Nickelsburg Road
- Seven Springs Mountain Road & Mountain Road
- Seven Springs Road and Seven Springs Mountain Road

Based upon a review of the traffic counts, the critical peak hours were generally identified as follows:

- Weekday Peak AM Hour 8:30 AM – 9:30 AM
- Friday Peak PM Hour 2:00 PM – 3:00 PM

The Year 2022 Existing Traffic Volumes were increased by a growth factor of 2% per year to account for general background growth to create Year 2026 Projected Traffic Volumes. In addition, traffic from other proposed or recently approved developments in the area as well as those contained in the Village Study were also accounted for. These volumes were added to the 2026 Projected Traffic Volumes resulting in the Year 2026 No-Build Traffic Volumes.

Estimates of the amount of traffic to be generated by the proposed residential development during each of the peak hours were developed to identify potential impacts. In addition, the TIS establishes arrival and departure distributions to assign the site generated traffic volumes to the surrounding roadway network. Based on a review of the Existing Traffic Volumes and the expected travel patterns on the surrounding roadway network, the distributions were identified.

The site generated traffic volumes were assigned to the roadway network based on the arrival and departure distributions. The site generated traffic volumes were then added to the Year 2026 No- Build Traffic Volumes to obtain the Year 2024 Build Traffic Volumes.

It was necessary to perform capacity analyses in order to determine existing and future traffic operating conditions at the study area intersections. The following is an explanation of the analysis method utilized in this report:

Signalized Intersection Capacity Analysis

The capacity analysis for a signalized intersection was performed in accordance with the procedures described in the Highway Capacity Manual, 6th Edition, dated 2016, published by the Transportation Research Board. The terminology used in identifying traffic flow conditions is Levels of Service. A Level of Service “A” represents the best condition and a Level of Service “F” represents the worst condition. A Level of Service “C” is generally used as a design standard while a Level of Service “D” is acceptable during peak periods. A Level of Service “E” represents an operation near capacity. In order to identify an intersection’s Level of Service, the average amount of vehicle delay is computed for each approach to the intersection as well as for the overall intersection.

Unsignalized Intersection Capacity Analysis

The unsignalized intersection capacity analysis method utilized in the TIS was also performed in accordance with the procedures described in the Highway Capacity Manual, 6th Edition, dated 2016. The procedure is based on total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. The average total delay for any particular critical movement is a function of the service rate or capacity of the approach and the degree of saturation. In order to identify the Level of Service, the average amount of vehicle delay is computed for each critical movement to the intersection.

3.8.2 Potential Impacts

3.8.2.1 Construction

Traffic during construction will increase as a result of construction workers and construction vehicles and will yield the most impacts during working hours (7:00 AM to 6:00 PM, Monday through Friday). Construction-related traffic will include that associated with deliveries of equipment and materials, machinery, as well as more general truck traffic, all of which will be temporary in nature and will cease upon completion of the construction phase of the Project.

3.8.2.2 Operation

Capacity analyses which take into consideration appropriate truck percentages, pedestrian activity, roadway grades and other factors were performed at the study area intersections utilizing the procedures described above to determine the Levels of Service and average vehicle delays. Summarized below are a description of the existing geometrics, traffic control and a summary of the existing and future Levels of Service as well as any recommended improvements.

Seven Springs Mountain Road and Karlsburg Road/Chevron Road

Seven Springs Mountain Road (CR 44) and Karlsburg Road/Chevron Road intersect at a “T” type intersection. Both Karlsburg Road and Chevron Road approaches consist of a single lane and are stop-sign controlled with painted stop bars. Sidewalks are present on the west side of Seven Springs Mountain Road south of the intersection, on the south side of Karlsburg Road, and on the north side of Chevron Road.

Capacity analysis was conducted for this intersection utilizing the 2022 Existing Traffic Volumes. The analysis results indicate that the intersection is currently operating at a Level of Service “B” during the AM Peak Hour and “C” during the PM Peak Hour. The capacity analysis was recomputed using the 2026 No-Build and Build Traffic volumes. These results indicate that the intersection is expected to experience Levels of Service “F” during the AM and PM Peak Hours under future conditions. The installation of a traffic signal, together with turning lanes and other pedestrian improvements, will be required to improves these conditions.

Seven Springs Mountain Road and Nickelsburg Road

Seven Springs Mountain Road and Nickelsburg Road intersect at a “T” type intersection. All approaches consist of one lane. Sidewalks are present on both sides of Seven Springs Mountain Road southeast of the intersection and on the west side on Seven Springs Mountain Road heading northwest from the intersection.

Capacity analysis was conducted for this intersection utilizing the 2022 Existing Traffic Volumes. The analysis results indicate that the intersection is currently operating at an overall Level of Service "B" during the AM and PM Peak Hours. The capacity analysis was recomputed using the 2026 No-Build and Build Traffic volumes. These results indicate that the intersection is expected to experience Levels of Service "C" or better during the AM and PM Peak Hours under future conditions. The widening of Seven Springs Mountain Road to construct a separate left turn lane is planned to be completed at this location as part of the County Seven Springs Mountain Road improvement project. A separate right turn lane should be provided on the eastbound approach and this intersection should also be monitored for a traffic signal installation.

<u>Seven Springs Mountain Road & Mountain Road</u>

Seven Springs Mountain Road currently intersects with Mountain Road at essentially three, separate unsignalized intersections, with "Stop" sign control on the northwest-bound Mountain Road movement to Seven Springs Mountain Road, on the northbound right-turn movement from Mountain Road to Seven Springs Mountain Road and on the southbound left-turn movement from Seven Springs Mountain Road to Mountain Road. Capacity analysis was conducted for this intersection utilizing the 2022 Existing Traffic Volumes. The analysis results indicate that the intersection is currently operating at an overall Level of Service "E" during the AM and PM Peak Hours.

The County has plans to complete the reconstruction of this intersection to a standard "T" intersection. The improvements to this intersection are being advanced by OCDPW in conjunction with the Village and the results of the TIS reflect these improvements with signalization and turning lanes under future No-Build and Build conditions.

The capacity analysis was recomputed using the 2026 No-Build and Build Traffic volumes. These results indicate that the intersection is expected to experience overall intersection Levels of Service “D” or better during the AM Peak Hours and “E” under future conditions.

Seven Springs Road and Seven Springs Mountain Road

Seven Springs Road and Seven Springs Mountain Road intersect at an unsignalized intersection with the northbound approach of Seven Springs Road being stop-sign controlled. The Seven Springs Road approach consists of one lane in each direction and the Seven Springs Mountain Road approach also consists of one lane in each direction. There are no sidewalks present.

Capacity analysis was conducted for this intersection utilizing the 2022 Existing Traffic Volumes. The analysis results indicate that the intersection is currently operating at a Level of Service “B” during the AM and PM Peak Hours.

The capacity analysis was recomputed using the 2026 No-Build and Build Traffic Volumes. These results indicate that the intersection is expected to experience Levels of Service “F” or better during the AM and PM Peak Hours under future conditions.

The Village of Kiryas Joel’s area wide traffic study indicated the need for signalization and provision of left turn lanes. More specifically, the approaches should be widened for separate left, through, and right turn lanes. Also, if possible, the exit approach from the park should be widened and realigned with the Seven Springs Road approach. Note that separate left turn lanes should be provided on both the Seven Springs Road and the Park Access Road for alignment purposes. With signalization and the geometric improvements, the additional traffic generated by the proposed development will be accommodated at overall Levels of Service “C” or better during all hours except Friday afternoon peak when an overall Level of Service “E” will be experienced.

<u>Seven Springs Road and Proposed Site Driveways</u>

Seven Springs Road and two (2) Site Access Drives are proposed. One is a “T” type intersection and the other a four-way aligning with the driveway to the parking area to the west. There is also another connecting driveway through the adjacent East Gate Development, which in turn connects to Seven Springs Road effectively providing a third driveway access to the site.

Capacity analysis was computed for these locations using the 2026 Build Traffic Volumes. These results indicate that the intersection is expected to experience Levels of Service “C” during the AM and PM Peak Hours under future conditions.

The widening of Seven Springs Road should include the provision of a separate left turn lane at these locations with sidewalks and enough land dedicated to accommodate an additional lane in the future, as well as to allow a potential realignment of Seven Springs Road at the southerly access. Appropriate pedestrian accommodations should also be made. New striping and stop bars should be included at this location. The central access driveway should be signalized and the northern driveway should be monitored for future signalization.

<u>Karlsburg Road and Proposed Site Driveway (Road A)</u>

Karlsburg Road and the Proposed Site Access is proposed to be built as an extension at the existing Karlsburg Road. To accommodate pedestrian movements, crosswalks and stop-sign control should be installed at this location.

The capacity analysis was recomputed using the 2026 No-Build and Build Traffic volumes. These results indicate that the intersection is expected to experience Levels of Service “C” or better during the AM and PM Peak Hours under future conditions.

Based on the above analysis, similar Levels of Service and delays will be experienced at the area intersections under the future No-Build and future Build Conditions with the completion of the improvements planned by the County as well as those outlined above. Thus, proposed mixed-use development traffic is not expected to cause any significant impact in overall traffic operations at the studied intersections.

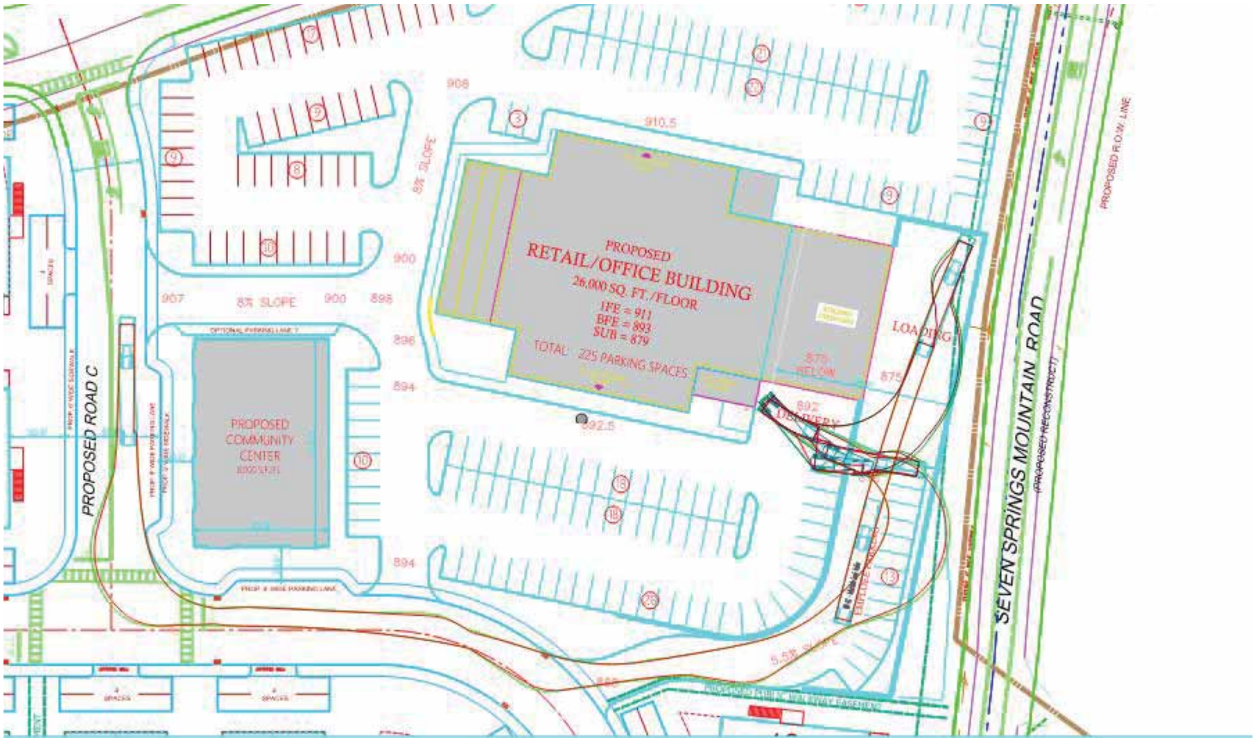
3.8.3 Proposed Mitigation

The following mitigation measures are proposed to avoid adverse effects associated with traffic:

1. The TIS shows the recommended traffic control and lanes for each approach at each intersection. These measures will be incorporated into the project design.
2. Seven Springs Road shall be realigned and widened to improve traffic conditions. The proposed access connections will be located to provide maximum sight distance along Seven Springs Road. Based on the speed data collected on this roadway, the 85^{th} percentile speed is 35 MPH. The minimum stopping sight distance for this is 250 feet. Appropriate clearing and grading will have to be completed to provide the maximum sight distances for entering and exiting vehicles and this should be indicated on the site plan. The central driveway will be signalized and the north driveway will be monitored for potential signalization.
3. A land dedication strip along Seven Springs Road along the entire site frontage will be given to the Village to accommodate the turn lanes, sidewalks, and any other future road widening.

4. A roadway connection is proposed to the adjacent East Gate development and this will provide both regular and emergency access to the project.
5. The installation of traffic signals at the intersection of Seven Springs Mountain Road and Seven Springs Road as well as at Seven Springs Mountain Road and Karlsburg Road / Chevron Road will be provided. Appropriate accommodations in terms of land dedication will be made to accommodate traffic and pedestrian pole placement as well as to accommodate separate right and left turn lane widenings on Seven Springs Mountain Road and will be incorporated into the final site plans.
6. The intersection of Karlsburg Road and Seven Springs Mountain Road should be widened to provide separate right and left turn lanes on all approaches, together with accommodations for the signal installation. The signal installation will include the crosswalks and pedestrian poles with pushbuttons.
7. The intersection of Seven Springs Mountain Road (C.R. 44) and Mountain Road is planned to be re-aligned by the County to a standard "T" intersection. Additionally, the intersection will be signalized and a separate right-turn lane on the southbound Seven Springs Mountain Road will be provided and these improvements have been accounted for in the analyses contained in the TIS. In addition to the separate left turn lane planned by the County, the intersection of Seven Springs Mountain Road and Nickelsburg Road will also be widened to provide a separate eastbound right turn lane and should be monitored for future signalization.

8. The commercial area will require space for trucks to load and unload materials. A truck turn around will be provided, utilizing space beneath the loading dock. A conceptual level turning template has been included below.



9. Centerline striping shall be provided along the internal roadways to encourage slower speeds internal to the development.

10. Select crosswalks will be raised to reduce speeding and allow for safer pedestrian travel. Raised crosswalks will be similar to those presented in the image below.

3.8.4 Public Transportation

The Village of Kiryas Joel utilizes Transit Orange as a local bus service for its residents. Various bus routes are available to destinations within the Village of Kiryas Joel, as well as in the local municipalities of Monroe and Woodbury, through the use of seven buses.[59] Use of public transit for daily trips to and from various locations (as opposed to use of individual vehicles) will help ease overall traffic levels, as well as reduce overall fuel use and, by extension, greenhouse gas emissions associated with long-term operation of the proposed Project as a residential subdivision. Further, the latter bus service provides interconnections to most of the significant employment districts, shopping locations, educational and medical facilities, and entertainment venues needed by the residents of the Village of Kiryas Joel.

Currently, Transit Orange provides bus services within the Village of Kiryas Joel via three main routes; the Local Route, Woodbury Commons, and Walmart Route. Each route is available seven days a week every two hours. The image below depicts the path of all three routes, the blue line representing the Local Route, the orange line representing the Woodbury Commons route, and the purple line representing the Walmart Route. This map is available online on the Transit Orange website, along with bus times and stops.

The maximum distance between two stops along the bus route is approximately 0.7 miles. Assuming a walking speed of 3 miles per hour, the maximum time someone might need to walk from a bus stop to an internal location is approximately 15 minutes.

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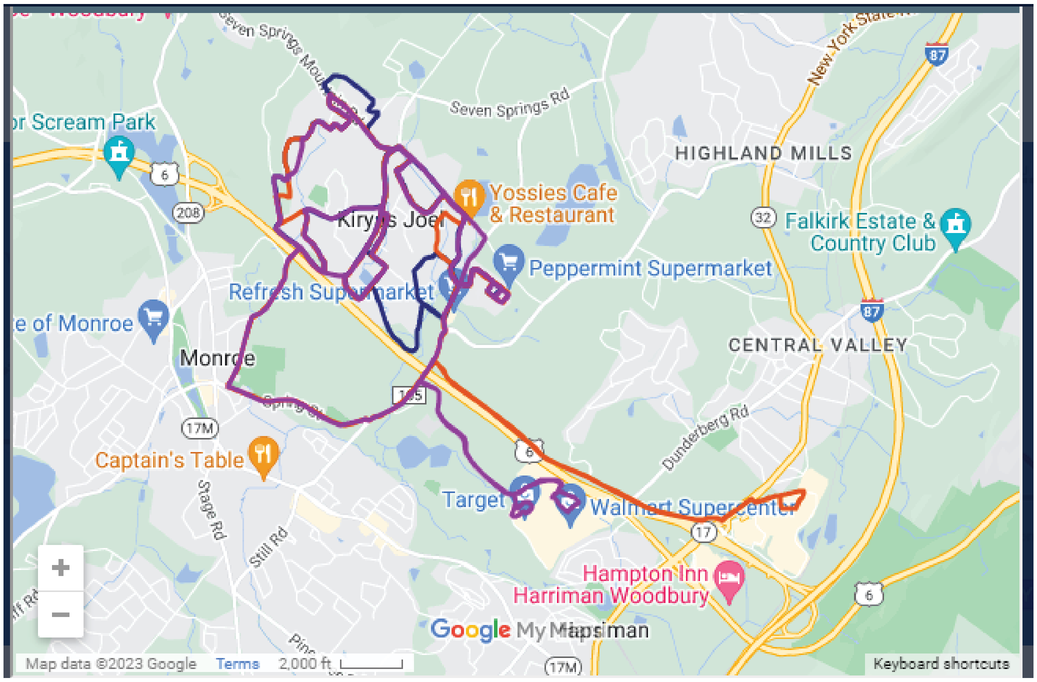
[59] Transit Orange. 2022. *Local Bus Service; Kiryas Joel*. Available at: https://www.ridetransitorange.com/kiryasjoel (Accessed September, 2022).



3.9 NOISE AND ODOR

3.9.1 Existing Conditions

3.9.1.1 <u>Noise</u>

According to the NYSDEC Program Policy entitled Assessing and Mitigating Noise[60]:

Noise is defined as any loud, discordant or disagreeable sound or sounds. More commonly, in an environmental context, noise is defined simply as unwanted sound. Certain activities inherently produce sound levels or sound characteristics that have the potential to create noise. The sound generated by proposed or existing facilities may become noise depending on the land use surrounding the facility, if these lands contain residential, commercial,

60 NYSDEC. 2001. *Assessing and Mitigating Noise Impacts – Program Policy* [website]. Available at: https://www.dec.ny.gov/docs/permits_ej_operations_pdf/noise2000.pdf (Accessed September, 2022).

institutional, or recreational uses, and the sound is perceived as noise by the users of the adjacent lands.

As noted in the NYSDEC Noise Policy referenced above, "[c]ertain activities inherently produce sound levels or sound characteristics that have the potential to create noise (i.e., unwanted sound)."

As stated previously, the current Project site encompasses a 41.24-acre area which predominantly contains mature deciduous forest with a small vernal pool habitat, a stream system, and residential development. The following three urban population centers are located within one mile of the site:

- Village of Kiryas Joel, Town of Palm Tree (approximately 0 feet; directly east and southeast of site);
- Village of Monroe, Town of Monroe (approximately 5,000 feet southwest of site); and
- Village of South Blooming Grove, Town of Blooming Grove (approximately 2,100 feet northwest of site)

Existing noise levels on the Site are those typical of a mature natural forested area bordered by residential development.

In addition, the following sensitive receptors such as schools, hospitals, or institutions are located within one mile of the Site:

- Sheer Dalet (school) (approximately 200 feet east);
- Yashiva Nishmat Chaim (college) (approximately 350 feet southeast);
- Cong. Ohr Hachaim (Synagogue) (approximately 650 feet southeast);

- Bais Shmiel Binyamin Satmar Rovna (Orthodox Synagogue) (approximately 1,200 feet east);
- Bahutz Shul (Synagogue) (approximately 1,400 feet southeast);
- Gonzaga Chapel (approximately 1,500 feet northeast);
- Rupshitz (Orthodox Synagogue) (approximately 1,600 feet southeast);
- Satmar Bais Kahana (Orthodox Synagogue) (approximately 1,600 feet east);
- Uta Mesivta Of Kiryas Joel (college) (approximately 1,900 feet southeast);
- Avodat Yisroel Kosnitz (Synagogue) (approximately 2,100 feet northwest);
- ANSHEI HATZADIK (Synagogue) (approximately 2,100 feet northwest);
- Toldot Tzvi Spinka (Synagogue) (approximately 2,200 feet east);
- Yetev Lev Satmar Cemetery (approximately 2,400 feet southeast);
- Spinka (Orthodox Synagogue) (approximately 3,000 feet southeast);
- UTA Nursery School (approximately 3,500 feet southeast);
- Tosh Ohel Mordechai (Synagogue) (approximately 4,400 feet southeast);
- Cong. Yetev Lev DSatmar – Beit Hamedresh Hagadol of KJ (Orthodox Synagogue) (approximately 4,400 feet southeast);
- Ezras Choilim Health Center (approximately 4,400 feet southeast);
- Sanz Zmigrod (Synagogue) (approximately 4,700 feet north); and
- Monroe Temple Beth-El (Reform Synagogue) (approximately 5,200 feet south).

An ambient sound level survey was not conducted as no significant impacts to noise levels are anticipated as a result of the proposed Project.

3.9.1.2 Odor

An odor is a chemical in the air that is "smelled" or sensed by our nose (olfactory system), and can be a significant environmental concern related to manufacturing, food processing, composting, landfills, and institutional or municipal facilities such as water and wastewater treatment plants[61]. Certain groups of chemicals that produce odors are potentially harmful and can cause health problems. Chemical applications, atomizing and liquid application systems, bioengineering programs, sheltering the activity or constructing containment structures equipped with appropriate air venting/filtering systems are all used as odor control methods.

The current project site encompasses a primarily undeveloped wooded area. The site is immediately bordered by residential land to the east, southeast, and south, and deciduous forest to the north and west. There are no odor producing actions occurring on site as is typical of a mature natural forested area.

3.9.2 Potential Impacts – Noise

While there are universal standards for quantitative sound level measurement methodologies, there are no universally accepted standards to measure the subjective effects of noise, or to measure the corresponding reactions of human annoyance and dissatisfaction. The lack of a common standard is due primarily to the wide variation in individual thresholds of annoyance caused by noise. Accordingly, an effective way of determining a person's subjective reaction to a new noise is by comparing the new noise to the existing or "ambient" environment to which that person has adapted. It is well-established that a cumulative increase in the total sound level of about 5 or 6 dBA at a given receptor is required before the new sound can become clearly perceptible or noticeable to most people. As explained in detail in section V, part A, subpart 2 of the NYSDEC guidance document, the combination of two sound levels is logarithmic rather

[61] NYSDEC. N.D. *Question 15 – Impact on Noise, Odor, and Light – Full EAF (Part 2), Full Environmental Assessment Form (FEAF) Workbook* [website]. Available at: https://www.dec.ny.gov/permits/91786.html#:~:text=Question%2015%20-%20Impact%20on%20Noise%2C%20Odor%2C%20and,an%20increase%20in%20noise%2C%20odors%2C%20or%20outdoor%20lighting (Accessed September, 2022).

than mathematically additive. In other words, two noise sources each with a sound level of 50 dBA have a combined sound level of 53 dBA, not 100 dBA due to the nature of how the logarithmic decibel scale is defined. Cumulative increases of between 3 and 5 dBA are generally regarded as negligible or hardly audible. Thus, lower sound levels from a new source are “buried” in the existing background sound level.

The NYSDEC Noise Policy suggests that new noise level increases that exceed 6 dBA above ambient may result in complaints in sensitive locations or may require additional analysis. The specific language relating to these perceptibility thresholds in the NYSDEC Noise Policy (Section V B.1.c) is as follows:

- Increases ranging from 0-3 dBA should have no appreciable effect on receptors.
- Increases from 3-6 dBA may have potential for adverse noise impact only in cases where the most sensitive receptors are present.

Sound pressure increases of more than 6 dBA may require additional analysis of potential impacts depending on existing SPLs and the character of surrounding land use and receptors.

3.9.2.1 Construction

Construction noise has the potential to disturb people at home in their residences, in office buildings or retail businesses and walking or travelling in the vicinity of the site. Construction of the Project requires the operation of heavy equipment and construction vehicles for various activities including blasting, grading, construction of access roads, excavation and pouring of foundations, the installation of utilities, and construction of above ground building structures. The type of noises generated during construction of this project are expected to be those related to operation of heavy machinery such as bulldozers, excavators, cranes and dump trucks (engine noise and back up alarms), pile driving equipment, power tools and equipment including generators and air compressors. These activities, although temporary, will produce the following types and levels of noise:

Blasting and rock removal: The site contains uneven terrain with shallow bedrock and rock outcroppings. The latter material will have to be removed to create terrain suitable for construction. Removal of rock material will involve use of dynamite for blasting, and potentially drilling equipment, e.g. a hoe ram. Sensitive areas within 1,500 feet of blasting (see Sensitive Receptors list in Section 3.9.1.1 above) will be at the highest risk for noise impacts. The Construction Noise Handbook provided by the NYSDOT Federal Highway Administration (FHA) indicates that blasting generates noise levels of 94 dBA at a distance of 50 feet. Likewise, a rock drill generates noise levels at an average of 81 dBA at a distance of 50 feet.[62]

Truck traffic and heavy equipment operation: Heavy equipment, gravel, concrete and materials must be delivered to the site by large trucks (including dump trucks, cement mixers, and tractor-trailers). Heavy equipment includes bulldozers and rollers during site preparation and road construction, backhoes, hoe rams, and pneumatic jacks during foundation excavation. Sound generated by truck traffic and heavy equipment ranges from 76 to 101 dBA at a distance of 50 feet.[63]

Noise from construction-related activities may cause some temporary annoyance above ambient noise levels at residences within and adjacent to the Project Site. Ongoing construction surrounding the site was observed on the April 12 and June 13, 2022 site

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[62] U.S. Department of Transportation (USDOT) Federal Highway Administration (FHA). 2017. *Construction Noise Handbook* [website]. Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm (Accessed September, 2022).

[63] U.S. Environmental Protection Agency. 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, December, 1971.

visits performed by C&S staff. Since construction activities are generally temporary and occur mostly during daytime hours, construction noise of this magnitude may well go unnoticed by many residents near the project because construction-related noise will not be significantly louder than ambient noise sources such as vehicles passing on the road and other additional construction activities already taking place.

3.9.2.2 Operation

NYSDEC Program Policy Guidance document DEP-00-01 referenced previously contains criteria by which noise impacts can be assessed. The project is located within a Residential zone. Indoor residential areas, hospitals, and schools are typically associated with noise levels of 45 dBA and outdoor areas where human activities take place are typically associated with noise levels of 55 dBA[64]. The NYSDEC Guidance states that incremental sound level increases over background of 0 to 3 dBA should have no appreciable effect on receptors while increases in the range of 3 to 6 dBA may have potential for adverse noise impact in cases where the most sensitive of receptors are present. The guidance also recommends, where increases of more than 6 dBA occur, that a closer analysis of impact potential may be warranted depending on existing background conditions and the nature of surrounding land use and receptors.

The proposed project involves construction of a residential subdivision that will be an addition to existing residential land associated with the Village of Kiryas Joel. Given that the proposed project will produce the same type of noise (that associated with residential use) as its surrounding landscape and will be in the immediate proximity to existing

[64] U.S. EPA. 2016. *EPA Identifies Noise Levels Affecting Health and Welfare [EPA press release – April 2, 1974]* [website]. Available at: https://archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html#:~:text=Noise%20levels%20for%20various%20areas%20are%20identified%20according,certain%20outdoor%20areas%20where%20human%20activity%20takes%20place (Accessed September, 2022).

residential development, impacts to noise levels associated with the operation of the proposed residential subdivision are not anticipated to be significant.

3.9.3 Potential Impacts – Odor

The project involves construction of a residential subdivision which will be a continuation of existing residential development associated with the Village of Kiryas Joel. No adverse impacts on odor are anticipated as there will be no construction of odor-producing facilities.

3.9.3.1 Construction

Construction activities have the potential to create minor levels of odor within and in the vicinity of the site. Potential odor will likely be associated with the operation of heavy equipment and construction vehicles for various activities including blasting, grading, construction of access roads, excavation and pouring of foundations, the installation of utilities, and construction of above ground building structures. Ongoing construction activities were observed nearby during the April 12 and June 13, 2022 site visits; additional construction activity is unlikely to significantly impact existing odor conditions. Further, construction will be temporary and any impacts to odor will cease with the completion of construction activities.

3.9.3.2 Operation

The proposed Project involves construction of a residential subdivision associated with existing residential units within the Village of Kiryas Joel. Odor impacts resulting from the proposed project are anticipated to be minor and will likely be associated with vehicle emissions.

3.9.4 Proposed Mitigation – Noise

3.9.4.1 Construction

Although impacts related to construction noise will be temporary and are not likely to be significant, measures will be employed to minimize and mitigate temporary construction noise, including:

- Implementing BMPs for sound abatement during construction, including use of appropriate mufflers and limiting hours of construction;
- Notifying landowners of certain construction sound impacts in advance; and
- If detailed geotechnical analyses determine that pile-driving and/or blasting is required during construction, providing advance notice to all neighbors and limiting such activities to the hours of 8 AM to 4 PM Monday to Friday.

3.9.4.2 Operation

Noise impacts related to the proposed residential subdivision are anticipated to be minor. The proposed Project will be a continuation of existing residential development. It is not anticipated to adversely impact noise on the site given that noise impacts will fit the existing type of noise surrounding the site and will be minor.

3.9.5 Proposed Mitigation – Odor

3.9.5.1 Construction

No significant impacts associated with construction odor are anticipated as a result of this project, and therefore mitigation is not required.

3.9.5.2 Operation

Odor impacts related to the proposed residential subdivision are anticipated to be minor. The proposed Project will be a continuation of existing residential development. It is not anticipated to adversely impact odor on the site given that the proposed Project will fit the existing land use surrounding the site. No mitigation is required.

3.10 DOCUMENTED ENVIRONMENTAL CONDITIONS

This section will describe recognized environmental conditions at the Project site. Potential impacts associated with the Project within or in the vicinity of such recognized environmental conditions will be identified, and mitigation measures recommended as appropriate.

3.10.1 Existing Conditions

The proposed project is located near the northwestern boundary of Kiryas Joel. The project site is generally situated southwest of Seven Springs Mountain Road, northeast of G Road and placed between Seven Springs and Karlsburg Road.

The site totals 41.24 acres and consists of three soil types including Arnot-Lordstown complex, Swartswood gravelly loam, and Swartswood and Mardin soils.

The site has no development history and no known environmental database records. There are also no listed adjacent properties with environmental database records.

There are a number of surrounding and close-proximity properties with environmental record histories. Table 7 below identifies the site name, type of record (database), address, direction from the project site, distance, and elevation difference.

Table 7. Properties with Environmental Record History

Site Name	Database	Address	Direction	Distance	Elevation Difference
Brach Residence	NY Spills	250 Seven Springs Road	NNE	.09	25
Brach Residence	NY Spills	250 Seven Springs Road	NNE	.09	25
Orange and Rockland Utility	NY Spills	2 Paksch Place	ESE	.11	-101
Abandoned Drums	NY Spills	94 Seven Spring Road (Seven Springs Road at Lanzut Court)	SSW	.11	-94
NYS DEC Region 3	RCRA Non Gen	94 Seven Springs Road	SSW	.11	-94
NYS DEC Region 3	Gen Manifest	94 Seven Springs Road	SSW	.11	-94

Although there are multiple surrounding properties with known environmental histories, the distance and status of sites allow for the assumption that they have had no negative environmental impacts on the subject property.

3.10.2 Potential Impacts

3.10.2.1 Construction

Potential adverse environmental impacts associated with the construction of this project can include air quality, water quality, noise, solid waste generation and natural communities. These impact categories are typical for major construction efforts in urban areas with nearby commercial, recreational and/or aesthetic resources subject to multiple uses by the public. The existing public roadways, trails, and waterways in the area will need to continue to serve the public during construction to the extent compatible with public safety. Since the duration of the construction effort will extend through multiple construction seasons, longer term plans for mitigating construction impacts will be beneficial.

The use of heavy construction equipment may produce volatile vapors and carbon monoxide emissions which, when added to background levels produced by motor vehicles, could result in short-term adverse impacts to air quality. Because of the current topography of the site, extensive excavation is anticipated as well as grading, placement of granular materials, and transportation of materials on site can create airborne particulates and contaminants.

The most common water quality issues associated with construction are erosion and sedimentation control in the areas disturbed by the construction effort. Removal of vegetative cover can also enhance the erosion effects of precipitation.

Construction of the project will generate some quantity of solid waste materials. Solid waste associated with construction of the project will include domestic waste generated by workers, and construction-related waste (e.g., containers and construction debris). Minimal impacts to natural communities within the areas of active construction are expected.

3.10.2.2 Operation

Operation of the facility will take place after construction. It is unlikely that this will result in any major impacts with regard to the environmental condition of the site. Maintenance of the property will be essential to ensure the long term integrity of the remedy and to prevent future impacts due to site disturbance and erosion. Other environmental impacts associated with operations such as noise and traffic are discussed separately under those sections of this document.

3.10.3 Proposed Mitigation

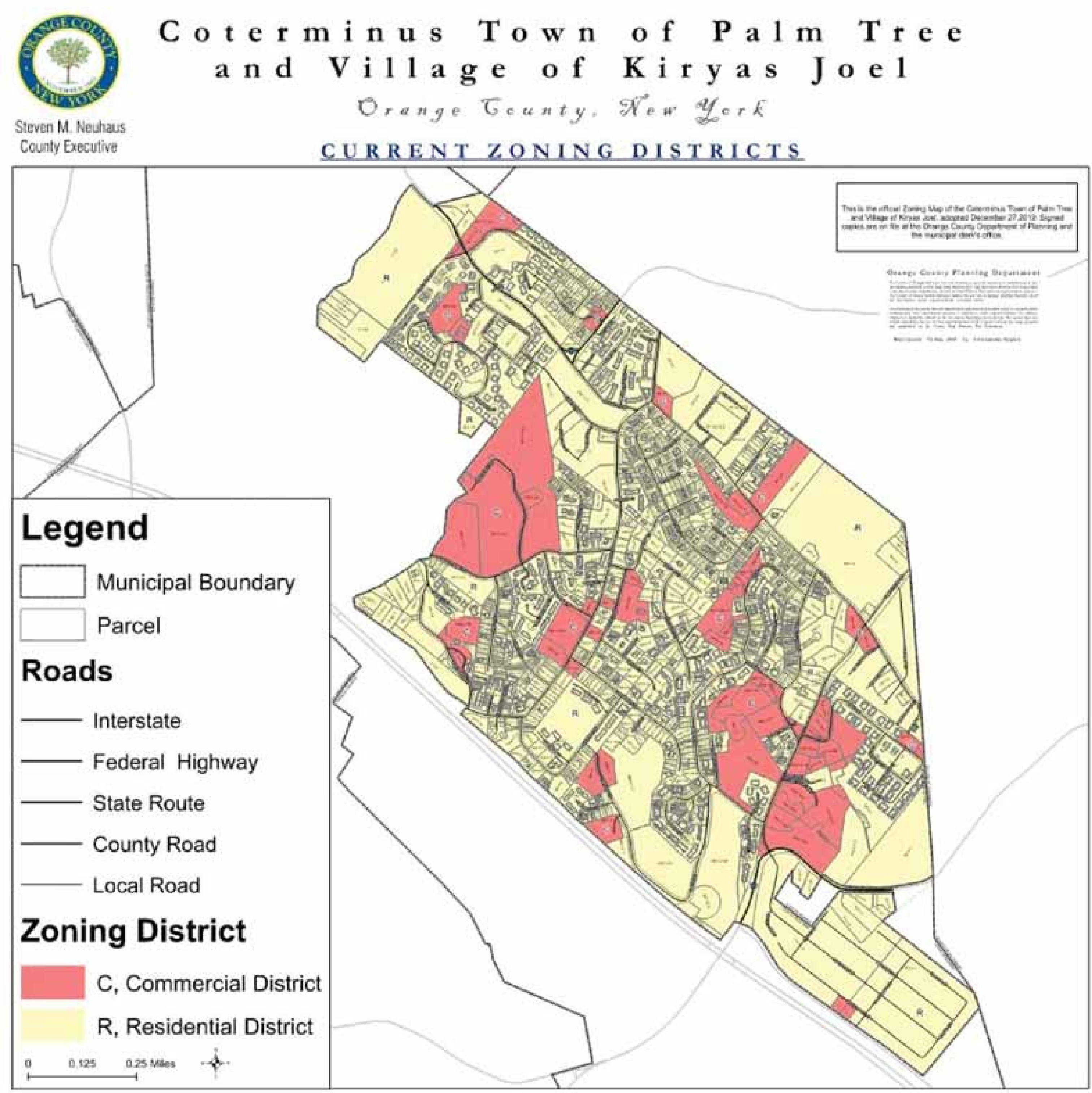
No adverse impacts related to documented environmental conditions are anticipated, and therefore no formal mitigation is necessary.

3.11 LAND USE AND ZONING

The site is located to the northwest of the Village of Kiryas Joel/Town of Palm Tree (See Figure 8). It is generally east of Seven Springs Road, south of Seven Springs Mountain Road and west of Karlsburg Road. In addition, it is located approximately 7 miles northwest from the Town of Harriman and 4 miles north of the Town of Monroe. The project would be located on an undeveloped wooded lot. Historically, the site has remained undeveloped. It consists of six parcels and land use is currently classified as Vacant Commercial. The total acreage of the project is 41.24 acres.

Land uses and existing conditions adjacent to the Project Site include:

- To the northeast, Gonzaga Park and Gonzaga Chapel
- To the east, Sheer Dalet, a local school
- To the southeast, multi-family residences as well as commercial buildings including a men's clothing goods store, a take-out restaurant, and CPA office
- To the south, multi-family residences and a Synagogue
- To the southwest, G Road and single-family homes
- To the west, Seven Springs Road and undeveloped wooded land owned by 7 Springs Villas LLC and Heinrich Landau



Sources: Created by C&S Engineers, Inc.

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Figure 8 | Land Use & Zoning

Karlsburg Acres Development Project Site
Town of Palm Tree, Orange County, NY

The Project Site is currently zoned Residential by the Village of Kiryas Joel/Town of Palm Tree. The district is primary to accommodate housing and public amenities. The following uses are permitted in this district:

- One-family and two-family dwellings;
- Multifamily dwellings;
- Village Hall, Village Fire Station, Village Police Station or other Village use;
- Public parks and playgrounds and other recreation facilities intended for general public use;
- Public parking lots;
- Essential services; and
- Synagogues, ritual baths, public schools, private schools, and other places of worship or religious observance and instruction.

Some uses are permitted upon issuance of a special zoning permit:

- Private garden house, tool house, playhouse, greenhouse or similar private accessory use not used for commercial or public purposes;
- Private garage or carport for housing private passenger cars of residents living on the premises;
- Home occupations with special permit for Class II home occupations; and
- Signs used on the same lot in conjunction with a permitted principal or accessory use provided that such signs are not illuminated or painted with reflective or luminous-type paint, and are mounted on the building (not free-standing).

3.11.1 Existing Conditions

Table 8. Project Consistency with Local Planning Documents

Plan	Relevant Goals/Strategies/Values	Project Consistencies	Project Inconsistencies
Kiryas Joel Comprehensive Plan (2018)	Relevant Goals: • Multiple family residential living is the foundation of the community. • Housing must be affordable for the predominantly low to middle income population. • Provide a fully walkable, pedestrian-oriented community with transportation access to regional centers. • Provide community services that support all aspects of family life and meet the needs of all resident age groups. • Provide adequate water and sewer services for the full development potential of the Village. • Establish development guidelines that encourage facilities and services in neighborhood settings, including neighborhood-scale retail, educational, civic, religious and recreational opportunities.	• Creating multiple residential living • Creating affordable housing • Providing pedestrian friendly community • Providing adequate water and sewer for this new development • This project will facilitate the encouragement of facilities and services in neighborhood settings, including neighborhood-scale retail, educational, civic, religious and recreational opportunities.	• None
Orange County Comprehensive Plan (2019)	Values: • Environmental quality and Sustainability • Economic prosperity and housing affordability • Community quality of life • Social equity	• Allowing families to live in the communities that they work and play in • Creation of new housing	• None

Plan	Relevant Goals/Strategies/Values	Project Consistencies	Project Inconsistencies
Orange County Economic Development Strategy (2015)	Goals: • To position the County to attract new businesses and investors to locate in Orange County • Support existing businesses and entrepreneurs within to expand and experiment Strategies: • Share best practices that encourage desired forms of development • Support for startups and incubator facilities • Continue infrastructure improvements and share educational programs regarding key industries	• Increase in desired development	• None
Mid-Hudson Regional Sustainability Plan (2013)	Goals: • Economic development • Environmental sustainability • Enhancing quality of life • Smart growth	• Economic development • Enhancing quality of life • Smart Growth	• None
Greenway Compact (2013)	Goals: • Promoting a multi-modal transportation network • Utilizing infill and redevelopment to minimize greenfield development • Conserving natural land resources Values: • Natural and Cultural resource protection • Economic Development • Public Access to the Hudson River • Regional Planning • Heritage and Environmental Education	• Economic Development	• Development of greenfields

Plan	Relevant Goals/Strategies/Values	Project Consistencies	Project Inconsistencies
Regional Housing Needs Assessment (2009)	Goals: • Affordable housing with the 3-County region • Decrease the affordability gap for housing Strategies: Values: • Affordable housing for all incomes and ages	• Creation of new housing for multiple ages/incomes	• None
Orange County Open Space Plan (2004)	Goals: • Increase access to waterways • Protection of natural resources Strategies • Establishment of an Open Space Fund • Review of sale parcels for open space value before auction Values • Importance of water resources, agriculture, biodiversity, cultural (scenic and historic) resources, and recreation	• None	• Development of open space

3.11.2 Potential Impacts

3.11.2.1 Construction

Preconstruction and construction activities are expected to have temporary impacts on land use in the area immediately surrounding the Project Site. Temporary construction activities will be limited to the Project Site. Activities proposed on the Project Site include:

- The installation of Project site/construction logistics, including fencing/wind screening, signage, alternate transportation routing and associated equipment;
- The installation of soil erosion and sedimentation controls;
- Utility demolition, relocation, and installation, including stormwater collection systems, water supply and wastewater collection lines, electric, data, telecommunications, and gas;

- Site excavation;
- Loading and unloading of materials and equipment; and
- Building construction.

These construction activities may result in temporary minor impacts from dust, noise, vibration and other minor inconveniences to nearby properties. Temporary adverse impacts to air quality may result from operation of construction equipment and vehicles, which could generate engine exhaust emission and fugitive dust.

3.11.2.2 Operation

Operation of the Proposed Project will change land use at the current site. The new land use is consistent with goals of regional planning documents and adjacent land uses. Therefore, operation will not adversely affect adjacent land uses.

3.11.3 Proposed Mitigation

The proposed Project is consistent with existing land uses and land use regulation of the Project Site and adjacent areas. Due to this consistency, no significant impacts to land use are expected. Consequently, no further mitigation measures are proposed.

3.12 PUBLIC HEALTH AND COMMUNITY SERVICES

3.12.1 Background Information

Currently, the property is primarily characterized as successional forest. A small vernal pool and intermittent stream also occur on site. The property is owned by Bakertown Road II Holding LLC, Seven Springs Corp., Eastgate Estates LLC, Lipa Oppenheim, & Mendel Oppenheim and is located within the Village of Kiryas Joel and Town of Palm Tree.

3.12.2 Fire Protection

The Project Site is served by the Village of Kiryas Joel Fire Department. The Fire Department is directly east of the Proposed Project site located at 3 Chevron Road. The Fire Station on Chevron Road is the only Station within Kiryas Joel. The Department's staff consists of 45 volunteers. The Department receives assistance from nearby Departments on an as-needed basis. Assistance from other Departments includes: South Blooming Grove Fire Department, Monroe Fire Department Station 2, Mombasha Fire Company, Woodbury Fire Department, and Washingtonville Fire Department.

3.12.3 Police Protection

The Project Site is served by the New York State Police, Orange County Sheriff's Department located at 110 Wells Farm Road in Goshen, New York, and the Village of Kiryas Joel Public Safety located at 177 Shunnemunk Road.

3.12.4 Emergency Services

The Project Site is served by the Kiryas Joel Volunteer Emergency Medical Services, Inc. which is located at 63 Forest Road within the Village of Kiryas Joel. The Kiryas Joel Volunteer Emergency Medical Services responded to over 4,600 calls in 2021. They are assisted by 86 volunteers and 10 ambulances. There are four health and medical centers within close proximity to the Proposed Project. Ezras Choilim is located at 49 Forest Road, a local medical center is located at 45 Van Buren Drive, and Rambam Urgent Care is located 1 Streislik Court. All are within the Village of Kiryas Joel. Outside of the Village, Crystal Run Healthcare is located at 855 NY-17M in Monroe, located less than 2.3 miles southwest of the Proposed Project Site.

3.12.5 Water Supply

The NYSDEC issued an increase in the total permitted water withdrawal from 17 production wells in May of 2021 to 2.79 mgd. The prior- approved withdrawal was 2.54 mgd. The new permit included four additional wells (KJP Well 1, Well 29, Well 32 and Well 33) and removed prior permitted wells no longer in service (Wells 5, 13B, 21B, 23, 24 and 25) and a reduced permitted capacity for Well 6 from 250 to 175 gpm. The present permitted capacity is provided in Table 9 below.

Table 9. Present permitted water capacity

Well No.	Permitted Capacity (gpm)	Maximum Well Field Capacity (gpd)
Village Wells		
1	76	1,000,000 monthly
5	0	
6	175	
8A	160	
9B	109	
13A	106	
13B	0	
14A	50	
17	200	
22	140	
29	120	
32	150	
Brenner Well Field		
21B	0	783,000
23	0	
24	0	
25	0	
26	112.5	
27	93.75	

Well No.	Permitted Capacity (gpm)	Maximum Well Field Capacity (gpd)
28	337.5	
Mountainville Well Field		
1	425	612,000
2	430	
Wells located outside Village boundary		
KJP Well 1	150	216,000
33	125	180,000
Village Total	**Total Permitted Withdrawal 2.79 mgd**	

The Village presently has 17 production wells in service (Wells 1, 6, 8A, 9B, 13A, 14A, 17, 22, 26, 27, 28, 29, 32 and 33; Mountainville, Wells 1 and 2; and KJP Well 1). The Village submitted the requested support documents for KJP Well 1, Well 29, Well 32 and Well 33 for approval (Orange County Department of Health (OCDOH) / New York State Department of Health (NYSDOH) for permanent use which has not been received to date. KJP Well 1 and Well 29 are presently being operated under a continued emergency-use authorization from OCDOH/NYSDOH pending final construction and approval. At this time, there are no approvals from OCDOH/NYSDOH to operate Wells 32 and 33As discussed above, Wells 32 and 33 are not approved sources of water supply at this time, which reduces the approved yield capacity to 2.57 mgd (million gallons per day) from the 15 production wells.

A review of 2022 well field operation reports indicate the Village's yearly average water demand is about 2.13 mgd with a maximum peak daily demand of 2.54 mgd (April 2022). The wells presently in service and approved for use have a permitted capacity of 2.57 mgd and considering the maximum peak water demand of 2.54 mgd reported in 2022, at this time there is no surplus water. At such time when regulatory agency approvals are received to allow the placement of Wells 32 and 33 in service, marginal surplus may be available.

3.12.6 Wastewater Treatment

The project site lies within Orange County Sewer District #1. Currently, sanitary sewer within the Village is conveyed to two sewage treatment facilities: the Village of Kiryas Joel sewage treatment plant (Village plant) and the Orange County Harriman treatment plant (Harriman plant). These two systems are operated by Orange County Sewer District#1. The Village plant is owned by the Village of Kiryas Joel but is operated by the Orange County Department of Public Works Division of Environmental Facilities. The Village plant has a capacity of one million gallons per day (mgd) and currently operates at full capacity. The Harriman Plant is owned and operated by Orange County and has a permitted capacity of 6.0 mgd and currently treats approximately 5.0 mgd. Flows from the Village of Kiryas Joel that are more than the 1.0 mgd treated at the Village plant are directed to the Harriman plant. In anticipation of continued growth in the southern portion of the County, the County has initiated planning an additional 3.0 mgd of capacity which would bring the total County treatment capacity to 9.0 mgd. The county is in the planning stages of the capacity upgrades at the Harriman Plant and as of 2021 had completed the final scoping document.

Conveyance infrastructure within the Village is tributary to two main lines, the east branch main and the west branch main. In 2008, approximately 2,000 LF of the west branch main was upsized to 24” piping to accommodate the development of VAAD Mountain and future developments.

Using the Orange County Sewer District No. 1 (OCSD) metric of 400 gpd per single family home (unit), the anticipated sewer demand for 608 proposed units is 243,200 gallons per day (gpd).

The site will connect to an existing manhole along Seven Springs Mountain Road. Existing survey indicates adequate depth exists for the proposed sewer to tie into the existing manhole at this location. Flows will be conveyed from the 40-acre Karlsburg Acres Development via gravity through approximately 4,700 LF of sewer main and 27 manholes. All flows from the Karlsburg Acres Development will combine prior to discharging into the existing manhole.

Approximately 4,700 LF of 8" SDR 35 sewer main and 27 sewer manholes will be constructed on site. Three sewer mains will be constructed, two to service the 40-acre Karlsburg Development and one to service the 10-acre development. The services will combine at the southeast edge of the site, with the 10-acre development discharging into the gravity sewer via a pump station and three new manholes will be constructed along Seven Springs Mountain Road prior to discharging into the existing manhole.

From the existing Seven Springs Mountain Road manhole, flows will be conveyed within the Village of Kiryas Joel network to the west branch main.

3.12.7 Environmental Conditions

As stated previously, the site is located on undeveloped land. There is no evidence of prior development or areas affected by past land use within the project boundary. There is no known evidence of spills, tanks, or other sources of waste within the site boundary.

There are environmental records for surrounding properties, most notably a residence located at 250 Seven Springs Road, 0.09 miles northeast of the site. The property is noted twice on the NY Spills database due to a leaking tank and subsequent tank removal. The tank was excavated and sampled. The case was closed in February of 2006.

Due to lack of previous development on site and no existing evidence of environmental records for the property, design and construction should not have to take previous environmental conditions into consideration.

3.12.8 Potential Impacts

3.12.8.1 Construction

Construction of the project will involve some intrusive work associated with installation of utilities, preliminary site grading and installation of foundations. This initial work will not have the benefit of protection by the proposed remedy as will the latter stages of construction. Potential adverse public health and safety impacts associated with the construction of this project can include air quality, water quality, noise, solid waste generation and physical hazards. These impact categories are typical for major construction efforts in areas with nearby commercial, recreational and/or aesthetic resources subject to multiple uses by the public. The existing public roadways in the area may continue to serve the public during construction to the extent compatible with public safety.

The use of heavy construction equipment may produce volatile vapors and carbon monoxide emissions which, when added to background levels produced by motor vehicles, could result in short-term adverse impacts to air quality. Because of the current topography of the site, extensive excavation is necessary and other construction activities, including grading, placement of granular materials and transportation of materials on site can create airborne particulates and contaminants.

The most common water quality issues associated with construction are erosion and sedimentation control in the areas disturbed by the construction effort. Removal of vegetative cover can also enhance the erosion effects of precipitation.

Construction of the project will generate some quantity of solid waste materials. Solid waste associated with construction of the project will include domestic waste generated by workers, and construction-related waste (e.g., containers and construction debris).

3.12.8.2 Operation

Impacts associated with operation and use of the site include increases in noise and traffic which are discussed separately under those specific sections of the site. There may be increased use of surrounding amenities due to an increase in population density such as grocery stores, schools, and other local services.

Based on 400 gallons per day per unit the projected demand for 471 residential units is 188,400 gpd. However, the NYS DOH has recently accepted 71 gallons per day per bedroom. The central water system extension has been designed to create a direct connection to the existing Village of Kiryas Joel assumed 8-inch ductile iron water main located at the proposed Mezabish Road Extension intersection with Forest Road. This distribution main will be installed as a 12-inch ductile iron water main in accordance with the Village of Kiryas Joel Water Department specifications. This connection will allow the proposed and approved projects to utilize the existing Village of Kiryas Joel water infrastructure and storage to provide the required pressure and storage for domestic usage and fire protection. The distribution system also includes the placement of multiple valves which allow portions of the main to be isolated if required. Valves have been spaced at intervals of no more than 800 feet and at all tee intersections in accordance with the 10 State Standards recommendations.

Approximately 1,800 linear feet of 8” ductile iron watermain is proposed for the development. The watermain forms a loop up through the site following Roads A and B. The existing watermain within Acres Road is proposed be tapped at the site entrance road located. Seven fire hydrants are proposed throughout the site with one at the high point of Road B and other locations throughout the development. No off-site water improvements are necessary or proposed. The action will involve an additional need for domestic water to service the project. The anticipated project completion date for the first Certificate of Occupancy is approximately in two years (2020). The Village of Kiryas Joel is currently progressing with connection to the New York City Catskill Aqueduct and evidence supports that the Aqueduct will be in service by the time that residences are ready to be occupied. The applicant has assumed all risks and certificates of occupancy would not be issued unless adequate water supply is available and approved by all involved agencies. Based upon an analysis and the expected time frame for connection to the Aqueduct, there is sufficient evidence of the availability of water from the completed Catskill Water extension to be able to meet the water demands of the project by the year 2020.

Hydrants along the proposed water distribution main are in accordance with 10 State Standards and are located at intervals of no more than 400 feet. Hydrants will be utilized for fire protection, air blow off, and main flushing. To ensure adequate flushing of the system, the hydrants are located at all terminal ends and highpoints in the system.

3.12.9 Proposed Mitigation

3.12.9.1 Construction Mitigation

To help mitigate air emissions during construction, the contractors will be instructed to employ proper construction and dust suppression techniques including wetting or shielding of work areas whenever significant potential for airborne particulates is present. If the mitigation efforts do not succeed in reducing the emissions to acceptable levels, work can be suspended until conditions improve or successful additional mitigation methods are incorporated.

Mitigation available for erosion during construction includes diversion ditches up-gradient of work areas, sedimentation basins, silt fences and other barriers such as straw bales. Properly installed and maintained, these temporary structures will need to be maintained until vegetative cover is restored. The scope and schedule for erosion and sedimentation control measures will be provided in a project specific SWPPP, which will be reviewed and approved by the appropriate state and/or federal agencies.

Fuel, lubricants, and any other construction-related chemicals, will be stored in specified, secondarily contained locations, and fueling and maintenance of equipment will be conducted at locations distant from the excavations so that spills or overfills can be cleaned up effectively.

Planning to provide for the safety of the workers and the general public during construction is central to the successful implementation of any major project and is vital when the project is located in an area that will be visited and traversed by the public during the construction effort. Exclusion zones limiting access of the public will need to be designated and enforced at certain times so that project-related activities will not overtly affect the users of the other areas of the site.

The air quality and water quality construction mitigation efforts discussed previously are intended to provide for the safety of both the site workers and the public, as would the construction and site management plans which control access and vehicular traffic in the project area. To be effective, these plans will be site specific addressing the range of potential hazards associated with each phase of the work, as well as the potential pathways by which workers and the public could be impacted and by incorporating proactive and conservative prevention and control measures for those situations. Site safety plans will be required for each phase of work and worker safety meetings will be held at periodic intervals during the project.

Wastes will be segregated and disposed of as a contractual obligation by the site contractor. Likely, a local garbage hauler will be engaged by the contractor to make regular pick-ups and transport the waste to a nearby permitted facility. The contractor will also be obliged to provide sanitary waste collection and disposal for the workers.

There could be the potential for workers or the general public to be exposed to hazardous materials during intrusive work on the site. Prior to any intrusive work, the contractor must prepare a plan for the removal and proper disposal of any waste materials that are determined to be present at locations and concentrations indicative of a potential hazard. This plan would include measures for characterizing waste materials for disposal purposes and handling. The plan may include air monitoring for the site to address the potential for hazardous materials to migrate via fugitive dust emissions from construction activity.

3.12.9.2 Operation Mitigation

Due to the Proposed Project site resulting in an increase in population density, the Proposed Project site includes a new retail and office building with additional parking spots. The new mixed-use building and additional parking spots will assist with off-loading capacity issues at existing stores and local amenities.

Operation, maintenance and expansion of the water supply system is funded by usage fees paid to the Water District. The Village has also instituted water connection fees for new housing construction from developers.

Based on the improvements proposed and available capacity at the Harriman Treatment Plant at this time it appears that additional mitigations are required within the collection system. The project is currently working with Orange County Sewer District No 1 for required improvements.

4.0 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

This section identifies unavoidable adverse impacts that may occur as a result of the implementation of the proposed project. Unavoidable adverse environmental impacts associated with the proposed project are the effects that exist after mitigation efforts have been implemented. The potential for these impacts are localized to the vicinity of the project area and generally are short term effects.

Unavoidable adverse impacts are those physical changes to the site or the immediate vicinity which cannot be avoided if the project is implemented. Such impacts are typical of most development projects and, as discussed in Chapter 3 herein, the applicant believes they have mitigated each of these impacts to the greatest extent practicable. The proposed project will result in unavoidable land clearing and regrading of land. This will result in unavoidable changes to the site's natural topography and removal of vegetation including mature trees. The project will result in the unavoidable creation of demand for utilities, public services, and will increase traffic to the site.

Construction

Short term construction impacts such as noise levels, air quality, parking and visual impacts are limited to the site. Dust control will also be utilized in order to minimize the impact to the surrounding area. Vehicles will access the site during construction, including delivery and worker vehicles.

Demolition and construction impacts are unavoidable; however, these impacts are short term and mitigations and appropriate use of BMPs will reduce impacts to the extent practicable. Approximately 32 acres of the site contain wildlife habitat in the forms of chestnut oak forest, a vernal pool, and an intermittent stream. These 32 acres of wildlife habitat will be converted to a built environment. Loss of vegetation and wildlife habitat are unavoidable and long term.

Operation

Operation of the proposed project will yield impacts, particularly related to stormwater and vegetation. The project site during operation will contain impervious surfaces including built residential and associated structures, as well as areas of mowed lawn and landscaping. This new impervious environment will increase the potential for stormwater to flow off site. Mitigation measures, including a SWPPP in accordance with a SPDES general permit, will help slow and treat water before it exits the Project Site. Additional mitigation measures and BMPs will ensure minimal adverse impacts during operation of the proposed project for the life of the Project.

4.1 GENERAL MINIMIZATION AND AVOIDANCE MEASURES

NYSDEC suggested BMPs will be employed throughout construction and implementation of project design, particularly with regard to geology, soils, and topography disturbance, as well as vegetation removal and habitat conversion. Further, maintenance of a clean work area during construction will promote minimization of adverse construction impacts. Additionally, any temporarily disturbed areas will be seeded to prevent excess erosion.

4.2 SPECIFIC MITIGATION MEASURES

Geology, Soils, and Topography

The proposed project will require grading of the existing topography to accommodate the proposed design plans. Due to the shallow bedrock throughout the site, blasting may be required to remove rock material. The Erosion and Sediment Control Plan will be employed, in accordance with the NYSDEC stormwater design manual, to account for ground disturbance and a SWPPP plan will be followed as required under the SPDES general permit to slow and treat stormwater before it exits the Project Site. Further, in the event of blasting, adherence to the Blast Monitoring and Safety Plan will be employed.

Water Resources

Surface Water

On site surface waters impacted by project activities will be reviewed by the USACE and NYSDEC. In the event regulatory criteria indicates the surface water impacts are significant, compensatory mitigation will be provided. The preferred mitigation option will be acquisition of in-lieu fee program credits.

Stormwater

Construction will inherently result in bare ground and exposed soil, requiring adherence to SWPPP conditions, in accordance with NYSDEC SPDES General Permit for stormwater discharges from construction activities – Permit No. GP-0-20-001.

Vegetation, Fish, and Wildlife

Approximately 32 acres of vegetated habitat will be converted to a built environment as a result of the proposed project. Adherence to the comprehensive sediment erosion control plan, as well as following conditions set forth in the SWPPP, in accordance with NYSDEC SPDES General Permit, will ensure minimal adverse impacts due to vegetation removal. No significant adverse impacts are anticipated in terms of wildlife displacement or habitat loss.

Threatened and Endangered Species

Desktop review and multiple field investigations indicated potential use of the site by northern long-eared bat and Indiana bat. Mitigation for potential impacts to bat species involves restricting tree cutting to winter months between October 15 and March 31 to avoid cutting any potential roosting trees while they are in use by bat species. Alternately, any blasting activities for grading purposes should be restricted to summer months to avoid interference with hibernation. Further, lighting involved with a built residential environment has the potential to interfere with bat species; therefore the proposed project design will implement “Dark Sky” initiatives for lighting, and use minimal lighting necessary to ensure security and safety.

Visual and Aesthetic Resources

Clearing will be restricted to the work area and the existing landscape surrounding the Project Site will be preserved to reduce view of the site. Further, the proposed project design will adhere to “Dark Sky” initiatives for lighting and use minimal lighting necessary to ensure security and safety.

Traffic and Transportation

The TIS (Appendix G) analyzed potential changes and impacts on traffic levels due to the proposed project. The TIS proposed the following mitigation measures (discussed in further detail in Section 3.8.3):

- Incorporate recommended traffic control and lanes at each intersection;
- Apply appropriate clearing and grading for minimum stopping distance (250 feet), plan for traffic signal in central driveway and potentially in north driveway;
- Land dedication strip along Seven Springs Road to the Village for turn lanes, sidewalks, and road widening;
- Roadway connection to adjacent East Gate Development for regular and emergency access;
- Land dedication for traffic signal at Seven Springs Mountain Road and Seven Springs Road;
- Widen intersection at Seven Springs Mountain Road and Karlsburg Road for right and left turn lanes and additional requirements for traffic signal installation;

- Realign intersection at Seven Springs Mountain Road (C.R. 44) and Mountain Road to a standard “T” intersection and signalize with appropriate turn lanes and accommodations.

Noise

Noise impacts due to construction activities will be mitigated by implementing BMPs for sound abatement during construction, including use of appropriate mufflers and limiting hours of construction, notifying landowners of certain construction sound impacts in advance, including blasting activities, restrict any blasting activities to the hours of 8 AM to 4 PM Monday to Friday. No noise impacts are anticipated during operation, and therefore, no mitigation measures are proposed during operation.

Public Health and Community Services

Specific mitigation measures related to public health and community services are currently being finalized via coordination with the Orange County Sewer District No. 1 for required improvements to the Lower Interceptor mains north of the Daj Pump Station.

5.0 ALTERNATIVES ANALYSIS

As required by 6 N.Y.C.R.R. § 617.9, alternatives to the Project "that are feasible, considering the objectives and capabilities of the project sponsor" will be evaluated; the specific alternatives that will be analyzed are:

- Alternative Project Location;
- Alternative Project Design and Scale; and
- No Action

5.1 ALTERNATIVE PROJECT LOCATION

The Alternative Project Location considers the feasibility of carrying out the proposed project at a similar alternative location. The project location was strategically chosen based on the prime location of available land directly adjacent to existing residential development, namely the East Gate Development within the Village of Kiryas Joel. Connection between the proposed and existing residential developments will promote convenience and connectivity within the community which can only benefit its residents. As such, the Alternative Project Location option is not practicable and will not be considered.

5.2 ALTERNATIVE PROJECT DESIGN AND SCALE

The Alternative Project Design and Scale considers a variation in the proposed project design, as well as the size and scope of the proposed project. The proposed project has been designed to suit the landscape and acreage offered by the site, as well as offer solutions to the needs of the Village of Kiryas Joel. Diverting from the ideal project design would likely result in a loss proposed project benefits, i.e. supplementing the critical housing need, increasing proximity to goods and services, and incorporating public transportation needs. Therefore, the Alternative Project Design and Scale option is not practicable and will not be considered.

5.3 NO ACTION

The No Action Alternative is considered in order to establish a baseline that will help assess both the benefits and impacts associated with feasible alternatives.

The No Action alternative would result in abandonment of the proposed project. This action would not be consistent with the goals of the project sponsors nor the needs of the community. This project helps to address a critical housing need in the Village of Kiryas Joel. A demand that is generally not met in surrounding communities. Much of the housing in the surrounding communities is not ideal because of the lack of community services provided in a walkable community setting, such as easy proximity to goods and services, public transportation and sufficient pedestrian facilities and shared transportation services that only come in a more densely populated area. Under the No Action Alternative, no water, sewer, traffic or community service demand would be generated and no additional tax revenue would be generated. The site would continue to have development potential.

5.4 ALTERNATIVE SCREENING

Table 10. List of Alternatives

Alternative	Description
1	Alternative Project Location
2	Alternative Project Design & Scale
3	No action alternative

Table 11. Results of Phase One Alternative Screening

Alternative	Description	Meets Objectives
1	Alternative Project Location	No
2	Alternative Project Design & Scale	No
3	No action alternative	No

6.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section identifies the unavoidable impacts that will irreversibly curtail the range of potential uses of the environment or result in the commitment of resources that are neither renewable nor recoverable. An irreversible commitment results in environmental changes that cannot, at a future date, be altered to restore the environment to its pre-construction state. Resources include not only the commitment of labor, fiscal resources and materials, but also natural and cultural resources committed as a result of project construction, operation and maintenance.

Construction of the Project will result in the short- and long-term commitment of natural resources, including structural steel, gravel, concrete and wood. The long-term commitment of these resources will limit their availability for other projects. However, the amount of materials required will comprise a very small percentage of the U.S. and world production of these materials. Some of the materials, including steel, may be reclaimed and recycled at the end of the Project's life. Therefore, although there will be an irretrievable commitment of some natural resources, this will not be a significant impact on the availability of these materials.

The construction, operation and maintenance of the project will require the irreversible commitment of human and fiscal resources to design, build, operate and maintain the facilities. Human resources will also be committed by governments during the planning, environmental reviews and permitting associated with the project. The commitment of human resources will not strain local resources.

Project construction, operation and maintenance will require the irretrievable commitment of energy resources, including those derived from petroleum products. Energy will also be committed to the manufacture and transport of materials to construct the project. Fuel will be consumed by workers commuting to the site during construction and operation, as well as by construction equipment. Additionally, energy and fuel will be used by the project and its occupants during the life of the project. Although this will be an irretrievable commitment of resources, it will not be a significant amount and will not impact the local energy supply.

The development will require the commitment of several resources that will be irreversibly and irretrievably committed to this project. This includes utility services (gas and electric) to serve the heating and electrical needs of the proposed households. In addition, the the site will require potable water and sewer service that would not be available to other users in the system once it is dedicated to use for this Site. Mature vegetation will be removed from the site and soils and topography will be irreversibly modified.

7.0 CUMULATIVE IMPACTS

Cumulative impacts are those that accumulate incrementally to affect any given resource(s); these impacts result from multiple past, present, and reasonably foreseeable future action(s). Cumulative impacts are the result of either (1) a single action, or (2) two or more actions that are minor when considered individually, but are significant when considered collectively. Impacts can be associated with various sponsors or applicants and may be indirect, secondary, long-term, and / or synergistic in nature.

Where individual effects of the project may interact with other effects of the project, such potential cumulative impacts have been addressed in Section 3.0 of the DEIS.

The site contains wildlife habitat with a surface water feature in the northern corner of the site and residential development in the southern portion of the site. Historical imagery indicates that the site has remained relatively undisturbed from 1965 to present (historical imagery is not available prior to 1965). Most of the residential development in the southern portion of the Project Site existed as it does today since 1965; however, one residential structure was built between 1965 and 1975. Land clearing and residential development began immediately east of the site by 2004.

Any past impacts to the site would likely be due to the surrounding residential development and operation and would be minor in nature. Cumulative impacts would therefore be associated with construction and operation of the proposed project discussed in this DEIS, as well as any future actions within or surrounding site. Given the historical use of the land surrounding the project, reasonably foreseeable future actions may well be related to residential development and use.

The cumulative impact analysis only considers the environmental categories with impacts under the proposed action with past, present, and/or reasonably foreseeable future projects. Categories of impacts to be examined in this section include:

- Water Resources – wetlands & surface water
- Vegetation and Wildlife – Indiana and northern long eared bat

Detailed project information is not available for the reasonably foreseeable future projects. The Village of Kiryas Joel Comprehensive Land Use Plan identifies an objective for continued growth including multifamily residential development and associated commercial retail and worship centers to serve the community.

Water Resources

The proposed project will result in impacts to wetlands and waterways. Indirect impacts to wetlands from this loss are not anticipated. Given that there is no practicable alternative that would achieve the purpose and need, and avoid wetlands and waterways, compensatory mitigation measures will be developed as necessary. The preferred mitigation option will be to acquire credits from an approved in-lieu fee mitigation program.

The Town of Palm Tree/Village of Kiryas Joel is anticipated to observe continued development growth to meet housing demands. National Wetland Inventory Mapping and NYSDEC Freshwater Wetlands Mapping depict resources within several areas of undeveloped portions of the Town / Village. Recently completed development projects are completed consistent with regulatory requirements. Future development that occurs within wetlands and waterways will receive necessary regulatory approvals. The overall goal of wetlands and waterway protection is to receive a no net loss. Compensatory mitigation has been completed as necessary for recent projects, and it will be completed as necessary to offset impacts that occur as a result of future projects. Regulatory protection and oversight of these resources ensures an overall no net loss will occur. As such, it can be assumed that no cumulative impacts will occur related to wetland and waterways associated with future development and for recently completed projects.

Indiana and northern long eared bat

The proposed project will result in impacts to habitat for the Indiana and northern long-eared bat. Direct take of these species is not anticipated; however, a reduction in suitable habitat is anticipated as a result of this project. A habitat assessment is prepared for both species that included a determination of the project's potential effect on both species related to habitat loss. A 2.5-mile buffer around the project area occupies 14,327.02 acres, and approximately 8,301.24 acres of forest/woody lands occur within the 2.5-miles buffer. In summary, forested lands occupy 57.9% of the 2.5-mile buffer. The removal of 32.56 acres of land results in a net loss of 0.39% of the woody vegetation in the 2.5-mile buffer.

A review of projects that have resulted in removal of forest cover within the last 5 years is completed using historical aerial imagery. It is apparent that approximately 40 acres of woodland has been cleared to allow for development projects. The total acreage removed accounts for less than half of a percent of the total woody habitat within 2.5 miles of the site. As such, the clearing that has occurred in the past 5 years is not considered significant relative to removal of potentially suitable habitat. In addition, no known roost trees were removed as part of these clearing activities.

There are several additional projects planned for the community within the next few years that are currently undeveloped woodlots. Based on information relatively available, it is our understanding that these projects would likely result in an additional loss of 30 acres of woodland. This accounts for approximately 0.04 percent of forest lands within a 2.5-mile radius of the site. None of these woodlots include known roost trees.

In total, the recent past, current, and foreseeable future projects will result in the removal of approximately 100 acres of forestland. Once these projects are complete, it is anticipated that 8,239.68 acres of forest land will be available for both species within 2.5-miles of the site. Note that this does not account for unknown development projects outside of the Village. Regardless, there will be a significant amount of forestland available and therefore no cumulative impacts relative to northern long-eared bat or Indiana bat is anticipated.

8.0 GROWTH INDUCING ASPECTS

Growth-inducing aspects are direct or indirect economic impacts from construction projects. Direct or indirect economic impacts from projects can remove growth impairments such as establishment of essential public services, new access to an area of construction or construction of additional housing in the surrounding area.

The proposed project includes 608 housing units. Assuming that each unit has 5.60 residents (the Village average[65]), even if each resident were new to the area, this would increase the Village population by only up to 3,405 people. The Village has adequate infrastructure to support new residents without a burden to existing services.

The project has the ability to increase density and foot traffic within the already dense community. Increased investment such as this will create spin-off development that will overall raise property values and increase the quality of life for the residents of Kiryas Joel.

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[65] http://quickfacts.census.gov/qfd/states/36/3611000.html accessed June 2, 2016

Options for housing are needed within Orange County. This project introduces a space where families are able to work, live, and play.

This project, like all residential development projects, could also have the effect of causing increases in surrounding commercial activity to meet local demands for goods and services. If the project is not built, then residents of Kiryas Joel will continue to seek suitable housing in the Village, or in nearby communities so that they can remain close to Kiryas Joel. This demand for housing has caused an increase in housing costs in Kiryas Joel, and would eventually create more demand on community services as housing becomes more affordable.

9.0 EFFECTS ON THE USE AND CONSERVATION OF ENERGY RESOURCES

It is anticipated that energy will be consumed in various forms throughout the execution of the project; these energy demands will be both temporary, e.g. those associated with construction activities, and long-term, e.g. those associated with operation of the project as a residential subdivision. Construction-related energy use will be associated with fuel and electricity consumption necessary to operate equipment and machinery. In general, energy use related to overall operation of the proposed residential subdivision will be associated with fuel, oil, propane, and electricity used to support residential needs (air conditioning, lighting, appliances). Long-term residential use is anticipated to vary depending on residents living in the subdivision. The design and plans for all energy conservation systems within the development will adhere to the New York State Energy Code. It is expected that all systems will be modern, energy efficient units.

Additionally, in accordance with the New York State Environmental Conservation Law, plumbing devices installed on showerheads and faucets within the subdivision will be low-flow water conservation devices, the purposes of which are to reduce water, especially hot water, demand which will in turn reduce the energy needed to heat the water.[66] Further, lighting fixtures will be chosen based on the ability of the lamps and ballasts to save energy.

As energy conservation is regulated at the state level, residential development must be designed and built in accordance with the New York State Energy Conservation

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[66] NYSDEC. N.D. *Certification Information For NYS Water Saving Plumbing Fixtures Law (as Required by Section 15-0314 of The Environmental Conservation Law)*. Available at: https://www.dec.ny.gov/lands/87361.html#:~:text=New%20York%20State%20Environmental%20Conservation%20Law%20requires%20that,the%20flow%20requirements%20of%20federal%20and%20state%20laws (Accessed September, 2022).

Construction Code[67], which specifies requirements necessary for all residential buildings. The latter specifications relate to hot water systems, heating and cooling systems, material and equipment specifications, electrical systems, and sealing the building envelope. Requirements related to residential building design include the following:

- insulation R-values and glazing and door U-factors be certified by the National Fenestration Rating Council (NFRC) or by using default values found in tables published in the Code;
- vapor retarders be installed in nonvented framed ceiling, wall, and floor areas;
- insulation levels for walls, roofs, and below-grade walls and glazing areas, and U-factors for windows and skylights meet or exceed minimum efficiency levels; and
- air leakage be limited through the building envelope.

Mechanical systems associated with water and air heating and cooling must also adhere to the NYS Energy Code, although compliance requirements may vary depending on the type of mechanical systems proposed.

Lighting specifications associated with the NYS Energy Code include the following:

- manual or automatic controls or switches that allow occupants to dim lights and turn them on or off when appropriate (control, switching, and wiring requirements are addressed in the Code that apply to all buildings);
- total connected loads for indoor lighting systems that do not exceed power allowances for a building, as described within the Code; and
- energy-efficient exterior lighting, as described within the Code.

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67 International Code Council, Inc. and New York State Department of State (NYSDOS). 2019. *2020 Energy Conservation Construction Code of New York State*. Available at: https://dos.ny.gov/system/files/documents/2020/09/2020-ecccnys-november-2019.pdf (Accessed September, 2022).

The design plans for the proposed project comply with the NYS Energy Conservation Construction Code.

ENERGY STAR-rated Home Building Contractors and Hospitality Partners is a program that provides certification to buildings and consumer products that meet guidelines for energy efficiency set by the U.S. Environmental Protection Agency (EPA). Residential homes and apartments that are ENERGY STAR certified are at least 10% more energy efficient than those built to code while also improving home quality, performance, and comfort.[68] Examples of features included in meeting ENERGY STAR performance guidelines include effective insulation systems, high performance windows, tight construction and ducts, and efficient heating and cooling equipment.[69] The Applicant will consider pursuing the ENERGY STAR rating for the proposed residential subdivision.

The project anticipates obtaining its electricity needs from Orange & Rockland. Based on current information from the utility providers, sufficient capacity is available to meet the needs of the project. No negative impacts are anticipated at this time with respect to energy demand.

Public Transportation

An additional sustainable design feature is the public transportation system for the Village of Kiryas Joel. The Village of Kiryas Joel utilizes Transit Orange as a local bus service for its residents. Various bus routes are available to destinations within the Village of Kiryas Joel, as well as in the local municipalities of Monroe and Woodbury. Seven buses are utilized

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68 Energy Star. N.D. *What is ENERGY STAR*. Available at: https://www.energystar.gov/about?s=mega (Accessed September, 2022).

69 Energy Star. N.D. *Build ENERGY STAR® QUALIFIED HOMES*. Available at: https://archive.epa.gov/greenbuilding/web/pdf/builder_brochure.pdf#:~:text=ENERGY%20STAR%20qualified%20homes%20may%20also%20be%20equipped,washing%20machines%2C%20refrigerators%2C%20and%20dish%C2%AD%20washers.%20Third-Party%20Testing (Accessed September, 2022).

to provide this service.[70] Use of public transit for daily trips to and from various locations (as opposed to use of individual vehicles) will reduce overall fuel use and, by extension, greenhouse gas emissions associated with long-term operation of the proposed Project as a residential subdivision.

[70] Transit Orange. 2022. *Local Bus Service; Kiryas Joel*. Available at: https://www.ridetransitorange.com/kiryasjoel (Accessed September, 2022).

<u>Appendix A</u>

Air Quality Assessment

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499 Col. Eileen Collins Blvd
Syracuse, New York 13212

Air Quality Assessment

Brach & Mann Associates Inc.

Karlsburg Acres Project Site

Town of Palm Tree, Orange County, New York

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April 6, 2023

Table of Contents

Attachments

1.0 Project Background

The Village of Kiryas Joel is proposing to construct a 608-unit subdivision within the existing community. The proposed project includes the construction of 82 new buildings, including 80 residential buildings varying in size, one 6,000 square foot public shul, and one 18,000 square foot commercial building. Additional project elements include four access roads, approximately 454 new parking spaces to service all proposed facilities, as well as public utilities including water, sewer, storm sewer, electric, and gas services, along with stormwater detention ponds. The Project may result in placement of fill in a wetland and a stream. The Project will require on-site tree removal on the majority of the 41.24-acre Project site.

Construction is anticipated to last 36 months. For the sake of this air quality analysis, it was assumed that the commercial building and shul will be constructed within 2023 and be operational in 2024. Construction of the residential buildings was assumed to be evenly paced throughout the 36-month construction period, with one-third of the residences being operational in 2024, 2025, and 2026, respectively.

The proposed project will not increase the number vehicles coming to and from the area. Design of the proposed project is currently underway. Although the proposed project would not result in an increase in surface transportation, there would be an increase in emissions from stationary sources (i.e., buildings) upon project completion and a temporary increase in emissions from use of heavy equipment and travel by contractors during construction. For the purposes of this air quality analysis, emissions from operational and construction sources were assessed based on air quality standards established under both the Clean Air Act (CAA) and the National Environmental Policy Act (NEPA).

2.0 Regulatory Background

Under the Federal Clean Air Act (CAA) (42 U.S.C. § 7401-7671q), the United States Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (PM10 and PM2.5), ozone, and lead. An area that violates a national primary or secondary NAAQS for one or more of the USEPA designated criteria pollutants is referred to as 'nonattainment'. According to the CAA, the NAAQS are applicable to all areas of the United States and associated territories. Each nonattainment area is required to have an applicable State Implementation Plan (SIP) that prescribes mitigation measures and timelines necessary to bring ambient concentrations of criteria pollutants below the NAAQS. When a nonattainment area successfully reduces criteria pollutant concentrations below the NAAQS, EPA re-designates the area a 'maintenance area'. New York State Department of Environmental Conservation (NYSDEC) prepares SIPs for each nonattainment and maintenance pollutant in the State of New York.

2.1 Conformity

Since the proposed project will occur in a nonattainment or maintenance area, the proposed impacts to air quality were assessed to determine whether project-level emissions would "conform" to the conditions of the applicable SIP, also known as General Conformity. The net increase in emissions of the applicable pollutants were compared against the threshold levels established in the General Conformity Rule, known as the *de minimis* thresholds, published at 40 CFR 93.153(b)(1)-(b), Applicability Analysis (see **Table 1**). Under the General Conformity Rule, if the net increase in emissions equals or exceeds the *de minimis* thresholds, further analysis (i.e., General Conformity Determination) would be required. NYSDEC does not provide state-level emissions thresholds that differ from the *de minimis thresholds.* Therefore, for the purposes of this assessment, the *de minimis* thresholds were used to assess the potential for air quality impacts.

The proposed project is located within Orange County, NY and is officially designated nonattainment for the revoked 1979 ozone standard (severe classification), nonattainment for the 1997 ozone standard (moderate classification), maintenance for the revoked 1997 $PM_{2.5}$ standard, and maintenance for the 2006 $PM_{2.5}$ standard. Ozone is not directly emitted from a source but is formed through the reaction of oxides of nitrogen (NOx) and volatile organic compounds (VOCs) in the presence of sunlight. Emissions of ozone are evaluated based on emissions of the ozone precursor pollutants, NOx and VOCs.

Consequently, General Conformity for this project applies to $PM_{2.5}$ (100 tons per year threshold per $PM_{2.5}$ maintenance), NOx (100 tons per year threshold per 1997 ozone standard nonattainment), VOCs (50 tons per year threshold per 1997 ozone standard nonattainment), SO_2 (100 tons per year per $PM_{2.5}$ maintenance), and NH_3 (100 tons per year per PM2.5 maintenance).

Table 1—Clean Air Act *De Minimis* Thresholds

Pollutant	Nonattainment Area Threshold (tons per year)	Maintenance Area Threshold (tons per year)
Carbon Monoxide (CO)	100	100
Particulate Matter ($PM_{2.5}$)		
Direct Emissions	100	100
SO_2	100	100
NO_x	100	100
VOC or Ammonia	100	100
Sulfur Dioxide (SO_2)	100	
Nitrogen Dioxide (NO_2)	100	
Ozone (O_3)	***VOC/NO_x***	***VOC/NO_x***
Inside an ozone transport region:	50/100	50/100

Source: 40 CFR 93.153(b)(1) & (2)

Note: The ozone transport region is a single transport region for ozone [within the meaning of CAA Section 176A(a)], comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia, given at CAA Sec. 184.

3.0 Emission Calculations

3.1 Construction Emissions

A construction emissions inventory was conducted to determine the expected emissions associated with heavy equipment, deliveries, and worker mobilization. Construction emissions come from three sources: nonroad, onroad, and fugitive emissions. Nonroad emissions represent emissions from construction vehicles such as bulldozers, excavators, or pavers. Onroad emissions represent emissions from vehicles that can travel on roadways that serve construction such as passenger vehicles for crew members traveling to and from the construction site, tractor trailers to deliver materials, or certain classes of dump trucks and concrete trucks that bring materials to and from the site. Fugitive emissions occur from activities such as the drying of paint, application of asphalt, and moving of soil that could emit particulate matter into the air.

Details regarding the construction vehicle fleet and hours of operation for construction vehicles were not known at the time of this analysis. Therefore, an assumed fleet mix and hours of operation would need to be generated based on available modeling tools or conversations with construction personnel. A desktop review of available tools for calculating construction emissions determined that the Airport Construction Emissions Inventory Tool (ACEIT) could be used as a basis for generating a fleet mix of construction equipment for typical construction projects. ACEIT was developed for the Transportation Research Board (TRB) using RS Means data and input from construction personnel to determine default activities and construction equipment activity data for standard project types. For the purposes of this project, ACEIT was used to determine the fleet mix and operational data for the construction activities associated with the Proposed Project (i.e., residential buildings, shul, commercial building, detention ponds, access roads, and parking lots). Since ACEIT was generated for use on airport-related construction projects, the inputs and results were reviewed and modified (as appropriate) by construction personnel that are familiar with residential construction.

ACEIT can model projects based on standard project types. For this analysis, project types (i.e., access road, building, detention basin, etc.) that match the scope of the work were selected and the model automatically selected a standard mix of activities for the project type. For example, when the “Parking Lot” project type was selected for this project, typical construction activities such as excavation and paving were automatically selected. The user is later prompted to enter overall size information, such as the dimensions of the basin, as well as the overall cost of the project. These inputs are used to calculate an assumed construction equipment usage in hours.

ACEIT has emission factors for fugitive and mobile sources incorporated into the software; however, the emission factors for mobile sources have been updated and rereleased in other models. Therefore, fugitive source emissions were calculated through ACEIT while emission factors for each of the equipment types specified in ACEIT were generated through the latest version of USEPA’s MOtor Vehicle Emission Simulator (MOVES3.1). MOVES3.1 is the latest version of emissions modeling software for mobile sources that was developed as a combination of two legacy models – NONROAD (which was previously only for off-road vehicles) and MOVES2012 (which was previously only for on-road vehicles). In order to be conservative, it was assumed that all equipment would be operating on diesel, with the exception of chain saws and on-road passenger vehicles for construction employees, which are assumed to operate on gasoline.

The proposed project involves the construction of residential buildings, a public shul, and a commercial building. ACEIT does not include these building types as a default project type but does include project types for construction of a 1-story, 10,000 square foot building and a 3-story, 30,000 square foot building. Therefore, to utilize default project types, the residential buildings were matched with construction of a 3-story, 30,000 square foot building, and the public shul and commercial buildings were matched with construction of a 1-story, 10,000 square foot building. The total hours of construction were increased proportionally to match the actual square footages of the residential buildings, public shul, and commercial building.

Based on the results of the construction emissions inventory, the emissions of criteria pollutants and greenhouse gases during construction of the proposed project are listed in **Table 2**. Modeling results are provided in **Attachment 1**.

Table 2—Construction Emissions by Year

Year	Source	CO (ST)	VOC (ST)	SOx (ST)	NOx (ST)	PM10 (ST)	PM2.5 (ST)	CO2e (MT)
De Minimis Thresholds		*100*	*50*	*100*	*100*	*100*	*100*	*N/A*
2023	Fugitive	0.64	9.80	0.01	0.04	0.54		
	Nonroad	3.33	0.65	0.01	7.72	0.43	0.42	2,872.80
	Onroad	29.91	0.55	0.02	6.14	0.25	0.23	3,833.17
	2023 TOTAL	***33.88***	***11.01***	***0.04***	***13.90***	***1.22***	***0.64***	***6,705.97***
2024	Fugitive	0.64	9.80	0.01	0.04	0.47		
	Nonroad	3.09	0.60	0.01	7.03	0.39	0.38	2,579.06
	Onroad	16.06	0.43	0.01	5.52	0.22	0.20	2,368.27
	2024 TOTAL	***19.79***	***10.84***	***0.03***	***12.59***	***1.09***	***0.59***	***4,947.32***
2025	Fugitive	0.64	9.80	0.01	0.04	0.47		
	Nonroad	3.09	0.60	0.01	7.03	0.39	0.38	2,579.06
	Onroad	16.06	0.43	0.01	5.52	0.22	0.20	2,368.27
	2025 TOTAL	***19.79***	***10.84***	***0.03***	***12.59***	***1.09***	***0.59***	***4,947.32***

ST – Short Tons, MT – Metric Tons

Source: C&S Engineers, Inc. 2022

3.2 Operational Emissions

According to the Traffic Impact Study completed for this project (dated September 7, 2022), the proposed project is not expected to significantly increase the number of vehicles traveling to and from the area (i.e., no increase over background growth); therefore, no significant increase in operational emissions from motor vehicles is anticipated. However, the proposed project will cause an increase in stationary emissions necessary to heat and power the various buildings.

For the purposes of this assessment, operations were assumed to begin in 2024 with the opening of the public shul, commercial building, and one third of the residential buildings. Natural gas usage for the proposed buildings was calculated based on the total square footage of the proposed buildings for multiplied by the typical heating value of 60 BTU per square foot, an efficiency of 90%, and the conservative estimate of the combustion sources operating half the year (4,380 hours per year). It was assumed that one third of the residential square footage would be operational for each year of construction. Electrical consumption of the proposed building was estimated based on an assumed watts per square foot, and emissions were calculated using regional emission factors from the EPA's Emissions & Generation Resource Integrated Database (eGrid2020, released on January 27, 2022) for the NPCC Upstate New York region. The square footage of the proposed buildings assigned to each year, along with the natural gas usage and electricity consumption is provided in **Table 3**.

Table 3—Estimated Natural Gas and Electricity Consumption

Year of Operation	Source	Total Square Footage	Natural Gas Usage (MCF per year)	Watts per Square Foot	Electricity Consumption (kwh per year)
2024	Residential Year 1	225,000	62.751	8	657,000
	Public Shul	6,000	1.673	6.7	14,673
	Commercial Building	18,000	5.020	10.5	68,985
2025	Residential Year 2	450,000	94.126	8	985,500
	Public Shul	6,000	1.673	6.7	14,673
	Commercial Building	18,000	5.020	10.5	68,985
2026	Residential Year 3	675,000	188.252	8	1,971,000
	Public Shul	6,000	1.673	6.7	14,673
	Commercial Building	18,000	5.020	10.5	68,985

ST – Short Tons, MT – Metric Tons Source: C&S Engineers, Inc. 2022

Table 4 provides a summary of emissions from stationary sources as the year each component of the Proposed Action will become operational, while **Attachment 1** provides the detailed calculations.

Table 4—Operational Emissions by Year

Year	Source	CO (ST)	VOC (ST)	SOx (ST)	NOx (ST)	PM10 (ST)	PM2.5 (ST)	CO2e (MT)
De Minimis Thresholds		*100*	*50*	*100*	*100*	*100*	*100*	*N/A*
2024	Residential	2.636	0.173	0.019	3.138	0.238	0.238	3,497.95
	Public Shul	0.070	0.005	0.001	0.084	0.006	0.006	92.98
	Commercial	0.211	0.014	0.002	0.251	0.019	0.019	281.58
	2023 TOTAL	***2.917***	***0.191***	***0.021***	***3.472***	***0.264***	***0.264***	***3,872.51***
2025	Onroad	3.953	0.259	0.028	4.706	0.358	0.358	5,246.93
	Nonroad	0.070	0.005	0.001	0.084	0.006	0.006	92.98
	Fugitive	0.211	0.014	0.002	0.251	0.019	0.019	281.58
	2024 TOTAL	***4.234***	***0.277***	***0.030***	***5.041***	***0.383***	***0.383***	***5,621.49***
2026	Onroad	7.907	0.518	0.056	9.413	0.715	0.715	10,493.85
	Nonroad	0.070	0.005	0.001	0.084	0.006	0.006	92.98
	Fugitive	0.211	0.014	0.002	0.251	0.019	0.019	281.58
	2025 TOTAL	***8.188***	***0.536***	***0.058***	***9.747***	***0.741***	***0.741***	***10,868.41***

ST – Short Tons, MT – Metric Tons Source: C&S Engineers, Inc. 2022

The expected emission increase of criteria pollutants, including operational and construction sources, from 2023 through 2026 are presented in **Table 5.** The *de minimis* threshold levels are also provided.

Table 5—Project Emissions by Year

Year	Source	CO (ST)	VOC (ST)	SOx (ST)	NOx (ST)	PM 2.5 (ST)	PM 10 (ST)	CO2e (MT)
De Minimis Thresholds		*100*	*50*	*100*	*100*	*100*	*100*	*N/A*
2023	Construction	33.882	11.009	0.041	13.902	1.216	0.641	6,705.97
2023 Total		***33.882***	***11.009***	***0.041***	***13.902***	***1.216***	***0.641***	***6,705.97***
2024	Construction	19.791	10.839	0.029	12.593	1.091	0.585	4,947.32
2024	Operations	2.917	0.191	0.021	3.472	0.264	0.264	3,872.51
2024 Total		***22.708***	***11.030***	***0.050***	***16.066***	***1.355***	***0.849***	***8,819.84***
2025	Construction	19.791	10.839	0.029	12.593	1.091	0.585	4,947.32
2025	Operations	4.234	0.277	0.030	5.041	0.383	0.383	5,621.49
2025 Total		***24.026***	***11.116***	***0.059***	***17.634***	***1.474***	***0.968***	***10,568.81***
2026	Operations	8.188	0.536	0.058	9.747	0.741	0.741	10,868.41
2026 Total		***8.188***	***0.536***	***0.058***	***9.747***	***0.741***	***0.741***	***10,868.41***

ST – Short Tons, MT – Metric Tons

Source: C&S Engineers, Inc. 2022

4.0 Results and Conclusions

4.1 Criteria Pollutant Emissions

For the purposes of this project, the proposed action's impact on air quality was assessed by evaluating the impact of the proposed project on the NAAQS. In accordance with procedures outlined in that document, the proposed project impacts to air quality were evaluated based on the following:

Indirect Source Review

New York State regulations for indirect sources apply only to the County of New York south of 60th Street. The Proposed Project is taking place in Orange County. Therefore, the Proposed Project does not require an indirect source review.

General Conformity with SIP

As illustrated in **Table 5**, the net emissions resulting from the Proposed Action were below the *de minimis* thresholds levels for all criteria pollutants. Therefore, given the expected emissions and the short timeframe of construction, it is unlikely that the pollutant concentration levels would exceed a NAAQS standard.

4.2 Greenhouse Gas Emissions

Greenhouse gas emissions associated with the project were also calculated for carbon dioxide, methane, and nitrous oxide. The resulting carbon dioxide equivalent emissions during construction and operation are presented in **Table 5**. There are currently no requirements for reporting greenhouse gases and no significance thresholds.

ATTACHMENT 1
MODELING RESULTS

Construction Emissions: Onroad Sources

Season	Vehicle Type	Total Project VMT*	CO (g/mi)**	VOC (g/mi)**	SOx (g/mi)**	NOx (g/mi)**	PM10 - Total (g/mi)**	PM2.5 Total (g/mi)**	CO2 (g/mi)**	CH4 (g/mi)**	N2O (g/mi)**	CO2e (g/mi)**	CO (ST)	VOC (ST)	SOx (ST)	NOx (ST)	PM10 - Total (ST)	PM2.5 Total (ST)	CO2 (MT)	CH4 (MT)	N2O (MT)	CO2e (MT)
Summer 2023	Combination Short-haul Truck	123,203.52	4.8225	0.6223	0.0073	11.8683	0.5296	0.4872	2,114.8733	0.0296	0.0041	2,116.8421	0.655	0.085	0.001	1.612	0.072	0.066	260.560	0.004	0.001	260.802
	Passenger Car	3,728,100.67	3.9188	0.0277	0.0026	0.0657	0.0025	0.0022	390.5614	0.0112	0.0022	391.4859	16.105	0.114	0.011	0.270	0.010	0.009	1,456.052	0.042	0.008	1,459.499
	Passenger Truck	29,202.80	2.3295	0.1752	0.0022	1.3630	0.0525	0.0483	644.0709	0.0153	0.0032	645.4052	0.075	0.006	0.000	0.044	0.002	0.002	18.809	0.000	0.000	18.848
	Single Unit Short-haul Truck	185,065.26	2.5976	0.4230	0.0044	4.4318	0.1946	0.1790	1,280.9684	0.0242	0.0041	1,282.8067	0.530	0.086	0.001	0.904	0.040	0.037	237.063	0.004	0.001	237.403
Winter 2023	Combination Short-haul Truck	123,203.52	4.8225	0.6223	0.0073	13.9902	0.5296	0.4872	2,114.8693	0.0296	0.0041	2,116.8410	0.655	0.085	0.001	1.900	0.072	0.066	260.559	0.004	0.001	260.802
	Passenger Car	3,728,100.67	2.7514	0.0210	0.0024	0.0729	0.0022	0.0020	358.4958	0.0081	0.0022	359.3419	11.307	0.086	0.010	0.300	0.009	0.008	1,336.508	0.030	0.008	1,339.663
	Passenger Truck	31,529.58	1.6425	0.1626	0.0020	1.2342	0.0525	0.0483	593.4532	0.0141	0.0032	594.7572	0.057	0.006	0.000	0.043	0.002	0.002	18.711	0.000	0.000	18.752
	Single Unit Short-haul Truck	185,065.26	2.5976	0.4230	0.0044	5.2241	0.1946	0.1790	1,280.9677	0.0242	0.0041	1,282.8059	0.530	0.086	0.001	1.066	0.040	0.037	237.063	0.004	0.001	237.403
2023 ESTIMATED CONSTRUCTION EMISSIONS - ONROAD SOURCES													**29.913**	**0.553**	**0.024**	**6.138**	**0.246**	**0.226**	**3,825.325**	**0.089**	**0.019**	**3,833.172**
Summer 2024	Combination Short-haul Truck	118,243.52	4.8225	0.6223	0.0073	11.8683	0.5296	0.4872	2,114.8733	0.0296	0.0041	2,116.8421	0.629	0.081	0.001	1.547	0.069	0.064	250.070	0.003	0.000	250.303
	Passenger Car	1,865,662.67	3.9188	0.0277	0.0026	0.0657	0.0025	0.0022	390.5614	0.0112	0.0022	391.4859	8.059	0.057	0.005	0.135	0.005	0.004	728.656	0.021	0.004	730.381
	Passenger Truck	28,936.52	2.3295	0.1752	0.0022	1.3630	0.0525	0.0483	644.0709	0.0153	0.0032	645.4052	0.074	0.006	0.000	0.043	0.002	0.002	18.637	0.000	0.000	18.676
	Single Unit Short-haul Truck	167,445.16	2.5976	0.4230	0.0044	4.4318	0.1946	0.1790	1,280.9684	0.0242	0.0041	1,282.8067	0.479	0.078	0.001	0.818	0.036	0.033	214.492	0.004	0.001	214.800
Winter 2024	Combination Short-haul Truck	118,243.52	4.8225	0.6223	0.0073	13.9902	0.5296	0.4872	2,114.8693	0.0296	0.0041	2,116.8410	0.629	0.081	0.001	1.824	0.069	0.064	250.070	0.003	0.000	250.303
	Passenger Car	1,865,662.67	2.7514	0.0210	0.0024	0.0729	0.0022	0.0020	358.4958	0.0081	0.0022	359.3419	5.658	0.043	0.005	0.150	0.005	0.004	668.832	0.015	0.004	670.411
	Passenger Truck	31,263.30	1.6425	0.1626	0.0020	1.2342	0.0525	0.0483	593.4532	0.0141	0.0032	594.7572	0.057	0.006	0.000	0.043	0.002	0.002	18.553	0.000	0.000	18.594
	Single Unit Short-haul Truck	167,445.16	2.5976	0.4230	0.0044	5.2241	0.1946	0.1790	1,280.9677	0.0242	0.0041	1,282.8059	0.479	0.078	0.001	0.964	0.036	0.033	214.492	0.004	0.001	214.800
2024 ESTIMATED CONSTRUCTION EMISSIONS - ONROAD SOURCES													**16.065**	**0.430**	**0.014**	**5.524**	**0.223**	**0.205**	**2,363.802**	**0.052**	**0.011**	**2,368.266**
Summer 2025	Combination Short-haul Truck	118,243.52	4.823	0.622	0.007	11.868	0.530	0.487	2,114.873	0.030	0.004	2,116.842	0.629	0.081	0.001	1.547	0.069	0.064	250.070	0.003	0.000	250.303
	Passenger Car	1,865,662.67	3.919	0.028	0.003	0.066	0.002	0.002	390.561	0.011	0.002	391.486	8.059	0.057	0.005	0.135	0.005	0.004	728.656	0.021	0.004	730.381
	Passenger Truck	28,936.52	2.329	0.175	0.002	1.363	0.053	0.048	644.071	0.015	0.003	645.405	0.074	0.006	0.000	0.043	0.002	0.002	18.637	0.000	0.000	18.676
	Single Unit Short-haul Truck	167,445.16	2.598	0.423	0.004	4.432	0.195	0.179	1,280.968	0.024	0.004	1,282.807	0.479	0.078	0.001	0.818	0.036	0.033	214.492	0.004	0.001	214.800
Winter 2025	Combination Short-haul Truck	118,243.52	4.823	0.622	0.007	13.990	0.530	0.487	2,114.869	0.030	0.004	2,116.841	0.629	0.081	0.001	1.824	0.069	0.064	250.070	0.003	0.000	250.303
	Passenger Car	1,865,662.67	2.751	0.021	0.002	0.073	0.002	0.002	358.496	0.008	0.002	359.342	5.658	0.043	0.005	0.150	0.005	0.004	668.832	0.015	0.004	670.411
	Passenger Truck	31,263.30	1.643	0.163	0.002	1.234	0.053	0.048	593.453	0.014	0.003	594.757	0.057	0.006	0.000	0.043	0.002	0.002	18.553	0.000	0.000	18.594
	Single Unit Short-haul Truck	167,445.16	2.598	0.423	0.004	5.224	0.195	0.179	1,280.968	0.024	0.004	1,282.806	0.479	0.078	0.001	0.964	0.036	0.033	214.492	0.004	0.001	214.800
2025 ESTIMATED CONSTRUCTION EMISSIONS - ONROAD SOURCES													**16.065**	**0.430**	**0.014**	**5.524**	**0.223**	**0.205**	**2,363.802**	**0.052**	**0.011**	**2,368.266**

*VMT generated by ACEIT

**Data generated by MOVES

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
1	2023	8	Access Road	Asphalt Placement	Asphalt Paver	Diesel	14.54	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.587	0.000	0.588
1	2023	8	Access Road	Asphalt Placement	Other General Equipment	Diesel	29.08	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.005	0.001	0.000	0.010	0.001	0.001	3.030	0.000	3.031
1	2023	8	Access Road	Asphalt Placement	Roller	Diesel	14.54	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.443	0.000	0.443
1	2023	8	Access Road	Asphalt Placement	Skid Steer Loader	Diesel	14.54	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.001	0.000	0.000	0.001	0.000	0.000	0.116	0.000	0.116
1	2023	8	Access Road	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	18.61	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.001	0.000	0.000	0.003	0.000	0.000	0.672	0.000	0.672
1	2023	8	Access Road	Clearing and Grubbing	Loader	Diesel	77.60	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.004	0.001	0.000	0.013	0.001	0.001	5.995	0.000	5.997
1	2023	8	Access Road	Curbing	Concrete Truck	Diesel	139.75	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.010	0.003	0.000	0.106	0.002	0.002	34.652	0.000	34.659
1	2023	8	Access Road	Curbing	Curb/Gutter Paver	Diesel	139.75	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.003	0.000	0.000	0.010	0.000	0.000	5.645	0.000	5.647
1	2023	8	Access Road	Curbing	Other General Equipment	Diesel	139.75	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.023	0.003	0.000	0.048	0.003	0.003	14.559	0.000	14.565
1	2023	8	Access Road	Drainage - 24 inch SICPP	Dozer	Diesel	111.90	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.004	0.001	0.000	0.015	0.001	0.001	9.260	0.000	9.262
1	2023	8	Access Road	Drainage - 24 inch SICPP	Excavator	Diesel	111.90	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.002	0.000	0.000	0.006	0.000	0.000	6.125	0.000	6.126
1	2023	8	Access Road	Drainage - 24 inch SICPP	Loader	Diesel	111.90	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.006	0.001	0.000	0.018	0.001	0.001	8.646	0.000	8.648
1	2023	8	Access Road	Drainage - 24 inch SICPP	Other General Equipment	Diesel	111.90	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.019	0.003	0.000	0.038	0.003	0.003	11.659	0.000	11.663
1	2023	8	Access Road	Drainage - 24 inch SICPP	Roller	Diesel	111.90	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.002	0.000	0.000	0.007	0.000	0.000	3.409	0.000	3.410
1	2023	8	Access Road	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	62.17	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.003	0.001	0.000	0.010	0.001	0.001	4.803	0.000	4.804
1	2023	8	Access Road	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	62.17	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.010	0.001	0.000	0.021	0.002	0.001	6.477	0.000	6.479
1	2023	8	Access Road	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	62.17	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.003	0.001	0.000	0.004	0.000	0.000	0.811	0.000	0.812
1	2023	8	Access Road	Dust Control	Water Truck	Diesel	20.00	131.001	29.931	0.180	313.278	21.589	20.942	53,953.387	1.282	0.003	0.001	0.000	0.007	0.000	0.000	1.079	0.000	1.080
1	2023	8	Access Road	Excavation (Borrow)	Dozer	Diesel	64.63	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.003	0.000	0.000	0.009	0.000	0.000	5.348	0.000	5.349
1	2023	8	Access Road	Excavation (Borrow)	Roller	Diesel	29.83	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.001	0.000	0.000	0.002	0.000	0.000	0.909	0.000	0.909
1	2023	8	Access Road	Excavation (Cut to Fill)	Dozer	Diesel	48.47	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.002	0.000	0.000	0.006	0.000	0.000	4.011	0.000	4.012
1	2023	8	Access Road	Excavation (Cut to Fill)	Excavator	Diesel	38.78	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.001	0.000	0.000	0.002	0.000	0.000	2.123	0.000	2.123
1	2023	8	Access Road	Excavation (Cut to Fill)	Roller	Diesel	38.78	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.001	0.000	0.000	0.003	0.000	0.000	1.181	0.000	1.182
1	2023	8	Access Road	Excavation (Topsoil Stripping)	Dozer	Diesel	18.25	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.510	0.000	1.510
1	2023	8	Access Road	Fencing	Concrete Truck	Diesel	38.82	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.003	0.001	0.000	0.029	0.001	0.001	9.626	0.000	9.627
1	2023	8	Access Road	Fencing	Other General Equipment	Diesel	155.27	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.026	0.004	0.000	0.053	0.004	0.004	16.177	0.000	16.183
1	2023	8	Access Road	Fencing	Skid Steer Loader	Diesel	155.27	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.007	0.001	0.000	0.008	0.001	0.001	1.239	0.000	1.240
1	2023	8	Access Road	Fencing	Tractors/Loader/Backhoe	Diesel	155.27	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.008	0.002	0.000	0.009	0.001	0.001	2.026	0.000	2.028
1	2023	8	Access Road	Grading	Dozer	Diesel	15.53	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.285	0.000	1.285
1	2023	8	Access Road	Grading	Grader	Diesel	15.53	15.901	2.819	0.175	43.734	3.459	3.355	64,847.731	0.221	0.000	0.000	0.000	0.001	0.000	0.000	1.007	0.000	1.007
1	2023	8	Access Road	Grading	Roller	Diesel	15.53	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.473	0.000	0.473
1	2023	8	Access Road	Hydroseeding	Hydroseeder	Diesel	13.99	16.105	3.003	0.045	55.938	2.506	2.430	15,342.721	0.268	0.000	0.000	0.000	0.001	0.000	0.000	0.215	0.000	0.215
1	2023	8	Access Road	Hydroseeding	Off-Road Truck	Diesel	13.99	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.001	0.000	0.000	0.011	0.000	0.000	3.469	0.000	3.469
1	2023	8	Access Road	Markings	Other General Equipment	Diesel	239.57	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.040	0.005	0.000	0.082	0.006	0.006	24.959	0.000	24.968
1	2023	8	Access Road	Sidewalks	Concrete Truck	Diesel	279.49	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.019	0.005	0.000	0.212	0.004	0.004	69.304	0.000	69.317
1	2023	8	Access Road	Sidewalks	Tractors/Loader/Backhoe	Diesel	279.49	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.014	0.003	0.000	0.017	0.002	0.002	3.646	0.000	3.650
1	2023	8	Access Road	Sidewalks	Vibratory Compactor	Diesel	279.49	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.534
1	2023	8	Access Road	Soil Erosion/Sediment Control	Other General Equipment	Diesel	12.93	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.002	0.000	0.000	0.004	0.000	0.000	1.347	0.000	1.348
1	2023	8	Access Road	Soil Erosion/Sediment Control	Pumps	Diesel	12.93	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.000	0.000	0.000	0.001	0.000	0.000	0.167	0.000	0.167
1	2023	8	Access Road	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	12.93	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.001	0.000	0.000	0.001	0.000	0.000	0.169	0.000	0.169
1	2023	8	Access Road	Street Lighting	Loader	Diesel	93.16	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.005	0.001	0.000	0.015	0.001	0.001	7.197	0.000	7.199
1	2023	8	Access Road	Street Lighting	Other General Equipment	Diesel	93.16	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.015	0.002	0.000	0.032	0.002	0.002	9.705	0.000	9.709
1	2023	8	Access Road	Street Lighting	Skid Steer Loader	Diesel	93.16	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.004	0.001	0.000	0.005	0.001	0.001	0.743	0.000	0.744
1	2023	8	Access Road	Street Lighting	Tractors/Loader/Backhoe	Diesel	93.16	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.005	0.001	0.000	0.006	0.001	0.001	1.215	0.000	1.217
1	2023	8	Access Road	Subbase Placement	Dozer	Diesel	24.49	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.003	0.000	0.000	2.027	0.000	2.027
1	2023	8	Access Road	Subbase Placement	Roller	Diesel	23.86	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.002	0.000	0.000	0.727	0.000	0.727
1	2023	8	Access Road	Topsoil Placement	Dozer	Diesel	34.50	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.005	0.000	0.000	2.855	0.000	2.856
1	2023	8	Building - 10000 sqft- 1 story	Concrete Foundations	Excavator	Diesel	384.00	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.006	0.001	0.000	0.021	0.001	0.001	21.019	0.000	21.022
1	2023	8	Building - 10000 sqft- 1 story	Concrete Foundations	Fork Truck	Diesel	384.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.002	0.000	0.000	0.025	0.000	0.000	12.207	0.000	12.209
1	2023	8	Building - 10000 sqft- 1 story	Exterior Wall Framing	Fork Truck	Diesel	288.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.002	0.000	0.000	0.019	0.000	0.000	9.155	0.000	9.157
1	2023	8	Building - 10000 sqft- 1 story	Exterior Wall Framing	Man Lift	Diesel	288.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.008	0.002	0.000	0.012	0.001	0.001	2.051	0.000	2.053
1	2023	8	Building - 10000 sqft- 1 story	Interior Build-Out/ Finishes	Fork Truck	Diesel	1,152.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.007	0.001	0.000	0.075	0.001	0.001	36.621	0.000	36.627
1	2023	8	Building - 10000 sqft- 1 story	Interior Build-Out/ Finishes	Man Lift	Diesel	1,152.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.032	0.006	0.000	0.047	0.004	0.004	8.204	0.000	8.214
1	2023	8	Building - 10000 sqft- 1 story	Roofing	High Lift	Diesel	144.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.004	0.001	0.000	0.006	0.001	0.001	1.025	0.000	1.027
1	2023	8	Building - 10000 sqft- 1 story	Roofing	Man Lift (Fascia Construction)	Diesel	144.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.004	0.001	0.000	0.006	0.001	0.001	1.025	0.000	1.027
1	2023	8	Building - 10000 sqft- 1 story	Security & Safety Systems	High Lift	Diesel	384.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.011	0.002	0.000	0.016	0.001	0.001	2.735	0.000	2.738
1	2023	8	Building - 10000 sqft- 1 story	Structural Steel Erection	40 Ton Crane	Diesel	288.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.008	0.002	0.000	0.012	0.001	0.001	2.051	0.000	2.053
1	2023	8	Building - 10000 sqft- 1 story	Structural Steel Erection	Fork Truck	Diesel	180.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.001	0.000	0.000	0.012	0.000	0.000	5.722	0.000	5.723
1	2023	8	Building - 30000 sqft- 3 stories	Concrete Foundations	Excavator	Diesel	1,200.38	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.018	0.003	0.000	0.065	0.003	0.003	65.706	0.000	65.714
1	2023	8	Building - 30000 sqft- 3 stories	Concrete Foundations	Fork Truck	Diesel	1,200.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.007	0.002	0.000	0.078	0.001	0.001	38.159	0.000	38.166
1	2023	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Fork Truck	Diesel	2,250.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.014	0.003	0.000	0.146	0.002	0.002	71.526	0.000	71.538
1	2023	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Generator	Diesel	1,125.00	26.711	6.226	0.039	69.489	4.462	4.328	12,115.435	0.344	0.033	0.008	0.000	0.086	0.006	0.005	13.630	0.000	13.643
1	2023	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Man Lift	Diesel	2,250.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.062	0.013	0.000	0.092	0.009	0.008	16.023	0.001	16.042
1	2023	8	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Fork Truck	Diesel	9,000.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.055	0.012	0.001	0.583	0.008	0.008	286.103	0.001	286.152
1	2023	8	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Man Lift	Diesel	9,000.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.250	0.051	0.000	0.368	0.034	0.033	64.093	0.002	64.168
1	2023	8	Building - 30000 sqft- 3 stories	Roofing	High Lift	Diesel	450.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.012	0.003	0.000	0.018	0.002	0.002	3.205	0.000	3.208
1	2023	8	Building - 30000 sqft- 3 stories	Roofing	Man Lift (Fascia Construction)	Diesel	90.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.002	0.001	0.000	0.004	0.000	0.000	0.641	0.000	0.642
1	2023	8	Building - 30000 sqft- 3 stories	Security & Safety Systems	High Lift	Diesel	3,000.38	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.083	0.017	0.000	0.123	0.011	0.011	21.367	0.001	21.392
1	2023	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	90 Ton Crane	Diesel	60.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.002	0.000	0.000	0.002	0.000	0.000	0.427	0.000	0.428
1	2023	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Pump	Diesel	45.00	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.001	0.000	0.000	0.004	0.000	0.000	0.580	0.000	0.580
1	2023	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Truck	Diesel	90.00	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.006	0.002	0.000	0.068	0.001	0.001	22.317	0.000	22.321

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
1	2023	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Fork Truck	Diesel	300.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.002	0.000	0.000	0.019	0.000	0.000	9.549	0.000	9.550
1	2023	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Laser Screed	Diesel	135.00	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.022	0.003	0.000	0.046	0.003	0.003	14.065	0.000	14.070
1	2023	8	Detention Basin	Drainage - 24 inch SICPP	Excavator	Diesel	60.00	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.001	0.000	0.000	0.003	0.000	0.000	3.284	0.000	3.285
1	2023	8	Detention Basin	Drainage	Dozer	Diesel	60.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.002	0.000	0.000	0.008	0.000	0.000	4.965	0.000	4.966
1	2023	8	Detention Basin	Drainage	Loader	Diesel	60.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.003	0.001	0.000	0.010	0.001	0.001	4.636	0.000	4.637
1	2023	8	Detention Basin	Drainage	Other General Equipment	Diesel	60.00	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.010	0.001	0.000	0.020	0.001	0.001	6.251	0.000	6.253
1	2023	8	Detention Basin	Drainage	Roller	Diesel	60.00	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.001	0.000	0.000	0.004	0.000	0.000	1.828	0.000	1.828
1	2023	8	Detention Basin	Dust Control	Water Truck	Diesel	60.00	131.001	29.931	0.180	313.278	21.589	20.942	53,953.387	1.282	0.009	0.002	0.000	0.021	0.001	0.001	3.237	0.000	3.240
1	2023	8	Detention Basin	Excavation (Cut to Fill)	Dozer	Diesel	120.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.005	0.001	0.000	0.016	0.001	0.001	9.930	0.000	9.932
1	2023	8	Detention Basin	Excavation (Cut to Fill)	Excavator	Diesel	120.00	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.002	0.000	0.000	0.006	0.000	0.000	6.568	0.000	6.569
1	2023	8	Detention Basin	Excavation (Cut to Fill)	Roller	Diesel	120.00	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.003	0.000	0.000	0.008	0.000	0.000	3.655	0.000	3.656
1	2023	8	Detention Basin	Excavation (Topsoil Stripping)	Dozer	Diesel	0.04	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.003
1	2023	8	Detention Basin	Fencing	Concrete Truck	Diesel	0.80	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.198	0.000	0.198
1	2023	8	Detention Basin	Fencing	Other General Equipment	Diesel	3.20	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.333	0.000	0.334
1	2023	8	Detention Basin	Fencing	Skid Steer Loader	Diesel	3.20	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.026
1	2023	8	Detention Basin	Fencing	Tractors/Loader/Backhoe	Diesel	3.20	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.000	0.042
1	2023	8	Detention Basin	Hydroseeding	Hydroseeder	Diesel	0.11	16.105	3.003	0.045	55.938	2.506	2.430	15,342.721	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002
1	2023	8	Detention Basin	Hydroseeding	Off-Road Truck	Diesel	0.11	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.026
1	2023	8	Detention Basin	Topsoil Placement	Dozer	Diesel	0.26	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.022
1	2023	8	Parking Lot	Asphalt Placement	Asphalt Paver	Diesel	3.76	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.152	0.000	0.152
1	2023	8	Parking Lot	Asphalt Placement	Other General Equipment	Diesel	7.51	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.003	0.000	0.000	0.783	0.000	0.783
1	2023	8	Parking Lot	Asphalt Placement	Roller	Diesel	3.76	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.000	0.114
1	2023	8	Parking Lot	Asphalt Placement	Skid Steer Loader	Diesel	3.76	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.000	0.030
1	2023	8	Parking Lot	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	4.81	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.000	0.000	0.000	0.001	0.000	0.000	0.174	0.000	0.174
1	2023	8	Parking Lot	Clearing and Grubbing	Loader	Diesel	16.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.003	0.000	0.000	1.236	0.000	1.236
1	2023	8	Parking Lot	Concrete Placement	Air Compressor	Diesel	10.02	19.678	3.337	0.059	68.298	3.149	3.054	20,451.679	0.291	0.000	0.000	0.000	0.001	0.000	0.000	0.205	0.000	0.205
1	2023	8	Parking Lot	Concrete Placement	Concrete Saws	Diesel	10.02	18.000	3.136	0.047	61.961	2.263	2.195	16,603.911	0.313	0.000	0.000	0.000	0.001	0.000	0.000	0.166	0.000	0.166
1	2023	8	Parking Lot	Concrete Placement	Concrete Truck	Diesel	41.74	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.003	0.001	0.000	0.032	0.001	0.001	10.350	0.000	10.352
1	2023	8	Parking Lot	Concrete Placement	Other General Equipment	Diesel	20.04	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.003	0.000	0.000	0.007	0.000	0.000	2.087	0.000	2.088
1	2023	8	Parking Lot	Concrete Placement	Rubber Tired Loader	Diesel	10.02	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.002	0.000	0.000	0.774	0.000	0.774
1	2023	8	Parking Lot	Concrete Placement	Slip Form Paver	Diesel	10.02	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
1	2023	8	Parking Lot	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	10.02	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.001	0.000	0.000	0.002	0.000	0.000	0.361	0.000	0.362
1	2023	8	Parking Lot	Curbing	Concrete Truck	Diesel	1.90	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.471	0.000	0.471
1	2023	8	Parking Lot	Curbing	Curb/Gutter Paver	Diesel	1.90	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.077	0.000	0.077
1	2023	8	Parking Lot	Curbing	Other General Equipment	Diesel	1.90	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.198	0.000	0.198
1	2023	8	Parking Lot	Drainage - 24 inch SICPP	Dozer	Diesel	3.15	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.260	0.000	0.260
1	2023	8	Parking Lot	Drainage - 24 inch SICPP	Excavator	Diesel	3.15	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.172
1	2023	8	Parking Lot	Drainage - 24 inch SICPP	Loader	Diesel	3.15	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.243	0.000	0.243
1	2023	8	Parking Lot	Drainage - 24 inch SICPP	Other General Equipment	Diesel	3.15	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.328	0.000	0.328
1	2023	8	Parking Lot	Drainage - 24 inch SICPP	Roller	Diesel	3.15	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.000	0.096
1	2023	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	5.24	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
1	2023	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	5.24	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.002	0.000	0.000	0.546	0.000	0.547
1	2023	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	5.24	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000	0.068
1	2023	8	Parking Lot	Excavation (Borrow)	Dozer	Diesel	16.70	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.382	0.000	1.382
1	2023	8	Parking Lot	Excavation (Borrow)	Roller	Diesel	7.71	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.235	0.000	0.235
1	2023	8	Parking Lot	Excavation (Cut to Fill)	Dozer	Diesel	12.52	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.002	0.000	0.000	1.036	0.000	1.036
1	2023	8	Parking Lot	Excavation (Cut to Fill)	Excavator	Diesel	10.02	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.000	0.000	0.000	0.001	0.000	0.000	0.548	0.000	0.548
1	2023	8	Parking Lot	Excavation (Cut to Fill)	Roller	Diesel	10.02	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.305	0.000	0.305
1	2023	8	Parking Lot	Excavation (Topsoil Stripping)	Dozer	Diesel	4.71	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.390	0.000	0.390
1	2023	8	Parking Lot	Fencing	Concrete Truck	Diesel	1.06	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.262	0.000	0.262
1	2023	8	Parking Lot	Fencing	Other General Equipment	Diesel	4.22	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.440	0.000	0.440
1	2023	8	Parking Lot	Fencing	Skid Steer Loader	Diesel	4.22	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
1	2023	8	Parking Lot	Fencing	Tractors/Loader/Backhoe	Diesel	4.22	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.055
1	2023	8	Parking Lot	Grading	Dozer	Diesel	3.22	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.266	0.000	0.267
1	2023	8	Parking Lot	Grading	Grader	Diesel	3.22	15.901	2.819	0.175	43.734	3.459	3.355	64,847.731	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.209
1	2023	8	Parking Lot	Grading	Roller	Diesel	3.22	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.000	0.098
1	2023	8	Parking Lot	Hydroseeding	Hydroseeder	Diesel	2.90	16.105	3.003	0.045	55.938	2.506	2.430	15,342.721	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.045
1	2023	8	Parking Lot	Hydroseeding	Off-Road Truck	Diesel	2.90	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.002	0.000	0.000	0.719	0.000	0.719
1	2023	8	Parking Lot	Markings	Other General Equipment	Diesel	0.87	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.091
1	2023	8	Parking Lot	Sidewalks	Concrete Truck	Diesel	3.80	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.003	0.000	0.000	0.942	0.000	0.942
1	2023	8	Parking Lot	Sidewalks	Tractors/Loader/Backhoe	Diesel	3.80	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050
1	2023	8	Parking Lot	Sidewalks	Vibratory Compactor	Diesel	3.80	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007
1	2023	8	Parking Lot	Soil Erosion/Sediment Control	Other General Equipment	Diesel	2.67	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.278	0.000	0.278
1	2023	8	Parking Lot	Soil Erosion/Sediment Control	Pumps	Diesel	2.67	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
1	2023	8	Parking Lot	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	2.67	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035
1	2023	8	Parking Lot	Street Lighting	Loader	Diesel	1.78	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000	0.137
1	2023	8	Parking Lot	Street Lighting	Other General Equipment	Diesel	1.78	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.185	0.000	0.185
1	2023	8	Parking Lot	Street Lighting	Skid Steer Loader	Diesel	1.78	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
1	2023	8	Parking Lot	Street Lighting	Tractors/Loader/Backhoe	Diesel	1.78	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.023
1	2023	8	Parking Lot	Subbase Placement	Dozer	Diesel	6.33	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.524	0.000	0.524
1	2023	8	Parking Lot	Subbase Placement	Roller	Diesel	6.16	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.000	0.188

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
1	2023	8	Parking Lot	Topsoil Placement	Dozer	Diesel	7.16	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.592	0.000	0.592
1	2023	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Bulldozer	Diesel	466.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.019	0.003	0.000	0.062	0.003	0.003	38.562	0.000	38.569
1	2023	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Chain Saws	Diesel	466.00	643.852	147.019	0.011	4.041	23.414	21.540	1,804.460	3.296	0.331	0.076	0.000	0.002	0.012	0.011	0.841	0.002	0.893
1	2023	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Front Loader	Diesel	466.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.026	0.004	0.000	0.075	0.004	0.004	36.002	0.000	36.011
1	2023	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Grub the site down 2'-0	Diesel	466.00	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.077	0.011	0.000	0.159	0.011	0.011	48.550	0.001	48.567
1	2023	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Log Chipper	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,115.040	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
1	2023	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Mulcher	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,115.040	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
1	2023	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Tractor	Diesel	932.00	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.047	0.009	0.000	0.055	0.007	0.007	12.158	0.000	12.173
1	2023	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Curbing)	Bob Cat	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
1	2023	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Compacting Equipment	Diesel	279.60	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.535
1	2023	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Small Dozer	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
1	2023	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Forktruck (Hoist)	Diesel	932.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.026	0.005	0.000	0.038	0.004	0.003	6.637	0.000	6.645
1	2023	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Roller	Diesel	466.00	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.010	0.002	0.000	0.030	0.002	0.002	14.195	0.000	14.199
1	2023	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Seed Truck Spreader	Diesel	186.40	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.031	0.004	0.000	0.063	0.005	0.004	19.420	0.000	19.427
1	2023	8	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Excavator	Diesel	1,398.00	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.020	0.004	0.000	0.075	0.004	0.004	76.523	0.000	76.533
1	2023	8	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Fork Truck	Diesel	699.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.004	0.001	0.000	0.045	0.001	0.001	22.221	0.000	22.224
2	2023	2	Access Road	Asphalt Placement	Asphalt Paver	Diesel	14.54	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.587	0.000	0.588
2	2023	2	Access Road	Asphalt Placement	Other General Equipment	Diesel	29.08	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.005	0.001	0.000	0.010	0.001	0.001	3.030	0.000	3.031
2	2023	2	Access Road	Asphalt Placement	Roller	Diesel	14.54	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.443	0.000	0.443
2	2023	2	Access Road	Asphalt Placement	Skid Steer Loader	Diesel	14.54	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.001	0.000	0.000	0.001	0.000	0.000	0.116	0.000	0.116
2	2023	2	Access Road	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	18.61	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.001	0.000	0.000	0.003	0.000	0.000	0.672	0.000	0.672
2	2023	2	Access Road	Clearing and Grubbing	Loader	Diesel	77.60	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.004	0.001	0.000	0.013	0.001	0.001	5.995	0.000	5.997
2	2023	2	Access Road	Concrete Placement	Air Compressor	Diesel	38.78	19.678	3.337	0.059	68.298	3.149	3.054	20,451.740	0.291	0.001	0.000	0.000	0.003	0.000	0.000	0.793	0.000	0.793
2	2023	2	Access Road	Concrete Placement	Concrete Saws	Diesel	38.78	18.000	3.136	0.047	61.961	2.263	2.195	16,603.981	0.313	0.001	0.000	0.000	0.003	0.000	0.000	0.644	0.000	0.644
2	2023	2	Access Road	Concrete Placement	Concrete Truck	Diesel	161.58	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.011	0.003	0.000	0.122	0.002	0.002	40.067	0.000	40.074
2	2023	2	Access Road	Concrete Placement	Other General Equipment	Diesel	77.56	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.013	0.002	0.000	0.026	0.002	0.002	8.080	0.000	8.083
2	2023	2	Access Road	Concrete Placement	Rubber Tired Loader	Diesel	38.78	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.002	0.000	0.000	0.006	0.000	0.000	2.996	0.000	2.997
2	2023	2	Access Road	Concrete Placement	Slip Form Paver	Diesel	38.78	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.001	0.000	0.000	0.003	0.000	0.000	1.567	0.000	1.567
2	2023	2	Access Road	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	38.78	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.003	0.000	0.000	0.006	0.000	0.000	1.399	0.000	1.400
2	2023	2	Access Road	Curbing	Concrete Truck	Diesel	139.75	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.010	0.003	0.000	0.106	0.002	0.002	34.652	0.000	34.659
2	2023	2	Access Road	Curbing	Curb/Gutter Paver	Diesel	139.75	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.003	0.000	0.000	0.010	0.000	0.000	5.645	0.000	5.647
2	2023	2	Access Road	Curbing	Other General Equipment	Diesel	139.75	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.023	0.003	0.000	0.048	0.003	0.003	14.559	0.000	14.565
2	2023	2	Access Road	Drainage - 24 inch SICPP	Dozer	Diesel	111.90	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.004	0.001	0.000	0.015	0.001	0.001	9.260	0.000	9.262
2	2023	2	Access Road	Drainage - 24 inch SICPP	Excavator	Diesel	111.90	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.002	0.000	0.000	0.006	0.000	0.000	6.125	0.000	6.126
2	2023	2	Access Road	Drainage - 24 inch SICPP	Loader	Diesel	111.90	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.006	0.001	0.000	0.018	0.001	0.001	8.646	0.000	8.648
2	2023	2	Access Road	Drainage - 24 inch SICPP	Other General Equipment	Diesel	111.90	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.019	0.003	0.000	0.038	0.003	0.003	11.659	0.000	11.663
2	2023	2	Access Road	Drainage - 24 inch SICPP	Roller	Diesel	111.90	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.002	0.000	0.000	0.007	0.000	0.000	3.409	0.000	3.410
2	2023	2	Access Road	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	62.17	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.003	0.001	0.000	0.010	0.001	0.001	4.803	0.000	4.804
2	2023	2	Access Road	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	62.17	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.010	0.001	0.000	0.021	0.002	0.001	6.477	0.000	6.479
2	2023	2	Access Road	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	62.17	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.003	0.001	0.000	0.004	0.000	0.000	0.811	0.000	0.812
2	2023	2	Access Road	Dust Control	Water Truck	Diesel	20.00	131.002	29.931	0.180	313.278	21.589	20.942	53,953.450	1.282	0.003	0.001	0.000	0.007	0.000	0.000	1.079	0.000	1.080
2	2023	2	Access Road	Excavation (Borrow)	Dozer	Diesel	64.63	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.003	0.000	0.000	0.009	0.000	0.000	5.348	0.000	5.349
2	2023	2	Access Road	Excavation (Borrow)	Roller	Diesel	29.83	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.001	0.000	0.000	0.002	0.000	0.000	0.909	0.000	0.909
2	2023	2	Access Road	Excavation (Cut to Fill)	Dozer	Diesel	48.47	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.002	0.000	0.000	0.006	0.000	0.000	4.011	0.000	4.012
2	2023	2	Access Road	Excavation (Cut to Fill)	Excavator	Diesel	38.78	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.001	0.000	0.000	0.002	0.000	0.000	2.123	0.000	2.123
2	2023	2	Access Road	Excavation (Cut to Fill)	Roller	Diesel	38.78	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.001	0.000	0.000	0.003	0.000	0.000	1.181	0.000	1.182
2	2023	2	Access Road	Excavation (Topsoil Stripping)	Dozer	Diesel	18.25	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.510	0.000	1.510
2	2023	2	Access Road	Fencing	Concrete Truck	Diesel	38.82	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.003	0.001	0.000	0.029	0.001	0.001	9.626	0.000	9.627
2	2023	2	Access Road	Fencing	Other General Equipment	Diesel	155.27	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.026	0.004	0.000	0.053	0.004	0.004	16.177	0.000	16.183
2	2023	2	Access Road	Fencing	Skid Steer Loader	Diesel	155.27	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.007	0.001	0.000	0.008	0.001	0.001	1.239	0.000	1.240
2	2023	2	Access Road	Fencing	Tractors/Loader/Backhoe	Diesel	155.27	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.008	0.002	0.000	0.009	0.001	0.001	2.026	0.000	2.028
2	2023	2	Access Road	Grading	Dozer	Diesel	15.53	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.285	0.000	1.285
2	2023	2	Access Road	Grading	Grader	Diesel	15.53	15.901	2.819	0.175	43.734	3.459	3.355	64,847.762	0.221	0.000	0.000	0.000	0.001	0.000	0.000	1.007	0.000	1.007
2	2023	2	Access Road	Grading	Roller	Diesel	15.53	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.473	0.000	0.473
2	2023	2	Access Road	Hydroseeding	Hydroseeder	Diesel	13.99	16.105	3.003	0.045	55.938	2.506	2.430	15,342.697	0.268	0.000	0.000	0.000	0.001	0.000	0.000	0.215	0.000	0.215
2	2023	2	Access Road	Hydroseeding	Off-Road Truck	Diesel	13.99	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.001	0.000	0.000	0.011	0.000	0.000	3.469	0.000	3.469
2	2023	2	Access Road	Markings	Other General Equipment	Diesel	239.57	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.040	0.005	0.000	0.082	0.006	0.006	24.959	0.000	24.968
2	2023	2	Access Road	Sidewalks	Concrete Truck	Diesel	279.49	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.019	0.005	0.000	0.212	0.004	0.004	69.304	0.000	69.317
2	2023	2	Access Road	Sidewalks	Tractors/Loader/Backhoe	Diesel	279.49	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.014	0.003	0.000	0.017	0.002	0.002	3.646	0.000	3.650
2	2023	2	Access Road	Sidewalks	Vibratory Compactor	Diesel	279.49	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.534
2	2023	2	Access Road	Soil Erosion/Sediment Control	Other General Equipment	Diesel	12.93	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.002	0.000	0.000	0.004	0.000	0.000	1.347	0.000	1.348
2	2023	2	Access Road	Soil Erosion/Sediment Control	Pumps	Diesel	12.93	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.000	0.000	0.000	0.001	0.000	0.000	0.167	0.000	0.167
2	2023	2	Access Road	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	12.93	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.001	0.000	0.000	0.001	0.000	0.000	0.169	0.000	0.169
2	2023	2	Access Road	Street Lighting	Loader	Diesel	93.16	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.005	0.001	0.000	0.015	0.001	0.001	7.197	0.000	7.199
2	2023	2	Access Road	Street Lighting	Other General Equipment	Diesel	93.16	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.015	0.002	0.000	0.032	0.002	0.002	9.705	0.000	9.709
2	2023	2	Access Road	Street Lighting	Skid Steer Loader	Diesel	93.16	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.004	0.001	0.000	0.005	0.001	0.001	0.743	0.000	0.744
2	2023	2	Access Road	Street Lighting	Tractors/Loader/Backhoe	Diesel	93.16	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.005	0.001	0.000	0.006	0.001	0.001	1.215	0.000	1.217
2	2023	2	Access Road	Subbase Placement	Dozer	Diesel	24.49	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.003	0.000	0.000	2.027	0.000	2.027
2	2023	2	Access Road	Subbase Placement	Roller	Diesel	23.86	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.002	0.000	0.000	0.727	0.000	0.727
2	2023	2	Access Road	Topsoil Placement	Dozer	Diesel	34.50	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.005	0.000	0.000	2.855	0.000	2.856
2	2023	2	Building - 10000 sqft- 1 story	Concrete Foundations	Excavator	Diesel	384.00	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.006	0.001	0.000	0.021	0.001	0.001	21.019	0.000	21.022

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
2	2023	2	Building - 10000 sqft- 1 story	Concrete Foundations	Fork Truck	Diesel	384.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.002	0.000	0.000	0.025	0.000	0.000	12.207	0.000	12.209
2	2023	2	Building - 10000 sqft- 1 story	Exterior Wall Framing	Fork Truck	Diesel	288.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.002	0.000	0.000	0.019	0.000	0.000	9.155	0.000	9.157
2	2023	2	Building - 10000 sqft- 1 story	Exterior Wall Framing	Man Lift	Diesel	288.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.008	0.002	0.000	0.012	0.001	0.001	2.051	0.000	2.053
2	2023	2	Building - 10000 sqft- 1 story	Interior Build-Out/ Finishes	Fork Truck	Diesel	1,152.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.007	0.001	0.000	0.075	0.001	0.001	36.621	0.000	36.627
2	2023	2	Building - 10000 sqft- 1 story	Interior Build-Out/ Finishes	Man Lift	Diesel	1,152.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.032	0.006	0.000	0.047	0.004	0.004	8.204	0.000	8.213
2	2023	2	Building - 10000 sqft- 1 story	Roofing	High Lift	Diesel	144.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.004	0.001	0.000	0.006	0.001	0.001	1.025	0.000	1.027
2	2023	2	Building - 10000 sqft- 1 story	Roofing	Man Lift (Fascia Construction)	Diesel	144.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.004	0.001	0.000	0.006	0.001	0.001	1.025	0.000	1.027
2	2023	2	Building - 10000 sqft- 1 story	Security & Safety Systems	High Lift	Diesel	384.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.011	0.002	0.000	0.016	0.001	0.001	2.735	0.000	2.738
2	2023	2	Building - 10000 sqft- 1 story	Structural Steel Erection	40 Ton Crane	Diesel	288.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.008	0.002	0.000	0.012	0.001	0.001	2.051	0.000	2.053
2	2023	2	Building - 10000 sqft- 1 story	Structural Steel Erection	Fork Truck	Diesel	180.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.001	0.000	0.000	0.012	0.000	0.000	5.722	0.000	5.723
2	2023	2	Building - 30000 sqft- 3 stories	Concrete Foundations	Excavator	Diesel	1,200.38	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.018	0.003	0.000	0.065	0.003	0.003	65.706	0.000	65.714
2	2023	2	Building - 30000 sqft- 3 stories	Concrete Foundations	Fork Truck	Diesel	1,200.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.007	0.002	0.000	0.078	0.001	0.001	38.159	0.000	38.166
2	2023	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Fork Truck	Diesel	2,250.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.014	0.003	0.000	0.146	0.002	0.002	71.526	0.000	71.538
2	2023	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Generator	Diesel	1,125.00	26.711	6.226	0.039	69.489	4.462	4.328	12,115.425	0.344	0.033	0.008	0.000	0.086	0.006	0.005	13.630	0.000	13.643
2	2023	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Man Lift	Diesel	2,250.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.062	0.013	0.000	0.092	0.009	0.008	16.023	0.001	16.042
2	2023	2	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Fork Truck	Diesel	9,000.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.055	0.012	0.001	0.583	0.008	0.008	286.103	0.001	286.152
2	2023	2	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Man Lift	Diesel	9,000.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.250	0.051	0.000	0.368	0.034	0.033	64.093	0.002	64.168
2	2023	2	Building - 30000 sqft- 3 stories	Roofing	High Lift	Diesel	450.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.012	0.003	0.000	0.018	0.002	0.002	3.205	0.000	3.208
2	2023	2	Building - 30000 sqft- 3 stories	Roofing	Man Lift (Fascia Construction)	Diesel	90.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.002	0.001	0.000	0.004	0.000	0.000	0.641	0.000	0.642
2	2023	2	Building - 30000 sqft- 3 stories	Security & Safety Systems	High Lift	Diesel	3,000.38	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.083	0.017	0.000	0.123	0.011	0.011	21.367	0.001	21.392
2	2023	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	90 Ton Crane	Diesel	60.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.002	0.000	0.000	0.002	0.000	0.000	0.427	0.000	0.428
2	2023	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Pump	Diesel	45.00	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.001	0.000	0.000	0.004	0.000	0.000	0.580	0.000	0.580
2	2023	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Truck	Diesel	90.00	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.006	0.002	0.000	0.068	0.001	0.001	22.317	0.000	22.321
2	2023	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Fork Truck	Diesel	300.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.002	0.000	0.000	0.019	0.000	0.000	9.549	0.000	9.550
2	2023	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Laser Screed	Diesel	135.00	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.022	0.003	0.000	0.046	0.003	0.003	14.065	0.000	14.070
2	2023	2	Detention Basin	Drainage - 24 inch SICPP	Excavator	Diesel	60.00	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.001	0.000	0.000	0.003	0.000	0.000	3.284	0.000	3.285
2	2023	2	Detention Basin	Drainage	Dozer	Diesel	60.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.002	0.000	0.000	0.008	0.000	0.000	4.965	0.000	4.966
2	2023	2	Detention Basin	Drainage	Loader	Diesel	60.00	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.003	0.001	0.000	0.010	0.001	0.001	4.635	0.000	4.637
2	2023	2	Detention Basin	Drainage	Other General Equipment	Diesel	60.00	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.010	0.001	0.000	0.020	0.001	0.001	6.251	0.000	6.253
2	2023	2	Detention Basin	Drainage	Roller	Diesel	60.00	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.001	0.000	0.000	0.004	0.000	0.000	1.828	0.000	1.828
2	2023	2	Detention Basin	Dust Control	Water Truck	Diesel	60.00	131.002	29.931	0.180	313.278	21.589	20.942	53,953.450	1.282	0.009	0.002	0.000	0.021	0.001	0.001	3.237	0.000	3.240
2	2023	2	Detention Basin	Excavation (Cut to Fill)	Dozer	Diesel	120.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.005	0.001	0.000	0.016	0.001	0.001	9.930	0.000	9.932
2	2023	2	Detention Basin	Excavation (Cut to Fill)	Excavator	Diesel	120.00	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.002	0.000	0.000	0.006	0.000	0.000	6.569	0.000	6.569
2	2023	2	Detention Basin	Excavation (Cut to Fill)	Roller	Diesel	120.00	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.003	0.000	0.000	0.008	0.000	0.000	3.655	0.000	3.656
2	2023	2	Detention Basin	Excavation (Topsoil Stripping)	Dozer	Diesel	0.04	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.003
2	2023	2	Detention Basin	Fencing	Concrete Truck	Diesel	0.80	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.198	0.000	0.198
2	2023	2	Detention Basin	Fencing	Other General Equipment	Diesel	3.20	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.333	0.000	0.334
2	2023	2	Detention Basin	Fencing	Skid Steer Loader	Diesel	3.20	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.026
2	2023	2	Detention Basin	Fencing	Tractors/Loader/Backhoe	Diesel	3.20	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.000	0.042
2	2023	2	Detention Basin	Hydroseeding	Hydroseeder	Diesel	0.11	16.105	3.003	0.045	55.938	2.506	2.430	15,342.697	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.002
2	2023	2	Detention Basin	Hydroseeding	Off-Road Truck	Diesel	0.11	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.026
2	2023	2	Detention Basin	Topsoil Placement	Dozer	Diesel	0.26	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.022
2	2023	2	Parking Lot	Asphalt Placement	Asphalt Paver	Diesel	3.76	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.152	0.000	0.152
2	2023	2	Parking Lot	Asphalt Placement	Other General Equipment	Diesel	7.51	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.003	0.000	0.000	0.783	0.000	0.783
2	2023	2	Parking Lot	Asphalt Placement	Roller	Diesel	3.76	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.000	0.114
2	2023	2	Parking Lot	Asphalt Placement	Skid Steer Loader	Diesel	3.76	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.000	0.030
2	2023	2	Parking Lot	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	4.81	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.000	0.000	0.000	0.001	0.000	0.000	0.174	0.000	0.174
2	2023	2	Parking Lot	Clearing and Grubbing	Loader	Diesel	16.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.003	0.000	0.000	1.236	0.000	1.236
2	2023	2	Parking Lot	Concrete Placement	Air Compressor	Diesel	10.02	19.678	3.337	0.059	68.298	3.149	3.054	20,451.740	0.291	0.000	0.000	0.000	0.001	0.000	0.000	0.205	0.000	0.205
2	2023	2	Parking Lot	Concrete Placement	Concrete Saws	Diesel	10.02	18.000	3.136	0.047	61.961	2.263	2.195	16,603.981	0.313	0.000	0.000	0.000	0.001	0.000	0.000	0.166	0.000	0.166
2	2023	2	Parking Lot	Concrete Placement	Concrete Truck	Diesel	41.74	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.003	0.001	0.000	0.032	0.001	0.001	10.350	0.000	10.352
2	2023	2	Parking Lot	Concrete Placement	Other General Equipment	Diesel	20.04	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.003	0.000	0.000	0.007	0.000	0.000	2.087	0.000	2.088
2	2023	2	Parking Lot	Concrete Placement	Rubber Tired Loader	Diesel	10.02	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.001	0.000	0.000	0.002	0.000	0.000	0.774	0.000	0.774
2	2023	2	Parking Lot	Concrete Placement	Slip Form Paver	Diesel	10.02	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
2	2023	2	Parking Lot	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	10.02	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.001	0.000	0.000	0.002	0.000	0.000	0.361	0.000	0.362
2	2023	2	Parking Lot	Curbing	Concrete Truck	Diesel	1.90	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.471	0.000	0.471
2	2023	2	Parking Lot	Curbing	Curb/Gutter Paver	Diesel	1.90	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.077	0.000	0.077
2	2023	2	Parking Lot	Curbing	Other General Equipment	Diesel	1.90	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.198	0.000	0.198
2	2023	2	Parking Lot	Drainage - 24 inch SICPP	Dozer	Diesel	3.15	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.260	0.000	0.260
2	2023	2	Parking Lot	Drainage - 24 inch SICPP	Excavator	Diesel	3.15	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.172
2	2023	2	Parking Lot	Drainage - 24 inch SICPP	Loader	Diesel	3.15	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.243	0.000	0.243
2	2023	2	Parking Lot	Drainage - 24 inch SICPP	Other General Equipment	Diesel	3.15	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.328	0.000	0.328
2	2023	2	Parking Lot	Drainage - 24 inch SICPP	Roller	Diesel	3.15	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.000	0.096
2	2023	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	5.24	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
2	2023	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	5.24	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.002	0.000	0.000	0.546	0.000	0.547
2	2023	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	5.24	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000	0.068
2	2023	2	Parking Lot	Excavation (Borrow)	Dozer	Diesel	16.70	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.382	0.000	1.382
2	2023	2	Parking Lot	Excavation (Borrow)	Roller	Diesel	7.71	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.235	0.000	0.235
2	2023	2	Parking Lot	Excavation (Cut to Fill)	Dozer	Diesel	12.52	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.002	0.000	0.000	1.036	0.000	1.036
2	2023	2	Parking Lot	Excavation (Cut to Fill)	Excavator	Diesel	10.02	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.000	0.000	0.000	0.001	0.000	0.000	0.548	0.000	0.548
2	2023	2	Parking Lot	Excavation (Cut to Fill)	Roller	Diesel	10.02	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.305	0.000	0.305

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
2	2023	2	Parking Lot	Excavation (Topsoil Stripping)	Dozer	Diesel	4.71	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.390	0.000	0.390
2	2023	2	Parking Lot	Fencing	Concrete Truck	Diesel	1.06	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.262	0.000	0.262
2	2023	2	Parking Lot	Fencing	Other General Equipment	Diesel	4.22	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.440	0.000	0.440
2	2023	2	Parking Lot	Fencing	Skid Steer Loader	Diesel	4.22	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
2	2023	2	Parking Lot	Fencing	Tractors/Loader/Backhoe	Diesel	4.22	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.055
2	2023	2	Parking Lot	Grading	Dozer	Diesel	3.22	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.266	0.000	0.267
2	2023	2	Parking Lot	Grading	Grader	Diesel	3.22	15.901	2.819	0.175	43.734	3.459	3.355	64,847.762	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.209
2	2023	2	Parking Lot	Grading	Roller	Diesel	3.22	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.000	0.098
2	2023	2	Parking Lot	Hydroseeding	Hydroseeder	Diesel	2.90	16.105	3.003	0.045	55.938	2.506	2.430	15,342.697	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.045
2	2023	2	Parking Lot	Hydroseeding	Off-Road Truck	Diesel	2.90	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.002	0.000	0.000	0.719	0.000	0.719
2	2023	2	Parking Lot	Markings	Other General Equipment	Diesel	0.87	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.091
2	2023	2	Parking Lot	Sidewalks	Concrete Truck	Diesel	3.80	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.003	0.000	0.000	0.942	0.000	0.942
2	2023	2	Parking Lot	Sidewalks	Tractors/Loader/Backhoe	Diesel	3.80	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050
2	2023	2	Parking Lot	Sidewalks	Vibratory Compactor	Diesel	3.80	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007
2	2023	2	Parking Lot	Soil Erosion/Sediment Control	Other General Equipment	Diesel	2.67	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.278	0.000	0.278
2	2023	2	Parking Lot	Soil Erosion/Sediment Control	Pumps	Diesel	2.67	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
2	2023	2	Parking Lot	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	2.67	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035
2	2023	2	Parking Lot	Street Lighting	Loader	Diesel	1.78	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000	0.137
2	2023	2	Parking Lot	Street Lighting	Other General Equipment	Diesel	1.78	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.185	0.000	0.185
2	2023	2	Parking Lot	Street Lighting	Skid Steer Loader	Diesel	1.78	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
2	2023	2	Parking Lot	Street Lighting	Tractors/Loader/Backhoe	Diesel	1.78	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.023
2	2023	2	Parking Lot	Subbase Placement	Dozer	Diesel	6.33	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.524	0.000	0.524
2	2023	2	Parking Lot	Subbase Placement	Roller	Diesel	6.16	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.000	0.188
2	2023	2	Parking Lot	Topsoil Placement	Dozer	Diesel	7.16	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.592	0.000	0.592
2	2023	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Bulldozer	Diesel	466.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.019	0.003	0.000	0.062	0.003	0.003	38.562	0.000	38.569
2	2023	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Chain Saws	Diesel	466.00	643.853	147.018	0.011	4.041	23.414	21.541	1,804.463	3.296	0.331	0.076	0.000	0.002	0.012	0.011	0.841	0.002	0.893
2	2023	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Front Loader	Diesel	466.00	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.026	0.004	0.000	0.075	0.004	0.004	36.002	0.000	36.011
2	2023	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Grub the site down 2'-0	Diesel	466.00	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.077	0.011	0.000	0.159	0.011	0.011	48.550	0.001	48.567
2	2023	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Log Chipper	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,114.971	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
2	2023	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Mulcher	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,114.971	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
2	2023	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Tractor	Diesel	932.00	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.047	0.009	0.000	0.055	0.007	0.007	12.158	0.000	12.173
2	2023	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Curbing)	Bob Cat	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
2	2023	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Compacting Equipment	Diesel	279.60	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.535
2	2023	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Small Dozer	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
2	2023	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Forktruck (Hoist)	Diesel	932.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.026	0.005	0.000	0.038	0.004	0.003	6.637	0.000	6.645
2	2023	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Roller	Diesel	466.00	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.010	0.002	0.000	0.030	0.002	0.002	14.195	0.000	14.199
2	2023	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Seed Truck Spreader	Diesel	186.40	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.031	0.004	0.000	0.063	0.005	0.004	19.420	0.000	19.427
2	2023	2	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Excavator	Diesel	1,398.00	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.020	0.004	0.000	0.075	0.004	0.004	76.523	0.000	76.533
2	2023	2	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Fork Truck	Diesel	699.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.004	0.001	0.000	0.045	0.001	0.001	22.221	0.000	22.224
2023 ESTIMATED CONSTRUCTION EMISSIONS - NONROAD SOURCES																3.330	0.651	0.009	7.724	0.430	0.416	2,871.741	0.031	2,872.795
1	2024	8	Access Road	Asphalt Placement	Asphalt Paver	Diesel	14.54	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.587	0.000	0.588
1	2024	8	Access Road	Asphalt Placement	Other General Equipment	Diesel	29.08	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.005	0.001	0.000	0.010	0.001	0.001	3.030	0.000	3.031
1	2024	8	Access Road	Asphalt Placement	Roller	Diesel	14.54	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.443	0.000	0.443
1	2024	8	Access Road	Asphalt Placement	Skid Steer Loader	Diesel	14.54	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.001	0.000	0.000	0.001	0.000	0.000	0.116	0.000	0.116
1	2024	8	Access Road	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	18.61	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.001	0.000	0.000	0.003	0.000	0.000	0.672	0.000	0.672
1	2024	8	Access Road	Clearing and Grubbing	Loader	Diesel	77.60	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.004	0.001	0.000	0.013	0.001	0.001	5.995	0.000	5.997
1	2024	8	Access Road	Curbing	Concrete Truck	Diesel	139.75	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.010	0.003	0.000	0.106	0.002	0.002	34.652	0.000	34.659
1	2024	8	Access Road	Curbing	Curb/Gutter Paver	Diesel	139.75	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.003	0.000	0.000	0.010	0.000	0.000	5.645	0.000	5.647
1	2024	8	Access Road	Curbing	Other General Equipment	Diesel	139.75	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.023	0.003	0.000	0.048	0.003	0.003	14.559	0.000	14.565
1	2024	8	Access Road	Drainage - 24 inch SICPP	Dozer	Diesel	111.90	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.004	0.001	0.000	0.015	0.001	0.001	9.260	0.000	9.262
1	2024	8	Access Road	Drainage - 24 inch SICPP	Excavator	Diesel	111.90	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.002	0.000	0.000	0.006	0.000	0.000	6.125	0.000	6.126
1	2024	8	Access Road	Drainage - 24 inch SICPP	Loader	Diesel	111.90	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.006	0.001	0.000	0.018	0.001	0.001	8.646	0.000	8.648
1	2024	8	Access Road	Drainage - 24 inch SICPP	Other General Equipment	Diesel	111.90	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.019	0.003	0.000	0.038	0.003	0.003	11.659	0.000	11.663
1	2024	8	Access Road	Drainage - 24 inch SICPP	Roller	Diesel	111.90	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.002	0.000	0.000	0.007	0.000	0.000	3.409	0.000	3.410
1	2024	8	Access Road	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	62.17	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.003	0.001	0.000	0.010	0.001	0.001	4.803	0.000	4.804
1	2024	8	Access Road	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	62.17	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.010	0.001	0.000	0.021	0.002	0.001	6.477	0.000	6.479
1	2024	8	Access Road	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	62.17	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.003	0.001	0.000	0.004	0.000	0.000	0.811	0.000	0.812
1	2024	8	Access Road	Dust Control	Water Truck	Diesel	20.00	131.001	29.931	0.180	313.278	21.589	20.942	53,953.387	1.282	0.003	0.001	0.000	0.007	0.000	0.000	1.079	0.000	1.080
1	2024	8	Access Road	Excavation (Borrow)	Dozer	Diesel	64.63	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.003	0.000	0.000	0.009	0.000	0.000	5.348	0.000	5.349
1	2024	8	Access Road	Excavation (Borrow)	Roller	Diesel	29.83	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.001	0.000	0.000	0.002	0.000	0.000	0.909	0.000	0.909
1	2024	8	Access Road	Excavation (Cut to Fill)	Dozer	Diesel	48.47	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.002	0.000	0.000	0.006	0.000	0.000	4.011	0.000	4.012
1	2024	8	Access Road	Excavation (Cut to Fill)	Excavator	Diesel	38.78	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.001	0.000	0.000	0.002	0.000	0.000	2.123	0.000	2.123
1	2024	8	Access Road	Excavation (Cut to Fill)	Roller	Diesel	38.78	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.001	0.000	0.000	0.003	0.000	0.000	1.181	0.000	1.182
1	2024	8	Access Road	Excavation (Topsoil Stripping)	Dozer	Diesel	18.25	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.510	0.000	1.510
1	2024	8	Access Road	Fencing	Concrete Truck	Diesel	38.82	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.003	0.001	0.000	0.029	0.001	0.001	9.626	0.000	9.627
1	2024	8	Access Road	Fencing	Other General Equipment	Diesel	155.27	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.026	0.004	0.000	0.053	0.004	0.004	16.177	0.000	16.183
1	2024	8	Access Road	Fencing	Skid Steer Loader	Diesel	155.27	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.007	0.001	0.000	0.008	0.001	0.001	1.239	0.000	1.240
1	2024	8	Access Road	Fencing	Tractors/Loader/Backhoe	Diesel	155.27	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.008	0.002	0.000	0.009	0.001	0.001	2.026	0.000	2.028
1	2024	8	Access Road	Grading	Dozer	Diesel	15.53	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.285	0.000	1.285
1	2024	8	Access Road	Grading	Grader	Diesel	15.53	15.901	2.819	0.175	43.734	3.459	3.355	64,847.731	0.221	0.000	0.000	0.000	0.001	0.000	0.000	1.007	0.000	1.007
1	2024	8	Access Road	Grading	Roller	Diesel	15.53	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.473	0.000	0.473

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
1	2024	8	Access Road	Hydroseeding	Hydroseeder	Diesel	13.99	16.105	3.003	0.045	55.938	2.506	2.430	15,342.721	0.268	0.000	0.000	0.000	0.001	0.000	0.000	0.215	0.000	0.215
1	2024	8	Access Road	Hydroseeding	Off-Road Truck	Diesel	13.99	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.001	0.000	0.000	0.011	0.000	0.000	3.469	0.000	3.469
1	2024	8	Access Road	Markings	Other General Equipment	Diesel	239.57	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.040	0.005	0.000	0.082	0.006	0.006	24.959	0.000	24.968
1	2024	8	Access Road	Sidewalks	Concrete Truck	Diesel	279.49	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.019	0.005	0.000	0.212	0.004	0.004	69.304	0.000	69.317
1	2024	8	Access Road	Sidewalks	Tractors/Loader/Backhoe	Diesel	279.49	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.014	0.003	0.000	0.017	0.002	0.002	3.646	0.000	3.650
1	2024	8	Access Road	Sidewalks	Vibratory Compactor	Diesel	279.49	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.534
1	2024	8	Access Road	Soil Erosion/Sediment Control	Other General Equipment	Diesel	12.93	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.002	0.000	0.000	0.004	0.000	0.000	1.347	0.000	1.348
1	2024	8	Access Road	Soil Erosion/Sediment Control	Pumps	Diesel	12.93	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.000	0.000	0.000	0.001	0.000	0.000	0.167	0.000	0.167
1	2024	8	Access Road	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	12.93	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.001	0.000	0.000	0.001	0.000	0.000	0.169	0.000	0.169
1	2024	8	Access Road	Street Lighting	Loader	Diesel	93.16	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.005	0.001	0.000	0.015	0.001	0.001	7.197	0.000	7.199
1	2024	8	Access Road	Street Lighting	Other General Equipment	Diesel	93.16	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.015	0.002	0.000	0.032	0.002	0.002	9.705	0.000	9.709
1	2024	8	Access Road	Street Lighting	Skid Steer Loader	Diesel	93.16	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.004	0.001	0.000	0.005	0.001	0.001	0.743	0.000	0.744
1	2024	8	Access Road	Street Lighting	Tractors/Loader/Backhoe	Diesel	93.16	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.005	0.001	0.000	0.006	0.001	0.001	1.215	0.000	1.217
1	2024	8	Access Road	Subbase Placement	Dozer	Diesel	24.49	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.003	0.000	0.000	2.027	0.000	2.027
1	2024	8	Access Road	Subbase Placement	Roller	Diesel	23.86	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.002	0.000	0.000	0.727	0.000	0.727
1	2024	8	Access Road	Topsoil Placement	Dozer	Diesel	34.50	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.005	0.000	0.000	2.855	0.000	2.856
1	2024	8	Building - 30000 sqft- 3 stories	Concrete Foundations	Excavator	Diesel	1,200.38	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.018	0.003	0.000	0.065	0.003	0.003	65.706	0.000	65.714
1	2024	8	Building - 30000 sqft- 3 stories	Concrete Foundations	Fork Truck	Diesel	1,200.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.007	0.002	0.000	0.078	0.001	0.001	38.159	0.000	38.166
1	2024	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Fork Truck	Diesel	2,250.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.014	0.003	0.000	0.146	0.002	0.002	71.526	0.000	71.538
1	2024	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Generator	Diesel	1,125.00	26.711	6.226	0.039	69.489	4.462	4.328	12,115.435	0.344	0.033	0.008	0.000	0.086	0.006	0.005	13.630	0.000	13.643
1	2024	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Man Lift	Diesel	2,250.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.062	0.013	0.000	0.092	0.009	0.008	16.023	0.001	16.042
1	2024	8	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Fork Truck	Diesel	9,000.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.055	0.012	0.001	0.583	0.008	0.008	286.103	0.001	286.152
1	2024	8	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Man Lift	Diesel	9,000.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.250	0.051	0.000	0.368	0.034	0.033	64.093	0.002	64.168
1	2024	8	Building - 30000 sqft- 3 stories	Roofing	High Lift	Diesel	450.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.012	0.003	0.000	0.018	0.002	0.002	3.205	0.000	3.208
1	2024	8	Building - 30000 sqft- 3 stories	Roofing	Man Lift (Fascia Construction)	Diesel	90.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.002	0.001	0.000	0.004	0.000	0.000	0.641	0.000	0.642
1	2024	8	Building - 30000 sqft- 3 stories	Security & Safety Systems	High Lift	Diesel	3,000.38	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.083	0.017	0.000	0.123	0.011	0.011	21.367	0.001	21.392
1	2024	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	90 Ton Crane	Diesel	60.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.002	0.000	0.000	0.002	0.000	0.000	0.427	0.000	0.428
1	2024	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Pump	Diesel	45.00	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.001	0.000	0.000	0.004	0.000	0.000	0.580	0.000	0.580
1	2024	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Truck	Diesel	90.00	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.006	0.002	0.000	0.068	0.001	0.001	22.317	0.000	22.321
1	2024	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Fork Truck	Diesel	300.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.002	0.000	0.000	0.019	0.000	0.000	9.549	0.000	9.550
1	2024	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Laser Screed	Diesel	135.00	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.022	0.003	0.000	0.046	0.003	0.003	14.065	0.000	14.070
1	2024	8	Parking Lot	Asphalt Placement	Asphalt Paver	Diesel	3.76	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.152	0.000	0.152
1	2024	8	Parking Lot	Asphalt Placement	Other General Equipment	Diesel	7.51	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.003	0.000	0.000	0.783	0.000	0.783
1	2024	8	Parking Lot	Asphalt Placement	Roller	Diesel	3.76	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.000	0.114
1	2024	8	Parking Lot	Asphalt Placement	Skid Steer Loader	Diesel	3.76	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.000	0.030
1	2024	8	Parking Lot	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	4.81	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.000	0.000	0.000	0.001	0.000	0.000	0.174	0.000	0.174
1	2024	8	Parking Lot	Clearing and Grubbing	Loader	Diesel	16.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.003	0.000	0.000	1.236	0.000	1.236
1	2024	8	Parking Lot	Concrete Placement	Air Compressor	Diesel	10.02	19.678	3.337	0.059	68.298	3.149	3.054	20,451.679	0.291	0.000	0.000	0.000	0.001	0.000	0.000	0.205	0.000	0.205
1	2024	8	Parking Lot	Concrete Placement	Concrete Saws	Diesel	10.02	18.000	3.136	0.047	61.961	2.263	2.195	16,603.911	0.313	0.000	0.000	0.000	0.001	0.000	0.000	0.166	0.000	0.166
1	2024	8	Parking Lot	Concrete Placement	Concrete Truck	Diesel	41.74	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.003	0.001	0.000	0.032	0.001	0.001	10.350	0.000	10.352
1	2024	8	Parking Lot	Concrete Placement	Other General Equipment	Diesel	20.04	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.003	0.000	0.000	0.007	0.000	0.000	2.087	0.000	2.088
1	2024	8	Parking Lot	Concrete Placement	Rubber Tired Loader	Diesel	10.02	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.002	0.000	0.000	0.774	0.000	0.774
1	2024	8	Parking Lot	Concrete Placement	Slip Form Paver	Diesel	10.02	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
1	2024	8	Parking Lot	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	10.02	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.001	0.000	0.000	0.002	0.000	0.000	0.361	0.000	0.362
1	2024	8	Parking Lot	Curbing	Concrete Truck	Diesel	1.90	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.471	0.000	0.471
1	2024	8	Parking Lot	Curbing	Curb/Gutter Paver	Diesel	1.90	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.077	0.000	0.077
1	2024	8	Parking Lot	Curbing	Other General Equipment	Diesel	1.90	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.198	0.000	0.198
1	2024	8	Parking Lot	Drainage - 24 inch SICPP	Dozer	Diesel	3.15	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.260	0.000	0.260
1	2024	8	Parking Lot	Drainage - 24 inch SICPP	Excavator	Diesel	3.15	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.172
1	2024	8	Parking Lot	Drainage - 24 inch SICPP	Loader	Diesel	3.15	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.243	0.000	0.243
1	2024	8	Parking Lot	Drainage - 24 inch SICPP	Other General Equipment	Diesel	3.15	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.328	0.000	0.328
1	2024	8	Parking Lot	Drainage - 24 inch SICPP	Roller	Diesel	3.15	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.000	0.096
1	2024	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	5.24	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
1	2024	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	5.24	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.002	0.000	0.000	0.546	0.000	0.547
1	2024	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	5.24	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000	0.068
1	2024	8	Parking Lot	Excavation (Borrow)	Dozer	Diesel	16.70	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.382	0.000	1.382
1	2024	8	Parking Lot	Excavation (Borrow)	Roller	Diesel	7.71	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.235	0.000	0.235
1	2024	8	Parking Lot	Excavation (Cut to Fill)	Dozer	Diesel	12.52	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.002	0.000	0.000	1.036	0.000	1.036
1	2024	8	Parking Lot	Excavation (Cut to Fill)	Excavator	Diesel	10.02	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.000	0.000	0.000	0.001	0.000	0.000	0.548	0.000	0.548
1	2024	8	Parking Lot	Excavation (Cut to Fill)	Roller	Diesel	10.02	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.305	0.000	0.305
1	2024	8	Parking Lot	Excavation (Topsoil Stripping)	Dozer	Diesel	4.71	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.390	0.000	0.390
1	2024	8	Parking Lot	Fencing	Concrete Truck	Diesel	1.06	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.262	0.000	0.262
1	2024	8	Parking Lot	Fencing	Other General Equipment	Diesel	4.22	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.440	0.000	0.440
1	2024	8	Parking Lot	Fencing	Skid Steer Loader	Diesel	4.22	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
1	2024	8	Parking Lot	Fencing	Tractors/Loader/Backhoe	Diesel	4.22	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.055
1	2024	8	Parking Lot	Grading	Dozer	Diesel	3.22	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.266	0.000	0.267
1	2024	8	Parking Lot	Grading	Grader	Diesel	3.22	15.901	2.819	0.175	43.734	3.459	3.355	64,847.731	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.209
1	2024	8	Parking Lot	Grading	Roller	Diesel	3.22	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.000	0.098
1	2024	8	Parking Lot	Hydroseeding	Hydroseeder	Diesel	2.90	16.105	3.003	0.045	55.938	2.506	2.430	15,342.721	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.045
1	2024	8	Parking Lot	Hydroseeding	Off-Road Truck	Diesel	2.90	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.002	0.000	0.000	0.719	0.000	0.719
1	2024	8	Parking Lot	Markings	Other General Equipment	Diesel	0.87	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.091

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
1	2024	8	Parking Lot	Sidewalks	Concrete Truck	Diesel	3.80	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.003	0.000	0.000	0.942	0.000	0.942
1	2024	8	Parking Lot	Sidewalks	Tractors/Loader/Backhoe	Diesel	3.80	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050
1	2024	8	Parking Lot	Sidewalks	Vibratory Compactor	Diesel	3.80	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007
1	2024	8	Parking Lot	Soil Erosion/Sediment Control	Other General Equipment	Diesel	2.67	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.278	0.000	0.278
1	2024	8	Parking Lot	Soil Erosion/Sediment Control	Pumps	Diesel	2.67	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
1	2024	8	Parking Lot	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	2.67	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035
1	2024	8	Parking Lot	Street Lighting	Loader	Diesel	1.78	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000	0.137
1	2024	8	Parking Lot	Street Lighting	Other General Equipment	Diesel	1.78	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.185	0.000	0.185
1	2024	8	Parking Lot	Street Lighting	Skid Steer Loader	Diesel	1.78	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
1	2024	8	Parking Lot	Street Lighting	Tractors/Loader/Backhoe	Diesel	1.78	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.023
1	2024	8	Parking Lot	Subbase Placement	Dozer	Diesel	6.33	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.524	0.000	0.524
1	2024	8	Parking Lot	Subbase Placement	Roller	Diesel	6.16	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.000	0.188
1	2024	8	Parking Lot	Topsoil Placement	Dozer	Diesel	7.16	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.592	0.000	0.592
1	2024	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Bulldozer	Diesel	466.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.019	0.003	0.000	0.062	0.003	0.003	38.562	0.000	38.569
1	2024	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Chain Saws	Diesel	466.00	643.852	147.019	0.011	4.041	23.414	21.540	1,804.460	3.296	0.331	0.076	0.000	0.002	0.012	0.011	0.841	0.002	0.893
1	2024	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Front Loader	Diesel	466.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.026	0.004	0.000	0.075	0.004	0.004	36.002	0.000	36.011
1	2024	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Grub the site down 2'-0	Diesel	466.00	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.077	0.011	0.000	0.159	0.011	0.011	48.550	0.001	48.567
1	2024	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Log Chipper	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,115.040	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
1	2024	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Mulcher	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,115.040	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
1	2024	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Tractor	Diesel	932.00	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.047	0.009	0.000	0.055	0.007	0.007	12.158	0.000	12.173
1	2024	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Curbing)	Bob Cat	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
1	2024	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Compacting Equipment	Diesel	279.60	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.535
1	2024	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Small Dozer	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
1	2024	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Forktruck (Hoist)	Diesel	932.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.026	0.005	0.000	0.038	0.004	0.003	6.637	0.000	6.645
1	2024	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Roller	Diesel	466.00	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.010	0.002	0.000	0.030	0.002	0.002	14.195	0.000	14.199
1	2024	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Seed Truck Spreader	Diesel	186.40	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.031	0.004	0.000	0.063	0.005	0.004	19.420	0.000	19.427
1	2024	8	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Excavator	Diesel	1,398.00	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.020	0.004	0.000	0.075	0.004	0.004	76.523	0.000	76.533
1	2024	8	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Fork Truck	Diesel	699.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.004	0.001	0.000	0.045	0.001	0.001	22.221	0.000	22.224
2	2024	2	Access Road	Asphalt Placement	Asphalt Paver	Diesel	14.54	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.587	0.000	0.588
2	2024	2	Access Road	Asphalt Placement	Other General Equipment	Diesel	29.08	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.005	0.001	0.000	0.010	0.001	0.001	3.030	0.000	3.031
2	2024	2	Access Road	Asphalt Placement	Roller	Diesel	14.54	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.443	0.000	0.443
2	2024	2	Access Road	Asphalt Placement	Skid Steer Loader	Diesel	14.54	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.001	0.000	0.000	0.001	0.000	0.000	0.116	0.000	0.116
2	2024	2	Access Road	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	18.61	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.001	0.000	0.000	0.003	0.000	0.000	0.672	0.000	0.672
2	2024	2	Access Road	Clearing and Grubbing	Loader	Diesel	77.60	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.004	0.001	0.000	0.013	0.001	0.001	5.995	0.000	5.997
2	2024	2	Access Road	Concrete Placement	Air Compressor	Diesel	38.78	19.678	3.337	0.059	68.298	3.149	3.054	20,451.740	0.291	0.001	0.000	0.000	0.003	0.000	0.000	0.793	0.000	0.793
2	2024	2	Access Road	Concrete Placement	Concrete Saws	Diesel	38.78	18.000	3.136	0.047	61.961	2.263	2.195	16,603.981	0.313	0.001	0.000	0.000	0.003	0.000	0.000	0.644	0.000	0.644
2	2024	2	Access Road	Concrete Placement	Concrete Truck	Diesel	161.58	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.011	0.003	0.000	0.122	0.002	0.002	40.067	0.000	40.074
2	2024	2	Access Road	Concrete Placement	Other General Equipment	Diesel	77.56	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.013	0.002	0.000	0.026	0.002	0.002	8.080	0.000	8.083
2	2024	2	Access Road	Concrete Placement	Rubber Tired Loader	Diesel	38.78	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.002	0.000	0.000	0.006	0.000	0.000	2.996	0.000	2.997
2	2024	2	Access Road	Concrete Placement	Slip Form Paver	Diesel	38.78	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.001	0.000	0.000	0.003	0.000	0.000	1.567	0.000	1.567
2	2024	2	Access Road	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	38.78	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.003	0.000	0.000	0.006	0.000	0.000	1.399	0.000	1.400
2	2024	2	Access Road	Curbing	Concrete Truck	Diesel	139.75	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.010	0.003	0.000	0.106	0.002	0.002	34.652	0.000	34.659
2	2024	2	Access Road	Curbing	Curb/Gutter Paver	Diesel	139.75	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.003	0.000	0.000	0.010	0.000	0.000	5.645	0.000	5.647
2	2024	2	Access Road	Curbing	Other General Equipment	Diesel	139.75	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.023	0.003	0.000	0.048	0.003	0.003	14.559	0.000	14.565
2	2024	2	Access Road	Drainage - 24 inch SICPP	Dozer	Diesel	111.90	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.004	0.001	0.000	0.015	0.001	0.001	9.260	0.000	9.262
2	2024	2	Access Road	Drainage - 24 inch SICPP	Excavator	Diesel	111.90	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.002	0.000	0.000	0.006	0.000	0.000	6.125	0.000	6.126
2	2024	2	Access Road	Drainage - 24 inch SICPP	Loader	Diesel	111.90	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.006	0.001	0.000	0.018	0.001	0.001	8.646	0.000	8.648
2	2024	2	Access Road	Drainage - 24 inch SICPP	Other General Equipment	Diesel	111.90	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.019	0.003	0.000	0.038	0.003	0.003	11.659	0.000	11.663
2	2024	2	Access Road	Drainage - 24 inch SICPP	Roller	Diesel	111.90	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.002	0.000	0.000	0.007	0.000	0.000	3.409	0.000	3.410
2	2024	2	Access Road	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	62.17	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.003	0.001	0.000	0.010	0.001	0.001	4.803	0.000	4.804
2	2024	2	Access Road	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	62.17	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.010	0.001	0.000	0.021	0.002	0.001	6.477	0.000	6.479
2	2024	2	Access Road	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	62.17	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.003	0.001	0.000	0.004	0.000	0.000	0.811	0.000	0.812
2	2024	2	Access Road	Dust Control	Water Truck	Diesel	20.00	131.002	29.931	0.180	313.278	21.589	20.942	53,953.450	1.282	0.003	0.001	0.000	0.007	0.000	0.000	1.079	0.000	1.080
2	2024	2	Access Road	Excavation (Borrow)	Dozer	Diesel	64.63	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.003	0.000	0.000	0.009	0.000	0.000	5.348	0.000	5.349
2	2024	2	Access Road	Excavation (Borrow)	Roller	Diesel	29.83	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.001	0.000	0.000	0.002	0.000	0.000	0.909	0.000	0.909
2	2024	2	Access Road	Excavation (Cut to Fill)	Dozer	Diesel	48.47	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.002	0.000	0.000	0.006	0.000	0.000	4.011	0.000	4.012
2	2024	2	Access Road	Excavation (Cut to Fill)	Excavator	Diesel	38.78	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.001	0.000	0.000	0.002	0.000	0.000	2.123	0.000	2.123
2	2024	2	Access Road	Excavation (Cut to Fill)	Roller	Diesel	38.78	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.001	0.000	0.000	0.003	0.000	0.000	1.181	0.000	1.182
2	2024	2	Access Road	Excavation (Topsoil Stripping)	Dozer	Diesel	18.25	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.510	0.000	1.510
2	2024	2	Access Road	Fencing	Concrete Truck	Diesel	38.82	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.003	0.001	0.000	0.029	0.001	0.001	9.626	0.000	9.627
2	2024	2	Access Road	Fencing	Other General Equipment	Diesel	155.27	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.026	0.004	0.000	0.053	0.004	0.004	16.177	0.000	16.183
2	2024	2	Access Road	Fencing	Skid Steer Loader	Diesel	155.27	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.007	0.001	0.000	0.008	0.001	0.001	1.239	0.000	1.240
2	2024	2	Access Road	Fencing	Tractors/Loader/Backhoe	Diesel	155.27	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.008	0.002	0.000	0.009	0.001	0.001	2.026	0.000	2.028
2	2024	2	Access Road	Grading	Dozer	Diesel	15.53	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.285	0.000	1.285
2	2024	2	Access Road	Grading	Grader	Diesel	15.53	15.901	2.819	0.175	43.734	3.459	3.355	64,847.762	0.221	0.000	0.000	0.000	0.001	0.000	0.000	1.007	0.000	1.007
2	2024	2	Access Road	Grading	Roller	Diesel	15.53	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.473	0.000	0.473
2	2024	2	Access Road	Hydroseeding	Hydroseeder	Diesel	13.99	16.105	3.003	0.045	55.938	2.506	2.430	15,342.697	0.268	0.000	0.000	0.000	0.001	0.000	0.000	0.215	0.000	0.215
2	2024	2	Access Road	Hydroseeding	Off-Road Truck	Diesel	13.99	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.001	0.000	0.000	0.011	0.000	0.000	3.469	0.000	3.469
2	2024	2	Access Road	Markings	Other General Equipment	Diesel	239.57	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.040	0.005	0.000	0.082	0.006	0.006	24.959	0.000	24.968
2	2024	2	Access Road	Sidewalks	Concrete Truck	Diesel	279.49	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.019	0.005	0.000	0.212	0.004	0.004	69.304	0.000	69.317
2	2024	2	Access Road	Sidewalks	Tractors/Loader/Backhoe	Diesel	279.49	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.014	0.003	0.000	0.017	0.002	0.002	3.646	0.000	3.650

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
2	2024	2	Access Road	Sidewalks	Vibratory Compactor	Diesel	279.49	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.534
2	2024	2	Access Road	Soil Erosion/Sediment Control	Other General Equipment	Diesel	12.93	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.002	0.000	0.000	0.004	0.000	0.000	1.347	0.000	1.348
2	2024	2	Access Road	Soil Erosion/Sediment Control	Pumps	Diesel	12.93	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.000	0.000	0.000	0.001	0.000	0.000	0.167	0.000	0.167
2	2024	2	Access Road	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	12.93	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.001	0.000	0.000	0.001	0.000	0.000	0.169	0.000	0.169
2	2024	2	Access Road	Street Lighting	Loader	Diesel	93.16	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.005	0.001	0.000	0.015	0.001	0.001	7.197	0.000	7.199
2	2024	2	Access Road	Street Lighting	Other General Equipment	Diesel	93.16	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.015	0.002	0.000	0.032	0.002	0.002	9.705	0.000	9.709
2	2024	2	Access Road	Street Lighting	Skid Steer Loader	Diesel	93.16	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.004	0.001	0.000	0.005	0.001	0.001	0.743	0.000	0.744
2	2024	2	Access Road	Street Lighting	Tractors/Loader/Backhoe	Diesel	93.16	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.005	0.001	0.000	0.006	0.001	0.001	1.215	0.000	1.217
2	2024	2	Access Road	Subbase Placement	Dozer	Diesel	24.49	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.003	0.000	0.000	2.027	0.000	2.027
2	2024	2	Access Road	Subbase Placement	Roller	Diesel	23.86	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.002	0.000	0.000	0.727	0.000	0.727
2	2024	2	Access Road	Topsoil Placement	Dozer	Diesel	34.50	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.005	0.000	0.000	2.855	0.000	2.856
2	2024	2	Building - 30000 sqft- 3 stories	Concrete Foundations	Excavator	Diesel	1,200.38	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.018	0.003	0.000	0.065	0.003	0.003	65.706	0.000	65.714
2	2024	2	Building - 30000 sqft- 3 stories	Concrete Foundations	Fork Truck	Diesel	1,200.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.007	0.002	0.000	0.078	0.001	0.001	38.159	0.000	38.166
2	2024	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Fork Truck	Diesel	2,250.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.014	0.003	0.000	0.146	0.002	0.002	71.526	0.000	71.538
2	2024	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Generator	Diesel	1,125.00	26.711	6.226	0.039	69.489	4.462	4.328	12,115.425	0.344	0.033	0.008	0.000	0.086	0.006	0.005	13.630	0.000	13.643
2	2024	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Man Lift	Diesel	2,250.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.062	0.013	0.000	0.092	0.009	0.008	16.023	0.001	16.042
2	2024	2	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Fork Truck	Diesel	9,000.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.055	0.012	0.001	0.583	0.008	0.008	286.103	0.001	286.152
2	2024	2	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Man Lift	Diesel	9,000.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.250	0.051	0.000	0.368	0.034	0.033	64.093	0.002	64.168
2	2024	2	Building - 30000 sqft- 3 stories	Roofing	High Lift	Diesel	450.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.012	0.003	0.000	0.018	0.002	0.002	3.205	0.000	3.208
2	2024	2	Building - 30000 sqft- 3 stories	Roofing	Man Lift (Fascia Construction)	Diesel	90.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.002	0.001	0.000	0.004	0.000	0.000	0.641	0.000	0.642
2	2024	2	Building - 30000 sqft- 3 stories	Security & Safety Systems	High Lift	Diesel	3,000.38	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.083	0.017	0.000	0.123	0.011	0.011	21.367	0.001	21.392
2	2024	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	90 Ton Crane	Diesel	60.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.002	0.000	0.000	0.002	0.000	0.000	0.427	0.000	0.428
2	2024	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Pump	Diesel	45.00	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.001	0.000	0.000	0.004	0.000	0.000	0.580	0.000	0.580
2	2024	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Truck	Diesel	90.00	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.006	0.002	0.000	0.068	0.001	0.001	22.317	0.000	22.321
2	2024	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Fork Truck	Diesel	300.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.002	0.000	0.000	0.019	0.000	0.000	9.549	0.000	9.550
2	2024	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Laser Screed	Diesel	135.00	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.022	0.003	0.000	0.046	0.003	0.003	14.065	0.000	14.070
2	2024	2	Parking Lot	Asphalt Placement	Asphalt Paver	Diesel	3.76	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.152	0.000	0.152
2	2024	2	Parking Lot	Asphalt Placement	Other General Equipment	Diesel	7.51	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.003	0.000	0.000	0.783	0.000	0.783
2	2024	2	Parking Lot	Asphalt Placement	Roller	Diesel	3.76	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.000	0.114
2	2024	2	Parking Lot	Asphalt Placement	Skid Steer Loader	Diesel	3.76	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.000	0.030
2	2024	2	Parking Lot	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	4.81	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.000	0.000	0.000	0.001	0.000	0.000	0.174	0.000	0.174
2	2024	2	Parking Lot	Clearing and Grubbing	Loader	Diesel	16.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.003	0.000	0.000	1.236	0.000	1.236
2	2024	2	Parking Lot	Concrete Placement	Air Compressor	Diesel	10.02	19.678	3.337	0.059	68.298	3.149	3.054	20,451.740	0.291	0.000	0.000	0.000	0.001	0.000	0.000	0.205	0.000	0.205
2	2024	2	Parking Lot	Concrete Placement	Concrete Saws	Diesel	10.02	18.000	3.136	0.047	61.961	2.263	2.195	16,603.981	0.313	0.000	0.000	0.000	0.001	0.000	0.000	0.166	0.000	0.166
2	2024	2	Parking Lot	Concrete Placement	Concrete Truck	Diesel	41.74	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.003	0.001	0.000	0.032	0.001	0.001	10.350	0.000	10.352
2	2024	2	Parking Lot	Concrete Placement	Other General Equipment	Diesel	20.04	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.003	0.000	0.000	0.007	0.000	0.000	2.087	0.000	2.088
2	2024	2	Parking Lot	Concrete Placement	Rubber Tired Loader	Diesel	10.02	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.001	0.000	0.000	0.002	0.000	0.000	0.774	0.000	0.774
2	2024	2	Parking Lot	Concrete Placement	Slip Form Paver	Diesel	10.02	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
2	2024	2	Parking Lot	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	10.02	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.001	0.000	0.000	0.002	0.000	0.000	0.361	0.000	0.362
2	2024	2	Parking Lot	Curbing	Concrete Truck	Diesel	1.90	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.471	0.000	0.471
2	2024	2	Parking Lot	Curbing	Curb/Gutter Paver	Diesel	1.90	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.077	0.000	0.077
2	2024	2	Parking Lot	Curbing	Other General Equipment	Diesel	1.90	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.198	0.000	0.198
2	2024	2	Parking Lot	Drainage - 24 inch SICPP	Dozer	Diesel	3.15	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.260	0.000	0.260
2	2024	2	Parking Lot	Drainage - 24 inch SICPP	Excavator	Diesel	3.15	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.172
2	2024	2	Parking Lot	Drainage - 24 inch SICPP	Loader	Diesel	3.15	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.243	0.000	0.243
2	2024	2	Parking Lot	Drainage - 24 inch SICPP	Other General Equipment	Diesel	3.15	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.328	0.000	0.328
2	2024	2	Parking Lot	Drainage - 24 inch SICPP	Roller	Diesel	3.15	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.000	0.096
2	2024	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	5.24	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
2	2024	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	5.24	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.002	0.000	0.000	0.546	0.000	0.547
2	2024	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	5.24	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000	0.068
2	2024	2	Parking Lot	Excavation (Borrow)	Dozer	Diesel	16.70	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.382	0.000	1.382
2	2024	2	Parking Lot	Excavation (Borrow)	Roller	Diesel	7.71	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.235	0.000	0.235
2	2024	2	Parking Lot	Excavation (Cut to Fill)	Dozer	Diesel	12.52	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.002	0.000	0.000	1.036	0.000	1.036
2	2024	2	Parking Lot	Excavation (Cut to Fill)	Excavator	Diesel	10.02	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.000	0.000	0.000	0.001	0.000	0.000	0.548	0.000	0.548
2	2024	2	Parking Lot	Excavation (Cut to Fill)	Roller	Diesel	10.02	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.305	0.000	0.305
2	2024	2	Parking Lot	Excavation (Topsoil Stripping)	Dozer	Diesel	4.71	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.390	0.000	0.390
2	2024	2	Parking Lot	Fencing	Concrete Truck	Diesel	1.06	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.262	0.000	0.262
2	2024	2	Parking Lot	Fencing	Other General Equipment	Diesel	4.22	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.440	0.000	0.440
2	2024	2	Parking Lot	Fencing	Skid Steer Loader	Diesel	4.22	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
2	2024	2	Parking Lot	Fencing	Tractors/Loader/Backhoe	Diesel	4.22	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.055
2	2024	2	Parking Lot	Grading	Dozer	Diesel	3.22	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.266	0.000	0.267
2	2024	2	Parking Lot	Grading	Grader	Diesel	3.22	15.901	2.819	0.175	43.734	3.459	3.355	64,847.762	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.209
2	2024	2	Parking Lot	Grading	Roller	Diesel	3.22	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.000	0.098
2	2024	2	Parking Lot	Hydroseeding	Hydroseeder	Diesel	2.90	16.105	3.003	0.045	55.938	2.506	2.430	15,342.697	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.045
2	2024	2	Parking Lot	Hydroseeding	Off-Road Truck	Diesel	2.90	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.002	0.000	0.000	0.719	0.000	0.719
2	2024	2	Parking Lot	Markings	Other General Equipment	Diesel	0.87	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.091
2	2024	2	Parking Lot	Sidewalks	Concrete Truck	Diesel	3.80	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.003	0.000	0.000	0.942	0.000	0.942
2	2024	2	Parking Lot	Sidewalks	Tractors/Loader/Backhoe	Diesel	3.80	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050
2	2024	2	Parking Lot	Sidewalks	Vibratory Compactor	Diesel	3.80	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007
2	2024	2	Parking Lot	Soil Erosion/Sediment Control	Other General Equipment	Diesel	2.67	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.278	0.000	0.278
2	2024	2	Parking Lot	Soil Erosion/Sediment Control	Pumps	Diesel	2.67	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
2	2024	2	Parking Lot	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	2.67	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035
2	2024	2	Parking Lot	Street Lighting	Loader	Diesel	1.78	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000	0.137
2	2024	2	Parking Lot	Street Lighting	Other General Equipment	Diesel	1.78	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.185	0.000	0.185
2	2024	2	Parking Lot	Street Lighting	Skid Steer Loader	Diesel	1.78	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
2	2024	2	Parking Lot	Street Lighting	Tractors/Loader/Backhoe	Diesel	1.78	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.023
2	2024	2	Parking Lot	Subbase Placement	Dozer	Diesel	6.33	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.524	0.000	0.524
2	2024	2	Parking Lot	Subbase Placement	Roller	Diesel	6.16	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.000	0.188
2	2024	2	Parking Lot	Topsoil Placement	Dozer	Diesel	7.16	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.592	0.000	0.592
2	2024	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Bulldozer	Diesel	466.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.019	0.003	0.000	0.062	0.003	0.003	38.562	0.000	38.569
2	2024	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Chain Saws	Diesel	466.00	643.853	147.018	0.011	4.041	23.414	21.541	1,804.463	3.296	0.331	0.076	0.000	0.002	0.012	0.011	0.841	0.002	0.893
2	2024	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Front Loader	Diesel	466.00	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.026	0.004	0.000	0.075	0.004	0.004	36.002	0.000	36.011
2	2024	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Grub the site down 2'-0	Diesel	466.00	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.077	0.011	0.000	0.159	0.011	0.011	48.550	0.001	48.567
2	2024	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Log Chipper	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,114.971	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
2	2024	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Mulcher	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,114.971	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
2	2024	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Tractor	Diesel	932.00	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.047	0.009	0.000	0.055	0.007	0.007	12.158	0.000	12.173
2	2024	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Curbing)	Bob Cat	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
2	2024	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Compacting Equipment	Diesel	279.60	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.535
2	2024	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Small Dozer	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
2	2024	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Forktruck (Hoist)	Diesel	932.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.026	0.005	0.000	0.038	0.004	0.003	6.637	0.000	6.645
2	2024	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Roller	Diesel	466.00	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.010	0.002	0.000	0.030	0.002	0.002	14.195	0.000	14.199
2	2024	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Seed Truck Spreader	Diesel	186.40	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.031	0.004	0.000	0.063	0.005	0.004	19.420	0.000	19.427
2	2024	2	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Excavator	Diesel	1,398.00	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.020	0.004	0.000	0.075	0.004	0.004	76.523	0.000	76.533
2	2024	2	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Fork Truck	Diesel	699.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.004	0.001	0.000	0.045	0.001	0.001	22.221	0.000	22.224
2024 ESTIMATED CONSTRUCTION EMISSIONS - NONROAD SOURCES																**3.088**	**0.604**	**0.008**	**7.030**	**0.393**	**0.380**	**2,578.095**	**0.028**	**2,579.058**
1	2025	8	Access Road	Asphalt Placement	Asphalt Paver	Diesel	14.54	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.587	0.000	0.588
1	2025	8	Access Road	Asphalt Placement	Other General Equipment	Diesel	29.08	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.005	0.001	0.000	0.010	0.001	0.001	3.030	0.000	3.031
1	2025	8	Access Road	Asphalt Placement	Roller	Diesel	14.54	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.443	0.000	0.443
1	2025	8	Access Road	Asphalt Placement	Skid Steer Loader	Diesel	14.54	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.001	0.000	0.000	0.001	0.000	0.000	0.116	0.000	0.116
1	2025	8	Access Road	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	18.61	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.001	0.000	0.000	0.003	0.000	0.000	0.672	0.000	0.672
1	2025	8	Access Road	Clearing and Grubbing	Loader	Diesel	77.60	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.004	0.001	0.000	0.013	0.001	0.001	5.995	0.000	5.997
1	2025	8	Access Road	Curbing	Concrete Truck	Diesel	139.75	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.010	0.003	0.000	0.106	0.002	0.002	34.652	0.000	34.659
1	2025	8	Access Road	Curbing	Curb/Gutter Paver	Diesel	139.75	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.003	0.000	0.000	0.010	0.000	0.000	5.645	0.000	5.647
1	2025	8	Access Road	Curbing	Other General Equipment	Diesel	139.75	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.023	0.003	0.000	0.048	0.003	0.003	14.559	0.000	14.565
1	2025	8	Access Road	Drainage - 24 inch SICPP	Dozer	Diesel	111.90	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.004	0.001	0.000	0.015	0.001	0.001	9.260	0.000	9.262
1	2025	8	Access Road	Drainage - 24 inch SICPP	Excavator	Diesel	111.90	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.002	0.000	0.000	0.006	0.000	0.000	6.125	0.000	6.126
1	2025	8	Access Road	Drainage - 24 inch SICPP	Loader	Diesel	111.90	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.006	0.001	0.000	0.018	0.001	0.001	8.646	0.000	8.648
1	2025	8	Access Road	Drainage - 24 inch SICPP	Other General Equipment	Diesel	111.90	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.019	0.003	0.000	0.038	0.003	0.003	11.659	0.000	11.663
1	2025	8	Access Road	Drainage - 24 inch SICPP	Roller	Diesel	111.90	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.002	0.000	0.000	0.007	0.000	0.000	3.409	0.000	3.410
1	2025	8	Access Road	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	62.17	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.003	0.001	0.000	0.010	0.001	0.001	4.803	0.000	4.804
1	2025	8	Access Road	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	62.17	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.010	0.001	0.000	0.021	0.002	0.001	6.477	0.000	6.479
1	2025	8	Access Road	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	62.17	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.003	0.001	0.000	0.004	0.000	0.000	0.811	0.000	0.812
1	2025	8	Access Road	Dust Control	Water Truck	Diesel	20.00	131.001	29.931	0.180	313.278	21.589	20.942	53,953.387	1.282	0.003	0.001	0.000	0.007	0.000	0.000	1.079	0.000	1.080
1	2025	8	Access Road	Excavation (Borrow)	Dozer	Diesel	64.63	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.003	0.000	0.000	0.009	0.000	0.000	5.348	0.000	5.349
1	2025	8	Access Road	Excavation (Borrow)	Roller	Diesel	29.83	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.001	0.000	0.000	0.002	0.000	0.000	0.909	0.000	0.909
1	2025	8	Access Road	Excavation (Cut to Fill)	Dozer	Diesel	48.47	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.002	0.000	0.000	0.006	0.000	0.000	4.011	0.000	4.012
1	2025	8	Access Road	Excavation (Cut to Fill)	Excavator	Diesel	38.78	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.001	0.000	0.000	0.002	0.000	0.000	2.123	0.000	2.123
1	2025	8	Access Road	Excavation (Cut to Fill)	Roller	Diesel	38.78	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.001	0.000	0.000	0.003	0.000	0.000	1.181	0.000	1.182
1	2025	8	Access Road	Excavation (Topsoil Stripping)	Dozer	Diesel	18.25	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.510	0.000	1.510
1	2025	8	Access Road	Fencing	Concrete Truck	Diesel	38.82	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.003	0.001	0.000	0.029	0.001	0.001	9.626	0.000	9.627
1	2025	8	Access Road	Fencing	Other General Equipment	Diesel	155.27	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.026	0.004	0.000	0.053	0.004	0.004	16.177	0.000	16.183
1	2025	8	Access Road	Fencing	Skid Steer Loader	Diesel	155.27	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.007	0.001	0.000	0.008	0.001	0.001	1.239	0.000	1.240
1	2025	8	Access Road	Fencing	Tractors/Loader/Backhoe	Diesel	155.27	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.008	0.002	0.000	0.009	0.001	0.001	2.026	0.000	2.028
1	2025	8	Access Road	Grading	Dozer	Diesel	15.53	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.285	0.000	1.285
1	2025	8	Access Road	Grading	Grader	Diesel	15.53	15.901	2.819	0.175	43.734	3.459	3.355	64,847.731	0.221	0.000	0.000	0.000	0.001	0.000	0.000	1.007	0.000	1.007
1	2025	8	Access Road	Grading	Roller	Diesel	15.53	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.473	0.000	0.473
1	2025	8	Access Road	Hydroseeding	Hydroseeder	Diesel	13.99	16.105	3.003	0.045	55.938	2.506	2.430	15,342.721	0.268	0.000	0.000	0.000	0.001	0.000	0.000	0.215	0.000	0.215
1	2025	8	Access Road	Hydroseeding	Off-Road Truck	Diesel	13.99	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.001	0.000	0.000	0.011	0.000	0.000	3.469	0.000	3.469
1	2025	8	Access Road	Markings	Other General Equipment	Diesel	239.57	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.040	0.005	0.000	0.082	0.006	0.006	24.959	0.000	24.968
1	2025	8	Access Road	Sidewalks	Concrete Truck	Diesel	279.49	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.019	0.005	0.000	0.212	0.004	0.004	69.304	0.000	69.317
1	2025	8	Access Road	Sidewalks	Tractors/Loader/Backhoe	Diesel	279.49	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.014	0.003	0.000	0.017	0.002	0.002	3.646	0.000	3.650
1	2025	8	Access Road	Sidewalks	Vibratory Compactor	Diesel	279.49	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.534
1	2025	8	Access Road	Soil Erosion/Sediment Control	Other General Equipment	Diesel	12.93	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.002	0.000	0.000	0.004	0.000	0.000	1.347	0.000	1.348
1	2025	8	Access Road	Soil Erosion/Sediment Control	Pumps	Diesel	12.93	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.000	0.000	0.000	0.001	0.000	0.000	0.167	0.000	0.167
1	2025	8	Access Road	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	12.93	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.001	0.000	0.000	0.001	0.000	0.000	0.169	0.000	0.169
1	2025	8	Access Road	Street Lighting	Loader	Diesel	93.16	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.005	0.001	0.000	0.015	0.001	0.001	7.197	0.000	7.199
1	2025	8	Access Road	Street Lighting	Other General Equipment	Diesel	93.16	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.015	0.002	0.000	0.032	0.002	0.002	9.705	0.000	9.709
1	2025	8	Access Road	Street Lighting	Skid Steer Loader	Diesel	93.16	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.004	0.001	0.000	0.005	0.001	0.001	0.743	0.000	0.744
1	2025	8	Access Road	Street Lighting	Tractors/Loader/Backhoe	Diesel	93.16	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.005	0.001	0.000	0.006	0.001	0.001	1.215	0.000	1.217
1	2025	8	Access Road	Subbase Placement	Dozer	Diesel	24.49	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.003	0.000	0.000	2.027	0.000	2.027
1	2025	8	Access Road	Subbase Placement	Roller	Diesel	23.86	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.002	0.000	0.000	0.727	0.000	0.727
1	2025	8	Access Road	Topsoil Placement	Dozer	Diesel	34.50	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.005	0.000	0.000	2.855	0.000	2.856

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
1	2025	8	Building - 30000 sqft- 3 stories	Concrete Foundations	Excavator	Diesel	1,200.38	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.018	0.003	0.000	0.065	0.003	0.003	65.706	0.000	65.714
1	2025	8	Building - 30000 sqft- 3 stories	Concrete Foundations	Fork Truck	Diesel	1,200.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.007	0.002	0.000	0.078	0.001	0.001	38.159	0.000	38.166
1	2025	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Fork Truck	Diesel	2,250.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.014	0.003	0.000	0.146	0.002	0.002	71.526	0.000	71.538
1	2025	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Generator	Diesel	1,125.00	26.711	6.226	0.039	69.489	4.462	4.328	12,115.435	0.344	0.033	0.008	0.000	0.086	0.006	0.005	13.630	0.000	13.643
1	2025	8	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Man Lift	Diesel	2,250.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.062	0.013	0.000	0.092	0.009	0.008	16.023	0.001	16.042
1	2025	8	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Fork Truck	Diesel	9,000.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.055	0.012	0.001	0.583	0.008	0.008	286.103	0.001	286.152
1	2025	8	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Man Lift	Diesel	9,000.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.250	0.051	0.000	0.368	0.034	0.033	64.093	0.002	64.168
1	2025	8	Building - 30000 sqft- 3 stories	Roofing	High Lift	Diesel	450.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.012	0.003	0.000	0.018	0.002	0.002	3.205	0.000	3.208
1	2025	8	Building - 30000 sqft- 3 stories	Roofing	Man Lift (Fascia Construction)	Diesel	90.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.002	0.001	0.000	0.004	0.000	0.000	0.641	0.000	0.642
1	2025	8	Building - 30000 sqft- 3 stories	Security & Safety Systems	High Lift	Diesel	3,000.38	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.083	0.017	0.000	0.123	0.011	0.011	21.367	0.001	21.392
1	2025	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	90 Ton Crane	Diesel	60.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.002	0.000	0.000	0.002	0.000	0.000	0.427	0.000	0.428
1	2025	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Pump	Diesel	45.00	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.001	0.000	0.000	0.004	0.000	0.000	0.580	0.000	0.580
1	2025	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Truck	Diesel	90.00	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.006	0.002	0.000	0.068	0.001	0.001	22.317	0.000	22.321
1	2025	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Fork Truck	Diesel	300.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.002	0.000	0.000	0.019	0.000	0.000	9.549	0.000	9.550
1	2025	8	Building - 30000 sqft- 3 stories	Wood Truss Frame	Laser Screed	Diesel	135.00	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.022	0.003	0.000	0.046	0.003	0.003	14.065	0.000	14.070
1	2025	8	Parking Lot	Asphalt Placement	Asphalt Paver	Diesel	3.76	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.152	0.000	0.152
1	2025	8	Parking Lot	Asphalt Placement	Other General Equipment	Diesel	7.51	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.003	0.000	0.000	0.783	0.000	0.783
1	2025	8	Parking Lot	Asphalt Placement	Roller	Diesel	3.76	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.000	0.114
1	2025	8	Parking Lot	Asphalt Placement	Skid Steer Loader	Diesel	3.76	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.000	0.030
1	2025	8	Parking Lot	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	4.81	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.000	0.000	0.000	0.001	0.000	0.000	0.174	0.000	0.174
1	2025	8	Parking Lot	Clearing and Grubbing	Loader	Diesel	16.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.003	0.000	0.000	1.236	0.000	1.236
1	2025	8	Parking Lot	Concrete Placement	Air Compressor	Diesel	10.02	19.678	3.337	0.059	68.298	3.149	3.054	20,451.679	0.291	0.000	0.000	0.000	0.001	0.000	0.000	0.205	0.000	0.205
1	2025	8	Parking Lot	Concrete Placement	Concrete Saws	Diesel	10.02	18.000	3.136	0.047	61.961	2.263	2.195	16,603.911	0.313	0.000	0.000	0.000	0.001	0.000	0.000	0.166	0.000	0.166
1	2025	8	Parking Lot	Concrete Placement	Concrete Truck	Diesel	41.74	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.003	0.001	0.000	0.032	0.001	0.001	10.350	0.000	10.352
1	2025	8	Parking Lot	Concrete Placement	Other General Equipment	Diesel	20.04	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.003	0.000	0.000	0.007	0.000	0.000	2.087	0.000	2.088
1	2025	8	Parking Lot	Concrete Placement	Rubber Tired Loader	Diesel	10.02	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.002	0.000	0.000	0.774	0.000	0.774
1	2025	8	Parking Lot	Concrete Placement	Slip Form Paver	Diesel	10.02	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
1	2025	8	Parking Lot	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	10.02	60.098	9.031	0.109	140.424	8.428	8.175	36,082.326	0.518	0.001	0.000	0.000	0.002	0.000	0.000	0.361	0.000	0.362
1	2025	8	Parking Lot	Curbing	Concrete Truck	Diesel	1.90	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.471	0.000	0.471
1	2025	8	Parking Lot	Curbing	Curb/Gutter Paver	Diesel	1.90	17.953	2.956	0.111	62.320	3.228	3.131	40,397.319	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.077	0.000	0.077
1	2025	8	Parking Lot	Curbing	Other General Equipment	Diesel	1.90	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.198	0.000	0.198
1	2025	8	Parking Lot	Drainage - 24 inch SICPP	Dozer	Diesel	3.15	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.260	0.000	0.260
1	2025	8	Parking Lot	Drainage - 24 inch SICPP	Excavator	Diesel	3.15	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.172
1	2025	8	Parking Lot	Drainage - 24 inch SICPP	Loader	Diesel	3.15	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.243	0.000	0.243
1	2025	8	Parking Lot	Drainage - 24 inch SICPP	Other General Equipment	Diesel	3.15	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.328	0.000	0.328
1	2025	8	Parking Lot	Drainage - 24 inch SICPP	Roller	Diesel	3.15	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.000	0.096
1	2025	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	5.24	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
1	2025	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	5.24	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.002	0.000	0.000	0.546	0.000	0.547
1	2025	8	Parking Lot	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	5.24	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000	0.068
1	2025	8	Parking Lot	Excavation (Borrow)	Dozer	Diesel	16.70	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.382	0.000	1.382
1	2025	8	Parking Lot	Excavation (Borrow)	Roller	Diesel	7.71	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.235	0.000	0.235
1	2025	8	Parking Lot	Excavation (Cut to Fill)	Dozer	Diesel	12.52	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.002	0.000	0.000	1.036	0.000	1.036
1	2025	8	Parking Lot	Excavation (Cut to Fill)	Excavator	Diesel	10.02	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.000	0.000	0.000	0.001	0.000	0.000	0.548	0.000	0.548
1	2025	8	Parking Lot	Excavation (Cut to Fill)	Roller	Diesel	10.02	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.305	0.000	0.305
1	2025	8	Parking Lot	Excavation (Topsoil Stripping)	Dozer	Diesel	4.71	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.390	0.000	0.390
1	2025	8	Parking Lot	Fencing	Concrete Truck	Diesel	1.06	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.262	0.000	0.262
1	2025	8	Parking Lot	Fencing	Other General Equipment	Diesel	4.22	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.440	0.000	0.440
1	2025	8	Parking Lot	Fencing	Skid Steer Loader	Diesel	4.22	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
1	2025	8	Parking Lot	Fencing	Tractors/Loader/Backhoe	Diesel	4.22	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.055
1	2025	8	Parking Lot	Grading	Dozer	Diesel	3.22	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.266	0.000	0.267
1	2025	8	Parking Lot	Grading	Grader	Diesel	3.22	15.901	2.819	0.175	43.734	3.459	3.355	64,847.731	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.209
1	2025	8	Parking Lot	Grading	Roller	Diesel	3.22	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.000	0.098
1	2025	8	Parking Lot	Hydroseeding	Hydroseeder	Diesel	2.90	16.105	3.003	0.045	55.938	2.506	2.430	15,342.721	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.045
1	2025	8	Parking Lot	Hydroseeding	Off-Road Truck	Diesel	2.90	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.002	0.000	0.000	0.719	0.000	0.719
1	2025	8	Parking Lot	Markings	Other General Equipment	Diesel	0.87	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.091
1	2025	8	Parking Lot	Sidewalks	Concrete Truck	Diesel	3.80	62.149	16.306	0.668	687.282	12.638	12.259	247,964.250	1.383	0.000	0.000	0.000	0.003	0.000	0.000	0.942	0.000	0.942
1	2025	8	Parking Lot	Sidewalks	Tractors/Loader/Backhoe	Diesel	3.80	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050
1	2025	8	Parking Lot	Sidewalks	Vibratory Compactor	Diesel	3.80	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007
1	2025	8	Parking Lot	Soil Erosion/Sediment Control	Other General Equipment	Diesel	2.67	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.278	0.000	0.278
1	2025	8	Parking Lot	Soil Erosion/Sediment Control	Pumps	Diesel	2.67	29.616	6.780	0.042	74.070	5.043	4.891	12,880.469	0.365	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
1	2025	8	Parking Lot	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	2.67	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035
1	2025	8	Parking Lot	Street Lighting	Loader	Diesel	1.78	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000	0.137
1	2025	8	Parking Lot	Street Lighting	Other General Equipment	Diesel	1.78	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.185	0.000	0.185
1	2025	8	Parking Lot	Street Lighting	Skid Steer Loader	Diesel	1.78	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
1	2025	8	Parking Lot	Street Lighting	Tractors/Loader/Backhoe	Diesel	1.78	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.023
1	2025	8	Parking Lot	Subbase Placement	Dozer	Diesel	6.33	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.524	0.000	0.524
1	2025	8	Parking Lot	Subbase Placement	Roller	Diesel	6.16	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.000	0.188
1	2025	8	Parking Lot	Topsoil Placement	Dozer	Diesel	7.16	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.592	0.000	0.592
1	2025	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Bulldozer	Diesel	466.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.426	0.435	0.019	0.003	0.000	0.062	0.003	0.003	38.562	0.000	38.569
1	2025	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Chain Saws	Diesel	466.00	643.852	147.019	0.011	4.041	23.414	21.540	1,804.460	3.296	0.331	0.076	0.000	0.002	0.012	0.011	0.841	0.002	0.893
1	2025	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Front Loader	Diesel	466.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.026	0.004	0.000	0.075	0.004	0.004	36.002	0.000	36.011

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
1	2025	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Grub the site down 2'-0	Diesel	466.00	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.077	0.011	0.000	0.159	0.011	0.011	48.550	0.001	48.567
1	2025	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Log Chipper	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,115.040	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
1	2025	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Mulcher	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,115.040	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
1	2025	8	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Tractor	Diesel	932.00	46.121	8.928	0.040	53.733	6.926	6.718	13,045.503	0.455	0.047	0.009	0.000	0.055	0.007	0.007	12.158	0.000	12.173
1	2025	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Curbing)	Bob Cat	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
1	2025	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Compacting Equipment	Diesel	279.60	7.270	2.168	0.007	13.252	0.768	0.745	1,905.924	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.535
1	2025	8	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Small Dozer	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.743	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
1	2025	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Forktruck (Hoist)	Diesel	932.00	25.196	5.094	0.023	37.070	3.448	3.344	7,121.446	0.245	0.026	0.005	0.000	0.038	0.004	0.003	6.637	0.000	6.645
1	2025	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Roller	Diesel	466.00	18.905	3.116	0.085	58.948	3.032	2.941	30,460.509	0.283	0.010	0.002	0.000	0.030	0.002	0.002	14.195	0.000	14.199
1	2025	8	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Seed Truck Spreader	Diesel	186.40	150.013	20.590	0.314	308.948	22.340	21.670	104,184.134	1.111	0.031	0.004	0.000	0.063	0.005	0.004	19.420	0.000	19.427
1	2025	8	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Excavator	Diesel	1,398.00	13.255	2.409	0.147	48.947	2.633	2.554	54,737.498	0.199	0.020	0.004	0.000	0.075	0.004	0.004	76.523	0.000	76.533
1	2025	8	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Fork Truck	Diesel	699.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.186	0.161	0.004	0.001	0.000	0.045	0.001	0.001	22.221	0.000	22.224
2	2025	2	Access Road	Asphalt Placement	Asphalt Paver	Diesel	14.54	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.587	0.000	0.588
2	2025	2	Access Road	Asphalt Placement	Other General Equipment	Diesel	29.08	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.005	0.001	0.000	0.010	0.001	0.001	3.030	0.000	3.031
2	2025	2	Access Road	Asphalt Placement	Roller	Diesel	14.54	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.443	0.000	0.443
2	2025	2	Access Road	Asphalt Placement	Skid Steer Loader	Diesel	14.54	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.001	0.000	0.000	0.001	0.000	0.000	0.116	0.000	0.116
2	2025	2	Access Road	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	18.61	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.001	0.000	0.000	0.003	0.000	0.000	0.672	0.000	0.672
2	2025	2	Access Road	Clearing and Grubbing	Loader	Diesel	77.60	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.004	0.001	0.000	0.013	0.001	0.001	5.995	0.000	5.997
2	2025	2	Access Road	Concrete Placement	Air Compressor	Diesel	38.78	19.678	3.337	0.059	68.298	3.149	3.054	20,451.740	0.291	0.001	0.000	0.000	0.003	0.000	0.000	0.793	0.000	0.793
2	2025	2	Access Road	Concrete Placement	Concrete Saws	Diesel	38.78	18.000	3.136	0.047	61.961	2.263	2.195	16,603.981	0.313	0.001	0.000	0.000	0.003	0.000	0.000	0.644	0.000	0.644
2	2025	2	Access Road	Concrete Placement	Concrete Truck	Diesel	161.58	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.011	0.003	0.000	0.122	0.002	0.002	40.067	0.000	40.074
2	2025	2	Access Road	Concrete Placement	Other General Equipment	Diesel	77.56	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.013	0.002	0.000	0.026	0.002	0.002	8.080	0.000	8.083
2	2025	2	Access Road	Concrete Placement	Rubber Tired Loader	Diesel	38.78	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.002	0.000	0.000	0.006	0.000	0.000	2.996	0.000	2.997
2	2025	2	Access Road	Concrete Placement	Slip Form Paver	Diesel	38.78	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.001	0.000	0.000	0.003	0.000	0.000	1.567	0.000	1.567
2	2025	2	Access Road	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	38.78	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.003	0.000	0.000	0.006	0.000	0.000	1.399	0.000	1.400
2	2025	2	Access Road	Curbing	Concrete Truck	Diesel	139.75	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.010	0.003	0.000	0.106	0.002	0.002	34.652	0.000	34.659
2	2025	2	Access Road	Curbing	Curb/Gutter Paver	Diesel	139.75	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.003	0.000	0.000	0.010	0.000	0.000	5.645	0.000	5.647
2	2025	2	Access Road	Curbing	Other General Equipment	Diesel	139.75	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.023	0.003	0.000	0.048	0.003	0.003	14.559	0.000	14.565
2	2025	2	Access Road	Drainage - 24 inch SICPP	Dozer	Diesel	111.90	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.004	0.001	0.000	0.015	0.001	0.001	9.260	0.000	9.262
2	2025	2	Access Road	Drainage - 24 inch SICPP	Excavator	Diesel	111.90	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.002	0.000	0.000	0.006	0.000	0.000	6.125	0.000	6.126
2	2025	2	Access Road	Drainage - 24 inch SICPP	Loader	Diesel	111.90	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.006	0.001	0.000	0.018	0.001	0.001	8.646	0.000	8.648
2	2025	2	Access Road	Drainage - 24 inch SICPP	Other General Equipment	Diesel	111.90	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.019	0.003	0.000	0.038	0.003	0.003	11.659	0.000	11.663
2	2025	2	Access Road	Drainage - 24 inch SICPP	Roller	Diesel	111.90	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.002	0.000	0.000	0.007	0.000	0.000	3.409	0.000	3.410
2	2025	2	Access Road	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	62.17	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.003	0.001	0.000	0.010	0.001	0.001	4.803	0.000	4.804
2	2025	2	Access Road	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	62.17	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.010	0.001	0.000	0.021	0.002	0.001	6.477	0.000	6.479
2	2025	2	Access Road	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	62.17	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.003	0.001	0.000	0.004	0.000	0.000	0.811	0.000	0.812
2	2025	2	Access Road	Dust Control	Water Truck	Diesel	20.00	131.002	29.931	0.180	313.278	21.589	20.942	53,953.450	1.282	0.003	0.001	0.000	0.007	0.000	0.000	1.079	0.000	1.080
2	2025	2	Access Road	Excavation (Borrow)	Dozer	Diesel	64.63	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.003	0.000	0.000	0.009	0.000	0.000	5.348	0.000	5.349
2	2025	2	Access Road	Excavation (Borrow)	Roller	Diesel	29.83	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.001	0.000	0.000	0.002	0.000	0.000	0.909	0.000	0.909
2	2025	2	Access Road	Excavation (Cut to Fill)	Dozer	Diesel	48.47	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.002	0.000	0.000	0.006	0.000	0.000	4.011	0.000	4.012
2	2025	2	Access Road	Excavation (Cut to Fill)	Excavator	Diesel	38.78	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.001	0.000	0.000	0.002	0.000	0.000	2.123	0.000	2.123
2	2025	2	Access Road	Excavation (Cut to Fill)	Roller	Diesel	38.78	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.001	0.000	0.000	0.003	0.000	0.000	1.181	0.000	1.182
2	2025	2	Access Road	Excavation (Topsoil Stripping)	Dozer	Diesel	18.25	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.510	0.000	1.510
2	2025	2	Access Road	Fencing	Concrete Truck	Diesel	38.82	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.003	0.001	0.000	0.029	0.001	0.001	9.626	0.000	9.627
2	2025	2	Access Road	Fencing	Other General Equipment	Diesel	155.27	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.026	0.004	0.000	0.053	0.004	0.004	16.177	0.000	16.183
2	2025	2	Access Road	Fencing	Skid Steer Loader	Diesel	155.27	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.007	0.001	0.000	0.008	0.001	0.001	1.239	0.000	1.240
2	2025	2	Access Road	Fencing	Tractors/Loader/Backhoe	Diesel	155.27	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.008	0.002	0.000	0.009	0.001	0.001	2.026	0.000	2.028
2	2025	2	Access Road	Grading	Dozer	Diesel	15.53	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.285	0.000	1.285
2	2025	2	Access Road	Grading	Grader	Diesel	15.53	15.901	2.819	0.175	43.734	3.459	3.355	64,847.762	0.221	0.000	0.000	0.000	0.001	0.000	0.000	1.007	0.000	1.007
2	2025	2	Access Road	Grading	Roller	Diesel	15.53	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.473	0.000	0.473
2	2025	2	Access Road	Hydroseeding	Hydroseeder	Diesel	13.99	16.105	3.003	0.045	55.938	2.506	2.430	15,342.697	0.268	0.000	0.000	0.000	0.001	0.000	0.000	0.215	0.000	0.215
2	2025	2	Access Road	Hydroseeding	Off-Road Truck	Diesel	13.99	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.001	0.000	0.000	0.011	0.000	0.000	3.469	0.000	3.469
2	2025	2	Access Road	Markings	Other General Equipment	Diesel	239.57	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.040	0.005	0.000	0.082	0.006	0.006	24.959	0.000	24.968
2	2025	2	Access Road	Sidewalks	Concrete Truck	Diesel	279.49	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.019	0.005	0.000	0.212	0.004	0.004	69.304	0.000	69.317
2	2025	2	Access Road	Sidewalks	Tractors/Loader/Backhoe	Diesel	279.49	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.014	0.003	0.000	0.017	0.002	0.002	3.646	0.000	3.650
2	2025	2	Access Road	Sidewalks	Vibratory Compactor	Diesel	279.49	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.534
2	2025	2	Access Road	Soil Erosion/Sediment Control	Other General Equipment	Diesel	12.93	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.002	0.000	0.000	0.004	0.000	0.000	1.347	0.000	1.348
2	2025	2	Access Road	Soil Erosion/Sediment Control	Pumps	Diesel	12.93	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.000	0.000	0.000	0.001	0.000	0.000	0.167	0.000	0.167
2	2025	2	Access Road	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	12.93	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.001	0.000	0.000	0.001	0.000	0.000	0.169	0.000	0.169
2	2025	2	Access Road	Street Lighting	Loader	Diesel	93.16	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.005	0.001	0.000	0.015	0.001	0.001	7.197	0.000	7.199
2	2025	2	Access Road	Street Lighting	Other General Equipment	Diesel	93.16	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.015	0.002	0.000	0.032	0.002	0.002	9.705	0.000	9.709
2	2025	2	Access Road	Street Lighting	Skid Steer Loader	Diesel	93.16	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.004	0.001	0.000	0.005	0.001	0.001	0.743	0.000	0.744
2	2025	2	Access Road	Street Lighting	Tractors/Loader/Backhoe	Diesel	93.16	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.005	0.001	0.000	0.006	0.001	0.001	1.215	0.000	1.217
2	2025	2	Access Road	Subbase Placement	Dozer	Diesel	24.49	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.003	0.000	0.000	2.027	0.000	2.027
2	2025	2	Access Road	Subbase Placement	Roller	Diesel	23.86	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.002	0.000	0.000	0.727	0.000	0.727
2	2025	2	Access Road	Topsoil Placement	Dozer	Diesel	34.50	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.005	0.000	0.000	2.855	0.000	2.856
2	2025	2	Building - 30000 sqft- 3 stories	Concrete Foundations	Excavator	Diesel	1,200.38	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.018	0.003	0.000	0.065	0.003	0.003	65.706	0.000	65.714
2	2025	2	Building - 30000 sqft- 3 stories	Concrete Foundations	Fork Truck	Diesel	1,200.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.007	0.002	0.000	0.078	0.001	0.001	38.159	0.000	38.166
2	2025	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Fork Truck	Diesel	2,250.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.014	0.003	0.000	0.146	0.002	0.002	71.526	0.000	71.538
2	2025	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Generator	Diesel	1,125.00	26.711	6.226	0.039	69.489	4.462	4.328	12,115.425	0.344	0.033	0.008	0.000	0.086	0.006	0.005	13.630	0.000	13.643
2	2025	2	Building - 30000 sqft- 3 stories	Exterior Wall Framing	Man Lift	Diesel	2,250.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.062	0.013	0.000	0.092	0.009	0.008	16.023	0.001	16.042

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
2	2025	2	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Fork Truck	Diesel	9,000.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.055	0.012	0.001	0.583	0.008	0.008	286.103	0.001	286.152
2	2025	2	Building - 30000 sqft- 3 stories	Interior Build-Out/ Finishes	Man Lift	Diesel	9,000.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.250	0.051	0.000	0.368	0.034	0.033	64.093	0.002	64.168
2	2025	2	Building - 30000 sqft- 3 stories	Roofing	High Lift	Diesel	450.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.012	0.003	0.000	0.018	0.002	0.002	3.205	0.000	3.208
2	2025	2	Building - 30000 sqft- 3 stories	Roofing	Man Lift (Fascia Construction)	Diesel	90.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.002	0.001	0.000	0.004	0.000	0.000	0.641	0.000	0.642
2	2025	2	Building - 30000 sqft- 3 stories	Security & Safety Systems	High Lift	Diesel	3,000.38	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.083	0.017	0.000	0.123	0.011	0.011	21.367	0.001	21.392
2	2025	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	90 Ton Crane	Diesel	60.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.002	0.000	0.000	0.002	0.000	0.000	0.427	0.000	0.428
2	2025	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Pump	Diesel	45.00	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.001	0.000	0.000	0.004	0.000	0.000	0.580	0.000	0.580
2	2025	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Concrete Truck	Diesel	90.00	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.006	0.002	0.000	0.068	0.001	0.001	22.317	0.000	22.321
2	2025	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Fork Truck	Diesel	300.38	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.002	0.000	0.000	0.019	0.000	0.000	9.549	0.000	9.550
2	2025	2	Building - 30000 sqft- 3 stories	Wood Truss Frame	Laser Screed	Diesel	135.00	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.022	0.003	0.000	0.046	0.003	0.003	14.065	0.000	14.070
2	2025	2	Parking Lot	Asphalt Placement	Asphalt Paver	Diesel	3.76	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.152	0.000	0.152
2	2025	2	Parking Lot	Asphalt Placement	Other General Equipment	Diesel	7.51	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.003	0.000	0.000	0.783	0.000	0.783
2	2025	2	Parking Lot	Asphalt Placement	Roller	Diesel	3.76	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.000	0.114
2	2025	2	Parking Lot	Asphalt Placement	Skid Steer Loader	Diesel	3.76	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.000	0.030
2	2025	2	Parking Lot	Asphalt Placement	Surfacing Equipment (Grooving)	Diesel	4.81	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.000	0.000	0.000	0.001	0.000	0.000	0.174	0.000	0.174
2	2025	2	Parking Lot	Clearing and Grubbing	Loader	Diesel	16.00	50.089	7.963	0.218	146.524	8.505	8.250	77,258.502	0.562	0.001	0.000	0.000	0.003	0.000	0.000	1.236	0.000	1.236
2	2025	2	Parking Lot	Concrete Placement	Air Compressor	Diesel	10.02	19.678	3.337	0.059	68.298	3.149	3.054	20,451.740	0.291	0.000	0.000	0.000	0.001	0.000	0.000	0.205	0.000	0.205
2	2025	2	Parking Lot	Concrete Placement	Concrete Saws	Diesel	10.02	18.000	3.136	0.047	61.961	2.263	2.195	16,603.981	0.313	0.000	0.000	0.000	0.001	0.000	0.000	0.166	0.000	0.166
2	2025	2	Parking Lot	Concrete Placement	Concrete Truck	Diesel	41.74	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.003	0.001	0.000	0.032	0.001	0.001	10.350	0.000	10.352
2	2025	2	Parking Lot	Concrete Placement	Other General Equipment	Diesel	20.04	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.003	0.000	0.000	0.007	0.000	0.000	2.087	0.000	2.088
2	2025	2	Parking Lot	Concrete Placement	Rubber Tired Loader	Diesel	10.02	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.001	0.000	0.000	0.002	0.000	0.000	0.774	0.000	0.774
2	2025	2	Parking Lot	Concrete Placement	Slip Form Paver	Diesel	10.02	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
2	2025	2	Parking Lot	Concrete Placement	Surfacing Equipment (Grooving)	Diesel	10.02	60.098	9.031	0.109	140.424	8.428	8.175	36,082.446	0.518	0.001	0.000	0.000	0.002	0.000	0.000	0.361	0.000	0.362
2	2025	2	Parking Lot	Curbing	Concrete Truck	Diesel	1.90	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.471	0.000	0.471
2	2025	2	Parking Lot	Curbing	Curb/Gutter Paver	Diesel	1.90	17.953	2.956	0.111	62.320	3.228	3.131	40,397.393	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.077	0.000	0.077
2	2025	2	Parking Lot	Curbing	Other General Equipment	Diesel	1.90	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.198	0.000	0.198
2	2025	2	Parking Lot	Drainage - 24 inch SICPP	Dozer	Diesel	3.15	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.260	0.000	0.260
2	2025	2	Parking Lot	Drainage - 24 inch SICPP	Excavator	Diesel	3.15	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.172
2	2025	2	Parking Lot	Drainage - 24 inch SICPP	Loader	Diesel	3.15	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.243	0.000	0.243
2	2025	2	Parking Lot	Drainage - 24 inch SICPP	Other General Equipment	Diesel	3.15	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.328	0.000	0.328
2	2025	2	Parking Lot	Drainage - 24 inch SICPP	Roller	Diesel	3.15	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.000	0.096
2	2025	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Loader	Diesel	5.24	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.001	0.000	0.000	0.405	0.000	0.405
2	2025	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Other General Equipment	Diesel	5.24	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.002	0.000	0.000	0.546	0.000	0.547
2	2025	2	Parking Lot	Drainage - 6 inch Perforated Underdrain	Tractors/Loader/Backhoe	Diesel	5.24	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.068	0.000	0.068
2	2025	2	Parking Lot	Excavation (Borrow)	Dozer	Diesel	16.70	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.001	0.000	0.000	0.002	0.000	0.000	1.382	0.000	1.382
2	2025	2	Parking Lot	Excavation (Borrow)	Roller	Diesel	7.71	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.235	0.000	0.235
2	2025	2	Parking Lot	Excavation (Cut to Fill)	Dozer	Diesel	12.52	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.002	0.000	0.000	1.036	0.000	1.036
2	2025	2	Parking Lot	Excavation (Cut to Fill)	Excavator	Diesel	10.02	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.000	0.000	0.000	0.001	0.000	0.000	0.548	0.000	0.548
2	2025	2	Parking Lot	Excavation (Cut to Fill)	Roller	Diesel	10.02	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.001	0.000	0.000	0.305	0.000	0.305
2	2025	2	Parking Lot	Excavation (Topsoil Stripping)	Dozer	Diesel	4.71	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.390	0.000	0.390
2	2025	2	Parking Lot	Fencing	Concrete Truck	Diesel	1.06	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.001	0.000	0.000	0.262	0.000	0.262
2	2025	2	Parking Lot	Fencing	Other General Equipment	Diesel	4.22	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.001	0.000	0.000	0.001	0.000	0.000	0.440	0.000	0.440
2	2025	2	Parking Lot	Fencing	Skid Steer Loader	Diesel	4.22	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
2	2025	2	Parking Lot	Fencing	Tractors/Loader/Backhoe	Diesel	4.22	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.055
2	2025	2	Parking Lot	Grading	Dozer	Diesel	3.22	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.000	0.000	0.000	0.266	0.000	0.267
2	2025	2	Parking Lot	Grading	Grader	Diesel	3.22	15.901	2.819	0.175	43.734	3.459	3.355	64,847.762	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.209
2	2025	2	Parking Lot	Grading	Roller	Diesel	3.22	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.000	0.098
2	2025	2	Parking Lot	Hydroseeding	Hydroseeder	Diesel	2.90	16.105	3.003	0.045	55.938	2.506	2.430	15,342.697	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.045
2	2025	2	Parking Lot	Hydroseeding	Off-Road Truck	Diesel	2.90	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.002	0.000	0.000	0.719	0.000	0.719
2	2025	2	Parking Lot	Markings	Other General Equipment	Diesel	0.87	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.000	0.000	0.000	0.090	0.000	0.091
2	2025	2	Parking Lot	Sidewalks	Concrete Truck	Diesel	3.80	62.149	16.306	0.668	687.281	12.638	12.259	247,963.680	1.383	0.000	0.000	0.000	0.003	0.000	0.000	0.942	0.000	0.942
2	2025	2	Parking Lot	Sidewalks	Tractors/Loader/Backhoe	Diesel	3.80	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.050	0.000	0.050
2	2025	2	Parking Lot	Sidewalks	Vibratory Compactor	Diesel	3.80	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007
2	2025	2	Parking Lot	Soil Erosion/Sediment Control	Other General Equipment	Diesel	2.67	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.278	0.000	0.278
2	2025	2	Parking Lot	Soil Erosion/Sediment Control	Pumps	Diesel	2.67	29.616	6.780	0.042	74.070	5.043	4.891	12,880.433	0.365	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.000	0.034
2	2025	2	Parking Lot	Soil Erosion/Sediment Control	Tractors/Loader/Backhoe	Diesel	2.67	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035
2	2025	2	Parking Lot	Street Lighting	Loader	Diesel	1.78	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000	0.137
2	2025	2	Parking Lot	Street Lighting	Other General Equipment	Diesel	1.78	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.000	0.000	0.000	0.001	0.000	0.000	0.185	0.000	0.185
2	2025	2	Parking Lot	Street Lighting	Skid Steer Loader	Diesel	1.78	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.014
2	2025	2	Parking Lot	Street Lighting	Tractors/Loader/Backhoe	Diesel	1.78	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.023
2	2025	2	Parking Lot	Subbase Placement	Dozer	Diesel	6.33	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.524	0.000	0.524
2	2025	2	Parking Lot	Subbase Placement	Roller	Diesel	6.16	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.000	0.188
2	2025	2	Parking Lot	Topsoil Placement	Dozer	Diesel	7.16	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.000	0.000	0.000	0.001	0.000	0.000	0.592	0.000	0.592
2	2025	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Bulldozer	Diesel	466.00	36.057	5.525	0.228	121.585	6.322	6.133	82,751.676	0.435	0.019	0.003	0.000	0.062	0.003	0.003	38.562	0.000	38.569
2	2025	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Chain Saws	Diesel	466.00	643.853	147.018	0.011	4.041	23.414	21.541	1,804.463	3.296	0.331	0.076	0.000	0.002	0.012	0.011	0.841	0.002	0.893
2	2025	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Front Loader	Diesel	466.00	50.089	7.963	0.218	146.524	8.505	8.249	77,258.303	0.562	0.026	0.004	0.000	0.075	0.004	0.004	36.002	0.000	36.011
2	2025	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Grub the site down 2'-0	Diesel	466.00	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.077	0.011	0.000	0.159	0.011	0.011	48.550	0.001	48.567
2	2025	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Log Chipper	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,114.971	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
2	2025	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Mulcher	Diesel	466.00	57.357	12.048	0.107	166.654	10.153	9.848	34,114.971	0.558	0.029	0.006	0.000	0.086	0.005	0.005	15.898	0.000	15.906
2	2025	2	Site Work - 10000 sqft	Site Clearing- Remove Trees & Shrubs	Tractor	Diesel	932.00	46.121	8.928	0.040	53.733	6.926	6.718	13,045.440	0.455	0.047	0.009	0.000	0.055	0.007	0.007	12.158	0.000	12.173
2	2025	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Curbing)	Bob Cat	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233

Construction Emissions: Nonroad Sources

Scenario ID	Year	Month	Project*	Construction Activity*	Equipment*	Fuel*	Hours of Activity*	CO (g/hr)**	VOC (g/hr)**	SOx (g/hr)**	NOx (g/hr)**	PM10 (g/hr)**	PM2.5 (g/hr)**	CO2 (g/hr)**	CH4 (g/hr)**	CO (tons)	VOC (tons)	SO2 (tons)	Nox (tons)	PM10 (tons)	PM2.5 (tons)	CO2 (MT)	CH4 (MT)	CO2e (MT)
2	2025	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Compacting Equipment	Diesel	279.60	7.270	2.168	0.007	13.252	0.768	0.745	1,905.922	0.188	0.002	0.001	0.000	0.004	0.000	0.000	0.533	0.000	0.535
2	2025	2	Site Work - 10000 sqft	Site Restoration- Landscaping (Rough Grading)	Small Dozer	Diesel	279.60	38.170	8.039	0.025	43.941	5.757	5.584	7,977.746	0.277	0.012	0.002	0.000	0.014	0.002	0.002	2.231	0.000	2.233
2	2025	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Forktruck (Hoist)	Diesel	932.00	25.196	5.094	0.023	37.070	3.447	3.344	7,121.404	0.245	0.026	0.005	0.000	0.038	0.004	0.003	6.637	0.000	6.645
2	2025	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Roller	Diesel	466.00	18.906	3.116	0.085	58.948	3.032	2.941	30,460.553	0.283	0.010	0.002	0.000	0.030	0.002	0.002	14.195	0.000	14.199
2	2025	2	Site Work - 10000 sqft	estoration- Landscaping (Top Soil Seed and Plar	Seed Truck Spreader	Diesel	186.40	150.013	20.590	0.314	308.947	22.340	21.670	104,184.105	1.111	0.031	0.004	0.000	0.063	0.005	0.004	19.420	0.000	19.427
2	2025	2	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Excavator	Diesel	1,398.00	13.255	2.409	0.147	48.948	2.633	2.554	54,737.752	0.199	0.020	0.004	0.000	0.075	0.004	0.004	76.523	0.000	76.533
2	2025	2	Site Work - 10000 sqft	Underground Services to 5 ft. of Building	Fork Truck	Diesel	699.00	5.552	1.171	0.084	58.758	0.843	0.818	31,789.210	0.161	0.004	0.001	0.000	0.045	0.001	0.001	22.221	0.000	22.224
2025 ESTIMATED CONSTRUCTION EMISSIONS - NONROAD SOURCES																**3.088**	**0.604**	**0.008**	**7.030**	**0.393**	**0.380**	**2,578.095**	**0.028**	**2,579.058**

*Data generated by ACEIT

**Data generated by MOVES

Construction Emissions: Fugitive Sources

Scenario ID	Year	Project	Fugitive Source Type	Number of Months	CO	NOx	SO2	PM10	VOC
1	2023	Access Road	Asphalt Drying	6	-	-	-	-	3.8882
1	2023	Access Road	Asphalt Storage and Batching	6	0.2536	0.0158	0.0029	0.0174	0.0079
1	2023	Access Road	Material Movement (Paved Roads)	6	-	-	-	0.0140	-
1	2023	Access Road	Material Movement (Unpaved Roads)	6	-	-	-	0.0501	-
1	2023	Access Road	Soil Handling	6	-	-	-	0.0297	-
1	2023	Access Road	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
1	2023	Building - 10000 sqft- 1 story	Concrete Mixing/Batching	6	-	-	-	0.0086	-
1	2023	Building - 10000 sqft- 1 story	Material Movement (Paved Roads)	6	-	-	-	0.0060	-
1	2023	Building - 10000 sqft- 1 story	Material Movement (Unpaved Roads)	6	-	-	-	0.0177	-
1	2023	Building - 30000 sqft- 3 stories	Concrete Mixing/Batching	6	-	-	-	0.0086	-
1	2023	Building - 30000 sqft- 3 stories	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
1	2023	Building - 30000 sqft- 3 stories	Material Movement (Unpaved Roads)	6	-	-	-	0.0059	-
1	2023	Detention Basin	Material Movement (Paved Roads)	6	-	-	-	-	-
1	2023	Detention Basin	Material Movement (Unpaved Roads)	6	-	-	-	0.0004	-
1	2023	Detention Basin	Soil Handling	6	-	-	-	0.0001	-
1	2023	Detention Basin	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
1	2023	Parking Lot	Asphalt Drying	6	-	-	-	-	1.0044
1	2023	Parking Lot	Asphalt Storage and Batching	6	0.0655	0.0041	0.0008	0.0045	0.0020
1	2023	Parking Lot	Concrete Mixing/Batching	6	-	-	-	0.0232	-
1	2023	Parking Lot	Material Movement (Paved Roads)	6	-	-	-	0.0050	-
1	2023	Parking Lot	Material Movement (Unpaved Roads)	6	-	-	-	0.0158	-
1	2023	Parking Lot	Soil Handling	6	-	-	-	0.0077	-
1	2023	Parking Lot	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
1	2023	Site Work - 10000 sqft	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
1	2023	Site Work - 10000 sqft	Material Movement (Unpaved Roads)	6	-	-	-	0.0060	-
1	2023	Site Work - 10000 sqft	Soil Handling	6	-	-	-	0.0009	-
1	2023	Site Work - 10000 sqft	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2023	Access Road	Asphalt Drying	6	-	-	-	-	3.8882
2	2023	Access Road	Asphalt Storage and Batching	6	0.2536	0.0158	0.0029	0.0174	0.0079
2	2023	Access Road	Concrete Mixing/Batching	6	-	-	-	0.0897	-
2	2023	Access Road	Material Movement (Paved Roads)	6	-	-	-	0.0140	-
2	2023	Access Road	Material Movement (Unpaved Roads)	6	-	-	-	0.0501	-
2	2023	Access Road	Soil Handling	6	-	-	-	0.0297	-
2	2023	Access Road	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2023	Building - 10000 sqft- 1 story	Concrete Mixing/Batching	6	-	-	-	0.0086	-
2	2023	Building - 10000 sqft- 1 story	Material Movement (Paved Roads)	6	-	-	-	0.0060	-
2	2023	Building - 10000 sqft- 1 story	Material Movement (Unpaved Roads)	6	-	-	-	0.0177	-
2	2023	Building - 30000 sqft- 3 stories	Concrete Mixing/Batching	6	-	-	-	0.0086	-
2	2023	Building - 30000 sqft- 3 stories	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
2	2023	Building - 30000 sqft- 3 stories	Material Movement (Unpaved Roads)	6	-	-	-	0.0059	-
2	2023	Detention Basin	Material Movement (Paved Roads)	6	-	-	-	-	-
2	2023	Detention Basin	Material Movement (Unpaved Roads)	6	-	-	-	0.0004	-
2	2023	Detention Basin	Soil Handling	6	-	-	-	0.0001	-
2	2023	Detention Basin	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2023	Parking Lot	Asphalt Drying	6	-	-	-	-	1.0044
2	2023	Parking Lot	Asphalt Storage and Batching	6	0.0655	0.0041	0.0008	0.0045	0.0020
2	2023	Parking Lot	Concrete Mixing/Batching	6	-	-	-	0.0232	-
2	2023	Parking Lot	Material Movement (Paved Roads)	6	-	-	-	0.0050	-
2	2023	Parking Lot	Material Movement (Unpaved Roads)	6	-	-	-	0.0158	-
2	2023	Parking Lot	Soil Handling	6	-	-	-	0.0077	-
2	2023	Parking Lot	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2023	Site Work - 10000 sqft	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
2	2023	Site Work - 10000 sqft	Material Movement (Unpaved Roads)	6	-	-	-	0.0060	-
2	2023	Site Work - 10000 sqft	Soil Handling	6	-	-	-	0.0009	-
2	2023	Site Work - 10000 sqft	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2023 ESTIMATED CONSTRUCTION EMISSIONS - FUGITIVE SOURCES					**0.6382**	**0.0398**	**0.0073**	**0.5400**	**9.8049**
1	2024	Access Road	Asphalt Drying	6	-	-	-	-	3.8882
1	2024	Access Road	Asphalt Storage and Batching	6	0.2536	0.0158	0.0029	0.0174	0.0079
1	2024	Access Road	Material Movement (Paved Roads)	6	-	-	-	0.0140	-
1	2024	Access Road	Material Movement (Unpaved Roads)	6	-	-	-	0.0501	-
1	2024	Access Road	Soil Handling	6	-	-	-	0.0297	-
1	2024	Access Road	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
1	2024	Building - 30000 sqft- 3 stories	Concrete Mixing/Batching	6	-	-	-	0.0086	-
1	2024	Building - 30000 sqft- 3 stories	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
1	2024	Building - 30000 sqft- 3 stories	Material Movement (Unpaved Roads)	6	-	-	-	0.0059	-
1	2024	Parking Lot	Asphalt Drying	6	-	-	-	-	1.0044
1	2024	Parking Lot	Asphalt Storage and Batching	6	0.0655	0.0041	0.0008	0.0045	0.0020
1	2024	Parking Lot	Concrete Mixing/Batching	6	-	-	-	0.0232	-
1	2024	Parking Lot	Material Movement (Paved Roads)	6	-	-	-	0.0050	-
1	2024	Parking Lot	Material Movement (Unpaved Roads)	6	-	-	-	0.0158	-
1	2024	Parking Lot	Soil Handling	6	-	-	-	0.0077	-
1	2024	Parking Lot	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
1	2024	Site Work - 10000 sqft	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
1	2024	Site Work - 10000 sqft	Material Movement (Unpaved Roads)	6	-	-	-	0.0060	-
1	2024	Site Work - 10000 sqft	Soil Handling	6	-	-	-	0.0009	-
1	2024	Site Work - 10000 sqft	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2024	Access Road	Asphalt Drying	6	-	-	-	-	3.8882

Construction Emissions: Fugitive Sources

Scenario ID	Year	Project	Fugitive Source Type	Number of Months	CO	NOx	SO2	PM10	VOC
2	2024	Access Road	Asphalt Storage and Batching	6	0.2536	0.0158	0.0029	0.0174	0.0079
2	2024	Access Road	Concrete Mixing/Batching	6	-	-	-	0.0897	-
2	2024	Access Road	Material Movement (Paved Roads)	6	-	-	-	0.0140	-
2	2024	Access Road	Material Movement (Unpaved Roads)	6	-	-	-	0.0501	-
2	2024	Access Road	Soil Handling	6	-	-	-	0.0297	-
2	2024	Access Road	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2024	Building - 30000 sqft- 3 stories	Concrete Mixing/Batching	6	-	-	-	0.0086	-
2	2024	Building - 30000 sqft- 3 stories	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
2	2024	Building - 30000 sqft- 3 stories	Material Movement (Unpaved Roads)	6	-	-	-	0.0059	-
2	2024	Parking Lot	Asphalt Drying	6	-	-	-	-	1.0044
2	2024	Parking Lot	Asphalt Storage and Batching	6	0.0655	0.0041	0.0008	0.0045	0.0020
2	2024	Parking Lot	Concrete Mixing/Batching	6	-	-	-	0.0232	-
2	2024	Parking Lot	Material Movement (Paved Roads)	6	-	-	-	0.0050	-
2	2024	Parking Lot	Material Movement (Unpaved Roads)	6	-	-	-	0.0158	-
2	2024	Parking Lot	Soil Handling	6	-	-	-	0.0077	-
2	2024	Parking Lot	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2024	Site Work - 10000 sqft	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
2	2024	Site Work - 10000 sqft	Material Movement (Unpaved Roads)	6	-	-	-	0.0060	-
2	2024	Site Work - 10000 sqft	Soil Handling	6	-	-	-	0.0009	-
2	2024	Site Work - 10000 sqft	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2024 ESTIMATED CONSTRUCTION EMISSIONS - FUGITIVE SOURCES					**0.6382**	**0.0398**	**0.0073**	**0.4748**	**9.8049**
1	2025	Access Road	Asphalt Drying	6	-	-	-	-	3.8882
1	2025	Access Road	Asphalt Storage and Batching	6	0.2536	0.0158	0.0029	0.0174	0.0079
1	2025	Access Road	Material Movement (Paved Roads)	6	-	-	-	0.0140	-
1	2025	Access Road	Material Movement (Unpaved Roads)	6	-	-	-	0.0501	-
1	2025	Access Road	Soil Handling	6	-	-	-	0.0297	-
1	2025	Access Road	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
1	2025	Building - 30000 sqft- 3 stories	Concrete Mixing/Batching	6	-	-	-	0.0086	-
1	2025	Building - 30000 sqft- 3 stories	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
1	2025	Building - 30000 sqft- 3 stories	Material Movement (Unpaved Roads)	6	-	-	-	0.0059	-
1	2025	Parking Lot	Asphalt Drying	6	-	-	-	-	1.0044
1	2025	Parking Lot	Asphalt Storage and Batching	6	0.0655	0.0041	0.0008	0.0045	0.0020
1	2025	Parking Lot	Concrete Mixing/Batching	6	-	-	-	0.0232	-
1	2025	Parking Lot	Material Movement (Paved Roads)	6	-	-	-	0.0050	-
1	2025	Parking Lot	Material Movement (Unpaved Roads)	6	-	-	-	0.0158	-
1	2025	Parking Lot	Soil Handling	6	-	-	-	0.0077	-
1	2025	Parking Lot	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
1	2025	Site Work - 10000 sqft	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
1	2025	Site Work - 10000 sqft	Material Movement (Unpaved Roads)	6	-	-	-	0.0060	-
1	2025	Site Work - 10000 sqft	Soil Handling	6	-	-	-	0.0009	-
1	2025	Site Work - 10000 sqft	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2025	Access Road	Asphalt Drying	6	-	-	-	-	3.8882
2	2025	Access Road	Asphalt Storage and Batching	6	0.2536	0.0158	0.0029	0.0174	0.0079
2	2025	Access Road	Concrete Mixing/Batching	6	-	-	-	0.0897	-
2	2025	Access Road	Material Movement (Paved Roads)	6	-	-	-	0.0140	-
2	2025	Access Road	Material Movement (Unpaved Roads)	6	-	-	-	0.0501	-
2	2025	Access Road	Soil Handling	6	-	-	-	0.0297	-
2	2025	Access Road	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2025	Building - 30000 sqft- 3 stories	Concrete Mixing/Batching	6	-	-	-	0.0086	-
2	2025	Building - 30000 sqft- 3 stories	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
2	2025	Building - 30000 sqft- 3 stories	Material Movement (Unpaved Roads)	6	-	-	-	0.0059	-
2	2025	Parking Lot	Asphalt Drying	6	-	-	-	-	1.0044
2	2025	Parking Lot	Asphalt Storage and Batching	6	0.0655	0.0041	0.0008	0.0045	0.0020
2	2025	Parking Lot	Concrete Mixing/Batching	6	-	-	-	0.0232	-
2	2025	Parking Lot	Material Movement (Paved Roads)	6	-	-	-	0.0050	-
2	2025	Parking Lot	Material Movement (Unpaved Roads)	6	-	-	-	0.0158	-
2	2025	Parking Lot	Soil Handling	6	-	-	-	0.0077	-
2	2025	Parking Lot	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2	2025	Site Work - 10000 sqft	Material Movement (Paved Roads)	6	-	-	-	0.0020	-
2	2025	Site Work - 10000 sqft	Material Movement (Unpaved Roads)	6	-	-	-	0.0060	-
2	2025	Site Work - 10000 sqft	Soil Handling	6	-	-	-	0.0009	-
2	2025	Site Work - 10000 sqft	Unstabilized Land and Wind Erosion	6	-	-	-	0.0000	-
2025 ESTIMATED CONSTRUCTION EMISSIONS - FUGITIVE SOURCES					**0.6382**	**0.0398**	**0.0073**	**0.4748**	**9.8049**

Operational Emissions: Building Sources

Estimated Natural Gas Consumption

Stationary Sources	Estimated Building Size (SF)	BTU/SF	Furnace Efficiency	Estimated Annual use (hrs)	Heat Content of NG (BTU/CF)	Natural Gas (cf/year)	Natural Gas 10^6 scf
Residential Buildings	675,000	60	0.90	4,380	1,047	188,252,149	188.25
Shul	6,000	60	0.90	4,380	1,047	1,673,352	1.67
Commercial Building	18,000	60	0.90	4,380	1,047	5,020,057	5.02

60 BTU per SF, a furnace efficiency of 90%, and the conservative estimate that the combustion sources operating approximately half of the year (4,380 hours per year).

Assumes a 1047 BTU per CF heat content of natural gas, from eia.gov

Emissions from Building Natural Gas Consumption

Operational Year	Source	NG Consumption (10^6 SCF)	CO (ST)	VOC (ST)	NOx (ST)	SOx (ST)	PM 2.5 (ST)	PM 10 (ST)	CO2 (MT)	N2O (MT)	CH4 (MT)	CO2e (MT)
2024	Residential Buildings	62.751	2.636	0.173	3.138	0.019	0.238	0.238	3,426.178	0.006	0.006	3,428.068
	Shul	1.673	0.070	0.005	0.084	0.001	0.006	0.006	91.365	0.000	0.000	91.415
	Commercial Building	5.020	0.211	0.014	0.251	0.002	0.019	0.019	274.094	0.000	0.000	274.245
2024 Total			**2.917**	**0.191**	**3.472**	**0.021**	**0.264**	**0.264**	**3,791.637**	**0.006**	**0.006**	**3,793.729**
2025	Residential Buildings	94.126	3.953	0.259	4.706	0.028	0.358	0.358	5,139.267	0.009	0.009	5,142.102
	Shul	1.673	0.070	0.005	0.084	0.001	0.006	0.006	91.365	0.000	0.000	91.415
	Commercial Building	5.020	0.211	0.014	0.251	0.002	0.019	0.019	274.094	0.000	0.000	274.245
2025 Total			**4.234**	**0.277**	**5.041**	**0.030**	**0.383**	**0.383**	**5,504.726**	**0.009**	**0.009**	**5,507.763**
2026	Residential Buildings	188.252	7.907	0.518	9.413	0.056	0.715	0.715	10,278.534	0.017	0.017	10,284.204
	Shul	1.673	0.070	0.005	0.084	0.001	0.006	0.006	91.365	0.000	0.000	91.415
	Commercial Building	5.020	0.211	0.014	0.251	0.002	0.019	0.019	274.094	0.000	0.000	274.245
2026 Total			**8.188**	**0.536**	**9.747**	**0.058**	**0.741**	**0.741**	**10,643.993**	**0.018**	**0.018**	**10,649.865**

Source: Natural Gas Combustion, EPA

Emissions from Building Electricity Consumption

Operational Year	Source	Building Size (Square Foot)	Watts per Square Foot	Estimated Consumption (kwh per year)	CO2 (MT)	CH4 (MT)	N2O (MT)	CO2e
2024	Residential Buildings	225,000	8	657,000.00	69.59	0.00	0.00	69.88
	Shul	6,000	6.7	14,673.00	1.55	0.00	0.00	1.56
	Commercial Building	18,000	10.5	68,985.00	7.31	0.00	0.00	7.34
2024 Total					**78.45**	**0.01**	**0.00**	**78.78**
2025	Residential Buildings	337,500	8	985,500.00	104.38	0.01	0.00	104.83
	Shul	6,000	6.7	14,673.00	1.55	0.00	0.00	1.56
	Commercial Building	18,000	10.5	68,985.00	7.31	0.00	0.00	7.34
2025 Total					**113.24**	**0.01**	**0.00**	**113.72**
2026	Residential Buildings	675,000	8	1,971,000.00	208.76	0.01	0.00	209.65
	Shul	6,000	6.7	14,673.00	1.55	0.00	0.00	1.56
	Commercial Building	18,000	10.5	68,985.00	7.31	0.00	0.00	7.34
2026 Total					**217.62**	**0.01**	**0.00**	**218.55**

eGrid Rates for NYUP Region (lb/MWh)

CO2	233.500
CH4	0.016
N2O	0.002
CO2e	234.500

Total Greenhouse Gas Pollutant Emissions from Building Operations

Operational Year	Source	Utility	CO2 (MT)	CH4 (MT)	N2O (MT)	CO2e
2024	Residential Buildings	Electricity	69.585	0.005	0.001	69.883
		Natural Gas	3,426.178	0.006	0.006	3,428.068
	Shul	Electricity	1.554	0.000	0.000	1.561
		Natural Gas	91.365	0.000	0.000	91.415
	Commercial Building	Electricity	7.306	0.001	0.000	7.338
		Natural Gas	274.094	0.000	0.000	274.245
Total 2024 GHG Emissions from Buildings			**3,870.083**	**0.012**	**0.007**	**3,872.511**
2025	Residential Buildings	Electricity	173.963	0.012	0.001	104.825
		Natural Gas	8,565.445	0.014	0.014	5,142.102
	Shul	Electricity	1.554	0.000	0.000	1.561
		Natural Gas	91.365	0.000	0.000	91.415
	Commercial Building	Electricity	7.306	0.001	0.000	7.338
		Natural Gas	274.094	0.000	0.000	274.245
Total 2025 GHG Emissions from Buildings			**9,113.728**	**0.027**	**0.016**	**5,621.486**
2026	Residential Buildings	Electricity	382.720	0.026	0.003	209.650
		Natural Gas	8,839.539	0.015	0.015	10,284.204
	Shul	Electricity	1.554	0.000	0.000	1.561
		Natural Gas	91.365	0.000	0.000	91.415
	Commercial Building	Electricity	7.306	0.001	0.000	7.338
		Natural Gas	274.094	0.000	0.000	274.245
Total 2026 GHG Emissions from Buildings			**9,596.579**	**0.042**	**0.019**	**10,868.413**

Total Emissions by Calendar Year

Year	Source	CO (ST)	VOC (ST)	SOx (ST)	NOx (ST)	PM10 - Total (ST	PM2.5 Total (ST	CO2e (MT)
De Minimis Thresholds		*100*	*50*	*100*	*100*	*100*	*100*	*N/A*
2023	Construction	33.882	11.009	0.041	13.902	1.216	0.641	6,705.97
2023 Total		**33.882**	**11.009**	**0.041**	**13.902**	**1.216**	**0.641**	**6,705.97**
2024	Construction	19.791	10.839	0.029	12.593	1.091	0.585	4,947.32
2024	Operations	2.917	0.191	0.021	3.472	0.264	0.264	3,872.51
2024 Total		**22.708**	**11.030**	**0.050**	**16.066**	**1.355**	**0.849**	**8,819.84**
2025	Construction	19.791	10.839	0.029	12.593	1.091	0.585	4,947.32
2025	Operations	4.234	0.277	0.030	5.041	0.383	0.383	5,621.49
2025 Total		**24.026**	**11.116**	**0.059**	**17.634**	**1.474**	**0.968**	**10,568.81**
2026	Operations	8.188	0.536	0.058	9.747	0.741	0.741	10,868.41
2026 Total		**8.188**	**0.536**	**0.058**	**9.747**	**0.741**	**0.741**	**10,868.41**

Appendix B

Geotechnical Investigation – Preliminary Findings

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CLIENT:	Brach and Mann Associates 254 Nininger Rd., Suite 201 Monroe, NY 10950	PROJECT: PROJ. No.: DATE:	Karlsburg Acres Subdivision Kiryas Joel, N.Y. 22315 February 17, 2023

Geotechnical Investigation – Preliminary Findings

Fifteen soil borings were drilled on January 24-25, 2023. Borings were drilled by the hollow-stem auger method, using a track-mounted drill rig. Drilling was performed by Soiltesting, Inc., of Oxford, Connecticut. The subsurface investigation was supervised and witnessed by Wyeth Patton, under the direction of Kevin Patton, P.E.

All borings were drilled to refusal on apparent bedrock. The boring elevation and depth data is summarized below and is shown on the attached drawing. In the 'Rock from FG' column, a minus sign indicated the depth to rock below the proposed finished grade, and positive values indicate the depth of rock to be cut. All values are in feet.

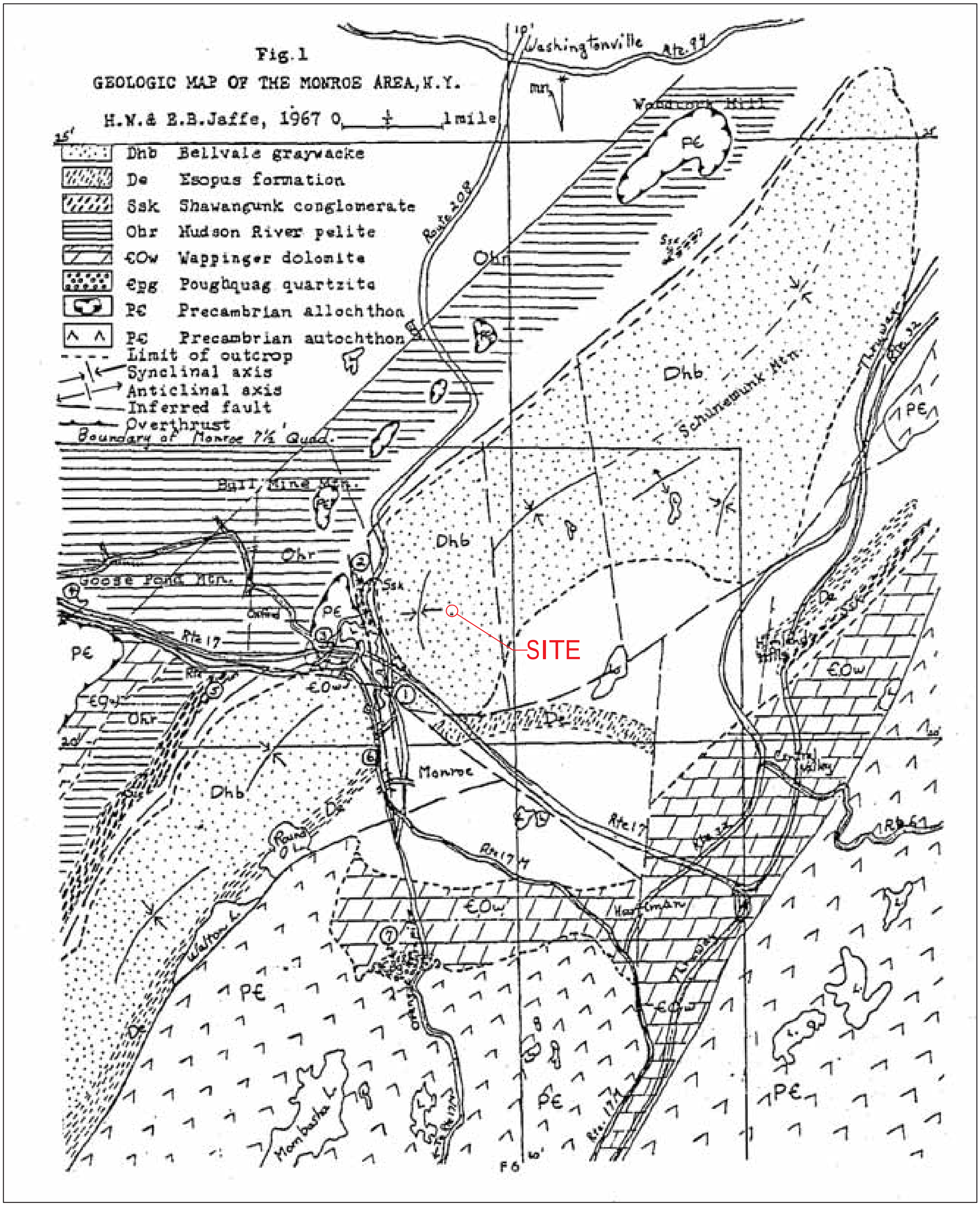
Boring No.	Exist. Elev.	Final Grade	Refusal Depth	Rock from FG
B 1	874.50	875.24	2.5	-3
B 2	894.85	884.94	14	-4
B 3	904.46	895.81	3	6
B 4	909.79	893.96	5	11
B 5	907.37	902.91	4	0
B 6	927.64	907.82	0.5	19
B 7	915.79	913.94	3.5	-2
B 8	941.58	921.74	2	18
B 9	899.39	909.53	6.5	-17
B 10	905.23	889.53	4.5	11
B 11	887.57	889.26	4.5	-6
B 12	880.91	886.59	4.5	-10
B 13	903.78	893.05	1	10
B 14	901.12	906.94	5	-11
B 15	896.87	888.15	3	6

The average depth to refusal was four feet; refusal was at three feet depth or less in six of the borings, and occurred at 3.5 to five feet depth in seven borings. Only two borings went deeper; boring B2, in the proposed intersection near the southwest corner of the site went to fourteen feet depth, four feet below the proposed finished grade, but the first eight feet consisted of loose fill. Boring B9, in the west-middle part of the site, met refusal at 6.5 feet; this location will receive about ten feet of fill. The soils were mostly silty to silty-clayey glacial till, mixed near the surface by frost and natural processes, with undisturbed till beginning at about four feet depth, where the soils were that deep. About two feet of relatively clean sand was present in the bottom of boring B9. At boring B4 there was about a foot of wood chips on the surface.

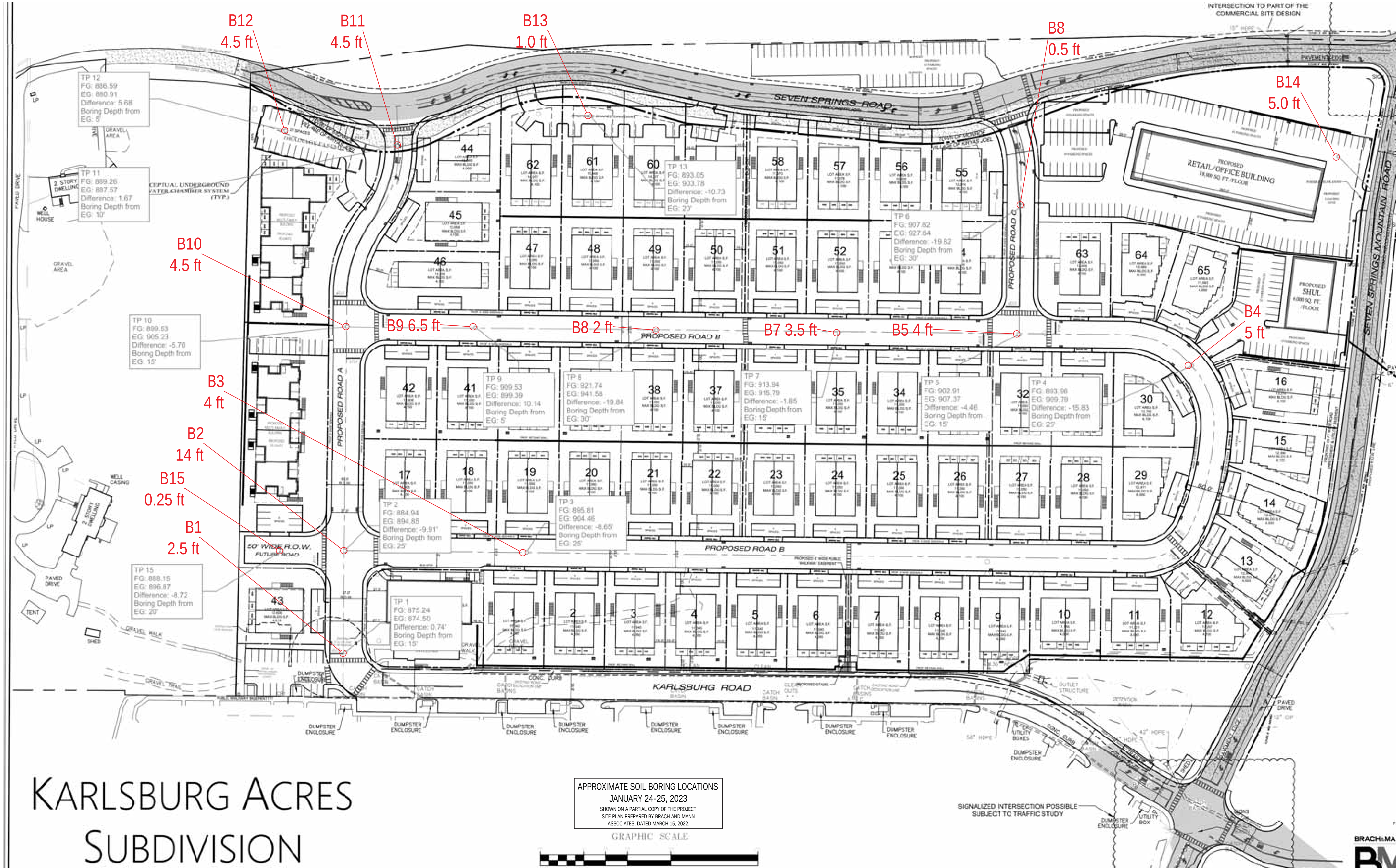
Refusal is believed to have occurred on bedrock in all of the borings, but it could have occurred on boulders or on detached bedrock at some locations. The rock is hard sandstone and medium-hard shale, and the auger was able to penetrate about six to twelve inches into the rock surface at some locations, with no penetration at others.

Additional information will be included in the final report.

Prepared by Kevin L. Patton, P.E.



Approximate location of the project site, shown on the Geologic Map of the Monroe Area (1967,) by Howard W. and Elizabeth B. Jaffee, as presented in the 1989 New York State Geological Association Guidebook. The site is belt of Devonian-age sandstone and shale of the Bellvale formation (symbol Dhb.) This is gray, medium-hard to hard rock. The arrow symbols indicate that the site is on the east limb of a syncline, with the beds dipping toward an axis indicated by the solid line.



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KARLSBURG ACRES SUBDIVISION

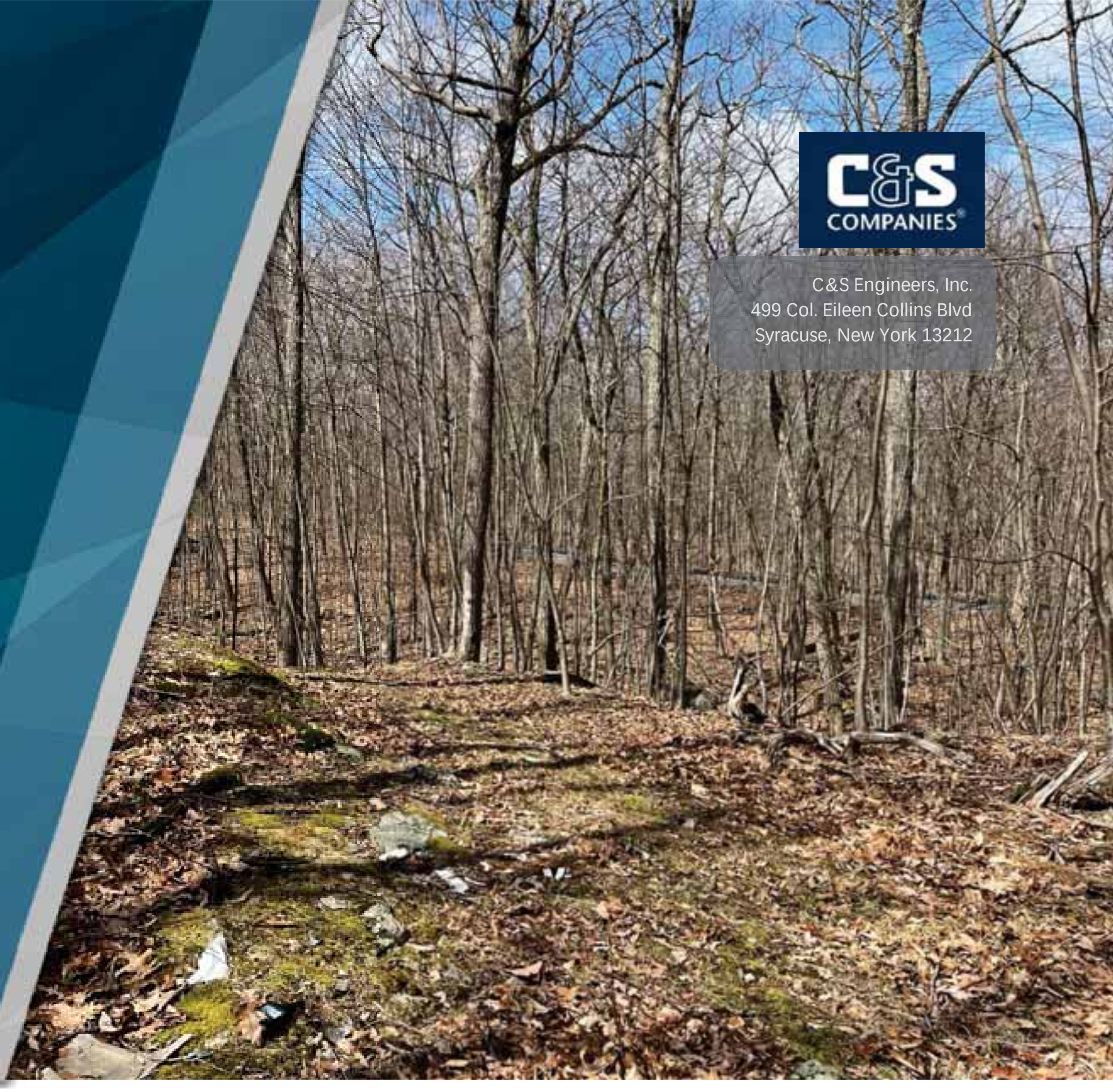
KIRYAS JOEL, N.Y.

SOIL BORING LOCATIONS AND DEPTHS

REV.	DATE	BY
0	2/17/2023	KLP

Appendix C

Rare, Threatened, and Endangered Species Habitat Assessment



Rare, Threatened, and Endangered Species Habitat Assessment

Karlsburg Acres Project Site

Town of Palm Tree

Orange County, New York

Prepared for:
Mr. Joel Mann
Brach & Mann Associates Inc.
PO Box 622
Monroe, NY 10949

April 6, 2023

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Appendices

1.0 Introduction

Brach & Mann Associates Inc. is proposing to construct a residential subdivision (Karlsburg Acres Subdivision) southeast of Seven Springs Road and southwest of Seven Springs Mountain Road in the Village of Kiryas Joel, Town of Palm Tree, Orange County, New York. The proposed project involves construction of a 310-unit residential subdivision. The proposed project will require federal approval under Section 404 of the Clean Water Act for any dredge or fill material into waters of the United States including wetlands; this will be in the form of a permit subject to review and approval by the United States Army Corps of Engineers (USACE). There will not be federal funding and the Village of Kiryas Joel will be the lead agency under the State Environmental Quality Review Act. C&S Engineers, Inc. (C&S) has conducted a rare, threatened, and endangered species habitat assessment. The Area of Interest (AOI) for this assessment totals 41.24-acres and is depicted in the attached Figure 1 – Project Location Map. This report outlines review of published resource materials, existing site conditions, and the results of field investigations.

1.1 Project Description

Brach & Mann Associates Inc. is proposing to construct a 310-unit residential subdivision within a 41.24-acre site.

1.2 Project Location

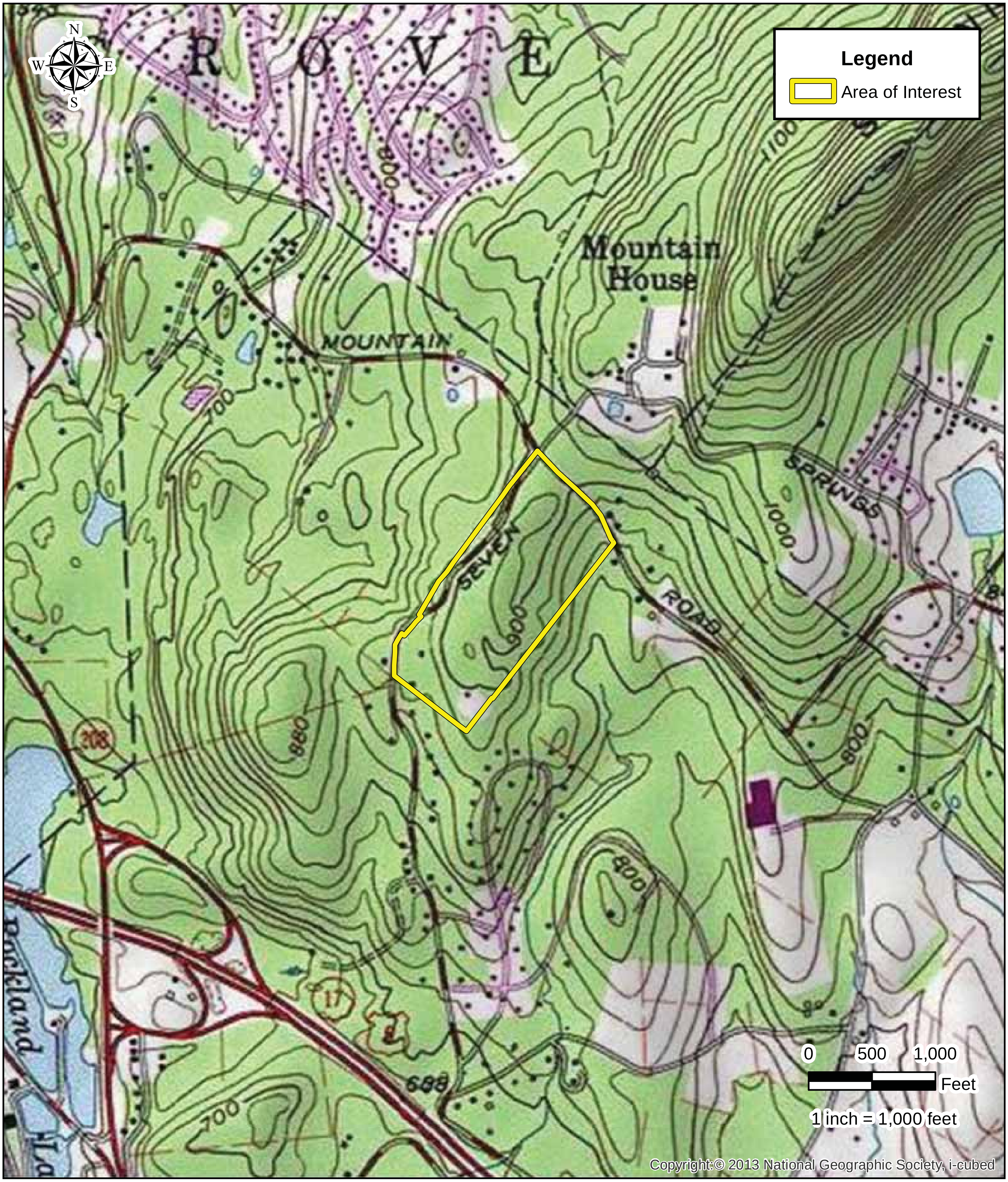
The AOI is located southeast of Seven Springs Road and southwest of Seven Springs Mountain Road in the Town of Palm Tree, Orange County (See Figure 1).

1.3 Agency Consultation

C&S consulted with the New York State Department of Environmental Conservation (NYSDEC) EAF Mapper Application to identify rare or state listed animals or plants, or significant natural communities within the project site. The EAF Mapper (See Appendix A) indicates that the site is located near known records of Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) occurrences. The NYSDEC Environmental Resource Mapper (ERM) indicates that the AOI is located in the vicinity of bats listed as endangered or threatened.

The U.S. Fish and Wildlife Service (USFWS) Information, Planning and Conservation (IPaC) System was reviewed to identify any federally threatened or endangered species within the project area. The official species list is provided as Appendix A. The IPaC system also listed Indiana bat and Northern long-eared bat, both as endangered, among other listed species. No critical habitat is identified in the IPaC report.

C&S contacted the New York State Department of Environmental Conservation (NYSDEC) New York Natural Heritage Program (NYNHP) and received a response on May 31, 2022. The NYNHP response listed Indiana bat and Northern long-eared bat as endangered at the state and federal levels, along with other listed plant species. This habitat assessment describes the suitability of the AOI to provide habitat for these state and federally protected species.



Sources: Created by C&S Engineers, Inc.

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Figure 1 | Project Location Map

Brach & Mann Associates Inc.
Karlsburg Acres Project Site
Town of Palm Tree, Orange County, NY

2.0 Field Surveys

C&S conducted field surveys to assess the suitability of habitat for those listed species known to occur within the vicinity of the project area. The field surveys occurred April 12 and June 13, 2022.

2.1 Habitat Assessment

2.1.1 Indiana bat

Indiana bats are listed as endangered at both the state and federal level, and many details of the species ecology are contained in the draft recovery plan prepared by USFWS[1]. These bats over-winter in caves and mines and migrate to summer habitat as early as mid-April in New York. Suitable winter habitat (hibernacula) includes underground voids such as caves or abandoned mines where winter temperature remains below 50° Fahrenheit (10°C) and above freezing, and are relatively stable. Suitable summer habitat for the Indiana bat consists of trees greater than 2.5 inches in diameter at breast height (dbh), with cracks, crevices, or exfoliating bark[2].

During summer, groups of females, their dependent pups, and occasional males form groups called maternity colonies. Maternity colonies may be spread among multiple trees with individual bats changing roosts every few days. Trees used by large portions of a maternity colony for all or part of the summer are termed primary roosts. Trees used by smaller numbers of bats for short periods of time are called alternate roosts. Primary roost trees are typically large dead or dying trees with exfoliating bark that usually receive direct sunlight for more than half the day; habitats most typical for primary roosts include riparian zones, bottomland and floodplain forests, forested wetlands, and upland communities at elevations less than 900 feet above mean sea level (North American Vertical Datum of 1988)[3]. Males tend to roost individually or in small numbers in trees with exfoliating bark, cracks, and crevices. Throughout the summer, Indiana bats forage in semi-open to closed (open understory) forested habitats, forest edges (i.e. fencerow, maintained right-of-way corridor), and riparian areas. Most bats leave their summer areas by October and return to the caves.

The USFWS IPaC and NYNHP (see Appendix A) indicate that the project is within the range of Indiana bats. The 2007 draft recovery plan does not list hibernaculum for Indiana bat within Orange County; however, further correspondence with NYNHP staff confirmed that the survey year for Indiana bat hibernaculum that was reported in the NYNHP letter was 2011, after the draft recovery plan was released. Given that the project is within the range of the species, the possibility exists for this species to use the site during the summer months.

The USFWS identifies suitable summer habitat within the "Range-wide Indiana Bat Survey Guidelines" dated March 2020. According to the USFWS, suitable summer habitat includes a variety of forested/woody areas, and may include some adjacent habitats including emergent wetlands and adjacent edges of agricultural fields. This includes forests containing potential roosts, and linear features such as fencerows, riparian forests, etc. Potential roosts include live trees and/or snags greater than or

[1] U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp.
[2] U.S. Fish and Wildlife Service (USFWS). May 2017. Indiana Bat Project Review Fact Sheet, New York Field Office. 4 pp.
[3] U.S. Fish and Wildlife Service (USFWS). May 2017. Indiana Bat Project Review Fact Sheet, New York Field Office. 4 pp.

equal to 5 inches diameter at breast height (dbh) that have exfoliating bark, cracks, crevices, and/or hollows. Individual trees may be considered suitable when they exhibit preferred roosting characteristics and are located within 1,000 feet of other forested/wooded habitat. Indiana bats have also been observed roosting in man-made structures such as bridges and bat houses. As such, these structures also qualify as potential summer habitat[4].

The proposed project involves development of a 310-unit residential subdivision; therefore, the area will be cleared prior to construction. Proximity to an existing maternity colony and presence of potential roost trees indicates that the AOI may be used by foraging bats during summer months. The ERM, IPaC species list, and NYNHP letter provide information regarding known occurrences of Indiana bat and northern long-eared bat, indicating that the AOI is located in the vicinity of bats listed as threatened or endangered.

2.1.2 Northern long-eared bat

The northern long-eared bat is listed as endangered at the state and federal level. The northern long-eared bat winters in caves and mines and migrates seasonally to summer roosts in dead and decadent trees. Northern long-eared bats are typically associated with mature interior forest[5] and tend to avoid woodlands with significant edge habitat[6]. They may most often be found in cluttered or densely forested areas including in uplands and at streams or vernal pools[7]. They may use small openings or canopy gaps as well. Some research suggests that northern long-eared bats forage on forested ridges and hillsides rather than in riparian or floodplain forests. Captures from New York suggest that northern long-eared bats may also be found using younger forest types[8]. This species selects day roosts in dead or live trees under loose bark, or in cavities and crevices, and may sometimes use caves as night roosts[9]. They may also roost in buildings or behind shutters. A variety of tree species are used for roosting. The structural complexity of surrounding habitat and availability of roost trees may be important factors in roost selection[10]. Roosts of female bats tend to be large diameter, tall trees, and in at least some areas, located within a less dense canopy[11]. Northern long-eared bats hibernate in caves and mines where the air temperature is constant, preferring cooler areas with high humidity[12].

In New York, a permit is required for the “take” of protected species under the Uniform Procedures Act that includes direct impact to the species as well as adverse modification to habitat. The New York State Department of Environmental Conservation (NYSDEC) considers impacts to “occupied” habitat as well as direct impacts to the species. NYSDEC requirements for northern long-eared bat protection to be

[4] U.S. Fish and Wildlife Service. 2020. Range-wide Indiana bat survey guidelines. 64 pages.
[5] Carroll, S. K., T. C. Carter and G. A. Feldhamer. 2002. Placement of nets for bats: effects on perceived fauna. Southeastern Naturalist 1:193-198.
[6] Yates, M. and R. Muzika. 2006. Effect of forest structure and fragmentation on site occupancy of bat species in Missouri Ozark forests. Journal of Wildlife Management 70:1238-1248.
[7] Brooks, R. T. and W. M. Ford. 2005. Bat Activity in a Forest Landscape of Central Massachusetts. Northeastern Naturalist 12:447-462.
[8] New York Natural Heritage Program. 2016. Online Conservation Guide for Myotis septentrionalis. Available from: http://www.acris.nynhp.org/guide.php?id=7407. Accessed October 9, 2017.
[9] U.S. Fish and Wildlife Service. 2013. 12-Month finding on a petition to list the eastern small-footed bat and the northern long-eared bat as threatened or endangered; Listing the northern long-eared bat as an endangered species; Proposed rule. Vol. 78 No.
[10] Carter, T. C. and G. A. Feldhamer. 2005. Roost tree use by maternity colonies of Indiana bats and northern long-eared bats in southern Illinois. Forest Ecology and Management 219:259-268.
[11] Sasse, D. B. and P. J. Pekins. 1996. Summer roosting ecology of northern long-eared bats (Myotis septentrionalis) in the White Mountain National Forest. Pp. 91-101 in Proceedings of the Bats and Forests Symposium of the British Columbia Ministry of Forest.
[12] U.S. Fish and Wildlife Service. 2013. 12-Month finding on a petition to list the eastern small-footed bat and the northern long-eared bat as threatened or endangered; Listing the northern long-eared bat as an endangered species; Proposed rule. Vol. 78 No.

consistent with USFWS in areas that are not considered "occupied habitat". NYSDEC defines occupied habitat as those areas within five (5) miles of a known hibernacula, or 1.5 miles from a documented summer occurrence. NYNHP identifies northern long-eared bat hibernaculum within 1.5 miles of the project AOI. The proposed project area is in occupied habitat, and therefore additional NYSDEC requirements are necessary.

The proposed project involves development of a 310-unit residential subdivision; therefore, the area will be cleared prior to construction. Proximity to an existing maternity colony and presence of potential roost trees indicates that the AOI may be used by roosting and foraging bats during summer months. The ERM, IPaC species list, and NYNHP letter provide information regarding known occurrences of Indiana bat and northern long-eared bat, indicating that the AOI is located in the vicinity of bats listed as endangered.

2.1.3 Habitat Assessment Results

An experienced biologist traversed the AOI to identify trees and habitat patches that are biologically similar and suitable for use by roosting and foraging bats. Potential roost trees are surveyed as part of the walkover as well. Potential roosts are defined as any tree, regardless of health (live, partially dead, or dead), dbh, or surrounding landscape features (canopy closure, solar exposure, understory clutter, relative distance from edges, travel corridors, and water) that exhibits at least one roosting structure (exfoliating bark, cracks and crevices, or cavities). Individual trees may be considered suitable habitat when they exhibit preferred characteristics and are within 1,000 feet of other forested habitat.

A site visit was conducted on April 12, 2022 to visually assess the suitability of the project habitat for Indiana bats and northern long-eared bats. The AOI contains chestnut oak forest with an intermittent stream system in the eastern corner of the AOI, a vernal pool in the northern corner of the AOI, paved roads in the northern and southern portions of the AOI, and urban structures in the southern portion of the AOI. Five potential roost trees were identified by C&S staff during the April 12, 2022 site visit (Figure 3). Two chestnut oak trees, each with approximately 24-inch dbh were identified in the northern and eastern portions of the AOI. Three shagbark hickory trees (9-inch, 10-inch, and 12-inch dbh) were identified in the central-southern portion of the AOI. The NYSGIS Clearinghouse website indicates that minimal disturbance has occurred within the AOI since 1994[13].

2.1.4 Roosting and Foraging Quality Summary

In order to further define the habitat quality, we describe suitable habitat found on-site including our opinion as to the overall roosting and foraging quality. In addition, potential roost trees are identified as probable primary or secondary roosts.

2.1.4.1 Identification of Overall Roost Quality

Areas of high potential roost quality possess many or all of the following characteristics:

- Many potential roost trees
- Large diameter trees
- Relatively open understory
- Easy access to drinking water and foraging areas

[13] New York State GIS Clearinghouse. N.D. Discover GIS Data NY. Available from: https://orthos.dhses.ny.gov/. Accessed July 7, 2022.

- Easy access to suitable flyways

Most low quality roosting areas are young forest with cluttered understories and only an occasional roost tree.

2.1.4.2 Identification of Potential Roost Trees

During the field study, the location of each potential roost is surveyed and labeled as a potential primary or secondary roost. The determination includes consideration of dbh, roosting structures (exfoliating bark, cracks and crevices, cavities), and tree health (live, partially dead, dead). Emphasis is placed on roost structure (as opposed to tree species) because Indiana bats and northern long-eared bats roost in many species of trees. These trees are also free from vines or other obstructing vegetation that may preclude use by bats.

Trees considered potential primary roost potential possess the following characteristics:

- Greater than 9-inches dbh
- Extensive areas of exfoliating bark or cracks where bats can live
- Significant solar exposure of at least one potential roost area of the tree
- Within 1,000 feet from suitable habitat

Trees considered likely secondary roosts have the following characteristics:

- Greater than 5-inches dbh
- Exfoliating bark or cracks present
- Potential roosting areas either too small to contain multiple bats or those roosting areas located in the shade
- Within 1,000 feet from suitable habitat

2.1.4.3 Estimating Foraging Habitat Suitability

Areas of high potential for use by foraging bats generally include the following:

- Forests with an open understory
- Forested wetlands
- Fencerows and other areas where forested habitat is bordered by open land
- Ponds or uncluttered streams, or rivers

Areas of limited potential generally include cluttered forest, scrub/shrub, and early successional forest.

2.1.4.4 Hibernacula

Lastly, a review of the project area for hibernacula is completed. Suitable winter habitat (hibernacula) includes underground voids such as caves or abandoned mines.

2.1.5 Potential Roost Tree Summary

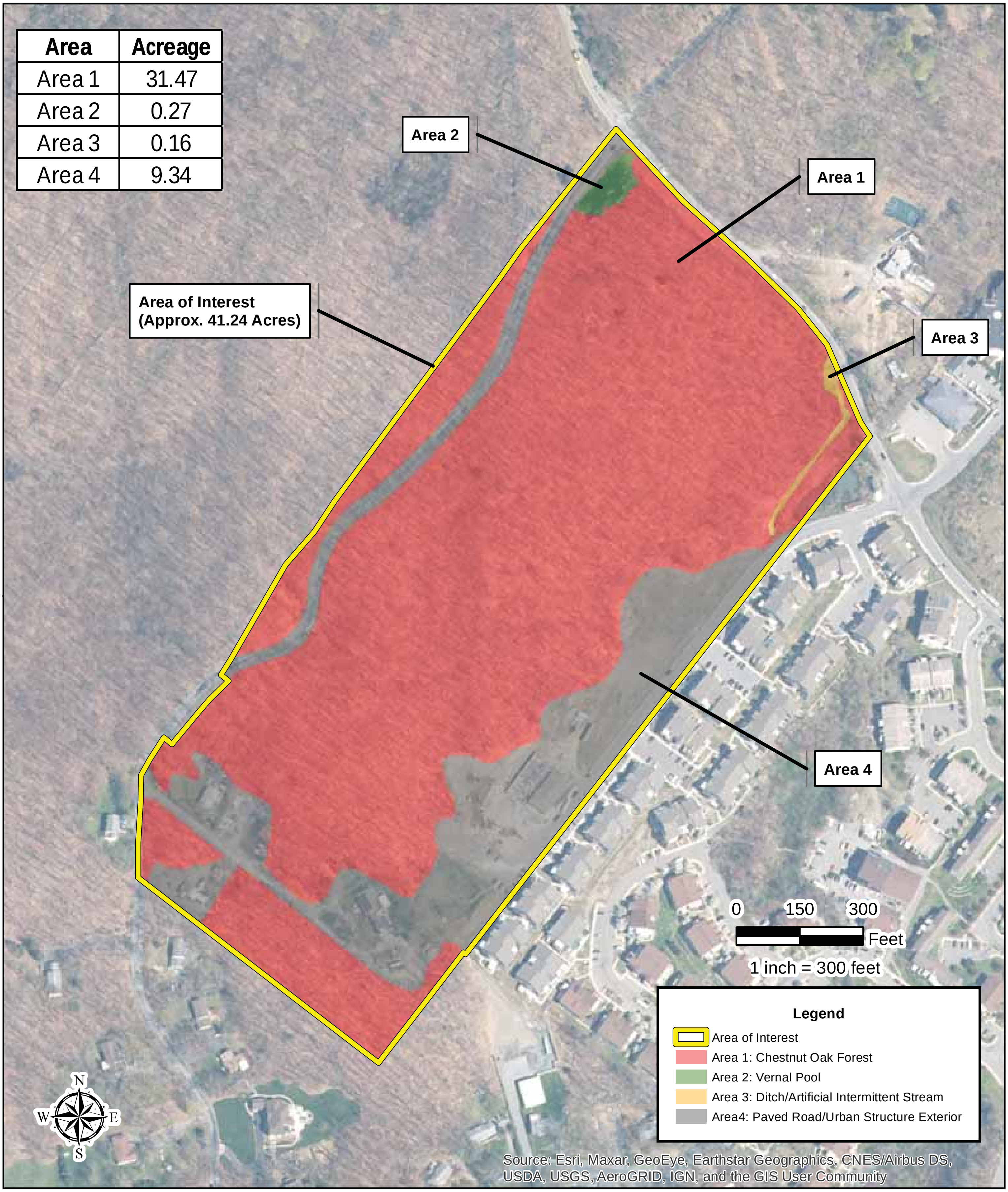
C&S identified five potential roost trees (PRT) within the AOI during the initial April 12 site visit. These included two chestnut oak trees in the northern portion of the AOI, each with approximately 24-inch dbh, and three shagbark hickory trees at 9-inch, 10-inch, and 12-inch dbh in the central portion of the AOI. Each of these trees could provide foraging opportunities for both species of bats. The two chestnut oak potential roosts are considered potential secondary roosts. Roosting opportunities (i.e. cracks and exfoliating bark) are present, but limited. The three shagbark hickory potential roosts trees contain extensive areas of exfoliating bark, sun exposure is adequate, and are greater than 9-inches dbh. As such, these three trees are considered potential primary roosts for both species of bats.

2.1.6 Indiana Bat and Northern Long-Eared Bat Summer Habitat Assessment Results

Proposed tree clearing areas are reviewed in the field to determine whether they meet the aforementioned suitable summer habitat criteria as identified by USFWS. In total, 32.56 acres of trees will be removed from the project site. The total parcel contains approximately 32.56 acres of forest/woody habitat. As the AOI contains mostly forest cover, the tree clearing occurs throughout the majority of Areas 1 and 2 (described below), as depicted in the attached Figure 2. Areas 3 and 4 (described below) do not contain suitable forest habitat. The Areas described below are consistent with the March 2014 New York State Department of Environmental Conservation (NYSDEC) report entitled *Ecological Communities of New York State*[14], Second Edition (*Ecological Communities*) as part of the New York Natural Heritage Program inventory. Figure 2 shows the ecological communities on site. Figure 3 shows the locations of potential roost trees. Below is a summary of each area:

> *Area 1:* Area 1 contains chestnut oak forest, which comprises the majority of the AOI. Consistent with Ecological Communities, chestnut oak forests are typically found in southern and southeastern New York, including portions of the Appalachian Plateau, Hudson Highlands, Manhattan Hills, and Coastal Lowlands ecozones. Characteristic with this ecological community, Area 1 contained chestnut oak (*Quercus montana*) and red oak (*Quercus rubra*) in the tree stratum, lowbush blueberry (*Vaccinium pallidum*) in the shrub stratum, and wintergreen (*Gaulteria procumbens*) in the herbaceous stratum. Area 1 also contained scattered beech (*Fagus grandifolia*), pignut oak (*Carya glabra*), grey birch (*Betula populifolia*), and a small stand of eastern hemlock (*Tsuga canadensis*) in the northeastern portion of the AOI, as well as American witch-hazel (*Hamamelis virginiana*) in the shrub stratum, and Virginia creeper (*Parthenocissus quinquefolia*), deer-tongue rosette grass (*Dichanthelium clandestinum*), garlic mustard (*Alliaria petiolata*), and multiple sedge species, including Eastern star sedge (*Carex radiata*) and stalk-grain sedge (*Carex stipata*), in the herbaceous stratum.

[14] Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2014. *Ecological Communities of New York State.* Second Edition. Accessed on October 9, 2017. Available at: http://www.dec.ny.gov/docs/wildlife_pdf/ecocomm2014.pdf



Area	Acreage
Area 1	31.47
Area 2	0.27
Area 3	0.16
Area 4	9.34

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Figure 2 | Ecological Communities Cover Type Map

Brach & Mann Associates Inc.
Karlsburg Acres Project Site
Town of Palm Tree, Orange County, NY

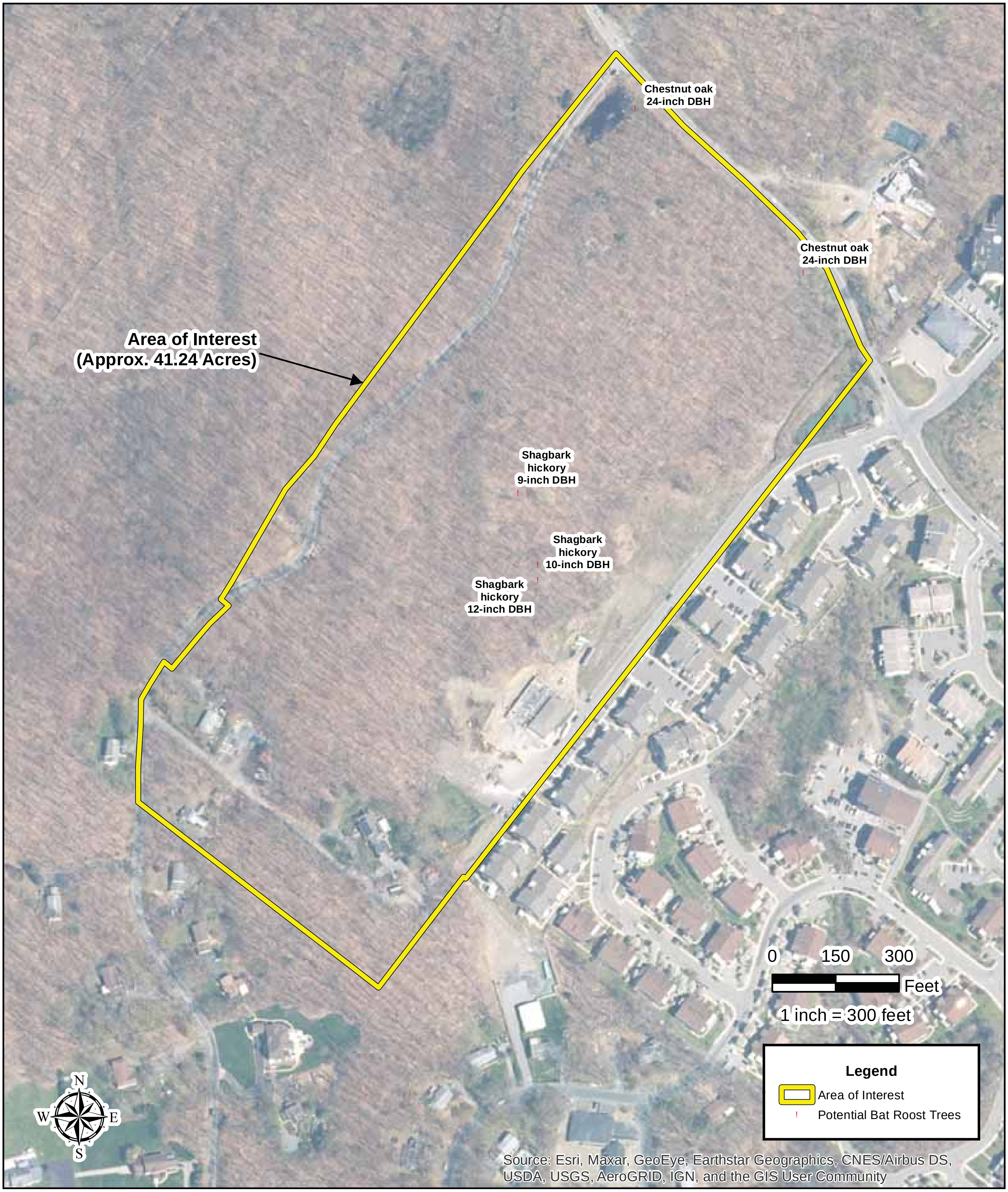

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Figure 3 | Potential Bat Roost Trees

Brach & Mann Associates Inc.

Karlsburg Acres Project Site

Town of Palm Tree, Orange County, NY

Four potential roost trees were identified within Area 1: three shagbark hickory trees at 9-inch, 10-inch, and 12-inch dbh, and one chestnut oak tree at 24-inch dbh.

Area 2: A vernal pool habitat is located in the northern corner of the site. Vernal pools are categorized by Ecological Communities as a type of palustrine forested mineral soil wetland. These aquatic communities are typically located in small depressions within a forested landscape, with intermittent to ephemeral flooding and inundation during the spring months or after substantial rainfall. Vernal pools are usually characterized by allochthonous organic matter input, with thick leaf litter from the surrounding forest providing energy to the ecosystem. Area 2 contains common winterberry (*Ilex verticillata*) in the shrub stratum, and Indian hemp (*Apocynum cannabinum*), purple loosestrife (*Lythrum salicaria*), common spike rush (*Eleocharis palustris*), and broad-leaf cat-tail (*Typha latifolia*) in the herbaceous stratum.

One potential roost tree, a chestnut oak tree at 24-inch dbh, was identified in Area 2.

Area 3: A ditch/artificial intermittent stream is located in the eastern corner of the site. Ecological Communities defines this habitat as a man-made waterway usually constructed for the purposes of drainage or irrigation. Surface flow in this system changes based on precipitation and groundwater levels; surface flow can also be artificially controlled. No potential roost trees were identified within Area 3.

Area 4: Developed land in the form of paved roads and urban structure exteriors are located in the northern, western, and southern portions of the AOI. No potential roost trees were identified in Area 4.

The project site contains suitable summer Indiana and Northern long-eared bat habitat. No winter habitat was identified during the field surveys. The following table provides an overview of the habitat found on site.

Table 1. Indiana Bat Habitat Summary

Area #	Habitat Suitability	Acreage
1	Moderate roosting/high foraging	31.47
2	Low roosting/high foraging	0.27
3	No roosting/high foraging	0.16
4	No roosting/no foraging	9.34

Area 1: Tree removal in Area 1 is considered significant. This area encompasses the majority of the AOI and contains four potential roost trees.

Area 2: Tree removal in Area 2 is considered significant. Although Area 2 encompasses a small portion of the AOI, it contains one PRT and suitable foraging habitat.

Area 3: Tree removal is not considered significant. Although Area 2 contains suitable habitat, no potential roost trees were identified.

Area 4: No significant tree removal will occur in Area 4 as this area contains developed land in the form of paved road and urban structure exteriors.

2.1.7 Indiana Bat and Northern Long-Eared Bat Winter Habitat Assessment Results

The chestnut oak forest portion of the AOI contains rock outcrop areas; however, the walkover failed to identify cracks, crevices, or underground voids that may be used by hibernating bats. No potential hibernacula were observed on site.

2.1.8 Assessment of Percent Forest Cover

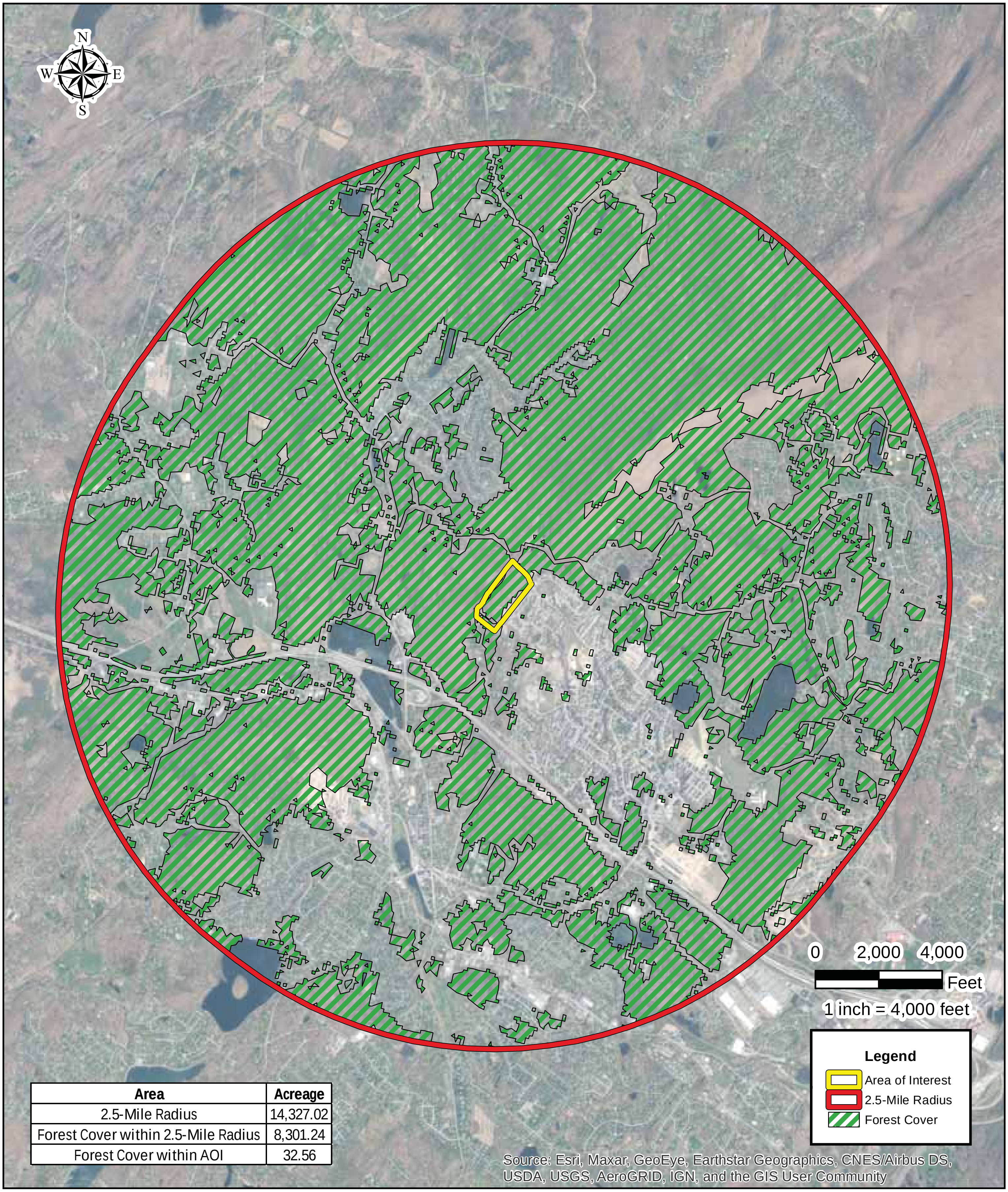
C&S completed an assessment of the percent forest cover within 2.5-miles of the project. National Land Cover Database (NLCD) dated 2019 data are initially used to identify forested lands near the project. The forest cover data is reviewed for accuracy using available aerial photography. Geographic information system (GIS) specialists remove areas identified as forested by NLCD based on evidence of tree clearing. A final map is generated that identifies woody lands within 2.5 miles of the project (See Figure 4).

A 2.5-mile buffer around the project area occupies 14,327.02 acres. The analysis indicates that approximately 8,301.24 acres of forest/woody lands occur within 2.5-miles of the project site. Forested lands occupy 57.9% of the 2.5-mile buffer. The removal of 32.56 acres of land results in a net loss of 0.39% of the woody vegetation in the 2.5-mile buffer. The small percentage of habitat loss as a result of this project is not considered significant.

3.0 Conclusion

A detailed habitat assessment for state and federally listed species is prepared for the Karlsburg Acres development project. Correspondence with the NYSDEC, USFWS, and NYNHP indicates that the Indiana bat and northern long-eared bat, both state and federally endangered, are known to occur near the project area. This habitat assessment describes the suitability of the AOI to provide habitat for these state and federally protected species.

Suitable summer habitat occurs on site for the Indiana bat and northern long-eared bat. The habitat assessment did not indicate significant roosting habitat within the limits of disturbance. The project will result in removal of 0.39% of the woody vegetation within 2.5 miles of the project site. The small percentage of tree removal is not considered significant. In order to avoid direct take of bats that may be using the site during summer months, it is recommended that all tree-clearing activities on site occur during winter months.



Area	Acreage
2.5-Mile Radius	14,327.02
Forest Cover within 2.5-Mile Radius	8,301.24
Forest Cover within AOI	32.56

Document Path: F:\Project\E82 - Brach & Mann Associates\E82001004 - Karlsburg Acres\Planning-Study\GIS\Projects\Karlsburg_BackgroundInfo\Mxds\Figure_4a_NLCD_Habitat_Assessment.mxd

Sources: . Created by C&S Engineers, Inc.

Modified: 8/3/2022 @ 3:06:26 PM

C&S COMPANIES®

Figure 4 | Forest Cover - NLCD Land Cover Data

Brach & Mann Associates Inc.

Karlsburg Acres Project Site

Town of Palm Tree, Orange County, NY

APPENDIX A
AGENCY CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo/es/section7.htm

In Reply Refer To: April 07, 2022
Project Code: 2022-0029525
Project Name: Karlsburg- Acres Development Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. **Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.**

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

Project Summary

Project Code: 2022-0029525
Event Code: None
Project Name: Karlsburg- Acres Development Project
Project Type: Commercial Development
Project Description: Development
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.352867450000005,-74.17815567074449,14z

Counties: Orange County, New York

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle *Glyptemys muhlenbergii* Population: Wherever found, except GA, NC, SC, TN, VA No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Small Whorled Pogonia *Isotria medeoloides* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: C&S Engineers, Inc.
Name: Shannon Booth
Address: 499 Col Eileen Collins Boulevard
City: Syracuse
State: NY
Zip: 13212
Email sbooth@cscos.com
Phone: 3159855938

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

May 31, 2022

Shannon Booth
C&S Engineers, Inc.
499 Col Eileen Collins Boulevard
Syracuse, NY 13212

Re: Karlsburg Acres Development Project
County: Orange Town/City: Monroe

Dear Shannon Booth:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur in the vicinity of the project site.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 3 Office, Division of Environmental Permits, at dep.r3@dec.ny.gov.

Sincerely,

Heidi J. Krahling

Heidi Krahling
Environmental Review Specialist
New York Natural Heritage Program

The following state-listed animals have been documented in the vicinity of the project site.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed.

For information about any permit considerations for the project, please contact the NYSDEC Region 3 Office, Department of Environmental Permits, at dep.r3@dec.ny.gov, (845) 256-3054.

The following species has been documented within 1.5 miles of the project site. Individual animals may travel 2.5 miles from documented locations. The main impact of concern is the cutting or removal of potential roost trees.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Mammals				
Indiana Bat *Hibernaculum*	*Myotis sodalis*	Endangered	Endangered	12787

The following species has been documented within 1.5 miles of the project site. Individual animals may travel 5 miles from documented locations. The main impact of concern is the cutting or removal of potential roost trees.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Mammals				
Northern Long-eared Bat *Hibernaculum*	*Myotis septentrionalis*	Threatened	Threatened	14145

This report only includes records from the NY Natural Heritage database.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

The following rare plants, rare animals, and significant natural communities have been documented at the project site, or in its vicinity.

We recommend that potential impacts of the proposed project on these species or communities be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine whether a species currently occurs at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following natural community is considered significant from a statewide perspective by the NY Natural Heritage Program. By meeting specific, documented criteria, the NY Natural Heritage Program considers this community occurrence to have high ecological and conservation value.

COMMON NAME	HERITAGE CONSERVATION STATUS
Upland/Terrestrial Communities	
Pitch Pine-Oak-Heath Rocky Summit	High Quality Occurrence of Uncommon Community Type

Documented within 1/3 mile northeast of the project site. The summit is small and in good condition. The community is intermediate between rocky summit and chestnut oak forest. 10155

The following plants are listed as Endangered or Threatened by New York State, and/or are rare in New York State, and so are a vulnerable natural resource of conservation concern.

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	HERITAGE CONSERVATION STATUS
Vascular Plants			
Glaucous Sedge	*Carex glaucodea*	Threatened	Imperiled in NYS

Documented within 250 yards north of the project site. 2020-05-28: The plants are growing along an old road in an oak-hickory forest. The dominant tree species are Quercus rubra and Carya glabra. 7853

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	HERITAGE CONSERVATION STATUS
Green Rock Cress	*Borodinia missouriensis*	Threatened	Imperiled in NYS

Documented within 250 yards north of the project site. 2003-07-03: This population is in a Carya ovalis or Carya glabra dominated woodland or forest on a slight southwest-facing slope. The canopy is somewhat open. The area is adjacent to a power-line cut and a disturbed field. Other species present include Carex umbellata and Cerastium arvensis. 10778

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

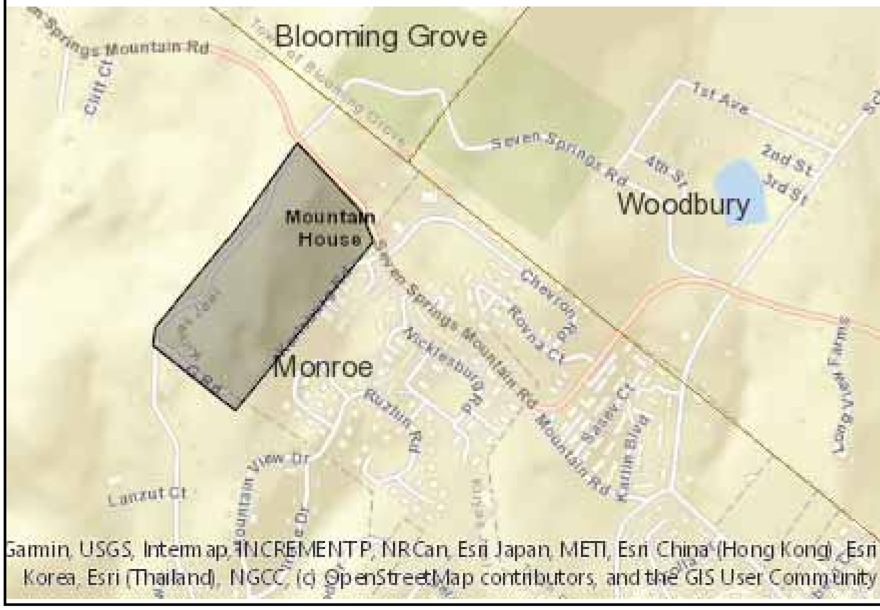
If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

Information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org. For descriptions of all community types, go to www.dec.ny.gov/animals/29384.html for Ecological Communities of New York State.

EAF Mapper Summary Report

Wednesday, June 8, 2022 10:41 AM



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.

B.i.i [Coastal or Waterfront Area]	No
B.i.ii [Local Waterfront Revitalization Area]	No
C.2.b. [Special Planning District]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.1.h [DEC Spills or Remediation Site - Potential Contamination History]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.1.h.i [DEC Spills or Remediation Site - Listed]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.1.h.i [DEC Spills or Remediation Site - Environmental Site Remediation Database]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.1.h.iii [Within 2,000' of DEC Remediation Site]	No
E.2.g [Unique Geologic Features]	No
E.2.h.i [Surface Water Features]	Yes
E.2.h.ii [Surface Water Features]	Yes
E.2.h.iii [Surface Water Features]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
E.2.h.iv [Surface Water Features - Stream Name]	860-95
E.2.h.iv [Surface Water Features - Stream Classification]	C
E.2.h.iv [Surface Water Features - Wetlands Name]	Federal Waters
E.2.h.v [Impaired Water Bodies]	No
E.2.i. [Floodway]	No
E.2.j. [100 Year Floodplain]	Yes
E.2.k. [500 Year Floodplain]	No

E.2.l. [Aquifers]	Yes
E.2.l. [Aquifer Names]	Sole Source Aquifer Names:Ramapo SSA
E.2.n. [Natural Communities]	Yes
E.2.n.i [Natural Communities - Name]	Pitch Pine-Oak-Heath Rocky Summit
E.2.n.i [Natural Communities - Acres]	5.0
E.2.o. [Endangered or Threatened Species]	Yes
E.2.o. [Endangered or Threatened Species - Name]	Indiana Bat, Northern Long-eared Bat
E.2.p. [Rare Plants or Animals]	No
E.3.a. [Agricultural District]	No
E.3.c. [National Natural Landmark]	No
E.3.d [Critical Environmental Area]	No
E.3.e. [National or State Register of Historic Places or State Eligible Sites]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.3.f. [Archeological Sites]	Yes
E.3.i. [Designated River Corridor]	No

Environmental Resource Mapper

The coordinates of the point you clicked on are:

UTM 18	**Easting:**	568593.9823169729	**Northing:**	4578493.071557577
Longitude/Latitude	**Longitude:**	-74.17998014404202	**Latitude:**	41.355027191557525

The approximate address of the point you clicked on is:
Town of Monroe, New York

County: Orange
Town: Monroe
USGS Quad: MONROE

Natural Communities in the Vicinity

Natural Community Name: Pitch pine-oak-heath rocky summit
Location: Schunnemunk Mountain House
Significance: High Quality Occurrence of Uncommon Community Type

Rare Plants and Rare Animals

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

This location is in the vicinity of Rare Plants Listed as Endangered, Threatened, or Rare by NYS

National Wetands Inventory

Attribute: PFO1E
Type: Freshwater Forested/Shrub Wetland
Acres: 0.639438957

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.

APPENDIX B
PHOTOGRAPHS

Photo Documentation

Project: Karlsburg Acres Development
Village of Kiryas Joel, Orange County, New York

Photo 1 – Stream A (Intermittent Stream/Ditch/Artificial Intermittent Stream) facing northeast, view of Karlsburg Road in the background.

Photos 2 (Left) and 3 (Right) – Stream A culverts facing northeast (Left) and east (Right).

Photo Documentation

Project: Karlsburg Acres Development
Village of Kiryas Joel, Orange County, New York

Photo 4 – Wetland B (Vernal Pool) facing northwest, view of Seven Springs Road in the background.

Photo 5 – Wetland C (Vernal Pool) facing southeast, view of Seven Springs Road in the background.

Photo Documentation

Photo 6 – Chestnut oak forest representative photo.

Photo 7 – Chestnut oak forest representative photo.

Photo 8 – Potential roost tree, shagbark hickory (*Carya ovata*) at 9-inch dbh, central portion of site.

Photo 9 – Potential roost tree, shagbark hickory (*Carya ovata*) at 12-inch dbh, central-southern portion of site.

Photo Documentation

Photo 10 – Potential roost tree, shagbark hickory (*Carya ovata*) at 10-inch dbh, central-southern portion of site.

Photo 11 – Potential roost tree, chestnut oak *(Quercus montana)* at 24-inch dbh, eastern portion of site.

Photo Documentation

Project: Karlsburg Acres Development
Village of Kiryas Joel, Orange County, New York

Photo 11 – Potential roost tree, chestnut oak *(Quercus montana)* at 24-inch dbh, northern portion of site.

Appendix D

Rare, Threatened, and Endangered Species Technical Memorandum

C&S Engineers, Inc.
499 Col. Eileen Collins Blvd
Syracuse, New York 13212

TECHNICAL MEMORANDUM

To: Brach & Mann Associates Inc.

From: Bryan A. Bayer, PWS, CE

Date: April 6, 2023

File: E82.001.004

Re: Karlsburg Acres Development, Seven Springs Road and Seven Springs Mountain Road, Village of Kiryas Joel, Town of Palm Tree, Orange County, New York

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A rare, threatened, and endangered (RTE) species habitat assessment was performed by a Professional Wetland Scientist (PWS)/Certified Ecologist (CE) from C&S Engineers, Inc. (C&S) on April 12 and June 13, 2022 within the Karlsburg Acres Development project anticipated limits of disturbance at the corner of Seven Springs Road and Seven Springs Mountain Road, Village of Kiryas Joel, New York. The Area of Investigation (AOI) is comprised of a 41.24-acre area within the property (See Attachment A, Figure 1). This technical memorandum was prepared to discuss the findings of the field investigation.

Existing Vegetative Communities

In March 2014, the New York State Department of Environmental Conservation (NYSDEC) published a report entitled *Ecological Communities of New York State*[1], Second Edition (*Ecological Communities*) as part of the New York Natural Heritage Program inventory. The report is a revised and expanded version of the original 1990 version that lists and describes ecological systems, subsystems, and communities within New York State. The classification was developed to help assess and protect biological diversity of the state. An assessment of the vegetative cover types within the proposed project area was conducted consistent with the representative characteristics presented in *Ecological Communities*.

Based on review of aerial photography and information collected during C&S's site visits, the AOI is primarily comprised of chestnut oak forest. The AOI also contains a vernal pool, and an intermittent stream, portions of which are considered a

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[1] Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2014. *Ecological Communities of New York State.* Second Edition. Accessed on October 9, 2017. Available at: http://www.dec.ny.gov/docs/wildlife_pdf/ecocomm2014.pdf

ditch/artificial intermittent stream, as well as paved roads and urban exterior structures associated with residential development.

Consistent with *Ecological Communities*, chestnut oak forests are typically found in southern and southeastern New York, including portions of the Appalachian Plateau, Hudson Highlands, Manhattan Hills, and Coastal Lowlands ecozones. These ecosystems are characteristically dominated by chestnut oak (*Quercus montana*) and red oak (*Quercus rubra*) in the tree stratum, black huckleberry (*Gaylussacia baccata*), mountain laurel (*Kalmia latifolia*), and lowbush blueberry (*Vaccinium pallidum*) in the shrub stratum, and Pennsylvania sedge (*Carex pennsylvanica*), wild sarsaparilla (*Aralia nudicaulis*), wintergreen (*Gaulteria procumbens*), and white cushion moss (*Leucobryum glaucum*) in the understory. Other common tree species found in chestnut oak forests are white oak (*Quercus alba*), black oak (*Quercus velutina*), and red maple (*Acer rubrum*). The site is primarily comprised of chestnut oak forest.

Ecological Communities defines the riverine cultural group as communities that are either created and maintained by human activities, or are modified by human influence to such a degree that stream flow, morphometry, water chemistry, and/or biological composition are significantly different than the waterway that existed prior to human influence. The ditch/artificial intermittent stream, classified under the riverine cultural group, is a man-made waterway usually constructed for the purposes of drainage or irrigation. Surface flow in this system changes based on precipitation and groundwater levels; surface flow can also be artificially controlled. Segments of the intermittent stream in the eastern corner of the AOI can be classified as a ditch/artificial intermittent stream ecological community based on human influence.

Vernal pools are categorized by *Ecological Communities* as a type of palustrine forested mineral soil wetland. These aquatic communities are typically located in small depressions within a forested landscape. They are usually intermittently to ephemerally flooded, with inundation most often occurring during spring months or after substantial rainfall; these areas tend to be drier in summer months and wetter during spring and fall months. Vernal pools are usually characterized by allochthonous organic matter input, with thick leaf litter from the surrounding forest providing energy to the ecosystem. Given their suitable characteristics and protection from fish predation, these aquatic communities typically support a high biodiversity of invertebrates and amphibians, particularly for breeding habitat. Vegetation is dominated by hydrophytic plant species, some examples being spikerush (*Eleocharis acicularis*), water purslane (*Ludwigia palustris*), duckweed (*Lemna minor*), and water-hemlock (*Cicuta maculata*). A vernal pool habitat was identified by C&S staff in the northern corner of the site.

Ecological Communities defines a paved road/path as a pathway or road that has been paved with brick, concrete, stone, asphalt, or other suitable materials, that may contain sparse vegetation in cracks and crevices. There are two main paved roads within the AOI, one running northeast-southwest along the western boundary of the AOI and the second running perpendicular to the first along the southern boundary of the site.

Urban structure exterior is described in *Ecological Communities* as a structure with an exterior comprised of metal, wood, or concrete. These structures include commercial or residential buildings, or bridges, as well as any structural surface made of inorganic materials like glass or plastic. Residential structures are located in the southwestern portion of the AOI.

The Ecological Communities Cover Type Map (Figure 2) is included in Attachment A. Photographs depicting the site have been included as Attachment B.

RTE Habitat Assessment

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) online service was consulted for this project. The IPaC is used to obtain a USFWS Official Species List (See Attachment C) that identifies the potential presence of federally listed rare, threatened, and endangered species near a proposed action that may be affected by project activities. The USFWS Official Species List dated April 7, 2022 lists two mammals, Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*), one reptile, bog turtle (*Glyptemys muhlenbergii*), one insect, monarch butterfly (*Danaus plexippus*), and one plant, small whorled pogonia (*Isotria medeoloides*). Lastly and according to the IPaC system, there are no critical habitats located within the property and no other Federally threatened or endangered species, or environmentally-sensitive habitat areas were identified.

The New York State Department of Environmental Conservation (NYSDEC) Environmental Resource Mapper (ERM) website provides generalized locations of animal and plant species listed as endangered or threatened known to occur within the vicinity of an action. The ERM uses the New York Natural Heritage Program (NYNHP) Database with respect to rare species. It is an interactive mapping application that depicts NYNHP data with added buffering; the buffering is species dependent and is intended to depict precise locations of protected species and establish a range where each individual species may occur. Projects that overlap ERM buffer areas require further coordination with NYNHP. In the event ERM rare species buffers do not encompass part or all of a project location, NYNHP indicates that no further coordination is necessary and it can be assumed there are no known records of endangered species within the vicinity of a project. The ERM (See Attachment C) indicates that the project is located in the vicinity of bats listed as endangered or threatened, as well as rare plants listed as endangered, threatened, or rare by New York State. Accordingly, NYNHP has been contacted in respect to rare, threatened, and endangered species.

The response from NYNHP, dated May 31, 2022, listed two mammals, Indiana bat and northern long-eared bat, each within 1.5 miles of the AOI, one ecological community, pitch-pine-oak-heath rocky summit within 1/3-mile northeast of the AOI, and two plants, glaucous sedge (*Carex glaucodea*) and green rock cress (*Borodinia missouriensis*), each within 250 yards north of the AOI.

Below is a description of the project's potential to impact species identified in the USFWS IPaC Resource List and the NYNHP list:

Indiana Bat

Indiana bats are listed as endangered at both the state and federal level, and many details of the species ecology are contained in the draft recovery plan prepared by USFWS[2]. These bats over-winter in caves and mines and migrate to summer habitat as early as mid-April in New York. Suitable winter habitat (hibernacula) includes underground voids such as caves or abandoned mines where winter temperature remains below 50° Fahrenheit (10°C) and above freezing, and are relatively stable. Suitable summer habitat for the Indiana bat consists of trees greater than 2.5 inches in diameter at breast height (dbh), with cracks, crevices, or exfoliating bark[3].

During summer, groups of females, their dependent pups, and occasional males form groups called maternity colonies. Maternity colonies may be spread among multiple trees with individual bats changing roosts every few days. Trees

[2] U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp.

[3] U.S. Fish and Wildlife Service (USFWS). May 2017. Indiana Bat Project Review Fact Sheet, New York Field Office. 4 pp.

used by large portions of a maternity colony for all or part of the summer are termed primary roosts. Trees used by smaller numbers of bats for short periods of time are called alternate roosts. Primary roost trees are typically large dead or dying trees with exfoliating bark that usually receive direct sunlight for more than half the day; habitats most typical for primary roosts include riparian zones, bottomland and floodplain forests, forested wetlands, and upland communities at elevations less than 900 feet above mean sea level (North American Vertical Datum of 1988)[4]. Males tend to roost individually or in small numbers in trees with exfoliating bark, cracks, and crevices. Throughout the summer, Indiana bats forage in semi-open to closed (open understory) forested habitats, forest edges (i.e. fencerow, maintained right-of-way corridor), and riparian areas. Most bats leave their summer areas by October and return to the caves.

The USFWS IPaC and NYNHP (see Attachment C) both indicate that the project is within the range of Indiana bats. The 2007 draft recovery plan indicates that the nearest hibernacula is located within Ulster County, New York approximately 30-miles north of the AOI. The 2007 draft recovery plan also indicates that eight extant maternity colonies exist within Orange County, New York.

The ERM indicates records (i.e. summer roosts, hibernacula) for Indiana bat within the vicinity of the project. The USFWS IPaC and NYNHP (see Attachment C) indicate that the project is within the range of Indiana bats. The 2007 draft recovery plan does not list hibernaculum for Indiana bat within Orange County; however, further correspondence with NYNHP staff confirmed that the survey year for Indiana bat hibernaculum that was reported in the NYNHP letter was 2011, after the draft recovery plan was released. Given that the project is within the range of the species, the possibility exists for this species to use the site during the summer months.

The AOI consists of chestnut oak forest with an intermittent stream system in the eastern corner of the site. The AOI is dominated by chestnut oak (*Quercus montana*) and red oak (*Quercus rubra*) (both species ranging from 8 to 20-inch dbh), with an eastern hemlock (*Tsuga canadensis*) stand (14 to 16-inch dbh) in the northeastern portion of the site. Young shagbark hickory (*Carya ovata*), approximately 9 to 10-inch dbh, were sparsely scattered throughout the site.

[4] U.S. Fish and Wildlife Service (USFWS). 2007. Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, MN. 258 pp.

American beech (*Fagus grandifolia*) was also located throughout the site, ranging from 15 to 24-inch dbh with more mature trees. Five potential roost trees were identified by C&S staff during the April 12, 2022 site visit (Attachment A, Figure 3). Two chestnut oak trees, each with approximately 24- inch dbh were identified in the northern and eastern portions of the AOI. Three shagbark hickory trees (9-inch, 10-inch, and 12-inch dbh) were identified in the central and southern portions of the AOI. The NYSGIS Clearinghouse website indicates that minimal disturbance has occurred within the AOI since 1994[5].

The proposed project involves development of a 310-unit residential subdivision; therefore, the area will be cleared prior to construction. Proximity to an existing hibernacula and presence of potential roost trees indicates that the AOI may be used by roosting and foraging bats during summer months.

Northern long-eared bat

The northern long-eared bat is listed as endangered at the state and federal levels. The northern long-eared bat winters in caves and mines and migrates seasonally to summer roosts in dead and decadent trees. Northern long-eared bats are typically associated with mature interior forest[6] and tend to avoid woodlands with significant edge habitat[7]. They may most often be found in cluttered or densely forested areas including in uplands and at streams or vernal pools[8]. They may use small openings or canopy gaps as well. Some research suggests that northern long-eared bats forage on forested ridges and hillsides rather than in riparian or floodplain forests. Captures from New York suggest that northern long-eared bats may also be found using younger forest types[9]. This species selects day roosts in dead or live trees under loose bark, or

[5] New York State GIS Clearinghouse. N.D. Discover GIS Data NY – View, Download, Connect. Available from: https://orthos.dhses.ny.gov. Accessed June 27, 2022.
[6] Carroll, S. K., T. C. Carter and G. A. Feldhamer. 2002. Placement of nets for bats: effects on perceived fauna. Southeastern Naturalist 1:193-198.
[7] Yates, M. and R. Muzika. 2006. Effect of forest structure and fragmentation on site occupancy of bat species in Missouri Ozark forests. Journal of Wildlife Management 70:1238-1248.
[8] Brooks, R. T. and W. M. Ford. 2005. Bat Activity in a Forest Landscape of Central Massachusetts. Northeastern Naturalist 12:447-462.
[9] New York Natural Heritage Program. 2016. Online Conservation Guide for Myotis septentrionalis. Available from: http://www.acris.nynhp.org/guide.php?id=7407. Accessed October 9, 2017.

in cavities and crevices, and may sometimes use caves as night roosts[10]. They may also roost in buildings or behind shutters. A variety of tree species are used for roosting. The structural complexity of surrounding habitat and availability of roost trees may be important factors in roost selection[11]. Roosts of female bats tend to be large diameter, tall trees, and in at least some areas, located within a less dense canopy[12]. Northern long-eared bats hibernate in caves and mines where the air temperature is constant, preferring cooler areas with high humidity[13].

A site visit was conducted on April 12, 2022 to visually assess the suitability of the project habitat for northern long-eared bats. The AOI contains chestnut oak forest with an intermittent stream system in the eastern corner of the site. Five potential roost trees were identified by C&S staff during the April 12, 2022 site visit (Attachment A, Figure 3). Two chestnut oak trees, each with approximately 24-inch dbh were identified in the northern and eastern portion of the AOI. Three shagbark hickory trees (9-inch, 10-inch, and 12-inch dbh) were identified in the central-southern portion of the AOI. The NYSGIS Clearinghouse website indicates that minimal disturbance has occurred within the AOI since 1994[5].

The proposed project involves development of a 310-unit residential subdivision; therefore, the area will be cleared prior to construction. Proximity to existing hibernacula and presence of potential roost trees indicates that the AOI may be used by foraging bats during summer months. The ERM provides information regarding known occurrences of northern long-eared bat, indicating that the AOI is located in the vicinity of bats listed as threatened or endangered.

In New York, a permit is required for the “take” of protected species under the Uniform Procedures Act that includes direct impact to the species as well as

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[10] U.S. Fish and Wildlife Service. 2013. 12-Month finding on a petition to list the eastern small-footed bat and the northern long-eared bat as threatened or endangered; Listing the northern long-eared bat as an endangered species; Proposed rule. Vol. 78 No.

[11] Carter, T. C. and G. A. Feldhamer. 2005. Roost tree use by maternity colonies of Indiana bats and northern long-eared bats in southern Illinois. Forest Ecology and Management 219:259-268.

[12] Sasse, D. B. and P. J. Pekins. 1996. Summer roosting ecology of northern long-eared bats (Myotis septentrionalis) in the White Mountain National Forest. Pp. 91-101 in Proceedings of the Bats and Forests Symposium of the British Columbia Ministry of Forest.

[13]U.S. Fish and Wildlife Service. 2013. 12-Month finding on a petition to list the eastern small-footed bat and the northern long-eared bat as threatened or endangered; Listing the northern long-eared bat as an endangered species; Proposed rule. Vol. 78 No.

adverse modification to habitat. The New York State Department of Environmental Conservation (NYSDEC) considers impacts to “occupied” habitat as well as direct impacts to the species. NYSDEC requirements for northern long-eared bat protection are consistent with USFWS in areas that are not considered “occupied habitat”. NYSDEC defines occupied habitat as those areas within five (5) miles of a known hibernacula, or 1.5 miles from a documented summer occurrence. NYNHP identifies northern long-eared bat hibernaculum within 1.5 miles of the project AOI. The proposed project area is in occupied habitat, and therefore additional NYSDEC requirements are necessary.

Bog Turtle

The habitat of bog turtles generally consists of small, open-canopy, herbaceous sedge meadows and fens. In the bog turtle’s northern range, seepage or spring-fed emergent wetlands associated with streams are the primary habitat[14]. In New York, bog turtles typically inhabit open, early successional wetlands, including, wet meadows, or calcareous bogs dominated by sedges or sphagnum moss[15].

Wetlands delineated on site contain a shallow rock restrictive layer with dense leaf litter and approximately 2 to 3 inches of gravelly sandy loam soil which support a seasonally flooded vernal pool/emergent marsh habitat; therefore, wetlands on site do not exhibit bog turtle habitat and are unlikely to support a bog turtle population. In addition, sediment and erosion control plans, and implementation of stormwater management practices, will be developed during the design of the proposed project and will be consistent with the NYS Department of Transportation Standard Specification for Temporary Soil and Erosion and Water Pollution Control, the New York State Stormwater Management Design Manual, and the NYS Guidelines for Urban Erosion and Sediment Control. Adherence to design standards, inspection and quality control during construction and periodic cleaning of erosion control features should minimize and mitigate the potential for erosion and sedimentation to impact downstream waters.

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[14] U.S. Fish & Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population; Recovery Plan.

[15] N.Y.S. Department of Environmental Conservation. 2008. Bog Turtle Fact Sheet; Bog Turtle *Clemmys muhlenbergii*. Available from: https://www.nrc.gov/docs/ML0833/ML083380545.pdf. Accessed April 11, 2022.

Based on the aforementioned information, no significant impacts to the bog turtle are anticipated as a result of the proposed project.

Monarch Butterfly

The monarch butterfly can be found in varying habitats, so long as milkweed (for breeding) and flowering plants (for nectar) are present. No milkweed plants were observed by C&S staff during either the April 12 or June 13 site visit. Further, the monarch butterfly is considered a candidate species and is not listed as threatened or endangered; therefore, requirements associated with potential presence of endangered or threatened species do not apply to this species[16].

Small Whorled Pogonia

The USFWS Official Species List indicates that small whorled pogonia is federally listed as threatened. According to the New York Flora Association (NYFA), small whorled pogonia is extant in New York State, and is historically known to have occurred in Orange County[17]. This plant generally occurs in open, dry, deciduous woods (typically dominated by oaks) with acidic soils. In areas where there is relatively high shrub coverage or high sapling density, flowering appears to be inhibited. The majority of existing locations of this species have sparse to moderate ground cover, relatively open understory, and are usually located near breaks in the canopy[18]. Small whorled pogonia is associated with chestnut oak forest habitats (that of the project AOI), among other ecological communities[19].

The USFWS Official Species List indicated the potential presence of small whorled pogonia in the project area. The initial April 12, 2022 site visit indicated that the AOI contains potentially suitable habitat for small whorled pogonia. A second site visit involving a survey for small whorled pogonia was conducted

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[16] U.S. Fish & Wildlife Service. N.D. *Danaus plexippus* Overview. Available from https://www.fws.gov/species/monarch-butterfly-danaus-plexippus. Accessed June 29, 2022.

[17] New York Flora Association. 2010. Endangered Small Whorled Pogonia Rediscovered in New York After Decades of Search. Available from: https://nyflora.org/endangered-small-whorled-pogonia-rediscovered-in-new-york-after-decades-of-search/. Accessed April 19, 2022.

[18] Wetland Studies & Solutions, Inc. N.D. Field Notes; Endangered and Threatened Species Alert: Small Whorled Pogonia. Available from: https://newsletters.wetlandstudies.com/newsletters/may03/pogonia_0503.htm. Accessed April 11, 2022.

[19] New York Natural Heritage Program. 2022. Online Conservation Guide for *Carex glaucodeai*. Available from: https://guides.nynhp.org/glaucous-sedge/. Accessed June 27, 2022.

on June 13, 2022, during the flowering season for the plant (generally flowering buds emerge in May and bloom in June[18]). C&S staff did not find any small whorled pogonia plants during the June 13, 2022 survey.

Glaucous sedge

Glaucous sedge is currently listed as threatened on the state level and is not listed at the federal level. This plant occurs primarily in the eastern portion of the state. It typically occurs in wet to mesic-dry deciduous forests and old fields, especially along the fringes of seasonally wet swamps and depressions. It also prefers clay or loam soils in calcareous woodland. It commonly grows along human and deer paths within forest habitats.

The NYNHP species list indicated the presence of glaucous sedge within 250 yards north of the AOI. The initial April 12, 2022 site visit indicated that the AOI contains potentially suitable habitat for glaucous sedge. A second site visit involving a survey for glaucous sedge was conducted on June 13, 2022, during the fruiting season for the plant (June through July[19]). C&S staff did not find any glaucous sedge plants during the June 13, 2022 survey.

Green rock cress

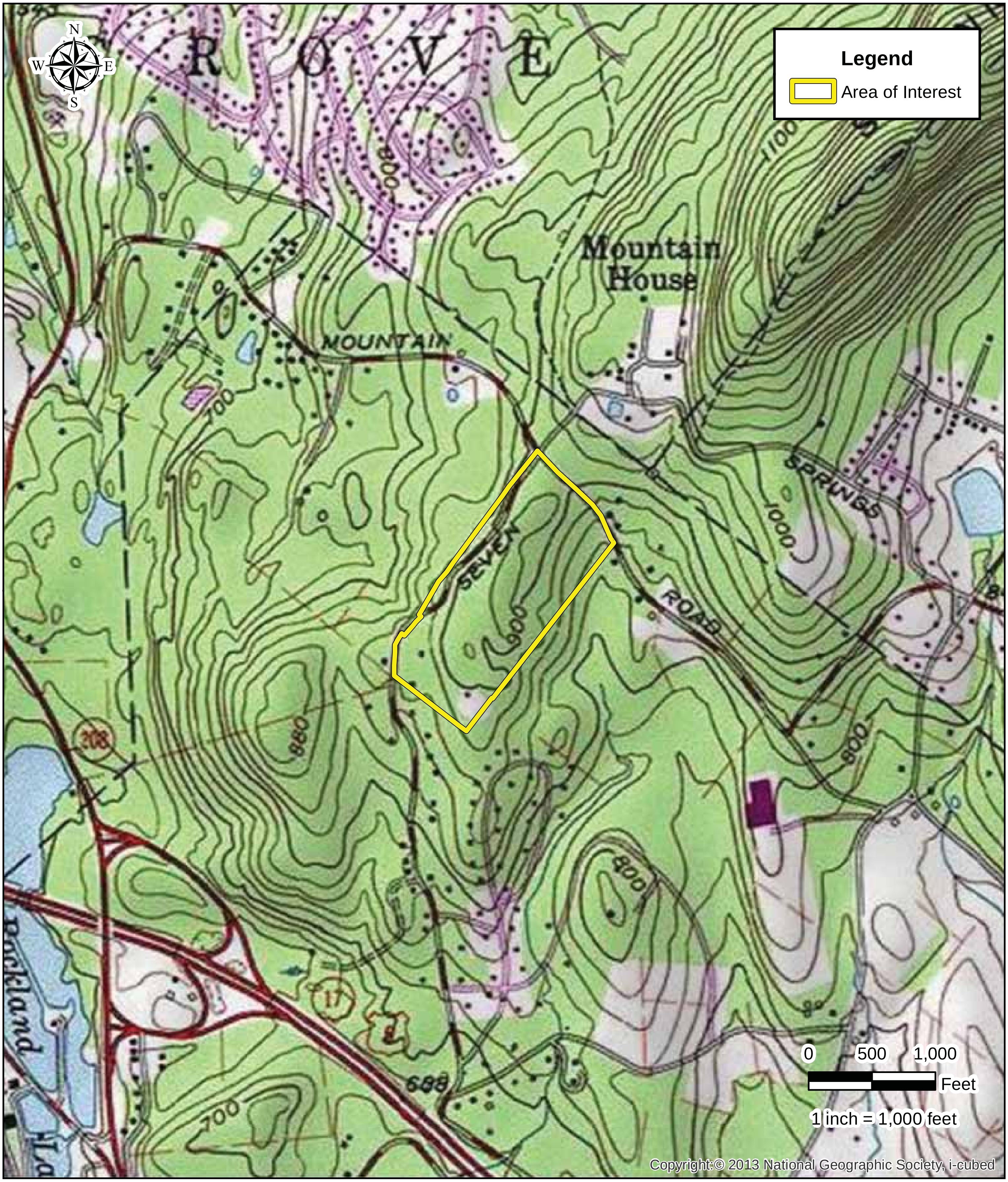
Green rock cress is currently listed as threatened at the state level and is not listed at the federal level. This plant is located throughout eastern New York. It typically prefers rocky upland habitats, particularly crevices of rock outcrops, ledges, and cliffs. It tends to be found in more open habitats with acidic, circumneutral, or calcareous conditions.

The NYNHP species list indicated the presence of glaucous sedge within 250 yards north of the AOI and the initial April 12, 2022 site visit indicated that the AOI contains potentially suitable habitat for green rock cress. However, the dominant ecological community, chestnut oak forest, observed within the AOI is not typically associated with green rock cress[20]. A second site visit involving a survey for green rock cress was conducted on June 13, 2022, during the fruiting season for the plant (June through July[20]). C&S staff did not find any glaucous sedge plants during the June 13, 2022 survey.

[20] New York Natural Heritage Program. 2022. Online Conservation Guide for *Borodinia missouriensis*. Available from: https://guides.nynhp.org/green-rock-cress/. Accessed June 27, 2022.

Further investigation into the project's potential to impact Indiana bat and Northern long-eared abt is warranted due to proximity of a known hibernacula. A seasonal restriction relative to tree clearing should occur to avoid direct take of protected bat species. With respect to the other listed plant and animal species identified as occurring near the project site, it is our opinion that the proposed project will not result in significant adverse effects including the bog turtle, small whorled pogonia, glaucous sedge, and green rock cress during and post-construction. No impacts to the monarch butterfly are anticipated as a result of this project as the project area does not provide suitable habitat. Further, the monarch butterfly is considered a candidate species and is not listed as threatened or endangered; therefore, requirements associated with potential presence of endangered or threatened species do not apply to this species

ATTACHMENT A
FIGURES

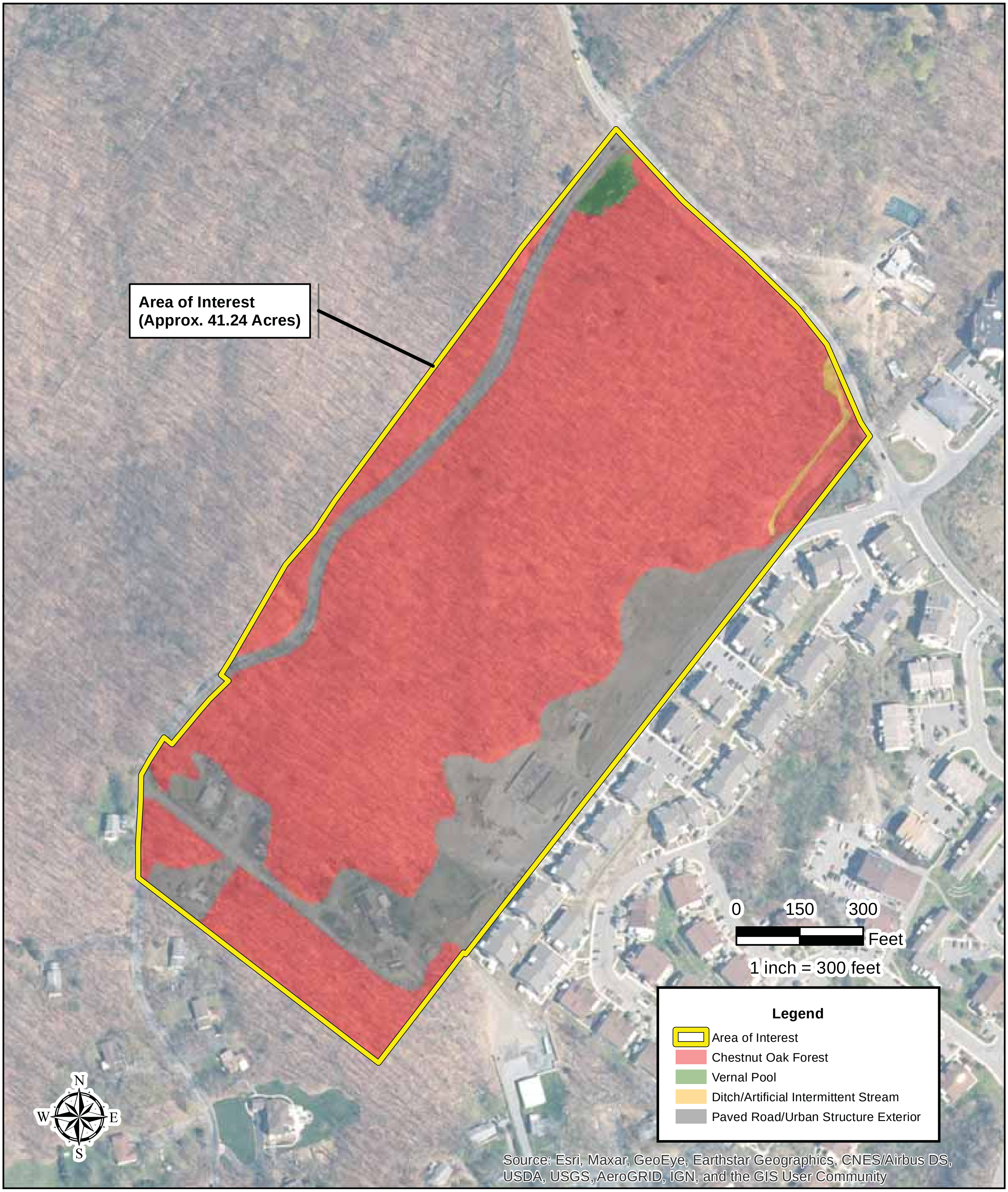


Sources: Created by C&S Engineers, Inc.

C&S COMPANIES®

Figure 1 | Project Location Map

Brach & Mann Associates Inc.
Karlsburg Acres Project Site
Town of Palm Tree, Orange County, NY



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Sources: . Created by C&S Engineers, Inc.

Modified: 8/9/2022 @ 10:23 PM

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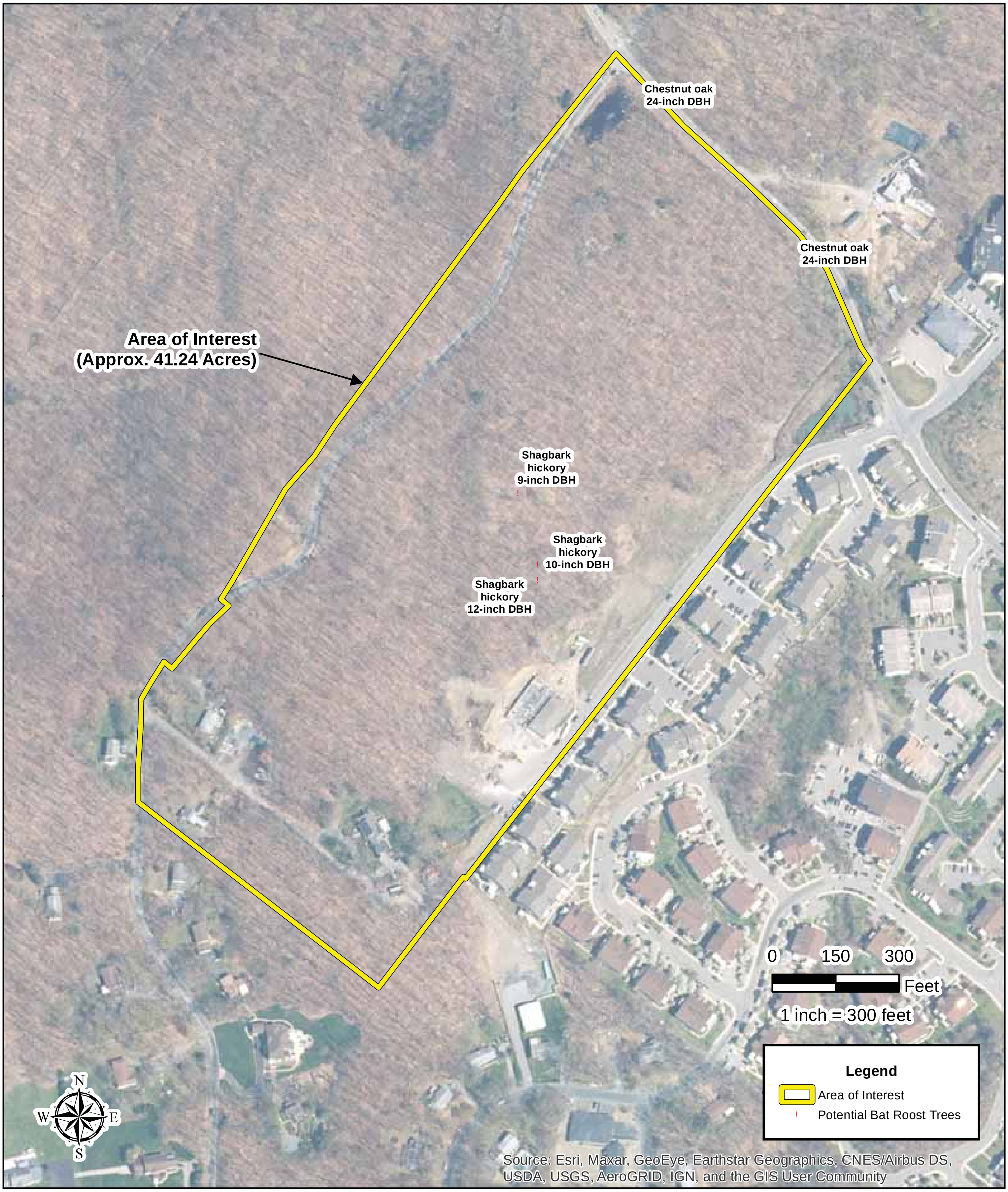
Figure 2 | Ecological Communities Cover Type Map

Brach & Mann Associates Inc.

Karlsburg Acres Project Site

Town of Palm Tree, Orange County, NY



Sources: . Created by C&S Engineers, Inc.

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Figure 3 | Potential Bat Roost Trees

Brach & Mann Associates Inc.

Karlsburg Acres Project Site

Town of Palm Tree, Orange County, NY

ATTACHMENT B
SITE PHOTOGRAPHS

Photo Documentation

Project: Karlsburg Acres Development
Village of Kiryas Joel, Orange County, New York

Photo 1 – Stream A (Intermittent Stream/Ditch/Artificial Intermittent Stream) facing northeast, view of Karlsburg Road in the background.

Photos 2 (Left) and 3 (Right) – Stream A culverts facing northeast (Left) and east (Right).

Photo Documentation

Project: Karlsburg Acres Development
Village of Kiryas Joel, Orange County, New York

Photo 4 – Wetland B (Vernal Pool) facing northwest, view of Seven Springs Road in the background.

Photo 5 – Wetland C (Vernal Pool) facing southeast, view of Seven Springs Road in the background.

Photo 6 – Chestnut oak forest representative photo.

Photo 7 – Chestnut oak forest representative photo.

Photo Documentation

Project: Karlsburg Acres Development
Village of Kiryas Joel, Orange County, New York

Photo 8 – Potential roost tree, shagbark hickory (*Carya ovata*) at 9-inch dbh, central portion of site.

Photo 9 – Potential roost tree, shagbark hickory (*Carya ovata*) at 12-inch dbh, central-southern portion of site.

Photo Documentation

Project: Karlsburg Acres Development
Village of Kiryas Joel, Orange County, New York

Photo 10 – Potential roost tree, shagbark hickory (*Carya ovata*) at 10-inch dbh, central-southern portion of site.

Photo 11 – Potential roost tree, chestnut oak *(Quercus montana)* at 24-inch dbh, eastern portion of site.

Photo Documentation

Project: Karlsburg Acres Development
Village of Kiryas Joel, Orange County, New York

Photo 11 – Potential roost tree, chestnut oak *(Quercus montana)* at 24-inch dbh, northern portion of site.

ATTACHMENT C

RTE INFORMATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo/es/section7.htm

In Reply Refer To: April 07, 2022
Project Code: 2022-0029525
Project Name: Karlsburg- Acres Development Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. **Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.**

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

Project Summary

Project Code: 2022-0029525
Event Code: None
Project Name: Karlsburg- Acres Development Project
Project Type: Commercial Development
Project Description: Development
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.352867450000005,-74.17815567074449,14z

Counties: Orange County, New York

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle *Glyptemys muhlenbergii* Population: Wherever found, except GA, NC, SC, TN, VA No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Small Whorled Pogonia *Isotria medeoloides* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: C&S Engineers, Inc.
Name: Shannon Booth
Address: 499 Col Eileen Collins Boulevard
City: Syracuse
State: NY
Zip: 13212
Email sbooth@cscos.com
Phone: 3159855938

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
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May 31, 2022

Shannon Booth
C&S Engineers, Inc.
499 Col Eileen Collins Boulevard
Syracuse, NY 13212

Re: Karlsburg Acres Development Project
County: Orange Town/City: Monroe

Dear Shannon Booth:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur in the vicinity of the project site.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 3 Office, Division of Environmental Permits, at dep.r3@dec.ny.gov.

Sincerely,

Heidi Krahling
Environmental Review Specialist
New York Natural Heritage Program

The following state-listed animals have been documented in the vicinity of the project site.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed.

For information about any permit considerations for the project, please contact the NYSDEC Region 3 Office, Department of Environmental Permits, at dep.r3@dec.ny.gov, (845) 256-3054.

The following species has been documented within 1.5 miles of the project site. Individual animals may travel 2.5 miles from documented locations. The main impact of concern is the cutting or removal of potential roost trees.

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	FEDERAL LISTING	
Mammals				
Indiana Bat *Hibernaculum*	*Myotis sodalis*	Endangered	Endangered	12787

The following species has been documented within 1.5 miles of the project site. Individual animals may travel 5 miles from documented locations. The main impact of concern is the cutting or removal of potential roost trees.

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	FEDERAL LISTING	
Mammals				
Northern Long-eared Bat *Hibernaculum*	*Myotis septentrionalis*	Threatened	Threatened	14145

This report only includes records from the NY Natural Heritage database.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

The following rare plants, rare animals, and significant natural communities have been documented at the project site, or in its vicinity.

We recommend that potential impacts of the proposed project on these species or communities be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine whether a species currently occurs at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following natural community is considered significant from a statewide perspective by the NY Natural Heritage Program. By meeting specific, documented criteria, the NY Natural Heritage Program considers this community occurrence to have high ecological and conservation value.

COMMON NAME	HERITAGE CONSERVATION STATUS
Upland/Terrestrial Communities	
Pitch Pine-Oak-Heath Rocky Summit	High Quality Occurrence of Uncommon Community Type

Documented within 1/3 mile northeast of the project site. The summit is small and in good condition. The community is intermediate between rocky summit and chestnut oak forest. 10155

The following plants are listed as Endangered or Threatened by New York State, and/or are rare in New York State, and so are a vulnerable natural resource of conservation concern.

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	HERITAGE CONSERVATION STATUS
Vascular Plants			
Glaucous Sedge	*Carex glaucodea*	Threatened	Imperiled in NYS

Documented within 250 yards north of the project site. 2020-05-28: The plants are growing along an old road in an oak-hickory forest. The dominant tree species are Quercus rubra and Carya glabra. 7853

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	HERITAGE CONSERVATION STATUS
Green Rock Cress	*Borodinia missouriensis*	Threatened	Imperiled in NYS

Documented within 250 yards north of the project site. 2003-07-03: This population is in a Carya ovalis or Carya glabra dominated woodland or forest on a slight southwest-facing slope. The canopy is somewhat open. The area is adjacent to a power-line cut and a disturbed field. Other species present include Carex umbellata and Cerastium arvensis. 10778

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

Information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org. For descriptions of all community types, go to www.dec.ny.gov/animals/29384.html for Ecological Communities of New York State.

Environmental Resource Mapper

The coordinates of the point you clicked on are:

UTM 18	**Easting:**	568593.9823169729	**Northing:**	4578493.071557577
Longitude/Latitude	**Longitude:**	-74.17998014404202	**Latitude:**	41.355027191557525

The approximate address of the point you clicked on is:
Town of Monroe, New York

County: Orange
Town: Monroe
USGS Quad: MONROE

Natural Communities in the Vicinity

Natural Community Name: Pitch pine-oak-heath rocky summit
Location: Schunnemunk Mountain House
Significance: High Quality Occurrence of Uncommon Community Type

Rare Plants and Rare Animals

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

This location is in the vicinity of Rare Plants Listed as Endangered, Threatened, or Rare by NYS

National Wetands Inventory

Attribute: PFO1E
Type: Freshwater Forested/Shrub Wetland
Acres: 0.639438957

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.

Appendix E

Rare, Threatened, and Endangered Species Correspondence

Environmental Resource Mapper

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

May 31, 2022

Shannon Booth
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499 Col Eileen Collins Boulevard
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Heidi J. Krahling

Heidi Krahling
Environmental Review Specialist
New York Natural Heritage Program

311

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo/es/section7.htm

In Reply Refer To: April 07, 2022
Project Code: 2022-0029525
Project Name: Karlsburg- Acres Development Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. **Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.**

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

Project Summary

Project Code: 2022-0029525
Event Code: None
Project Name: Karlsburg- Acres Development Project
Project Type: Commercial Development
Project Description: Development
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.352867450000005,-74.17815567074449,14z

Counties: Orange County, New York

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle *Glyptemys muhlenbergii* Population: Wherever found, except GA, NC, SC, TN, VA No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Small Whorled Pogonia *Isotria medeoloides* Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: C&S Engineers, Inc.
Name: Shannon Booth
Address: 499 Col Eileen Collins Boulevard
City: Syracuse
State: NY
Zip: 13212
Email sbooth@cscos.com
Phone: 3159855938

Appendix F

SHPO Correspondence

September 02, 2022

Bryan Bayer
Managing Environmental Scientist
C&S Companies
499 Col. Eileen Collins BLVD
Syracuse, NY 13212

Re: USACE
Karlsburg Acres Development
22PR06358

Dear Bryan Bayer:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8).

Based upon this review, it is the opinion of the New York SHPO that no historic properties, including archaeological and/or historic resources, will be affected by this undertaking.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Roger Daniel Mackay

R. Daniel Mackay

Deputy State Historic Preservation Officer
Division for Historic Preservation

Appendix G

Traffic Impact Study

Traffic Impact Study

Karlsburg Acres
Village of Kiryas Joel
Orange County, NY
Project No. 22003343A

September 7, 2022

Prepared for:

Brach & Mann Associates
254 Nininger Road, Suite 201
Monroe, NY 10950

Prepared by:

Philip J. Grealy, Ph.D., P.E.
Geographic Discipline Leader
NY Professional Engineer
License No. 59858

400 Columbus Avenue
Suite 180E
Valhalla New York 10595
Main: 877-627-3772
Colliersengineering.com

Accelerating success.

Table of Contents

Appendices

I. Introduction

A. Project Description and Location

(Figure No. 1)

This report has been prepared to evaluate the potential traffic impacts associated with the proposed mixed-use development, which is proposed to include 608 residential units, an approximately 18,000 square foot retail/office building, and an approximately 6,000 square foot Shul (neighborhood worship center) located off of Karlsburg Road south of Seven Springs Road in the Village of Kiryas Joel, Orange County, New York. As shown on Figure No. 1, access to the development is proposed via one driveway connection from Karlsburg Road and two driveway connections from Seven Springs Road.

A Design Year of 2026 has been utilized in completing the traffic analysis in order to evaluate future traffic conditions associated with this proposed development.

B. Scope of Study

This study has been prepared to identify current and future traffic operating conditions on the surrounding roadway network and to assess the potential traffic impacts of the proposed residential development.

All available traffic count data for the study area intersections were obtained from previous reports prepared by our office. These data were supplemented with new traffic counts collected by representatives of Colliers Engineering & Design CT, P.C. These data were also compared to count data obtained from the New York State Department of Transportation (NYSDOT) as well as to the data from the "Comprehensive Traffic Impact Study" prepared for the Village of Kiryas Joel by Creighton Manning dated September 2020. Together these data were utilized to establish the Year 2022 Existing Traffic Volumes representing existing traffic conditions in the vicinity of the site.

The Year 2022 Existing Traffic Volumes were then projected to the 2026 Design Year to take into account background traffic growth. In addition, traffic for other specific potential or approved developments in the area were estimated and then added to the Projected Traffic Volumes to obtain the Year 2026 No-Build Traffic Volumes.

Estimates were then made of the potential traffic that the proposed development would generate during each of the peak hours (see Section III-C for further discussion). The resulting site generated traffic volumes were then added to the roadway system and combined with the Year 2024 No-Build Traffic Volumes resulting in the Year 2026 Build Traffic Volumes.

The Existing, No-Build and Build Traffic Volumes were then compared to roadway capacities based on the procedures from the Highway Capacity Manual to determine existing and future

Levels of Service and operating conditions. Recommendations for improvements were made where necessary to serve the existing and/or future traffic volumes.

II. Existing Roadway and Traffic Descriptions

A. Description of Existing Roadways

As shown on Figure No. 1, the proposed mixed-use development will be accessed from one driveway connection via Karlsburg Road and two driveway connections from Seven Springs Road. The following is a brief description of the roadways located within the study area. In addition, Section III-F provides a further description of the existing geometrics, traffic control and a summary of the existing and future Levels of Service and any recommended improvements for each of the study area intersections. Appendix "D" contains copies of the capacity analyses which indicate the existing geometrics (including lane widths) and other characteristics for each of the individual intersections studied.

1. <u>Seven Springs Road</u>
   Seven Springs Road is a two-lane roadway, which traverses in a generally north/south direction in the vicinity of the site. The roadway has a double yellow centerline with and no shoulders. The posted speed limit is 30 MPH.

2. <u>Seven Springs Mountain Road (CR 44)</u>
   Seven Springs Mountain Road is a two-lane County roadway that generally traverses in an eastbound until its split with Mountain Road where it then traverses northbound until its termination as the western leg of a four-legged intersection with Forest Road/Schunnemunk Road opposite Seven Springs Road. The roadway has a double yellow centerline and white edge line with paved shoulders. The speed limit on this roadway is posted at 30 MPH. The intersection of Seven Springs Mountain Road (CR 44) and Mountain Road is planned to be improved by the County to form more of a standard "T" intersection with turning lanes.

3. <u>Karlsburg Road</u>
   Karlsburg is a two-lane local roadway that begins at its intersection with Seven Springs Mountain Road opposite Chevron Road and currently terminates as a dead-end. This roadway has a double yellow centerline, no posted speed limit, and serves existing residential uses.

4. <u>Nickelsburg Road</u>

   Nickelsburg Road is a two-lane local roadway that begins at its intersection with Seven Springs Mountain Road and currently terminates at a dead-end cul-de-sac. This roadway has a double yellow centerline, no posted speed limit, and serves existing residential uses. It is planned to connect to the Forest Edge development, which in turn will connect to Forest Road.

5. <u>Mountain Road</u>

   Mountain Road is a two-lane local roadway that begins at its intersection with Seven Springs Road and terminates at its intersection with Forest Road. This roadway has a double yellow centerline and white edge line, no, posted speed limit, and serves existing residential uses.

B. Year 2022 Existing Traffic Volumes

(Figures No. 2 and 3)

Manual traffic counts were collected by representatives of Colliers Engineering & Design CT, P.C. on Friday, June 17, 2022 (2:00 PM – 7:00 PM) for the Friday PM Peak Hours, Sunday, June 19, 2022 (11:00 AM – 3:00 PM) for the Sunday Midday Peak Hours, and Tuesday, June 21, 2022 for the AM Peak Hours to determine the existing traffic volume conditions at the study area intersections. These traffic counts were then compared to traffic volume data from previous traffic studies conducted by our office and to traffic volume data available from the New York State Department of Transportation (NYSDOT) for the roadways as week as from the "Comprehensive Traffic Impact Study" prepared for the Village of Kiryas Joel by Creighton Manning dated September 2020. Based on this information, the Year 2022 Existing Traffic Volumes were established for the Weekday Peak AM and Friday Peak PM Hours at the following study area intersections.

- Seven Springs Mountain Road & Karlsburg Road
- Seven Springs Mountain Road & Nickelsburg Road
- Seven Springs Mountain Road & Mountain Road
- Seven Springs Road and Seven Springs Mountain Road

Based upon a review of the traffic counts, the critical peak hours were generally identified as follows:

- Weekday Peak AM Hour 8:30 AM – 9:30 AM
- Friday Peak PM Hour 2:00 PM – 3:00 PM

The resulting Year 2022 Existing Traffic Volumes are shown on Figures No. 2 and 3 for the Weekday Peak AM Hour and Friday Peak PM Hours, respectively. Note that Sunday Peak Hour volumes were collected for the area intersections. Generally, these volumes were found to be comparable to or less than the Friday Peak and no further analysis of the Sunday Peak conditions was undertaken. Similarly, the volumes for other Weekday PM Peak Hours were found to be lower than the Friday Peak and these were not analyzed in detail.

III. Evaluation of Future Traffic Conditions

A. Year 2026 No-Build Traffic Volumes

(Figure No. 4 through 9)

The Year 2022 Existing Traffic Volumes were increased by a growth factor of 2% per year to account for general background growth resulting in the Year 2026 Projected Traffic Volumes which are shown on Figures No. 4 and 5 for each of the Peak Hours. In addition, traffic from other proposed or recently approved developments in the area as well as those contained in the Village Study were also accounted for. The resulting traffic volumes associated with other developments are shown on Figures No. 6 and 7 for each of the peak hours. These volumes were added to the 2026 Projected Traffic Volumes resulting in the Year 2026 No-Build Traffic Volumes which are shown on Figures No. 8 and 9 for the Weekday Peak AM and Friday Peak PM Hours, respectively.

B. Site Generated Traffic Volumes

(Table No. 1)

Estimates of the amount of traffic to be generated by the proposed residential development during each of the peak hours were developed based on a review of information published by the Institute of Transportation Engineers (ITE) as contained in the report entitled "Trip Generation", 11th Edition, 2021, based on Land Use Category – 220 Multi-Family Housing together with localized trip generation data developed by the Village Traffic Consultant. For the commercial portion of the project (office and retail), Land Use Categories 712 and 822 were used to determine the peak trip generation. Also, note that the proposed Shul is for the neighborhood and would not be expected to generate significant external traffic levels. Table No. 1 summarizes the trip generation rates and corresponding site generated traffic volumes that were utilized for the Weekday Peak AM and Friday Peak PM Peak Hours.

C. Arrival/Departure Distribution

(Figures No. 10 and 11)

It was necessary to establish arrival and departure distributions to assign the site generated traffic volumes to the surrounding roadway network. Based on a review of the Existing Traffic Volumes and the expected travel patterns on the surrounding roadway network, the distributions were identified. The anticipated arrival and departure distributions are shown on Figures No. 10 and 11, respectively.

D. 2026 Build Conditions Traffic Volumes

(Figures No. 12 through 15)

The site generated traffic volumes were assigned to the roadway network based on the arrival and departure distributions referenced above. The resulting site generated traffic volumes for each of the study area intersections are shown on Figures No. 12 and 13 for each of the peak hours, respectively. The site generated traffic volumes were then added to the Year 2026 No-Build Traffic Volumes to obtain the Year 2024 Build Traffic Volumes. The resulting Year 2026 Build Traffic Volumes are shown on Figures No. 14 and 15 for the Weekday Peak AM and Friday Peak PM Hours, respectively.

E. Description of Analysis Procedures

It was necessary to perform capacity analyses in order to determine existing and future traffic operating conditions at the study area intersections. The following is a brief description of the analysis method utilized in this report:

- Signalized Intersection Capacity Analysis

  The capacity analysis for a signalized intersection was performed in accordance with the procedures described in the Highway Capacity Manual, 6th Edition, dated 2016, published by the Transportation Research Board. The terminology used in identifying traffic flow conditions is Levels of Service. A Level of Service "A" represents the best condition and a Level of Service "F" represents the worst condition. A Level of Service "C" is generally used as a design standard while a Level of Service "D" is acceptable during peak periods. A Level of Service "E" represents an operation near capacity. In order to identify an intersection's Level of Service, the average amount of vehicle delay is computed for each approach to the intersection as well as for the overall intersection.

- Unsignalized Intersection Capacity Analysis

  The unsignalized intersection capacity analysis method utilized in this report was also performed in accordance with the procedures described in the Highway Capacity Manual, 6th Edition, dated 2016. The procedure is based on total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. The average total delay for any particular critical movement is a function of the service rate or capacity of the approach and the degree of saturation. In order to identify the Level of Service, the average amount of vehicle delay is computed for each critical movement to the intersection.

Additional information concerning signalized and unsignalized Levels of Service can be found in Appendix "C" of this report.

F. Results of Analysis

(Table No. 2)

Capacity analyses which take into consideration appropriate truck percentages, pedestrian activity, roadway grades and other factors were performed at the study area intersections utilizing the procedures described above to determine the Levels of Service and average vehicle delays. Summarized below are a description of the existing geometrics, traffic control and a summary of the existing and future Levels of Service as well as any recommended improvements.

Table No. 2 summarizes the results of the capacity analysis for the 2022 Existing, 2026 No-Build and 2026 Build Conditions. Appendix "D" contains copies of the capacity analysis which also indicate the existing geometrics (including lane widths) and other characteristics for each of the individual intersections studied.

1. Seven Springs Mountain Road and Kalrsburg Road/Chevron Road

   Seven Springs Mountain Road (CR 44) and Karlsburg Road/Chevron Road intersect at a "T" type intersection. Both Karlsburg Road and Chevron Road approaches consist of a single lane and are stop-sign controlled with painted stop bars. Sidewalks are present on the west side of Seven Springs Mountain Road south of the intersection, on the south side of Karlsburg Road, and on the north side of Chevron Road.

   Capacity analysis was conducted for this intersection utilizing the 2022 Existing Traffic Volumes. The analysis results indicate that the intersection is currently operating at a Level of Service "B" during the AM Peak Hour and "C" during the PM Peak Hour.

   The capacity analysis was recomputed using the 2026 No-Build and Build Traffic volumes. These results indicate that the intersection is expected to experience Levels of Service "F" during the AM and PM Peak Hours under future conditions. The installation of a traffic signal, together with turning lanes and other pedestrian improvements, will be required to improves these conditions (see Figure G-1).

2. Seven Springs Mountain Road and Nickelsburg Road

   Seven Springs Mountain Road and Nickelsburg Road intersect at a "T" type intersection. All approaches consist of one lane. Sidewalks are present on both sides of Seven Springs Mountain Road southeast of the intersection and on the west side on Seven Springs Mountain Road heading northwest from the intersection.

   Capacity analysis was conducted for this intersection utilizing the 2022 Existing Traffic Volumes. The analysis results indicate that the intersection is currently operating at an overall Level of Service "B" during the AM and PM Peak Hours.

   The capacity analysis was recomputed using the 2026 No-Build and Build Traffic volumes. These results indicate that the intersection is expected to experience Levels of Service "C" or better during the AM and PM Peak Hours under future conditions. The widening of Seven

Springs Mountain Road to construct a separate left turn lane is planned to be completed at this location as part of the County Seven Springs Mountain Road improvement project. A separate right turn lane should be provided on the eastbound approach and this intersection should also be monitored for a traffic signal installation (see Figure G-1).

3. <u>Seven Springs Mountain Road & Mountain Road</u>

   Seven Springs Mountain Road currently intersects with Mountain Road at essentially three, separate unsignalized intersections, with "Stop" sign control on the northwest-bound Mountain Road movement to Seven Springs Mountain Road, on the northbound right-turn movement from Mountain Road to Seven Springs Mountain Road and on the southbound left-turn movement from Seven Springs Mountain Road to Mountain Road. Capacity analysis was conducted for this intersection utilizing the 2022 Existing Traffic Volumes. The analysis results indicate that the intersection is currently operating at an overall Level of Service "E" during the AM and PM Peak Hours.

   The County has plans to complete the reconstruction of this intersection to a standard "T" intersection. The improvements to this intersection are being advanced by OCDPW in conjunction with the Village and the results in Table 2 reflects these improvements with signalization and turning lanes under future No-Build and Build conditions.

   The capacity analysis was recomputed using the 2026 No-Build and Build Traffic volumes. These results indicate that the intersection is expected to experience overall intersection Levels of Service "D" or better during the AM Peak Hours and "E" under future conditions.

4. <u>Seven Springs Road and Seven Springs Mountain Road</u>

   Seven Springs Road and Seven Springs Mountain Road intersect at an unsignalized intersection with the northbound approach of Seven Springs Road being stop-sign controlled. The Seven Springs Road approach consists of one lane in each direction and the Seven Springs Mountain Road approach also consists of one lane in each direction. There are no sidewalks present.

   Capacity analysis was conducted for this intersection utilizing the 2022 Existing Traffic Volumes. The analysis results indicate that the intersection is currently operating at a Level of Service "B" during the AM and PM Peak Hours.

   The capacity analysis was recomputed using the 2026 No-Build and Build Traffic Volumes. These results indicate that the intersection is expected to experience Levels of Service "F" or better during the AM and PM Peak Hours under future conditions.

   The Village of Kiryas Joel's area wide traffic study indicated the need for signalization and provision of left turn lanes. More specifically, the approaches should be widened for separate left, through, and right turn lanes as depicted on Figure G-1. Also, if possible, the exit approach from the park should be widened and realigned with the Seven Springs Road approach. Note that separate left turn lanes should be provided on both the Seven Springs Road and the Park Access Road for alignment purposes. With signalization and the geometric improvements, the additional traffic generated by the proposed development will be accommodated at overall Levels of Service "C" or better during all hours except Friday afternoon peak when an overall Level of Service "E" will be experienced.

5. Seven Springs Road and Proposed Site Driveways

   Seven Springs Road and two (2) Site Access Drives are proposed. One is a "T" type intersection and the other a four-way aligning with the driveway to the parking area to the west. There is also another connecting driveway through the adjacent East Gate Development, which in turn connects to Seven Springs Road effectively providing a third driveway access to the site.

   Capacity analysis was computed for these locations using the 2026 Build Traffic Volumes. These results indicate that the intersection is expected to experience Levels of Service "C" during the AM and PM Peak Hours under future conditions.

   The widening of Seven Springs Road should include the provision of a separate left turn lane at these locations with sidewalks and enough land dedicated to accommodate an additional lane in the future, as well as to allow a potential realignment of Seven Springs Road at the southerly access. Appropriate pedestrian accommodations should also be made. New striping and stop bars should be included at this location. The central access driveway should be signalized and the northern driveway should be monitored for future signalization.

6. Karlsburg Road and Proposed Site Driveway (Road A)

   Karlsburg Road and the Proposed Site Access is proposed to be built as an extension at the existing Karlsburg Road.

   To accommodate pedestrian movements, crosswalks and stop-sign control should be installed at this location.

   The capacity analysis was recomputed using the 2026 No-Build and Build Traffic volumes. These results indicate that the intersection is expected to experience Levels of Service "C" or better during the AM and PM Peak Hours under future conditions.

G. Summary of Findings and Recommendations

1. Figure G-1 shows the recommended traffic control and lanes for each approach at each intersection.

2. The proposed access connections should be located to provide maximum sight distance along Seven Springs Road. Based on the speed data collected on this roadway, the 85th percentile speed is 35 MPH. The minimum stopping sight distance for this is 250 feet. It appears that appropriate clearing and grading will have to be completed to provide the maximum sight distances for entering and exiting vehicles and this should be indicated on the site plan. The central driveway should be signalized and the north driveway should be monitored for potential signalization.

3. A land dedication strip along Seven Springs Road along the entire site frontage should be given to the Village to accommodate the turn lanes, sidewalks, and any other future road widening.

4. A roadway connection is proposed to the adjacent East Gate development and this will provide both regular and emergency access to the project.

5. The installation of traffic signals at the intersection of Seven Springs Mountain Road and Seven Springs Road as well as at Seven Springs Mountain Road and Karlsburg Road/Chevron Road will be required in the future. Appropriate accommodations in terms of land dedication should be made to accommodate traffic and pedestrian pole placement as well as to accommodate separate right and left turn lane widenings on Seven Springs Mountain Road and should be incorporated into the final site plans.

6. The intersection of Karlsburg Road and Seven Springs Mountain Road should be widened to provide separate right and left turn lanes on all approaches, together with accommodations for the signal installation. The signal installation should include the crosswalks and pedestrian poles with pushbuttons.

7. The intersection of Seven Springs Mountain Road (C.R. 44) and Mountain Road is planned to be re-aligned by the County to a standard "T" intersection. Additionally, the intersection will be signalized and a separate right-turn lane on the southbound Seven Springs Mountain Road will be provided and these improvements have been accounted for in the analyses contained herein. In addition to the separate left turn lane planned by the County, the intersection of Seven Springs Mountain Road and Nickelsburg Road should also be widened to provide a separate eastbound right turn lane and should be monitored for future signalization.

IV. Summary and Conclusion

Based on the above analysis, similar Levels of Service and delays will be experienced at the area intersections under the future No-Build and future Build Conditions with the completion of the improvements planned by the County as well as those outlined above. Thus, proposed mixed-use development traffic is not expected to cause any significant impact in overall traffic operations at the studied intersections.

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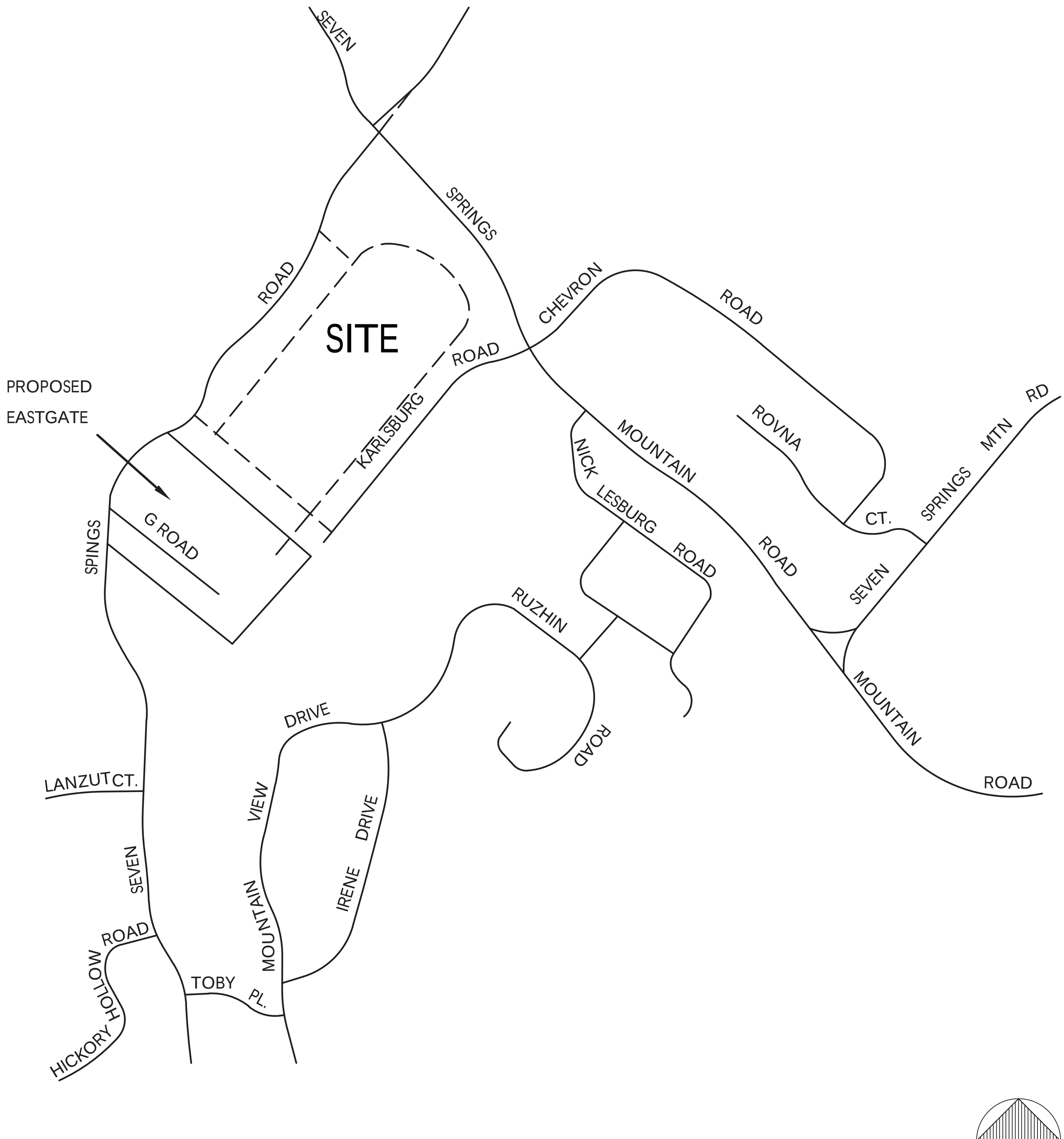
Traffic Impact Study

Appendix A | Traffic Figures



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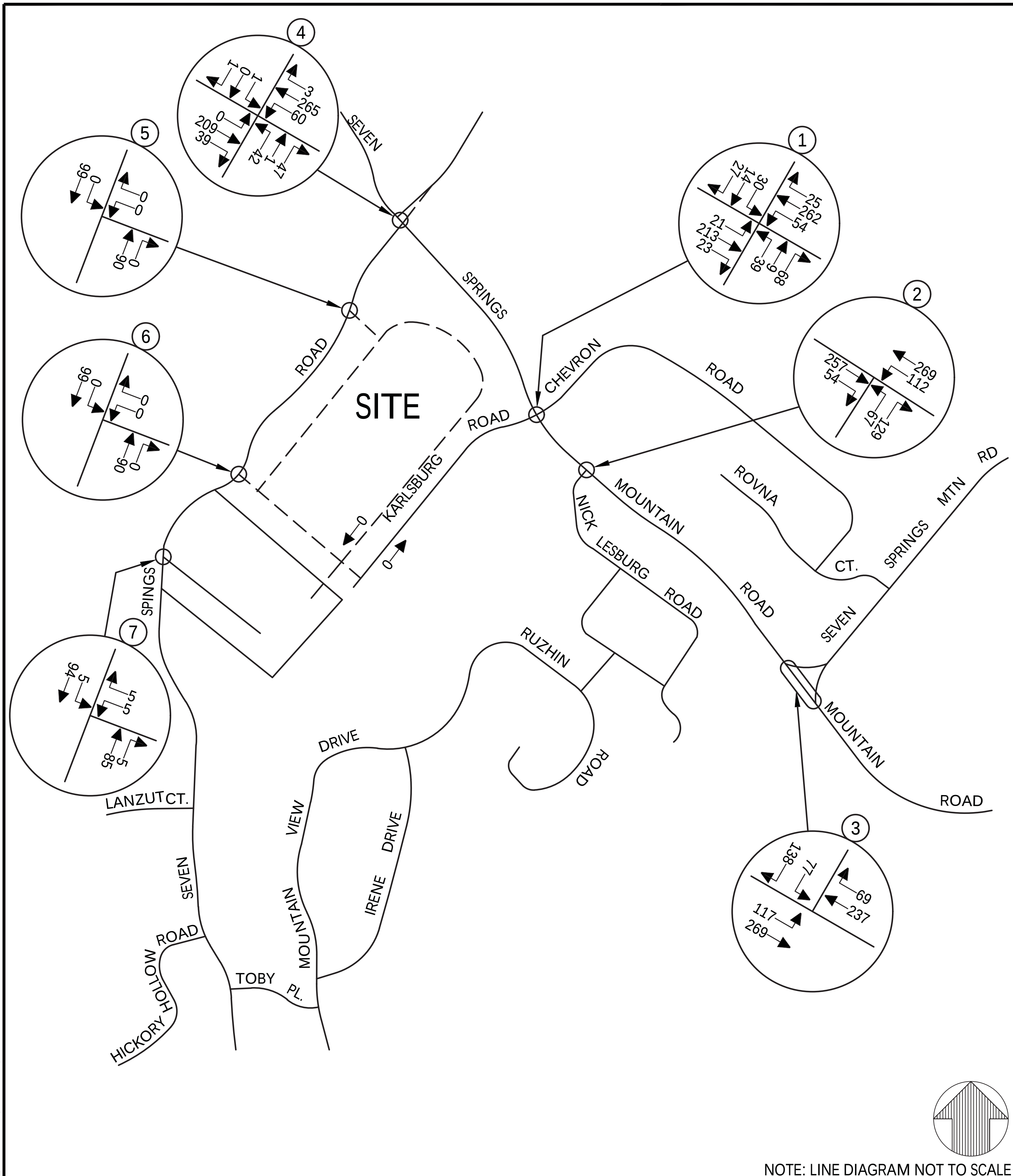

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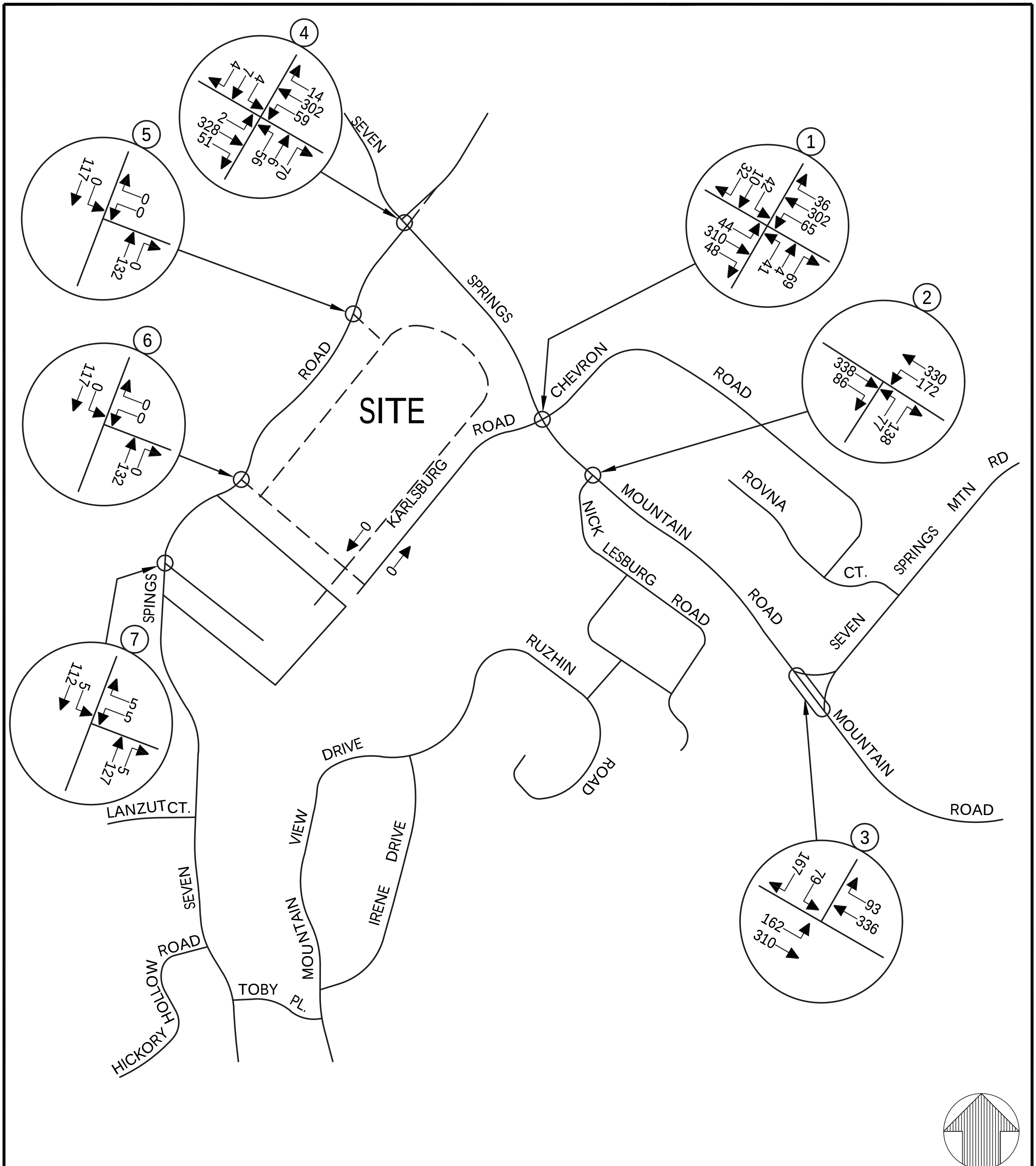

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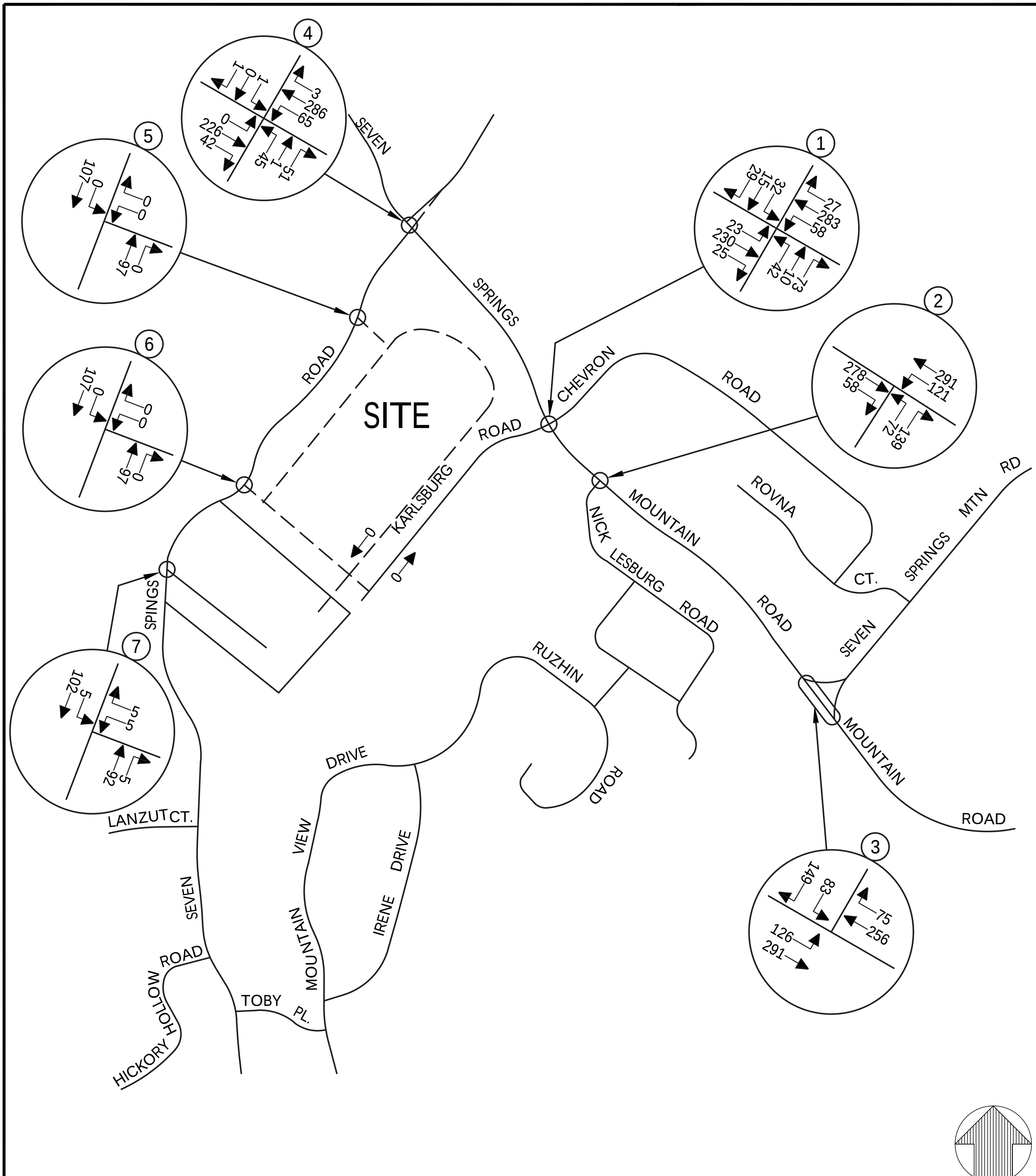

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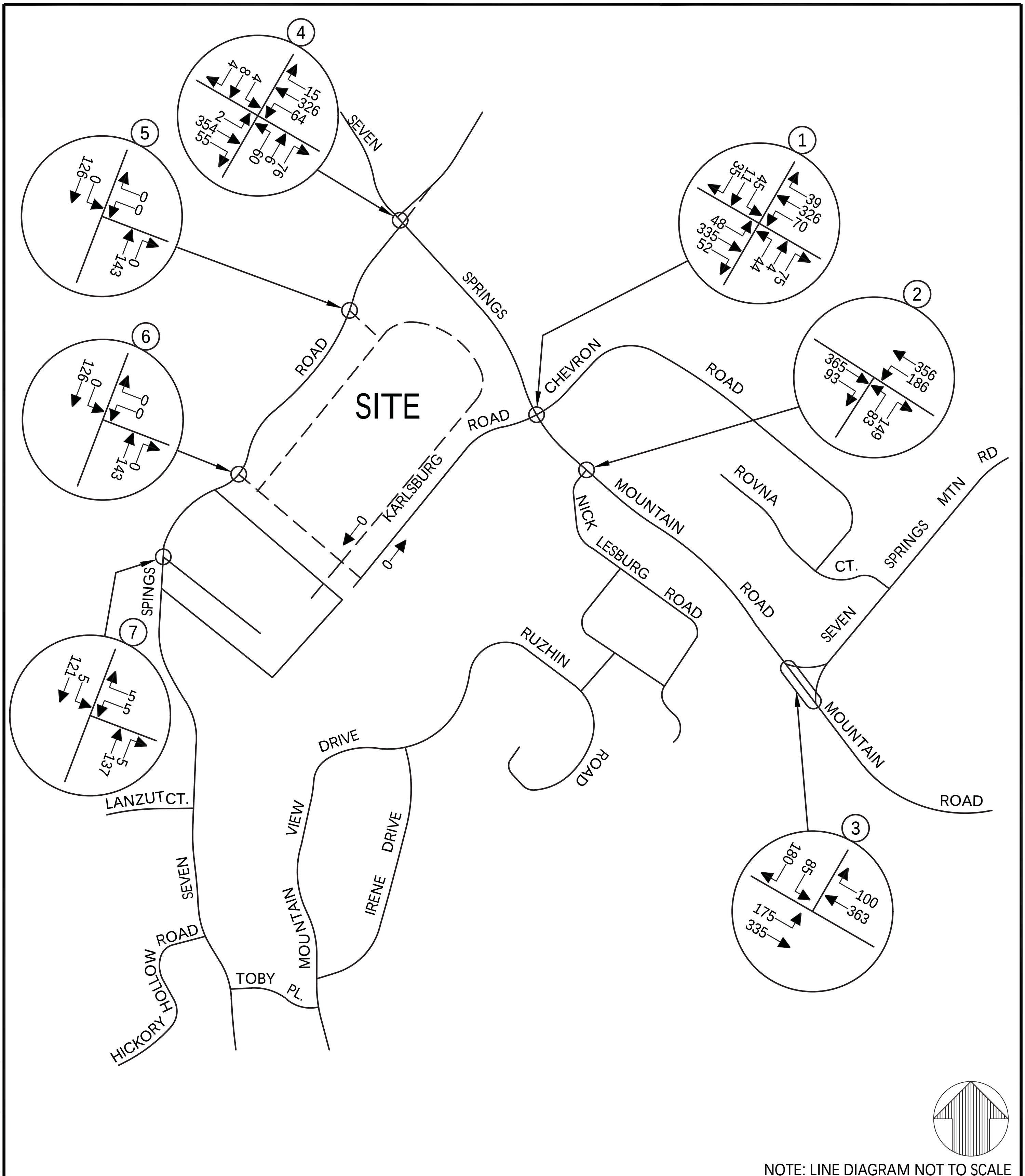

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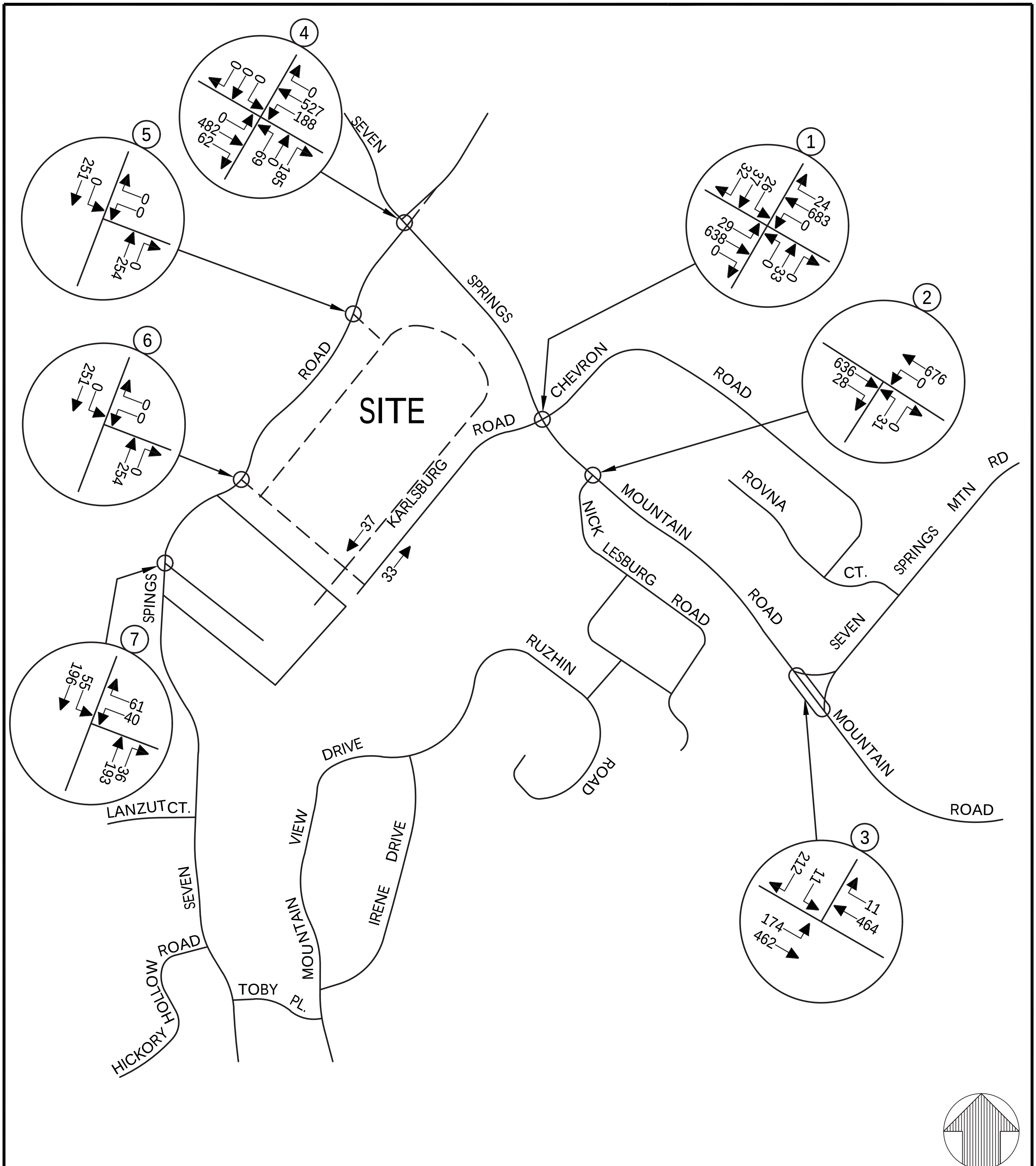

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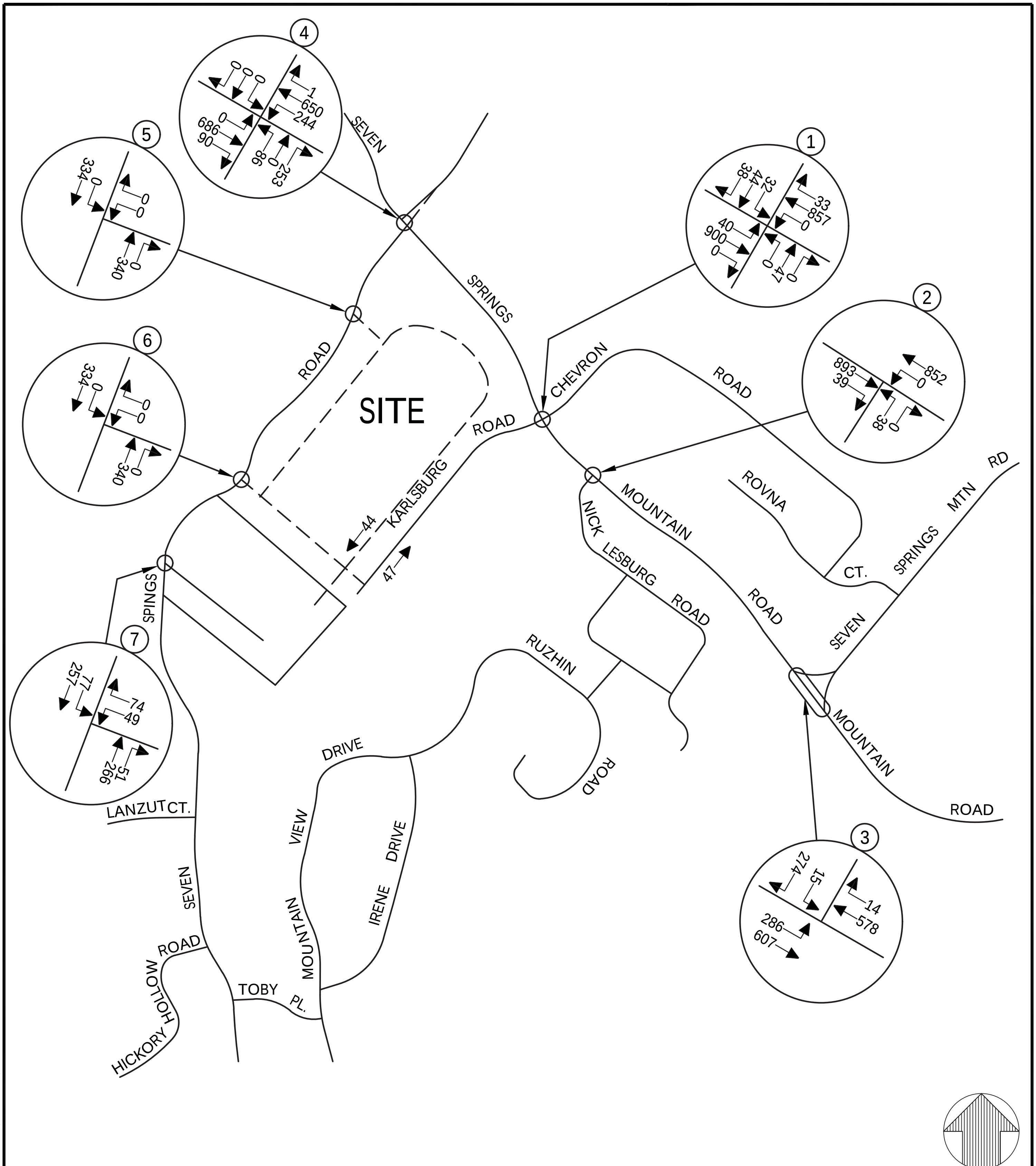

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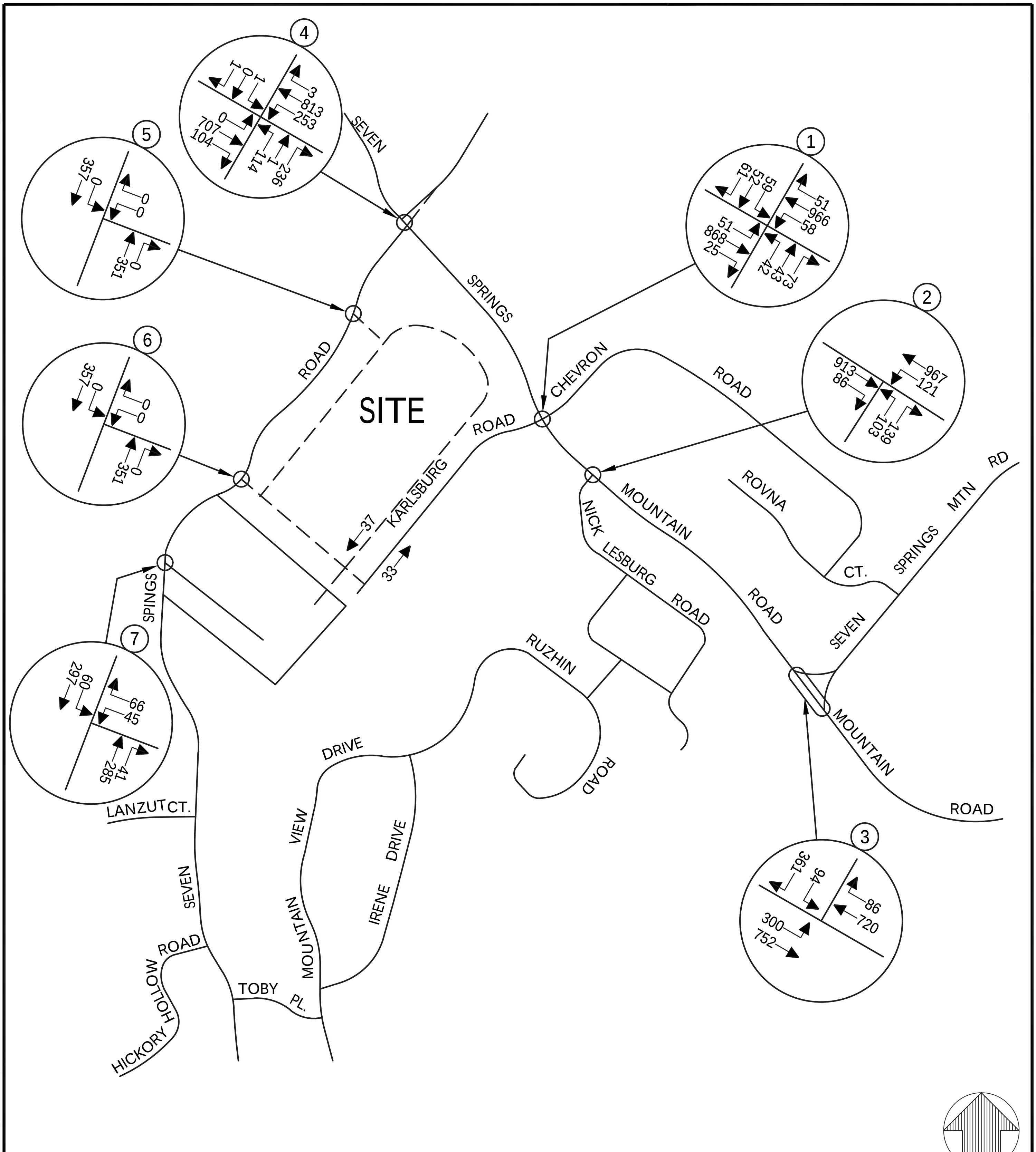

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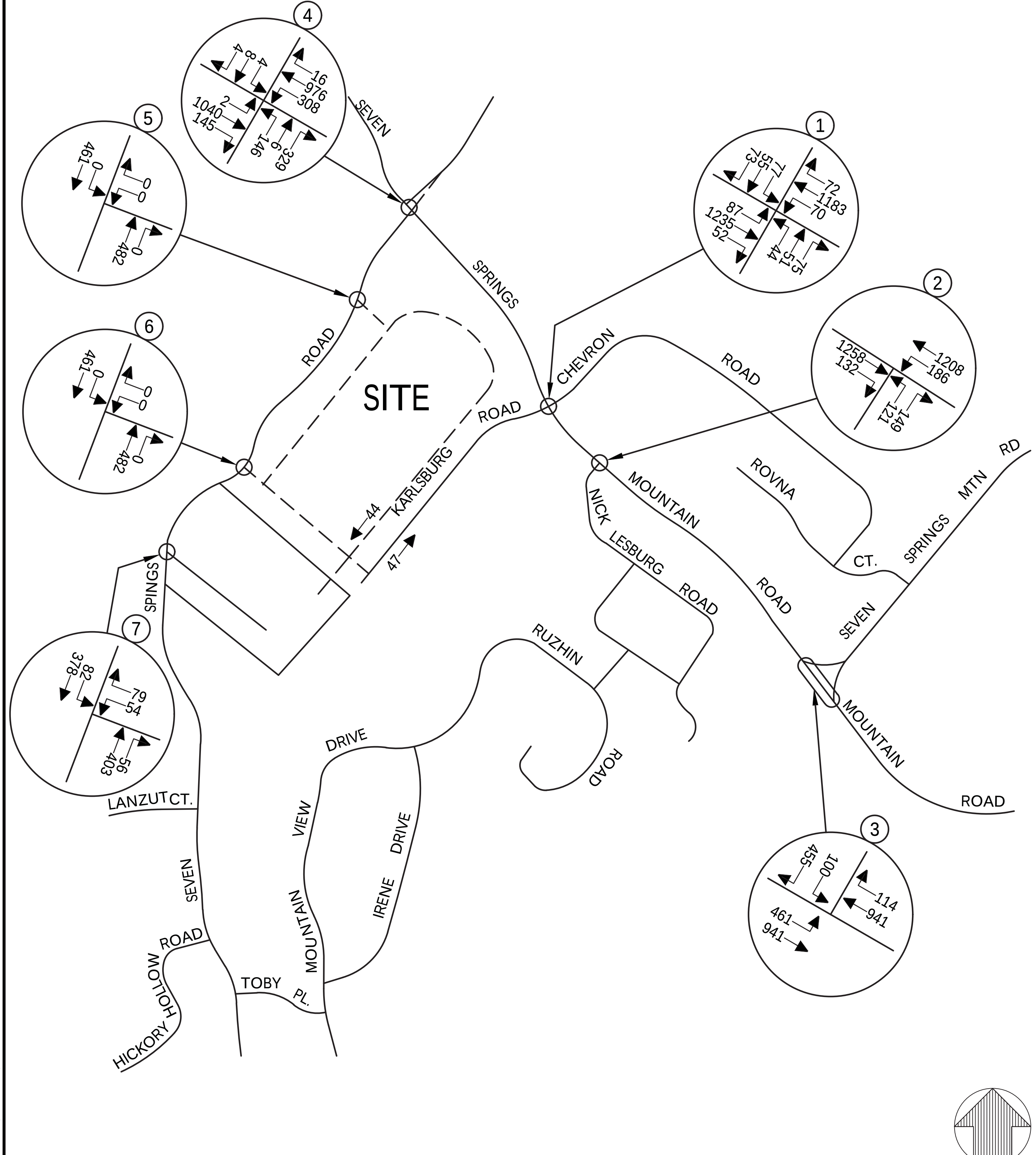

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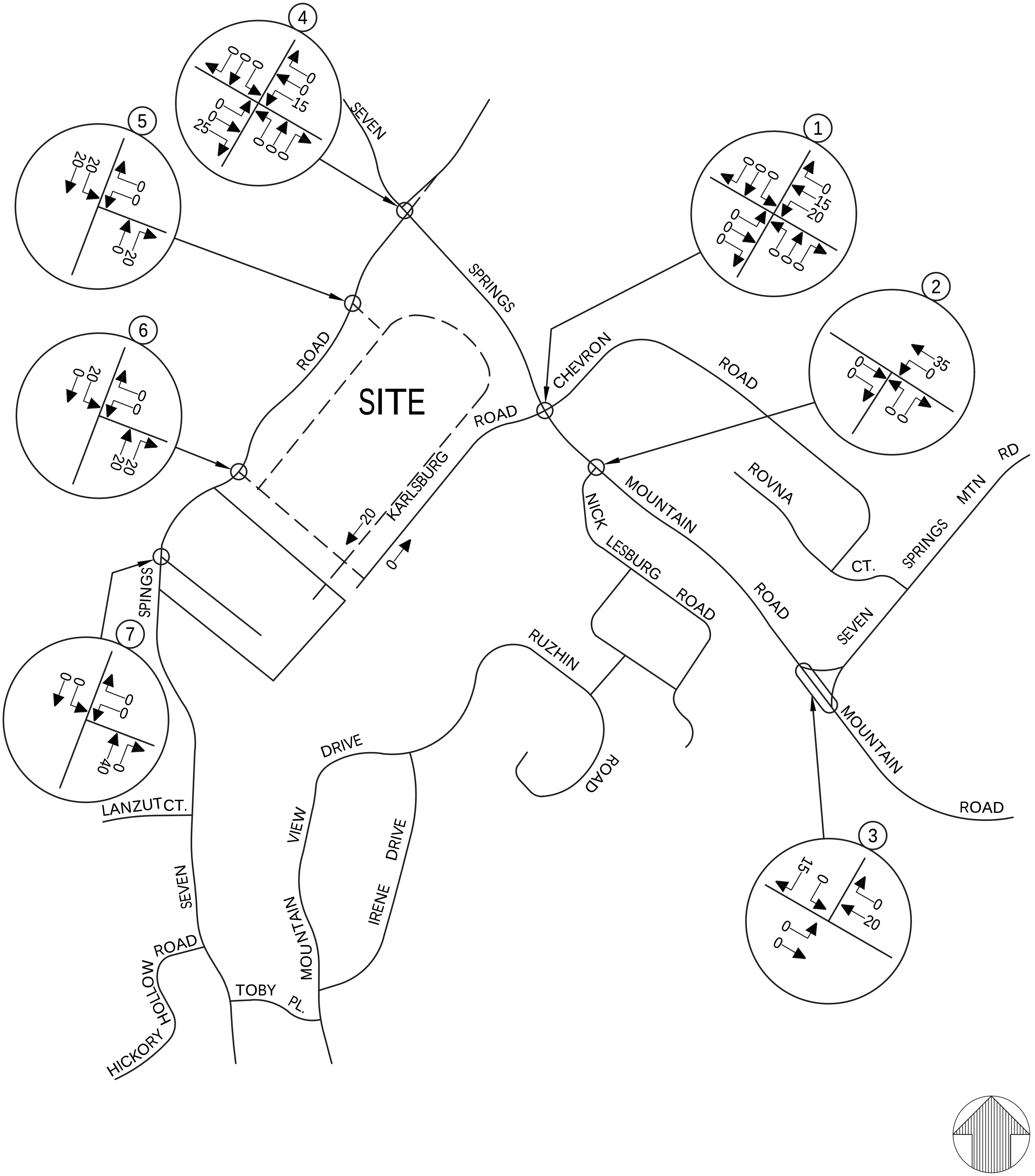

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PROJECT NUMBER:	DRAWING NAME:
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SHEET TITLE:
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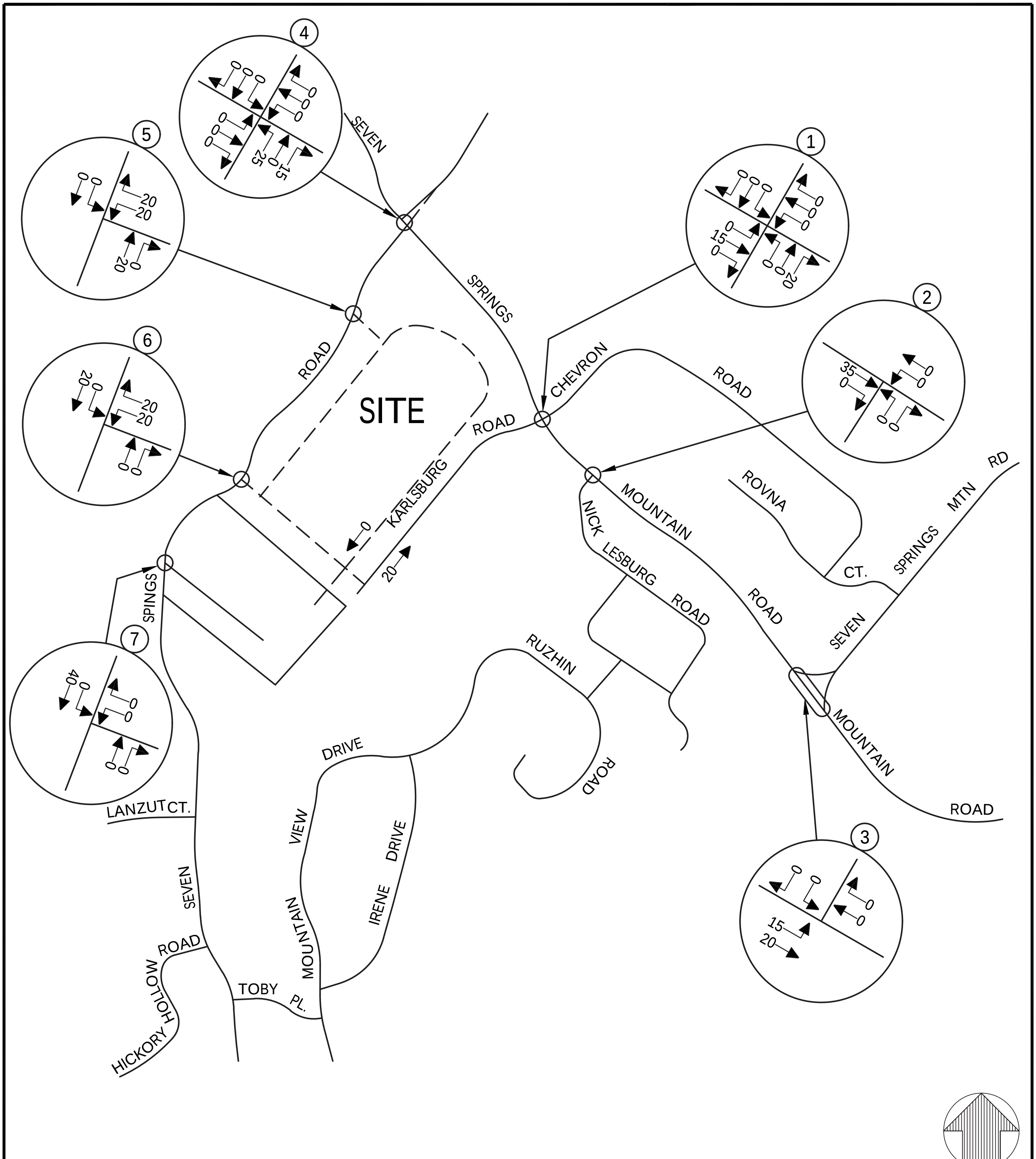

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11

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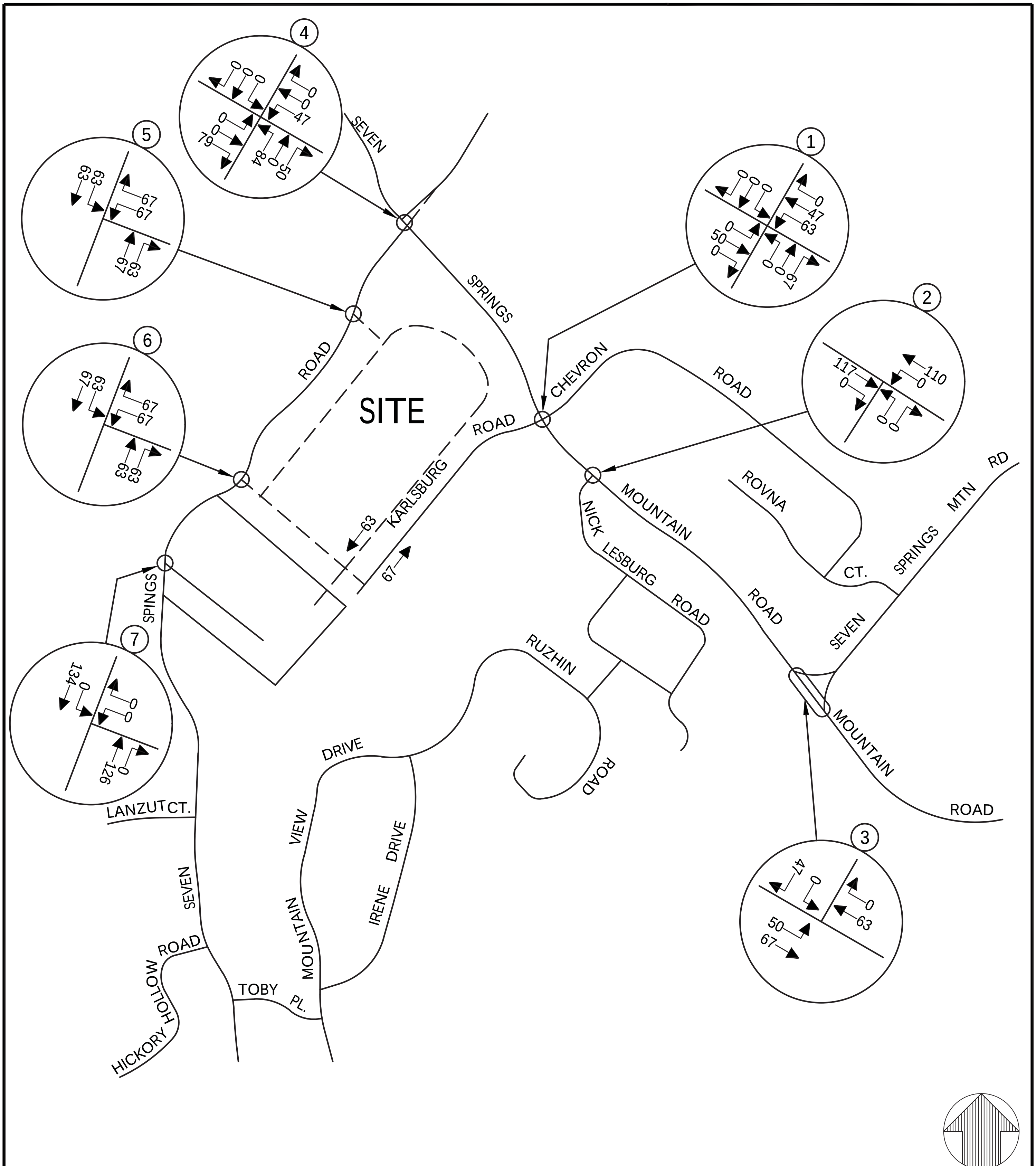

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PROJECT NUMBER:	DRAWING NAME:
22003343A	220830RH_FIGURE

SHEET TITLE:
SITE GENERATED TRAFFIC VOLUMES
WEEKDAY PEAK AM HOUR

SHEET NUMBER:
12

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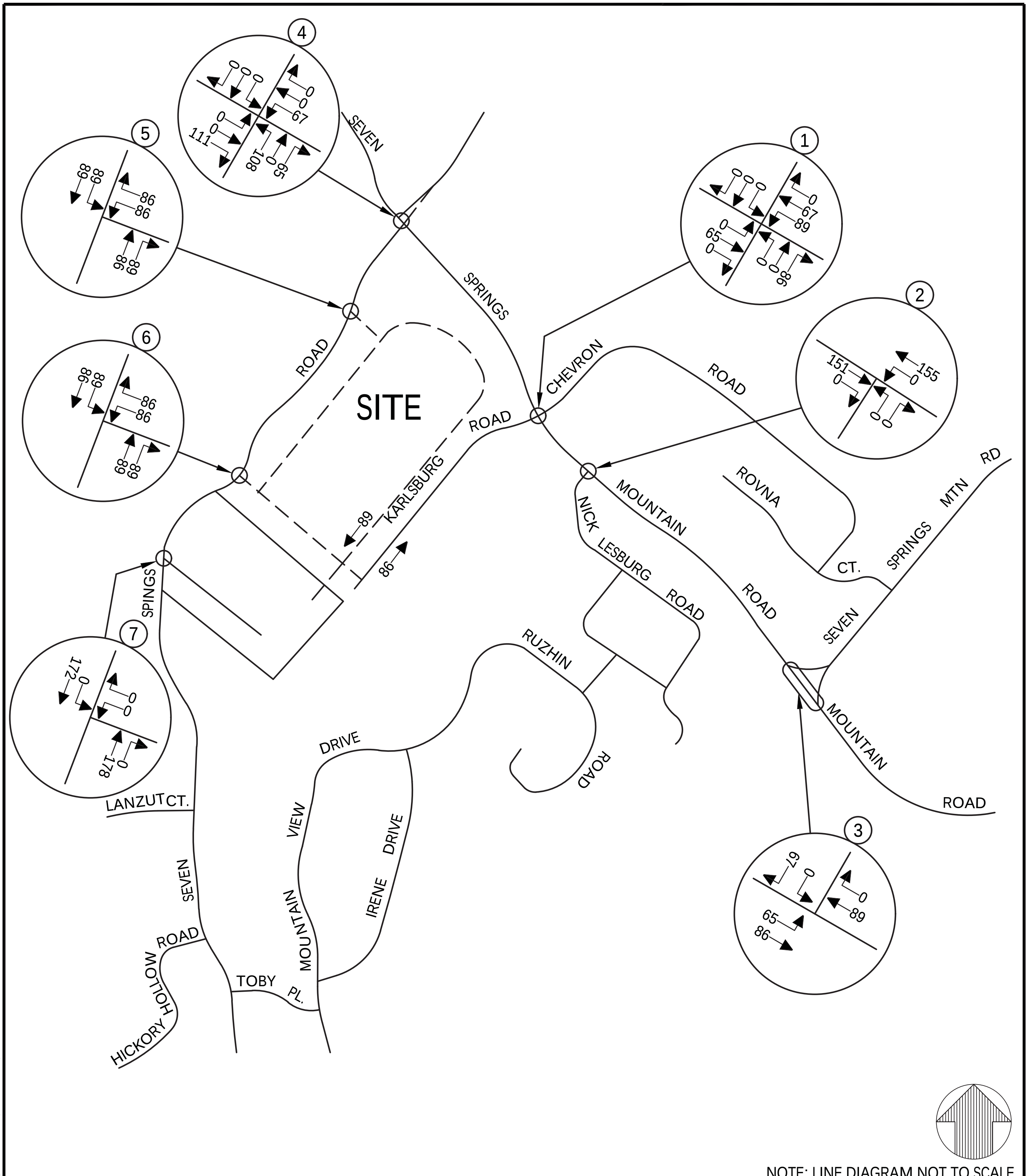
By: RHILARIO



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PROJECT NUMBER:	DRAWING NAME:
22003343A	220830RH_FIGURE

SHEET TITLE:
SITE GENERATED TRAFFIC VOLUMES
WEEKDAY PEAK FRIDAY HOUR

SHEET NUMBER:
13

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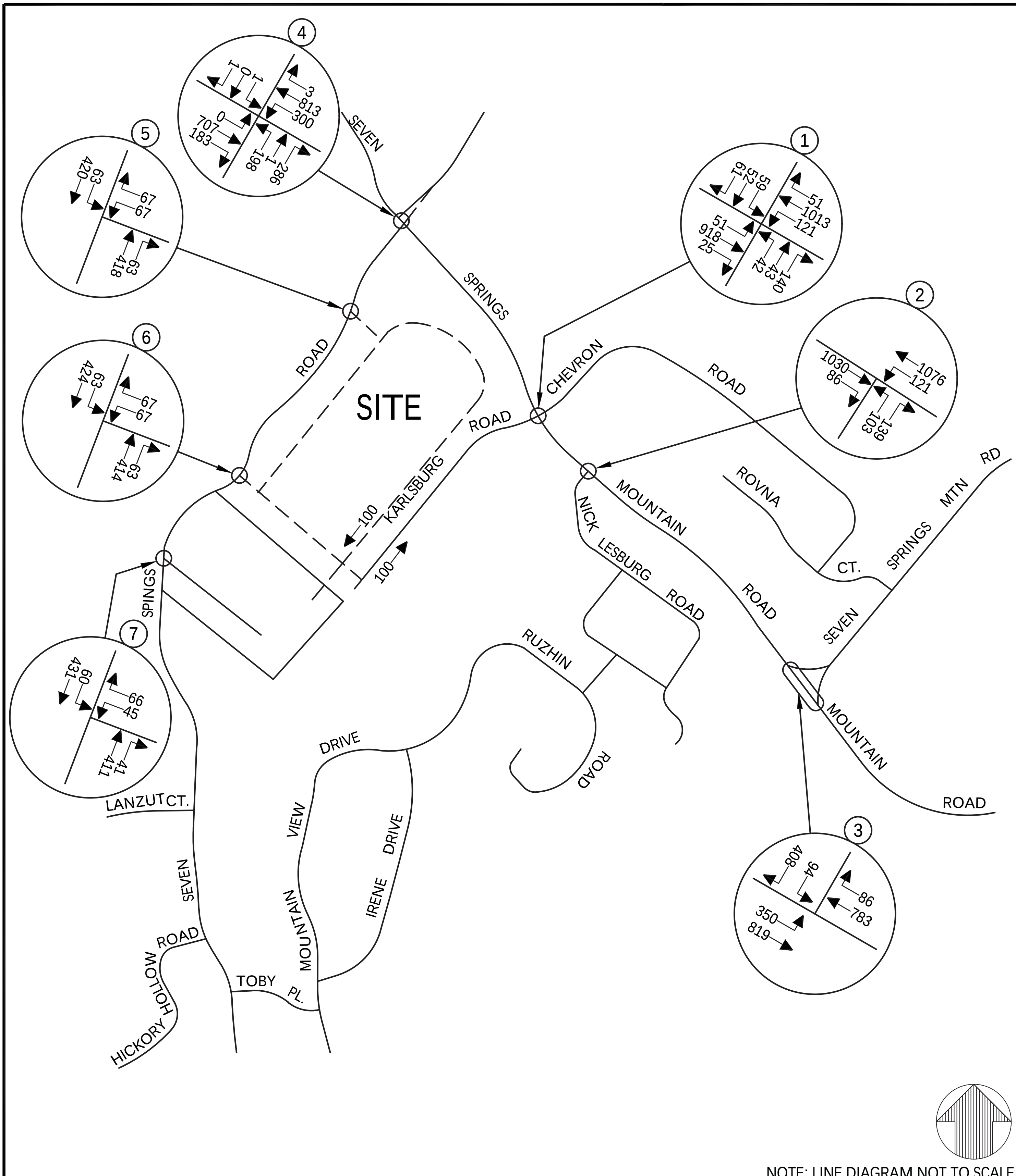

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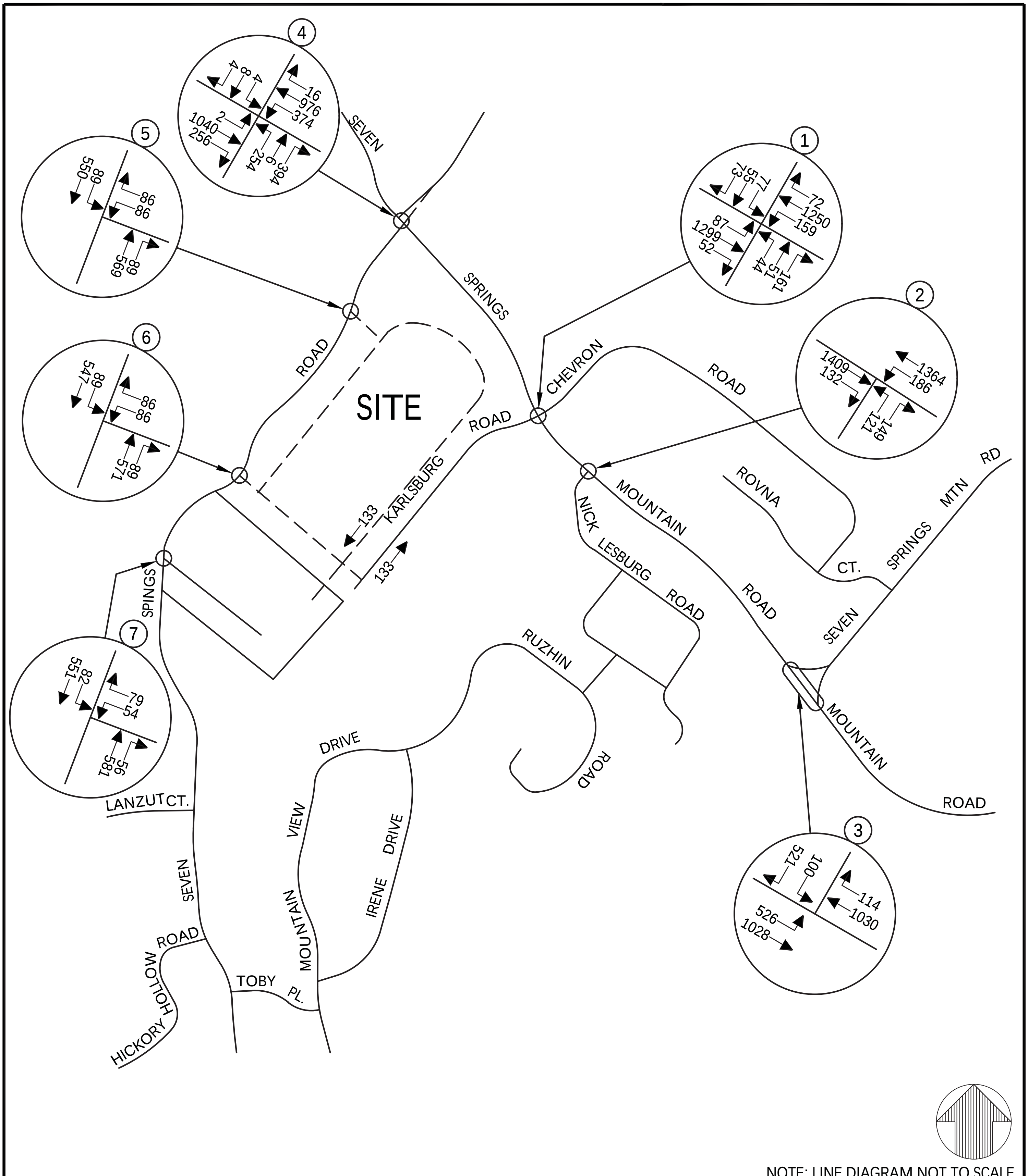

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PROJECT NUMBER:	DRAWING NAME:
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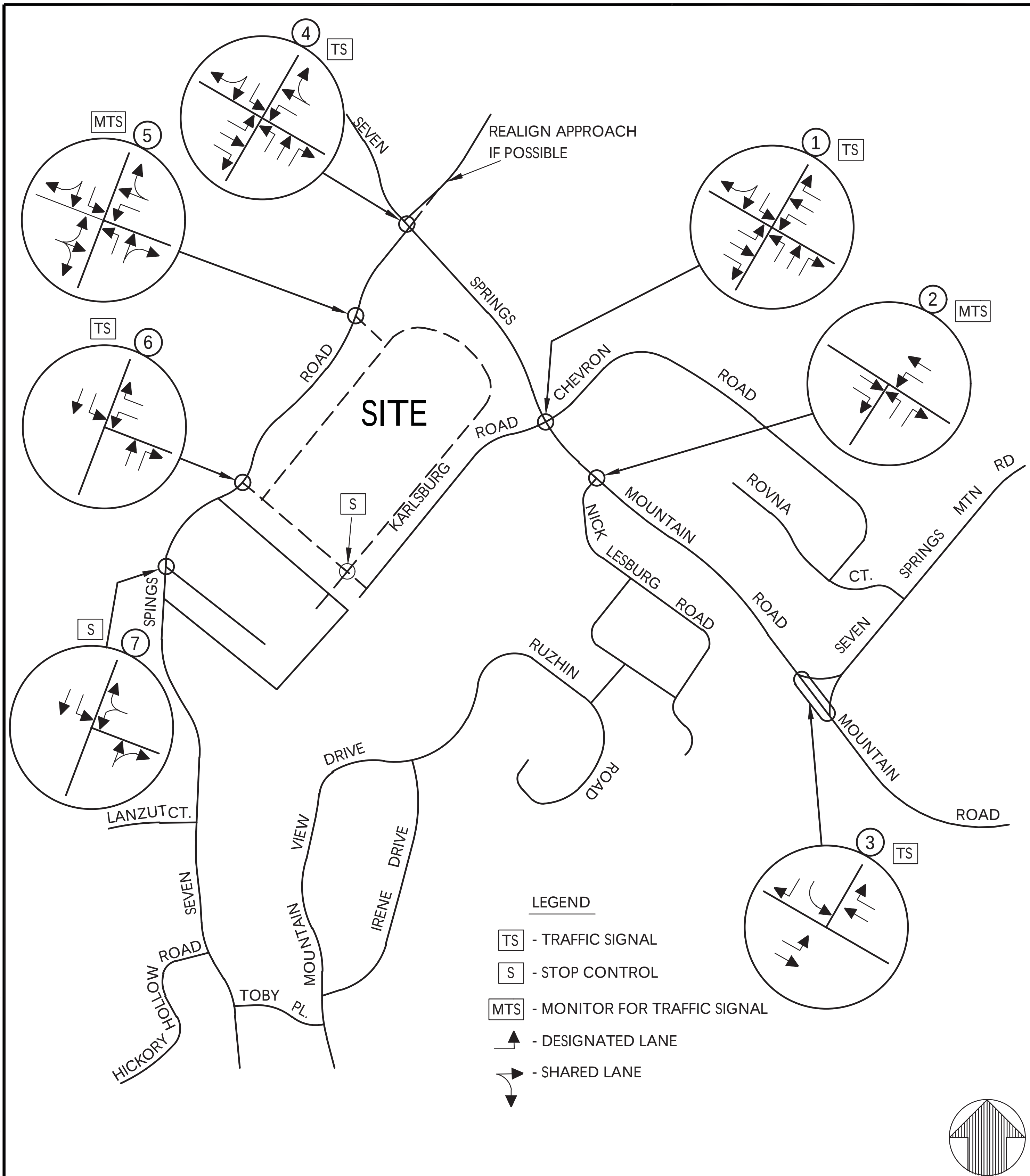
SHEET TITLE:
2026 BUILD TRAFFIC VOLUMES
WEEKDAY PEAK PM HOUR

SHEET NUMBER:
15



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PROJECT NUMBER:	DRAWING NAME:
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SHEET TITLE:
RECOMMENDED LANE GEOMETRY & TRAFFIC CONTROL

SHEET NUMBER:
G - 1

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Traffic Impact Study

Appendix B | Tables

TABLE NO. 1 (W/ KJ RATES)

HOURLY TRIP GENERATION RATES AND ANTICIPATED SITE GENERATED TRAFFIC VOLUMES

VILLAGE OF KIRYAS JOEL, ORANGE COUNTY, NEW YORK

KARLSBURG ACRES	ENTRY		EXIT		TOTAL	
	HTGR*	VOLUME	HTGR*	VOLUME	HTGR*	VOLUME
RESIDENTIAL (608 UNITS)						
WEEKDAY PEAK AM HOUR	0.47	286	0.52	316	0.99	602
FRIDAY PEAK HOUR	0.66	401	0.63	383	1.29	784
WEEKDAY PEAK PM HOUR	0.49	298	0.47	286	0.96	584
OFFICE (8,000 S.F.)						
WEEKDAY PEAK AM HOUR	1.57	13	1.04	8	2.61	21
FRIDAY PEAK HOUR	1.32	10	1.83	15	3.15	25
WEEKDAY PEAK PM HOUR	1.32	10	1.83	15	3.15	25
RETAIL (8,000 S.F.)						
WEEKDAY PEAK AM HOUR	1.86	15	1.24	10	3.10	25
FRIDAY PEAK HOUR	4.15	33	4.15	33	8.30	66
WEEKDAY PEAK PM HOUR	4.15	33	4.15	33	8.30	66
TOTALS						
WEEKDAY PEAK AM HOUR	-	314	-	334	-	648
FRIDAY PEAK HOUR	-	444	-	431	-	875
WEEKDAY PEAK PM HOUR	-	341	-	334	-	675

NOTES:

1) THE ABOVE HOURLY TRIP GENERATION RATES (HTGR) FOR THE RESIDENTIAL ARE BASED ON LOCAL KIRYAS JOEL DATA COMPILED BY CREIGHTON MANNING COLLECTED AT LEMBERG CT. AND DINEV ROAD.

2) THE HOURLY TRIP GENERATION RATES (HTGR) ARE BASED ON DATA PUBLISHED BY THE INSTITUTE OF TRANSPORTATION ENGINEERS (ITE) AS CONTAINED IN THE TRIP GENERATION HANDBOOK, 11TH EDITION, 2021. ITE LAND USE CODE - 712 - SMALL OFFICE BUILDING AND ITE LAND USE CODE - 822 - STRIP RETAIL PLAZA.

Table No. 2
Level of Service Summary Table
Weekday Peak AM Hour

				2022 Existing			2026 No-Build			2026 Build			Change in Delay
				v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	No-Build to Build
1	Seven Springs Mountain Road & Karlsburg Road/ Chevron Road	Unsignalized											
	Karlsburg Road	EB	LTR	0.30	C	17.3	F[*]	F	F[*]	F[*]	F	F[*]	-
	Chevron Road	WB	LTR	0.17	B	14.8	F[*]	F	F[*]	F[*]	F	F[*]	-
	Seven Springs Mountain Road	SEB	LTR	0.02	A	8.2	0.10	B	12.0	0.11	B	12.6	0.6
	Seven Springs Mountain Road	NWB	LTR	0.05	A	8.0	0.09	B	10.9	0.21	B	12.4	1.5
	With Turning Lanes & Signalization												
	Karlsburg Road	EB	L	-	-	-	0.28	D	48.6	0.26	D	47.6	-1.0
			T	-	-	-	0.26	D	39.0	0.24	D	38.1	-0.9
			R	-	-	-	0.27	D	35.8	0.49	D	36.7	0.9
	Chevron Road	WB	L	-	-	-	0.27	D	43.1	0.27	D	42.3	-0.8
			TR	-	-	-	0.60	D	42.5	0.58	D	41.4	-1.1
	Seven Springs Mountain Road	SEB	L	-	-	-	0.29	C	23.2	0.39	C	28.4	5.2
			T	-	-	-	0.74	B	17.1	0.80	C	20.9	3.8
			R	-	-	-	0.03	A	7.1	0.03	A	7.9	0.8
	Seven Springs Mountain Road	NWB	L	-	-	-	0.21	B	12.3	0.49	B	17.2	4.9
			T	-	-	-	0.93	C	26.5	0.99	D	35.1	8.6
			R	-	-	-	0.06	A	7.2	0.06	A	7.6	0.4
		Overall		-	-	-	-	C	24.1	-	C	29.0	4.9
2	Seven Springs Mountain Road & Nicklesburg Road	Unsignalized											
	Seven Springs Mountain Road	WB	LT	0.12	A	8.8	0.24	B	13.6	0.28	C	15.4	1.8
	Nicklesburg Road	NEB	LR	0.61	D	29.3	F[*]	F	F[*]	F[*]	F	F[*]	-
	With Turning Lanes & Signalization												
	Seven Springs Mountain Road	EB	T	-	-	-	0.81	B	15.1	0.92	C	20.5	5.4
			R	-	-	-	0.08	A	2.0	0.08	A	2.0	0.0
	Seven Springs Mountain Road	WB	L	-	-	-	0.48	B	16.7	0.66	C	27.7	11.0
			T	-	-	-	0.76	A	7.8	0.84	A	9.8	2.0
	Nicklesburg Road	NEB	L	-	-	-	0.57	D	46.8	0.57	D	46.8	0.0
			R	-	-	-	0.64	D	46.2	0.64	D	46.2	0.0
		Overall		-	-	-	-	B	14.9	-	B	18.1	3.2
3	Seven Springs Mountain Road & Mountain Road	Unsignalized											
	Seven Springs Mountain Road	SEB	LT	0.11	A	8.6	-	-	-	-	-	-	-
	Seven Springs Mountain Road	SWB	LR	0.42	C	16.3	-	-	-	-	-	-	-
	With Signalization												-
	Seven Springs Mountain Road	SEB	L	-	-	-	1.32	F	197.5	1.77	F	397.3	199.8
			T	-	-	-	0.60	A	8.2	0.68	A	9.5	1.3
	Mountain Road	NWB	TR	-	-	-	0.97	D	41.1	1.10	F	84.3	43.2
	Seven Springs Mountain Road	SWB	L	-	-	-	0.27	C	33.8	0.27	C	35.0	1.2
			R	-	-	-	0.82	D	43.9	0.95	E	64.7	20.8
		Overall		-	-	-	-	D	50.8	-	F	98.4	47.6
	With Turning Lanes & Signalization												
	Seven Springs Mountain Road	SEB	L	-	-	-	0.88	D	45.1	0.93	E	73.1	28.0
			T	-	-	-	0.60	A	9.1	0.62	A	9.1	0.0
	Mountain Road	NWB	T	-	-	-	0.94	D	42.1	1.03	F	73.0	30.9
			R	-	-	-	0.14	B	15.0	0.14	B	17.9	2.9
	Seven Springs Mountain Road	SWB	L	-	-	-	0.25	D	39.1	0.28	D	48.9	9.8
			R	-	-	-	0.63	C	33.1	0.67	D	38.0	4.9
		Overall		-	-	-	-	C	29.2	-	D	44.0	14.8

Table No. 2
Level of Service Summary Table
Weekday Peak AM Hour

				2022 Existing			2026 No-Build			2026 Build			Change in Delay
				v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	No-Build to Build
4	Seven Springs Mountain Road & Seven Springs Road	Unsignalized											
	Seven Springs Mountain Road	EB	LTR	0.00	A	0.0	0.00	A	0.0	0.00	A	0.0	0.0
	Seven Springs Mountain Road	WB	LTR	0.05	A	8.1	0.36	B	12.6	0.46	B	14.7	2.1
	Seven Springs Road	NB	LTR	0.21	C	15.2	F[*]	F	F[*]	F[*]	F	F[*]	-
	Seven Springs Road	SB	LTR	0.00	B	12.2	F[*]	F	F[*]	F[*]	F	F[*]	-
	With Turning Lanes & Signalization												
	Seven Springs Mountain Road	EB	L	-	-	-	0.00	A	0.0	0.00	A	0.0	0.0
			T	-	-	-	0.93	C	21.8	0.94	D	36.9	15.1
			R	-	-	-	0.13	A	7.6	0.22	A	9.3	1.7
	Seven Springs Mountain Road	WB	L	-	-	-	0.86	C	21.8	0.91	D	49.8	28.0
			TR	-	-	-	0.72	A	9.1	0.70	B	10.9	1.8
	Seven Springs Road	NB	L	-	-	-	0.41	C	31.1	0.66	D	47.1	16.0
			T	-	-	-	0.00	C	25.7	0.00	C	33.8	8.1
			R	-	-	-	0.61	C	23.9	0.63	C	29.5	5.6
	Seven Springs Road	SB	L	-	-	-	0.01	D	36.4	0.01	D	51.2	14.8
			TR	-	-	-	0.01	D	36.4	0.01	D	51.2	14.8
		Overall		-	-	-	-	B	17.2	-	C	27.9	10.7
5	Seven Springs Road & Site Access (North)	Signalized											
	Site Access (Parking Lot)	EB	LTR	-	-	-	-	-	-	0.06	B	14.4	-
	Site Access (North)	WB	L	-	-	-	-	-	-	0.20	B	14.9	-
			TR	-	-	-	-	-	-	0.44	B	15.6	-
	Seven Springs Road	NB	L	-	-	-	-	-	-	0.01	A	6.8	-
			TR	-	-	-	-	-	-	0.81	B	10.5	-
	Seven Springs Road	SB	L	-	-	-	-	-	-	0.17	A	7.0	-
			TR	-	-	-	-	-	-	0.62	A	7.6	-
		Overall		-	-	-	-	-	-	-	A	9.8	-
6	Seven Springs Road & Site Access (Central)	Signalized											
	Site Access (Central)	WB	L	-	-	-	-	-	-	0.38	B	14.6	-
			R	-	-	-	-	-	-	0.26	B	12.3	-
	Seven Springs Road	NB	T	-	-	-	-	-	-	0.79	B	10.3	-
			R	-	-	-	-	-	-	0.10	A	4.7	-
	Seven Springs Road	SB	L	-	-	-	-	-	-	0.16	A	6.3	-
			T	-	-	-	-	-	-	0.43	A	3.8	-
		Overall		-	-	-	-	-	-	-	A	7.6	-
7	Seven Springs Road & Site Access (South)	Unsignalized											
	Site Access (South)	WB	LR	0.01	A	9.2	0.24	B	14.1	0.32	C	18.4	4.3
	Seven Springs Road	SB	LT	0.00	A	7.5	0.06	A	8.2	0.06	A	8.7	0.5

NOTES:

1) THE ABOVE REPRESENTS THE LEVEL OF SERVICE AND VEHICLE DELAY IN SECONDS, C [16.2], FOR EACH KEY APPROACH OF THE UNSIGNALIZED INTERSECTIONS AS WELL AS FOR EACH APPROACH AND THE OVERALL INTERSECTION FOR THE SIGNALIZED INTERSECTIONS. SEE APPENDIX "C" FOR A DESCRIPTION OF THE LEVELS OF SERVICE.
2) F[*] REPRESENTS A DELAY THAT EXCEEDS 300 SECONDS.

Table No. 2
Level of Service Summary Table
Weekday Peak PM Friday Hour

				2022 Existing			2026 No-Build			2026 Build			Change in Delay
				v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	No-Build to Build
1	Seven Springs Mountain Road & Karlsburg Road/ Chevron Road		Unsignalized										
	Karlsburg Road	EB	LTR	0.40	C	24.6	F[*]	F	F[*]	F[*]	F	F[*]	-
	Chevron Road	WB	LTR	0.26	C	18.8	F[*]	F	F[*]	F[*]	F	F[*]	-
	Seven Springs Mountain Road	SEB	LTR	0.04	A	8.2	0.18	B	13.7	0.19	B	14.3	0.6
	Seven Springs Mountain Road	NWB	LTR	0.06	A	8.4	0.15	B	13.8	0.37	C	17.4	3.6
	With Turning Lanes & Signalization												
	Karlsburg Road	EB	L	-	-	-	0.26	D	47.3	0.25	D	47.1	-0.2
			T	-	-	-	0.17	D	39.1	0.17	D	38.9	-0.2
			R	-	-	-	0.25	D	36.3	0.46	D	35.6	-0.7
	Chevron Road	WB	L	-	-	-	0.32	D	43.0	0.33	D	43.1	0.1
			TR	-	-	-	0.50	D	41.9	0.50	D	41.8	-0.1
	Seven Springs Mountain Road	SEB	L	-	-	-	0.61	C	30.2	0.61	C	29.1	-1.1
			T	-	-	-	0.95	C	31.7	1.05	F	61.1	29.4
			R	-	-	-	0.05	A	6.9	0.05	A	8.4	1.5
	Seven Springs Mountain Road	NWB	L	-	-	-	0.43	C	26.5	0.85	D	41.8	15.3
			T	-	-	-	1.02	F	42.5	1.08	F	61.3	18.8
			R	-	-	-	0.08	A	7.1	0.08	A	7.2	0.1
			Overall	-	-	-	-	D	35.9	-	D	54.6	18.7
2	Seven Springs Mountain Road & Nicklesburg Road		Unsignalized										
	Seven Springs Mountain Road	WB	LT	0.17	A	9.1	0.45	C	19.6	0.51	C	23.9	4.3
	Nicklesburg Road	NEB	LR	0.88	F	71.3	F[*]	F	F[*]	F[*]	F	F[*]	-
	With Turning Lanes & Signalization												
	Seven Springs Mountain Road	EB	T	-	-	-	1.04	F	39.8	1.16	F	92.1	52.3
			R	-	-	-	0.12	A	3.1	0.12	A	3.1	0.0
	Seven Springs Mountain Road	WB	L	-	-	-	0.87	D	47.8	0.87	D	43.7	-4.1
			T	-	-	-	0.83	A	6.9	0.94	A	9.4	2.5
	Nicklesburg Road	NEB	L	-	-	-	0.83	E	78.8	0.83	E	78.8	0.0
			R	-	-	-	0.56	D	42.7	0.56	D	42.7	0.0
			Overall	-	-	-	-	C	27.3	-	D	49.7	22.4
3	Seven Springs Mountain Road & Mountain Road		Unsignalized										
	Seven Springs Mountain Road	SEB	LT	0.16	A	8.9	-	-	-	-	-	-	-
	Seven Springs Mountain Road	SWB	LR	0.55	C	21.9	-	-	-	-	-	-	-
	With Signalization												-
	Seven Springs Mountain Road	SEB	L	-	-	-	F[*]	F	F[*]	F[*]	F	F[*]	-
			T	-	-	-	0.66	A	9.2	0.72	B	10.6	1.4
	Mountain Road	NWB	TR	-	-	-	1.03	F	59.0	1.12	F	88.2	29.2
	Seven Springs Mountain Road	SWB	L	-	-	-	0.29	D	46.9	0.29	D	46.9	0.0
			R	-	-	-	1.09	F	116.9	1.24	F	175.8	58.9
			Overall	-	-	-	-	F	160.3	-	F	210.4	50.1
	With Turning Lanes & Signalization												
	Seven Springs Mountain Road	SEB	L	-	-	-	1.04	F	102.4	1.19	F	154.7	52.3
			T	-	-	-	0.65	A	9.6	0.71	B	11.0	1.4
	Mountain Road	NWB	T	-	-	-	1.15	F	116.0	1.26	F	160.6	44.6
			R	-	-	-	0.18	B	19.3	0.18	B	19.3	0.0
	Seven Springs Mountain Road	SWB	L	-	-	-	0.29	D	50.3	0.29	D	50.3	0.0
			R	-	-	-	0.68	D	37.9	0.78	D	42.7	4.8
			Overall	-	-	-	-	E	63.0	-	F	86.7	23.7

Table No. 2
Level of Service Summary Table
Weekday Peak PM Friday Hour

					2022 Existing			2026 No-Build			2026 Build			Change in Delay
					v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	No-Build to Build
4	Seven Springs Mountain Road & Seven Springs Road	Unsignalized												
	Seven Springs Mountain Road		EB	LTR	0.00	A	7.9	0.00	B	10.4	0.00	B	10.4	0.0
	Seven Springs Mountain Road		WB	LTR	0.06	A	8.5	0.59	C	20.7	0.80	E	35.2	14.5
	Seven Springs Road		NB	LTR	0.39	C	21.1	F[*]	F	F[*]	F[*]	F	F[*]	-
	Seven Springs Road		SB	LTR	0.05	C	15.7	F[*]	F	F[*]	F[*]	F	F[*]	-
	With Turning Lanes & Signalization													
	Seven Springs Mountain Road		EB	L	-	-	-	0.01	C	27.7	0.01	C	27.9	0.2
				T	-	-	-	1.10	F	94.9	1.10	F	95.4	0.5
				R	-	-	-	0.16	B	11.5	0.27	B	12.0	0.5
	Seven Springs Mountain Road		WB	L	-	-	-	0.96	F	92.0	1.17	F	158.1	66.1
				TR	-	-	-	0.77	B	14.5	0.77	B	14.6	0.1
	Seven Springs Road		NB	L	-	-	-	0.51	E	56.4	0.87	F	82.8	26.4
				T	-	-	-	0.02	D	48.2	0.02	D	48.2	0.0
				R	-	-	-	0.62	D	40.5	0.74	D	45.9	5.4
	Seven Springs Road		SB	L	-	-	-	0.03	E	64.4	0.03	E	65.6	1.2
				TR	-	-	-	0.08	E	64.6	0.09	E	65.9	1.3
		Overall			-	-	-	-	E	55.6	-	E	64.9	9.3
5	Seven Springs Road & Site Access (North)	Signalized												
	Site Access (Parking Lot)		EB	LTR	-	-	-	-	-	-	0.07	C	20.3	-
	Site Access (North)		WB	L	-	-	-	-	-	-	0.30	C	21.4	-
				TR	-	-	-	-	-	-	0.60	C	22.7	-
	Seven Springs Road		NB	L	-	-	-	-	-	-	0.02	A	6.6	-
				TR	-	-	-	-	-	-	0.89	B	11.9	-
	Seven Springs Road		SB	L	-	-	-	-	-	-	0.29	A	9.6	-
				TR	-	-	-	-	-	-	0.66	A	7.3	-
		Overall			-	-	-	-	-	-	-	B	11.2	-
6	Seven Springs Road & Site Access (Central)	Signalized												
	Site Access (Central)		WB	L	-	-	-	-	-	-	0.55	C	21.1	-
				R	-	-	-	-	-	-	0.35	B	17.2	-
	Seven Springs Road		NB	T	-	-	-	-	-	-	0.87	B	11.5	-
				R	-	-	-	-	-	-	0.12	A	4.0	-
	Seven Springs Road		SB	L	-	-	-	-	-	-	0.26	A	8.8	-
				T	-	-	-	-	-	-	0.51	A	3.6	-
		Overall			-	-	-	-	-	-	-	A	8.7	-
7	Seven Springs Road & Site Access (South)	Unsignalized												
	Site Access (South)		WB	LR	0.01	A	9.5	0.38	C	20.0	0.59	E	38.3	18.3
	Seven Springs Road		SB	LT	0.00	A	7.6	0.09	A	8.8	0.10	A	9.6	0.8

NOTES:

1) THE ABOVE REPRESENTS THE LEVEL OF SERVICE AND VEHICLE DELAY IN SECONDS, C [16.2], FOR EACH KEY APPROACH OF THE UNSIGNALIZED INTERSECTIONS AS WELL AS FOR EACH APPROACH AND THE OVERALL INTERSECTION FOR THE SIGNALIZED INTERSECTIONS. SEE APPENDIX "C" FOR A DESCRIPTION OF THE LEVELS OF SERVICE.

2) F[*] REPRESENTS A DELAY THAT EXCEEDS 300 SECONDS.

Traffic Impact Study

Appendix C | Level of Service Standards

Level of Service Standards

Level of Service for Signalized Intersections

Level of Service (LOS) can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay and volume-to-capacity (v/c) ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control. It is also a measure of driver discomfort and fuel consumption. The volume-to-capacity ratio quantifies the degree to which a phase's capacity is utilized by a lane group.

- **LOS A** describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
- **LOS B** describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
- **LOS C** describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate.
- **LOS D** describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long.
- **LOS E** describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long.
- **LOS F** describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long.

A lane group can incur a delay less than 80 s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicates that cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 s/veh represents failure from a delay perspective).

The Level of Service Criteria for signalized intersections are given in Exhibit 19-8 from the *Highway Capacity Manual, 6th Edition* published by the Transportation Research Board.

Exhibit 19-8 LOS by Volume-to-Capacity Ratio

Control Delay (s/veh)	v/c ≤ 1.0	v/c ≥ 1.0
≤10	A	F
>10-20	B	F
>20-35	C	F
>35-55	D	F
>55-80	E	F
>80	F	F

For approach-based and intersection wide assessments, LOS is defined solely by control delay.

Level of Service Criteria
For Two-Way Stop-Controlled (TWSC) Unsignalized Intersections

Level of Service (LOS) for a two-way stop-controlled (TWSC) intersection is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns. LOS is not defined for the intersection as a whole or for major-street approaches.

The Level of Service Criteria for TWSC unsignalized intersections are given in Exhibit 20-2 from the Highway Capacity Manual, 6th Edition published by the Transportation Research Board.

Exhibit 20-2 LOS by Volume-to-Capacity Ratio

Control Delay (s/veh)	v/c ≤ 1.0	v/c ≥ 1.0
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

The LOS criteria apply to each lane on a given approach and to each approach on the minor street.
LOS is not calculated for major-street approaches or for the intersection as a whole.

As Exhibit 20-2 notes, LOS F is assigned to the movement if the volume-to-capacity ratio for the movement exceeds 1.0, regardless of the control delay.

The Level of Service Criteria for unsignalized intersections are somewhat different from the criteria for signalized intersections.

Level of Service Criteria
For All-Way Stop-Controlled (AWSC) Unsignalized Intersections

The Levels of Service (LOS) for all-way stop-controlled (AWSC) intersections are given in Exhibit 21-8. As the exhibit notes, LOS F is assigned if the volume-to-capacity (v/c) ratio of a lane exceeds 1.0, regardless of the control delay. For assessment of LOS at the approach and intersection levels, LOS is based solely on control delay.

The Level of Service Criteria for AWSC unsignalized intersections are given in Exhibit 21-8 from the *Highway* Capacity *Manual*, *6th Edition* published by the Transportation Research Board.

Exhibit 21-8 LOS by Volume-to-Capacity Ratio

Control Delay (s/veh)	v/c ≤ 1.0	v/c ≥ 1.0
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

For approaches and intersection wide assessment, LOS is defined solely by control delay.

Traffic Impact Study

Appendix D | Capacity Analysis

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	39	9	68	30	14	27	21	213	23	54	262	25
Future Volume (vph)	39	9	68	30	14	27	21	213	23	54	262	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	13	12	12	11	12	12	11	12
Grade (%)		2%			-8%			5%			3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.921			0.949			0.988			0.990	
Flt Protected		0.984			0.979			0.996			0.992	
Satd. Flow (prot)	0	1546	0	0	1619	0	0	1505	0	0	1485	0
Flt Permitted		0.984			0.979			0.996			0.992	
Satd. Flow (perm)	0	1546	0	0	1619	0	0	1505	0	0	1485	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		731			304			433			369	
Travel Time (s)		16.6			6.9			9.8			8.4	
Confl. Peds. (#/hr)	1		13	13		1	5		2	2		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	60%	19%	15%	55%	0%	18%	17%	17%	11%	22%	14%
Adj. Flow (vph)	42	10	74	33	15	29	23	232	25	59	285	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	126	0	0	77	0	0	280	0	0	371	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	0.93	1.01	0.95	0.91	0.95	1.03	1.08	1.03	1.02	1.07	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	39	9	68	30	14	27	21	213	23	54	262	25
Future Vol, veh/h	39	9	68	30	14	27	21	213	23	54	262	25
Conflicting Peds, #/hr	1	0	13	13	0	1	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-8	-	-	5	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	60	19	15	55	0	18	17	17	11	22	14
Mvmt Flow	42	10	74	33	15	29	23	232	25	59	285	27

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	733	728	260	768	727	305	317	0	0	259	0	0
Stage 1	293	293	-	422	422	-	-	-	-	-	-	-
Stage 2	440	435	-	346	305	-	-	-	-	-	-	-
Critical Hdwy	7.55	7.5	6.59	5.65	5.45	5.4	4.28	-	-	4.21	-	-
Critical Hdwy Stg 1	6.55	6.5	-	4.65	4.45	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.55	6.5	-	4.65	4.45	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.54	3.471	3.635	4.495	3.3	2.362	-	-	2.299	-	-
Pot Cap-1 Maneuver	306	266	729	426	405	791	1158	-	-	1255	-	-
Stage 1	686	559	-	705	612	-	-	-	-	-	-	-
Stage 2	562	470	-	751	661	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	267	243	719	343	371	786	1152	-	-	1252	-	-
Mov Cap-2 Maneuver	267	243	-	343	371	-	-	-	-	-	-	-
Stage 1	669	545	-	685	574	-	-	-	-	-	-	-
Stage 2	496	441	-	639	644	-	-	-	-	-	-	-

Approach	EB	WB	SE	NW
HCM Control Delay, s	17.3	14.8	0.7	1.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1	WBLn1	SEL	SET	SER
Capacity (veh/h)	1252	-	-	418	445	1152	-	-
HCM Lane V/C Ratio	0.047	-	-	0.302	0.173	0.02	-	-
HCM Control Delay (s)	8	0	-	17.3	14.8	8.2	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.3	0.6	0.1	-	-

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	257	54	112	269	67	129
Future Volume (vph)	257	54	112	269	67	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)	1%			0%	3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.977				0.911	
Flt Protected				0.986	0.983	
Satd. Flow (prot)	1531	0	0	1647	1538	0
Flt Permitted				0.986	0.983	
Satd. Flow (perm)	1531	0	0	1647	1538	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		27	33		27	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	10%	18%	12%	7%	10%
Adj. Flow (vph)	286	60	124	299	74	143
Shared Lane Traffic (%)						
Lane Group Flow (vph)	346	0	0	423	217	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection						
Int Delay, s/veh	7.6					

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	257	54	112	269	67	129
Future Vol, veh/h	257	54	112	269	67	129
Conflicting Peds, #/hr	0	27	33	0	27	33
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	3	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	18	10	18	12	7	10
Mvmt Flow	286	60	124	299	74	143

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	379	0	923	382
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	574	-
Critical Hdwy	-	-	4.28	-	7.07	6.6
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	-	-	2.362	-	3.563	3.39
Pot Cap-1 Maneuver	-	-	1097	-	252	628
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	503	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1063	-	205	589
Mov Cap-2 Maneuver	-	-	-	-	205	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	423	-

Approach	EB	WB	NE
HCM Control Delay, s	0	2.6	29.3
HCM LOS			D

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	359	-	-	1063	-
HCM Lane V/C Ratio	0.607	-	-	0.117	-
HCM Control Delay (s)	29.3	-	-	8.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	3.8	-	-	0.4	-

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	117	269	237	69	77	138
Future Volume (vph)	117	269	237	69	77	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12
Grade (%)		-4%	5%		-7%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.970		0.914	
Flt Protected		0.985			0.982	
Satd. Flow (prot)	0	1609	1532	0	1561	0
Flt Permitted		0.985			0.982	
Satd. Flow (perm)	0	1609	1532	0	1561	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	15			7	7	15
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	14%	15%	18%	15%	8%	10%
Adj. Flow (vph)	126	289	255	74	83	148
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	415	329	0	231	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.02	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	117	269	237	69	77	138
Future Vol, veh/h	117	269	237	69	77	138
Conflicting Peds, #/hr	15	0	0	7	7	15
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-4	5	-	-7	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	14	15	18	15	8	10
Mvmt Flow	126	289	255	74	83	148

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	344	0	-	0	855	322
Stage 1	-	-	-	-	307	-
Stage 2	-	-	-	-	548	-
Critical Hdwy	4.24	-	-	-	5.08	5.6
Critical Hdwy Stg 1	-	-	-	-	4.08	-
Critical Hdwy Stg 2	-	-	-	-	4.08	-
Follow-up Hdwy	2.326	-	-	-	3.572	3.39
Pot Cap-1 Maneuver	1151	-	-	-	447	746
Stage 1	-	-	-	-	826	-
Stage 2	-	-	-	-	702	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1136	-	-	-	378	727
Mov Cap-2 Maneuver	-	-	-	-	378	-
Stage 1	-	-	-	-	708	-
Stage 2	-	-	-	-	693	-

Approach	SE		NW		SW	
HCM Control Delay, s	2.6		0		16.3	
HCM LOS					C	

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1136	-	546
HCM Lane V/C Ratio	-	-	0.111	-	0.423
HCM Control Delay (s)	-	-	8.6	0	16.3
HCM Lane LOS	-	-	A	A	C
HCM 95th %tile Q(veh)	-	-	0.4	-	2.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	209	39	60	265	3	42	1	47	1	0	1
Future Volume (vph)	0	209	39	60	265	3	42	1	47	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	10	12	12	11	12	12	11	12
Grade (%)		1%			1%			2%			-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979			0.999			0.930			0.932	
Flt Protected					0.991			0.977			0.976	
Satd. Flow (prot)	0	1516	0	0	1602	0	0	1314	0	0	1696	0
Flt Permitted					0.991			0.977			0.976	
Satd. Flow (perm)	0	1516	0	0	1602	0	0	1314	0	0	1696	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			453			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	18%	18%	14%	8%	0%	25%	0%	27%	0%	0%	0%
Adj. Flow (vph)	0	220	41	63	279	3	44	1	49	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	261	0	0	345	0	0	94	0	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.05	1.01	1.01	1.10	1.01	1.01	1.06	1.01	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	209	39	60	265	3	42	1	47	1	0	1
Future Vol, veh/h	0	209	39	60	265	3	42	1	47	1	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	1	-	-	2	-	-	-3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	18	18	14	8	0	25	0	27	0	0	0
Mvmt Flow	0	220	41	63	279	3	44	1	49	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	282	0	0	261	0	0	648	649	241	673	668	281
Stage 1	-	-	-	-	-	-	241	241	-	407	407	-
Stage 2	-	-	-	-	-	-	407	408	-	266	261	-
Critical Hdwy	4.1	-	-	4.24	-	-	7.75	6.9	6.67	6.5	5.9	5.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	5.9	-	5.5	4.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	5.9	-	5.5	4.9	-
Follow-up Hdwy	2.2	-	-	2.326	-	-	3.725	4	3.543	3.5	4	3.3
Pot Cap-1 Maneuver	1292	-	-	1237	-	-	329	364	730	416	427	781
Stage 1	-	-	-	-	-	-	695	691	-	669	643	-
Stage 2	-	-	-	-	-	-	552	574	-	777	727	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1292	-	-	1237	-	-	314	342	730	369	401	781
Mov Cap-2 Maneuver	-	-	-	-	-	-	314	342	-	369	401	-
Stage 1	-	-	-	-	-	-	695	691	-	669	604	-
Stage 2	-	-	-	-	-	-	518	540	-	723	727	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.5	15.2	12.2
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	448	1292	-	-	1237	-	-	501
HCM Lane V/C Ratio	0.211	-	-	-	0.051	-	-	0.004
HCM Control Delay (s)	15.2	0	-	-	8.1	0	-	12.2
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.8	0	-	-	0.2	-	-	0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	5	85	5	5	94
Future Volume (vph)	5	5	85	5	5	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	12	10	12	12	10
Grade (%)	-3%		2%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.992			
Flt Protected	0.976					0.997
Satd. Flow (prot)	1504	0	1561	0	0	1568
Flt Permitted	0.976					0.997
Satd. Flow (perm)	1504	0	1561	0	0	1568
Link Speed (mph)	30		30			30
Link Distance (ft)	359		1260			550
Travel Time (s)	8.2		28.6			12.5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	12%	5%	5%	15%
Adj. Flow (vph)	6	6	94	6	6	104
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	100	0	0	110
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	9		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.12	0.98	1.11	1.01	0.98	1.07
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	85	5	5	94
Future Vol, veh/h	5	5	85	5	5	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	2	-	-	-3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	5	12	5	5	15
Mvmt Flow	6	6	94	6	6	104

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	213	97	0	0	100	0
Stage 1	97	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	5.85	5.95	-	-	4.15	-
Critical Hdwy Stg 1	4.85	-	-	-	-	-
Critical Hdwy Stg 2	4.85	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	796	959	-	-	1474	-
Stage 1	934	-	-	-	-	-
Stage 2	919	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	793	959	-	-	1474	-
Mov Cap-2 Maneuver	793	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	915	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	868	1474	-
HCM Lane V/C Ratio	-	-	0.013	0.004	-
HCM Control Delay (s)	-	-	9.2	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	41	4	69	42	10	32	44	310	48	65	302	36
Future Volume (vph)	41	4	69	42	10	32	44	310	48	65	302	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	13	12	12	11	12	12	11	12
Grade (%)		2%			-8%			5%			3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.919			0.949			0.984			0.988	
Flt Protected		0.982			0.976			0.995			0.992	
Satd. Flow (prot)	0	1735	0	0	1764	0	0	1681	0	0	1664	0
Flt Permitted		0.982			0.976			0.995			0.992	
Satd. Flow (perm)	0	1735	0	0	1764	0	0	1681	0	0	1664	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		731			304			433			369	
Travel Time (s)		16.6			6.9			9.8			8.4	
Confl. Peds. (#/hr)	12		15	16		13	13		12	15		16
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	0%	6%	5%	20%	6%	2%	5%	2%	5%	7%	6%
Adj. Flow (vph)	44	4	73	45	11	34	47	330	51	69	321	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	0	0	90	0	0	428	0	0	428	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	0.93	1.01	0.95	0.91	0.95	1.03	1.08	1.03	1.02	1.07	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	41	4	69	42	10	32	44	310	48	65	302	36
Future Vol, veh/h	41	4	69	42	10	32	44	310	48	65	302	36
Conflicting Peds, #/hr	12	0	15	16	0	13	13	0	12	15	0	16
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-8	-	-	5	-	-	3	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	0	6	5	20	6	2	5	2	5	7	6
Mvmt Flow	44	4	73	45	11	34	47	330	51	69	321	38

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	979	978	387	998	984	369	375	0	0	396	0	0
Stage 1	465	465	-	494	494	-	-	-	-	-	-	-
Stage 2	514	513	-	504	490	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.9	6.46	5.55	5.1	5.46	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.52	5.9	-	4.55	4.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.9	-	4.55	4.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4	3.354	3.545	4.18	3.354	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	206	226	638	342	358	725	1183	-	-	1146	-	-
Stage 1	549	538	-	687	645	-	-	-	-	-	-	-
Stage 2	513	509	-	681	646	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	168	191	619	260	303	705	1163	-	-	1127	-	-
Mov Cap-2 Maneuver	168	191	-	260	303	-	-	-	-	-	-	-
Stage 1	512	501	-	640	585	-	-	-	-	-	-	-
Stage 2	437	462	-	556	602	-	-	-	-	-	-	-

Approach	EB	WB	SE	NW
HCM Control Delay, s	24.6	18.8	0.9	1.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1	WBLn1	SEL	SET	SER
Capacity (veh/h)	1127	-	-	303	350	1163	-	-
HCM Lane V/C Ratio	0.061	-	-	0.4	0.255	0.04	-	-
HCM Control Delay (s)	8.4	0	-	24.6	18.8	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.9	1	0.1	-	-

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	338	86	172	330	77	138
Future Volume (vph)	338	86	172	330	77	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)	1%			0%	3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.973				0.913	
Flt Protected				0.983	0.982	
Satd. Flow (prot)	1687	0	0	1774	1632	0
Flt Permitted				0.983	0.982	
Satd. Flow (perm)	1687	0	0	1774	1632	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		25	27		25	27
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	7%	2%	7%	6%	1%
Adj. Flow (vph)	356	91	181	347	81	145
Shared Lane Traffic (%)						
Lane Group Flow (vph)	447	0	0	528	226	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	14.8

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	338	86	172	330	77	138
Future Vol, veh/h	338	86	172	330	77	138
Conflicting Peds, #/hr	0	25	27	0	25	27
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	3	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	5	7	2	7	6	1
Mvmt Flow	356	91	181	347	81	145

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	474	0	1163	456
Stage 1	-	-	-	-	429	-
Stage 2	-	-	-	-	734	-
Critical Hdwy	-	-	4.12	-	7.06	6.51
Critical Hdwy Stg 1	-	-	-	-	6.06	-
Critical Hdwy Stg 2	-	-	-	-	6.06	-
Follow-up Hdwy	-	-	2.218	-	3.554	3.309
Pot Cap-1 Maneuver	-	-	1088	-	174	584
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	414	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1060	-	131	554
Mov Cap-2 Maneuver	-	-	-	-	131	-
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	319	-

Approach	EB	WB	NE
HCM Control Delay, s	0	3.1	71.3
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	257	-	-	1060	-
HCM Lane V/C Ratio	0.881	-	-	0.171	-
HCM Control Delay (s)	71.3	-	-	9.1	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	7.5	-	-	0.6	-

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	163	310	336	93	79	167
Future Volume (vph)	163	310	336	93	79	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12
Grade (%)		-4%	5%		-7%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.971		0.908	
Flt Protected		0.983			0.984	
Satd. Flow (prot)	0	1783	1690	0	1633	0
Flt Permitted		0.983			0.984	
Satd. Flow (perm)	0	1783	1690	0	1633	0
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	9			10	10	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	4%	6%	8%	4%	4%
Adj. Flow (vph)	172	326	354	98	83	176
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	498	452	0	259	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.02	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	6

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Vol, veh/h	163	310	336	93	79	167
Future Vol, veh/h	163	310	336	93	79	167
Conflicting Peds, #/hr	9	0	0	10	10	9
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-4	5	-	-7	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	4	6	8	4	4
Mvmt Flow	172	326	354	98	83	176

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	462	0	-	0	1093	422
Stage 1	-	-	-	-	413	-
Stage 2	-	-	-	-	680	-
Critical Hdwy	4.12	-	-	-	5.04	5.54
Critical Hdwy Stg 1	-	-	-	-	4.04	-
Critical Hdwy Stg 2	-	-	-	-	4.04	-
Follow-up Hdwy	2.218	-	-	-	3.536	3.336
Pot Cap-1 Maneuver	1099	-	-	-	359	681
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	651	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1089	-	-	-	285	670
Mov Cap-2 Maneuver	-	-	-	-	285	-
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	645	-

Approach	SE	NW	SW
HCM Control Delay, s	3.1	0	21.9
HCM LOS			C

Minor Lane/Major Mvmt	NWT	NWR	SEL	SET	SWLn1
Capacity (veh/h)	-	-	1089	-	467
HCM Lane V/C Ratio	-	-	0.158	-	0.554
HCM Control Delay (s)	-	-	8.9	0	21.9
HCM Lane LOS	-	-	A	A	C
HCM 95th %tile Q(veh)	-	-	0.6	-	3.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	328	51	59	302	14	56	6	70	4	7	4
Future Volume (vph)	2	328	51	59	302	14	56	6	70	4	7	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	10	12	12	11	12	12	11	12
Grade (%)		1%			1%			2%			-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.995			0.928			0.964	
Flt Protected					0.992			0.979			0.987	
Satd. Flow (prot)	0	1698	0	0	1632	0	0	1558	0	0	1774	0
Flt Permitted					0.992			0.979			0.987	
Satd. Flow (perm)	0	1698	0	0	1632	0	0	1558	0	0	1774	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			453			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	6%	4%	17%	5%	0%	8%	0%	5%	0%	0%	0%
Adj. Flow (vph)	2	345	54	62	318	15	59	6	74	4	7	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	401	0	0	395	0	0	139	0	0	15	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.05	1.01	1.01	1.10	1.01	1.01	1.06	1.01	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	328	51	59	302	14	56	6	70	4	7	4
Future Vol, veh/h	2	328	51	59	302	14	56	6	70	4	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	1	-	-	2	-	-	-3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	6	4	17	5	0	8	0	5	0	0	0
Mvmt Flow	2	345	54	62	318	15	59	6	74	4	7	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	333	0	0	399	0	0	831	833	372	866	853	326
Stage 1	-	-	-	-	-	-	376	376	-	450	450	-
Stage 2	-	-	-	-	-	-	455	457	-	416	403	-
Critical Hdwy	4.1	-	-	4.27	-	-	7.58	6.9	6.45	6.5	5.9	5.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.58	5.9	-	5.5	4.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.58	5.9	-	5.5	4.9	-
Follow-up Hdwy	2.2	-	-	2.353	-	-	3.572	4	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	1238	-	-	1083	-	-	257	280	654	319	344	740
Stage 1	-	-	-	-	-	-	607	595	-	639	620	-
Stage 2	-	-	-	-	-	-	545	543	-	662	645	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1238	-	-	1083	-	-	237	260	654	263	319	740
Mov Cap-2 Maneuver	-	-	-	-	-	-	237	260	-	263	319	-
Stage 1	-	-	-	-	-	-	606	594	-	638	577	-
Stage 2	-	-	-	-	-	-	498	505	-	580	644	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.3	21.1	15.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	360	1238	-	-	1083	-	-	352
HCM Lane V/C Ratio	0.386	0.002	-	-	0.057	-	-	0.045
HCM Control Delay (s)	21.1	7.9	0	-	8.5	0	-	15.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.8	0	-	-	0.2	-	-	0.1

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	5	5	127	5	5	112
Future Volume (vph)	5	5	127	5	5	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	12	10	12	12	10
Grade (%)	-3%		2%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.995			
Flt Protected	0.976					0.998
Satd. Flow (prot)	1504	0	1564	0	0	1568
Flt Permitted	0.976					0.998
Satd. Flow (perm)	1504	0	1564	0	0	1568
Link Speed (mph)	30		30			30
Link Distance (ft)	374		1260			536
Travel Time (s)	8.5		28.6			12.2
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	5%	12%	5%	5%	15%
Adj. Flow (vph)	6	6	146	6	6	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	152	0	0	135
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	9		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.12	0.98	1.11	1.01	0.98	1.07
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	5	127	5	5	112
Future Vol, veh/h	5	5	127	5	5	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	2	-	-	-3
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	5	5	12	5	5	15
Mvmt Flow	6	6	146	6	6	129

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	290	149	0	0	152	0
Stage 1	149	-	-	-	-	-
Stage 2	141	-	-	-	-	-
Critical Hdwy	5.85	5.95	-	-	4.15	-
Critical Hdwy Stg 1	4.85	-	-	-	-	-
Critical Hdwy Stg 2	4.85	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	729	901	-	-	1411	-
Stage 1	893	-	-	-	-	-
Stage 2	899	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	725	901	-	-	1411	-
Mov Cap-2 Maneuver	725	-	-	-	-	-
Stage 1	893	-	-	-	-	-
Stage 2	895	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	803	1411	-
HCM Lane V/C Ratio	-	-	0.014	0.004	-
HCM Control Delay (s)	-	-	9.5	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	42	43	73	59	52	61	51	868	25	58	966	51
Future Volume (vph)	42	43	73	59	52	61	51	868	25	58	966	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	13	12	12	11	12	12	11	12
Grade (%)		2%			-8%			5%			3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.938			0.952			0.996			0.994	
Flt Protected		0.987			0.983			0.997			0.997	
Satd. Flow (prot)	0	1469	0	0	1568	0	0	1608	0	0	1626	0
Flt Permitted		0.987			0.983			0.997			0.997	
Satd. Flow (perm)	0	1469	0	0	1568	0	0	1608	0	0	1626	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		731			304			433			369	
Travel Time (s)		16.6			6.9			9.8			8.4	
Confl. Peds. (#/hr)	1		13	13		1	5		2	2		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	60%	19%	15%	55%	0%	18%	10%	17%	11%	10%	14%
Adj. Flow (vph)	46	47	79	64	57	66	55	943	27	63	1050	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	172	0	0	187	0	0	1025	0	0	1168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	0.93	1.01	0.95	0.91	0.95	1.03	1.08	1.03	1.02	1.07	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	42	43	73	59	52	61	51	868	25	58	966	51
Future Vol, veh/h	42	43	73	59	52	61	51	868	25	58	966	51
Conflicting Peds, #/hr	1	0	13	13	0	1	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-8	-	-	5	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	60	19	15	55	0	18	10	17	11	10	14
Mvmt Flow	46	47	79	64	57	66	55	943	27	63	1050	55

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	2335	2305	972	2352	2291	1084	1110	0	0	972	0	0
Stage 1	1069	1069	-	1209	1209	-	-	-	-	-	-	-
Stage 2	1266	1236	-	1143	1082	-	-	-	-	-	-	-
Critical Hdwy	7.55	7.5	6.59	5.65	5.45	5.4	4.28	-	-	4.21	-	-
Critical Hdwy Stg 1	6.55	6.5	-	4.65	4.45	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.55	6.5	-	4.65	4.45	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.54	3.471	3.635	4.495	3.3	2.362	-	-	2.299	-	-
Pot Cap-1 Maneuver	~ 19	~ 20	270	65	76	339	573	-	-	674	-	-
Stage 1	235	210	-	360	348	-	-	-	-	-	-	-
Stage 2	178	168	-	381	383	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 12	266	-	~ 45	337	570	-	-	673	-	-
Mov Cap-2 Maneuver	-	~ 12	-	-	~ 45	-	-	-	-	-	-	-
Stage 1	185	165	-	283	261	-	-	-	-	-	-	-
Stage 2	84	126	-	149	301	-	-	-	-	-	-	-

Approach	EB	WB	SE	NW
HCM Control Delay, s			0.6	0.6
HCM LOS	-	-		

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1	WBLn1	SEL	SET	SER
Capacity (veh/h)	673	-	-	-	-	570	-	-
HCM Lane V/C Ratio	0.094	-	-	-	-	0.097	-	-
HCM Control Delay (s)	10.9	0	-	-	-	12	0	-
HCM Lane LOS	B	A	-	-	-	B	A	-
HCM 95th %tile Q(veh)	0.3	-	-	-	-	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	913	86	121	967	103	139
Future Volume (vph)	913	86	121	967	103	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)	1%			0%	3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.988				0.922	
Flt Protected				0.994	0.979	
Satd. Flow (prot)	1641	0	0	1703	1554	0
Flt Permitted				0.994	0.979	
Satd. Flow (perm)	1641	0	0	1703	1554	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		27	33		27	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	18%	10%	7%	10%
Adj. Flow (vph)	992	93	132	1051	112	151
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1085	0	0	1183	263	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	607.7

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	913	86	121	967	103	139
Future Vol, veh/h	913	86	121	967	103	139
Conflicting Peds, #/hr	0	27	33	0	27	33
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	3	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	18	10	7	10
Mvmt Flow	992	93	132	1051	112	151

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1118	0	2414	1105
Stage 1	-	-	-	-	1072	-
Stage 2	-	-	-	-	1342	-
Critical Hdwy	-	-	4.28	-	7.07	6.6
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	-	-	2.362	-	3.563	3.39
Pot Cap-1 Maneuver	-	-	569	-	~ 23	225
Stage 1	-	-	-	-	269	-
Stage 2	-	-	-	-	190	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	551	-	~ 9	211
Mov Cap-2 Maneuver	-	-	-	-	~ 9	-
Stage 1	-	-	-	-	261	-
Stage 2	-	-	-	-	~ 79	-

Approach	EB	WB	NE
HCM Control Delay, s	0	1.5	$ 5841.8
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	20	-	-	551	-
HCM Lane V/C Ratio	13.152	-	-	0.239	-
HCM Control Delay (s)	$ 5841.8	-	-	13.6	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	33.3	-	-	0.9	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	300	752	720	86	94	361
Future Volume (vph)	300	752	720	86	94	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12
Grade (%)		-4%	5%		-7%	
Storage Length (ft)	200			100	200	200
Storage Lanes	1			0	1	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			1.00		0.98	0.94
Frt			0.986			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1615	1703	1646	0	1672	1520
Flt Permitted	0.145				0.950	
Satd. Flow (perm)	246	1703	1646	0	1640	1427
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			10			184
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	15			7	7	15
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	14%	10%	10%	15%	8%	10%
Adj. Flow (vph)	323	809	774	92	101	388
Shared Lane Traffic (%)						
Lane Group Flow (vph)	323	809	866	0	101	388
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.02	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Number of Detectors	2	2	2		2	2
Detector Template						
Leading Detector (ft)	83	83	83		83	83
Trailing Detector (ft)	-5	-5	-5		-5	-5
Detector 1 Position(ft)	-5	-5	-5		-5	-5
Detector 1 Size(ft)	40	40	40		40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)	43	43	43		43	43
Detector 2 Size(ft)	40	40	40		40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0		0.0	0.0
Turn Type	pm+pt	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		8	5

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Permitted Phases	2					8
Detector Phase	5	2	6		8	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	10.0	23.0	23.0		23.0	10.0
Total Split (s)	13.0	76.0	63.0		24.0	13.0
Total Split (%)	13.0%	76.0%	63.0%		24.0%	13.0%
Maximum Green (s)	8.0	71.0	58.0		19.0	8.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Min	Min		None	None
Walk Time (s)		7.0	7.0		7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		15	15		15	
v/c Ratio	0.94	0.60	0.88		0.43	0.82
Control Delay	54.2	7.6	27.4		41.7	31.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	54.2	7.6	27.4		41.7	31.2
Queue Length 50th (ft)	~95	160	350		53	101
Queue Length 95th (ft)	#219	356	#736		106	#220
Internal Link Dist (ft)		1396	543		564	
Turn Bay Length (ft)	200				200	200
Base Capacity (vph)	342	1440	1200		440	471
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.94	0.56	0.72		0.23	0.82

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 79.5

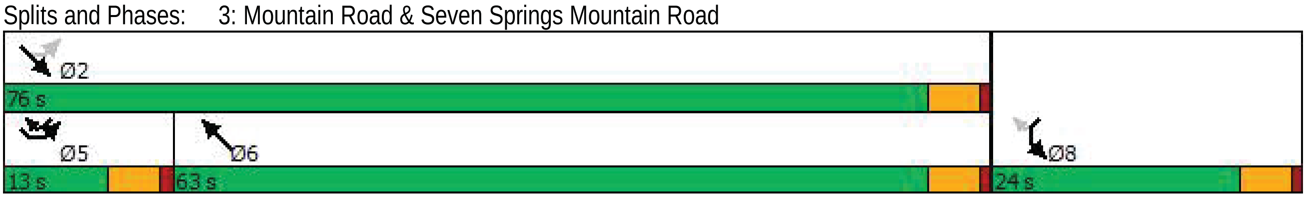
Natural Cycle: 100

Control Type: Actuated-Uncoordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Mountain Road & Seven Springs Mountain Road



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	300	752	720	86	94	361
Future Volume (veh/h)	300	752	720	86	94	361
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1847	1907	1605	1530	2055	2025
Adj Flow Rate, veh/h	323	809	774	92	101	388
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	14	10	10	15	8	10
Cap, veh/h	246	1341	802	95	380	474
Arrive On Green	0.08	0.70	0.57	0.57	0.19	0.19
Sat Flow, veh/h	1759	1907	1406	167	1957	1716
Grp Volume(v), veh/h	323	809	0	866	101	388
Grp Sat Flow(s),veh/h/ln	1759	1907	0	1573	1957	1716
Q Serve(g_s), s	8.0	21.4	0.0	51.4	4.3	19.0
Cycle Q Clear(g_c), s	8.0	21.4	0.0	51.4	4.3	19.0
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h	246	1341	0	897	380	474
V/C Ratio(X)	1.32	0.60	0.00	0.97	0.27	0.82
Avail Cap(c_a), veh/h	246	1385	0	933	380	474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.7	7.5	0.0	20.1	33.5	33.1
Incr Delay (d2), s/veh	167.7	0.7	0.0	21.0	0.4	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.3	7.5	0.0	22.1	2.1	9.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	197.5	8.2	0.0	41.1	33.8	43.9
LnGrp LOS	F	A	A	D	C	D
Approach Vol, veh/h		1132	866		489	
Approach Delay, s/veh		62.2	41.1		41.8	
Approach LOS		E	D		D	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	73.8	13.0	60.8	24.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	71.0	8.0	58.0	19.0
Max Q Clear Time (g_c+I1), s	23.4	10.0	53.4	21.0
Green Ext Time (p_c), s	6.5	0.0	2.3	0.0

Intersection Summary	
HCM 6th Ctrl Delay	50.8
HCM 6th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	0	707	104	253	813	3	114	1	236	1	0	1
Future Volume (vph)	0	707	104	253	813	3	114	1	236	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	10	12	12	11	12	12	11	12
Grade (%)		1%			1%			2%			-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983						0.909			0.932	
Flt Protected					0.988			0.984			0.976	
Satd. Flow (prot)	0	1522	0	0	1594	0	0	1288	0	0	1696	0
Flt Permitted					0.988			0.984			0.976	
Satd. Flow (perm)	0	1522	0	0	1594	0	0	1288	0	0	1696	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			453			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	18%	18%	14%	8%	0%	25%	0%	27%	0%	0%	0%
Adj. Flow (vph)	0	744	109	266	856	3	120	1	248	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	853	0	0	1125	0	0	369	0	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.05	1.01	1.01	1.10	1.01	1.01	1.06	1.01	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	873.4											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	0	707	104	253	813	3	114	1	236	1	0	1
Future Vol, veh/h	0	707	104	253	813	3	114	1	236	1	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	1	-	-	2	-	-	-3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	18	18	14	8	0	25	0	27	0	0	0
Mvmt Flow	0	744	109	266	856	3	120	1	248	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	859	0	0	853	0	0	2189	2190	799	2313	2243	858
Stage 1	-	-	-	-	-	-	799	799	-	1390	1390	-
Stage 2	-	-	-	-	-	-	1390	1391	-	923	853	-
Critical Hdwy	4.1	-	-	4.24	-	-	7.75	6.9	6.67	6.5	5.9	5.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	5.9	-	5.5	4.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	5.9	-	5.5	4.9	-
Follow-up Hdwy	2.2	-	-	2.326	-	-	3.725	4	3.543	3.5	4	3.3
Pot Cap-1 Maneuver	791	-	-	737	-	-	~ 22	36	334	40	62	386
Stage 1	-	-	-	-	-	-	318	367	-	224	266	-
Stage 2	-	-	-	-	-	-	135	181	-	380	436	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	791	-	-	737	-	-	~ 10	11	334	4	19	386
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 10	11	-	4	19	-
Stage 1	-	-	-	-	-	-	318	367	-	224	82	-
Stage 2	-	-	-	-	-	-	~ 42	56	-	97	436	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3	$ 5543.8	$ 573.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	29	791	-	-	737	-	-	8
HCM Lane V/C Ratio	12.74	-	-	-	0.361	-	-	0.263
HCM Control Delay (s)	$ 5543.8	0	-	-	12.6	0		$ 573.4
HCM Lane LOS	F	A	-	-	B	A	-	F
HCM 95th %tile Q(veh)	45.6	0	-	-	1.7	-	-	0.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	45	66	285	41	60	297
Future Volume (vph)	45	66	285	41	60	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	12	10	12	12	10
Grade (%)	-3%		2%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.983			
Flt Protected	0.980					0.992
Satd. Flow (prot)	1490	0	1553	0	0	1576
Flt Permitted	0.980					0.992
Satd. Flow (perm)	1490	0	1553	0	0	1576
Link Speed (mph)	30		30			30
Link Distance (ft)	296		1260			536
Travel Time (s)	6.7		28.6			12.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	12%	5%	5%	15%
Adj. Flow (vph)	50	73	317	46	67	330
Shared Lane Traffic (%)						
Lane Group Flow (vph)	123	0	363	0	0	397
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	9		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.12	0.98	1.11	1.01	0.98	1.07
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection						
Int Delay, s/veh	2.6					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	66	285	41	60	297
Future Vol, veh/h	45	66	285	41	60	297
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	2	-	-	-3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	5	12	5	5	15
Mvmt Flow	50	73	317	46	67	330

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	804	340	0	0	363	0
Stage 1	340	-	-	-	-	-
Stage 2	464	-	-	-	-	-
Critical Hdwy	5.85	5.95	-	-	4.15	-
Critical Hdwy Stg 1	4.85	-	-	-	-	-
Critical Hdwy Stg 2	4.85	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	398	716	-	-	1179	-
Stage 1	756	-	-	-	-	-
Stage 2	677	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	370	716	-	-	1179	-
Mov Cap-2 Maneuver	370	-	-	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	630	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.1	0	1.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	519	1179	-
HCM Lane V/C Ratio	-	-	0.238	0.057	-
HCM Control Delay (s)	-	-	14.1	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.9	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	44	51	75	77	55	73	87	1235	52	70	1183	72
Future Volume (vph)	44	51	75	77	55	73	87	1235	52	70	1183	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	13	12	12	11	12	12	11	12
Grade (%)		2%			-8%			5%			3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.940			0.952			0.995			0.993	
Flt Protected		0.987			0.982			0.997			0.997	
Satd. Flow (prot)	0	1804	0	0	1745	0	0	1742	0	0	1749	0
Flt Permitted		0.987			0.982			0.997			0.997	
Satd. Flow (perm)	0	1804	0	0	1745	0	0	1742	0	0	1749	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		731			304			433			369	
Travel Time (s)		16.6			6.9			9.8			8.4	
Confl. Peds. (#/hr)	12		15	16		13	13		12	15		16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	0%	6%	5%	20%	6%	2%	2%	2%	5%	2%	6%
Adj. Flow (vph)	46	54	79	81	58	77	92	1300	55	74	1245	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	179	0	0	216	0	0	1447	0	0	1395	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	0.93	1.01	0.95	0.91	0.95	1.03	1.08	1.03	1.02	1.07	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	44	51	75	77	55	73	87	1235	52	70	1183	72
Future Vol, veh/h	44	51	75	77	55	73	87	1235	52	70	1183	72
Conflicting Peds, #/hr	12	0	15	16	0	13	13	0	12	15	0	16
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-8	-	-	5	-	-	3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	0	6	5	20	6	2	2	2	5	2	6
Mvmt Flow	46	54	79	81	58	77	92	1300	55	74	1245	76

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	3039	3012	1359	3041	3001	1312	1337	0	0	1370	0	0
Stage 1	1527	1527	-	1447	1447	-	-	-	-	-	-	-
Stage 2	1512	1485	-	1594	1554	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.9	6.46	5.55	5.1	5.46	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.52	5.9	-	4.55	4.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.9	-	4.55	4.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4	3.354	3.545	4.18	3.354	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	~ 6	~ 10	165	~ 29	~ 44	254	516	-	-	492	-	-
Stage 1	124	153	-	306	342	-	-	-	-	-	-	-
Stage 2	127	161	-	268	317	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 1	160	-	~ 4	247	507	-	-	484	-	-
Mov Cap-2 Maneuver	-	~ 1	-	-	~ 4	-	-	-	-	-	-	-
Stage 1	~ 30	~ 37	-	~ 75	137	-	-	-	-	-	-	-
Stage 2	~ 20	64	-	-	77	-	-	-	-	-	-	-

Approach	EB	WB	SE	NW
HCM Control Delay, s			0.9	0.7
HCM LOS	-	-		

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1	WBLn1	SEL	SET	SER
Capacity (veh/h)	484	-	-	-	-	507	-	-
HCM Lane V/C Ratio	0.152	-	-	-	-	0.181	-	-
HCM Control Delay (s)	13.8	0	-	-	-	13.7	0	-
HCM Lane LOS	B	A	-	-	-	B	A	-
HCM 95th %tile Q(veh)	0.5	-	-	-	-	0.7	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1258	132	186	1208	121	149
Future Volume (vph)	1258	132	186	1208	121	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)	1%			0%	3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.987				0.925	
Flt Protected				0.993	0.978	
Satd. Flow (prot)	1760	0	0	1850	1640	0
Flt Permitted				0.993	0.978	
Satd. Flow (perm)	1760	0	0	1850	1640	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		25	27		25	27
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	7%	2%	2%	6%	1%
Adj. Flow (vph)	1324	139	196	1272	127	157
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1463	0	0	1468	284	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	51.4

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	1258	132	186	1208	121	149
Future Vol, veh/h	1258	132	186	1208	121	149
Conflicting Peds, #/hr	0	25	27	0	25	27
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	3	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	7	2	2	6	1
Mvmt Flow	1324	139	196	1272	127	157

Major/Minor	Major1			Major2	Minor1	
Conflicting Flow All	0	0	1490	0	3110	1448
Stage 1	-	-	-	-	1421	-
Stage 2	-	-	-	-	1689	-
Critical Hdwy	-	-	4.12	-	7.06	6.51
Critical Hdwy Stg 1	-	-	-	-	6.06	-
Critical Hdwy Stg 2	-	-	-	-	6.06	-
Follow-up Hdwy	-	-	2.218	-	3.554	3.309
Pot Cap-1 Maneuver	-	-	451	-	~ 7	~ 143
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	~ 121	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	439	-	0	~ 136
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	168	-
Stage 2	-	-	-	-	0	-

Approach	EB			WB	NE
HCM Control Delay, s	0			2.6	$ 568.2
HCM LOS					F

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	136	-	-	439	-
HCM Lane V/C Ratio	2.09	-	-	0.446	-
HCM Control Delay (s)	$ 568.2	-	-	19.6	0
HCM Lane LOS	F	-	-	C	A
HCM 95th %tile Q(veh)	23.1	-	-	2.2	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

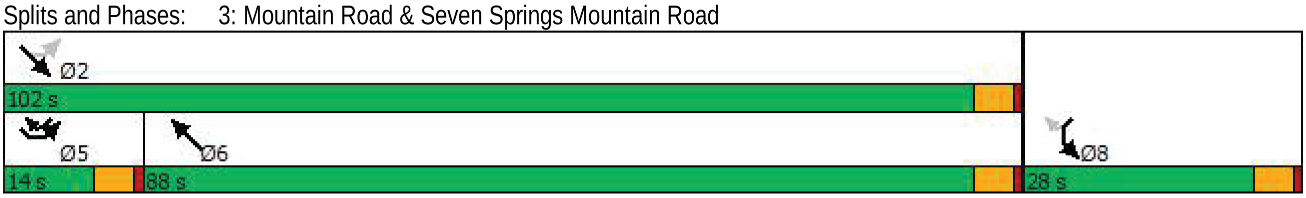
Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	461	941	941	114	100	455
Future Volume (vph)	461	941	941	114	100	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12
Grade (%)		-4%	5%		-7%	
Storage Length (ft)	200			100	200	200
Storage Lanes	1			0	1	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.99		0.96	0.95
Frt			0.985			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1805	1837	1767	0	1736	1607
Flt Permitted	0.077				0.950	
Satd. Flow (perm)	146	1837	1767	0	1674	1524
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9			135
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	9			10	10	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	8%	4%	4%
Adj. Flow (vph)	485	991	991	120	105	479
Shared Lane Traffic (%)						
Lane Group Flow (vph)	485	991	1111	0	105	479
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.02	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Number of Detectors	2	2	2		2	2
Detector Template						
Leading Detector (ft)	83	83	83		83	83
Trailing Detector (ft)	-5	-5	-5		-5	-5
Detector 1 Position(ft)	-5	-5	-5		-5	-5
Detector 1 Size(ft)	40	40	40		40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)	43	43	43		43	43
Detector 2 Size(ft)	40	40	40		40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0		0.0	0.0
Turn Type	pm+pt	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		8	5

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Permitted Phases	2					8
Detector Phase	5	2	6		8	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	10.0	23.0	23.0		23.0	10.0
Total Split (s)	14.0	102.0	88.0		28.0	14.0
Total Split (%)	10.8%	78.5%	67.7%		21.5%	10.8%
Maximum Green (s)	9.0	97.0	83.0		23.0	9.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Min	Min		None	None
Walk Time (s)		7.0	7.0		7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		15	15		15	
v/c Ratio	1.97	0.67	0.92		0.54	1.18
Control Delay	473.2	8.4	30.9		60.2	132.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	473.2	8.4	30.9		60.2	132.2
Queue Length 50th (ft)	~501	248	630		78	~265
Queue Length 95th (ft)	#753	463	#1138		137	#459
Internal Link Dist (ft)		1396	543		564	
Turn Bay Length (ft)	200				200	200
Base Capacity (vph)	246	1541	1274		346	407
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	1.97	0.64	0.87		0.30	1.18

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 116.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Mountain Road & Seven Springs Mountain Road



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	461	941	941	114	100	455
Future Volume (veh/h)	461	941	941	114	100	455
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	2027	2027	1723	1634	2115	2115
Adj Flow Rate, veh/h	485	991	991	120	105	479
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	8	4	4
Cap, veh/h	189	1513	962	116	356	441
Arrive On Green	0.07	0.75	0.64	0.64	0.18	0.18
Sat Flow, veh/h	1931	2027	1506	182	2015	1793
Grp Volume(v), veh/h	485	991	0	1111	105	479
Grp Sat Flow(s),veh/h/ln	1931	2027	0	1689	2015	1793
Q Serve(g_s), s	9.0	31.6	0.0	83.0	5.9	23.0
Cycle Q Clear(g_c), s	9.0	31.6	0.0	83.0	5.9	23.0
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h	189	1513	0	1078	356	441
V/C Ratio(X)	2.57	0.66	0.00	1.03	0.29	1.09
Avail Cap(c_a), veh/h	189	1513	0	1078	356	441
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.6	8.2	0.0	23.5	46.5	49.0
Incr Delay (d2), s/veh	719.7	1.0	0.0	35.5	0.5	67.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	41.7	12.6	0.0	40.9	3.0	22.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	768.3	9.2	0.0	59.0	46.9	116.9
LnGrp LOS	F	A	A	F	D	F
Approach Vol, veh/h		1476	1111		584	
Approach Delay, s/veh		258.7	59.0		104.3	
Approach LOS		F	E		F	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	102.0	14.0	88.0	28.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	97.0	9.0	83.0	23.0
Max Q Clear Time (g_c+I1), s	33.6	11.0	85.0	25.0
Green Ext Time (p_c), s	9.7	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	160.3
HCM 6th LOS	F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1040	145	308	976	16	146	6	329	4	8	4
Future Volume (vph)	2	1040	145	308	976	16	146	6	329	4	8	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	10	12	12	11	12	12	11	12
Grade (%)		1%			1%			2%			-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.983			0.998			0.908			0.966	
Flt Protected					0.988			0.985			0.988	
Satd. Flow (prot)	0	1757	0	0	1694	0	0	1550	0	0	1779	0
Flt Permitted					0.988			0.985			0.988	
Satd. Flow (perm)	0	1757	0	0	1694	0	0	1550	0	0	1779	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			453			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	4%	5%	2%	0%	5%	0%	5%	0%	0%	0%
Adj. Flow (vph)	2	1095	153	324	1027	17	154	6	346	4	8	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1250	0	0	1368	0	0	506	0	0	16	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.05	1.01	1.01	1.10	1.01	1.01	1.06	1.01	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1040	145	308	976	16	146	6	329	4	8	4
Future Vol, veh/h	2	1040	145	308	976	16	146	6	329	4	8	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	1	-	-	2	-	-	-3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	2	4	5	2	0	5	0	5	0	0	0
Mvmt Flow	2	1095	153	324	1027	17	154	6	346	4	8	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1044	0	0	1248	0	0	2866	2868	1172	3036	2936	1036
Stage 1	-	-	-	-	-	-	1176	1176	-	1684	1684	-
Stage 2	-	-	-	-	-	-	1690	1692	-	1352	1252	-
Critical Hdwy	4.1	-	-	4.15	-	-	7.55	6.9	6.45	6.5	5.9	5.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.55	5.9	-	5.5	4.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.55	5.9	-	5.5	4.9	-
Follow-up Hdwy	2.2	-	-	2.245	-	-	3.545	4	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	674	-	-	547	-	-	~ 7	12	~ 216	13	25	309
Stage 1	-	-	-	-	-	-	202	235	-	160	201	-
Stage 2	-	-	-	-	-	-	~ 96	125	-	234	303	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	674	-	-	547	-	-	-	0	~ 216	-	0	309
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	200	233	-	158	0	-
Stage 2	-	-	-	-	-	-	-	0	-	-	300	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4.9		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	674	-	-	547	-	-	-
HCM Lane V/C Ratio	-	0.003	-	-	0.593	-	-	-
HCM Control Delay (s)	-	10.4	0	-	20.7	0	-	-
HCM Lane LOS	-	B	A	-	C	A	-	-
HCM 95th %tile Q(veh)	-	0	-	-	3.8	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	79	403	56	82	378
Future Volume (vph)	54	79	403	56	82	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	12	10	12	12	10
Grade (%)	-3%		2%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.984			
Flt Protected	0.980					0.991
Satd. Flow (prot)	1490	0	1554	0	0	1575
Flt Permitted	0.980					0.991
Satd. Flow (perm)	1490	0	1554	0	0	1575
Link Speed (mph)	30		30			30
Link Distance (ft)	273		1260			533
Travel Time (s)	6.2		28.6			12.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	12%	5%	5%	15%
Adj. Flow (vph)	60	88	448	62	91	420
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	0	510	0	0	511
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	9		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.12	0.98	1.11	1.01	0.98	1.07
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection						
Int Delay, s/veh	3.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	54	79	403	56	82	378
Future Vol, veh/h	54	79	403	56	82	378
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	2	-	-	-3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	5	12	5	5	15
Mvmt Flow	60	88	448	62	91	420

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1081	479	0	0	510	0
Stage 1	479	-	-	-	-	-
Stage 2	602	-	-	-	-	-
Critical Hdwy	5.85	5.95	-	-	4.15	-
Critical Hdwy Stg 1	4.85	-	-	-	-	-
Critical Hdwy Stg 2	4.85	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	285	604	-	-	1040	-
Stage 1	668	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	253	604	-	-	1040	-
Mov Cap-2 Maneuver	253	-	-	-	-	-
Stage 1	668	-	-	-	-	-
Stage 2	530	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20	0	1.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	386	1040	-
HCM Lane V/C Ratio	-	-	0.383	0.088	-
HCM Control Delay (s)	-	-	20	8.8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.8	0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	42	43	140	59	52	61	51	918	25	121	1013	51
Future Volume (vph)	42	43	140	59	52	61	51	918	25	121	1013	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	13	12	12	11	12	12	11	12
Grade (%)		2%			-8%			5%			3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.916			0.952			0.997			0.994	
Flt Protected		0.991			0.983			0.997			0.995	
Satd. Flow (prot)	0	1466	0	0	1568	0	0	1521	0	0	1484	0
Flt Permitted		0.991			0.983			0.997			0.995	
Satd. Flow (perm)	0	1466	0	0	1568	0	0	1521	0	0	1484	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		731			304			433			369	
Travel Time (s)		16.6			6.9			9.8			8.4	
Confl. Peds. (#/hr)	17		20	19		16	16		17	20		19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	60%	19%	15%	55%	0%	18%	17%	17%	11%	22%	14%
Adj. Flow (vph)	46	47	152	64	57	66	55	998	27	132	1101	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	245	0	0	187	0	0	1080	0	0	1288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	0.93	1.01	0.95	0.91	0.95	1.03	1.08	1.03	1.02	1.07	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	42	43	140	59	52	61	51	918	25	121	1013	51
Future Vol, veh/h	42	43	140	59	52	61	51	918	25	121	1013	51
Conflicting Peds, #/hr	17	0	20	19	0	16	16	0	17	20	0	19
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-8	-	-	5	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	60	19	15	55	0	18	17	17	11	22	14
Mvmt Flow	46	47	152	64	57	66	55	998	27	132	1101	55

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	2613	2581	1052	2653	2567	1165	1175	0	0	1045	0	0
Stage 1	1142	1142	-	1412	1412	-	-	-	-	-	-	-
Stage 2	1471	1439	-	1241	1155	-	-	-	-	-	-	-
Critical Hdwy	7.55	7.5	6.59	5.65	5.45	5.4	4.28	-	-	4.21	-	-
Critical Hdwy Stg 1	6.55	6.5	-	4.65	4.45	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.55	6.5	-	4.65	4.45	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.54	3.471	3.635	4.495	3.3	2.362	-	-	2.299	-	-
Pot Cap-1 Maneuver	~ 12	~ 12	241	~ 44	~ 55	309	541	-	-	632	-	-
Stage 1	212	190	-	300	298	-	-	-	-	-	-	-
Stage 2	132	128	-	350	363	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 3	232	-	~ 16	298	530	-	-	618	-	-
Mov Cap-2 Maneuver	-	~ 3	-	-	~ 16	-	-	-	-	-	-	-
Stage 1	157	141	-	223	114	-	-	-	-	-	-	-
Stage 2	~ 20	49	-	~ 60	269	-	-	-	-	-	-	-

Approach	EB	WB	SE	NW
HCM Control Delay, s			0.6	1.3
HCM LOS	-	-		

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1	WBLn1	SEL	SET	SER
Capacity (veh/h)	618	-	-	-	-	530	-	-
HCM Lane V/C Ratio	0.213	-	-	-	-	0.105	-	-
HCM Control Delay (s)	12.4	0	-	-	-	12.6	0	-
HCM Lane LOS	B	A	-	-	-	B	A	-
HCM 95th %tile Q(veh)	0.8	-	-	-	-	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1030	86	121	1076	103	139
Future Volume (vph)	1030	86	121	1076	103	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)	1%			0%	3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.990				0.922	
Flt Protected				0.995	0.979	
Satd. Flow (prot)	1541	0	0	1679	1554	0
Flt Permitted				0.995	0.979	
Satd. Flow (perm)	1541	0	0	1679	1554	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		27	33		27	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	10%	18%	12%	7%	10%
Adj. Flow (vph)	1144	96	134	1196	114	154
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1240	0	0	1330	268	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2386.4

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	1030	86	121	1076	103	139
Future Vol, veh/h	1030	86	121	1076	103	139
Conflicting Peds, #/hr	0	27	33	0	27	33
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	3	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	18	10	18	12	7	10
Mvmt Flow	1144	96	134	1196	114	154

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1273	0	2716	1258
Stage 1	-	-	-	-	1225	-
Stage 2	-	-	-	-	1491	-
Critical Hdwy	-	-	4.28	-	7.07	6.6
Critical Hdwy Stg 1	-	-	-	-	6.07	-
Critical Hdwy Stg 2	-	-	-	-	6.07	-
Follow-up Hdwy	-	-	2.362	-	3.563	3.39
Pot Cap-1 Maneuver	-	-	495	-	~ 14	181
Stage 1	-	-	-	-	221	-
Stage 2	-	-	-	-	156	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	479	-	~ 2	170
Mov Cap-2 Maneuver	-	-	-	-	~ 2	-
Stage 1	-	-	-	-	214	-
Stage 2	-	-	-	-	~ 25	-

Approach	EB	WB	NE
HCM Control Delay, s	0	1.6	$ 25187.3
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	5	-	-	479	-
HCM Lane V/C Ratio	53.778	-	-	0.281	-
HCM Control Delay (s)	$ 25187.3	-	-	15.4	0
HCM Lane LOS	F	-	-	C	A
HCM 95th %tile Q(veh)	35.8	-	-	1.1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

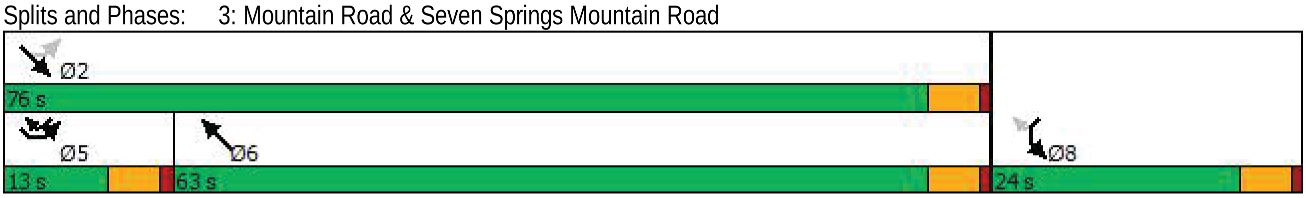
Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	350	819	783	86	91	408
Future Volume (vph)	350	819	783	86	91	408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12
Grade (%)		-4%	5%		-7%	
Storage Length (ft)	200			100	200	200
Storage Lanes	1			0	1	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			1.00		0.98	0.94
Frt			0.987			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1615	1629	1547	0	1672	1520
Flt Permitted	0.142				0.950	
Satd. Flow (perm)	241	1629	1547	0	1640	1427
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9			157
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	15			7	7	15
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	14%	15%	18%	15%	8%	10%
Adj. Flow (vph)	376	881	842	92	98	439
Shared Lane Traffic (%)						
Lane Group Flow (vph)	376	881	934	0	98	439
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		11	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.02	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Number of Detectors	2	2	2		2	2
Detector Template						
Leading Detector (ft)	83	83	83		83	83
Trailing Detector (ft)	-5	-5	-5		-5	-5
Detector 1 Position(ft)	-5	-5	-5		-5	-5
Detector 1 Size(ft)	40	40	40		40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)	43	43	43		43	43
Detector 2 Size(ft)	40	40	40		40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0		0.0	0.0
Turn Type	pm+pt	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		8	5

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Permitted Phases	2					8
Detector Phase	5	2	6		8	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	10.0	23.0	23.0		23.0	10.0
Total Split (s)	13.0	76.0	63.0		24.0	13.0
Total Split (%)	13.0%	76.0%	63.0%		24.0%	13.0%
Maximum Green (s)	8.0	71.0	58.0		19.0	8.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Min	Min		None	None
Walk Time (s)		7.0	7.0		7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		15	15		15	
v/c Ratio	1.20	0.67	0.93		0.48	1.06
Control Delay	133.9	9.1	33.2		45.1	83.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	133.9	9.1	33.2		45.1	83.3
Queue Length 50th (ft)	~91	196	449		54	~175
Queue Length 95th (ft)	#294	462	#872		102	#278
Internal Link Dist (ft)		1396	543		564	
Turn Bay Length (ft)	200				200	200
Base Capacity (vph)	314	1316	1007		355	414
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	1.20	0.67	0.93		0.28	1.06

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 90
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Mountain Road & Seven Springs Mountain Road



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	350	819	783	86	91	408
Future Volume (veh/h)	350	819	783	86	91	408
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1847	1832	1486	1530	2055	2025
Adj Flow Rate, veh/h	376	881	842	92	98	439
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	14	15	18	15	8	10
Cap, veh/h	213	1301	763	83	372	463
Arrive On Green	0.08	0.71	0.58	0.58	0.19	0.19
Sat Flow, veh/h	1759	1832	1315	144	1957	1716
Grp Volume(v), veh/h	376	881	0	934	98	439
Grp Sat Flow(s),veh/h/ln	1759	1832	0	1459	1957	1716
Q Serve(g_s), s	8.0	26.9	0.0	58.0	4.3	19.0
Cycle Q Clear(g_c), s	8.0	26.9	0.0	58.0	4.3	19.0
Prop In Lane	1.00			0.10	1.00	1.00
Lane Grp Cap(c), veh/h	213	1301	0	846	372	463
V/C Ratio(X)	1.77	0.68	0.00	1.10	0.26	0.95
Avail Cap(c_a), veh/h	213	1301	0	846	372	463
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.8	8.1	0.0	21.0	34.5	35.8
Incr Delay (d2), s/veh	363.8	1.4	0.0	63.3	0.4	28.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.4	9.3	0.0	32.6	2.1	14.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	397.7	9.5	0.0	84.3	34.9	64.7
LnGrp LOS	F	A	A	F	C	E
Approach Vol, veh/h		1257	934		537	
Approach Delay, s/veh		125.6	84.3		59.3	
Approach LOS		F	F		E	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	76.0	13.0	63.0	24.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	71.0	8.0	58.0	19.0
Max Q Clear Time (g_c+I1), s	28.9	10.0	60.0	21.0
Green Ext Time (p_c), s	7.6	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	98.4
HCM 6th LOS	F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	707	183	300	813	3	198	1	286	1	0	1
Future Volume (vph)	0	707	183	300	813	3	198	1	286	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	10	12	12	11	12	12	11	12
Grade (%)		1%			1%			2%			-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.972						0.920			0.932	
Flt Protected					0.987			0.980			0.976	
Satd. Flow (prot)	0	1505	0	0	1589	0	0	1300	0	0	1696	0
Flt Permitted					0.987			0.980			0.976	
Satd. Flow (perm)	0	1505	0	0	1589	0	0	1300	0	0	1696	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			453			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	18%	18%	14%	8%	0%	25%	0%	27%	0%	0%	0%
Adj. Flow (vph)	0	744	193	316	856	3	208	1	301	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	937	0	0	1175	0	0	510	0	0	2	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.05	1.01	1.01	1.10	1.01	1.01	1.06	1.01	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4525

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	707	183	300	813	3	198	1	286	1	0	1
Future Vol, veh/h	0	707	183	300	813	3	198	1	286	1	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	1	-	-	2	-	-	-3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	18	18	14	8	0	25	0	27	0	0	0
Mvmt Flow	0	744	193	316	856	3	208	1	301	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	859	0	0	937	0	0	2331	2332	841	2482	2427	858
Stage 1	-	-	-	-	-	-	841	841	-	1490	1490	-
Stage 2	-	-	-	-	-	-	1490	1491	-	992	937	-
Critical Hdwy	4.1	-	-	4.24	-	-	7.75	6.9	6.67	6.5	5.9	5.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.75	5.9	-	5.5	4.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.75	5.9	-	5.5	4.9	-
Follow-up Hdwy	2.2	-	-	2.326	-	-	3.725	4	3.543	3.5	4	3.3
Pot Cap-1 Maneuver	791	-	-	684	-	-	~ 17	29	315	31	49	386
Stage 1	-	-	-	-	-	-	299	349	-	200	242	-
Stage 2	-	-	-	-	-	-	~ 116	160	-	352	405	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	791	-	-	684	-	-	~ 4	3	315	0	6	386
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 4	3	-	0	6	-
Stage 1	-	-	-	-	-	-	299	349	-	200	28	-
Stage 2	-	-	-	-	-	-	~ 13	19	-	16	405	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4	$ 23250.1	14.4
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	10	791	-	-	684	-	-	386
HCM Lane V/C Ratio	51.053	-	-	-	0.462	-	-	0.005
HCM Control Delay (s)	$ 23250.1	0	-	-	14.7	0	-	14.4
HCM Lane LOS	F	A	-	-	B	A	-	B
HCM 95th %tile Q(veh)	65.5	0	-	-	2.4	-	-	0

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	45	66	411	41	60	431
Future Volume (vph)	45	66	411	41	60	431
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	12	10	12	12	10
Grade (%)	-3%		2%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.988			
Flt Protected	0.980					0.994
Satd. Flow (prot)	1490	0	1558	0	0	1573
Flt Permitted	0.980					0.994
Satd. Flow (perm)	1490	0	1558	0	0	1573
Link Speed (mph)	30		30			30
Link Distance (ft)	238		1260			553
Travel Time (s)	5.4		28.6			12.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	12%	5%	5%	15%
Adj. Flow (vph)	50	73	457	46	67	479
Shared Lane Traffic (%)						
Lane Group Flow (vph)	123	0	503	0	0	546
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	9		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.12	0.98	1.11	1.01	0.98	1.07
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	2.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	66	411	41	60	431
Future Vol, veh/h	45	66	411	41	60	431
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	2	-	-	-3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	5	12	5	5	15
Mvmt Flow	50	73	457	46	67	479

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1093	480	0	0	503	0
Stage 1	480	-	-	-	-	-
Stage 2	613	-	-	-	-	-
Critical Hdwy	5.85	5.95	-	-	4.15	-
Critical Hdwy Stg 1	4.85	-	-	-	-	-
Critical Hdwy Stg 2	4.85	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	281	603	-	-	1046	-
Stage 1	667	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	257	603	-	-	1046	-
Mov Cap-2 Maneuver	257	-	-	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	1.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	390	1046	-
HCM Lane V/C Ratio	-	-	0.316	0.064	-
HCM Control Delay (s)	-	-	18.4	8.7	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	44	51	161	77	55	73	87	1299	52	159	1250	72
Future Volume (vph)	44	51	161	77	55	73	87	1299	52	159	1250	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	13	12	12	11	12	12	11	12
Grade (%)		2%			-8%			5%			3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.915			0.952			0.995			0.993	
Flt Protected		0.992			0.982			0.997			0.995	
Satd. Flow (prot)	0	1749	0	0	1745	0	0	1742	0	0	1744	0
Flt Permitted		0.992			0.982			0.997			0.995	
Satd. Flow (perm)	0	1749	0	0	1745	0	0	1742	0	0	1744	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		731			304			433			369	
Travel Time (s)		16.6			6.9			9.8			8.4	
Confl. Peds. (#/hr)	12		15	16		13	13		12	15		16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	0%	6%	5%	20%	6%	2%	2%	2%	5%	2%	6%
Adj. Flow (vph)	46	54	169	81	58	77	92	1367	55	167	1316	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	269	0	0	216	0	0	1514	0	0	1559	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	0.93	1.01	0.95	0.91	0.95	1.03	1.08	1.03	1.02	1.07	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	44	51	161	77	55	73	87	1299	52	159	1250	72
Future Vol, veh/h	44	51	161	77	55	73	87	1299	52	159	1250	72
Conflicting Peds, #/hr	12	0	15	16	0	13	13	0	12	15	0	16
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	2	-	-	-8	-	-	5	-	-	3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	0	6	5	20	6	2	2	2	5	2	6
Mvmt Flow	46	54	169	81	58	77	92	1367	55	167	1316	76

Major/Minor	Minor1			Minor2			Major1			Major2		
Conflicting Flow All	3363	3336	1426	3410	3325	1383	1408	0	0	1437	0	0
Stage 1	1594	1594	-	1704	1704	-	-	-	-	-	-	-
Stage 2	1769	1742	-	1706	1621	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.9	6.46	5.55	5.1	5.46	4.12	-	-	4.15	-	-
Critical Hdwy Stg 1	6.52	5.9	-	4.55	4.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.9	-	4.55	4.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4	3.354	3.545	4.18	3.354	2.218	-	-	2.245	-	-
Pot Cap-1 Maneuver	~ 3	~ 6	~ 150	~ 18	~ 31	234	485	-	-	463	-	-
Stage 1	113	141	-	243	284	-	-	-	-	-	-	-
Stage 2	87	117	-	243	302	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	~ 145	-	0	228	477	-	-	455	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 6	~ 7	-	~ 13	0	-	-	-	-	-	-	-
Stage 2	-	0	-	~ 15	~ 16	-	-	-	-	-	-	-

Approach	EB	WB	SE	NW
HCM Control Delay, s			0.9	1.9
HCM LOS	-	-		

Minor Lane/Major Mvmt	NWL	NWT	NWR	EBLn1	WBLn1	SEL	SET	SER
Capacity (veh/h)	455	-	-	-	-	477	-	-
HCM Lane V/C Ratio	0.368	-	-	-	-	0.192	-	-
HCM Control Delay (s)	17.4	0	-	-	-	14.3	0	-
HCM Lane LOS	C	A	-	-	-	B	A	-
HCM 95th %tile Q(veh)	1.7	-	-	-	-	0.7	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1409	132	186	1364	121	149
Future Volume (vph)	1409	132	186	1364	121	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Grade (%)	1%			0%	3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.988				0.925	
Flt Protected				0.994	0.978	
Satd. Flow (prot)	1763	0	0	1852	1640	0
Flt Permitted				0.994	0.978	
Satd. Flow (perm)	1763	0	0	1852	1640	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		25	27		25	27
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	7%	2%	2%	6%	1%
Adj. Flow (vph)	1483	139	196	1436	127	157
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1622	0	0	1632	284	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection						
Int Delay, s/veh	67.4					
Movement	**EBT**	**EBR**	**WBL**	**WBT**	**NEL**	**NER**
Lane Configurations						
Traffic Vol, veh/h	1409	132	186	1364	121	149
Future Vol, veh/h	1409	132	186	1364	121	149
Conflicting Peds, #/hr	0	25	27	0	25	27
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	0	3	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	7	2	2	6	1
Mvmt Flow	1483	139	196	1436	127	157

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1649	0	3433	1607
Stage 1	-	-	-	-	1580	-
Stage 2	-	-	-	-	1853	-
Critical Hdwy	-	-	4.12	-	7.06	6.51
Critical Hdwy Stg 1	-	-	-	-	6.06	-
Critical Hdwy Stg 2	-	-	-	-	6.06	-
Follow-up Hdwy	-	-	2.218	-	3.554	3.309
Pot Cap-1 Maneuver	-	-	392	-	~ 4	~ 114
Stage 1	-	-	-	-	140	-
Stage 2	-	-	-	-	~ 98	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	382	-	0	~ 108
Mov Cap-2 Maneuver	-	-	-	-	0	-
Stage 1	-	-	-	-	136	-
Stage 2	-	-	-	-	0	-

Approach	EB	WB	NE
HCM Control Delay, s	0	2.9	$ 822.9
HCM LOS			F

Minor Lane/Major Mvmt	NELn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	108	-	-	382	-
HCM Lane V/C Ratio	2.632	-	-	0.513	-
HCM Control Delay (s)	$ 822.9	-	-	23.9	0
HCM Lane LOS	F	-	-	C	A
HCM 95th %tile Q(veh)	26.1	-	-	2.8	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

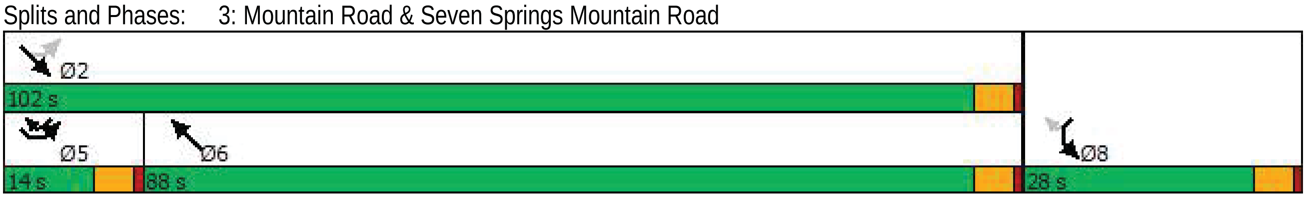
Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	526	1028	1030	114	100	521
Future Volume (vph)	526	1028	1030	114	100	521
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12
Grade (%)		-4%	5%		-7%	
Storage Length (ft)	200			0	200	200
Storage Lanes	1			0	1	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.99		0.96	0.95
Frt			0.987			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1805	1837	1772	0	1736	1607
Flt Permitted	0.045				0.950	
Satd. Flow (perm)	86	1837	1772	0	1674	1524
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			8			111
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	9			10	10	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	8%	4%	4%
Adj. Flow (vph)	554	1082	1084	120	105	548
Shared Lane Traffic (%)						
Lane Group Flow (vph)	554	1082	1204	0	105	548
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.02	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Number of Detectors	2	2	2		2	2
Detector Template						
Leading Detector (ft)	83	83	83		83	83
Trailing Detector (ft)	-5	-5	-5		-5	-5
Detector 1 Position(ft)	-5	-5	-5		-5	-5
Detector 1 Size(ft)	40	40	40		40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)	43	43	43		43	43
Detector 2 Size(ft)	40	40	40		40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0		0.0	0.0
Turn Type	pm+pt	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		8	5

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Permitted Phases	2					8
Detector Phase	5	2	6		8	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	10.0	23.0	23.0		23.0	10.0
Total Split (s)	14.0	102.0	88.0		28.0	14.0
Total Split (%)	10.8%	78.5%	67.7%		21.5%	10.8%
Maximum Green (s)	9.0	97.0	83.0		23.0	9.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead		Lag			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Min	Min		None	None
Walk Time (s)		7.0	7.0		7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		15	15		15	
v/c Ratio	2.80	0.73	0.98		0.55	1.45
Control Delay	843.5	9.9	41.4		61.5	244.1
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	843.5	9.9	41.4		61.5	244.1
Queue Length 50th (ft)	~687	304	793		78	~410
Queue Length 95th (ft)	#954	577	#1296		137	#619
Internal Link Dist (ft)		1396	543		564	
Turn Bay Length (ft)	200				200	200
Base Capacity (vph)	198	1481	1225		331	379
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	2.80	0.73	0.98		0.32	1.45

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 120.4
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Mountain Road & Seven Springs Mountain Road



Movement	SEL	SET	NWT	NWR	SWL	SWR		
Lane Configurations								
Traffic Volume (veh/h)	526	1028	1030	114	100	521		
Future Volume (veh/h)	526	1028	1030	114	100	521		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Work Zone On Approach		No	No		No			
Adj Sat Flow, veh/h/ln	2027	2027	1723	1634	2115	2115		
Adj Flow Rate, veh/h	554	1082	1084	120	105	548		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	2	2	2	8	4	4		
Cap, veh/h	189	1513	972	108	356	441		
Arrive On Green	0.07	0.75	0.64	0.64	0.18	0.18		
Sat Flow, veh/h	1931	2027	1523	169	2015	1793		
Grp Volume(v), veh/h	554	1082	0	1204	105	548		
Grp Sat Flow(s),veh/h/ln	1931	2027	0	1691	2015	1793		
Q Serve(g_s), s	9.0	37.8	0.0	83.0	5.9	23.0		
Cycle Q Clear(g_c), s	9.0	37.8	0.0	83.0	5.9	23.0		
Prop In Lane	1.00			0.10	1.00	1.00		
Lane Grp Cap(c), veh/h	189	1513	0	1080	356	441		
V/C Ratio(X)	2.93	0.72	0.00	1.12	0.29	1.24		
Avail Cap(c_a), veh/h	189	1513	0	1080	356	441		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	48.6	9.0	0.0	23.5	46.5	49.0		
Incr Delay (d2), s/veh	882.9	1.6	0.0	64.7	0.5	126.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	50.3	15.2	0.0	49.8	3.0	29.8		
Unsig. Movement Delay, s/veh								
LnGrp Delay(d),s/veh	931.5	10.6	0.0	88.2	46.9	175.8		
LnGrp LOS	F	B	A	F	D	F		
Approach Vol, veh/h		1636	1204		653			
Approach Delay, s/veh		322.5	88.2		155.1			
Approach LOS		F	F		F			
Timer - Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		102.0			14.0	88.0		28.0
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0
Max Green Setting (Gmax), s		97.0			9.0	83.0		23.0
Max Q Clear Time (g_c+I1), s		39.8			11.0	85.0		25.0
Green Ext Time (p_c), s		11.7			0.0	0.0		0.0
Intersection Summary								
HCM 6th Ctrl Delay			210.4					
HCM 6th LOS			F					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1040	256	374	976	16	254	6	394	4	8	4
Future Volume (vph)	2	1040	256	374	976	16	254	6	394	4	8	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	10	12	12	11	12	12	11	12
Grade (%)		1%			1%			2%			-3%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.998			0.919			0.966	
Flt Protected					0.986			0.981			0.988	
Satd. Flow (prot)	0	1737	0	0	1689	0	0	1562	0	0	1779	0
Flt Permitted					0.986			0.981			0.988	
Satd. Flow (perm)	0	1737	0	0	1689	0	0	1562	0	0	1779	0
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			453			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	4%	5%	2%	0%	5%	0%	5%	0%	0%	0%
Adj. Flow (vph)	2	1095	269	394	1027	17	267	6	415	4	8	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1366	0	0	1438	0	0	688	0	0	16	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.01	1.05	1.01	1.01	1.10	1.01	1.01	1.06	1.01	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection												
Int Delay, s/veh	3.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1040	256	374	976	16	254	6	394	4	8	4
Future Vol, veh/h	2	1040	256	374	976	16	254	6	394	4	8	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	1	-	-	2	-	-	-3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	2	4	5	2	0	5	0	5	0	0	0
Mvmt Flow	2	1095	269	394	1027	17	267	6	415	4	8	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1044	0	0	1364	0	0	3064	3066	1230	3268	3192	1036
Stage 1	-	-	-	-	-	-	1234	1234	-	1824	1824	-
Stage 2	-	-	-	-	-	-	1830	1832	-	1444	1368	-
Critical Hdwy	4.1	-	-	4.15	-	-	7.55	6.9	6.45	6.5	5.9	5.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.55	5.9	-	5.5	4.9	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.55	5.9	-	5.5	4.9	-
Follow-up Hdwy	2.2	-	-	2.245	-	-	3.545	4	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	674	-	-	494	-	-	~ 5	9	~ 199	9	18	309
Stage 1	-	-	-	-	-	-	~ 186	219	-	135	175	-
Stage 2	-	-	-	-	-	-	~ 78	105	-	211	272	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	674	-	-	494	-	-	-	0	~ 199	-	0	309
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	-	-	0	-
Stage 1	-	-	-	-	-	-	~ 183	216	-	133	0	-
Stage 2	-	-	-	-	-	-	-	0	-	-	268	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	9.6		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	674	-	-	494	-	-	-
HCM Lane V/C Ratio	-	0.003	-	-	0.797	-	-	-
HCM Control Delay (s)	-	10.4	0	-	35.2	0	-	-
HCM Lane LOS	-	B	A	-	E	A	-	-
HCM 95th %tile Q(veh)	-	0	-	-	7.4	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	79	581	56	82	551
Future Volume (vph)	54	79	581	56	82	551
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	12	10	12	12	10
Grade (%)	-3%		2%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.988			
Flt Protected	0.980					0.994
Satd. Flow (prot)	1490	0	1557	0	0	1573
Flt Permitted	0.980					0.994
Satd. Flow (perm)	1490	0	1557	0	0	1573
Link Speed (mph)	30		30			30
Link Distance (ft)	284		1260			535
Travel Time (s)	6.5		28.6			12.2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	12%	5%	5%	15%
Adj. Flow (vph)	60	88	646	62	91	612
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	0	708	0	0	703
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	9		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.12	0.98	1.11	1.01	0.98	1.07
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	54	79	581	56	82	551
Future Vol, veh/h	54	79	581	56	82	551
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	2	-	-	-3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	5	12	5	5	15
Mvmt Flow	60	88	646	62	91	612

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1471	677	0	0	708	0
Stage 1	677	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Critical Hdwy	5.85	5.95	-	-	4.15	-
Critical Hdwy Stg 1	4.85	-	-	-	-	-
Critical Hdwy Stg 2	4.85	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	176	474	-	-	877	-
Stage 1	559	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	148	474	-	-	877	-
Mov Cap-2 Maneuver	148	-	-	-	-	-
Stage 1	559	-	-	-	-	-
Stage 2	423	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.3	0	1.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	250	877	-
HCM Lane V/C Ratio	-	-	0.591	0.104	-
HCM Control Delay (s)	-	-	38.3	9.6	0
HCM Lane LOS	-	-	E	A	A
HCM 95th %tile Q(veh)	-	-	3.4	0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	42	43	73	59	52	61	51	868	25	58	966	51
Future Volume (vph)	42	43	73	59	52	61	51	868	25	58	966	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	12	12	12	12
Grade (%)		0%			-5%			-6%			0%	
Storage Length (ft)	100		100	100		100	100		100	125		125
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.95	0.97	0.99				0.98			0.97
Frt			0.850		0.920				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1188	1357	1609	1411	0	1576	1720	1422	1626	1727	1417
Flt Permitted	0.586			0.726			0.122			0.178		
Satd. Flow (perm)	1058	1188	1292	1197	1411	0	202	1720	1387	305	1727	1373
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			79		49				69			69
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		732			428			433			369	
Travel Time (s)		16.6			9.7			9.8			8.4	
Confl. Peds. (#/hr)	1		13	13		1	5		2	2		5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	60%	19%	15%	55%	0%	18%	10%	17%	11%	10%	14%
Adj. Flow (vph)	46	47	79	64	57	66	55	943	27	63	1050	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	47	79	64	123	0	55	943	27	63	1050	55
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	0.97	0.97	0.97	0.96	1.01	0.96	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2	2	2	2		2	2	2	2	2	2
Detector Template												
Leading Detector (ft)	83	83	83	83	83		83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	0	-5	-5		-5	-5	0	-5	-5	0
Detector 1 Position(ft)	-5	-5	0	-5	-5		-5	-5	0	-5	-5	0
Detector 1 Size(ft)	40	40	40	40	40		40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43		43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40		40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	5		8		1	6		5	2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	4		4	8			6		6	2		2
Detector Phase	4	4	5	8	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	30.0	30.0	15.0	30.0	30.0		15.0	65.0	65.0	15.0	65.0	65.0
Total Split (%)	27.3%	27.3%	13.6%	27.3%	27.3%		13.6%	59.1%	59.1%	13.6%	59.1%	59.1%
Maximum Green (s)	25.0	25.0	10.0	25.0	25.0		10.0	60.0	60.0	10.0	60.0	60.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag			Lead				Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	18.0	18.0		18.0	18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)	15	15		15	15			15	15		15	15
v/c Ratio	0.33	0.30	0.25	0.40	0.53		0.25	0.79	0.03	0.21	0.88	0.06
Control Delay	45.3	43.7	7.8	47.5	33.0		7.5	21.8	0.0	6.0	22.0	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	49.0	0.0	0.0	7.7	0.0
Total Delay	45.3	43.7	7.8	47.5	33.0		7.5	70.9	0.0	6.0	29.7	2.2
Queue Length 50th (ft)	31	32	0	44	51		6	362	0	6	329	0
Queue Length 95th (ft)	60	61	33	77	97		25	#922	0	m22	#1078	m3
Internal Link Dist (ft)		652			348			353			289	
Turn Bay Length (ft)	100		100	100			100		100	125		125
Base Capacity (vph)	240	270	357	272	358		279	1192	982	354	1199	974
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	125	0
Spillback Cap Reductn	0	0	14	0	0		0	334	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.17	0.23	0.24	0.34		0.20	1.10	0.03	0.18	0.98	0.06

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 80 (73%), Referenced to phase 2:NWTL and 6:SETL, Start of Red

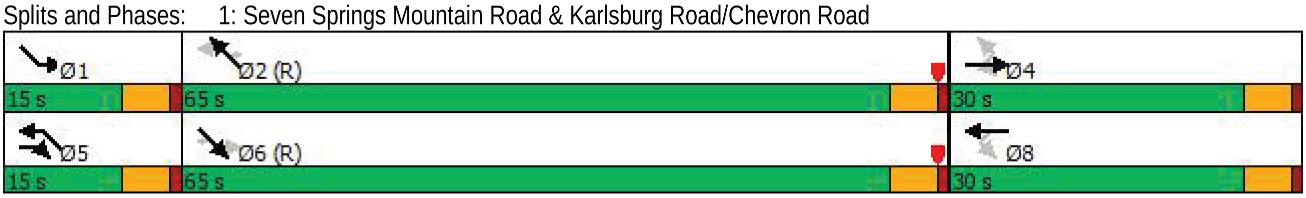
Natural Cycle: 80

Control Type: Actuated-Coordinated

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Seven Springs Mountain Road & Karlsburg Road/Chevron Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	42	43	73	59	52	61	51	868	25	58	966	51
Future Volume (veh/h)	42	43	73	59	52	61	51	868	25	58	966	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	0.97		0.96	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1011	1618	1872	1271	2097	1866	1986	1881	1737	1752	1693
Adj Flow Rate, veh/h	46	47	79	64	57	66	55	943	27	63	1050	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	60	19	15	55	0	18	10	17	11	10	14
Cap, veh/h	163	182	292	239	95	110	191	1279	1023	303	1132	923
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.04	0.64	0.64	0.04	0.65	0.65
Sat Flow, veh/h	1211	1011	1322	1231	526	609	1777	1986	1588	1654	1752	1429
Grp Volume(v), veh/h	46	47	79	64	0	123	55	943	27	63	1050	55
Grp Sat Flow(s),veh/h/ln	1211	1011	1322	1231	0	1135	1777	1986	1588	1654	1752	1429
Q Serve(g_s), s	4.0	4.4	5.5	5.2	0.0	11.0	1.1	35.4	0.7	1.4	58.2	1.6
Cycle Q Clear(g_c), s	15.0	4.4	5.5	9.6	0.0	11.0	1.1	35.4	0.7	1.4	58.2	1.6
Prop In Lane	1.00		1.00	1.00		0.54	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	163	182	292	239	0	205	191	1279	1023	303	1132	923
V/C Ratio(X)	0.28	0.26	0.27	0.27	0.00	0.60	0.29	0.74	0.03	0.21	0.93	0.06
Avail Cap(c_a), veh/h	220	230	354	296	0	258	286	1279	1023	389	1132	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.59	0.59	0.59
Uniform Delay (d), s/veh	48.3	38.7	35.6	42.9	0.0	41.4	22.9	13.3	7.1	12.2	17.2	7.2
Incr Delay (d2), s/veh	0.3	0.3	0.2	0.2	0.0	1.1	0.3	3.8	0.0	0.1	9.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.1	1.8	1.6	0.0	3.1	0.8	15.7	0.2	0.5	23.7	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	39.0	35.8	43.1	0.0	42.5	23.2	17.1	7.1	12.3	26.5	7.2
LnGrp LOS	D	D	D	D	A	D	C	B	A	B	C	A
Approach Vol, veh/h		172			187			1025			1168	
Approach Delay, s/veh		40.1			42.7			17.1			24.9	
Approach LOS		D			D			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	76.1		24.9	9.3	75.9		24.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	60.0		25.0	10.0	60.0		25.0				
Max Q Clear Time (g_c+I1), s	3.1	60.2		17.0	3.4	37.4		13.0				
Green Ext Time (p_c), s	0.0	0.0		0.3	0.1	4.5		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			24.1									
HCM 6th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.

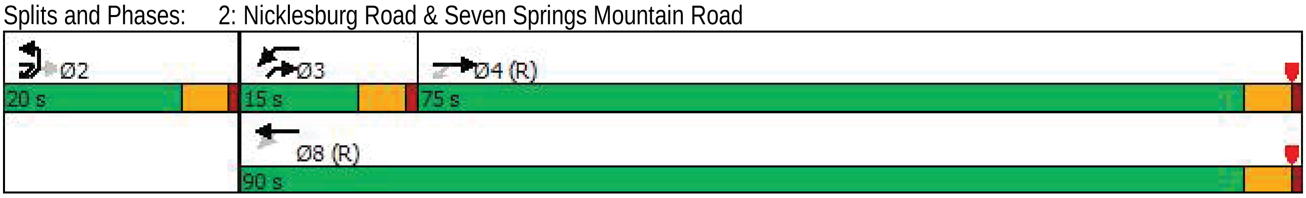
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	913	86	121	967	103	139
Future Volume (vph)	913	86	121	967	103	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	1%			0%	3%	
Storage Length (ft)		100	100		0	100
Storage Lanes		1	1		1	1
Taper Length (ft)			75		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.92	0.91
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1719	1461	1530	1727	1662	1446
Flt Permitted			0.150		0.950	
Satd. Flow (perm)	1719	1347	242	1727	1525	1314
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		68				124
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		27	33		27	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	18%	10%	7%	10%
Adj. Flow (vph)	992	93	132	1051	112	151
Shared Lane Traffic (%)						
Lane Group Flow (vph)	992	93	132	1051	112	151
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.01	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	4	2	3	8	2	3
Permitted Phases		4	8			2

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Detector Phase	4	2	3	8	2	3
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	75.0	20.0	15.0	90.0	20.0	15.0
Total Split (%)	68.2%	18.2%	13.6%	81.8%	18.2%	13.6%
Maximum Green (s)	70.0	15.0	10.0	85.0	15.0	10.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	Min	None	C-Max	Min	None
Walk Time (s)	7.0					
Flash Dont Walk (s)	18.0					
Pedestrian Calls (#/hr)	15					
v/c Ratio	0.83	0.08	0.48	0.76	0.65	0.45
Control Delay	19.8	1.0	8.5	10.5	64.1	13.6
Queue Delay	18.2	0.0	0.0	0.7	86.8	0.0
Total Delay	38.0	1.0	8.5	11.2	150.8	13.6
Queue Length 50th (ft)	673	7	16	295	77	15
Queue Length 95th (ft)	#931	m7	33	550	133	65
Internal Link Dist (ft)	289			1396	439	
Turn Bay Length (ft)		100	100			100
Base Capacity (vph)	1195	1147	312	1390	226	368
Starvation Cap Reductn	220	0	0	0	0	0
Spillback Cap Reductn	0	0	0	106	158	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.08	0.42	0.82	1.65	0.41

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Red
Natural Cycle: 75
Control Type: Actuated-Coordinated
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Nicklesburg Road & Seven Springs Mountain Road



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	913	86	121	967	103	139
Future Volume (veh/h)	913	86	121	967	103	139
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1746	1746	1633	1752	1743	1699
Adj Flow Rate, veh/h	992	93	132	1051	112	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	18	10	7	10
Cap, veh/h	1224	1192	274	1386	196	234
Arrive On Green	0.70	0.70	0.04	0.79	0.12	0.12
Sat Flow, veh/h	1746	1451	1555	1752	1660	1440
Grp Volume(v), veh/h	992	93	132	1051	112	151
Grp Sat Flow(s),veh/h/ln	1746	1451	1555	1752	1660	1440
Q Serve(g_s), s	43.3	1.4	2.4	34.5	7.0	10.8
Cycle Q Clear(g_c), s	43.3	1.4	2.4	34.5	7.0	10.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1224	1192	274	1386	196	234
V/C Ratio(X)	0.81	0.08	0.48	0.76	0.57	0.64
Avail Cap(c_a), veh/h	1224	1192	346	1386	226	261
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.61	0.61	0.45	0.45	1.00	1.00
Uniform Delay (d), s/veh	11.4	1.9	16.5	6.0	45.9	43.1
Incr Delay (d2), s/veh	3.7	0.1	0.2	1.8	1.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.7	0.6	1.8	9.9	2.9	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.1	2.0	16.7	7.8	46.8	46.2
LnGrp LOS	B	A	B	A	D	D
Approach Vol, veh/h	1085			1183	263	
Approach Delay, s/veh	14.0			8.8	46.4	
Approach LOS	B			A	D	

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	18.0	9.9	82.1	92.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	15.0	10.0	70.0	85.0
Max Q Clear Time (g_c+I1), s	12.8	4.4	45.3	36.5
Green Ext Time (p_c), s	0.2	0.2	5.4	5.9

Intersection Summary	
HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	300	752	720	86	94	361
Future Volume (vph)	300	752	720	86	94	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)		-4%	5%		-7%	
Storage Length (ft)	200			100	200	200
Storage Lanes	1			1	1	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				0.96	0.98	0.94
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1615	1762	1684	1369	1672	1520
Flt Permitted	0.112				0.950	
Satd. Flow (perm)	190	1762	1684	1316	1639	1427
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				31		137
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	15			7	7	15
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	14%	10%	10%	15%	8%	10%
Adj. Flow (vph)	323	809	774	92	101	388
Shared Lane Traffic (%)						
Lane Group Flow (vph)	323	809	774	92	101	388
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes		Yes	
Headway Factor	0.97	0.97	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		8	5

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Permitted Phases	2			6		8
Detector Phase	5	2	6	6	8	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	35.0	110.0	75.0	75.0	30.0	35.0
Total Split (%)	25.0%	78.6%	53.6%	53.6%	21.4%	25.0%
Maximum Green (s)	30.0	105.0	70.0	70.0	25.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	Min	Min	None
Walk Time (s)		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		15	15	15	15	
v/c Ratio	0.68	0.60	0.94	0.14	0.45	0.61
Control Delay	29.9	8.3	47.8	12.8	55.8	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	8.3	47.8	12.8	55.8	22.2
Queue Length 50th (ft)	124	175	516	23	75	146
Queue Length 95th (ft)	284	407	#915	61	140	267
Internal Link Dist (ft)		1396	543		564	
Turn Bay Length (ft)	200			100	200	200
Base Capacity (vph)	551	1543	1115	882	395	703
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.52	0.69	0.10	0.26	0.55

Intersection Summary

Area Type: Other

Cycle Length: 140

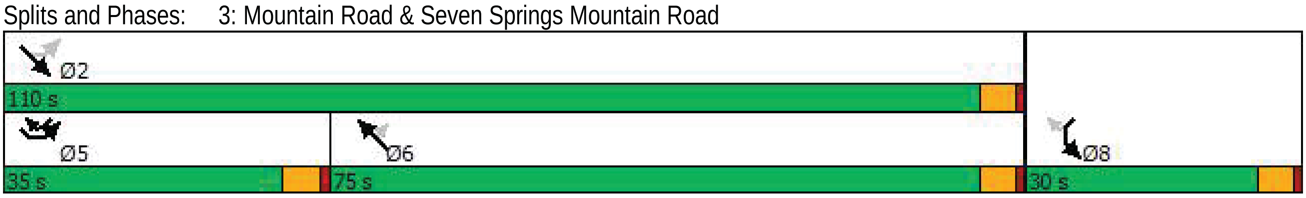
Actuated Cycle Length: 113.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Mountain Road & Seven Springs Mountain Road



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	300	752	720	86	94	361
Future Volume (veh/h)	300	752	720	86	94	361
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1847	1907	1605	1530	2055	2025
Adj Flow Rate, veh/h	323	809	774	92	101	388
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	14	10	10	15	8	10
Cap, veh/h	366	1349	823	661	406	616
Arrive On Green	0.15	0.71	0.51	0.51	0.21	0.21
Sat Flow, veh/h	1759	1907	1605	1288	1957	1716
Grp Volume(v), veh/h	323	809	774	92	101	388
Grp Sat Flow(s),veh/h/ln	1759	1907	1605	1288	1957	1716
Q Serve(g_s), s	14.3	25.2	53.1	4.4	5.1	21.9
Cycle Q Clear(g_c), s	14.3	25.2	53.1	4.4	5.1	21.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	366	1349	823	661	406	616
V/C Ratio(X)	0.88	0.60	0.94	0.14	0.25	0.63
Avail Cap(c_a), veh/h	550	1710	959	770	418	626
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.2	8.7	26.8	14.9	38.8	31.1
Incr Delay (d2), s/veh	10.9	0.4	15.3	0.1	0.3	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.2	9.5	22.9	1.3	2.5	9.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	45.1	9.1	42.1	15.0	39.1	33.1
LnGrp LOS	D	A	D	B	D	C
Approach Vol, veh/h		1132	866		489	
Approach Delay, s/veh		19.4	39.2		34.3	
Approach LOS		B	D		C	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	87.8	22.7	65.1	29.3
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	105.0	30.0	70.0	25.0
Max Q Clear Time (g_c+I1), s	27.2	16.3	55.1	23.9
Green Ext Time (p_c), s	6.6	1.5	5.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	29.2
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	707	104	253	813	3	114	1	236	1	0	1
Future Volume (vph)	0	707	104	253	813	3	114	1	236	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	10	10	10	12	12	11	10	12	11	12
Grade (%)		1%			1%			2%			-3%	
Storage Length (ft)	100		100	100		0	100		100	100		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1890	1549	1271	1470	1633	0	1430	1818	1175	1832	1585	0
Flt Permitted				0.129			0.755					
Satd. Flow (perm)	1890	1549	1271	200	1633	0	1136	1818	1175	1928	1585	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53						175		267	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			454			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	18%	18%	14%	8%	0%	25%	0%	27%	0%	0%	0%
Adj. Flow (vph)	0	744	109	266	856	3	120	1	248	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	744	109	266	859	0	120	1	248	1	1	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes				
Headway Factor	1.01	1.05	1.10	1.10	1.10	1.01	1.01	1.06	1.11	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2	2	2	2		2	2	2	2	2	
Detector Template												
Leading Detector (ft)	83	83	83	83	83		83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5		-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5		-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40		40	40	40	40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43		43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40		40	40	40	40	40	
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turn Type	Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	
Protected Phases		6	7	5	2		7	4	5		8	
Permitted Phases	6		6	2			4		4	8		
Detector Phase	6	6	7	5	2		7	4	5	8	8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.0	10.0	9.5	10.0	10.0		9.5	10.0	10.0	10.0	10.0	
Total Split (s)	85.0	85.0	20.0	30.0	115.0		20.0	35.0	30.0	15.0	15.0	
Total Split (%)	56.7%	56.7%	13.3%	20.0%	76.7%		13.3%	23.3%	20.0%	10.0%	10.0%	
Maximum Green (s)	80.0	80.0	15.5	25.0	110.0		15.5	30.0	25.0	10.0	10.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.5	5.0	5.0		4.5	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead	Lead			Lead		Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes		Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0	3.0	2.0	2.0		3.0	2.0	2.0	2.0	2.0	
Recall Mode	Min	Min	None	None	Min		None	None	None	None	None	
Walk Time (s)	7.0	7.0			7.0			7.0				
Flash Dont Walk (s)	18.0	18.0			18.0			18.0				
Pedestrian Calls (#/hr)	15	15			15			15				
v/c Ratio		0.95	0.12	0.67	0.70		0.56	0.00	0.44	0.01	0.00	
Control Delay		49.3	3.7	27.1	11.3		58.8	49.0	11.9	66.0	0.0	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		49.3	3.7	27.1	11.3		58.8	49.0	11.9	66.0	0.0	
Queue Length 50th (ft)		477	11	76	240		78	1	31	1	0	
Queue Length 95th (ft)		#870	37	222	509		172	6	124	8	0	
Internal Link Dist (ft)		595			615			374			479	
Turn Bay Length (ft)			100	100			100		100	100		
Base Capacity (vph)		1175	935	470	1477		259	549	626	194	399	
Starvation Cap Reductn		0	0	0	26		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.63	0.12	0.57	0.59		0.46	0.00	0.40	0.01	0.00	

Intersection Summary

Area Type: Other

Cycle Length: 150

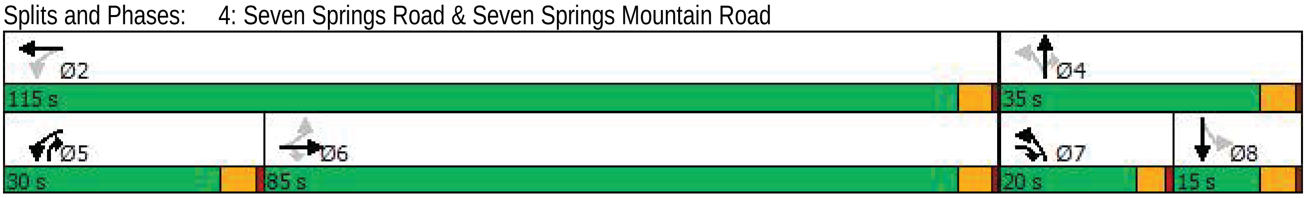
Actuated Cycle Length: 109.2

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Seven Springs Road & Seven Springs Mountain Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	707	104	253	813	3	114	1	236	1	0	1
Future Volume (veh/h)	0	707	104	253	813	3	114	1	236	1	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1894	1627	1627	1687	1776	1894	1506	1876	1476	2018	2018	2018
Adj Flow Rate, veh/h	0	744	109	266	856	3	120	1	248	1	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	18	18	14	8	0	25	0	27	0	0	0
Cap, veh/h	87	801	811	310	1181	4	293	396	408	161	0	103
Arrive On Green	0.00	0.49	0.49	0.12	0.67	0.67	0.10	0.21	0.21	0.06	0.00	0.06
Sat Flow, veh/h	651	1627	1379	1606	1768	6	1434	1876	1251	1220	0	1710
Grp Volume(v), veh/h	0	744	109	266	0	859	120	1	248	1	0	1
Grp Sat Flow(s),veh/h/ln	651	1627	1379	1606	0	1774	1434	1876	1251	1220	0	1710
Q Serve(g_s), s	0.0	35.3	2.9	6.8	0.0	25.7	6.2	0.0	13.7	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	35.3	2.9	6.8	0.0	25.7	6.2	0.0	13.7	0.1	0.0	0.0
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	87	801	811	310	0	1185	293	396	408	161	0	103
V/C Ratio(X)	0.00	0.93	0.13	0.86	0.00	0.72	0.41	0.00	0.61	0.01	0.00	0.01
Avail Cap(c_a), veh/h	399	1580	1471	612	0	2369	426	683	599	235	0	208
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.6	7.6	19.1	0.0	8.8	30.2	25.7	23.3	36.4	0.0	36.4
Incr Delay (d2), s/veh	0.0	2.2	0.0	2.7	0.0	0.3	0.9	0.0	0.5	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	11.9	0.8	2.5	0.0	7.2	2.2	0.0	3.9	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	21.8	7.6	21.8	0.0	9.1	31.1	25.7	23.9	36.4	0.0	36.4
LnGrp LOS	A	C	A	C	A	A	C	C	C	D	A	D
Approach Vol, veh/h		853			1125			369			2	
Approach Delay, s/veh		20.0			12.1			26.3			36.4	
Approach LOS		B			B			C			D	

Timer - Assigned Phs		2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s		60.0		22.4	14.5	45.5	12.4	10.0				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0	4.5	5.0				
Max Green Setting (Gmax), s		110.0		30.0	25.0	80.0	15.5	10.0				
Max Q Clear Time (g_c+I1), s		27.7		15.7	8.8	37.3	8.2	2.1				
Green Ext Time (p_c), s		3.5		0.8	0.7	3.3	0.3	0.0				

Intersection Summary			
HCM 6th Ctrl Delay			17.2
HCM 6th LOS			B

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	44	51	75	77	55	73	87	1235	52	70	1183	72
Future Volume (vph)	44	51	75	77	55	73	87	1235	52	70	1183	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	12	12	12	12
Grade (%)		0%			-5%			-6%			0%	
Storage Length (ft)	100		100	100		100	100		100	125		125
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.95	0.97	0.97				0.95			0.95
Frt			0.850		0.914				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1900	1524	1762	1546	0	1823	1855	1631	1719	1863	1524
Flt Permitted	0.553			0.722			0.054			0.054		
Satd. Flow (perm)	1008	1900	1444	1295	1546	0	104	1855	1556	98	1863	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			42		56				69			69
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		732			428			433			369	
Travel Time (s)		16.6			9.7			9.8			8.4	
Confl. Peds. (#/hr)	12		15	16		13	13		12	15		16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	0%	6%	5%	20%	6%	2%	2%	2%	5%	2%	6%
Adj. Flow (vph)	46	54	79	81	58	77	92	1300	55	74	1245	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	54	79	81	135	0	92	1300	55	74	1245	76
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	0.97	0.97	0.97	0.96	1.01	0.96	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2	2	2	2		2	2	2	2	2	2
Detector Template												
Leading Detector (ft)	83	83	83	83	83		83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	0	-5	-5		-5	-5	0	-5	-5	0
Detector 1 Position(ft)	-5	-5	0	-5	-5		-5	-5	0	-5	-5	0
Detector 1 Size(ft)	40	40	40	40	40		40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43		43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40		40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	5		8		1	6		5	2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	4		4	8			6		6	2		2
Detector Phase	4	4	5	8	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	30.0	30.0	15.0	30.0	30.0		15.0	65.0	65.0	15.0	65.0	65.0
Total Split (%)	27.3%	27.3%	13.6%	27.3%	27.3%		13.6%	59.1%	59.1%	13.6%	59.1%	59.1%
Maximum Green (s)	25.0	25.0	10.0	25.0	25.0		10.0	60.0	60.0	10.0	60.0	60.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag			Lead				Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	18.0	18.0		18.0	18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)	15	15		15	15			15	15		15	15
v/c Ratio	0.33	0.21	0.25	0.45	0.52		0.51	1.05	0.05	0.45	0.98	0.08
Control Delay	45.4	40.0	16.8	48.7	30.6		23.5	60.4	2.0	17.5	32.5	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	21.7	0.0	0.0	39.9	0.0
Total Delay	45.4	40.0	16.8	48.7	30.6		23.5	82.1	2.0	17.5	72.5	3.4
Queue Length 50th (ft)	31	36	22	56	54		10	783	0	7	389	0
Queue Length 95th (ft)	60	65	51	92	102		69	#1414	14	m22	#1348	m7
Internal Link Dist (ft)		652			348			353			289	
Turn Bay Length (ft)	100		100	100			100		100	125		125
Base Capacity (vph)	229	431	371	294	394		235	1239	1062	221	1271	1005
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	143	0
Spillback Cap Reductn	0	0	7	0	0		0	347	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.13	0.22	0.28	0.34		0.39	1.46	0.05	0.33	1.10	0.08

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 80 (73%), Referenced to phase 2:NWTL and 6:SETL, Start of Red

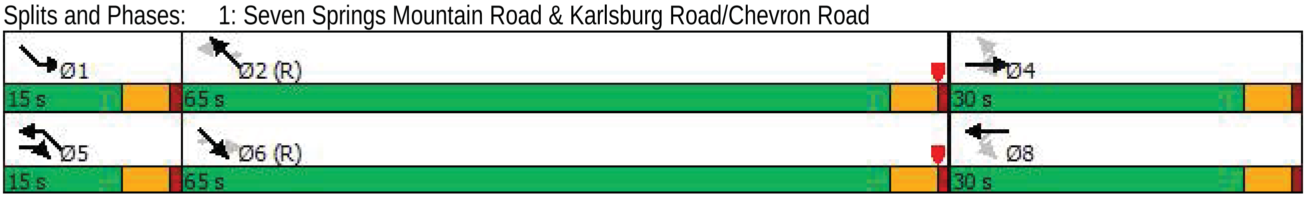
Natural Cycle: 90

Control Type: Actuated-Coordinated

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Seven Springs Mountain Road & Karlsburg Road/Chevron Road



2026 No-Build Traffic Volumes (W/ Improvements) Peak Friday Hour
1: Seven Springs Mountain Road & Karlsburg Road/Chevron Road 09/06/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	44	51	75	77	55	73	87	1235	52	70	1183	72
Future Volume (veh/h)	44	51	75	77	55	73	87	1235	52	70	1183	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.95	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1900	1811	2022	1796	2007	2106	2106	2106	1826	1870	1811
Adj Flow Rate, veh/h	46	54	79	81	58	77	92	1300	55	74	1245	76
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	0	6	5	20	6	2	2	2	5	2	6
Cap, veh/h	178	324	312	257	116	154	151	1374	1153	172	1217	986
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.04	0.65	0.65	0.04	0.65	0.65
Sat Flow, veh/h	1217	1900	1467	1312	680	902	2006	2106	1767	1739	1870	1516
Grp Volume(v), veh/h	46	54	79	81	0	135	92	1300	55	74	1245	76
Grp Sat Flow(s),veh/h/ln	1217	1900	1467	1312	0	1582	2006	2106	1767	1739	1870	1516
Q Serve(g_s), s	3.9	2.7	4.9	6.2	0.0	8.5	1.6	61.6	1.2	1.5	71.6	2.0
Cycle Q Clear(g_c), s	12.4	2.7	4.9	8.8	0.0	8.5	1.6	61.6	1.2	1.5	71.6	2.0
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	178	324	312	257	0	269	151	1374	1153	172	1217	986
V/C Ratio(X)	0.26	0.17	0.25	0.32	0.00	0.50	0.61	0.95	0.05	0.43	1.02	0.08
Avail Cap(c_a), veh/h	248	432	396	332	0	359	248	1374	1153	260	1217	986
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.44	0.44	0.44
Uniform Delay (d), s/veh	47.0	39.0	36.2	42.7	0.0	41.4	28.7	17.3	6.9	26.3	19.2	7.1
Incr Delay (d2), s/veh	0.3	0.1	0.2	0.3	0.0	0.5	1.5	14.4	0.1	0.3	23.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.3	1.8	2.0	0.0	3.4	1.6	31.8	0.5	1.3	35.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.3	39.1	36.3	43.0	0.0	41.9	30.2	31.7	6.9	26.5	42.5	7.1
LnGrp LOS	D	D	D	D	A	D	C	C	A	C	F	A
Approach Vol, veh/h		179			216			1447			1395	
Approach Delay, s/veh		40.0			42.3			30.7			39.7	
Approach LOS		D			D			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.7	76.6		23.7	9.5	76.8		23.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	60.0		25.0	10.0	60.0		25.0				
Max Q Clear Time (g_c+I1), s	3.6	73.6		14.4	3.5	63.6		10.8				
Green Ext Time (p_c), s	0.1	0.0		0.4	0.1	0.0		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			35.9									
HCM 6th LOS			D									

Notes

User approved pedestrian interval to be less than phase max green.

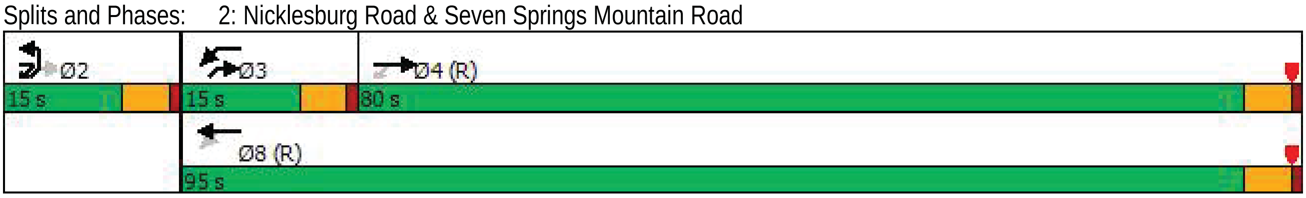
Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1258	132	186	1208	121	149
Future Volume (vph)	1258	132	186	1208	121	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	1%			0%	3%	
Storage Length (ft)		100	100		0	100
Storage Lanes		1	1		1	1
Taper Length (ft)			75		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.90	0.91
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1853	1502	1770	1863	1677	1575
Flt Permitted			0.050		0.950	
Satd. Flow (perm)	1853	1391	93	1863	1502	1429
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		76				74
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		25	27		25	27
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	7%	2%	2%	6%	1%
Adj. Flow (vph)	1324	139	196	1272	127	157
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1324	139	196	1272	127	157
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.01	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	4	2	3	8	2	3
Permitted Phases		4	8			2

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Detector Phase	4	2	3	8	2	3
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	80.0	15.0	15.0	95.0	15.0	15.0
Total Split (%)	72.7%	13.6%	13.6%	86.4%	13.6%	13.6%
Maximum Green (s)	75.0	10.0	10.0	90.0	10.0	10.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	None	None	C-Max	None	None
Walk Time (s)	7.0					
Flash Dont Walk (s)	18.0					
Pedestrian Calls (#/hr)	15					
v/c Ratio	1.04	0.13	0.89	0.83	0.86	0.49
Control Delay	45.1	0.9	65.6	12.1	93.6	25.0
Queue Delay	25.3	0.0	0.0	4.6	660.0	0.0
Total Delay	70.4	0.9	65.6	16.6	753.6	25.0
Queue Length 50th (ft)	~1058	11	86	391	90	48
Queue Length 95th (ft)	m#1001	m2	#216	633	#197	110
Internal Link Dist (ft)	289			1396	439	
Turn Bay Length (ft)		100	100			100
Base Capacity (vph)	1276	1111	228	1528	152	330
Starvation Cap Reductn	241	0	0	0	0	0
Spillback Cap Reductn	0	0	0	193	152	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.28	0.13	0.86	0.95	127.00	0.48

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Red
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Nicklesburg Road & Seven Springs Mountain Road



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	1258	132	186	1208	121	149
Future Volume (veh/h)	1258	132	186	1208	121	149
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1790	1870	1870	1758	1832
Adj Flow Rate, veh/h	1324	139	196	1272	127	157
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	7	2	2	6	1
Cap, veh/h	1274	1156	225	1530	152	280
Arrive On Green	0.68	0.68	0.09	0.82	0.09	0.09
Sat Flow, veh/h	1864	1490	1781	1870	1674	1553
Grp Volume(v), veh/h	1324	139	196	1272	127	157
Grp Sat Flow(s),veh/h/ln	1864	1490	1781	1870	1674	1553
Q Serve(g_s), s	75.2	2.6	7.8	42.5	8.2	10.0
Cycle Q Clear(g_c), s	75.2	2.6	7.8	42.5	8.2	10.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1274	1156	225	1530	152	280
V/C Ratio(X)	1.04	0.12	0.87	0.83	0.83	0.56
Avail Cap(c_a), veh/h	1274	1156	227	1530	152	280
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.16	0.16	0.21	0.21	1.00	1.00
Uniform Delay (d), s/veh	17.4	3.1	40.2	5.7	49.2	41.1
Incr Delay (d2), s/veh	22.3	0.0	7.6	1.2	29.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	35.3	1.1	5.7	11.1	4.7	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.8	3.1	47.8	6.9	78.8	42.7
LnGrp LOS	F	A	D	A	E	D
Approach Vol, veh/h	1463			1468	284	
Approach Delay, s/veh	36.3			12.3	58.8	
Approach LOS	D			B	E	

Timer - Assigned Phs	2	3	4	8
Phs Duration (G+Y+Rc), s	15.0	14.8	80.2	95.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	10.0	10.0	75.0	90.0
Max Q Clear Time (g_c+I1), s	12.0	9.8	77.2	44.5
Green Ext Time (p_c), s	0.0	0.0	0.0	9.2

Intersection Summary	
HCM 6th Ctrl Delay	27.3
HCM 6th LOS	C

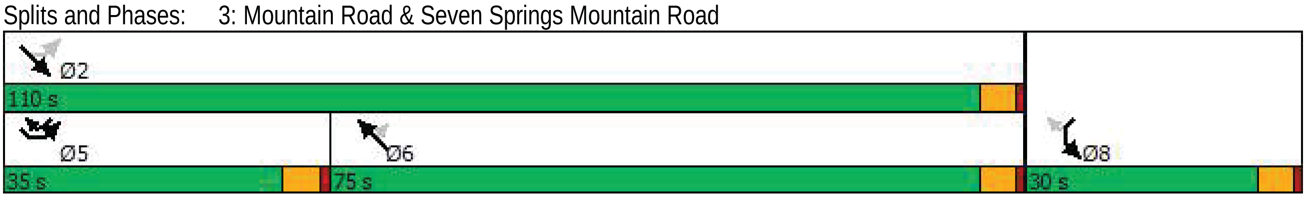
Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	461	941	941	114	100	455
Future Volume (vph)	461	941	941	114	100	455
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12
Grade (%)		-4%	5%		-7%	
Storage Length (ft)	200			100	200	200
Storage Lanes	1			1	1	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				0.95	0.97	0.96
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1805	1837	1816	1458	1736	1607
Flt Permitted	0.053				0.950	
Satd. Flow (perm)	101	1837	1816	1389	1688	1535
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				31		74
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	9			10	10	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	8%	4%	4%
Adj. Flow (vph)	485	991	991	120	105	479
Shared Lane Traffic (%)						
Lane Group Flow (vph)	485	991	991	120	105	479
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes		Yes	
Headway Factor	0.97	1.02	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		8	5

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Permitted Phases	2			6		8
Detector Phase	5	2	6	6	8	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	35.0	110.0	75.0	75.0	30.0	35.0
Total Split (%)	25.0%	78.6%	53.6%	53.6%	21.4%	25.0%
Maximum Green (s)	30.0	105.0	70.0	70.0	25.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	Min	Min	None
Walk Time (s)		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		15	15	15	15	
v/c Ratio	1.03	0.67	1.02	0.16	0.49	0.79
Control Delay	90.3	9.7	65.9	13.3	61.0	40.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.3	9.7	65.9	13.3	61.0	40.9
Queue Length 50th (ft)	~356	256	789	34	85	292
Queue Length 95th (ft)	#673	591	#1275	80	144	422
Internal Link Dist (ft)		1396	543		564	
Turn Bay Length (ft)	200			100	200	200
Base Capacity (vph)	470	1471	969	756	331	604
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.67	1.02	0.16	0.32	0.79

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 131.5
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Mountain Road & Seven Springs Mountain Road



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	461	941	941	114	100	455
Future Volume (veh/h)	461	941	941	114	100	455
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	2027	2027	1723	1634	2115	2115
Adj Flow Rate, veh/h	485	991	991	120	105	479
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	8	4	4
Cap, veh/h	465	1520	862	686	360	704
Arrive On Green	0.21	0.75	0.50	0.50	0.18	0.18
Sat Flow, veh/h	1931	2027	1723	1371	2015	1793
Grp Volume(v), veh/h	485	991	991	120	105	479
Grp Sat Flow(s),veh/h/ln	1931	2027	1723	1371	2015	1793
Q Serve(g_s), s	30.0	33.5	70.0	6.7	6.3	25.0
Cycle Q Clear(g_c), s	30.0	33.5	70.0	6.7	6.3	25.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	465	1520	862	686	360	704
V/C Ratio(X)	1.04	0.65	1.15	0.18	0.29	0.68
Avail Cap(c_a), veh/h	465	1520	862	686	360	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.1	8.6	35.0	19.2	49.8	35.2
Incr Delay (d2), s/veh	53.3	1.0	81.0	0.1	0.4	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.6	13.7	47.9	2.2	3.3	14.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	102.4	9.6	116.0	19.3	50.3	37.9
LnGrp LOS	F	A	F	B	D	D
Approach Vol, veh/h		1476	1111		584	
Approach Delay, s/veh		40.1	105.5		40.1	
Approach LOS		D	F		D	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	110.0	35.0	75.0	30.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	105.0	30.0	70.0	25.0
Max Q Clear Time (g_c+I1), s	35.5	32.0	72.0	27.0
Green Ext Time (p_c), s	9.7	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	63.0
HCM 6th LOS	E

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1040	145	308	976	16	146	6	329	4	8	4
Future Volume (vph)	2	1040	145	308	976	16	146	6	329	4	8	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	10	10	10	12	12	11	10	12	11	12
Grade (%)		1%			1%			2%			-3%	
Storage Length (ft)	100		100	100		0	100		100	100		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998				0.850		0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1796	1792	1442	1596	1727	0	1702	1818	1421	1832	1771	0
Flt Permitted	0.259			0.047			0.580					
Satd. Flow (perm)	490	1792	1442	79	1727	0	1039	1818	1421	1928	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			51		1				70		4	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			454			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	4%	5%	2%	0%	5%	0%	5%	0%	0%	0%
Adj. Flow (vph)	2	1095	153	324	1027	17	154	6	346	4	8	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	1095	153	324	1044	0	154	6	346	4	12	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes				
Headway Factor	1.01	1.05	1.10	1.10	1.10	1.01	1.01	1.06	1.11	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2	2	2	2		2	2	2	2	2	
Detector Template												
Leading Detector (ft)	83	83	83	83	83		83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5		-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5		-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40		40	40	40	40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43		43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40		40	40	40	40	40	
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turn Type	Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	
Protected Phases		6	7	5	2		7	4	5		8	
Permitted Phases	6		6	2			4		4	8		
Detector Phase	6	6	7	5	2		7	4	5	8	8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.0	10.0	9.5	10.0	10.0		9.5	10.0	10.0	10.0	10.0	
Total Split (s)	85.0	85.0	20.0	30.0	115.0		20.0	35.0	30.0	15.0	15.0	
Total Split (%)	56.7%	56.7%	13.3%	20.0%	76.7%		13.3%	23.3%	20.0%	10.0%	10.0%	
Maximum Green (s)	80.0	80.0	15.5	25.0	110.0		15.5	30.0	25.0	10.0	10.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.5	5.0	5.0		4.5	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead	Lead			Lead		Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes		Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0	3.0	2.0	2.0		3.0	2.0	2.0	2.0	2.0	
Recall Mode	Min	Min	None	None	Min		None	None	None	None	None	
Walk Time (s)	7.0	7.0			7.0			7.0				
Flash Dont Walk (s)	18.0	18.0			18.0			18.0				
Pedestrian Calls (#/hr)	15	15			15			15				
v/c Ratio	0.01	1.06	0.15	0.96	0.76		0.73	0.03	0.64	0.05	0.16	
Control Delay	15.0	73.8	4.8	84.3	13.4		76.5	50.3	35.3	68.0	57.2	
Queue Delay	0.0	0.0	0.0	0.0	0.7		0.0	0.0	0.0	0.0	0.0	
Total Delay	15.0	73.8	4.8	84.3	14.1		76.5	50.3	35.3	68.0	57.2	
Queue Length 50th (ft)	1	~1027	22	235	348		133	5	209	3	7	
Queue Length 95th (ft)	6	#1471	57	#484	794		210	18	317	17	30	
Internal Link Dist (ft)		595			615			374			479	
Turn Bay Length (ft)	100		100	100			100		100	100		
Base Capacity (vph)	283	1036	1061	337	1373		223	394	541	139	131	
Starvation Cap Reductn	0	0	0	0	109		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.01	1.06	0.14	0.96	0.83		0.69	0.02	0.64	0.03	0.09	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 138.6

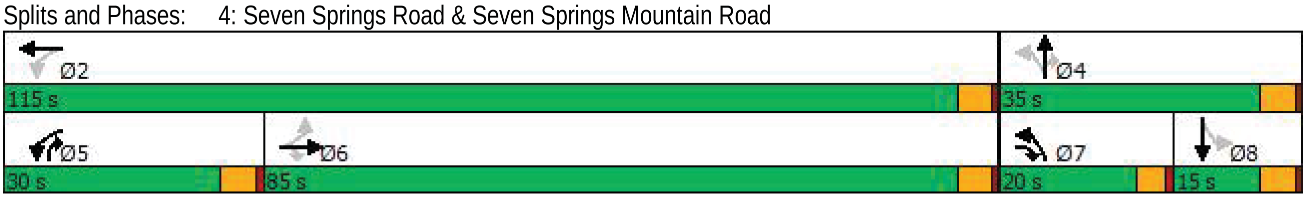
Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Seven Springs Road & Seven Springs Mountain Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1040	145	308	976	16	146	6	329	4	8	4
Future Volume (veh/h)	2	1040	145	308	976	16	146	6	329	4	8	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1894	1864	1835	1820	1864	1894	1802	1876	1802	2018	2018	2018
Adj Flow Rate, veh/h	2	1095	153	324	1027	17	154	6	346	4	8	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	2	4	5	2	0	5	0	5	0	0	0
Cap, veh/h	263	995	977	337	1342	22	303	374	559	131	95	47
Arrive On Green	0.53	0.53	0.53	0.17	0.73	0.73	0.09	0.20	0.20	0.07	0.07	0.07
Sat Flow, veh/h	547	1864	1555	1733	1829	30	1717	1876	1527	1110	1269	635
Grp Volume(v), veh/h	2	1095	153	324	0	1044	154	6	346	4	0	12
Grp Sat Flow(s),veh/h/ln	547	1864	1555	1733	0	1859	1717	1876	1527	1110	0	1904
Q Serve(g_s), s	0.3	80.0	6.1	23.6	0.0	51.0	12.1	0.4	27.8	0.5	0.0	0.9
Cycle Q Clear(g_c), s	21.4	80.0	6.1	23.6	0.0	51.0	12.1	0.4	27.8	0.5	0.0	0.9
Prop In Lane	1.00		1.00	1.00		0.02	1.00		1.00	1.00		0.33
Lane Grp Cap(c), veh/h	263	995	977	337	0	1365	303	374	559	131	0	142
V/C Ratio(X)	0.01	1.10	0.16	0.96	0.00	0.77	0.51	0.02	0.62	0.03	0.00	0.08
Avail Cap(c_a), veh/h	263	995	977	337	0	1365	319	376	561	131	0	142
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.7	34.9	11.5	53.7	0.0	12.1	55.0	48.2	38.9	64.4	0.0	64.5
Incr Delay (d2), s/veh	0.0	60.0	0.0	38.3	0.0	2.4	1.3	0.0	1.5	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	50.9	2.1	15.2	0.0	19.3	5.4	0.2	10.7	0.1	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	94.9	11.5	92.0	0.0	14.5	56.4	48.2	40.5	64.4	0.0	64.6
LnGrp LOS	C	F	B	F	A	B	E	D	D	E	A	E
Approach Vol, veh/h		1250			1368			506			16	
Approach Delay, s/veh		84.6			32.8			45.4			64.6	
Approach LOS		F			C			D			E	

Timer - Assigned Phs		2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s		115.0		34.9	30.0	85.0	18.6	16.2				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0	4.5	5.0				
Max Green Setting (Gmax), s		110.0		30.0	25.0	80.0	15.5	10.0				
Max Q Clear Time (g_c+I1), s		53.0		29.8	25.6	82.0	14.1	2.9				
Green Ext Time (p_c), s		5.0		0.0	0.0	0.0	0.1	0.0				

Intersection Summary		
HCM 6th Ctrl Delay		55.6
HCM 6th LOS		E

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	42	43	140	59	52	61	51	918	25	121	1013	51
Future Volume (vph)	42	43	140	59	52	61	51	918	25	121	1013	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	12	12	12	12
Grade (%)		0%			-5%			-6%			0%	
Storage Length (ft)	100		100	100		100	100		100	125		125
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97		0.94	0.96	0.97				0.94			0.94
Frt			0.850		0.920				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1719	1188	1357	1609	1386	0	1576	1720	1422	1626	1727	1417
Flt Permitted	0.587			0.726			0.097			0.124		
Satd. Flow (perm)	1030	1188	1271	1181	1386	0	161	1720	1341	212	1727	1330
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			88		49				69			69
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		732			428			433			369	
Travel Time (s)		16.6			9.7			9.8			8.4	
Confl. Peds. (#/hr)	17		20	19		16	16		17	20		19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	60%	19%	15%	55%	0%	18%	10%	17%	11%	10%	14%
Adj. Flow (vph)	46	47	152	64	57	66	55	998	27	132	1101	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	47	152	64	123	0	55	998	27	132	1101	55
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	0.97	0.97	0.97	0.96	1.01	0.96	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2	2	2	2		2	2	2	2	2	2
Detector Template												
Leading Detector (ft)	83	83	83	83	83		83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	0	-5	-5		-5	-5	0	-5	-5	0
Detector 1 Position(ft)	-5	-5	0	-5	-5		-5	-5	0	-5	-5	0
Detector 1 Size(ft)	40	40	40	40	40		40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43		43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40		40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	5		8		1	6		5	2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	4		4	8			6		6	2		2
Detector Phase	4	4	5	8	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	30.0	30.0	15.0	30.0	30.0		15.0	65.0	65.0	15.0	65.0	65.0
Total Split (%)	27.3%	27.3%	13.6%	27.3%	27.3%		13.6%	59.1%	59.1%	13.6%	59.1%	59.1%
Maximum Green (s)	25.0	25.0	10.0	25.0	25.0		10.0	60.0	60.0	10.0	60.0	60.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag			Lead				Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	18.0	18.0		18.0	18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)	15	15		15	15			15	15		15	15
v/c Ratio	0.33	0.30	0.45	0.41	0.54		0.29	0.88	0.03	0.51	0.92	0.06
Control Delay	45.8	43.7	17.2	47.7	33.4		9.0	29.3	0.1	10.9	25.1	2.8
Queue Delay	0.0	0.0	0.1	0.0	0.0		0.0	48.3	0.0	0.0	28.8	0.0
Total Delay	45.8	43.7	17.4	47.7	33.4		9.0	77.6	0.1	10.9	53.9	2.8
Queue Length 50th (ft)	31	32	38	44	51		6	451	0	13	341	0
Queue Length 95th (ft)	60	61	78	77	97		25	#1027	0	m44	#1157	m3
Internal Link Dist (ft)		652			348			353			289	
Turn Bay Length (ft)	100		100	100			100		100	125		125
Base Capacity (vph)	234	270	362	268	352		249	1134	907	291	1198	944
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	157	0
Spillback Cap Reductn	0	0	17	0	0		0	354	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.17	0.44	0.24	0.35		0.22	1.28	0.03	0.45	1.06	0.06

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 80 (73%), Referenced to phase 2:NWTL and 6:SETL, Start of Red

Natural Cycle: 90

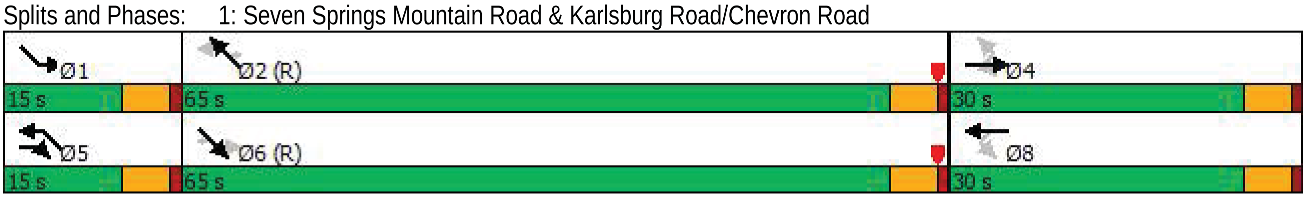
Control Type: Actuated-Coordinated

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Seven Springs Mountain Road & Karlsburg Road/Chevron Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	42	43	140	59	52	61	51	918	25	121	1013	51
Future Volume (veh/h)	42	43	140	59	52	61	51	918	25	121	1013	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.95	0.96		0.95	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1011	1618	1872	1271	2097	1866	1986	1881	1737	1752	1693
Adj Flow Rate, veh/h	46	47	152	64	57	66	55	998	27	132	1101	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	60	19	15	55	0	18	10	17	11	10	14
Cap, veh/h	174	192	311	237	99	115	142	1244	985	271	1115	899
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.04	0.63	0.63	0.05	0.64	0.64
Sat Flow, veh/h	1200	1011	1299	1142	521	604	1777	1986	1572	1654	1752	1412
Grp Volume(v), veh/h	46	47	152	64	0	123	55	998	27	132	1101	55
Grp Sat Flow(s),veh/h/ln	1200	1011	1299	1142	0	1125	1777	1986	1572	1654	1752	1412
Q Serve(g_s), s	4.0	4.3	11.1	5.5	0.0	10.9	1.2	41.5	0.7	3.1	67.6	1.6
Cycle Q Clear(g_c), s	14.9	4.3	11.1	9.9	0.0	10.9	1.2	41.5	0.7	3.1	67.6	1.6
Prop In Lane	1.00		1.00	1.00		0.54	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	174	192	311	237	0	214	142	1244	985	271	1115	899
V/C Ratio(X)	0.26	0.24	0.49	0.27	0.00	0.58	0.39	0.80	0.03	0.49	0.99	0.06
Avail Cap(c_a), veh/h	219	230	360	280	0	256	238	1244	985	343	1115	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.46	0.46	0.46
Uniform Delay (d), s/veh	47.3	37.8	36.3	42.0	0.0	40.5	27.8	15.4	7.8	16.9	19.6	7.6
Incr Delay (d2), s/veh	0.3	0.2	0.4	0.2	0.0	0.9	0.6	5.5	0.1	0.2	15.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.1	3.6	1.6	0.0	3.1	0.9	19.0	0.2	1.6	29.2	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.6	38.1	36.7	42.3	0.0	41.4	28.4	20.9	7.9	17.2	35.1	7.6
LnGrp LOS	D	D	D	D	A	D	C	C	A	B	D	A
Approach Vol, veh/h		245			187			1080			1288	
Approach Delay, s/veh		39.0			41.7			21.0			32.1	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	75.0		25.9	10.2	73.9		25.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	60.0		25.0	10.0	60.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	69.6		16.9	5.1	43.5		12.9				
Green Ext Time (p_c), s	0.0	0.0		0.6	0.1	4.5		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			29.0									
HCM 6th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1030	86	121	1076	103	139
Future Volume (vph)	1030	86	121	1076	103	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	1%			0%	3%	
Storage Length (ft)		100	100		0	100
Storage Lanes		1	1		1	1
Taper Length (ft)			75		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.92	0.91
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1719	1461	1530	1727	1662	1446
Flt Permitted			0.074		0.950	
Satd. Flow (perm)	1719	1347	119	1727	1525	1314
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		60				94
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		27	33		27	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	10%	18%	10%	7%	10%
Adj. Flow (vph)	1120	93	132	1170	112	151
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1120	93	132	1170	112	151
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.01	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	4	2	3	8	2	3
Permitted Phases		4	8			2

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Detector Phase	4	2	3	8	2	3
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	75.0	20.0	15.0	90.0	20.0	15.0
Total Split (%)	68.2%	18.2%	13.6%	81.8%	18.2%	13.6%
Maximum Green (s)	70.0	15.0	10.0	85.0	15.0	10.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	Min	None	C-Max	Min	None
Walk Time (s)	7.0					
Flash Dont Walk (s)	18.0					
Pedestrian Calls (#/hr)	15					
v/c Ratio	0.96	0.09	0.64	0.84	0.65	0.46
Control Delay	31.5	1.0	28.0	14.8	64.1	18.5
Queue Delay	42.9	0.0	0.0	2.0	94.0	0.0
Total Delay	74.4	1.0	28.0	16.8	158.1	18.5
Queue Length 50th (ft)	847	8	24	399	77	32
Queue Length 95th (ft)	m#1110	m5	92	#823	133	85
Internal Link Dist (ft)	289			1396	439	
Turn Bay Length (ft)		100	100			100
Base Capacity (vph)	1170	1127	226	1390	226	346
Starvation Cap Reductn	186	0	0	0	0	0
Spillback Cap Reductn	0	0	0	108	172	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.08	0.58	0.91	2.07	0.44

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Red

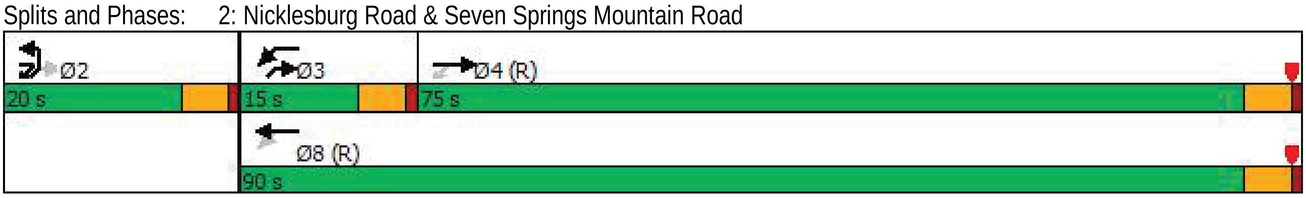
Natural Cycle: 90

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Nicklesburg Road & Seven Springs Mountain Road



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	1030	86	121	1076	103	139
Future Volume (veh/h)	1030	86	121	1076	103	139
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1746	1746	1633	1752	1743	1699
Adj Flow Rate, veh/h	1120	93	132	1170	112	151
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	18	10	7	10
Cap, veh/h	1224	1192	201	1386	196	234
Arrive On Green	0.70	0.70	0.04	0.79	0.12	0.12
Sat Flow, veh/h	1746	1451	1555	1752	1660	1440
Grp Volume(v), veh/h	1120	93	132	1170	112	151
Grp Sat Flow(s),veh/h/ln	1746	1451	1555	1752	1660	1440
Q Serve(g_s), s	58.9	1.4	2.4	46.2	7.0	10.8
Cycle Q Clear(g_c), s	58.9	1.4	2.4	46.2	7.0	10.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1224	1192	201	1386	196	234
V/C Ratio(X)	0.92	0.08	0.66	0.84	0.57	0.64
Avail Cap(c_a), veh/h	1224	1192	273	1386	226	261
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.50	0.50	0.37	0.37	1.00	1.00
Uniform Delay (d), s/veh	13.7	1.9	27.2	7.2	45.9	43.1
Incr Delay (d2), s/veh	6.8	0.1	0.5	2.5	1.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.9	0.6	2.5	13.3	2.9	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.5	2.0	27.7	9.8	46.8	46.2
LnGrp LOS	C	A	C	A	D	D
Approach Vol, veh/h	1213			1302	263	
Approach Delay, s/veh	19.1			11.6	46.4	
Approach LOS	B			B	D	

Timer - Assigned Phs		2	3	4			8
Phs Duration (G+Y+Rc), s		18.0	9.9	82.1			92.0
Change Period (Y+Rc), s		5.0	5.0	5.0			5.0
Max Green Setting (Gmax), s		15.0	10.0	70.0			85.0
Max Q Clear Time (g_c+I1), s		12.8	4.4	60.9			48.2
Green Ext Time (p_c), s		0.2	0.2	4.2			7.4

Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

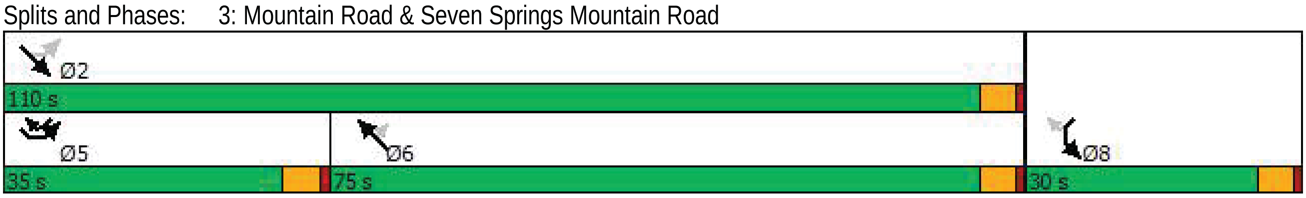
Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	350	819	783	86	94	408
Future Volume (vph)	350	819	783	86	94	408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	12
Grade (%)		-4%	5%		-7%	
Storage Length (ft)	200			100	200	200
Storage Lanes	1			1	1	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				0.96	0.98	0.94
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1615	1762	1684	1369	1672	1520
Flt Permitted	0.098				0.950	
Satd. Flow (perm)	167	1762	1684	1316	1639	1427
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				28		113
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	15			7	7	15
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	14%	10%	10%	15%	8%	10%
Adj. Flow (vph)	376	881	842	92	101	439
Shared Lane Traffic (%)						
Lane Group Flow (vph)	376	881	842	92	101	439
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes		Yes	
Headway Factor	0.97	0.97	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		8	5

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Permitted Phases	2			6		8
Detector Phase	5	2	6	6	8	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	35.0	110.0	75.0	75.0	30.0	35.0
Total Split (%)	25.0%	78.6%	53.6%	53.6%	21.4%	25.0%
Maximum Green (s)	30.0	105.0	70.0	70.0	25.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	Min	Min	None
Walk Time (s)		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		15	15	15	15	
v/c Ratio	0.81	0.63	0.94	0.13	0.49	0.74
Control Delay	43.9	8.7	48.7	12.5	61.2	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	8.7	48.7	12.5	61.2	33.3
Queue Length 50th (ft)	200	210	610	24	81	229
Queue Length 95th (ft)	#417	484	#1049	63	140	348
Internal Link Dist (ft)		1396	543		564	
Turn Bay Length (ft)	200			100	200	200
Base Capacity (vph)	467	1424	907	722	321	599
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.62	0.93	0.13	0.31	0.73

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 130.4
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Mountain Road & Seven Springs Mountain Road



Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	350	819	783	86	94	408
Future Volume (veh/h)	350	819	783	86	94	408
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1847	1907	1605	1530	2055	2025
Adj Flow Rate, veh/h	376	881	842	92	101	439
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	14	10	10	15	8	10
Cap, veh/h	403	1421	818	656	356	654
Arrive On Green	0.20	0.75	0.51	0.51	0.18	0.18
Sat Flow, veh/h	1759	1907	1605	1288	1957	1716
Grp Volume(v), veh/h	376	881	842	92	101	439
Grp Sat Flow(s),veh/h/ln	1759	1907	1605	1288	1957	1716
Q Serve(g_s), s	24.7	30.0	70.0	5.2	6.1	25.0
Cycle Q Clear(g_c), s	24.7	30.0	70.0	5.2	6.1	25.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	403	1421	818	656	356	654
V/C Ratio(X)	0.93	0.62	1.03	0.14	0.28	0.67
Avail Cap(c_a), veh/h	437	1458	818	656	356	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.9	8.3	33.7	17.8	48.5	35.3
Incr Delay (d2), s/veh	26.2	0.8	39.3	0.1	0.4	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.1	11.5	35.3	1.6	3.1	12.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	73.1	9.1	73.0	17.9	48.9	38.0
LnGrp LOS	E	A	F	B	D	D
Approach Vol, veh/h		1257	934		540	
Approach Delay, s/veh		28.2	67.6		40.0	
Approach LOS		C	E		D	

Timer - Assigned Phs		2			5	6		8
Phs Duration (G+Y+Rc), s		107.4			32.4	75.0		30.0
Change Period (Y+Rc), s		5.0			5.0	5.0		5.0
Max Green Setting (Gmax), s		105.0			30.0	70.0		25.0
Max Q Clear Time (g_c+I1), s		32.0			26.7	72.0		27.0
Green Ext Time (p_c), s		7.8			0.7	0.0		0.0

Intersection Summary			
HCM 6th Ctrl Delay			44.0
HCM 6th LOS			D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	707	183	300	813	3	198	1	286	1	0	1
Future Volume (vph)	0	707	183	300	813	3	198	1	286	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	10	10	10	12	12	11	10	12	11	12
Grade (%)		1%			1%			2%			-3%	
Storage Length (ft)	100		100	100		0	100		100	100		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999				0.850		0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1890	1549	1271	1470	1633	0	1430	1818	1175	1832	1585	0
Flt Permitted				0.124			0.755					
Satd. Flow (perm)	1890	1549	1271	192	1633	0	1136	1818	1175	1928	1585	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94						175		239	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			454			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	18%	18%	14%	8%	0%	25%	0%	27%	0%	0%	0%
Adj. Flow (vph)	0	744	193	316	856	3	208	1	301	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	744	193	316	859	0	208	1	301	1	1	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes				
Headway Factor	1.01	1.05	1.10	1.10	1.10	1.01	1.01	1.06	1.11	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2	2	2	2		2	2	2	2	2	
Detector Template												
Leading Detector (ft)	83	83	83	83	83		83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5		-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5		-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40		40	40	40	40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43		43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40		40	40	40	40	40	
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turn Type	Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	
Protected Phases		6	7	5	2		7	4	5		8	
Permitted Phases	6		6	2			4		4	8		
Detector Phase	6	6	7	5	2		7	4	5	8	8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.0	10.0	9.5	10.0	10.0		9.5	10.0	10.0	10.0	10.0	
Total Split (s)	85.0	85.0	20.0	30.0	115.0		20.0	35.0	30.0	15.0	15.0	
Total Split (%)	56.7%	56.7%	13.3%	20.0%	76.7%		13.3%	23.3%	20.0%	10.0%	10.0%	
Maximum Green (s)	80.0	80.0	15.5	25.0	110.0		15.5	30.0	25.0	10.0	10.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.5	5.0	5.0		4.5	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead	Lead			Lead		Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes		Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0	3.0	2.0	2.0		3.0	2.0	2.0	2.0	2.0	
Recall Mode	Min	Min	None	None	Min		None	None	None	None	None	
Walk Time (s)	7.0	7.0			7.0			7.0				
Flash Dont Walk (s)	18.0	18.0			18.0			18.0				
Pedestrian Calls (#/hr)	15	15			15			15				
v/c Ratio		0.96	0.21	0.79	0.70		0.89	0.00	0.52	0.01	0.00	
Control Delay		51.2	3.8	38.4	11.6		88.6	49.0	16.1	67.0	0.0	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.2	0.0	0.0	
Total Delay		51.2	3.8	38.4	11.7		88.6	49.0	16.3	67.0	0.0	
Queue Length 50th (ft)		488	21	125	240		~174	1	66	1	0	
Queue Length 95th (ft)		#870	58	#346	509		#347	6	187	8	0	
Internal Link Dist (ft)		595			615			374			479	
Turn Bay Length (ft)			100	100			100		100	100		
Base Capacity (vph)		1105	917	428	1459		233	486	604	171	358	
Starvation Cap Reductn		0	0	0	27		0	0	32	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.67	0.21	0.74	0.60		0.89	0.00	0.53	0.01	0.00	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 117.7

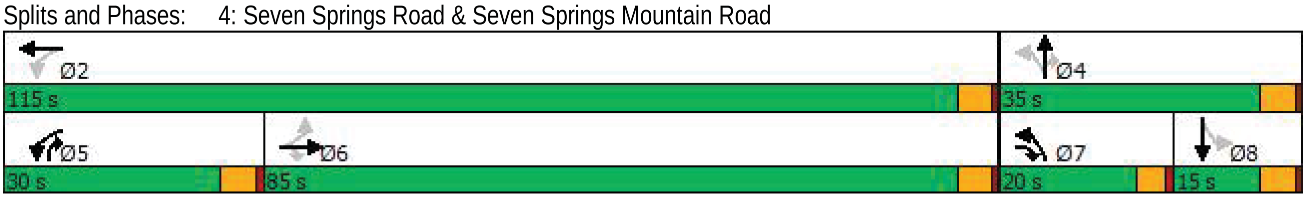
Natural Cycle: 90

Control Type: Actuated-Uncoordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Seven Springs Road & Seven Springs Mountain Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	707	183	300	813	3	198	1	286	1	0	1
Future Volume (veh/h)	0	707	183	300	813	3	198	1	286	1	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1894	1627	1627	1687	1776	1894	1506	1876	1476	2018	2018	2018
Adj Flow Rate, veh/h	0	744	193	316	856	3	208	1	301	1	0	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	18	18	14	8	0	25	0	27	0	0	0
Cap, veh/h	64	788	859	346	1216	4	313	419	478	116	0	76
Arrive On Green	0.00	0.48	0.48	0.16	0.69	0.69	0.14	0.22	0.22	0.04	0.00	0.04
Sat Flow, veh/h	651	1627	1379	1606	1768	6	1434	1876	1251	1162	0	1710
Grp Volume(v), veh/h	0	744	193	316	0	859	208	1	301	1	0	1
Grp Sat Flow(s),veh/h/ln	651	1627	1379	1606	0	1774	1434	1876	1251	1162	0	1710
Q Serve(g_s), s	0.0	48.7	6.9	15.2	0.0	32.8	15.2	0.0	21.9	0.1	0.0	0.1
Cycle Q Clear(g_c), s	0.0	48.7	6.9	15.2	0.0	32.8	15.2	0.0	21.9	0.1	0.0	0.1
Prop In Lane	1.00		1.00	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	64	788	859	346	0	1220	313	419	478	116	0	76
V/C Ratio(X)	0.00	0.94	0.22	0.91	0.00	0.70	0.66	0.00	0.63	0.01	0.00	0.01
Avail Cap(c_a), veh/h	214	1162	1175	450	0	1742	313	502	534	168	0	153
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	27.5	9.3	32.6	0.0	10.6	41.9	33.8	28.2	51.2	0.0	51.2
Incr Delay (d2), s/veh	0.0	9.5	0.0	17.2	0.0	0.3	5.2	0.0	1.3	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	19.5	2.0	9.9	0.0	10.7	5.8	0.0	6.6	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	36.9	9.3	49.8	0.0	10.9	47.1	33.8	29.5	51.2	0.0	51.2
LnGrp LOS	A	D	A	D	A	B	D	C	C	D	A	D
Approach Vol, veh/h		937			1175			510			2	
Approach Delay, s/veh		31.2			21.4			36.7			51.2	
Approach LOS		C			C			D			D	

Timer - Assigned Phs		2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s		82.1		30.0	22.8	59.3	20.0	10.0				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0	4.5	5.0				
Max Green Setting (Gmax), s		110.0		30.0	25.0	80.0	15.5	10.0				
Max Q Clear Time (g_c+I1), s		34.8		23.9	17.2	50.7	17.2	2.1				
Green Ext Time (p_c), s		3.5		0.6	0.6	3.6	0.0	0.0				

Intersection Summary			
HCM 6th Ctrl Delay			27.9
HCM 6th LOS			C

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	5	67	5	67	5	418	63	63	420	5
Future Volume (vph)	5	5	5	67	5	67	5	418	63	63	420	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	12	12	11	12
Grade (%)		0%			0%			3%			3%	
Storage Length (ft)	0		0	75		0	50		0	150		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			50			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.955			0.861			0.980			0.998	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1733	0	1752	1588	0	1726	1612	0	1726	1600	0
Flt Permitted		0.885		0.746			0.478			0.347		
Satd. Flow (perm)	0	1559	0	1376	1588	0	869	1612	0	630	1600	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			74			11			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		198			289			973			454	
Travel Time (s)		4.5			6.6			22.1			10.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	11%	3%	3%	13%	3%
Adj. Flow (vph)	6	6	6	74	6	74	6	464	70	70	467	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	74	80	0	6	534	0	70	473	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.07	1.02	1.02	1.07	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		2	2		2	2		2	2	
Detector Template	Left											
Leading Detector (ft)	20	83		83	83		83	83		83	83	
Trailing Detector (ft)	0	-5		-5	-5		-5	-5		-5	-5	
Detector 1 Position(ft)	0	-5		-5	-5		-5	-5		-5	-5	
Detector 1 Size(ft)	20	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		43		43	43		43	43		43	43	
Detector 2 Size(ft)		40		40	40		40	40		40	40	
Detector 2 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Total Split (s)	30.0	30.0		30.0	30.0		15.0	55.0		15.0	55.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		15.0%	55.0%		15.0%	55.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		10.0	50.0		10.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Pedestrian Calls (#/hr)	15	15		15	15			15			15	
v/c Ratio		0.06		0.29	0.22		0.01	0.56		0.13	0.44	
Control Delay		18.8		24.9	9.2		5.6	14.9		5.5	9.5	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		18.8		24.9	9.2		5.6	14.9		5.5	9.6	
Queue Length 50th (ft)		3		19	1		1	119		6	54	
Queue Length 95th (ft)		22		70	36		6	346		31	280	
Internal Link Dist (ft)		118			209			893			374	
Turn Bay Length (ft)				75			50			150		
Base Capacity (vph)		879		773	925		758	1435		662	1423	
Starvation Cap Reductn		0		0	0		0	0		0	53	
Spillback Cap Reductn		0		0	0		0	0		0	0	
Storage Cap Reductn		0		0	0		0	0		0	0	
Reduced v/c Ratio		0.02		0.10	0.09		0.01	0.37		0.11	0.35	

Intersection Summary

Area Type: Other

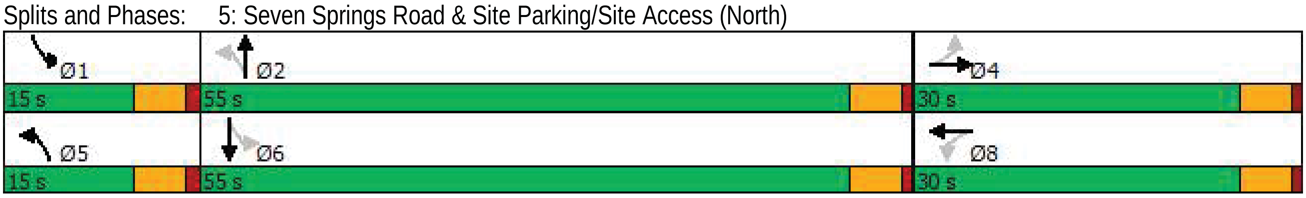
Cycle Length: 100

Actuated Cycle Length: 52.3

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 5: Seven Springs Road & Site Parking/Site Access (North)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	67	5	67	5	418	63	63	420	5
Future Volume (veh/h)	5	5	5	67	5	67	5	418	63	63	420	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1803	1684	1803	1803	1654	1803
Adj Flow Rate, veh/h	6	6	6	74	6	74	6	464	70	70	467	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	11	3	3	13	3
Cap, veh/h	167	85	60	375	14	167	432	573	86	414	754	10
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.01	0.40	0.40	0.07	0.46	0.46
Sat Flow, veh/h	303	743	523	1391	119	1471	1717	1429	216	1717	1630	21
Grp Volume(v), veh/h	18	0	0	74	0	80	6	0	534	70	0	473
Grp Sat Flow(s),veh/h/ln	1569	0	0	1391	0	1591	1717	0	1645	1717	0	1651
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	1.7	0.1	0.0	10.4	0.8	0.0	7.8
Cycle Q Clear(g_c), s	1.7	0.0	0.0	1.4	0.0	1.7	0.1	0.0	10.4	0.8	0.0	7.8
Prop In Lane	0.33		0.33	1.00		0.93	1.00		0.13	1.00		0.01
Lane Grp Cap(c), veh/h	312	0	0	375	0	181	432	0	659	414	0	764
V/C Ratio(X)	0.06	0.00	0.00	0.20	0.00	0.44	0.01	0.00	0.81	0.17	0.00	0.62
Avail Cap(c_a), veh/h	1207	0	0	1180	0	1102	894	0	2279	770	0	2286
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.3	0.0	0.0	14.8	0.0	14.9	6.8	0.0	9.6	6.9	0.0	7.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.0	0.6	0.0	0.0	0.9	0.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.5	0.0	0.0	2.6	0.2	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.4	0.0	0.0	14.9	0.0	15.6	6.8	0.0	10.5	7.0	0.0	7.6
LnGrp LOS	B	A	A	B	A	B	A	A	B	A	A	A
Approach Vol, veh/h		18			154			540			543	
Approach Delay, s/veh		14.4			15.2			10.5			7.5	
Approach LOS		B			B			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	19.5		9.1	5.3	21.7		9.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	50.0		25.0	10.0	50.0		25.0				
Max Q Clear Time (g_c+I1), s	2.8	12.4		3.7	2.1	9.8		3.7				
Green Ext Time (p_c), s	0.1	2.1		0.0	0.0	1.7		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			9.8									
HCM 6th LOS			A									

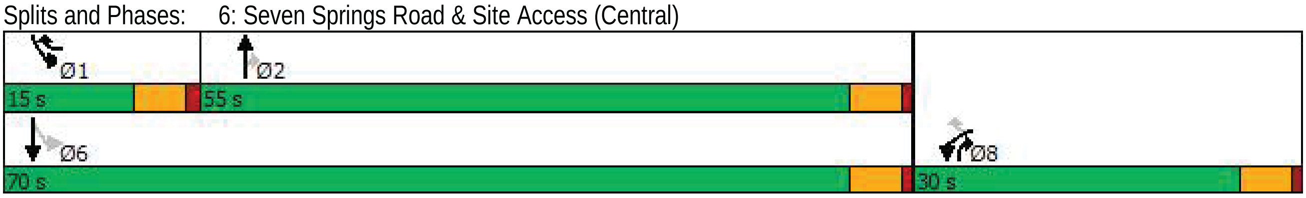
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	67	67	414	63	63	424
Future Volume (vph)	67	67	414	63	63	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	11
Grade (%)	0%		6%			-3%
Storage Length (ft)	0	0		100	100	
Storage Lanes	1	1		1	1	
Taper Length (ft)	50				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1568	1605	1521	1779	1650
Flt Permitted	0.950				0.339	
Satd. Flow (perm)	1752	1568	1605	1521	635	1650
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		74		70		
Link Speed (mph)	30		30			30
Link Distance (ft)	260		528			973
Travel Time (s)	5.9		12.0			22.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	11%	3%	3%	13%
Adj. Flow (vph)	74	74	460	70	70	471
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	74	460	70	70	471
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.09	1.04	0.98	1.02
Turning Speed (mph)	15	9		9	15	
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	pm+ov	NA	pm+ov	pm+pt	NA
Protected Phases	8	1	2	8	1	6
Permitted Phases		8		2	6	
Detector Phase	8	1	2	8	1	6

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.0	10.0	30.0	30.0	10.0	30.0
Total Split (s)	30.0	15.0	55.0	30.0	15.0	70.0
Total Split (%)	30.0%	15.0%	55.0%	30.0%	15.0%	70.0%
Maximum Green (s)	25.0	10.0	50.0	25.0	10.0	65.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag		Lead	Lag		Lead	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	Min	None	None	Min
Walk Time (s)	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	15		15	15		15
v/c Ratio	0.22	0.12	0.55	0.06	0.12	0.41
Control Delay	21.2	4.2	16.3	0.7	5.6	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	4.2	16.3	0.7	5.6	7.3
Queue Length 50th (ft)	17	0	94	0	5	49
Queue Length 95th (ft)	61	23	292	6	32	208
Internal Link Dist (ft)	180		448			893
Turn Bay Length (ft)				100	100	
Base Capacity (vph)	1028	768	1473	1445	682	1573
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.10	0.31	0.05	0.10	0.30

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 49
Natural Cycle: 70
Control Type: Actuated-Uncoordinated

Splits and Phases: 6: Seven Springs Road & Site Access (Central)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	67	67	414	63	63	424
Future Volume (veh/h)	67	67	414	63	63	424
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1856	1856	1525	1644	1973	1823
Adj Flow Rate, veh/h	74	74	460	70	70	471
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	11	3	3	13
Cap, veh/h	195	285	583	686	449	1091
Arrive On Green	0.11	0.11	0.38	0.38	0.07	0.60
Sat Flow, veh/h	1767	1572	1525	1393	1879	1823
Grp Volume(v), veh/h	74	74	460	70	70	471
Grp Sat Flow(s),veh/h/ln	1767	1572	1525	1393	1879	1823
Q Serve(g_s), s	1.3	1.4	9.2	0.9	0.6	4.8
Cycle Q Clear(g_c), s	1.3	1.4	9.2	0.9	0.6	4.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	195	285	583	686	449	1091
V/C Ratio(X)	0.38	0.26	0.79	0.10	0.16	0.43
Avail Cap(c_a), veh/h	1287	1256	2221	2181	863	3451
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	12.1	9.4	4.7	6.2	3.7
Incr Delay (d2), s/veh	0.5	0.2	0.9	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.4	2.1	0.2	0.1	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.6	12.3	10.3	4.7	6.3	3.8
LnGrp LOS	B	B	B	A	A	A
Approach Vol, veh/h	148		530			541
Approach Delay, s/veh	13.5		9.6			4.1
Approach LOS	B		A			A

Timer - Assigned Phs	1	2	6	8
Phs Duration (G+Y+Rc), s	7.4	18.1	25.6	8.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	10.0	50.0	65.0	25.0
Max Q Clear Time (g_c+I1), s	2.6	11.2	6.8	3.4
Green Ext Time (p_c), s	0.1	2.0	1.7	0.4

Intersection Summary	
HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	45	66	411	41	60	431
Future Volume (vph)	45	66	411	41	60	431
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	12	10	12	12	10
Grade (%)	-3%		2%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.988			
Flt Protected	0.980					0.994
Satd. Flow (prot)	1490	0	1558	0	0	1573
Flt Permitted	0.980					0.994
Satd. Flow (perm)	1490	0	1558	0	0	1573
Link Speed (mph)	30		30			30
Link Distance (ft)	313		1260			528
Travel Time (s)	7.1		28.6			12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	12%	5%	5%	15%
Adj. Flow (vph)	50	73	457	46	67	479
Shared Lane Traffic (%)						
Lane Group Flow (vph)	123	0	503	0	0	546
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	9		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.12	0.98	1.11	1.01	0.98	1.07
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection						
Int Delay, s/veh	2.5					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	45	66	411	41	60	431
Future Vol, veh/h	45	66	411	41	60	431
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	2	-	-	-3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	5	12	5	5	15
Mvmt Flow	50	73	457	46	67	479

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1093	480	0	0	503	0
Stage 1	480	-	-	-	-	-
Stage 2	613	-	-	-	-	-
Critical Hdwy	5.85	5.95	-	-	4.15	-
Critical Hdwy Stg 1	4.85	-	-	-	-	-
Critical Hdwy Stg 2	4.85	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	281	603	-	-	1046	-
Stage 1	667	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	257	603	-	-	1046	-
Mov Cap-2 Maneuver	257	-	-	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	540	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.4	0	1.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	390	1046	-
HCM Lane V/C Ratio	-	-	0.316	0.064	-
HCM Control Delay (s)	-	-	18.4	8.7	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.2	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (vph)	44	51	161	77	55	73	87	1299	52	159	1250	72
Future Volume (vph)	44	51	161	77	55	73	87	1299	52	159	1250	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	12	12	12	12
Grade (%)		0%			-5%			-6%			0%	
Storage Length (ft)	100		100	100		100	100		100	125		125
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98		0.95	0.97	0.97				0.95			0.95
Frt			0.850		0.914				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1900	1524	1762	1546	0	1823	1855	1631	1719	1863	1524
Flt Permitted	0.553			0.722			0.056			0.054		
Satd. Flow (perm)	1008	1900	1444	1295	1546	0	107	1855	1556	98	1863	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			35		56				69			69
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		732			428			433			369	
Travel Time (s)		16.6			9.7			9.8			8.4	
Confl. Peds. (#/hr)	12		15	16		13	13		12	15		16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	0%	6%	5%	20%	6%	2%	2%	2%	5%	2%	6%
Adj. Flow (vph)	46	54	169	81	58	77	92	1367	55	167	1316	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	54	169	81	135	0	92	1367	55	167	1316	76
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	0.97	0.97	0.97	0.96	1.01	0.96	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2	2	2	2		2	2	2	2	2	2
Detector Template												
Leading Detector (ft)	83	83	83	83	83		83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	0	-5	-5		-5	-5	0	-5	-5	0
Detector 1 Position(ft)	-5	-5	0	-5	-5		-5	-5	0	-5	-5	0
Detector 1 Size(ft)	40	40	40	40	40		40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43		43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40		40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4	5		8		1	6		5	2	

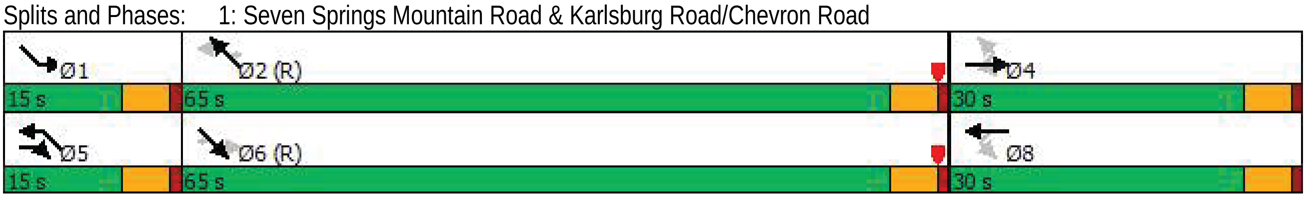
2026 Build Traffic Volumes (W/ Improvements) Peak Friday Hour
1: Seven Springs Mountain Road & Karlsburg Road/Chevron Road 09/06/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Permitted Phases	4		4	8			6		6	2		2
Detector Phase	4	4	5	8	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	30.0	30.0	15.0	30.0	30.0		15.0	65.0	65.0	15.0	65.0	65.0
Total Split (%)	27.3%	27.3%	13.6%	27.3%	27.3%		13.6%	59.1%	59.1%	13.6%	59.1%	59.1%
Maximum Green (s)	25.0	25.0	10.0	25.0	25.0		10.0	60.0	60.0	10.0	60.0	60.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag			Lead				Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes				Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	None	None	None		None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)	18.0	18.0		18.0	18.0			18.0	18.0		18.0	18.0
Pedestrian Calls (#/hr)	15	15		15	15			15	15		15	15
v/c Ratio	0.33	0.21	0.49	0.45	0.52		0.51	1.14	0.05	0.83	1.04	0.08
Control Delay	45.4	40.0	29.0	48.7	30.6		24.4	96.2	2.1	38.6	45.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	1.5	0.0	0.0	25.8	0.0
Total Delay	45.4	40.0	29.1	48.7	30.6		24.4	97.7	2.1	38.6	70.9	4.0
Queue Length 50th (ft)	31	36	80	56	54		10	~1101	0	64	593	3
Queue Length 95th (ft)	60	65	120	92	102		69	#1529	14	m92	m#1330	m5
Internal Link Dist (ft)		652			348			353			289	
Turn Bay Length (ft)	100		100	100			100		100	125		125
Base Capacity (vph)	229	431	365	294	394		235	1198	1029	221	1271	1005
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	180	0
Spillback Cap Reductn	0	0	5	0	0		0	332	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.13	0.47	0.28	0.34		0.39	1.58	0.05	0.76	1.21	0.08

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 80 (73%), Referenced to phase 2:NWTL and 6:SETL, Start of Red
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Seven Springs Mountain Road & Karlsburg Road/Chevron Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Volume (veh/h)	44	51	161	77	55	73	87	1299	52	159	1250	72
Future Volume (veh/h)	44	51	161	77	55	73	87	1299	52	159	1250	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.96	0.97		0.95	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1900	1811	2022	1796	2007	2106	2106	2106	1826	1870	1811
Adj Flow Rate, veh/h	46	54	169	81	58	77	92	1367	55	167	1316	76
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	0	6	5	20	6	2	2	2	5	2	6
Cap, veh/h	181	327	368	245	117	155	151	1299	1089	196	1214	984
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.04	0.62	0.62	0.08	0.65	0.65
Sat Flow, veh/h	1217	1900	1468	1214	680	902	2006	2106	1766	1739	1870	1516
Grp Volume(v), veh/h	46	54	169	81	0	135	92	1367	55	167	1316	76
Grp Sat Flow(s),veh/h/ln	1217	1900	1468	1214	0	1582	2006	2106	1766	1739	1870	1516
Q Serve(g_s), s	3.9	2.7	10.8	6.7	0.0	8.5	1.8	67.8	1.4	6.2	71.4	2.0
Cycle Q Clear(g_c), s	12.4	2.7	10.8	9.4	0.0	8.5	1.8	67.8	1.4	6.2	71.4	2.0
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	181	327	368	245	0	272	151	1299	1089	196	1214	984
V/C Ratio(X)	0.25	0.17	0.46	0.33	0.00	0.50	0.61	1.05	0.05	0.85	1.08	0.08
Avail Cap(c_a), veh/h	248	432	449	312	0	360	248	1299	1089	224	1214	984
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.24	0.24	0.24
Uniform Delay (d), s/veh	46.9	38.8	35.2	42.8	0.0	41.2	27.6	21.1	8.3	35.6	19.3	7.1
Incr Delay (d2), s/veh	0.3	0.1	0.3	0.3	0.0	0.5	1.5	40.1	0.1	6.2	42.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.3	3.9	2.0	0.0	3.3	1.5	44.4	0.5	4.8	41.3	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	38.9	35.6	43.1	0.0	41.8	29.1	61.1	8.4	41.8	61.3	7.2
LnGrp LOS	D	D	D	D	A	D	C	F	A	D	F	A
Approach Vol, veh/h		269			216			1514			1559	
Approach Delay, s/veh		38.2			42.3			57.3			56.5	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	9.7	76.4		23.9	13.3	72.8		23.9
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	10.0	60.0		25.0	10.0	60.0		25.0
Max Q Clear Time (g_c+I1), s	3.8	73.4		14.4	8.2	69.8		11.4
Green Ext Time (p_c), s	0.1	0.0		0.7	0.1	0.0		0.6

Intersection Summary	
HCM 6th Ctrl Delay	54.6
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1409	132	186	1364	121	149
Future Volume (vph)	1409	132	186	1364	121	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	1%			0%	3%	
Storage Length (ft)		100	100		0	100
Storage Lanes		1	1		1	1
Taper Length (ft)			75		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.90	0.91
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1853	1502	1770	1863	1677	1575
Flt Permitted			0.050		0.950	
Satd. Flow (perm)	1853	1391	93	1863	1502	1429
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		67				53
Link Speed (mph)	30			30	30	
Link Distance (ft)	369			1476	519	
Travel Time (s)	8.4			33.5	11.8	
Confl. Peds. (#/hr)		25	27		25	27
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	7%	2%	2%	6%	1%
Adj. Flow (vph)	1483	139	196	1436	127	157
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1483	139	196	1436	127	157
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes			Yes		
Headway Factor	1.01	1.01	1.00	1.00	1.02	1.02
Turning Speed (mph)		9	15		15	9
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	4	2	3	8	2	3
Permitted Phases		4	8			2

Lane Group	EBT	EBR	WBL	WBT	NEL	NER
Detector Phase	4	2	3	8	2	3
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	80.0	15.0	15.0	95.0	15.0	15.0
Total Split (%)	72.7%	13.6%	13.6%	86.4%	13.6%	13.6%
Maximum Green (s)	75.0	10.0	10.0	90.0	10.0	10.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	None	None	C-Max	None	None
Walk Time (s)	7.0					
Flash Dont Walk (s)	18.0					
Pedestrian Calls (#/hr)	15					
v/c Ratio	1.16	0.13	0.89	0.94	0.86	0.51
Control Delay	92.9	0.7	65.6	22.0	93.6	30.8
Queue Delay	0.8	0.0	0.0	44.6	660.0	0.0
Total Delay	93.7	0.7	65.6	66.7	753.6	30.8
Queue Length 50th (ft)	~1302	12	86	610	90	61
Queue Length 95th (ft)	m#1099	m1	#216	#1255	#197	124
Internal Link Dist (ft)	289			1396	439	
Turn Bay Length (ft)		100	100			100
Base Capacity (vph)	1276	1109	228	1528	152	313
Starvation Cap Reductn	211	0	0	0	0	0
Spillback Cap Reductn	0	0	0	279	152	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.39	0.13	0.86	1.15	127.00	0.50

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 4:EBT and 8:WBTL, Start of Red

Natural Cycle: 150

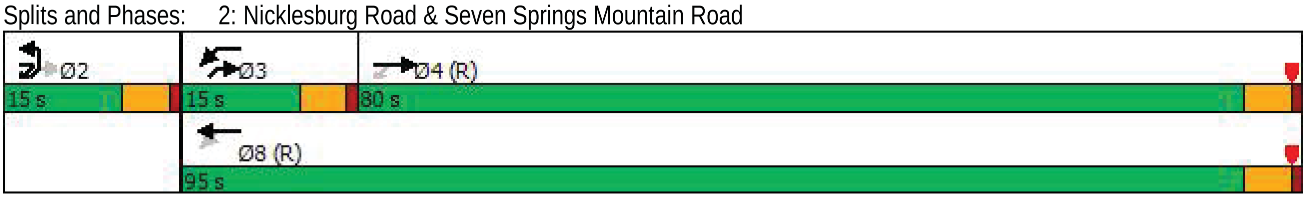
Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Nicklesburg Road & Seven Springs Mountain Road



Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	1409	132	186	1364	121	149
Future Volume (veh/h)	1409	132	186	1364	121	149
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1864	1790	1870	1870	1758	1832
Adj Flow Rate, veh/h	1483	139	196	1436	127	157
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	7	2	2	6	1
Cap, veh/h	1274	1156	225	1530	152	280
Arrive On Green	0.68	0.68	0.09	0.82	0.09	0.09
Sat Flow, veh/h	1864	1490	1781	1870	1674	1553
Grp Volume(v), veh/h	1483	139	196	1436	127	157
Grp Sat Flow(s),veh/h/ln	1864	1490	1781	1870	1674	1553
Q Serve(g_s), s	75.2	2.6	7.8	66.1	8.2	10.0
Cycle Q Clear(g_c), s	75.2	2.6	7.8	66.1	8.2	10.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1274	1156	225	1530	152	280
V/C Ratio(X)	1.16	0.12	0.87	0.94	0.83	0.56
Avail Cap(c_a), veh/h	1274	1156	227	1530	152	280
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.09	0.09	0.09	0.09	1.00	1.00
Uniform Delay (d), s/veh	17.4	3.1	40.2	7.8	49.2	41.1
Incr Delay (d2), s/veh	74.7	0.0	3.5	1.5	29.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	53.8	1.0	5.5	17.1	4.7	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	92.1	3.1	43.7	9.4	78.8	42.7
LnGrp LOS	F	A	D	A	E	D
Approach Vol, veh/h	1622			1632	284	
Approach Delay, s/veh	84.4			13.5	58.8	
Approach LOS	F			B	E	

Timer - Assigned Phs		2	3	4			8
Phs Duration (G+Y+Rc), s		15.0	14.8	80.2			95.0
Change Period (Y+Rc), s		5.0	5.0	5.0			5.0
Max Green Setting (Gmax), s		10.0	10.0	75.0			90.0
Max Q Clear Time (g_c+I1), s		12.0	9.8	77.2			68.1
Green Ext Time (p_c), s		0.0	0.0	0.0			10.2

Intersection Summary			
HCM 6th Ctrl Delay			49.7
HCM 6th LOS			D

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	526	1028	1030	114	100	521
Future Volume (vph)	526	1028	1030	114	100	521
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12
Grade (%)		-4%	5%		-7%	
Storage Length (ft)	200			100	200	200
Storage Lanes	1			1	1	0
Taper Length (ft)	75				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor				0.95	0.97	0.96
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1805	1837	1816	1458	1736	1607
Flt Permitted	0.053				0.950	
Satd. Flow (perm)	101	1837	1816	1389	1688	1535
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				28		57
Link Speed (mph)		30	30		30	
Link Distance (ft)		1476	623		644	
Travel Time (s)		33.5	14.2		14.6	
Confl. Peds. (#/hr)	9			10	10	9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	8%	4%	4%
Adj. Flow (vph)	554	1082	1084	120	105	548
Shared Lane Traffic (%)						
Lane Group Flow (vph)	554	1082	1084	120	105	548
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes		Yes	
Headway Factor	0.97	1.02	1.03	1.03	1.00	0.96
Turning Speed (mph)	15			9	15	9
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	5	2	6		8	5

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Permitted Phases	2			6		8
Detector Phase	5	2	6	6	8	5
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	35.0	95.0	75.0	75.0	30.0	35.0
Total Split (%)	25.0%	67.9%	53.6%	53.6%	21.4%	25.0%
Maximum Green (s)	30.0	90.0	70.0	70.0	25.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Min	Min	Min	Min	None
Walk Time (s)		7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		18.0	18.0	18.0	18.0	
Pedestrian Calls (#/hr)		15	15	15	15	
v/c Ratio	1.18	0.74	1.12	0.16	0.49	0.92
Control Delay	137.6	11.6	97.4	13.7	61.0	57.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	137.6	11.6	97.4	13.7	61.0	57.7
Queue Length 50th (ft)	~489	314	~1014	36	85	379
Queue Length 95th (ft)	#813	732	#1453	82	144	#562
Internal Link Dist (ft)		1396	543		564	
Turn Bay Length (ft)	200			100	200	200
Base Capacity (vph)	470	1471	969	754	331	593
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.18	0.74	1.12	0.16	0.32	0.92

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 131.5

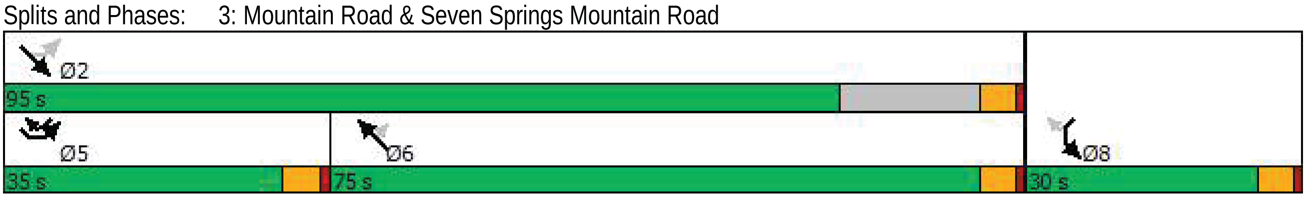
Natural Cycle: 140

Control Type: Actuated-Uncoordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Mountain Road & Seven Springs Mountain Road



Movement	SEL	SET	NWT	NWR	SWL	SWR	
Lane Configurations							
Traffic Volume (veh/h)	526	1028	1030	114	100	521	
Future Volume (veh/h)	526	1028	1030	114	100	521	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			0.99	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	2027	2027	1723	1634	2115	2115	
Adj Flow Rate, veh/h	554	1082	1084	120	105	548	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Percent Heavy Veh, %	2	2	2	8	4	4	
Cap, veh/h	465	1520	862	686	360	704	
Arrive On Green	0.21	0.75	0.50	0.50	0.18	0.18	
Sat Flow, veh/h	1931	2027	1723	1371	2015	1793	
Grp Volume(v), veh/h	554	1082	1084	120	105	548	
Grp Sat Flow(s),veh/h/ln	1931	2027	1723	1371	2015	1793	
Q Serve(g_s), s	30.0	40.1	70.0	6.7	6.3	25.0	
Cycle Q Clear(g_c), s	30.0	40.1	70.0	6.7	6.3	25.0	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	465	1520	862	686	360	704	
V/C Ratio(X)	1.19	0.71	1.26	0.18	0.29	0.78	
Avail Cap(c_a), veh/h	465	1520	862	686	360	704	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	49.1	9.4	35.0	19.2	49.8	37.2	
Incr Delay (d2), s/veh	105.6	1.6	125.6	0.1	0.4	5.5	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	29.3	16.5	58.6	2.2	3.3	17.4	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	154.7	11.0	160.6	19.3	50.3	42.7	
LnGrp LOS	F	B	F	B	D	D	
Approach Vol, veh/h		1636	1204		653		
Approach Delay, s/veh		59.6	146.5		43.9		
Approach LOS		E	F		D		
Timer - Assigned Phs		2			5	6	8
Phs Duration (G+Y+Rc), s		110.0			35.0	75.0	30.0
Change Period (Y+Rc), s		5.0			5.0	5.0	5.0
Max Green Setting (Gmax), s		90.0			30.0	70.0	25.0
Max Q Clear Time (g_c+I1), s		42.1			32.0	72.0	27.0
Green Ext Time (p_c), s		11.5			0.0	0.0	0.0
Intersection Summary							
HCM 6th Ctrl Delay			86.7				
HCM 6th LOS			F				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	1040	256	374	976	16	254	6	394	4	8	4
Future Volume (vph)	2	1040	256	374	976	16	254	6	394	4	8	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	10	10	10	12	12	11	10	12	11	12
Grade (%)		1%			1%			2%			-3%	
Storage Length (ft)	100		100	100		0	100		100	100		0
Storage Lanes	1		1	1		0	1		1	1		0
Taper Length (ft)	75			75			75			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998				0.850		0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1796	1792	1442	1596	1727	0	1702	1818	1421	1832	1771	0
Flt Permitted	0.253			0.047			0.571					
Satd. Flow (perm)	478	1792	1442	79	1727	0	1023	1818	1421	1928	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			89		1				70		4	
Link Speed (mph)		40			40			30			30	
Link Distance (ft)		675			695			454			559	
Travel Time (s)		11.5			11.8			10.3			12.7	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	4%	5%	2%	0%	5%	0%	5%	0%	0%	0%
Adj. Flow (vph)	2	1095	269	394	1027	17	267	6	415	4	8	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	1095	269	394	1044	0	267	6	415	4	12	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes				
Headway Factor	1.01	1.05	1.10	1.10	1.10	1.01	1.01	1.06	1.11	0.98	1.02	0.98
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	2	2	2	2	2		2	2	2	2	2	
Detector Template												
Leading Detector (ft)	83	83	83	83	83		83	83	83	83	83	
Trailing Detector (ft)	-5	-5	-5	-5	-5		-5	-5	-5	-5	-5	
Detector 1 Position(ft)	-5	-5	-5	-5	-5		-5	-5	-5	-5	-5	
Detector 1 Size(ft)	40	40	40	40	40		40	40	40	40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)	43	43	43	43	43		43	43	43	43	43	
Detector 2 Size(ft)	40	40	40	40	40		40	40	40	40	40	
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turn Type	Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	Perm	NA	
Protected Phases		6	7	5	2		7	4	5		8	
Permitted Phases	6		6	2			4		4	8		
Detector Phase	6	6	7	5	2		7	4	5	8	8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.0	10.0	9.5	10.0	10.0		9.5	10.0	10.0	10.0	10.0	
Total Split (s)	85.0	85.0	20.0	30.0	115.0		20.0	35.0	30.0	15.0	15.0	
Total Split (%)	56.7%	56.7%	13.3%	20.0%	76.7%		13.3%	23.3%	20.0%	10.0%	10.0%	
Maximum Green (s)	80.0	80.0	15.5	25.0	110.0		15.5	30.0	25.0	10.0	10.0	
Yellow Time (s)	4.0	4.0	3.5	4.0	4.0		3.5	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	4.5	5.0	5.0		4.5	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead	Lead			Lead		Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes		Yes	Yes	Yes	
Vehicle Extension (s)	2.0	2.0	3.0	2.0	2.0		3.0	2.0	2.0	2.0	2.0	
Recall Mode	Min	Min	None	None	Min		None	None	None	None	None	
Walk Time (s)	7.0	7.0			7.0			7.0				
Flash Dont Walk (s)	18.0	18.0			18.0			18.0				
Pedestrian Calls (#/hr)	15	15			15			15				
v/c Ratio	0.01	1.07	0.25	1.18	0.77		1.21	0.02	0.76	0.05	0.16	
Control Delay	15.0	76.8	5.4	147.1	13.8		177.4	50.3	42.4	68.0	57.3	
Queue Delay	0.0	0.0	0.0	0.0	0.8		0.0	0.0	6.3	0.0	0.0	
Total Delay	15.0	76.8	5.4	147.1	14.6		177.4	50.3	48.7	68.0	57.3	
Queue Length 50th (ft)	1	~1027	41	~358	348		~308	5	280	3	7	
Queue Length 95th (ft)	6	#1471	98	#637	794		#454	18	414	17	30	
Internal Link Dist (ft)		595			615			374			479	
Turn Bay Length (ft)	100		100	100			100		100	100		
Base Capacity (vph)	274	1028	1064	334	1363		221	391	548	138	130	
Starvation Cap Reductn	0	0	0	0	109		0	0	90	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.01	1.07	0.25	1.18	0.83		1.21	0.02	0.91	0.03	0.09	

Intersection Summary

Area Type: Other

Cycle Length: 150

Actuated Cycle Length: 139.6

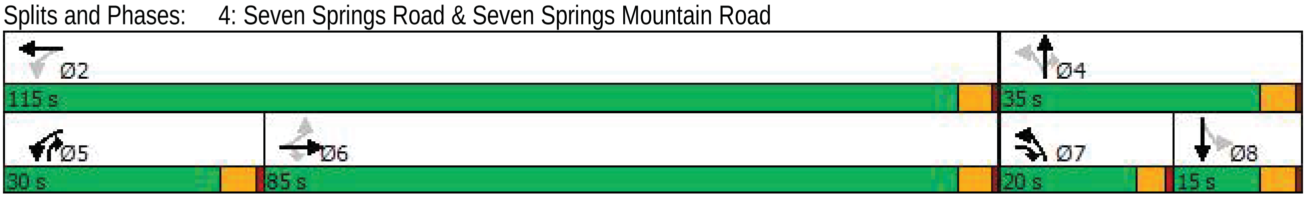
Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Seven Springs Road & Seven Springs Mountain Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1040	256	374	976	16	254	6	394	4	8	4
Future Volume (veh/h)	2	1040	256	374	976	16	254	6	394	4	8	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1894	1864	1835	1820	1864	1894	1802	1876	1802	2018	2018	2018
Adj Flow Rate, veh/h	2	1095	269	394	1027	17	267	6	415	4	8	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	2	4	5	2	0	5	0	5	0	0	0
Cap, veh/h	262	994	990	337	1341	22	307	375	560	117	85	42
Arrive On Green	0.53	0.53	0.53	0.17	0.73	0.73	0.10	0.20	0.20	0.07	0.07	0.07
Sat Flow, veh/h	547	1864	1555	1733	1829	30	1717	1876	1527	1042	1269	635
Grp Volume(v), veh/h	2	1095	269	394	0	1044	267	6	415	4	0	12
Grp Sat Flow(s),veh/h/ln	547	1864	1555	1733	0	1859	1717	1876	1527	1042	0	1904
Q Serve(g_s), s	0.3	80.0	11.4	25.0	0.0	51.2	15.5	0.4	30.0	0.5	0.0	0.9
Cycle Q Clear(g_c), s	21.6	80.0	11.4	25.0	0.0	51.2	15.5	0.4	30.0	0.5	0.0	0.9
Prop In Lane	1.00		1.00	1.00		0.02	1.00		1.00	1.00		0.33
Lane Grp Cap(c), veh/h	262	994	990	337	0	1363	307	375	560	117	0	127
V/C Ratio(X)	0.01	1.10	0.27	1.17	0.00	0.77	0.87	0.02	0.74	0.03	0.00	0.09
Avail Cap(c_a), veh/h	262	994	990	337	0	1363	307	375	560	117	0	127
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.8	35.0	12.0	54.6	0.0	12.2	60.5	48.2	41.3	65.6	0.0	65.7
Incr Delay (d2), s/veh	0.0	60.4	0.1	103.5	0.0	2.4	22.3	0.0	4.6	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	51.0	4.0	21.8	0.0	19.4	4.7	0.2	14.1	0.1	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.9	95.4	12.0	158.1	0.0	14.6	82.8	48.2	45.9	65.6	0.0	65.9
LnGrp LOS	C	F	B	F	A	B	F	D	D	E	A	E
Approach Vol, veh/h		1366			1438			688			16	
Approach Delay, s/veh		78.9			53.9			60.2			65.8	
Approach LOS		E			D			E			E	

Timer - Assigned Phs		2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s		115.0		35.0	30.0	85.0	20.0	15.0				
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0	4.5	5.0				
Max Green Setting (Gmax), s		110.0		30.0	25.0	80.0	15.5	10.0				
Max Q Clear Time (g_c+I1), s		53.2		32.0	27.0	82.0	17.5	2.9				
Green Ext Time (p_c), s		5.0		0.0	0.0	0.0	0.0	0.0				

Intersection Summary			
HCM 6th Ctrl Delay			64.9
HCM 6th LOS			E

Notes

User approved pedestrian interval to be less than phase max green.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	5	5	86	5	86	5	643	89	89	622	5
Future Volume (vph)	5	5	5	86	5	86	5	643	89	89	622	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	11	12	12	11	12
Grade (%)		0%			0%			3%			3%	
Storage Length (ft)	0		0	75		0	50		0	150		0
Storage Lanes	0		0	1		0	1		0	1		0
Taper Length (ft)	25			50			75			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.955			0.859			0.982			0.999	
Flt Protected		0.984		0.950			0.950			0.950		
Satd. Flow (prot)	0	1733	0	1752	1585	0	1726	1725	0	1726	1755	0
Flt Permitted		0.902		0.746			0.330			0.183		
Satd. Flow (perm)	0	1589	0	1376	1585	0	600	1725	0	333	1755	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			96			10			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		198			289			973			454	
Travel Time (s)		4.5			6.6			22.1			10.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	6	6	6	96	6	96	6	714	99	99	691	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	18	0	96	102	0	6	813	0	99	697	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.07	1.02	1.02	1.07	1.02
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		2	2		2	2		2	2	
Detector Template	Left											
Leading Detector (ft)	20	83		83	83		83	83		83	83	
Trailing Detector (ft)	0	-5		-5	-5		-5	-5		-5	-5	
Detector 1 Position(ft)	0	-5		-5	-5		-5	-5		-5	-5	
Detector 1 Size(ft)	20	40		40	40		40	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		43		43	43		43	43		43	43	
Detector 2 Size(ft)		40		40	40		40	40		40	40	
Detector 2 Type		Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Total Split (s)	30.0	30.0		30.0	30.0		15.0	55.0		15.0	55.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		15.0%	55.0%		15.0%	55.0%	
Maximum Green (s)	25.0	25.0		25.0	25.0		10.0	50.0		10.0	50.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	18.0	18.0		18.0	18.0			18.0			18.0	
Pedestrian Calls (#/hr)	15	15		15	15			15			15	
v/c Ratio		0.07		0.45	0.31		0.01	0.80		0.28	0.58	
Control Delay		24.3		37.8	10.6		5.2	22.2		6.4	10.9	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.7	
Total Delay		24.3		37.8	10.6		5.2	22.2		6.4	11.6	
Queue Length 50th (ft)		5		42	2		1	262		10	113	
Queue Length 95th (ft)		23		94	43		6	#720		40	461	
Internal Link Dist (ft)		118			209			893			374	
Turn Bay Length (ft)				75			50			150		
Base Capacity (vph)		565		486	622		573	1222		431	1322	
Starvation Cap Reductn		0		0	0		0	0		0	314	
Spillback Cap Reductn		0		0	0		0	0		0	0	
Storage Cap Reductn		0		0	0		0	0		0	0	
Reduced v/c Ratio		0.03		0.20	0.16		0.01	0.67		0.23	0.69	

Intersection Summary

Area Type: Other

Cycle Length: 100

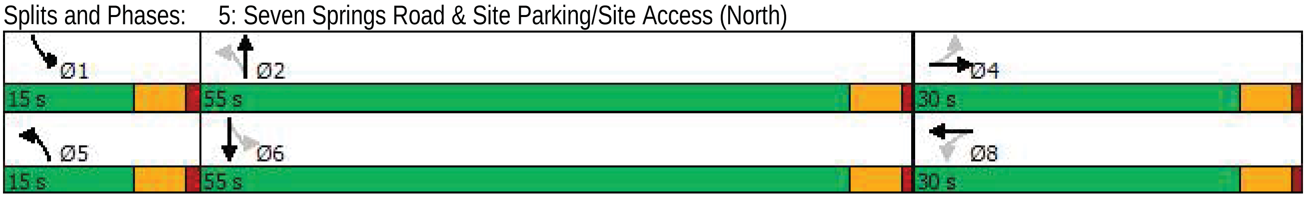
Actuated Cycle Length: 74.4

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Seven Springs Road & Site Parking/Site Access (North)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	86	5	86	5	643	89	89	622	5
Future Volume (veh/h)	5	5	5	86	5	86	5	643	89	89	622	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1803	1803	1803	1803	1803	1803
Adj Flow Rate, veh/h	6	6	6	96	6	96	6	714	99	99	691	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	119	82	53	315	10	160	392	807	112	342	1048	9
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.01	0.52	0.52	0.07	0.59	0.59
Sat Flow, veh/h	219	762	491	1391	93	1493	1717	1549	215	1717	1784	15
Grp Volume(v), veh/h	18	0	0	96	0	102	6	0	813	99	0	697
Grp Sat Flow(s),veh/h/ln	1472	0	0	1391	0	1587	1717	0	1764	1717	0	1800
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	3.1	0.1	0.0	20.7	1.2	0.0	13.2
Cycle Q Clear(g_c), s	3.1	0.0	0.0	2.6	0.0	3.1	0.1	0.0	20.7	1.2	0.0	13.2
Prop In Lane	0.33		0.33	1.00		0.94	1.00		0.12	1.00		0.01
Lane Grp Cap(c), veh/h	253	0	0	315	0	170	392	0	919	342	0	1057
V/C Ratio(X)	0.07	0.00	0.00	0.30	0.00	0.60	0.02	0.00	0.89	0.29	0.00	0.66
Avail Cap(c_a), veh/h	849	0	0	856	0	787	718	0	1749	555	0	1785
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	0.0	21.2	0.0	21.5	6.6	0.0	10.7	9.4	0.0	7.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.2	0.0	1.3	0.0	0.0	1.2	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	1.0	0.0	1.1	0.0	0.0	6.1	0.4	0.0	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	0.0	0.0	21.4	0.0	22.7	6.6	0.0	11.9	9.6	0.0	7.3
LnGrp LOS	C	A	A	C	A	C	A	A	B	A	A	A
Approach Vol, veh/h		18			198			819			796	
Approach Delay, s/veh		20.3			22.1			11.9			7.6	
Approach LOS		C			C			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	31.3		10.4	5.4	34.6		10.4				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	50.0		25.0	10.0	50.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	22.7		5.1	2.1	15.2		5.1				
Green Ext Time (p_c), s	0.1	3.6		0.0	0.0	2.8		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			11.2									
HCM 6th LOS			B									

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	86	86	651	89	89	624
Future Volume (vph)	86	86	651	89	89	624
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	12	12	11
Grade (%)	0%		6%			-3%
Storage Length (ft)	0	0		100	100	
Storage Lanes	1	1		1	1	
Taper Length (ft)	50				75	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1752	1568	1730	1521	1779	1810
Flt Permitted	0.950				0.183	
Satd. Flow (perm)	1752	1568	1730	1521	343	1810
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		96		99		
Link Speed (mph)	30		30			30
Link Distance (ft)	260		528			973
Travel Time (s)	5.9		12.0			22.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	96	96	723	99	99	693
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	96	723	99	99	693
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						Yes
Headway Factor	1.00	1.00	1.09	1.04	0.98	1.02
Turning Speed (mph)	15	9		9	15	
Number of Detectors	2	2	2	2	2	2
Detector Template						
Leading Detector (ft)	83	83	83	83	83	83
Trailing Detector (ft)	-5	-5	-5	-5	-5	-5
Detector 1 Position(ft)	-5	-5	-5	-5	-5	-5
Detector 1 Size(ft)	40	40	40	40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	43	43	43	43	43	43
Detector 2 Size(ft)	40	40	40	40	40	40
Detector 2 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	pm+ov	NA	pm+ov	pm+pt	NA
Protected Phases	8	1	2	8	1	6
Permitted Phases		8		2	6	
Detector Phase	8	1	2	8	1	6

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.0	10.0	30.0	30.0	10.0	30.0
Total Split (s)	30.0	15.0	55.0	30.0	15.0	70.0
Total Split (%)	30.0%	15.0%	55.0%	30.0%	15.0%	70.0%
Maximum Green (s)	25.0	10.0	50.0	25.0	10.0	65.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag		Lead	Lag		Lead	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	None	Min	None	None	Min
Walk Time (s)	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	18.0		18.0	18.0		18.0
Pedestrian Calls (#/hr)	15		15	15		15
v/c Ratio	0.35	0.17	0.81	0.08	0.27	0.56
Control Delay	30.4	5.2	23.2	0.6	6.3	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	5.2	23.2	0.6	6.3	8.3
Queue Length 50th (ft)	32	0	201	0	9	98
Queue Length 95th (ft)	91	31	#560	7	40	330
Internal Link Dist (ft)	180		448			893
Turn Bay Length (ft)				100	100	
Base Capacity (vph)	687	670	1388	1461	461	1662
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.14	0.52	0.07	0.21	0.42

Intersection Summary

Area Type: Other

Cycle Length: 100

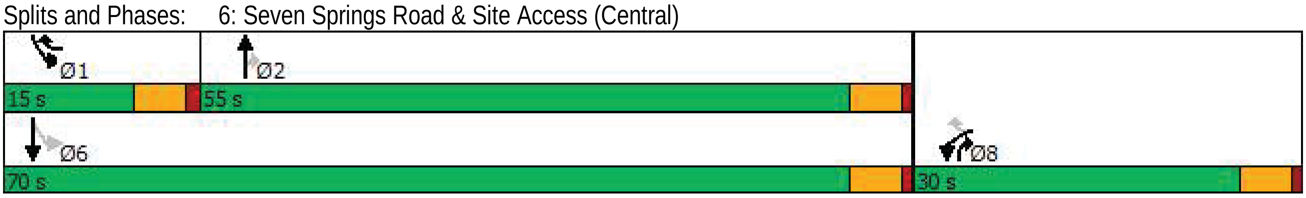
Actuated Cycle Length: 67.1

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Seven Springs Road & Site Access (Central)



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	86	86	651	89	89	624
Future Volume (veh/h)	86	86	651	89	89	624
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1856	1856	1644	1644	1973	1973
Adj Flow Rate, veh/h	96	96	723	99	99	693
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	176	278	828	841	379	1357
Arrive On Green	0.10	0.10	0.50	0.50	0.08	0.69
Sat Flow, veh/h	1767	1572	1644	1393	1879	1973
Grp Volume(v), veh/h	96	96	723	99	99	693
Grp Sat Flow(s),veh/h/ln	1767	1572	1644	1393	1879	1973
Q Serve(g_s), s	2.4	2.5	18.3	1.4	1.0	8.0
Cycle Q Clear(g_c), s	2.4	2.5	18.3	1.4	1.0	8.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	176	278	828	841	379	1357
V/C Ratio(X)	0.55	0.35	0.87	0.12	0.26	0.51
Avail Cap(c_a), veh/h	940	958	1748	1620	633	2728
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.1	17.0	10.3	4.0	8.6	3.5
Incr Delay (d2), s/veh	1.0	0.3	1.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.8	4.9	0.4	0.3	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.1	17.2	11.5	4.0	8.8	3.6
LnGrp LOS	C	B	B	A	A	A
Approach Vol, veh/h	192		822			792
Approach Delay, s/veh	19.2		10.6			4.3
Approach LOS	B		B			A

Timer - Assigned Phs	1	2	6	8
Phs Duration (G+Y+Rc), s	8.6	28.7	37.3	9.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s	10.0	50.0	65.0	25.0
Max Q Clear Time (g_c+I1), s	3.0	20.3	10.0	4.5
Green Ext Time (p_c), s	0.1	3.4	2.8	0.6

Intersection Summary	
HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	79	581	56	82	551
Future Volume (vph)	54	79	581	56	82	551
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	12	10	12	12	10
Grade (%)	-3%		2%			-3%
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.988			
Flt Protected	0.980					0.994
Satd. Flow (prot)	1490	0	1557	0	0	1573
Flt Permitted	0.980					0.994
Satd. Flow (perm)	1490	0	1557	0	0	1573
Link Speed (mph)	30		30			30
Link Distance (ft)	262		1260			528
Travel Time (s)	6.0		28.6			12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	5%	12%	5%	5%	15%
Adj. Flow (vph)	60	88	646	62	91	612
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	0	708	0	0	703
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	9		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.12	0.98	1.11	1.01	0.98	1.07
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection						
Int Delay, s/veh	4.2					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	54	79	581	56	82	551
Future Vol, veh/h	54	79	581	56	82	551
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-3	-	2	-	-	-3
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	5	12	5	5	15
Mvmt Flow	60	88	646	62	91	612

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1471	677	0	0	708	0
Stage 1	677	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Critical Hdwy	5.85	5.95	-	-	4.15	-
Critical Hdwy Stg 1	4.85	-	-	-	-	-
Critical Hdwy Stg 2	4.85	-	-	-	-	-
Follow-up Hdwy	3.545	3.345	-	-	2.245	-
Pot Cap-1 Maneuver	176	474	-	-	877	-
Stage 1	559	-	-	-	-	-
Stage 2	502	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	148	474	-	-	877	-
Mov Cap-2 Maneuver	148	-	-	-	-	-
Stage 1	559	-	-	-	-	-
Stage 2	423	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	38.3	0	1.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	250	877	-
HCM Lane V/C Ratio	-	-	0.591	0.104	-
HCM Control Delay (s)	-	-	38.3	9.6	0
HCM Lane LOS	-	-	E	A	A
HCM 95th %tile Q(veh)	-	-	3.4	0.3	-

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