MEETING DATE: October 3, 2022

TOPIC: Mystic Cove Redevelopment

At the September 6, 2022 Planning Commission Meeting, the Commission tabled Mystic Cove Redevelopment Site Plan to the October 3, 2022 Planning Commission Meeting.

All documents from the last meeting are attached and you have been provided separately a copy of the Engineering Plans for your review.

Mystic Cove Redevelopment - Site Plan Review

The procedure the Planning Commission is as follows:

1. Presentation of Planner's Report
2. Presentation by Applicant
3. Commission Deliberation and Action

ATTACHMENTS:

Mystic Cove - Site Plan Review #1, September 1, 2022 - Cover

N035 LT-02 SP Review 2-3 Mystic Cove

Mystic Cove Fire Department 2nd Site Plan Review Letter

2022-09-29 Attorney Report

2022-09-30 Mystic PC Set

Mystic Cove MDOT

Moceri Letter

Mystic Cove Ordinance Conformance letter

Mystic cove PA

Mystic Cove Signed Lighthouse PA

Mystic Cove SP 08.10.2022 FULL SET

Mystic Cove Traffic Impact Study-071822-LakeOrion

Mystic Cove150 heights PA-

N035 LT-01 SP Review Mystic Cove

Konopnick letter

MCKENNA

Lake Orion MICHIGAN

Planning and Zoning Review Summary

Mystic Cove Redevelopment

SITE ADDRESS / PARCEL ID	APPROVING BODY	APPLICANT / PROPERTY OWNER
Properties generally located at 440, 458, and 468 S. Broadway and 46, 138, and 150 Heights	Planning Commission	Moceri Companies

BRIEF SUMMARY OF REQUEST

SITE PLAN REVIEW

Multiple-family dwellings and a live/work development consisting of seven buildings with a total of 47 units:

- Building #1: Live/Work (optional)
- Building #2: Live/Work (optional)
- Building #3: Stacked Townhouse
- Building #4: Stacked Townhouse
- Building #5: Stacked Townhouse
- Building #6: Stacked Townhouse
- Building #7: Stacked Townhouse



EXISTING SITE INFORMATION

SITE ZONING & LAND USE	SURROUNDING ZONING & LAND USE	SIZE OF SITE
MU, Mixed Use District	Adjacent to the MU, Mixed Use District and to the south (Orion Township) are the districts of Restricted Business, Office and Professional and Single-Family Residential	4.49-acres

COMPATIBILITY WITH ZONING ORDINANCE

- Promotes mixed-use development along M-24
- Provides residential land uses along the Lake
- Conceals parking from both M-24 and the Lake
- Improve connectivity / viewsheds to the Lake
- Does not increase the overall amount of impervious surface
- Provides for a pocket park and public art feature
- Preserves and relocates two of the historic cabins, in collaboration with the Village's Parks and Recreation Advisory Board and the Arts Center

PLANNER RECOMMENDATION

☒ Approve - (with conditions or without conditions)

☐ Revise and resubmit

☐ Deny

Attachment: Mystic Cove - Site Plan Review #1, September 1, 2022 - Cover (5448 : Moceri Mystic Cove Redevelopment)

Recommendation

Based upon compliance with the Village's Zoning Ordinance, the proposed multiple-family and mixed-use Mystic Cove redevelopment (concerning parcel IDs: 09-11-255-002, 09-11-277-013, 09-11-277-018, 09-11-277-028, 09-11-277-035, 09-11-277-041, 09-11-277-048, 09-11-403-007; -008, 09-11-403-008, and 09-11-403-009) is recommended for approval, contingent that the following items are addressed to the satisfaction of the Planning Commission and reviewed administratively:

- *Land combination applications for the adjacent parcels is approved by the Village.*
- *A cross access easement to the adjacent northern property is secured to the satisfaction of the Village Attorney.*
- *The sidewalk be extended slightly along Heights Road to connect to the western 11 residential units.*
- *The additional 21 parking spaces (constructed with permeable pavers) are permitted to remain, even though the total amount of parking exceeds the maximum number of spaces allowable (20% extra maximum permitted), except that the two additional off-street parking spaces to the north are eliminated (leaving a total of 19 additional parking spaces on-site).*
- *The building materials, particularly on the streetscape facing façades of Buildings #1 and #2 along S. Broadway, are found to meet the building design standards of section 9.03(C.3).*
- *Signage will be permitted under a separate application.*

If you have any questions, please do not hesitate to contact us. Thank you.

Respectfully submitted,

McKENNA

Laura E. Haw

Laura Haw, AICP, NCI
Senior Principal Planner

CC: **Village Clerk,** Ms. Susan Galeczka, 21 E. Church Street, Lake Orion, MI 48362 (galeczkas@lakeorion.org)

Attachment: Mystic Cove - Site Plan Review #1, September 1, 2022 - Cover (5448 : Moceri Mystic Cove Redevelopment:)

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Site Plan Review

Standards for Site Plan Approval are set forth by Article 19: Administrative Procedures and Standards. This project is reviewed against the Village's Zoning Ordinance, Master Plan, existing site conditions, and sound planning and design principles.

We offer the following comments for your consideration; underlined items require additional discussion and/or identify outstanding items to be addressed.

1. USE & HARMONIOUS DESIGN

All elements of the site shall be harmoniously and efficiently designed in relation to the topography, size, and type of land, and the character of the adjacent properties and the proposed use. The site will be developed so as not to impede the normal and orderly development or improvement of surrounding properties for uses permitted on such property.

Findings: The site is zoned the MU, Mixed Use District where both multiple-family and live/work units are permitted uses per section 9.02. Permitted uses within the live/work buildings could include retail establishments, personal service establishments, offices, and the like. The existing boathouse will be preserved and renovated.

Land combinations for the two separate adjacent parcels will be required.

2. DIMENSIONAL STANDARDS

The site plan shall comply with the district requirements for minimum floor area, height of building, lot size, yard space, density and all other requirements as set forth in the Schedule of Regulations.

Findings: The subject building complies with the dimensional standards of the MU, Mixed Use District:

Dimensional Measurement	Required	Proposed	Comments
Min. Lot Area	n/a	4.49 ac.	-
Min. Lot Frontage	60'	324'	In compliance.
Max. Density (Dwelling Units per Acre)	58 units	47 units	In compliance.
Front Yard Setback	10' min. / 25' max.	10' to 21'-4"	In compliance.
Min. Side Yard Setback (both)	0'	6'-6"	In compliance.
Min. Rear (water) Yard Setback	25'	25'	In compliance.
Min. Floor Area per 2-Bedroom Unit	800 sq. ft.	>800 sq. ft.	In compliance.
Min. Floor Area per 3-Bedroom Unit	1,000 sq. ft.	>1,000 sq. ft.	In compliance.
Max. 1st Floor Area	12,500 sq. ft.	<12,500 sq. ft.	In compliance.

Dimensional Measurement	Required	Proposed	Comments
Max. Building Height	36’	35’-9”	In compliance.
Max. Lot Coverage	50%	27%	In compliance (lot coverage includes any building footprint).

3. NATURAL FEATURES & LANDSCAPING

The existing natural landscape shall be preserved in its natural state as much as possible, by minimizing tree and soil removal and by topographic modifications that result in maximum harmony with adjacent properties

There shall be reasonable visual and sound privacy. Fences, walks, barriers, and landscaping shall be used, as appropriate, for the protection and enhancement of property and the safety and privacy of occupants and users.

Findings:

Landscaping and Plant Material. The landscape plan details the addition of 134 new deciduous and evergreen trees, 332 shrubs, and over 1,800 perennials which are to be installed along S. Broadway, Heights, the Lake, property lines, and the interior of the subject site. Per the 15.02, no single tree species accounts for more than 20% of the plant material provided onsite, creating more diversity than currently present at the site today.

Common Areas. Per section 9.03(C.5), a minimum of 10% of the site must be reserved for open space and amenities, greater than what is required by Ordinance; this includes pocket parks, green areas, pedestrian walkways and expanded landscape areas and buffers. This requirement is satisfied as 22% of the site is green space, which includes the pocket park, pedestrian sidewalks, and public art (the 22% excludes water coverage).

Environmentally Sensitive Design. Per section 9.03(D), the incorporation of environmentally sensitive design treatments is necessary to enhance water quality and environmental health for the Village; this includes the reduction of impervious surfaces, shared parking, use of permeable pavers, use of native species, and more. This proposal does not increase the total amount of impervious surfaces on the site, utilizes pervious pavement, and incorporates native species and additional landscaping, beyond which is required by Ordinance.

4. ACCESS & CIRCULATION

All buildings or groups of buildings shall be so arranged as to permit convenient and direct emergency vehicle access.

The arrangement of public or common ways for vehicular and pedestrian circulation shall respect the pattern of existing or planned streets or pedestrian or bicycle pathways in the vicinity of the site. Streets and drives that are a part of an existing or planned street system serving adjacent developments shall be of an appropriate width to the volume of traffic they are planned to carry and shall have a dedicated right-of-way equal to that specified in a recognized source of reference.

Attachment: Mystic Cove - Site Plan Review #1, September 1, 2022 - Cover (5448 : Moceri Mystic Cove Redevelopment:)

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There shall be a pedestrian circulation system that is insulated as completely as possible from the vehicular circulation system.

Where the Planning Commission determines, after expert consultation, that public safety would be substantially promoted in a particular location by reducing the number of points of ingress and egress between private property and an adjoining highway, cross-access may be required. Shared drive approaches between adjoining parcels may also be permitted under this Section.

Findings:

Access Points. Access to the site is limited to one, two-way curb cut off S. Broadway and one, two-way curb cut off Heights. This redevelopment eliminates 4 existing curb cuts, which is an improvement to the corridor. Per MDOT (Michigan Department of Transportation), the minimum spacing between driveways on a 35 MPH road is 245-feet). With a total frontage of 324-feet on S. Broadway, only one curb cut is appropriate at this location, which the site layout meets. This improves both vehicular and pedestrian safety along the corridor.

A traffic study has been completed by the Applicant and reviewed by the Village Engineer, please find these reports under separate cover.

Cross Access. An easement for future cross-access ingress and egress is proposed to the northern property and the internal street is stubbed at this location; the cross access agreement must be secured by the applicant to the satisfaction of the Village Attorney.

Pedestrian Connectivity. Per section 9.03(C.8), sidewalks are required both within and between other sites in the MU District. This standard is met - sidewalks are provided along S. Broadway, with access and viewsheds to the Lake through a pocket park. The front entryways of Buildings #1, and #2 also connect directly to the S. Broadway public sidewalk, as required (see criteria #6). It is recommended the sidewalk be extended along Heights Road to connect to the western 11 residential units.

5. PARKING & LOADING

Off-street parking, loading, and unloading areas and outside refuse storage areas, or other storage areas that face or are visible from adjacent homes, or from public thoroughfares, shall be screened by walls, fencing or landscaping of effective height.

Findings: In compliance with section 9.03(2), parking is proposed within the interior of the site; no parking areas will directly abut either the Lake or S. Broadway, which furthers both the goals and intent of the Ordinance and Master Plan. The parking spaces are enclosed (within tuck-under garages) or so located within the interior of the site and screened by the buildings/landscaping. This configuration promotes a more enjoyable pedestrian environment along the Lake and the streetscape.

Per section 14.02, two parking spaces are required for each unit which results in a total of 94 required parking spaces (with 47 units). A total of 134 parking spaces are proposed, exceeding this requirement by 40 parking spaces.

Per section 14.02(B.2), the minimum parking requirement shall not exceed 20% in an effort to minimize excessive areas of pavement, unless otherwise approved by the Planning Commission. It is recommended that the addition 21 parking spaces (those beyond the 20% maximum) are permitted to remain, especially as

the driveways for each unit are constructed out of permeable pavers. However, it is recommended that the two additional off-street parking spaces to the north are eliminated.

Off-street parking space and aisleway dimensions comply with (and exceed) the minimum required per section 14.04. Should Buildings #1 and #2 be developed as live/work units in the future, dedicated barrier free parking spaces may need to be added to the surface parking lots. As the site provides for additional parking, beyond that required by Ordinance, there is sufficient space to accommodate such an adjustment.

6. BUILDING DESIGN & ARCHITECTURE

Building design and architecture shall relate to and be harmonious with the surrounding neighborhood in terms of texture, scale, mass, proportion, materials, and color. Buildings should be designed with stylistic harmony and aim to serve people of all ages and abilities.

Findings:

Building Design. Per section 9.03(C.3.a), all buildings along the street frontage must have a primary entrance facing the street, accessible to all pedestrians. This requirement is satisfied as Buildings #1 and #2 feature entryways off S. Broadway and sidewalks leading directly to them.

Building Material. Per section 9.03(C.3.b), preferred building materials in the Ordinance include brick, stone, and integrally colored architectural block. Clapboard, Hardy Plank, and shake shingles are encouraged only as accent building materials and vinyl/metal siding is discouraged. The primary building materials proposed are horizontal siding, vertical board and batten, and brick and stone 3-foot foundational bands along the first floor.

Building materials must be addressed to the satisfaction of the Planning Commission. It is recommended that all buildings incorporate greater masonry and that Buildings #1 and #2 contain the most masonry as this property is a gateway into the Village.

Misc. Site Features.

- A multi-box, decorative mailbox is proposed across from Building #4.
- Trash collection will be individual; no shared dumpster enclosures are proposed. Residential trash receptacles will be stores within the garages and rolled out on garage collection day.
- A 6-foot in height vinyl fence (detail on Sheet 6) in a neutral color, is proposed along the south property line; the location and placement of the fence is in compliance with section 15.04.

7. ENGINEERING / STORMWATER MANAGEMENT

Appropriate measures shall be taken to ensure that the removal of stormwater will not adversely affect adjoining properties or the capacity of the public storm drainage system and shall comply with State and Federal standards. Provisions shall be made for the construction of stormwater facilities, and the prevention of erosion and dust. Surface water on all paved areas shall be collected at intervals so that it will not obstruct the flow of vehicles or pedestrian traffic and will not create nuisance ponding in paved areas.

Adequate services and utilities and improvements shall be available or provided, located and constructed with sufficient capacity and durability to properly serve the development. All utilities shall be located underground

Attachment: Mystic Cove - Site Plan Review #1, September 1, 2022 - Cover (5448 : Moceri Mystic Cove Redevelopment:)

unless modified by the Planning Commission based on persuasive evidence provided by the applicant indicating it is not feasible to locate utilities underground.

Where possible and practical, drainage design shall recognize existing natural drainage patterns.

Findings: Stormwater pre-treatment infrastructure is proposed before any water runoff is discharged into the Lake. All stormwater and utility requirements must be addressed to the satisfaction of the Village Engineer.

8. LIGHTING

Exterior lighting shall be so arranged so that it is deflected away from adjoining properties and so that it does not impede vision of drivers along adjacent streets.

Findings: Building mounted lighting, undermount building lighting, decorative pole lighting, and accent bollard lighting for the pedestrian walkways are all proposed for the development.

As required by Ordinance, the proposed light fixtures along M-24 comply with the specific decorative lighting standards of 15.09(F), which includes the ornate, acorn luminaire that exists along the corridors streetscape. In general, lighting levels are well below the maximum permitted per section 15.9 and are in compliance with the Ordinance.

Standards	Standard	Proposed	Comments
Max. Height of Light Fixtures	22' or the height of the building, whichever is less. For the decorative streetscape lighting, pole lights must be between 13'-17'.	8'-9' (building mounded) 21' (building mounted, underlighting) 4' (boardwalk bollards) 15' (decorate streetlights along M-24) 14' (interior parking lot)	In compliance.
Max. Illumination at Any Given Point	10 fc.	9.8 fc.	In compliance.
Max. Illumination at the Property Line	0.5 fc.	0.5 fc.	In compliance.

Attachment: Mystic Cove - Site Plan Review #1, September 1, 2022 - Cover (5448 : Moceri Mystic Cove Redevelopment:)

CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

September 29, 2022

D. Wayne O'Neal
Interim Village Manager
Village of Lake Orion
21 E. Church St.
Lake Orion, MI 48362

Re: Mystic Cove
Site Plan Review No. 2-3
NFE Job No. N035

Dear Mr. O'Neal:

We have reviewed the revised Site Plan for the above referenced site. We received revised site plans from the developer on September 13, met to discuss their revisions on September 21, and received updated plans on September 22. The revisions between September 13 and September 22 were very minor in nature and did not warrant a full resubmittal. Our review is consistent with the requirements of Article 19 of the Zoning Ordinance, Section D – Required Information. We have the following comments:

1. The entrance and any improvements in the Broadway St. (M-24) right of way are subject to the review and approval of the Michigan Department of Transportation. Documentation has been provided to confirm conceptual approval.
2. It is indicated that garbage collection is intended to be via rolled garbage cans placed beside garages. It should be noted that the garbage truck must back up to serve buildings 2 and 3.
3. The guest parking for Building 2 is provided adjacent to Building 1.
4. The hydrant protection for Building 6 appears to be inadequate. We will defer to the Fire Department review for confirmation. The developer has agreed that if an additional hydrant is necessary, it will be added during construction plan approval.
5. The only area of concrete sidewalk is the sidewalk extension to Broadway Street adjacent to Building 1. We understand that sidewalk may be revised to be constructed of pavers, consistent with the remainder of the site.
6. Preliminary Stormwater management for the site has been indicated adequately.
7. A cross-access / ingress / egress easement is indicated to the properties to the north (parcel 09-11-277-047, and 09-11-277-008). This easement must be executed prior to approval.
8. The Landscape plans were not included as part of the revised site plan set received September 13 and must be part of the overall Site Plan set.

The following items are required, but can be addressed during the engineering phase of the project:

1. It appears that a portion of the existing sanitary sewer on the site is intended to be removed. The sewer easement must be vacated (L5544, P. 76-77). The remaining sewer extending

Attachment: N035 LT-02 SP Review 2-3 Mystic Cove (5448 : Moceri Mystic Cove Redevelopment:)

north is downstream with no outlet. It must be confirmed that no services exist on that portion of sewer, and the sewer must be grouted solid.

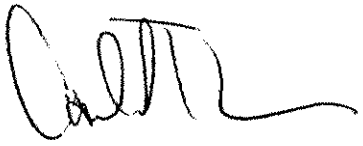
2. The capital improvement plan for the sanitary sewer indicates sealing of the joints for the existing sanitary sewer on site. This must be accomplished with the project.
3. Indicate the hydrant removal of the hydrant north of building 2 on the demolition plan.
4. The HMA pavement section detail for Heights Road must meet RCOC standards.
5. Stormwater management must meet the requirements of the Oakland County Water Resources Commissioner's Standards.
6. A parcel combination of parcels 09-11-277-013, 018, 028, 035, 041, 048 and a part of 09-11-255-002, along with Parcels 09-11-403-007 through -009 must be completed prior to approval. It must be confirmed that the unplatted submerged lands (part of parcel 09-11-255-002) are part of the resultant parcel.

Complete Engineering Plans meeting the requirements of Ordinance 31.26, Design and Construction Standards must be submitted for review, and no construction shall begin prior to engineering approval.

We recommend that the plan be approved subject to the above comments. If you have any questions, please do not hesitate to call.

Sincerely,

Nowak & Fraus Engineers



Carol P. Thurber, PE, CFM

CC: Laura Haw, McKenna
Wesley Sanchez, DPW Director

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Attachment: N035 LT-02 SP Review 2-3 Mystic Cove (5448 : Moceri Mystic Cove Redevelopment:)

Charter Township of Orion

3365 Gregory Rd., Lake Orion MI 48359
www.oriontownship.org

Fire Department
Phone: (248) 391-0304, ext. 2000
Fax: (248) 309-6993

To: Village of Lake Orion, Manager
From: Jeff Williams, Fire Marshal
Re: Mystic Cove 2nd Site Plan Review
Date: 08/01/2022

The Orion Township Fire Department has completed its review of site plan application Mystic Cove for the limited purpose of compliance with Village of Lake Orion Ordinance's, Michigan Building Code, and all applicable Fire Codes.

Based upon the application and documentation provided, the Fire Department has the following recommendation:

X Approved
Approved with Comments (See below)
Not approved

Comments: None

This approval is limited to the application and materials reviewed which at this time do not raise a specific concern with regard to location and/or impact on health and safety. However, the approval is conditioned upon the applicant providing sufficient additional information at time of building permit application that includes data or documents, confirming full compliance with all applicable building codes, fire codes and Township Ordinances.

If there are any questions, the Fire Department may be reached at 248-391-0304 ext. 2004.
Sincerely,

Jeffrey Williams

Jeff Williams, Fire Marshal
Orion Township Fire Department

Attachment: Mystic Cove Fire Department 2nd Site Plan Review Letter (5448 : Moceri Mystic Cove Redevelopment:)

Beier Howlett
ATTORNEYS AND COUNSELORS

NICCOLAS J. GROCHOWSKI
ngrochowski@bhlaw.us.com
Telephone (248) 282-1074

September 29, 2022

Planning Commission
Village of Lake Orion
21 East Church Street
Lake Orion, MI 48362

Re: Legal Opinion Regarding the Proposed Constellation Bay and Mystic Cove Redevelopment Projects and MU Zoning Standards for Site Plan Review

Dear Members of the Planning Commission:

This office has been requested to provide the Planning Commission with a Legal Opinion regarding the site plan review and MU zoning standards regarding the permitted uses within the MU District Zoning Ordinance and, more specifically, the provisions contained in Section 9.02(A)(10), regarding the ground story requirement for non-residential uses, as proposed in the two (2) site plan reviews for the above referenced redevelopment projects.

It is first relevant to note, that both the Constellation Bay and Mystic Cove redevelopment projects are ***not*** proposed PUD projects and thus, the Planning Commission is not required to conduct a required public hearing, and the review is that of a typical "site plan review" which the Planning Commission is accustomed to. Although there is no required "public hearing," because the site plan review is conducted at a public meeting and the meeting is open to the public, the public must still be allowed to make public comments.

In general, it is my understanding that both redevelopment projects propose to place single and multiple family dwelling units abutting the lake. Further, the proposed redevelopments are reflecting single and multiple family dwelling units, with the ground story enumerated as "flex space" with dwelling units above those ground floor spaces, for all of the units that abut M-24. It is further depicted by the applicant that those "flex spaces," on the ground floor units abutting M-24, appear to represent uses that are non-residential in nature such as office, commercial, retail and similar uses. Lastly, the Mystic Cove development shows a proposed retail use at the M-24 and Heights Road intersection.

These two (2) redevelopment projects are zoned MU-Mixed Use District. Thus, the standards applicable to both of the projects are contained in Article 9, MU-Mixed Use District, which are Sections 9.01 through 9.03 of the Village Zoning Ordinance. Section 9.01 states:

> "The MU, Mixed Use District is intended to promote compatible combinations of commercial, office, service, and residential development along M-24 south of Paint Creek to serve as a gateway into the DC, Downtown Center District. Office,

Attachment: 2022-09-29 Attorney Report (5448 : Moceri Mystic Cove Redevelopment:)

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commercial, and retail development should be located along M-24, with residential land uses located along the Lake to buffer existing single-family neighborhoods from the impacts of non-residential uses and M-24.

Development in this district is intended to serve the nearby neighborhoods and is not intended to be highway-oriented in scale. Parking lots should not be exposed to view from M-24 or the Lake, but should be screened from these important frontages by buildings. Site design should maintain and enhance pedestrian and/or image connectivity to the Downtown area."

Section 9.02(A)(10) of the MU Zoning Ordinance states the following:

"A. Principal Permitted Uses and Structures

In the MU District, the following uses are permitted subject to the standards listed in Section 9.03.C.

10. Single family and multiple family dwelling units, subject to the design standards of Section 9.03.C, when located above the ground story and subject to the ground story being only non-residential use."

Unlike the previous legal opinion provided to the Planning Commission regarding a very similar issue pertaining to the Starboard PUD, this situation is distinctly different because the Constellation Bay and Mystic Cove projects are *not* proposed as *PUD* projects. Thus, the underlying MU Zoning Ordinance is applicable, is read in its entirety and applied accordingly. As such, it is clear that Section 9.01 of the MU Zoning Ordinance intends to provide for compatible combinations of office, commercial, and retail and/or combination "live-work" units abutting M-24 and, for only residential land uses abutting the lake. Further, Section 9.02(A)(10) requires that the ground story of any single or multiple family dwelling unit be devoted to non-residential use. Thus, in our opinion, reading and applying the MU Zoning Ordinance as a whole, the MU standards appear to require that: any units abutting M-24 must be solely devoted to office, commercial and retail uses; or if a "live-work" unit is proposed abutting M-24, the ground floor of the "live-work" unit must be devoted to non-residential uses that are otherwise permitted in the MU zoning district. Further, we believe that the language of the MU Zoning Ordinance also permits and encourages *exclusive* residential use along the lakeside of any proposed development in the MU district and would exclude office, commercial, retail and/or combination "live-work" units from being located along the lakeside.

Therefore, the MU Zoning Ordinance standards in Section 9.02 allow for "principal permitted uses and structures" such as "stand alone" office, commercial, and retail development along the M-24 corridor. Moreover, the MU Zoning Ordinance allows for single or multiple family dwelling units along or abutting the M-24 corridor, if the ground floor of those units are restricted

Attachment: 2022-09-29 Attorney Report (5448 : Moceri Mystic Cove Redevelopment:)

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to non-residential uses. Those non-residential uses must be devoted to only those office, commercial, retail or "principal permitted uses" allowed under Section 9.02 of the MU Zoning Ordinance. Furthermore, the MU Zoning Ordinance permits and encourages single or multifamily uses and structures that are adjacent to, or abut, the lakeside of any given development property and does not require and appears to prohibit structures such as office, commercial, retail or "live-work" units abutting or adjacent to the lake.

Therefore, the Planning Commission should endeavor to independently review each of the site plans in accordance with the above referenced standards and, of course, include all other applicable MU standards. If the proposed plans reflect office, commercial, retail uses and structures, and/or "live-work" units with the ground floor devoted to office, commercial or retail uses and structures, as permitted under the MU Zoning Ordinance, along the M-24 corridor, and single or multiple family residential units along the lakeside of the property, then such proposed uses and buildings would be permitted under the MU Zoning Ordinance.

The Planning Commission should also be cognizant of the fact that if both of the proposed site plans conform to the above referenced standards, and all other applicable MU standards, (unlike a PUD which allows for great flexibility in the a site plan and greater discretion to the Planning Commission in offering a recommendation for approval or denial to the Village Council) and there is no other lawful basis to deny site plan approval, the applicant would be entitled to site plan approval.

If you have any questions, please do not hesitate to contact me. I remain,

Very truly yours,

BEIER HOWLETT, P.C.

/s/ Niccolas J. Grochowski
Niccolas J. Grochowski
Lake Orion Village Attorney

Attachment: 2022-09-29 Attorney Report (5448 : Moceri Mystic Cove Redevelopment:)

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MYSTIC COVE

SITE PLAN

PARCEL NOs. 09-11-255-002, 09-11-277-013, 09-11-277-018, 09-11-277-028, 09-11-277-035, 09-11-277-041, 09-11-277-048, 09-11-403-007, 09-11-403-008, AND 09-11-403-009

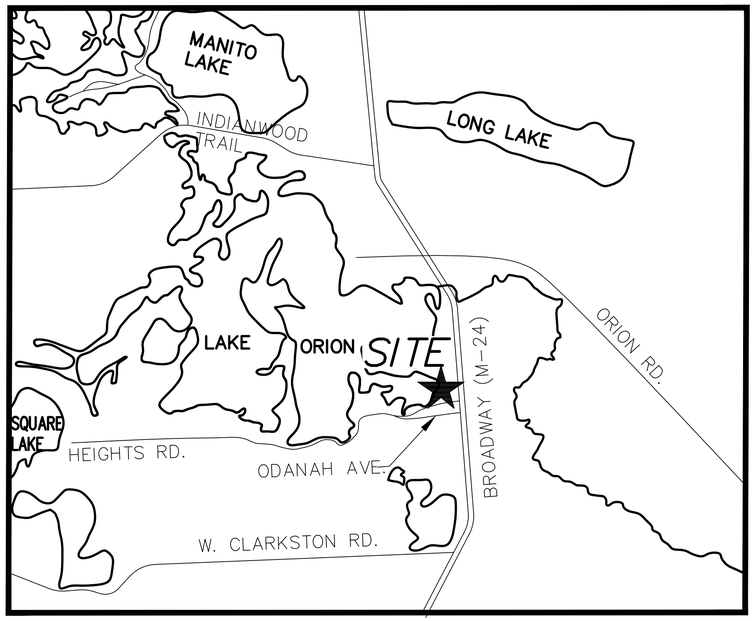
VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN

APPLICANT
MOCERI COMPANIES
3005 UNIVERSITY DRIVE
AUBURN HILLS, MI 48326
PHONE: (248) 340-9400

ENGINEER
GIFFELS WEBSTER
MS. NANCY STANDISH, PE
1025 E. MAPLE, SUITE 100
BIRMINGHAM, MI 48009
PHONE: (248) 852-3100

SURVEYOR
GIFFELS WEBSTER
MR. CHRIS ASIALA, PS
1025 E. MAPLE, SUITE 100
BIRMINGHAM, MI 48009
PHONE: (248) 852-3100

LANDSCAPE ARCHITECT
GIFFELS WEBSTER
MR. MARK HANSEN
1025 E. MAPLE, SUITE 100
BIRMINGHAM, MI 48009
PHONE: (248) 852-3100



LOCATION MAP
NOT TO SCALE

SHEET INDEX

ENGINEERING PLANS

1	COVER SHEET
2-3	TOPOGRAPHIC SURVEY
4	SITE AND PAVING PLAN
5	PRELIMINARY GRADING PLAN
6	PRELIMINARY UTILITY PLAN
7	SITE NOTES AND DETAILS
7A	STORMWATER MANAGEMENT CALCULATIONS
8	FIRE PROTECTION PLAN

LANDSCAPE AND LIGHTING

L1	LANDSCAPE PLAN
L2	LANDSCAPE DETAILS
L3	SITE RENDERING
LI1	LIGHTING PLAN

SHEETS BY OTHERS

ARCHITECTURAL

5 SHEETS	BUILDING 1 FLOOR PLANS AND ELEVATIONS
5 SHEETS	BUILDING 2 FLOOR PLANS AND ELEVATIONS
4 SHEETS	BUILDINGS 3-7 FLOOR PLANS AND ELEVATIONS

PROPERTY DESCRIPTION

PARCELS 09-11-277-013, 09-11-277-041, 09-11-277-048, 09-11-403-007, 09-11-403-008 AND 09-11-403-009 AND PART OF PARCELS 09-11-255-002, 09-11-277-018, 09-11-277-028 AND 09-11-277-035

A PARCEL OF LAND IN THE EAST 1/2 OF SECTION 11, T-04-N, R-10-E, VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN BEING ALL OF LOTS 50 AND 53 AND PART OF LOTS 48, 49, 51 AND 52 OF ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION AND PART OF CANADAIGUA CITY AS RECORDED IN LIBER 52, PAGES 17 AND 17A OF PLATS, OAKLAND COUNTY RECORDS AND ALL OF LOTS 24-30 OF ASSESSOR'S PLAT OF THE CUTCHEON SUBDIVISION AS RECORDED IN LIBER 27, PAGE 8, OAKLAND COUNTY RECORDS, BEING MORE PARTICULARLY DESCRIBED AS:

COMMENCING AT THE SOUTHEAST CORNER OF LOT 54, BEING ALSO THE SOUTHWEST CORNER OF LOT 56 OF SAID ASSESSOR'S REPLAT OF DECKER'S ADDITION; THENCE S.80°07'47"W, 170.01 FEET TO THE POINT OF BEGINNING; THENCE S.80°07'47"W., 210.04 FEET; THENCE S.60°06'55"W., 171.35 FEET; THENCE S.71°08'03"W., 19.11 FEET; THENCE S.68°05'13"W., 19.31 FEET TO A POINT ON THE SOUTHWEST CORNER OF LOT 30 OF SAID CUTCHEON'S SUBDIVISION, THENCE S.69°08'24"W., 140.31 FEET TO A POINT ON THE SOUTHEAST CORNER OF LOT 26 OF SAID CUTCHEON'S SUBDIVISION, THENCE S.69°54'27"W., 35.69 FEET; THENCE S.62°12'22"W., 69.99 FEET TO A POINT ON THE SOUTHWEST CORNER OF LOT 24 OF SAID CUTCHEON'S SUBDIVISION; THENCE N.28°04'59"W., 137.54 FEET ALONG THE WEST LINE OF SAID LOT 24; THENCE N.28°04'59"W., 50.81 FEET; THENCE N.66°19'33"E., 19.59 FEET; THENCE N.76°57'35"E., 172.31 FEET; THENCE N.80°26'52"E., 136.44 FEET; THENCE S.07°51'05"E., 37.04 FEET; THENCE S.07°49'50"E., 46.87 FEET; THENCE N.67°40'51"E., 155.54 FEET; THENCE N.36°37'56"E., 53.02 FEET; THENCE N.15°50'43"E., 114.76 FEET; THENCE N.29°14'53"E., 42.89 FEET; THENCE N.37°26'30"E., 40.01 FEET TO A POINT ON THE WEST LINE OF LOT 52 OF SAID DECKER'S ADDITION REPLAT; THENCE N.03°19'41"W., 239.66 FEET TO A POINT ON THE NORTHWEST CORNER OF LOT 48 OF SAID DECKER'S ADDITION REPLAT; THENCE THE FOLLOWING 3 COURSES ON THE NORTH LINE OF SAID LOT 48 (1) N.82°12'23"E., 125.23 FEET; (2) N.07°56'42"W., 10.00 FEET; (3) N.82°03'18"E., 211.82 FEET TO A POINT AT THE NORTHEAST CORNER OF SAID LOT 48; THENCE S.04°10'20"E., 142.74 FEET TO A POINT ON THE SOUTHEAST CORNER OF LOT 49 OF SAID DECKER'S ADDITION REPLAT; THENCE CONTINUING S.04°10'20"E., 183.34 FEET; THENCE S.85°49'40"W., 163.97 FEET; THENCE S.25°38'00"W., 142.86 FEET; THENCE S.09°50'46"E., 33.98 FEET TO THE POINT OF BEGINNING AND CONTAINING 4.49 ACRES.

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Qua ity Contro :	MP
Section:	11
	T-04-N R-10-E

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NANCY MARIE STANDISH
ENGINEER
No. 6201061386
LICENSED PROFESSIONAL ENGINEER

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08 09 2022	REV S ONS PER OWNER
08 09 2022	RESUBM FOR S E P AN APPROVA
08 09 2022	REV SED FOR S E P AN APPROVA
09 01 2022	REV SED FOR S E P AN APPROVA
09 12 2022	REV SED S ORM FOR S E P AN APPROVA

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COVER SHEET

MYS C COVE

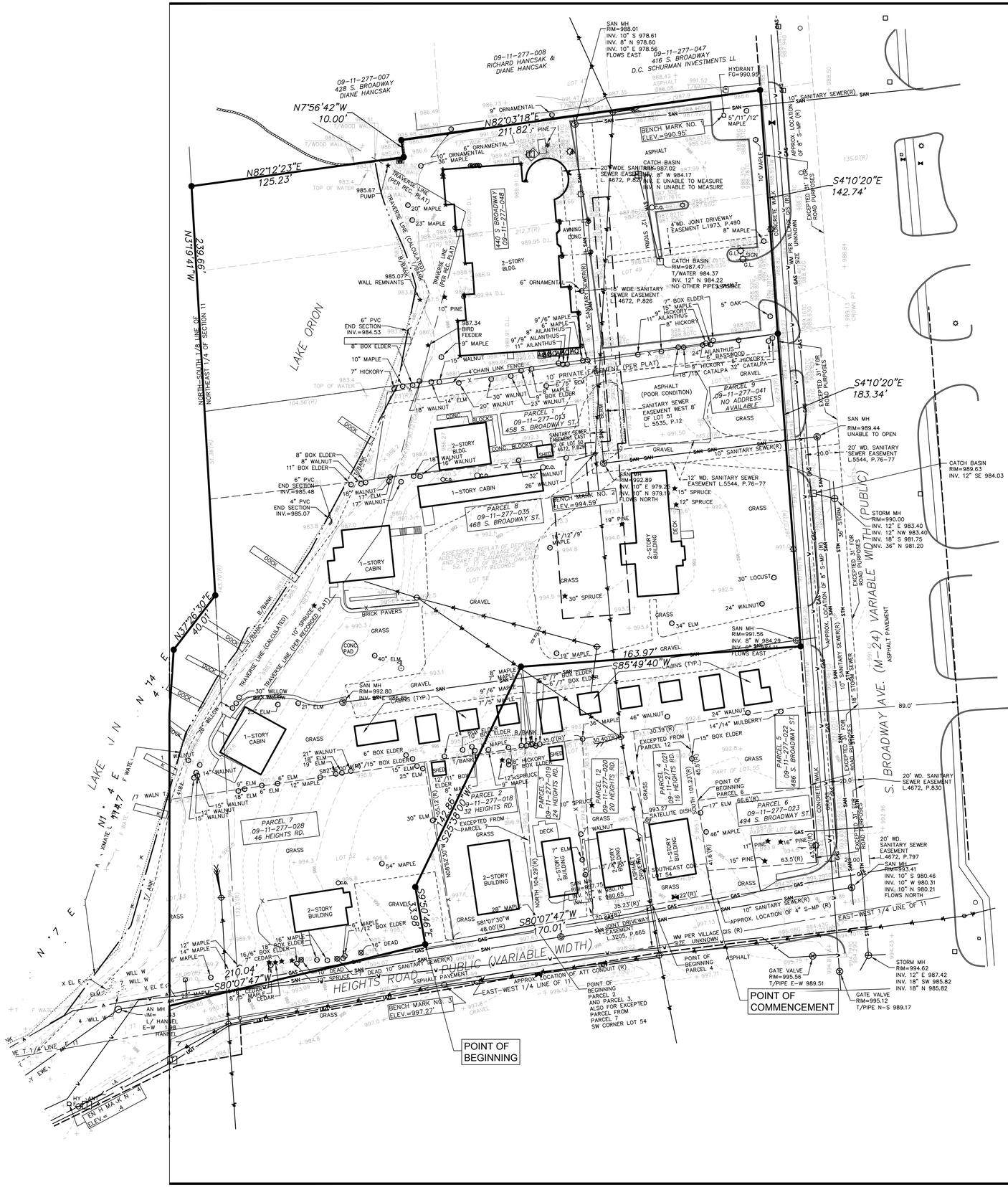
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LEGEND – EXISTING

SECTION LINE		SAN, MH	
E/ PAVEMENT		SAN, CLEAN OUT	C.O.
CURB		SAN, RISER	
E/ GRAVEL		SAN, PUMP STATION	P.S.
CL ROAD		COMB. MH	C
E/ WALK		GATE VALVE	
RAILROAD		HYDRANT	
E/ BRICK		WATER VALVE	
MISC. LINE		WATER METER	W
FENCE	X	POST INDICATOR VALVE	
GUARD RAIL		WELL HEAD	
WALL		FDC CONNECTION	
BLDG. LINE		IRRIGATION CONTROL BOX	W
OVERHEAD WIRES	OH	STORM MH	
RAILING		CATCH BASIN	
OVERHANG LINE		BEEHIVE CB	
T/ BANK		CL DITCH/STREAM	
B/ BANK		CULVERT E.S.	
CL DITCH/STREAM		SHRUB LINE	
SHRUB LINE		ROOF/DOWN SPOUT	
TREE LINE		OVERFLOW/OUTLET STRUCTURE	
WATER EDGE		WETLAND LINE	
WETLAND LINE		STORM CLEAN OUT	C.O.
STORM LINE	STM	ROUND CB	
SAN, LINE	SAN	LIGHT POLE	
WATER LINE	W	UTILITY POLE	
GAS LINE	GAS	ELEC. TRANS.	E
UG ELEC. LINE	UGE	AIR CONDITIONER	AC
UG TELE. LINE	UGT	ELEC. MH	E
UG CABLE TV LINE	CTV	ELEC. METER	E
PAINT STRIPE		ELEC. RISER	
COMBINED SEWER		TRAFFIC CONTROL BOX	C
PLD LINE	PLD	STEAM MH	ST
STEAM	STEAM	PUBLIC LIGHTING MH	L
ELECTRIC OVERHEAD		MISC. TOPO. FEATURE	
TELEPHONE OVERHEAD	TEL	SURVEY CONTROL POINT	
GAS METER	G	FOUND IRON	
GAS RISER	GAS	FOUND NAIL	
GAS VALVE		F. CUT CROSS	
GAS MH	G	SECTION COR.	
TELE. RISER		FENCE POST	
TELE. MH	T	BENCHMARK	
TELE. CROSS BOX	T	FOUND PIPE	
CABLE RISER		FOUND MON.	
PAY PHONE		ASPHALT	ASPH.
MANHOLE		CONCRETE	CONC.
SIGN		AIR CONDITIONER	A.C.
PROT. POST/GUARD POST		GUARD POST	G.P.
GUY		CHAIN-LINK FENCE	C.L.F.
DECIDUOUS TREE		DOOR LEDGE	D.L.
CONIFEROUS TREE		FINISHED FLOOR	F.F.
DEAD TREE		OVERHANG	O.H.
UTILITY FLAG	GAS FLAG	FOUND IRON	F.I.
BLDG. CORNER (FIELD LOCATED)		SET IRON	S.I.
HANDICAP PARKING		FOUND IRON PIPE	F.I.P.
WETLAND FLAG		MEASURED	(M)
BUSH/SHRUB		RECORD	(R)
PARKING METER		FOUND MONUMENT	F.M.
RESIDENTIAL MAILBOX		SET NAIL	S.N.
U.S. MAILBOX	USPS	CORRUGATED METAL PIPE	CMP
EXISTING ELEVATION	000.00+0.00	REINFORCED CONCRETE PIPE	RCP
SOIL BORING		GROUND LIGHT	G.L.
MONITORING WELL			
LAWN IRRIG. HEAD			
CENTERLINE R.R. TRACK			

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09.12.2022	REVISED STORM FOR SITE PLAN APPROVAL

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TOPOGRAPHIC SURVEY

MYSTIC COVE

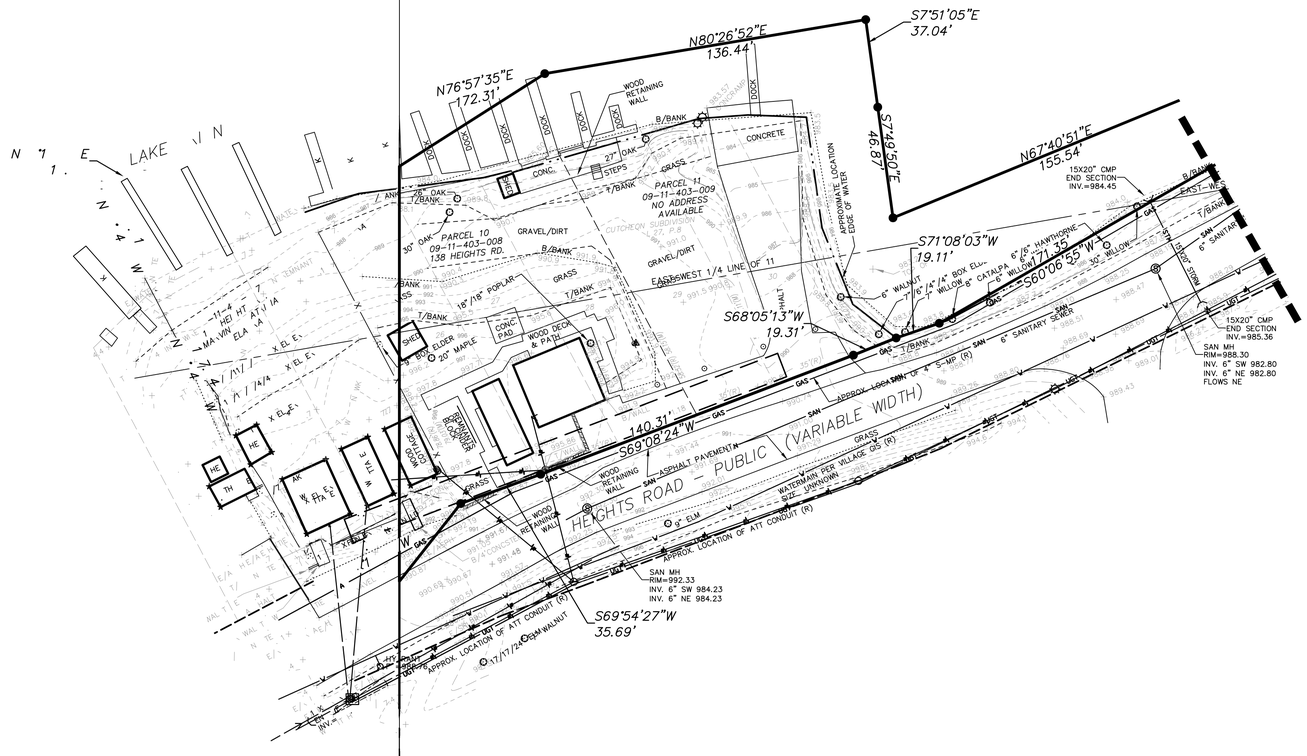
VILLAGE OF LAKE ORION
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0 30' 60'
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LEGEND – EXISTING

SECTION LINE		SAN, MH	
E/ PAVEMENT		C.O. SAN, CLEAN OUT	
CURB		SAN, RISER	
E/ GRAVEL		P.S. SAN, PUMP STATION	
CL ROAD		COMB. MH	
E/ WALK		GATE VALVE	
RAILROAD		HYDRANT	
E/ BRICK		WATER VALVE	
MISC. LINE		WATER METER	
FENCE	X	POST INDICATOR VALVE	
GUARD RAIL		WELL HEAD	
WALL		FDC CONNECTION	
BLDG. LINE		IRRIGATION CONTROL BOX	W
OVERHEAD WIRES	OH	STORM MH	
RAILING		CATCH BASIN	
OVERHANG LINE		BEEHIVE CB	
T/ BANK		CULVERT E.S.	
B/ BANK		ROOF/DOWN SPOUT	
CL DITCH/STREAM		OVERFLOW/OUTLET STRUCTURE	
SHRUB LINE		C.O. STORM CLEAN OUT	
TREE LINE		ROUND CB	
WATER EDGE		LIGHT POLE	
WETLAND LINE		UTILITY POLE	
STORM LINE	STM	ELEC. TRANS.	E
SAN. LINE	SAN	AIR CONDITIONER	AC
WATER LINE	W	ELEC. MH	E
GAS LINE	GAS	ELEC. METER	E
UG ELEC. LINE	UGE	ELEC. RISER	
UG TELE. LINE	UGT	TRAFFIC CONTROL BOX	C
UG CABLE TV LINE	CTV	STEAM MH	ST
PAINT STRIPE		PUBLIC LIGHTING MH	L
COMBINED SEWER			
PLD LINE	PLD		
STEAM LINE	STEAM		
ELECTRIC OVERHEAD			
TELEPHONE OVERHEAD	TEL		

G	GAS METER		MISC. TOPO. FEATURE
	GAS RISER		SURVEY CONTROL POINT
GAS	GAS VALVE		FOUND IRON
G	GAS MH		FOUND NAIL
	TELE. RISER		F. CUT CROSS
T	TELE. MH		SECTION COR.
T	TELE. CROSS BOX		FENCE POST
	CABLE RISER		BENCHMARK
	PAY PHONE		FOUND PIPE
	MANHOLE		FOUND MON.
	SIGN	ASPH.	ASPHALT
	PROT. POST/GUARD POST	CONC.	CONCRETE
	GUY	A.C.	AIR CONDITIONER
	DECIDUOUS TREE	G.P.	GUARD POST
	CONIFEROUS TREE	C.L.F.	CHAIN-LINK FENCE
	DEAD TREE	D.L.	DOOR LEDGE
(SET/FND)	UTILITY FLAG	F.F.	FINISHED FLOOR
	BLDG. CORNER (FIELD LOCATED)	O.H.	OVERHANG
	HANDICAP PARKING	F.I.	FOUND IRON
	WETLAND FLAG	F.I.P.	FOUND IRON PIPE
	BUSH/SHRUB	(M)	MEASURED
	PARKING METER	(R)	RECORD
	RESIDENTIAL MAILBOX	F.M.	FOUND MONUMENT
	U.S. MAILBOX	S.N.	SET NAIL
000.00+00.00	EXISTING ELEVATION	CMP	CORREGATED METAL PIPE
		RCP	REINFORCED CONCRETE PIPE
	SOIL BORING	G.L.	GROUND LIGHT
	MONITORING WELL		
	LAWN IRRIG. HEAD		
	CENTERLINE R.R. TRACK		

UTILITY STATEMENT

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.

(R) = UTILITY SHOWN FROM RECORDS OR PLANS, & FIELD LOCATED WHERE POSSIBLE.

PRIOR TO THE PLANNED BUILDING IMPROVEMENTS, AND/ OR CONSTRUCTION, THE RESPECTIVE UTILITY COMPANIES MUST BE NOTIFIED TO STAKE THE PRECISE LOCATION OF THEIR UTILITIES.

BENCH MARK DATA

(NAVD88) DATUM

SITE BENCH MARK NO. 1
ARROW ON HYDRANT LOCATED EAST NORTHEAST ±120 FEET FROM THE NORTHEAST CORNER OF BUILDING ADDRESS 440 S BROADWAY
ELEVATION = 990.95'

SITE BENCH MARK NO. 2
SET MAG NAIL IN SOUTH FACE OF A UTILITY POLE LOCATED EAST ±60 FEET FROM THE SOUTHEAST BUILDING CORNER OF ADDRESS 458 S BROADWAY AND NORTHWEST ±20 FROM THE NORTHWEST BUILDING CORNER OF 468 S BROADWAY.
ELEVATION = 994.59'

SITE BENCH MARK NO. 3
SET MAG NAIL IN NORTH FACE OF A UTILITY POLE LOCATED ±45 FEET FROM THE SOUTHWEST CORNER OF ADDRESS 32 HEIGHTS ROAD.
ELEVATION = 997.27'

SITE BENCH MARK NO. 4
ARROW ON HYDRANT LOCATED ON THE SOUTH SIDE OF HEIGHTS ROAD AT HOUSE NO. 69 HEIGHTS RD.
ELEVATION = 990.43'

NOTES:

- ELECTRIC AND WATER UTILITY MAPS WERE NOT AVAILABLE AT TIME OF SURVEY.

- SURVEY IN ACCORDANCE WITH TITLE COMMITMENT NO. VGA401966, ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY THROUGH ITS AGENCY VANGUARD TITLE INSURANCE AGENCY, LLC, WITH AN EFFECTIVE DATE OF OCTOBER 4, 2021 LAST REVISED DECEMBER 28, 2021.

- THIS PARCELS ARE LOCATED WITHIN A FEDERALLY DESIGNATED FLOOD HAZARD AREA ZONE "X" (AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN) IN ACCORDANCE WITH THE FEDERAL INSURANCE RATE MAP, PANEL NUMBER 238 OF 704, MAP NUMBER 26125C0238F, EFFECTIVE DATE SEPTEMBER 29, 2006.

- SOURCE INFORMATION FROM PLANS AND MARKINGS WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES PURSUANT TO SECTION 5.E.IV. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED.

- TREE SIZES AND SPECIES ARE THE BEST ESTIMATION OF THE FIELD SURVEYOR. SPECIFIC QUESTIONS REGARDING INDIVIDUAL TREES SHOULD BE DIRECTED TO A QUALIFIED FORESTER.

- THIS TOPOGRAPHIC SURVEY WAS PROVIDED WITH EXISTING SNOW COVER OF 1" - 3". EVERY EFFORT HAS BEEN MADE TO LOCATE OBSERVABLE UTILITY STRUCTURES AND EVIDENCE, HOWEVER THE SURVEYOR CANNOT WARRANT COMPLETE FIELD IDENTIFICATION.

- SEE SHEET 2 FOR SCHEDULE OF STRUCTURES.

N

0 30' 60'

SCALE: 1" = 30'

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TOPOGRAPHIC SURVEY

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

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LEGEND

- PR GATE VALVE AND WELL
- PR HYDRANT
- PR VALVE AND BOX
- PR WATERMAIN
- PR STORM CATCH BASIN
- PR STORM MANHOLE
- PR STORM REAR YARD
- PR STORM END SECTION
- PR RIP RAP
- PR STORM SEWER
- PR CLEAN OUT
- PR SANITARY MANHOLE
- PR SANITARY SEWER
- PR UNDERGROUND ELECTRIC SERV
- PR LIGHT FIXTURE (SEE LIGHTING PLAN FOR TYPE OF FIXTURE)
- PR TRANSFORMER
- PR UNDERGROUND GAS SERVICE
- PR UNDERGROUND TELEPHONE SERVICE
- PR UTILITY CROSSING
- PR CONTOUR MINOR (1')
- PR CONTOUR MAJOR (5')
- PR SPOT ELEVATION
- PR SWALE
- PR CURB AND GUTTER
- PR REVERSE CURB AND GUTTER
- PR PERVIOUS ASPHALT
- PR CONCRETE PAVEMENT
- PR M-24 APPROACH PAVEMENT
- PR PERVIOUS PAVERS
- PR OPEN SPACE AREA
- PR HEIGHTS WALK PAVEMENT

SITE PLAN NOTES:

TOTAL SITE AREA: 195,955 SF, 4.49 ACRES

PLATTED SITE AREA HEIGHTS ROAD: 0.78 ACRES
PLATTED SITE AREA HEIGHTS/BROADWAY: 3.13 ACRES
TOTAL PLATTED SITE AREA: 3.91 ACRES
INCLUDING 0.58 ACRES OF PLATTED BOTTOMLAND
PER ZONING ORDINANCE 9.03.C.7.B PLATTED BOTTOMLANDS ARE ALLOWED FOR DENSITY CALCULATIONS IN THE MU DISTRICT

ZONING: MU, MIXED USE
ALLOWED DENSITY: 15 RESIDENCES/ACRE
15 RESIDENCES / ACRE x 0.78 ACRES: 11.70 RESIDENCES
15 RESIDENCES / ACRE x 3.13 ACRES: 46.95 RESIDENCES
ALLOWED RESIDENCES: 58.65 RESIDENCES

PROPOSED RESIDENCES:
LAKE RESIDENCES 36 RESIDENCES
M-24 RESIDENCES 11 RESIDENCES
TOTAL 47 RESIDENCES

PROPOSED BEDROOM BREAKDOWN:
2-BEDROOM RESIDENCES 12 RESIDENCES
3-BEDROOM RESIDENCES 35 RESIDENCES
TOTAL 47 RESIDENCES

OPEN SPACE: 42,885 SF / 0.98 ACRES
22%

PARKING:

REQUIRED: MULTI-FAMILY REQUIREMENTS
2 SPACES PER UNIT
47 x 2 = 94 SPACES
TOTAL REQUIRED: 94 SPACES

PROVIDED:
GARAGE SPACES 70 SPACES
DRIVEWAY SPACES 58 SPACES
OFF-STREET SPACES 4 SPACES
TOTAL SPACES 132 SPACES

NOTES:
1. MYSTIC COVE IS PROPOSED MULTI-FAMILY RESIDENCE COMMUNITY WITH OPTION LIVE/WORK UNITS ALONG M-24.
2. TRASH RECEPTACLES WILL BE STORED IN THE RESIDENCE GARAGES AND ROLLED OUT ON GARBAGE DAY.
3. (A) NO PARKING FIRE LANE SIGN.
4. HEIGHTS ROAD PATHWAY SUBJECT TO APPROVAL BY RCOC.

AREA, HEIGHT, BULK AND PLACEMENT REGULATIONS:

SETBACKS

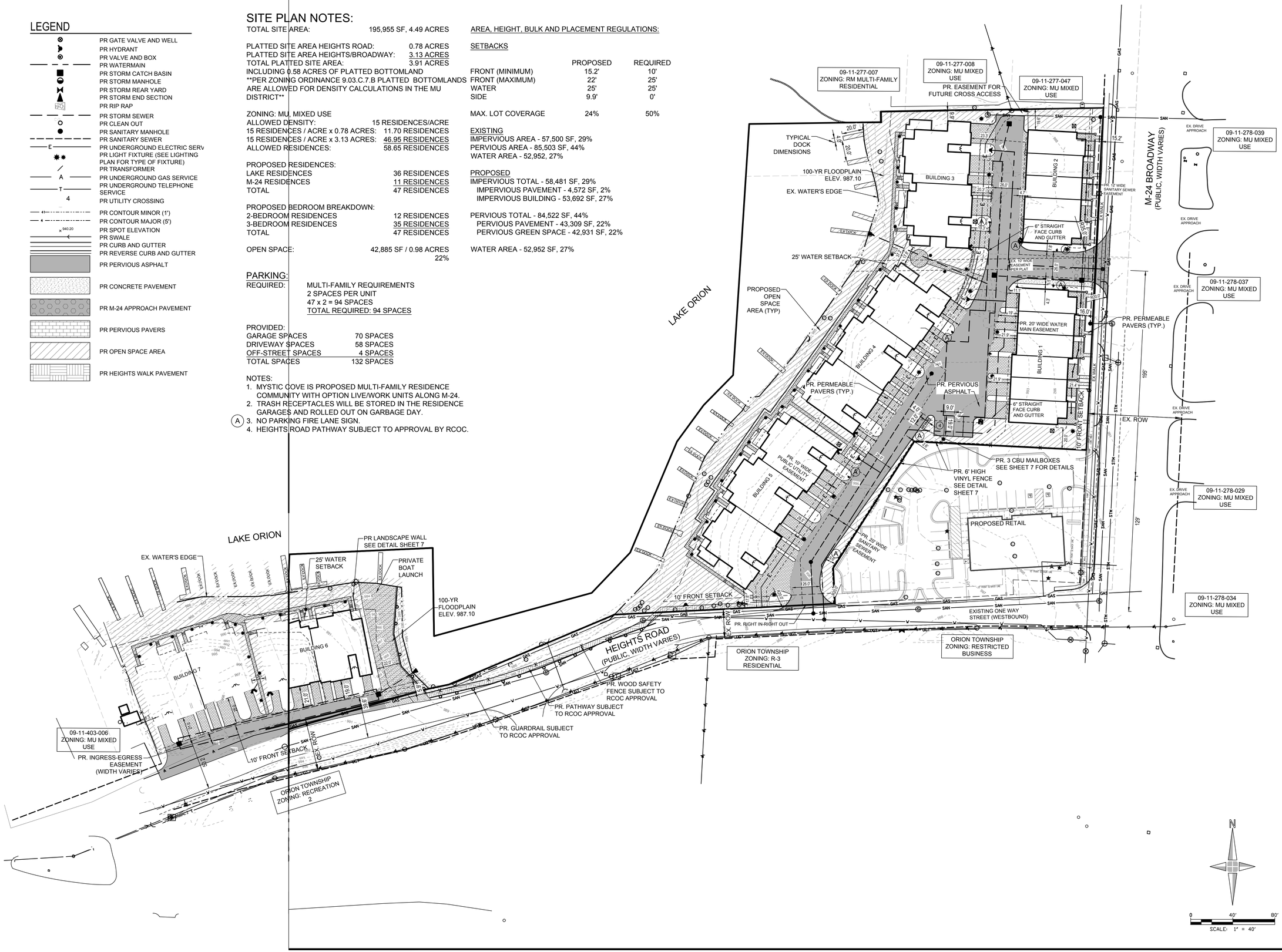
	PROPOSED	REQUIRED
FRONT (MINIMUM)	15.2'	10'
FRONT (MAXIMUM)	22'	25'
WATER	25'	25'
SIDE	9.9'	0'
MAX. LOT COVERAGE	24%	50%

EXISTING
IMPERVIOUS AREA - 57,500 SF, 29%
PERVIOUS AREA - 85,503 SF, 44%
WATER AREA - 52,952, 27%

PROPOSED
IMPERVIOUS TOTAL - 58,481 SF, 29%
IMPERVIOUS PAVEMENT - 4,572 SF, 2%
IMPERVIOUS BUILDING - 53,692 SF, 27%

PERVIOUS TOTAL - 84,522 SF, 44%
PERVIOUS PAVEMENT - 43,309 SF, 22%
PERVIOUS GREEN SPACE - 42,931 SF, 22%

WATER AREA - 52,952 SF, 27%



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09.21.2022	REVISED PER PLANNER/ENGINEER MEETING

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SITE AND PAVING PLAN

MYSTIC COVE

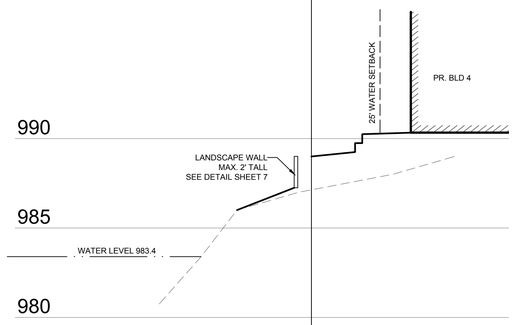
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Attachment: 2022-09-30 Mystic PC Set (5448 : Mocerl Mystic Cove Redevelopment)



SECTION 1-1

SCALE: H:1"=10', V:1"=4'

LEGEND

- PR GATE VALVE AND WELL
- PR HYDRANT
- PR VALVE AND BOX
- PR WATERMAIN
- PR STORM CATCH BASIN
- PR STORM MANHOLE
- PR STORM REAR YARD
- PR STORM END SECTION
- PR RIP RAP
- PR STORM SEWER
- PR CLEAN OUT
- PR SANITARY MANHOLE
- PR SANITARY SEWER
- PR UNDERGROUND ELECTRIC SER
- PR LIGHT FIXTURE (SEE LIGHTING PLAN FOR TYPE OF FIXTURE)
- PR TRANSFORMER
- PR UNDERGROUND GAS SERVICE
- PR UNDERGROUND TELEPHONE SERVICE
- PR UTILITY CROSSING
- PR CONTOUR MINOR (1')
- PR CONTOUR MAJOR (5')
- PR SPOT ELEVATION
- PR SWALE
- PR CURB AND GUTTER
- PR REVERSE CURB AND GUTTER
- PR PERVIOUS ASPHALT
- PR CONCRETE PAVEMENT
- PR M-24 APPROACH PAVEMENT
- PR PERVIOUS PAVERS
- PR OPEN SPACE AREA
- PR HEIGHTS WALK PAVEMENT

GRADING

ABBREVIATIONS:

PW - PERMANENT WATER ELEVATION
HW - HIGH WATER / 100 YEAR STORM ELEVATION
FB - FREEBOARD ELEVATION
CD - CURB DROP FOR WALK
T/C - TOP OF CURB
G - GUTTER
T/A - TOP OF ASPHALT
BR - BOTTOM OF RAMP
TR - TOP OF RAMP
R - RAMP
L - LANDING
T/WALL - TOP OF WALL
B/WALL - BOTTOM OF WALL

ADA NOTES:

1. WALKS: CROSS SLOPES SHALL NOT EXCEED 2% AND LONGITUDINAL SLOPES SHALL NOT EXCEED 5%.
2. LANDINGS: CROSS AND LONGITUDINAL SLOPES SHALL NOT EXCEED 2% ON ALL LANDINGS.
3. RAMPS: CROSS SLOPES SHALL NOT EXCEED 2% AND LONGITUDINAL SLOPES SHALL NOT EXCEED 8.3%.

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DATE:	ISSUE:
07.13.2022	SUBMIT FOR SITE PLAN APPROVAL
07.27.2022	REVISIONS PER FIRE MARSHAL REVIEW
08.09.2022	REVISIONS PER OWNER
08.09.2022	RESUBMIT FOR SITE PLAN APPROVAL
08.09.2022	REVISED FOR SITE PLAN APPROVAL
09.01.2022	REVISED FOR SITE PLAN APPROVAL
09.12.2022	REVISED STORM FOR SITE PLAN APPROVAL

Developed For:

MOCERI COMPANIES

3500 UNIVERSITY DRIVE
AUBURN HILLS, MI
48326

248.340.9400

PRELIMINARY GRADING PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	5
Project:	20107.10

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WATERMAIN NOTES OF INTENT:

1. ALL PROPOSED WATERMAIN SHALL BE 8" AND CENTERED IN A 20' WIDE PUBLIC EASEMENT. WATERMAIN SHALL CONNECT TO EXISTING MAIN IN M-24 AND IN HEIGHTS ROADS.
2. THE COVER OVER EXISTING AND PROPOSED WATERMAIN SHALL HAVE A MINIMUM COVER OF 5.5'
3. EXISTING HYDRANT ON NORTH SIDE OF BUILDING 2 IS PROPOSED TO BE REMOVED.

SANITARY SEWER NOTES OF INTENT:

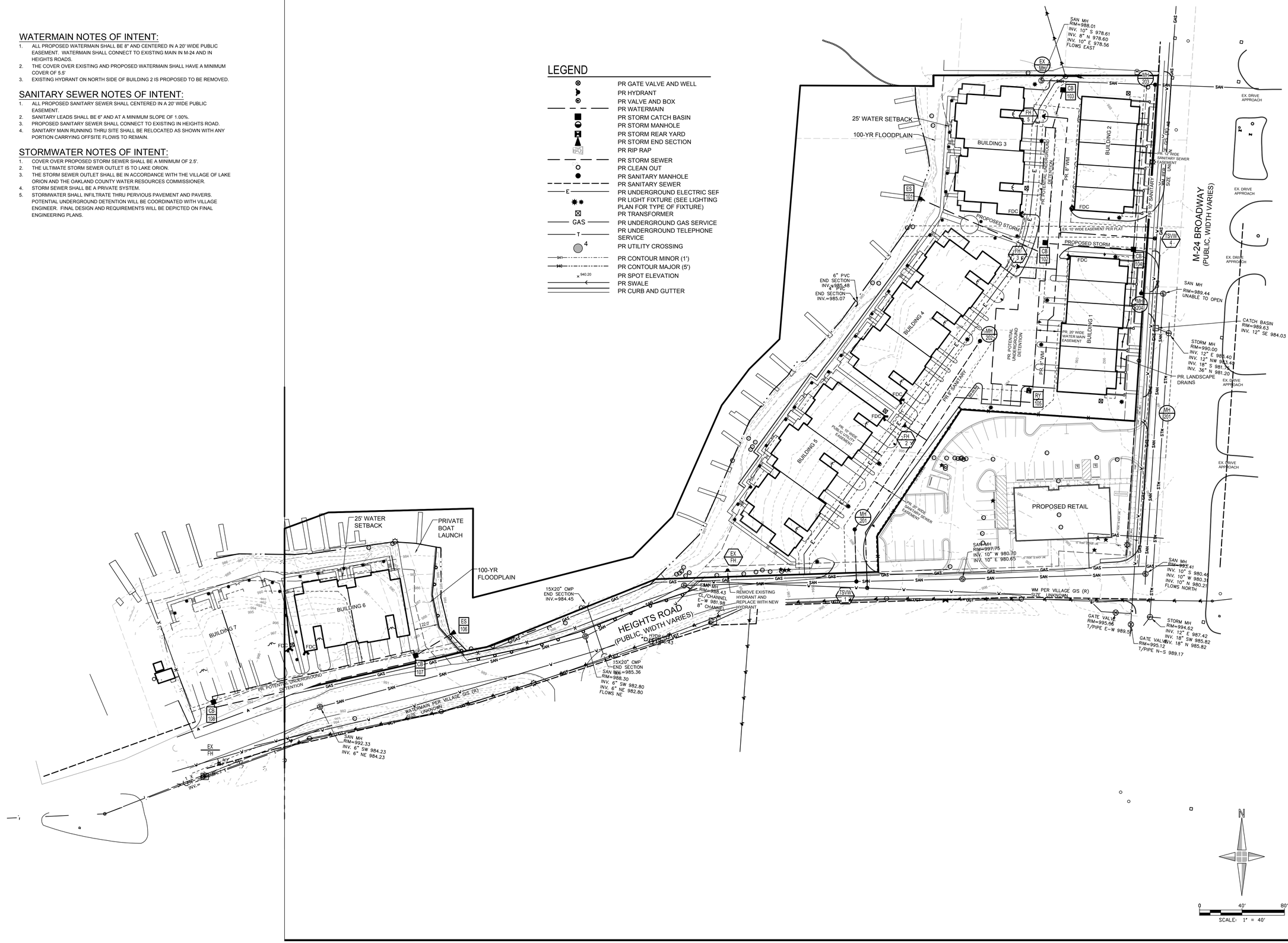
1. ALL PROPOSED SANITARY SEWER SHALL CENTERED IN A 20' WIDE PUBLIC EASEMENT.
2. SANITARY LEADS SHALL BE 6" AND AT A MINIMUM SLOPE OF 1.00%.
3. PROPOSED SANITARY SEWER SHALL CONNECT TO EXISTING IN HEIGHTS ROAD.
4. SANITARY MAIN RUNNING THRU SITE SHALL BE RELOCATED AS SHOWN WITH ANY PORTION CARRYING OFFSITE FLOWS TO REMAIN.

STORMWATER NOTES OF INTENT:

1. COVER OVER PROPOSED STORM SEWER SHALL BE A MINIMUM OF 2.5'.
2. THE ULTIMATE STORM SEWER OUTLET IS TO LAKE ORION.
3. THE STORM SEWER OUTLET SHALL BE IN ACCORDANCE WITH THE VILLAGE OF LAKE ORION AND THE OAKLAND COUNTY WATER RESOURCES COMMISSIONER.
4. STORM SEWER SHALL BE A PRIVATE SYSTEM.
5. STORMWATER SHALL INFILTRATE THRU PERVIOUS PAVEMENT AND PAVERS. POTENTIAL UNDERGROUND DETENTION WILL BE COORDINATED WITH VILLAGE ENGINEER. FINAL DESIGN AND REQUIREMENTS WILL BE DEPICTED ON FINAL ENGINEERING PLANS.

LEGEND

- PR GATE VALVE AND WELL
- PR HYDRANT
- PR VALVE AND BOX
- PR WATERMAIN
- PR STORM CATCH BASIN
- PR STORM MANHOLE
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08.09.2022	REVISED FOR SITE PLAN APPROVAL
09.01.2022	REVISED FOR SITE PLAN APPROVAL
09.12.2022	REVISED STORM FOR SITE PLAN APPROVAL
09.21.2022	REVISED PER PLANNER/ENGINEER MEETING

Developed For:

MOCERI COMPANIES
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PRELIMINARY UTILITY PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
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GENERAL NOTES:

1 A CONS RUC ON SHA BE PERFORMED N ACCORDANCE W H HE CURREN S ANDARDS AND SPEC F CA ONS OF THE VILLAGE OF AKE OR ON, OAK AND COUN Y WA ER RESOURCES COMM SS ONER, AND HE M CH GAN DEPAR MEN OF ENV RONMENT, GREAT AKES AND ENERGY

2 A WORK W H N HE OAK AND COUN Y ROAD COMM SS ON OR MDO R GH OF WAY SHA BE N ACCORDANCE W TH SUPP EMEN A PERM SPEC F CA ONS AND BY PERM ON Y

3 A PERM S REQU RED SHA BE OB A NED BY HE CON RAC OR A PERM FEES, BONDS, AND NSURANCE REQUIRED BY THE SSU NG AGENC ES SHA BE PROV DED BY HE CON RAC OR, AND MUS BE KEP CURREN HE CON RAC OR S RESPONSIBLE FOR A O HER FEES, NSPEC ON COS S, E C , AND SHA ADHERE O A REQU REMEN S SE FOR H N SA D PERM S.

4 72 HOURS PR OR O EXCAVA ON, HE CON RAC OR SHA NO FY M SS D G (1 800 482 7171) FOR OCA ON OF UNDERGROUND AND CAB E FAC ES, AND SHA NO FY REPRESEN A VES OF O HER U ES OCA ED N HE V C N Y OF HE WORK.

5 U Y NFORMA ON SHOWN ON HE P ANS WAS OB A NED FROM U Y OWNERS AND MAY OR MAY NO BE ACCURATE AND COMP E E CON RAC OR SHA VER FY AND OR OB A N ANY NFORMA ON NECESSARY REGARD NG HE PRESENCE OF UNDERGROUND U ES WH CH M GH HAVE AN EFFEC ON H S PROJEC , AND SHA BE RESPONS B E FOR ANY DAMAGE TO ANY PUB C OR PR VA E U ES, SHOWN OR NO SHOWN ON HE P ANS

6 HE U Y PO ES SHOWN ON HESE DRAW NGS ARE N ENDED O SHOW ON Y HE OCA ON OF EX S NG PO ES THE CONTRACTOR S RESPONS B E FOR DE ERM N NG HE QUAN Y AND D REC ON OF OVERHEAD NES

7 HE CON RAC OR SHA PROV DE FOR CON RO ED ACCESS O HE S E FOR USE BY HE VAR OUS WORK FORCES, EMERGENCY VEH C ES, OCCUPAN S, V S ORS, E C HROUGHOU CONS RUC ON H S ACCESS MUS PROV DE FOR HE REMOVAL OF MUD FROM VEH C ES RES ROADWAYS AND DR VEWAYS SHA BE MA N A NED AND OPEN FOR EMERGENCY VEH C ES A A TIMES. IT SHALL BE HE CON RAC OR S RESPONS B Y O NO FY HE RES DEN S AND BUS NESSES, WHOSE DR VEWAYS ARE AFFEC ED BY HIS SCHEDU E, 24 HOURS N ADVANCE CON RAC OR SHA SCHEDU E CONS RUC ON A NON PEAK USE HOURS AND SHALL MINIMIZE DR VEWAY C OSURE BY EXPED NG CONS RUC ON

8 DUR NG CONS RUC ON, CON RAC OR MAY ENCOUN ER SPR NK ER HEADS, P P NG, GH NG, AND BUR ED E EC R CAL CABLE, MA BOXES, FENCES, S GNS, E C CON RAC OR SHA REP ACE AND OR RES ORE A COMPONEN S OF SUCH SYSTEMS. THIS WORK SHA BE NC DEN A O HE PROJEC

9 R GH OF WAYS AND FRON OF O S D S URBED BY CONS RUC ON SHA BE RES ORED BY OPSO , SEED AND MULCH.

10 HE CON RAC OR S REQU RED O CONF NE CONS RUC ON AC V ES O HE M S OF HE S E AS SHOWN ON HE CONSTRUCTION P ANS ANY DAMAGE OR D SRUP ON O ADJACEN S ES S HE RESPONS B Y OF HE CON RAC OR O CORRECT IMMEDIATELY. NO OFF S E WORK SHA BE PERFORMED OU S DE OF PUB C R GH S OF WAY OR DED CA ED EASEMEN S W HOU PRIOR WRITTEN APPROVA OF HE PROPER Y OWNER

11 GREA CARE SHA BE AKEN O AVO D DAMAGE O VEGE A ON OU S DE HE C EAR NG AND GRUBB NG M S NO DRIVING OR PARK NG OF VEH C ES AND OR S ORAGE OF MA ER A S AND SUPP ES SHA BE PERM ED OU S DE HE M S OF CONSTRUCTION.

12 HE PRO EC ON OF EX S NG REES, AS REQU RED, SHA BE SO E Y HE CON RAC OR S RESPONS B Y

13 F NA C EANUP AND RES ORA ON SHA CONS S OF F NE GRAD NG OF CONS RUC ON AREAS, REMOVA OF CONSTRUCTION SIGNS, E C OPSO SHA BE SPREAD OVER A D S URBED AREAS, FO OWED BY SEED, FER ZER AND EROS ON MA OR STRAW MULCH, OR AS FUR HER REQU RED BY HE ANDSCAP NG P ANS AND SPEC F CA ONS A REQU RED RES ORA ON EMS NOT SPECIFICALLY DEN F ED AS A PAY EM SHA BE CONS DERED NC DEN A O HE CON RAC

14 A RES ORA ON SHA BE SPEC F ED ON HE P ANS AND N HE SPEC F CA ONS NON PAY EMS SHA BE NC DENTAL TO THE PROJEC

15 HE CON RAC OR AND OR H S SUBCON RAC ORS SHA NO FY HE V AGE OF AKE OR ON, OR ON OWNSH P F RE DEPARTMENT, HE OR ON OWNSH P PO C DEPAR MEN , MDO AND HE OAK AND COUN Y ROAD COMM SS ON WO (2) WEEKS PRIOR TO THE BEG NN NG OF CONS RUC ON

16 HE CON RAC OR SHA PROV DE NECESSARY S GNS, BARR CADES, AND GH S O PRO EC HE RAFF C AND HE WORK AS D REC ED BY HE F E D ENG NEER OR HE ROADWAY JUR SD C ONA AGENCY A RAFF C CON RO SHA BE N ACCORDANCE W H HE M CH GAN MANUA OF UN FORM RAFF C CON RO DEV CES (MMU CD)

17 A O MARKERS AND MONUMEN PO N S D S URBED DUR NG CONS RUC ON SHA BE REP ACED BY A REG S ERED LAND SURVEYOR A HE EXPENSE OF HE CON RAC OR

18 HE CON RAC OR SHA BE RESPONS B E FOR A DEWA ER NG REQU RED O CONS RUC HE PROPOSED U ES AND SHALL BE DONE PER APPROVED DEWA ER NG P AN COS OF DEWA ER NG SHA BE NC DEN A O HE PROJEC

DEMOLITION NOTES:

1 W H HE EXCEP ON OF AN AMOUN OF EXCAVA ED MA ER A S SUFF C EN FOR BACKF NG AND CONS RUC ON OF FILLS AS CA ED FOR ON HE P ANS AND AS ND CA ED BE OW, A BROKEN CONCRE E, S ONE AND EXCESS EXCAVA ED MATERIALS SHALL BE D SPOSED OF BY HE CON RAC OR

2 HE CON RAC OR W BE REQU RED O OB A N HE R OWN D SPOSA GROUND, AND W RECE VE NO ADD ONA COMPENSATION FOR D SPOS NG OF ANY OF HE EXCESS MA ER A S MA ER A S ACCEP AB E O HE ENG NEER MAY BE D SPOSED OF ON-SITE AT THE CON RAC ORS EXPENSE N A MANNER APPROVED N ADVANCE BY HE ENG NEER

3 HE EDGE OF EX S NG PAVEMEN SHA BE C EANED OF EAR H AND O HER FORE GN MA ER A BEFORE ADJACEN POURS ARE P ACED

4 EX S NG U ES ON S E W BE CAPPED OR BU K HEADED A HE MA N N ACCORDANCE W H V AGE OF AKE ORION AND SERV CE PROV DER S ANDARDS A BU KHEAD NG AND OR SEWER P PE REMOVA NECESS A ED BY HE REMOVA OF DRAINAGE S RUC URES SHA BE NC UDED N HE S RUC URE REMOVA

5 HE CON RAC OR SHA COORD NA E W H AFFEC ED U Y COMPAN ES FOR HE REMOVA OR RE OCA ON OF UTILITY POLES.

6 S REE S GNS N HE WAY OF CONS RUC ON W BE REMOVED AND RESE MMED A E Y N A EMPORARY OCA ON, AS APPROVED BY HE F E D ENG NEER

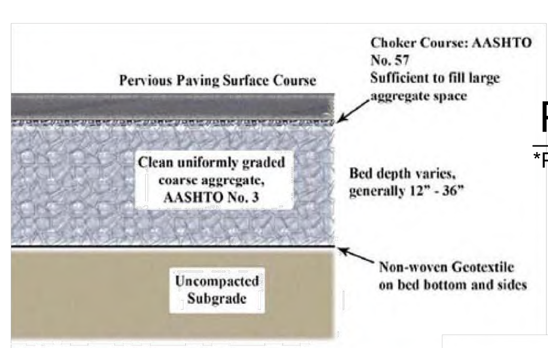
7 HE CON RAC OR SHA PRO EC A EX S NG S GNS AND POS S SCHEDU ED O REMA N, AS D REC ED BY HE F ELD ENGINEER.

8 A UNDERGROUND U ES NO ND CA ED FOR REMOVA SHA BE PRO EC ED HROUGHOU CONS RUC ON

9 HE CON RAC OR SHA BE RESPONS B E FOR PRO EC NG A PR VA E PROPER Y (NC UD NG BU D NGS AND FOUNDATIONS) HROUGHOU CONS RUC ON AND SHA MA N A N A SAFE PEDES R AN ACCESS A A MES

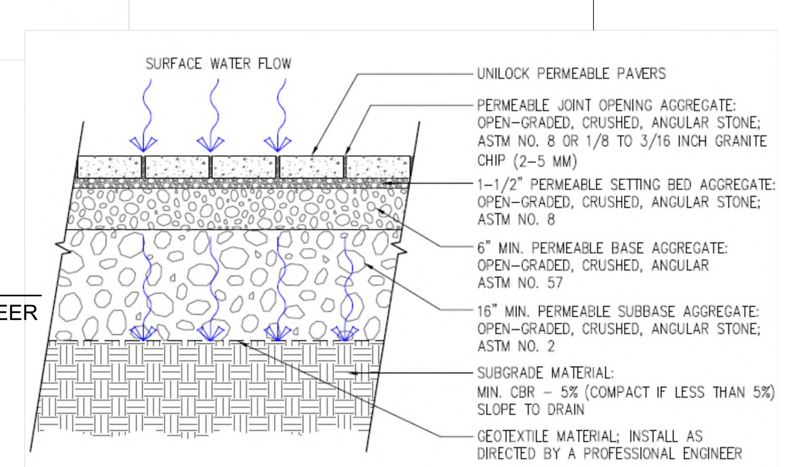
10 EX S NG PAVEMEN S, S DEWA KS, CURBS, DR VEWAYS, GU ERS, CROSSWA KS, AND O HER B UM NOUS OR CONCRETE SURFACES O BE REMOVED, SHA BE REMOVED O HE M S SHOWN OR AS REQU RED BY HE ENG NEER REMOVA SHA BE CAREFULLY DONE AND O A NEA NE CONCRE E SAWS OR O HER MECHAN CA EQU PMEN APPROVED BY HE ENG NEER SHALL BE USED ON H S WORK

11 HE REMOVA OF PAVEMEN , CURBS AND WA KS SHA NC UDE A REQU RED SAWCU NG CURB REMOVA S NCIDENTAL TO PAVEMEN REMOVA



PERVIOUS ASPHALT SECTION

PER WCWRC MANUAL, TO BE DESIGNED BY GEOTECHNICAL ENGINEER FOR SITE SPECIFIC CONDITIONS



PERMEABLE PAVER SECTION

TO BE DESIGNED BY GEOTECHNICAL ENGINEER FOR SITE SPECIFIC CONDITIONS

GRADING NOTES:

1. EXCESS EXCAVATION SHALL BE DISPOSED OF BY THE CONTRACTOR. COST OF DISPOSAL WILL BE INCIDENTAL TO THE PROJECT.
2. THE FINAL SUB-GRADE SHALL BE THOROUGHLY PROOF-ROLLED UNDER THE OBSERVATION OF THE SOILS ENGINEER.
3. NO FROZEN MATERIAL SHALL BE PERMITTED AS BACKFILL UNDER ANY ROADWAY, DRIVEWAY OR PARKING AREA.
4. PRIOR TO THE START OF ANY FILLING, THE CONTRACTOR SHALL REMOVE ALL TOPSOIL AND ALL OTHER UNACCEPTABLE SOIL FROM THE FILL AREAS, AND PROPERLY BACKFILL WITH ACCEPTABLE SOIL.
6. GENERAL GRADING REQUIREMENTS ARE AS FOLLOWS:
   A. FINISH GRADE AT EXISTING BUILDING SHALL MATCH BRICK LEDGES, DOORWAYS OR BASEMENT WINDOWS
   B. MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING: 5% WITHIN THE FIRST 10' AND 2% AFTER.
   C. SIDEWALK CROSS SLOPE SHALL BE NO MORE THAN 2%.
   D. PAVEMENT SLOPES (1.0% MINIMUM, 4.0% MAXIMUM) UNIFORMLY BETWEEN FINISH GRADE ON PLANS
   E. LAWN AREAS ± 2% MINIMUM TO 25% (BERMS) MAXIMUM
9. PRIOR TO THE PLACEMENT OF ANY BASE ASPHALT OR LEVELING COURSE, THE CURBS SHALL BE PARTIALLY BACKFILLED AND THE SUB-GRADE SHALL BE PROOF-ROLLED UNDER THE SUPERVISION OF THE SOILS ENGINEER.
10. ALL SIDEWALK AND PATHWAYS IN ANY PUBLIC R.O.W. SHALL BE INSPECTED BY THE AGENCY WITH JURISDICTION.

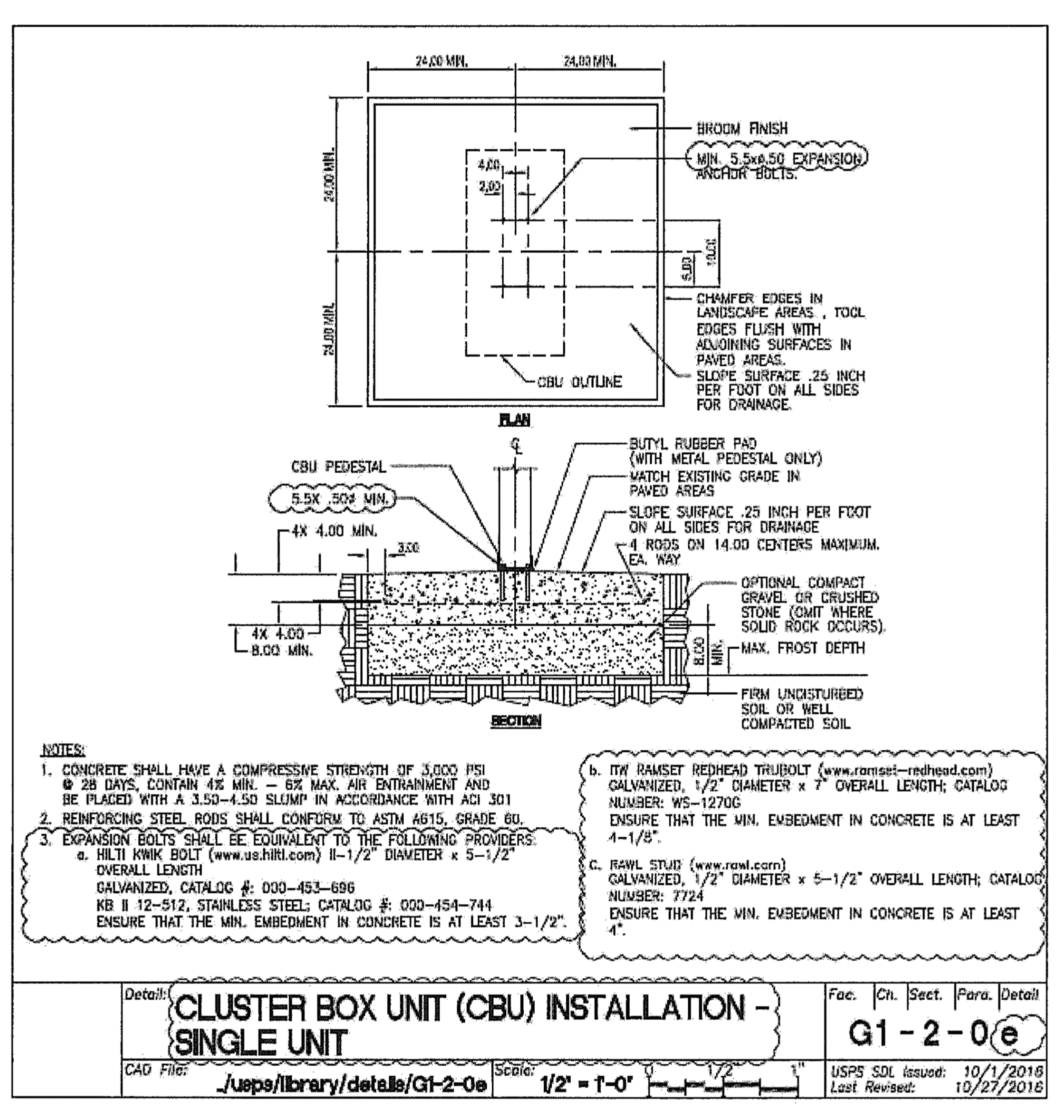
PAVING NOTES:

1. THE PAVING CONTRACTOR SHALL BE REQUIRED TO COORDINATE THE INSTALLATION OF GAS, ELECTRIC, PHONE, CABLE, SPRINKLERS, ETC. IN SUCH A MANNER THAT WILL FACILITATE THEIR PROPER INSTALLATION PRIOR TO PLACING THE PAVEMENT MATERIALS. ENSURE THAT ALL REQUIRED PIPES, CONDUITS, CABLES AND SLEEVES ARE PROPERLY PLACED AND THAT THE TRENCHES ARE PROPERLY BACKFILLED AND COMPACTED.
2. BUTT JOINTS SHALL BE PLACED AT ALL LOCATIONS WHERE AN EXISTING ASPHALT PAVEMENT SURFACE IS BEING DISTURBED BY REMOVALS AND/OR THE INSTALLATION OF NEW ASPHALT PAVEMENT.
3. ALL PAVEMENT AREAS SHOULD BE CLEARED AND GRUBBED BY REMOVING SURFACE VEGETATION, TOPSOIL, DEBRIS AND OTHER DELETERIOUS MATERIALS.
4. THE PLACEMENT OF THE FINAL ASPHALT LIFT SHALL BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED, OR AS APPROVED BY THE OWNER. A BOND COAT OF SS-1H EMULSION SHALL BE APPLIED AT A RATE OF 0.10 GALLONS/S.Y.D.) BETWEEN THE LEVELING AND WEARING COURSE WHEN 48 HOURS HAVE ELAPSED BETWEEN PLACEMENTS.
6. PROPOSED AGGREGATE BASE SHALL EXTEND A MINIMUM OF 1 FOOT BEYOND THE PAVEMENT EDGE/BACK OF CURB.
7. ALL BARRIER FREE RAMPS, WALK, LANDINGS AND CURBS SHALL BE A.D.A. COMPLIANT AND MEET MDOT STANDARD PLAN R-28.
8. DIMENSIONS ARE TO FACE OF CURB.

UTILITY NOTES:

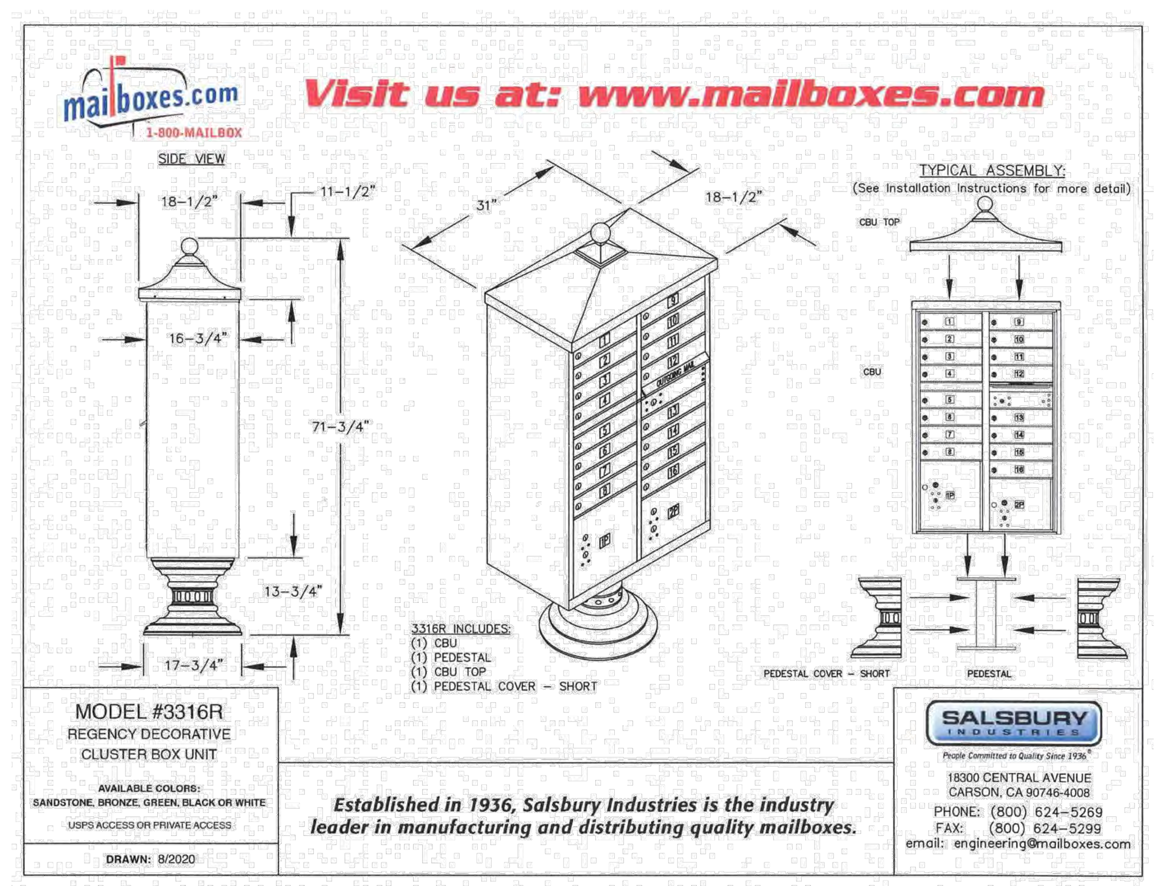
1. REFER TO ARCHITECTURAL PLANS TO COORDINATE ALL:
   A. WATER SUPPLY, METERING, SPRINKLER AND FDC PIPING, DESIGN AND COORDINATION
   B. BUILDING SEWER, BUILDING DRAIN DESIGN AND CONNECTIONS TO CLEAN OUTS AND ROOF CONNECTORS
   C. GAS, ELECTRIC AND COMMUNICATION SERVICES, AND LIGHTING DETAILS
   D. ALL BUILDING ACCESS WALKS AND ENTRY DETAILS, INCLUDING SUPPORTED SLABS
   E. ALL WORK TO CONSTRUCT THE BUILDING AND ALL ITEMS CONNECTED TO IT
2. ALL TRENCHES WITHIN A ONE ON ONE SLOPE OF PAVEMENT SHALL BE BACKFILLED WITH SAND (MDOT CLASS II MINIMUM) AND MECHANICALLY COMPACTED IN NOT MORE THAN 9" LAYER TO 95% MAXIMUM DRY DENSITY PER MODIFIED PROCTER COMPACTION TEST ASTM D-1557. COMPACTED SAND BACKFILL SHALL ALSO BE PROVIDED FOR ALL SEWER TRENCHES LOCATED UNDER, OR WITHIN, THREE FEET OF PAVEMENT.
3. A MINIMUM VERTICAL CLEARANCE OF 18 INCHES IS REQUIRED AT UTILITY CROSSINGS (MEASURED FROM THE OUTSIDE OF PIPE TO THE OUTSIDE OF PIPE). POSITIVE PROVISIONS SHALL BE MADE TO ENSURE THAT ALL UTILITY TRENCHES ARE FREE DRAINING DURING ALL PHASES OF CONSTRUCTION.
4. THE MINIMUM SLOPE FOR A BUILDING LEAD IS 1%. LEADS SHALL ONLY BE CONNECTED TO THE MAIN LINE WITH WYES.
5. ROADWAY, DRIVEWAY AND PARKING AREA CROSSINGS SHALL BE TEMPORARILY CONDITIONED IMMEDIATELY AFTER CROSSING BY PLACING 8" OF MDOT 22A GRAVEL OR SLAG AGGREGATE, AND SHALL BE MAINTAINED IN GOOD, DUST FREE CONDITION UNTIL PAVEMENT RESTORATION IS MADE.
6. THE CONTRACTOR SHALL COORDINATE THE REMOVAL OF ALL UTILITY LINES AND STRUCTURES, AS OUTLINED ON THE DEMOLITION PLAN, WITH THE INSTALLATION OF UTILITY IMPROVEMENTS.
7. THE CONTRACTOR SHALL REMOVE UTILITIES, WHICH HAVE BEEN ABANDONED IN PLACE, AS REQUIRED TO COMPLETE INSTALLATION OF NEW UTILITIES. WHENEVER ABANDONED UTILITIES ARE CUT, CONTRACTOR SHALL COMPLETELY CAP BOTH ENDS TO PREVENT THE INFILTRATION OF SOILS.
8. NO CONNECTION MAY BE MADE TO ANY EXISTING WATER MAIN UNTIL THE NEW MAIN HAS PASSED ALL PRESSURE AND BACTERIOLOGICAL TESTING.
9. WATER LEADS SHALL HAVE A MINIMUM OF 5.5 FEET OF COVER.

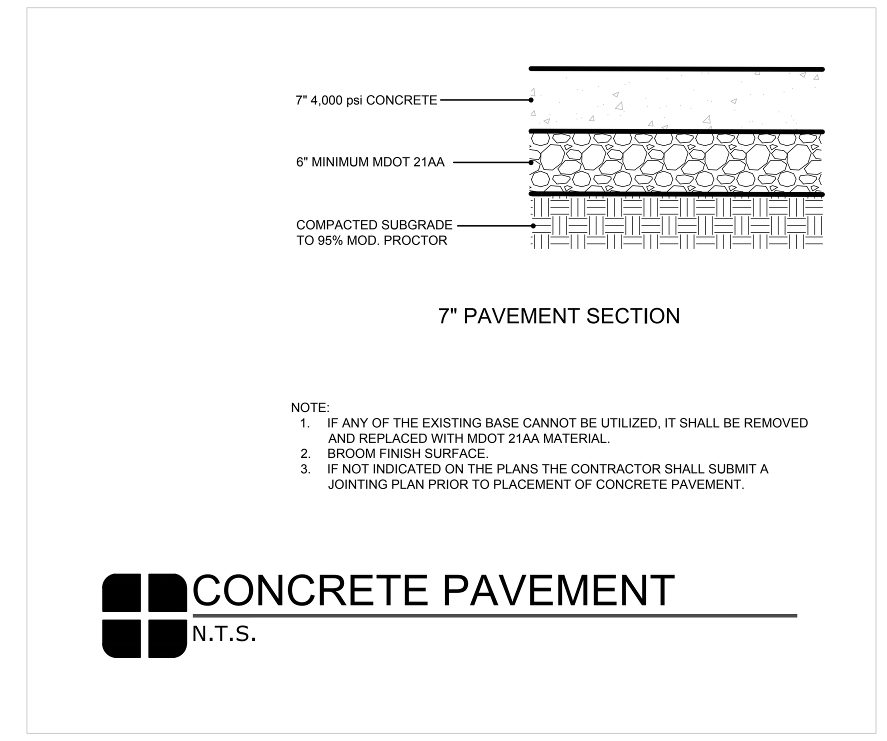
APPENDIX A – Cluster Box Unit Installation Single Unit





TYPICAL 6' HIGH VINYL FENCE IMAGE

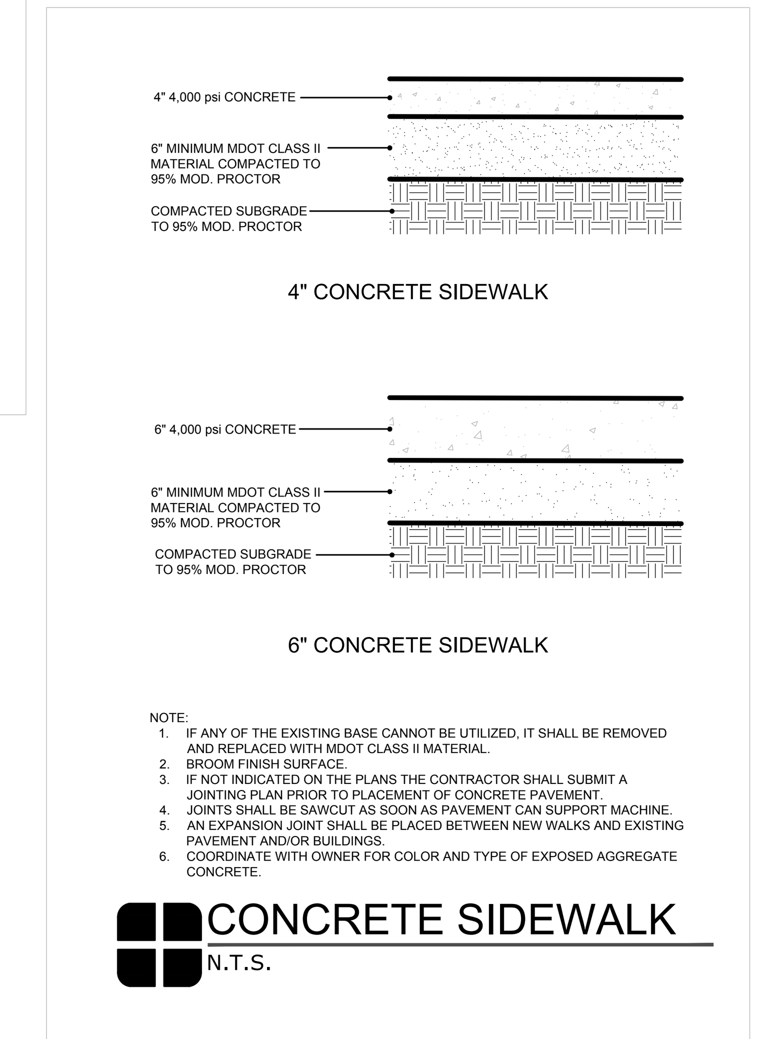




NOTE:
1. IF ANY OF THE EXISTING BASE CANNOT BE UTILIZED, IT SHALL BE REMOVED AND REPLACED WITH MDOT 21AA MATERIAL.
2. BROOM FINISH SURFACE.
3. IF NOT INDICATED ON THE PLANS THE CONTRACTOR SHALL SUBMIT A JOINTING PLAN PRIOR TO PLACEMENT OF CONCRETE PAVEMENT.

CONCRETE PAVEMENT

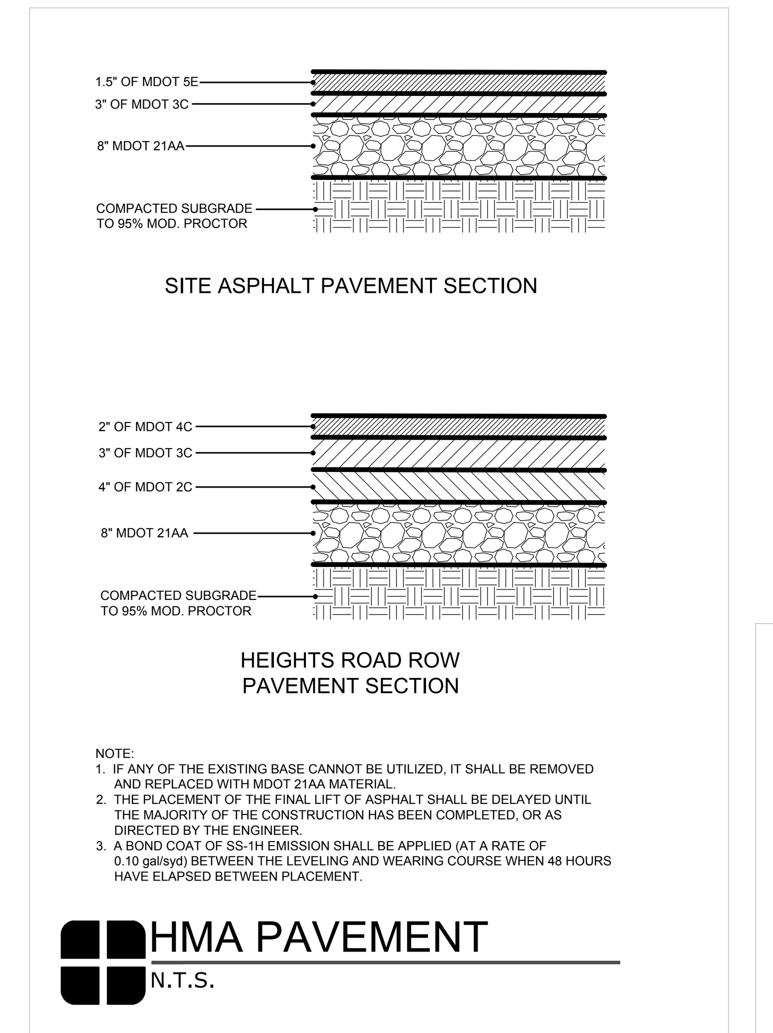
N.T.S.



NOTE:
1. IF ANY OF THE EXISTING BASE CANNOT BE UTILIZED, IT SHALL BE REMOVED AND REPLACED WITH MDOT CLASS II MATERIAL.
2. BROOM FINISH SURFACE.
3. IF NOT INDICATED ON THE PLANS THE CONTRACTOR SHALL SUBMIT A JOINTING PLAN PRIOR TO PLACEMENT OF CONCRETE PAVEMENT.
4. JOINTS SHALL BE SAWCUT AS SOON AS PAVEMENT CAN SUPPORT MACHINE.
5. AN EXPANSION JOINT SHALL BE PLACED BETWEEN NEW WALKS AND EXISTING PAVEMENT AND/OR BUILDINGS.
6. COORDINATE WITH OWNER FOR COLOR AND TYPE OF EXPOSED AGGREGATE CONCRETE.

CONCRETE SIDEWALK

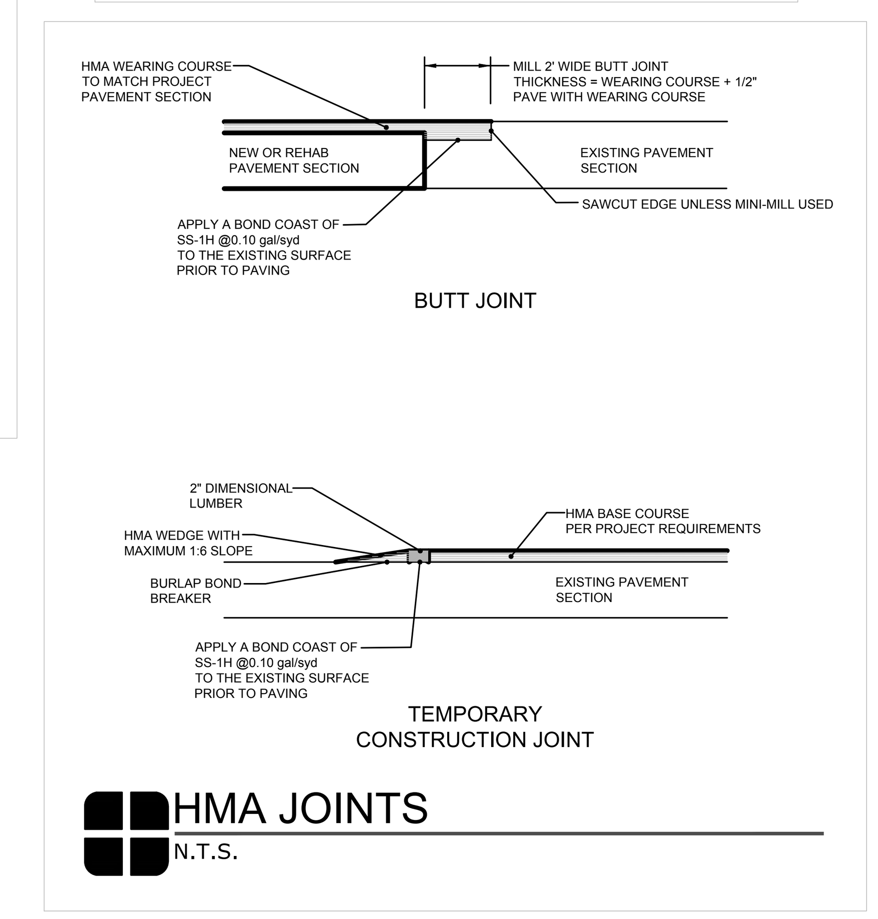
N.T.S.



NOTE:
1. IF ANY OF THE EXISTING BASE CANNOT BE UTILIZED, IT SHALL BE REMOVED AND REPLACED WITH MDOT 21AA MATERIAL.
2. THE PLACEMENT OF THE FINAL LIFT OF ASPHALT SHALL BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION HAS BEEN COMPLETED, OR AS DIRECTED BY THE ENGINEER.
3. A BOND COAT OF SS-1H EMISSION SHALL BE APPLIED (AT A RATE OF 0.10 gal/syd) BETWEEN THE LEVELING AND WEARING COURSE WHEN 48 HOURS HAVE ELAPSED BETWEEN PLACEMENT.

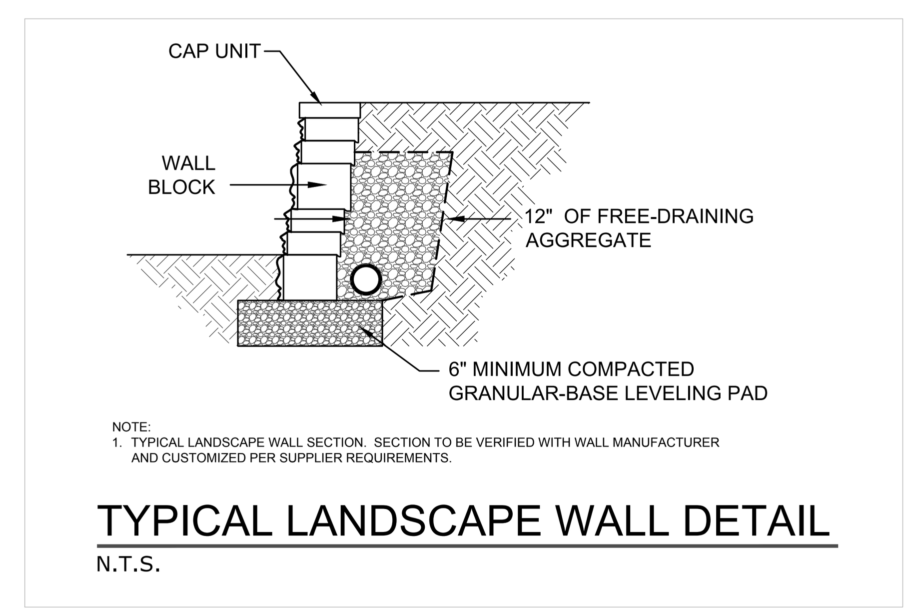
HMA PAVEMENT

N.T.S.



HMA JOINTS

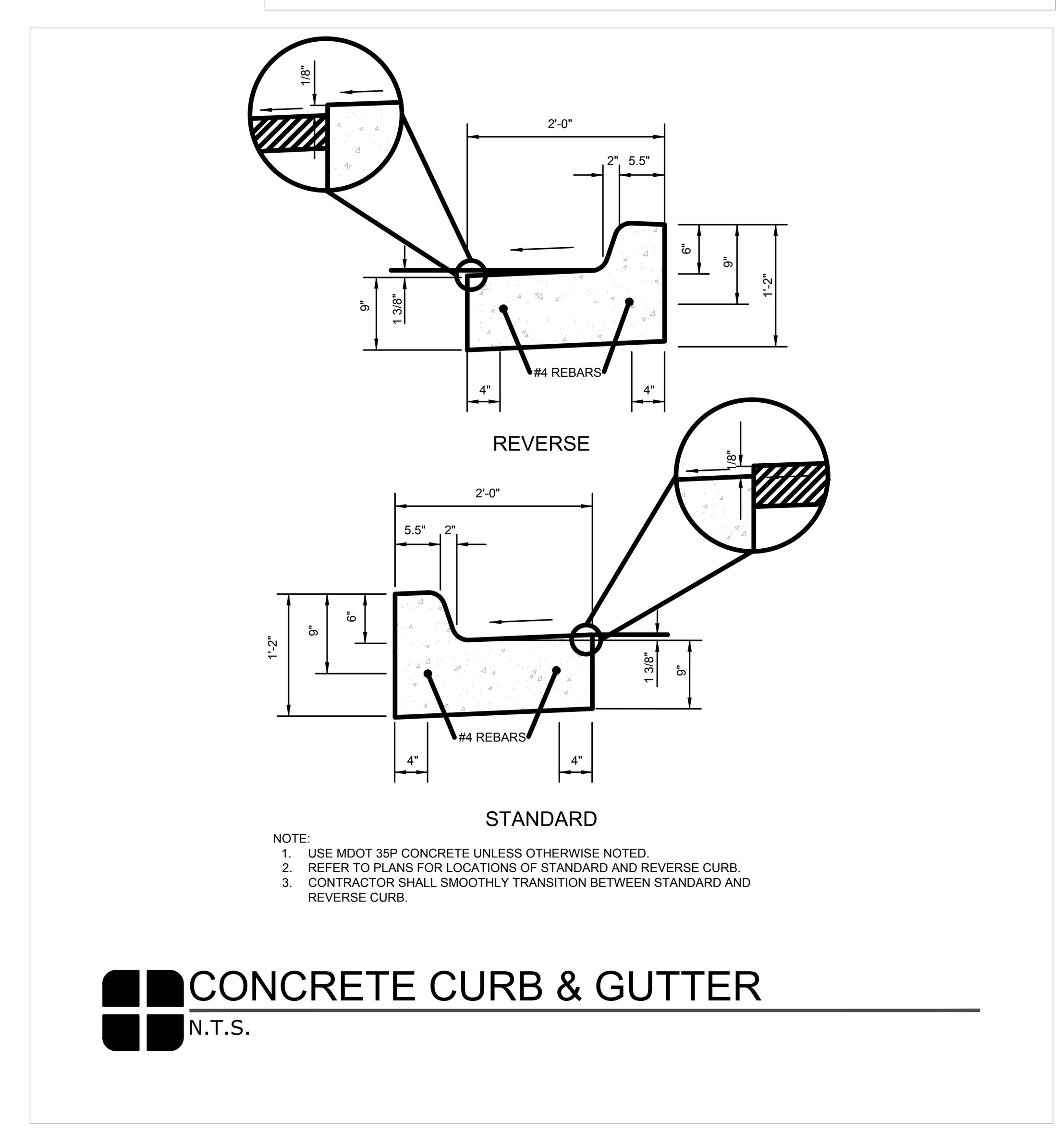
N.T.S.



NOTE:
1. TYPICAL LANDSCAPE WALL SECTION. SECTION TO BE VERIFIED WITH WALL MANUFACTURER AND CUSTOMIZED PER SUPPLIER REQUIREMENTS.

TYPICAL LANDSCAPE WALL DETAIL

N.T.S.



NOTE:
1. USE MDOT 35P CONCRETE UNLESS OTHERWISE NOTED.
2. REFER TO PLANS FOR LOCATIONS OF STANDARD AND REVERSE CURB.
3. CONTRACTOR SHALL SMOOTHLY TRANSITION BETWEEN STANDARD AND REVERSE CURB.

CONCRETE CURB & GUTTER

N.T.S.

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Manager:	NS
Designer:	-
Quality Control:	MP
Section:	11
	T-04-N R-10-E

Professional Seal:

811 Know what's below. Call before you dig.

DATE:	ISSUE:
07.13.2022	SUBMIT FOR SITE PLAN APPROVAL
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08.09.2022	REVISED FOR SITE PLAN APPROVAL
09.01.2022	REVISED FOR SITE PLAN APPROVAL
09.12.2022	REVISED STORM FOR SITE PLAN APPROVAL
09.21.2022	REVISED PER PLANNER/ENGINEER MEETING

Developed For:

MOCERI COMPANIES
3500 UNIVERSITY DRIVE
AUBURN HILLS, MI
48326
248.340.9400

SITE NOTES AND DETAILS

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	NA
Sheet:	7
Project:	20107.10

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Attachment: 2022-09-30 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

H:\2020\20107\20107.10 Mystic Cove\Design\CAD\07 Site Notes and Details.dwg

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Detention Design

Project Name	Mystic Cove Heights/Broadway
Project Number	20107.10
Completed By	NMS
Working Date	09.09.2022
Jurisdiction	Oakland County

Site Weighted "C" Calculation

	Area (acres)	C	Area x C
Building Roofs	1.23	0.95	1.17
Pavement	0.10	0.95	0.10
Pervious Pavement	1.00	0.50	0.50
Lawn Areas	1.02	0.30	0.31
Total	3.35		2.07

C= Area x C / Area = 2.07 / 3.35 = **0.62**

Channel Protection Volume Control

The required Channel Protection Volume (VCP-R) is the post-development site runoff volume from a 1.3-inch rainfall event. CPVC also promotes groundwater recharge, stabilizes flow rates and baseflow in our natural watercourses, and addresses water quality control criteria (Total Suspended Solids).

C Factor = 0.62 Property Area = 2.57 acres

Req. Channel Protection Volume V_{CP-R} = 4,719 x A x C

= 4,719 x 2.57 x 0.62

= **7,492 cubic feet**

Channel Protection Rate Control: Extended Detention

Extended Detention is required for the site's post-development runoff volume from a 1.9-inch rainfall event. This **Extended Detention Volume (V_{ED})** shall be dewatered in not less than 48 hours.

C Factor = 0.62 Property Area = 2.57 acres

Extended Detention Volume V_{ED} = 6,897 x A x C

= 6,897 x 2.57 x 0.62

= **10,950 cubic feet**

Water Quality Control

Mechanical Separators: Mechanical separators designed for the required TSS removal at a **peak flow rate (Q_{WQ})** generated by a 1-year peak flow

Calculate Time of Concentration - Time required for water to travel from the hydraulically most reremote point of the drainage sub-area to a design point

Sheet Flow (no more than 300')

K = 0.48 S = 3.00 Slope of flow path in percent

Velocity of sheet flow, v_{sheet} = K x $S^{0.5}$

v_{sheet} = 0.48 x 3.00 $^{0.50}$

v_{sheet} = 0.83 ft/s

L = 300 ft Flow Length

Travel Time, T_{sheet} = L / (3,600 x v_{sheet})

T_{sheet} = 300 / (3,600 x 0.83)

T_{sheet} = 0.10 hours = 6.01 minutes

Waterway Flow - Swales or Shallow Drainage Course

K = 1.20 S = 1.00 Slope of flow path in percent

Velocity of waterway flow, $v_{waterway}$ = K x $S^{0.5}$

$v_{waterway}$ = 1.20 x 1.00 $^{0.50}$

$v_{waterway}$ = 1.20 ft/s

L = 70 ft Flow Length

Travel Time, $T_{waterway}$ = L / (3,600 x $v_{waterway}$)

$T_{waterway}$ = 70 / (3,600 x 1.20)

$T_{waterway}$ = 0.02 hours = 0.97 minutes

Pipe Flow

T_{Stpe} = 15.00 minutes (from pipe network calculations, subtract initial Tc (15 or 20 minutes) from ending Tc)

Time of Concentration T_C = T_{sheet} + $T_{waterway}$ + T_{Stpe}

T_C = 6.01 + 0.97 + 15.00

Time of Concentration T_C = 21.99 minutes

Peak Rainfall Intensity I_5 = 35.44 / (T_C + 9.17)$^{0.81}$

= 35.44 / (21.99 + 9.17)$^{0.81}$

= **2.19 inches / hour**

C Factor = 0.62 I_5 = 2.19 in/hr Property Area = 2.57 acres

Peak Flow Rate Q_{WQ} = C x I_5 x A

= 0.62 x 2.19 x 2.57

= **3.47 cfs**

Detention and Flood Control

The allowable 100-year post-development peak flow rate (Q_{100P}) shall be approved by the OCWRC office on a case-by-case basis and will be calculated one of two ways: 1. Using the Variable Release Rate (see equations below), 2. County-determined peak flow rate based on a documented County Drain flow capacity or other known downstream. Prior to commencing with site plan design, contact the OCWRC Permitting Department to confirm which of the above methods is more restrictive and will apply to your site.

The **variable release rate (cfs/acre)** is capped at 1.0 cfs/acre for developments 2 acres or less. For all developments equal to or greater than 100 acres, the variable release rate is 0.15 cfs/acre.

Property Area = 2.57 acres

CHECK: 2.57 < 2 acres ? **Q_{ARR} = 1.0 cfs / acre**

CHECK: 2.57 >= 100 acres ? **Q_{ARR} = 0.15 cfs / acre**

Variable Release Rate Q_{ARR} = 1.1055 - 0.206 x ln(A)

= 1.1055 - 0.206 x ln(2.57)

= **0.91 cfs / acre**

Property Area = 2.57 acres

Allowable 100-year Post Development Peak Flow Rate: Q_{100P} = Q_{ARR} x A

Q_{100P} = (Q_{ARR}) x 2.57

Q_{100P} = 2.34 cfs

C Factor = 0.62 Property Area = 2.57 acres

100-year Runoff Volume V_{100R} = 18,895 x C x A

= 18,895 x 0.62 x 2.57

= **29,999 cubic feet**

Time of Concentration T_C = 21.99 minutes

100-year Peak Rainfall Intensity I_{100} = 83.3 / (T_C + 9.17)$^{0.81}$

= 83.3 / (21.99 + 9.17)$^{0.81}$

= **5.14 inches / hour**

C Factor = 0.62 I_{100} = 5.14 in/hr Property Area = 2.57 acres

100-year Peak Inflow Rate Q_{100IN} = C x I_{100} x A

= 0.62 x 5.14 x 2.57

= **8.16 cfs**

Q_{100P} = 2.34 cfs Q_{100IN} = 8.16 cfs

Storage Curve Factor R = [0.206 - 0.15ln (Q100P / Q100IN)]

= [0.206 - 0.15ln (2.34 / 8.16)]

= **0.39**

V_{100R} = 29,999 cubic feet R = 0.39 V_{CP-R} = 0 cubic feet **(provided CVPC volume)**

Required 100-year Detention Volume V_{ARR} = (V_{100R} x R) - V_{CP-R}

= (29,999 x 0.39) - 0

= **11,797 cubic feet**

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Detention Design

Project Name	Mystic Cove Heights Road
Project Number	20107.10
Completed By	NMS
Working Date	09.09.2022
Jurisdiction	Oakland County

Site Weighted "C" Calculation

	Area (acres)	C	Area x C
Building Roofs	1.23	0.95	1.17
Pavement	0.10	0.95	0.10
Pervious Pavement	1.00	0.50	0.50
Lawn Areas	1.02	0.30	0.31
Total	3.35		2.07

C= Area x C / Area = 2.07 / 3.35 = **0.62**

Channel Protection Volume Control

The required Channel Protection Volume (VCP-R) is the post-development site runoff volume from a 1.3-inch rainfall event. CPVC also promotes groundwater recharge, stabilizes flow rates and baseflow in our natural watercourses, and addresses water quality control criteria (Total Suspended Solids).

C Factor = 0.62 Property Area = 0.78 acres

Req. Channel Protection Volume V_{CP-R} = 4,719 x A x C

= 4,719 x 0.78 x 0.62

= **2,274 cubic feet**

Channel Protection Rate Control: Extended Detention

Extended Detention is required for the site's post-development runoff volume from a 1.9-inch rainfall event. This **Extended Detention Volume (V_{ED})** shall be dewatered in not less than 48 hours.

C Factor = 0.62 Property Area = 0.78 acres

Extended Detention Volume V_{ED} = 6,897 x A x C

= 6,897 x 0.78 x 0.62

= **3,323 cubic feet**

Water Quality Control

Mechanical Separators: Mechanical separators designed for the required TSS removal at a **peak flow rate (Q_{WQ})** generated by a 1-year peak flow

Calculate Time of Concentration - Time required for water to travel from the hydraulically most reremote point of the drainage sub-area to a design point

Sheet Flow (no more than 300')

K = 0.48 S = 3.00 Slope of flow path in percent

Velocity of sheet flow, v_{sheet} = K x $S^{0.5}$

v_{sheet} = 0.48 x 3.00 $^{0.50}$

v_{sheet} = 0.83 ft/s

L = 300 ft Flow Length

Travel Time, T_{sheet} = L / (3,600 x v_{sheet})

T_{sheet} = 300 / (3,600 x 0.83)

T_{sheet} = 0.10 hours = 6.01 minutes

Waterway Flow - Swales or Shallow Drainage Course

K = 1.20 S = 1.00 Slope of flow path in percent

Velocity of waterway flow, $v_{waterway}$ = K x $S^{0.5}$

$v_{waterway}$ = 1.20 x 1.00 $^{0.50}$

$v_{waterway}$ = 1.20 ft/s

L = 70 ft Flow Length

Travel Time, $T_{waterway}$ = L / (3,600 x $v_{waterway}$)

$T_{waterway}$ = 70 / (3,600 x 1.20)

$T_{waterway}$ = 0.02 hours = 0.97 minutes

Pipe Flow

T_{Stpe} = 15.00 minutes (from pipe network calculations, subtract initial Tc (15 or 20 minutes) from ending Tc)

Time of Concentration T_C = T_{sheet} + $T_{waterway}$ + T_{Stpe}

T_C = 6.01 + 0.97 + 15.00

Time of Concentration T_C = 21.99 minutes

Peak Rainfall Intensity I_5 = 35.44 / (T_C + 9.17)$^{0.81}$

= 35.44 / (21.99 + 9.17)$^{0.81}$

= **2.19 inches / hour**

C Factor = 0.62 I_5 = 2.19 in/hr Property Area = 0.78 acres

Peak Flow Rate Q_{WQ} = C x I_5 x A

= 0.62 x 2.19 x 0.78

= **1.05 cfs**

Detention and Flood Control

The allowable 100-year post-development peak flow rate (Q_{100P}) shall be approved by the OCWRC office on a case-by-case basis and will be calculated one of two ways: 1. Using the Variable Release Rate (see equations below), 2. County-determined peak flow rate based on a documented County Drain flow capacity or other known downstream. Prior to commencing with site plan design, contact the OCWRC Permitting Department to confirm which of the above methods is more restrictive and will apply to your site.

The **variable release rate (cfs/acre)** is capped at 1.0 cfs/acre for developments 2 acres or less. For all developments equal to or greater than 100 acres, the variable release rate is 0.15 cfs/acre.

Property Area = 0.78 acres

CHECK: 0.78 < 2 acres ? **Q_{ARR} = 1.0 cfs / acre**

CHECK: 0.78 >= 100 acres ? **Q_{ARR} = 0.15 cfs / acre**

Variable Release Rate Q_{ARR} = 1.1055 - 0.206 x ln(A)

= 1.1055 - 0.206 x ln(0.78)

= **1.16 cfs / acre**

Property Area = 0.78 acres

Allowable 100-year Post Development Peak Flow Rate: Q_{100P} = Q_{ARR} x A

Q_{100P} = (Q_{ARR}) x 0.78

Q_{100P} = 0.90 cfs

C Factor = 0.62 Property Area = 0.78 acres

100-year Runoff Volume V_{100R} = 18,895 x C x A

= 18,895 x 0.62 x 0.78

= **9,105 cubic feet**

Time of Concentration T_C = 21.99 minutes

100-year Peak Rainfall Intensity I_{100} = 83.3 / (T_C + 9.17)$^{0.81}$

= 83.3 / (21.99 + 9.17)$^{0.81}$

= **5.14 inches / hour**

C Factor = 0.62 I_{100} = 5.14 in/hr Property Area = 0.78 acres

100-year Peak Inflow Rate Q_{100IN} = C x I_{100} x A

= 0.62 x 5.14 x 0.78

= **2.48 cfs**

Q_{100P} = 0.90 cfs Q_{100IN} = 2.48 cfs

Storage Curve Factor R = [0.206 - 0.15ln (Q100P / Q100IN)]

= [0.206 - 0.15ln (0.90 / 2.48)]

= **0.36**

V_{100R} = 9,105 cubic feet R = 0.36 V_{CP-R} = 0 cubic feet **(provided CVPC volume)**

Required 100-year Detention Volume V_{ARR} = (V_{100R} x R) - V_{CP-R}

= (9,105 x 0.36) - 0

= **3,254 cubic feet**

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Manager:	NS
Designer:	-
Quality Control:	MP
Section:	11
	T-04-N R-10-E

Professional Seal:

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09.01.2022	REVISED FOR SITE PLAN APPROVAL
09.12.2022	REVISED STORM FOR SITE PLAN APPROVAL

Developed For:

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AUBURN HILLS, MI
48326

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STORMWATER MANAGEMENT CALCULATIONS

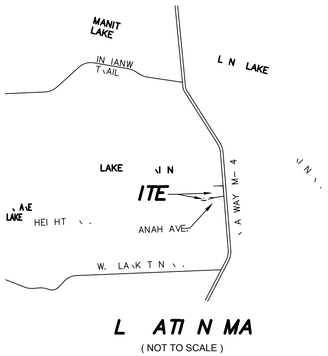
MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

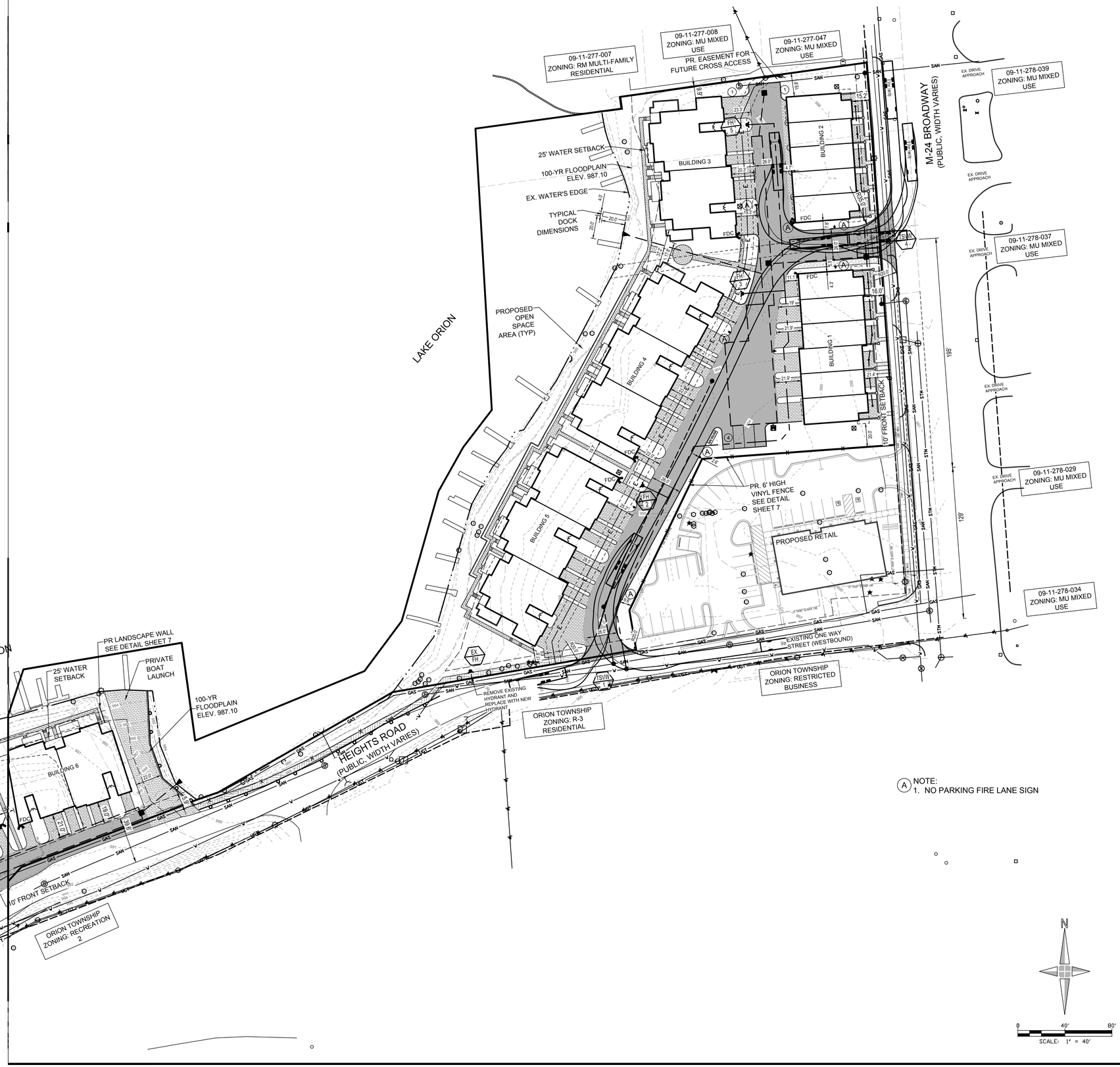
Date:	03.16.2022
Scale:	NA
Sheet:	7A
Project:	20107.10

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Attachment: 2022-09-30 Mystic PC Set (5448 : Mocerl Mystic Cove Redevelopment)



(NOT TO SCALE)



(A) NOTE:
1. NO PARKING FIRE LANE SIGN

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48326

248.340.9400

FIRE PROTECTION PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	8
Project:	20107.10

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H:\20\20100\20107.10 Mystic Cove\Design\CAD\08 Fire Protection Plan.dwg

Attachment: 2022-09-30 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

PLANT LIST: XXX / X

PERENNIALS:

NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
40	SWEET KATE SPIDERWORT	TRADESCANTIA X SWEET KATE	1 GAL. POT	SPI
424	HORSETAIL GRASS	EQUISETUM HYEMALE	1 GAL. POT	HTG
30	JAPANESE IRIS	IRIS ENSATA	1 GAL. POT	IRS
220	SILVER DRAGON LIRIOPE	LIRIOPE SPICATA SILVER DRAGON	1 GAL. POT	LIR
28	STARRY STARRY NIGHT HIBISCUS	HIBISCUS STARRY STARRY NIGHT	1 GAL. POT	HYB
48	MILLENNIUM ALLIUM	ALLIUM 'MILLENNIUM'	1 GAL. POT	ALI
73	OVERDAM FEATHER REED GRASS	CALAMAGROSTIS X ACUTIFLORA OVERDAM	3 GAL. POT	OFR
761	ORCHID FROST LAMIUM	LAMIUM MACULATUM ORCHID FROST PPAF11122	1 GAL. POT	LAM
38	MONTROSE WHITE CALAMINT	CALAMINTHA NEPETA MONTROSE WHITE	2 GAL. POT	WHT
116	PURRSIAN BLUE CATMINT	NEPETA FAASSENII 'PURRSIAN BLUE'	2 GAL. POT	CAT
19	CRYSTAL BLUE SALVIA	SALVIA NEMOROSA 'CRYSTAL BLUE'	1 GAL. POT	SLC
19	MOULIN ROUGE SALVIA	SALVIA PRATENSIS 'MOULIN ROUGE'	1 GAL. POT	SLM
12	DELICIOUS CANDY CONEFLOWER	ECHINACEA 'DELICIOUS CANDY'	1 GAL. POT	GBS
41	ENCORE MAIDEN GRASS	MISCANTHUS SINENSIS 'ENCORE'	3 GAL. POT	MEG

SHRUBS:

NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
151	FINE LINE	RHAMNUS FRANGULA	5-6' HT. B&B	FLN
57	SPRINTER BOXWOOD	BUXUS MICROPHYLLA 'BULTHOUSE' PP25896	30" DIA. B&B	BOX
3	GOLDEN PACIFIC JUNIPER	JUNIPERUS CONFERTA GOLDEN PACIFIC	3 GAL. POT	JUN
18	SKYROCKET JUNIPERS	JUNIPERUS SCOPULORUM 'SKYROCKET'	4-5' HT. B&B	SKY
103	TAYLOR JUNIPER	JUNIPERUS VIRGINIANA 'TAYLOR'	6' HT. B&B	ITL

TREES:

NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
13	CUPRESSINA NORWAY SPRUCE	PICEA ABIES CUPRESSINA	8' HT. B&B	NS
18	GREEN GIANT ARBORVITAE	THUJA PLICATA 'GREEN GIANT'	8' HT. B&B	GG
12	BALDCYPRESS	TAXODIUM DISTICHUM	8' HT. B&B	BS
25	CRIMSON SPIRE OAK	QUERCUS X CRIMSCHMIDT PP#9103	3" CAL. B&B	OK
2	LONDON PLANE TREE	PLATANUS X ACERIFOLIA	3" CAL. B&B	LP
2	ROYAL FROST BIRCH	BETULA X ROYAL FROST	3" CAL. B&B	RF
28	PARKLAND PILLAR BIRCH	BETULA PLATYPHYLLA 'JEFPARK' PP25468	3" CAL. B&B	WB
16	ARNOLD TULIP TREE	LIRIODENDRON TULIPIFERA 'ARNOLD'	3" CAL. B&B	TU
1	BLACK GUM	NYSSA SYLVATICA	3" CAL. B&B	BG
10	RIVER BIRCH	BETULA NIGRA	3" CAL. B&B	RB
7	JAPANESE TREE LILAC	SYRINGA RETICULATA	2" CAL. B&B	JL



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	T-04-N R-10-E

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09.01.2022	REVISED FOR SITE PLAN APPROVAL

Developed For:

MOCERI COMPANIES

3500 UNIVERSITY DRIVE
AUBURN HILLS, MI
48326

248.340.9400

LANDSCAPE PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	L1
Project:	20107.10

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Attachment: 2022-09-30 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

PLANT NOTES:

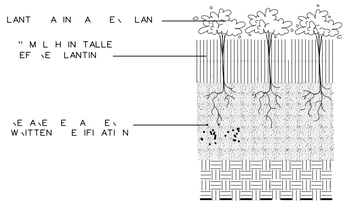
1. Plant materials shall be sound, healthy vigorous, free from plant diseases and insects or their eggs, and shall have normal, healthy root systems. Caliper measurements shall be taken 6: above the ground level. All other measurements shall be in accordance with the latest edition of "American Standard for Nursery Stock" (ANSI Z-60.1 + A3002004.)
2. Planting bed soil for annuals shall be screened topsoil. To deter weed growth during the establishment of annual, & perennial bed, apply a pre-emergent (Preen' or equal) after planting 2-3 times per growing season, at a rate per recommendation of product manufacturer.
3. Planting pockets shall be no deeper than the height of the root ball, saucer shall be made on the edges of the plant pocket.
4. All tree wrap shall be removed upon planting.
5. Mulch shall be shredded hardwood bark, free from deleterious materials and suitable as a top dressing of planting beds and individual tree plantings.
6. Trees shall be mulched with minimum of 3" deep hardwood bark mulch.
7. Grass seed shall be certified turf grass seed complying with A.S.P.A. specifications, and free of weed seeds and undesirable native grasses. Seeded areas shall not be permitted to dry out. All lawn areas shall be fertilized and watered as required during the first growing season to maintain a dense and vigorous growing lawn.
8. Plants shall be guaranteed for two complete growing seasons (24 months). Dead material shall be replaced as needed prior to the expiration of the guarantee period, in accordance with the local ordinance requirements.
9. Contractor shall provide in writing a list of recommended maintenance procedures for the first two (2) growing seasons.
10. Remove top ⅓ of burlap on root ball or all if wrapped in plastic covering and/or nylon cord.
11. Plant materials shall be used in compliance with the provisions of the local ordinance and shall be nursery grown, free of pests and diseases, hardy in this county, in conformance with the standards of the American Association of Nurserymen, and shall have passed inspections required under state regulations. In addition, plant materials shall conform to the standard of the county cooperative extension service.

GENERAL NOTES:

1. All Construction shall conform to the current standards and specifications of local ordinances.
2. All areas not built, landscaped, or paved upon shall be seeded or sodded. Terra seed system or approved equal is encouraged.
3. Contractor to provide tree gaters, one per tree as shown on plan, to convey water for the first two years.
4. Two (2) year guarantee period begins at Final Inspection of landscape material by the City's representative, a landscape architect or nurseryman, and prior to the authorization of the occupancy permit. This is the first of two (1 of 2) required City inspections of the Landscape Plan installation.
5. Building Department will not release construction bonds until City approved landscape architect or nurseryman has inspected the site and approved the installation of landscape plans. Final bond will not be released until the two (2) year guarantee expires and final inspection is made.
6. Owner is then responsible for care and maintenance of all plants upon return of bonds. All plant material is to be maintained for the natural life of the plant. No removal of any plants material is permitted without replacement.

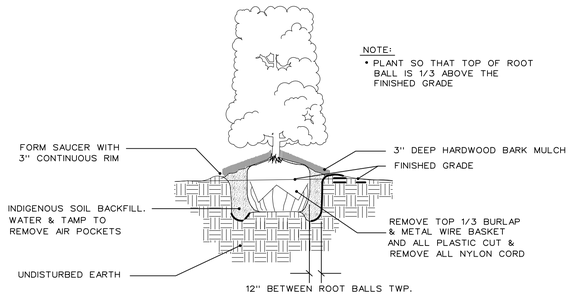
LANDSCAPE CONTRACTOR'S "TWO-YEAR IRRIGATION REQUIREMENT PERIOD"

It shall be the responsibility of the landscape contractor to program and periodically adjust the irrigation system (provided by others) as required to ensure delivery of proper and adequate water supply to all plant material, and seeded lawn areas serviced by the same irrigation system, to ensure the establishment of healthy plant material and lawn for their first year of growth. Following the landscape contractor's two-year irrigation requirement period, the contractor shall provide the owner with suggested irrigation maintenance schedule for their use.



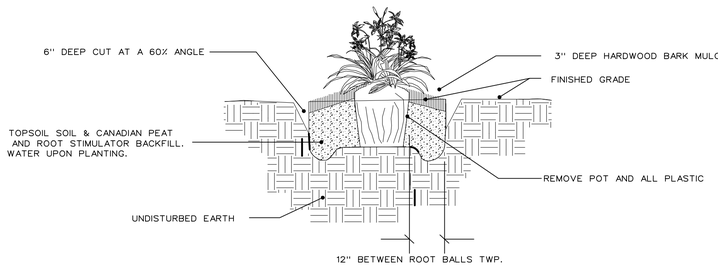
GROUNDCOVER PLANTING DETAIL

N ALE



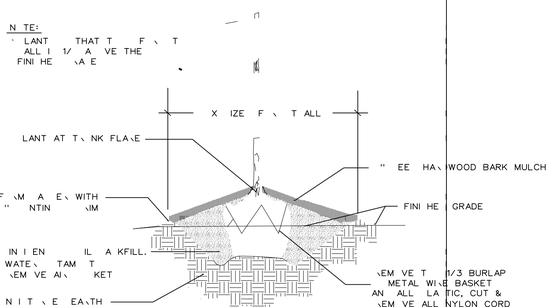
SHRUB HEDGE PLANTING DETAIL

NO SCALE



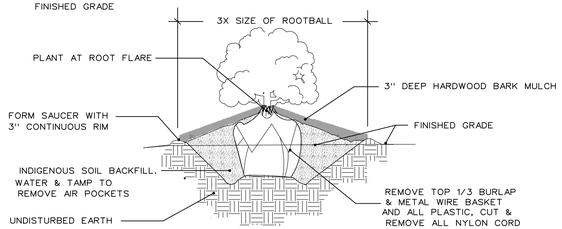
PERENNIAL PLANTING DETAIL

NO SCALE



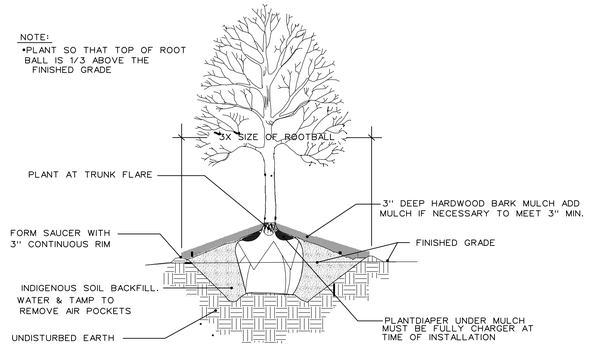
EVERGREEN TREE PLANTING DETAIL

N ALE



SHRUB PLANTING DETAIL

NO SCALE

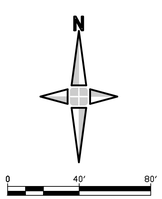


TREE / SHRUB PLANT DIAPER DETAIL

NO SCALE

LAWN SEED MIX:

30% PERENNIAL RYGRASS
20% PARK KENTUCKY BLUEGRASS
45% CREEPING RED FESCUE
5% ANNUAL RYEGRASS
4#/1000 S.F. SEEDING RATE



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	T-04-N R-10-E

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811 Know what's **below.** **Call** before you dig.

DATE:	ISSUE:
07.13.2022	SUBMIT FOR SITE PLAN APPROVAL
07.27.2022	REVISIONS PER FIRE MARSHAL REVIEW
08.09.2022	REVISIONS PER OWNER
08.09.2022	RESUBMIT FOR SITE PLAN APPROVAL

Developed For:

MOCERI COMPANIES

3500 UNIVERSITY DRIVE
AUBURN HILLS, MI
48326

248.340.9400

LANDSCAPE PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	L2
Project:	20107.10

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Attachment: 2022-09-30 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

H:\20\20100\20107.10 Mystic Cove\Design\CAD\Mystic Cove LANDSCAPE PLAN.dwg



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SITE RENDERING

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	NA
Sheet:	L3
Project:	20107.10

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Attachment: 2022-09-30 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)



Lighted Bollard



Pole Fixture



Wall Pack



Acorn Fixture per Village Requirements



Recessed Fixture (Balcony Lighting)

Schedule

Symbol	Label	Image	Quantity	Manufacturer	Catalog Number	Description	Plot	Wattage
	A		110	Wave Lighting		60 Watt Equivalent, A19 Screw Base Lamp, with clear frosted diffuser LED array, 4000K CCT	 Max: 1150cd	9.5
	B		11	Lithonia Lighting	MR2 LED 2 30A350/51K SR3 MVOLT HS	MR2 HOUSING WITH TWO TYPE 3 LIGHT ENGINES AT 350mA WITH HOUSE SIDE SHIELDS	 Max: 7018cd	226
	C		43	Lithonia Lighting	RADB LED P1 40K SYM DNAXD	RADB LED P1 40K SYM DNAXD	 Max: 3196cd	5.21
	D		3	American Electric Lighting	HTFL P10 XX 40K R5VC AP 8R	Hartsfield LED, P10, 4000K, Type 5 Visual Comfort, Polycarbonate 8" Refractor	 Max: 342cd	25.3
	E		48		A19-60W-P1-27K-E26-U1	60 Watt Equivalent, A19 Screw Base Lamp, with white opaque dome lens covering LED array, 2700K CCT	 Max: 1150cd	9.5

Mounting Height Note

Mounting height is measured from grade to face of fixture. Pole height should be calculated as the mounting height less base height.

General Note

The Engineer and/or Architect must determine applicability of the layout to existing/future field conditions. This lighting layout represents illumination levels calculated from laboratory date taken under controlled conditions in accordance with illuminating engineering society approved methods. Actual performance of any manufacturer's luminaire may vary due to cariation in electrical voltage, tolerance in lamps, and other variable field conditions. Mounting heights indicated are from grade and/or floor up.

These lighting calculations are not a substitute for independent engineering analysis of lighting system suitability and safety. The Engineer and/or Architect is responsible to review for Michigan Energy Code and Lighting Quality Compliance.

Unless exempt, project must comply with lighting controls requirements defined in ASHRAE 90.1 2013. For specific information contact GBA controls group at ASG@gasserbush.com OR 734-266-6705.

Ordering Note

For Inquiries Contact Gasser Bush at quotes@gasserbush.com.

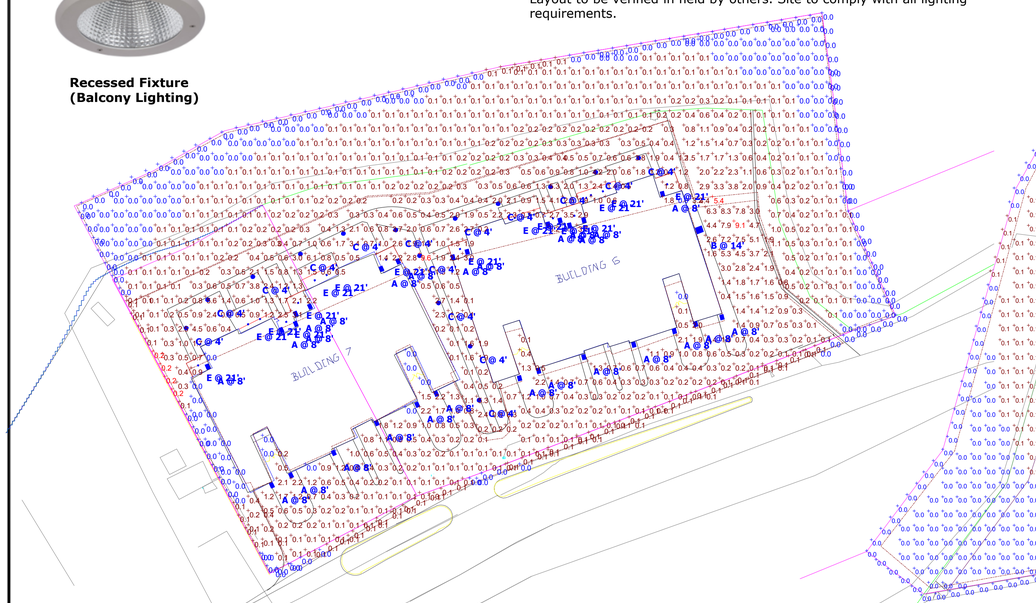
Drawing Note

This drawing was generated from an electroinc image for estimation purpose only. Layout to be verified in field by others. Site to comply with all lighting requirements.

Statistics

Description	Symbol	Avg	Max
East Lake Front	+	0.1 fc	0.9 fc
East Parking Areas	+	1.9 fc	9.8 fc
East Pedestrian Areas	+	1.2 fc	9.2 fc
Prop Line East	+	0.1 fc	0.5 fc
Prop Line West	+	0.0 fc	0.2 fc
West Lake Front	+	0.2 fc	5.4 fc
West Parking Areas	+	0.8 fc	9.1 fc
West Pedestrian Areas	+	1.2 fc	9.6 fc

Pedestrian Area Average: 1.2
Parking Area Average: 1.35



Plan View - A
Scale - 1" = 30ft



Plan View
Scale - 1" = 30ft

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LIGHTING PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	
Sheet:	LI-1
Project:	20107.10

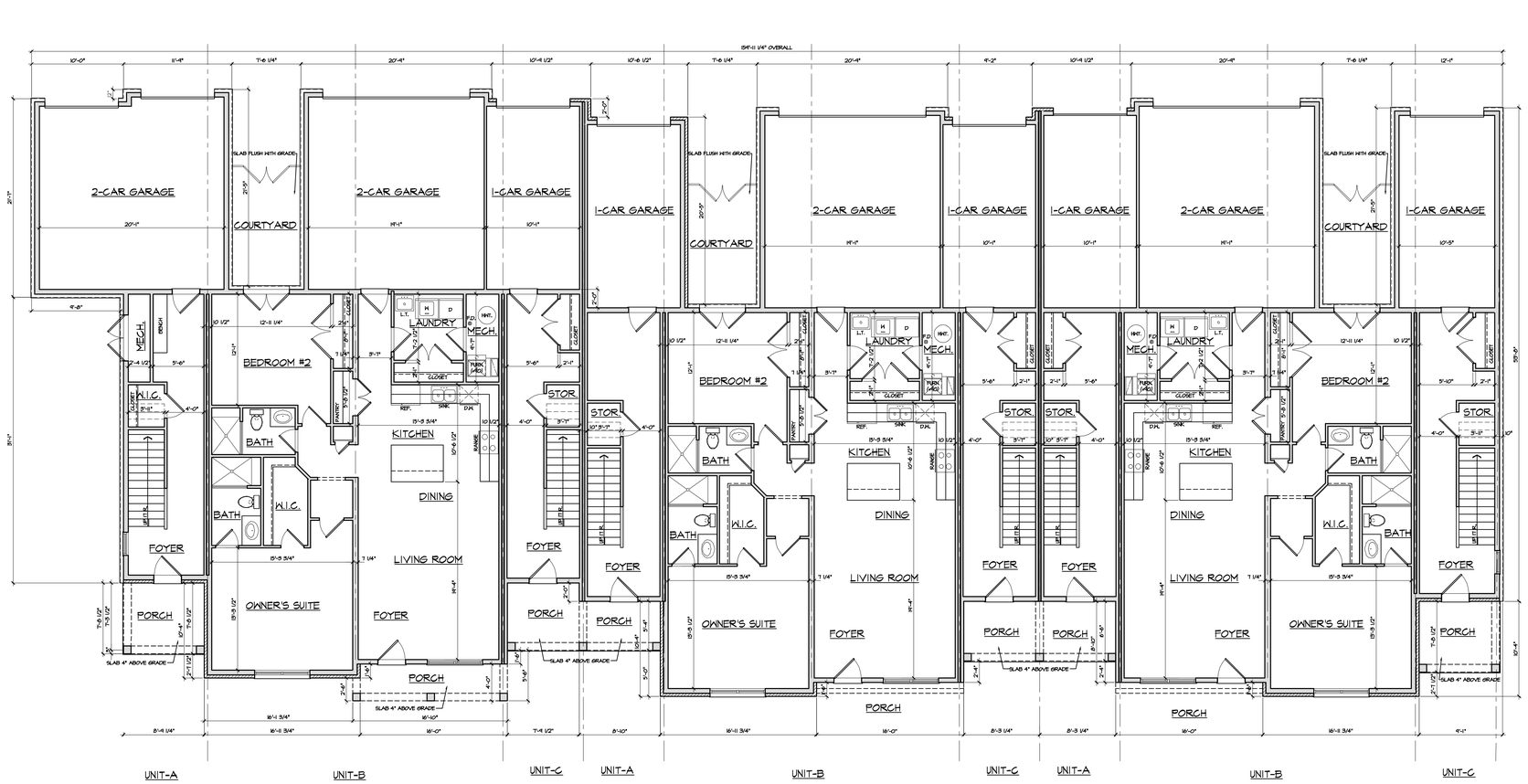
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FIRST FLOOR PLAN

SCALE: 3/16" = 1'-0"

BUILDING 4

UNIT-A
SQUARE FOOTAGE
1ST FLOOR = 303 SQUARE FEET
2ND FLOOR = 1175 SQUARE FEET
3RD FLOOR = 115 SQUARE FEET
TOTAL = 2642 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
1ST FLOOR = 1331 SQUARE FEET

UNIT-C
SQUARE FOOTAGE
1ST FLOOR = 279 SQUARE FEET
2ND FLOOR = 1163 SQUARE FEET
3RD FLOOR = 1150 SQUARE FEET
TOTAL = 2566 SQUARE FEET

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BUILDING #2

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Chkd:

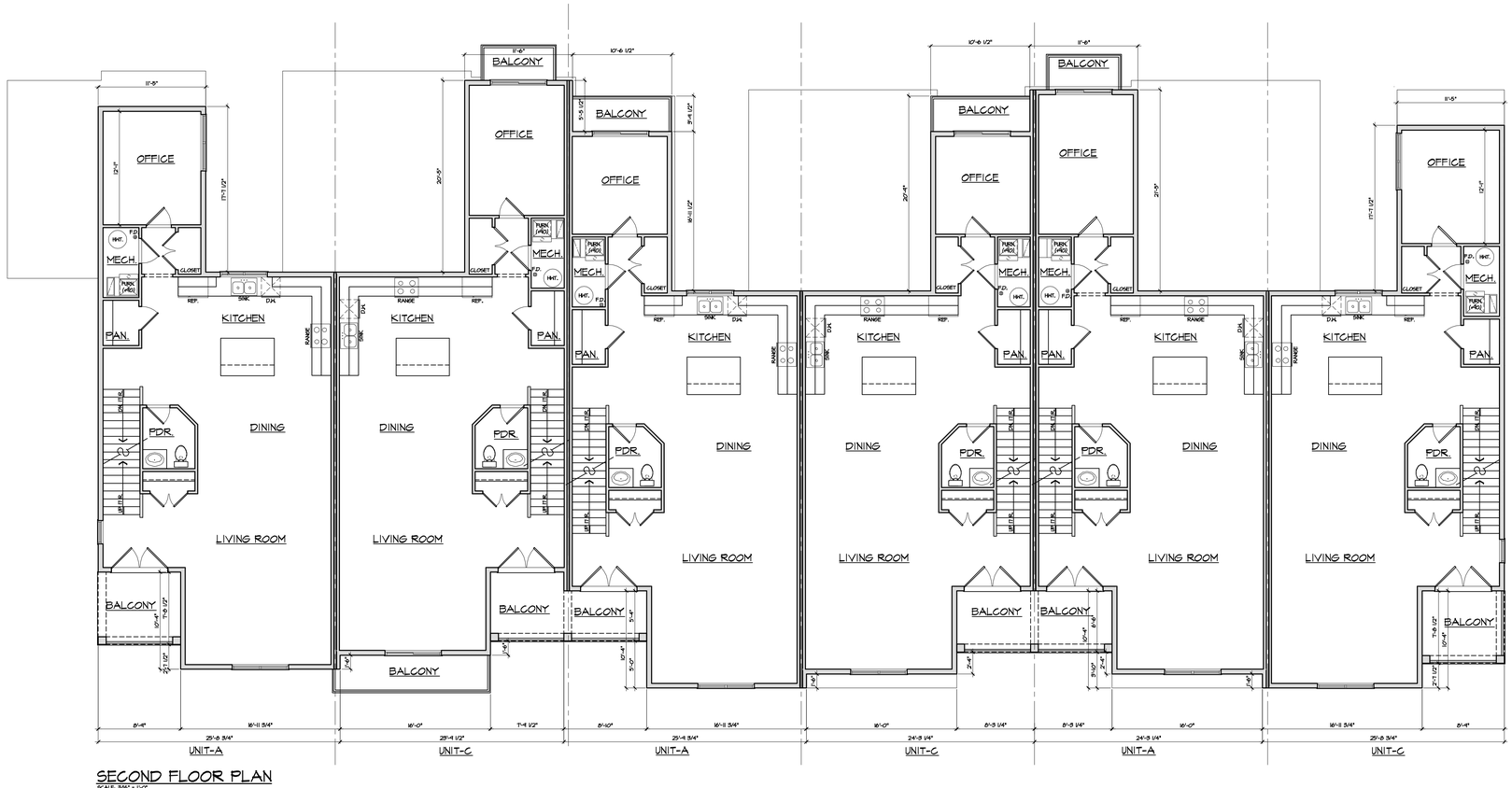
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SECOND FLOOR PLAN
SCALE: 3/16" = 1'-0"

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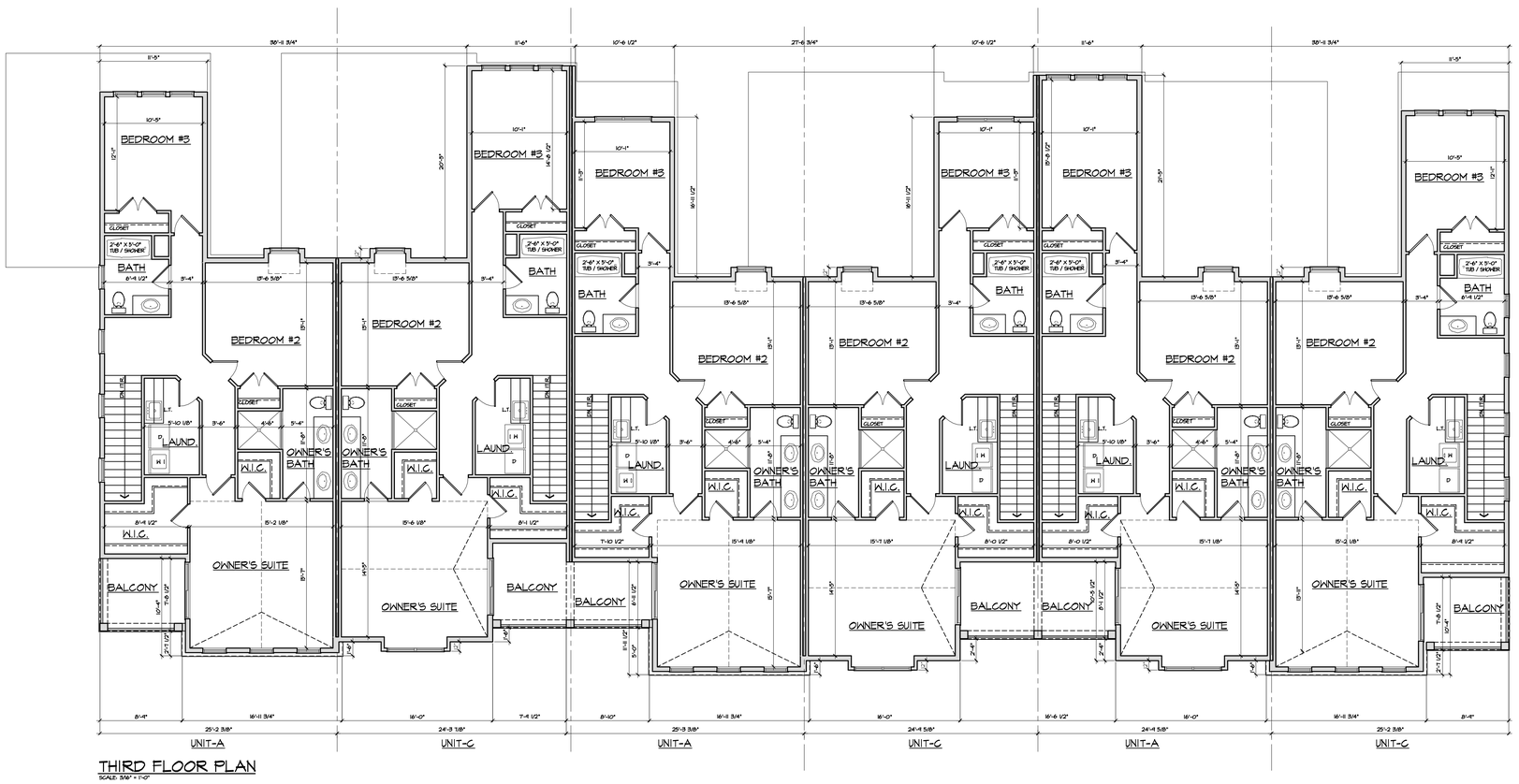
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THIRD FLOOR PLAN

SCALE: 3/16" = 1'-0"

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NORTH ELEVATION
SCALE: 3/16" = 1'-0"



SOUTH ELEVATION
SCALE: 3/16" = 1'-0"



EAST ELEVATION
SCALE: 3/16" = 1'-0"



WEST ELEVATION
SCALE: 3/16" = 1'-0"

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FLEX / LIVE WORK FLOOR PLAN

SCALE: 1/4" = 1'-0"

UNIT-A
SQUARE FOOTAGE
FLEX / LIVE WORK = 674 SQUARE FEET

1ST FLOOR = 1119 SQUARE FEET
2ND FLOOR = 1001 SQUARE FEET
TOTAL = 2120 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-A
SQUARE FOOTAGE
FLEX / LIVE WORK = 674 SQUARE FEET

1ST FLOOR = 1119 SQUARE FEET
2ND FLOOR = 1001 SQUARE FEET
TOTAL = 2120 SQUARE FEET

ALL WINDOW NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
2040-2 = 2'-0" X 4'-0", 2-WIDE WINDOW UNIT

ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
ALL FIRST FLOOR CEILING HEIGHTS TO BE 9'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

BUILDING 2

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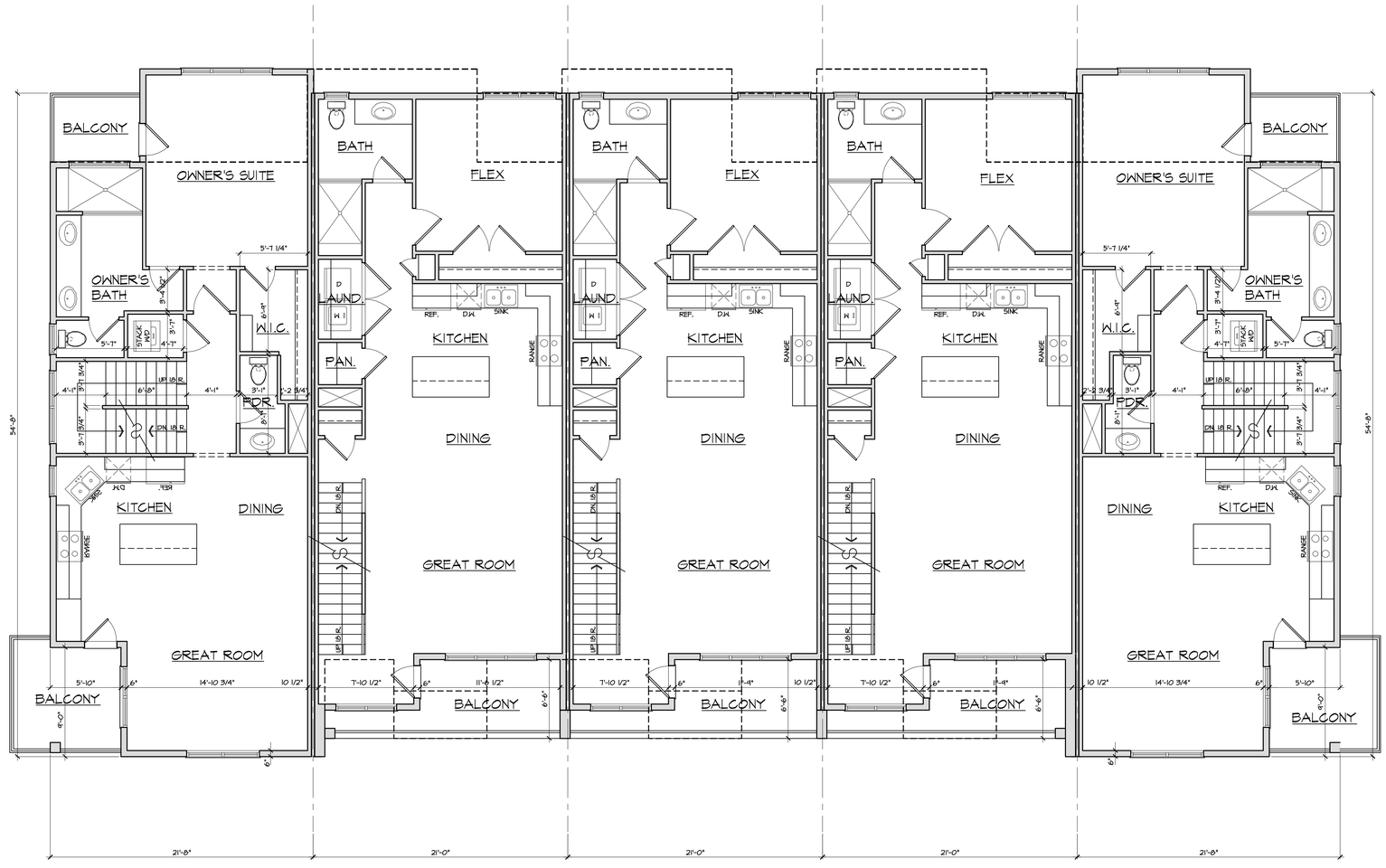
MOCERI CUSTOM HOMES
MYSTIC COVE
3-STORY / 5-PLEX
BUILDING #4

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FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

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EXAMPLE:
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ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
ALL SECOND FLOOR CEILING HEIGHTS TO BE 9'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

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SECOND FLOOR PLAN

SCALE: 1/4" = 1'-0"

ALL WINDOW NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
2040-2 = 2'-0" X 4'-0", 2-WIDE WINDOW UNIT

ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
ALL THIRD FLOOR CEILING HEIGHTS TO BE 8'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

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SOUTH ELEVATION

SCALE: 3/16" = 1'-0"



EAST ELEVATION

SCALE: 1/4" = 1'-0"

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NORTH ELEVATION

SCALE: 3/16" = 1'-0"



WEST ELEVATION

SCALE: 1/4" = 1'-0"

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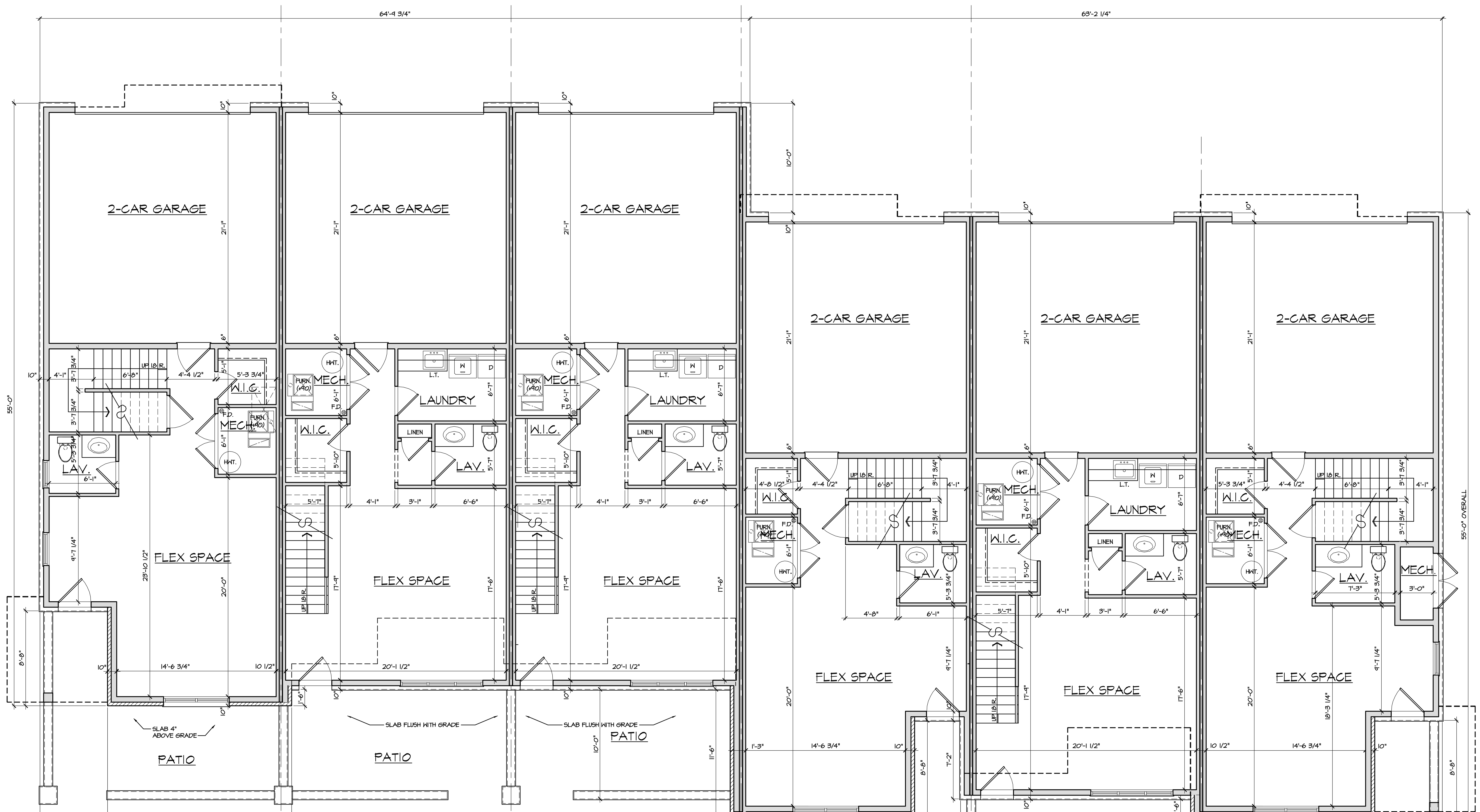
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FLEX / LIVE WORK FLOOR PLAN

SCALE: 1/4" = 1'-0"

UNIT-A
SQUARE FOOTAGE
FLEX / LIVE WORK = 674 SQUARE FEET

1ST FLOOR = 1119 SQUARE FEET
2ND FLOOR = 1001 SQUARE FEET
TOTAL = 2120 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-B
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FLEX / LIVE WORK = 663 SQUARE FEET

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UNIT-A
SQUARE FOOTAGE
FLEX / LIVE WORK = 674 SQUARE FEET

1ST FLOOR = 1119 SQUARE FEET
2ND FLOOR = 1001 SQUARE FEET
TOTAL = 2120 SQUARE FEET

ALL WINDOW NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
2040-2 = 2'-0" X 4'-0", 2-WIDE WINDOW UNIT

BUILDING 1

ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
ALL FIRST FLOOR CEILING HEIGHTS TO BE 9'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

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MYSTIC COVE
3-STORY / STAGGERED 6-PLEX
BUILDING #5

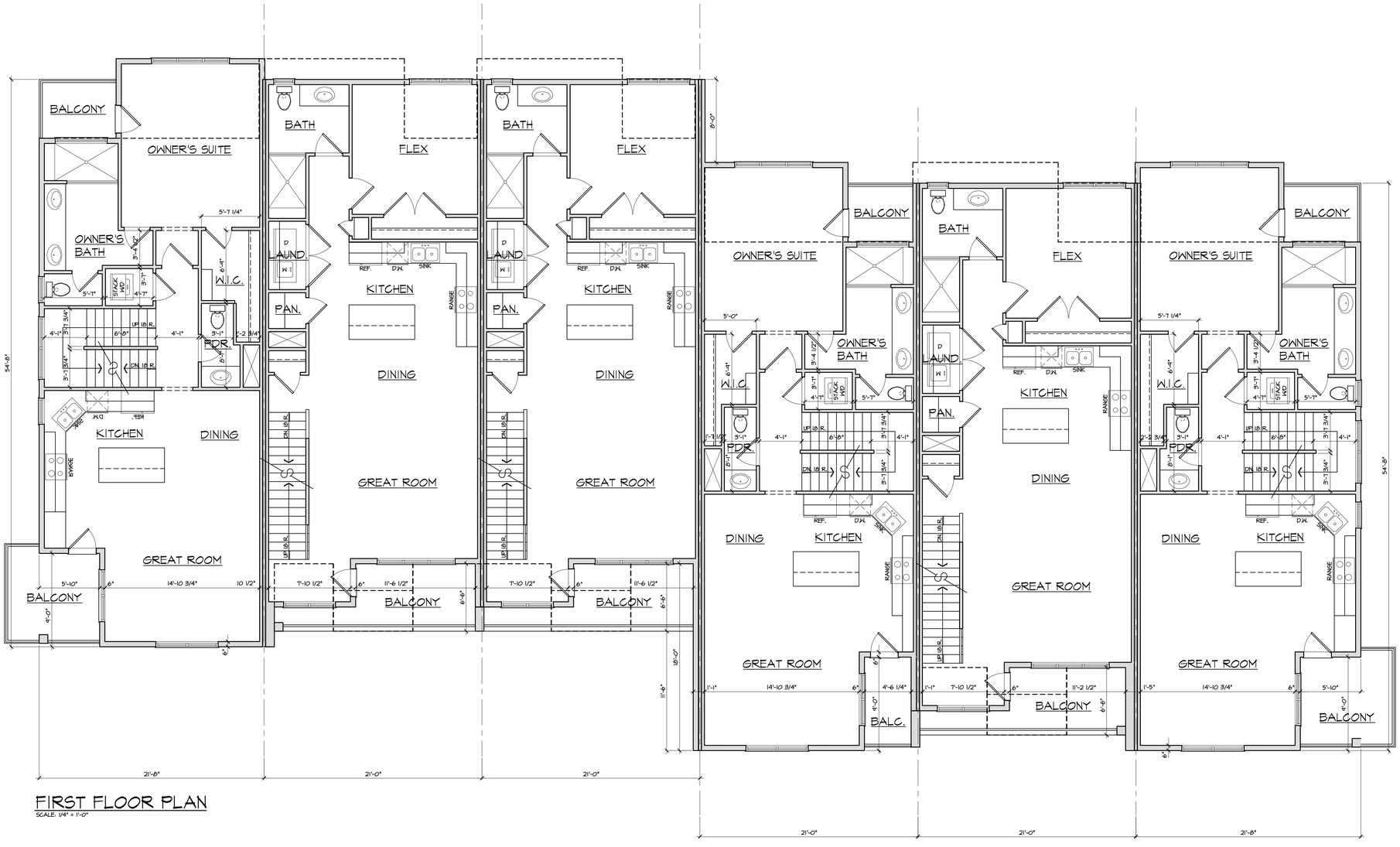
Review Set: 09/01/22
Permit:
Final Set:
Revisions:

Drwn: B.H.
Chkd:
Job No. 22067
Sheet No. 2 OF X

LIFESTYLE BY DESIGN

Attachment: 2022-09-30 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

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FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

ALL WINDOW NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
2040-2 = 2'-0" X 4'-0", 2-WIDE WINDOW UNIT

ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
ALL SECOND FLOOR CEILING HEIGHTS TO BE 9'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

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BUILDING #5

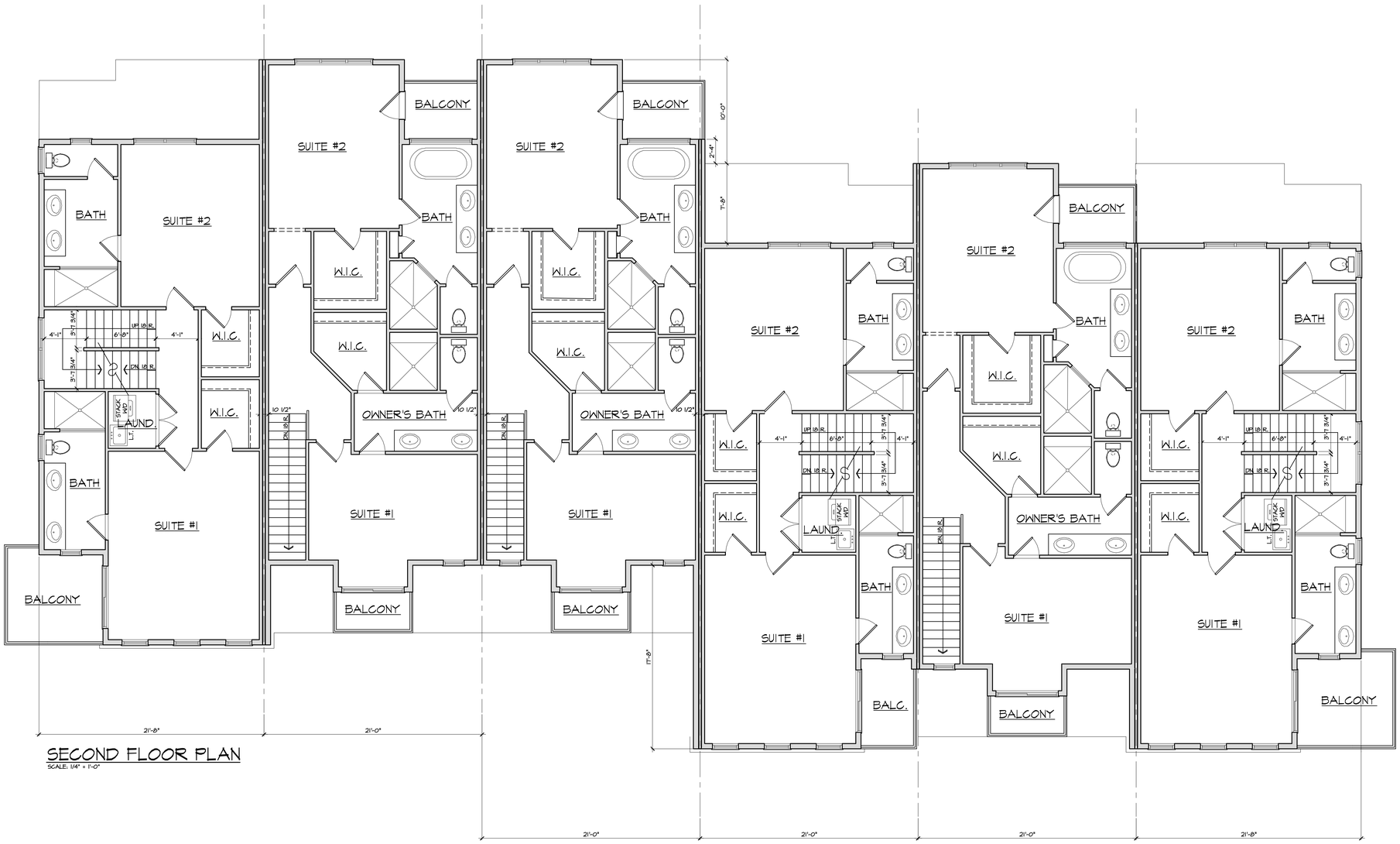
Review Set: 01/01/22
Permit:
Final Set:
Revisions:

Drwn: B.H.
Chkd:
Job No. 22067
Sheet No. 3 OF X

LIFESTYLE BY DESIGN

Attachment: 2022-09-30 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

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SECOND FLOOR PLAN

SCALE: 1/4" = 1'-0"

ALL WINDOW NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER) EXAMPLE: 2040-2 = 2'-0" X 4'-0", 2-WIDE WINDOW UNIT

ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER) EXAMPLE: 3080 = 3'-0" X 8'-0"

NOTE:
ALL THIRD FLOOR CEILING HEIGHTS TO BE 8'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

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BUILDING #5

Review Set: 04/01/22
Permit:
Final Set:
Revisions:

Drwn: B.H.
Chkd:
Job No. 22067
Sheet No. 4 OF X

LIFESTYLE BY DESIGN

Attachment: 2022-09-30 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

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SOUTH ELEVATION

SCALE: 3/16" = 1'-0"



EAST ELEVATION

SCALE: 1/4" = 1'-0"

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3-STORY / STAGGERED 6-PLEX
BUILDING #5

Review Set: 09/01/22
Permit:
Final Set:
Revisions:

Drwn: B.H.
Chkd:

Job No. 22067

Sheet No. 10 OF X

LIFESTYLE BY DESIGN

Attachment: 2022-09-39 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

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NORTH ELEVATION

SCALE: 3/16" = 1'-0"



WEST ELEVATION

SCALE: 1/4" = 1'-0"

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BUILDING #5

Review Set: 09/01/22
Permit:
Final Set:
Revisions:

Drwn: B.H.
Chkd:

Job No. 22067

Sheet No. 11 OF X

LIFESTYLE BY DESIGN

Attachment: 2022-09-39 Mystic PC Set (5448 : Moceri Mystic Cove Redevelopment)

From: Gough, Stacey (MDOT) <goughs@michigan.gov>
Sent: Monday, August 08, 2022 9:01 AM
To: Nancy Standish <nstandish@giffelswebster.com>
Cc: Dominic F. Moceri <DFM@moceri.com>; Dominic J. Moceri <Dominic@moceri.com>; Gough, Stacey (MDOT) <goughs@michigan.gov>; Thomas, Jesse (MDOT) <ThomasJ19@michigan.gov>; Jackson, Roderick (MDOT) <JacksonR3@michigan.gov>
Subject: RE: Mystic Cove - 63112-86096-22

** This email has been received from outside the organization – Think before clicking on links, opening attachments, or responding. **

Nancy,

I have communicated with Lori and MDOT finds the TIS and conceptual plan acceptable to MDOT for the residential drive approach.

Please upload a full set of plans to CPS for full permit review. Make sure you hit resubmit or I won't be notified.

Thanks,
Stacey

Stacey Gough
MDOT Oakland TSC
Utility & Permit Engineer
800 Vanguard Dr.
Pontiac, MI 48341
Cell - 248-895-2558

Attachment: Mystic Cove MDOT (5448 : Moceri Mystic Cove Redevelopment:)

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Dear Village of Lake Orion Planning Commission Members,

The Zoning Ordinance and land uses in place within the Village of Lake Orion clearly demonstrate that Residential along the shoreline is a permitted use on the first floor in the MU District.

Mixed Use such as Live-Work with public space on the first floor together with residential use directly above for small business applications is also consistent with the Zoning Ordinance as it pertains to buildings in the MU district fronting along M-24.

Attached is the MU Ordinance and current examples of first floor residential living space along the east shoreline of Lake Orion.

Conjecture from the public contrary to the attached and as it pertains to our site plan submissions are irrational. A condition of a legal interpretation is disingenuous.

Please transmit to all Members of the Planning Commission and Village Consultants for review and concurrence.

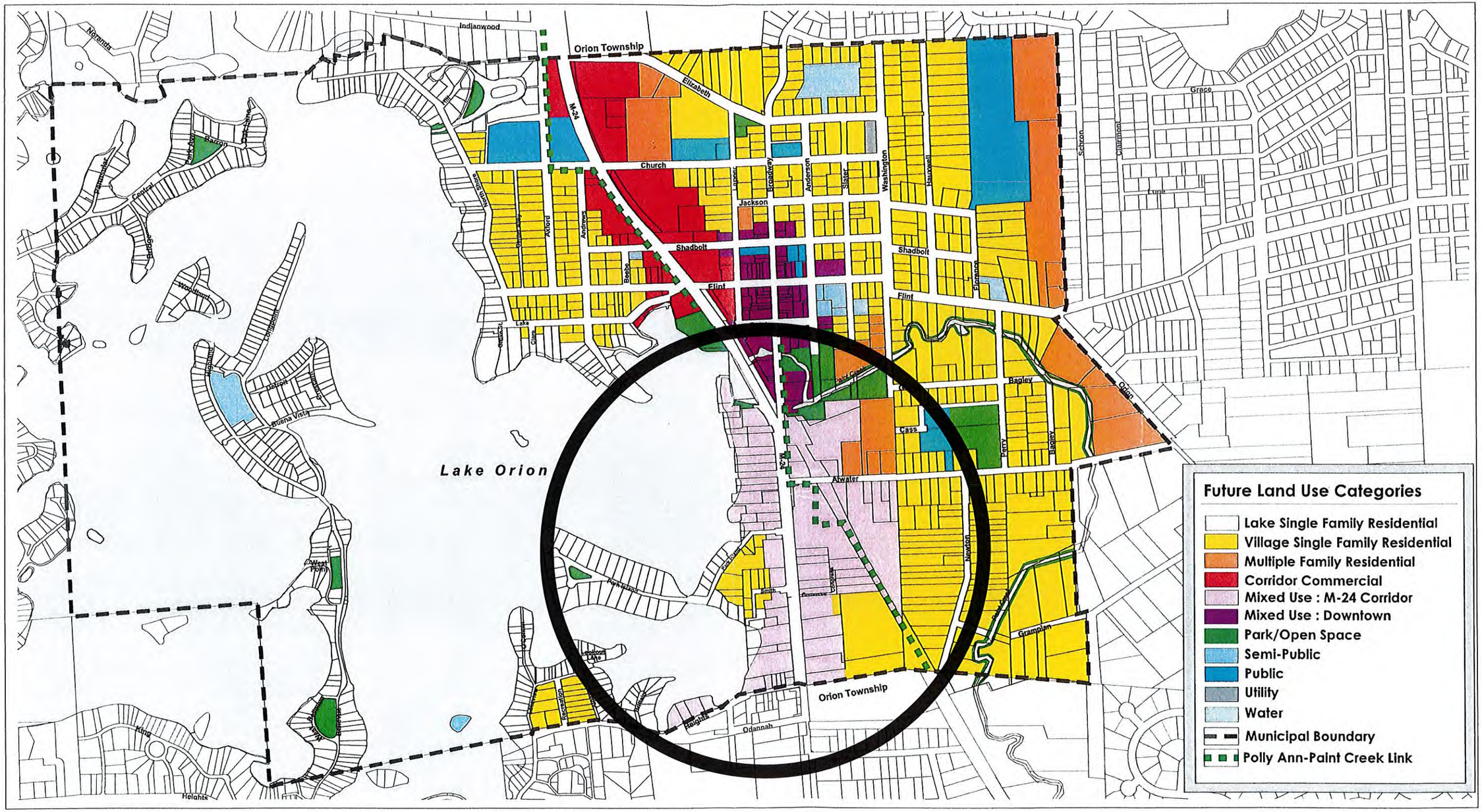
Best Regards,
Dominic J Moceri

Moceri Companies
3005 University Dr.
Auburn Hills, MI 48326

Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

McKenna Associates Incorporated

Village of Lake Orion, Michigan



Map 8 - Future Land Use - Amendment #1

Adopted: 3/03/08

Basemap Source: Oakland County 1999
Data Source: McKenna Associates, Inc., 9/2002

0 Ft. 350 Ft. 700 Ft.

3/06/2008

Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

Current Residential Units in the MU District - 1st Floor Living

210 S. Broadway Street (#09-11-226-002)

222 S. Broadway Street (#09-11-231-001)

226 S. Broadway Street (#09-11-226-006)

302 S. Broadway Street (#09-11-226-056)

314 S. Broadway Street (#09-11-226-054)

328 S. Broadway Street (#09-11-226-016)

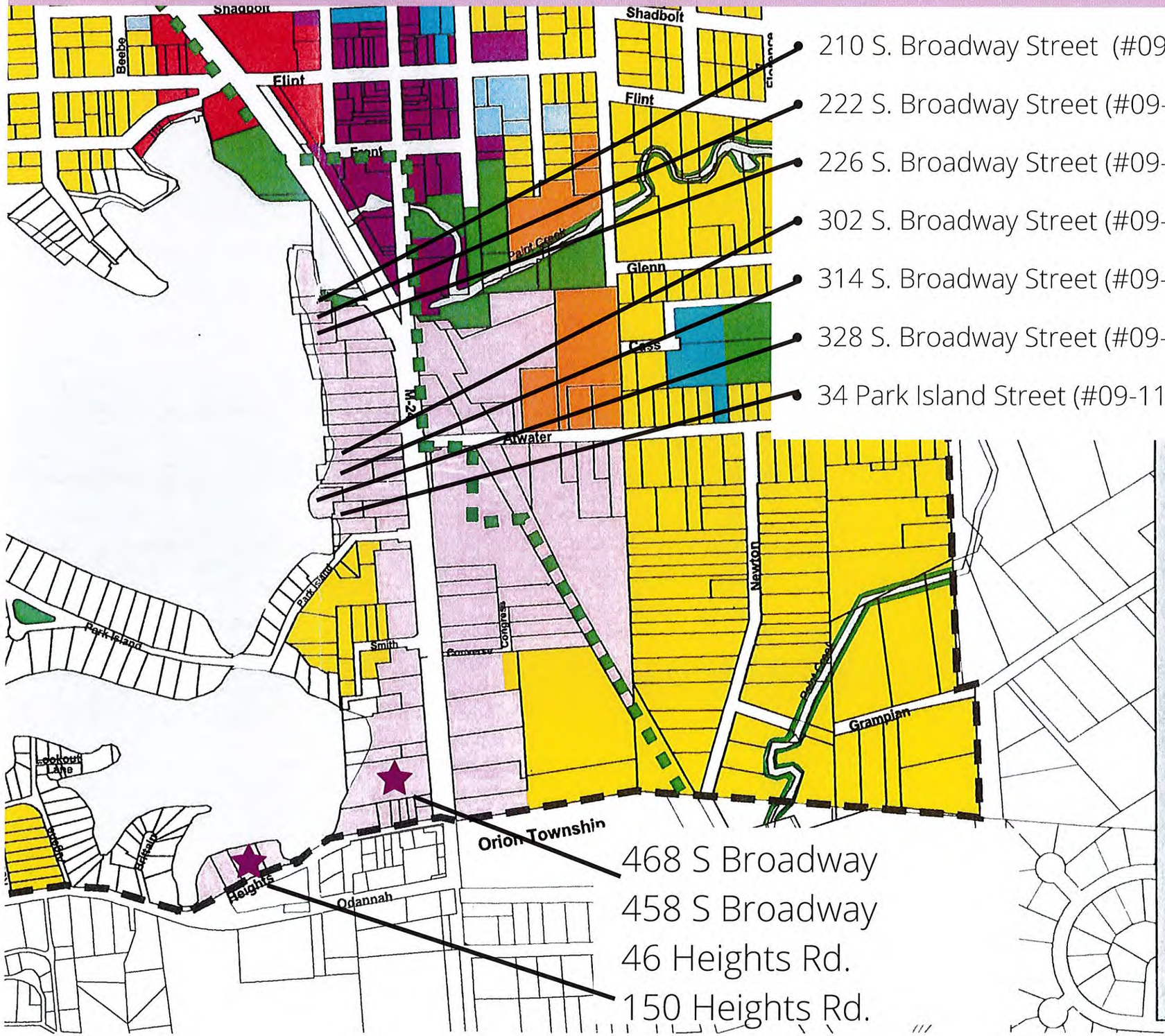
34 Park Island Street (#09-11-226-060)

468 S Broadway

458 S Broadway

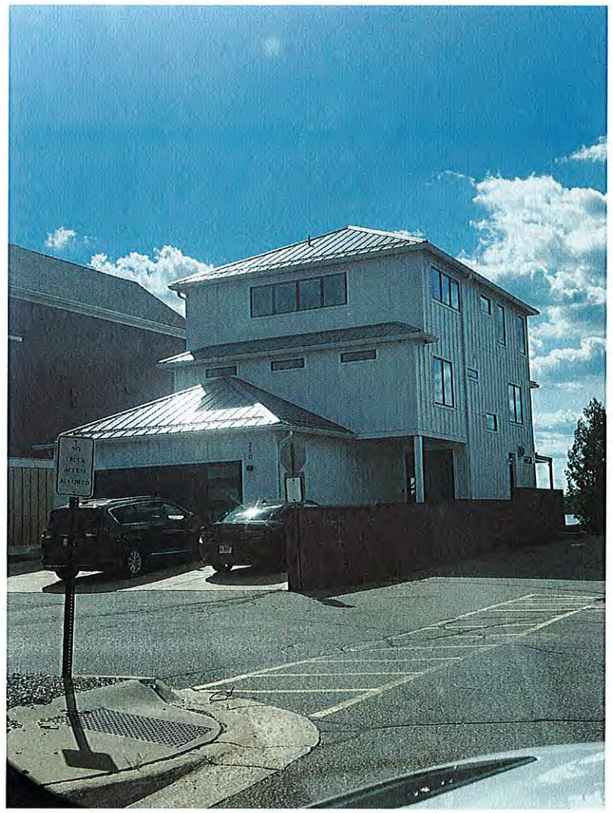
46 Heights Rd.

150 Heights Rd.



Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

210 S. Broadway Street (#09-11-226-002)



34 Park Island Street (#09-11-226-060)



226 S. Broadway Street (#09-11-226-006) (Left Side)



222 S. Broadway Street (#09-11-231-001) (Right Side and Below)



Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

302 S. Broadway Street (#09-11-226-056)



314 S. Broadway Street (#09-11-226-054)



328 S. Broadway Street
(#09-11-226-016)

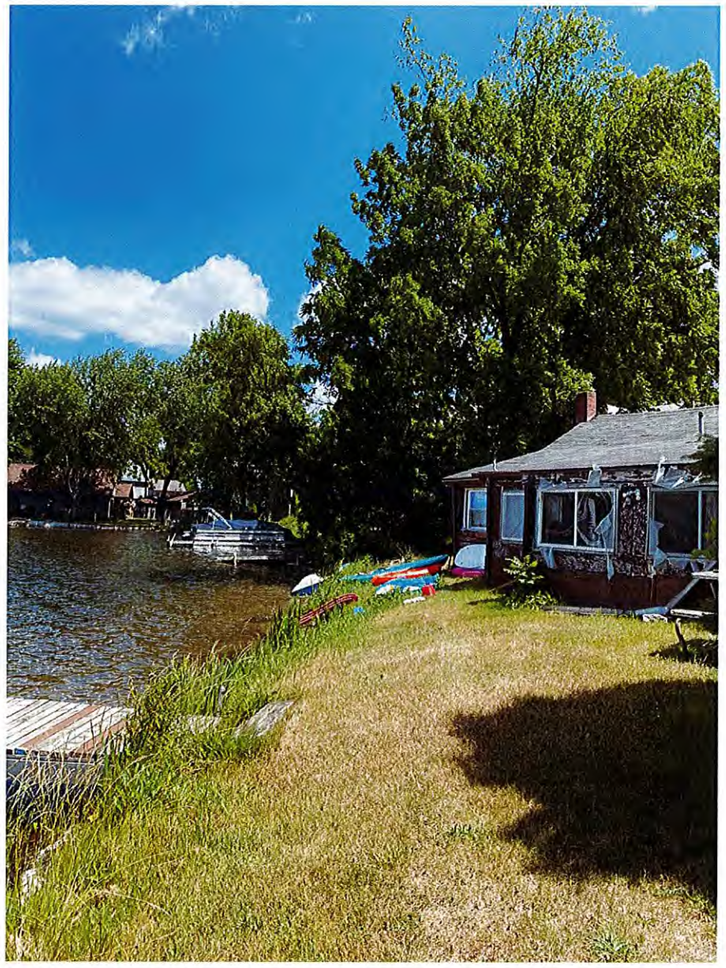


Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

468 S. Broadway Street







Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

46 Heights Rd.





Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

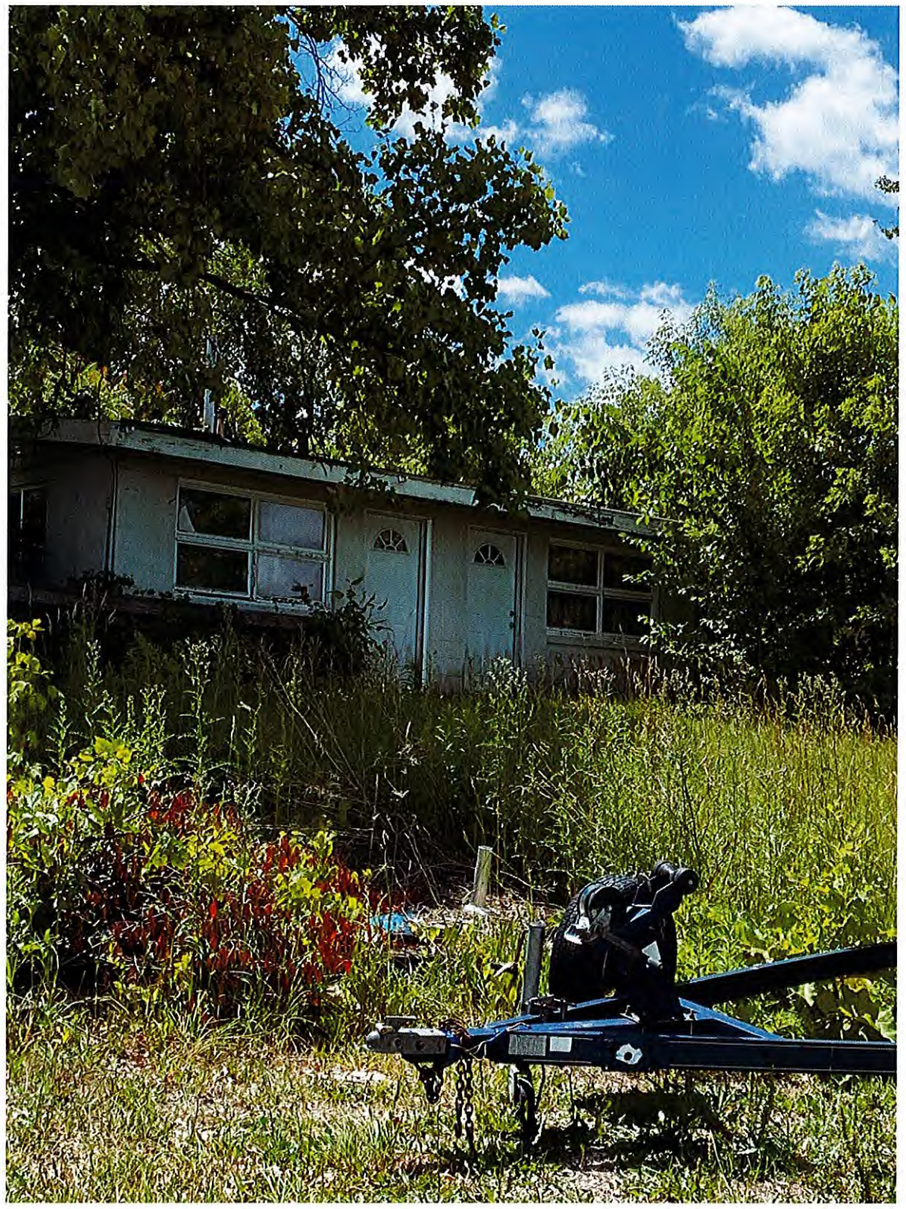
458 S Broadway





Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

150 Heights adjacent to Snug Harbor





Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

ARTICLE 9

MU – MIXED USE DISTRICT

Section 9.01 - STATEMENT OF PURPOSE

The MU, Mixed Use District is intended to promote compatible combinations of commercial, office, service, and residential development along M-24 south of Paint Creek to serve as a gateway into the DC, Downtown Center District. Office, commercial, and retail development should be located along M-24, with residential land uses located along the Lake to buffer existing single-family neighborhoods from the impacts of non-residential uses and M-24.

Development in this district is intended to serve the nearby neighborhoods and is not intended to be highway-oriented in scale. Parking lots should not be exposed to view from M-24 or the Lake, but should be screened from these important frontages by buildings. Site design should maintain and enhance pedestrian and/or image connectivity to the Downtown area.

Section 9.02 – PERMITTED USES

A. Principal Permitted Uses and Structures
In the MU District, the following uses are permitted subject to the standards listed in Section 9.03.C.

1. Banks, savings and loans, or other types of financial institutions.
2. Any retail business whose principal activity is the sale, rental or servicing of merchandise within a completely enclosed building.
3. Standard restaurants and carry-out restaurants, including coffee shops, with or without outdoor seating areas, subject to the following:
   a. Pedestrian circulation and access to building entrances (both on and off site) shall not be impaired.
      i. A clear path with a minimum width of six (6) feet leading to the entrance to the establishment shall be maintained free of tables and other encumbrances.
      ii. A minimum of five (5) feet of clear sidewalk space shall be maintained between the curb and any outdoor seating area.
   b. The outdoor seating area shall be kept clean, litter-free, and with a well-kept appearance within and immediately adjacent to the area of the tables and chairs. Preparation of food and beverages is prohibited in the outdoor seating area.

   c. Tables, chairs, planters, waste receptacles, and other elements of street furniture shall be compatible with the architectural characteristics of the building, subject to Planning Commission approval.
4. Grocery stores, convenience stores, meat markets, bakeries, and other establishments whose principal activity is the sale of food not meant for consumption on the premises.
5. Health clubs and spas.
6. Personal service establishments, including beauty and barber shops, shoe repair, tailors, self-service laundries, dry cleaning establishments and other similar uses.
7. Music, art, dance, or photography studios or galleries or similar uses.
8. Offices, including medical and dental, business, professional and governmental.
9. Publicly owned and operated buildings, libraries, parks and recreation facilities, municipal buildings, facilities and uses.
10. Single family and multiple family dwelling units, subject to the design standards of Section 9.03.C, when located above the ground story and subject to the ground story being only non-residential use.

B. Permitted Uses After Special Land Use Approval
In the MU District, the Planning Commission may permit the following uses in accordance with the procedures and discretionary standards of Article 19 and the standards below:

1. Public utility buildings (telephone exchange buildings, electric transformer stations and substations, and gas regulator stations, but not including service or storage yards) when operating requirements necessitate locating in the district to serve the immediate vicinity and subject to the following requirements:
   a. No outside service or storage yard shall be permitted.
   b. All such uses shall be enclosed either by a six (6) foot high decorative masonry wall or by a fence with dense, evergreen screening landscaping provided to form an opaque screen to a height of six (6) feet at planting.
   c. All lines serving such sites shall be underground. Overhead transmission lines and tower structures are expressly prohibited.

Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

4. A community correction center, resident home, halfway house, or other similar facility which houses an inmate population under the jurisdiction of the Michigan Department of Corrections.

C. Permitted Accessory Uses and Structures
Accessory buildings, structures or uses customarily incidental to any of the principal permitted uses in the MU District.

Section 9.03 – DEVELOPMENT STANDARDS

A. Site Plan Review
Site plan review and approval is required for all uses in the MU District in accordance with the requirements of Article 19 of this Ordinance. However in a shopping center or multi-tenant building, a change of a use permitted by right to another use permitted by right in the MU District may be permitted without submission of a full site plan in accordance with the requirements of Section 19.02.B.

B. Area, Height, Bulk and Placement Regulations
Buildings and uses in the MU District are subject to the area, height, bulk and placement requirements in Article 12, Schedule of Regulations.

The following table summarizes the regulations in Article 12.

Maximum Building Height [2]	36 ft.
Minimum Setbacks	
Front (minimum)	10 ft.
Front (maximum)	25 ft.
Water	25 ft.
Side [1]	0 ft.
Rear	25 ft.
Side Street	10 ft.
Maximum Lot Coverage	50%

[1] 20 ft. if abutting a residential district
[2] Building height may be increased to a maximum of 42 ft. subject to special land use review and approval. The number of stories shall not exceed 3.

C. Design Standards
The following design standards shall apply to all new construction in the MU District:

1. Site Layout/Uses.

   a. It is the intent of the MU district to promote nonresidential (commercial, office and service) land uses along M-24, and residential land uses to buffer the Lake and existing residential

neighborhoods from the impacts of nonresidential commercial development and M-24.

   b. New development should be walkable, and should include pedestrian connections to the Downtown Center district as well as nearby neighborhoods.

   c. Drive-in or drive-through establishments shall not be permitted on sites that have frontage on the Lake.

2. Parking.

   a. The minimum number of parking spaces required on a site shall be the sum of all of the individual uses as required in Article 14.

   b. Parking areas should be located in the middle of sites, and must be screened from view from M-24 and/or the Lake by buildings and/or landscaping.

3. Building Design.

   a. All buildings along the street frontage of the parcel shall have a primary entrance or entrances on the façade facing the street. All primary entrances must be accessible to pedestrians. Primary entrances should be highlighted through the incorporation of architectural features such as canopies, awnings, porticos, raised cornice parapets over the doors arches, large windows, or architectural details such as tile work and moldings that are integrated into the building structure and design.

   b. Building materials used on exteriors of new buildings shall be appropriate for the character and size of the proposed building, and shall complement the materials used on surrounding buildings and in the Village Downtown. Brick, stone, integrally colored architectural block are preferred building materials. Clapboard materials such as cement siding ("Hardy Plank" or similar) and shake shingles are encouraged as accent building materials. E.I.F.S. and metal may be acceptable as accent materials only, and should not comprise more than 20% of the wall area of any façade. Vinyl or metal siding is discouraged.

4. Maximum First Floor Area. The maximum first floor area for any use, including freestanding structures and any individual tenant in a multi-tenant retail or office facility in the MU district shall be 12,500 square feet.

5. Common Area. All developments in the MU district shall provide a minimum of 10% of the lot area as site amenities over and above the minimum landscape and open space requirements of this Ordinance Such site amenities may be in the form of pocket parks, green areas,

Attachment: Moceri Letter (5448 : Moceri Mystic Cove Redevelopment:)

MYSTIC COVE MIXED USE ORDINANCE CONFORMANCE

MU-MIXED USE DISTRICT REQUIREMENTS

- **Sec 9.01**
  - Office, commercial, and retail development should be located along M-24
    - *Requirement satisfied. Residences along M-24 shall be allowed work use.*
  - Buffer Lake and existing single-family neighborhoods from nonresidential uses and M-24 with residential land uses.
    - *Requirement satisfied. Buildings along the lake are residential uses.*
  - Screen Parking lots from M-24 and Lake
    - *Requirement satisfied. Buildings front M-24. No parking lots are located along the roadway.*
  - Maintain and enhance pedestrian and/or image connectivity to the downtown area.
    - *Requirement satisfied. Enhanced & improved pedestrian connections provided along lake edge and M-24 frontage.*

- **Sec 9.02 (A10) (Permitted uses)**
  - Residential units subject to the design standards of 9.03C when located above the ground story and subject to ground story being only non-residential use.
    - *Requirement does not apply. Exclusively non-residential first story uses will not be allowed.*

  1b. Pedestrian connection to downtown center and nearby neighborhoods
    - *Requirement satisfied. Walk to be maintained along M-24 and walk connection provided from development to M-24 walk along with building front door direct connection to the M-24 walkway.*

- **Sec 9.02 C Permitted Accessory Uses**
  - Accessory buildings, structures, or uses occasionally incidental to any principal permitted uses in the MU district
    - *Requirement not applicable*

- **Sec 9.03 B Area, Height, Bulk and Placement Requirements**

Requirement	Conformance
Building Height (see Height overlay standards) (36')	yes
Minimum Setbacks	
o Front (min 10) / (max 25ft)	10' min / 25' max
o Water (25')	25' min
o Side (0', 20') abutting residential	9.9'
o Rear (25')	NA
o Side street (10')	17.8'
o Maximum Lot Coverage (50%)	24%

Attachment: Mystic Cove Ordinance Conformance letter (5448 : Moceri Mystic Cove Redevelopment:)

- **Sec 9.03 C Design Standards**

1. Site Layout / Uses

Buffer Lake and all existing residential neighborhood from nonresidential uses and M24

- *Requirement satisfied. Buildings along the lake are residential uses.*

2. Parking

Minimum parking spaces shall be the sum of all individual uses required in Article 14

- *Requirement satisfied. Required 94 Spaces, Provided 134 Spaces*

Screening from M24 and Lake

- *Requirement satisfied parking buffered from the lake and M-24 by the buildings.*

3. Building Design

- *Requirement satisfied. See Architectural elevations, floor plans, and renderings.*

4. Floor Area (Maximum 12,500 sq ft (first floor for each building)

- *Requirement satisfied. See architectural plans.*

5. Common Area (10% of the lot area)

- *Requirement satisfied. 22% open space provided.*

6. Cross access to adjacent units to be accommodated for future connection.

- *Requirement satisfied. A cross access easement will be provided for future connection to the property to the north. Due to potential use of proposed retail and federal requirements, cross access cannot be provided with the proposed retail parcel.*

7. Residential Dwelling Units

Residential density in areas of the site shall be as permitted in the RM District based on that area of the site dedicated solely to residential use.

- Requirement satisfied.
  All of the site area is dedicated solely to residential use, allowing units frontage along Lapeer Road to have the potential to be live / work residences. Maximum density shall be 15du/ac.

8. Pedestrian Connectivity

- *Requirement satisfied.*
  Connections to abutting MU District properties will be permitted. Mystic currently has 4 driveways on M-24 and will be reduced to 1. One access is proposed on Heights removing all the existing house driveways.

D. Environmentally Sensitive Design

- *Requirement satisfied. Project proposes providing a stormwater pretreatment device to pretreat stormwater before being discharged into the lake. Prior uses had no pretreatment. Project is proposing updated enhanced landscaping. Development will maintain the existing lake edge and will clean-up debris along the lake edge.*

Attachment: Mystic Cove Ordinance Conformance letter (5448 : Moceri Mystic Cove Redevelopment:)

Mystic Cove South Parcels

AGREEMENT FOR PURCHASE AND SALE

THIS AGREEMENT FOR PURCHASE AND SALE (this "Agreement") is entered into on October 11, 2021 ("Effective Date"), by and between BZ LAKE ORION, LLC, a Michigan limited liability company, whose address is 803 West Big Beaver Road, Suite 100, Troy, Michigan 48084 ("Seller"), and MOCERI LAKE ORION LLC, a Michigan limited liability company, whose address is 3005 University Drive, Suite 100, Auburn Hills, Michigan 48326 ("Purchaser").

BACKGROUND

Seller is the owner of Parcels 1, 2 and 10 located in the Village of Lake Orion, Orion Township, Oakland County, Michigan, which are legally described on **Exhibit "A"** and depicted in **Exhibit "A-1"** attached hereto and made a part hereof, (collectively, the "Property").

Seller agrees to sell to Purchaser Parcels 2 and 10, and shall retain Parcel 1 ("Excluded Land"). The Excluded Land is in the southeast quadrant of the Property near the intersection of Heights Road and South Broadway Avenue, as depicted in Exhibit "A-1".

AGREEMENT

1. Purchase and Sale.

Subject to all of the terms and conditions of this Agreement, Seller will sell to Purchaser, and Purchaser will purchase from Seller, the Property together with the improvements thereon and appurtenances thereto, including all of Seller's rights, title and interest, if any, in and to: (i) any and all property lying in the bed of any street adjoining such real property, (ii) bottomland rights in lake, along with all walkways, docks and seawalls, (iii) any strips and gores of land adjacent to, abutting or used in connection with such real property, (iv) any easements and rights, if any, inuring to the benefit of such real property or to Seller in connection therewith, (v) all improvements thereon, and (vi) all parcel splits.

2. Purchase Price.

The purchase price to be paid by Purchaser for the Property shall be

2.01 Deposit.

Upon execution of this Agreement by both parties, Purchaser shall deposit with LIRA Title Agency ("Escrow Agent"), whose address is 12900 Hall Road, Suite 180, Sterling Heights, Michigan 48313, the sum of The Deposit shall be held in a non-interest bearing account, and shall be refunded, forfeited, or credited to the Purchase Price at closing as provided in this Agreement.

3. Title & Survey.

Within thirty (30) days after the Effective Date, Seller shall provide, at Seller's expense, a commitment for title insurance, including copies of all exceptions, prepared by Escrow Agent ("Commitment"). Within thirty (30) days after the Effective Date, Purchaser may obtain, at its sole expense, an ALTA survey sealed and dated within six (6) months of the Effective Date ("Survey").

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

Purchaser shall have twenty-one (21) days from receipt of both the Commitment and Survey (if Purchaser obtains a Survey within the thirty (30) day period described above) in which to examine the condition of title and the Survey. Within such twenty-one (21) day period, if Purchaser fails to provide Seller with written notice of specific defects which make title to the Property unsatisfactory to Purchaser, or specific defects in the Survey which make the Property unsatisfactory to Purchaser, then, for all purposes of this Agreement, Purchaser shall be deemed to have accepted title in the condition described in the Commitment and shall have accepted the Survey. If Purchaser notifies Seller of Purchaser's objections to the condition of title (including matters revealed on the Survey), or of objections to the Survey within such twenty-one (21) day period, then Seller agrees to use reasonable diligence to make title good and marketable, or correct the objectionable items on the Survey, for which purposes Seller shall have reasonable time, but, in no event, not more than fourteen (14) days from the receipt of Purchaser's written notice that title and/or the Survey are/is unacceptable. If title and/or the Survey are/is not rendered acceptable to Purchaser at the end of fourteen (14) days, the Deposit, at the election of Purchaser, may, by notice in writing to Seller not later than ten (10) days after the end of such fourteen (14) day period, be returned to Purchaser and all parties shall be released from any and all obligations hereunder. If Purchaser does not give notice to Seller within ten (10) days after the end of such fourteen (14) day period, Purchaser shall be deemed to have waived any defects in title and/or the Survey. Notwithstanding the provisions of this Section, if Seller's title is subject to any mortgage, land contract vendor's interest, mechanics lien or other lien or encumbrances securing a monetary obligation, the same shall be deemed a defect to Seller's title without the necessity of objection by Purchaser and shall be paid and satisfied (or bonded over if disputed) and discharged of record at closing.

4. Investigation Period.

(a) Purchaser shall have a period of ninety (90) days from the Effective Date in which to investigate the Property ("Investigation Period"); provided, however, if Seller fails to deliver the Seller's Materials (as defined below) within seven (7) days from the Effective Date then the Investigation Period shall commence on the date that Purchaser has received all of Seller's Materials (as defined below). If Seller is not in possession of certain items in the list of Seller's Materials, Seller shall advise Purchaser of the same, at which time the Investigation Period shall commence. During the Investigation Period, Purchaser shall inspect all aspects of the Property it deems necessary, including, but not limited to, environmental studies (which may include borings) and all studies necessary in order to obtain site plan approval from the Village of Lake Orion for a new residential development on the Property, including the removal of certain existing structures, land divisions, docks, seawalls and boat slips along Lake Orion. During the Investigation Period, Purchaser may, in its sole discretion, seek a determination as to whether the Property can be improved pursuant to Purchaser's development plan and shall have the right to obtain any rezoning, planned unit development ("PUD") or special land use permit for the Property, as may be necessary for Purchaser's intended development. Purchaser may verify that adequate utility service is available to the Property and that the soil conditions, including drainage, sanitary sewer availability, and water availability, are acceptable for the intended use.

(b) Seller shall provide to Purchaser, at no cost to Purchaser, copies of any building plans, land surveys, wetlands studies, soil reports, all environmental reports (including the location of past and existing underground storage tanks, monitored well locations, if any, copies of Phase I Reports, Phase II Reports, Brownfield Plans and Due Care Plans, if applicable), all leases, licenses, agreements and permits pertaining to the Property, including any either with or

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

provided by Michigan Department of Environmental, Great Lakes and Energy, Michigan Department of Environmental Quality, Michigan Department of Natural Resources, and/or Village of Lake Orion, service contracts and other documents pertaining to the Property reasonably within the possession or control of Seller (collectively, "Seller's Materials").

(c) During the Investigation Period, Purchaser and its agents shall be provided with full access to the Property, including permission to perform soil borings and to conduct other investigations as needed to determine the Property's compatibility for Purchaser's proposed development. Purchaser assumes liability for the acts of its agents who enter the Property, and shall indemnify, defend and hold Seller harmless from any loss, cost, damage or expense incurred by Seller as a result of such acts.

(d) Within the Investigation Period, Purchaser shall provide written notification to Seller as to whether Purchaser is, or is not, satisfied with the Property. Lack of Purchaser's notification shall be deemed to be Purchaser's satisfaction with the Property. If Purchaser terminates this Agreement within the Investigation Period or Entitlement Period (as defined below), Purchaser's Deposit shall be returned by Escrow Agent to Purchaser.

(e) During the Investigation Period, Purchaser and Seller shall endeavor to reasonably and in good faith determine the legal description of the Excluded Land. Seller shall be responsible for all costs associated with causing the Excluded Land to obtain a parcel split and have its own parcel number(s) separate and distinct from those of the Property being sold to Purchaser and for providing Purchaser with easements for utility access, if necessary.

4.01 Entitlement Period.

If Purchaser has not obtained the Governmental Approvals (as defined in Section 4.02, below) during the Investigation Period, Purchaser shall have the right, upon Purchaser delivering notice to Seller prior to the expiration of the Investigation Period, to continue its pursuit of the requisite Governmental Approvals for an additional period of time which expires one hundred eighty (180) days after expiration of the Investigation Period ("Entitlement Period"). Upon the commencement of the Entitlement Period, Purchaser shall be deemed satisfied with its inspection of the Property's title, survey and property investigation (unless otherwise agreed to in writing), as the Entitlement Period is intended to give Purchaser the time needed to obtain Governmental Approvals. All Governmental Approvals must be satisfactory to Purchaser for Purchaser's intended development of the Property. If the Governmental Approvals obtained during the Entitlement Period are unacceptable to Purchaser, Purchaser shall provide Seller with a written notice terminating this Agreement and receive a refund of its Deposit.

If Purchaser has not obtained the Governmental Approvals within the Entitlement Period, Purchaser may extend the Entitlement Period for an additional ninety-five (95) consecutive days ("Extended Entitlement Period"). In order to exercise the Extended Entitlement Period, Purchaser's Deposit shall become non-refundable (except in the event of Seller's default) and applicable to the Purchase Price. The Extended Entitlement Period shall commence at the expiration of the Entitlement Period upon Purchaser delivering written notice to Seller requesting such extension prior to the expiration of the Entitlement Period. If Purchaser does not terminate the Agreement prior to the expiration of the Entitlement Period and does not exercise the Extended Entitlement Period, the Deposit shall become non-refundable, and applicable to the Purchase Price (except in the event of Seller's default).

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

Provided Purchaser proceeds in a diligent manner investigating the Property, provides routine status reports to Seller (not more frequently than once a month) and puts forth best efforts to obtain Governmental Approvals, the parties will adhere to the timing provided in this Section 4.01 During the Entitlement Period and/or Extended Entitlement Period, Purchaser shall have the right to continue to investigate the Property as it deems necessary to obtain Governmental Approvals.

4.02 Zoning and Site Plan Approval Period.

Seller agrees, at no cost to Seller, to cooperate with Purchaser's endeavors to obtain final site plan approvals, permits and entitlements, including rezoning, land divisions and/or PUD agreements, as may be necessary ("Governmental Approvals") for the construction of multifamily residential development at the Property. For purposes of this Section, all development related materials shall be prepared at Purchaser's expense. Seller shall be solely responsible for the cost of the land division to remove the Excluded Land from the Property.

5. Closing.

The purchase and sale contemplated by this Agreement shall be closed on a date mutually acceptable to Purchaser and Seller that is within thirty (30) days after Purchaser's receipt of all final Governmental Approvals for Purchaser's development at the Property. Closing shall occur at the offices of Purchaser's legal counsel at a time mutually agreed upon by Seller and Purchaser. If Purchaser notifies Seller that it requires a reasonable extension of the date of closing for the purpose of obtaining financing, then Seller shall grant such reasonable extension.

5.01 Closing Documents.

Seller shall deliver to Purchaser the following documents at or prior to closing:

(a) A Covenant Deed in recordable form, prepared by Purchaser and duly executed by Seller, conveying to Purchaser fee simple title to the Property. The Covenant Deed shall be subject only to the exceptions to title not objected to or waived by Purchaser pursuant to Section 3.00 above. The Covenant Deed shall not state the purchase price. The parties shall sign a transfer tax valuation affidavit.

(b) An affidavit containing Seller's United States taxpayer identification number and stating that Seller is not a foreign person under the Internal Revenue Code, Section 1445, and other applicable laws and Internal Revenue Service regulations.

(c) The customary Seller's affidavit (owner's affidavit) sufficient to induce the title company to issue its policy at closing without "standard exceptions".

(d) An assignment of: (i) any contracts and other agreements, including leases, licenses and service contracts (approved by Purchaser) with respect to the Property; (ii) all site plans, construction and development drawings, plans and specifications, documents, surveys, and engineering and soil reports and studies with respect to the Property and (iii) all licenses, permits, agreements, zoning approvals, drainage rights, and similar or equivalent private and governmental documents and approvals of every kind and character pertaining or applicable to

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

or in any way connected with the Property, including any permits or other authorizations from the Michigan Department of Natural Resources and/or Michigan Department of Environmental, Great Lakes and Energy in the form attached hereto as **Exhibit "B"**.

(e) A duly executed Assignment and Assumption of Leases in the form attached as **Exhibit "C"**.

(f) An executed certificate certifying the rent roll, current as of the day of Closing, attached hereto as **Exhibit "D"**.

(g) To the extent in Seller's possession, all certificates of insurance, if any, which are required by the leases at the Property to be furnished to the landlord.

(h) A closing statement reflecting the Purchase Price and the agreed upon adjustments to the Purchase Price.

(i) An executed certificate to Purchaser that the representations and warranties of Seller contained in this Agreement are true and correct as of the closing date.

(j) All other documents that may be deemed necessary in order to close the transaction contemplated by this Agreement.

(k) Purchaser shall also sign the closing statement. The parties shall cooperate to execute and deliver such other documents as are usual and customary to give effect the intentions of this Agreement.

5.02 Payment of the Purchase Price; Adjustments.

(a) At the closing, Purchaser shall pay to Seller the Purchase Price in cash or certified funds.

(b) Seller shall pay the cost of the Owner's ALTA title insurance policy at closing. Purchaser shall pay recording fees and the cost of any mortgage policy and special coverage endorsements requested by Purchaser. Purchaser shall receive credit against the Purchase Price for the Deposit. Seller shall be responsible for all transfer taxes. Purchaser shall pay for the cost of recording the deed. Seller shall pay the Title Company's closing costs.

(c) Seller shall pay real estate taxes due and payable before closing. At closing, the current real estate taxes on the Property shall be prorated between the parties on a "due date" basis in accordance with local custom. Installments of special assessments shall be prorated between the parties in the same manner as current real estate taxes. Other special assessment installments due before closing shall be paid by Seller, and those due after closing shall be paid by Purchaser. In addition, Seller shall cost of all utility consumption through the day of closing, including the payment of all water, sewer and storm water fees.

(d) All rent, fees, charges and other income due under the leases, assigned by Seller to Purchaser, and any and all other income, profits, or revenue accruing to Seller, or the Property, with respect to the Property, and received by Seller on or before the closing, shall be prorated as of closing on an accrual basis. Seller shall be entitled to receive cash flow attributable

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

to the period prior to the closing date. Also, Purchaser shall receive a credit in the amount of the security deposits delivered to Seller pursuant to the tenants' leases, and all accounts receivable shall be transferred to Purchaser at the time of Closing.

6. Possession.

Purchaser shall be granted possession of the Property as of the closing.

7. As-Is Conveyance.

Other than as provided herein, Purchaser is acquiring the Property "As-Is" with all faults and defects, other than as set forth in this Agreement.

8. Condemnation.

In the event of the institution against the record owner of the Property of any proceedings, judicial, administrative or otherwise, relating to the taking, or to a proposed taking of any portion of the Property by eminent domain, condemnation or otherwise which may materially impair the proposed development of the Property, within thirty (30) days after receipt by Seller of such notice, the Seller shall notify Purchaser, and Purchaser shall have the right for thirty (30) days thereafter to terminate this Agreement and obtain a full refund of the Deposit. If Purchaser does not terminate this Agreement and proceeds to closing, all proceeds of the condemnation shall belong to Purchaser, including all proceeds due to Seller under the leases.

9. Default.

If this transaction does not close due to a default on the part of Purchaser, then any Deposit placed in escrow under this Agreement shall be delivered by the Escrow Agent to Seller as liquidated damages and as Seller's sole and exclusive remedy. If this transaction does not close due to a default on the part of Seller, then Purchaser shall be entitled to a return of its Deposit and shall have such remedies as may be available at law and in equity, including specific performance.

10. Seller's Representations and Warranties.

Seller represents and warrants to Purchaser that:

(a) Seller shall reasonably cooperate with Purchaser during the Investigation Period in Purchaser's effort to obtain Governmental Approvals for the development of the Property, including, but not limited to, rezoning of the Property, land divisions, a PUD agreement and/or court proceedings, as may be necessary.

(b) Seller's knowledge of the environmental condition of the Property is limited to the information contained in the environmental reports, if any, in Seller's possession, copies of which shall be provided to Purchaser.

(c) There are no known condemnation or eminent domain proceedings pending or contemplated against the Property or any part thereof, and Seller has received no notice of the desire of any public authority or other entity to take or use the Property or any part thereof.

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

(d) There are no threatened or pending lawsuits or proceedings against or affecting Seller or any part of the Property which (i) do or could affect title to the Property or any part thereof; or (ii) do or could prohibit or make unlawful the consummation of the transaction contemplated by this Agreement or render Seller unable to consummate the same.

(e) Seller shall not: (i) sell, transfer or market the Property; (ii) enter into new leases, easements or licenses, without the approval of Purchaser, which approval shall not be unreasonably withheld, and in no event shall Seller enter into any new easements or licenses that will not terminate within thirty (30) days after closing; or (iv) permit any lien to arise against the Property that cannot be terminated prior to closing or discharged at closing.

(f) Seller has no actual knowledge of any claims and has not received notice from a third party alleging an interest in the bottomlands of the body of water owned by Seller.

(g) Seller shall not list or otherwise market the Property during the duration of this Agreement.

(h) Seller has no actual knowledge of existing violations of any laws, zoning ordinances, regulations, orders or requirements of departments of housing, building, fire, labor, health, or other municipal departments or other governmental authorities having jurisdiction against or affecting the Property.

(i) There is no assessment presently outstanding or unpaid for local improvements or otherwise which has or may become a lien against the Property. Further, Seller knows of no public improvements which have been ordered to be made and/or which have not heretofore been completed, assessed and paid for.

(j) There are no attachments, executions or assignment for the benefit of creditors or voluntary proceedings in bankruptcy or under any other debtor relief laws contemplated by or pending or threatened by or against Seller and there is no pending or threatened action, suit, arbitration, claim or proceeding against Seller or any of its principals that could adversely affect its ability to perform its obligations under this Agreement and consummate the sale of the Property pursuant hereto.

(k) Seller has no knowledge or notice that any present default or breach exists under any mortgage or other encumbrance encumbering the Property or any covenants, conditions, restrictions, rights-of-way or easements which may affect the Property or any portion or portions thereof and that, to the best of Seller's knowledge, no condition or circumstance exists which, with the passage of time and/or the giving of notice, or otherwise, would constitute or result in a default or breach under any such covenants, conditions, restrictions, rights-of-way or easements.

(l) No person, firm or other legal entity other than Purchaser has any right or option whatsoever to acquire the Property or any portion or portions thereof or any interest therein.

(m) There are no contracts and/or service contracts, leases, licenses, maintenance or management agreements or other similar agreements affecting the Property except as set forth on **Exhibit "E".**

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

(n) To the best of Seller's knowledge, (i) there exists no uncured events of default under any lease nor any event which, with the giving of notice or the passage of time or both, would constitute an event of default by Seller at the Property, (ii) there has not been any assertion in writing by a tenant, nor does it have any defense, set-off or counterclaim with respect to its obligations under any of the leases at the Property; and (iii) no rent under any lease has been prepaid for more than one (1) month in advance, nor are there any rebates, rental concessions, free-rent periods, credits, set-offs, rent reductions, take-back or take-over obligations or any other concessions granted thereunder.

(o) Seller shall cause Parcel 1, Excluded Property, to have its own legal description and parcel number(s) separate and distinct from the Parcel 2 at or prior to closing, and for providing Purchaser with easements for utility access and surface drainage, if necessary. Any land not included in the legal description for Parcel 1, which is contiguous with Parcel 2, shall be conveyed to Purchaser at Closing.

It is understood and agreed that Seller is not making and has not at any time made any warranties or representations of any kind or character, expressed or implied, with respect to the Property, including, but not limited to, any warranties or representations as to habitability, merchantability, fitness for a particular purpose, title (other than Seller's limited warranty of title to be set forth in the deed), zoning, tax consequences, latent or patent physical or environmental condition, utilities, operating history or projections, valuation, governmental approvals, the compliance of the Property with governmental laws, the truth, accuracy or completeness of the Property documents or any other information provided by or on behalf of Seller to Purchaser, or any other matter or thing regarding the Property. Purchaser acknowledges and agrees that upon Closing, Seller shall sell and convey to Purchaser and Purchaser shall accept the Property "AS IS, WHERE IS, WITH ALL FAULTS".

Purchaser has not relied on will not rely on, and Seller is not liable for or bound by, any expressed or implied warranties, guaranties, statements, representations or information pertaining to the Property or relating thereto (including specifically, without limitation, property information packages distributed with respect to the Property) made or furnished by Seller, the manager of the Property, or any real estate broker or agent representing or purporting to represent Seller, to whomever made or given, directly or indirectly, orally or in writing, unless specifically set forth in this Agreement.

Purchaser represents to Seller that Purchaser has conducted, or will conduct prior to Closing, such investigations of the Property, including but not limited to, the physical and environmental conditions thereof, as Purchaser deems necessary to satisfy itself as to the condition of the Property and the existence or nonexistence or curative action to be taken with respect to any hazardous or toxic substances on or discharged from the property, and will rely solely upon same and not upon any information provided by or on behalf of Seller or its agents or employees with respect thereto, other than such representations, warranties and covenants of Seller as are expressly set forth in this Agreement.

Upon Closing, and pursuant to the governance of Michigan and Federal laws, Purchaser shall assume the risk that adverse matters, including, but not limited to, construction defects and adverse physical and environmental conditions, may not have been revealed by Purchaser's investigations, and Purchaser, which upon Closing, shall be deemed to have waived, relinquished and released Seller (and Seller's officers, directors, shareholders, partners, members, employees

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

and agents) from and against any and all claims, demands, causes of action (including causes of action in tort), losses, damages, liabilities, costs and expenses (including attorneys' fees and court costs) of any and every kind or character, known or unknown, which Purchaser might have asserted or alleged against Seller (and Seller's officers, directors, shareholders, partners, members, employees and agents) at any time by reason of or arising out of any latent or patent construction defects or physical conditions, violations of any applicable laws (including, without limitation, any environmental laws) and any and all other acts, omissions, events, circumstances or matters regarding the Property, other than for those matters for which Seller has knowledge of but does not disclose to Purchaser. Other than as provided by controlling legal and governing authority, Purchaser agrees that should any cleanup, remediation or removal of hazardous substances or other environmental conditions on the Property be required after the Closing Date, such clean-up, removal or remediation shall be the responsibility of and shall be performed at the sole cost and expense of Purchaser. Purchaser does not indemnify Seller for any claims made against Seller by any governmental agency or third parties which arise from an environmental condition at the Property.

11. Miscellaneous.

(a) **Entire Agreement.** This Agreement constitutes the entire agreement between the parties with respect to the transaction contemplated herein and supersedes all prior understandings or agreements between the parties. No amendment or modification of this Agreement shall be binding upon the parties unless made in writing and signed by both Seller and Purchaser.

(b) **Binding Effect.** This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective representatives, successors and permitted assigns.

(c) **Notices.** Any notice, request, demand, instruction or other communication to be given to either party hereunder, except where required to be delivered at the closing, shall be in writing and shall be hand delivered or sent by Federal Express or a comparable overnight mail service, or mailed by U.S. registered or certified mail, return receipt requested, postage prepaid, or transmitted electronically with a delivery verification to Purchaser, Seller, Purchaser's counsel, Seller's counsel and Escrow Agent, at their respective addresses set forth below. Notice shall be deemed to have been given upon receipt or delivery of said notice at the appropriate address as is set forth below. Counsel for the Seller or Purchaser can give notice on behalf of their respective client. The addressees for the purpose of this Section may be changed by giving notice of such change in compliance with this Section. Unless and until such written notice is received, the last addressee and address stated herein shall be deemed to continue in effect for all purposes hereunder:

If to Purchaser:

Dominic F. Moceri
3005 University Drive
Auburn Hills Michigan 48326
Phone: (248) 340-9400
Fax: (248) 340-5965
Email: DFM@moceri.com

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment)

With a copy to:	John J. Premo, Esq. Kickham Hanley PLLC 32121 Woodward Avenue, Suite 300 Royal Oak, Michigan 48073 Phone: (248) 544-1500 Fax: (248) 544-1501 Email: jpremo@kickhamhanley.com
If to Seller:	Ron Bostick, Sr. BZ Lake Orion, LLC 803 W. Big Beaver Road, Suite 100 Troy, Michigan 48084 Phone: (248) 709-4000 Fax: (248) 817-2169 Email: rbirstroy@yahoo.com
With a copy to:	Joseph W. Thomas, Esq. Thomas Legal Group PLC 801 W. Big Beaver Rd., Ste. 401 Troy, MI 48084 Phone: (248) 613-4700 Email: jthomas@jthomaslegal.com J. Christian Hauser, Esq. Frasco Caponigro Wineman Scheible Hauser & Luttmann, PLLC 1301 W. Long Lake Road, Suite 250 Troy, MI 48098 Phone: (248) 334-6767 Email: ch@frascap.com
Escrow Agent:	David P. Piccinini LIRA Title Agency 12900 Hall Road, Suite 180 Sterling Heights, Michigan 48313 Phone: (586) 843-3852 Email: Dave@LiraTitle.com

(d) **Broker Commissions.** No broker has assisted with this transaction. Each party hereto shall indemnify, defend and hold the other party hereto harmless from any and all other claims for commissions or fees by brokers made against the other party, and resulting loss, cost (including reasonable attorney's fees) and damages, which claim shall have arisen out of any written document or alleged oral agreement entered or purported to have been entered into by the indemnifying party and the person claiming such commission if the transaction contemplated hereunder by the parties is consummated. The provisions of this Section shall survive the closing and any cancellation or termination of this Agreement.

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment)

(e) **Time is of the Essence.** Time shall be deemed of the essence in this Agreement. This Agreement shall be effective as of the Effective Date of this Agreement listed on the first page and shall be the "date of this Agreement" for the purpose of computation of all time periods and shall become effective only after Purchaser has received a fully executed copy of this Agreement.

(f) **Assignment.** This Agreement may be assigned by Purchaser without notice to Seller.

(g) **Governing Law.** This Agreement and the rights of the parties hereunder shall be governed by and construed in accordance with the laws and customs of the State of Michigan.

(h) **Counterparts.** This Agreement may be executed in counterparts, each of which constitutes an original, and all of which, taken together, constitute one and the same instrument, and facsimile or electronically transmitted signatures on this Agreement shall be deemed to constitute original signatures.

(i) **Electronic Signatures.** The execution and delivery of this Agreement may be affected by electronic means, including by PDF or facsimile transmission, and shall be as valid and effective as an original signature.

(j) **Authority.** Each person executing this Agreement, by his or her execution hereof, represents and warrants that he/she is fully authorized to do so, and that no further action or consent on the part of the party for whom they are acting is required for the effectiveness and enforceability of this Agreement against such party following such execution.

(k) **Severability.** If any provision of this Agreement should be held to be invalid or unenforceable, the validity and enforceability of the remaining provisions of this Agreement shall not be affected thereby.

(l) **Waiver.** One or more waivers of any covenant, term or condition of this Agreement by either party shall not be construed as a waiver of any subsequent breach of the same covenant, term or condition. The consent or approval by either party to or of any act by the other party requiring such consent or approval shall not be deemed to be a waiver of or render unnecessary consent to or approval of any subsequent similar act.

(m) **Relationship of the Parties.** Nothing herein contained shall be deemed or construed by the parties hereto, or by any third party, as creating the relationship of principal and agent or of partnership or of joint venture between the parties hereto.

(n) **Prevailing Party.** In the event of any dispute hereunder or of any action to interpret or enforce this Agreement, any provision hereof or any matter arising herefrom, the prevailing party shall be entitled to recover its reasonable costs, fees and expenses, including, but not limited to, witness fees, expert fees, consultant fees, attorney, paralegal and legal assistant fees, costs and expenses and other professional fees, costs and expenses whether suit be brought or not, and whether in settlement, in any declaratory action, at trial or on appeal.

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

(m) **Merger.** There shall be no merger of any obligations in this Agreement, if any, with other agreements unless it is specifically agreed to in writing by the Purchaser and Seller.

(o) **Computation of Time Periods.** If the date upon which the Investigation Period expires, the Closing Date or any other date or time period provided or in this Agreement is or ends on a Saturday, Sunday or federal, state or legal holiday, then such date shall automatically be extended until 5:00 p.m. Eastern Standard Time of the next day which is not a Saturday, Sunday or federal, state or legal holiday. For purposes of this Agreement, unless otherwise specified herein, all time periods and references to "days" shall mean calendar days.

(Signatures on Following Page)

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

IN WITNESS WHEREOF, the parties have executed this Agreement for Purchase and Sale on the respective dates set forth below.

PURCHASER:

Moceri Lake Orion LLC, a Michigan limited liability company (on behalf of an entity to be formed)

By: _____
Dominic F. Moceri
Its: Manager

Dated: October 11, 2021

SELLER:

BZ Lake Orion, LLC, a Michigan limited liability company

By: DocuSigned by: Ron Bostick, Sr.
B848EAB1292A411...
Ronald C. Bostick
Its: Member

Dated: October 12, 2021

and

By: DocuSigned by: Dan Zaraga
55C778E355BD452...
Dan Zaraga
Its: Member

Dated: October ___, 2021

ESCROW AGENT ACCEPTANCE:

LIRA Title Agency

By: _____
David P. Piccinini
Its: President

Dated: October ___, 2021

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment:)

EXHIBIT "A"

LEGAL DESCRIPTIONS

PARCEL 1 (Excluded Land):

A PARCEL OF LAND IN THE NORTHEAST 1/4 OF SECTION 11, T-04-N, R-10-E, VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN, BEING ALL OF LOT 54 AND PART OF LOTS 52, 55, AND 56 OF ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION AND PART OF CANADAIGUA CITY, AS RECORDED IN LIBER 52, PAGES 17 AND 17A OF PLATS, OAKLAND COUNTY RECORDS, BEING MORE PARTICULARLY DESCRIBED AS:
BEGINNING AT THE SOUTHEAST CORNER OF LOT 54, BEING ALSO THE SOUTHWEST CORNER OF LOT 56; THENCE S80°08'37"W, 167.15 FEET ALONG THE NORTH LINE OF HEIGHTS ROAD (PLATTED AS BELLEVUE AVENUE – 24.00 FEET WIDE); THENCE N09°51'23"W, 36.78 FEET; THENCE N25°31'48"E, 119.25 FEET; THENCE N80°08'37"E, 174.32 FEET TO A POINT ON THE WEST RIGHT OF WAY LINE OF M-24 AS WIDENED (89.00 FEET WIDE); THENCE THE FOLLOWING 3 COURSES ALONG THE WEST RIGHT OF WAY LINE OF M-24 AS WIDENED: (1) S04°09'17"E, 126.67 FEET ALONG A LINE BEING 31.00 FEET WEST OF AND PARALLEL TO THE EAST LINE OF LOTS 52, 55 AND 56, AND (2) S85°42'35"W, 63.54 FEET TO A POINT ON THE WEST LINE OF LOT 56, BEING ALSO THE EAST LINE OF LOT 54, AND (3) S08°13'52"E, 14.13 FEET ALONG SAID LOT LINE TO THE POINT OF BEGINNING AND CONTAINING 0.635 ACRES.

CONTAINING PARCELS: 09-11-277-019; 09-11-277-020; 09-11-277-021; 09-11-277-022; 09-11-277-023; PART OF 09-11-277-018; PART OF 09-11-277-035.

PARCEL 2:

A PARCEL OF LAND IN THE NORTHEAST 1/4 OF SECTION 11, T-04-N, R-10-E, VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN, BEING ALL OF LOTS 50, 51, AND 53, AND PART OF LOT 52 OF ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION AND PART OF CANADAIGUA CITY, AS RECORDED IN LIBER 52, PAGES 17 AND 17A OF PLATS, OAKLAND COUNTY RECORDS, BEING MORE PARTICULARLY DESCRIBED AS:
COMMENCING AT THE SOUTHEAST CORNER OF LOT 54, BEING ALSO THE SOUTHWEST CORNER OF LOT 56; THENCE S80°08'37"W, 167.15 FEET ALONG THE NORTH LINE OF HEIGHTS ROAD (PLATTED AS BELLEVUE AVENUE – 24.00 FEET WIDE) TO THE POINT OF BEGINNING; THENCE CONTINUING S80°08'37"W, 203.35 FEET TO A POINT "A"; THENCE CONTINUING S80°08'37"W, 9.50 FEET MORE OR LESS, TO THE WATER'S EDGE OF LAKE ORION; THENCE NORTHEASTERLY 418.00 FEET, MORE OR LESS, ALONG THE SOUTHEASTERLY EDGE OF WATER OF LAKE ORION; THENCE N82°16'41"E, 18.00 FEET, MORE OR LESS, TO A POINT "B", LAKE ORION BEING TRAVERSED BY THE FOLLOWING LINE: BEGINNING AT THE ABOVE MENTIONED POINT "A"; THENCE N36°41'00"E, 57.66 FEET; THENCE N17°50'08"E, 116.20 FEET; THENCE N32°02'41"E, 243.91 FEET TO THE END OF THE TRAVERSE LINE AT THE ABOVE MENTIONED POINT "B"; THENCE N82°16'41"E, 206.33 FEET TO A POINT ON THE WEST RIGHT OF WAY LINE OF M-24 AS WIDENED (89.00 FEET WIDE); THENCE S04°09'17"E, 183.31 FEET ALONG SAID WEST LINE OF M-24, BEING A LINE 31.00 FEET WEST OF AND PARALLEL TO THE EAST LINE OF LOTS 51 AND 52; THENCE S80°08'37"W, 174.32 FEET; THENCE S25°31'48"W, 119.25 FEET; THENCE

Attachment: Mystic cove PA (5448 : Moceri Mystic Cove Redevelopment)

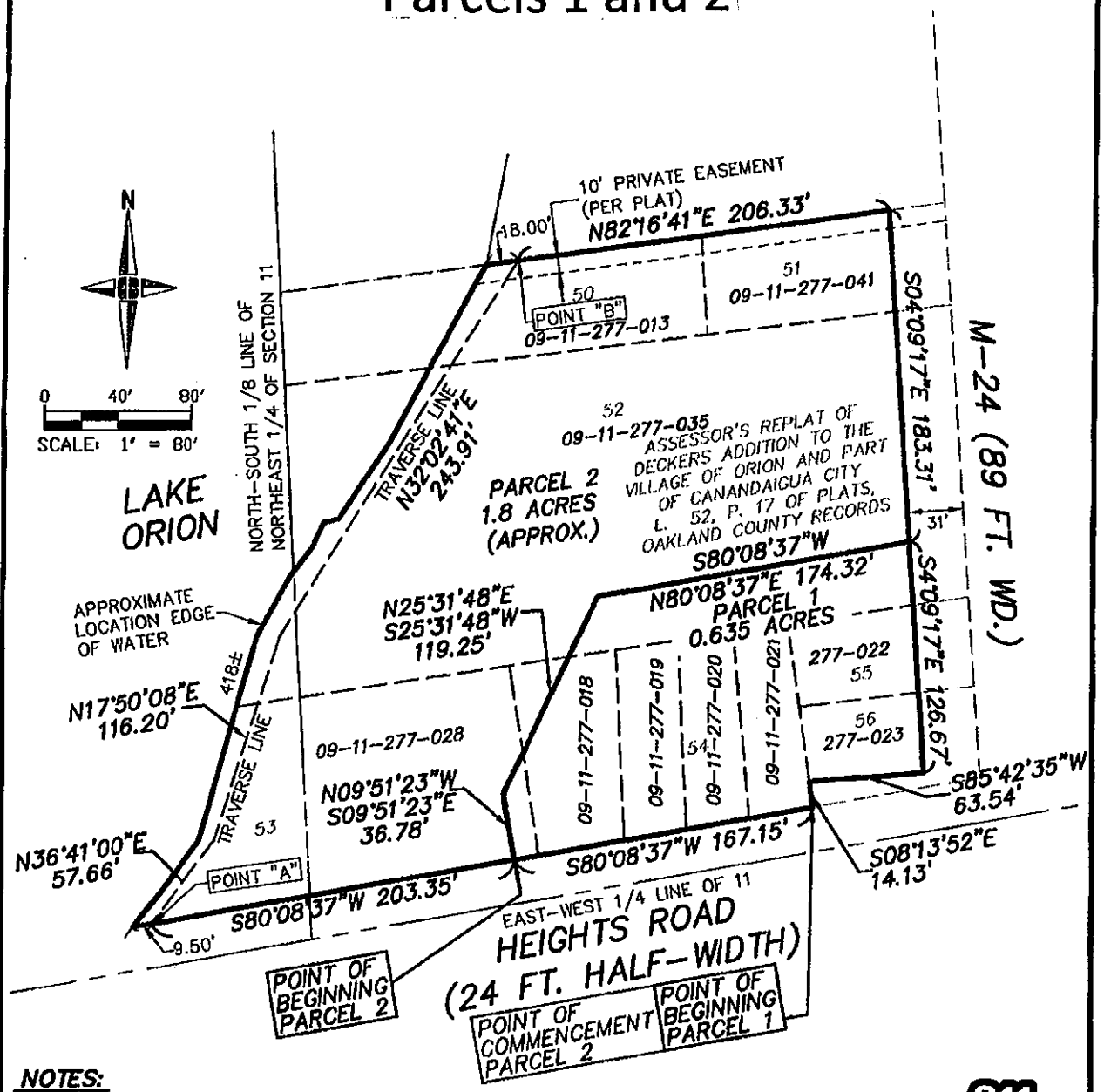
S09°51'23"E, 36.78 FEET TO THE POINT OF BEGINNING AND CONTAINING APPROXIMATELY 1.8 ACRES, INCLUDING THE LAND UP TO THE WATER'S EDGE. CONTAINING PARCELS: 09-11-277-013; 09-11-277-041; PART OF 09-11-277-035; PART OF 09-11-277-018; PART OF 09-11-277-028

AND

PARCEL 10:
LOTS 26, 27, 28, 29 AND 30, THE CUTCHEON SUBDIVISION, AS RECORDED IN LIBER 27 OF PLATS, PAGE 8, OAKLAND COUNTY RECORDS. PARCEL #09-11-403-008 & 09 11 403 009

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Parcels 1 and 2



NOTES:

- NO FIELD WORK WAS PERFORMED BY GIFFELS WEBSTER AT THIS TIME.
- MEASUREMENTS AND DESCRIPTIONS ARE BASED UPON PLAT, TAX RECORDS, AND ALTA/NSPS SURVEY BY LAND TECH, DATED 05/30/2019.
- NO GUARANTEE AS TO OWNERSHIP IS MADE.

811 Know what's below. Call before you dig.

LAKE ORION | VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN | PURCHASE AGREEMENT EXHIBIT

giffels webster
Engineers Surveyors Planners Landscape Architects
28 West Adams Road
Suite 1200
Detroit, MI 48226
p (313) 962-4442
f (313) 962-5068
www.giffelswebster.com

Executive:	J.N.R.
Manager:	C.A.A.
Designer:	H.S.R.
Quality Control:	A.L.G.
Section:	11
	T-04-N R-10-E

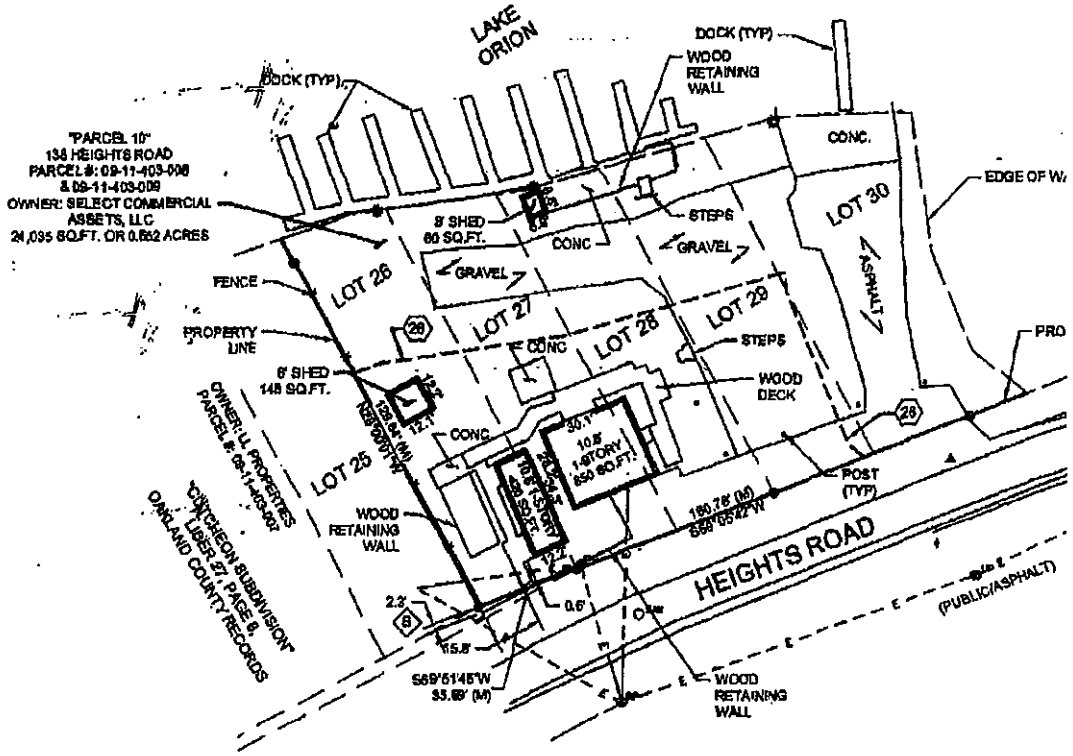
DATE:	ISSUE:

Date:	09.29.21
Scale:	1"=80'
Sheet:	1 OF 2
Project:	20107.00

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Parcel 10



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JAMES R. PORRITT, JR.
Attorney at Law
436 S. Broadway, Ste. C
Lake Orion, Michigan 48362
(248) 693-6245

REAL ESTATE PURCHASE AGREEMENT

THIS REAL ESTATE PURCHASE AGREEMENT (this "Agreement") is entered into on December 16, 2021 ("Effective Date"), by and between LIGHTHOUSE 436 L.L.C., a Michigan limited liability company ("Seller"), and MOCERI LAKE ORION LLC, a Michigan limited liability company ("Purchaser").

WHEREAS, Seller is the owner of a fee title interest in and to that certain parcel of land and the building and improvements thereon located at 436-440 S. Broadway, Lake Orion, Michigan (the "Property"), as more particularly described as follows:

LOTS 48 and 49 of ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION and PART OF CANANDAIGUA CITY, according to the plat thereof recorded in Liber 52 of Plats, Pages 17 and 17A of Oakland County Records, EXCEPT East 31 feet taken for Broadway Road.

Tax Parcel Identification No. 09-11-277-048

WHEREAS, Seller has agreed to sell, and Purchaser has agreed to purchase, the Property in accordance with the terms set forth herein.

NOW, THEREFORE, in consideration of the mutual covenants and agreements of the parties hereinafter set forth, the parties do hereby mutually covenant and agree as follows:

1. **PURCHASE AND SALE**. Subject to the terms and conditions of this Agreement, Seller will sell to Purchaser and Purchaser will purchase from Seller, the Property together with the improvements thereon and appurtenances thereto, including all remaining parcels divisions, as more specifically described as follows:

All fixtures and appurtenances in or on the premises (unless specifically excepted herein) including, if any, lighting fixtures, shades, venetian blinds, drapery hardware, curtain rods, window treatments, ventilating fixtures, screens, storm sash, built-in kitchen appliances and equipment, attached mirrors, attached humidifiers, awnings, landscaping, all wall to wall carpeting, and ***Excluding Stained Glass Windows in Suite E***, if any, now on the premises; subject to the existing building and use restrictions, easements and zoning ordinances, if any.

2. **PURCHASE PRICE**. Seller agrees to accept and Purchaser agrees to pay the sum of ONE MILLION FIVE HUNDRED THOUSAND AND NO/100 DOLLARS ($1,500,000.00) as and for the entire purchase price for the above described land and premises ("Purchase Price") upon the following conditions:

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(a) **CASH SALE**. Purchaser shall pay the Purchase Price as adjusted in accordance with the provisions hereinafter set forth in cash or certified funds upon the close of this transaction. Seller shall thereupon deliver its good and sufficient Warranty Deed conveying marketable title to Purchaser, along with all remaining parcel divisions.

(b) **TENANTS IN POSSESSION**. Seller shall deliver and Purchaser shall accept the Property subject to the lease rights of the following tenants: James R. Porritt, Jr. and sub-tenants, Allen Wolf, David Berkal and Kevin Cleary (Law Offices), Dori Freeland DDS, MS (Orthodontist Offices) and The Leading Edge, Inc. During the term of this Agreement, Landlord shall not amend or extend the terms of any existing lease nor enter into any new leases at the Property without the written consent of Purchaser.

3. EARNEST MONEY DEPOSIT. Purchaser's earnest money deposit in the amount of TWENTY-FIVE THOUSAND AND NO/100 DOLLARS ($25,000.00) ("Deposit") shall be deposited with Shield Title Agency Inc., located at 30400 Telegraph Road, Suite 118, Bingham Farms, Michigan 48025, Attention: Kira Dorocak, Esq. (248) 557-9621 (referred to herein as "Title Company" or "Escrow Agent"), within three (3) business days of the Effective Date. Said amount shall be applied to the Purchase Price if the sale is consummated, or, if a sale is not consummate, it will be released to Seller or returned to Purchaser in accordance with this Agreement.

4. EVIDENCE OF TITLE AND ALTA SURVEY.

(a) Seller shall obtain, at Seller's expense, a commitment for title insurance in an amount not less than the Purchase Price, bearing a date of issuance later than the Effective Date of this Agreement and guaranteeing and insuring the Property's title in the condition required for performance of this Agreement ("Commitment"), including copies of all exceptions, prepared by Title Company. Purchaser shall have ten (10) business days after receipt of the Commitment (defined below) and Survey (defined below) in which to examine the condition of title and Survey to determine its condition. Within such ten (10) business day period, if Purchaser fails to provide Seller with written notice of specific defects which make title and/or Survey to the Property unsatisfactory to Purchaser, then, for all purposes of this Agreement, Purchaser shall be deemed to have accepted title in the condition described in the Commitment. If Purchaser timely notifies Seller of Purchaser's objections to the condition of title (including matters revealed on the Survey), then Seller agrees to use reasonable diligence to make title and Survey good and marketable, and acceptable to Purchaser, for which purpose Seller shall have a reasonable time, but in no event more than ten (10) business days after the receipt of Purchaser's written notice objecting to the condition of title and Survey ("Seller's Remedy Period"). If title is not rendered acceptable to Purchaser at the end of the Seller's Remedy Period, Purchaser may elect to waive any defects in title, in which event the closing shall take place pursuant to this Agreement. However, Purchaser may terminate this Agreement within ten (10) business days after the expiration of the Seller's Remedy Period if it chooses not to move forward with the transaction and shall have its entire deposit returned. Notwithstanding the provisions of this Section, if Seller's title is subject to any mortgage, land contract vendor's interest, mechanics lien or other lien or encumbrances securing a monetary obligation, the same shall be deemed a defect to Seller's title without the necessity of objection by Purchaser and shall be paid and satisfied (or bonded over if disputed) and discharged of record at closing.

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(b) Seller shall provide to Purchaser an ALTA survey certified to Purchaser and Escrow Agent dated within thirty (30) days of the Effective Date ("Survey"). The cost of the Survey shall be an expense to Seller.

5. CLOSING DATE. Purchaser agrees to complete the sale within ten (10) business days after the expiration of the Inspection Period (Paragraph 19) ("Closing Date"), unless Purchaser has previously terminated this Agreement.

6. EFFECTIVE DATE. Effective Date of this Agreement is that date listed on the first page and shall be the "date of this Agreement" for the purpose of computing the time periods and shall become effect only after purchaser has received a fully executed copy of this Agreement.

7. PURCHASER'S DEFAULT. In the event of default by Purchaser, Seller may retain the Deposit as liquidated damages as its sole remedy.

8. SELLER'S DEFAULT. In the event of default by Seller, Purchaser may, at its option, elect to enforce the terms of this Agreement or demand, and be entitled to receive, an immediate refund of its Deposit in full termination of this Agreement.

9. TITLE OBJECTIONS. (See Paragraph 4)

10. SELLER'S REPRESENTATIONS AND WARRANTIES. Seller represents to Purchaser as follows:

(a) Seller has the authority to enter into and perform this Agreement.

(b) To the best of Seller's knowledge, there are no condemnation or eminent domain proceedings pending or contemplated against the Property or any part thereof, and Seller has received no notice of the desire of any public authority or other entity to take or use the Property or any part thereof.

(c) There are no pending suits or proceedings against or affecting Seller or any part of the Property which: (i) affect, or could affect, title to the Property or any part thereof; or (ii) prohibit, or could prohibit, or make unlawful the consummation of the transaction contemplated by this Agreement, or render Seller unable to consummate the same.

11. WATER ESCROW. Seller hereby agrees to deposit with Escrow Agent an amount sufficient to pay the final water bill. These funds are to be held in escrow until final billing, determined by the date of possession. It is the obligation of Seller to take such final water meter readings and furnish the same to the Escrow Agent.

12. DELIVERIES PRIOR TO OR AT CLOSING. The parties shall deliver to each other the documents and items indicated below:

(a) Seller shall deliver to Purchaser:

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

(1) A Tenant Estoppel Certificate from each tenant currently leasing space at the Property in the form as attached hereto in Exhibit A.

(2) An appropriate "Seller's Affidavit" or other acceptable evidence to the Title Company attesting to the absence of liens, lien rights, rights of parties in possession and other encumbrances arising under Seller naming the Title Company as the benefited party, so as to enable the Title Company to delete the "standard" exceptions for such matters from Purchaser's owner's policy of title insurance for the Property and otherwise insure any "gap" period occurring between the Closing and the recordation of certain closing documents.

(3) A duly executed Warranty Deed with respect to the Property, subject to no exceptions other than those accepted by Purchaser, along with all future land divisions, and otherwise as approved by the Title Company and revised as needed to conform to the requirements of the laws of the State of Michigan.

(4) A duly executed Assignment and Assumption of Leases and Rents ("Assignment") in the form attached as Exhibit B.

(5) A duly executed Bill of Sale.

(6) A duly executed certification confirming the rent roll.

(7) Duly executed counterparts of the closing statement.

(8) An appropriate FIRPTA Affidavit or Certificate by Seller, evidencing that Seller is not a foreign person or entity under Section 1445(f)(3) of the Internal Revenue Code, as amended.

(9) To the extent in Seller's possession, all certificates of insurance, if any, which are required by the leases at the Property to be furnished to the successor landlord.

(10) Such other closing documents as are reasonably necessary and proper in order to consummate the transaction contemplated by this Agreement.

(b) Purchaser shall deliver to Seller:

(1) The Purchase Price, less all the deductions, prorations, and credits provided for herein.

(2) Duly executed counterparts of the closing statement.

(3) An executed counterpart of the Assignment.

(4) Such other closing documents as are reasonably necessary and proper in order to consummate the transaction contemplated by this Agreement.

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13. TAXES, CLOSING COSTS AND PRORATED ITEMS. The closing costs shall be allocated and other closing adjustments and prorations made between Seller and Purchaser as follows:

(a) Seller shall be charged with the following items, all of which shall be paid out of Seller's funds at the closing: (i) all real estate conveyance taxes for the Property imposed by state or local authorities (including all transfer taxes) and all recording charges for the Warranty Deed for the Property; (ii) the costs of removing any lien, assessment, mortgage or encumbrance causing a title defect and required to be discharged hereunder in order to convey title to the Property as herein provided, including, without limitation, any prepayment penalties or fees incurred in connection therewith; (iii) the cost of all utility consumption through the day of closing, including the payment of all storm water fees; (iv) the cost of the owner's policy of title insurance (ALTA form, including any additional premiums to delete the "standard" exceptions for parties in possession, matters of survey and construction lien claims); (v) one-half (1/2) of the costs and fees charged by the Escrow Agent, and (vi) fees and expenses of Seller's counsel.

(b) Purchaser shall be charged with the following items in addition to the Purchase Price payable to Seller at closing: (i) fees and expenses of Purchaser's counsel; (ii) the costs of such endorsements to the owner's policy of title insurance as Purchaser may request; (iii) such other costs and expenses as Purchaser may incur in connection with its investigations and examinations of the Property and (iv) one-half (1/2) of the costs and fees charged by the Escrow Agent.

(c) All rent, fees, charges and other income due under the leases assigned by Seller to Purchaser, and any and all other income, profits, or revenue accruing to Seller, or the Property, with respect to the Property ("Income"), and received by Seller on or before the closing, shall be prorated as of closing on an accrual basis. Seller shall be entitled to receive cash flow attributable to the period prior to the closing date. All costs and items of expense of Seller incurred in the operation of the Property which are not reimbursed by tenants (excluding amortization and depreciation) ("Expenses"), shall be prorated as of the closing over the period to which the cost or item of expense applies. To the extent the Expenses can accurately be prorated on the Closing Date, such Expenses shall be prorated at closing. To the extent such Expenses cannot accurately be prorated on the Closing Date (e.g., utility charges), such Expenses shall be prorated and adjusted by Purchaser as of the closing when the actual bills covering the period in which the closing occurs are received by Purchaser, and the parties shall account to each other post-closing.

(d) Notwithstanding anything herein to the contrary, the real estate taxes shall be prorated in a manner consistent with local industry customs. Also, Purchaser shall receive a credit in the amount of the security deposits delivered to Seller pursuant to the tenants' leases, and all accounts receivable shall be transferred to Purchaser at the time of closing.

(e) Notwithstanding anything in this Agreement to the contrary, public authority charges (e.g. special assessments, water or sewer assessments or contracts, paving charges, lake level maintenance fees, but not limited thereto) shall be apportioned between the Purchaser and the Seller in the following manner: If the public authority charges have been levied by said

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authority prior to the Effective Date of this Agreement, then Seller shall satisfy the entire obligation at or prior to closing. If a public authority charge is levied after the Effective Date of this Agreement, then it shall be the responsibility of the Purchaser to assume or discharge the obligation as required. Seller shall advise Purchaser of any notices received from the local government regarding a charge. If Purchaser objects to the proposed charge, it shall have the right to terminate this Agreement and receive a return of the Deposit.

14. CLOSING LOCATION. Subject to Paragraph 16 below, the closing of this transaction shall take place at the Title Company be means of an escrow closing.

15. ESCROW CLOSING. It is the intent and understanding of the parties that this real estate transaction be consummated by means of an escrow closing. Complete closing packages shall be prepared by Escrow Agent and furnished to both Seller and Purchaser two (2) days in advance of the Closing Date. All funds shall be remitted in certified funds to the Escrow Agent at or prior to the Closing Date in the full amounts required in conformance with the closing statements. All deeds, mortgages, mortgage notes, contracts, bills of sale, escrow agreements, closing statements, settlement statements, certificates, affidavits, forms and related requisite written instruments and documents shall be properly signed, witnessed, acknowledged, notarized and delivered to the Title Company at the time of or prior to the Closing Date. It is the intent of the parties that neither Seller nor Purchaser be required to appear or attend a closing and that the Title Company make such disbursements, deliveries, and arrange such recordings as necessary to effectuate and complete sale/purchase transaction. If for any reason closing packages are not timely furnished or other causes prevent the timely delivery of funds or documents required for consummation, both parties agree to attend a closing upon receipt of reasonable written notice from either party or the Escrow Agent.

16. "AS IS" CONDITION. Purchaser acknowledges and agrees that the Property is being conveyed by Seller to Purchaser "As Is" with all faults and defects, and that, except as expressly set forth in this Agreement, Seller has not made, does not make and specifically disclaims any representations, warranties, promises, covenants, agreements or guarantees of any kind or character whatsoever whether express or implied, oral or written, past, present or future, as to, concerning or with respect to the Property.

Seller agrees to keep and maintain the Property in the same condition as of Effective Date of this Agreement until possession by Purchaser.

17. TIME IS OF THE ESSENCE OF THE AGREEMENT. Time shall be deemed of the essence in this Agreement.

18. PHYSICAL CONDITION INSPECTION. Purchaser shall have until February 2, 2022 to inspect the Property ("Inspection Period"). During the Inspection Period, Purchaser shall perform those inspections that it deems necessary in order to acquire the Property, which may include, but, not limited to, its physical condition, structural, plumbing, heating and electrical systems, and environmental condition. Purchaser shall have until February 2, 2022, to conduct such inspections, tests, and examinations of the Property as Purchaser deems necessary, inclusive of wetlands determinations, soil conditions, environmental audits, topographical and engineering

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measurements. Purchaser shall also, during the Inspection Period, make inquiry of appropriate agencies, utilities and city officials to satisfy itself as to the availability of requisite utilities and capacity of sewer and water and application of zoning and other ordinances. It is expressly understood and agreed, however, that this Agreement is not conditioned upon and does not contemplate any re-zoning of the Property. Purchaser may, but shall not be required to, seek site plan approval of the contemplated use. Purchaser agrees to indemnify and to hold harmless the Seller from any and all damage or injury occurring during or resulting from such assessment, inspection or examination. Purchaser agrees to repair and restore the Property to its like condition as of the Effective Date, reasonable wear and tear excepted.

If Purchaser fails to notify Seller in writing by February 2, 2022, at 5:01 p.m. EST, that it will not proceed to closing, the sale of the Property will be completed in accordance with this Agreement. However, if on or prior to February 2, 2022, at 5:00 p.m. EST, Purchaser provides written notice to Seller that the Property is not satisfactory to Purchaser, Seller shall cause the Escrow Agent to return the Deposit to Purchaser in full termination of this Agreement. Purchaser shall surrender to Seller any and all reports, summaries, survey, or results before receiving return of the Deposit.

It is further understood and agreed that all information, reports, summaries, survey and results obtained by Purchaser during such inspections, tests and examinations of the Property shall be kept confidential and Purchaser and Purchaser's employees, agents, consultants and contractors shall not divulge, disclose or publish the same to any person, persons or entities, other than may be necessary in order for Purchaser to acquire the Property.

19. LIMITATION OF ACTION. An action for breach of this Agreement or otherwise arising out of this transaction or Agreement cannot be brought more than one year after the Closing Date.

20. ATTORNEY REVIEW. Each of the parties hereto acknowledges that it has either had this Agreement reviewed and approved by an attorney of its choice or has had the opportunity to do so and elected to accept the terms and conditions hereof of its own free will and choice.

21. BINDING EFFECT. The benefits of this Agreement shall inure to and the obligations hereunder shall be binding upon the estates, personal representations, heirs, successors and assigns of the parties hereto.

22. BROKERS COMMISSION. In the event Purchaser consummates the transaction contemplated herein, then, at closing, Seller agrees to pay Beacon Real Estate Company ("Broker") a commission for services rendered in connection with this transaction, pursuant to its separate agreement with Broker. Except as provided above, Seller and Purchaser acknowledge that no other broker was involved in this transaction, and each party agrees to indemnify and hold harmless the other party from and against any claim that a commission or fee is due to any broker who dealt with the party from whom indemnification is sought.

23. CONSTRUCTION LIEN INDEMNIFICATION. Purchaser promises and agrees to indemnify and hold harmless Seller from any and all debts, claims, obligations, damages, costs and attorney fees arising by reason of any contractors, architects, engineers, surveyors, design

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professionals, planners, sub-contractors, laborers, materials suppliers, agents or employees claiming an interest or filing a construction lien or claim of lien against the Property by reason of or attendant to any work or materials supplied, furnished or alleged to have been contracted for with Purchaser or on behalf of Purchaser or at the behest of Purchaser. Purchaser shall take such measures as necessary to discharge any liens filed against the Property within ten (10) days of receipt of notice of same. Failure to have any such lien discharged within fifteen (15) days of receipt of notice shall constitute a default hereunder.

24. NO ASSIGNMENT. No assignment of this Agreement shall be binding without the written consent of Seller or Purchaser, as the case may be, and such consent will not be unreasonably conditioned or delayed.

25. ENTIRE AGREEMENT. This Agreement is the full agreement between the parties. All oral representations, statements, negotiations and understandings between the parties are merged and included herein. No modifications, additions, or amendments shall be binding unless in writing and signed by the parties hereto.

26. COUNTERPARTS. This Agreement may be executed in counterparts, each of which constitutes an original, and all of which, taken together, constitute one and the same instrument, and facsimile or electronically transmitted signatures on this Agreement shall be deemed to constitute original signatures.

27. SEVERABILITY. If any provision of this Agreement should be held to be invalid or unenforceable, the validity and enforceability of the remaining provisions of this Agreement shall not be affected thereby.

28. RELATIONSHIP OF THE PARTIES. Nothing herein contained shall be deemed or construed by the parties hereto, or by any third party, as creating the relationship of principal and agent or of partnership or of joint venture between the parties hereto.

29. PREVAILING PARTY. In the event of any dispute hereunder or of any action to interpret or enforce this Agreement, any provision hereof or any matter arising herefrom, the prevailing party shall be entitled to recover its reasonable costs, fees and expenses, including, but not limited to, witness fees, expert fees, consultant fees, attorney, paralegal and legal assistant fees, costs and expenses and other professional fees, costs and expenses whether suit be brought or not, and whether in settlement, in any declaratory action, at trial or on appeal.

30. MERGER. There shall be no merger of any obligations in this Agreement, if any, with other agreements unless it is specifically agreed to in writing by Purchaser and Seller.

31. SERVICE CONTRACTS. Unless specifically identified in a written instrument, authorized by Purchaser, none of Seller's service contracts at the Property will be assigned to or accepted by Purchaser. Seller shall indemnify and hold harmless Purchaser for all damages, costs and claims arising from the contracts which arising from Seller's default.

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

IN WITNESS WHEREOF the parties hereto have signed this Agreement upon the day and date set opposite their respective signatures.

PURCHASERS:

MOCERI LAKE ORION LLC, a Michigan Limited liability company

By: _____
Dominic J. Moceri
Its: Manager

SELLERS:

LIGHTHOUSE 436, LLC, a Michigan limited liability company

By: _____
James R. Porritt Jr., Member

By: _____

By: _____
Andrea Hitz, Trustee, Member
Its: Managers

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

IN WITNESS WHEREOF the parties hereto have signed this Agreement upon the day and date set opposite their respective signatures.

PURCHASERS:

MOCERI LAKE ORION LLC, a Michigan Limited liability company

By: _____
Dominic J. Moceri
Its: Manager

SELLERS:

LIGHTHOUSE 436, LLC, a Michigan limited liability company

By: _____
James R. Porritt Jr., Mem

By: _____
WILLIAM A. JARDINE, M

By: _____

Its: Managers

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EXHIBIT A

TENANT ESTOPPEL CERTIFCATE

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TENANT ESTOPPEL CERTIFICATE

DATE: _____ ___, 20__

PROPERTY: _____ City, County, State

LANDLORD: _____

TENANT: _____

TENANT'S NOTICE ADDRESS: _____
_____
_____

LEASED PREMISES: _____ rentable square feet ("Leased Premises")

LEASE DOCUMENTS: Lease between _____ ("Tenant") and ___ _____("Landlord") dated _____ _____, as amended by _____ _____(collectively, the "Lease")

Tenant hereby certifies for the benefit of Landlord, each of its assigns and transferees, and their respective mortgage lenders and the mortgage lenders' successors and assigns, that:

1. The Lease identified above constitutes the entire agreement between the parties. There are no other agreements (oral or written) between Landlord and Tenant concerning the Leased Premises. The Lease has not been assigned by Tenant, nor has Tenant sublet the Leased Premises or any portion thereof.

2. The Lease is valid and in full force and effect. To the best of Tenant's knowledge, Landlord is not in default in the performance of its obligations under the Lease. There are no existing defenses against the enforcement by Landlord of any of the obligations of Tenant under this Lease.

3. Tenant has accepted possession of the Leased Premises. The Lease term commenced on _____. The Lease term, excluding unexercised renewals and extensions, will terminate on _____. Except as stated in the Lease, Tenant has no right to renew or extend the Lease and no right to cancel or reduce the term of the Lease.

4. Tenant has paid base rent and additional rent for the Leased Premises for the period up to and including _____. The base monthly rent presently payable under the Lease is $_____. The additional rent presently payable under the Lease is $_____. No rent has been paid more than one month in advance. Tenant's security deposit is $_____.

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5. Tenant has no present or future rights to any free rent, reduction in rent, or any other type of rent concession or to any lease support payments or lease buy-outs. Tenant has no present claims against Landlord under the Lease. Tenant has received all required contributions from Landlord on account of Tenant's improvements. No payments are due to Tenant from Landlord.

6. Tenant Estoppel Certificate has no outstanding options or rights of first refusal to purchase the Leased Premises or any part thereof or any real property of which the Leased Premises are a part.

7. No actions, whether voluntary or otherwise, are pending against Tenant or any general partner of Tenant under the laws of the United States or any state thereof.

8. Landlord has completed any construction work or tenant improvement work required to be performed by Landlord under the Lease and no punchlist items remain to be completed.

This Certificate is being executed and delivered by Tenant for the benefit of the parties set forth above. Tenant understands and agrees that the statements in this certificate will be relied upon by said parties.

TENANT:

[Tenant's company name]

_____

By: _____

Its: _____

Dated: _____ ___, 20___

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

EXHIBIT B

ASSIGNMENT AND ASSUMPTION OF LEASES AND RENTS

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

THIS ASSIGNMENT AND ASSUMPTION OF LEASES AND RENTS (this "Assignment") is made as of this __ day of _____, 20__ between _____("Assignor"), and _____ ("Assignee") and its assigns.

Recitals:

A. Assignor and Assignee are parties to that certain Real Estate Purchase Agreement dated effective as of _____ ___, 20__ ("Agreement") for the purchase of certain real property located at _____, which property is more particularly described in the Agreement ("Property").

B. In connection with the sale of the Property to Assignee, Assignor desires to assign, and Assignee desires to assume, all of Assignor's right, title and interest as landlord in and to the leases and subleases set forth on Exhibit A attached hereto (collectively, the "Leases").

NOW, THEREFORE, in consideration of One Dollar ($1.00) and the mutual covenants and agreements contained herein, Assignor and Assignee hereby agree as follows:

1. Assignment of Leases. Assignor hereby assigns, transfers, and sets over unto Assignee, its successors and assigns, all of Assignor's right, title and interest in, to and under the Leases.

2. Assumption of Leasehold Obligations. Assignee hereby assumes the Leases and all of Assignor's rights and obligations thereunder. Assignee agrees, for itself and for the benefit of its successors and assigns, to keep, perform, fulfill or cause to be performed all of the terms, covenants, conditions and obligations contained in the Leases that, by the respective terms therein, are imposed upon Assignor.

3. Cross-Indemnification. Assignee hereby agrees to indemnify, protect, defend and hold Assignor harmless from and against any and all claims, damages, losses, costs and expenses (including attorneys' fees) arising in connection with the Leases and relating to the period subsequent to the date of this Assignment. Assignor hereby agrees to indemnify, protect, defend and hold Assignee harmless from and against any and all claims, damages, losses, costs and expenses (including attorneys' fees) arising in connection with the Leases and relating to the period prior to the date of this Assignment.

4. Lease Condition. The Leases are being assigned in an "AS IS" condition without warranty or representation. Assignee acknowledges that no warranties or representations have been made in connection therewith other than those made in the Agreement which by the express terms of the Agreement survive closing of the sale of the Property.

5. Successors. This instrument and the provisions herein contained shall be binding upon and inure to the benefit of Assignor and Assignee and their respective successors and assigns.

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

6. Governing Law. This Assignment shall be governed by and construed in accordance with the laws of the State of Michigan.

7. Counterparts. This instrument may be executed in counterpart, each of which constitutes an original, and all of which, taken together, constitute one and the same instrument, and facsimile or electronically transmitted signatures on this instrument shall be deemed to constitute original signatures.

IN WITNESS WHEREOF, the parties hereto have duly executed this Assignment as of the day and year first written above.

ASSIGNEE:

By:_____

Its:

ASSIGNOR:

By:_____

Its: _____

STATE OF)
)ss
COUNTY OF)

The foregoing instrument was acknowledged before me this _____ day of _____ _____, 20___, by _____, _____ of _____ _____, a _____, on behalf of the company.

_____

Notary Public, _____ County, ___
Acting in the County of _____
My Commission Expires:_____

STATE OF)
)ss
COUNTY OF)

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

The foregoing instrument was acknowledged before me this _____ day of _____ _____, 20___, by _____, _____ of _____, _____ _____, on behalf of the company.

_____

Notary Public, _____ County, ___
Acting in the County of _____
My Commission Expires:_____

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

EXHIBIT C

CERTIFIED RENT ROLL

Attachment: Mystic Cove Signed Lighthouse PA (5448 : Moceri Mystic Cove Redevelopment:)

MYSTIC COVE

SITE PLAN

PARCEL NOs. 09-11-255-002, 09-11-277-013, 09-11-277-018, 09-11-277-028, 09-11-277-035, 09-11-277-041, 09-11-277-048, 09-11-403-007, 09-11-403-008, AND 09-11-403-009

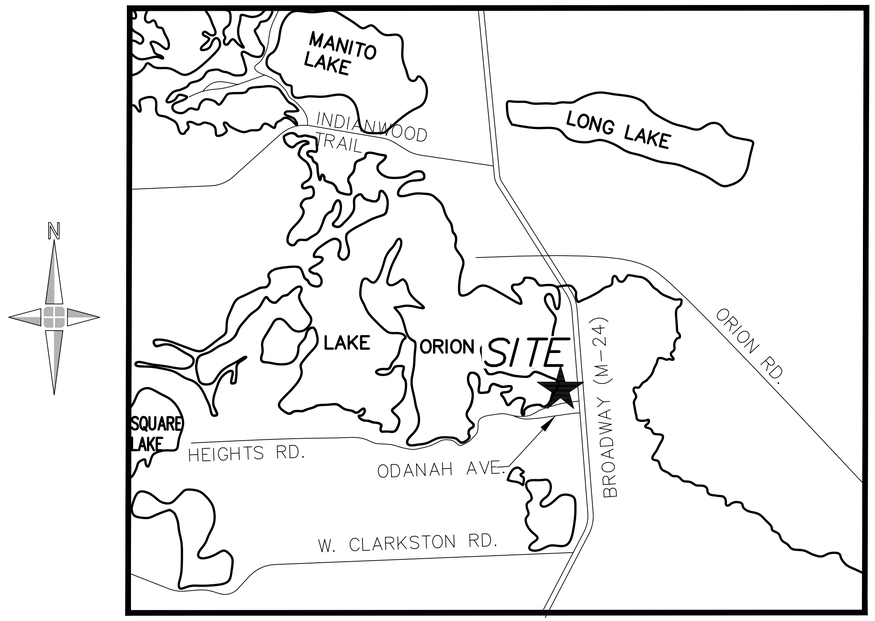
VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN

APPLICANT
MOCERI COMPANIES
3005 UNIVERSITY DRIVE
AUBURN HILLS, MI 48326
PHONE: (248) 340-9400

ENGINEER
GIFFELS WEBSTER
MS. NANCY STANDISH, PE
1025 E. MAPLE, SUITE 100
BIRMINGHAM, MI 48009
PHONE: (248) 852-3100

SURVEYOR
GIFFELS WEBSTER
MR. CHRIS ASIALA, PS
1025 E. MAPLE, SUITE 100
BIRMINGHAM, MI 48009
PHONE: (248) 852-3100

LANDSCAPE ARCHITECT
GIFFELS WEBSTER
MR. MARK HANSEN
1025 E. MAPLE, SUITE 100
BIRMINGHAM, MI 48009
PHONE: (248) 852-3100



LOCATION MAP
NOT TO SCALE

SHEET INDEX

ENGINEERING PLANS

1	COVER SHEET
2-3	TOPOGRAPHIC SURVEY
4	SITE AND PAVING PLAN
5	PRELIMINARY GRADING PLAN
6	PRELIMINARY UTILITY PLAN
7	SITE NOTES AND DETAILS
8	FIRE PROTECTION PLAN

LANDSCAPE AND LIGHTING

L1	LANDSCAPE PLAN
L2	LANDSCAPE DETAILS
L3	SITE RENDERING
LI1	LIGHTING PLAN

SHEETS BY OTHERS

ARCHITECTURAL

5 SHEETS	BUILDING 1 FLOOR PLANS AND ELEVATIONS
5 SHEETS	BUILDING 2 FLOOR PLANS AND ELEVATIONS
4 SHEETS	BUILDINGS 3-7 FLOOR PLANS AND ELEVATIONS

PROPERTY DESCRIPTION

PARCELS 09-11-277-013, 09-11-277-041, 09-11-277-048, 09-11-403-007, 09-11-403-008 AND 09-11-403-009 AND PART OF PARCELS 09-11-255-002, 09-11-277-018, 09-11-277-028 AND 09-11-277-035

A PARCEL OF LAND IN THE EAST 1/2 OF SECTION 11, T-04-N, R-10-E, VILLAGE OF LAKE ORION, OAKLAND COUNTY, MICHIGAN BEING ALL OF LOTS 50 AND 53 AND PART OF LOTS 48, 49, 51 AND 52 OF ASSESSOR'S REPLAT OF DECKER'S ADDITION TO THE VILLAGE OF ORION AND PART OF CANADAIGUA CITY AS RECORDED IN LIBER 52, PAGES 17 AND 17A OF PLATS, OAKLAND COUNTY RECORDS AND ALL OF LOTS 24-30 OF ASSESSOR'S PLAT OF THE CUTCHEON SUBDIVISION AS RECORDED IN LIBER 27, PAGE 8, OAKLAND COUNTY RECORDS, BEING MORE PARTICULARLY DESCRIBED AS:

COMMENCING AT THE SOUTHEAST CORNER OF LOT 54, BEING ALSO THE SOUTHWEST CORNER OF LOT 56 OF SAID ASSESSOR'S REPLAT OF DECKER'S ADDITION; THENCE S.80°07'47"W, 170.01 FEET TO THE POINT OF BEGINNING; THENCE S.80°07'47"W., 210.04 FEET; THENCE S.60°06'55"W., 171.35 FEET; THENCE S.71°08'03"W., 19.11 FEET; THENCE S.68°05'13"W., 19.31 FEET TO A POINT ON THE SOUTHWEST CORNER OF LOT 30 OF SAID CUTCHEON'S SUBDIVISION, THENCE S.69°08'24"W., 140.31 FEET TO A POINT ON THE SOUTHEAST CORNER OF LOT 26 OF SAID CUTCHEON'S SUBDIVISION, THENCE S.69°54'27"W., 35.69 FEET; THENCE S.62°12'22"W., 69.99 FEET TO A POINT ON THE SOUTHWEST CORNER OF LOT 24 OF SAID CUTCHEON'S SUBDIVISION; THENCE N.28°04'59"W., 137.54 FEET ALONG THE WEST LINE OF SAID LOT 24; THENCE N.28°04'59"W., 50.81 FEET; THENCE N.66°19'33"E., 19.59 FEET; THENCE N.76°57'35"E., 172.31 FEET; THENCE N.80°26'52"E., 136.44 FEET; THENCE S.07°51'05"E., 37.04 FEET; THENCE S.07°49'50"E., 46.87 FEET; THENCE N.67°40'51"E., 155.54 FEET; THENCE N.36°37'56"E., 53.02 FEET; THENCE N.15°50'43"E., 114.76 FEET; THENCE N.29°14'53"E., 42.89 FEET; THENCE N.37°26'30"E., 40.01 FEET TO A POINT ON THE WEST LINE OF LOT 52 OF SAID DECKER'S ADDITION REPLAT; THENCE N.03°19'41"W., 239.66 FEET TO A POINT ON THE NORTHWEST CORNER OF LOT 48 OF SAID DECKER'S ADDITION REPLAT; THENCE THE FOLLOWING 3 COURSES ON THE NORTH LINE OF SAID LOT 48 (1) N.82°12'23"E., 125.23 FEET; (2) N.07°56'42"W., 10.00 FEET; (3) N.82°03'18"E., 211.82 FEET TO A POINT AT THE NORTHEAST CORNER OF SAID LOT 48; THENCE S.04°10'20"E., 142.74 FEET TO A POINT ON THE SOUTHEAST CORNER OF LOT 49 OF SAID DECKER'S ADDITION REPLAT; THENCE CONTINUING S.04°10'20"E., 183.34 FEET; THENCE S.85°49'40"W., 163.97 FEET; THENCE S.25°38'00"W., 142.86 FEET; THENCE S.09°50'46"E., 33.98 FEET TO THE POINT OF BEGINNING AND CONTAINING 4.49 ACRES.

Engineers
Surveyors
P anners
andscape Architects

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Birmingham, M 48009
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f (313) 962 5068
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Executive:	MP
Manager:	NS
Designer:	-
Qua ity Contro :	MP
Section:	11
	T-04-N R-10-E

Professional Seal:

STATE OF MICHIGAN
NANCY MARIE STANDISH
ENGINEER
No. 6201061386
LICENSED PROFESSIONAL ENGINEER

Know what's be ow
Ca before you dig

DATE:	ISSUE:
07 13 2022	SUBM FOR S E P AN APPROVA
07 27 2022	REV S ONS PER F RE MARSHA REV EW
08 09 2022	REV S ONS PER OWNER
08 09 2022	RESUBM FOR S E P AN APPROVA

Developed For:

MOCERI COMPANIES

3500 UNIVERSITY DRIVE
AUBURN HILLS, MI
48326

~~248.340.9400~~
248.340.9400

COVER SHEET

MYS C COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Sca e:	NA
Sheet:	1
Project:	20107.10

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LEGEND – EXISTING

SECTION LINE; E/ PAVEMENT; CURB; E/ GRAVEL; CL ROAD; E/ WALK; RAILROAD; E/ BRICK; MISC. LINE; FENCE; GUARD RAIL; WALL; BLDG. LINE; OVERHEAD WIRES; RAILING; OVERHANG LINE; T/ BANK; B/ BANK; CL DITCH/STREAM; SHRUB LINE; TREE LINE; WATER EDGE; WETLAND LINE; STORM LINE; SAN. LINE; WATER LINE; GAS LINE; UG ELEC. LINE; UG TELE. LINE; UG CABLE TV LINE; PAINT STRIPE; COMBINED SEWER; PLD LINE; STEAM LINE; ELECTRIC OVERHEAD; TELEPHONE OVERHEAD

SAN. MH; SAN. CLEAN OUT; SAN. RISER; SAN. PUMP STATION; COMB. MH; GATE VALVE; HYDRANT; WATER VALVE; WATER METER; POST INDICATOR VALVE; WELL HEAD; FDC CONNECTION; IRRIGATION CONTROL BOX; STORM MH; CATCH BASIN; BEEHIVE CB; CULVERT E.S.; ROOF/DOWN SPOUT; OVERFLOW/OUTLET STRUCTURE; STORM CLEAN OUT; ROUND CB; LIGHT POLE; UTILITY POLE; ELEC. TRANS.; AIR CONDITIONER; ELEC. MH; ELEC. METER; ELEC. RISER; TRAFFIC CONTROL BOX; STEAM MH; PUBLIC LIGHTING MH

GAS METER; GAS RISER; GAS VALVE; GAS MH; TELE. RISER; TELE. MH; TELE. CROSS BOX; CABLE RISER; PAY PHONE; MANHOLE; SIGN; PROT. POST/GUARD POST; GUY; DECIDUOUS TREE; CONIFEROUS TREE; DEAD TREE; UTILITY FLAG; BLDG. CORNER (FIELD LOCATED); HANDICAP PARKING; WETLAND FLAG; BUSH/SHRUB; PARKING METER; RESIDENTIAL MAILBOX; U.S. MAILBOX; EXISTING ELEVATION; SOIL BORING; MONITORING WELL; LAWN IRRIG. HEAD; CENTERLINE R.R. TRACK

MISC. TOPO. FEATURE; SURVEY CONTROL POINT; FOUND IRON; FOUND NAIL; F. CUT CROSS; SECTION COR.; FENCE POST; BENCHMARK; FOUND PIPE; FOUND MON.

ASPH.	ASPHALT
CONC.	CONCRETE
A.C.	AIR CONDITIONER
G.P.	GUARD POST
C.L.F.	CHAIN-LINK FENCE
D.L.	DOOR LEDGE
F.F.	FINISHED FLOOR
O.H.	OVERHANG
F.I.	FOUND IRON
S.I.	SET IRON
F.I.P.	FOUND IRON PIPE
(M)	MEASURED
(R)	RECORD
F.M.	FOUND MONUMENT
S.N.	SET NAIL
CMP	CORREGATED METAL PIPE
RCP	REINFORCED CONCRETE PIPE
G.L.	GROUND LIGHT

SCALE: 1" = 30' (0, 30', 60')

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Engineers
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Manager:	NS
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Quality Control:	MP
Section:	11
	T-04-N R-10-E

Professional Seal:

811 Know what's below. Call before you dig.

DATE:	ISSUE:
07.13.2022	SUBMIT FOR SITE PLAN APPROVAL
07.27.2022	REVISIONS PER FIRE MARSHAL REVIEW
08.09.2022	REVISIONS PER OWNER
08.09.2022	RESUBMIT FOR SITE PLAN APPROVAL

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AUBURN HILLS, MI
48326
248.340.9400

TOPOGRAPHIC SURVEY

MYSTIC COVE

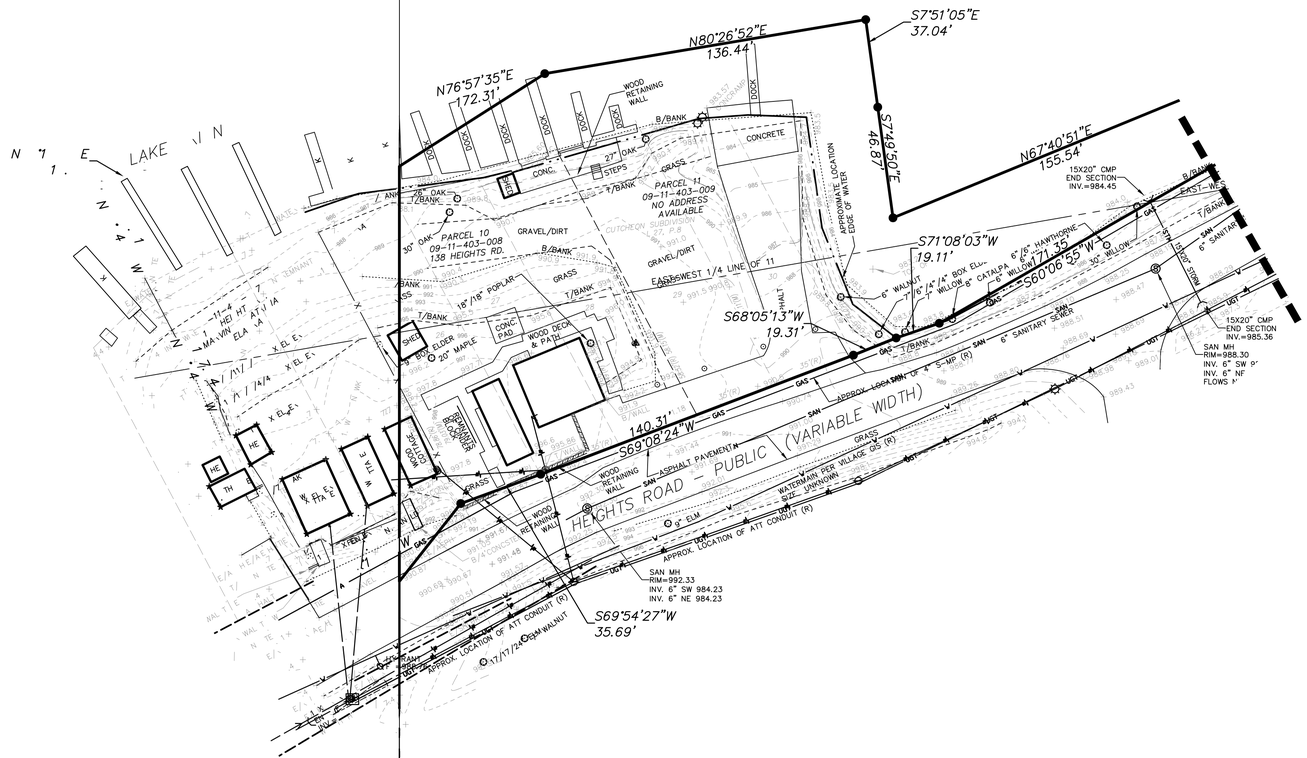
VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=30'
Sheet:	02
Project:	20107.10

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H:\20\20100\20107.10 Mystic Cove\Design\CAD\02 Topographic Survey.dwg

Attachment: Mystic Cove SP 08.10.2022 FULL SET (5448 : Moceri Mystic Cove Redevelopment)



LEGEND – EXISTING

SECTION LINE		SAN. MH	
E/ PAVEMENT		SAN. CLEAN OUT	C.O.
CURB		SAN. RISER	
E/ GRAVEL		SAN. PUMP STATION	P.S.
CL ROAD		COMB. MH	C
E/ WALK		GATE VALVE	
RAILROAD		HYDRANT	
E/ BRICK		WATER VALVE	
MISC. LINE		WATER METER	W
FENCE	X	POST INDICATOR VALVE	
GUARD RAIL		WELL HEAD	
WALL		FDC CONNECTION	
BLDG. LINE		IRRIGATION CONTROL BOX	W
OVERHEAD WIRES	OH	STORM MH	
RAILING		CATCH BASIN	
OVERHANG LINE		BEEHIVE CB	
T/ BANK		CULVERT E.S.	
B/ BANK		ROOF/DOWN SPOUT	
CL DITCH/STREAM		OVERFLOW/OUTLET STRUCTURE	
SHRUB LINE		STORM CLEAN OUT	C.O.
TREE LINE		ROUND CB	
WATER EDGE		LIGHT POLE	
WETLAND LINE		UTILITY POLE	
STORM LINE	STM	ELEC. TRANS.	E
SAN. LINE	SAN	AIR CONDITIONER	AC
WATER LINE	W	ELEC. MH	E
GAS LINE	GAS	ELEC. METER	E
UG ELEC. LINE	UGE	ELEC. RISER	
UG TELE. LINE	UGT	TRAFFIC CONTROL BOX	C
UG CABLE TV LINE	CTV	STEAM MH	ST
PAINT STRIPE		PUBLIC LIGHTING MH	L
COMBINED SEWER			
PLD LINE	PLD		
STEAM LINE	STEAM		
ELECTRIC OVERHEAD			
TELEPHONE OVERHEAD	TEL		

GAS METER	G	MISC. TOPO. FEATURE	
GAS RISER		SURVEY CONTROL POINT	
GAS VALVE	GAS	FOUND IRON	
GAS MH	G	FOUND NAIL	
TELE. RISER		F. CUT CROSS	
TELE. MH	T	SECTION COR.	
TELE. CROSS BOX	T	FENCE POST	
CABLE RISER		BENCHMARK	
PAY PHONE		FOUND PIPE	
MANHOLE		FOUND MON.	
SIGN		ASPHALT	ASPH.
PROT. POST/GUARD POST		CONCRETE	CONC.
GUY		AIR CONDITIONER	A.C.
DECIDUOUS TREE		GUARD POST	G.P.
CONIFEROUS TREE		CHAIN-LINK FENCE	C.L.F.
DEAD TREE		DOOR LEDGE	D.L.
UTILITY FLAG	GAS MARKER	FINISHED FLOOR	F.F.
BLDG. CORNER (FIELD LOCATED)		OVERHANG	O.H.
HANDICAP PARKING		FOUND IRON	F.I.
WETLAND FLAG		FOUND IRON PIPE	F.I.P.
BUSH/SHRUB		SET IRON	S.I.
PARKING METER		MEASURED	(M)
RESIDENTIAL MAILBOX		RECORD	(R)
U.S. MAILBOX	US	FOUND MONUMENT	F.M.
EXISTING ELEVATION	000.00+0.00	SET NAIL	S.N.
SOIL BORING		CORRUGATED METAL PIPE	CMP
MONITORING WELL		REINFORCED CONCRETE PIPE	RCP
LAWN IRRIG. HEAD		GROUND LIGHT	G.L.
CENTERLINE R.R. TRACK			

UTILITY STATEMENT

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE.

(R) = UTILITY SHOWN FROM RECORDS OR PLANS, & FIELD LOCATED WHERE POSSIBLE.

PRIOR TO THE PLANNED BUILDING IMPROVEMENTS, AND/ OR CONSTRUCTION, THE RESPECTIVE UTILITY COMPANIES MUST BE NOTIFIED TO STAKE THE PRECISE LOCATION OF THEIR UTILITIES.

BENCH MARK DATA

(NAVD88) DATUM

SITE BENCH MARK NO. 1
ARROW ON HYDRANT LOCATED EAST NORTHEAST ±120 FEET FROM THE NORTHEAST CORNER OF BUILDING ADDRESS 440 S BROADWAY
ELEVATION = 990.95'

SITE BENCH MARK NO. 2
SET MAG NAIL IN SOUTH FACE OF A UTILITY POLE LOCATED EAST ±60 FEET FROM THE SOUTHEAST BUILDING CORNER OF ADDRESS 458 S BROADWAY AND NORTHWEST ±20 FROM THE NORTHWEST BUILDING CORNER OF 468 S BROADWAY.
ELEVATION = 994.59'

SITE BENCH MARK NO. 3
SET MAG NAIL IN NORTH FACE OF A UTILITY POLE LOCATED ±45 FEET FROM THE SOUTHWEST CORNER OF ADDRESS 32 HEIGHTS ROAD.
ELEVATION = 997.27'

SITE BENCH MARK NO. 4
ARROW ON HYDRANT LOCATED ON THE SOUTH SIDE OF HEIGHTS ROAD AT HOUSE NO. 69 HEIGHTS RD.
ELEVATION = 990.43'

NOTES:

- ELECTRIC AND WATER UTILITY MAPS WERE NOT AVAILABLE AT TIME OF SURVEY.

- SURVEY IN ACCORDANCE WITH TITLE COMMITMENT NO. VGA401966, ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY THROUGH ITS AGENCY VANGUARD TITLE INSURANCE AGENCY, LLC, WITH AN EFFECTIVE DATE OF OCTOBER 4, 2021 LAST REVISED DECEMBER 28, 2021.

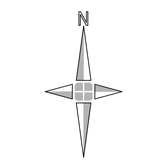
- THIS PARCELS ARE LOCATED WITHIN A FEDERALLY DESIGNATED FLOOD HAZARD AREA ZONE "X" (AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN) IN ACCORDANCE WITH THE FEDERAL INSURANCE RATE MAP, PANEL NUMBER 238 OF 704, MAP NUMBER 26125C0238F, EFFECTIVE DATE SEPTEMBER 29, 2006.

- SOURCE INFORMATION FROM PLANS AND MARKINGS WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES PURSUANT TO SECTION 5.E.IV. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED.

- TREE SIZES AND SPECIES ARE THE BEST ESTIMATION OF THE FIELD SURVEYOR. SPECIFIC QUESTIONS REGARDING INDIVIDUAL TREES SHOULD BE DIRECTED TO A QUALIFIED FORESTER.

- THIS TOPOGRAPHIC SURVEY WAS PROVIDED WITH EXISTING SNOW COVER OF 1" - 3". EVERY EFFORT HAS BEEN MADE TO LOCATE OBSERVABLE UTILITY STRUCTURES AND EVIDENCE, HOWEVER THE SURVEYOR CANNOT WARRANT COMPLETE FIELD IDENTIFICATION.

- SEE SHEET 2 FOR SCHEDULE OF STRUCTURES.



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Developed For:

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3500 UNIVERSITY DRIVE
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TOPOGRAPHIC SURVEY

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
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Attachment: Mystic Cove SP 08.10.2022 FULL SET (5448 : Moceri Mystic Cove Redevelopment)



(NOT TO SCALE)

SITE PLAN NOTES:

TOTAL SITE AREA: 195,955 SF, 4.49 ACRES

PLATTED SITE AREA HEIGHTS ROAD: 0.78 ACRES
PLATTED SITE AREA HEIGHTS/BROADWAY: 3.13 ACRES
TOTAL PLATTED SITE AREA: 3.91 ACRES

ZONING: MU, MIXED USE
ALLOWED DENSITY: 15 RESIDENCES/ACRE
15 RESIDENCES / ACRE x 0.78 ACRES: 11.70 RESIDENCES
15 RESIDENCES / ACRE x 3.13 ACRES: 46.95 RESIDENCES
ALLOWED RESIDENCES: 58.65 RESIDENCES

PROPOSED RESIDENCES:
LAKE RESIDENCES 36 RESIDENCES
M-24 RESIDENCES 11 RESIDENCES
TOTAL 47 RESIDENCES

PROPOSED BEDROOM BREAKDOWN:
2-BEDROOM RESIDENCES 12 RESIDENCES
3-BEDROOM RESIDENCES 35 RESIDENCES
TOTAL 47 RESIDENCES

OPEN SPACE: 42,885 SF / 0.98 ACRES
22%

PARKING:

REQUIRED: MULTI-FAMILY REQUIREMENTS
2 SPACES PER UNIT
47 x 2 = 94 SPACES
TOTAL REQUIRED: 94 SPACES

PROVIDED:
GARAGE SPACES 70 SPACES
DRIVEWAY SPACES 58 SPACES
OFF-STREET SPACES 6 SPACES
TOTAL SPACES 134 SPACES

NOTES:
1. MYSTIC COVE IS PROPOSED MULTI-FAMILY RESIDENCE COMMUNITY WITH OPTION LIVE/WORK UNITS ALONG M-24.
2. TRASH RECEPTACLES WILL BE STORED IN THE RESIDENCE GARAGES AND ROLLED OUT ON GARBAGE DAY.
3. HEIGHTS ROAD
(A) 4. NO PARKING FIRE LANE SIGN

AREA, HEIGHT, BULK AND PLACEMENT REGULATIONS:

SETBACKS

	PROPOSED	REQUIRED
FRONT (MINIMUM)	10'	10'
FRONT (MAXIMUM)	25'	25'
WATER	25'	25'
SIDE	9.9'	0'
MAX. LOT COVERAGE	24%	50%

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07.27.2022	REVISIONS PER FIRE MARSHAL REVIEW
08.09.2022	REVISIONS PER OWNER
08.09.2022	RESUBMIT FOR SITE PLAN APPROVAL

Developed For:

MOCERI COMPANIES
3500 UNIVERSITY DRIVE
AUBURN HILLS, MI
48326
248.340.9400

SITE AND PAVING PLAN

MYSTIC COVE

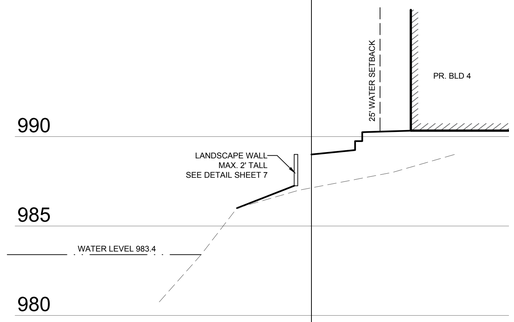
VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	4
Project:	20107.10

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Attachment: Mystic Cove SP 08.10.2022 FULL SET (5448 : Moceri Mystic Cove Redevelopment)



SECTION 1-1

SCALE: H:1"=10', V:1"=4'

LEGEND

- PR GATE VALVE AND WELL
- PR HYDRANT
- PR VALVE AND BOX
- PR WATERMAIN
- PR STORM CATCH BASIN
- PR STORM MANHOLE
- PR STORM REAR YARD
- PR STORM END SECTION
- PR RIP RAP
- PR STORM SEWER
- PR CLEAN OUT
- PR SANITARY MANHOLE
- PR SANITARY SEWER
- PR UNDERGROUND ELECTRIC SERVICE
- PR UNDERGROUND GAS SERVICE
- PR UNDERGROUND TELEPHONE SERVICE
- PR UTILITY CROSSING
- PR CONTOUR MINOR (1')
- PR CONTOUR MAJOR (5')
- PR SPOT ELEVATION
- PR SWALE
- PR CURB AND GUTTER
- PR REVERSE CURB AND GUTTER
- PR STD. DUTY ASPHALT
- PR CONCRETE PAVEMENT

GRADING

ABBREVIATIONS:

PW - PERMANENT WATER ELEVATION
HW - HIGH WATER / 100 YEAR STORM ELEVATION
FB - FREEBOARD ELEVATION
CD - CURB DROP FOR WALK
T/C - TOP OF CURB
G - GUTTER
T/A - TOP OF ASPHALT
BR - BOTTOM OF RAMP
TR - TOP OF RAMP
R - RAMP
L - LANDING
T/WALL - TOP OF WALL
B/WALL - BOTTOM OF WALL

ADA NOTES:

1. WALKS: CROSS SLOPES SHALL NOT EXCEED 2% AND LONGITUDINAL SLOPES SHALL NOT EXCEED 5%.
2. LANDINGS: CROSS AND LONGITUDINAL SLOPES SHALL NOT EXCEED 2% ON ALL LANDINGS.
3. RAMPS: CROSS SLOPES SHALL NOT EXCEED 2% AND LONGITUDINAL SLOPES SHALL NOT EXCEED 8.3%.

N

0 40' 80'

SCALE: 1" = 40'

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PRELIMINARY GRADING PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	5
Project:	20107.10

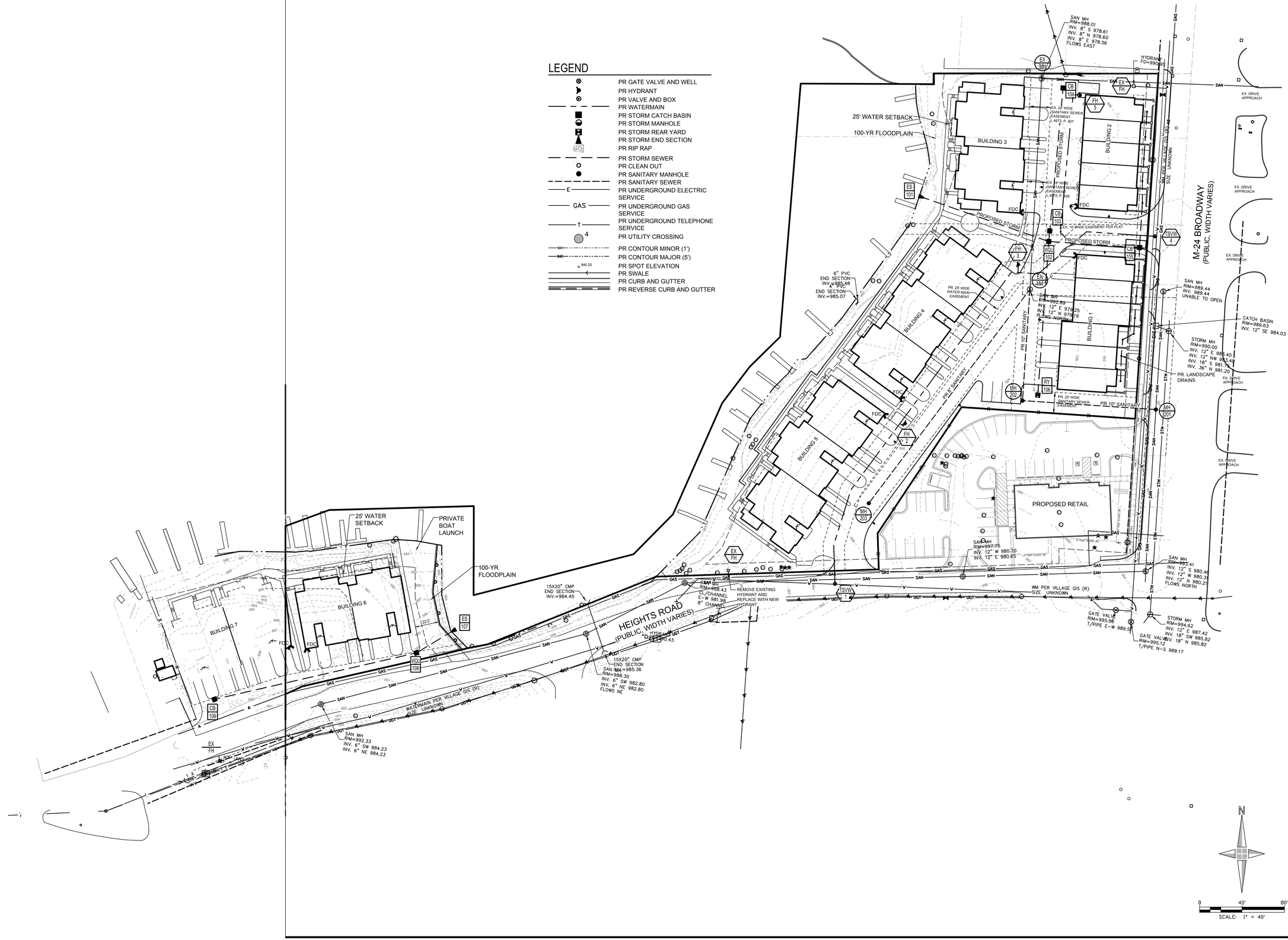
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LEGEND

- PR GATE VALVE AND WELL
- PR HYDRANT
- PR VALVE AND BOX
- PR WATERMAIN
- PR STORM CATCH BASIN
- PR STORM MANHOLE
- PR STORM REAR YARD
- PR STORM END SECTION
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PRELIMINARY UTILITY PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
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Project:	20107.10

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H:\20\20100\20107.10 Mystic Cove\Design\CAD\06 Utility Plan.dwg

Attachment: Mystic Cove SP 08.10.2022 FULL SET (5448 : Moceri Mystic Cove Redevelopment)

GENERAL NOTES:

1 A CONS RUC ON SHA BE PERFORMED N ACCORDANCE W H HE CURREN S ANDARDS AND SPEC F CA ONS OF THE VILLAGE OF AKE OR ON, OAK AND COUN Y WA ER RESOURCES COMM SS ONER, AND HE M CH GAN DEPAR MEN OF ENV RONMENT, GREAT AKES AND ENERGY

2 A WORK W H N HE OAK AND COUN Y ROAD COMM SS ON OR MDO R GH OF WAY SHA BE N ACCORDANCE W TH SUPP EMEN A PERM SPEC F CA ONS AND BY PERM ON Y

3 A PERM S REQU RED SHA BE OB A NED BY HE CON RAC OR A PERM FEES, BONDS, AND NSURANCE REQUIRED BY THE SSU NG AGENC ES SHA BE PROV DED BY HE CON RAC OR, AND MUS BE KEP CURREN HE CON RAC OR S RESPONSIBLE FOR A O HER FEES, NSPEC ON COS S, E C , AND SHA ADHERE O A REQU REMEN S SE FOR H N SA D PERM S.

4 72 HOURS PR OR O EXCAVA ON, HE CON RAC OR SHA NO FY M SS D G (1 800 482 7171) FOR OCA ON OF UNDERGROUND AND CAB E FAC ES, AND SHA NO FY REPRESEN A VES OF O HER U ES OCA ED N HE V C N Y OF HE WORK.

5 U Y NFORMA ON SHOWN ON HE P ANS WAS OB A NED FROM U Y OWNERS AND MAY OR MAY NO BE ACCURATE AND COMP E E CON RAC OR SHA VER FY AND OR OB A N ANY NFORMA ON NECESSARY REGARD NG HE PRESENCE OF UNDERGROUND U ES WH CH M GH HAVE AN EFFEC ON H S PROJEC , AND SHA BE RESPONS B E FOR ANY DAMAGE TO ANY PUB C OR PR VA E U ES, SHOWN OR NO SHOWN ON HE P ANS

6 HE U Y PO ES SHOWN ON HESE DRAW NGS ARE N ENDED O SHOW ON Y HE OCA ON OF EX S NG PO ES THE CONTRACTOR S RESPONS B E FOR DE ERM N NG HE QUAN Y AND D REC ON OF OVERHEAD NES

7 HE CON RAC OR SHA PROV DE FOR CON RO ED ACCESS O HE S E FOR USE BY HE VAR OUS WORK FORCES, EMERGENCY VEH C ES, OCCUPAN S, V S ORS, E C HROUGHOU CONS RUC ON H S ACCESS MUS PROV DE FOR HE REMOVAL OF MUD FROM VEH C ES RES ROADWAYS AND DR VEWAYS SHA BE MA N A NED AND OPEN FOR EMERGENCY VEH C ES A A TIMES, IT SHALL BE HE CON RAC OR S RESPONS B Y O NO FY HE RES DEN S AND BUS NESSES, WHOSE DR VEWAYS ARE AFFEC ED BY HIS SCHEDU E, 24 HOURS N ADVANCE CON RAC OR SHA SCHEDU E CONS RUC ON A NON PEAK USE HOURS AND SHALL MINIMIZE DR VEWAY C OSURE BY EXPED NG CONS RUC ON

8 DUR NG CONS RUC ON, CON RAC OR MAY ENCOUN ER SPR NK ER HEADS, P P NG, GH NG, AND BUR ED E EC R CAL CABLE, MA BOXES, FENCES, S GNS, E C CON RAC OR SHA REP ACE AND OR RES ORE A COMPONEN S OF SUCH SYS TEMS. THIS WORK SHA BE NC DEN A O HE PROJEC

9 R GH OF WAYS AND FRON OF O S D S URBED BY CONS RUC ON SHA BE RES ORED BY OPSO , SEED AND MULCH.

10 HE CON RAC OR S REQU RED O CONF NE CONS RUC ON AC V ES O HE M S OF HE S E AS SHOWN ON HE CONSTRUCTION P ANS ANY DAMAGE OR D SRUP ON O ADJACEN S ES S HE RESPONS B Y OF HE CON RAC OR O CORREC T IMMEDIATELY. NO OFF S E WORK SHA BE PERFORMED OU S DE OF PUB C R GH S OF WAY OR DED CA ED EASEMEN S W HOU PRIOR WRITTEN APPROVA OF HE PROPER Y OWNER

11 GREA CARE SHA BE AKEN O AVO D DAMAGE O VEGE A ON OU S DE HE C EAR NG AND GRUBB NG M S NO DRIVING OR PARK NG OF VEH C ES AND OR S ORAGE OF MA ER A S AND SUPP ES SHA BE PERM ED OU S DE HE M S OF CONSTRUCTION.

12 HE PRO EC ON OF EX S NG REES, AS REQU RED, SHA BE SO E Y HE CON RAC OR S RESPONS B Y

13 F NA C EANUP AND RES ORA ON SHA CONS S OF F NE GRAD NG OF CONS RUC ON AREAS, REMOVA OF CONSTRUCTION SIGNS, E C OPSO SHA BE SPREAD OVER A D S URBED AREAS, FO OWED BY SEED, FER ZER AND EROS ON MA OR STRAW MULCH, OR AS FUR HER REQU RED BY HE ANDSCAP NG P ANS AND SPEC F CA ONS A REQU RED RES ORA ON EMS NOT SPECIFICALLY DEN F ED AS A PAY EM SHA BE CONS DERED NC DEN A O HE CON RAC

14 A RES ORA ON SHA BE SPEC F ED ON HE P ANS AND N HE SPEC F CA ONS NON PAY EMS SHA BE NC DENTAL TO THE PROJEC

15 HE CON RAC OR AND OR H S SUBCON RAC ORS SHA NO FY HE V AGE OF AKE OR ON, OR ON OWNSH P F RE DEPARTMENT, HE OR ON OWNSH P PO C DEPAR MEN , MDO AND HE OAK AND COUN Y ROAD COMM SS ON WO (2) WEEKS PRIOR TO THE BEG NN NG OF CONS RUC ON

16 HE CON RAC OR SHA PROV DE NECESSARY S GNS, BARR CADES, AND GH S O PRO EC HE RAFF C AND HE WORK AS D REC ED BY HE F E D ENG NEER OR HE ROADWAY JUR SD C ONA AGENCY A RAFF C CON RO SHA BE N ACCORDANCE W H HE M CH GAN MANUA OF UN FORM RAFF C CON RO DEV CES (MMU CD)

17 A O MARKERS AND MONUMEN PO N S D S URBED DUR NG CONS RUC ON SHA BE REP ACED BY A REG S ERED LAND SURVEYOR A HE EXPENSE OF HE CON RAC OR

18 HE CON RAC OR SHA BE RESPONS B E FOR A DEWA ER NG REQU RED O CONS RUC HE PROPOSED U ES AND SHALL BE DONE PER APPROVED DEWA ER NG P AN COS OF DEWA ER NG SHA BE NC DEN A O HE PROJEC

DEMOLITION NOTES:

1 W H HE EXCEP ON OF AN AMOUN OF EXCAVA ED MA ER A S SUFF C EN FOR BACKF NG AND CONS RUC ON OF FILLS AS CA ED FOR ON HE P ANS AND AS ND CA ED BE OW, A BROKEN CONCRE E, S ONE AND EXCESS EXCAVA ED MATERIALS SHALL BE D SPOSED OF BY HE CON RAC OR

2 HE CON RAC OR W BE REQU RED O OB A N HE R OWN D SPOSA GROUND, AND W RECE VE NO ADD ONA COMPENSATION FOR D SPOS NG OF ANY OF HE EXCESS MA ER A S MA ER A S ACCEP AB E O HE ENG NEER MAY BE D SPOSED OF ON-SITE AT THE CON RAC ORS EXPENSE N A MANNER APPROVED N ADVANCE BY HE ENG NEER

3 HE EDGE OF EX S NG PAVEMEN SHA BE C EANED OF EAR H AND O HER FORE GN MA ER A BEFORE ADJACEN POURS ARE P ACED

4 EX S NG U ES ON S E W BE CAPPED OR BU K HEADED A HE MA N N ACCORDANCE W H V AGE OF AKE ORION AND SERV CE PROV DER S ANDARDS A BU KHEAD NG AND OR SEWER P PE REMOVA NECESS A ED BY HE REMOVAL OF DRAINAGE S RUC URES SHA BE NC UDED N HE S RUC URE REMOVA

5 HE CON RAC OR SHA COORD NA E W H AFFEC ED U Y COMPAN ES FOR HE REMOVA OR RE OCA ON OF UTILITY POLES.

6 S REE S GNS N HE WAY OF CONS RUC ON W BE REMOVED AND RESE MMED A E Y N A EMPORARY OCA ON, AS APPROVED BY HE F E D ENG NEER

7 HE CON RAC OR SHA PRO EC A EX S NG S GNS AND POS S SCHEDU ED O REMA N, AS D REC ED BY HE F ELD ENGINEER.

8 A UNDERGROUND U ES NO ND CA ED FOR REMOVA SHA BE PRO EC ED HROUGHOU CONS RUC ON

9 HE CON RAC OR SHA BE RESPONS B E FOR PRO EC NG A PR VA E PROPER Y (NC UD NG BU D NGS AND FOUNDATIONS) HROUGHOU CONS RUC ON AND SHA MA N A N SAFE PEDES R AN ACCESS A A MES

10 EX S NG PAVEMEN S, S DEWA KS, CURBS, DR VEWAYS, GU ERS, CROSSWA KS, AND O HER B UM NOUS OR CONCRETE SURFACES O BE REMOVED, SHA BE REMOVED O HE M S SHOWN OR AS REQU RED BY HE ENG NEER REMOVA SHA BE CAREFULLY DONE AND O A NEA NE CONCRE E SAWS OR O HER MECHAN CA EQU PMEN APPROVED BY HE ENG NEER SHALL BE USED ON H S WORK

11 HE REMOVA OF PAVEMEN , CURBS AND WA KS SHA NC UDE A REQU RED SAWCU NG CURB REMOVA S NCIDENTAL TO PAVEMEN REMOVA



TYPICAL 6' HIGH VINYL FENCE IMAGE

GRADING NOTES:

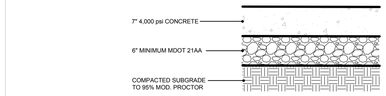
1. EXCESS EXCAVATION SHALL BE DISPOSED OF BY THE CONTRACTOR. COST OF DISPOSAL WILL BE INCIDENTAL TO THE PROJECT.
2. THE FINAL SUB-GRADE SHALL BE THOROUGHLY PROOF-ROLLED UNDER THE OBSERVATION OF THE SOILS ENGINEER.
3. NO FROZEN MATERIAL SHALL BE PERMITTED AS BACKFILL UNDER ANY ROADWAY, DRIVEWAY OR PARKING AREA.
4. PRIOR TO THE START OF ANY FILLING, THE CONTRACTOR SHALL REMOVE ALL TOPSOIL AND ALL OTHER UNACCEPTABLE SOIL FROM THE FILL AREAS, AND PROPERLY BACKFILL WITH ACCEPTABLE SOIL.
6. GENERAL GRADING REQUIREMENTS ARE AS FOLLOWS:
   - A. FINISH GRADE AT EXISTING BUILDING SHALL MATCH BRICK LEDGES, DOORWAYS OR BASEMENT WINDOWS
   - B. MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDINGS: 5% WITHIN THE FIRST 10' AND 2% AFTER.
   - C. SIDEWALK CROSS SLOPE SHALL BE NO MORE THAN 2%.
   - D. PAVEMENT SLOPES (1.0% MINIMUM, 4.0% MAXIMUM) UNIFORMLY BETWEEN FINISH GRADE ON PLANS
   - E. LAWN AREAS ± 2% MINIMUM TO 25% (BERMS) MAXIMUM
9. PRIOR TO THE PLACEMENT OF ANY BASE ASPHALT OR LEVELING COURSE, THE CURBS SHALL BE PARTIALLY BACKFILLED AND THE SUB-GRADE SHALL BE PROOF-ROLLED UNDER THE SUPERVISION OF THE SOILS ENGINEER.
10. ALL SIDEWALK AND PATHWAYS IN ANY PUBLIC R.O.W. SHALL BE INSPECTED BY THE AGENCY WITH JURISDICTION.

PAVING NOTES:

1. THE PAVING CONTRACTOR SHALL BE REQUIRED TO COORDINATE THE INSTALLATION OF GAS, ELECTRIC, PHONE, CABLE, SPRINKLERS, ETC. IN SUCH A MANNER THAT WILL FACILITATE THEIR PROPER INSTALLATION PRIOR TO PLACING THE PAVEMENT MATERIALS. ENSURE THAT ALL REQUIRED PIPES, CONDUITS, CABLES AND SLEEVES ARE PROPERLY PLACED AND THAT THE TRENCHES ARE PROPERLY BACKFILLED AND COMPACTED.
2. BUTT JOINTS SHALL BE PLACED AT ALL LOCATIONS WHERE AN EXISTING ASPHALT PAVEMENT SURFACE IS BEING DISTURBED BY REMOVALS AND/OR THE INSTALLATION OF NEW ASPHALT PAVEMENT.
3. ALL PAVEMENT AREAS SHOULD BE CLEARED AND GRUBBED BY REMOVING SURFACE VEGETATION, TOPSOIL, DEBRIS AND OTHER DELETERIOUS MATERIALS.
4. THE PLACEMENT OF THE FINAL ASPHALT LIFT SHALL BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED, OR AS APPROVED BY THE OWNER. A BOND COAT OF SS-1H EMULSION SHALL BE APPLIED (AT A RATE OF 0.10 GALLONS/S.Y.D.) BETWEEN THE LEVELING AND WEARING COURSE WHEN 48 HOURS HAVE ELAPSED BETWEEN PLACEMENTS.
6. PROPOSED AGGREGATE BASE SHALL EXTEND A MINIMUM OF 1 FOOT BEYOND THE PAVEMENT EDGE/BACK OF CURB.
7. ALL BARRIER FREE RAMPS, WALK, LANDINGS AND CURBS SHALL BE A.D.A. COMPLIANT AND MEET MDOT STANDARD PLAN R-28.
8. DIMENSIONS ARE TO FACE OF CURB.

UTILITY NOTES:

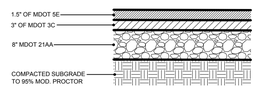
1. REFER TO ARCHITECTURAL PLANS TO COORDINATE ALL:
   - A. WATER SUPPLY, METERING, SPRINKLER AND FDC PIPING, DESIGN AND COORDINATION
   - B. BUILDING SEWER, BUILDING DRAIN DESIGN AND CONNECTIONS TO CLEAN OUTS AND ROOF CONNECTORS
   - C. GAS, ELECTRIC AND COMMUNICATION SERVICES, AND LIGHTING DETAILS
   - D. ALL BUILDING ACCESS WALKS AND ENTRY DETAILS, INCLUDING SUPPORTED SLABS
   - E. ALL WORK TO CONSTRUCT THE BUILDING AND ALL ITEMS CONNECTED TO IT
2. ALL TRENCHES WITHIN A ONE ON ONE SLOPE OF PAVEMENT SHALL BE BACKFILLED WITH SAND (MDOT CLASS II MINIMUM) AND MECHANICALLY COMPACTED IN NOT MORE THAN 9" LAYER TO 95% MAXIMUM DRY DENSITY PER MODIFIED PROCTER COMPACTION TEST ASTM D-1557. COMPACTED SAND BACKFILL SHALL ALSO BE PROVIDED FOR ALL SEWER TRENCHES LOCATED UNDER, OR WITHIN, THREE FEET OF PAVEMENT.
3. A MINIMUM VERTICAL CLEARANCE OF 18 INCHES IS REQUIRED AT UTILITY CROSSINGS (MEASURED FROM THE OUTSIDE OF PIPE TO THE OUTSIDE OF PIPE). POSITIVE PROVISIONS SHALL BE MADE TO ENSURE THAT ALL UTILITY TRENCHES ARE FREE DRAINING DURING ALL PHASES OF CONSTRUCTION.
4. THE MINIMUM SLOPE FOR A BUILDING LEAD IS 1%. LEADS SHALL ONLY BE CONNECTED TO THE MAIN LINE WITH WYES.
5. ROADWAY, DRIVEWAY AND PARKING AREA CROSSINGS SHALL BE TEMPORARILY CONDITIONED IMMEDIATELY AFTER CROSSING BY PLACING 6" OF MDOT 22A GRAVEL OR SLAG AGGREGATE, AND SHALL BE MAINTAINED IN GOOD, DUST FREE CONDITION UNTIL PAVEMENT RESTORATION IS MADE.
6. THE CONTRACTOR SHALL COORDINATE THE REMOVAL OF ALL UTILITY LINES AND STRUCTURES, AS OUTLINED ON THE DEMOLITION PLAN, WITH THE INSTALLATION OF UTILITY IMPROVEMENTS.
7. THE CONTRACTOR SHALL REMOVE UTILITIES, WHICH HAVE BEEN ABANDONED IN PLACE, AS REQUIRED TO COMPLETE INSTALLATION OF NEW UTILITIES. WHENEVER ABANDONED UTILITIES ARE CUT, CONTRACTOR SHALL COMPLETELY CAP BOTH ENDS TO PREVENT THE INFILTRATION OF SOILS.
8. NO CONNECTION MAY BE MADE TO ANY EXISTING WATER MAIN UNTIL THE NEW MAIN HAS PASSED ALL PRESSURE AND BACTERIOLOGICAL TESTING.
9. WATER LEADS SHALL HAVE A MINIMUM OF 5.5 FEET OF COVER.



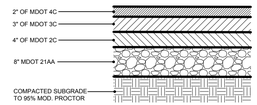
7" PAVEMENT SECTION

NOTE:
1. IF ANY OF THE EXISTING BASE CANNOT BE UTILIZED, IT SHALL BE REMOVED AND REPLACED WITH MDOT 21AA MATERIAL.
2. BROOM FINISH SURFACE.
3. IF NOT INDICATED ON THE PLANS THE CONTRACTOR SHALL SUBMIT A JOINTING PLAN PRIOR TO PLACEMENT OF CONCRETE PAVEMENT.

CONCRETE PAVEMENT
N.T.S.



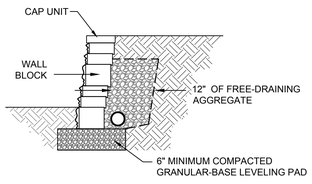
SITE ASPHALT PAVEMENT SECTION



GUNN ROAD
PAVEMENT SECTION

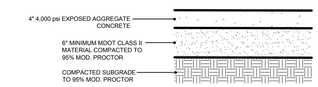
NOTE:
1. IF ANY OF THE EXISTING BASE CANNOT BE UTILIZED, IT SHALL BE REMOVED AND REPLACED WITH MDOT 21AA MATERIAL.
2. THE PLACEMENT OF THE FINAL LIFT OF ASPHALT SHALL BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION HAS BEEN COMPLETED, OR AS DIRECTED BY THE ENGINEER.
3. A BOND COAT OF SS-1H EMISSION SHALL BE APPLIED (AT A RATE OF 0.10 gal/syd) BETWEEN THE LEVELING AND WEARING COURSE WHEN 48 HOURS HAVE ELAPSED BETWEEN PLACEMENT.

HMA PAVEMENT
N.T.S.

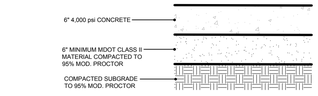


NOTE:
1. TYPICAL LANDSCAPE WALL SECTION. SECTION TO BE VERIFIED WITH WALL MANUFACTURER AND CUSTOMIZED PER SUPPLIER REQUIREMENTS.

TYPICAL LANDSCAPE WALL DETAIL
N.T.S.



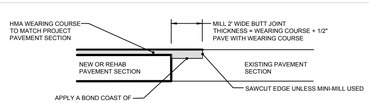
4" CONCRETE SIDEWALK



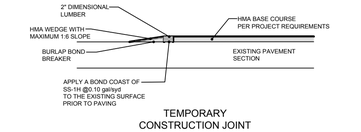
6" CONCRETE SIDEWALK

NOTE:
1. IF ANY OF THE EXISTING BASE CANNOT BE UTILIZED, IT SHALL BE REMOVED AND REPLACED WITH MDOT CLASS II MATERIAL.
2. BROOM FINISH SURFACE.
3. IF NOT INDICATED ON THE PLANS THE CONTRACTOR SHALL SUBMIT A JOINTING PLAN PRIOR TO PLACEMENT OF CONCRETE PAVEMENT.
4. JOINTS SHALL BE SAWCUT AS SOON AS PAVEMENT CAN SUPPORT MACHINE.
5. AN EXPANSION JOINT SHALL BE PLACED BETWEEN NEW WALKS AND EXISTING PAVEMENT AND/OR BUILDINGS.
6. COORDINATE WITH OWNER FOR COLOR AND TYPE OF EXPOSED AGGREGATE CONCRETE.

CONCRETE SIDEWALK
N.T.S.

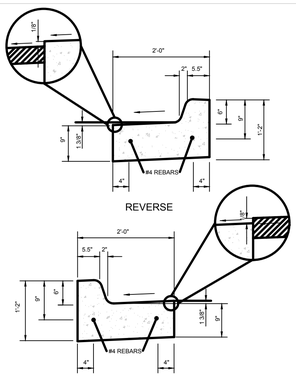


BUTT JOINT



TEMPORARY
CONSTRUCTION JOINT

HMA JOINTS
N.T.S.



NOTE:
1. USE MDOT 35P CONCRETE UNLESS OTHERWISE NOTED.
2. REFER TO PLANS FOR LOCATIONS OF STANDARD AND REVERSE CURB.
3. CONTRACTOR SHALL SMOOTHLY TRANSITION BETWEEN STANDARD AND REVERSE CURB.

CONCRETE CURB & GUTTER
N.T.S.

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Designer:	-
Quality Control:	MP
Section:	11
	T-04-N R-10-E

Professional Seal:

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DATE:	ISSUE:
07.13.2022	SUBMIT FOR SITE PLAN APPROVAL
07.27.2022	REVISIONS PER FIRE MARSHAL REVIEW
08.09.2022	REVISIONS PER OWNER
08.09.2022	RESUBMIT FOR SITE PLAN APPROVAL

Developed For:

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248.340.9400

SITE NOTES AND DETAILS

MYSTIC COVE

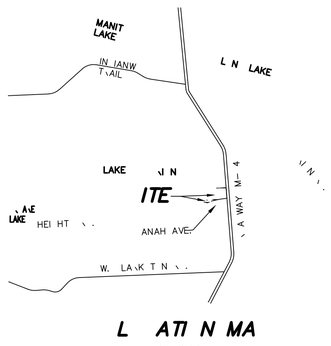
VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

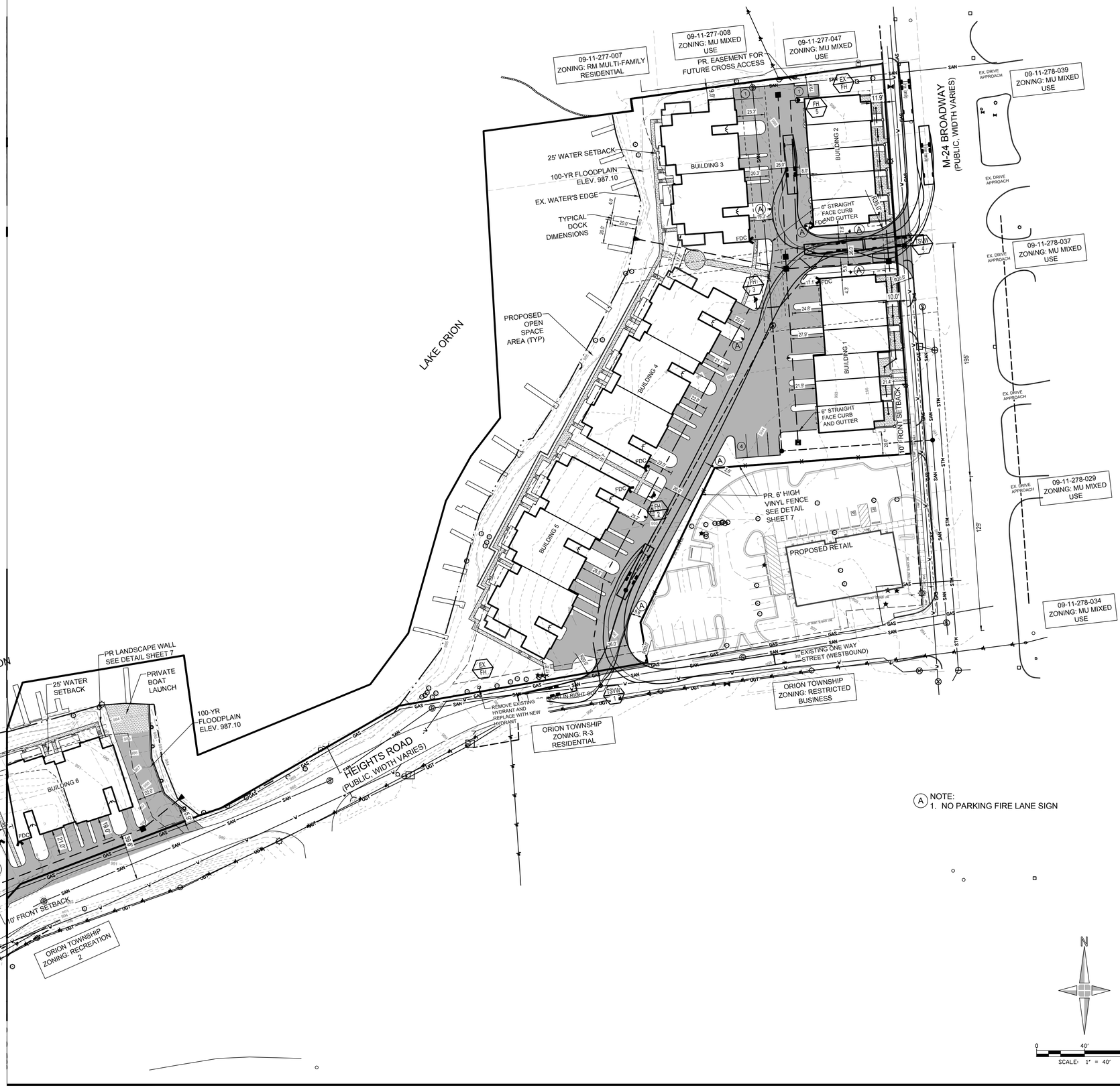
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Scale:	NA
Sheet:	7
Project:	20107.10

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Attachment: Mystic Cove SP 08.10.2022 FULL SET (5448 : Moceri Mystic Cove Redevelopment)

H:\20\20100\20107-10 Mystic Cove\Design\CAD\07 Site Notes and Details.dwg





A NOTE:
1. NO PARKING FIRE LANE SIGN

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FIRE PROTECTION PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	8
Project:	20107.10

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H:\20\20100\20107.10 Mystic Cove\Design\CAD\08 Fire Protection Plan.dwg

Attachment: Mystic Cove SP 08.10.2022 FULL SET (5448 : Moceri Mystic Cove Redevelopment)

PLANT LIST: XXX / X

PERENNIALS:

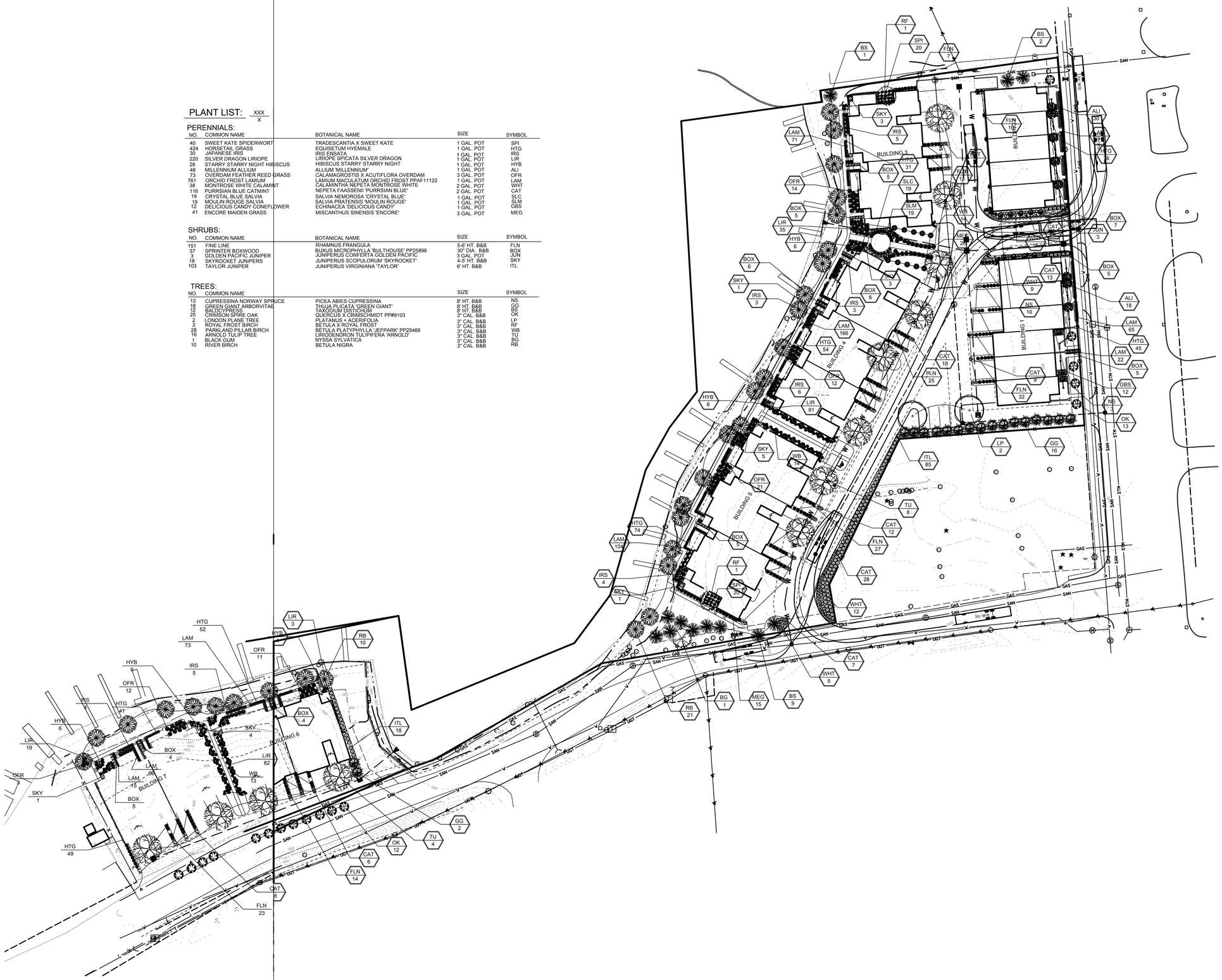
NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
40	SWEET KATE SPIDERWORT	TRADESCANTIA X SWEET KATE	1 GAL. POT	SPI
424	HORSETAIL GRASS	EQUISETUM HYEMALE	1 GAL. POT	HTG
30	JAPANESE IRIS	IRIS ENSATA	1 GAL. POT	IRS
220	SILVER DRAGON LIRIOPE	LIRIOPE SPICATA SILVER DRAGON	1 GAL. POT	LIR
28	STARRY STARRY NIGHT HIBISCUS	HIBISCUS STARRY STARRY NIGHT	1 GAL. POT	HYB
48	MILLENNIUM ALLIUM	ALLIUM 'MILLENNIUM'	1 GAL. POT	ALI
73	OVERDAM FEATHER REED GRASS	CALAMAGROSTIS X ACUTIFLORA OVERDAM	3 GAL. POT	OFR
761	ORCHID FROST LAMIUM	LAMIUM MACULATUM ORCHID FROST PPAF11122	1 GAL. POT	LAM
38	MONTROSE WHITE CALAMINT	CALAMINTHA NEPETA MONTROSE WHITE	2 GAL. POT	WHT
116	PURRSIAN BLUE CATMINT	NEPETA FAASSENII 'PURRSIAN BLUE'	2 GAL. POT	CAT
19	CRYSTAL BLUE SALVIA	SALVIA NEMOROSA 'CRYSTAL BLUE'	1 GAL. POT	SLC
19	MOULIN ROUGE SALVIA	SALVIA PRATENSIS 'MOULIN ROUGE'	1 GAL. POT	SLM
12	DELICIOUS CANDY CONEFLOWER	ECHINACEA 'DELICIOUS CANDY'	1 GAL. POT	GBS
41	ENCORE MAIDEN GRASS	MISCANTHUS SINENSIS 'ENCORE'	3 GAL. POT	MEG

SHRUBS:

NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
151	FINE LINE	RHAMNUS FRANGULA	5-6' HT. B&B	FLN
57	SPRINTER BOXWOOD	BUXUS MICROPHYLLA 'BULTHOUSE' PP25896	30" DIA. B&B	BOX
3	GOLDEN PACIFIC JUNIPER	JUNIPERUS CONFERTA GOLDEN PACIFIC	3 GAL. POT	JUN
18	SKYROCKET JUNIPERS	JUNIPERUS SCOPULORUM 'SKYROCKET'	4-5' HT. B&B	SKY
103	TAYLOR JUNIPER	JUNIPERUS VIRGINIANA 'TAYLOR'	6' HT. B&B	ITL

TREES:

NO.	COMMON NAME	BOTANICAL NAME	SIZE	SYMBOL
13	CUPRESSINA NORWAY SPRUCE	PICEA ABIES CUPRESSINA	8' HT. B&B	NS
18	GREEN GIANT ARBORVITAE	THUJA PLICATA 'GREEN GIANT'	8' HT. B&B	GG
12	BALDCYPRESS	TAXODIUM DISTICHUM	8' HT. B&B	BS
25	CRIMSON SPIRE OAK	QUERCUS X CRIMSCHMIDT PP#9103	3" CAL. B&B	OK
2	LONDON PLANE TREE	PLATANUS X ACERIFOLIA	3" CAL. B&B	LP
2	ROYAL FROST BIRCH	BETULA X ROYAL FROST	3" CAL. B&B	RF
28	PARKLAND PILLAR BIRCH	BETULA PLATYPHYLLA 'JEFPARK' PP25468	3" CAL. B&B	WB
16	ARNOLD TULIP TREE	LIRIODENDRON TULIPIFERA 'ARNOLD'	3" CAL. B&B	TU
1	BLACK GUM	NYSSA SYLVATICA	3" CAL. B&B	BG
10	RIVER BIRCH	BETULA NIGRA	3" CAL. B&B	RB



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Section:	11
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Professional Seal:

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Developed For:

MOCERI COMPANIES

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AUBURN HILLS, MI
48326

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LANDSCAPE PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	L1
Project:	20107.10

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Attachment: Mystic Cove SP 08.10.2022 FULL SET (5448 : Moceri Mystic Cove Redevelopment)

PLANT NOTES:

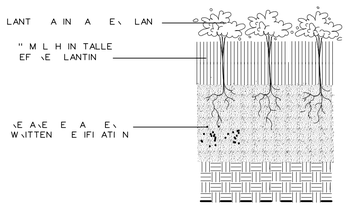
1. Plant materials shall be sound, heathy vigorous, free from plant diseases and insects or their eggs, and shall have normal, healthy root systems. Caliper measurements shall be taken 6: above the ground level. All other measurements shall be in accordance with the latest edition of "American Standard for Nursery Stock" (ANSI Z-60.1 + A3002004.)
2. Planting bed soil for annuals shall be screened topsoil. To deter weed growth during the establishment of annual, & perennial bed, apply a pre-emergent (Preen' or equal) after planting 2-3 times per growing season, at a rate per recommendation of product manufacturer.
3. Planting pockets shall be no deeper than the height of the root ball, saucer shall be made on the edges of the plant pocket.
4. All tree wrap shall be removed upon planting.
5. Mulch shall be shredded hardwood bark, free from deleterious materials and suitable as a top dressing of planting beds and individual tree plantings.
6. Trees shall be mulched with minimum of 3" deep hardwood bark mulch.
7. Grass seed shall be certified turf grass seed complying with A.S.P.A. specifications, and free of weed seeds and undesirable native grasses. Seeded areas shall not be permitted to dry out. All lawn areas shall be fertilized and watered as required during the first growing season to maintain a dense and vigorous growing lawn.
8. Plants shall be guaranteed for two complete growing seasons (24 months). Dead material shall be replaced as needed prior to the expiration of the guarantee period, in accordance with the local ordinance requirements.
9. Contractor shall provide in writing a list of recommended maintenance procedures for the first two (2) growing seasons.
10. Remove top ⅓ of burlap on root ball or all if wrapped in plastic covering and/or nylon cord.
11. Plant materials shall be used in compliance with the provisions of the local ordinance and shall be nursery grown, free of pests and diseases, hardy in this county, in conformance with the standards of the American Association of Nurserymen, and shall have passed inspections required under state regulations. In addition, plant materials shall conform to the standard of the county cooperative extension service.

GENERAL NOTES:

1. All Construction shall conform to the current standards and specifications of local ordinances.
2. All areas not built, landscaped, or paved upon shall be seeded or sodded. Terra seed system or approved equal is encouraged.
3. Contractor to provide tree gaters, one per tree as shown on plan, to convey water for the first two years.
4. Two (2) year guarantee period begins at Final Inspection of landscape material by the City's representative, a landscape architect or nurseryman, and prior to the authorization of the occupancy permit. This is the first of two (1 of 2) required City inspections of the Landscape Plan installation.
5. Building Department will not release construction bonds until City approved landscape architect or nurseryman has inspected the site and approved the installation of landscape plans. Final bond will not be released until the two (2) year guarantee expires and final inspection is made.
6. Owner is then responsible for care and maintenance of all plants upon return of bonds. All plant material is to be maintained for the natural life of the plant. No removal of any plants material is permitted without replacement.

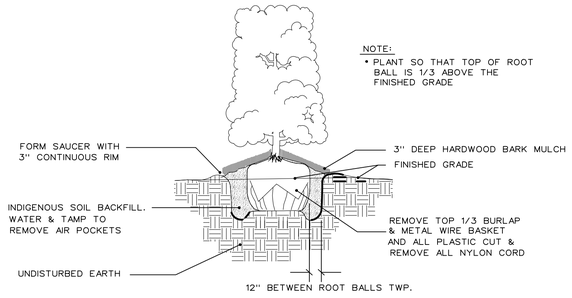
LANDSCAPE CONTRACTOR'S "TWO-YEAR IRRIGATION REQUIREMENT PERIOD"

It shall be the responsibility of the landscape contractor to program and periodically adjust the irrigation system (provided by others) as required to ensure delivery of proper and adequate water supply to all plant material, and seeded lawn areas serviced by the same irrigation system, to ensure the establishment of healthy plant material and lawn for their first year of growth. Following the landscape contractor's two-year irrigation requirement period, the contractor shall provide the owner with suggested irrigation maintenance schedule for their use.



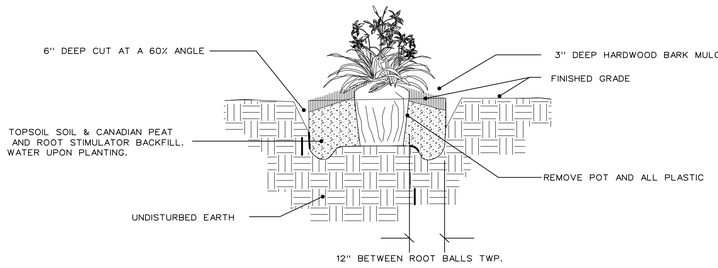
GROUNDCOVER PLANTING DETAIL

N ALE



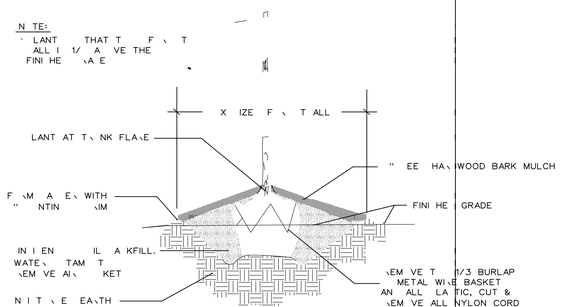
SHRUB HEDGE PLANTING DETAIL

NO SCALE



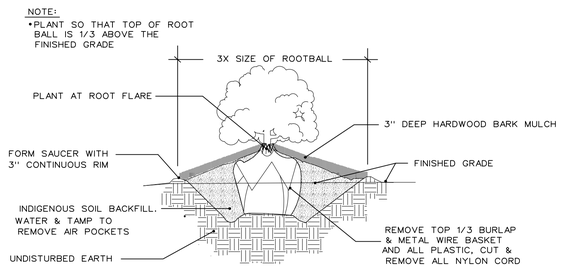
PERENNIAL PLANTING DETAIL

NO SCALE



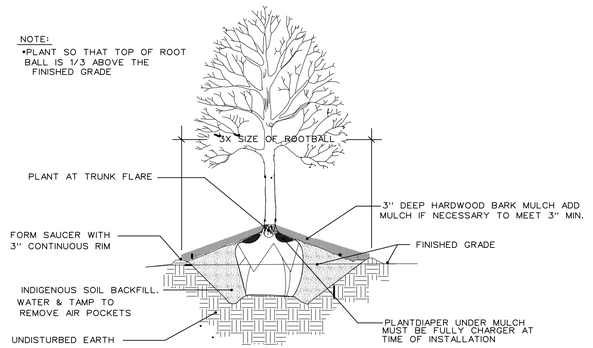
EVERGREEN TREE PLANTING DETAIL

N ALE



SHRUB PLANTING DETAIL

NO SCALE

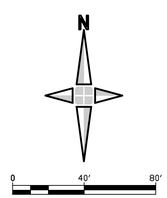


TREE / SHRUB PLANT DIAPER DETAIL

NO SCALE

LAWN SEED MIX:

30% PERENNIAL RYGRASS
20% PARK KENTUCKY BLUEGRASS
45% CREEPING RED FESCUE
5% ANNUAL RYEGRASS
4#/1000 S.F. SEEDING RATE



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AUBURN HILLS, MI
48326

248.340.9400

LANDSCAPE PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	1"=40'
Sheet:	L2
Project:	20107.10

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SITE RENDERING

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	NA
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Lighted Bollard



Pole Fixture



Wall Pack



Acorn Fixture per Village Requirements



Recessed Fixture (Balcony Lighting)

Schedule

Symbol	Label	Image	Quantity	Manufacturer	Catalog Number	Description	Plot	Wattage
	A		118	Wave Lighting		60 Watt Equivalent, A19 Screw Base Lamp, with clear frosted diffuser LED array, 4000K CCT		9.5
	B		17	Lithonia Lighting	MR2 LED 2 30A350/51K SR3 MVOLT HS	MR2 HOUSING WITH TWO TYPE 3 LIGHT ENGINES AT 350mA WITH HOUSE SIDE SHIELDS		226
	C		88	Lithonia Lighting	RADB LED P1 40K SYM DNAXD	RADB LED P1 40K SYM DNAXD		5.21
	D		7	American Electric Lighting	HTFL P10 XX 40K R5VC AP 8R	Hartsfield LED, P10, 4000K, Type 5 Visual Comfort, Polycarbonate 8" Refractor		25.3
	E		48		A19-60W-P1-27K-E26-U1	60 Watt Equivalent, A19 Screw Base Lamp, with white opaque dome lens covering LED array, 2700K CCT		9.5

Mounting Height Note

Mounting height is measured from grade to face of fixture. Pole height should be calculated as the mounting height less base height.

General Note

The Engineer and/or Architect must determine applicability of the layout to existing/future field conditions. This lighting layout represents illumination levels calculated from laboratory date taken under controlled conditions in accordance with illuminating engineering society approved methods. Actual performance of any manufacturer's luminaire may vary due to cariation in electrical voltage, tolerance in lamps, and other variable field conditions. Mounting heights indicated are from grade and/or floor up.

These lighting calculations are not a substitute for independent engineering analysis of lighting system suitability and safety. The Engineer and/or Architect is responsible to review for Michigan Energy Code and Lighting Quality Compliance.

Unless exempt, project must comply with lighting controls requirements defined in ASHRAE 90.1 2013. For specific information contact GBA controls group at ASG@gasserbush.com OR 734-266-6705.

Ordering Note

For Inquiries Contact Gasser Bush at quotes@gasserbush.com.

Drawing Note

This drawing was generated from an electroinc image for estimation purpose only. Layout to be verified in field by others. Site to comply with all lighting requirements.

Statistics		
Description	Symbol	Avg
Prop Line East	+	0.3 fc
Prop Line West	+	0.4 fc
East Lake Front	+	0.1 fc
East Parking Areas	+	2.4 fc
East Pedestrian Areas	+	2.0 fc
West Lake Front	+	0.1 fc
West Parking Areas	+	2.8 fc
West Pedestrian Areas	+	2.1 fc

Plan View - A
Scale - 1" = 30ft



Plan View
Scale - 1" = 30ft

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LIGHTING PLAN

MYSTIC COVE

VILLAGE OF LAKE ORION
OAKLAND COUNTY
MICHIGAN

Date:	03.16.2022
Scale:	
Sheet:	LI-1
Project:	20107.10

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FLEX / LIVE WORK FLOOR PLAN

SCALE: 1/4" = 1'-0"

UNIT-A
SQUARE FOOTAGE
FLEX / LIVE WORK = 674 SQUARE FEET

1ST FLOOR = 1119 SQUARE FEET
2ND FLOOR = 1001 SQUARE FEET
TOTAL = 2120 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
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UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
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SQUARE FOOTAGE
FLEX / LIVE WORK = 674 SQUARE FEET

1ST FLOOR = 1119 SQUARE FEET
2ND FLOOR = 1001 SQUARE FEET
TOTAL = 2120 SQUARE FEET

ALL WINDOW NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
2040-2 = 2'-0" X 4'-0", 2-WIDE WINDOW UNIT

ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
ALL FIRST FLOOR CEILING HEIGHTS TO BE 9'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

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MYSTIC COVE
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BUILDING #5

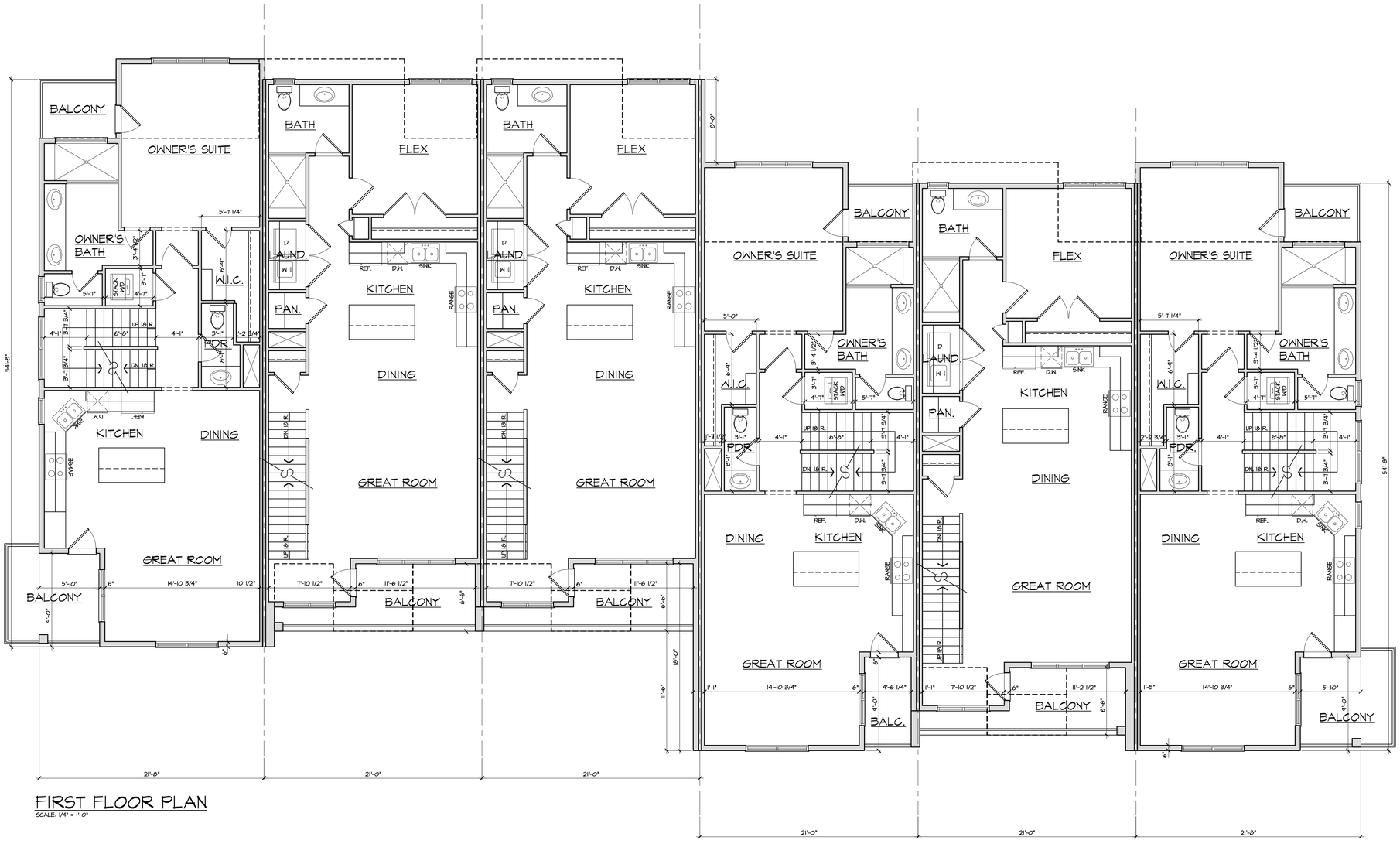
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FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

ALL WINDOW NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
2040-2 = 2'-0" X 4'-0", 2-WIDE WINDOW UNIT

ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
ALL SECOND FLOOR CEILING HEIGHTS TO BE 9'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

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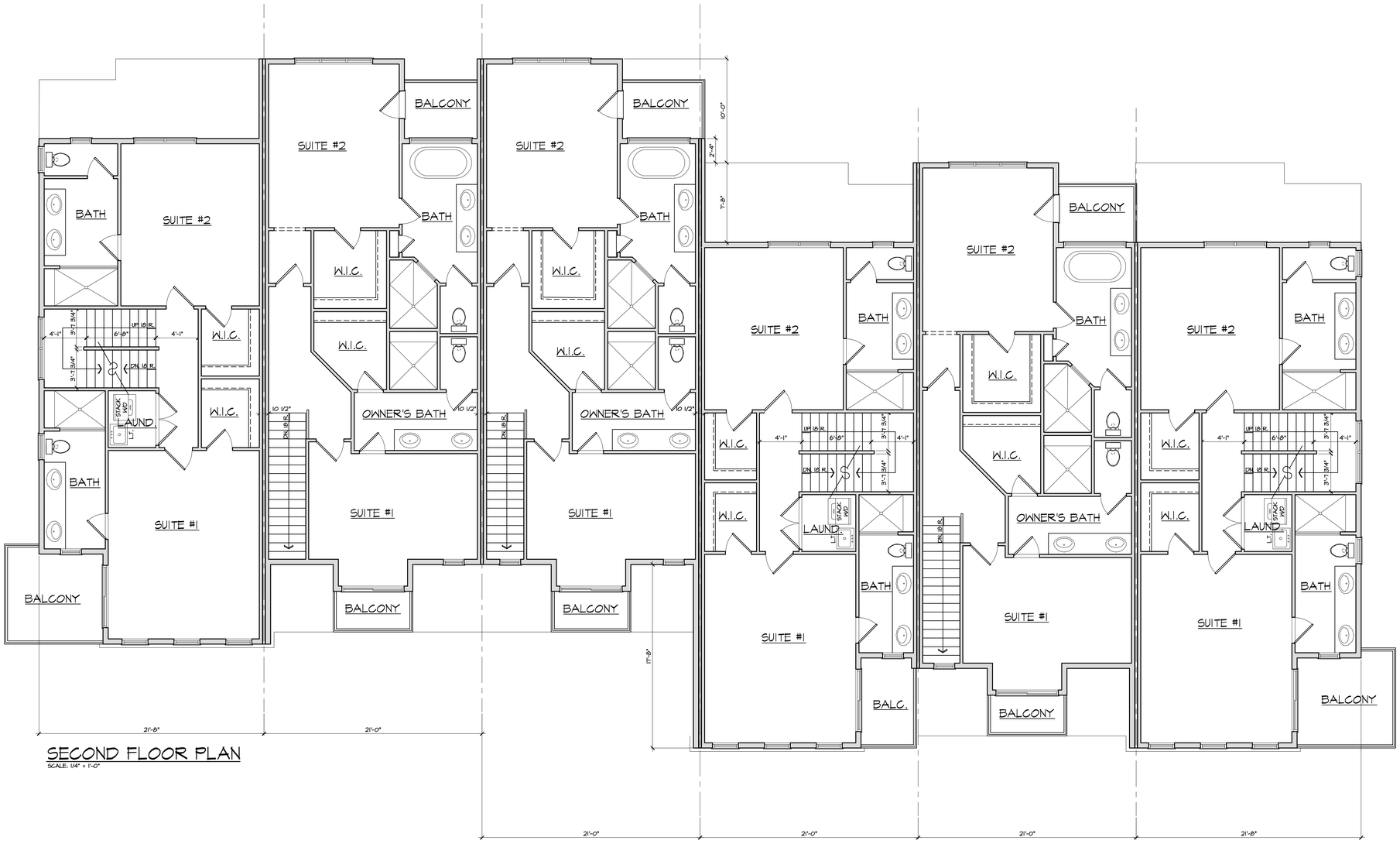
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LEFT ELEVATION

SCALE: 3/16" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"

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REAR ELEVATION

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FLEX / LIVE WORK FLOOR PLAN

SCALE: 1/4" = 1'-0"

UNIT-A
SQUARE FOOTAGE
FLEX / LIVE WORK = 674 SQUARE FEET

1ST FLOOR = 1119 SQUARE FEET
2ND FLOOR = 1001 SQUARE FEET
TOTAL = 2120 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
FLEX / LIVE WORK = 663 SQUARE FEET

1ST FLOOR = 1017 SQUARE FEET
2ND FLOOR = 984 SQUARE FEET
TOTAL = 2001 SQUARE FEET

UNIT-B
SQUARE FOOTAGE
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EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
ALL FIRST FLOOR CEILING HEIGHTS TO BE 9'-1 1/8" HIGH UNLESS NOTED OTHERWISE.

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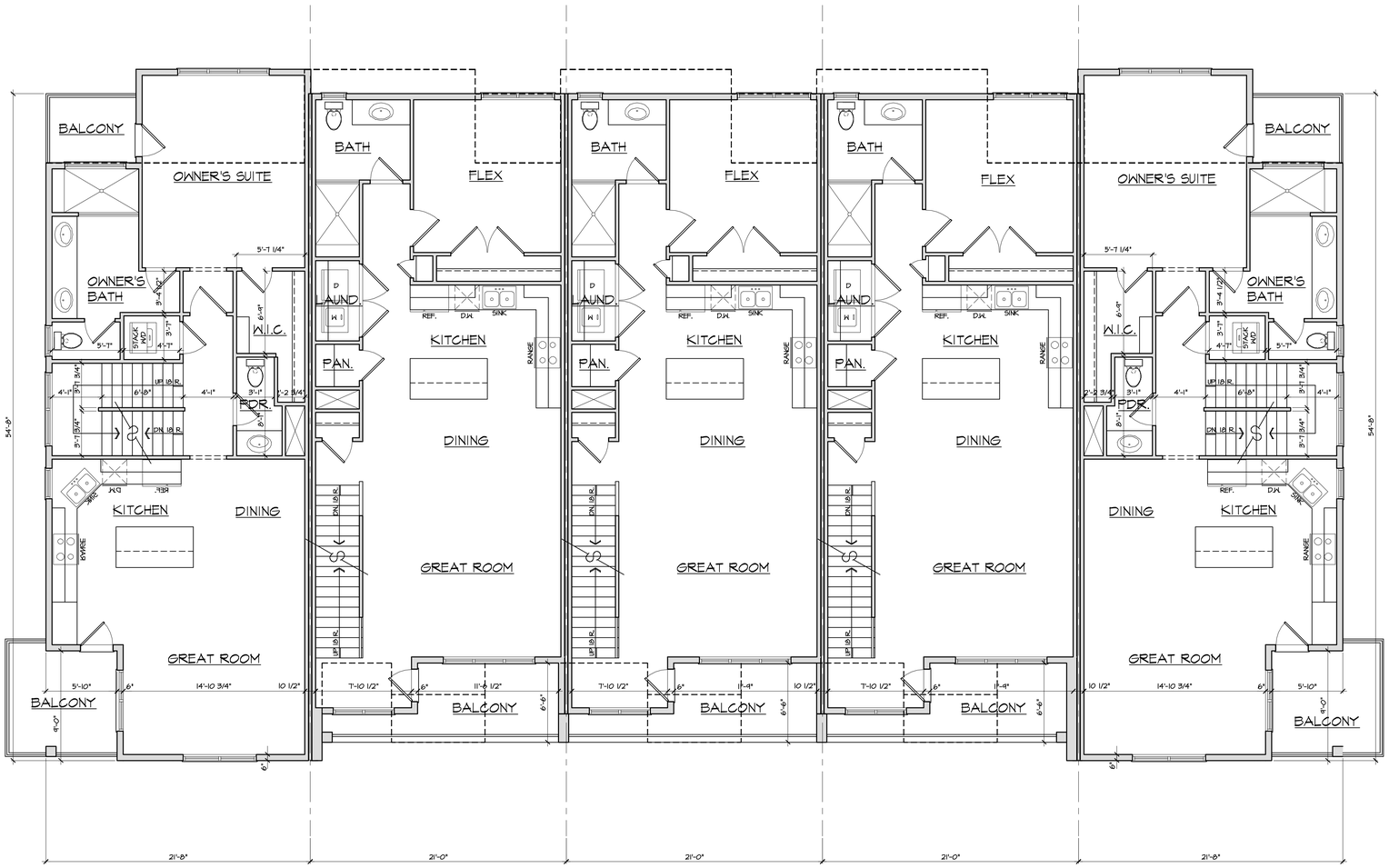
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EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
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SECOND FLOOR PLAN

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EXAMPLE:
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ALL DOOR NUMBERS REFER TO GENERIC SIZES (NO SPECIFIC MANUFACTURER)
EXAMPLE:
3080 = 3'-0" X 8'-0"

NOTE:
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LEFT ELEVATION

SCALE: 3/16" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"

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RIGHT ELEVATION

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REAR ELEVATION

SCALE: 1/4" = 1'-0"

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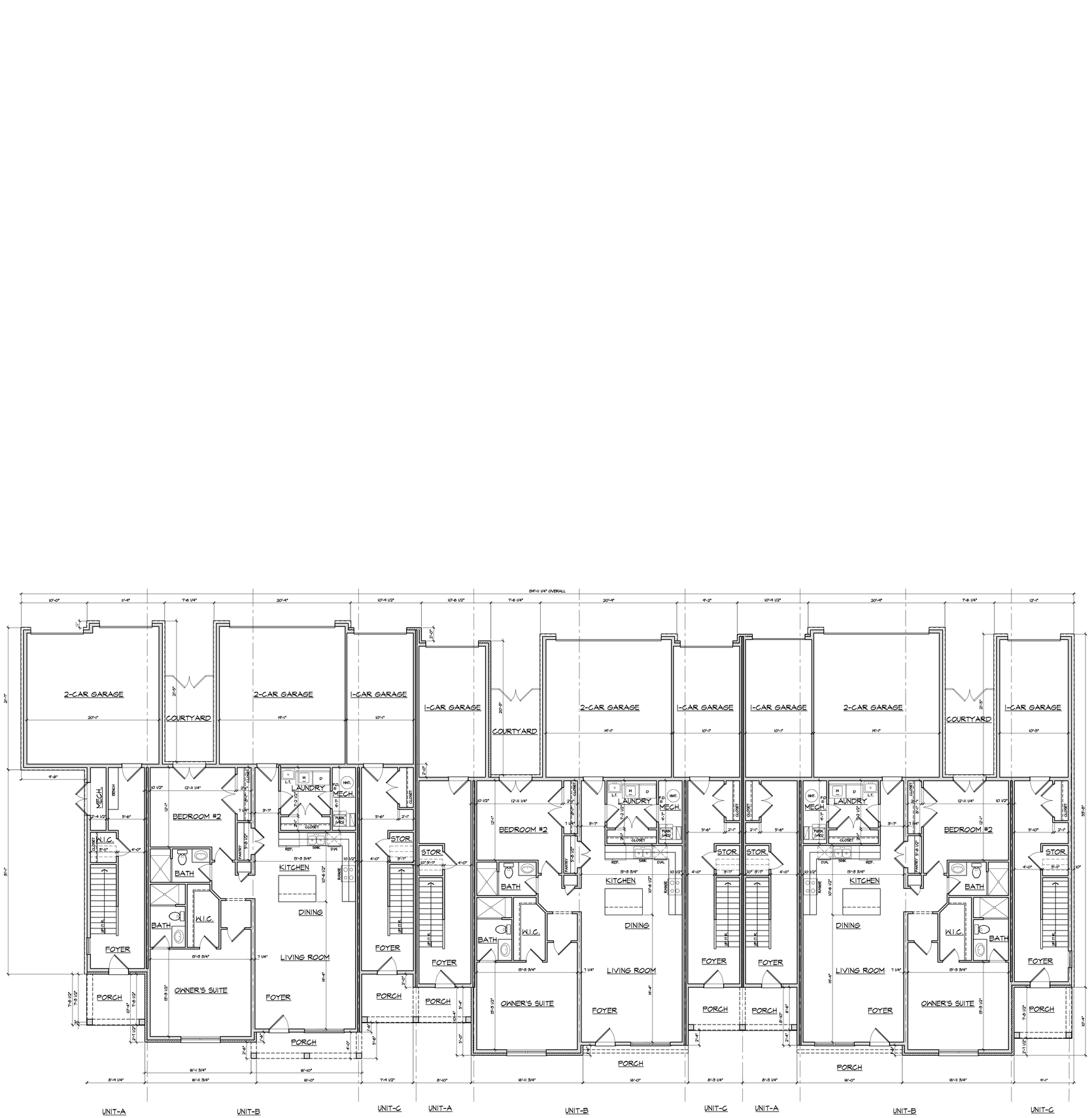
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FIRST FLOOR PLAN

SCALE: 3/16" = 1'-0"

UNIT-A SQUARE FOOTAGE
1ST FLOOR = 303 SQUARE FEET
2ND FLOOR = 1175 SQUARE FEET
3RD FLOOR = 1115 SQUARE FEET
TOTAL = 2642 SQUARE FEET

UNIT-B SQUARE FOOTAGE
1ST FLOOR = 1331 SQUARE FEET

UNIT-C SQUARE FOOTAGE
1ST FLOOR = 274 SQUARE FEET
2ND FLOOR = 1165 SQUARE FEET
3RD FLOOR = 1150 SQUARE FEET
TOTAL = 2566 SQUARE FEET

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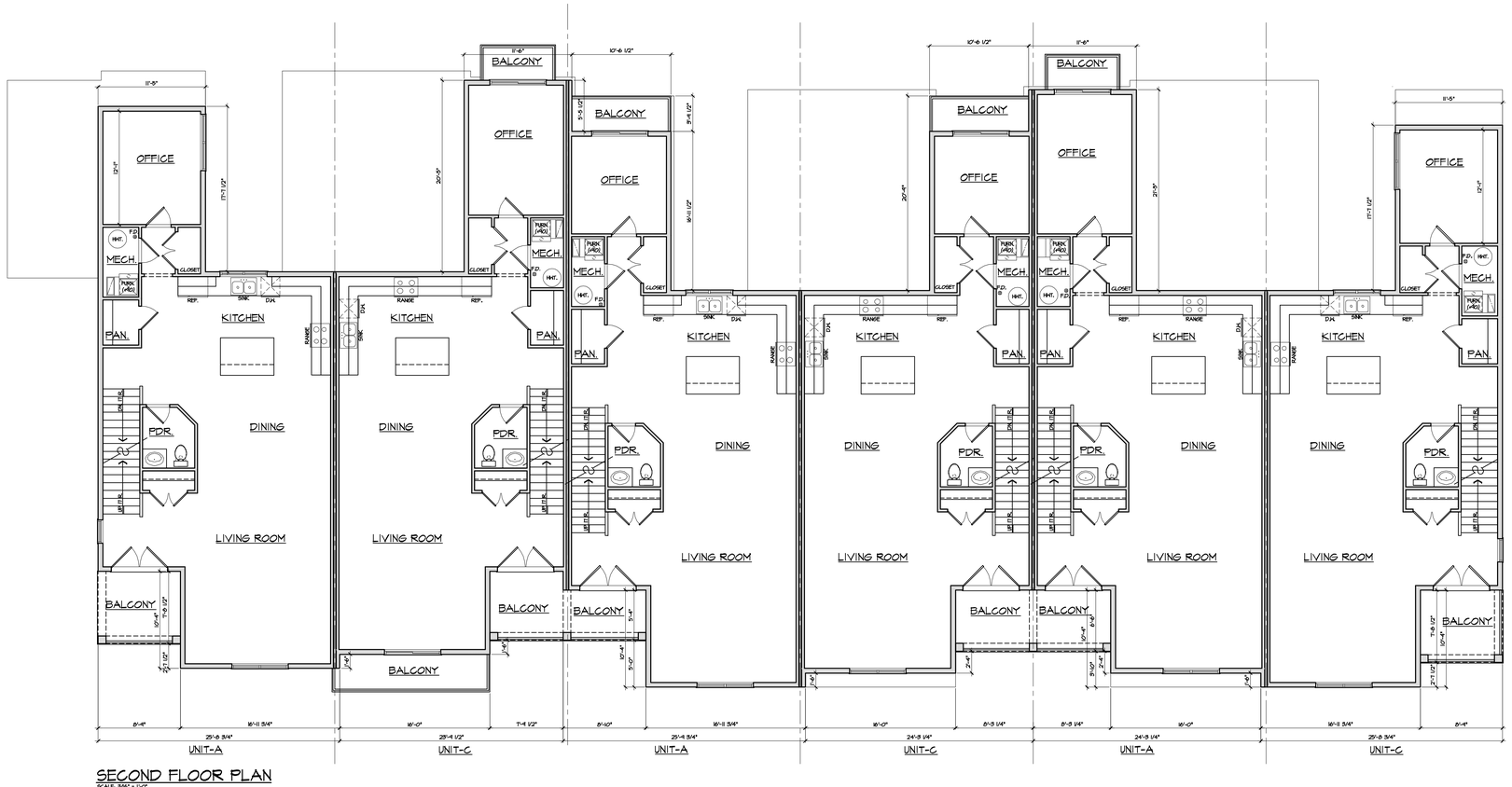
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SECOND FLOOR PLAN

SCALE: 3/16" = 1'-0"

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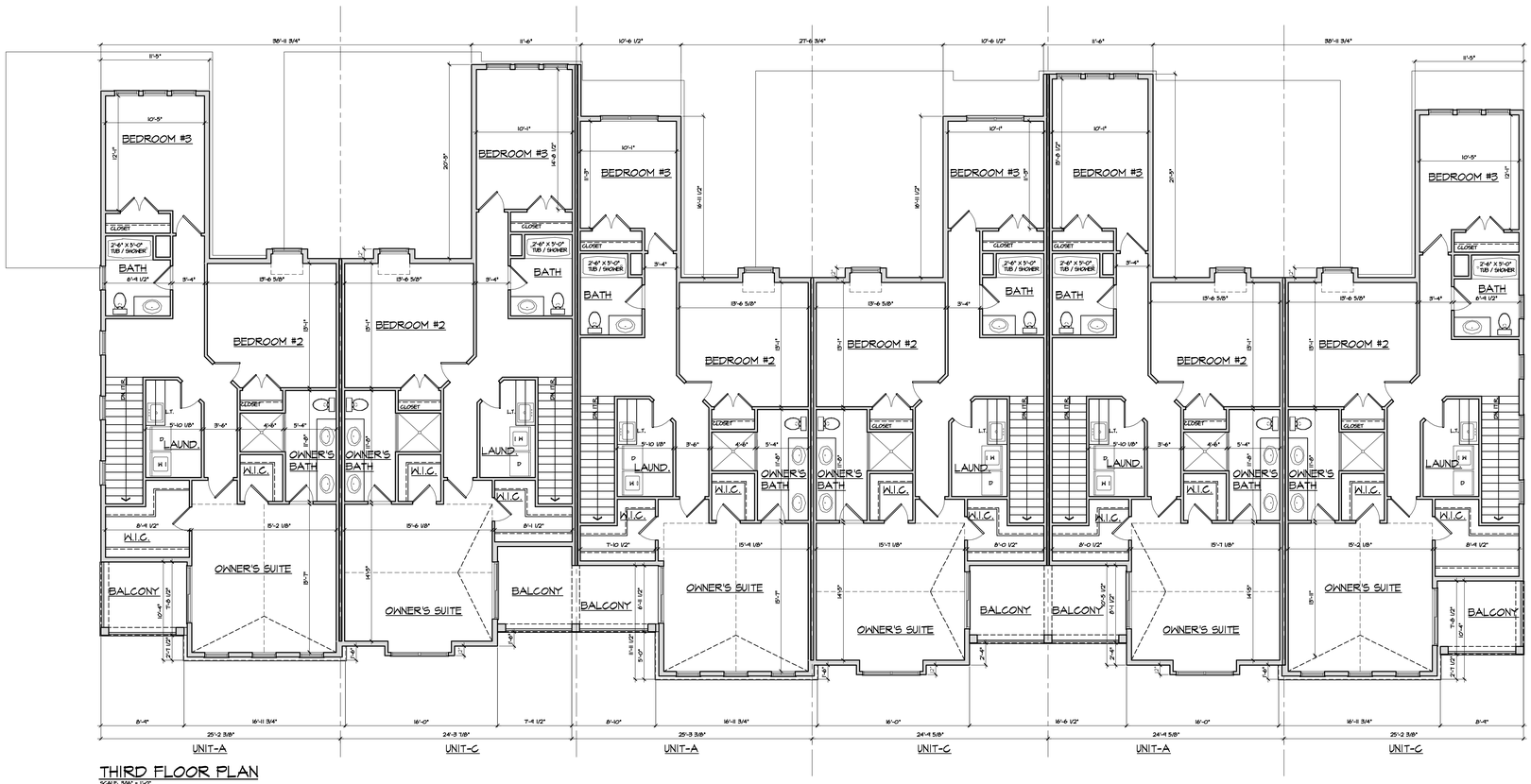
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THIRD FLOOR PLAN
SCALE: 3/16" = 1'-0"

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LEFT ELEVATION

SCALE: 3/16" = 1'-0"



RIGHT ELEVATION

SCALE: 3/16" = 1'-0"



REAR ELEVATION

SCALE: 3/16" = 1'-0"



FRONT ELEVATION

SCALE: 3/16" = 1'-0"

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TRAFFIC IMPACT STUDY

Mystic Cove
Lake Orion, Michigan

Prepared for

Mystic Cove LLC
3005 University Drive
Auburn Hills, MI 48326

July, 2022



AEW Project No. 0361-0074

Prepared by: Mohammed Lutfi, P.E., PTOE

Carlie delaPaz

ANDERSON, ECKSTEIN & WESTRICK, INC.
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Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

EXECUTIVE SUMMARY

Anderson, Eckstein & Westrick, Inc. (AEW) Conducted this traffic Impact Study (TIS) for the proposed Mystic Cove residential development and the proposed Medical Marijuana dispensary and Provision center in Lake Orion, Michigan. The project site is situated on the northwest corner of M-24 and Heights Road.

The study is proposed to include:

- 47 units of Multifamily Housing (Low-Rise)
- 4,435 square-feet of proposed Medical Marijuana dispensary

The residential development has two (2) proposed access points.

- One driveway is location on the west side of M-24, and is a full access driveway. The other access point is located on the north side of Heights Road and is a restricted driveway with a westbound right-turn entry and the southbound right-turn exit.

Medical Marijuana dispensary and Provision center has two (2) proposed access points.

- One driveway is location on the west side of M-24, and is a full access driveway. The other access point is located on the north side of Heights Road and is a restricted driveway with a westbound right-turn entry and the southbound right-turn exit.

on June 16, 2022 a turning movement count was collected at the following intersections:

1. Odanah Avenue & M-24
2. Heights Drive & M-24
3. Atwater Street & M-24
4. Smith Court & M-24
5. Converse Court & M-24
6. Converse Court & Atwater Commons Drive

Trafficware's Synchro 11 was used to perform intersection capacity analysis and assign Levels of Service (LOS) for the study intersections and lane group movements based on the Highway Capacity Manual, 6th Edition (HCM6) methodologies.

The historical data and population for Lake Orion forecasts showed a growth rate of 0.9% per year. Due to the projected build-out year of 2024, a growth rate of 1.8% was applied to the existing traffic volumes to obtain the background traffic volumes.

The proposed multifamily housing and the proposed Marijuana Dispensary development are estimated to generate 66 trips in the AM Peak and 108 trips in the PM peak.

A right-turn lane taper analysis was conducted utilizing MDOT's warrant published in Geometric Design Guidance. The analysis resulted in a "radius only" result meaning a right-turn taper is not needed for both the proposed developments.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

The mitigation strategy recommended is signal optimization at both of the failing signalized intersections.

The proposed development will have minimal impact on the traffic operations on M-24. The increase in traffic volume from the site generated traffic, along with the turning movements from the proposed development, did not have a significant impact on the roadway network

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

EXECUTIVE SUMMARY **2**
1.0 INTRODUCTION **6**
1.1 Project Overview 6
1.2 Scope of Study 9
2.0 STUDY AREA CHARACTERISTICS **11**
2.1 Roadway Characteristics 11
2.2 Non-Motorized Characteristics 11
3.0 EXISTING TRAFFIC ANALYSIS **11**
3.1 Existing Traffic Conditions 11
3.2 Traffic Operations Analysis Methodology 14
3.3 Existing/No Build LOS Analysis 14
4.0 BACKGROUND AND FUTURE TRAFFIC GROWTH **15**
4.1 Background Trip Generation 15
4.2 Background Level of Service 17
5.0 PROPOSED BUILD CONDITIONS **18**
5.1 Build Trip Generation 18
5.2 Trip Distribution 18
6.0 BUILD CONDITIONS **21**
7.0 OPENING YEAR (2024) BUILD (LOS) PEAK HOUR ANALYSIS WITH MITIGATION **23**
8.0 QUEUE ANALYSIS **25**
9.0 CRASH ANALYSIS **27**
10.0 RIGHT TURN WARRANT **28**
10.1 (MYSTIC COVE DRIVEWAY) 28
10.2 (DISPENSARY DRIVEWAY) 29
11.0 SIGHT DISTANCE EVALUATION **30**
12.0 CONCLUSION & RECOMMENDATIONS **30**

FIGURES

Figure 1.1 – Proposed Development Location 7
Figure 1.2 – Mystic Cove & Dispensary Preliminary Site Plan 8
Figure 1.3 - Study Intersections 10
Figure 3.1 - 2021 Existing/No Build Peak Hour Volumes 12
Figure 3.2 - Existing Lane Configuration & Traffic Control 13
Figure 4.1 – 2024 Background Conditions Traffic Counts 16
Figure 5.1 – Trip Distribution 19
Figure 5.2 – Trip Generation 20

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Figure 5.3 – 2024 Build Conditions Traffic Count....21
Figure 10.1 – Mystic Cove Right-Turn Lane/Taper Analysis....28
Figure 10.2– Dispensary Driveway Right-Turn Lane/Taper Analysis....29

TABLES

Table 2.1 - Roadway Characteristics.... 11
Table 3.1 - Level of Service Definitions and Criteria.... 14
Table 3.2 - 2022 Existing/No Build Condition Level of Service Peak Hour Analysis.... 15
Table 4.3 – 2024 Background Level of Service Peak Hour Analysis.... 17
Table 5.1 – Proposed Build Trip Generation.... 18
Table 6.1 – Build Level of Service Peak Hour Analysis.... 22
Table 7.1 – Build with Mitigation Level of Service Peak Hour Analysis.... 24
Table 8.1 – Existing, Background and Build Queue Length Peak Hour Analysis.... 26
Table 9.1 - Crash Type Summary.... 27

APPENDICES

Appendix A – Existing Data Collected
Appendix B – Existing Condition Reports LOS & Queue Analysis
Appendix C – Background Condition Reports LOS & Queue Analysis
Appendix D – Build Condition Reports LOS & Queue Analysis
Appendix E – Crash Data

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

1.0 INTRODUCTION

1.1 Project Overview

This report presents the methodologies, analyses, and results of the traffic impact study (TIS) for the proposed Mystic Cove residential development and the proposed Medical Marijuana dispensary and Provision center in Lake Orion, Michigan. The project site is situated on the northwest corner of M-24 and Heights Road.

The proposed development (Mystic Cove) consists of 47 residential units. The residential development has two (2) proposed access points. One driveway is location on the west side of M-24, and is a full access driveway. The other access point is located on the north side of Heights Road and is a restricted driveway with a westbound right-turn entry and the southbound right-turn exit.

The proposed marijuana dispensary is 4,435 square-feet. The development access plan includes two (2) driveways. One driveway is located on the west side of M-24 and is a full access driveway. The other proposed driveway is located on the north side of Heights Road and is restricted access only a westbound right turn entry and a southbound right turn exit. This proposed development will also be included in this report to properly evaluate the roadway network. The proposed development's location and the preliminary site plan can be found below in Figure 1.1 and 1.2, respectively.

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Figure 1.1 – Proposed Development Location

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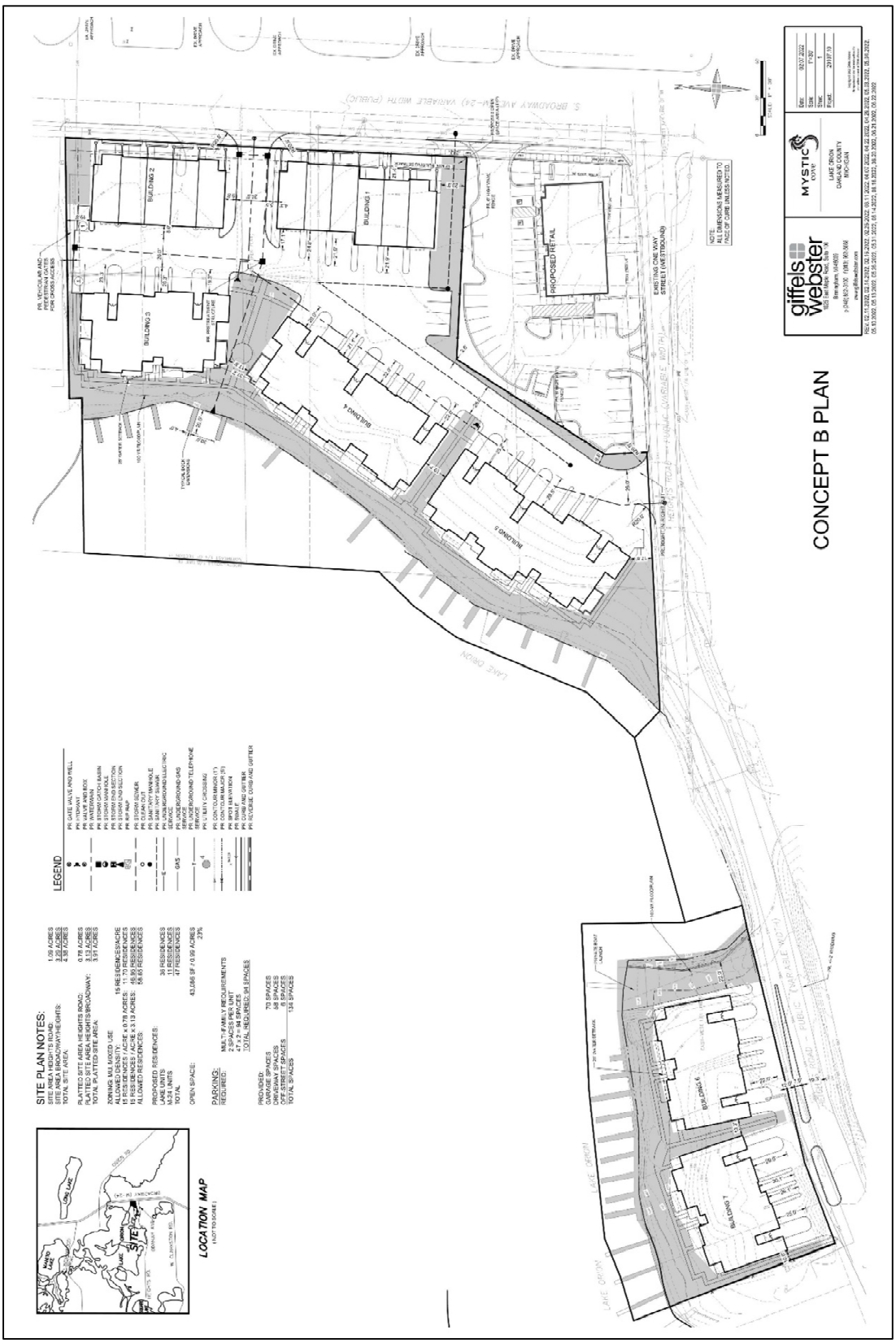


Figure 1.2 – Mystic Cove & Dispensary Preliminary Site Plan

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The objective of this study is to evaluate the impact the proposed developments will have on the traffic patterns and flow of the surrounding area.

The scope of this study was developed based on Anderson, Eckstein & Westrick, Inc. (AEW) knowledge of the study area, accepted traffic engineering practice, and information published by the Institute of Transportation Engineers (ITE). The study analyses were completed using Synchro and SimTraffic, Version 11 traffic analysis software and follow MDOT Electronic Traffic Control Device Guideline.

The specific objectives of the study are to:

- Quantify existing traffic volumes and operations.
- Project existing volumes to the proposed build-out year utilizing historical traffic growth rates.
- Calculate future traffic counts including the trip generation.
- Distribute the generated trips throughout the network based on the existing traffic patterns.
- Analyze the level of service and queue lengths for each study intersection under the existing, background, and build conditions.

1.2 Scope of Study

The overall scope of the traffic impact study is to identify the traffic impact of the proposed developments on adjacent street network, including the impact of background traffic growth in the area. The study will focus on the roadway system surrounding the proposed development site, specifically the following six (6) intersections.

The intersections analyzed for this study area are presented in Figure 1.3 and include:

1. Odanah Avenue & M-24
2. Heights Road & M-24
3. Atwater Street & M-24
4. Smith Court & M-24
5. Converse Court & M-24
6. Converse Court & Atwater Commons Drive

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Figure 1.3 - Study Intersections

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2.0 STUDY AREA CHARACTERISTICS

2.1 Roadway Characteristics

The project traffic study area includes:

- M-24
- Odanah Avenue
- Heights Road
- Atwater Street
- Smith Court
- Converse Court
- Atwater Commons Drive

Table 2.1 – Roadway Characteristics presents the functional classification, controlling jurisdiction, average daily traffic (ADT), posted speed and general lane description for each of the study area roadways.

Table 2.1 - Roadway Characteristics

Road	Functional Classification	Controlling Jurisdiction	ADT	Posted Speed	Lane Description
M-24	Principal Arterial	MDOT	37,515	35 MPH	4 lanes w/ CLT
Odanah Avenue	Major Collector	RCOC	3,160	35 MPH	2 lanes – One Way
Heights Road	Major Collector	RCOC	3,294	35 MPH	2 lanes – One Way
Atwater Street	Local	City	N/A	25 MPH	2 lanes
Smith Court	Local	City	N/A	25 MPH	2 lanes
Converse Court	Local	City	N/A	25 MPH	2 lanes
Atwater Commons Drive	-	Private	N/A	25 MPH	2 lanes

(Traffic Sources: 2018 MDOT Traffic Volumes Map and SEMCOG Road Jurisdiction and Functional Classification Maps)

2.2 Non-Motorized Characteristics

Currently there is a sidewalk on the west and east of M-24, and on the south side of Smith Court. A sidewalk is present on the north and south side of Atwater Street, and the east and west side of Atwater Commons Drive. No sidewalk is currently present on Heights Road, Odanah Avenue, and Converse Court.

3.0 EXISTING TRAFFIC ANALYSIS

3.1 Existing Traffic Conditions

The existing data was collected on June 16, 2022 and was used to develop the existing conditions. The data collection can be found in Appendix A – Existing Data Collected. Traffic count data was obtained at the following intersections:

7. Odanah Avenue & M-24
8. Heights Drive & M-24
9. Atwater Street & M-24
10. Smith Court & M-24

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11. Converse Court & M-24
12. Converse Court & Atwater Commons Drive

The peak hour volume for each intersection was used for this study and volumes were balanced upward through the study network. At locations where access is provided between study intersections, "dummy" intersections were used to account for sink and source volumes, and through volumes were carried along the main study roadways. 2022 existing/no build peak hour traffic volumes are presented below in Figure 3.1 and the roadway network lane configuration and traffic control is provided in Figure 3.2.

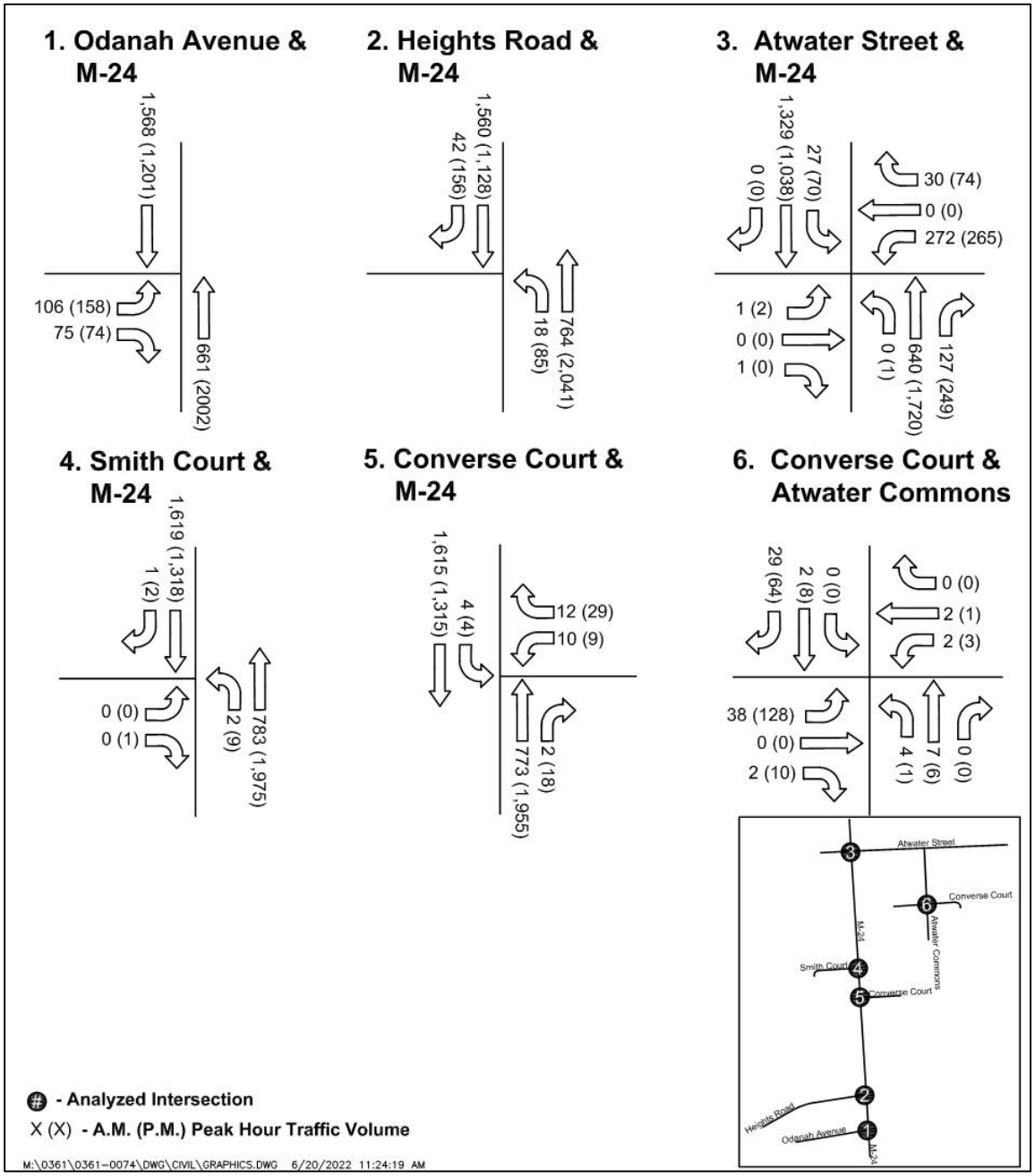


Figure 3.1 - 2021 Existing/No Build Peak Hour Volumes

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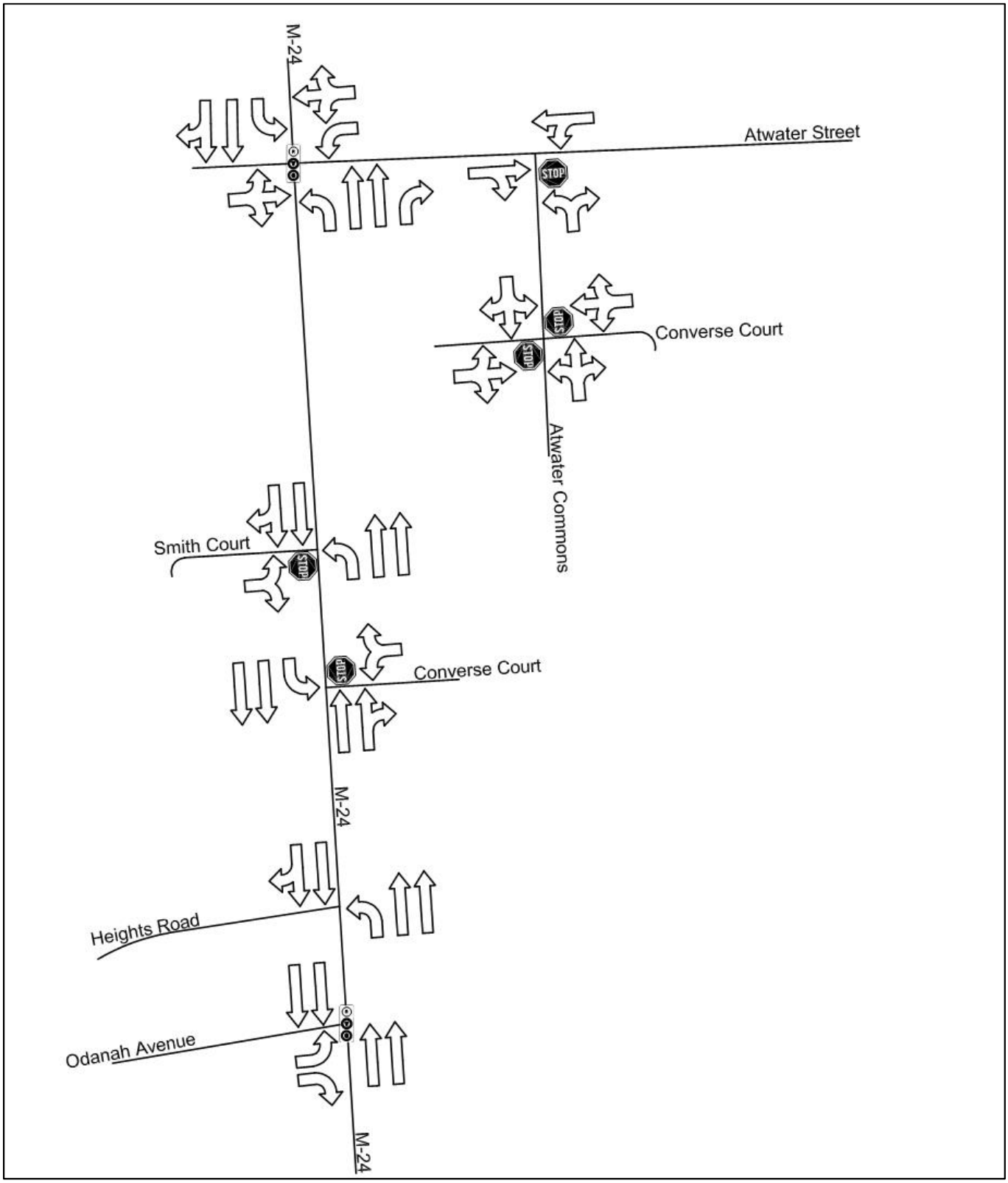


Figure 3.2 - Existing Lane Configuration & Traffic Control

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3.2 Traffic Operations Analysis Methodology

Trafficware's Synchro 11 was used to perform intersection capacity analysis and assign Levels of Service (LOS) for the study intersections and lane group movements based on the Highway Capacity Manual, 6th Edition (HCM6) methodologies. LOS is a letter grade that describes traffic operations based on the amount of delay experienced by vehicles at an intersection, along an intersection approach (e.g., eastbound, westbound), or in a specific lane group (e.g., eastbound right turn, eastbound through-left). LOS can range from A-F with A representing the conditions in which vehicles experience the least amount of delay, and F representing the conditions in which vehicles experience the most delay. The LOS D is typically used as a threshold for "acceptable" operations and is sometimes described as being "near capacity". The LOS E is often described as operations "at capacity", while LOS F describes conditions "over capacity". Additionally, LOS for the stop-controlled intersections was reported by approach. Table 3.1 provides information regarding the delay thresholds for LOS.

Table 3.1 - Level of Service Definitions and Criteria

Level-of-Service (LOS)	Signalized Intersections Delay (seconds)	Un-Signalized Intersections Delay (seconds)
A	< 10.0	< 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	> 80.0	> 50.0

3.3 Existing/No Build LOS Analysis

The peak hour intersection volumes, existing approach peak hour factors (PHF), truck percentages, and default lane utilization factors were used for the Existing and Background analyses. The resulting overall LOS and delays by intersection for the existing/no build conditions are shown in Table 3.2 – 2022 Existing/No Build Condition Level of Service. The existing conditions summary reports are provided in Appendix B – Existing Conditions Reports LOS & Queue Analysis.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Table 3.2 - 2022 Existing/No Build Condition Level of Service Peak Hour Analysis

Intersection & Traffic Control	Approach	Lane Group	2022 Existing/No Build (LOS)	
			AM-Peak LOS/Delay	PM Peak LOS/Delay
M-24 & Odanah Avenue Signalized	Eastbound	Left	E/56.1	E/58.2
		Right	D/48.8	D/44.9
	Northbound	2-Thru	A/3.7	A/9.2
	Southbound	2-Thru	A/6.1	A/5.4
	Intersection Overall		**A/9.2**	**B/11.3**
M-24 & Heights Road Unsignalized	Northbound	Left	C/15.8	B/14.9
		2-Thru	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow
	Intersection Overall		**A/0.1**	**B/0.4**
M-24 & Smith Court Unsignalized	Eastbound	Left/Right	A/0.0	B/10.6
	Northbound	Left	B/15.1	B/12.1
		2-Thru	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow
	Intersection Overall		**A/0.0**	**B/0.1**
M-24 & Atwater Street Signalized	Eastbound	Left/Thru/Right	D/42.4	D/40.7
	Westbound	Left	E/60.7	E/70.2
		Left/Thru/Right	D/47.0	D/46.9
	Northbound	Left	A/0.0	B/13.3
		2-Thru	B/11.0	C/21.5
		Right	A/9.1	B/11.3
	Southbound	Left	A/8.8	D/48.0
		Thru&Thru/Right	B/15.6	B/14.1
	Intersection Overall		**B/18.5**	**C/23.2**
Atwater Commons & Converse Court Unsignalized	Eastbound	Left/Thru/Right	A/9.0	A/9.7
	Westbound	Left/Thru/Right	A/9.1	A/9.2
	Northbound	Left/Thru/Right	A/3.4	A/1.5
	Southbound	Left/Thru/Right	A/0.0	A/0.0
	Intersection Overall		**A/5.4**	**A/6.1**
M-24 & Converse Court Unsignalized	Westbound	Left/Right	B/14.2	C/23.5
	Northbound	Thru&Thru/Right	Free Flow	Free Flow
	Southbound	Left	A/9.7	C/19.1
		2-Thru	Free Flow	Free Flow
	Intersection Overall		**A/0.2**	**B/0.4**

The results of the existing condition analysis indicate that nearly all study intersections overall and intersection movement levels of service currently operate at a LOS D or better with a few exceptions operating at unacceptable LOS as shown in Table 3.2. The following movements operate at a LOS E or F:

- M-24 & Odanah Avenue: AM & PM Peak – Eastbound Left
- M-24 & Atwater Street: AM & PM Peak – Westbound Left

4.0 BACKGROUND AND FUTURE TRAFFIC GROWTH

4.1 Background Trip Generation

To properly evaluate the impact the proposed development will have on the current traffic network, the existing traffic volume must be projected to the proposed build-out year to obtain the background traffic. The background traffic is the traffic growth that is not related to the development. In order to determine the growth rate of the study area,

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the Southeast Michigan Council of Governments (SEMCOG) was referenced. The historical data and population for Lake Orion forecasts showed a growth rate of 0.9% per year. Due to the projected build-out year of 2024, a growth rate of 1.8% was applied to the existing traffic volumes to obtain the background traffic volumes. The background traffic volume can be found below in Figure 4.1.

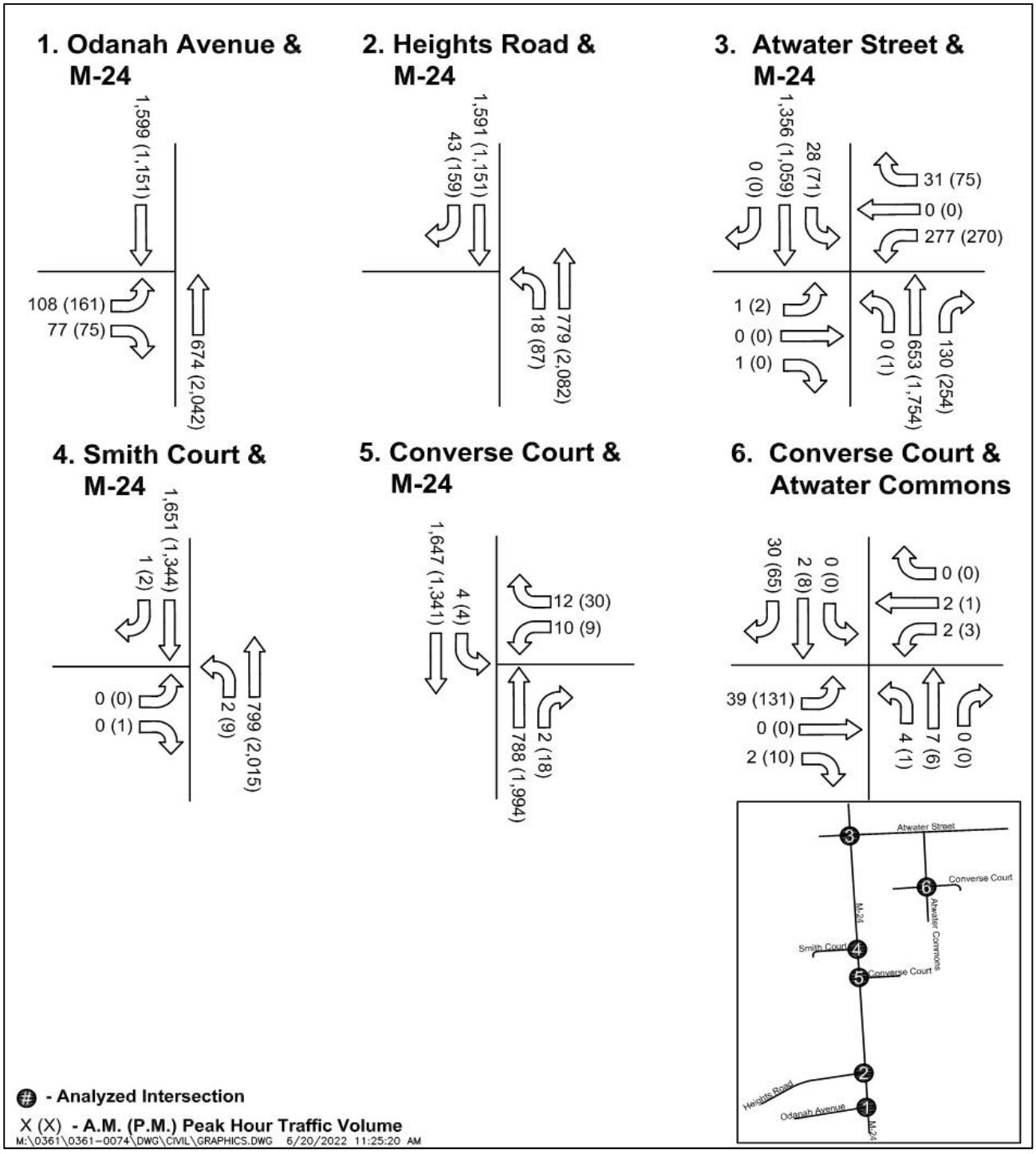


Figure 4.1 – 2024 Background Conditions Traffic Counts

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4.2 Background Level of Service

In Table 4.3, below, the existing/no build LOS and the background condition LOS is shown, Appendix C – Background Condition Reports LOS & Queue Analysis, shows the detailed background conditions calculated in Synchro11 and SimTraffic11 using the new traffic volumes adjusted by the aforementioned growth factor.

Table 4.3 – 2024 Background Level of Service Peak Hour Analysis

Intersection & Traffic Control	Approach	Lane Group	2022 Existing/No Build (LOS)		2024 Background (LOS)	
			AM-Peak LOS/Delay	PM Peak LOS/Delay	AM-Peak LOS/Delay	PM Peak LOS/Delay
M-24 & Odanah Avenue Signalized	Eastbound	Left	E/56.1	E/58.2	E/56.2	E/58.1
		Right	D/48.8	D/44.9	D/48.8	D/44.7
	Northbound	2-Thru	A/3.7	A/9.2	A/3.8	A/9.6
	Southbound	2-Thru	A/6.1	A/5.4	A/6.3	A/5.6
	Intersection Overall		**A/9.2**	**B/11.3**	**A/9.4**	**B/11.6**
M-24 & Heights Road Unsignalized	Northbound	Left	C/15.8	B/14.9	C/16.2	C/15.2
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.1**	**B/0.4**	**A/0.1**	**B/0.5**
M-24 & Smith Court Unsignalized	Eastbound	Left/Right	A/0.0	B/10.6	A/0.0	B/10.6
	Northbound	Left	B/15.1	B/12.1	C/15.5	B/12.3
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.0**	**B/0.1**	**A/0.0**	**B/0.1**
M-24 & Atwater Street Signalized	Eastbound	Left/Thru/Right	D/42.4	D/40.7	D/42.5	D/40.5
	Westbound	Left	E/60.7	E/70.2	E/63.5	E/71.5
		Left/Thru/Right	D/47.0	D/46.9	D/47.5	D/47.1
	Northbound	Left	A/0.0	B/13.3	A/0.0	B/13.8
		2-Thru	B/11.0	C/21.5	B/11.0	C/22.4
		Right	A/9.1	B/11.3	A/9.0	A/7.6
	Southbound	Left	A/8.8	D/48.0	A/8.9	D/49.5
		Thru&Thru/Right	B/15.6	B/14.1	B/15.7	B/14.4
	Intersection Overall		**B/18.5**	**C/23.2**	**B/18.7**	**C/23.6**
Atwater Commons & Converse Court Unsignalized	Eastbound	Left/Thru/Right	A/9.0	A/9.7	A/9.0	A/9.7
	Westbound	Left/Thru/Right	A/9.1	A/9.2	A/9.1	A/9.3
	Northbound	Left/Thru/Right	A/3.4	A/1.5	A/3.4	A/1.5
	Southbound	Left/Thru/Right	A/0.0	A/0.0	A/0.0	A/0.0
	Intersection Overall		**A/5.4**	**A/6.1**	**A/5.3**	**A/6.1**
M-24 & Converse Court Unsignalized	Westbound	Left/Right	B/14.2	C/23.5	B/13.3	C/24.0
	Northbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Left	A/9.7	C/19.1	A/9.5	C/19.8
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.2**	**B/0.4**	**A/0.1**	**B/0.4**

The results of the background condition analysis indicate that most of the study intersections overall and intersection movement levels of service currently operate at a LOS D or better with a few exceptions operating at unacceptable LOS as shown in Table 4.3. The following movements operate at a LOS E or F:

- M-24 & Odanah Avenue: AM & PM Peak – Eastbound Left
- M-24 & Atwater Street: AM & PM Peak – Westbound Left

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5.0 PROPOSED BUILD CONDITIONS

5.1 Build Trip Generation

The AM and PM peak hour vehicle trips that would be generated by the proposed development were forecasted based on the ITE Trip Generation Manual 11th Edition and engineering judgement. Land use codes 220 and 882 were selected. The proposed multifamily housing and the proposed Marijuana Dispensary development are estimated to generate 66 trips in the AM Peak and 108 trips in the PM peak, cumulatively. The detailed trip generated is shown in Table 5.1, below.

Table 5.1 – Proposed Build Trip Generation

Land Use	Independent Variable	Land Use Code	Weekday AM Peak Hour Generated Trips			Weekday PM Peak Hour Generated Trips		
Multifamily Housing (Low-Rise)	47 Units	220	IN (24%)	OUT (76%)	TOTAL	IN (63%)	OUT (37%)	TOTAL
Generated Trips			5	14	19	15	9	24
Marijuana Dispensary	4,435 Sft	882	IN (52%)	OUT (48%)	TOTAL	IN (50%)	OUT (50%)	TOTAL
Generated Trips			24	23	47	42	42	84
Total Generated Trips			**29**	**37**	**66**	**57**	**51**	**108**

5.2 Trip Distribution

Traffic expected to be generated by a project must be distributed and assigned to the roadway system so the impacts of the proposed project on roadway links and intersections within the study area can be analyzed. Trips were distributed based on the volume of traffic entering and exiting the study area during the AM and PM peak hours. After an estimate of the total traffic into and out of the site has been made, that traffic must be distributed and assigned to the roadway system. The trip distribution step produces estimates of trip origins and destinations. The existing directional distribution obtained from Atwater Street, M-24, Heights Road, and Odanah Avenue was utilized to determine where the traffic would be entering and exiting the study site. The trip distribution, Trip Generation and build traffic volumes can be found below in Figure 5.1, 5.2 and 5.3, respectively.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

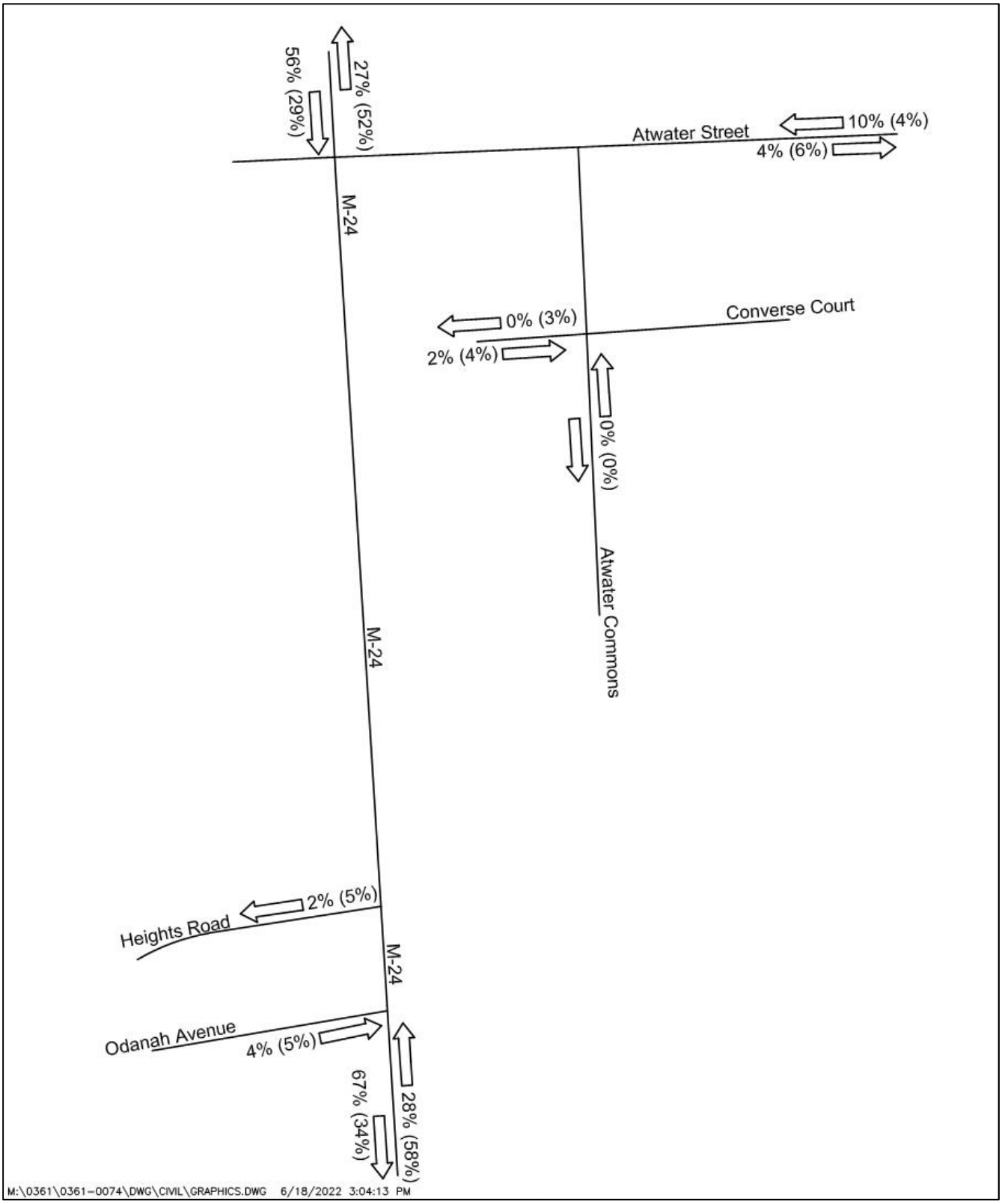


Figure 5.1 – Trip Distribution

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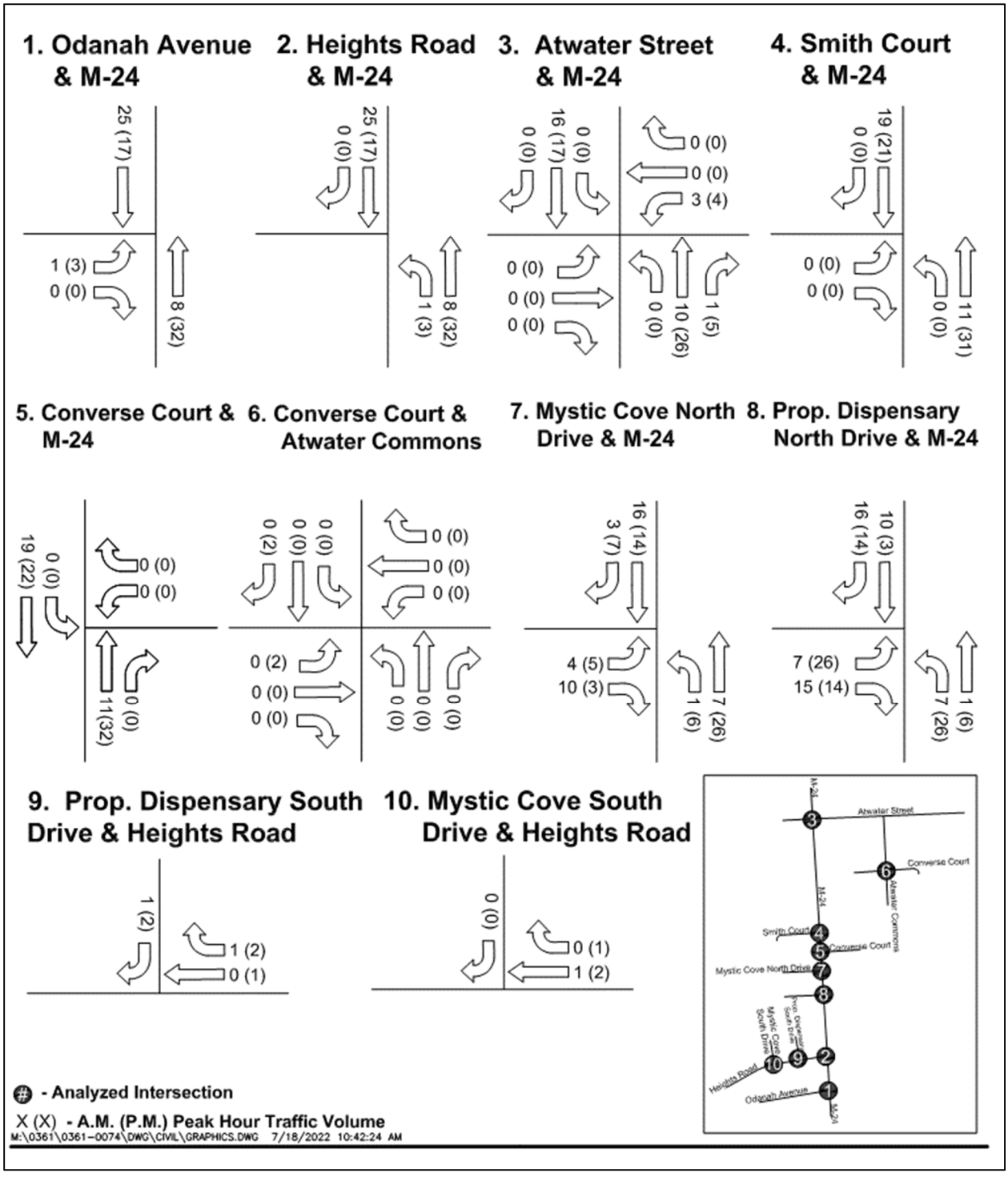


Figure 5.2 – Trip Generation

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

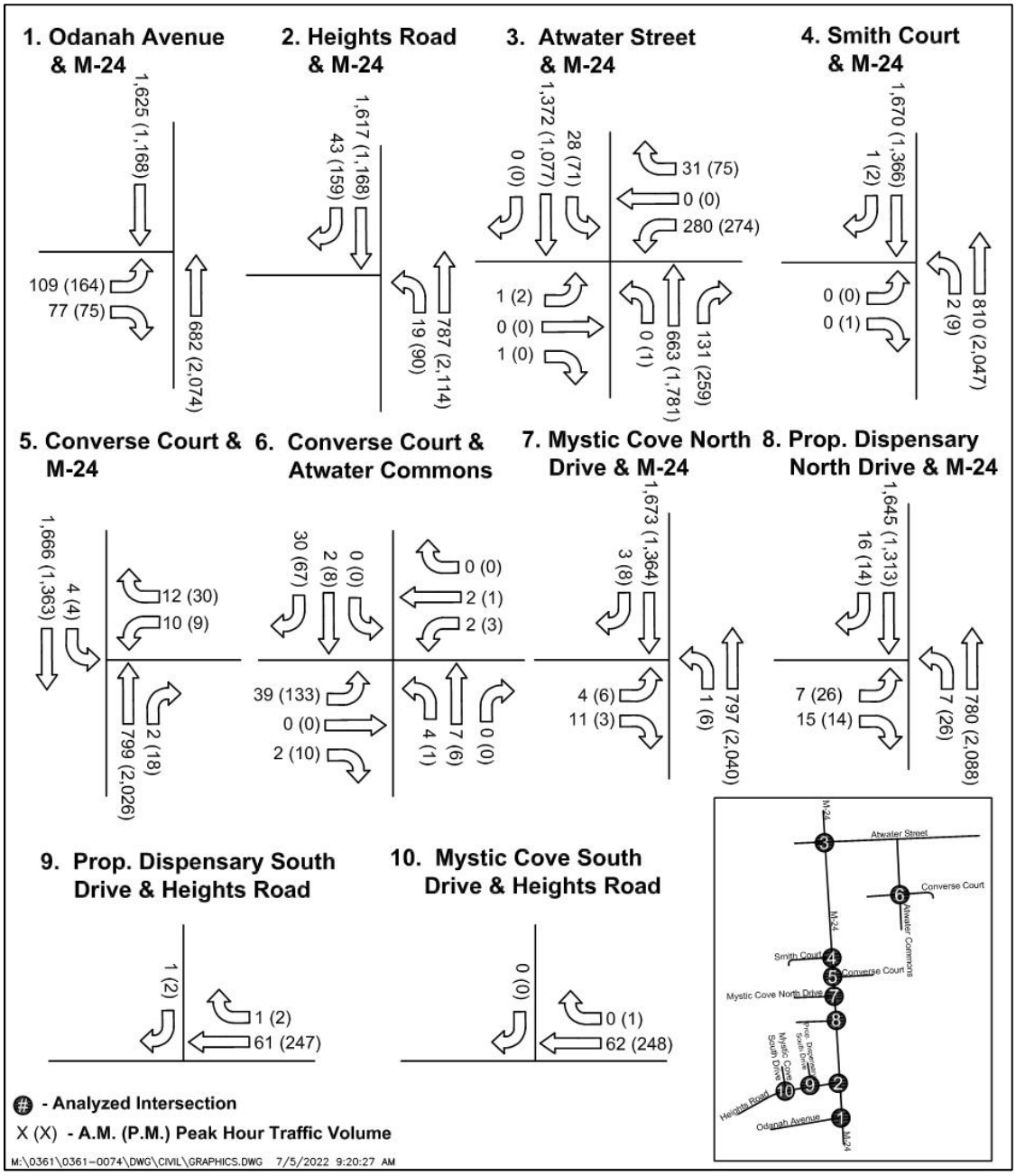


Figure 5.3 – 2024 Build Conditions Traffic Count

6.0 BUILD CONDITIONS

The build conditions were implemented in Synchro11 and simulated using SimTraffic11. The LOS was calculated and presented below in Table 6.1. Table 6.1 also presents the background LOS for comparison. The full reports for the build conditions can be found in Appendix D – Build Condition Reports LOS & Queue Analysis.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Table 6.1 – Build Level of Service Peak Hour Analysis

Intersection & Traffic Control	Approach	Lane Group	2024 Background (LOS)		2024 Build (LOS)	
			AM-Peak LOS/Delay	PM Peak LOS/Delay	AM-Peak LOS/Delay	PM Peak LOS/Delay
M-24 & Odanah Avenue Signalized	Eastbound	Left	E/56.2	E/58.1	E/56.1	E/58.4
		Right	D/48.8	D/44.7	D/48.7	D/44.5
	Northbound	2-Thru	A/3.8	A/9.6	A/3.8	B/10.0
	Southbound	2-Thru	A/6.3	A/5.6	A/6.5	A/5.7
	Intersection Overall		**A/9.4**	**B/11.6**	**A/9.5**	**B/11.9**
M-24 & Heights Road Unsignalized	Northbound	Left	C/16.2	C/15.2	C/16.5	C/15.6
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.1**	**B/0.5**	**A/0.1**	**B/0.5**
M-24 & Smith Court Unsignalized	Eastbound	Left/Right	A/0.0	B/10.6	A/0.0	B/10.6
	Northbound	Left	C/15.5	B/12.3	C/15.7	B/12.5
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.0**	**B/0.1**	**A/0.0**	**B/0.1**
M-24 & Atwater Street Signalized	Eastbound	Left/Thru/Right	D/42.5	D/40.5	D/42.4	D/40.5
	Westbound	Left	E/63.5	E/71.5	E/63.8	E/72.9
		Left/Thru/Right	D/47.5	D/47.1	D/47.5	D/47.3
	Northbound	Left	A/0.0	B/13.8	A/0.0	B/14.2
		2-Thru	B/11.0	C/22.4	B/11.1	C/23.2
		Right	A/9.0	A/7.6	A/9.1	A/7.7
	Southbound	Left	A/8.9	D/49.5	A/9.0	D/50.5
		Thru&Thru/Right	B/15.7	B/14.4	B/16.0	B/14.6
	Intersection Overall		**B/18.7**	**C/23.6**	**B/18.9**	**C/24.1**
Atwater Commons & Converse Court Unsignalized	Eastbound	Left/Thru/Right	A/9.0	A/9.7	A/9.0	A/9.7
	Westbound	Left/Thru/Right	A/9.1	A/9.3	A/9.1	A/9.3
	Northbound	Left/Thru/Right	A/3.4	A/1.5	A/3.4	A/1.5
	Southbound	Left/Thru/Right	A/0.0	A/0.0	A/0.0	A/0.0
	Intersection Overall		**A/5.3**	**A/6.1**	**A/5.3**	**A/6.2**
M-24 & Converse Court Unsignalized	Westbound	Left/Right	B/13.3	C/24.0	B/13.4	D/25.0
	Northbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Left	A/9.5	C/19.8	A/9.6	C/20.5
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.1**	**B/0.4**	**A/0.1**	**B/0.4**
M-24 & North Mystic Cove Driveway Unsignalized	Eastbound	Left/Right	n/a	n/a	C/15.5	C/19.2
	Northbound	Left	n/a	n/a	B/15.0	B/12.4
		2-Thru	n/a	n/a	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	n/a	n/a	Free Flow	Free Flow
	Intersection Overall		n/a	n/a	**A/0.1**	**B/0.1**
M-24 & Proposed Dispensary Driveway Unsignalized	Eastbound	Left/Right	n/a	n/a	D/26.9	D/27.0
	Northbound	Left	n/a	n/a	C/15.9	B/13.2
		2-Thru	n/a	n/a	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	n/a	n/a	Free Flow	Free Flow
	Intersection Overall		n/a	n/a	**A/0.3**	**C/0.4**
Heights Road & South Mystic Cove Driveway Unsignalized	Westbound	Thru/Right	n/a	n/a	Free Flow	Free Flow
	Southbound	Right	n/a	n/a	A/0.0	A/0.0
	Intersection Overall		n/a	n/a	**A/0.0**	**A/0.0**
Heights Road & Proposed Dispensary Driveway Unsignalized	Westbound	Thru/Right	n/a	n/a	Free Flow	Free Flow
	Southbound	Right	n/a	n/a	A/8.6	A/9.7
	Intersection Overall		n/a	n/a	**A/0.1**	**A/0.1**

The results of the build analysis indicate that most of the study intersections overall and intersection movement levels of service currently operate at a LOS D or better with a few exceptions operating at unacceptable LOS as shown in Table 6.1. The following intersections/intersection movements operate at a LOS E or F:

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

- M-24 & Odanah Avenue: AM & PM Peak – Eastbound Left
- M-24 & Atwater Street: AM & PM Peak – Westbound Left

7.0 OPENING YEAR (2024) BUILD (LOS) PEAK HOUR ANALYSIS WITH MITIGATION

Alternative mitigation options were analyzed for the intersections that are projected to fail in the future. The intersections that are projected to fail are M-24 & Odanah Avenue and M-24 & Atwater Street. The mitigation strategy recommended for both intersections is signal optimization. Table 7.1, below, shows the build level of service and the mitigation level of service. Utilizing Synchro11, the splits, cycle length, and offset were optimized at both signalized locations during the AM and PM peak hours.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Table 7.1 – Build with Mitigation Level of Service Peak Hour Analysis

Intersection & Traffic Control	Approach	Lane Group	2024 Build (LOS)		2024 Mitigation (LOS)	
			AM-Peak LOS/Delay	PM-Peak LOS/Delay	AM-Peak LOS/Delay	PM-Peak LOS/Delay
M-24 & Odanah Avenue Signalized	Eastbound	Left	E/56.1	E/58.4	C/26.1	C/34.6
		Right	D/48.7	D/44.5	C/23.9	C/28.3
	Northbound	2-Thru	A/3.8	B/10.0	A/5.1	B/12.6
	Southbound	2-Thru	A/6.5	A/5.7	A/9.2	A/6.5
	Intersection Overall		**A/9.4**	**B/11.9**	**A/9.3**	**B/12.0**
M-24 & Heights Road Unsignalized	Northbound	Left	C/16.5	C/15.6	C/16.5	C/15.6
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.1**	**B/0.5**	**A/0.1**	**B/0.5**
M-24 & Smith Court Unsignalized	Eastbound	Left/Right	A/0.0	B/10.6	A/0.0	A/9.8
	Northbound	Left	C/15.7	B/12.4	B/14.7	B/12.2
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.0**	**B/0.1**	**A/0.0**	**B/0.1**
M-24 & Atwater Street Signalized	Eastbound	Left/Thru/Right	D/42.4	D/40.5	C/31.2	C/30.0
	Westbound	Left	E/63.8	E/72.9	D/46.7	E/56.6
		Left/Thru/Right	D/47.5	D/47.3	C/34.2	C/34.0
	Northbound	Left	A/0.0	B/14.2	A/0.0	A/8.0
		2-Thru	B/11.1	C/23.2	B/19.2	C/33.4
		Right	A/9.1	A/7.7	B/15.1	A/7.6
	Southbound	Left	A/9.0	D/50.5	B/10.7	C/21.3
		Thru&Thru/Right	B/16.0	B/14.6	D/38.6	B/15.9
	Intersection Overall		**B/18.9**	**C/24.0**	**C/31.8**	**C/27.1**
Atwater Commons & Converse Court Unsignalized	Eastbound	Left/Thru/Right	A/9.0	A/9.7	A/9.0	A/9.7
	Westbound	Left/Thru/Right	A/9.1	A/9.3	A/9.1	A/9.3
	Northbound	Left/Thru/Right	A/3.4	A/1.5	A/3.4	A/1.5
	Southbound	Left/Thru/Right	A/0.0	A/0.0	A/0.0	A/0.0
	Intersection Overall		**A/5.3**	**A/6.2**	**A/5.3**	**A/6.2**
M-24 & Converse Court Unsignalized	Westbound	Left/Right	B/13.4	C/25.0	B/13.3	C/23.2
	Northbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Left	A/9.6	C/20.4	A/9.6	C/19.7
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.1**	**B/0.4**	**A/0.1**	**B/0.4**
M-24 & North Mystic Cove Driveway Unsignalized	Eastbound	Left/Right	C/15.9	C/18.2	B/14.7	C/18.0
	Northbound	Left	B/15.0	B/12.4	B/14.0	B/12.1
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.1**	**B/0.1**	**A/0.1**	**B/0.1**
M-24 & Proposed Dispensary Driveway Unsignalized	Eastbound	Left/Right	D/26.8	D/27.0	D/26.9	D/26.8
	Northbound	Left	C/15.9	B/13.2	C/15.9	B/13.2
		2-Thru	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Thru&Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Intersection Overall		**A/0.3**	**C/0.4**	**A/0.3**	**C/0.4**
Heights Road & South Mystic Cove Driveway Unsignalized	Westbound	Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Right	A/0.0	A/0.0	A/0.0	A/0.0
	Intersection Overall		**A/0.0**	**A/0.0**	**A/0.0**	**A/0.0**
Heights Road & Proposed Dispensary Driveway Unsignalized	Westbound	Thru/Right	Free Flow	Free Flow	Free Flow	Free Flow
	Southbound	Right	A/8.6	A/9.7	A/8.6	A/9.7
	Intersection Overall		**A/0.1**	**A/0.1**	**A/0.1**	**A/0.1**

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

8.0 QUEUE ANALYSIS

A queueing analysis was conducted to determine the 95th percentile queues at the study area intersections to determine the impacts due to the proposed development to the study intersections. SimTraffic11 was utilized to simulate 5 runs of the peak hours, which were evaluated to give the most accurate queue length. Table 8.1 – Queueing Analyses presents the queueing results.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Table 8.1 – Existing, Background and Build Queue Length Peak Hour Analysis

Intersection	Approach	Movement	2022 Existing Condition		2024 Background Condition		2024 Build Condition	
			AM - Peak Queue Length (ft)	PM - Peak Queue Length (ft)	AM - Peak Queue Length (ft)	PM - Peak Queue Length (ft)	AM - Peak Queue Length (ft)	PM - Peak Queue Length (ft)
M-24 & Odanah Avenue Signalized	Eastbound	Left	138	191	153	213	142	215
		Right	111	121	117	115	124	120
	Northbound	Thru	98	314	98	299	113	356
		Thru	59	295	63	272	66	359
	Southbound	Thru	111	101	107	101	105	99
		Thru	107	92	107	92	107	95
M-24 & Heights Road Unsignalized	Northbound	Left	38	73	43	76	41	75
		Thru	-	94	7	84	13	85
	Southbound	Thru/Right	12	12	8	17	17	23
		Thru	12	15	7	3	10	13
M-24 & Converse Court Unsignalized	Westbound	Left/Right	46	77	46	74	49	162
	Northbound	Thru/Right	-	3	-	-	-	9
		Thru	-	10	-	6	-	4
	Southbound	Left	16	16	18	17	12	16
		Thru	5	-	9	6	8	8
		Thru	-	-	-	-	4	-
M-24 & Smith Court Unsignalized	Eastbound	Left/Right	-	12	-	10	-	11
	Northbound	Left	14	26	17	24	15	25
		Thru	5	18	4	18	13	9
		Thru	-	-	4	-	8	-
	Southbound	Thru/Right	-	6	6	-	5	7
		Thru	4	-	-	-	-	-
M-24 & Atwater Street Signalized	Eastbound	Left/Thru/Right	16	9	14	11	13	14
	Westbound	Left	142	144	141	144	140	142
		Left/Thru/Right	255	297	249	302	246	325
	Northbound	Left	-	17	-	4	-	-
		Thru	143	497	130	487	141	513
		Thru	154	512	126	502	146	527
		Right	83	289	88	305	104	318
	Southbound	Left	84	103	70	105	138	142
		Thru	363	309	363	317	363	319
		Thru/Right	317	242	308	240	313	253
Atwater Commons & Converse Court Unsignalized	Eastbound	Left/Thru/Right	49	67	50	64	46	67
	Westbound	Left/Thru/Right	19	31	23	23	19	22
	Northbound	Left/Thru/Right	4	-	4	-	4	-
	Southbound	Left/Thru/Right	-	-	-	-	-	-
Heights Road & Mystic Cove Driveway Unsignalized	Southbound	Right					-	-
	Westbound	Thru/Right					-	-
Heights Road & Prop. Dispensary Driveway Unsignalized	Southbound	Right					11	15
	Westbound	Thru/Right					-	-
M-24 & Mystic Cove Driveway Unsignalized	Eastbound	Left/Right					43	35
	Northbound	Left					5	19
		Thru					-	-
		Thru					-	-
	Southbound	Thru/Right					6	-
		Thru					5	-
M-24 & Proposed Dispensary Driveway Unsignalized	Eastbound	Left/Right					52	104
	Northbound	Left					19	44
		Thru					-	9
		Thru					-	23
	Southbound	Thru/Right					9	-
		Thru					13	-

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

9.0 CRASH ANALYSIS

A crash analysis was conducted at the study intersections. Five years of crash data was collected and reviewed (2017-2021). A 150-foot radius was used as the limits for each intersection for the crash analysis. Traffic crash reports and summaries were obtained from the Transportation Improvement Association's Traffic Crash Analysis Tool (TCAT) website. A summary of crashes by type is provided in Table 9.1, copies of crash report summaries can be found in Appendix E.

Table 9.1 - Crash Type Summary

Intersection	Crash Type	Crashes	% of Total	KAB Crashes	%KAB
Odanah Avenue & M-24 Signalized	Single	1	3%	0	0%
	Head-On	2	6%	0	0%
	Angle	5	14%	1	33%
	Rear-End	23	66%	2	67%
	Sideswipe	3	8%	0	0%
	Back	1	3%	0	0%
	Other includes, Bike, Ped, Motorcycle	0	0%	0	0%
	Total	**35**	**100%**	**3**	**100%**
Heights Road & M-24 Unsignalized	Single	2	6%	0	0%
	Head-On	1	3%	1	33.3%
	Angle	4	12%	1	33.3%
	Rear-End	19	56%	0	0%
	Sideswipe	7	20%	1	33.3%
	Back	0	0%	0	0%
	Other includes, Bike, Ped, Motorcycle	1	3%	0	0%
	Total	**34**	**100%**	**3**	**100%**
Atwater Street & M-24 Signalized	Single	2	4%	0	0%
	Head-On	0	0%	0	0%
	Angle	14	25%	2	100%
	Rear-End	28	51%	0	0%
	Sideswipe	6	11%	0	0%
	Back	3	5%	0	0%
	Other includes, Bike, Ped, Motorcycle	2	4%	0	0%
	Total	**55**	**100%**	**2**	**100%**
Smith Court & M-24 Unsignalized	Single	1	3%	1	33%
	Head-On	0	0%	0	0%
	Angle	8	24%	2	67%
	Rear-End	17	50%	0	0%
	Sideswipe	6	17%	0	0%
	Back	1	3%	0	0%
	Other includes, Bike, Ped, Motorcycle	1	3%	0	0%
	Total	**34**	**100%**	**3**	**100%**
Converse Court & Atwater Commons Drive Unsignalized	Single	1	100%	0	-
	Head-On	0	0%	0	-
	Angle	0	0%	0	-
	Rear-End	0	0%	0	-
	Sideswipe	0	0%	0	-
	Back	0	0%	0	-
	Other includes, Bike, Ped, Motorcycle	0	0%	0	-
	Total	**1**	**100%**	**0**	**-**

Note: KAB Crashes are fatal and severe crashes as noted by the KABCO scale: K= fatal crash, A=incapacitating injury, B=non-incapacitating injury, C=possible injury, and O= no injury.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

10.0 RIGHT TURN WARRANT

10.1 (MYSTIC COVE DRIVEWAY)

An analysis for a right-turn lane or taper requirement was conducted for the Mystic Cove proposed drive located on M-24. The current speed limit on M-24 at the drive is 35 miles per hour. The Warrant for Right Turn Deceleration Lane published by the Michigan Department of Transportation (MDOT) was utilized for this analysis. This analysis considers the peak hour directional traffic volume and the peak hour right turns. Figure 10.1, below, shows the MDOT graph with the projected build volumes.

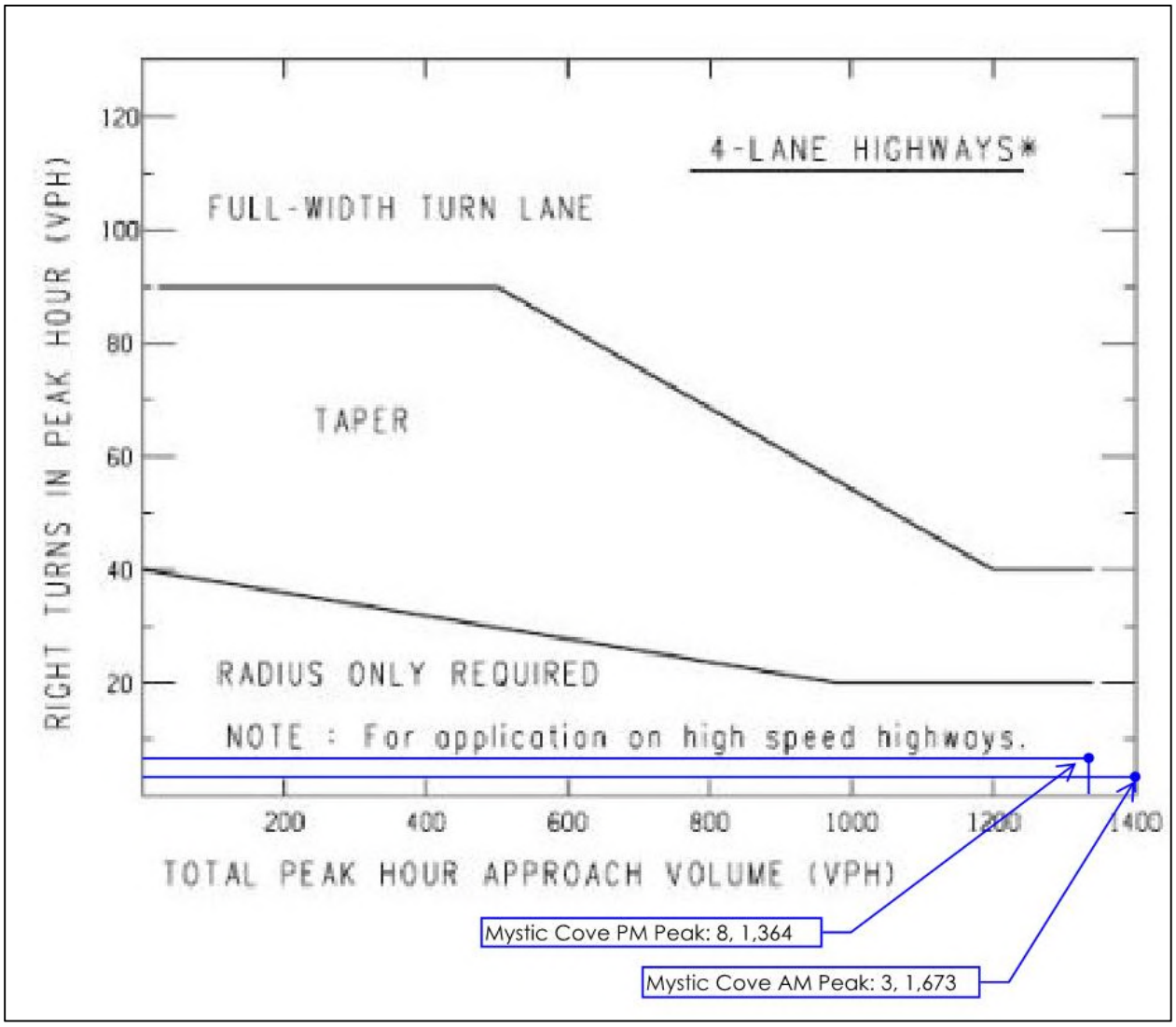


Figure 10.1 – Mystic Cove Right-Turn Lane/Taper Analysis

The right-turn lane/taper analysis resulted in the proposed Mystic Cove driveway off M-24 not warranting a right-turn lane/taper.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

10.2 (DISPENSARY DRIVEWAY)

An analysis for a right-turn lane or taper requirement was conducted for the proposed dispensary driveway located on M-24. The current speed limit on M-24 at the drive is 35 miles per hour.

The Warrant for Right Turn Deceleration Lane published by the Michigan Department of Transportation (MDOT) was utilized for this analysis. This analysis considers the peak hour directional traffic volume and the peak hour right turns. Figure 10.2, below, shows the MDOT graph with the projected build volumes.

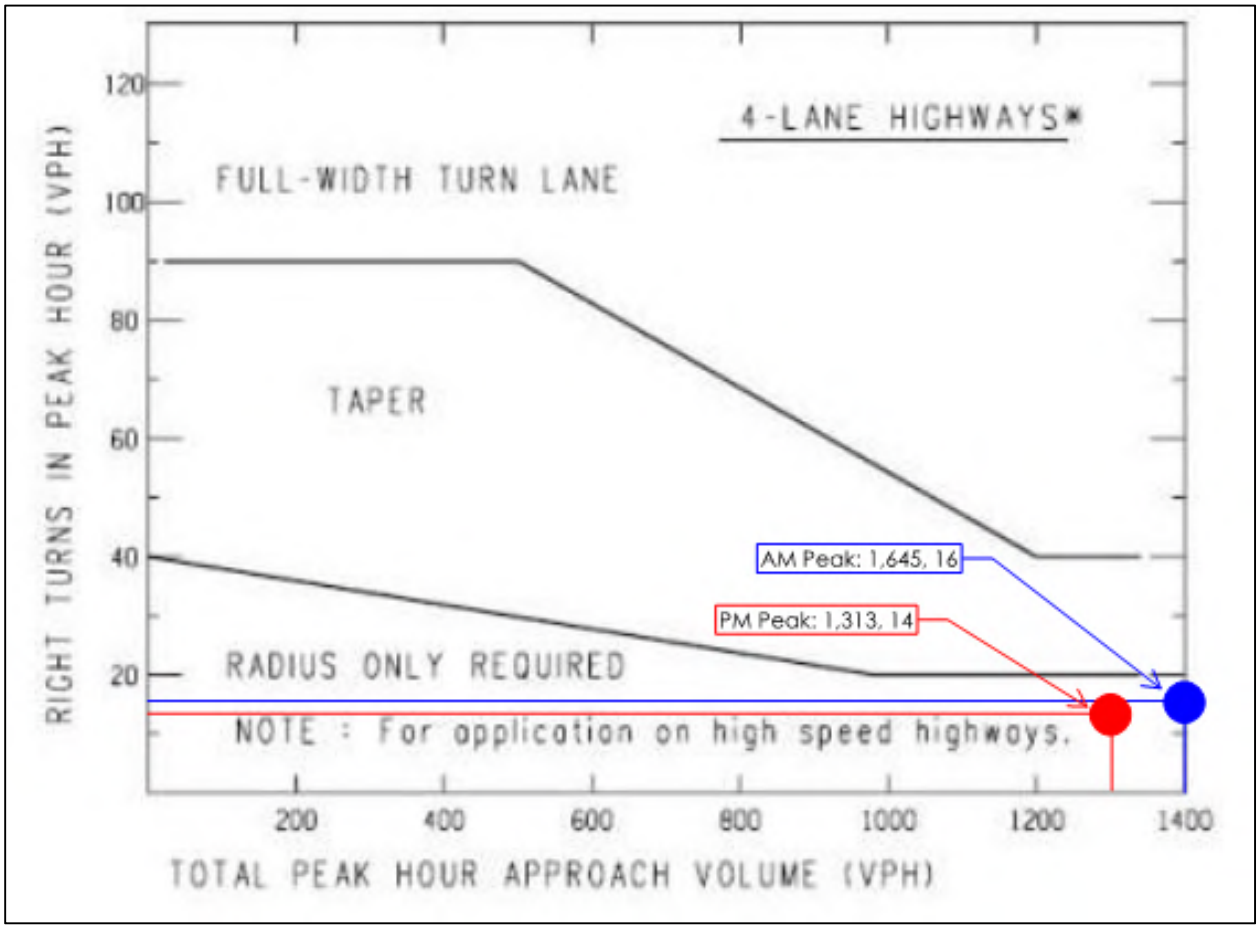


Figure 10.2– Dispensary Driveway Right-Turn Lane/Taper Analysis

The right-turn lane/taper analysis resulted in the proposed dispensary driveway off M-24 not warranting a right-turn lane/taper.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

11.0 SIGHT DISTANCE EVALUATION

Sight distance measurements were reviewed at the project access drives with M-24. Drive access point meet the minimum requirement set in the American Association of State Highway Transportation Officials (AASHTO) latest Edition requirements. These measurements indicate that the available line of sight for motorists traveling along M-24 approaching project driveway and for motorists exiting both driveways exceed the recommended minimum sight distance requirements for 35 MPH approach speed.

12.0 CONCLUSION & RECOMMENDATIONS

Traffic Counts were taken on June 16, 2022 to obtain the existing conditions of the study site. The existing conditions were simulated in Synchro11 and SimTraffic11 and the level of service and the 95th percentile queue was calculated. The existing conditions resulted in nearly all the study intersections having an acceptable level of service, except for M-24 & Odanah Avenue in the AM and PM peak and M-24 & Atwater Street in both the AM and PM peaks.

The mitigation strategy recommended is signal optimization at both of the failing signalized intersections. This mitigation strategy was simulated in Synchro11 and resulted in an acceptable LOS for the AM peak at all intersections, and nearly all intersections in the PM resulting in an acceptable LOS. M-24 & Atwater Street in the PM still resulted in a LOS "E" with a 56.6 second delay for the westbound left turn movement. This approach movement was failing in the existing/no build conditions and background conditions, so it was concluded that the LOS is not due to the proposed development. The lack of vehicle utilization at Converse Court turning left onto M-24 due to the intersection being unsignalized is the cause of the high volume turning left westbound at Atwater Street. Therefore, the proposed development will have minimal impact on the traffic operations on M-24. The increase in traffic volume from the site generated traffic, along with the turning movements from the proposed development, did not have a significant impact on the roadway network

A right-turn lane taper analysis was conducted utilizing MDOT's warrant published in Geometric Design Guidance. The analysis resulted in a "radius only" result meaning a right-turn taper is not needed for both the proposed development.

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

APPENDIX A: EXISTING DATA COLLECTED

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Thursday, June 16, 2022

AM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
7:45 AM	0	5	352	0	0	*357*	0	72	0	10	0	*82*	0	0	135	26	0	*161*	0	1	0	1	0	*2*	**602**
8:00 AM	0	6	377	0	0	*383*	0	67	0	5	0	*72*	0	0	143	28	0	*171*	0	0	0	0	0	*0*	**626**
8:15 AM	0	9	289	0	0	*298*	0	68	0	8	0	*76*	0	0	168	37	0	*205*	0	0	0	0	0	*0*	**579**
8:30 AM	0	7	311	0	0	*318*	0	65	0	7	0	*72*	0	0	194	36	0	*230*	0	0	0	0	0	*0*	**620**
Peak Hour Total	0	27	1329	0	0	*1356*	0	272	0	30	0	*302*	0	0	640	127	0	*767*	0	1	0	1	0	*2*	**2427**
PHF	0.000	0.750	0.881	0.000	0.000	*0.885*	0.000	0.944	0.000	0.750	0.000	*0.921*	0.000	0.000	0.825	0.858	0.000	*0.834*	0.000	0.250	0.000	0.250	0.000	*0.250*	**0.969**

M-24

Total Vehicles On Leg			3900		
Vehicles Entering Intersection	2691		Vehicles Exiting Intersection	1209	
Southbound					
Cars	0	2598	42	0	0
Heavy	0	51	0	0	0
Total	**0**	**2649**	**42**	**0**	**0**
	R	T	L	U-TURN	PED

Driveway

Total Vehicles on Leg	Vehicles Entering Intersection	Vehicles Exiting Intersection
6	6	0

Eastbound

	Cars	Heavy	**Total**
PED	0	0	**0**
U-TURN	0	0	**0**
L	4	0	**4**
T	0	0	**0**
R	2	0	**2**

Total Volumes

Westbound

	Cars	Heavy	**Total**
R	47	0	**47**
T	0	0	**0**
L	508	2	**510**
U-TURN	0	0	**0**
PED	0	0	**0**

Vehicles Entering Intersection	Total Vehicles on Leg	Vehicles Exiting Intersection
557	839	282

Atwater Rd

	PED	U-TURN	L	T	R
Cars	0	0	0	1135	239
Heavy	0	0	0	23	1
Total	**0**	**0**	**0**	**1158**	**240**
Northbound					
Vehicles Entering Intersection	1398		Vehicles Exiting Intersection	3161	
Total Vehicles On Leg			4559		
M-24					

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Atwater Rd and M-24
Lake Orion Michigan
Wednesday, June 15, 2022
PM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:30 PM	0	12	262	0	0	*274*	0	63	0	26	0	*89*	0	0	433	61	0	*494*	0	1	0	0	0	*1*	**858**
4:45 PM	0	16	244	0	0	*260*	0	64	0	17	0	*81*	0	0	403	62	0	*465*	0	0	0	0	0	*0*	**806**
5:00 PM	0	20	251	0	0	*271*	0	61	0	17	0	*78*	0	0	456	51	0	*507*	0	0	0	0	0	*0*	**856**
5:15 PM	0	22	281	0	0	*303*	0	77	0	14	0	*91*	0	1	428	75	0	*504*	0	1	0	0	0	*1*	**899**
Peak Hour Total	0	70	1038	0	0	*1108*	0	265	0	74	0	*339*	0	1	1720	249	0	*1970*	0	2	0	0	0	*2*	**3419**
PHF	0.000	0.795	0.923	0.000	0.000	*0.914*	0.000	0.860	0.000	0.712	0.000	*0.931*	0.000	0.250	0.943	0.830	0.000	*0.971*	0.000	0.500	0.000	0.000	0.000	*0.500*	**0.951**

M-24					
Total Vehicles On Leg			11330		
Vehicles Entering Intersection	4296		Vehicles Exiting Intersection	7034	
Southbound					
Cars	0	4004	266	0	0
Heavy	0	26	0	0	0
Total	**0**	**4030**	**266**	**0**	**0**
	R	T	L	U-TURN	PED

Driveway	Total Vehicles on Leg 14	Vehicles Entering Intersection 6	Vehicles Exiting Intersection 8	Eastbound	Cars	Heavy	Total
					0	0	**0**
					0	0	**0**
					6	0	**6**
					0	0	**0**
					0	0	**0**

	PED	U-TURN	L	T	R
Cars	0	0	8	6750	1008
Heavy	0	0	0	10	0
Total	**0**	**0**	**8**	**6760**	**1008**

Total Volumes

	Cars	Heavy	Total
R	268	0	**268**
T	0	0	**0**
L	1062	4	**1066**
U-TURN	0	0	**0**
PED	0	0	**0**

Westbound | Vehicles Entering Intersection 1334 | Vehicles Exiting Intersection 1274 | Total Vehicles on Leg 2608 | Atwater Rd

Northbound					
Vehicles Entering Intersection	7776		Vehicles Exiting Intersection	5096	
Total Vehicles On Leg			12872		
M-24					

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Atwater Commons Dr and Converse Ct/Emerald Chase Dr
Lake Orion Michigan
Thursday, June 16, 2022
AM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
7:45 AM	0	0	0	5	0	*5*	0	1	0	0	0	*1*	0	4	1	0	0	*5*	0	11	0	0	0	*11*	**22**
8:00 AM	0	0	0	9	0	*9*	0	0	0	0	0	*0*	0	0	2	0	0	*2*	0	11	0	1	0	*12*	**23**
8:15 AM	0	0	2	8	0	*10*	0	0	1	0	0	*1*	0	0	2	0	0	*2*	0	2	0	0	0	*2*	**15**
8:30 AM	0	0	0	7	0	*7*	0	1	1	0	0	*2*	0	0	2	0	0	*2*	0	14	0	1	0	*15*	**26**
Peak Hour Total	0	0	2	29	0	*31*	0	2	2	0	0	*4*	0	4	7	0	0	*11*	0	38	0	2	0	*40*	**86**
PHF	0.000	0.000	0.250	0.806	0.000	*0.775*	0.000	0.500	0.500	0.000	0.000	*0.500*	0.000	0.250	0.875	0.000	0.000	*0.550*	0.000	0.679	0.000	0.500	0.000	*0.667*	**0.827**

Atwater Commons Dr

Total Vehicles On Leg			125		
Vehicles Entering Intersection 46			Vehicles Exiting Intersection 79		
Southbound					
Cars	42	4	0	0	0
Heavy	0	0	0	0	0
Total	**42**	**4**	**0**	**0**	**0**
	R	T	L	U-TURN	PED

Converse Ct

Total Vehicles on Leg 115

Vehicles Entering Intersection 63

Vehicles Exiting Intersection 52

Eastbound

	Cars	Heavy	Total
PED	0	0	**0**
U-TURN	0	0	**0**
L	60	0	**60**
T	0	0	**0**
R	3	0	**3**

Total Volumes

Westbound

	Cars	Heavy	Total
R	2	0	**2**
T	4	0	**4**
L	2	0	**2**
U-TURN	0	0	**0**
PED	0	0	**0**

Vehicles Entering Intersection 8

Vehicles Exiting Intersection 0

Total Vehicles on Leg 8

Emerald Chase Dr

	PED	U-TURN	L	T	R
Cars	0	0	6	17	0
Heavy	0	0	0	0	0
Total	**0**	**0**	**6**	**17**	**0**
Northbound					
Vehicles Entering Intersection 23			Vehicles Exiting Intersection 9		
Total Vehicles On Leg			32		
Atwater Commons Dr					

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Atwater Commons Dr and Converse Ct/Emerald Chase Dr
Lake Orion Michigan
Wednesday, June 14, 2022
PM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:30 PM	0	0	1	10	0	*11*	0	0	0	0	0	*0*	0	0	0	0	0	*0*	0	26	0	1	0	*27*	**38**
4:45 PM	0	0	0	19	0	*19*	0	1	0	0	0	*1*	0	1	2	0	0	*3*	0	31	0	4	0	*35*	**58**
5:00 PM	0	0	2	19	0	*21*	0	1	0	0	0	*1*	0	0	2	0	0	*2*	0	37	0	3	0	*40*	**64**
5:15 PM	0	0	5	16	0	*21*	0	1	1	0	0	*2*	0	0	2	0	0	*2*	0	34	0	2	0	*36*	**61**
Peak Hour Total	0	0	8	64	0	*72*	0	3	1	0	0	*4*	0	1	6	0	0	*7*	0	128	0	10	0	*138*	**221**
PHF	0.000	0.000	0.400	0.842	0.000	*0.857*	0.000	0.750	0.250	0.000	0.000	*0.500*	0.000	0.250	0.750	0.000	0.000	*0.583*	0.000	0.865	0.000	0.625	0.000	*0.863*	**0.863**

Atwater Commons Dr

Total Vehicles On Leg			770		
Vehicles Entering Intersection	266		Vehicles Exiting Intersection	504	
Southbound					
Cars	246	20	0	0	0
Heavy	0	0	0	0	0
Total	**246**	**20**	**0**	**0**	**0**
	R	T	L	U-TURN	PED

Converse Ct

Total Vehicles on Leg 764

Vehicles Entering Intersection 510

Vehicles Exiting Intersection 254

Eastbound

	Cars	Heavy	Total
PED	0	0	**0**
U-TURN	0	0	**0**
L	478	0	**478**
T	0	0	**0**
R	32	0	**32**

Total Volumes

Westbound

	Cars	Heavy	Total
R	0	0	**0**
T	4	0	**4**
L	6	0	**6**
U-TURN	0	0	**0**
PED	0	0	**0**

Vehicles Entering Intersection 10

Vehicles Exiting Intersection 0

Total Vehicles on Leg 10

Emerald Chase Dr

	PED	U-TURN	L	T	R
Cars	0	0	4	26	0
Heavy	0	0	0	0	0
Total	**0**	**0**	**4**	**26**	**0**

Northbound

Vehicles Entering Intersection	30	Vehicles Exiting Intersection	58
Total Vehicles On Leg		88	

Atwater Commons Dr

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Heights Rd and M-24
Lake Orion Michigan
Thursday, June 16, 2022
AM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
7:45 AM	0	2	421	7	0	*430*	0	0	0	0	0	*0*	0	3	166	0	0	*169*	0	0	0	0	0	*0*	**599**
8:00 AM	0	0	420	7	0	*427*	0	0	0	0	0	*0*	0	5	174	0	0	*179*	0	0	0	0	0	*0*	**606**
8:15 AM	0	0	352	12	0	*364*	0	0	0	0	0	*0*	0	4	199	0	0	*203*	0	0	0	0	0	*0*	**567**
8:30 AM	0	1	367	16	0	*384*	0	0	0	2	0	*2*	0	6	225	0	0	*231*	0	0	0	0	0	*0*	**617**
Peak Hour Total	0	3	1560	42	0	*1605*	0	0	0	2	0	*2*	0	18	764	0	0	*782*	0	0	0	0	0	*0*	**2389**
PHF	0.000	0.375	0.926	0.656	0.000	*0.933*	0.000	0.000	0.000	0.250	0.000	*0.250*	0.000	0.750	0.849	0.000	0.000	*0.846*	0.000	0.000	0.000	0.000	0.000	*0.000*	**0.968**

M-24					
Total Vehicles On Leg			4552		
Vehicles Entering Intersection	3161		Vehicles Exiting Intersection	1391	
Southbound					
Cars	72	3041	11	0	0
Heavy	0	37	0	0	0
Total	**72**	**3078**	**11**	**0**	**0**
	R	T	L	U-TURN	PED

Heights Rd	Total Vehicles on Leg 112	Vehicles Entering Intersection 0	Eastbound	Cars	Heavy	**Total**	
				0	0	**0**	PED
				0	0	**0**	U-TURN
				0	0	**0**	L
		Vehicles Exiting Intersection 112		0	0	**0**	T
				0	0	**0**	R

Total Volumes

	Cars	Heavy	**Total**	Westbound	Vehicles Entering Intersection 2	Total Vehicles on Leg 13	Florist Driveway
R	2	0	**2**				
T	0	0	**0**				
L	0	0	**0**		Vehicles Exiting Intersection 11		
U-TURN	0	0	**0**				
PED	0	0	**0**				

	PED	U-TURN	L	T	R
Cars	0	0	40	1380	0
Heavy	0	0	0	9	0
Total	**0**	**0**	**40**	**1389**	**0**
Northbound					
Vehicles Entering Intersection	1429		Vehicles Exiting Intersection	3078	
Total Vehicles On Leg			4507		
M-24					

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Heights Rd and M-24
Lake Orion Michigan
Wednesday, June 15, 2022
PM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:30 PM	0	9	268	40	0	*317*	0	0	0	0	0	*0*	0	17	508	0	0	*525*	0	0	0	0	0	*0*	**842**
4:45 PM	0	0	272	28	0	*300*	0	0	0	0	0	*0*	0	27	525	0	0	*552*	0	0	0	0	0	*0*	**852**
5:00 PM	0	2	282	38	0	*322*	0	0	0	1	0	*1*	0	22	480	0	0	*502*	0	0	0	0	0	*0*	**825**
5:15 PM	0	4	306	50	0	*360*	0	0	0	0	0	*0*	0	19	528	0	0	*547*	0	0	0	1	0	*1*	**908**
Peak Hour Total	0	15	1128	156	0	*1299*	0	0	0	1	0	*1*	0	85	2041	0	0	*2126*	0	0	0	1	0	*1*	**3427**
PHF	0.000	0.417	0.922	0.780	0.000	*0.902*	0.000	0.000	0.000	0.250	0.000	*0.250*	0.000	0.787	0.966	0.000	0.000	*0.963*	0.000	0.000	0.000	0.250	0.000	*0.250*	**0.944**

M-24					
Total Vehicles On Leg			13038		
Vehicles Entering Intersection	5006		Vehicles Exiting Intersection	8032	
Southbound					
Cars	560	4346	82	0	0
Heavy	0	18	0	0	0
Total	**560**	**4364**	**82**	**0**	**0**
	R	T	L	U-TURN	PED

Heights Rd	Total Vehicles on Leg 890	Vehicles Entering Intersection 2 / Vehicles Exiting Intersection 888	Eastbound	Cars	Heavy	Total	
				0	0	**0**	PED
				0	0	**0**	U-TURN
				0	0	**0**	L
				0	0	**0**	T
				2	0	**2**	R

Total Volumes

	Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 12 / Vehicles Exiting Intersection 84	Total Vehicles on Leg 96	Florist Driveway
R	10	0	**10**				
T	0	0	**0**				
L	2	0	**2**				
U-TURN	0	0	**0**				
PED	0	0	**0**				

	PED	U-TURN	L	T	R
Cars	0	0	328	8020	2
Heavy	0	0	0	2	0
Total	**0**	**0**	**328**	**8022**	**2**
Northbound					
Vehicles Entering Intersection	8352		Vehicles Exiting Intersection	4368	
Total Vehicles On Leg			12720		
M-24					

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Odanah St and M-24
Lake Orion Michigan
Thursday, June 16, 2022
AM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
7:45 AM	0	0	434	0	0	*434*	0	0	0	0	0	*0*	0	0	134	0	0	*134*	0	26	0	21	0	*47*	**615**
8:00 AM	0	0	415	0	0	*415*	0	0	0	0	0	*0*	0	0	156	0	0	*156*	0	20	0	17	0	*37*	**608**
8:15 AM	0	0	355	0	0	*355*	0	0	0	0	0	*0*	0	0	181	0	0	*181*	0	26	0	16	0	*42*	**578**
8:30 AM	0	0	364	0	0	*364*	0	0	0	0	0	*0*	0	0	190	1	0	*191*	0	34	0	21	0	*55*	**610**
Peak Hour Total	0	0	1568	0	0	*1568*	0	0	0	0	0	*0*	0	0	661	1	0	*662*	0	106	0	75	0	*181*	**2411**
PHF	0.000	0.000	0.903	0.000	0.000	*0.903*	0.000	0.000	0.000	0.000	0.000	*0.000*	0.000	0.000	0.870	0.250	0.000	*0.866*	0.000	0.779	0.000	0.893	0.000	*0.823*	**0.980**

M-24					
Total Vehicles On Leg		4496			
Vehicles Entering Intersection	3089	Vehicles Exiting Intersection	1407		
Southbound					
Cars	0	3042	0	0	0
Heavy	0	47	0	0	0
Total	**0**	**3089**	**0**	**0**	**0**
	R	T	L	U-TURN	PED

Odanah St	Total Vehicles on Leg 339	Vehicles Entering Intersection 339	Vehicles Exiting Intersection 0	Eastbound	Cars	Heavy	**Total**
				PED	0	0	**0**
				U-TURN	0	0	**0**
				L	193	2	**195**
				T	0	0	**0**
				R	144	0	**144**

Total Volumes

	Cars	Heavy	**Total**	Westbound	Vehicles Entering Intersection 0	Total Vehicles on Leg 1	Florist Driveway
R	0	0	**0**				
T	0	0	**0**				
L	0	0	**0**		Vehicles Exiting Intersection 1		
U-TURN	0	0	**0**				
PED	0	0	**0**				

	PED	U-TURN	L	T	R
Cars	0	0	0	1183	1
Heavy	0	0	0	29	0
Total	**0**	**0**	**0**	**1212**	**1**
Northbound					
Vehicles Entering Intersection	1213	Vehicles Exiting Intersection	3233		
Total Vehicles On Leg		4446			
M-24					

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Odanah St and M-24
Lake Orion Michigan
Wednesday, June 15, 2022
PM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:30 PM	0	0	295	0	0	*295*	0	0	0	0	0	*0*	0	0	499	2	0	*501*	0	36	1	16	0	*53*	**849**
4:45 PM	0	0	319	0	0	*319*	0	0	0	1	0	*1*	0	0	479	2	0	*481*	0	41	0	20	0	*61*	**862**
5:00 PM	0	0	284	0	0	*284*	0	1	0	0	0	*1*	0	0	514	0	0	*514*	0	35	0	21	0	*56*	**855**
5:15 PM	0	0	303	0	0	*303*	0	1	0	0	0	*1*	0	0	510	2	0	*512*	0	46	1	17	0	*64*	**880**
Peak Hour Total	0	0	1201	0	0	*1201*	0	2	0	1	0	*3*	0	0	2002	6	0	*2008*	0	158	2	74	0	*234*	**3446**
PHF	0.000	0.000	0.941	0.000	0.000	*0.941*	0.000	0.500	0.000	0.250	0.000	*0.750*	0.000	0.000	0.974	0.750	0.000	*0.977*	0.000	0.859	0.500	0.881	0.000	*0.914*	**0.979**

M-24					
Total Vehicles On Leg			13196		
Vehicles Entering Intersection	4590		Vehicles Exiting Intersection	8606	
Southbound					
Cars	0	4570	0	0	0
Heavy	0	20	0	0	0
Total	**0**	**4590**	**0**	**0**	**0**
	R	T	L	U-TURN	PED

Odanah St	Total Vehicles on Leg 946	Vehicles Entering Intersection 946	Vehicles Exiting Intersection 0	Eastbound	Cars	Heavy	Total
					0	0	**0**
					0	0	**0**
					646	2	**648**
					4	0	**4**
					294	0	**294**

PED
U-TURN
L
T
R

Total Volumes

Westbound	Cars	Heavy	Total
R	12	0	**12**
T	0	0	**0**
L	6	0	**6**
U-TURN	0	0	**0**
PED	0	0	**0**

Vehicles Entering Intersection 18
Vehicles Exiting Intersection 18
Total Vehicles on Leg 36
Florist Driveway

	PED	U-TURN	L	T	R
Cars	0	0	0	7870	14
Heavy	0	0	0	76	0
Total	**0**	**0**	**0**	**7946**	**14**
Northbound					
Vehicles Entering Intersection	7960		Vehicles Exiting Intersection	4890	
Total Vehicles On Leg			12850		
M-24					

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Smith Ct/Converse Ct and M-24
Lake Orion Michigan
Thursday, June 16, 2022
AM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
7:45 AM	0	1	453	0	0	*454*	0	4	0	4	0	*8*	0	0	153	1	0	*154*	0	0	0	0	0	*0*	**616**
8:00 AM	0	2	417	0	0	*419*	0	0	0	4	0	*4*	0	0	189	2	0	*191*	0	0	0	0	0	*0*	**614**
8:15 AM	0	0	368	1	0	*369*	0	5	0	3	0	*8*	0	2	210	0	0	*212*	0	0	0	0	0	*0*	**589**
8:30 AM	0	1	381	0	0	*382*	0	1	0	1	0	*2*	0	0	221	1	0	*222*	0	0	0	0	0	*0*	**606**
Peak Hour Total	0	4	1619	1	0	*1624*	0	10	0	12	0	*22*	0	2	773	4	0	*779*	0	0	0	0	0	*0*	**2425**
PHF	0.000	0.500	0.893	0.250	0.000	*0.894*	0.000	0.500	0.000	0.750	0.000	*0.688*	0.000	0.250	0.874	0.500	0.000	*0.877*	0.000	0.000	0.000	0.000	0.000	*0.000*	**0.984**

M-24					
Total Vehicles On Leg		4570			
Vehicles Entering Intersection	3160	Vehicles Exiting Intersection	1410		
Southbound					
Cars	1	3086	7	0	0
Heavy	0	66	0	0	0
Total	**1**	**3152**	**7**	**0**	**0**
	R	T	L	U-TURN	PED

Smith Ct	Total Vehicles on Leg 8	Vehicles Entering Intersection 4	Vehicles Exiting Intersection 4	Eastbound	Cars	Heavy	Total	
					0	0	**0**	PED
					0	0	**0**	U-TURN
					1	0	**1**	L
					0	0	**0**	T
					3	0	**3**	R

Total Volumes

	Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 40	Total Vehicles on Leg 53	Converse Ct	Vehicles Exiting Intersection 13
R	20	1	**21**					
T	0	0	**0**					
L	19	0	**19**					
U-TURN	0	0	**0**					
PED	0	0	**0**					

	PED	U-TURN	L	T	R
Cars	0	0	3	1336	6
Heavy	0	0	0	52	0
Total	**0**	**0**	**3**	**1388**	**6**
Northbound					
Vehicles Entering Intersection	1397	Vehicles Exiting Intersection	3174		
Total Vehicles On Leg		4571			
M-24					

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

Wednesday, June 15, 2022

PM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
5:00 PM	0	3	332	0	0	*335*	0	3	0	5	0	*8*	0	1	491	6	0	*498*	0	0	0	0	0	*0*	**841**
5:15 PM	0	1	362	2	0	*365*	0	0	0	9	0	*9*	0	2	525	5	0	*532*	0	0	0	0	0	*0*	**906**
5:30 PM	0	2	327	1	0	*330*	0	1	0	10	0	*11*	0	2	490	2	0	*494*	0	0	0	1	0	*1*	**836**
5:45 PM	0	0	315	0	0	*315*	0	3	0	5	0	*8*	0	0	490	4	0	*494*	0	0	0	0	0	*0*	**817**
Peak Hour Total	0	6	1336	3	0	*1345*	0	7	0	29	0	*36*	0	5	1996	17	0	*2018*	0	0	0	1	0	*1*	**3400**
PHF	0.000	0.500	0.923	0.375	0.000	*0.921*	0.000	0.583	0.000	0.725	0.000	*0.818*	0.000	0.625	0.950	0.708	0.000	*0.948*	0.000	0.000	0.000	0.250	0.000	*0.250*	**0.938**

M-24					
Total Vehicles On Leg			13178		
Vehicles Entering Intersection	5156		Vehicles Exiting Intersection	8022	
Southbound					
Cars	6	5084	18	0	0
Heavy	0	48	0	0	0
Total	**6**	**5132**	**18**	**0**	**0**
	R	T	L	U-TURN	PED

Smith Ct	Total Vehicles on Leg 36	Vehicles Entering Intersection 6	Vehicles Exiting Intersection 30	Eastbound	Cars	Heavy	Total	
					0	0	**0**	PED
					0	0	**0**	U-TURN
					2	0	**2**	L
					0	0	**0**	T
					4	0	**4**	R

Total Volumes

	Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 144	Vehicles Exiting Intersection 84	Total Vehicles on Leg 228	Converse Ct
R	110	0	**110**					
T	0	0	**0**					
L	34	0	**34**					
U-TURN	0	0	**0**					
PED	0	0	**0**					

	PED	U-TURN	L	T	R
Cars	0	0	24	7856	66
Heavy	0	0	0	54	0
Total	**0**	**0**	**24**	**7910**	**66**
Northbound					
Vehicles Entering Intersection	8000		Vehicles Exiting Intersection	5170	
Total Vehicles On Leg			13170		
M-24					

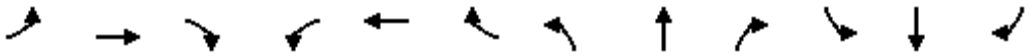
Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove

APPENDIX B: EXISTING CONDITION REPORTS LOS & QUEUE ANALYSIS

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1006: M-24 & Odanah Avenue

06/28/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	0	75	0	0	0	0	661	0	0	1568	0
Future Volume (vph)	106	0	75	0	0	0	0	661	0	0	1568	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6					6.1			6.1	
Lane Util. Factor	1.00		1.00					0.95			0.95	
Frt	1.00		0.85					1.00			1.00	
Flt Protected	0.95		1.00					1.00			1.00	
Satd. Flow (prot)	1863		1667					3725			3725	
Flt Permitted	0.95		1.00					1.00			1.00	
Satd. Flow (perm)	1863		1667					3725			3725	
Peak-hour factor, PHF	0.78	0.92	0.89	0.92	0.92	0.92	0.60	0.87	0.92	0.92	0.90	0.60
Adj. Flow (vph)	136	0	84	0	0	0	0	760	0	0	1742	0
RTOR Reduction (vph)	0	0	38	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	136	0	46	0	0	0	0	760	0	0	1742	0
Turn Type	D.Pm		Prot	D.Pm		Prot		NA			NA	
Protected Phases			2			2		1			1	
Permitted Phases	2			2						1		
Actuated Green, G (s)	14.0		14.0					94.3			94.3	
Effective Green, g (s)	14.0		14.0					94.3			94.3	
Actuated g/C Ratio	0.12		0.12					0.79			0.79	
Clearance Time (s)	5.6		5.6					6.1			6.1	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	217		194					2927			2927	
v/s Ratio Prot			0.03					0.20			c0.47	
v/s Ratio Perm	c0.07											
v/c Ratio	0.63		0.24					0.26			0.60	
Uniform Delay, d1	50.5		48.1					3.5			5.2	
Progression Factor	1.00		1.00					1.00			1.00	
Incremental Delay, d2	5.6		0.6					0.2			0.9	
Delay (s)	56.1		48.8					3.7			6.1	
Level of Service	E		D					A			A	
Approach Delay (s)		53.3			0.0			3.7			6.1	
Approach LOS		D			A			A			A	

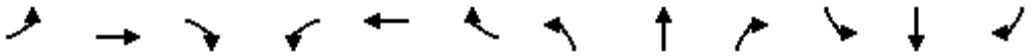
Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1015: M-24 & Atwater Street

06/28/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	272	0	30	0	640	127	27	1329	0
Future Volume (vph)	1	0	1	272	0	30	0	640	127	27	1329	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3		6.3	6.3			5.5	5.5	5.5	5.5	
Lane Util. Factor		1.00		0.95	0.95			0.95	1.00	1.00	0.95	
Frt		0.93		1.00	0.96			1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1784		1770	1728			3725	1667	1863	3725	
Flt Permitted		0.88		0.76	0.78			1.00	1.00	0.32	1.00	
Satd. Flow (perm)		1617		1407	1394			3725	1667	633	3725	
Peak-hour factor, PHF	0.60	0.60	0.60	0.94	0.60	0.75	0.60	0.83	0.86	0.75	0.88	0.60
Adj. Flow (vph)	2	0	2	289	0	40	0	771	148	36	1510	0
RTOR Reduction (vph)	0	3	0	0	61	0	0	0	56	0	0	0
Lane Group Flow (vph)	0	1	0	168	100	0	0	771	93	36	1510	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		3			3		2	1	1	2	1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		19.2		19.2	19.2			75.0	75.0	83.5	75.0	
Effective Green, g (s)		19.2		19.2	19.2			75.0	75.0	83.5	75.0	
Actuated g/C Ratio		0.16		0.16	0.16			0.62	0.62	0.70	0.62	
Clearance Time (s)		6.3		6.3	6.3			5.5	5.5	5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		258		225	223			2328	1041	527	2328	
v/s Ratio Prot								0.21	0.06	c0.00	c0.41	
v/s Ratio Perm		0.00		c0.12	0.07					0.04		
v/c Ratio		0.00		0.75	0.45			0.33	0.09	0.07	0.65	
Uniform Delay, d1		42.4		48.1	45.6			10.6	8.9	8.5	14.2	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		12.6	1.4			0.4	0.2	0.3	1.4	
Delay (s)		42.4		60.7	47.0			11.0	9.1	8.8	15.6	
Level of Service		D		E	D			B	A	A	B	
Approach Delay (s)		42.4			54.0			10.7			15.4	
Approach LOS		D			D			B			B	

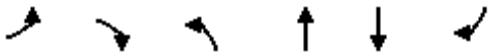
Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9001: M-24 & Heights Road

06/28/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	18	764	1560	42
Future Volume (Veh/h)	0	0	18	764	1560	42
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.75	0.85	0.93	0.67
Hourly flow rate (vph)	0	0	24	899	1677	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				229		
pX, platoon unblocked	0.95					
vC, conflicting volume	2206	870	1740			
vC1, stage 1 conf vol	1708					
vC2, stage 2 conf vol	498					
vCu, unblocked vol	2162	870	1740			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	93			
cM capacity (veh/h)	126	295	358			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	24	450	450	1118	622
Volume Left	24	0	0	0	0
Volume Right	0	0	0	0	63
cSH	358	1700	1700	1700	1700
Volume to Capacity	0.07	0.26	0.26	0.66	0.37
Queue Length 95th (ft)	5	0	0	0	0
Control Delay (s)	15.8	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	0.4			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9002: M-24 & Converse Court

06/28/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	12	773	2	4	1615
Future Volume (Veh/h)	10	12	773	2	4	1615
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.60	0.75	0.87	0.60	0.60	0.89
Hourly flow rate (vph)	17	16	889	3	7	1815
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			884			878
pX, platoon unblocked	0.73	0.98			0.98	
vC, conflicting volume	1812	446			892	
vC1, stage 1 conf vol	890					
vC2, stage 2 conf vol	922					
vCu, unblocked vol	1236	384			840	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	97			99	
cM capacity (veh/h)	332	600			772	

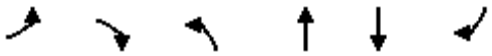
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	33	593	299	7	908	908
Volume Left	17	0	0	7	0	0
Volume Right	16	0	3	0	0	0
cSH	424	1700	1700	772	1700	1700
Volume to Capacity	0.08	0.35	0.18	0.01	0.53	0.53
Queue Length 95th (ft)	6	0	0	1	0	0
Control Delay (s)	14.2	0.0	0.0	9.7	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	14.2	0.0		0.0		
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9003: M-24 & Smith Court

06/28/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	2	783	1619	1
Future Volume (Veh/h)	0	0	2	783	1619	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.60	0.87	0.89	0.60
Hourly flow rate (vph)	0	0	3	900	1819	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				961	801	
pX, platoon unblocked	0.73	0.72	0.72			
vC, conflicting volume	2276	910	1821			
vC1, stage 1 conf vol	1820					
vC2, stage 2 conf vol	456					
vCu, unblocked vol	1901	110	1369			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	140	667	360			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	3	450	450	1213	608
Volume Left	0	3	0	0	0	0
Volume Right	0	0	0	0	0	2
cSH	1700	360	1700	1700	1700	1700
Volume to Capacity	0.00	0.01	0.26	0.26	0.71	0.36
Queue Length 95th (ft)	0	1	0	0	0	0
Control Delay (s)	0.0	15.1	0.0	0.0	0.0	0.0
Lane LOS	A	C				
Approach Delay (s)	0.0	0.1			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9004: Atwater Commons & Converse Court

06/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	0	2	2	2	0	4	7	0	0	2	29
Future Volume (Veh/h)	38	0	2	2	2	0	4	7	0	0	2	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.60	0.60	0.60	0.60	0.60	0.60	0.88	0.60	0.60	0.60	0.81
Hourly flow rate (vph)	56	0	3	3	3	0	7	8	0	0	3	36
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	44	43	21	46	61	8	39			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	44	43	21	46	61	8	39			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	100	100	100	100	100			100		
cM capacity (veh/h)	952	845	1056	950	826	1074	1571			1612		

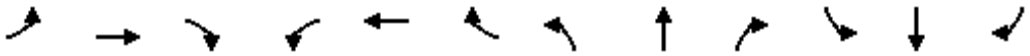
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	59	6	15	39
Volume Left	56	3	7	0
Volume Right	3	0	0	36
cSH	957	884	1571	1612
Volume to Capacity	0.06	0.01	0.00	0.00
Queue Length 95th (ft)	5	1	0	0
Control Delay (s)	9.0	9.1	3.4	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.0	9.1	3.4	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	14.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1006: M-24 & Odanah Avenue

06/28/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	0	74	0	0	0	0	2002	0	0	1128	0
Future Volume (vph)	158	0	74	0	0	0	0	2002	0	0	1128	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6					6.1			6.1	
Lane Util. Factor	1.00		1.00					0.95			0.95	
Frt	1.00		0.85					1.00			1.00	
Flt Protected	0.95		1.00					1.00			1.00	
Satd. Flow (prot)	1863		1667					3725			3725	
Flt Permitted	0.95		1.00					1.00			1.00	
Satd. Flow (perm)	1863		1667					3725			3725	
Peak-hour factor, PHF	0.86	0.92	0.88	0.92	0.92	0.92	0.60	0.97	0.92	0.92	0.94	0.60
Adj. Flow (vph)	184	0	84	0	0	0	0	2064	0	0	1200	0
RTOR Reduction (vph)	0	0	72	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	184	0	12	0	0	0	0	2064	0	0	1200	0
Turn Type	D.Pm		Prot	D.Pm		Prot		NA			NA	
Protected Phases			2			2		1			1	
Permitted Phases	2			2						1		
Actuated Green, G (s)	16.7		16.7					91.6			91.6	
Effective Green, g (s)	16.7		16.7					91.6			91.6	
Actuated g/C Ratio	0.14		0.14					0.76			0.76	
Clearance Time (s)	5.6		5.6					6.1			6.1	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	259		231					2843			2843	
v/s Ratio Prot			0.01					c0.55			0.32	
v/s Ratio Perm	c0.10											
v/c Ratio	0.71		0.05					0.73			0.42	
Uniform Delay, d1	49.3		44.8					7.5			5.0	
Progression Factor	1.00		1.00					1.00			1.00	
Incremental Delay, d2	8.8		0.1					1.7			0.5	
Delay (s)	58.2		44.9					9.2			5.4	
Level of Service	E		D					A			A	
Approach Delay (s)		54.0			0.0			9.2			5.4	
Approach LOS		D			A			A			A	

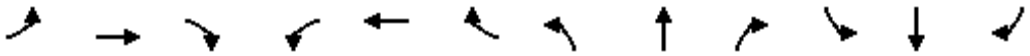
Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1015: M-24 & Atwater Street

06/28/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	265	0	74	1	1720	249	70	1038	0
Future Volume (vph)	2	0	0	265	0	74	1	1720	249	70	1038	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3		6.3	6.3		5.5	5.5	5.5	5.5	5.5	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95	1.00	1.00	0.95	
Frt		1.00		1.00	0.92		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95		0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1863		1770	1677		1863	3725	1667	1863	3725	
Flt Permitted		0.43		0.76	0.85		0.19	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		845		1408	1453		374	3725	1667	108	3725	
Peak-hour factor, PHF	0.60	0.60	0.60	0.86	0.60	0.71	0.60	0.94	0.83	0.80	0.92	0.60
Adj. Flow (vph)	3	0	0	308	0	104	2	1830	300	88	1128	0
RTOR Reduction (vph)	0	0	0	0	60	0	0	0	66	0	0	0
Lane Group Flow (vph)	0	3	0	213	139	0	2	1830	234	88	1128	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		3			3		2	1	1	2	1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		21.4		21.4	21.4		81.3	72.8	72.8	81.3	72.8	
Effective Green, g (s)		21.4		21.4	21.4		81.3	72.8	72.8	81.3	72.8	
Actuated g/C Ratio		0.18		0.18	0.18		0.68	0.61	0.61	0.68	0.61	
Clearance Time (s)		6.3		6.3	6.3		5.5	5.5	5.5	5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		150		251	259		358	2259	1011	197	2259	
v/s Ratio Prot							0.00	c0.49	0.14	c0.03	0.30	
v/s Ratio Perm		0.00		c0.15	0.10		0.00			0.27		
v/c Ratio		0.02		0.85	0.54		0.01	0.81	0.23	0.45	0.50	
Uniform Delay, d1		40.7		47.7	44.8		13.3	18.3	10.8	40.9	13.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		22.5	2.1		0.0	3.3	0.5	7.2	0.8	
Delay (s)		40.7		70.2	46.9		13.3	21.5	11.3	48.0	14.1	
Level of Service		D		E	D		B	C	B	D	B	
Approach Delay (s)		40.7			59.0			20.1			16.6	
Approach LOS		D			E			C			B	

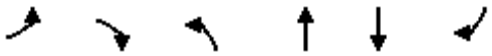
Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9001: M-24 & Heights Road

06/28/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	85	2041	1128	156
Future Volume (Veh/h)	0	0	85	2041	1128	156
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.79	0.97	0.92	0.78
Hourly flow rate (vph)	0	0	108	2104	1226	200
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				229		
pX, platoon unblocked	0.69					
vC, conflicting volume	2594	713	1426			
vC1, stage 1 conf vol	1326					
vC2, stage 2 conf vol	1268					
vCu, unblocked vol	2412	713	1426			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	77			
cM capacity (veh/h)	166	374	473			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	108	1052	1052	817	609
Volume Left	108	0	0	0	0
Volume Right	0	0	0	0	200
cSH	473	1700	1700	1700	1700
Volume to Capacity	0.23	0.62	0.62	0.48	0.36
Queue Length 95th (ft)	22	0	0	0	0
Control Delay (s)	14.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	0.7			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9002: M-24 & Converse Court

06/28/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	29	1955	18	4	1315
Future Volume (Veh/h)	9	29	1955	18	4	1315
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.60	0.73	0.95	0.71	0.60	0.92
Hourly flow rate (vph)	15	40	2058	25	7	1429
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			884			878
pX, platoon unblocked	0.77	0.68			0.68	
vC, conflicting volume	2799	1042			2083	
vC1, stage 1 conf vol	2070					
vC2, stage 2 conf vol	728					
vCu, unblocked vol	1687	122			1653	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	94			97	
cM capacity (veh/h)	96	616			263	

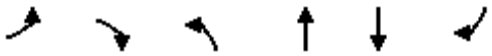
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	55	1372	711	7	714	714
Volume Left	15	0	0	7	0	0
Volume Right	40	0	25	0	0	0
cSH	249	1700	1700	263	1700	1700
Volume to Capacity	0.22	0.81	0.42	0.03	0.42	0.42
Queue Length 95th (ft)	21	0	0	2	0	0
Control Delay (s)	23.5	0.0	0.0	19.1	0.0	0.0
Lane LOS	C			C		
Approach Delay (s)	23.5	0.0		0.1		
Approach LOS	C					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9003: M-24 & Smith Court

06/28/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1	9	1975	1318	2
Future Volume (Veh/h)	0	1	9	1975	1318	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.63	0.95	0.92	0.60
Hourly flow rate (vph)	0	2	14	2079	1433	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				961	801	
pX, platoon unblocked	0.78	0.82	0.82			
vC, conflicting volume	2502	718	1436			
vC1, stage 1 conf vol	1434					
vC2, stage 2 conf vol	1068					
vCu, unblocked vol	1313	215	1091			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	221	647	520			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	2	14	1040	1040	955	481
Volume Left	0	14	0	0	0	0
Volume Right	2	0	0	0	0	3
cSH	647	520	1700	1700	1700	1700
Volume to Capacity	0.00	0.03	0.61	0.61	0.56	0.28
Queue Length 95th (ft)	0	2	0	0	0	0
Control Delay (s)	10.6	12.1	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.6	0.1			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9004: Atwater Commons & Converse Court

06/28/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	0	10	3	1	0	1	6	0	0	8	64
Future Volume (Veh/h)	128	0	10	3	1	0	1	6	0	0	8	64
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.60	0.63	0.75	0.60	0.60	0.60	0.75	0.60	0.60	0.60	0.84
Hourly flow rate (vph)	147	0	16	4	2	0	2	8	0	0	13	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	64	63	51	79	101	8	89			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	64	63	51	79	101	8	89			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	98	100	100	100	100			100		
cM capacity (veh/h)	927	827	1017	894	788	1074	1506			1612		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	163	6	10	89
Volume Left	147	4	2	0
Volume Right	16	0	0	76
cSH	935	856	1506	1612
Volume to Capacity	0.17	0.01	0.00	0.00
Queue Length 95th (ft)	16	1	0	0
Control Delay (s)	9.7	9.2	1.5	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.7	9.2	1.5	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	19.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 21: M-24

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	T	T
Maximum Queue (ft)	57	16	9	130	135
Average Queue (ft)	18	1	0	24	22
95th Queue (ft)	47	7	4	84	87
Link Distance (ft)	76	13	13	106	106
Upstream Blk Time (%)	1	0	0	0	1
Queuing Penalty (veh)	0	0	0	3	4
Storage Bay Dist (ft)					
Storage Blk Time (%)				2	
Queuing Penalty (veh)				0	

Intersection: 1006: M-24 & Odanah Avenue

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	LT	T
Maximum Queue (ft)	161	132	110	65	105	95
Average Queue (ft)	77	59	51	22	70	60
95th Queue (ft)	138	111	98	59	111	107
Link Distance (ft)	494	494	536	536	13	13
Upstream Blk Time (%)					13	13
Queuing Penalty (veh)					104	101
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 1015: M-24 & Atwater Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LTR	T	T	R	L	T	TR
Maximum Queue (ft)	29	115	315	181	179	107	156	329	330
Average Queue (ft)	3	95	157	84	83	34	19	261	192
95th Queue (ft)	16	142	255	143	154	83	84	363	317
Link Distance (ft)	107		277	573	573		303	303	303
Upstream Blk Time (%)			1				0	5	1
Queuing Penalty (veh)			4				0	0	0
Storage Bay Dist (ft)		75				160			
Storage Blk Time (%)		6	40	7	0				
Queuing Penalty (veh)		10	54	0	1				

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 9001: M-24 & Heights Road

Movement	NB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	42	25	23
Average Queue (ft)	13	1	1
95th Queue (ft)	38	12	12
Link Distance (ft)		323	323
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	50		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	1		

Intersection: 9002: M-24 & Converse Court

Movement	WB	SB	SB
Directions Served	LR	L	T
Maximum Queue (ft)	52	31	6
Average Queue (ft)	19	2	0
95th Queue (ft)	46	16	5
Link Distance (ft)	203		32
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		3	

Intersection: 9003: M-24 & Smith Court

Movement	NB	NB	SB
Directions Served	L	T	T
Maximum Queue (ft)	30	6	6
Average Queue (ft)	2	0	0
95th Queue (ft)	14	5	4
Link Distance (ft)		32	102
Upstream Blk Time (%)	1		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)	50		
Storage Blk Time (%)	1		
Queuing Penalty (veh)	4		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 9004: Atwater Commons & Converse Court

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	52	25	6
Average Queue (ft)	24	4	0
95th Queue (ft)	49	19	4
Link Distance (ft)	128	173	237
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 291

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 21: M-24

Movement	NB	NB	SB	SB
Directions Served	T	TR	T	T
Maximum Queue (ft)	87	81	73	49
Average Queue (ft)	8	6	10	4
95th Queue (ft)	43	34	44	28
Link Distance (ft)	11	11	106	106
Upstream Blk Time (%)	1	0	0	0
Queuing Penalty (veh)	6	2	0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)			1	
Queuing Penalty (veh)			0	

Intersection: 1006: M-24 & Odanah Avenue

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	LT	T
Maximum Queue (ft)	225	141	373	330	91	94
Average Queue (ft)	114	58	194	177	66	47
95th Queue (ft)	191	121	314	295	101	92
Link Distance (ft)	494	494	536	536	11	11
Upstream Blk Time (%)					15	12
Queuing Penalty (veh)					86	69
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 1015: M-24 & Atwater Street

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LTR	L	T	T	R	L	T	TR
Maximum Queue (ft)	17	115	343	24	544	555	235	124	324	261
Average Queue (ft)	1	91	170	1	343	355	155	54	213	142
95th Queue (ft)	9	144	297	17	497	512	289	103	309	242
Link Distance (ft)	107		277		573	573		303	303	303
Upstream Blk Time (%)			3		0	0			1	0
Queuing Penalty (veh)			10		1	1			0	0
Storage Bay Dist (ft)		75		80			160			
Storage Blk Time (%)		8	46		27	23	1			
Queuing Penalty (veh)		17	62		0	57	7			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 9001: M-24 & Heights Road

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	75	143	92	29	24
Average Queue (ft)	40	18	6	1	2
95th Queue (ft)	73	94	42	12	15
Link Distance (ft)		106	106	323	323
Upstream Blk Time (%)	0	1	0		
Queuing Penalty (veh)	0	10	1		
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	11				
Queuing Penalty (veh)	108				

Intersection: 9002: M-24 & Converse Court

Movement	WB	NB	NB	SB
Directions Served	LR	T	TR	L
Maximum Queue (ft)	98	14	4	25
Average Queue (ft)	32	0	0	3
95th Queue (ft)	77	10	3	16
Link Distance (ft)	203	215	215	
Upstream Blk Time (%)				3
Queuing Penalty (veh)				0
Storage Bay Dist (ft)				50
Storage Blk Time (%)				3
Queuing Penalty (veh)				18

Intersection: 9003: M-24 & Smith Court

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	24	31	33	11
Average Queue (ft)	1	6	2	0
95th Queue (ft)	12	26	18	6
Link Distance (ft)	237		32	102
Upstream Blk Time (%)		2	0	
Queuing Penalty (veh)		0	1	
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		2	0	
Queuing Penalty (veh)		19	0	

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 9004: Atwater Commons & Converse Court

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (ft)	67	31
Average Queue (ft)	37	4
95th Queue (ft)	58	21
Link Distance (ft)	128	173
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 523

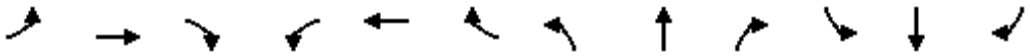
Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

APPENDIX C: BACKGROUND CONDITION REPORTS LOS & QUEUE ANALYSIS

Attachment: Mystic Cove Traffic Impact Study-071822-Lake Vision (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1006: M-24 & Odanah Avenue

06/28/2022



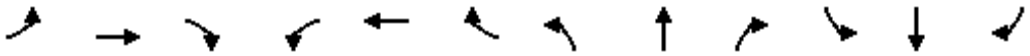
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	0	75	0	0	0	0	661	0	0	1568	0
Future Volume (vph)	106	0	75	0	0	0	0	661	0	0	1568	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6					6.1			6.1	
Lane Util. Factor	1.00		1.00					0.95			0.95	
Frt	1.00		0.85					1.00			1.00	
Flt Protected	0.95		1.00					1.00			1.00	
Satd. Flow (prot)	1863		1667					3725			3725	
Flt Permitted	0.95		1.00					1.00			1.00	
Satd. Flow (perm)	1863		1667					3725			3725	
Peak-hour factor, PHF	0.78	0.92	0.89	0.92	0.92	0.92	0.60	0.87	0.92	0.92	0.90	0.60
Growth Factor (vph)	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%
Adj. Flow (vph)	139	0	86	0	0	0	0	775	0	0	1777	0
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	139	0	51	0	0	0	0	775	0	0	1777	0
Turn Type	D.Pm		Prot	D.Pm		Prot		NA			NA	
Protected Phases			2			2		1			1	
Permitted Phases	2			2						1		
Actuated Green, G (s)	14.2		14.2					94.1			94.1	
Effective Green, g (s)	14.2		14.2					94.1			94.1	
Actuated g/C Ratio	0.12		0.12					0.78			0.78	
Clearance Time (s)	5.6		5.6					6.1			6.1	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	220		197					2921			2921	
v/s Ratio Prot			0.03					0.21			c0.48	
v/s Ratio Perm	c0.07											
v/c Ratio	0.63		0.26					0.27			0.61	
Uniform Delay, d1	50.4		48.1					3.5			5.3	
Progression Factor	1.00		1.00					1.00			1.00	
Incremental Delay, d2	5.8		0.7					0.2			1.0	
Delay (s)	56.2		48.8					3.8			6.3	
Level of Service	E		D					A			A	
Approach Delay (s)		53.4			0.0			3.8			6.3	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1015: M-24 & Atwater Street

06/28/2022



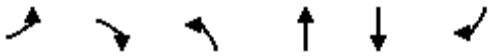
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	272	0	30	0	640	127	27	1329	0
Future Volume (vph)	1	0	1	272	0	30	0	640	127	27	1329	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3		6.3	6.3			5.5	5.5	5.5	5.5	
Lane Util. Factor		1.00		0.95	0.95			0.95	1.00	1.00	0.95	
Frt		0.93		1.00	0.96			1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1784		1770	1728			3725	1667	1863	3725	
Flt Permitted		0.88		0.76	0.78			1.00	1.00	0.32	1.00	
Satd. Flow (perm)		1614		1407	1394			3725	1667	621	3725	
Peak-hour factor, PHF	0.60	0.60	0.60	0.94	0.60	0.75	0.60	0.83	0.86	0.75	0.88	0.60
Growth Factor (vph)	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%
Adj. Flow (vph)	2	0	2	295	0	41	0	787	151	37	1540	0
RTOR Reduction (vph)	0	3	0	0	61	0	0	0	56	0	0	0
Lane Group Flow (vph)	0	1	0	171	104	0	0	787	95	37	1540	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		3			3		2	1	1	2	1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		19.0		19.0	19.0			75.2	75.2	83.7	75.2	
Effective Green, g (s)		19.0		19.0	19.0			75.2	75.2	83.7	75.2	
Actuated g/C Ratio		0.16		0.16	0.16			0.63	0.63	0.70	0.63	
Clearance Time (s)		6.3		6.3	6.3			5.5	5.5	5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		255		222	220			2334	1044	521	2334	
v/s Ratio Prot								0.21	0.06	c0.01	c0.41	
v/s Ratio Perm		0.00		c0.12	0.07					0.04		
v/c Ratio		0.00		0.77	0.47			0.34	0.09	0.07	0.66	
Uniform Delay, d1		42.5		48.4	45.9			10.6	8.9	8.6	14.3	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		15.1	1.6			0.4	0.2	0.3	1.5	
Delay (s)		42.5		63.5	47.5			11.0	9.0	8.9	15.7	
Level of Service		D		E	D			B	A	A	B	
Approach Delay (s)		42.5			55.7			10.7			15.6	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9001: M-24 & Heights Road

06/28/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	18	764	1560	42
Future Volume (Veh/h)	0	0	18	764	1560	42
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.75	0.85	0.93	0.67
Hourly flow rate (vph)	0	0	24	917	1711	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				229		
pX, platoon unblocked	0.95					
vC, conflicting volume	2250	888	1775			
vC1, stage 1 conf vol	1743					
vC2, stage 2 conf vol	506					
vCu, unblocked vol	2206	888	1775			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	93			
cM capacity (veh/h)	121	287	346			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	24	458	458	1141	634
Volume Left	24	0	0	0	0
Volume Right	0	0	0	0	64
cSH	346	1700	1700	1700	1700
Volume to Capacity	0.07	0.27	0.27	0.67	0.37
Queue Length 95th (ft)	6	0	0	0	0
Control Delay (s)	16.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	0.4			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9002: M-24 & Converse Court

06/28/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	12	773	2	4	1615
Future Volume (Veh/h)	10	12	773	2	4	1615
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	13	857	2	4	1791
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			884			878
pX, platoon unblocked	0.73	0.97			0.97	
vC, conflicting volume	1762	430			859	
vC1, stage 1 conf vol	858					
vC2, stage 2 conf vol	904					
vCu, unblocked vol	1147	359			801	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	350	620			797	

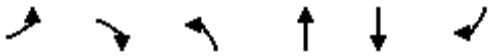
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	24	571	288	4	896	896
Volume Left	11	0	0	4	0	0
Volume Right	13	0	2	0	0	0
cSH	458	1700	1700	797	1700	1700
Volume to Capacity	0.05	0.34	0.17	0.01	0.53	0.53
Queue Length 95th (ft)	4	0	0	0	0	0
Control Delay (s)	13.3	0.0	0.0	9.5	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.3	0.0		0.0		
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9003: M-24 & Smith Court

06/28/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	2	783	1619	1
Future Volume (Veh/h)	0	0	2	783	1619	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.60	0.87	0.89	0.60
Hourly flow rate (vph)	0	0	3	918	1855	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				961	801	
pX, platoon unblocked	0.72	0.71	0.71			
vC, conflicting volume	2321	928	1857			
vC1, stage 1 conf vol	1856					
vC2, stage 2 conf vol	465					
vCu, unblocked vol	1932	99	1399			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	133	670	346			

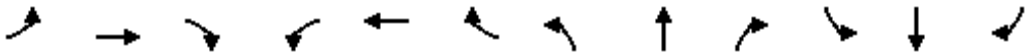
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	3	459	459	1237	620
Volume Left	0	3	0	0	0	0
Volume Right	0	0	0	0	0	2
cSH	1700	346	1700	1700	1700	1700
Volume to Capacity	0.00	0.01	0.27	0.27	0.73	0.36
Queue Length 95th (ft)	0	1	0	0	0	0
Control Delay (s)	0.0	15.5	0.0	0.0	0.0	0.0
Lane LOS	A	C				
Approach Delay (s)	0.0	0.1			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9004: Atwater Commons & Converse Court

06/28/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	0	2	2	2	0	4	7	0	0	2	29
Future Volume (Veh/h)	38	0	2	2	2	0	4	7	0	0	2	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.60	0.60	0.60	0.60	0.60	0.60	0.88	0.60	0.60	0.60	0.81
Hourly flow rate (vph)	57	0	3	3	3	0	7	8	0	0	3	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	45	44	22	46	62	8	40			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	45	44	22	46	62	8	40			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	100	100	100	100	100			100		
cM capacity (veh/h)	951	845	1056	949	825	1074	1570			1612		

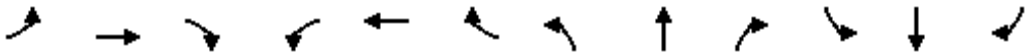
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	6	15	40
Volume Left	57	3	7	0
Volume Right	3	0	0	37
cSH	956	883	1570	1612
Volume to Capacity	0.06	0.01	0.00	0.00
Queue Length 95th (ft)	5	1	0	0
Control Delay (s)	9.0	9.1	3.4	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.0	9.1	3.4	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	5.3			
Intersection Capacity Utilization	14.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1006: M-24 & Odanah Avenue

06/28/2022



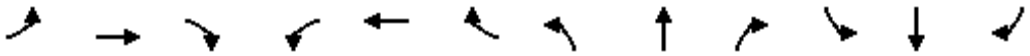
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	0	74	0	0	0	0	2002	0	0	1128	0
Future Volume (vph)	158	0	74	0	0	0	0	2002	0	0	1128	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6					6.1			6.1	
Lane Util. Factor	1.00		1.00					0.95			0.95	
Frt	1.00		0.85					1.00			1.00	
Flt Protected	0.95		1.00					1.00			1.00	
Satd. Flow (prot)	1863		1667					3725			3725	
Flt Permitted	0.95		1.00					1.00			1.00	
Satd. Flow (perm)	1863		1667					3725			3725	
Peak-hour factor, PHF	0.86	0.92	0.88	0.92	0.92	0.92	0.60	0.97	0.92	0.92	0.94	0.60
Growth Factor (vph)	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%
Adj. Flow (vph)	187	0	86	0	0	0	0	2105	0	0	1224	0
RTOR Reduction (vph)	0	0	74	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	187	0	12	0	0	0	0	2105	0	0	1224	0
Turn Type	D.Pm		Prot	D.Pm		Prot		NA			NA	
Protected Phases			2			2		1			1	
Permitted Phases	2			2						1		
Actuated Green, G (s)	16.9		16.9					91.4			91.4	
Effective Green, g (s)	16.9		16.9					91.4			91.4	
Actuated g/C Ratio	0.14		0.14					0.76			0.76	
Clearance Time (s)	5.6		5.6					6.1			6.1	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	262		234					2837			2837	
v/s Ratio Prot			0.01					c0.57			0.33	
v/s Ratio Perm	c0.10											
v/c Ratio	0.71		0.05					0.74			0.43	
Uniform Delay, d1	49.2		44.6					7.8			5.1	
Progression Factor	1.00		1.00					1.00			1.00	
Incremental Delay, d2	8.9		0.1					1.8			0.5	
Delay (s)	58.1		44.7					9.6			5.6	
Level of Service	E		D					A			A	
Approach Delay (s)		53.9			0.0			9.6			5.6	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1015: M-24 & Atwater Street

06/28/2022



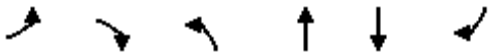
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	265	0	74	1	1720	249	70	1038	0
Future Volume (vph)	2	0	0	265	0	74	1	1720	249	70	1038	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3		6.3	6.3		5.5	5.5	5.5	5.5	5.5	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95	1.00	1.00	0.95	
Frt		1.00		1.00	0.92		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95		0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1863		1770	1677		1863	3725	1667	1863	3725	
Flt Permitted		0.42		0.76	0.85		0.18	1.00	1.00	0.06	1.00	
Satd. Flow (perm)		830		1408	1453		360	3725	1667	108	3725	
Peak-hour factor, PHF	0.60	0.60	0.60	0.86	0.60	0.71	0.60	0.94	0.83	0.80	0.92	0.60
Growth Factor (vph)	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%
Adj. Flow (vph)	3	0	0	314	0	106	2	1866	306	89	1151	0
RTOR Reduction (vph)	0	0	0	0	60	0	0	0	76	0	0	0
Lane Group Flow (vph)	0	3	0	217	143	0	2	1866	230	89	1151	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	custom	pm+pt	NA	
Protected Phases		3			3		2	1	1	2	1	
Permitted Phases	3			3			1		2	1		
Actuated Green, G (s)		21.6		21.6	21.6		81.1	72.6	81.1	81.1	72.6	
Effective Green, g (s)		21.6		21.6	21.6		81.1	72.6	81.1	81.1	72.6	
Actuated g/C Ratio		0.18		0.18	0.18		0.68	0.60	0.68	0.68	0.60	
Clearance Time (s)		6.3		6.3	6.3		5.5	5.5	5.5	5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		149		253	261		349	2253	1203	197	2253	
v/s Ratio Prot							0.00	c0.50	0.12	c0.03	0.31	
v/s Ratio Perm		0.00		c0.15	0.10		0.00		0.02	0.27		
v/c Ratio		0.02		0.86	0.55		0.01	0.83	0.19	0.45	0.51	
Uniform Delay, d1		40.5		47.7	44.8		13.8	18.8	7.2	42.2	13.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		23.8	2.4		0.0	3.7	0.4	7.3	0.8	
Delay (s)		40.5		71.5	47.1		13.8	22.4	7.6	49.5	14.4	
Level of Service		D		E	D		B	C	A	D	B	
Approach Delay (s)		40.5			59.7			20.3			16.9	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9001: M-24 & Heights Road

06/28/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	85	2041	1128	156
Future Volume (Veh/h)	0	0	85	2041	1128	156
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.79	0.97	0.92	0.78
Hourly flow rate (vph)	0	0	110	2146	1251	204
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				229		
pX, platoon unblocked	0.67					
vC, conflicting volume	2646	728	1455			
vC1, stage 1 conf vol	1353					
vC2, stage 2 conf vol	1293					
vCu, unblocked vol	2473	728	1455			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	76			
cM capacity (veh/h)	162	366	461			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	110	1073	1073	834	621
Volume Left	110	0	0	0	0
Volume Right	0	0	0	0	204
cSH	461	1700	1700	1700	1700
Volume to Capacity	0.24	0.63	0.63	0.49	0.37
Queue Length 95th (ft)	23	0	0	0	0
Control Delay (s)	15.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	0.7			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9002: M-24 & Converse Court

06/28/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	29	1955	18	4	1315
Future Volume (Veh/h)	9	29	1955	18	4	1315
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.60	0.73	0.95	0.71	0.60	0.92
Hourly flow rate (vph)	15	41	2099	26	7	1458
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			885			878
pX, platoon unblocked	0.75	0.66			0.66	
vC, conflicting volume	2855	1062			2125	
vC1, stage 1 conf vol	2112					
vC2, stage 2 conf vol	743					
vCu, unblocked vol	1692	65			1674	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	94			97	
cM capacity (veh/h)	91	651			250	

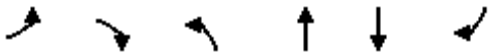
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	56	1399	726	7	729	729
Volume Left	15	0	0	7	0	0
Volume Right	41	0	26	0	0	0
cSH	245	1700	1700	250	1700	1700
Volume to Capacity	0.23	0.82	0.43	0.03	0.43	0.43
Queue Length 95th (ft)	21	0	0	2	0	0
Control Delay (s)	24.0	0.0	0.0	19.8	0.0	0.0
Lane LOS	C			C		
Approach Delay (s)	24.0	0.0		0.1		
Approach LOS	C					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9003: M-24 & Smith Court

06/28/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1	9	1975	1318	2
Future Volume (Veh/h)	0	1	9	1975	1318	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.63	0.95	0.92	0.60
Hourly flow rate (vph)	0	2	15	2121	1461	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				962	801	
pX, platoon unblocked	0.76	0.81	0.81			
vC, conflicting volume	2553	732	1464			
vC1, stage 1 conf vol	1462					
vC2, stage 2 conf vol	1090					
vCu, unblocked vol	1304	210	1110			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	215	647	508			

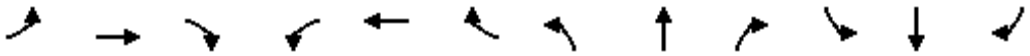
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	2	15	1060	1060	974	490
Volume Left	0	15	0	0	0	0
Volume Right	2	0	0	0	0	3
cSH	647	508	1700	1700	1700	1700
Volume to Capacity	0.00	0.03	0.62	0.62	0.57	0.29
Queue Length 95th (ft)	0	2	0	0	0	0
Control Delay (s)	10.6	12.3	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.6	0.1			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9004: Atwater Commons & Converse Court

06/28/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	0	10	3	1	0	1	6	0	0	8	64
Future Volume (Veh/h)	128	0	10	3	1	0	1	6	0	0	8	64
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.60	0.63	0.75	0.60	0.60	0.60	0.75	0.60	0.60	0.60	0.84
Hourly flow rate (vph)	150	0	16	4	2	0	2	8	0	0	14	78
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	66	65	53	81	104	8	92			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	66	65	53	81	104	8	92			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	98	100	100	100	100			100		
cM capacity (veh/h)	925	825	1014	892	785	1074	1503			1612		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	166	6	10	92
Volume Left	150	4	2	0
Volume Right	16	0	0	78
cSH	933	853	1503	1612
Volume to Capacity	0.18	0.01	0.00	0.00
Queue Length 95th (ft)	16	1	0	0
Control Delay (s)	9.7	9.3	1.5	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.7	9.3	1.5	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	6.1			
Intersection Capacity Utilization	19.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 21: M-24

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	T	T
Maximum Queue (ft)	64	12	4	116	119
Average Queue (ft)	20	1	0	30	23
95th Queue (ft)	53	6	3	90	82
Link Distance (ft)	76	12	12	106	106
Upstream Blk Time (%)	2	0	0	0	0
Queuing Penalty (veh)	0	0	0	3	4
Storage Bay Dist (ft)					
Storage Blk Time (%)				3	
Queuing Penalty (veh)				0	

Intersection: 1006: M-24 & Odanah Avenue

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	LT	T
Maximum Queue (ft)	171	131	117	79	98	91
Average Queue (ft)	86	63	48	25	74	65
95th Queue (ft)	153	117	98	63	107	107
Link Distance (ft)	494	494	536	536	12	12
Upstream Blk Time (%)					14	13
Queuing Penalty (veh)					112	105
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 1015: M-24 & Atwater Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LTR	T	T	R	L	T	TR
Maximum Queue (ft)	29	115	285	151	139	119	112	324	322
Average Queue (ft)	2	97	156	77	71	37	22	261	187
95th Queue (ft)	14	141	249	130	126	88	70	363	308
Link Distance (ft)	107		277	573	573		303	303	303
Upstream Blk Time (%)			1				0	5	1
Queuing Penalty (veh)			3				0	0	0
Storage Bay Dist (ft)		75				160			
Storage Blk Time (%)		6	41	5	0	0			
Queuing Penalty (veh)		9	56	0	0	0			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 9001: M-24 & Heights Road

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	55	21	5	9	14
Average Queue (ft)	14	0	0	0	1
95th Queue (ft)	43	7	4	7	8
Link Distance (ft)		106	106	323	323
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	1	0			
Queuing Penalty (veh)	3	0			

Intersection: 9002: M-24 & Converse Court

Movement	WB	SB	SB
Directions Served	LR	L	T
Maximum Queue (ft)	56	31	28
Average Queue (ft)	19	3	1
95th Queue (ft)	46	18	9
Link Distance (ft)	203		32
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		1	
Queuing Penalty (veh)		5	

Intersection: 9003: M-24 & Smith Court

Movement	NB	NB	NB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	30	6	6	14
Average Queue (ft)	3	0	0	0
95th Queue (ft)	17	4	4	6
Link Distance (ft)		32	32	102
Upstream Blk Time (%)	1	0	0	
Queuing Penalty (veh)	0	0	0	
Storage Bay Dist (ft)	50			
Storage Blk Time (%)	1	0		
Queuing Penalty (veh)	4	0		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 9004: Atwater Commons & Converse Court

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	54	31	6
Average Queue (ft)	24	5	0
95th Queue (ft)	50	23	4
Link Distance (ft)	128	173	237
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 307

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 21: M-24

Movement	NB	NB	SB	SB
Directions Served	T	TR	T	T
Maximum Queue (ft)	74	65	96	68
Average Queue (ft)	7	4	10	7
95th Queue (ft)	37	27	50	40
Link Distance (ft)	12	12	106	106
Upstream Blk Time (%)	0	0	0	0
Queuing Penalty (veh)	4	1	1	0
Storage Bay Dist (ft)				
Storage Blk Time (%)			1	
Queuing Penalty (veh)			0	

Intersection: 1006: M-24 & Odanah Avenue

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	LT	T
Maximum Queue (ft)	260	142	354	309	101	87
Average Queue (ft)	126	61	178	154	64	46
95th Queue (ft)	213	115	299	272	101	92
Link Distance (ft)	494	494	536	536	12	12
Upstream Blk Time (%)					15	12
Queuing Penalty (veh)					84	68
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 1015: M-24 & Atwater Street

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LTR	L	T	T	R	L	T	TR
Maximum Queue (ft)	23	115	342	5	524	557	235	124	315	259
Average Queue (ft)	1	97	181	0	324	333	139	57	208	137
95th Queue (ft)	11	144	302	4	487	502	305	105	317	240
Link Distance (ft)	107		277		573	573		303	303	303
Upstream Blk Time (%)			4		0	0			1	0
Queuing Penalty (veh)			15		0	2			0	0
Storage Bay Dist (ft)		75		80			160			
Storage Blk Time (%)		10	48		29	24				
Queuing Penalty (veh)		21	65		0	61				

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 9001: M-24 & Heights Road

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	84	127	64	4	28
Average Queue (ft)	40	15	3	0	3
95th Queue (ft)	76	84	28	3	17
Link Distance (ft)		106	106	232	232
Upstream Blk Time (%)	0	0	0		
Queuing Penalty (veh)	0	5	0		
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	9	0			
Queuing Penalty (veh)	93	0			

Intersection: 9002: M-24 & Converse Court

Movement	WB	NB	SB	SB
Directions Served	LR	T	L	T
Maximum Queue (ft)	105	9	24	13
Average Queue (ft)	33	0	3	0
95th Queue (ft)	74	6	17	6
Link Distance (ft)	203	308		32
Upstream Blk Time (%)			3	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)			50	
Storage Blk Time (%)			3	
Queuing Penalty (veh)			22	

Intersection: 9003: M-24 & Smith Court

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	19	31	37	7
Average Queue (ft)	1	5	1	0
95th Queue (ft)	10	24	18	0
Link Distance (ft)	237		32	102
Upstream Blk Time (%)		2	0	
Queuing Penalty (veh)		0	1	
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		2	0	
Queuing Penalty (veh)		20	0	

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

06/28/2022

Intersection: 9004: Atwater Commons & Converse Court

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (ft)	78	31
Average Queue (ft)	40	5
95th Queue (ft)	64	23
Link Distance (ft)	128	173
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 519

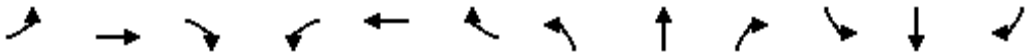
Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

APPENDIX D: BUILD CONDITION REPORTS
LOS & QUEUE ANALYSIS

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1006: M-24 & Odanah Avenue

07/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	0	75	0	0	0	0	682	0	0	1625	0
Future Volume (vph)	109	0	75	0	0	0	0	682	0	0	1625	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6					6.1			6.1	
Lane Util. Factor	1.00		1.00					0.95			0.95	
Frt	1.00		0.85					1.00			1.00	
Flt Protected	0.95		1.00					1.00			1.00	
Satd. Flow (prot)	1863		1667					3725			3725	
Flt Permitted	0.95		1.00					1.00			1.00	
Satd. Flow (perm)	1863		1667					3725			3725	
Peak-hour factor, PHF	0.78	0.92	0.89	0.92	0.92	0.92	0.60	0.87	0.92	0.92	0.90	0.60
Adj. Flow (vph)	140	0	84	0	0	0	0	784	0	0	1806	0
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	140	0	51	0	0	0	0	784	0	0	1806	0
Turn Type	D.Pm		Prot	D.Pm		Prot		NA			NA	
Protected Phases			2			2		1			1	
Permitted Phases	2			2						1		
Actuated Green, G (s)	14.3		14.3					94.0			94.0	
Effective Green, g (s)	14.3		14.3					94.0			94.0	
Actuated g/C Ratio	0.12		0.12					0.78			0.78	
Clearance Time (s)	5.6		5.6					6.1			6.1	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	222		198					2917			2917	
v/s Ratio Prot			0.03					0.21			c0.48	
v/s Ratio Perm	c0.08											
v/c Ratio	0.63		0.26					0.27			0.62	
Uniform Delay, d1	50.3		48.0					3.6			5.5	
Progression Factor	1.00		1.00					1.00			1.00	
Incremental Delay, d2	5.7		0.7					0.2			1.0	
Delay (s)	56.1		48.7					3.8			6.5	
Level of Service	E		D					A			A	
Approach Delay (s)		53.3			0.0			3.8			6.5	
Approach LOS		D			A			A			A	

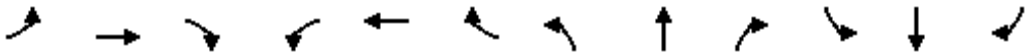
Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1015: M-24 & Atwater Street

07/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	1	280	0	31	0	663	131	28	1372	0
Future Volume (vph)	1	0	1	280	0	31	0	663	131	28	1372	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3		6.3	6.3			5.5	5.5	5.5	5.5	
Lane Util. Factor		1.00		0.95	0.95			0.95	1.00	1.00	0.95	
Frt		0.93		1.00	0.96			1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	0.96			1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1784		1770	1729			3725	1667	1863	3725	
Flt Permitted		0.88		0.76	0.78			1.00	1.00	0.31	1.00	
Satd. Flow (perm)		1614		1407	1394			3725	1667	611	3725	
Peak-hour factor, PHF	0.60	0.60	0.60	0.94	0.60	0.75	0.60	0.83	0.86	0.75	0.88	0.60
Adj. Flow (vph)	2	0	2	298	0	41	0	799	152	37	1559	0
RTOR Reduction (vph)	0	3	0	0	61	0	0	0	57	0	0	0
Lane Group Flow (vph)	0	1	0	173	105	0	0	799	95	37	1559	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		3			3		2	1	1	2	1	
Permitted Phases	3			3			1			1		
Actuated Green, G (s)		19.1		19.1	19.1			75.1	75.1	83.6	75.1	
Effective Green, g (s)		19.1		19.1	19.1			75.1	75.1	83.6	75.1	
Actuated g/C Ratio		0.16		0.16	0.16			0.63	0.63	0.70	0.63	
Clearance Time (s)		6.3		6.3	6.3			5.5	5.5	5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		256		223	221			2331	1043	514	2331	
v/s Ratio Prot								0.21	0.06	c0.01	c0.42	
v/s Ratio Perm		0.00		c0.12	0.08					0.05		
v/c Ratio		0.00		0.78	0.47			0.34	0.09	0.07	0.67	
Uniform Delay, d1		42.4		48.4	45.9			10.7	8.9	8.8	14.4	
Progression Factor		1.00		1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		15.5	1.6			0.4	0.2	0.3	1.5	
Delay (s)		42.4		63.8	47.5			11.1	9.1	9.0	16.0	
Level of Service		D		E	D			B	A	A	B	
Approach Delay (s)		42.4			55.8			10.8			15.8	
Approach LOS		D			E			B			B	

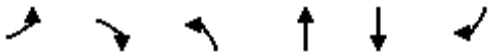
Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9001: M-24 & Heights Road

07/05/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	19	787	1617	43
Future Volume (Veh/h)	0	0	19	787	1617	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.75	0.85	0.93	0.67
Hourly flow rate (vph)	0	0	25	926	1739	64
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				229		
pX, platoon unblocked	0.94					
vC, conflicting volume	2284	902	1803			
vC1, stage 1 conf vol	1771					
vC2, stage 2 conf vol	513					
vCu, unblocked vol	2242	902	1803			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	93			
cM capacity (veh/h)	117	281	338			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	25	463	463	1159	644
Volume Left	25	0	0	0	0
Volume Right	0	0	0	0	64
cSH	338	1700	1700	1700	1700
Volume to Capacity	0.07	0.27	0.27	0.68	0.38
Queue Length 95th (ft)	6	0	0	0	0
Control Delay (s)	16.5	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	0.4			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9002: M-24 & Converse Court

07/05/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	12	799	2	4	1666
Future Volume (Veh/h)	10	12	799	2	4	1666
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	13	868	2	4	1811
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			883			878
pX, platoon unblocked	0.73	0.97			0.97	
vC, conflicting volume	1782	435			870	
vC1, stage 1 conf vol	869					
vC2, stage 2 conf vol	914					
vCu, unblocked vol	1157	365			812	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			99	
cM capacity (veh/h)	346	615			789	

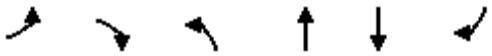
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	24	579	291	4	906	906
Volume Left	11	0	0	4	0	0
Volume Right	13	0	2	0	0	0
cSH	453	1700	1700	789	1700	1700
Volume to Capacity	0.05	0.34	0.17	0.01	0.53	0.53
Queue Length 95th (ft)	4	0	0	0	0	0
Control Delay (s)	13.4	0.0	0.0	9.6	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.4	0.0		0.0		
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9003: M-24 & Smith Court

07/05/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	2	810	1670	1
Future Volume (Veh/h)	0	0	2	810	1670	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.60	0.87	0.89	0.60
Hourly flow rate (vph)	0	0	3	931	1876	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				960	801	
pX, platoon unblocked	0.71	0.71	0.71			
vC, conflicting volume	2348	939	1878			
vC1, stage 1 conf vol	1877					
vC2, stage 2 conf vol	472					
vCu, unblocked vol	2078	84	1412			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	99			
cM capacity (veh/h)	129	677	338			

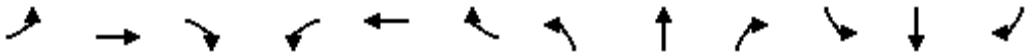
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	3	466	466	1251	627
Volume Left	0	3	0	0	0	0
Volume Right	0	0	0	0	0	2
cSH	1700	338	1700	1700	1700	1700
Volume to Capacity	0.00	0.01	0.27	0.27	0.74	0.37
Queue Length 95th (ft)	0	1	0	0	0	0
Control Delay (s)	0.0	15.7	0.0	0.0	0.0	0.0
Lane LOS	A	C				
Approach Delay (s)	0.0	0.1			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9004: Atwater Commons & Converse Court

07/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	0	2	2	2	0	4	7	0	0	2	30
Future Volume (Veh/h)	39	0	2	2	2	0	4	7	0	0	2	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.68	0.60	0.60	0.60	0.60	0.60	0.60	0.88	0.60	0.60	0.60	0.81
Hourly flow rate (vph)	57	0	3	3	3	0	7	8	0	0	3	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	45	44	22	46	62	8	40			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	45	44	22	46	62	8	40			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	100	100	100	100	100			100		
cM capacity (veh/h)	951	845	1056	949	825	1074	1570			1612		

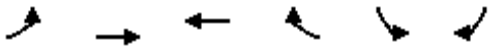
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	6	15	40
Volume Left	57	3	7	0
Volume Right	3	0	0	37
cSH	956	883	1570	1612
Volume to Capacity	0.06	0.01	0.00	0.00
Queue Length 95th (ft)	5	1	0	0
Control Delay (s)	9.0	9.1	3.4	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.0	9.1	3.4	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	5.3			
Intersection Capacity Utilization	14.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9005: Heights Road & Mystic Cove Heights Driveway

07/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	62	0	0	0
Future Volume (Veh/h)	0	0	62	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	67	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	67				67	67
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67				67	67
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1535				938	997

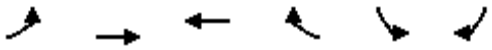
Direction, Lane #	WB 1	SB 1
Volume Total	67	0
Volume Left	0	0
Volume Right	0	0
cSH	1700	1700
Volume to Capacity	0.04	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS		A
Approach Delay (s)	0.0	0.0
Approach LOS		A

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	6.7%	ICU Level of Service		A
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9006: Heights Road & Proposed Dispensary Heights Driveway

07/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	61	1	0	1
Future Volume (Veh/h)	0	0	61	1	0	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	66	1	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	67				66	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67				66	66
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1535				939	997

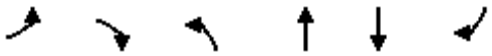
Direction, Lane #	WB 1	SB 1
Volume Total	67	1
Volume Left	0	0
Volume Right	1	1
cSH	1700	997
Volume to Capacity	0.04	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	8.6
Lane LOS		A
Approach Delay (s)	0.0	8.6
Approach LOS		A

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	13.3%	ICU Level of Service		A
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9007: M-24 & Proposed Dispensary M-24 Driveway

07/05/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	15	7	780	1645	16
Future Volume (Veh/h)	7	15	7	780	1645	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	16	8	848	1788	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				370		
pX, platoon unblocked	0.95					
vC, conflicting volume	2236	902	1805			
vC1, stage 1 conf vol	1796					
vC2, stage 2 conf vol	440					
vCu, unblocked vol	2197	902	1805			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	94	98			
cM capacity (veh/h)	114	280	337			

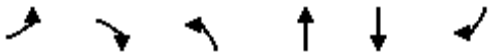
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	24	8	424	424	1192	613
Volume Left	8	8	0	0	0	0
Volume Right	16	0	0	0	0	17
cSH	188	337	1700	1700	1700	1700
Volume to Capacity	0.13	0.02	0.25	0.25	0.70	0.36
Queue Length 95th (ft)	11	2	0	0	0	0
Control Delay (s)	26.9	15.9	0.0	0.0	0.0	0.0
Lane LOS	D	C				
Approach Delay (s)	26.9	0.1			0.0	
Approach LOS	D					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9008: M-24 & Mystic Cove M-24 Driveway

07/05/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	11	1	797	1673	3
Future Volume (Veh/h)	4	11	1	797	1673	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	12	1	866	1818	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				667	1094	
pX, platoon unblocked	0.73	0.71	0.71			
vC, conflicting volume	2254	910	1821			
vC1, stage 1 conf vol	1820					
vC2, stage 2 conf vol	435					
vCu, unblocked vol	1740	52	1337			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	100			
cM capacity (veh/h)	144	712	363			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	1	433	433	1212	609
Volume Left	4	1	0	0	0	0
Volume Right	12	0	0	0	0	3
cSH	358	363	1700	1700	1700	1700
Volume to Capacity	0.04	0.00	0.25	0.25	0.71	0.36
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	15.5	15.0	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	15.5	0.0			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

07/05/2022

Intersection: 21: M-24

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	T	T
Maximum Queue (ft)	69	4	4	141	139
Average Queue (ft)	21	0	0	35	31
95th Queue (ft)	53	3	3	105	105
Link Distance (ft)	76	9	9	106	106
Upstream Blk Time (%)	2	0	0	1	1
Queuing Penalty (veh)	0	0	0	8	9
Storage Bay Dist (ft)					
Storage Blk Time (%)				3	
Queuing Penalty (veh)				0	

Intersection: 1006: M-24 & Odanah Avenue

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	LT	T
Maximum Queue (ft)	170	149	153	103	96	88
Average Queue (ft)	82	66	53	24	72	63
95th Queue (ft)	142	124	113	66	105	107
Link Distance (ft)	494	494	536	536	9	9
Upstream Blk Time (%)					14	13
Queuing Penalty (veh)					115	110
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 1015: M-24 & Atwater Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LTR	T	T	R	L	T	TR
Maximum Queue (ft)	29	115	284	163	170	120	259	329	322
Average Queue (ft)	2	96	157	82	80	44	31	259	195
95th Queue (ft)	13	140	246	141	146	104	138	363	313
Link Distance (ft)	107		277	573	573		303	303	303
Upstream Blk Time (%)			0				0	6	1
Queuing Penalty (veh)			1				0	0	0
Storage Bay Dist (ft)		75				160			
Storage Blk Time (%)		8	42	6	0				
Queuing Penalty (veh)		14	59	0	0				

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

07/05/2022

Intersection: 9001: M-24 & Heights Road

Movement	NB	NB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	49	17	40	9
Average Queue (ft)	14	1	2	1
95th Queue (ft)	41	13	17	10
Link Distance (ft)		106	94	94
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50			
Storage Blk Time (%)	1			
Queuing Penalty (veh)	5			

Intersection: 9002: M-24 & Converse Court

Movement	WB	SB	SB	SB
Directions Served	LR	L	T	T
Maximum Queue (ft)	69	25	22	6
Average Queue (ft)	19	1	1	0
95th Queue (ft)	49	12	8	4
Link Distance (ft)	203		32	32
Upstream Blk Time (%)		0	0	0
Queuing Penalty (veh)		0	0	0
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		0	0	
Queuing Penalty (veh)		2	0	

Intersection: 9003: M-24 & Smith Court

Movement	NB	NB	NB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	30	28	18	17
Average Queue (ft)	2	1	1	0
95th Queue (ft)	15	13	8	5
Link Distance (ft)		32	32	102
Upstream Blk Time (%)	2	0	0	
Queuing Penalty (veh)	0	1	0	
Storage Bay Dist (ft)	50			
Storage Blk Time (%)	2	0		
Queuing Penalty (veh)	7	0		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Intersection: 9004: Atwater Commons & Converse Court

Movement	EB	WB	NB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	47	31	6
Average Queue (ft)	23	3	0
95th Queue (ft)	46	19	4
Link Distance (ft)	128	173	237
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9005: Heights Road & Mystic Cove Heights Driveway

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 9006: Heights Road & Proposed Dispensary Heights Driveway

Movement	SB
Directions Served	R
Maximum Queue (ft)	11
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	71
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Intersection: 9007: M-24 & Proposed Dispensary M-24 Driveway

Movement	EB	NB	SB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	60	29	20	30
Average Queue (ft)	21	4	1	1
95th Queue (ft)	52	19	9	13
Link Distance (ft)	105		81	81
Upstream Blk Time (%)	0			0
Queuing Penalty (veh)	0			0
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 9008: M-24 & Mystic Cove M-24 Driveway

Movement	EB	NB	SB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	54	6	9	6
Average Queue (ft)	14	0	0	0
95th Queue (ft)	43	5	6	5
Link Distance (ft)	110		150	150
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		50		
Storage Blk Time (%)				
Queuing Penalty (veh)				

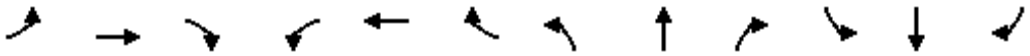
Network Summary

Network wide Queuing Penalty: 333

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1006: M-24 & Odanah Avenue

07/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	0	75	0	0	0	0	2074	0	0	1168	0
Future Volume (vph)	164	0	75	0	0	0	0	2074	0	0	1168	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6					6.1			6.1	
Lane Util. Factor	1.00		1.00					0.95			0.95	
Frt	1.00		0.85					1.00			1.00	
Flt Protected	0.95		1.00					1.00			1.00	
Satd. Flow (prot)	1863		1667					3725			3725	
Flt Permitted	0.95		1.00					1.00			1.00	
Satd. Flow (perm)	1863		1667					3725			3725	
Peak-hour factor, PHF	0.86	0.92	0.88	0.92	0.92	0.92	0.60	0.97	0.92	0.92	0.94	0.60
Adj. Flow (vph)	191	0	85	0	0	0	0	2138	0	0	1243	0
RTOR Reduction (vph)	0	0	73	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	191	0	12	0	0	0	0	2138	0	0	1243	0
Turn Type	D.Pm		Prot	D.Pm		Prot		NA			NA	
Protected Phases			2			2		1			1	
Permitted Phases	2			2						1		
Actuated Green, G (s)	17.1		17.1					91.2			91.2	
Effective Green, g (s)	17.1		17.1					91.2			91.2	
Actuated g/C Ratio	0.14		0.14					0.76			0.76	
Clearance Time (s)	5.6		5.6					6.1			6.1	
Vehicle Extension (s)	3.0		3.0					3.0			3.0	
Lane Grp Cap (vph)	265		237					2831			2831	
v/s Ratio Prot			0.01					c0.57			0.33	
v/s Ratio Perm	c0.10											
v/c Ratio	0.72		0.05					0.76			0.44	
Uniform Delay, d1	49.2		44.4					8.1			5.2	
Progression Factor	1.00		1.00					1.00			1.00	
Incremental Delay, d2	9.3		0.1					1.9			0.5	
Delay (s)	58.4		44.5					10.0			5.7	
Level of Service	E		D					B			A	
Approach Delay (s)		54.2			0.0			10.0			5.7	
Approach LOS		D			A			B			A	

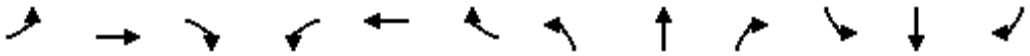
Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Signalized Intersection Capacity Analysis
1015: M-24 & Atwater Street

07/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	0	0	274	0	75	1	1781	259	71	1077	0
Future Volume (vph)	2	0	0	274	0	75	1	1781	259	71	1077	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.3		6.3	6.3		5.5	5.5	5.5	5.5	5.5	
Lane Util. Factor		1.00		0.95	0.95		1.00	0.95	1.00	1.00	0.95	
Frt		1.00		1.00	0.92		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.95		0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1863		1770	1678		1863	3725	1667	1863	3725	
Flt Permitted		0.42		0.76	0.85		0.18	1.00	1.00	0.06	1.00	
Satd. Flow (perm)		823		1408	1452		348	3725	1667	108	3725	
Peak-hour factor, PHF	0.60	0.60	0.60	0.86	0.60	0.71	0.60	0.94	0.83	0.80	0.92	0.60
Adj. Flow (vph)	3	0	0	319	0	106	2	1895	312	89	1171	0
RTOR Reduction (vph)	0	0	0	0	60	0	0	0	76	0	0	0
Lane Group Flow (vph)	0	3	0	220	145	0	2	1895	236	89	1171	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	custom	pm+pt	NA	
Protected Phases		3			3		2	1	1	2	1	
Permitted Phases	3			3			1		2	1		
Actuated Green, G (s)		21.7		21.7	21.7		81.0	72.5	81.0	81.0	72.5	
Effective Green, g (s)		21.7		21.7	21.7		81.0	72.5	81.0	81.0	72.5	
Actuated g/C Ratio		0.18		0.18	0.18		0.68	0.60	0.68	0.68	0.60	
Clearance Time (s)		6.3		6.3	6.3		5.5	5.5	5.5	5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		148		254	262		342	2250	1201	197	2250	
v/s Ratio Prot							0.00	c0.51	0.12	c0.03	0.31	
v/s Ratio Perm		0.00		c0.16	0.10		0.00		0.02	0.27		
v/c Ratio		0.02		0.87	0.55		0.01	0.84	0.20	0.45	0.52	
Uniform Delay, d1		40.4		47.7	44.7		14.2	19.1	7.3	43.2	13.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		25.1	2.5		0.0	4.0	0.4	7.3	0.9	
Delay (s)		40.5		72.9	47.3		14.2	23.2	7.7	50.5	14.6	
Level of Service		D		E	D		B	C	A	D	B	
Approach Delay (s)		40.5			60.5			21.0			17.1	
Approach LOS		D			E			C			B	

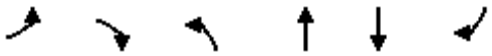
Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9001: M-24 & Heights Road

07/05/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	90	2114	1168	159
Future Volume (Veh/h)	0	0	90	2114	1168	159
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.79	0.97	0.92	0.78
Hourly flow rate (vph)	0	0	114	2179	1270	204
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				229		
pX, platoon unblocked	0.66					
vC, conflicting volume	2690	737	1474			
vC1, stage 1 conf vol	1372					
vC2, stage 2 conf vol	1318					
vCu, unblocked vol	2526	737	1474			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	75			
cM capacity (veh/h)	159	361	453			

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	114	1090	1090	847	627
Volume Left	114	0	0	0	0
Volume Right	0	0	0	0	204
cSH	453	1700	1700	1700	1700
Volume to Capacity	0.25	0.64	0.64	0.50	0.37
Queue Length 95th (ft)	25	0	0	0	0
Control Delay (s)	15.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	0.8			0.0	
Approach LOS					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9002: M-24 & Converse Court

07/05/2022



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	29	2026	18	4	1363
Future Volume (Veh/h)	9	29	2026	18	4	1363
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.60	0.73	0.95	0.71	0.60	0.92
Hourly flow rate (vph)	15	40	2133	25	7	1482
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)			883			878
pX, platoon unblocked	0.75	0.65			0.65	
vC, conflicting volume	2900	1079			2158	
vC1, stage 1 conf vol	2146					
vC2, stage 2 conf vol	755					
vCu, unblocked vol	1706	41			1703	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	94			97	
cM capacity (veh/h)	86	663			240	

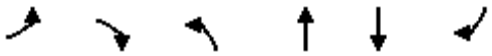
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	55	1422	736	7	741	741
Volume Left	15	0	0	7	0	0
Volume Right	40	0	25	0	0	0
cSH	234	1700	1700	240	1700	1700
Volume to Capacity	0.23	0.84	0.43	0.03	0.44	0.44
Queue Length 95th (ft)	22	0	0	2	0	0
Control Delay (s)	25.0	0.0	0.0	20.5	0.0	0.0
Lane LOS	D			C		
Approach Delay (s)	25.0	0.0		0.1		
Approach LOS	D					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9003: M-24 & Smith Court

07/05/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1	9	2047	1366	2
Future Volume (Veh/h)	0	1	9	2047	1366	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.60	0.60	0.63	0.95	0.92	0.60
Hourly flow rate (vph)	0	2	14	2155	1485	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				960	801	
pX, platoon unblocked	0.81	0.81	0.81			
vC, conflicting volume	2592	744	1488			
vC1, stage 1 conf vol	1486					
vC2, stage 2 conf vol	1106					
vCu, unblocked vol	2495	206	1128			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	163	646	497			

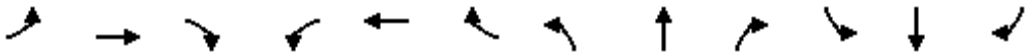
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	2	14	1078	1078	990	498
Volume Left	0	14	0	0	0	0
Volume Right	2	0	0	0	0	3
cSH	646	497	1700	1700	1700	1700
Volume to Capacity	0.00	0.03	0.63	0.63	0.58	0.29
Queue Length 95th (ft)	0	2	0	0	0	0
Control Delay (s)	10.6	12.5	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.6	0.1			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9004: Atwater Commons & Converse Court

07/05/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	133	0	10	3	1	0	1	6	0	0	8	67
Future Volume (Veh/h)	133	0	10	3	1	0	1	6	0	0	8	67
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.60	0.63	0.75	0.60	0.60	0.60	0.75	0.60	0.60	0.60	0.84
Hourly flow rate (vph)	153	0	16	4	2	0	2	8	0	0	13	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	66	65	53	81	105	8	93			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	66	65	53	81	105	8	93			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	100	98	100	100	100	100			100		
cM capacity (veh/h)	925	825	1014	892	784	1074	1501			1612		

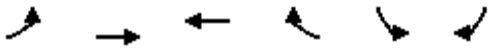
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	169	6	10	93
Volume Left	153	4	2	0
Volume Right	16	0	0	80
cSH	932	853	1501	1612
Volume to Capacity	0.18	0.01	0.00	0.00
Queue Length 95th (ft)	16	1	0	0
Control Delay (s)	9.7	9.3	1.5	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.7	9.3	1.5	0.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	20.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9005: Heights Road & Mystic Cove Heights Driveway

07/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	248	1	0	0
Future Volume (Veh/h)	0	0	248	1	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	270	1	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	271				270	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	271				270	270
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1292				719	768

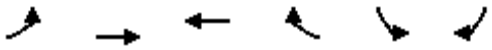
Direction, Lane #	WB 1	SB 1
Volume Total	271	0
Volume Left	0	0
Volume Right	1	0
cSH	1700	1700
Volume to Capacity	0.16	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	0.0
Lane LOS		A
Approach Delay (s)	0.0	0.0
Approach LOS		A

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	15.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9006: Heights Road & Proposed Dispensary Heights Driveway

07/05/2022



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	247	2	0	2
Future Volume (Veh/h)	0	0	247	2	0	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	268	2	0	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	270				269	269
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	270				269	269
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1293				720	770

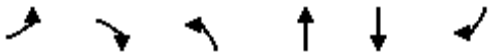
Direction, Lane #	WB 1	SB 1
Volume Total	270	2
Volume Left	0	0
Volume Right	2	2
cSH	1700	770
Volume to Capacity	0.16	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.0	9.7
Lane LOS		A
Approach Delay (s)	0.0	9.7
Approach LOS		A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9007: M-24 & Proposed Dispensary M-24 Driveway

07/05/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	14	26	2088	1313	14
Future Volume (Veh/h)	26	14	26	2088	1313	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	15	28	2270	1427	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				370		
pX, platoon unblocked	0.65					
vC, conflicting volume	2626	721	1442			
vC1, stage 1 conf vol	1434					
vC2, stage 2 conf vol	1191					
vCu, unblocked vol	2423	721	1442			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	96	94			
cM capacity (veh/h)	167	370	466			

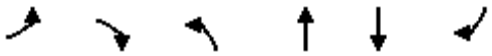
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	43	28	1135	1135	951	491
Volume Left	28	28	0	0	0	0
Volume Right	15	0	0	0	0	15
cSH	207	466	1700	1700	1700	1700
Volume to Capacity	0.21	0.06	0.67	0.67	0.56	0.29
Queue Length 95th (ft)	19	5	0	0	0	0
Control Delay (s)	27.0	13.2	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	27.0	0.2			0.0	
Approach LOS	D					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

HCM Unsignalized Intersection Capacity Analysis
9008: M-24 & Mystic Cove M-24 Driveway

07/05/2022



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	3	6	2040	1364	8
Future Volume (Veh/h)	6	3	6	2040	1364	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	3	7	2217	1483	9
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)				667	1094	
pX, platoon unblocked	0.74	0.81	0.81			
vC, conflicting volume	2610	746	1492			
vC1, stage 1 conf vol	1488					
vC2, stage 2 conf vol	1122					
vCu, unblocked vol	1304	207	1132			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	99			
cM capacity (veh/h)	210	645	495			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	10	7	1108	1108	989	503
Volume Left	7	7	0	0	0	0
Volume Right	3	0	0	0	0	9
cSH	263	495	1700	1700	1700	1700
Volume to Capacity	0.04	0.01	0.65	0.65	0.58	0.30
Queue Length 95th (ft)	3	1	0	0	0	0
Control Delay (s)	19.2	12.4	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	19.2	0.0			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

07/05/2022

Intersection: 21: M-24

Movement	NB	NB	SB	SB
Directions Served	T	TR	T	T
Maximum Queue (ft)	75	56	66	30
Average Queue (ft)	8	4	11	3
95th Queue (ft)	42	25	42	20
Link Distance (ft)	11	11	106	106
Upstream Blk Time (%)	0	0	0	
Queuing Penalty (veh)	5	1	0	
Storage Bay Dist (ft)				
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 1006: M-24 & Odanah Avenue

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	LT	T
Maximum Queue (ft)	256	151	471	479	91	98
Average Queue (ft)	123	61	210	195	67	50
95th Queue (ft)	215	120	356	359	99	95
Link Distance (ft)	494	494	536	536	11	11
Upstream Blk Time (%)			0	0	15	13
Queuing Penalty (veh)			0	0	90	77
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 1015: M-24 & Atwater Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	LTR	T	T	R	L	T	TR
Maximum Queue (ft)	29	115	333	582	593	235	214	318	288
Average Queue (ft)	2	98	190	356	370	164	61	223	156
95th Queue (ft)	14	142	325	513	527	318	142	319	253
Link Distance (ft)	107		277	573	573		303	303	303
Upstream Blk Time (%)			6	0	0		0	1	0
Queuing Penalty (veh)			23	3	4		0	0	0
Storage Bay Dist (ft)		75				160			
Storage Blk Time (%)		11	51	29	24				
Queuing Penalty (veh)		25	71	0	64				

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

07/05/2022

Intersection: 9001: M-24 & Heights Road

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	88	154	42	26	40
Average Queue (ft)	40	14	3	1	4
95th Queue (ft)	75	85	27	13	23
Link Distance (ft)		106	106	94	94
Upstream Blk Time (%)	0	1	0		
Queuing Penalty (veh)	0	10	1		
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	9	0			
Queuing Penalty (veh)	92	0			

Intersection: 9002: M-24 & Converse Court

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	TR	L	T
Maximum Queue (ft)	157	6	8	25	18
Average Queue (ft)	58	0	1	2	1
95th Queue (ft)	162	4	9	16	8
Link Distance (ft)	203	149	149		32
Upstream Blk Time (%)	7			2	0
Queuing Penalty (veh)	0			0	2
Storage Bay Dist (ft)				50	
Storage Blk Time (%)				2	0
Queuing Penalty (veh)				14	0

Intersection: 9003: M-24 & Smith Court

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	T
Maximum Queue (ft)	18	31	12	10
Average Queue (ft)	1	6	0	0
95th Queue (ft)	11	25	9	7
Link Distance (ft)	237		32	102
Upstream Blk Time (%)		2	0	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		2	0	
Queuing Penalty (veh)		17	0	

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Queuing and Blocking Report
Baseline

07/05/2022

Intersection: 9004: Atwater Commons & Converse Court

Movement	EB	WB
Directions Served	LTR	LTR
Maximum Queue (ft)	78	31
Average Queue (ft)	43	4
95th Queue (ft)	67	22
Link Distance (ft)	128	173
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9005: Heights Road & Mystic Cove Heights Driveway

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 9006: Heights Road & Proposed Dispensary Heights Driveway

Movement	SB
Directions Served	R
Maximum Queue (ft)	28
Average Queue (ft)	2
95th Queue (ft)	15
Link Distance (ft)	68
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Intersection: 9007: M-24 & Proposed Dispensary M-24 Driveway

Movement	EB	NB	NB	NB
Directions Served	LR	L	T	T
Maximum Queue (ft)	120	51	17	56
Average Queue (ft)	45	17	1	3
95th Queue (ft)	104	44	9	23
Link Distance (ft)	135		94	94
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		1	0	
Queuing Penalty (veh)		12	0	

Intersection: 9008: M-24 & Mystic Cove M-24 Driveway

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	49	31
Average Queue (ft)	10	4
95th Queue (ft)	35	19
Link Distance (ft)	138	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		50
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Network Summary

Network wide Queuing Penalty: 569

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

APPENDIX E: CRASH DATA

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Transportation Improvement Association

Crash Detail for 1/1/2017 - 12/31/2021
Criteria: WHERE A.AGENCY_ID = 14 AND A.GeoCoords.STIntersects (GEOMETRY::STGeomFromWKB(GEOGRAPHY::STPointFromText('POINT(-83.2381079672678 42.779884759039)', 4326).STBuffer(30.48).STAsBinary(),4326)) = 1

#1 **Location:** SB EMERALD CHASE (0.004) 5 feet Wof PAINT CREEK **Crash ID:** 2391309

Date: 09/18/2021 **Day:** Sat **Hour:** 3pm **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** single

CVT: Orion Twp **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 210004206

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	bicyclist	none	none	none	failed to yield	car	ctrfront
2		go straight	veh in transpt	none	none	none	none	uncoded	none

UD10: 2391309

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Crash Type

Count	Type
0	uncoded
1	single
0	head-on
0	head-on/lt
0	angle
0	rr-end
0	rr-end/lt
0	rr-end/rt
0	ss-same
0	ss-opp
0	back
0	other
0	unknown
Totals	1

Lighting Conditions

Count	Type
0	uncoded
1	day
0	dawn
0	dusk
0	dark/ltd
0	dark/unltd
0	other
0	unknown
Totals	1

Weather Conditions

Count	Type
0	uncoded
1	clear
0	cloudy
0	fog
0	rain
0	snow
0	wind
0	sleet/hail
0	blowing snow
0	blowing sand
0	smoke
0	unknown
Totals	1

Road Condition

Count	Type
0	uncoded
1	dry
0	wet
0	ice
0	snow
0	mud
0	slush
0	debris
0	water
0	sand
0	oily
0	other
0	unknown
Totals	1

Crashes by Month

Count	Type
0	January
0	February
0	March
0	April
0	May
0	June
0	July
0	August
1	September
0	October
0	November
0	December
Totals	1

Hazardous Action

Count	Type
1	none
0	speeding
0	spd too slow
1	failed to yield
0	disrgd traffic cntrl
0	wrong way
0	left of center
0	imprp passing
0	imprp lane use
0	imprp turn
0	imprp/no signal
0	imprp backing
0	unable to stop
0	other
0	unknown
0	reckls driving
0	carels driving
Totals	2

Unit Type

Count	Type
1	Bicyclist
0	Engineer
1	Vehicle
0	Pedestrian
Totals	2

Crashes by Year

Count	Type
1	2021
Totals	1

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Crash Severity

	Fatal	A	B	C	No Injy	Total
Persons	0	0	0	0	0	0
Crashes	0	0	0	0	1	1

Alcohol in Crashes

	Fatal	A	B	C	PDO	Total
Drinking	0	0	0	0	0	0
Not Drinking	0	0	0	0	1	1
Totals	0	0	0	0	1	1

Crashes per Hour by Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
12a-1a	0	0	0	0	0	0	0	0
1a-2a	0	0	0	0	0	0	0	0
2a-3a	0	0	0	0	0	0	0	0
3a-4a	0	0	0	0	0	0	0	0
4a-5a	0	0	0	0	0	0	0	0
5a-6a	0	0	0	0	0	0	0	0
6a-7a	0	0	0	0	0	0	0	0
7a-8a	0	0	0	0	0	0	0	0
8a-9a	0	0	0	0	0	0	0	0
9a-10a	0	0	0	0	0	0	0	0
10a-11a	0	0	0	0	0	0	0	0
11a-12p	0	0	0	0	0	0	0	0
12p-1p	0	0	0	0	0	0	0	0
1p-2p	0	0	0	0	0	0	0	0
2p-3p	0	0	0	0	0	0	0	0
3p-4p	0	0	0	0	0	0	1	1
4p-5p	0	0	0	0	0	0	0	0
5p-6p	0	0	0	0	0	0	0	0
6p-7p	0	0	0	0	0	0	0	0
7p-8p	0	0	0	0	0	0	0	0
8p-9p	0	0	0	0	0	0	0	0
9p-10p	0	0	0	0	0	0	0	0
10p-11p	0	0	0	0	0	0	0	0
11p-12a	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	1	1

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Transportation Improvement Association

Crash Detail for 1/1/2017 - 12/31/2021
Criteria: WHERE A.AGENCY_ID = 14 AND A.GeoCoords.STIntersects (GEOMETRY::STGeomFromWKB(GEOGRAPHY::STPointFromText('POINT(-83.2395670889719 42.7806131576743)', 4326).STBuffer(30.48).STAsBinary(),4326)) = 1

#1 **Location:** S BROADWAY 9M-240 (7.12) 20 feet Nof ATWATER ST **Crash ID:** 9929759

Date: 01/03/2017 **Day:** Tue **Hour:** 11a **Weather:** fog **Roadway:** wet **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 170000020

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	none	pickup	lftfront
2	W	left turn	veh in transpt	none	none	none	failed to yield	car	lftrear

UD10: 9929759

#2 **Location:** BROADWAY (7.116) 10 feet Wof ATWATER **Crash ID:** 9935598

Date: 01/11/2017 **Day:** Wed **Hour:** 1pm **Weather:** cloudy **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 1 **Injy 0:** 1 **How:** angle

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170006042

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	disrgd traffic cntrl	car	ctrfront
2	W	start on rdwy	veh in transpt	none	none	none	none	car	ctrfront

UD10: 9935598

#3 **Location:** S BROADWAY 9M-240 (7.109) 35 feet Sof ATWATER ST **Crash ID:** 9935663

Date: 01/11/2017 **Day:** Wed **Hour:** 9am **Weather:** cloudy **Roadway:** wet **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170000105

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	none	car	lftfront
2	N	change lanes	veh in transpt	none	none	none	other	car	rtrear

UD10: 9935663

#4 **Location:** S BROADWAY 9M-240 (7.119) 15 feet Nof ATWATER ST **Crash ID:** 9935664

Date: 01/11/2017 **Day:** Wed **Hour:** 10a **Weather:** cloudy **Roadway:** wet **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170000106

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	none	pickup	ctrrear
2	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 9935664

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#5 **Location:** NB S BROADWAY (7.118) 10 feet Nof ATWATER RD **Crash ID:** 9960419

Date: 01/27/2017 **Day:** Fri **Hour:** 6am **Weather:** cloudy **Roadway:** dry **LIght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** single

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170000286

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	other fixed obj	none	none	none	none	car	undercrg

UD10: 9960419

#6 **Location:** SB S BROADWAY (7.122) 30 feet Nof ATWATER **Crash ID:** 9967278

Date: 02/09/2017 **Day:** Thu **Hour:** 12p **Weather:** snow **Roadway:** snow **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170000460

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	stop on road	veh in transpt	none	none	none	none	truck/bus	ctrrear
2	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 9967278

#7 **Location:** S BROADWAY 9M-240 (7.118) 10 feet Nof ATWATER **Crash ID:** 1026948

Date: 04/18/2017 **Day:** Tue **Hour:** 1pm **Weather:** unknown **Roadway:** unknown **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** back

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170001279

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	backing	veh in transpt	none	none	none	imprp backing	pickup	none
2	S	stop on road	veh in transpt	none	none	none	none	pickup	ctrfront

UD10: 1026948

#8 **Location:** S BROADWAY (7.108) 40 feet Sof ATWATER **Crash ID:** 1043540

Date: 04/20/2017 **Day:** Thu **Hour:** 8pm **Weather:** cloudy **Roadway:** wet **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170001297

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1043540

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#9 **Location:** N LAPEER/M24 (7.113) 15 feet Sof N ATWATER **Crash ID:** 1057578

Date: 05/21/2017 **Day:** Sun **Hour:** 6pm **Weather:** rain **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end/lt

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 170001783

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1		go straight	veh in transpt	none	none	none	unknown	car	none
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1057578

#10 **Location:** ATWATER (0.008) 40 feet Eof BROADWAY **Crash ID:** 1089932

Date: 06/20/2017 **Day:** Tue **Hour:** 3pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170002202

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	go straight	veh in transpt	none	none	none	other	car	ctrfront
2	W	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1089932

#11 **Location:** ATWATER (0) 0 feet Xof S BROADWAY 9M-240 **Crash ID:** 1203826

Date: 11/07/2017 **Day:** Tue **Hour:** 2pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 170003973

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	left turn	veh in transpt	none	none	none	none	car	ctrfront
2	S	go straight	veh in transpt	none	none	none	disrgd traffic cntrl	pickup	lftside

UD10: 1203826

#12 **Location:** NB S BROADWAY (7.105) 60 feet Sof ATWATER **Crash ID:** 1218473

Date: 11/17/2017 **Day:** Fri **Hour:** 3pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170004084

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1218473

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#13 **Location:** S BROADWAY (7.121) 25 feet Nof ATWATER **Crash ID:** 1224303

Date: 11/24/2017 **Day:** Fri **Hour:** 10p **Weather:** clear **Roadway:** dry **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170004177

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1224303

#14 **Location:** S BROADWAY (7.11) 30 feet Sof ATWATER **Crash ID:** 1254349

Date: 12/06/2017 **Day:** Wed **Hour:** 10p **Weather:** clear **Roadway:** dry **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170004307

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1		left turn	veh in transpt	none	none	none	unknown	car	none
2	N	go straight	veh in transpt	none	none	none	none	car	lftfront

UD10: 1254349

#15 **Location:** ATWATER (0.003) 15 feet Eof S BROADWAY 9M-240 **Crash ID:** 1314869

Date: 02/03/2018 **Day:** Sat **Hour:** 6pm **Weather:** cloudy **Roadway:** snow **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** back

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 180000413

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	stop on road	veh in transpt	none	none	none	none	car	ctrfront
2	E	backing	veh in transpt	none	none	none	imprp backing	car	none

UD10: 1314869

#16 **Location:** S BROADWAY (7.119) 15 feet Nof ATWATER **Crash ID:** 1337869

Date: 03/10/2018 **Day:** Sat **Hour:** 7pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 180045737

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1337869

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#17 **Location:** ATWATER (0.007) 35 feet Eof S BROADWAY 9M-240 **Crash ID:** 1342211

Date: 03/16/2018 **Day:** Fri **Hour:** 2pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 180000868

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	veh in transpt	none	none	none	none	car	lftrear
2	S	left turn	veh in transpt	none	none	none	failed to yield	car	rtfront

UD10: 1342211

#18 **Location:** S BROADWAY 9M-240 (7.11) 30 feet Sof ATWATER ST **Crash ID:** 1352694

Date: 04/01/2018 **Day:** Sun **Hour:** 12p **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 8 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180001054

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1352694

#19 **Location:** S BROADWAY (7.125) 50 feet Nof ATWATER **Crash ID:** 1374149

Date: 04/27/2018 **Day:** Fri **Hour:** 8am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** fwy other **HBD:** N **Drugs:** N **Complaint #:** 180001346

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	right turn	veh in transpt	none	none	none	imprp passing	car	ctrrear
2	N	go straight	veh in transpt	none	none	none	none	truck/bus	rtfront

UD10: 1374149

#20 **Location:** SB BROADWAY (7.116) 50 feet Eof W ATWATER **Crash ID:** 1413328

Date: 05/10/2018 **Day:** Thu **Hour:** 6pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** rr-end

CVT: Lake Orion **Area:** fwy other **HBD:** N **Drugs:** N **Complaint #:** 180001520

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	backing	veh in transpt	none	none	none	imprp backing	car	ctrfront
2	SE	nodriver parked	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1413328

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#21 **Location:** NB S BROADWAY (7.125) 49 feet Nof ATWATER **Crash ID:** 1391729

Date: 05/16/2018 **Day:** Wed **Hour:** 1pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180001588

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	speeding	car	ctrfront
2	N	go straight	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1391729

#22 **Location:** S BROADWAY 9M-240 (7.109) 35 feet Sof ATWATER ST **Crash ID:** 1425547

Date: 06/28/2018 **Day:** Thu **Hour:** 1pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180002158

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1425547

#23 **Location:** S BROADWAY (7.124) 40 feet Nof ATWATER **Crash ID:** 1434498

Date: 07/09/2018 **Day:** Mon **Hour:** 5pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180002332

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1434498

#24 **Location:** ATWATER (0.003) 15 feet Eof S BROADWAY 9M-240 **Crash ID:** 1435446

Date: 07/12/2018 **Day:** Thu **Hour:** 1pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180002364

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	W	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1435446

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#25 **Location:** S BROADWAY M-24 (7.118) 10 feet Nof ATWATER ST **Crash ID:** 1464060

Date: 08/17/2018 **Day:** Fri **Hour:** 5pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180002877

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1464060

#26 **Location:** ATWATER (0) 60 feet Wof S BROADWAY ST **Crash ID:** 1490967

Date: 09/18/2018 **Day:** Tue **Hour:** 8am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 180003368

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	left turn	veh in transpt	none	none	none	failed to yield	car	rtfront
2	E	go straight	veh in transpt	none	none	none	none	car	lftside

UD10: 1490967

#27 **Location:** ATWATER (0.009) 50 feet Eof S LAPEER **Crash ID:** 1501889

Date: 09/25/2018 **Day:** Tue **Hour:** 7pm **Weather:** cloudy **Roadway:** dry **Llght:** dusk

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 180180783

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	left turn	veh in transpt	none	none	none	failed to yield	car	lftfront
2	E	stop on road	veh in transpt	none	none	none	none	car	rtfront

UD10: 1501889

#28 **Location:** ATWATER (0.008) 40 feet Eof S BROADWAY 9M-240 ST **Crash ID:** 1517176

Date: 10/13/2018 **Day:** Sat **Hour:** 12p **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** single

CVT: Lake Orion **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 180003827

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	SE	left turn	ran off road/r	none	none	none	failed to yield	car	ctrfront

UD10: 1517176

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#29 **Location:** ATWATER (0.011) 60 feet Eof S BROADWAY ST **Crash ID:** 1533904

Date: 10/29/2018 **Day:** Mon **Hour:** 3pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180004122

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	W	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1533904

#30 **Location:** S BROADWAY (7.105) 60 feet Sof ATWATER **Crash ID:** 1582219

Date: 12/15/2018 **Day:** Sat **Hour:** 8pm **Weather:** clear **Roadway:** dry **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180004798

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	go straight	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1582219

#31 **Location:** LAPEER (7.111) 25 feet Sof ATWATER ST **Crash ID:** 1613530

Date: 01/15/2019 **Day:** Tue **Hour:** 3pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 190009889

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	car	rtrear
2	N	go straight	veh in transpt	none	none	none	unable to stop	pickup	none

UD10: 1613530

#32 **Location:** S BROADWAY (7.116) 0 feet Xof ATWATER **Crash ID:** 1627095

Date: 01/27/2019 **Day:** Sun **Hour:** 10a **Weather:** snow **Roadway:** snow **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** other

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 190000326

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	disrgd traffic cntrl	car	lftrear
2	SW	left turn	veh in transpt	none	none	none	none	pickup	rtfront

UD10: 1627095

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#33 **Location:** S BROADWAY (7.114) 10 feet Sof ATWATER ST **Crash ID:** 1676797

Date: 03/28/2019 **Day:** Thu **Hour:** 10a **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 190001176

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	disrgd traffic cntrl	car	rtside
2	W	left turn	veh in transpt	none	none	none	none	pickup	ctrfront

UD10: 1676797

#34 **Location:** ATWATER (0.004) 20 feet Eof S BROADWAY ST **Crash ID:** 1775071

Date: 07/26/2019 **Day:** Fri **Hour:** 5pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** back

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190003032

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	backing	veh in transpt	none	none	none	imprp backing	car	none
2	W	go straight	veh in transpt	none	none	none	none	car	ctrfront

UD10: 1775071

#35 **Location:** S BROADWAY (7.114) 10 feet Sof ATWATER **Crash ID:** 1853132

Date: 10/22/2019 **Day:** Tue **Hour:** 5am **Weather:** cloudy **Roadway:** wet **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 1 **Injy 0:** 0 **How:** angle

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 190004678

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	other	car	ctrfront
2	W	left turn	veh in transpt	none	none	none	none	car	rtrear

UD10: 1853132

#36 **Location:** S BROADWAY (7.124) 40 feet Nof ATWATER **Crash ID:** 1867107

Date: 10/31/2019 **Day:** Thu **Hour:** 1pm **Weather:** rain **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190004823

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	change lanes	veh in transpt	none	none	none	failed to yield	car	rtside
2	N	go straight	veh in transpt	none	none	none	none	pickup	lftrear

UD10: 1867107

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#37 **Location:** S BROADWAY (7.122) 30 feet Nof ATWATER **Crash ID:** 1879782

Date: 11/11/2019 **Day:** Mon **Hour:** 10a **Weather:** snow **Roadway:** snow **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190004988

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1879782

#38 **Location:** S BROADWAY (7.116) 0 feet Xof ATWATER **Crash ID:** 1926170

Date: 01/01/2020 **Day:** Wed **Hour:** 9am **Weather:** cloudy **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** angle

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 200000003

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	disrgd traffic cntrl	car	ctrfront
2	W	left turn	veh in transpt	none	none	none	none	pickup	rtfront

UD10: 1926170

#39 **Location:** S BROADWAY 9M-240 (7.105) 58 feet Sof ATWATER ST **Crash ID:** 1966476

Date: 02/09/2020 **Day:** Sun **Hour:** 12p **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** angle

CVT: Lake Orion **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 200000522

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	NE	change lanes	veh in transpt	none	none	none	none	pickup	rtside
2	NW	right turn	veh in transpt	none	none	none	failed to yield	car	ctrfront

UD10: 1966476

#40 **Location:** S BROADWAY (7.108) 42 feet Sof ATWATER **Crash ID:** 1966478

Date: 02/11/2020 **Day:** Tue **Hour:** 9am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200000541

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1966478

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#41 **Location:** S BROADWAY (7.125) 48 feet Nof ATWATER **Crash ID:** 2013869

Date: 05/21/2020 **Day:** Thu **Hour:** 5pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200004132

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	S	go straight	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2013869

#42 **Location:** S BROADWAY (7.121) 26 feet Nof ATWATER **Crash ID:** 2031465

Date: 06/16/2020 **Day:** Tue **Hour:** 7pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 1 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200004955

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	start on rdwy	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	start on rdwy	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2031465

#43 **Location:** ATWATER (0) 50 feet Eof S BROADWAY 9M-240 **Crash ID:** 2152878

Date: 11/15/2020 **Day:** Sun **Hour:** 1pm **Weather:** cloudy **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 200006988

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	veh in transpt	none	none	none	none	car	lftrear
2	S	left turn	veh in transpt	none	none	none	failed to yield	car	rtfront

UD10: 2152878

#44 **Location:** NB S BROADWAY (7.116) 30 feet Sof ATWATER **Crash ID:** 2167021

Date: 12/06/2020 **Day:** Sun **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Orion Twp **Area:** fwy other **HBD:** N **Drugs:** N **Complaint #:** 200007205

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	go straight	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 2167021

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#45 **Location:** ATWATER (0) 20 feet Eof S BROADWAY ST **Crash ID:** 2180434

Date: 12/25/2020 **Day:** Fri **Hour:** 3pm **Weather:** snow **Roadway:** snow **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 200007417

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	ran off road/r	none	none	none	other	car	ctrfront
2	W	stop on road	veh in transpt	none	none	none	none	car	ctrfront
3		none	veh in transpt	none	none	none	unknown	car	none

UD10: 2180434

#46 **Location:** ATWATER (0.005) 26 feet Eof W S BROADWAY ST **Crash ID:** 2209925

Date: 01/30/2021 **Day:** Sat **Hour:** 6pm **Weather:** clear **Roadway:** dry **LIght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 5 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210000500

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	W	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2209925

#47 **Location:** S BROADWAY 9M-240 (7.122) 32 feet Nof ATWATER ST **Crash ID:** 2229062

Date: 02/11/2021 **Day:** Thu **Hour:** 1pm **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210000677

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	start on rdwy	veh in transpt	none	none	none	none	car	ctrrear
2	S	go straight	veh in transpt	none	none	none	unknown	car	ctrfront

UD10: 2229062

#48 **Location:** BROADWAY (7.097) 100 feet Sof S ATWATER ST **Crash ID:** 2229064

Date: 02/22/2021 **Day:** Mon **Hour:** 4am **Weather:** snow **Roadway:** slush **LIght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** ss-same

CVT: Orion Twp **Area:** curved **HBD:** N **Drugs:** N **Complaint #:** 210000817

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	none	veh in transpt	none	none	none	speeding	car	rtrear
2	S	go straight	veh in transpt	none	none	none	none	car	rtside

UD10: 2229064

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#49 **Location:** ATWATER (0.011) 58 feet Eof S BROADWAY **Crash ID:** 2284014

Date: 05/18/2021 **Day:** Tue **Hour:** 10a **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210002057

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	W	slow/stop on rd	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 2284014

#50 **Location:** S BROADWAY (7.124) 42 feet Sof ATWATER ST **Crash ID:** 2317585

Date: 06/23/2021 **Day:** Wed **Hour:** 10a **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** ss-same

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210002677

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	change lanes	veh in transpt	none	none	none	imprp lane use	pickup	ctrfront
2	N	go straight	veh in transpt	none	none	none	none	car	rtfront

UD10: 2317585

#51 **Location:** S BROADWAY (7.116) 0 feet Xof ATWATER RD **Crash ID:** 2327415

Date: 07/06/2021 **Day:** Tue **Hour:** 7pm **Weather:** cloudy **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** other

CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 210002958

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	SW	left turn	veh in transpt	none	none	none	failed to yield	car	ctrfront
2	S	go straight	veh in transpt	none	none	none	none	pickup	lftrear

UD10: 2327415

#52 **Location:** S BROADWAY 9M240 (7.122) 32 feet Sof ATWATER ST **Crash ID:** 2358602

Date: 08/17/2021 **Day:** Tue **Hour:** 11a **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210003708

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	other	car	ctrfront
2	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrrear
3	S	go straight	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 2358602

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#53 **Location:** ATWATER (0) 0 feet Xof S BROADWAY ST **Crash ID:** 2378779

Date: 08/30/2021 **Day:** Mon **Hour:** 8pm **Weather:** clear **Roadway:** dry **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** ss-same

CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 210003937

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	SE	left turn	veh in transpt	none	none	none	left of center	car	rtfront
2	SE	left turn	veh in transpt	none	none	none	none	car	lftrear

UD10: 2378779

#54 **Location:** S BROADWAY (7.121) 100 feet Nof ATWATER **Crash ID:** 2452905

Date: 11/17/2021 **Day:** Wed **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** ss-same

CVT: Orion Twp **Area:** fwy other **HBD:** N **Drugs:** N **Complaint #:** 210005245

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unknown	car	lftrear
2	N	change lanes	veh in transpt	none	none	none	other	car	rtfront

UD10: 2452905

#55 **Location:** NB S BROADWAY (7.116) 60 feet Sof E ATWATER ST **Crash ID:** 2473626

Date: 11/22/2021 **Day:** Mon **Hour:** 1pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** angle

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210005343

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	right turn	veh in transpt	none	none	none	failed to yield	car	lftfront
2	N	go straight	veh in transpt	none	none	none	none	car	rtside

UD10: 2473626

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Crash Type

Count	Type
0	uncoded
2	single
0	head-on
0	head-on/lt
14	angle
27	rr-end
1	rr-end/lt
0	rr-end/rt
6	ss-same
0	ss-opp
3	back
2	other
0	unknown
Totals	55

Lighting Conditions

Count	Type
0	uncoded
45	day
0	dawn
1	dusk
9	dark/ltd
0	dark/unltd
0	other
0	unknown
Totals	55

Weather Conditions

Count	Type
0	uncoded
29	clear
17	cloudy
1	fog
2	rain
5	snow
0	wind
0	sleet/hail
0	blowing snow
0	blowing sand
0	smoke
1	unknown
Totals	55

Road Condition

Count	Type
0	uncoded
38	dry
10	wet
0	ice
5	snow
0	mud
1	slush
0	debris
0	water
0	sand
0	oily
0	other
1	unknown
Totals	55

Crashes by Month

Count	Type
9	January
6	February
3	March
4	April
5	May
4	June
4	July
3	August
2	September
4	October
7	November
4	December
Totals	55

Hazardous Action

Count	Type
53	none
2	speeding
0	spd too slow
10	failed to yield
5	disrgd traffic cntrl
0	wrong way
1	left of center
1	imprp passing
1	imprp lane use
0	imprp turn
0	imprp/no signal
4	imprp backing
22	unable to stop
6	other
5	unknown
0	reckls driving
0	carels driving
Totals	110

Unit Type

Count	Type
0	Bicyclist
0	Engineer
110	Vehicle
0	Pedestrian
Totals	110

Crashes by Year

Count	Type
14	2017
16	2018
7	2019
8	2020
10	2021
Totals	55

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Crash Severity

	Fatal	A	B	C	No Injy	Total
Persons	0	0	2	4	0	6
Crashes	0	0	2	2	51	55

Alcohol in Crashes

	Fatal	A	B	C	PDO	Total
Drinking	0	0	0	0	0	0
Not Drinking	0	0	2	2	51	55
Totals	0	0	2	2	51	55

Crashes per Hour by Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
12a-1a	0	0	0	0	0	0	0	0
1a-2a	0	0	0	0	0	0	0	0
2a-3a	0	0	0	0	0	0	0	0
3a-4a	0	0	0	0	0	0	0	0
4a-5a	0	1	0	0	0	0	0	1
5a-6a	0	0	1	0	0	0	0	1
6a-7a	0	0	0	0	0	1	0	1
7a-8a	0	0	0	0	0	0	0	0
8a-9a	0	0	1	0	0	1	0	2
9a-10a	0	0	1	2	0	0	0	3
10a-11a	1	1	1	2	1	0	0	6
11a-12p	0	0	2	0	0	0	0	2
12p-1p	2	0	0	0	1	0	1	4
1p-2p	1	1	1	2	4	0	0	9
2p-3p	0	0	1	0	0	1	0	2
3p-4p	0	1	2	0	0	2	0	5
4p-5p	1	0	0	1	0	0	0	2
5p-6p	0	1	0	0	1	2	0	4
6p-7p	1	0	0	0	1	0	2	4
7p-8p	0	0	3	0	0	0	1	4
8p-9p	0	1	0	0	1	0	1	3
9p-10p	0	0	0	0	0	0	0	0
10p-11p	0	0	0	1	0	1	0	2
11p-12a	0	0	0	0	0	0	0	0
Totals	6	6	13	8	9	8	5	55

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Transportation Improvement Association

Crash Detail for 1/1/2017 - 12/31/2021
Criteria: WHERE A.AGENCY_ID = 14 AND A.GeoCoords.STIntersects (GEOMETRY::STGeomFromWKB(GEOGRAPHY::STPointFromText('POINT(-83.2392237662179 42.7764237641176)', 4326).STBuffer(30.48).STAsBinary(),4326)) = 1

#1 **Location:** S BROADWAY 9M-240 (6.826) 5 feet Nof HEIGHTS RD **Crash ID:** 9934829

Date: 01/06/2017 **Day:** Fri **Hour:** 8am **Weather:** cloudy **Roadway:** dry **Light:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170000047

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	S	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront

UD10: 9934829

#2 **Location:** S BROADWAY 9M-240 (6.836) 60 feet Nof HEIGHTS RD **Crash ID:** 9981520

Date: 02/22/2017 **Day:** Wed **Hour:** 7am **Weather:** cloudy **Roadway:** dry **Light:** dawn

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 170000605

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	none	car	rtside
2	E	right turn	veh in transpt	none	none	none	failed to yield	car	lftside

UD10: 9981520

#3 **Location:** LAPEER (6.825) 50 feet Nof HEIGHTS RD **Crash ID:** 1006598

Date: 03/30/2017 **Day:** Thu **Hour:** 9am **Weather:** rain **Roadway:** wet **Light:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170055281

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1006598

#4 **Location:** S LAPEER (6.824) 5 feet Sof E HEIGHTS RD **Crash ID:** 1046943

Date: 05/18/2017 **Day:** Thu **Hour:** 3pm **Weather:** clear **Roadway:** dry **Light:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** rr-end

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 170087798

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear
3	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1046943

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#5 **Location:** S LAPEER (6.82) 25 feet Sof HEIGHTS RD **Crash ID:** 1139195

Date: 09/05/2017 **Day:** Tue **Hour:** 5pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170163653

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1139195

#6 **Location:** S BROADWAY (6.827) 10 feet Nof HEIGHTS **Crash ID:** 1166072

Date: 09/29/2017 **Day:** Fri **Hour:** 12p **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 2 **Injy 0:** 1 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170003498

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1166072

#7 **Location:** S BROADWAY (6.844) 100 feet Nof HEIGHTS RD **Crash ID:** 1218475

Date: 11/18/2017 **Day:** Sat **Hour:** 5pm **Weather:** rain **Roadway:** wet **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-opp

CVT: Lake Orion **Area:** parking **HBD:** N **Drugs:** N **Complaint #:** 170004098

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	leaving parking	veh in transpt	none	none	none	none	pickup	rtside
2	N	go straight	veh in transpt	none	none	none	unknown	pickup	none

UD10: 1218475

#8 **Location:** LAPEER (6.821) 21 feet Sof HEIGHTS RD **Crash ID:** 1224302

Date: 11/22/2017 **Day:** Wed **Hour:** 9am **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** other

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170004153

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	equip fail	none	none	none	other	truck/bus	none
2	S	nodriver parked	veh in transpt	none	none	none	none	car	rtfront

UD10: 1224302

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#9 **Location:** S LAPEER (6.825) 50 feet Nof HEIGHTS RD **Crash ID:** 1327016

Date: 02/26/2018 **Day:** Mon **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180037093

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1327016

#10 **Location:** S LAPEER (6.844) 100 feet Nof HEIGHTS RD **Crash ID:** 1352665

Date: 03/31/2018 **Day:** Sat **Hour:** 10a **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180059771

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	change lanes	veh in transpt	none	none	none	imprp lane use	car	lftfront
2	S	go straight	veh in transpt	none	none	none	none	car	lftside

UD10: 1352665

#11 **Location:** S BROADWAY (6.827) 13 feet Nof HEIGHTS RD **Crash ID:** 1374151

Date: 04/29/2018 **Day:** Sun **Hour:** 12a **Weather:** clear **Roadway:** dry **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** single

CVT: Lake Orion **Area:** inter other **HBD:** Y **Drugs:** N **Complaint #:** 180001371

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	curb	none	none	none	other	car	undercrg

UD10: 1374151

#12 **Location:** S LAPEER (6.821) 20 feet Sof HEIGHTS RD **Crash ID:** 1404067

Date: 05/28/2018 **Day:** Mon **Hour:** 2pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 180099645

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	change lanes	veh in transpt	none	none	none	imprp lane use	car	rtside
2	N	go straight	veh in transpt	none	none	none	none	car	lftfront

UD10: 1404067

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#13 **Location:** SB S LAPEER (6.825) 10 feet Nof HEIGHTS RD **Crash ID:** 1504119

Date: 09/30/2018 **Day:** Sun **Hour:** 3pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** ss-same

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 180183922

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	change lanes	veh in transpt	none	none	none	imprp turn	car	rtfront
2	S	go straight	veh in transpt	none	none	none	none	car	lftfront

UD10: 1504119

#14 **Location:** S BROADWAY M-24 (6.839) 75 feet Nof HEIGHTS RD **Crash ID:** 1532715

Date: 10/23/2018 **Day:** Tue **Hour:** 5pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180004019

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1532715

#15 **Location:** S BROADWAY 9M-240 (6.829) 20 feet Nof HEIGHTS RD **Crash ID:** 1566168

Date: 11/19/2018 **Day:** Mon **Hour:** 8am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180004416

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	stop on road	veh in transpt	none	none	none	none	car	lftrear
2	S	change lanes	veh in transpt	none	none	none	unable to stop	pickup	rtfront

UD10: 1566168

#16 **Location:** NB LAPEER (6.82) 25 feet Sof S HEIGHTS RD **Crash ID:** 1607201

Date: 01/04/2019 **Day:** Fri **Hour:** 6pm **Weather:** clear **Roadway:** dry **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190002568

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	rtfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	rtrear

UD10: 1607201

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#17 **Location:** S BROADWAY (6.825) 10 feet Sof HEIGHTS RD **Crash ID:** 1644054

Date: 02/08/2019 **Day:** Fri **Hour:** 8am **Weather:** blowing snow **Roadway:** snow **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** ss-same

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190000462

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	left turn	veh in transpt	none	none	none	none	car	rtfront
2	N	go straight	veh in transpt	none	none	none	imprp lane use	car	none

UD10: 1644054

#18 **Location:** S LAPEER (6.825) 15 feet Nof HEIGHTS RD **Crash ID:** 1648635

Date: 02/17/2019 **Day:** Sun **Hour:** 7pm **Weather:** snow **Roadway:** ice **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 190031337

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 1648635

#19 **Location:** LAPEER (6.825) 10 feet Wof HEIGHTS RD **Crash ID:** 1652741

Date: 02/17/2019 **Day:** Sun **Hour:** 7pm **Weather:** snow **Roadway:** snow **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 2 **Injy C:** 0 **Injy 0:** 5 **How:** angle

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 190031330

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	disrgd traffic cntrl	car	ctrfront
2	E	left turn	veh in transpt	none	none	none	none	car	ctrfront
3	N	stop on road	veh in transpt	none	none	none	none	car	ctrfront

UD10: 1652741

#20 **Location:** S LAPEER (6.825) 10 feet Nof HEIGHTS RD **Crash ID:** 1702092

Date: 04/29/2019 **Day:** Mon **Hour:** 3pm **Weather:** rain **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 1 **How:** rr-end

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 190079861

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	multiple
3		slow/stop on rd	veh in transpt	none	none	none	unknown	car	none

UD10: 1702092

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#21 **Location:** LAPEER (6.825) 5 feet Nof S HEIGHTS ST **Crash ID:** 1750876

Date: 06/23/2019 **Day:** Sun **Hour:** 3pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Lake Orion **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 190119951

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	left turn	veh in transpt	none	none	none	wrong way	car	ctrfront
2	S	go straight	veh in transpt	none	none	none	none	car	ctrfront

UD10: 1750876

#22 **Location:** HEIGHTS (2.063) 15 feet Wof S S BROADWAY ST **Crash ID:** 1751709

Date: 06/25/2019 **Day:** Tue **Hour:** 2pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 190121517

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	failed to yield	car	ctrfront
2	E	go straight	veh in transpt	none	none	none	none	car	lftside

UD10: 1751709

#23 **Location:** S BROADWAY (6.844) 100 feet Nof HEIGHTS RD **Crash ID:** 1924430

Date: 10/15/2019 **Day:** Tue **Hour:** 3pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** rr-end

CVT: Lake Orion **Area:** fwy other **HBD:** N **Drugs:** N **Complaint #:** 190004577

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	go straight	veh in transpt	none	none	none	none	car	ctrfront

UD10: 1924430

#24 **Location:** S BROADWAY 9M-240 (6.839) 74 feet Sof HEIGHTS RD **Crash ID:** 2009736

Date: 02/09/2020 **Day:** Sun **Hour:** 12p **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 8 **How:** ss-same

CVT: Lake Orion **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 200000523

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	change lanes	veh in transpt	none	none	none	unknown	car	rtrear
2	S	change lanes	veh in transpt	none	none	none	unknown	car	lftfront

UD10: 2009736

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#25 **Location:** S LAPEER (6.821) 21 feet Sof HEIGHTS RD **Crash ID:** 1972621

Date: 02/14/2020 **Day:** Fri **Hour:** 5pm **Weather:** cloudy **Roadway:** dry **Llght:** dusk

Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 0 **Injy 0:** 2 **How:** head-on

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200032598

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	other	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	pickup	ctrfront

UD10: 1972621

#26 **Location:** S BROADWAY (6.833) 42 feet Nof HEIGHTS RD **Crash ID:** 1982838

Date: 03/04/2020 **Day:** Wed **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 2 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200046066

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1982838

#27 **Location:** S LAPEER (6.826) 5 feet Nof HEIGHTS RD **Crash ID:** 2021409

Date: 05/29/2020 **Day:** Fri **Hour:** 7pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 0 **Injy 0:** 1 **How:** ss-same

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 200108587

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	passing	veh in transpt	none	none	none	imprp passing	motorcycle	lftside
2	S	right turn	veh in transpt	none	none	none	none	car	rtside

UD10: 2021409

#28 **Location:** LAPEER (6.819) 32 feet Sof HEIGHTS RD **Crash ID:** 2069517

Date: 08/04/2020 **Day:** Tue **Hour:** 2pm **Weather:** rain **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200156063

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 2069517

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#29 **Location:** S LAPEER (6.816) 50 feet Sof HEIGHTS RD **Crash ID:** 2164741

Date: 12/03/2020 **Day:** Thu **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 1 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200240626

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2164741

#30 **Location:** S LAPEER (6.829) 21 feet Nof HEIGHTS RD **Crash ID:** 2273253

Date: 05/03/2021 **Day:** Mon **Hour:** 3pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** rr-end

CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 210086820

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	stop on road	veh in transpt	none	none	none	none	car	rtrear
2	S	go straight	veh in transpt	none	none	none	unknown	car	none

UD10: 2273253

#31 **Location:** S BROADWAY (6.84) 79 feet Nof HEIGHTS RD **Crash ID:** 2334616

Date: 07/21/2021 **Day:** Wed **Hour:** 5pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210003220

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2334616

#32 **Location:** S LAPEER (6.827) 10 feet Nof HEIGHTS RD **Crash ID:** 2408171

Date: 10/10/2021 **Day:** Sun **Hour:** 4pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210210923

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2408171

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#33 **Location:** S LAPEER (6.827) 10 feet Nof HEIGHTS RD **Crash ID:** 2429956

Date: 10/26/2021 **Day:** Tue **Hour:** 5pm **Weather:** cloudy **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end/rt

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210223488

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	SW	right turn	veh in transpt	none	none	none	none	car	rtrear

UD10: 2429956

#34 **Location:** S BROADWAY (6.83) 100 feet Nof HEIGHTS RD **Crash ID:** 2420838

Date: 10/27/2021 **Day:** Wed **Hour:** 1am **Weather:** clear **Roadway:** dry **LIght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** single

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210004855

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	animal	none	none	none	none	car	lftfront

UD10: 2420838

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Crash Type

Count	Type
0	uncoded
2	single
1	head-on
0	head-on/lt
4	angle
18	rr-end
0	rr-end/lt
1	rr-end/rt
6	ss-same
1	ss-opp
0	back
1	other
0	unknown
Totals	34

Lighting Conditions

Count	Type
0	uncoded
26	day
1	dawn
1	dusk
6	dark/ltd
0	dark/unltd
0	other
0	unknown
Totals	34

Weather Conditions

Count	Type
0	uncoded
15	clear
12	cloudy
0	fog
4	rain
2	snow
0	wind
0	sleet/hail
1	blowing snow
0	blowing sand
0	smoke
0	unknown
Totals	34

Road Condition

Count	Type
0	uncoded
27	dry
4	wet
1	ice
2	snow
0	mud
0	slush
0	debris
0	water
0	sand
0	oily
0	other
0	unknown
Totals	34

Crashes by Month

Count	Type
2	January
7	February
3	March
2	April
4	May
2	June
1	July
1	August
3	September
5	October
3	November
1	December
Totals	34

Hazardous Action

Count	Type
34	none
0	speeding
0	spd too slow
2	failed to yield
1	disrgd traffic cntrl
1	wrong way
0	left of center
1	imprp passing
3	imprp lane use
1	imprp turn
0	imprp/no signal
0	imprp backing
18	unable to stop
3	other
5	unknown
0	reckls driving
0	carels driving
Totals	69

Unit Type

Count	Type
0	Bicyclist
0	Engineer
69	Vehicle
0	Pedestrian
Totals	69

Crashes by Year

Count	Type
8	2017
7	2018
8	2019
6	2020
5	2021
Totals	34

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Crash Severity

	Fatal	A	B	C	No Injy	Total
Persons	0	0	4	7	0	11
Crashes	0	0	3	5	26	34

Alcohol in Crashes

	Fatal	A	B	C	PDO	Total
Drinking	0	0	0	0	1	1
Not Drinking	0	0	3	5	25	33
Totals	0	0	3	5	26	34

Crashes per Hour by Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
12a-1a	1	0	0	0	0	0	0	1
1a-2a	0	0	0	1	0	0	0	1
2a-3a	0	0	0	0	0	0	0	0
3a-4a	0	0	0	0	0	0	0	0
4a-5a	0	0	0	0	0	0	0	0
5a-6a	0	0	0	0	0	0	0	0
6a-7a	0	0	0	0	0	0	0	0
7a-8a	0	0	0	1	0	0	0	1
8a-9a	0	1	0	0	0	2	0	3
9a-10a	0	0	0	1	1	0	0	2
10a-11a	0	0	0	0	0	0	1	1
11a-12p	0	0	0	0	0	0	0	0
12p-1p	1	0	0	0	0	1	0	2
1p-2p	0	0	0	0	0	0	0	0
2p-3p	0	1	2	0	0	0	0	3
3p-4p	2	2	1	0	1	0	0	6
4p-5p	1	1	0	1	1	0	0	4
5p-6p	0	0	3	1	0	1	1	6
6p-7p	0	0	0	0	0	1	0	1
7p-8p	2	0	0	0	0	1	0	3
8p-9p	0	0	0	0	0	0	0	0
9p-10p	0	0	0	0	0	0	0	0
10p-11p	0	0	0	0	0	0	0	0
11p-12a	0	0	0	0	0	0	0	0
Totals	7	5	6	5	3	6	2	34

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Transportation Improvement Association

Crash Detail for 1/1/2017 - 12/31/2021
Criteria: WHERE A.AGENCY_ID = 14 AND A.GeoCoords.STIntersects (GEOMETRY::STGeomFromWKB(GEOGRAPHY::STPointFromText('POINT(-83.2391620754106 42.7757622550141)', 4326).STBuffer(30.48).STAsBinary(),4326)) = 1

#1 **Location:** LAPEER (6.797) 150 feet Sof HEIGHTS RD **Crash ID:** 9983250

Date: 03/04/2017 **Day:** Sat **Hour:** 11a **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 3 **Injy 0:** 0 **How:** head-on/lt

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 170038285

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	NW	left turn	veh in transpt	none	none	none	imprp turn	car	rtside
2	S	go straight	veh in transpt	none	none	none	none	car	ctrfront

UD10: 9983250

#2 **Location:** ODANAH (0.21) 45 feet SWof S LAPEER RD **Crash ID:** 1033003

Date: 05/02/2017 **Day:** Tue **Hour:** 4pm **Weather:** cloudy **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** single

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170077078

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	loss of control	none	none	none	carels driving	car	lftfront

UD10: 1033003

#3 **Location:** S LAPEER (6.762) 100 feet Sof ODANAH **Crash ID:** 1062703

Date: 06/03/2017 **Day:** Sat **Hour:** 9am **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** angle

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 170098561

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	right turn	veh in transpt	none	none	none	failed to yield	car	lftfront
2	S	go straight	veh in transpt	none	none	none	none	car	rtfront

UD10: 1062703

#4 **Location:** ODANAH (0.205) 75 feet Wof S LAPEER RD **Crash ID:** 1069162

Date: 06/10/2017 **Day:** Sat **Hour:** 8pm **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 3 **Injy C:** 0 **Injy 0:** 1 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170104072

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	E	stop on road	veh in transpt	none	none	none	none	car	multiple
3	E	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1069162

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#5 **Location:** ODANAH (0.21) 50 feet Wof M24 RD **Crash ID:** 1085549

Date: 07/02/2017 **Day:** Sun **Hour:** 12a **Weather:** clear **Roadway:** dry **LIght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** back

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170002392

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1		backing	veh in transpt	none	none	none	imprp backing	car	ctrrear
2	E	stop on road	veh in transpt	none	none	none	none	car	ctrfront

UD10: 1085549

#6 **Location:** S LAPEER (6.775) 30 feet Sof ODANAH **Crash ID:** 1106371

Date: 07/27/2017 **Day:** Thu **Hour:** 10a **Weather:** cloudy **Roadway:** wet **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 2 **Injy 0:** 1 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170136885

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	carels driving	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear
3	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1106371

#7 **Location:** LAPEER (6.772) 50 feet Sof ODANAH **Crash ID:** 1128605

Date: 08/16/2017 **Day:** Wed **Hour:** 6pm **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 170150600

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 1128605

#8 **Location:** SB S LAPEER (6.782) 5 feet Nof E ODANAH AVE **Crash ID:** 1279728

Date: 01/05/2018 **Day:** Fri **Hour:** 1pm **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 2 **Injy 0:** 4 **How:** angle

CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 180002903

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	E	left turn	veh in transpt	none	none	none	none	car	lftside

UD10: 1279728

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#9 **Location:** S LAPEER (6.787) 200 feet Sof HEIGHTS RD **Crash ID:** 1323099

Date: 02/10/2018 **Day:** Sat **Hour:** 8am **Weather:** snow **Roadway:** slush **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same

CVT: Orion Twp **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 180026134

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	left turn	veh in transpt	none	none	none	left of center	car	lftfront
2	S	go straight	veh in transpt	none	none	none	none	car	rtside

UD10: 1323099

#10 **Location:** S LAPEER (6.779) 10 feet Sof ODANAH **Crash ID:** 1381663

Date: 05/03/2018 **Day:** Thu **Hour:** 3pm **Weather:** rain **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 180082174

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1381663

#11 **Location:** SB S LAPEER (6.772) 50 feet Sof ODANAH **Crash ID:** 1490854

Date: 09/13/2018 **Day:** Thu **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 180172611

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 1490854

#12 **Location:** S LAPEER (6.768) 300 feet Sof HEIGHTS **Crash ID:** 1521836

Date: 10/16/2018 **Day:** Tue **Hour:** 6pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** angle

CVT: Orion Twp **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 180195331

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	left turn	veh in transpt	none	none	none	failed to yield	car	lftside
2	N	go straight	veh in transpt	none	none	none	none	car	rtfront

UD10: 1521836

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#13 **Location:** SB S LAPEER (6.779) 10 feet Sof ODANAH **Crash ID:** 1529020

Date: 10/24/2018 **Day:** Wed **Hour:** 5pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 180200812

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1529020

#14 **Location:** LAPEER (6.775) 30 feet Sof ODANAH **Crash ID:** 1575094

Date: 12/05/2018 **Day:** Wed **Hour:** 9am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 180229240

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1575094

#15 **Location:** S LAPEER (6.779) 10 feet Sof ODANAH **Crash ID:** 1627067

Date: 01/28/2019 **Day:** Mon **Hour:** 2pm **Weather:** clear **Roadway:** snow **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 190018147

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	unknown	other	none

UD10: 1627067

#16 **Location:** LAPEER (6.776) 25 feet Sof ODANAH ST **Crash ID:** 1647639

Date: 02/17/2019 **Day:** Sun **Hour:** 6pm **Weather:** snow **Roadway:** snow **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 190031304

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1647639

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#17 **Location:** S LAPEER (6.785) 20 feet Nof ODANAH **Crash ID:** 1665868

Date: 03/01/2019 **Day:** Fri **Hour:** 6am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 0 **Injy 0:** 1 **How:** angle

CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 190039048

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	disrgd traffic cntrl	car	lftfront
2	E	left turn	veh in transpt	none	none	none	none	pickup	lftrear

UD10: 1665868

#18 **Location:** S LAPEER (6.787) 200 feet Sof HEIGHTS RD **Crash ID:** 1680637

Date: 03/31/2019 **Day:** Sun **Hour:** 1pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190060136

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	change lanes	veh in transpt	none	none	none	imprp lane use	car	rtside
2	N	go straight	veh in transpt	none	none	none	none	car	lftfront

UD10: 1680637

#19 **Location:** ODANAH (0.212) 35 feet Wof S LAPEER RD **Crash ID:** 1719369

Date: 05/19/2019 **Day:** Sun **Hour:** 4pm **Weather:** rain **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** Y **Drugs:** N **Complaint #:** 190093775

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	veh in transpt	none	none	none	unable to stop	car	rtfront
2	E	stop on road	veh in transpt	none	none	none	none	car	lftrear

UD10: 1719369

#20 **Location:** S LAPEER (6.772) 50 feet Sof ODANAH **Crash ID:** 1760573

Date: 07/05/2019 **Day:** Fri **Hour:** 6pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 190129432

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1760573

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#21 **Location:** S LAPEER (6.777) 20 feet Sof ODANAH **Crash ID:** 1822534

Date: 09/19/2019 **Day:** Thu **Hour:** 12p **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190185277

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1822534

#22 **Location:** S LAPEER (6.784) 15 feet Nof ODANAH AVE **Crash ID:** 1900091

Date: 11/27/2019 **Day:** Wed **Hour:** 5pm **Weather:** rain **Roadway:** wet **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 1 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 190233872

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	start on rdwy	veh in transpt	none	none	none	unable to stop	car	none
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1900091

#23 **Location:** S LAPEER (6.775) 32 feet Sof ODANAH **Crash ID:** 1932845

Date: 01/07/2020 **Day:** Tue **Hour:** 5pm **Weather:** clear **Roadway:** dry **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200004501

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1932845

#24 **Location:** S LAPEER (6.772) 48 feet Sof ODANAH **Crash ID:** 2008664

Date: 05/09/2020 **Day:** Sat **Hour:** 3pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 3 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200094013

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	go straight	veh in transpt	none	none	none	none	car	ctrrear
3	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2008664

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#25 **Location:** LAPEER (6.775) 32 feet Sof ODANAH ST **Crash ID:** 2022619

Date: 06/02/2020 **Day:** Tue **Hour:** 12p **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 2 **Injy 0:** 1 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200111158

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2022619

#26 **Location:** ODANAH (0.219) 0 feet Nof S LAPEER RD **Crash ID:** 2079569

Date: 08/19/2020 **Day:** Wed **Hour:** 3pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 2 **Injy C:** 0 **Injy 0:** 0 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200167197

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2079569

#27 **Location:** LAPEER (6.783) 10 feet Nof ODANAH ST **Crash ID:** 2102649

Date: 09/16/2020 **Day:** Wed **Hour:** 7am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200186557

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2102649

#28 **Location:** LAPEER (6.787) 32 feet Nof ODANAH ST **Crash ID:** 2205811

Date: 01/26/2021 **Day:** Tue **Hour:** 8am **Weather:** snow **Roadway:** snow **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210016414

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 2205811

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#29 **Location:** LAPEER (6.762) 100 feet Sof ODANAH **Crash ID:** 2223740

Date: 02/17/2021 **Day:** Wed **Hour:** 10a **Weather:** clear **Roadway:** snow **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 210031769

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	right turn	veh in transpt	none	none	none	failed to yield	car	lftfront
2	S	go straight	veh in transpt	none	none	none	none	car	rtfront

UD10: 2223740

#30 **Location:** S LAPEER (6.785) 21 feet Nof ODANAH **Crash ID:** 2239377

Date: 03/12/2021 **Day:** Fri **Hour:** 8pm **Weather:** clear **Roadway:** dry **Llght:** dark/unltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** Y **Drugs:** N **Complaint #:** 210049412

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2239377

#31 **Location:** ODANAH (0.211) 42 feet Wof S LAPEER RD **Crash ID:** 2316659

Date: 06/22/2021 **Day:** Tue **Hour:** 8pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** Y **Drugs:** N **Complaint #:** 210125921

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	E	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2316659

#32 **Location:** S LAPEER (6.785) 21 feet Nof ODANAH AVE **Crash ID:** 2378761

Date: 09/08/2021 **Day:** Wed **Hour:** 8am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210186140

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2378761

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#33 **Location:** S LAPEER (6.787) 30 feet Nof ODANAH **Crash ID:** 2414456

Date: 10/13/2021 **Day:** Wed **Hour:** 12p **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** ss-same

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210213135

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	carels driving	car	none
2	S	stop on road	veh in transpt	none	none	none	none	pickup	rtside

UD10: 2414456

#34 **Location:** S BROADWAY (6.785) 20 feet Nof ODANAH **Crash ID:** 2427232

Date: 10/22/2021 **Day:** Fri **Hour:** 4pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210220474

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear

UD10: 2427232

#35 **Location:** SB LAPEER (6.777) 20 feet Sof NE ODANAH **Crash ID:** 2487062

Date: 12/14/2021 **Day:** Tue **Hour:** 9am **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** head-on/lt

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 210260689

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	NW	left turn	veh in transpt	none	none	none	failed to yield	car	lftfront
2	S	go straight	veh in transpt	none	none	none	none	pickup	lftrear

UD10: 2487062

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Crash Type

Count	Type
0	uncoded
1	single
0	head-on
2	head-on/lt
5	angle
23	rr-end
0	rr-end/lt
0	rr-end/rt
3	ss-same
0	ss-opp
1	back
0	other
0	unknown
Totals	35

Lighting Conditions

Count	Type
0	uncoded
30	day
0	dawn
0	dusk
4	dark/ltd
1	dark/unltd
0	other
0	unknown
Totals	35

Weather Conditions

Count	Type
0	uncoded
25	clear
4	cloudy
0	fog
3	rain
3	snow
0	wind
0	sleet/hail
0	blowing snow
0	blowing sand
0	smoke
0	unknown
Totals	35

Road Condition

Count	Type
0	uncoded
26	dry
4	wet
0	ice
4	snow
0	mud
1	slush
0	debris
0	water
0	sand
0	oily
0	other
0	unknown
Totals	35

Crashes by Month

Count	Type
4	January
3	February
4	March
0	April
4	May
4	June
3	July
2	August
4	September
4	October
1	November
2	December
Totals	35

Hazardous Action

Count	Type
36	none
0	speeding
0	spd too slow
4	failed to yield
1	disrgd traffic cntrl
0	wrong way
1	left of center
0	imprp passing
1	imprp lane use
1	imprp turn
0	imprp/no signal
1	imprp backing
23	unable to stop
0	other
1	unknown
0	reckls driving
3	carels driving
Totals	72

Unit Type

Count	Type
0	Bicyclist
0	Engineer
72	Vehicle
0	Pedestrian
Totals	72

Crashes by Year

Count	Type
7	2017
7	2018
8	2019
5	2020
8	2021
Totals	35

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Crash Severity

	Fatal	A	B	C	No Injy	Total
Persons	0	0	6	12	0	18
Crashes	0	0	3	7	25	35

Alcohol in Crashes

	Fatal	A	B	C	PDO	Total
Drinking	0	0	0	0	3	3
Not Drinking	0	0	3	7	22	32
Totals	0	0	3	7	25	35

Crashes per Hour by Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
12a-1a	1	0	0	0	0	0	0	1
1a-2a	0	0	0	0	0	0	0	0
2a-3a	0	0	0	0	0	0	0	0
3a-4a	0	0	0	0	0	0	0	0
4a-5a	0	0	0	0	0	0	0	0
5a-6a	0	0	0	0	0	0	0	0
6a-7a	0	0	0	0	0	1	0	1
7a-8a	0	0	0	1	0	0	0	1
8a-9a	0	0	1	1	0	0	1	3
9a-10a	0	0	1	1	0	0	1	3
10a-11a	0	0	0	1	1	0	0	2
11a-12p	0	0	0	0	0	0	1	1
12p-1p	0	0	1	1	1	0	0	3
1p-2p	1	0	0	0	0	1	0	2
2p-3p	0	1	0	0	0	0	0	1
3p-4p	0	0	0	1	1	0	1	3
4p-5p	1	0	1	0	1	1	0	4
5p-6p	0	0	1	2	0	0	0	3
6p-7p	1	0	1	1	0	1	0	4
7p-8p	0	0	0	0	0	0	0	0
8p-9p	0	0	1	0	0	1	1	3
9p-10p	0	0	0	0	0	0	0	0
10p-11p	0	0	0	0	0	0	0	0
11p-12a	0	0	0	0	0	0	0	0
Totals	4	1	7	9	4	5	5	35

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

Transportation Improvement Association

Crash Detail for 1/1/2017 - 12/31/2021
Criteria: WHERE A.AGENCY_ID = 14 AND A.GeoCoords.STIntersects (GEOMETRY::STGeomFromWKB(GEOGRAPHY::STPointFromText('POINT(-83.2393793343408 42.778416123843)', 4326).STBuffer(30.48).STAsBinary(),4326)) = 1

#1 **Location:** S BROADWAY (6.975) 60 feet Nof SMITH CT **Crash ID:** 9977244

Date: 02/24/2017 **Day:** Fri **Hour:** 4pm **Weather:** cloudy **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170000632

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	left turn	veh in transpt	none	none	none	failed to yield	pickup	rtfront
2	N	go straight	veh in transpt	none	none	none	none	car	lftside

UD10: 9977244

#2 **Location:** S BROADWAY M-24 (6.968) 75 feet Nof CONVERSE CT **Crash ID:** 9992255

Date: 03/03/2017 **Day:** Fri **Hour:** 6pm **Weather:** unknown **Roadway:** unknown **LIght:** dusk

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170000753

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 9992255

#3 **Location:** LAPEER (6.954) 1584 feet Nof SUMMER AVE **Crash ID:** 1070935

Date: 06/13/2017 **Day:** Tue **Hour:** 6am **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170105656

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	none	car	ctrrear
2	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1070935

#4 **Location:** S BROADWAY (6.975) 60 feet Nof SMITH CT **Crash ID:** 1071043

Date: 06/13/2017 **Day:** Tue **Hour:** 8am **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170002104

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1071043

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#5 **Location:** S BROADWAY (6.964) 1 feet Nof SMITH CT **Crash ID:** 1110673

Date: 08/01/2017 **Day:** Tue **Hour:** 11a **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170002740

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	pickup	rtfront
2	N	go straight	veh in transpt	none	none	none	none	car	lftrear

UD10: 1110673

#6 **Location:** S BROADWAY M-24 (6.952) 10 feet Sof CONVERSE CT **Crash ID:** 1254354

Date: 12/13/2017 **Day:** Wed **Hour:** 3pm **Weather:** snow **Roadway:** snow **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 170004389

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	car	ctrrear
2	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1254354

#7 **Location:** LAPEER (6.951) 15 feet Sof CONVERSE CT **Crash ID:** 1279623

Date: 01/02/2018 **Day:** Tue **Hour:** 2pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** ss-same

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180000817

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1		unknown	veh in transpt	none	none	none	unknown	uncoded	none
2	S	go straight	veh in transpt	none	none	none	none	car	rtfront

UD10: 1279623

#8 **Location:** S BROADWAY (6.954) 0 feet Xof CONVERSE CT **Crash ID:** 1391730

Date: 05/16/2018 **Day:** Wed **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** other

CVT: Lake Orion **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 180001589

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	go straight	bicyclist	none	none	none	failed to yield	car	ctrfront
2		go straight	veh in transpt	none	none	none	none	uncoded	none

UD10: 1391730

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#9 **Location:** S BROADWAY (6.954) 25 feet Eof CONVERSE CT **Crash ID:** 1391731

Date: 05/16/2018 **Day:** Wed **Hour:** 5pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** fwy other **HBD:** N **Drugs:** N **Complaint #:** 180001590

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	W	go straight	veh in transpt	none	none	none	none	pickup	ctrrear

UD10: 1391731

#10 **Location:** S BROADWAY 9M-240 (6.947) 35 feet Sof CONVERSE CT **Crash ID:** 1434500

Date: 07/07/2018 **Day:** Sat **Hour:** 6pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** ss-same

CVT: Lake Orion **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 180002298

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	right turn	veh in transpt	none	none	none	none	car	lftrear
2	N	change lanes	veh in transpt	none	none	none	unknown	car	none

UD10: 1434500

#11 **Location:** BROADWAY (6.946) 40 feet Sof CONVERSE CT **Crash ID:** 1490968

Date: 09/19/2018 **Day:** Wed **Hour:** 3pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Lake Orion **Area:** fwy other **HBD:** N **Drugs:** N **Complaint #:** 180003385

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	go straight	veh in transpt	none	none	none	none	car	ctrrear

UD10: 1490968

#12 **Location:** S BROADWAY 9M-240 (6.952) 10 feet Sof CONVERSE CT **Crash ID:** 1553015

Date: 11/14/2018 **Day:** Wed **Hour:** 4pm **Weather:** cloudy **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 180004329

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	pickup	ctrrear
2	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront

UD10: 1553015

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#13 **Location:** S BROADWAY (6.962) 11 feet Sof SMITH CT **Crash ID:** 1609634

Date: 12/21/2018 **Day:** Fri **Hour:** 6am **Weather:** unknown **Roadway:** unknown **Llght:** dark/unltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** back

CVT: Lake Orion **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 180004868

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	nodriver parked	veh in transpt	none	none	none	none	car	lftfront
2	W	backing	veh in transpt	none	none	none	imprp backing	car	lftrear

UD10: 1609634

#14 **Location:** S BROADWAY (6.97) 30 feet Nof SMITH CT ST **Crash ID:** 1711334

Date: 05/09/2019 **Day:** Thu **Hour:** 7pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 3 **How:** angle

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190001764

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	left turn	veh in transpt	none	none	none	failed to yield	car	rtfront
2	N	go straight	veh in transpt	none	none	none	none	car	lftside

UD10: 1711334

#15 **Location:** S BROADWAY 9M-240 (6.967) 70 feet Nof CONVERSE CT **Crash ID:** 1873644

Date: 10/30/2019 **Day:** Wed **Hour:** 12p **Weather:** cloudy **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 190004802

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	none	car	lftrear
2	N	avoid veh-ft/bk	veh in transpt	none	none	none	unable to stop	car	rtside

UD10: 1873644

#16 **Location:** S BROADWAY (6.975) 58 feet Nof SMITH CT **Crash ID:** 2022057

Date: 05/27/2020 **Day:** Wed **Hour:** 5pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** angle

CVT: Lake Orion **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 200004449

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1		go straight	veh in transpt	none	none	none	unknown	car	none
2	S	right turn	veh in transpt	none	none	none	none	pickup	rtfront

UD10: 2022057

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#17 **Location:** S BROADWAY (6.951) 11 feet Sof CONVERSE CT **Crash ID:** 2022055

Date: 05/29/2020 **Day:** Fri **Hour:** 7am **Weather:** cloudy **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 2 **Injy 0:** 1 **How:** rr-end

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200004500

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	none	pickup	ctrfront
2	S	go straight	veh in transpt	none	none	none	none	car	ctrrear
3	S	go straight	veh in transpt	none	none	none	none	other	ctrrear

UD10: 2022055

#18 **Location:** S BROADWAY (6.961) 16 feet Nof CONVERSE CT **Crash ID:** 2025920

Date: 06/02/2020 **Day:** Tue **Hour:** 1pm **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** ss-same

CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200004639

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	right turn	veh in transpt	none	none	none	failed to yield	car	lftfront
2	S	go straight	veh in transpt	none	none	none	none	truck/bus	rtfront

UD10: 2025920

#19 **Location:** CONVERSE (0.002) 11 feet Eof S BROADWAY 9M-240 **Crash ID:** 2054129

Date: 07/15/2020 **Day:** Wed **Hour:** 5pm **Weather:** cloudy **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 0 **Injy 0:** 1 **How:** single

CVT: Lake Orion **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200005440

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	right turn	bicyclist	none	none	none	none	car	rtfront
2	N	go straight	veh in transpt	none	none	none	other	uncoded	none

UD10: 2054129

#20 **Location:** S BROADWAY (6.948) 100 feet Sof CONVERSE CT **Crash ID:** 2102975

Date: 08/31/2020 **Day:** Mon **Hour:** 3pm **Weather:** clear **Roadway:** dry **LIght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200006047

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	right turn	veh in transpt	none	none	none	failed to yield	car	rtfront
2	N	stop on road	veh in transpt	none	none	none	none	car	rtrear

UD10: 2102975

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)

#21 **Location:** SB S BROADWAY (6.978) 150 feet Nof S SMITH CT **Crash ID:** 2123890

Date: 10/13/2020 **Day:** Tue **Hour:** 8pm **Weather:** clear **Roadway:** dry **Llght:** dark/ltd

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 1 **How:** rr-end

CVT: Orion Twp **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 200006594

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrrear
2	S	go straight	veh in transpt	none	none	none	unknown	car	none

UD10: 2123890

#22 **Location:** EB CONVERSE CT (0.006) 32 feet Eof S BROADWAY ST **Crash ID:** 2217309

Date: 01/29/2021 **Day:** Fri **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** ss-opp

CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 210000490

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	NE	right turn	veh in transpt	none	none	none	imprp turn	car	lftfront
2	W	stop on road	veh in transpt	none	none	none	none	car	lftside

UD10: 2217309

#23 **Location:** S BROADWAY (6.953) 0 feet Xof CONVERSE CT **Crash ID:** 2229063

Date: 02/17/2021 **Day:** Wed **Hour:** 3pm **Weather:** cloudy **Roadway:** wet **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 1 **Injy 0:** 1 **How:** angle

CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 210000756

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	left turn	veh in transpt	none	none	none	none	car	ctrfront
2	N	go straight	veh in transpt	none	none	none	imprp lane use	car	ctrfront

UD10: 2229063

#24 **Location:** SB S BROADWAY (6.958) 26 feet Nof E SMITH CT **Crash ID:** 2241181

Date: 03/10/2021 **Day:** Wed **Hour:** 4pm **Weather:** clear **Roadway:** dry **Llght:** day

Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end

CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210001027

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	none	motorcycle	ctrfront
2	S	go straight	veh in transpt	none	none	none	reckls driving	car	lftrear

UD10: 2241181

Attachment: Mystic Cove Traffic Impact Study-071822-LakeOrion (5448 : Moceri Mystic Cove Redevelopment:)