500 West Big Beaver
Troy, MI 48084
troymi.gov

248.524.3364
planning@troymi.gov

PLANNING COMMISSION
MEETING AGENDA
REGULAR MEETING

Carlton Faison, Chairman, Tom Krent, Vice Chairman
Ollie Apahidean, Karen Crusse, Barbara Fowler,
Michael W. Hutson, David Lambert, Sadek Rahman and John J. Tagle

December 10, 2019 **7:00 P.M.** **Council Chambers**

1. ROLL CALL

2. APPROVAL OF AGENDA

3. APPROVAL OF MINUTES – November 26, 2019

4. PUBLIC COMMENT – For Items Not on the Agenda

SPECIAL USE

5. PUBLIC HEARING – SPECIAL USE AND PRELIMINARY SITE PLAN REVIEW (File Number SU JPLN2019-0033) – Proposed Bethesda Romanian Pentecostal Church Addition, North of Long Lake, East of John R, South of Tucker (2075 E Long Lake), Section 12, Currently Zoned R-1C (One Family Residential) District

6. PUBLIC HEARING – SPECIAL USE AND PRELIMINARY SITE PLAN REVIEW (SP JPLN2019-0037) – Proposed Bostick 801, LLC Redevelopment, East side of Crooks, south of Big Beaver (801 W. Big Beaver), Section 28, Currently Zoned BB (Big Beaver Road) District

CONDITIONAL REZONING

7. PUBLIC HEARING – CONDITIONAL REZONING (CR JPLN2019-003) – Proposed Livernois Court, West of Livernois, North of Big Beaver, (88-20-22-301-008 and 88-20-22-301-009), Section 22, From R-1C (One Family Residential), to BB (Big Beaver Road) District.

PUBLIC HEARINGS

8. PUBLIC HEARING – ZONING ORDINANCE TEXT AMENDMENT (File Number ZOTA 254) – Cluster Square Footage

9. PUBLIC HEARING – ZONING ORDINANCE TEXT AMENDMENT (File Number ZOTA 255) – Transitions in NN (Neighborhood Node) Zoning District

OTHER BUSINESS

10. PLANNING COMMISSION MEETING SCHEDULE FOR 2020

11. PUBLIC COMMENT – Items on Current Agenda

12. PLANNING COMMISSION COMMENT

13. ADJOURN

NOTICE: *People with disabilities needing accommodations for effective participation in this meeting should contact the City Clerk by e-mail at clerk@troymi.gov or by calling (248) 524-3317 at least two working days in advance of the meeting. An attempt will be made to make reasonable accommodations.*

Vice Chair Krent called the Regular meeting of the Troy City Planning Commission to order at 7:00 p.m. on November 26, 2019 in the Council Chamber of the Troy City Hall.

1. ROLL CALL

Present:
Ollie Apahidean
Michael W. Hutson
Tom Krent
David Lambert
Sadek Rahman
John J. Tagle

Absent:
Karen Crusse
Carlton M. Faison
Barbara Fowler

Also Present:
R. Brent Savidant, Community Development Director
Julie Quinlan Dufrane, Assistant City Attorney
Jackie Ferencz, Planning Department Administrative Assistant
Kathy L. Czarnecki, Recording Secretary

2. APPROVAL OF AGENDA

Resolution # PC-2019-11-079
Moved by: Tagle
Support by: Apahidean

RESOLVED, To approve the Agenda as prepared.

Yes: All present (6)
Absent: Crusse, Faison, Fowler

MOTION CARRIED

3. APPROVAL OF MINUTES

Resolution # PC-2019-11-080
Moved by: Lambert
Support by: Hutson

RESOLVED, To approve the minutes of the November 12, 2019 Regular meeting as submitted.

Yes: All present (6)
Absent: Crusse, Faison, Fowler

MOTION CARRIED

4. PUBLIC COMMENT – Items not on the Agenda

There was no one present who wished to speak.

SPECIAL USE APPROVAL AND PRELIMINARY SITE PLAN REVIEWS

5. PUBLIC HEARING - SPECIAL USE APPROVAL AND PRELIMINARY SITE PLAN REVIEW (File Number SU JPLN2019-0033) – Proposed Bethesda Romanian Pentecostal Church Addition, North of Long Lake, East of John R, South of Tucker (2075 E Long Lake), Section 12, Currently Zoned R-1C (One Family Residential) District

Mr. Savidant asked Commissioner Apahidean to discuss his relationship with the church, noting he recused himself in previous meetings that the Board considered an application from the church.

Mr. Apahidean said he lives 800 feet from the church. He said he has no pecuniary interest in the application and feels he could render a decision on facts and findings presented. He asked the Board's preference if he should recuse himself from discussion and action on the item.

Vice Chair Krent went around the table asking each member his preference. It was the consensus of the Board that Mr. Apahidean could remain.

Mr. Savidant announced a Special Use Approval requires five (5) affirmative votes and the applicant could request a postponement until a full Board is present.

Jamal Hamood, attorney representing the church, asked to postpone the item until a full board is present.

PUBLIC HEARING OPENED

There was no one present who wished to speak.

PUBLIC HEARING CLOSED

Resolution # PC-2019-11-081
Moved by: Rahman
Support by: Tagle

RESOLVED, That Special Use Approval and Preliminary Site Plan Approval for the proposed Bethesda Romanian Pentecostal Church Addition, North side of Long Lake Road, East of John R, South of Tucker (2075 E. Long Lake), Section 12, Currently Zoned R-1C (One Family Residential) District, be postponed to the December 10, 2019 Regular meeting.

Yes: All present (6)
Absent: Crusse, Faison, Fowler

MOTION CARRIED

Vice Chair Krent said the Public Hearing would continue at the December 10, 2019 Regular meeting.

6. PUBLIC HEARING - SPECIAL USE APPROVAL AND PRELIMINARY SITE PLAN REVIEW (File Number SU JPLN2019-0036) – Proposed Horizon Bank Site Improvements, West side of Crooks, South of Big Beaver (2555 Crooks), Section 29, Currently Zoned O (Office) District

Mr. Savidant reviewed the proposed Horizon Bank application. He addressed the location of the drive-through, parking, landscaping improvements, lighting and elevations. Mr. Savidant said the Special Use Standards have been met and it is recommended to grant Special Use Approval and Preliminary Site Plan Approval with one condition as identified in the Planning Consultant report dated November 5, 2019.

Present were Chris Brayak of Wightman Architects and James Jaska of Horizon Bank.

Mr. Brayak addressed site improvements, specifically landscaping and lighting.

There was discussion on:
- Building occupancy; bank and other tenants.
- Ground sign; application in process.

PUBLIC HEARING OPENED

There was no one present who wished to speak. *

PUBLIC HEARING CLOSED

Resolution # PC-2019-11-082
Moved by: Hutson
Support by: Rahman

RESOLVED, That Special Use Approval and Preliminary Site Plan Approval for the proposed Horizon Bank Site Improvements, including ATM drive-through, West side of Crooks, South of Big Beaver (2555 Crooks), Section 29, Currently Zoned O (Office) District, be granted, subject to the following condition:

1. Provide lighting fixture cutsheets on plan set prior to Final Site Plan Approval.

Yes: All present (6)
Absent: Crusse, Faison, Fowler

MOTION CARRIED

OTHER BUSINESS

7. PUBLIC COMMENT – Items on Current Agenda *

Tom Strat, 2410 Silver Pointe Drive, Waterford; addressed Agenda item #6. Mr. Strat voiced no objection to the application but noted the narrowness of the drive-through lane.

8. PLANNING COMMISSION COMMENT

There were general Planning Commission comments.

The Regular meeting of the Planning Commission adjourned at 7:23 p.m.

Respectfully submitted,

_____
Tom Krent, Vice Chair

_____
Kathy L. Czarnecki, Recording Secretary

C:\Users\bob\Documents\Kathy\COT Planning Commission Minutes\2019\2019 11 26 Regular Meeting_Draft.doc

DATE: December 5, 2019

TO: Planning Commission

FROM: R. Brent Savidant, Community Development Director

SUBJECT: PUBLIC HEARING - SPECIAL USE AND PRELIMINARY SITE PLAN REVIEW (File Number SU JPLN2019-0033) – Proposed Bethesda Romanian Pentecostal Church Addition, North of Long Lake, East of John R, South of Tucker (2075 E Long Lake), Section 12, Currently Zoned R-1C (One Family Residential) District

The petitioner CMA Design Services submitted the above referenced Special Use Approval and Preliminary Site Plan Approval application to construct an addition to Bethesda Romanian Pentecostal Church.

Bethesda Romanian Pentecostal Church submitted a previous Special Use application for an addition in 2017. The item was considered by the Planning Commission at four meetings and was denied approval on April 9, 2019. This application is considered a new and separate application. A public hearing was opened (and left open) on November 26, 2019 and the item was postponed by the Planning Commission at the request of the applicant.

The attached report prepared by Carlisle/Wortman Associates, Inc. (CWA), the City's Planning Consultant, summarizes the application. CWA prepared the report with input from various City departments including Planning, Engineering, Public Works and Fire. City Management supports the findings of fact contained in the report and recommends approval of the project, as noted.

Attachments:

1. Maps
2. Report prepared by Carlisle/Wortman Associates, Inc.
3. Public comment

G:\SPECIAL USE\SU JPLN2019-0033 BETHESDA CHURCH ADDITION\PC Memo 12 10 2019.docx

PROPOSED RESOLUTION

PUBLIC HEARING - SPECIAL USE AND PRELIMINARY SITE PLAN REVIEW (File Number SU JPLN2019-0033) – Proposed Bethesda Romanian Pentecostal Church Addition, North of Long Lake, East of John R, South of Tucker (2075 E Long Lake), Section 12, Currently Zoned R-1C (One Family Residential) District

Resolution # PC-2019-11-
Moved by:
Seconded by:

RESOLVED, That Special Use Approval and Preliminary Site Plan Approval for the proposed Bethesda Romanian Pentecostal Church Addition, North side of Long Lake Road, East of John R, South of Tucker (2075 E. Long Lake), Section 12, Currently Zoned R-1C (One Family Residential) District, be **[approved] or [approved with conditions] or [denied] or [postponed].**

The Planning Commission makes the following findings of fact and conclusions based on written materials, comments and testimony of the Applicant's representatives, other interested persons, professional consultants and other factual material presented to the Commission to assist with its deliberation:

1. The building addition **[is] or [is not]** designed in a manner that is harmonious with the character of adjacent property and the surrounding area because:
    a. the applicant [**has] or [has not]** mitigated the building massing and visual impact through architectural design and landscape buffering.
    b. Building massing is inconsistent with the character of adjacent properties and the surrounding area.
    c. A tenet of the Master Plan is the protection of single family neighborhoods. The proposed addition **[is] or [is not]** compatible with the existing homes on Tucker.
    d. [insert additional reasons, if any]
    e. [insert additional reasons, if any]

2. The proposed addition [**does] or [does not]** impact traffic on Tucker Street and [**does] or [does not]** significantly impact traffic entering and exiting the site because _____.

3. The project **[is] or [is not]** adequately served by essential public facilities and services because _____.

4. The addition [**complies] or [does not comply]** with all applicable ordinance standards because _____.

5. The proposed addition [**does] <u>or</u> [does not]** unreasonably impact the quality of the neighborhood on Tucker Street in comparison to the impacts associated with typical permitted uses.

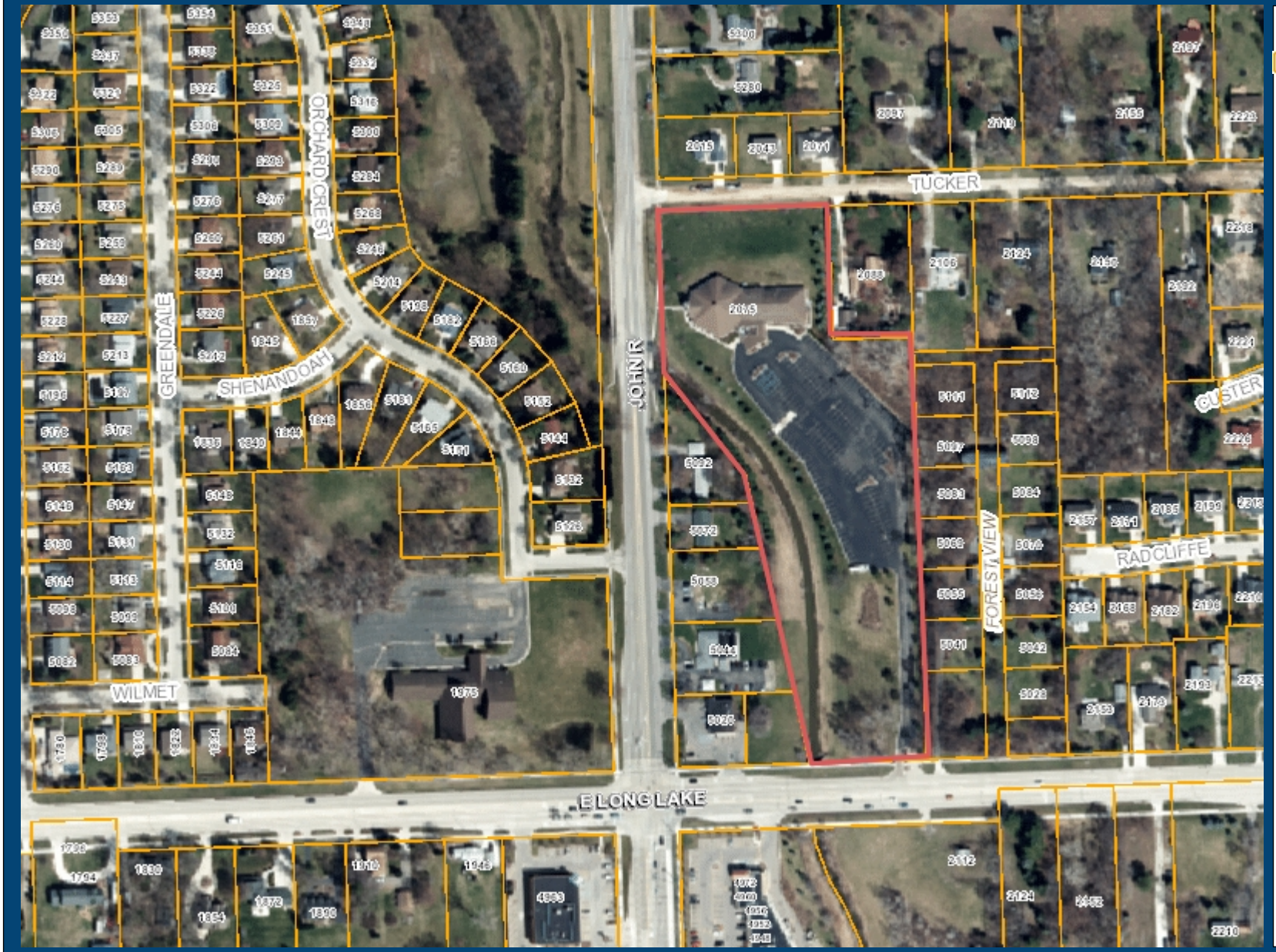
Be it finally resolved, approval shall be subject to the following conditions:

_____

Yes:
No:
Absent:
MOTION CARRIED / FAILED

Bethesda Romanian Church Addition

City of Troy Planning Department



Legend:

- Tax Parcel
- Aerial
  - Red: Band_1
  - Green: Band_2
  - Blue: Band_3

752 0 376 752 Feet

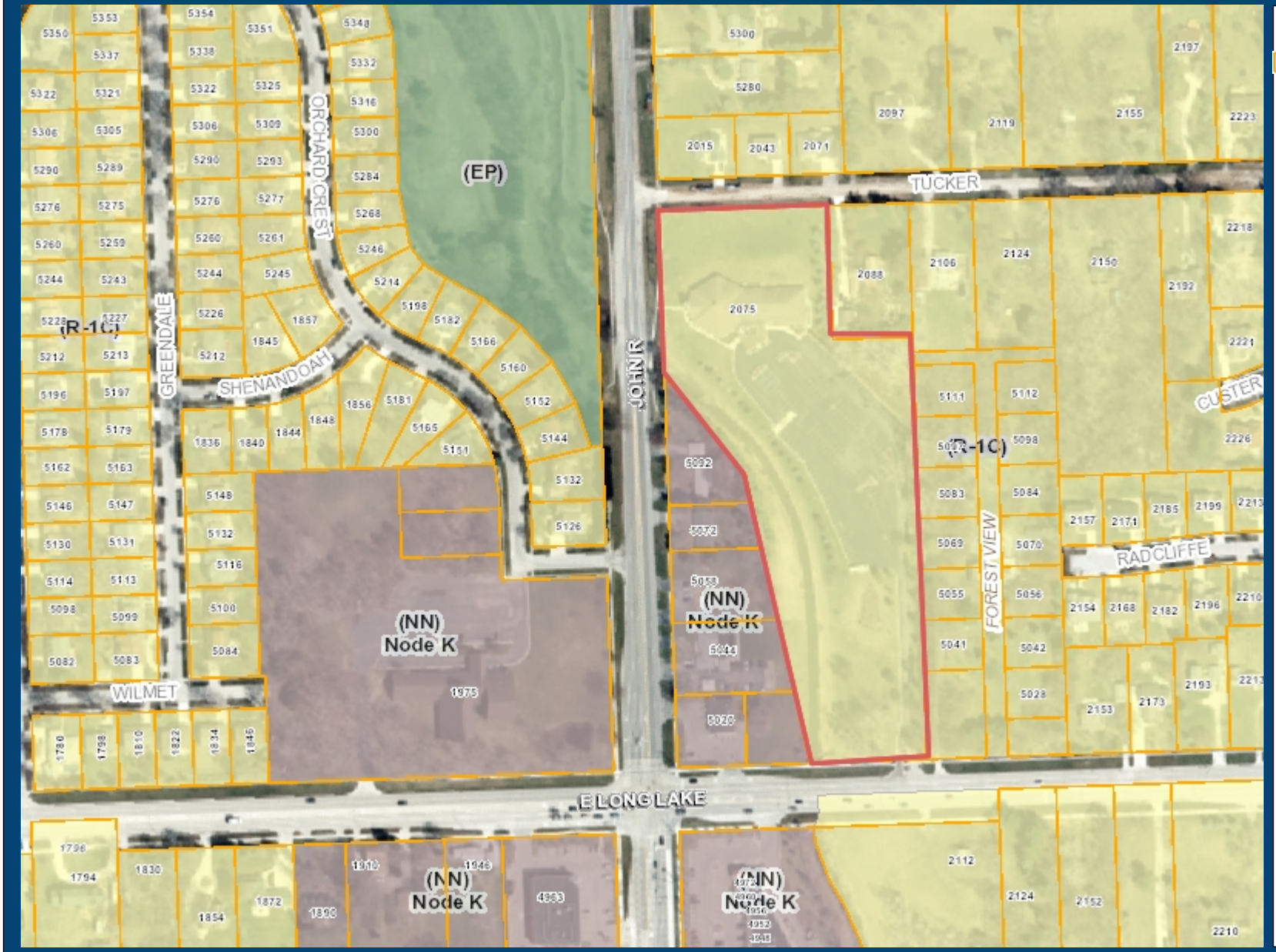
Scale 1: 4,514

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

Printed: 3/7/2017

Bethesda Romanian Church Addition

City of Troy Planning Department



Legend:

- Tax Parcel

Form Based Zoning 2

- (PUD) Planned Unit Development
- (PUD) Planned Unit Development
- (CF) Community Facilities District
- (EP) Environmental Protection District
- (BB) Big Beaver Road
- (MR) Maple Road
- (NN) Neighborhood Nodes (A-U)
- (CB) Community Business
- (GB) General Business
- (IB) Integrated Industrial Business District
- (O) Office Building District
- (OM) Office Mixed Use
- (P) Vehicular Parking District
- (R-1A) One Family Residential District
- (R-1B) One Family Residential District
- (R-1C) One Family Residential District
- (R-1D) One Family Residential District
- (R-1E) One Family Residential District
- (RT) One Family Attached Residential Distric
- (MF) Multi-Family Residential
- (MHP) Manufactured Housing
- (UR) Urban Residential
- (RC) Research Center District
- (PV) Planned Vehicle Sales

Aerial

- Red: Band_1
- Green: Band_2
- Blue: Band_3

752 0 376 752 Feet

Scale 1: 4,514

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

Printed: 3/7/2017

Carlisle | Wortman
ASSOCIATES, INC.
117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

Date: November 5, 2019

Special Use and Site Plan Review
For
City of Troy, Michigan

Applicant:	Simon Timbuc, Pastor
Project Name:	Bethesda Romanian Pentecostal Church Addition
Plan Date:	September 19, 2019 (Stamped)
Location:	2075 E. Long Lake Road, Troy MI 48085
Zoning:	R-1C Single Family Residential
Action Requested:	Special Use and Site Plan Approval

PROJECT AND SITE DESCRIPTION

The applicant is requesting site plan approval for an addition and site improvements to an existing place of worship located on East Long Lake Road, east of John Road. The proposed two-story addition is a total of 15,780 square feet. The addition is located on the north side of the property, adjacent to Tucker Drive. The two-story building addition includes a fellowship hall, warming kitchen, chapel, restrooms, and eight (8) Sunday school classrooms. Other site improvements include additional landscaping, and a stormwater management detention pond. The addition will require the regrading of the berm that exists along Tucker.

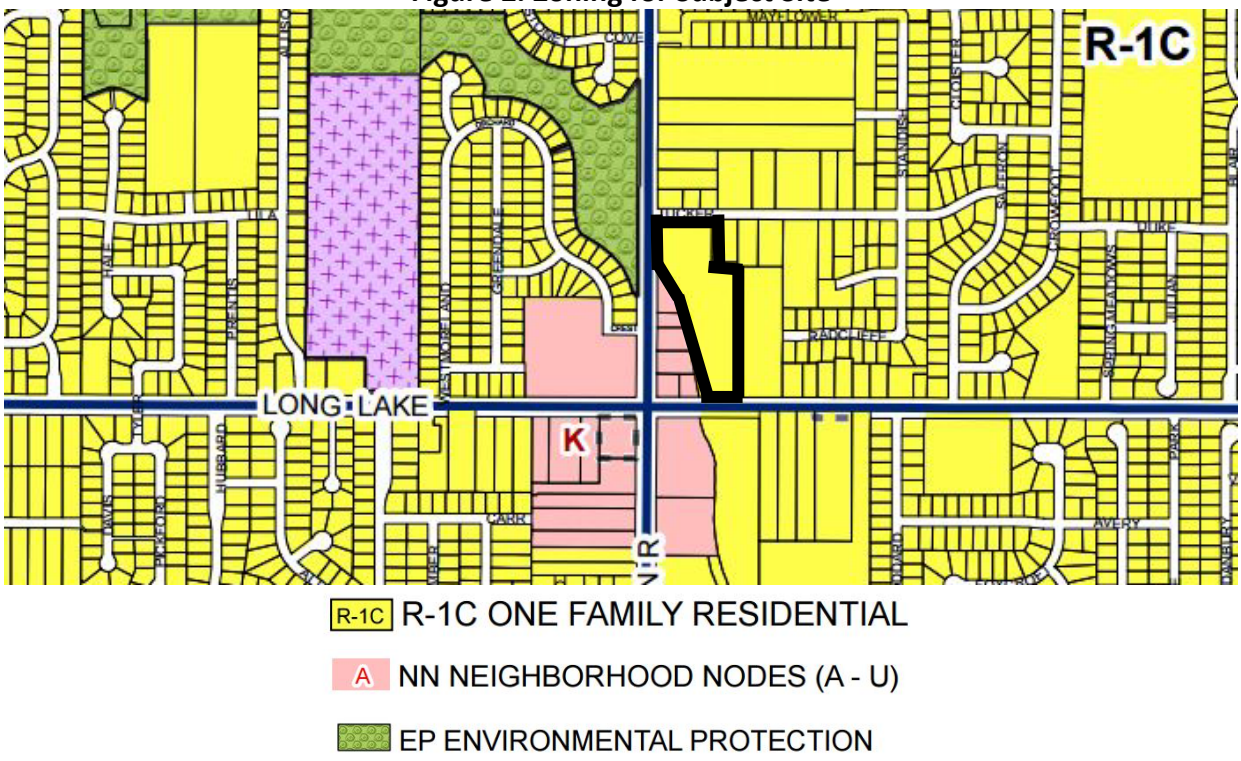
The Planning Commission denied for a building addition on April 4, 2019. The applicant has resubmitted a revised application.

The site is zoned R-1C, and the proposed additional requires a Special Use Permit.

Figure 1. Location of Subject Site

Source: Google Maps

Figure 2. Zoning for Subject Site



Source: City of Troy Zoning Map

Table 1. Zoning of Adjacent Properties

	Master Plan	Zoning	Use
North	Single Family Residential	R-1C	Residential
South	Single Family Residential	R-1C and NN (K)	Commercial & Residential
East	Single Family Residential	R-1C	Residential
West	Single Family Residential	NN (K) and EP	Residential & Environmental Preservation

PHOTO OF LOCATION

The proposed location of addition.

LAST PLANNING COMMISSION REVIEW

The Planning Commission passed the following resolution on April 9, 2019:

Resolution # PC-2019-04-026
Moved by: Crusse
Support by: Krent

***RESOLVED**, That Special Use Approval and Preliminary Site Plan Approval for the proposed Bethesda Romanian Pentecostal Church Addition, North side of Long Lake, East of John R, South of Tucker (2075 E. Long Lake), Section 12, Currently Zoned R-1C (One Family Residential) District, be denied.*

The Planning Commission makes the following findings of fact and conclusions based on written materials, comments and testimony of the Applicant's representatives, other interested persons, professional consultants and other factual material presented to the Commission to assist with its deliberation:

1. *The building addition is not designed in a manner that is harmonious with the character of adjacent property and the surrounding area because:*
    a. *The applicant has not mitigated the building massing and visual impact through architectural design and landscape buffering.*
    b. *Building massing is inconsistent with the character of adjacent properties and the surrounding area.*
    c. *A tenet of the Master Plan is the protection of single family neighborhoods. The proposed addition is not compatible with the existing homes on Tucker.*
2. *The proposed addition does unreasonably impact the quality of the neighborhood on Tucker Street in comparison to the impacts associated with typical permitted uses.*

Yes: Crusse, Faison, Krent, Lambert, Rahman
No: Hutson, Tagle
Absent: Fowler
Recused: Apahidean

PLAN CHANGES

The applicant has resubmitted their application. Though it's a new application, we note the following changes to the application:

1. Reduced the building size from 19,167 sq/ft to 15,780 sq/ft
2. Reduced building footprint from 14,605 sq/ft to 12,026 sq/ft
3. Reduced height to 26'-8"

4. Excluding window bumpouts, increased setback on Tucker from 55-feet to 59-feet
5. Eliminated the gym use
6. Reduced number of classrooms
7. Altered first floor windows to reduce visual impact on Tucker
8. Eliminated all second-floor windows

LANDSCAPE, ACOUSTICS, and PHOTOMETRICS

Landscape:

The applicant proposes the following landscaping:

Type	Number	Height at time of planting	Maximum Height
Concolor Fir	18	10-12 feet	30-50 feet
Little Leaf Linden	6	4-5-inch diameter	50-60 feet
Green Giant Arborvitae	12	9-10 feet	50-60 feet
Forsythia (shrub)	21	36 inches	8-10 feet

Acoustic Calculations:

The applicant has provided an acoustic study. The study concludes that at the Tucker Road property line the decibel level is approximately 22 decibels. That equates to a "faint" noise.

Photometric:

The applicant has provided a photometric plan that complies with ordinance requirements.

STANDARDS FOR APPROVAL

Places of Worship, and associated uses, are permitted subject to Special Use approval. For any special use, according to Section 9.02.D, the Planning Commission shall *"…review the request, supplementary materials either in support or opposition thereto, as well as the Planning Department's report, at a Public Hearing established for that purpose, and shall either grant or deny the request, table action on the request, or grant the request subject to specific conditions."*

Section 9.03 states that before approving any requests for Special Use Approval, the Planning Commission shall consider:

1. *Compatibility with Adjacent Uses. The Special Use shall be designed and constructed in a manner harmonious with the character of adjacent property and the surrounding area. In determining whether a Special Use will be harmonious and not create a significant detrimental impact, as compared to the impacts of permitted uses.*

2. *Compatibility with the Master Plan. The proposed Special Use shall be compatible and in accordance with the goals and objectives of the City of Troy Master Plan and any associated sub-area and corridor plans.*

3. *Traffic Impact. The proposed Special Use shall be located and designed in a manner which will minimize the impact of traffic, taking into consideration: pedestrian access and safety; vehicle trip generation (i.e. volumes); types of traffic, access location, and design, circulation and parking design; street and bridge capacity and, traffic operations at nearby intersections and access points. Efforts shall be made to ensure that multiple transportation modes are safely and effectively accommodated in an effort to provide alternate modes of access and alleviate vehicular traffic congestion.*

4. *Impact on Public Services. The proposed Special Use shall be adequately served by essential public facilities and services, such as: streets, pedestrian or bicycle facilities, police and fire protection, drainage systems, refuse disposal, water and sewage facilities, and schools. Such services shall be provided and accommodated without an unreasonable public burden.*

5. *Compliance with Zoning Ordinance Standards. The proposed Special Use shall be designed, constructed, operated and maintained to meet the stated intent of the zoning districts and shall comply with all applicable ordinance standards.*

6. *Impact on the Overall Environment. The proposed Special Use shall not unreasonably impact the quality of natural features and the environment in comparison to the impacts associated with typical permitted uses.*

7. *Special Use Approval Specific Requirements. The general standards and requirements of this Section are basic to all uses authorized by Special Use Approval. The specific and detailed requirements relating to particular uses and area requirements must be also satisfied for those uses.*

RECOMMENDATION

The Planning Commission shall determine if the applicant has provided sufficient evidence to meet the special use standards.

If the Planning Commissions finds the special use standards have been met, the Planning Commission may approve the special use and preliminary site plan.

Benjamin R. Carlisle

CARLISLE/WORTMAN ASSOC., INC.
Benjamin R. Carlisle, LEED AP, AICP

BETHESDA ROMANIAN PENTECOSTAL CHURCH

2075 E LONG LAKE RD, TROY, MI 48085

ORIGINAL PROPOSED BUILDING
APRIL 2019

(RENDERING SHOWN AT 10 YEAR GROWTH)

NEW PROPOSED BUILDING

(RENDERING SHOWN AT 10 YEAR GROWTH)

CMA DESIGN SERVICES

BUILDER: CMA DESIGN SERVICES
8183 RHODE DDR. SUITE B
SHELBY TWP., MI 48317

KALAJIAN ARCHITECTURE & DESIGN LLC

ARCHITECT: KALAJIAN ARCHITECTURE & DESIGN
7871 AUSTIN DR.,
TROY, MI 48083

Bethesda Romanian Pentecostal Church

OWNER: BETHESDA ROMANIAN PENTECOSTAL CHURCH
2075 E LONG LAKE RD.
TROY, MI 48085

INDEX:

PREVIOUS PLANNING COMMISION COMMENTS

-SMELLS/DOORS COMING FROM THE KITCHEN
- -PLEASE BE AWARE THAT THE KITCHEN SHOWN ON THE PROPOSED ADDITION IS SOLELY FOR THE PURPOSE OF WARMING ALREADY PREPARED FOOD

-DUMPSTER LOCATION/ TRASH PICKUP
- -THE CHURCH WILL NOT HAVE ANY TRASH PICK UP SCHEDULED ALONG TUCKER DRIVE AND WILL UTILIZE THE SAME TRASH SERVICE THAT IS CURRENTLY IN PLACE FOR THE EXISTING BUILDING. THE EXISTING DUMPSTER SURROUND IS LOCATED ON THE SOUTHWEST SIDE OF THE CHURCH'S PARKING LOT AND ACCESSED THROUGH THEIR LONG LAKE RD ENTRANCE

-ALTERNATE LOCATIONS FOR ADDITION:
- -THE REMAINING SITE HAS MANY RESTRICTIONS SUCH AS PARKING, EASEMENTS AND WETLANDS LOCATIONS. AN ADDITION ON THE SOUTH SIDE OF THE EXISTING CHURCH WOULD REQUIRE LOST PARKING SPACES TO BE RE-LOCATED TO THE NORTH SIDE OF THE CHURCH
- -ANYWHERE ELSE THE ADDITION IS PLACED WITHIN THE SITE WOULD OCCUR WITHIN THE FLOOD PLAN AS SHOWN WITHIN THE FLOOD PLAIN MAP PROVIDED. THIS WOULD NOT MAKE IT FEASIBLE WITHOUT MITIGATION WHICH WOULD BE IMPRACTICAL WITH THIS SITE SINCE MOST OF IT IS WITHIN THE FLOOD PLAIN ZONE OTHER THAN THE EXISTING AND PROPOSED BUILDING LOCATION

-THE SCHEDULED CHURCH TIMES ARE AS FOLLOWS:
- -SUNDAY 9:00 A.M. AND 5:00 P.M.
- -TUESDAY: 6:30 P.M.
- -WEDNESDAY: 7:00 P.M.
- -THURSDAY: 5:30 P.M. AND 7:00 P.M.
- -FRIDAY: 6:00 P.M. (BAND & CHOIR PRACTICE) AND 6:30 P.M. (BAND & CHOIR PRACTICE) 8:00P.M (YOUTH GROUP)
- -SATURDAY: 10:30 A.M. AND 6:00 P.M. (MENS CHOIR)
- -A FULL SCHEDULE INCLUDING SPECIAL EVENTS CAN BE SEEN BY CLICKING ON THE PROVIDED LINK TO THE CHURCH WEBSITE CALANDER: HTTP://WWW.BETEZDA.COM/CALANDER/

-LANDSCAPING MAINTENANCE
- -ALL LANDSCAPED AREAS SHALL BE AUTOMATICALLY IRRIGATED SEE PG. C-1
- -ALL LIGHTING ON THE SITE SHALL BE SHIELDED AND NOT ENCROACH UPON ABUTTING PROPERTIES OR RIGHT-OF-WAYS
- -LANDSCAPING TO BE INSTALLED AT THE START OF THE PROJECT TO ACT AS A VISUAL BUFFER BETWEEN NEIGHBORS AND ACTIVE SITE

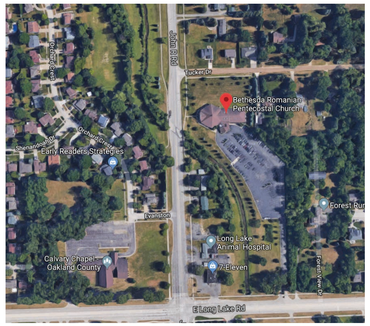
-SITE ACCESS
- -SEE PAGE C-1 TO VIEW SUGGESTED CONSTRUCTION DRIVEWAYS

-NOISE
- -PLEASE SEE ACOUSTIC STUDY ON PAGE A-4

-SIZE OF THE BUILDING
- -THE OVERALL SQFT. WAS REDUCED FROM 19,200 SQFT (FIRST SUBMISSION) TO 12,026 SQFT. PLEASE SEE PRIMARY PROJECT CHANGES AS WELL AS PAGE A-3
- -THE BUILDING HEIGHT WAS REDUCED FROM THE ORIGINAL 39'-0" TO A HEIGHT OF 28'-0" PLEASE SEE PRIMARY PROJECT CHANGES AS WELL AS PAGE A-3

-WINDOWS
- -WINDOWS WERE KEPT TO A MINIMUM ON THE NORTH SIDE OF THE BUILDING WITH WESTWARD EXPOSURE(NOT FACING TUCKER)

-PROPERTY VALUE
- -N/A



PROJECT LOCATION: BETHESDA ROMANIAN PENTECOSTAL CHURCH
2075 E LONG LAKE RD.
TROY, MI 48085

GENERAL STATEMENTS/NOTES:

-LANDSCAPING MAINTENANCE - SEE ATTACHED STATEMENT
-CLASSROOM USE- SEE ATTACHED STATEMENT
-CONSTRUCTION TRAFFIC- SEE PAGE C-1
-MEETING WITH NEIGHBORS ON ____/_____
-CONSTRUCTION PHASE 1- PLANTING TO CONCEAL SITE WORK
-PARKING

PRIMARY PROJECT CHANGES

-FOOTPRINT:
- FIRST SUBMISSION- 19,200 SQFT
- APRIL 2019 SUBMISSION- 14,605 SQFT.
- NEW SUBMISSION- 12,026 SQFT.
- DIFFRENCE BETWEEN SUBMISSIONS- 2,579 SQFT
- REDUCTION 37.4 % FROM THE FIRST SUBMISSION

-HEIGHT:
- FIRST SUBMISSION- 39'-0"
- 2019 SUBMISSION- 30'-0"
- NEW SUBMISSION- 26'-8"

-VISIBILITY FROM BLDG TO NEIGHBORS
- -REMOVED BASKETBALL COURT
- -REDUCED CLASSROOMS

PREVIOUS SUBMISSIONS

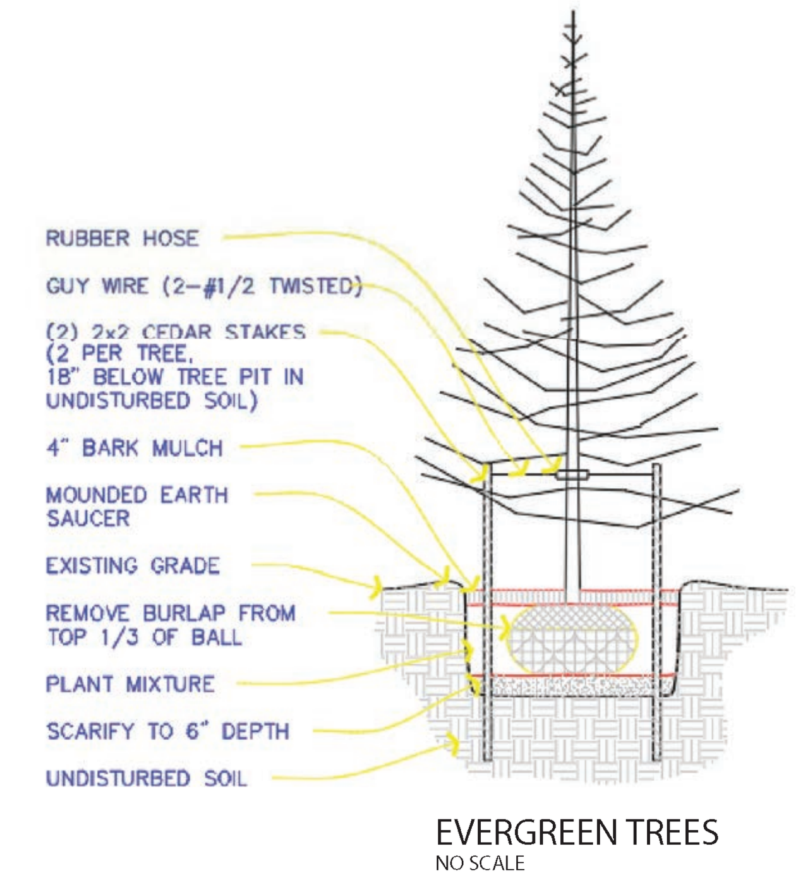
PLANNING COMMISSION SUBMISSION	2017.04.25
PLANNING COMMISSION SUBMISSION	2017.07.25
PLANNING COMMISSION SUBMISSION	2018.10.09
PLANNING COMMISSION SUBMISSION	2019.02.26
PLANNING COMMISSION SUBMISSION	2019.

BUILDING INFORMATION:

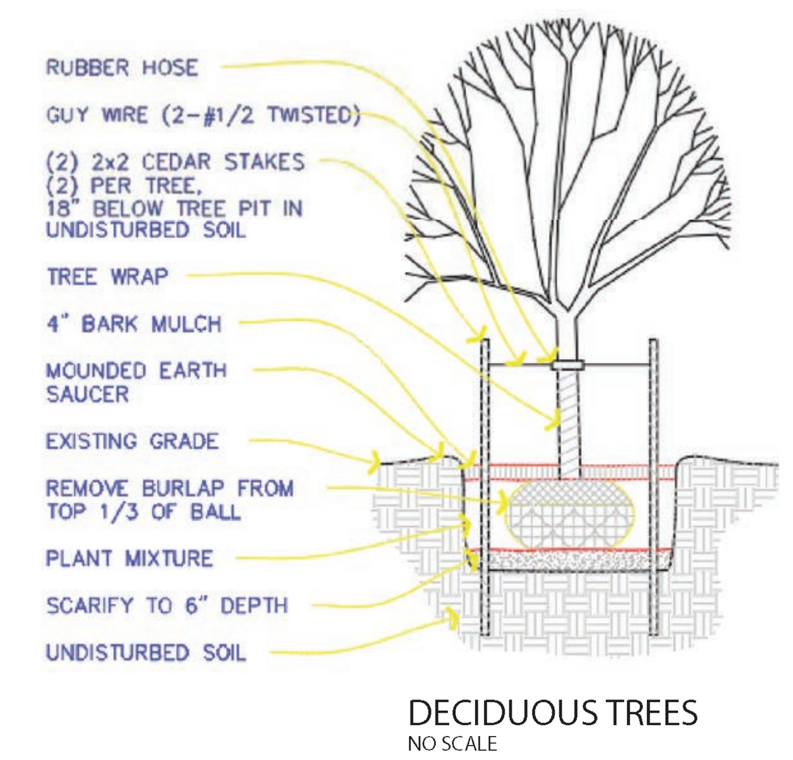
BUILDING CODE:	2015 MICHIGAN BUILDING CODE
MECHANICAL CODE:	2015 MICHIGAN MECHANICAL CODE
PLUMBING CODE:	2015 MICHIGAN PLUMBING CODE
ELECTRICAL CODE	2017 NATIONAL ELECTRIC CODE (2017 NEC) W/ PART 8 AMENDMENTS
ENERGY CODE:	ASHRAE 90.1 2013 PART 10A MICHIGAN UNIFORM ENERGY
FIRE CODE:	2015 INTERNATIONAL FIRE CODE
BARRIER FREE:	P.A. 1 OF 1966 AS AMENDED CHAPTER 11 OF THE MICHIGAN BUILDING CODE, ICC/ANSI A117.1-3009 STANDARD AS REFRENCED FROM CHAPTER 11
USE GROUP:	A-3 ASSEMBLY USES INTENDED FOR WORSHIP
CONSTRUCTION TYPE:	
BUILDING AREA:	FIRST FLOOR- 12,026 SQFT SECOND FLOOR- 3,754 SQFT
SPRINKLERED:	YES
RISK CATEGORY:	III
OCCUPANCY:	PER TABLE 1004.2 MICHIGAN BUILDING CODE 2015 (FLOOR AREA IN SQ.FT. PER PERSON) (MAXIMUM FLOOR AREA ALLOWANCE PER OCCUPANT)
ASSEMBLY:	WITHOUT FIXED SEATS 7 NET STANDING SPACE 5 NET UNCONCENTRATED (TABLES AND CHAIRS) 15 NET
CLASSROOM:	20 NET
FOUNDATION SOIL BEARING:	2,000 PSF ASSUMED
ROOF LIVE LOAD:	
ROOF DEAD LOAD:	
GROUND SNOW LOAD:	
FROST DEPTH:	42 IN.
WIND LOAD:	115 MPH
SEISMIC LOAD:	Ss= 0.112 S1= 0.043

PROPOSED SITE PLAN

SCALE:1" = 20'-0"



EVERGREEN TREES
NO SCALE



DECIDUOUS TREES
NO SCALE

CONCOLOR FIR "ABIES CONCOLOR"	LITTLELEAF LINDEN "TILIA CORDATA"	GREEN GIANT ARBORVITAE "THUJA STANDISHII X PLICATA"	FORSYTHIA "FORSYTHIA X INTERMEDIA"
TREE TYPE: EVERGREEN	TREE TYPE: DECIDUOUS	TREE TYPE: EVERGREEN	TREE TYPE: FLOWERING SHRUB
QUANTITY: 18	QUANTITY: 6	QUANTITY: 12	QUANTITY: 21
PLANTING SIZE: 8'-10'	PLANTING SIZE: 3" DIA.	PLANTING SIZE: 6'-7'	PLANTING SIZE: 36"
MATURE SIZE: HEIGHT: 30'-50' WIDTH: 20'	MATURE SIZE: HEIGHT: 50'-60' WIDTH: 40'	MATURE SIZE: HEIGHT: 50'-60' WIDTH: 12'-20'	MATURE SIZE: HEIGHT: 8'-10' WIDTH: 10'-12'
GROWTH RATE: 12"-24" PER A YEAR	GROWTH RATE: 13"-24" PER A YEAR	GROWTH RATE: AT LEAST 24" PER A YEAR	GROWTH RATE: AT LEAST 24" PER A YEAR
CF	LL	GGA	FOR

SOURCE: WWW.ARBORDAY.ORG

GENERAL STATEMENTS/NOTES:

-ALL LANDSCAPED AREAS SHALL BE AUTOMATICALLY IRRIGATED.
-ALL LIGHTING ON THE SITE SHALL BE SHIELDED AND NOT ENCROACH UPON ABUTTING PROPERTIES OR RIGHT-OF-WAYS.
-LANDSCAPING TO BE INSTALLED AT START OF PROJECT TO ACT AS VISUAL BUFFER BETWEEN NEIGHBORS AND ACTIVE SITE

LANDSCAPE NOTES PER CITY OF TROY

1. ALL PLANT MATERIAL SHALL CONFORM IN BOTANICAL NAME, DIMENSIONS AND QUALITY OF "HORTICULTURE STANDARDS ADOPTED BY THE AMERICAN ASSOCIATION OF NURSERYMEN (AAN).
2. ALL BARE ROOT (BR) PLANT MATERIAL SHALL HAVE A WELL BRANCHED ROOT SYSTEM, CHARACTERISTIC OF THE SPECIES. THE ROOT SYSTEM WILL MEET THE MINIMUM STANDARDS FOR BARE ROOT NURSERY STOCK AS SET DOWN BY THE AAN.
3. BALLED AND BURLAPPED (B & B) PLANT MATERIAL SHALL BE WITH ORIGINAL SOIL, INTACT WITH THE FIBROUS ROOTS TO INSURE MAXIMUM RECOVERY AFTER TRANSPLANTING.
4. POTTED PLANTS SHALL HAVE SUFFICIENT ROOT STRUCTURES TO INSURE FULL RECOVERY AND DEVELOPMENT.
5. ANY PLANTS EXISTING ON THE SITE REQUIRING RELOCATION MUST BE DUG IN ACCORDANCE WITH THE ABOVE STATED STANDARDS.
6. NURSERY STOCK SHALL BE VIGOROUS FREE FROM DISEASE, INSECTS, INSECT EGGS, OR LARVAE.
7. SUBSTITUTION OF MATERIALS INCLUDED IN AN APPROVED PLAN SHALL BE MADE WITH THE CONSENT OF THE CITY. THE OWNER MAY REQUEST AN AMENDMENT VERBALLY OR IN WRITING. THE DEVELOPER SHALL PROVIDE AN AS-BUILT DRAWING INDICATING THE CHANGES PRIOR TO THE RELEASE OF THE LANDSCAPE DEPOSIT.

TREE PROTECTION NOTES

1. APPROVED TREE PROTECTION SHALL BE ERECTED PRIOR TO START OF CONSTRUCTION ACTIVITIES AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
2. NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE DRIP LINE OF ANY DESIGNATED TREE TO REMAIN.
3. ALL UTILITY SERVICE REQUESTS MUST INCLUDE NOTIFICATION TO THE INSTALLER THAT PROTECTED TREES MUST BE AVOIDED. ALL TRENCHING SHALL OCCUR OUTSIDE OF THE PROTECTED FENCING.
4. SWALES SHALL BE ROUTED TO AVOID THE AREA WITHIN THE DRIP LINES OF PROTECTED TREES.
5. ROOT ZONES OF PROTECTED TREES SHOULD BE WELL MARKED WITH BRIGHT COLORS AND SURROUNDED WITH RIGIDLY STAKED FENCING.
6. THE STRIPPING OF TOPSOIL FROM AROUNDD PROTECTED TREES SHALL BE PROHIBITED.

GENERAL LANDSCAPING NOTES

1. PLANTS TO BE WATERED PRIOR TO AND AFTER PLANTING IS COMPLETED.
2. ALL PLANT MATERIAL IS TO BE GUARANTEED FOR A MINIMUM OF ONE FULL YEAR FROM TIME OF PLANTING.
3. INSTALLATION OF ALL PLANTS SHALL BE IN ACCORDANCE WITH AAN STANDARDS.
4. PROVIDE CLEAN BACKFILL SOIL, USING SOIL STOCKPILED ON SITE. SOIL SHALL BE SCREENED AND FREE OF ANY DEBRIS, FOREIGN MATERIALS AND STONE. ADD FERTILIZER TO ALL PLANTS WHEN PITS ARE BACKFILLED.
5. ALL PLANTING SHALL BE MULCHED WITH SHREDDED HARDWOOD BARK SPREAD TO A MINIMUM DEPTH OF 3". MULCH IS TO BE FREE FROM DEBRIS AND FOREIGN MATERIAL.
6. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK SHOWN
7. ALL WORK SHALL BE IRRIGATED AS REQUIRED AND SEED ALL AREAS DISTURBED DURING CONSTRUCTION.

EXISTING TREE NOTES

1. SEE EXISTING TREE REMARKS WITHIN ENCLOSED MASTER TREE LIST (PROVIDED BY NOWAK & FRAUS ENGINEERS) FOR LOCATION OF ALL FAIR CONDITION TREES TO BE RESTORED AND PROTECTED FROM FURTHER DAMAGE TREES
2. REMOVE POOR TREES

REQUIRED LANDSCAPING

A. MAINTAIN STREET FRONTAGE LANDSCAPING - MINIMUM (1) TREE PER EACH 30 LINEAR FEET OF STREET FRONTAGE.
B. REPLACE TREES WITHIN NEW CONSTRUCTION ZONE TO MAINTAIN MINIMUM REQUIRED NUMBEROF TREES.
C. PROVIDE PLANTING WITHIN EXPANDED DETENTION BASIN.
D. REPLACE ALL TREES NOTED AS POOR CONDITION AS NOTED ABOVE.

PROPERTY INFORMATION

PARCEL NUMBER: 88-20-12-351-037
FRONTAGE: 7.54 ACRES
ACREAGE: 7.54 ACRES
LEGAL DESCRIPTION:
T2N, R11E, SEC 12 EYSTER'S JOHN R ACRES SUB LOT 5 ALSO LOT 15 EXC N 250 FT OF LOT 16 4-13-98 FR013, 028, 032 TO 034
NEIGHBORHOOD CODE: XCHUR
ZONING: R-1C ONE FAMILY RESIDENTIAL

LEGEND

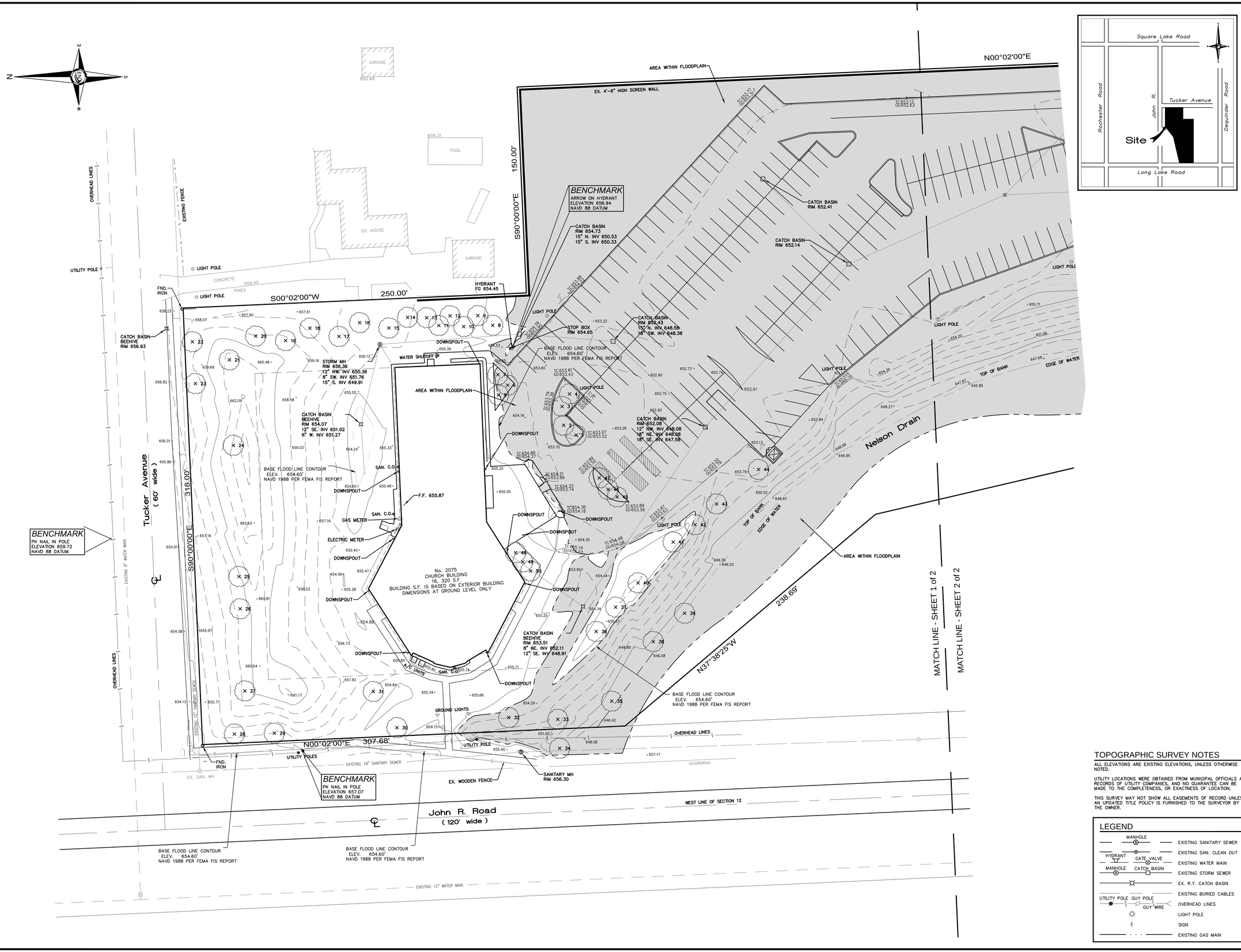
- SPRINKLER HEAD
- MAIN LINE
- SECONDARY LINE
- ZONES

CMA DESIGN SERVICES
KALAJIAN ARCHITECTURE & DESIGN LLC

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26
CHURCH REVIEW	2019.07.17

BETHESDA ROMANIAN PENTECOSTAL

PAGE:
C-1



TOPOGRAPHIC SURVEY NOTES

ALL ELEVATIONS ARE EXISTING ELEVATIONS, UNLESS OTHERWISE NOTED.

UTILITY LOCATIONS WERE OBTAINED FROM MUNICIPAL OFFICIALS AND RECORDS OF UTILITY COMPANIES, AND NO GUARANTEE CAN BE MADE TO THE COMPLETENESS, OR EXACTNESS OF LOCATION.

THIS SURVEY MAY NOT SHOW ALL EASEMENTS OF RECORD UNLESS AN UPDATED TITLE POLICY IS FURNISHED TO THE SURVEYOR BY THE OWNER.

LEGEND

- MANHOLE
- HYDRANT
- GATE VALVE
- MANHOLE
- CATCH BASIN
- UTILITY POLE
- GUY POLE
- GUY WIRE

- EXISTING SANITARY SEWER
- EXISTING SAN. CLEAN OUT
- EXISTING WATER MAIN
- EXISTING STORM SEWER
- EX. R.Y. CATCH BASIN
- EXISTING BURIED CABLES
- OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN

NF ENGINEERS

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LAND SURVEYORS
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NOWAK & FRAUS ENGINEERS
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PONTIAC, MI 48342-5032
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FAX. (248) 332-8257

SEAL

STATE OF MICHIGAN
PATRICK J. WILLIAMS
ENGINEER
NO. 44351
LICENSED PROFESSIONAL ENGINEER

PROJECT
Bathesda Romanian Pentecostal Church

CLIENT
Bathesda Romanian Pentecostal Church
2075 E. Long Lake Rd.
Troy, MI 48085

Contact: Pastor Simion Timbuc
Ph: (248) 740-8800

PROJECT LOCATION
Part of the Southwest ¼ of Section 12
T. 2 North, R. 11 East
City of Troy,
Oakland County, Michigan

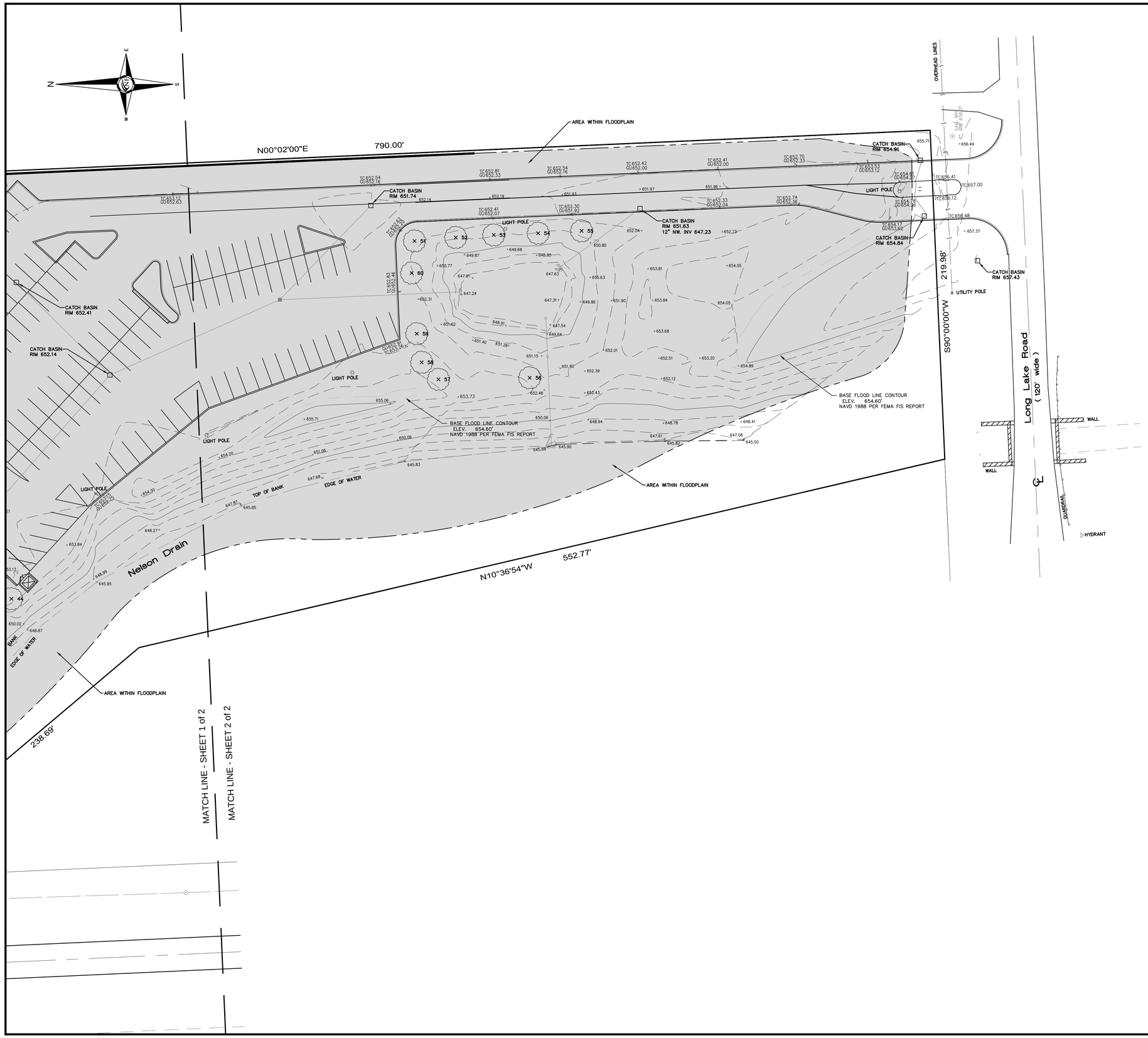
SHEET
Boundary / Topographic / Tree Survey

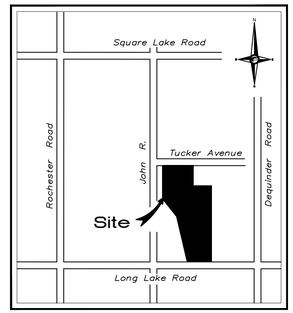
Know what's **below** **Call** before you dig.

REVISIONS
02-21-2019 Revised Per Client
09-12-2019 Revised Per Client

DRAWN BY: A. Eizember
DESIGNED BY:
APPROVED BY: P. Williams
DATE: September 23, 2016
SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. 9333-02
SHEET NO. SP-1





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LEGEND

- MANHOLE — EXISTING SANITARY SEWER
- EXISTING SAN. CLEAN OUT
- HYDRANT, GATE VALVE — EXISTING WATER MAIN
- MANHOLE, CATCH BASIN — EXISTING STORM SEWER
- EX. R.Y. CATCH BASIN
- EXISTING BURIED CABLES
- UTILITY POLE, GUY POLE, GUY WIRE — OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN

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SEAL

STATE OF MICHIGAN — PATRICK J. WILLIAMS — ENGINEER NO. 44351 — LICENSED PROFESSIONAL ENGINEER

PROJECT
Bathesda Romanian Pentecostal Church

CLIENT
Bathesda Romanian Pentecostal Church
2075 E. Long Lake Rd.
Troy, MI 48085

Contact: Pastor Simion Timbuc
Ph: (248) 740-8800

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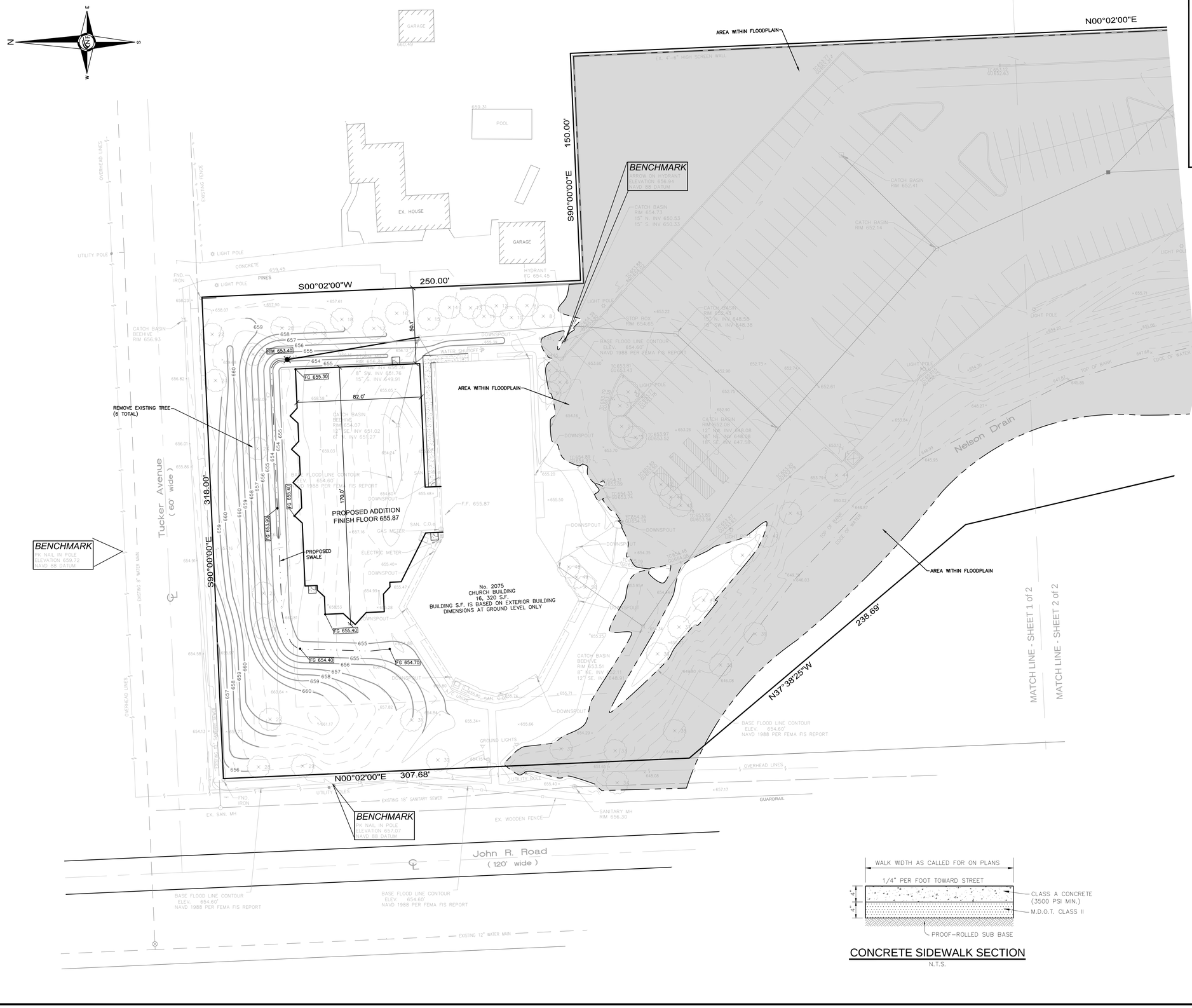
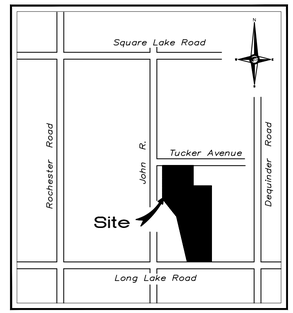
02-21-2019 Revised Per Client
09-12-2019 Revised Per Client

DRAWN BY: A. Eizember
DESIGNED BY:
APPROVED BY: P. Williams
DATE: September 23, 2016
SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. **9333-02**
SHEET NO. **SP-2**





CONCRETE SIDEWALK SECTION

N.T.S.

PAVING LEGEND

PROPOSED CONCRETE PAVEMENT

LEGEND

- AREA OF FLOODPLAIN
- MANHOLE — EXISTING SANITARY SEWER
- HYDRANT, GATE VALVE — SAN. CLEAN OUT
- EXISTING WATERMAIN
- MANHOLE, CATCH BASIN — EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
- EXISTING BURIED CABLES
- UTILITY POLE, GUY POLE, GUY WIRE — OVERHEAD LINES
- LIGHT POLE
- SIGN
- EXISTING GAS MAIN
- C.O., MANHOLE — PR. SANITARY SEWER
- HYDRANT, GATE VALVE — PR. WATER MAIN
- INLET, C.B., MANHOLE — PR. STORM SEWER
- PR. R. Y. CATCH BASIN
- PROPOSED LIGHT POLE
- TC 600.00 — PR. TOP OF CURB ELEVATION
- GU 600.00 — PR. GUTTER ELEVATION
- TW 600.00 — PR. TOP OF WALK ELEVATION
- TP 600.00 — PR. TOP OF PVMT. ELEVATION
- FG 600.00 — FINISH GRADE ELEVATION

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Oakland County, Michigan

SHEET
Preliminary Site Plan

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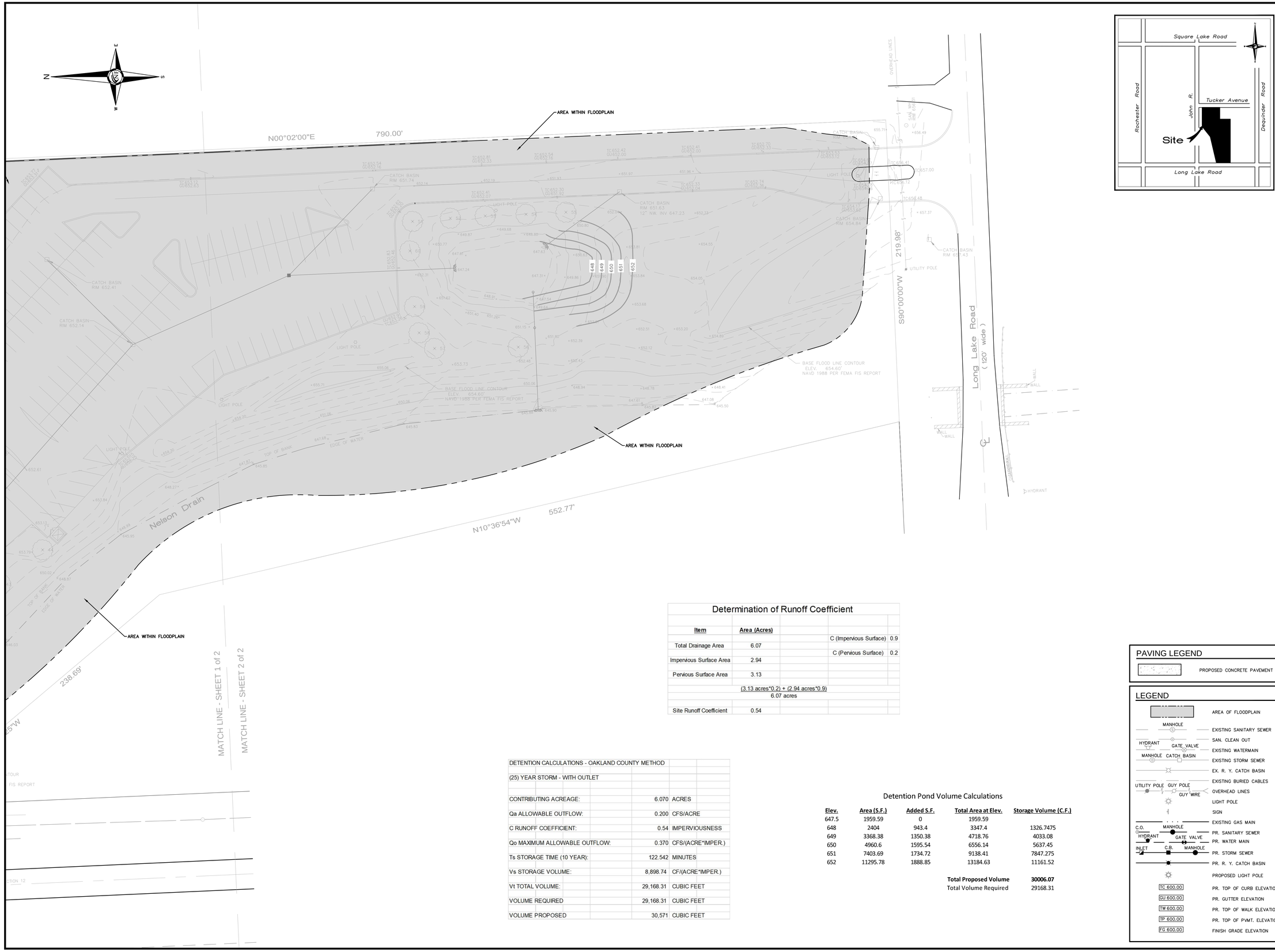
02-21-2019 Revised Per Client
09-12-2019 Revised Per Client

DRAWN BY:
A. Eizember
DESIGNED BY:
P. Williams
APPROVED BY:
P. Williams
DATE:
September 23, 2016
SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. 9333-02
SHEET NO. SP-3



Determination of Runoff Coefficient

Item	Area (Acres)		
		C (Impervious Surface)	0.9
Total Drainage Area	6.07		
		C (Pervious Surface)	0.2
Impervious Surface Area	2.94		
Pervious Surface Area	3.13		
(3.13 acres*0.2) + (2.94 acres*0.9)			
6.07 acres			
Site Runoff Coefficient	0.54		

DETENTION CALCULATIONS - OAKLAND COUNTY METHOD		
(25) YEAR STORM - WITH OUTLET		
CONTRIBUTING ACREAGE:	6.070	ACRES
Qa ALLOWABLE OUTFLOW:	0.200	CFS/ACRE
C RUNOFF COEFFICIENT:	0.54	IMPERVIOUSNESS
Qo MAXIMUM ALLOWABLE OUTFLOW:	0.370	CFS/(ACRE*IMPER.)
Ts STORAGE TIME (10 YEAR):	122.542	MINUTES
Vs STORAGE VOLUME:	8,898.74	CF/(ACRE*IMPER.)
Vt TOTAL VOLUME:	29,168.31	CUBIC FEET
VOLUME REQUIRED	29,168.31	CUBIC FEET
VOLUME PROPOSED	30,571	CUBIC FEET

Detention Pond Volume Calculations

Elev.	Area (S.F.)	Added S.F.	Total Area at Elev.	Storage Volume (C.F.)
647.5	1959.59	0	1959.59	
648	2404	943.4	3347.4	1326.7475
649	3368.38	1350.38	4718.76	4033.08
650	4960.6	1595.54	6556.14	5637.45
651	7403.69	1734.72	9138.41	7847.275
652	11295.78	1888.85	13184.63	11161.52
			Total Proposed Volume	**30006.07**
			Total Volume Required	29168.31

PAVING LEGEND

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DESIGNED BY: P. Williams
APPROVED BY: P. Williams
DATE: September 23, 2016
SCALE: 1" = 30'
30 15 0 15 30 45

NFE JOB NO. **9333-02**
SHEET NO. **SP-4**

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all the areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Michigan State Plane South zone 6401 (FIPSZONE 2113). The **horizontal datum** was NAD83. Differences in datum, spheroid, projection or state plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information about the **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base Map information shown on this FIRM was derived from the Oakland County GIS Department from photography dated September 2002 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

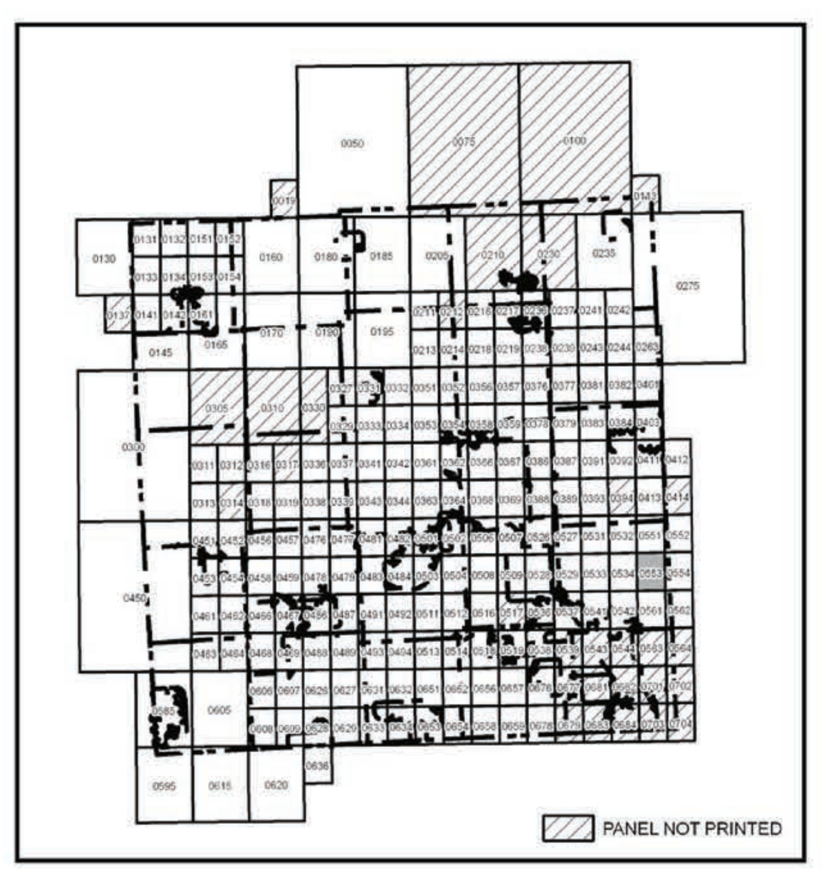
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The **profile base lines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result if improved topographic data, the **profile base line** in some cases may deviate significantly from the channel centerline or appear outside the SFHA.

PANEL INDEX



PROJECT LOCATION

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100 year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside of the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~513~~~	Base Flood Elevation line and value; elevation in feet*
(EL 10)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)——(A)	Cross section line
(23)- - - -(23)	Transect line
97° 07' 30" , 32° 22' 30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{47}10^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 17
4700000 FT	5000-foot grid tick: Michigan State Plane South Coordinate System, 6401 zone (FIPSZONE 2113), Lambert Conformal Conic projection
HE0181 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 29, 2006

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

January 16, 2009 – to change Base Flood Elevations, and Special Flood Hazard Areas and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0553G

FIRM
FLOOD INSURANCE RATE MAP

OAKLAND COUNTY, MICHIGAN
(ALL JURISDICTIONS)

PANEL 553 OF 704
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TROY, CITY OF	260180	0553	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26125C0553G

MAP REVISED
JANUARY 16, 2009

Federal Emergency Management Agency

CMA DESIGN SERVICES
Phone: (586) 726-1043 Fax: (586) 726-6609
P.O. Box 183392, Shelby Township, Michigan 48318

KALAJIAN
ARCHITECTURE & DESIGN LLC

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26

BETHESDA ROMANIAN PENTECOSTAL

FEMA FIRM MAP

PAGE:
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NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all the areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevationstable in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary if Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Michigan State Plane South zone 6401 (FIPSZONE 2113). The **horizontal datum** was NAD83. Differences in datum, spheroid, projection or state plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information about the **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at http://www.ngs.noaa.gov.

Base Map information shown on this FIRM was derived from the Oakland County GIS Department from photography dated September 2002 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

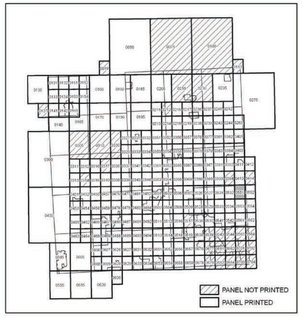
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

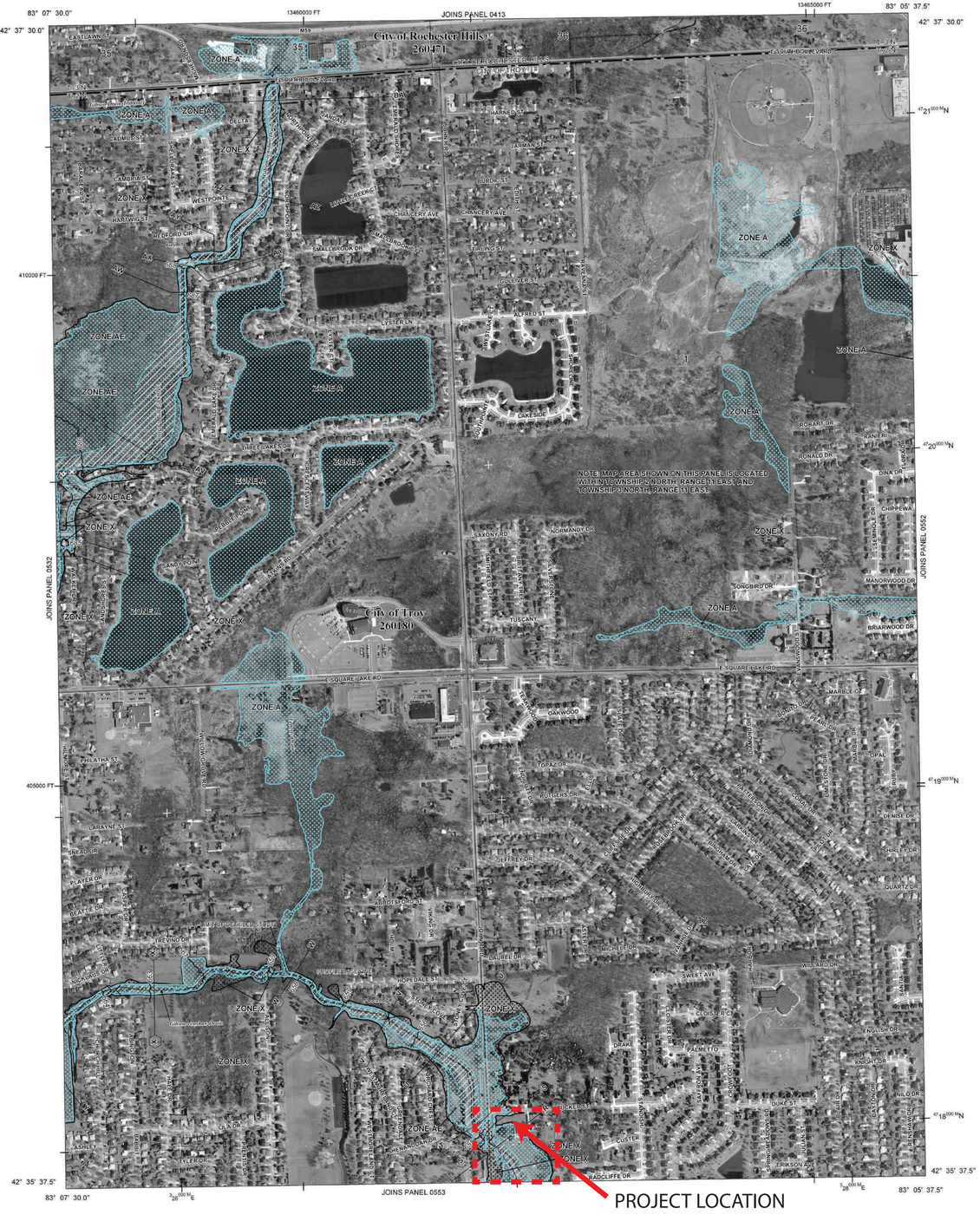
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and their website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The **profile base lines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result if improved topographic data, the **profile base line** in some cases may deviate significantly from the channel centerline or appear outside the SFHA.

PANEL INDEX





LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100 year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside of the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 (EL 10) — Base Flood Elevation line and value; elevation in feet* / Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A: Cross section line
- 23 — 23: Transect line
- 97° 07' 30", 32° 22' 30": Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4710 000 N: 1000-meter Universal Transverse Mercator grid values, zone 17
- 4700000 FT: 5000-foot grid tick: Michigan State Plane South Coordinate System, 6401 zone (FIPSZONE 2113), Lambert Conformal Conic projection
- HE0181 ×: Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5: River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 29, 2006

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0551F

FIRM
FLOOD INSURANCE RATE MAP

OAKLAND COUNTY, MICHIGAN
(ALL JURISDICTIONS)

PANEL 551 OF 704
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ROCHESTER HILLS, CITY OF	260471	0551	F
TROY, CITY OF	260180	0551	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26125C0551F

EFFECTIVE DATE
SEPTEMBER 29, 2006

Federal Emergency Management Agency

CMA DESIGN SERVICES
Phone: (586) 726-1043 Fax: (586) 726-4409
P.O. Box 183992, Shelby Township, Michigan 48318

KALAJIAN ARCHITECTURE & DESIGN LLC

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26

BETHESDA ROMANIAN PENTECOSTAL

FEMA FIRM MAP

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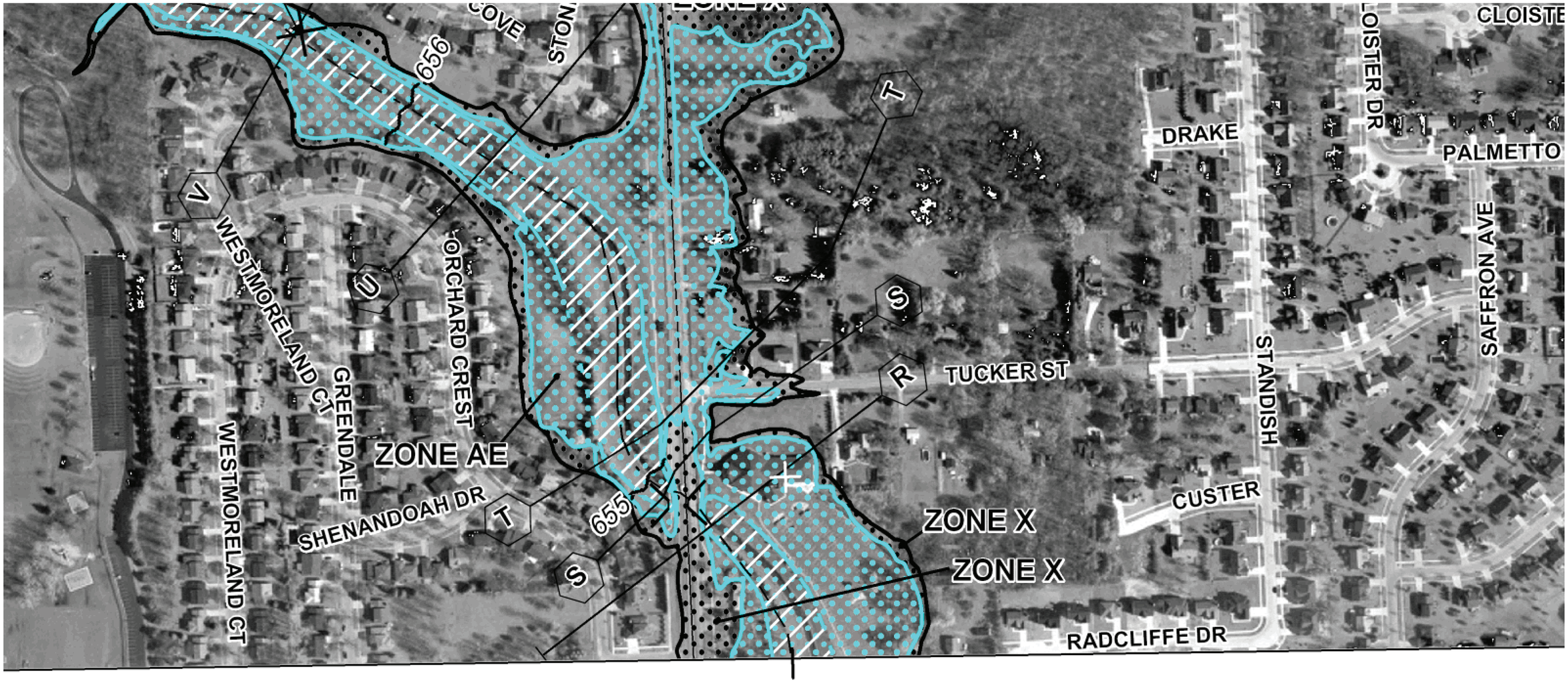


JOINS PANEL 0553

CMA DESIGN SERVICES
Phone: (586) 726-1043 Fax: (586) 726-4409
P.O. Box 183392, Shelby Township, Michigan 48318

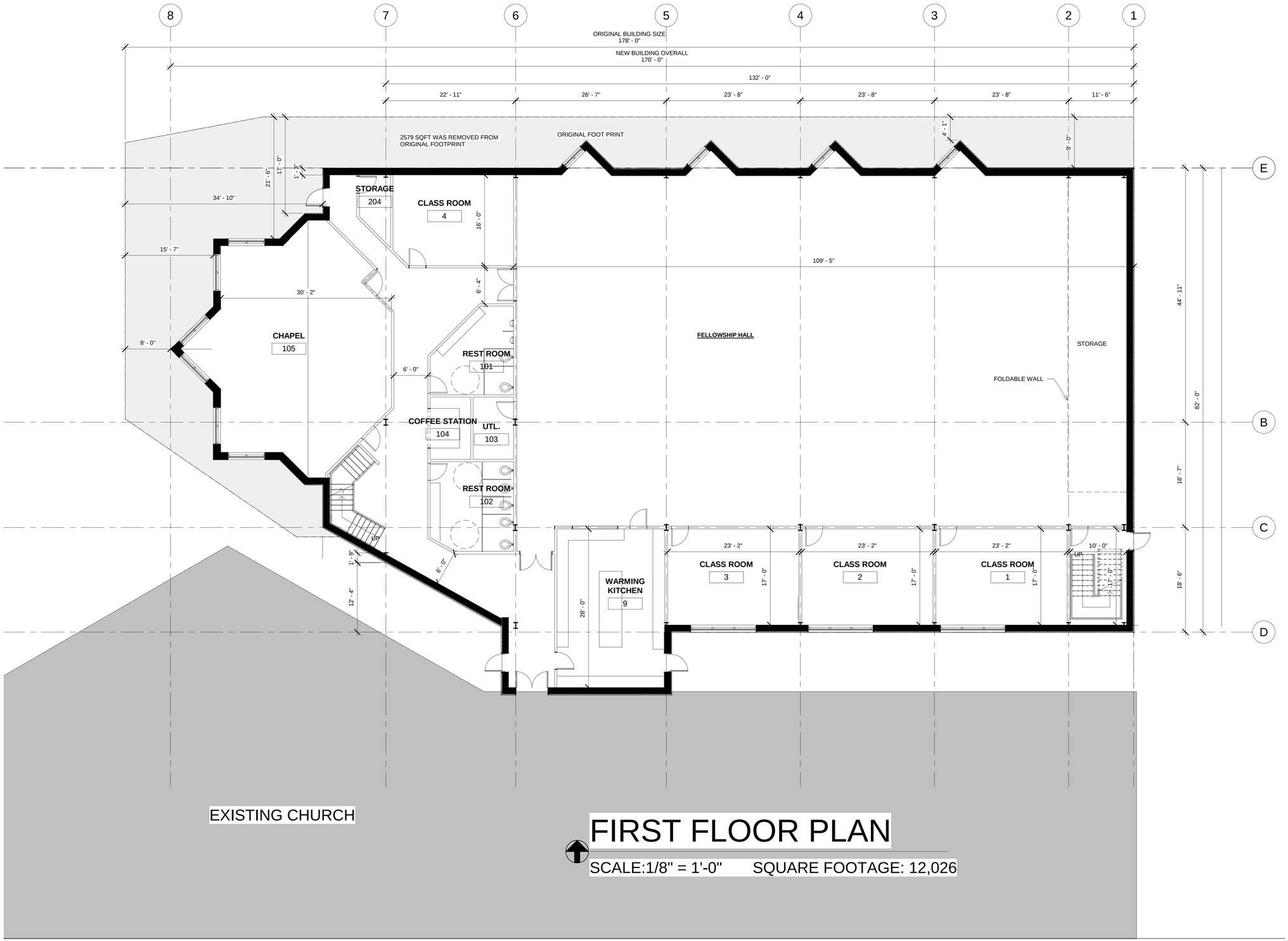
KALAJIAN ARCHITECTURE & DESIGN LLC

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26

BETHESDA ROMANIAN PENTECOSTAL

FEMA CLOSE UP

PAGE:
F-3



EXISTING CHURCH

FIRST FLOOR PLAN

SCALE:1/8" = 1'-0" SQUARE FOOTAGE: 12,026

GENERAL STATEMENTS/NOTES:

-ALL LANDSCAPED AREAS SHALL BE AUTOMATICALLY IRRIGATED.
-ALL LIGHTING ON THE SITE SHALL BE SHIELDED AND NOT ENCROACH UPON ABUTTING PROPERTIES OR RIGHT-OF-WAYS.

PROPERTY INFORMATION

PARCEL NUMBER: 88-20-12-351-037
FRONTAGE: 7.54 ACRES
ACREAGE: 7.54 ACRES
LEGAL DESCRIPTION:
T2N, R11E, SEC 12 EYSTER'S JOHN R ACRES SUB LOT 5 ALSO LOT 15 EXC N 250 FT OF LOT 16 4-13-98 FR013, 028, 032 TO 034
NEIGHBORHOOD CODE: XCHUR
ZONING: R-1C ONE FAMILY RESIDENTIAL

CMA DESIGN SERVICES
KALAJIAN ARCHITECTURE & DESIGN LLC

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26
CHURCH REVIEW	2019.07.17

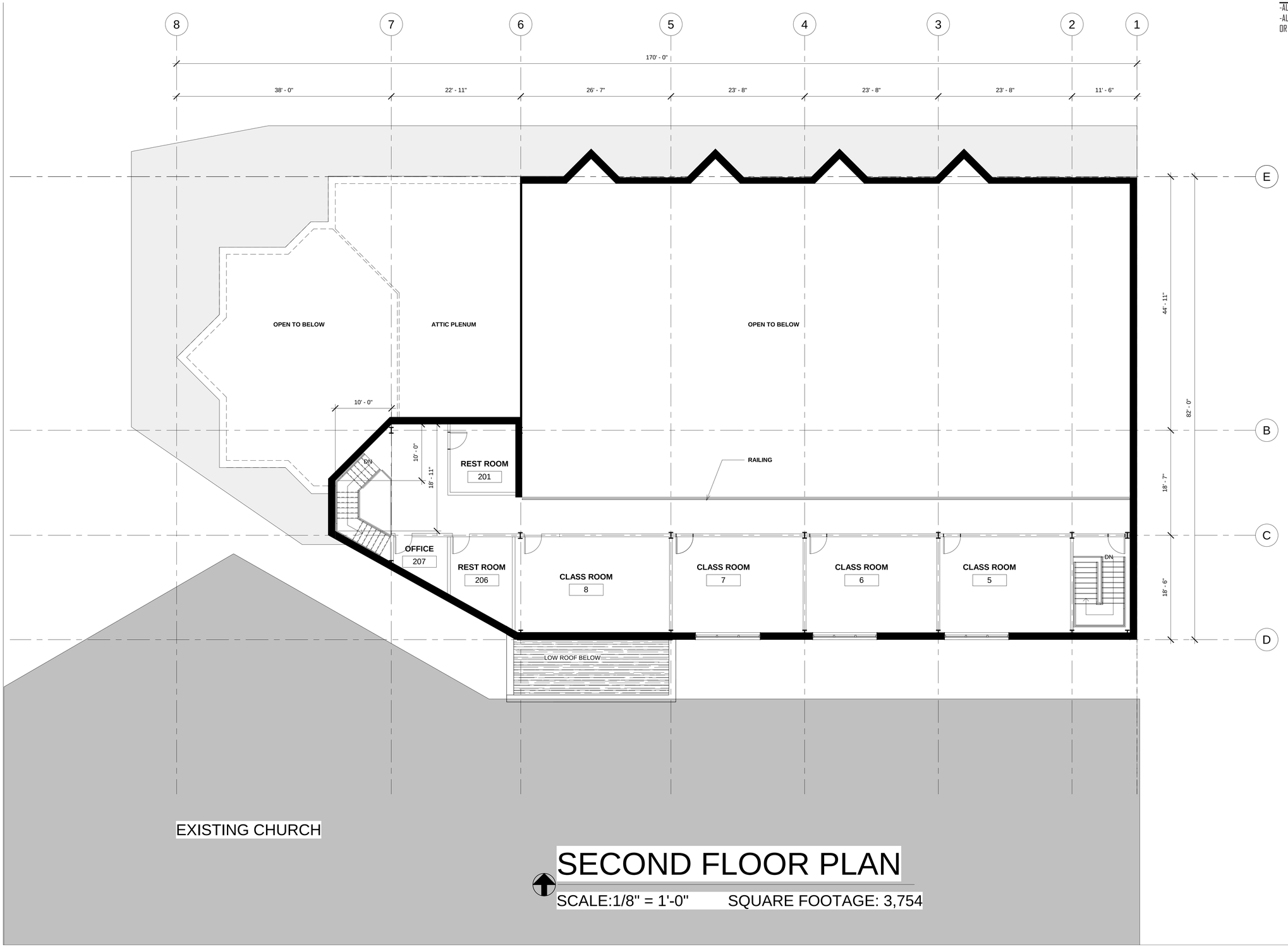
BETHESDA ROMANIAN PENTECOSTAL

FIRST FLOOR PLAN

PAGE:
A-2

GENERAL STATEMENTS/NOTES:

-ALL LANDSCAPED AREAS SHALL BE AUTOMATICALLY IRRIGATED.
-ALL LIGHTING ON THE SITE SHALL BE SHIELDED AND NOT ENCROACH UPON ABUTTING PROPERTIES OR RIGHT-OF-WAYS.



SECOND FLOOR PLAN

SCALE:1/8" = 1'-0" SQUARE FOOTAGE: 3,754

CMA DESIGN SERVICES
KALAJIAN ARCHITECTURE & DESIGN LLC

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26
CHURCH REVIEW	2019.07.17

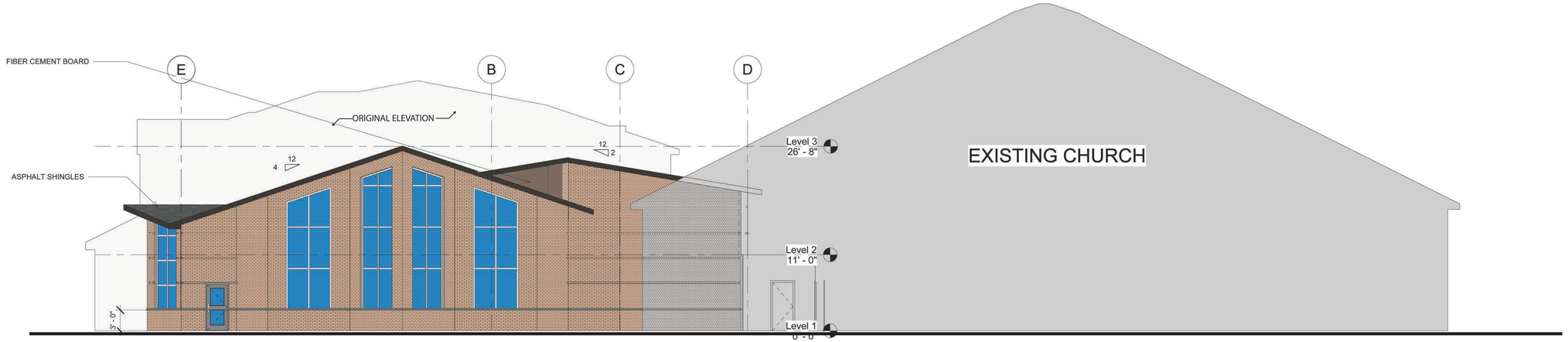
BETHESDA ROMANIAN PENTECOSTAL

SECOND FLOOR PLAN

PAGE:
A-2a

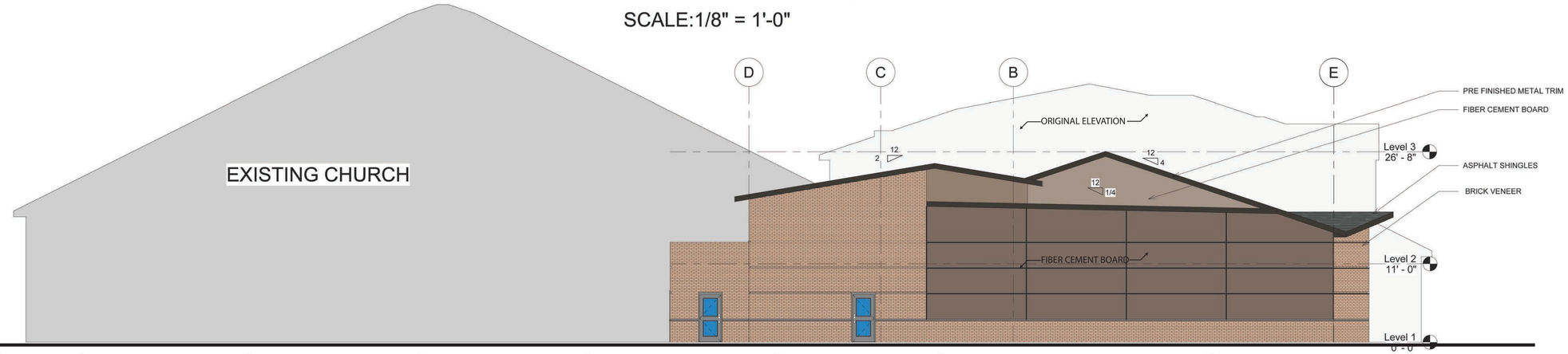
GENERAL STATEMENTS/NOTES:

-ALL LANDSCAPED AREAS SHALL BE AUTOMATICALLY IRRIGATED.
-ALL LIGHTING ON THE SITE SHALL BE SHIELDED AND NOT ENCROACH UPON ABUTTING PROPERTIES OR RIGHT-OF-WAYS.



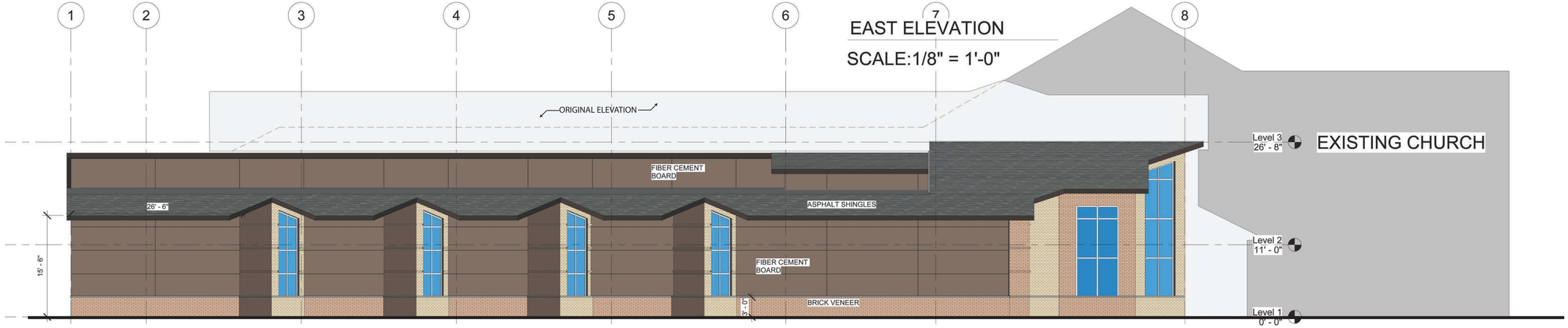
WEST ELEVATION

SCALE:1/8" = 1'-0"



EAST ELEVATION

SCALE:1/8" = 1'-0"



NORTH ELEVATION

SCALE:1/8" = 1'-0"

CMA DESIGN SERVICES
KALAJIAN ARCHITECTURE & DESIGN LLC

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26
CHURCH REVIEW	2019.07.17

BETHESDA ROMANIAN PENTECOSTAL

ELEVATIONS

EQUATIONS

TL = SPLs – SPLr + 10Log S/A

TL = Transmission Loss

SPLs = The average sound pressure level in the source room

SPLr =The average sound pressure level in the receiving room

S = The surface area of the partition

A = The absorption, in sabins, in the receive room

A = S α

A = Total absorption, Sabins

S= Surface Area, square feet or square meters

α = Absorption Coefficient

Common Variables

S= 110'-0" x 12'-0" = 1320 sqft.

SPLs = 95 dB the sound of a full orchestra

SPLr- 50 dB the average sound of a suburban area

Transmission Loss Through the Wall

A = S α

Using the coefficient of: Gypsum board ½", nailed to 2x4's, 15 in. o.c.

Actual Wall:

5/8" Gypsum board, screwed to 2x6's 18 ga. Metal studs, batt insulation, Dens Glass, vapor barrier 2" air gap, Brick veneer.

STC value of 56

R-Value 22.2

250Hz

A = S α

=1320 sqft x .08 = 105.6 sabins

500Hz

A = S α

= 1320 sqft x .05 =66 sabins

1000- 4000 Hz

A = S α

= 1320 sqft x .03= 39.6 sabins

Best case scenario using 1000-4000 Hz

TL = SPLs – SPLr + 10Log S/A

= 95dB – 50db +10log 1320sqft/39.6 sabins

=45 + 15.23

Loss of 60.23 dB

Worst case scenario using 250 Hz

TL = SPLs – SPLr + 10Log S/A

=95dB – 50 dB + 10log 1320sqft/105.6 sabins

=45+10.97

=55.97 dB

Inverse Square Law

According to the inverse-square law, the intensity ratio for doubling of distance is $2^2 = 4$, and the corresponding decibel reduction is 10 log 4, or 6 dB

Starting dB

95dB -55.97dB= 39.03dB

$2^2 = 4$

39.03dB -6dB=33.03

$4^2 = 16$

33.03dB -6dB =27.03dB

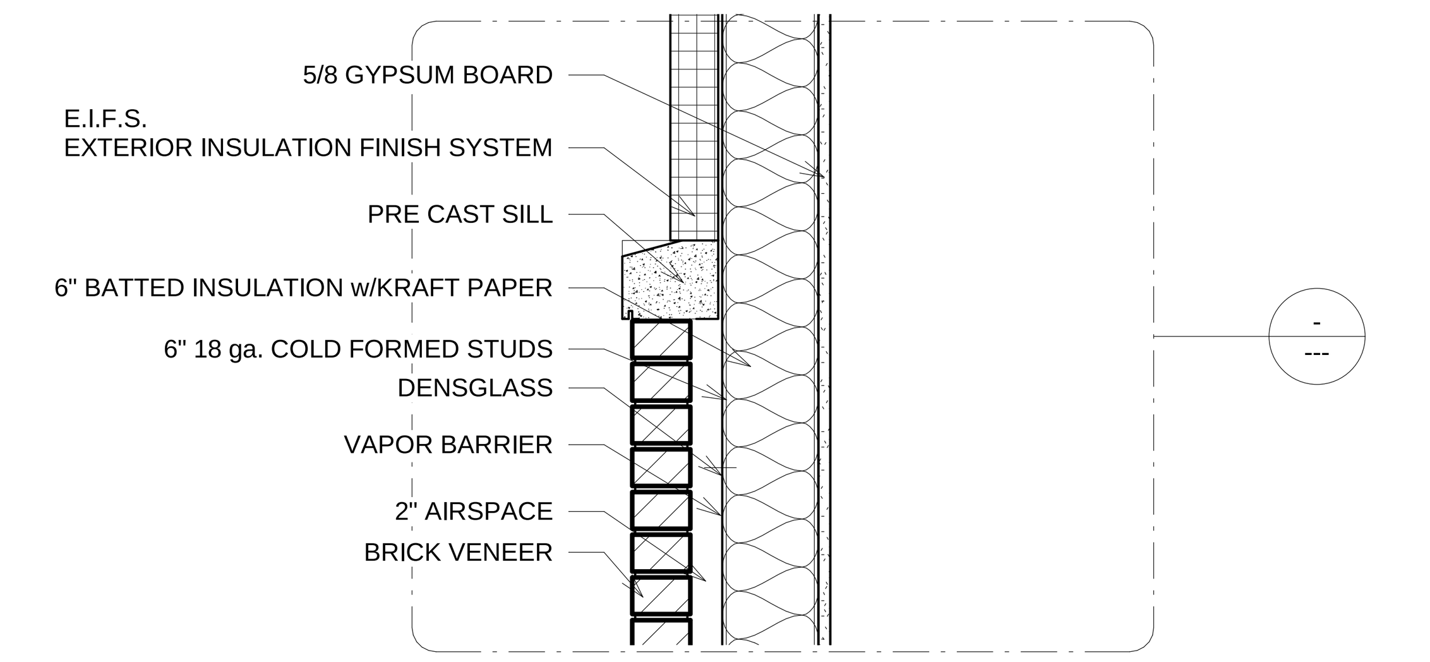
Even coming out of the building, the average background noise of a suburban area would be 50 resulting in not being able to hear the noise coming from the church. At 16'-0" you would not be able to hear the church in a rural area

Resources: Source: Mechanical and Electrical Equipment for Buildings.

APPARENT LOUDNESS	EXAMPLES	dB(DECIBLE)
DEAFENINING	JET AIRCRAFT	140 dB
DEAFENINING	THRESHOLD OF FEELING	130 dB
VERY LOUD	THUNDER	120 dB
VERY LOUD	SUBWAY TRAIN	110 dB
VERY LOUD	NOISY INDUSTRIAL PLANT	100 dB
* VERY LOUD	BAND	95 dB
VERY LOUD	LOUD STREET NOISES	90 dB
VERY LOUD	VACUUM CLEANER	80 dB
LOUD	AVERAGE STREET NOISE	70 dB
LOUD	AVERAGE OFFICE	60 dB
MODERATE	2-PERSON CONVERSATION	50 dB
MODERATE	PRIVATE OFFICE	40 dB
FAINT	BEDROOM	30 dB
* FAINT	NOISE AT SIDEWALK	21.97 dB
FAINT	RUSTLING LEAVES	20 dB
VERY FAINT	NORMAL BREATHING	10 dB

*DEPICTS SOUND FROM ACOUSTIC STUDY

SOURCE: "SOUND CONTROL CONSTRUCTION"
2ND EDITION-PRINCIPALS AND PERFORMANCE BY UNITED STATES GYPSUM

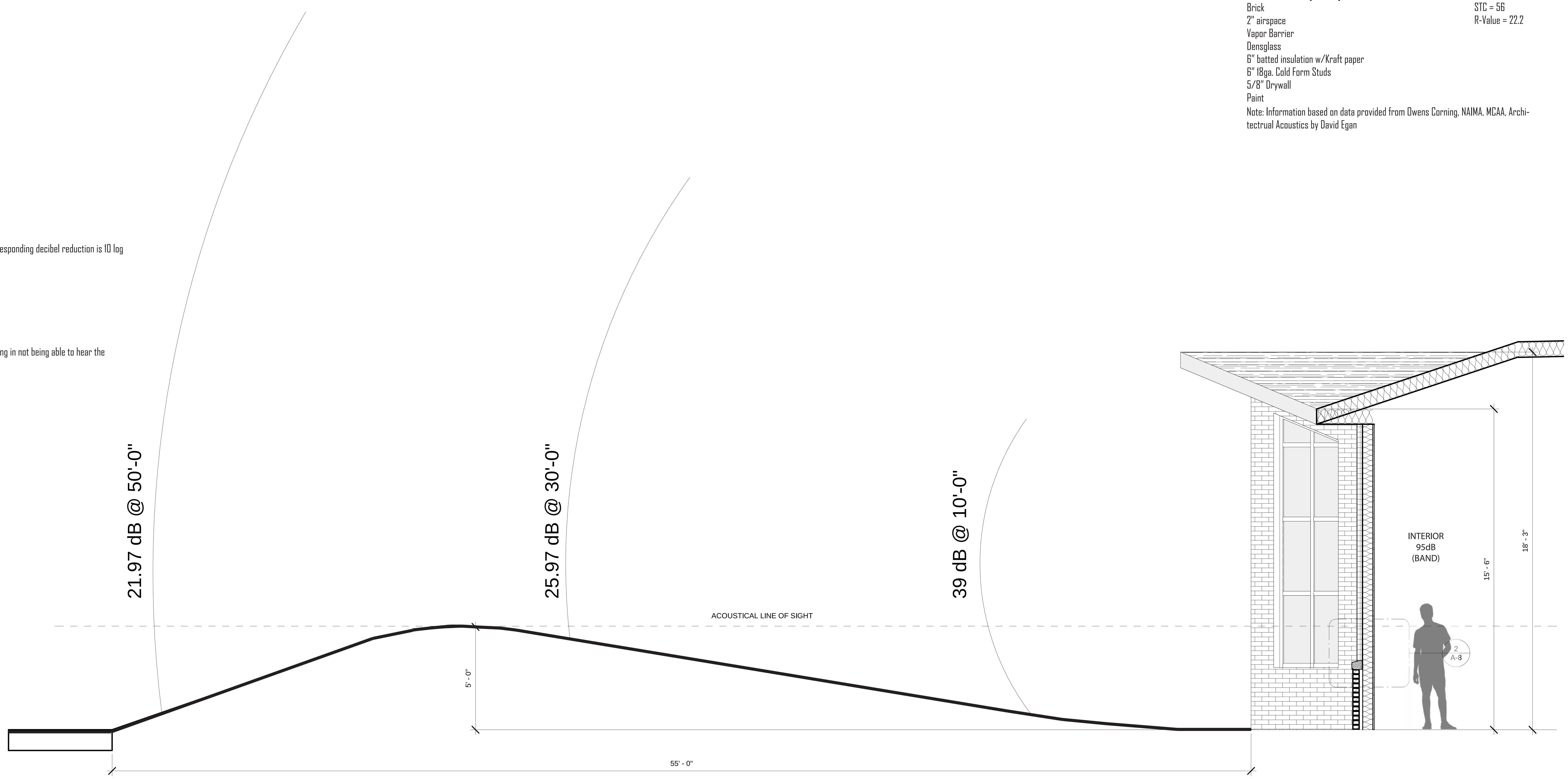


Wall Assembly Analysis

Brick
2" airspace
Vapor Barrier
Densglass
6" batted insulation w/Kraft paper
6" 18ga. Cold Form Studs
5/8" Drywall
Paint

STC = 56
R-Value = 22.2

Note: Information based on data provided from Owens Corning, NAIMA, MCAA, Architectrual Acoustics by David Egan



ACOUSTIC STUDY

SCALE: 3/8" = 1'-0"

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26
CHURCH REVIEW	2019.07.17

CMA DESIGN SERVICES

KALAJIAN ARCHITECTURE & DESIGN LLC

BETHESDA ROMANIAN PENTECOSTAL

ACOUSTICS

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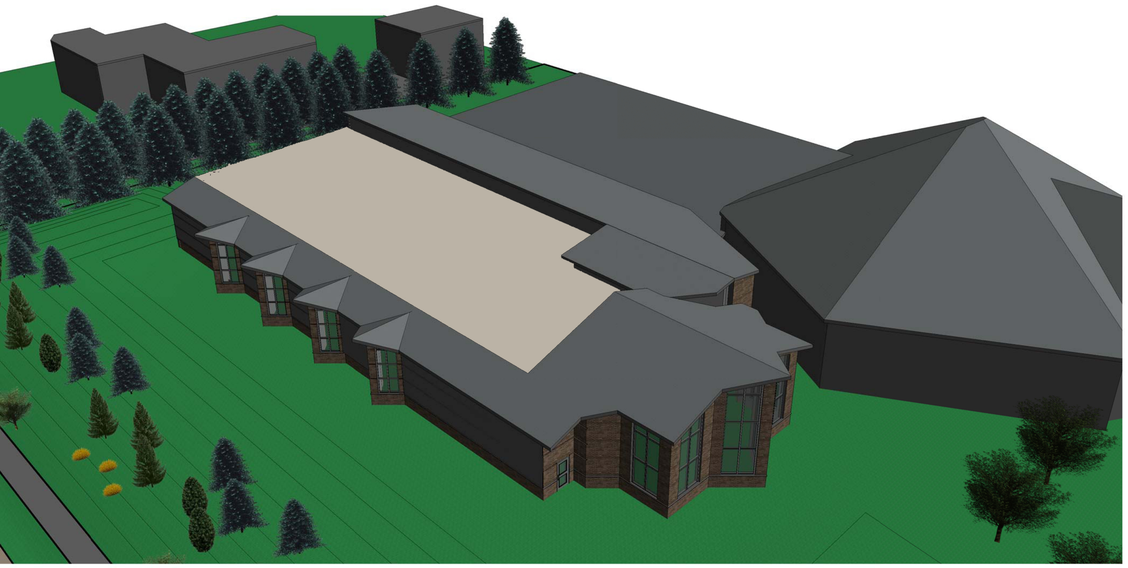
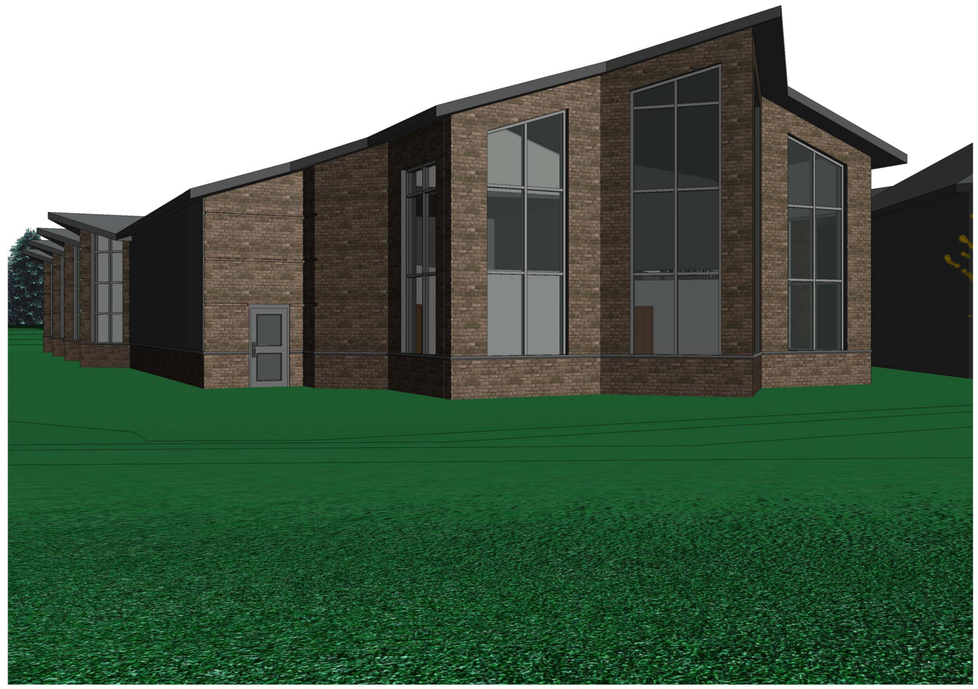
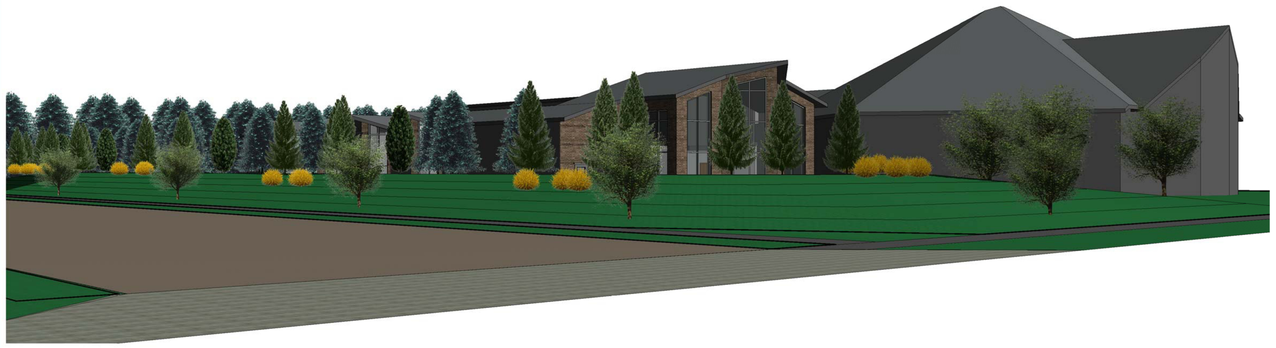


NORTH WEST AERIAL



WEST PERSPECTIVE

NORTH EAST AERIAL



PERSPECTIVE FROM JON R. & TUCKER

CMA DESIGN SERVICES

KALAJIAN ARCHITECTURE & DESIGN LLC

REVISIONS	DATE
PLANNING COMMISION SUBMISSION	2017.04.25
PLANNING COMMISION SUBMISSION	2017.07.25
PLANNING COMMISION SUBMISSION	2018.10.09
PLANNING COMMISION SUBMISSION	2019.02.26
CHURCH REVIEW	2019.07.17

BETHESDA ROMANIAN PENTECOSTAL

ISOMETRICS

D-Series Size 1
LED Wall Luminaire

Catalog Number

Notes

Type

Hit the Tab key or mouse over the page to see all interactive elements

d-series

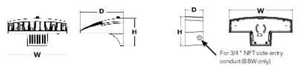
Specifications

Luminaire

Width: 13-3/4" (34.9 cm)
Weight: 12 lbs (5.4 kg)
Depth: 10" (25.4 cm)
Height: 6-3/8" (16.2 cm)

Back Box (BBW, ELCW)

Width: 13-3/4" (34.9 cm)
BBW Weight: 5 lbs (2.3 kg)
Depth: 4" (10.2 cm)
ELCW Weight: 10 lbs (4.5 kg)
Height: 6-3/8" (16.2 cm)



Introduction

The D-Series Wall luminaire is a stylish, fully integrated LED solution for building-mount applications. It features a sleek, modern design and is carefully engineered to provide long-lasting, energy-efficient lighting with a variety of optical and control options for customized performance.

With an expected service life of over 20 years of nighttime use and up to 74% in energy savings over comparable 250W metal halide luminaires, the D-Series Wall is a reliable, low-maintenance lighting solution that produces sites that are exceptionally illuminated.

Ordering Information

EXAMPLE: DSXW1 LED 20C 1000 40K T3M MVOLT DDBTXD

DSXW1 LED

Series	LEDs	Drive Current	Color temperature	Distribution	Voltage	Mounting	Control Options
DSXW1 LED	10C 10 LEDs (one engine)	350 350 mA	30K 3000K	T2S Type I Short	MVOLT [2]	**Shipped included**	**Shipped installed**
	20C 20 LEDs (two engines) [1]	530 530 mA	40K 4000K	T2M Type I Medium	120 [3]	(blank) Surface mounting bracket	PE Photoelectric cell, button type [4]
		700 700 mA	50K 5000K	T3S Type II Short	208 [3]	BBW Surface-mounted back box (for conduit entry) [5]	DMG 0-10V dimming driver (no controls; wires pulled outside fixture)
		1000 1000 mA (1A) [1]	AMBPC Amber phosphor converted	T3M Type II Medium	240 [3]		PIR 180° motion/ambient light sensor, <15 mtg ht [1,6]
				T4M Type IV Medium	277 [3]		PIRH 180° motion/ambient light sensor, 15-30 mtg ht [1,6]
				TFTM Forward Throw Medium	347 [10]		PIR1FC3V Motion/ambient sensor, 8-15 mounting height, ambient sensor enabled at 1fc [1,6]
				ASYDF Asymmetric diffuse	480 [10]		PIRH1FC3V Motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc [1,6]
							ELCW Emergency battery backup (includes external component enclosure), non CEC compliant [4]

Other Options		Shipped separately [9]		Finish (required)					
Shipped installed		BSW	Bird-deterrent spikes	DDBXD	Dark bronze	DSSXD	Sandstone	DWHGXD	Textured white
SF	Single fuse (120, 277 or 347V) [10]	WG	Wire guard	DBLXD	Black	DDBTXD	Textured dark bronze	DSTXD	Textured sandstone
DF	Double fuse (208, 240 or 480V) [10]	VG	Vandal guard	DNAXD	Natural aluminum	DBLBXD	Textured black		
HS	House-side shield [7]	DDL	Diffused drop lens	DWHXD	White	DNATXD	Textured natural aluminum		
SPD	Separate surge protection								

Accessories
Ordered and shipped separately.

DSXBRSS	Rear-side shield (one per light engine)
DSXBRSW	Bird-deterrent spikes
DSXWGA	Wire guard accessory
DSXWYVGA	Vandal guard accessory

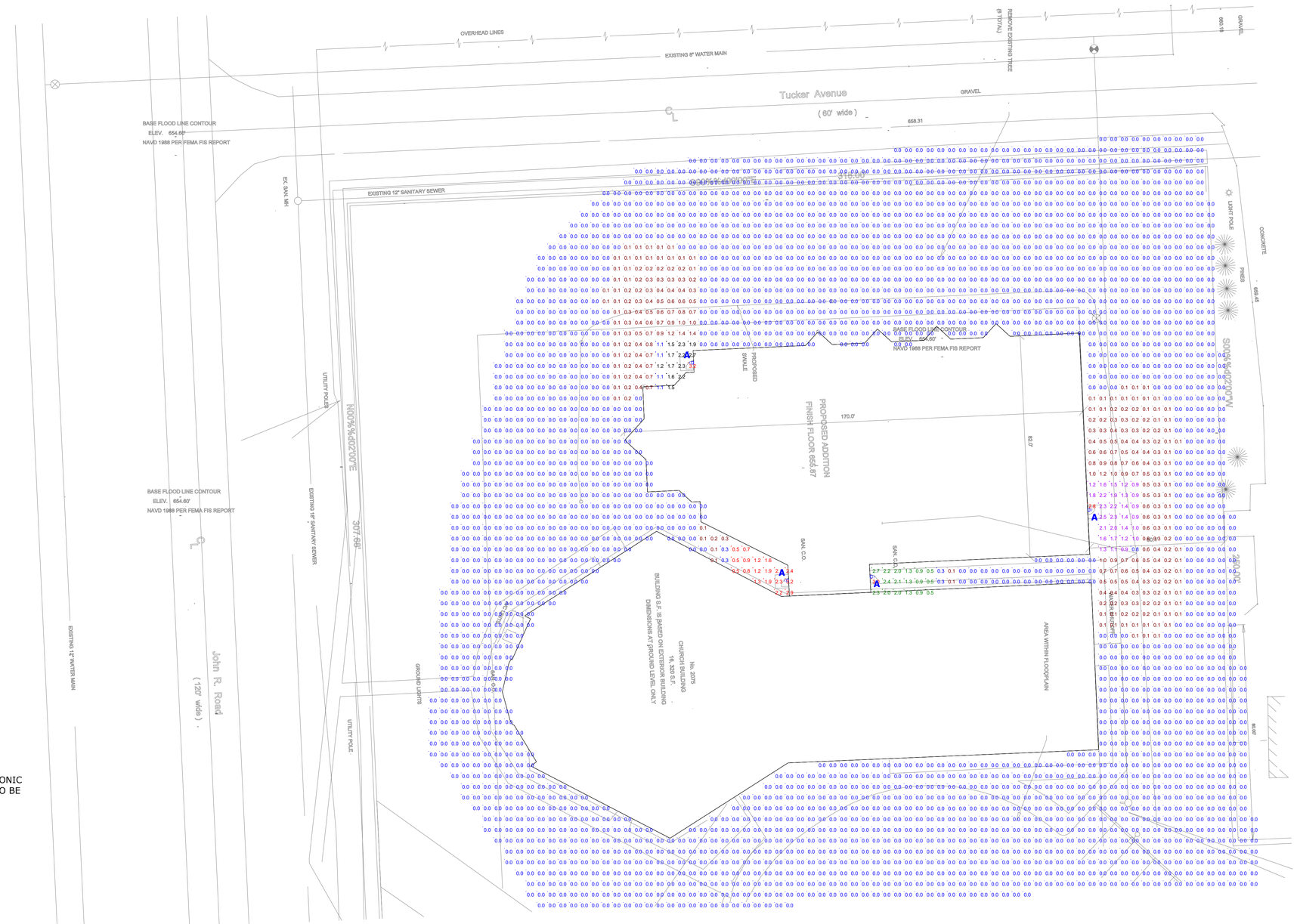
NOTES
1. 20C 1000lm not available with PIR, PIRH, PIR1FC3V or PIRH1FC3V.
2. MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
3. Single fuse (SF) requires 120, 277 or 347 voltage option. Double fuse (DF) requires 208, 240 or 480 voltage option.
4. Only available with 20C, 700mA, or 1000mA. Not available with PIR or PIRH.
5. Back box ships installed on fixture. Cannot be field installed. Cannot be ordered as an accessory.
6. Photocontrol (PE) requires 120, 208, 240, 277 or 347 voltage option. Not available with motion/ambient light sensors (PIR or PIRH).
7. Reference Motion Sensor table on page 3.
8. Cold weather (-20C) rated. Not compatible with conduit entry applications. Not available with BBW mounting option. Not available with fusing. Not available with 347 or 480 voltage options. Emergency components located in back box housing. Emergency mode IES files located on product page at www.lithonia.com.
9. Not available with ELCW.
10. Also available as a separate accessory; see Accessories information.

Schedule

Symbol	Label	QTY	Catalog Number	Description	Lamp	Number Lamps	Lumens per Lamp	LLF	Wattage	Mounting Height
	A	4	DSXW1 LED 10C 530 40K T3M MVOLT	DSXW1 LED WITH (1) 10 LED LIGHT ENGINES, TYPE T3M OPTIC, 4000K, @ 530mA.	LED	1	2159	0.9	19.1	9'-0"

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
ENTRANCE 1		1.5 fc	3.0 fc	0.3 fc	10.0:1	5.0:1	0.5:1
ENTRANCE 2		1.4 fc	3.2 fc	0.3 fc	10.7:1	4.7:1	0.4:1
ENTRANCE 3		1.8 fc	3.2 fc	1.1 fc	2.9:1	1.6:1	0.6:1
ENTRANCE 4		1.5 fc	2.8 fc	0.8 fc	3.5:1	1.9:1	0.5:1



Plan View
Scale - 1" = 20ft

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.

Drawing Note
THIS DRAWING WAS GENERATED FROM AN ELECTRONIC IMAGE FOR ESTIMATION PURPOSE ONLY. LAYOUT TO BE VERIFIED IN FIELD BY OTHERS.

General Note
1. SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
2. CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: 0' - 0"

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 DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRE MAY VARY DUE TO VARIATION 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.

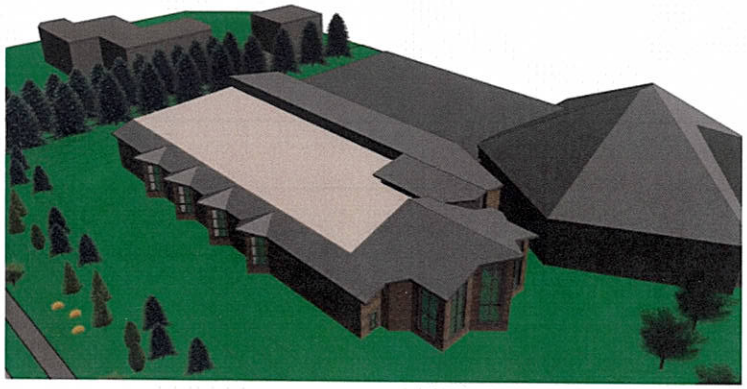
UNLESS EXEMPT, PROJECT MUST COMPLY WITH LIGHTING CONTROLS REQUIRMENTS DEFINED IN ASHRAE 90.1 2013. FOR SPECIFIC INFORMATION CONTACT GBA CONTROLS GROUP AT ASG@GASSERBUSH.COM OR 734-266-6705.

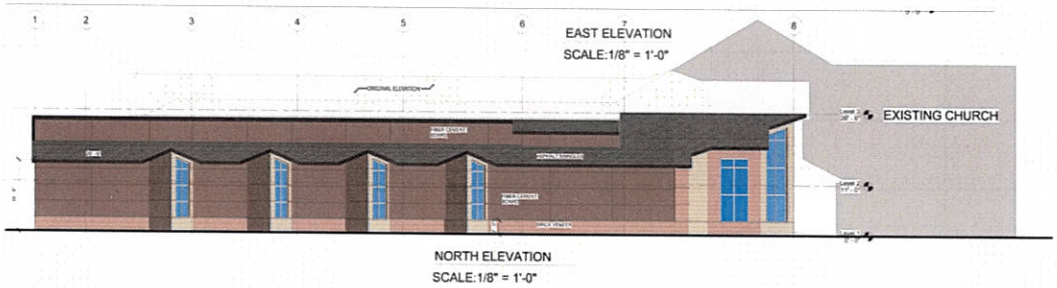
Ordering Note
FOR INQUIRIES CONTACT GASSER BUSH AT QUOTES@GASSERBUSH.COM OR 734-266-6705.

BRPC
PHOTOMETRIC SITE PLAN
PREPARED FOR: KALAJIAN ARCHITECTURE & DESIGN LLC.
GASSER BUSH ASSOCIATES
WWW.GASSERBUSH.COM

Designer	TV/KB
Date	11/7/2018 rev. 9/17/2019
Scale	Not to Scale
Drawing No.	#18-26263-V2

1 of 1



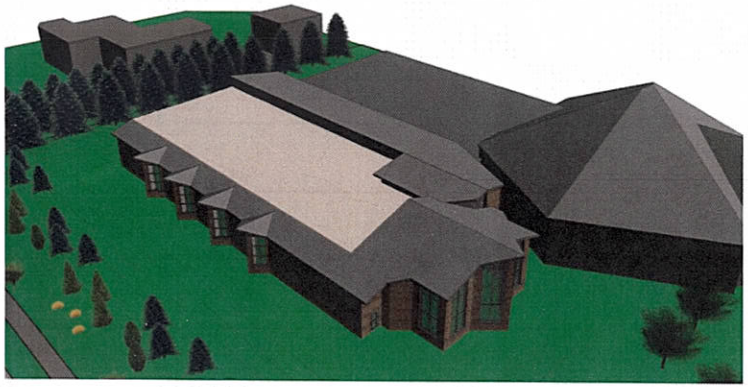


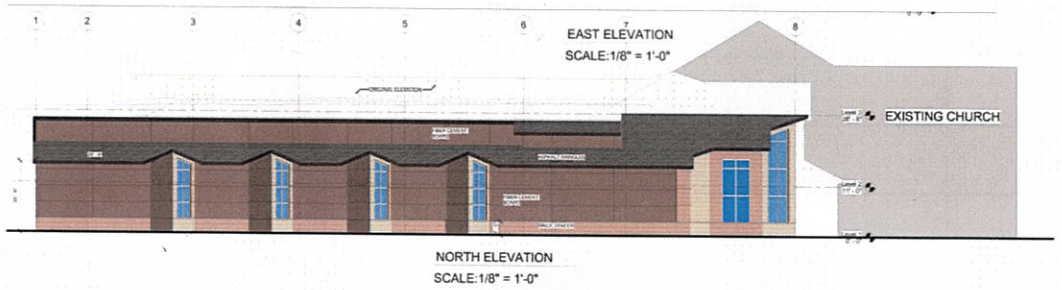
Petition to OPPOSE Bethesda Romanian Pentecostal Church Addition (Dated September 19, 2019)
Please sign below if you would OPPOSE this type of developmental in your residential neighborhood

Name	Address	Signature	Troy Home Owner
PRAVEEN KADALA	2150 Chaps Dr		Yes
Srinivas Alapati	2118 Chaps dr.		yes
Marcelo Bertocchi	2086 Chaps Dr.		Renting
Matteo DeSano	5012 John R Rd		Rent
Randall Stevens	5092 John R Rd	Randall R.	Yes
Ken Andreoni	2097 Tucker	KEN ANDREONI	YES
Sirisha Mishra	2023 Chaps Dr		Owner
Mike Lanham	2124 TUCKER DR.	MIKE LANHAM SR.	YES
Bokai Jin	2043 Tucker Dr.		YES
ALEXANDER TABOR	5280 JOHN R.	Alexander Tabor	YES
Daniela Sayl Bair	5041 Forest View	Bair	Yes

Petition to OPPOSE Bethesda Romanian Pentecostal Church Addition (Dated September 19, 2019)

Name	Address	Signature	Home Owner
Farook SALEEM	2015 Tucker	Farook Saleem	Yes
Julian Salem	2015 Tucker	Julian Salem	Yes
Judi MILIDRAG	5300 John R	Judi Milidrag	yes
BRIAN D. MILIDRAG	5300 JOHN R. RD	Brian	yes
MONICA HAUSNER	2071 Tucker Dr.	Monica Hausner	Yes
CHRISTOPHER HAUSNER	2071 TUCKER DR	Christopher Haus	Yes
karim Alhaidari	2088 Tucker Dr.		Yes
Lina Hashim	2088 Tucker Dr.		yes
Thomas Scheuer	2248 Tucker Dr		yes
Tracy Scheuer	2248 Tucker Dr.	Tracy Scheuer	Yes
Jean Maikrzek	2322 Tucker Dr.	Jean Maikrzek	yes
Rick Churay	2338 Tucker	Richard R Churay	Yes
JAMES White	2242 TUCKER	James T. White	Yes
Doreen Nash	2325 Tucker	Doreen Nash	yes
FRANK FARON	2317 TUCKER		YES
VINCE WATSON	2262 TUCKER Dr		YES
Michael VEGGIAN	2155 TUCKER DR	M Veggian	YES
BRUNO VEGGIAN	2119 TUCKER DR	B Veggian	YES
Jianmei Wu	5111 Forest View Dr. Troy MI 48085		Yes
Tingting Quan	5097 Forest View Dr. Troy, MI. 48085		Yes
~~Shahin Mohammad~~	~~5063 Forest View Dr Troy~~ 48085		Yes
A R Ghumi	5069 Forest view Dr Troy		Yes
Yaging Hou	5055 forest view Dr Troy		Yes
Sylvia Hermiz	5028 Forest View Dr. Troy		Yes
PATRICK SMITH	2234 TUCKER		Yes
SANDRA ANDREONI	2097 TUCKER	SM Andreoni	YES
ELAINE M. WOLF	2150 Tucker	Elaine M. Wolf	Yes





Petition to OPPOSE Bethesda Romanian Pentecostal Church Addition (Dated September 19, 2019)
Please sign below if you would OPPOSE this type of developmental in your residential neighborhood

Name	Address	Signature	Troy Home Owner
Kathryn Mouton	3431 Tothill Drive, 48084		Yes
Brandon Preblish	4628 Argyle Dr 48085		yes
Richard Tellatti	4056 Middlebury 48085		yes
Rita Mecoli	5088 Shady Creek 48085	Rita Mecoli	yes
Richard Powell	5088 Shady Creek 48085		yes
Rachana Mallempati	2039 Chaps Dr.		Yes
Yeelin Tan	2055 Chaps Dr		Yes
Saradha Ramalingam	2119 chaps dr		yes
SRINIVAS. TALLURI	2182 chaps Dr		yes
SIVA. Kanthamani	2166 Chaps Dr		Yes.

From:	Mary Stockdale
To:	Planning
Subject:	rezoning of #88-20-03-278-027
Date:	Monday, October 7, 2019 2:33:04 PM

Attention to the Planning Commission,

Since we live on De Etta, we want to bring to your attention the difficulty we have at leaving the street. We do have a street light but it seems its for the church's discretion when it works. It is a nightmare to try to turn left off the street, either due to the church having services or when they let out, heavy traffic, or just the oddity of the traffic flow. I'm surprised at the number of cars I have seen STOP at the yellow flashing light. Since we are a dead end street, we are forced to deal with this headache. Now you want to rezone for an office district. We don't know what added grief that's going to add to this congestion but do want you to know that we don't want any outlet onto De Etta.

Thank you

Dennis and Mary Stockdale
964 De Etta

From:	Monica Hausner
To:	Planning
Subject:	Fwd: Please Read - Opposition to Bethesda Development
Date:	Monday, November 11, 2019 3:16:18 PM
Attachments:	image.png image.png image.png Bethesda Church Opposition Petition_November 2019.pdf

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---------- Forwarded message ---------
From: **Monica Hausner** <mhausner2@gmail.com>
Date: Mon, Nov 11, 2019 at 3:08 PM
Subject: Please Read - Opposition to Bethesda Development
To: Monica Hausner <mhausner2@gmail.com>

Dear Troy Planning Commission,

I am writing to express my opposition to the September 19, 2019 Bethesda Romanian proposed expansion in our residential neighborhood for the following reasons:

1) **NOT Compatible with Adjacent Uses**

The proposed addition is still NOT constructed in a manner that is harmonious with the character of the adjacent property and the surrounding areas.

- **Massive size** (**15,789 square feet & 170 feet long**) compared to the residential homes. **Residents could not build this type of structure**.
    - **Very minimal reduction (2,600 sq. ft.) in size from April 2019 submission**
    - The reduction in classrooms was simply replaced by a chapel
    - The fellowship hall is just another name for the gym—it is the same size (109 ft. x 63 ft.)
- **Building will directly face the Tucker residents' front door**
- **Building looks and feels like a School** - Parishioners emailed me and said that the church wants to open a school at this building in the future
- **Low quality materials** - "Pre-manufactured" construction using cement board and faux brick
- **Setback Concerns** - The homes on the same side of the proposed addition will have a significant larger setback

2) **Noise, Lights and Hours of Operation Concerns**

- Residents surrounding the church complained about the noise
- Activities continue until 11pm or later on the weekends
- Residents on Forest View complained about the light pollution and lights on late at night

3) **Long History of Parking/Safety Concerns – How can the church be allowed to expand?**

Recent photos from November 3, 2019

4) **NOT Compatible with the Master Plan**

- **Loss of green space** – The master plan speaks to preservation of green space.

5) **Negative Impact on the Overall Environment & Neighborhood**

- The addition will **negatively affect the quality and natural features of Tucker** (i.e. reduction in green space) and **significantly change the look and feel of the residential neighborhood**.
- Proposed **tree plantings will take 10 years to mature, if they even survive**. The church has a history of over 20 years of not maintaining their property/landscaping (see pictures below).

There has been no maintenance of the trees for the past 20 years, yet the applicant provides beautiful "drawings" of the landscaping. Below are examples of the current landscaping.

6) **Concerns with the Church Renting the Facility**

The information below is from the Bethesda website: https://www.betezda.com/calendar/

"**To reserve any church facilities** please email us at: **betezdarpc@gmail.com**

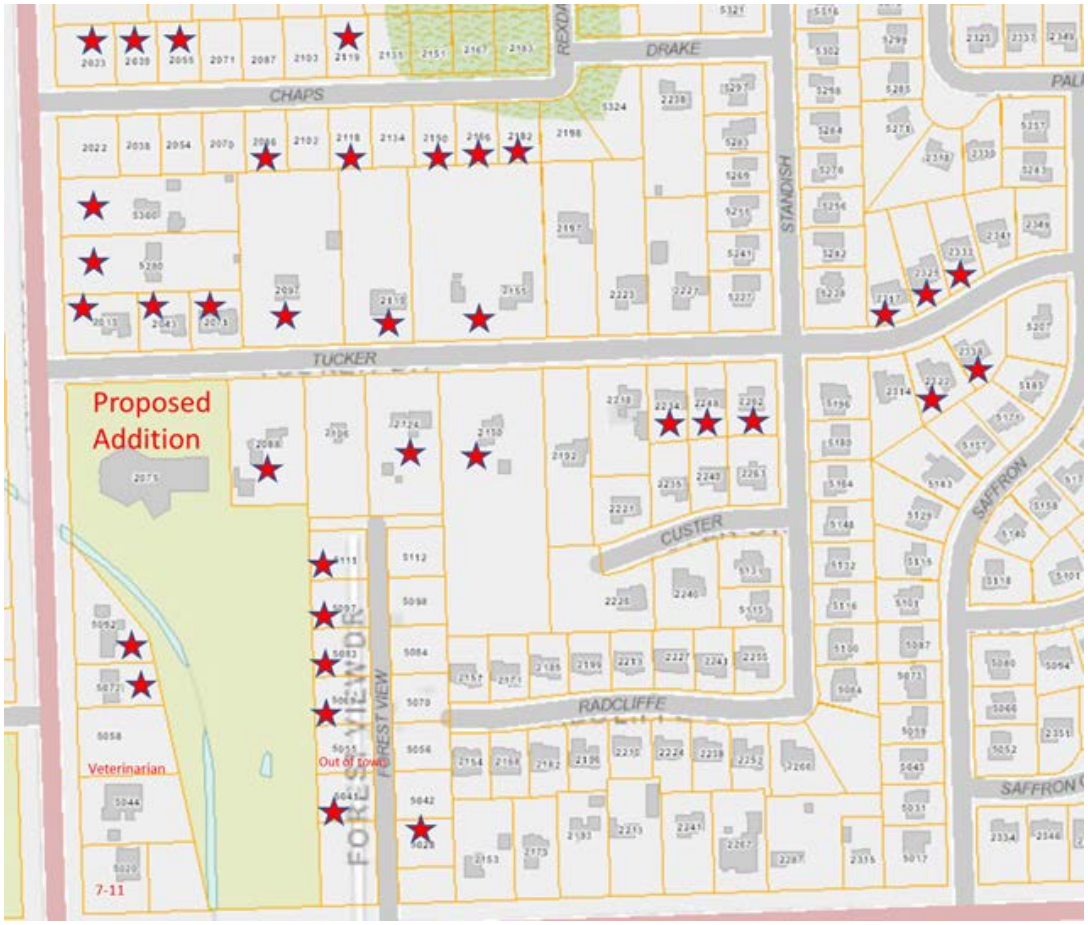
Please specify room(s) requested:
Sanctuary
Fellowship Hall
Upstairs Room(s)
Other

Date and Time

Thank you for reserving in advance, and please allow 24-48 hours for confirmation and approval."

Also, you can see the church already has a "Fellowship Hall" listed. Why is a second Fellowship Hall needed?

7) Residents surrounding the church **OPPOSE** the development as represented by the red stars below. Also, please see the attached petition with **47 signatures of the area residents opposing the development.**



8) **The Planning Commission should align with the newly Elected Mayor and City Council**

Below are the Mayor's and City Council's top goals:

- **Ethan Baker – "Preserve the character of our neighborhoods by balancing green space with smart, reasonable development"**
- **Edna Abrahim – "Ensure common sense development that preserves our neighborhood's character"**
- **Theresa Brooks – "Work to protect green spaces and respect our residents"**
- **Ann Erickson Gault – "Work to preserve our existing neighborhoods,**

support only developments that <u>fit within the character of those neighborhoods</u>”

Thank you for your support.

Kind regards,
Monica Hausner
2071 Tucker Dr.

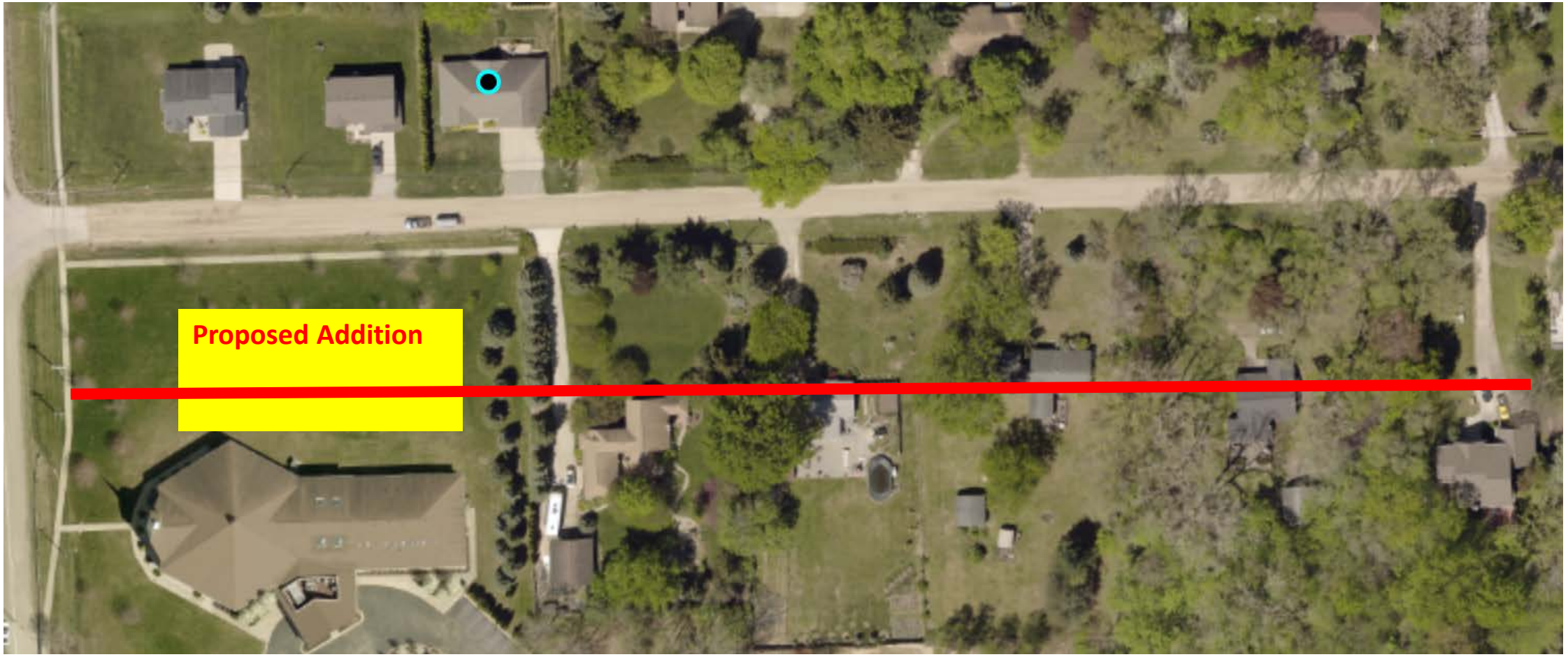
Residents Opposition to Bethesda Proposed Addition

November 26, 2019

Addition is Not Compatible with the Existing Homes & Master Plan

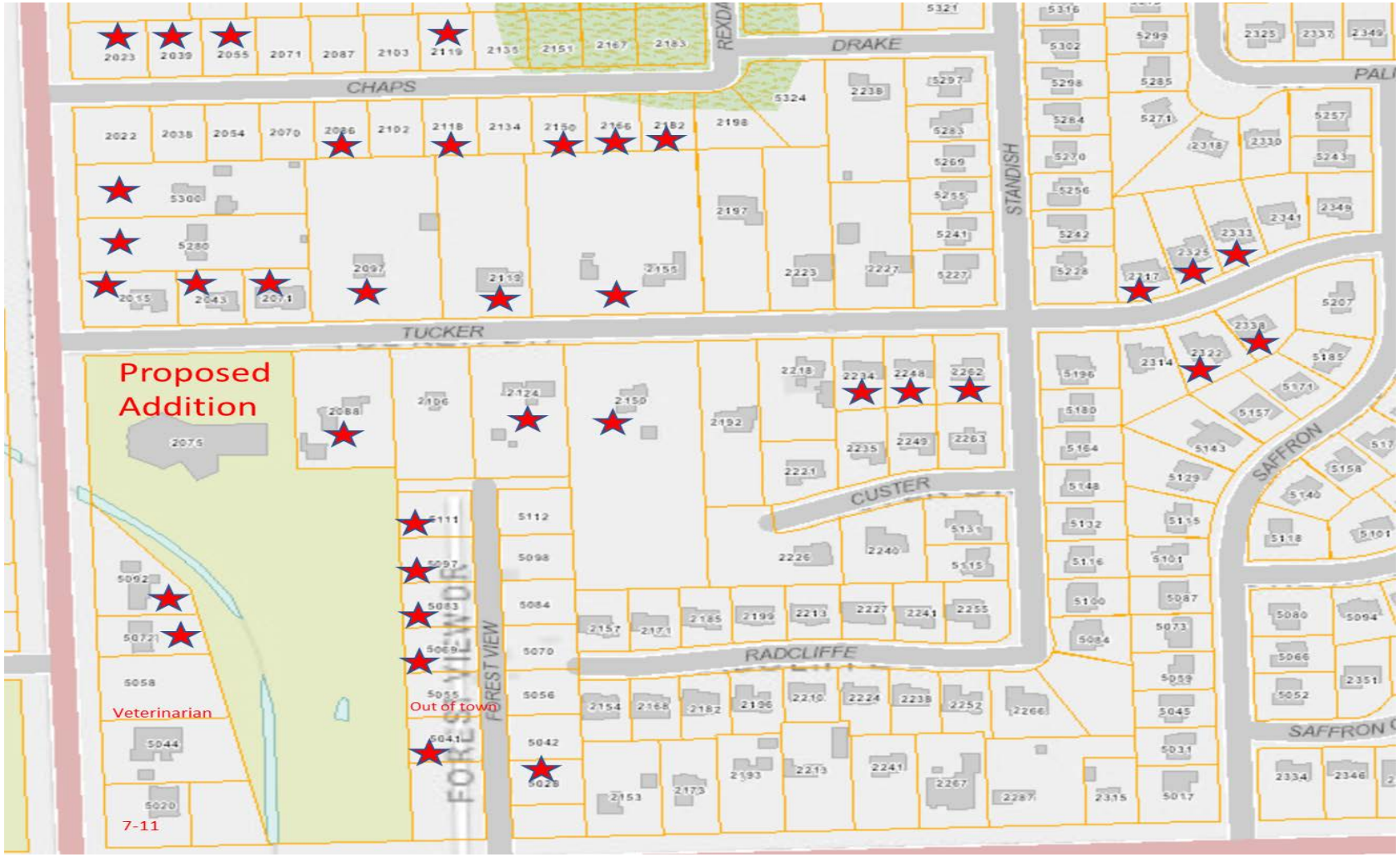
- **Massive size** (**15,789 square feet & 170 feet long**) compared to the residential homes. **Residents could not build this type of structure**.
  - **Very minimal reduction (2,600 sq. ft.) in size from April 2019 submission**
  - Reduction in classrooms was simply replaced by a chapel
  - Fellowship hall is just another name for the gym—same size (109 ft. x 63 ft.)
- **Building looks and feels like a School** - Parishioners informed me that the church wants to open a school at this building
- **Low quality materials** - "Pre-manufactured" construction using cement board and faux brick
- **Significant loss of green space – The tenant of the Master Plan is the protection of single-family neighborhoods**

Addition Does Not Match the Setback of Existing Homes - Not Harmonious with Neighborhood



BUILDING MASS IS INCONSISTENT WITH THE ADJACENT PROPERTIES

Red stars represent surrounding Residents that signed a petition OPPOSING addition



History of Parking/Safety Concerns
Parking in Fire Lanes & Non-Designated Areas

PARKING IN THE FIRE LANES

Recent Parking/Safety Concerns

November 3, 2019

PARKING IN THE FIRE LANE

November 24, 2019

PARKING IN THE FIRE LANE

Renting Concerns
Church already has a Fellowship Hall (Per Website)

Below information is from the church's website:

- **To reserve any church facilities** please email us at: **betezdarpc@gmail.com**
- Please specify room(s) requested:
  Sanctuary
  Fellowship Hall
  Upstairs Room(s)
  Other

  Date and Time

Thank you for reserving in advance, and please allow 24-48 hours for confirmation and approval.

NO MAINTENANCE ON TREES FOR THE PAST 20 YEARS

Current Tree in Front of Church

New Spring 2019 Planting

Weeds already growing with the new plantings

Concerns with Current Noise, Lights & Hours of Operation

- Residents surrounding the church complained about the current noise late into the night and the light pollution
- On weekends, activities can continue until 11pm or later

Planning Commission Needs to Align with Newly Elected Mayor & City Council's Top Goals

- **Ethan Baker – "Preserve the character of our neighborhoods by balancing green space with smart, reasonable development"**
- **Edna Abrahim – "Ensure common sense development that preserves our neighborhood's character"**
- **Theresa Brooks – "Work to protect green spaces and respect our residents"**
- **Ann Erickson Gault – "Work to preserve our existing neighborhoods, support only developments that fit within the character of those neighborhoods"**

(Source: *Troy Times* – October 24, 2019 & October 31, 2019)

OPPOSE for the following reasons:

- Building massing is inconsistent with the character of adjacent properties
- A tenet of the Master Plan is the protection of single-family neighborhoods
- Proposed addition is not compatible with the existing homes on Tucker
- Proposed addition does unreasonably impact the quality of the neighborhood on Tucker

2075 E. Long Lake Rd., Troy, MI 48085
248-7507407

November 25, 2019

To the City of Troy, Planning Commission,

Attention: R. Brent Savidant
Community Development Director

As members of the Bethesda RP Church, we were taken aback by your presentation of an email that was purported to have been submitted anonymously by someone who claimed to be a member of the church. That letter, although it was submitted anonymously, was presented at the last meeting, on the overhead screen, to create the impression that members of our church do not support the project at issue.

As a result, the church leadership took a brief survey of our membership and confirmed, what we already knew, that the project at issue has overwhelming support from our membership. This support is evidenced by the signatures on the attached petition. More than half of those signatures are from Troy residents who would like to see this project move forward.

We ask that this letter and the attached petition be added to the file and taken into consideration at the public hearing scheduled for November 26th, 2019.

Respectfully submitted,

Bethesda Church Administrative Board

List with residents of Troy who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd. Troy, MI 48085 to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
Benjamin Baraiac	3395 Kilmer TROY mi 48083	
ARPAD G. MADO	304 BELLAVENUE. TROY MI. 48085	
Adina Baraiac	3395 Kilmer TROY MI 48083	
Lacramioara Silaghi	3027 Waterfall Dr Troy MI 48083	
Loredana Pop	3105 Talbot Dr, Troy MI 48083	
DAN CIMPAN	16680 AKCREST DR, TROY, MI, 48083	
CORNEL DRĂGOI	1923 Kirkton Dr. Troy, MI 48083	
ADRIANA DRAGOI	1923 Kirkton Dr. MI 48083	
JOHN TRIPOLY	1880 MILVERTON TROY MI 48083	
ANA TRIPON	1880 Milverton dr. TROY MI 48083	
PETRU LUPAS	2197 TUCKER dr TROY MI 48085	
CORNELIA LUPAS	2197 TUCKER DR TROY MI 48085	
DOINA IANCHIS	2197 BURDIC DR. TROY MI 48085	
VICTOR IANCHIS	2197 BURDIC DR. TROY MI 48085	
[redacted]	[redacted]	
CECILIA VARVARA	73 Forthton dr. TROY MI 48084	
DANIEL GEORGIU	1117 GLASER DR, TROY, MI 48085	
AMELIA GEORGIU	1117 GLASER DR, TROY, MI 48085	
Gherghina Stanciu	111 xx Mahan Ave. Hazel Park MI 48030	
Gabriel Ardelean	4011 Butternut Hill Troy MI 48098	

List with residents of Troy who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd. Troy, MI 48085 to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
Laura Ardelean	4105 Butternut Hill Troy MI. 48098	
DAN SILAGHI	3027 WATERFALL DR. TROY MI 48083	
DANIEL TAT	850 Barbara TROY. MI. 48084	
DORINA SILAGHI	3027 WATERFALL DR., TROY, MI 48083	
GAVRIL SILAGHI	3027 WATERFALL DR, TROY, MI 48083	
MARIANA LASC	5690 Houghton Dr. Troy Mi- 48098	
LIVIU ARTIC	4059 Gateslord Circle Dr MI 48085	
Luciana & Camelia Petrisor	4872 Alton Dr. TROY MI 48085	
DUMITRU MANCI	2391 CASTLETON TROY MI 48083	
OLIMPIA XAHA	2391 Castleton Troy MI. 4803	
DANIEL MURZA	2218 TUCKER TROY, MI 48085	
LIGIA MURZA	2218 Tucker Troy MI 48085	
ELIZABETH MADO	304 GLENAVEN DR TROY MI. 48085	
PETRU POP	3105 TALBOT AV TROY MI 48083	
Elisabeta POP	3105 TALBOT AR TROY MI 48083	
MARIA MORARU	1781 Castleton DR TROY MI 48083	
Victor MORARU	1781 Castleton DR TROY MI 48083	
Mariana Galan	3435 KILMER TROY MI 48083	
Vasile Galan	3435 KILMER TROY MI 48083	

List with residents of Troy who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd. Troy, MI 48085 to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
GABRIEL IOACHIMCIUC	1110 GLASER DRIVE, TROY 48085	
IOHN SERBAN	2727 CHESTERFIELD DR TROY	
LIDIA MARC	1807 NORTH LAKE DR, TROY	
DOREL MARC	1807 NORTH LAKE DR, TROY, MI	
~~ADRIAN IANCHIS~~		
Yuto Fukushima	2414 John Road Troy, MI	
Stefania Craseuc	41561 AEQUIVARE RD TROY 48085	
Ionut Tripon	1880 Milverton Dr Troy 48083	
Claudia Dumitrescu	6952 Solomon Ave. TROY. MI 48085	
FLORIN FILIMON	2840 CLAYTON DR TROY MI 48083	
~~GABRIEL ROS~~	~~100 RL~~	
MARCELA MUSCAS	1662 MILVERTON TROY MI 48083	
NICOLAE MUSCAS	1662 MILVERTON TROY MI 48083	Nicolae Muscas
Teodet Schwab	2743 Dover Dr. Troy MI 48083	
Silvia Swab	2743 Dover Dr Troy MI 48083	
Simina Tyiran	3465 Fernleigh Dr. Troy MI 48083	
Daniel P. Tyiran	3465 Fernleigh Dr. Troy, MI 48083	
ROMEO PELLE	2257 GOLFVIEW DR, APT. 201, TROY MI 48084	
RODICA PELLE	2257 Golfview, APT. 201, TROY, MI 48084	Rodica Pelle

List with residents of Troy who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd. Troy, MI 48085 to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
TEOFIL BARJUCA	2240 Custer Dr. Troy, MI 48085	
MARIA COZMA	6246 BROCKTON AVE MI. 48071	
GHEORGHE ROJU	2020 GABRIEL DR TROY MI 48083	
Renei Drasovean	953 Mucu Stv. Troy Mi 48084	
~~CRAINICEANU DARIUS~~	~~2239 LONGFELLOW AVE, ON, N9B 3Z7~~	WRONG SHEET
Gheorghe Ardelean	2757 Continental Troy MI 48083	
Cezica Grădianu	2315 Cumberland Dr. Troy MI 48085	
Dorin. Grădianu	2315 Cumberland Dr. Troy MI. 48085	
Florica Ardelean	2751 Continental Dr Troy MI 48083	
Bianca Hotca	Auburn Hills 4462	
EMANUELA BARJUCA	2240 CUSTER DR TROY MI 48085	
STEFAN MIHAC	3625 Crooks Rd. Troy, MI 48084	
GABI CRET	5245 WESTOREL AND TROY 48085	
NICOLAI IANOS	809 Hartland Dr Troy 48083	
Irene Ianos	809 Hartland Dr Troy MI 48083	
Cornelia Rascol	793 Hartland Dr Troy MI 48083	C. Rascol
Nicolai Rascol	793 Hartland Dr Troy MI 48083	N. Rascol

List with people who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd., Troy, MI 48085, to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
Julien Cohut	2350 E. NEWARK RD LAPEER Mi	
Michede Cohut	2350 E. NEWARK Rd LAPEER MI 48446	
Gabriela Cohut	12130 Jade Point, Sterling Hgts Mi 48312	
Nick Cohut	12130 Jade Point, Sterling Hgts, Mi 48312	
Daniel Marcu	2812 Hartline, Rochester Hills 48309	
Ruxanda Peret	2962 Walbridge Rd Rochester Hills 48307	
OLIMPIA CORNEANU	3450 Brookwood St. Shelby-Twp. MI. 48317	
Daniela Tecar	3926 Oak Knoll Rd. Waterford MI 48328	
GEORGE STAGOS	14514 ASHTON DR, SHELBY, 48315	
GAVRIL FILIMON	49378 DUNHILL DR. MACOMB. MI. 48044	
MARIUS FORGACIU	2060 CURTIS ADDISON TWP MI 48367	
Otilia Balint	2163 N. Rochester Oakland Twp MI. 48363	Otilia Balint
[redacted]		
Esther Chirodea	1801 N Rochester Rd	
DANIEL CHIRODEA	1801 N ROCHESTER RD	
Alin Forgaciu	24799 Glenwyrie Dr, Southfield, MI 48033	
Daniela Forgaciu	24799 Glenwyrie Dr, Southfield, MI 48033	
[redacted] SAMUEL CUBAS	4545 DUDLEY St Dearborn Hts. Mi 48125	
Florentin Ghita	620 E. Rowland Ave, Madison Heights	
Priscilla Ghita	620 E. Rowland Ave Madison-Height	
Jonathan Tita	3007 Belinda Dr Sterling Heights	

List with people who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd., Troy, MI 48085, to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
PETRU BALINT	2163 Rochester Oakland MI 48363	
Sanda Pantis	6556 Petillo ct Washington MI	
Lucian Pantis	6556 Petillo ct Washington MI	
Teofil Martinescul	49378 Dunhill Dr Macomb, MI 48044	
Andrei Petrea	1700 S Coats rd Oxford MI 49371	
PAVEL PETREA	1700 S COATS RD AXFORD MI 48371	
Vasile Balint	3644 Collins Rd. Oakland MI. 48363	
Anca Balint	1830 Hckail Rd Leonard MI 48367	
Ida Miletic-	Madison Heght 30110A MI. 48967	
Chitu Ioana	Madison Heights 31011 MI 48367	
GABY BUNA	Sterling HTS 48310	
Papuc Daniela	15148 Seagull dr. Sterling Heights 48313	
Papuc Ioana Daniela	15148 Seagull dr. Sterling Heights 48313	
Paul Filimon	36643 Egan St Clinton Twp. 48035	
Gabi Filimon	49378 Dunhill DR Macomb 48044	
Lidia Filimon	49378 Dunhill DR. Macomb 48044	
Stelan Boeriu	2387 Chesley Dr. Sterling Hts MI. 48310	
Florin Sirb	37048 Heaton dr. Sterling Hts 48310	
Corina Petrea	2490 Hiller Rd W. Bloomfield 48324	
CORNEL PISTA	2440 WINSTON DR STERLING HTS MI 48310	
MOISE ADRIAN TAN	2841 KOPER DR STERLING HTS 48310	

List with people who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd., Troy, MI 48085, to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
VERONICA FLIMON	51241 SHADYWOOD DR. MACOMB	
Maria Pusto	24907 Glenview Ct. Macomb MI 48044	Maria Pusto
IOSIF MUSCAS	30464 MADISON AGTS MI 48071	Iosif Muscas
VALERIA MUSCAS	30464 MADISON AGTS MI 48071	Valeria Muscas
Dochita Melinte	2490 Frankson Rochester Mi 48307	Dochita Melinte
Costica Melinte	2490 Frankson Rochester Hills Mi 48307	
Michael Sofronie	2578 HARTLINE DR. Rochester Hills 48309	
Vincente Sfronie	2578 Hartline Dr. Rochester Hills 48309	
Leontin T. Buzas	5415 Branch Str. Sterling Hts	Leontin Buzas
Florarea Buzas	" "	Florarea Buzas
Rachel Polocoser	38352 Sumpter Drive, Sterling HTS 48310	
Sorel Polocoser	38352 Sumpter Drive, Sterling Heights 48310	
Andreea Chise	3148 ELPHIN DRIVE, STERLING HEIGHTS, 48310	
Florian Libert	2094 OAKCREST RD, STERLING HTS	Florian Libert
FLORIN MUSCAS	11485 16 1/2 mile Rd, Sterling Hts MI 48312	
Maria Libert	2094 Oakcrest Rd Sterling Hts Mi	
IOAN PUSTA	753 Virginia Ave, Roseville MI 48066	
ADRIAN IANCHIS	39346 Lambike Dr, Sterling Hts, 48313	Andreea Chise
CRISTIAN BALINT	31644 COLLINS RD, OAKLAND MI 48363	
MILCEA CORNEAN	5450 BROOKLAWN STR. SHELBY TWP MI 48317	
MARGARETA FLIMON	5585 ROBERT ST. SHELBY TWP MI 48316	

List with people who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd., Troy, MI 48085, to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
MARIUS HARICA	28419 PARCK CT MADISON HTS 48071	[signature]
Alexandru Pusta	21207 Glenview ct Macomb 48044	[signature]
Jason Chse	3148 elphin Dr Sterling heights 48310	[signature]
LUCIAN MUDURA	14062 BUNKER HILL, SHELBY TWP. MI	[signature]
ANA MUDURA	14062 BUNKER HILL, SHELBY TWP, MI	[signature]
POP ALEXANDRU	27049 BRUSH MADISON HEIGHTS	[signature]
POP DORINA	27049 BRUSH MADISON HEIGHTS	[signature]
IOAN MURESAN	33498 CLIFTON DR. STERLING HTS	[signature]
Leonte Tiniuc	36457 ANN ARBOR TR. LIVONIA MI 48150	[signature]
EMILIA PANTEA	25716 Dei ST. Madison HTS. 48071	[signature]
GHEORGHE PANTEA	25716 Dei ST. Madison HTS 48071	[signature]
Violeta Sucu	40341 Sterling Hts 48310	[signature]
Vasile Sucu	40341 Sterling Hts 48310	[signature]
FLORIN PANTEA	74562 GOULD RD. BRUCE TWP. 48065	[signature]
Darius Marea	3788 Dearborn Ave, Rochester Hills, 48304	[signature]
Ligia Forgaciu	498 W South Blvd Rochester Hills 48307	[signature]
ENOK KEREKES	28156 NEWPORT DR. WARREN MI 48088	[signature]
GEORGIANA KEREKES	28156 NEWPORT DR. WARREN MI 48088	[signature]
DORINA LIONTE	48475 PRESIDENTIAL MACOMB.	[signature]
ARON FILIPOVAN	51241 SHADYWOOD DR. [illegible]	[signature]
Floarea Zdremtan	2844 Koper Dr Sterling Hts	[signature]

List with people who support the project of Bethesda R. P. Church located at 2075 E. Long Lake Rd., Troy, MI 48085, to build a new building as an addition to the existing church

Name	Address (Street, City, Zip Code, State)	Signature
~~Lucian&Camelia~~		
Paul Racin	858 Monterey Ln Rochester Hills MI 48307	
Jennifer Balint	2163 W. Rochester Rd. Oakland Mi 48363	
Robert Ianchis	39346 Lembke Dr. Sterling Heights	Robert Ianchis
Ramona Manea	3550 E clarkston Rd. Oakland MI 48363	
Eduard Manea	3550 E Clarkston Rd Oakland 48363	
Claudia Lupus	20840 Orchard Lake Rd Farmin 48336	
Vasile Dan Balint	941 Wynstone Cir N, Oakland MI 48363	
Paul Forgaciu	498 SOUTH BLVD, ROCHESTER HILLS MI 48307	
Liviu Rus	816 Palms Rd Bloomfield Hills, MI 48304	
FLORICA TARCAS	93 Rosehaet Auburn Hills 48326	
PETRU LUPUS	36618 JACKMEN DR. 48312 STH. HILLS	Petru Lupus
Stephanie Rascol	3037 York Rd Rochester Hills MI 48309	Stephanie Rascol
Josif Rascol	3037 York Rd Rochester Hills MI 48309	Josif
Raluca Tirla	3007, Belinda Dr, Sterling Heights, Mi, 48310	
Bogdan Sanda	113 overlook Dr, Hendersonville TN, 37075	
MARCEL LUPUS	20925 Mehaffie Rd	
GABRIEL RUS	100 BLAKE ST LEONARD MI 48367	Gabriel Rus
CODRUTA RUS	100 BLAKE ST LEONARD MI 48367	Codruta Rus
ELIAN TORCAS	15477 VALERIE DR. MACOMB, MI, 48044	
DAN MELINTE	6021 Rickett WASHINGTON MI 48094	

DATE: December 6, 2019

TO: Planning Commission

FROM: R. Brent Savidant, Community Development Director

SUBJECT: PUBLIC HEARING – SPECIAL USE AND PRELIMINARY SITE PLAN REVIEW (SP JPLN2019-0037) – Proposed Bostick 801, LLC Redevelopment, East side of Crooks, south of Big Beaver (801 W. Big Beaver), Section 28, Currently Zoned BB (Big Beaver Road) District

The petitioner Bostick 801, LLC submitted the above referenced Special Use and Preliminary Site Plan application for the proposed mixed use project including a 6-story, 140 room Hyatt Place Hotel, 232-seat (8,538 square feet) Ford's Garage restaurant and 5-level parking deck. The 4.22-acre site is currently zoned BB.

The attached report prepared by Carlisle/Wortman Associates, Inc. (CWA), the City's Planning Consultant, summarizes the project. CWA prepared the report with input from various City departments including Planning, Engineering, Public Works and Fire. City Management supports the findings of fact contained in the report and the recommendations included therein.

Attachments:

1. Maps
2. Report prepared by Carlisle/Wortman Associates, Inc.
3. Traffic Impact Assessment, prepared by ROWE PSC, dated September 24, 2019.
4. Shared Parking Analysis, prepared by ROWE PSC, dated October 14, 2019.
5. Memorandum prepared by OHM, dated October 23, 2019.
6. Email from Ron Wilson (with attachments).

G:\SPECIAL USE\SU JPLN2019-0037 (SP) BOSTICK 801 LLC REDEVELOPMENT\PC Memo 2019 12 10.docx

PROPOSED RESOLUTION

PUBLIC HEARING – SPECIAL USE AND PRELIMINARY SITE PLAN REVIEW (SP JPLN2019-0037) – Proposed Bostick 801, LLC Redevelopment, East side of Crooks, south of Big Beaver (801 W. Big Beaver), Section 28, Currently Zoned BB (Big Beaver Road) District

Resolution # PC-2019-12-
Moved by:
Seconded by:

RESOLVED, That Special Use Approval and Preliminary Site Plan Approval, pursuant to Articles 8 and 9 of the Zoning Ordinance, as requested for the proposed mixed use Bostick 801, LLC Redevelopment, including hotel, restaurant and parking structure, located on the east side of Crooks, south of Big Beaver (801 W. Big Beaver), Section 28, Currently Zoned BB (Big Beaver) District, be granted, subject to applicant the following:

_____) or

(denied, for the following reasons: _____) or

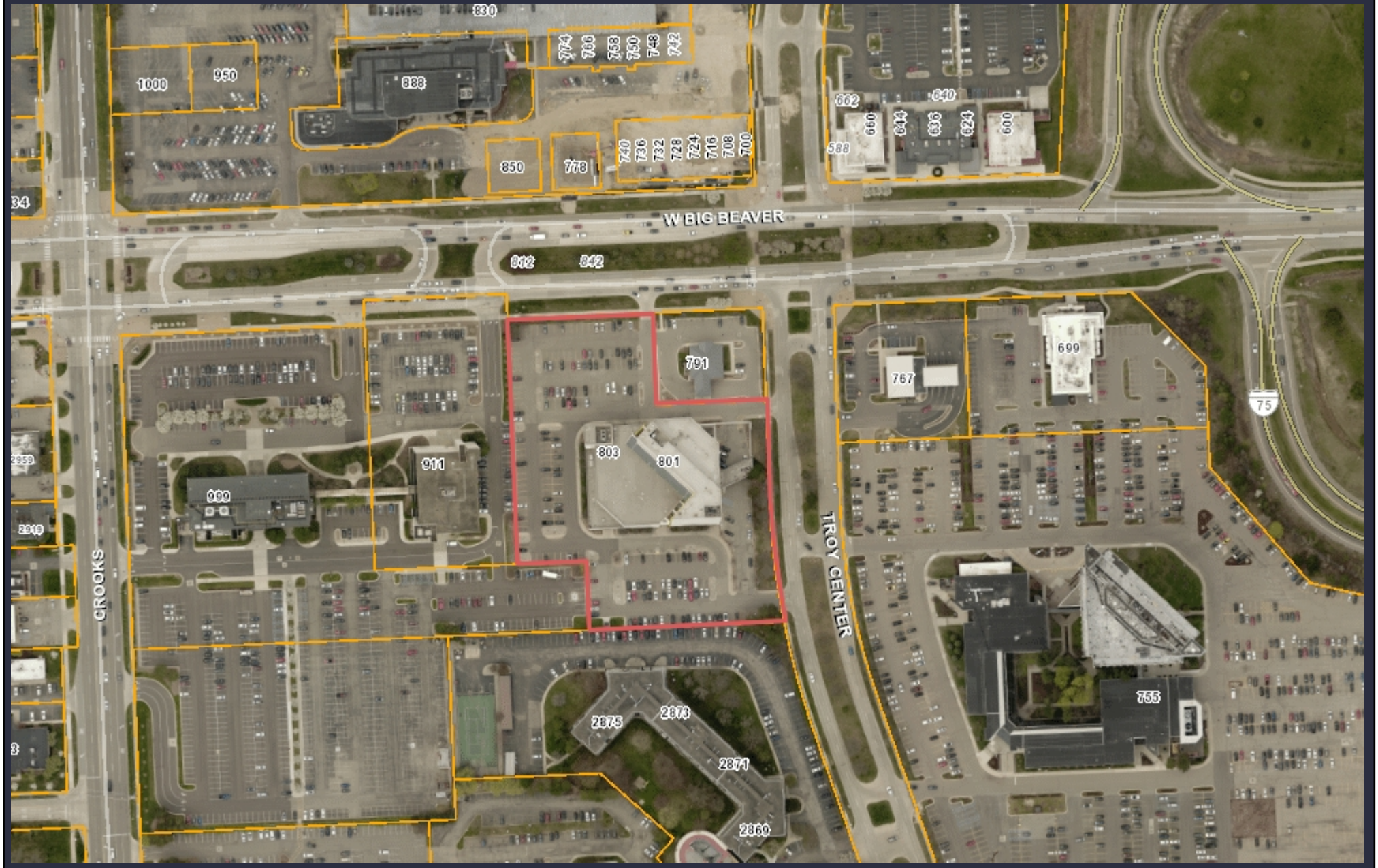
(postponed, for the following reasons: _____)

Yes:
No:

MOTION CARRIED/FAILED

G:\SPECIAL USE\SU JPLN2019-0008 COURTYARD HOTEL\Proposed PC Resolution 11 12 2019.docc

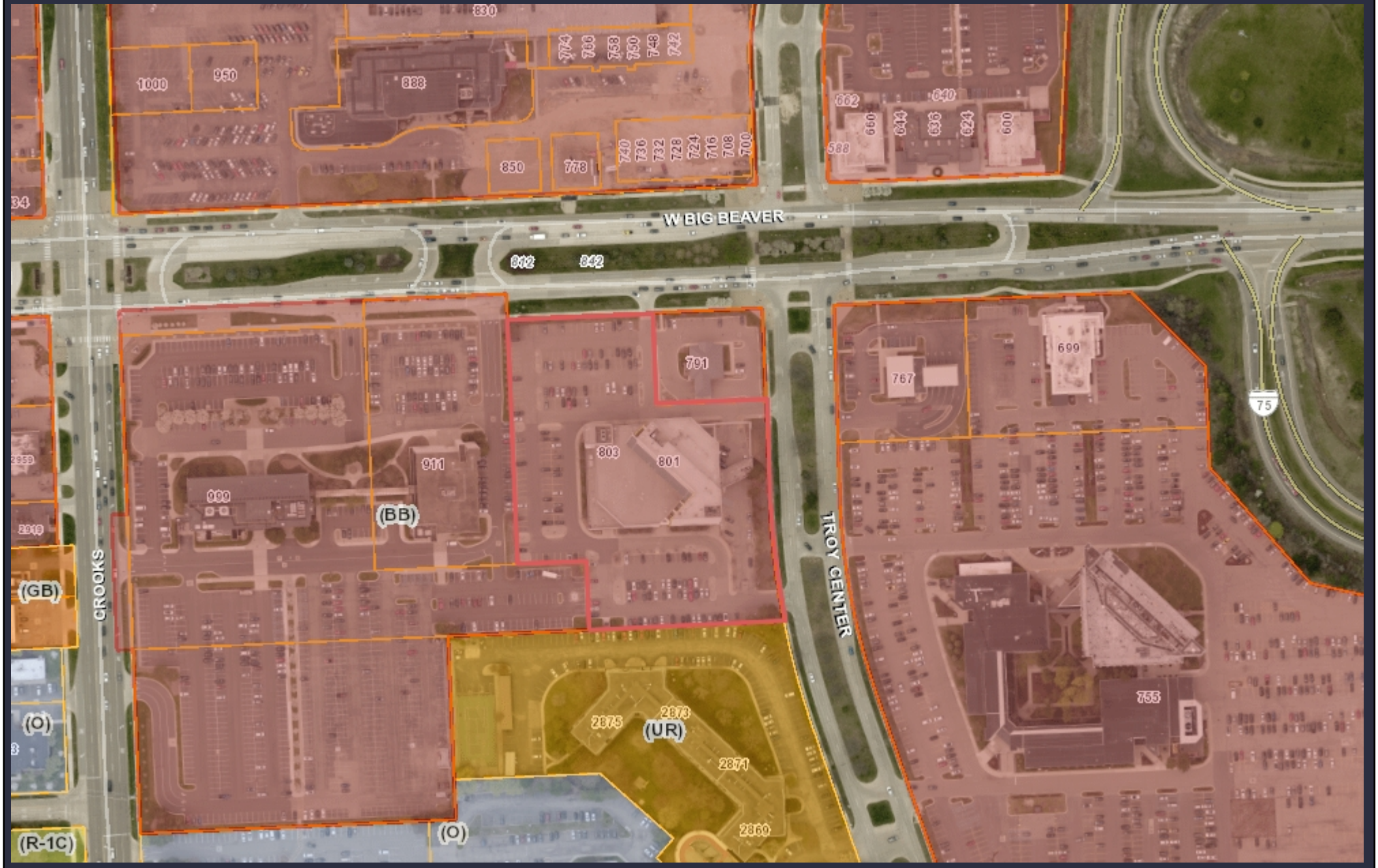
GIS Online



595 0 297 595 Feet

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

GIS Online



595 0 297 595 Feet

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

Carlisle | Wortman
ASSOCIATES, INC.
117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

Date: December 5, 2019

Special Use and Preliminary Site Plan Review
For
City of Troy, Michigan

Applicant: 801 Bostic LLC

Project Name: Hyatt Place-Big Beaver

Plan Date: October 14, 2019

Location: Big Beaver

Zoning: BB, Big Beaver Form-Based District

Action Requested: Preliminary Site Plan and Special Use Approval

PROJECT AND SITE DESCRIPTION

801 Big Beaver is currently improved with a 5-story office building (Huntington Bank building). The applicant is proposing the construction of the following additional buildings on the site:

- 6-story, 72-foot tall, 140 room Hyatt Place Hotel
- 232-seat, 8,538 sq/ft restaurant
- 5-level, 361-space parking structure

The 361-space parking structure will serve all uses on site. The hotel and restaurant will be connected. The hotel/restaurant will be located on the existing surface parking area just west of the existing office building. The parking structure will be located on the existing surface parking area just south of the existing office building. The parking structure and restaurant are permitted uses in the BB, Big Beaver form-base district. The hotel is a special use in the BB, Big Beaver form-base district.

Figure 1. *– Subject site aerial photo*

Size of subject property:
4.22 acres

Current use of subject property:
Office (bank with drive-through on corner is not part of this site)

Proposed use of subject site:

- 6-story, 72-foot, 140 room Hyatt Place Hotel
- 232-seat, 8,538 sq/ft restaurant
- 5-level, 361-space parking structure

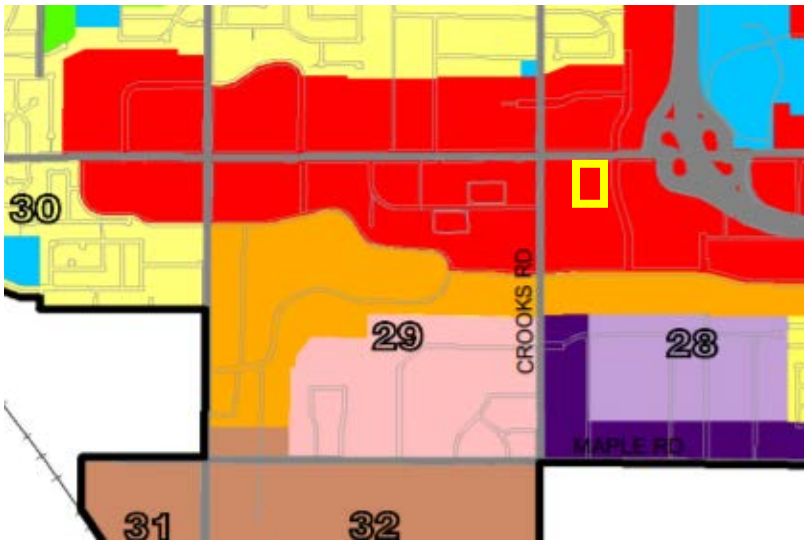
Zoning:
The property is zoned BB, Big Beaver form-base district

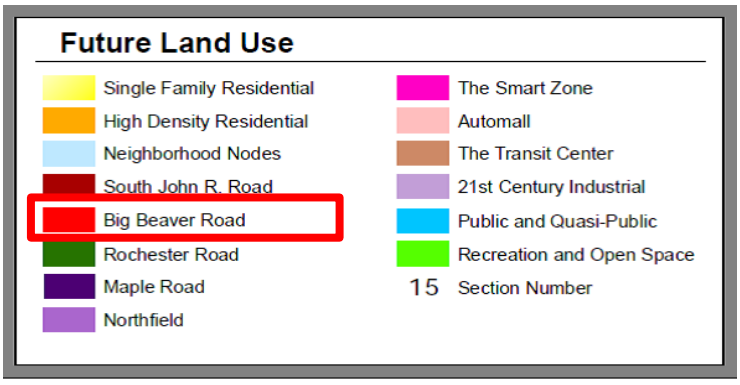
Surrounding Property Details:

Direction	Zoning	Use
North	BB, Big Beaver	Retail and Hotel
South	UR, Urban Residential	Multiple Family Residential
East	BB, Big Beaver	Office
West	BB, Big Beaver	Office

MASTER PLAN

The site is located within the area designated as Big Beaver in the Master Plan. The Big Beaver designation responds to the recommendations set forth in the Big Beaver Corridor Study, which promotes flexibility with land use relationships including higher density, vertically integrated mixed-use commercial, office, and residential towers. The Big Beaver Corridor Study and Master Plan promote redevelopment with a greater mix of land uses, particularly new residencies, but also encourages the use of prominent ground floor retail, restaurants, and cafes allowing visual interest and activity for visitors and residents.





Additional hotel uses along and peripheral to Big Beaver promote the goals of the Big Beaver Corridor Study and Master Plan including transforming Big Beaver into a destination or "people place" characterized by round-the-clock activity and an exciting nightlife, promote redevelopment opportunities along the corridor, maintain and improve existing businesses along Big Beaver, and transform the corridor into a pedestrian-friendly environment.

Specifically, page 48 of the Big Beaver Corridor Study calls this site as a mixed use; retail/office/residential use. Adding a compatible and vibrant mix of uses including structed parking to the existing mixed-use fabric is consistent with the Master Plan.

NATURAL RESOURCES

Woodlands: The applicant has identified a total of 38 regulated trees on the site. Of the trees surveyed, 3 are a landmark tree and 35 are woodland trees. The applicant is preserving 24 of the 38 regulated trees.

Replacement Details		
Protected Tree	**Inches Removed**	**Replacement Required**
Landmark	32 inches	32 inches
Woodland	108 inches	54 inches
Preservation/Mitigation	**Inches Preserved**	**Credit**
Landmark	16 inches	32 inches
Woodland	226 inches	452 inches
Protected Replacement Required	86 Inches	
Preservation Credit	484 Inches	
Total	**+ 398-inch credit**	

Items to be Addressed: *None*

BUILDING LOCATION AND SITE ARRANGEMENT

The proposed restaurant/hotel building is situated adjacent to Big Beaver. The restaurant use of the building will be the portion that fronts on Big Beaver. A majority of the first floor of the hotel is at-grade parking. The remaining portion first floor portion is lobby and storage.

The 5-level, 359-space parking structure is located on the rear portion of the site along the southern property line. Access to the site will provided with one curb cut on Big Beaver Road and two curb cuts on Troy Center Drive. The site includes pedestrian connections between the parking structure and all other uses on site.

Items to be Addressed: *None*

AREA, WIDTH, HEIGHT, SETBACKS

BB, Big Beaver form-base district bulk requirements are set forth in Article 5.

Table 1. *– Site requirements and proposed dimensions*

	Required / Allowed	Provided	Compliance
Front (Big Beaver)	10-foot build-to-line, up to 30-feet with PC approval	11.9 to 21.3 feet	Complies with PC approval
Front (Troy Center Drive)	10-foot build-to-line, up to 30-feet with PC approval	10.7 10 18.5 feet	Complies with PC approval
Side	0 foot	6.9 feet	Complies
Rear	40 foot minimum	45 feet	Complies
Required Open Space	15 percent	24 percent	Complies
Building Height	Unlimited	6-story, 72-foot	Needs Special Use Approval
Parking (Big Beaver)	Not located in front yard and screened	Existing parking	Existing parking
Parking (Troy)	Not located in front yard and screened	Existing parking	Existing parking

Items to be Addressed: *None*

PARKING

Parking Calculations:

The applicant has completed a parking study for the site. Uses on site used to determine parking calculations include:

- Existing 122,386 sq/ft office (77,874 leasable)
- New 140 room hotel
- New 232 seat restaurant

The parking study notes that shared parking for this site is appropriate due to the varied proposed uses. The study concludes that the overall peak demand on site is 2 p.m on a weekday, which requires 449 parking spaces. The applicant has indicated plans that show 359 spaces and 361 spaces. The applicant should clarify the number of spaces in the parking structure. The site is served with 359/361 deck parking spaces and 106 at grade spaces, which total 465/467 spaces total on site.

Use	Weekday (peak)	Weekend (peak)
Restaurant	76	99
Hotel	114	154
Office	259	0
Total	**449**	**253**

The City's engineering consultant OHM has reviewed the parking study and does not recommend approval. They note two items:

1. The analysis method must be revised. While Troy allows for the use of ULI / ITE methodologies for shared parking, the actual parking rates used MUST reflect city zoning ordinance required rates.
2. The analysis states an assumption that the 2,949 SF of conference space will be used by non-guests during the day and by hotel guests at night. The peak period for weekday parking is 2pm which is a time when the conference facilities could well be used based on this assumption. OHM believes that the conference facilities be considered in the parking analysis.

Items to be Addressed**:** *1). Clarify number of parking spaces in structure; and 2). Address OHM's parking study review*

TRAFFIC

The applicant completed a traffic impact assessment (TIA) for the proposed 140 room hotel and 232-seat restaurant. The traffic study only accounts for traffic increase due to the hotel and restaurant. It does not account for existing traffic of the existing office building.

The traffic study concludes that the hotel and restaurant will add 71 cars during the AM peak hour and 138 cars during the PM peak hour:

	AM Peak Hour			PM Peak Hour			Week Day
	In	**Out**	**Total**	**In**	**Out**	**Total**	
Restaurant	3	3	6	40	19	59	633
Hotel	38	27	65	40	39	79	1,154
Total Trips	41	30	71	80	58	138	1,787

The trip generation will be distributed as follows:

<u>AM Peak Hour</u>
20% from and 34% to the south
5% from and 63% to the east
75% from and 3% to the west

<u>PM Peak Hour</u>
26% from and 26% to the south
12% from and 66% to the east
62% from and 8% to the west

The traffic study concludes that no additional traffic improvements are necessary.

The City's engineering consultant OHM has reviewed the parking study and does not recommend approval. They note four items:

1. The architectural drawing attached to the TIA and showing the parking calculations differs from the preliminary site plan and the provided parking.
2. The figures showing the site generated traffic volumes appear to be incomplete. There is no traffic shown going through the I-75 interchange.
3. The background traffic shows a total for the site driveways of 19 during the AM peak, with 17 entering and 2 exiting. During the PM peak the total is 51, with 17 entering and 34 exiting. According to ITE trip generation calculations the existing office building on site would be expected to generate approximately 76 entering and 13 exiting for a total of 89 during the AM peak. The total is 89 during the PM peak, with 14 exiting and 75 exiting. OHM questions what the building occupancy was at the time of the counts. If substantially unoccupied, the background traffic should be adjusted to reflect the trip generation of a reasonably occupied site.
4. There is a large disparity in the collected turning volumes at Troy Center Drive and Big Beaver when compared to the MDOT study. The counts in 2017 were more than double the counts collected in 2019. These recent counts were likely impacted by Big Beaver and I-75 construction and should not be relied on. The study should instead use the 2017 counts taken for Big Beaver at Town Center and at the crossovers flanking this intersection. Regarding the site driveway volumes, reference the concern noted above.

***Items to be Addressed*:** *Address OHM's traffic study review*

ACCESS AND CIRCULATION

Vehicular access:

The site is currently served with three curb cuts; one on Big Beaver Road and two curb cuts on Troy Center Drive. The only change to access is that the applicant is altering the location of one of the curb cuts on Troy Center Drive.

The City's engineering consultant OHM has reviewed the site plan for circulation and has made noted recommendations.

Pedestrian access:

The site includes direct pedestrian connection from Big Beaver and internal pedestrian connections including between the parking structure and all other uses on site. The applicant is providing a brick-paver walkway from the structure to the hotel. The brick-paver walkway should continue across the hotel's front to the restaurant entrance.

Items to be Addressed: *1). Address OHM's circulation review; and 2). Continue brick-paver across the hotel's front to the restaurant entrance.*

LIGHTING

The applicant has provided a lighting (photometric) plan and lighting fixture details. The applicant is proposing a four (4) pole lights, six (6) bollard lights, twenty-nine (29) parking structure down lighting, and thirty-four (34) building lights. It appears that the lighting levels slightly exceed the maximum levels along the western property line.

The photometric plan did not indicate any lighting of the parking structure. It is presumed that the garage will be lit, even if just internally. Lighting should be shown to determine light impact, particularly on the upper levels as they will be seen from the adjacent apartment building to the south.

Items to be Addressed: *1). Reduce lighting levels along western property line; and 2). Indicate lighting and photometrics for the parking structure.*

LANDSCAPING

The application includes a landscape plan and calculations.

	Required:	Provided:	Compliance:
Street Trees: The Ordinance requires that the greenbelt shall be landscaped with a minimum of one (1) deciduous tree for every thirty (30) lineal feet, or fraction thereof, of frontage abutting a public road right-of-way.	Big Beaver Road 243 LF = 8 trees Troy Center Drive 372 LF = 12 trees	Big Beaver: 8 trees Troy Center: 12 trees	Compliant but see note below
Site landscaping: A minimum of twenty percent (15%) of the site area shall be comprised of hardscape and landscape material.	15%	12.5% landscaping. Hardscape percentage not provided	Appears complaint with hardscape percentage provided.
Parking Lot Landscaping: 1 tree for every 8 parking spaces. Trees may be located adjacent to parking lot with planning commission approval.	82 spaces = 10 trees	10 trees	Compliant

While the applicant is compliant with landscaping along Troy Center Drive, the applicant is not proposing any landscaping between the 5-story parking structure and Troy Center Drive. The applicant should provide some landscaping to soften the front façade of the parking structure from Troy Center Drive.

Items to be Addressed*: 1). Provide hardscape calculation; and 2). Provide landscaping to soften the front façade of the parking structure from Troy Center Drive.*

FLOOR PLANS AND ELEVATIONS

The applicant has submitted floor plans and elevations. Materials include a mix of "wall plank" panels, and fiber cement board. As set forth in Section 8.06.B. Development shall incorporate the following recognized best architectural building design practices:

1) Foster a lasting impact on the community through the provision of high-quality design, construction, and detailing.
2) Provide high quality, durable materials, such as but not limited to stone, brick, glass, and metal. E.I.F.S. or material equivalent shall only be used as an accent material.
3) Develop buildings with creativity that includes balanced compositions and forms.
4) Design roofs that are appropriate to the architectural style of the building and create an appropriate visual exterior mass of the building given the context of the site.
5) For commercial buildings, incorporate clearly defined, highly visible customer entrances using features such as canopies, porticos, arcades, arches, wing walls, ground plane elements, and/or landscape planters.
6) Include community amenities that add value to the development such as patio/ seating areas, water features, artwork or sculpture, clock towers, pedestrian plazas with park benches or other features located in areas accessible to the public.

Hotel: The primary building material is brick with metal panels on the upper floors. Colors appears to be a mixture of browns, tans, greys, and white.

Restaurant: The primary building material is brick with metal panels on the second floor. The brick and metal material and color match the hotel.

Parking Structure: The primary material is concrete with brick accents and other architectural details. All four sides of the structure will be highly visible including the southern elevation from the apartment site.

The existing 5-story office building on site is highlighted with white paneling. The applicant's architect should describe how the hotel/restaurant and parking structure materials and architecture complement the existing office building and any other surrounding buildings.

The applicant has been asked to bring to the meeting the building materials samples, a color rendering, and a 3-D model to evaluate the overall architecture program. The Planning Commission should discuss the materials and elevations based upon the additional information provided at the meeting.

Items to be Addressed: *Make any changes to building material use and elevations based upon direction from the Planning Commission.*

STANDARDS FOR APPROVAL

Hotels are permitted subject to Special Use approval. For any Special Use, according to Section 9.02.D, the Planning Commission shall *"…review the request, supplementary materials either in support or opposition thereto, as well as the Planning Department's report, at a Public Hearing established for that purpose, and shall either grant or deny the request, table action on the request, or grant the request subject to specific conditions."*

Section 9.03 states that before approving any requests for Special Use approval, the Planning Commission shall consider:

1. *Compatibility with Adjacent Uses. The Special Use shall be designed and constructed in a manner harmonious with the character of adjacent property and the surrounding area. In determining whether a Special Use will be harmonious and not create a significant detrimental impact, as compared to the impacts of permitted uses.*

2. *Compatibility with the Master Plan. The proposed Special Use shall be compatible and in accordance with the goals and objectives of the City of Troy Master Plan and any associated sub-area and corridor plans.*

3. *Traffic Impact. The proposed Special Use shall be located and designed in a manner which will minimize the impact of traffic, taking into consideration: pedestrian access and safety; vehicle trip generation (i.e. volumes); types of traffic, access location, and design, circulation and parking design; street and bridge capacity and, traffic operations at nearby intersections and access points. Efforts shall be made to ensure that multiple transportation modes are safely and effectively accommodated in an effort to provide alternate modes of access and alleviate vehicular traffic congestion.*

4. *Impact on Public Services. The proposed Special Use shall be adequately served by essential public facilities and services, such as: streets, pedestrian or bicycle facilities, police and fire protection, drainage systems, refuse disposal, water and sewage facilities, and schools. Such services shall be provided and accommodated without an unreasonable public burden.*

5. *Compliance with Zoning Ordinance Standards. The proposed Special Use shall be designed, constructed, operated and maintained to meet the stated intent of the zoning districts and shall comply with all applicable ordinance standards.*

6. *Impact on the Overall Environment. The proposed Special Use shall not unreasonably impact the quality of natural features and the environment in comparison to the impacts associated with typical permitted uses.*

7. *Special Use Approval Specific Requirements. The general standards and requirements of this Section are basic to all uses authorized by Special Use Approval. The specific and detailed*

requirements relating to particular uses and area requirements must be also satisfied for those uses.

The Planning Commission desires to review each lodging use on a case-by-case basis to ensure the architectural and material quality is consistent with the stated intention of the Master Plan and Zoning Ordinance; that such use does not oversaturate the market especially considering the difficulty in retrofitting hotels for future uses; and ensure that a hotel development does potentially negatively impact adjacent properties.

The applicant should describe the hotel market conditions that may impact the hotel to ensure that they market is not over saturated.

Provided that the applicant can prove to the satisfaction of the Planning Commission that the hotel market is not over saturated, conceptually we find the Special Use Standards. However as noted in OHM's review there are outstanding issues with regards to parking and traffic that must be addressed prior to a final recommendation.

RECOMMENDATION

Overall we support the development of this site and find it to be a significant investment on Big Beaver. However, there are some noted site plan issues, specifically with regards to parking and traffic, that must be addressed prior to approval. We recommend the Planning Commission hold a public hearing but postpone action to allow the applicant to address noted items.

CARLISLE/WORTMAN ASSOC., INC.
Benjamin R. Carlisle, LEED AP, AICP

ROWE PROFESSIONAL SERVICES COMPANY

Large Firm Resources. Personal Attention.℠

Memorandum

To: David Hunter, PE, PS – PEA, Inc.

From: Michael J. Labadie, PE and Jill M. Bauer, PE, PTOE

Date: September 24, 2019

RE: Traffic Impact Assessment for Hotel and Restaurant Addition to Big Beaver Business Center

---

ROWE Professional Services Company has completed a traffic impact assessment (TIA) related to the proposed hotel and quality restaurant in the existing Big Beaver Business Center at 801/803 Big Beaver Road. This development is located in the southwest quadrant of the Big Beaver Road/Troy Center Drive intersection in Troy, MI. The current site plan (included in the materials attached to this report) indicates a 140-room hotel and a 7,550-square-foot (SF) quality restaurant. This TIA is intended to determine if any improvements would be necessary to mitigate traffic impacts related to the proposed development on the adjacent road network. It has been completed in accordance with the requirements specified by the city's engineering consultant. For the analysis, traffic models were provided by the Michigan Department of Transportation (MDOT) that represented both existing conditions and the new interchange layout that will be built at Big Beaver Road and I-75. These traffic models were revised to account for the addition of the hotel and restaurant. In the MDOT study, all traffic volumes were forecasted by MDOT for the year 2040.

TRAFFIC IMPACT ASSESSMENT

Traffic Counts

Turning movement counts were collected by MDOT at the following intersections along Big Beaver Road:

- Big Beaver Road and westbound to eastbound crossover (west of Crooks)
- Big Beaver Road and Crooks Road
- Big Beaver Road and eastbound to westbound crossover (east of Crooks)
- Big Beaver Road and westbound to eastbound crossover (west of Troy Center Drive)
- Big Beaver Road and Troy Center Drive
- Big Beaver Road and Wilshire Drive
- Big Beaver Road and eastbound to westbound crossover (east of Wilshire Drive)
- Big Beaver Road and southbound I-75 ramps
- Big Beaver Road and northbound I-75 ramps
- Big Beaver Road and westbound to eastbound crossover (west of Livernois Road)
- Big Beaver Road and Livernois Road
- Big Beaver Road and eastbound to westbound crossover (east of Livernois Road)

MDOT then used this data to project 2040 traffic volumes. MDOT provided the Synchro Models and 2040 traffic projections from the I-75 Modernization Project for use in this traffic study. These models were then revised to account for the addition of the hotel and restaurant. Additional turning movement counts were collected, via Traffic Data Collection (TDC), during the weekday AM (7 a.m. to 9 a.m.) and PM (4 p.m. to 6 p.m.) peak periods on August 14, 2019 at the intersections of:

- Big Beaver Road and Site Driveway 1
- Troy Center Drive and Site Driveway 2
- Troy Center Drive and Site Driveway 3
- Troy Center Drive and PNC Site Driveway

The existing peak hour traffic volumes are shown in Figure 1 attached to this memo.

Background Traffic Scenario

MDOT provided traffic data projected to the year 2040 for intersections on Big Beaver Road listed above. Based on a review of the traffic volumes provided by MDOT, a background growth rate of 0.2 percent was utilized on all traffic counts taken by TDC. The projection of this data to 2040 was considered adequate to account for future development that may take place between the present and 2040, so no other proposed developments were included in the background traffic.

The background traffic volumes are shown in Figure 2 attached to this memorandum.

Trip Generation

Using the information and methodologies specified in the latest version of *Trip Generation (10th Edition)* published by the Institute of Transportation Engineers (ITE), ROWE forecast the weekday AM and PM peak hour trips associated with the proposed commercial development. The results of the trip generation forecasts for the proposed hotel (140 rooms) and the proposed quality restaurant (7,550 SF) are provided below in Table 2.

Table 2
Trip Generation for Proposed Commercial Development

Land Use	Land Use Code	Units	AM Peak Hour			PM Peak Hour			Week Day
			In	Out	Total	In	Out	Total	
Quality Restaurant	931	SF	3	3	6	40	19	59	633
Hotel	310	Rooms	38	27	65	40	39	79	1,154
Total	**-**	**-**	**41**	**30**	**71**	**80**	**58**	**138**	**1,787**

Trip Distribution

The existing traffic volumes were used to develop a trip distribution model for the AM and PM peak hours for the new traffic that will be generated by the proposed development. The existing traffic patterns indicate the following probable distribution for the completion of the hotel (140 rooms) and the proposed quality restaurant (7,550 SF):

AM Peak Hour
20% from and 34% to the south
5% from and 63% to the east
75% from and 3% to the west

PM Peak Hour
26% from and 26% to the south
12% from and 66% to the east
62% from and 8% to the west

The site generated vehicle trip assignments for the site are shown in Figure 3 attached to this memo. The background traffic volumes were combined with the site generated traffic volumes to obtain the total future traffic volumes, which are shown in Figure 4 attached to this memo.

Level of Service Analysis

A level of service (LOS) analysis for existing, background (no build), and total future (build) conditions for the AM and PM peak hours was performed for the intersections of:

- Big Beaver Road and Site Driveway 1
- Big Beaver Road and Troy Center Drive
- Troy Center Drive and Site Driveway 2
- Troy Center Drive and Site Driveway 3
- Troy Center Drive and PNC Site Driveway
- Eastbound Big Beaver Road and westbound to eastbound crossover/Kelly Services Drive (West of Troy Center Drive)
- Westbound Big Beaver Road and eastbound to westbound crossover (east of Troy Center Drive)
- All signalized and stop controlled intersections in the I-75/Big Beaver Road interchange

According to the most recent edition of the *Highway Capacity Manual (6th Edition)*, LOS is a qualitative measure describing operational conditions of a traffic stream or intersection. LOS ranges from A to F, with LOS A being the best and LOS D generally being considered acceptable. Table 3 presents the criteria for defining the various levels of service for signalized and unsignalized intersections.

Table 3
LOS Criteria

LOS	Average Stopped Delay/Vehicle (seconds)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Note: LOS D is considered acceptable in urban/suburban areas.

The results of the LOS analyses for the intersection listed above are summarized in the tables below.

Unsignalized Intersection of Big Beaver Road and Site Driveway 1

The intersection of Big Beaver Road and Site Driveway 1 consists of a stop controlled northbound (NB) approach with one incoming and one outgoing lane. Big Beaver Road consists of three eastbound (EB) lanes, with the rightmost lane supporting both through and right turn movements. The results of the LOS analysis for the unsignalized intersection of Big Beaver Road and Site Driveway 1 indicate that, under existing conditions, all approaches to the intersection operate at an LOS A with no delay during the AM peak hour and at an LOS F or A during the PM peak hour. These conditions are similar for the increase in background traffic in 2040. The LOS F occurs on the approach exiting the site. This analysis does not account for the signal 300 feet upstream that creates gaps for vehicles to utilize. The delays experienced by motorists may be lower than calculated.

With the addition of site generated traffic, the northbound site driveway approach at the intersection would operate at an LOS D or better during the AM peak hour and at an LOS F during the PM peak hour. The delays experienced by motorists may be lower than calculated due to the provision of gaps created by the upstream signalized intersection.

The operational results for the intersection of Big Beaver Road and Site Driveway 1 are presented in Tables 4 and 5.

Table 4
AM Peak Hour
LOS Analysis for Big Beaver Road and Site Driveway 1

Approach	Existing	Background	Future
Eastbound Big Beaver Road	A (0.0)	A (0.0)	A (0.0)
Northbound Site Driveway 1	A (0.0)	A (0.0)	D (34.2)
Overall	**A (0.0)**	**A (0.0)**	**A (0.1)**

(XX.X) Average seconds of delay per vehicle.

Table 5
PM Peak Hour
LOS Analysis for Big Beaver Road and Site Driveway 1

Approach	Existing	Background	Future
Eastbound Big Beaver Road	A (0.0)	A (0.0)	A (0.0)
Northbound Site Driveway 1	F (87.6)	F (105.9)	F (161.1)
Overall	**A (0.2)**	**A (0.2)**	**A (0.8)**

(XX.X) Average seconds of delay per vehicle.

Signalized Intersection of Big Beaver Road and Troy Center Drive

The results of the LOS analysis for the signalized intersection of Big Beaver Road and Troy Center Drive indicate that, under existing conditions, all approaches to the intersection operate at an LOS D or better during both the AM and PM peak hours. With the increase in background traffic, the eastbound Big Beaver Road approach to the intersection operates at an LOS B or better during the AM and PM peak hours; however, the northbound Troy Center Drive approach operates at an LOS E. This analysis does not account for gaps in traffic from upstream signals, which could allow vehicles to turn right on red, reducing the delay.

With the addition of site generated traffic, all approaches to the intersection would operate with minimal increases to delay and a similar LOS at all approaches during both the AM and PM peak hours when compared to background conditions. Therefore, the traffic generated by the proposed development would have a minimal impact on the operation of this intersection.

The operational results for the intersection of Big Beaver Road and Troy Center Drive are presented in Tables 6 and 7.

Table 6
AM Peak Hour
LOS Analysis for Big Beaver Road and Troy Center Drive

Approach	Existing	Background	Future
Eastbound Big Beaver Road	A (0.5)	A (4.4)	A (4.5)
Northbound Troy Center Drive	D (52.5)	E (57.4)	E (57.5)
Overall	**A (3.2)**	**A (7.1)**	**A (7.4)**

(XX.X) Average seconds of delay per vehicle.

Table 7
PM Peak Hour
LOS Analysis for Big Beaver Road and Troy Center Drive

Approach	Existing	Background	Future
Eastbound Big Beaver Road	B (10.0)	B (22.3)	C (27.7)
Northbound Troy Center Drive	D (52.0)	E (63.1)	E (63.0)
Overall	**B (13.4)**	**C (25.6)**	**C (30.8)**

(XX.X) Average seconds of delay per vehicle.

Unsignalized Intersection of Troy Center Drive and Site Driveway 2

The intersection of Troy Center Drive and Site Driveway 2 consists of a stop controlled eastbound approach with one incoming and one outgoing lane. Troy Center Drive consists of two southbound (SB) lanes, with the rightmost lane supporting both through and right turn movements. The results of the LOS analysis for the unsignalized intersection of Troy Center Drive and Site Driveway 2 indicate that, under existing conditions, all approaches to the intersection operate at an LOS A or better during both the AM and PM peak hours. With the increase in background traffic, all approaches to the intersection operate at an LOS A or better during the AM and PM peak hours.

With the addition of site generated traffic, all approaches to the intersection would operate at an LOS A or better during the AM and PM peak hours. Therefore, the traffic generated by the proposed development would have a negligible impact on the operation of this intersection.

The operational results for the intersection of Troy Center Drive and Site Driveway 2 are presented in Tables 8 and 9.

Table 8
AM Peak Hour
LOS Analysis for Troy Center Drive and Site Driveway 2

Approach	Existing	Background	Future
Eastbound Site Driveway 2	A (9.0)	A (9.1)	A (9.2)
Southbound Troy Center Drive	A (0.0)	A (0.0)	A (0.0)
Overall	**A (0.0)**	**A (0.0)**	**A (0.4)**

(XX.X) Average seconds of delay per vehicle.

Table 9
PM Peak Hour
LOS Analysis for Troy Center Drive and Site Driveway 2

Approach	Existing	Background	Future
Eastbound Site Driveway 2	A (8.9)	A (9.0)	A (9.3)
Southbound Troy Center Drive	A (0.0)	A (0.0)	A (0.0)
Overall	**A (0.4)**	**A (0.4)**	**A (0.9)**

(XX.X) Average seconds of delay per vehicle.

Unsignalized Intersection of Troy Center Drive and Site Driveway 3

The intersection of Troy Center Drive and Site Driveway 3 consists of a stop controlled eastbound approach with one incoming and one outgoing lane. Troy Center Drive consists of two southbound lanes, with the rightmost lane supporting both through and right turn movements. The results of the LOS analysis for the unsignalized intersection of Troy Center Drive and Site Driveway 3 indicate that, under existing conditions, all approaches to the intersection operate at an LOS A or better during the AM and PM peak hours. With

the increase in background traffic, all approaches to the intersection operate at an LOS A or better during the AM and PM peak hours.

With the addition of site generated traffic, all approaches to the intersection would operate at an LOS A or better during the AM and PM peak hours. Therefore, the traffic generated by the proposed development would have a negligible impact on the operation of this intersection.

The operational results for the intersection of Troy Center Drive and Site Driveway 3 are presented in Tables 10 and 11.

Table 10
AM Peak Hour
LOS Analysis for Troy Center Drive and Site Driveway 3

Approach	Existing	Background	Future
Eastbound Site Driveway 3	A (8.7)	A (8.8)	A (8.8)
Southbound Troy Center Drive	A (0.0)	A (0.0)	A (0.0)
Overall	**A (0.1)**	**A (0.1)**	**A (0.1)**

(XX.X) Average seconds of delay per vehicle.

Table 11
PM Peak Hour
LOS Analysis for Troy Center Drive and Site Driveway 3

Approach	Existing	Background	Future
Eastbound Site Driveway 3	A (8.8)	A (8.9)	A (9.1)
Southbound Troy Center Drive	A (0.0)	A (0.0)	A (0.0)
Overall	**A (0.8)**	**A (0.8)**	**A (1.6)**

(XX.X) Average seconds of delay per vehicle.

Unsignalized Intersection of Troy Center Drive and PNC Site Driveway

The intersection of Troy Center Drive and PNC Site Driveway consists of stop controlled eastbound and westbound (WB) approaches with one eastbound lane that can make a left turn or through movement and one eastbound lane that can make a right turn. Troy Center Drive consists of two northbound lanes, with the rightmost lane supporting both through and right turn movements. The results of the LOS analysis for the unsignalized intersection of Troy Center Drive and PNC Site Driveway indicate that, under existing conditions, all approaches to the intersection operate at an LOS B or better during the AM and PM peak hours. With the small increase in background traffic, all approaches to the intersection operate at an LOS B or better during the AM and PM peak hours.

With the addition of site generated traffic, all approaches to the intersection would operate at an LOS B or better during the AM and PM peak hours. Therefore, the traffic generated by the proposed development would have a negligible impact on the operation of this intersection.

The operational results for the intersection of Troy Center Drive and PNC Site Driveway are presented in Tables 12 and 13.

Table 12
AM Peak Hour
LOS Analysis for Troy Center Drive and PNC Site Driveway

Approach	Existing	Background	Future
Eastbound PNC Site Driveway	B (10.5)	B (10.7)	B (10.7)
Westbound PNC Site Driveway	A (8.7)	A (8.7)	A (8.7)
Northbound Troy Center Drive	A (0.0)	A (0.0)	A (0.0)
Overall	**A (4.0)**	**A (4.0)**	**A (3.9)[1]**

(XX.X) Average seconds of delay per vehicle.
[1]Delay decreases due to rounding in HCM methodology

Table 13
PM Peak Hour
LOS Analysis for Troy Center Drive and PNC Site Driveway

Approach	Existing	Background	Future
Eastbound PNC Site Driveway	B (10.2)	B (10.3)	B (10.7)
Westbound PNC Site Driveway	A (9.5)	A (9.6)	A (9.8)
Northbound Troy Center Drive	A (0.0)	A (0.0)	A (0.0)
Overall	**A (5.2)**	**A (5.3)**	**A (5.0)[1]**

(XX.X) Average seconds of delay per vehicle.
[1]Delay decreases due to rounding in HCM methodology

Signalized Intersection of EB Big Beaver Road and WB to EB Crossover/Kelly Services Drive

The results of the LOS analysis for the signalized intersection of eastbound Big Beaver Road and westbound to eastbound crossover/Kelly Services Drive indicate that, under existing conditions, all approaches to the intersection operate at an LOS E or better during the AM and PM peak hours. With the increase in background traffic, all approaches to the intersection operate at an LOS E or better during the AM peak hour and at an LOS F in the PM peak hour. The LOS F on the northbound and southbound approaches in the PM hour may be caused by volume balancing completed by MDOT in the provided analysis files. A large number of vehicles exit the site the in PM, but no vehicles exit the site in the AM, which is not typical for an office building. It appears likely that traffic volume data was not collected and input into the MDOT analysis files, but rather that this intersection was used as a volume balancing node. Notwithstanding, with an actuated signal, signal timings and delays will vary throughout the peak hour, and delays experienced by motorists may be less than predicted by the model.

With the addition of site generated traffic, all approaches to the intersection would operate at an LOS E or better during the AM peak hour and at an LOS F in the PM peak hour, with a very minimal increase in delays. Therefore, the traffic generated by the proposed development would not have a noticeable impact on the operation of this intersection.

The operational results for the intersection of eastbound Big Beaver Road and westbound to eastbound crossover/Kelly Services Drive are presented in Tables 14 and 15.

Table 14
AM Peak Hour
LOS Analysis for EB Big Beaver Road and WB to EB Crossover/Kelly Services Drive

Approach	Existing	Background	Future
Eastbound Big Beaver Road	B (10.3)	B (14.3)	B (14.6)
Northbound Kelly Services Drive	A (0.0)	A (0.0)	A (0.0)
Southbound WB to EB Crossover	E (66.4)	E (78.4)	E (78.2)[1]
Overall	**C (24.7)**	**C (30.7)**	**C (30.8)**

(XX.X) Average seconds of delay per vehicle.
[1]Delay decreases due to rounding in HCM methodology.

Table 15
PM Peak Hour
LOS Analysis for EB Big Beaver Road and WB to EB Crossover/Kelly Services Drive

Approach	Existing	Background	Future
Eastbound Big Beaver Road	A (9.5)	B (10.8)	B (11.6)
Northbound Kelly Services Drive	E (75.7)	F (131.6)	F (131.6)
Southbound WB to EB Crossover	E (65.7)	F (122.4)	F(130.0)
Overall	**C (24.9)**	**D (40.2)**	**D (41.7)**

(XX.X) Average seconds of delay per vehicle.

Signalized Intersection of WB Big Beaver Road and EB to WB Crossover (East of Troy Center Drive)

The results of the LOS analysis for the signalized intersection of westbound Big Beaver Road and eastbound to westbound crossover indicate that, under existing conditions, all approaches to the intersection operate at an LOS C or better during the AM peak hour and at an LOS E or higher during the PM peak hour. With the increase in background traffic all approaches to the intersection operate at an LOS E or better during the AM and PM peak hours. This analysis does not account for gaps in traffic from upstream signals, which could allow vehicles to turn right on red, reducing the delay.

With the addition of site generated traffic, all approaches to the intersection would operate at an LOS E or better during the AM and PM peak hours. Therefore, the traffic generated by the proposed development would have a negligible impact on the operation of this intersection.

The operational results for the intersection of westbound Big Beaver Road and eastbound to westbound crossover are presented in Tables 16 and 17.

Table 16
AM Peak Hour
LOS Analysis for WB Big Beaver Road and EB to WB Crossover

Approach	Existing	Background	Future
Westbound Big Beaver Road	A (8.5)	A (5.9)[1]	A (5.9)
Northbound EB to WB Crossover	C (34.2)	E (73.2)	E (72.8)[1]
Overall	**A (9.2)**	**A (7.5)[1]**	**A (7.6)**

(XX.X) Average seconds of delay per vehicle.
[1]Delay decreases due to actuated signal timing.

Table 17
PM Peak Hour
LOS Analysis for WB Big Beaver Road and EB to WB Crossover

Approach	Existing	Background	Future
Westbound Big Beaver Road	A (6.1)	A (5.6)	A (5.7)
Northbound EB to WB Crossover	E (58.3)	E (59.7)	E (59.3)[1]
Overall	**B (12.9)**	**B (12.2)**	**B (12.3)**

(XX.X) Average seconds of delay per vehicle.
[1]Delay decreases due to actuated signal timing.

Existing Interchange of Big Beaver Road and I-75

The results of the LOS analysis for the existing interchange of Big Beaver Road and I-75 indicate that, under existing conditions, all approaches to the intersection operate at an LOS D or better during the AM and PM peak hours, with the exception of the westbound Big Beaver Road and southbound I-75 off-ramp, which operates at an LOS E in the AM peak hour.

The operational results for the existing interchange of Big Beaver Road and I-75 are presented in Table 18.

Table 18
LOS Analysis for Existing Big Beaver Road and I-75 Interchange

Intersection	Approach	Traffic Control	AM Peak	PM Peak
EB Big Beaver Road and NB I-75	Eastbound Big Beaver Road	Free	A (0.0)	A (0.2)
	NB I-75 On-Ramp	Free	A (0.2)	A (0.5)
	NB I-75 Off-Ramp	Stop Sign	D (34.2)	C (24.9)
EB Big Beaver Road and SB I-75	Eastbound Big Beaver Road	Signal	A (4.1)	B (15.8)
	SB I-75 On-Ramp	Free	A (0.5)	A (0.5)
	SB I-75 Off-Ramp	Signal	D (41.2)	D (54.2)
WB Big Beaver Road and NB I-75	Westbound Big Beaver Road	Signal	A (5.3)	A (1.4)
	NB I-75 On-Ramp	Free	A (0.2)	A (0.1)
	NB I-75 Off-Ramp	Signal	D (42.9)	D (47.6)
WB Big Beaver Road and SB I-75	Westbound Big Beaver Road	Signal	B (18.9)	A (8.1)
	SB I-75 On-Ramp	Free	A (0.1)	A (0.1)
	SB I-75 Off-Ramp	Signal	E (62.1)	D (39.4)

(XX.X) Average seconds of delay per vehicle.

Proposed Interchange of Big Beaver Road and I-75

MDOT is currently in the design phase for the reconstruction of the interchange of Big Beaver Road and I-75. The existing cloverleaf interchange will be removed, and a Diverging Diamond Interchange (DDI) will be built. The results of the LOS analysis for the proposed interchange of Big Beaver Road and I-75 indicate that, under background conditions, all approaches to the new intersections associated with the construction of a DDI operate at an LOS D or better during the AM and PM peak hours, with the exception of westbound Big Beaver Road and southbound I-75 which operates at an LOS E in the PM peak hour. These delays are considered acceptable for a major urban freeway interchange.

With the addition of site generated traffic, all approaches to the intersection would operate at an LOS D or better during the AM and PM peak hours, with the exception of westbound Big Beaver Road and southbound I-75 which operates at an LOS E in the PM peak hour. Therefore, the traffic generated by the proposed development would have a negligible impact on the operation of this intersection.

The operational results for the proposed interchange of Big Beaver Road and I-75 are presented in Tables 19 and 20.

Table 19
AM Peak Hour
LOS Analysis for Proposed Big Beaver Road and I-75 Interchange

Intersection	Approach	Traffic Control	Background	Future
EB Big Beaver Road and NB I-75	Eastbound Big Beaver Road	Signal	C (26.8)	C (27.0)
	NB I-75 On-Ramp	Free	A (8.0)	A (8.0)
	NB I-75 Off-Ramp	Signal	C (25.2)	C (25.2)
EB Big Beaver Road and SB I-75	Eastbound Big Beaver Road	Signal	D (49.6)	D (50.2)
	SB I-75 On-Ramp	Free	A (0.0)	A (0.0)
	SB I-75 Off-Ramp	Signal	B (13.8)	B (13.8)
WB Big Beaver Road and NB I-75	Westbound Big Beaver Road	Signal	B (19.6)	B (19.6)
	NB I-75 On-Ramp	Free	A (0.0)	A (0.0)
	NB I-75 Off-Ramp	Signal	C (29.2)	C (29.2)
WB Big Beaver Road and SB I-75	Westbound Big Beaver Road	Signal	D (42.2)	D (42.3)
	SB I-75 On-Ramp	Free	A (7.5)	A (7.5)
	SB I-75 Off-Ramp	Signal	D (51.4)	D (51.4)

Table 20
PM Peak Hour
LOS Analysis for Proposed Big Beaver Road and I-75 Interchange

Intersection	Approach	Traffic Control	Background	Future
EB Big Beaver Road and NB I-75	Eastbound Big Beaver Road	Signal	C (34.8)	D (36.0)
	NB I-75 On-Ramp	Free	A (9.5)	A (9.5)
	NB I-75 Off-Ramp	Signal	C (31.7)	C (31.7)
EB Big Beaver Road and SB I-75	Eastbound Big Beaver Road	Signal	C (34.8)	C (34.8)
	SB I-75 On-Ramp	Free	A (0.0)	A (0.0)
	SB I-75 Off-Ramp	Signal	C (25.9)	C (25.9)
WB Big Beaver Road and NB I-75	Westbound Big Beaver Road	Signal	D (47.6)	D (49.9)
	NB I-75 On-Ramp	Free	A (0.0)	A (0.0)
	NB I-75 Off-Ramp	Signal	B (17.7)	B (17.7)
WB Big Beaver Road and SB I-75	Westbound Big Beaver Road	Signal	E (74.4)	E (75.5)
	SB I-75 On-Ramp	Free	A (7.5)	A (7.5)
	SB I-75 Off-Ramp	Signal	C (27.2)	C (27.2)

Conclusions and Recommendations for the Traffic Impact Assessment

The proposed project consists of a 140-room hotel and a 7,550-square-foot quality restaurant. The proposed development will have access to Troy Center Drive via two existing approaches and access to Big Beaver Road via one existing approach. The proposed development is forecast to generate 71 trips during the AM peak hour (41 inbound and 30 outbound from the site) and 138 trips during the PM peak hour (80 inbound and 58 outbound from the site).

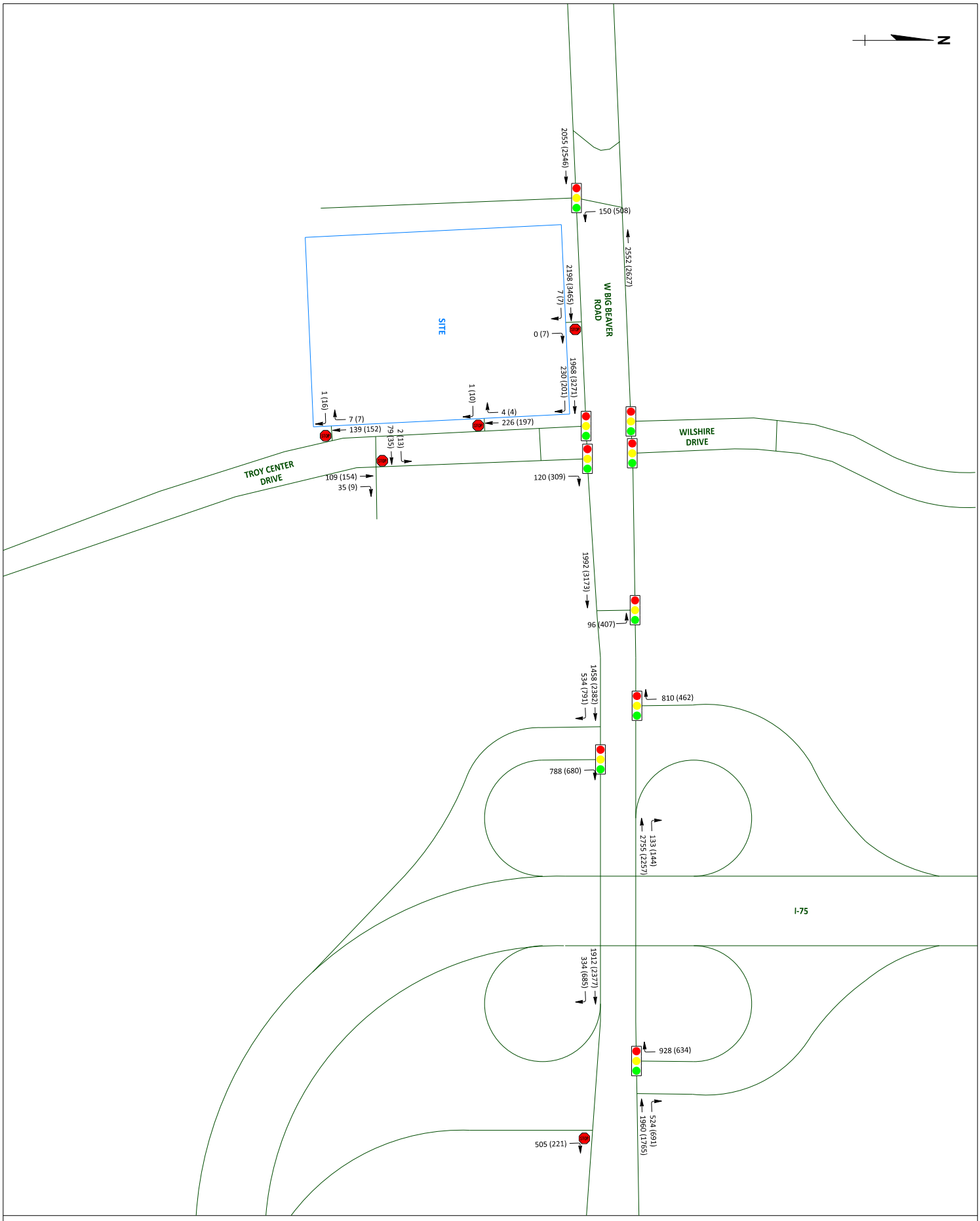
An operational analysis was performed for existing, background and total future conditions for the intersections of:

- Big Beaver Road and Site Driveway 1
- Big Beaver Road and Troy Center Drive
- Troy Center Drive and Site Driveway 2
- Troy Center Drive and Site Driveway 3
- Troy Center Drive and PNC Site Driveway
- Eastbound Big Beaver Road and westbound to eastbound crossover/Kelly Services Drive (west of Troy Center Drive)
- Westbound Big Beaver Road and eastbound to westbound crossover (east of Troy Center Drive)
- All signalized and stop controlled intersections in the I-75/Big Beaver Road interchange

The operational analysis indicated that most approaches of the intersections studied would operate at acceptable levels during both the AM and PM peak hours. The northbound approach of the site driveway exiting onto Big Beaver Road, the northbound approach of Troy Center Drive turning onto Big Beaver Road, and the northbound approach to the eastbound to westbound crossover experience larger delays and an LOS E or F in existing, background, and future traffic scenarios. This analysis does not account for the close proximity of the upstream signals that can create gaps in traffic flow for turning vehicles to utilize, thereby decreasing the delay experienced by vehicles. All delays experienced by motorists are considered acceptable.

Attachments

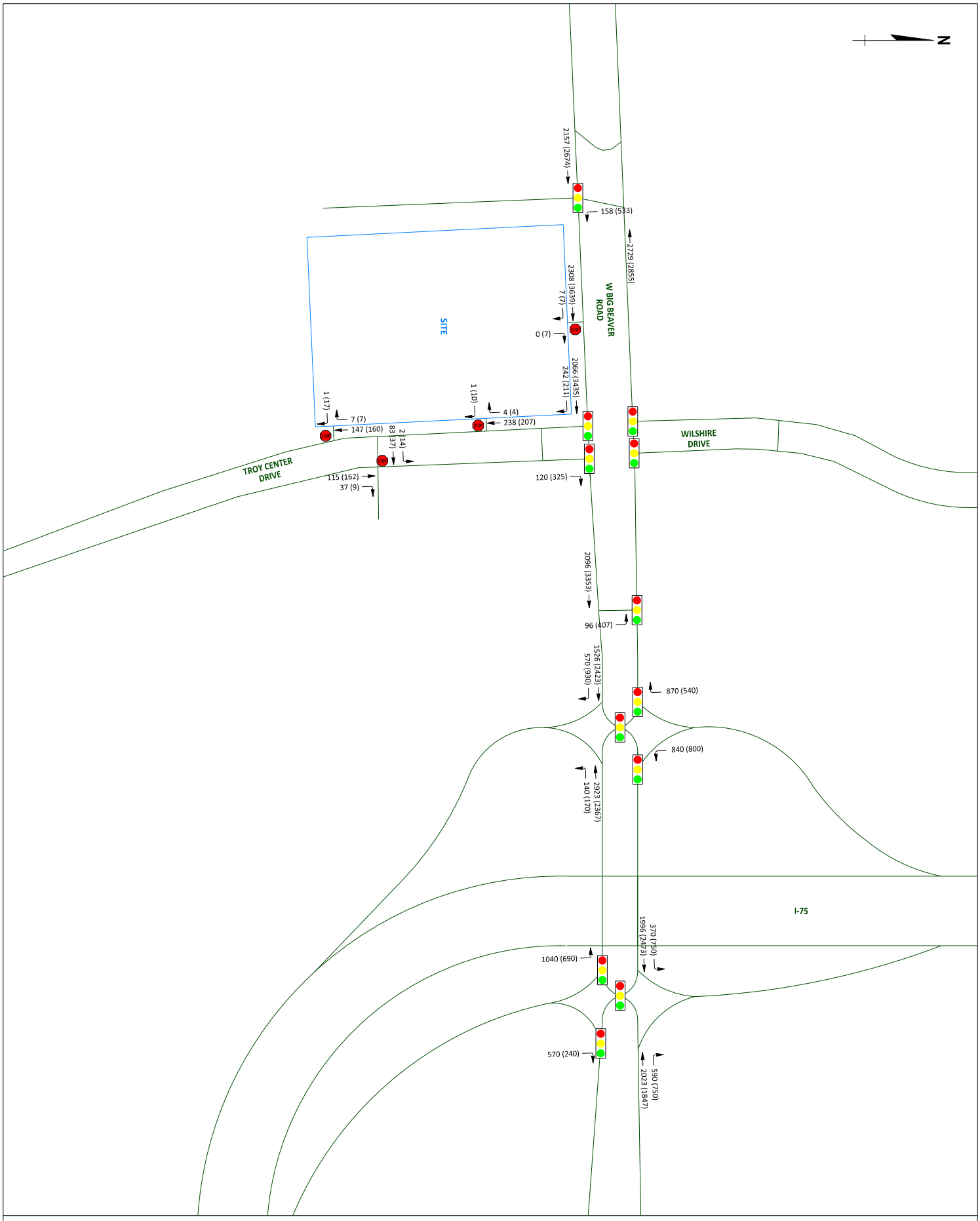
REPORT FIGURES



2019 EXISTING AM (PM) PEAK HOUR TRAFFIC VOLUMES

FIGURE 1

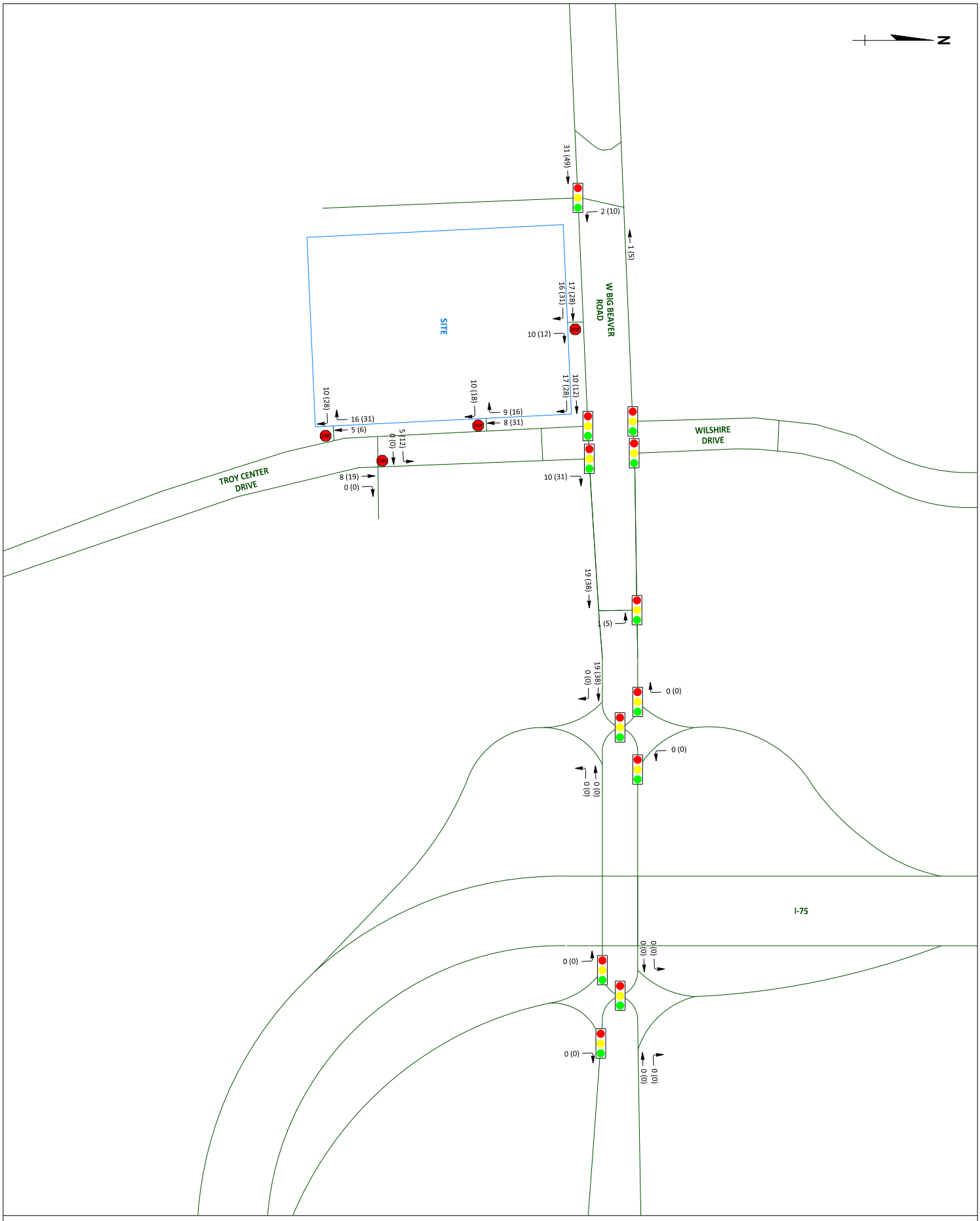
ROWE PROFESSIONAL SERVICES COMPANY



2040 TOTAL BACKGROUND AM (PM) PEAK HOUR TRAFFIC VOLUMES

FIGURE 2

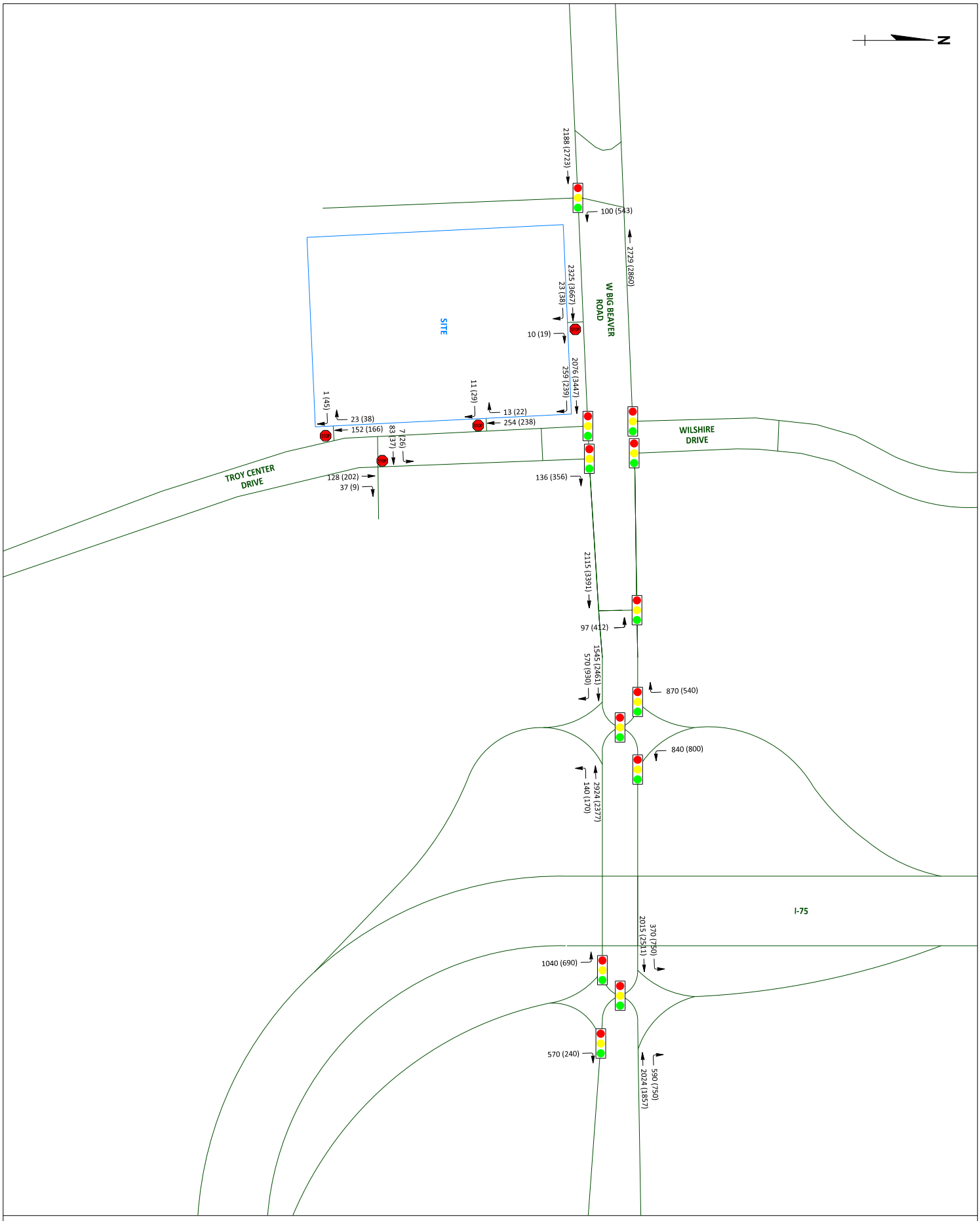
ROWE PROFESSIONAL SERVICES COMPANY



SITE GENERATED AM (PM) PEAK HOUR TRAFFIC VOLUMES

FIGURE 3

ROWE PROFESSIONAL SERVICES COMPANY



2020 TOTAL FUTURE AM (PM) PEAK HOUR TRAFFIC VOLUMES

FIGURE 4

ROWE PROFESSIONAL SERVICES COMPANY

TRAFFIC COUNTS

Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 4SY NE

File Name : TMC_1 EB Big Beaver & Site Dw_8-14-19
Site Code : TMC_1
Start Date : 8/14/2019
Page No : 1

4 Hour traffic study was conducted during typical weekday (Wednesday) from 7:00 AM - 9:00 AM morning & 4:00 PM - 6:00 PM afternoon peak hours, while school was not in session.

Groups Printed- Pass Cars - Single Units - Heavy Trucks - Peds

	EB Big Beaver Road Westbound				Site Dw. 801 Big Beaver Northbound				EB Big Beaver Road Eastbound				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	1	0	0	1	4	279	0	283	284
07:15 AM	0	0	0	0	0	0	0	0	1	315	0	316	316
07:30 AM	0	0	0	0	0	0	1	1	0	343	0	343	344
07:45 AM	0	0	0	0	0	0	0	0	0	345	0	345	345
Total	0	0	0	0	1	0	1	2	5	1282	0	1287	1289
08:00 AM	0	0	0	0	0	0	0	0	2	363	0	365	365
08:15 AM	0	0	0	0	0	0	0	0	4	396	0	400	400
08:30 AM	0	0	0	0	0	0	0	0	0	333	0	333	333
08:45 AM	0	0	0	0	0	0	2	2	1	410	0	411	413
Total	0	0	0	0	0	0	2	2	7	1502	0	1509	1511
*** BREAK ***													
04:00 PM	0	0	0	0	0	0	0	0	7	459	0	466	466
04:15 PM	0	0	0	0	3	0	0	3	3	481	0	484	487
04:30 PM	0	0	0	0	2	0	0	2	2	492	0	494	496
04:45 PM	0	0	0	0	0	0	1	1	3	464	0	467	468
Total	0	0	0	0	5	0	1	6	15	1896	0	1911	1917
05:00 PM	0	0	0	0	3	0	0	3	1	530	0	531	534
05:15 PM	0	0	0	0	3	0	0	3	2	489	0	491	494
05:30 PM	0	0	0	0	1	0	0	1	1	496	0	497	498
05:45 PM	0	0	0	0	0	0	1	1	3	452	0	455	456
Total	0	0	0	0	7	0	1	8	7	1967	0	1974	1982
Grand Total	0	0	0	0	13	0	5	18	34	6647	0	6681	6699
Apprch %	0	0	0		72.2	0	27.8		0.5	99.5	0		
Total %	0	0	0	0	0.2	0	0.1	0.3	0.5	99.2	0	99.7	
Pass Cars	0	0	0	0	13	0	0	13	34	6538	0	6572	6585
% Pass Cars	0	0	0	0	100	0	0	72.2	100	98.4	0	98.4	98.3
Single Units	0	0	0	0	0	0	0	0	0	81	0	81	81
% Single Units	0	0	0	0	0	0	0	0	0	1.2	0	1.2	1.2
Heavy Trucks	0	0	0	0	0	0	0	0	0	28	0	28	28
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0.4	0	0.4	0.4
Peds	0	0	0	0	0	0	5	5	0	0	0	0	5
% Peds	0	0	0	0	0	0	100	27.8	0	0	0	0	0.1

TDC Traffic Comments: Non-signalized "T" intersection. Video VCU camera was located within NE intersection quadrant. Note: Peds. are excluded from peak hour reports. Traffic study was performed for Troy Center Drive Traffic Impact Study for ROWE Professional Services Company.

Traffic Data Collection, LLC

www:tdccounts.com

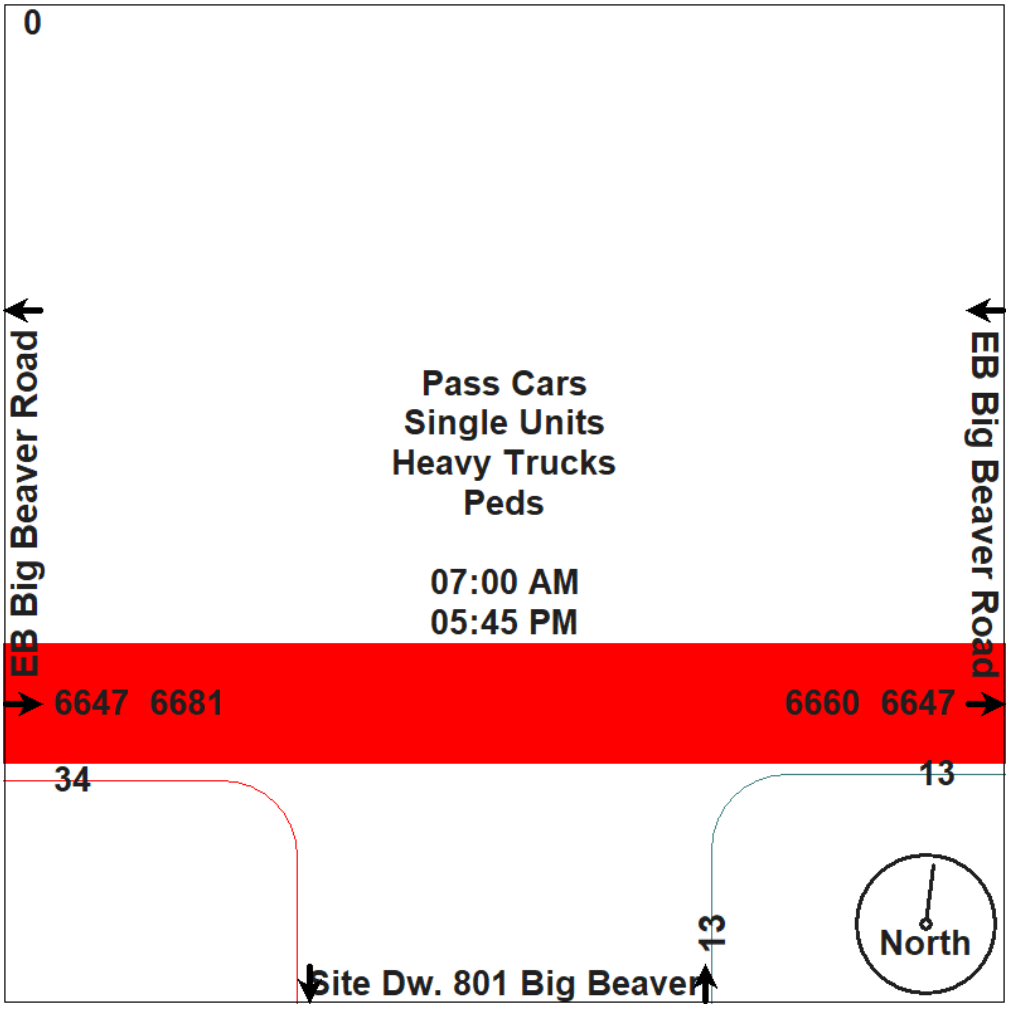
Phone: 586.786-5407

Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 4SY NE

File Name : TMC_1 EB Big Beaver & Site Dw_8-14-19
Site Code : TMC_1
Start Date : 8/14/2019
Page No : 2



Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

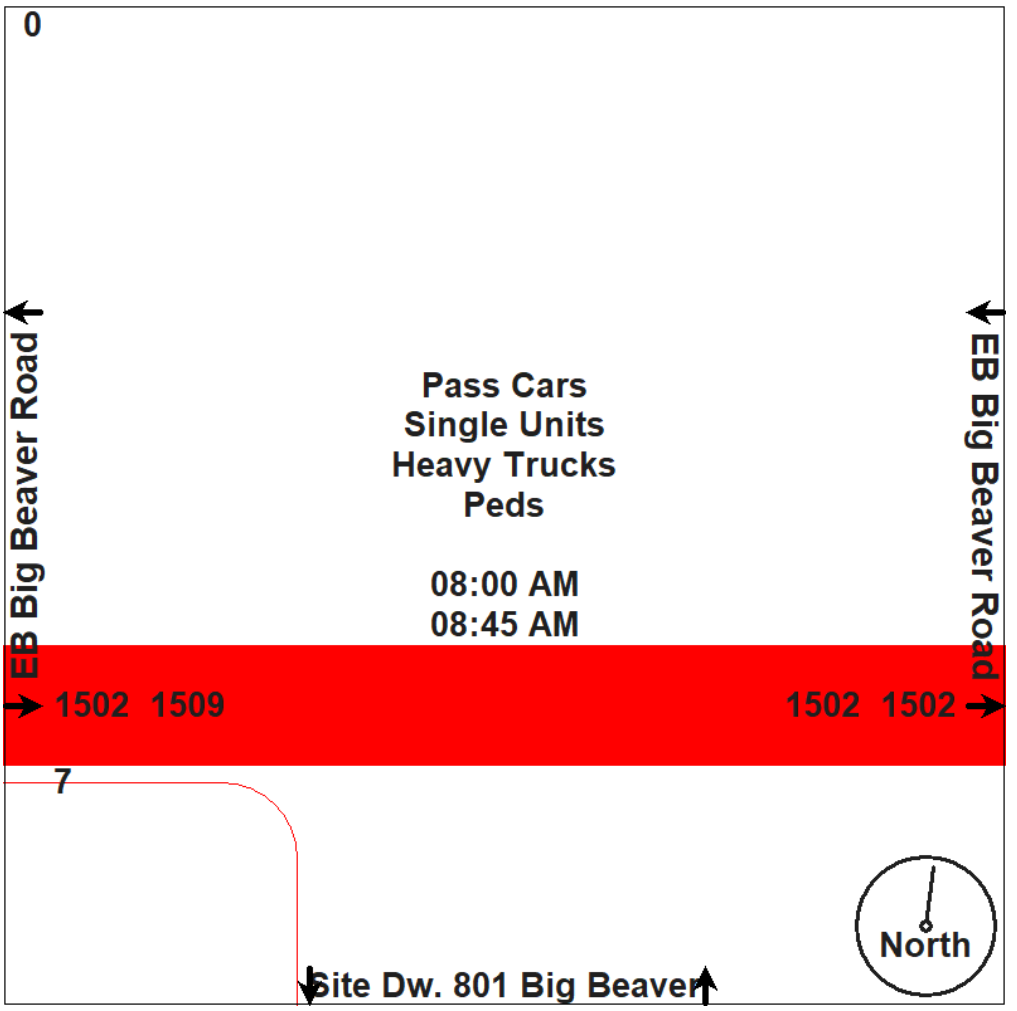
Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 4SY NE

File Name : TMC_1 EB Big Beaver & Site Dw_8-14-19
Site Code : TMC_1
Start Date : 8/14/2019
Page No : 3

	EB Big Beaver Road Westbound			Site Dw. 801 Big Beaver Northbound			EB Big Beaver Road Eastbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	0	0	0	0	0	0	2	363	365	365
08:15 AM	0	0	0	0	0	0	**4**	396	400	400
08:30 AM	0	0	0	0	0	0	0	333	333	333
08:45 AM	0	0	0	0	0	0	1	**410**	**411**	**411**
Total Volume	0	0	0	0	0	0	7	1502	1509	1509
% App. Total	0	0		0	0		0.5	99.5		
PHF	.000	.000	.000	.000	.000	.000	.438	.916	.918	.918
Pass Cars	0	0	0	0	0	0	7	1472	1479	1479
% Pass Cars	0	0	0	0	0	0	100	98.0	98.0	98.0
Single Units	0	0	0	0	0	0	0	24	24	24
% Single Units	0	0	0	0	0	0	0	1.6	1.6	1.6
Heavy Trucks	0	0	0	0	0	0	0	6	6	6
% Heavy Trucks	0	0	0	0	0	0	0	0.4	0.4	0.4
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



Traffic Data Collection, LLC

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Phone: 586.786-5407

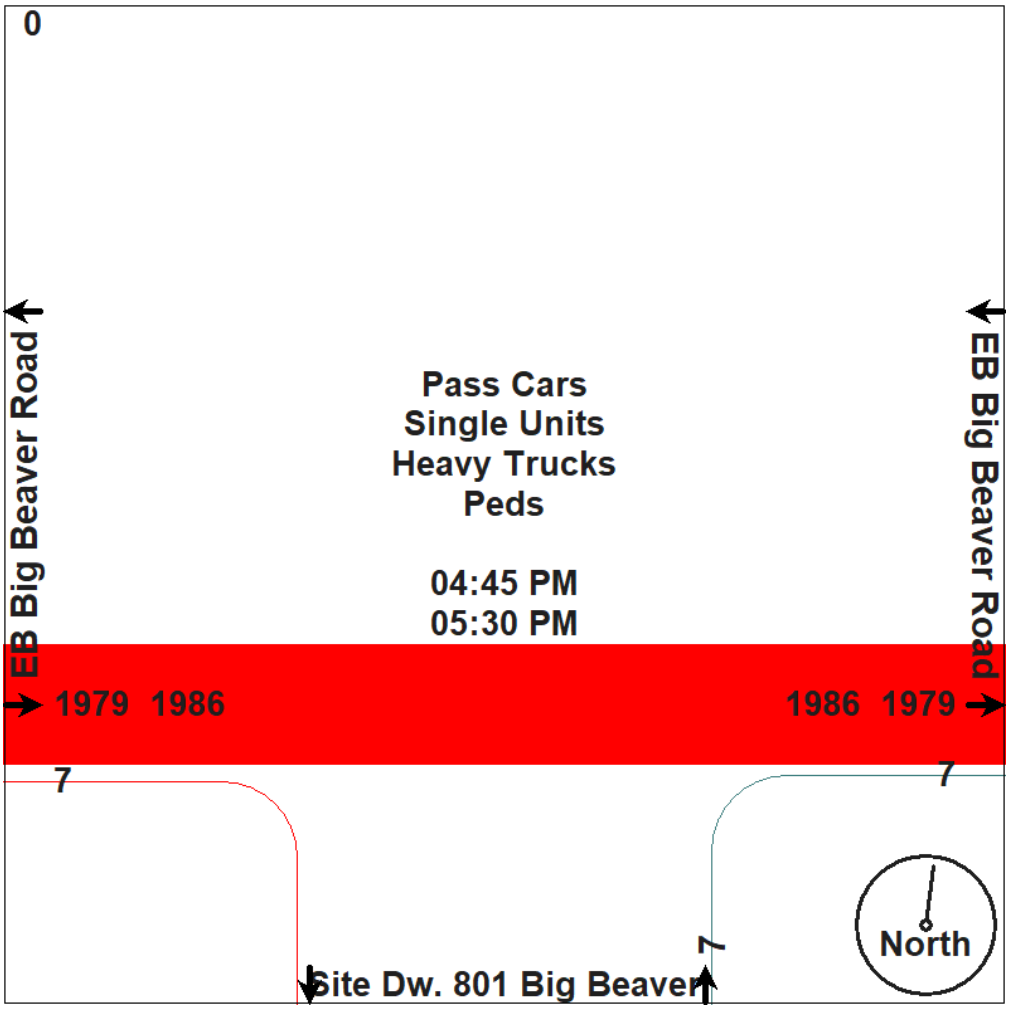
Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 4SY NE

File Name : TMC_1 EB Big Beaver & Site Dw_8-14-19
Site Code : TMC_1
Start Date : 8/14/2019
Page No : 4

	EB Big Beaver Road Westbound			Site Dw. 801 Big Beaver Northbound			EB Big Beaver Road Eastbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	0	0	0	0	0	0	**3**	464	467	467
05:00 PM	0	0	0	**3**	0	**3**	1	**530**	**531**	**534**
05:15 PM	0	0	0	3	0	3	2	489	491	494
05:30 PM	0	0	0	1	0	1	1	496	497	498
Total Volume	0	0	0	7	0	7	7	1979	1986	1993
% App. Total	0	0		100	0		0.4	99.6		
PHF	.000	.000	.000	.583	.000	.583	.583	.933	.935	.933
Pass Cars	0	0	0	7	0	7	7	1957	1964	1971
% Pass Cars	0	0	0	100	0	100	100	98.9	98.9	98.9
Single Units	0	0	0	0	0	0	0	15	15	15
% Single Units	0	0	0	0	0	0	0	0.8	0.8	0.8
Heavy Trucks	0	0	0	0	0	0	0	7	7	7
% Heavy Trucks	0	0	0	0	0	0	0	0.4	0.4	0.4
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 4SY NE

File Name : TMC_1 EB Big Beaver & Site Dw_8-14-19
Site Code : TMC_1
Start Date : 8/14/2019
Page No : 5

Aerial Photo

Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 6H3 SE

File Name : TMC_2 SB Troy Center & North Site Dw_8-14-19
Site Code : TMC_2
Start Date : 8/14/2019
Page No : 1

4 Hour traffic study was conducted during typical weekday (Thursday) from 7:00 AM - 9:00 AM morning & 4:00 PM - 6:00 PM afternoon peak hours, while school was not in session.

Groups Printed- Pass Cars - Single Units - Heavy Trucks - Peds

	SB Troy Center Drive Southbound				SB Troy Center Drive Northbound				North Site Dw. 801 Big Beaver Eastbound				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
07:00 AM	1	37	0	38	0	0	0	0	2	0	0	2	40
07:15 AM	0	54	0	54	0	0	0	0	0	0	1	1	55
07:30 AM	0	47	0	47	0	0	0	0	0	0	0	0	47
07:45 AM	1	55	0	56	0	0	0	0	0	0	0	0	56
Total	2	193	0	195	0	0	0	0	2	0	1	3	198
08:00 AM	1	56	0	57	0	0	0	0	1	0	0	1	58
08:15 AM	1	54	0	55	0	0	0	0	0	0	0	0	55
08:30 AM	1	52	0	53	0	0	0	0	0	0	0	0	53
08:45 AM	1	64	0	65	0	0	0	0	0	0	1	1	66
Total	4	226	0	230	0	0	0	0	1	0	1	2	232
*** BREAK ***													
04:00 PM	3	41	0	44	0	0	0	0	11	0	0	11	55
04:15 PM	1	39	0	40	0	0	0	0	5	0	1	6	46
04:30 PM	2	47	0	49	0	0	0	0	3	0	0	3	52
04:45 PM	2	45	0	47	0	0	0	0	1	0	0	1	48
Total	8	172	0	180	0	0	0	0	20	0	1	21	201
05:00 PM	0	55	0	55	0	0	0	0	2	0	0	2	57
05:15 PM	0	50	0	50	0	0	0	0	4	0	0	4	54
05:30 PM	0	39	1	40	0	0	0	0	1	0	0	1	41
05:45 PM	0	41	0	41	0	0	0	0	1	0	0	1	42
Total	0	185	1	186	0	0	0	0	8	0	0	8	194
Grand Total	14	776	1	791	0	0	0	0	31	0	3	34	825
Apprch %	1.8	98.1	0.1		0	0	0		91.2	0	8.8		
Total %	1.7	94.1	0.1	95.9	0	0	0	0	3.8	0	0.4	4.1	
Pass Cars	14	770	0	784	0	0	0	0	31	0	0	31	815
% Pass Cars	100	99.2	0	99.1	0	0	0	0	100	0	0	91.2	98.8
Single Units	0	6	0	6	0	0	0	0	0	0	0	0	6
% Single Units	0	0.8	0	0.8	0	0	0	0	0	0	0	0	0.7
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Peds	0	0	1	1	0	0	0	0	0	0	3	3	4
% Peds	0	0	100	0.1	0	0	0	0	0	0	100	8.8	0.5

TDC Traffic Comments: Non-signalized "T" intersection. Video VCU camera was located within SE intersection quadrant. Note: Peds. are excluded from peak hour reports. Traffic study was performed for Troy Center Drive Traffic Impact Study for ROWE Professional Services Company.

Traffic Data Collection, LLC

www:tdccounts.com

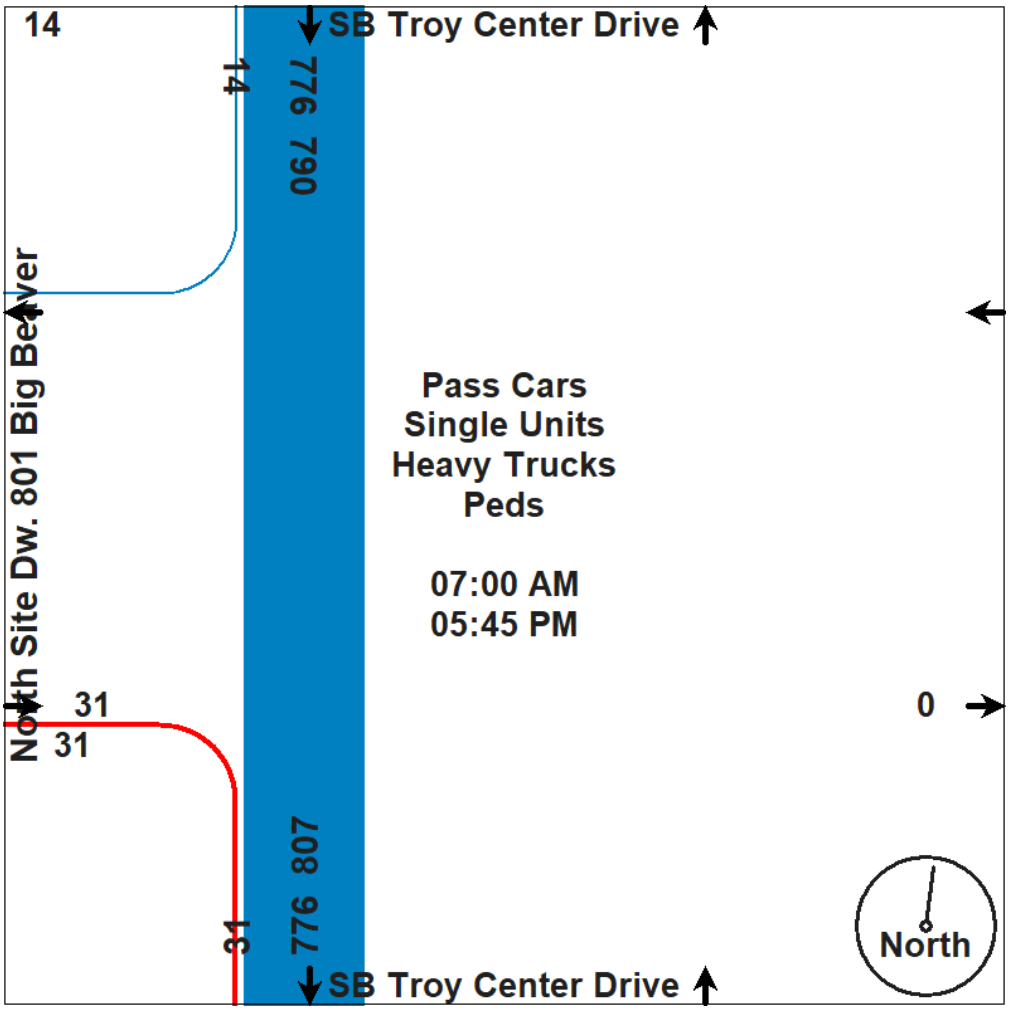
Phone: 586.786-5407

Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 6H3 SE

File Name : TMC_2 SB Troy Center & North Site Dw_8-14-19
Site Code : TMC_2
Start Date : 8/14/2019
Page No : 2



Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

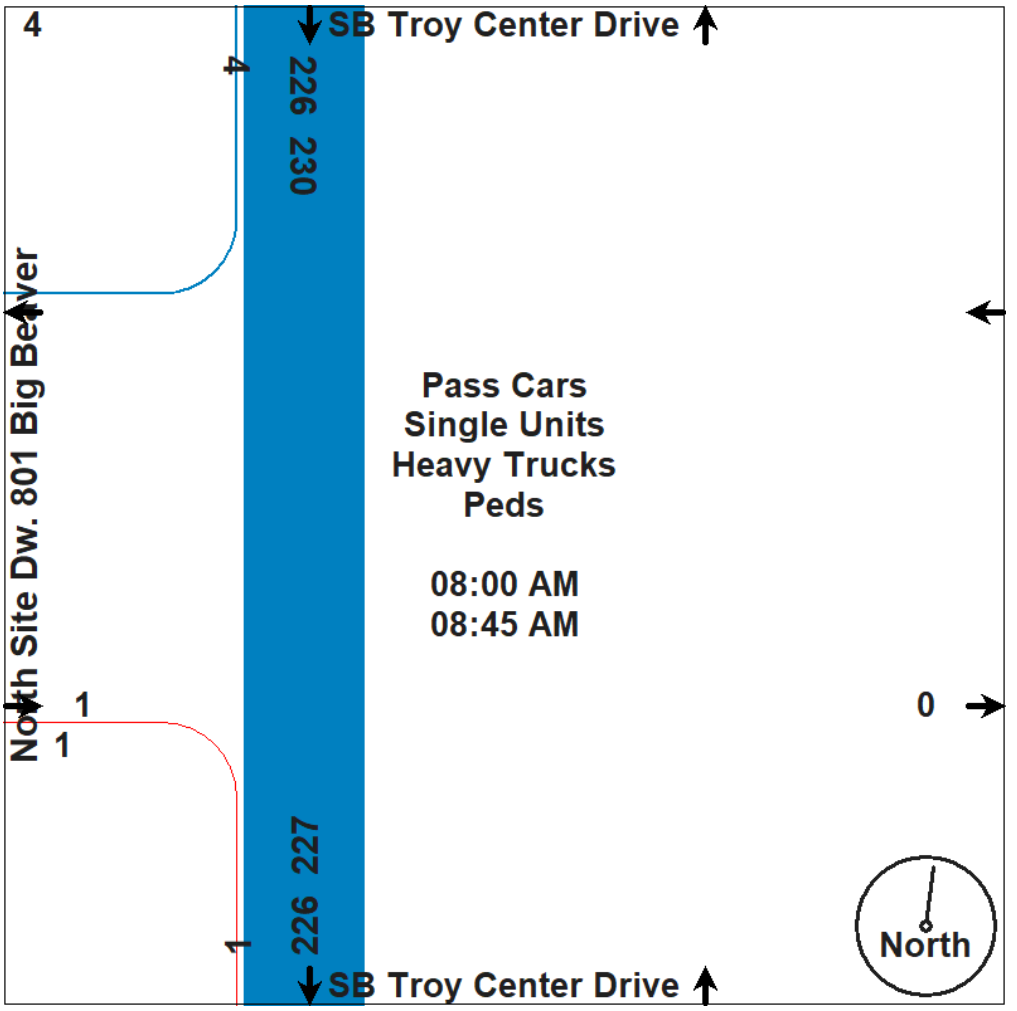
Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 6H3 SE

File Name : TMC_2 SB Troy Center & North Site Dw_8-14-19
Site Code : TMC_2
Start Date : 8/14/2019
Page No : 3

	SB Troy Center Drive Southbound			SB Troy Center Drive Northbound			North Site Dw. 801 Big Beaver Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**1**	56	57	0	0	0	**1**	0	**1**	58
08:15 AM	1	54	55	0	0	0	0	0	0	55
08:30 AM	1	52	53	0	0	0	0	0	0	53
08:45 AM	1	**64**	**65**	0	0	0	0	0	0	**65**
Total Volume	4	226	230	0	0	0	1	0	1	231
% App. Total	1.7	98.3		0	0		100	0		
PHF	1.00	.883	.885	.000	.000	.000	.250	.000	.250	.888
Pass Cars	4	223	227	0	0	0	1	0	1	228
% Pass Cars	100	98.7	98.7	0	0	0	100	0	100	98.7
Single Units	0	3	3	0	0	0	0	0	0	3
% Single Units	0	1.3	1.3	0	0	0	0	0	0	1.3
Heavy Trucks	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

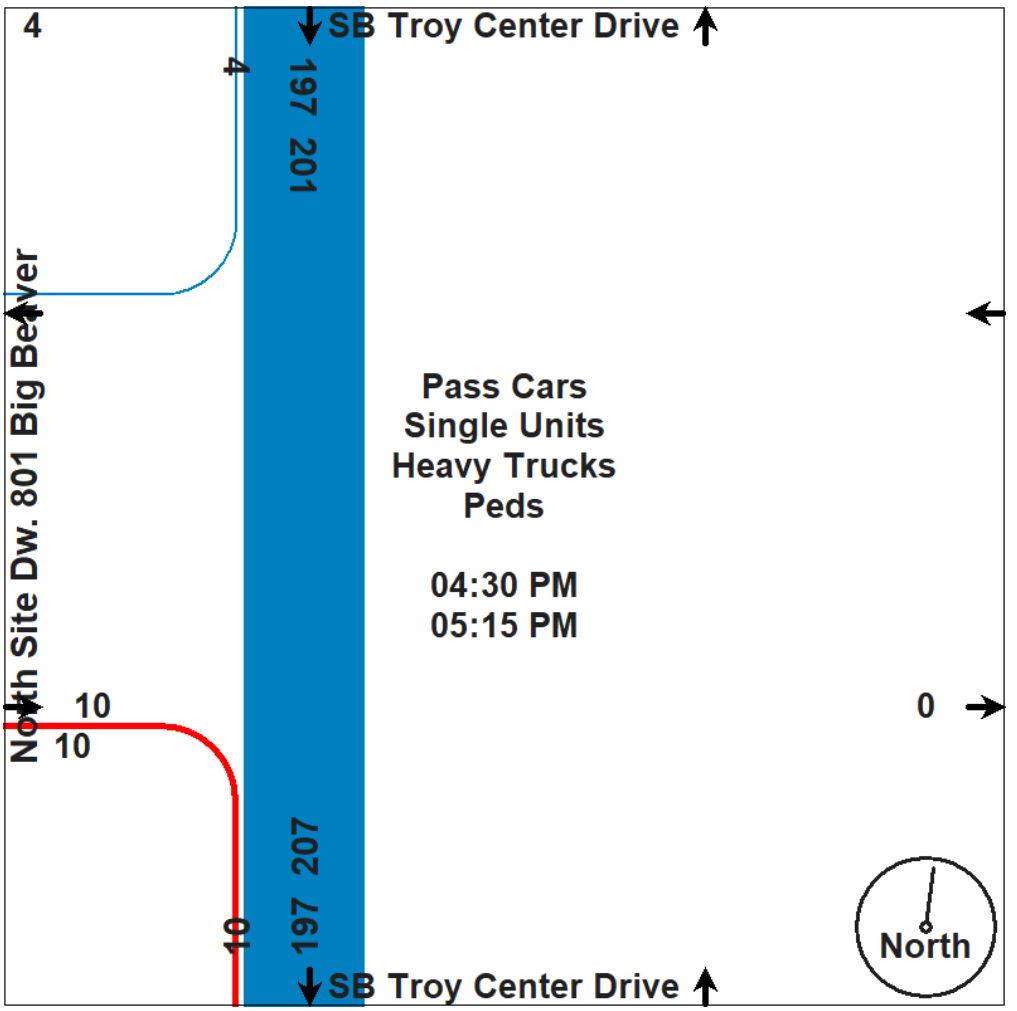
Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 6H3 SE

File Name : TMC_2 SB Troy Center & North Site Dw_8-14-19
Site Code : TMC_2
Start Date : 8/14/2019
Page No : 4

	SB Troy Center Drive Southbound			SB Troy Center Drive Northbound			North Site Dw. 801 Big Beaver Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	**2**	47	49	0	0	0	3	0	3	52
04:45 PM	2	45	47	0	0	0	1	0	1	48
05:00 PM	0	**55**	**55**	0	0	0	2	0	2	**57**
05:15 PM	0	50	50	0	0	0	**4**	0	**4**	54
Total Volume	4	197	201	0	0	0	10	0	10	211
% App. Total	2	98		0	0		100	0		
PHF	.500	.895	.914	.000	.000	.000	.625	.000	.625	.925
Pass Cars	4	197	201	0	0	0	10	0	10	211
% Pass Cars	100	100	100	0	0	0	100	0	100	100
Single Units	0	0	0	0	0	0	0	0	0	0
% Single Units	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

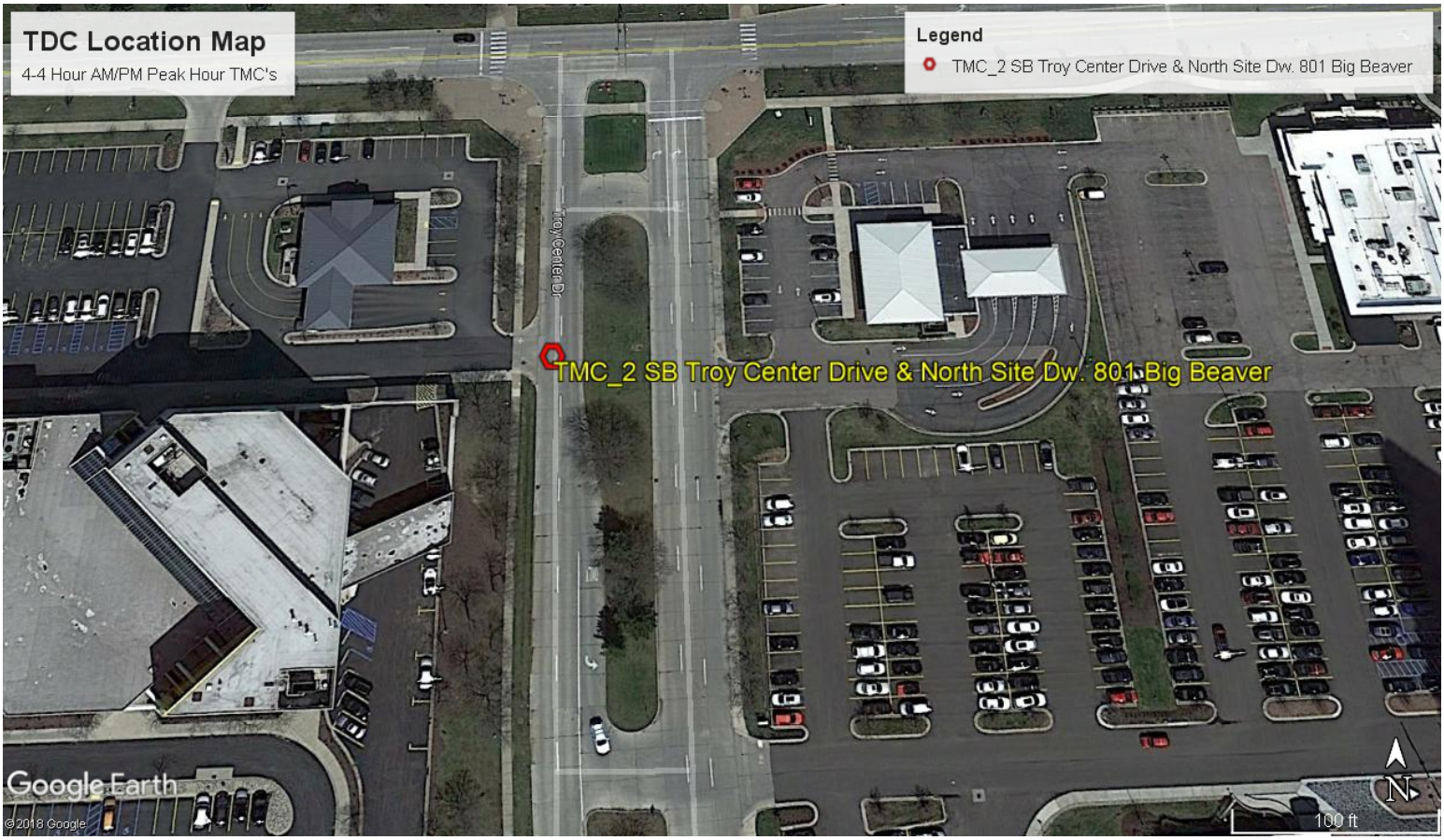
Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 6H3 SE

File Name : TMC_2 SB Troy Center & North Site Dw_8-14-19
Site Code : TMC_2
Start Date : 8/14/2019
Page No : 5

Aerial Photo



Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 5DW SE

File Name : TMC_3 SB Troy Center & South Site Dw_8-14-19
Site Code : TMC_3
Start Date : 8/14/2019
Page No : 1

4 Hour traffic study was conducted during typical weekday (Thursday) from 7:00 AM - 9:00 AM morning & 4:00 PM - 6:00 PM afternoon peak hours, while school was not in session.

Groups Printed- Pass Cars - Single Units - Heavy Trucks - Peds

	SB Troy Center Drive Southbound				SB Troy Center Drive Northbound				South Site Dw. 801 Big Beaver Eastbound				
Start Time	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Int. Total
07:00 AM	1	21	0	22	0	0	0	0	0	0	0	0	22
07:15 AM	1	29	0	30	0	0	0	0	0	0	0	0	30
07:30 AM	0	33	0	33	0	0	0	0	0	0	0	0	33
07:45 AM	0	31	0	31	0	0	0	0	0	0	0	0	31
Total	2	114	0	116	0	0	0	0	0	0	0	0	116
08:00 AM	3	41	0	44	0	0	0	0	0	0	0	0	44
08:15 AM	0	32	0	32	0	0	0	0	0	0	0	0	32
08:30 AM	2	29	0	31	0	0	0	0	0	0	0	0	31
08:45 AM	2	46	0	48	0	0	0	0	1	0	1	2	50
Total	7	148	0	155	0	0	0	0	1	0	1	2	157
*** BREAK ***													
04:00 PM	0	37	1	38	0	0	0	0	2	0	0	2	40
04:15 PM	2	29	0	31	0	0	0	0	7	0	1	8	39
04:30 PM	4	34	0	38	0	0	0	0	2	0	0	2	40
04:45 PM	1	34	0	35	0	0	0	0	2	0	0	2	37
Total	7	134	1	142	0	0	0	0	13	0	1	14	156
05:00 PM	0	51	0	51	0	0	0	0	5	0	0	5	56
05:15 PM	1	33	0	34	0	0	0	0	0	0	0	0	34
05:30 PM	1	35	0	36	0	0	0	0	1	0	0	1	37
05:45 PM	0	19	0	19	0	0	0	0	2	0	0	2	21
Total	2	138	0	140	0	0	0	0	8	0	0	8	148
Grand Total	18	534	1	553	0	0	0	0	22	0	2	24	577
Apprch %	3.3	96.6	0.2		0	0	0		91.7	0	8.3		
Total %	3.1	92.5	0.2	95.8	0	0	0	0	3.8	0	0.3	4.2	
Pass Cars	18	533	0	551	0	0	0	0	22	0	0	22	573
% Pass Cars	100	99.8	0	99.6	0	0	0	0	100	0	0	91.7	99.3
Single Units	0	1	0	1	0	0	0	0	0	0	0	0	1
% Single Units	0	0.2	0	0.2	0	0	0	0	0	0	0	0	0.2
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0
Peds	0	0	1	1	0	0	0	0	0	0	2	2	3
% Peds	0	0	100	0.2	0	0	0	0	0	0	100	8.3	0.5

TDC Traffic Comments: Non-signalized "T" intersection. Video VCU camera was located within SE intersection quadrant. Note: Peds. are excluded from peak hour reports. Traffic study was performed for Troy Center Drive Traffic Impact Study for ROWE Professional Services Company.

Traffic Data Collection, LLC

www:tdccounts.com

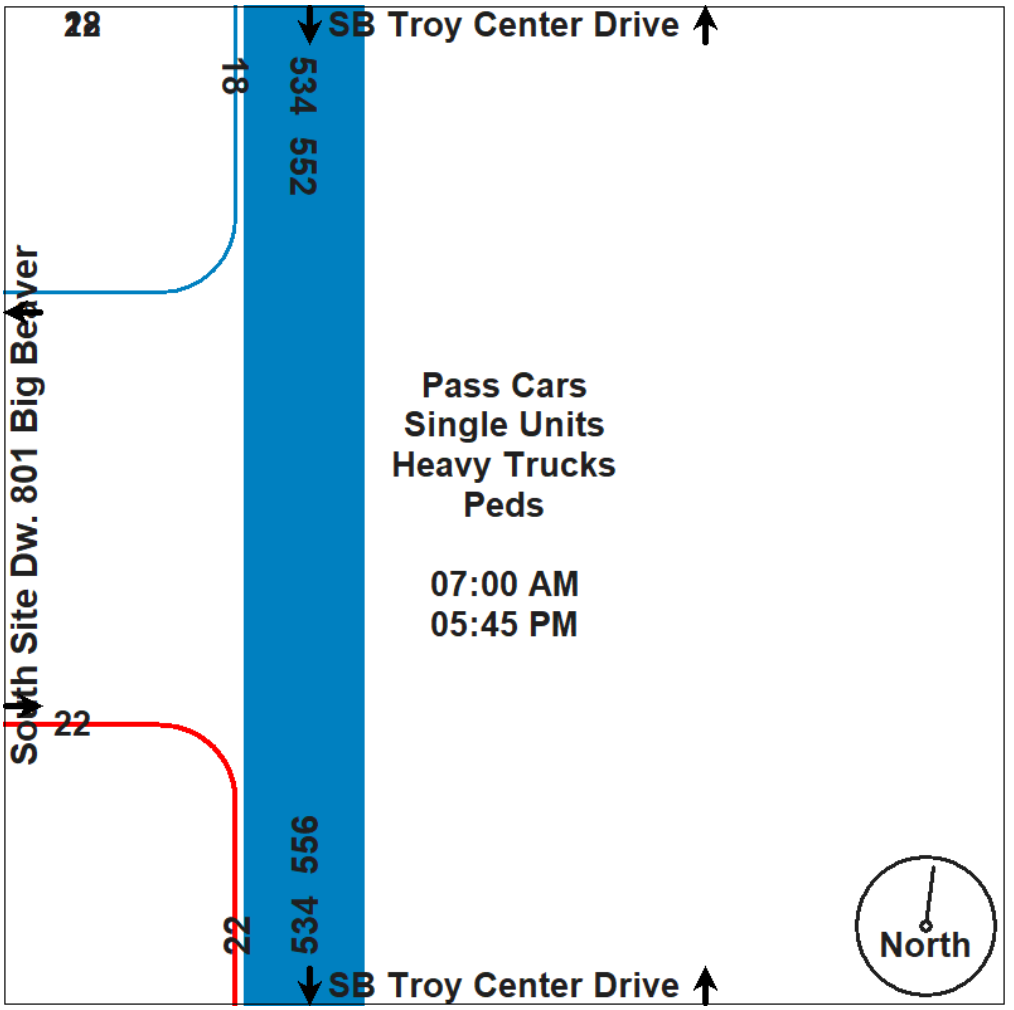
Phone: 586.786-5407

Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 5DW SE

File Name : TMC_3 SB Troy Center & South Site Dw_8-14-19
Site Code : TMC_3
Start Date : 8/14/2019
Page No : 2



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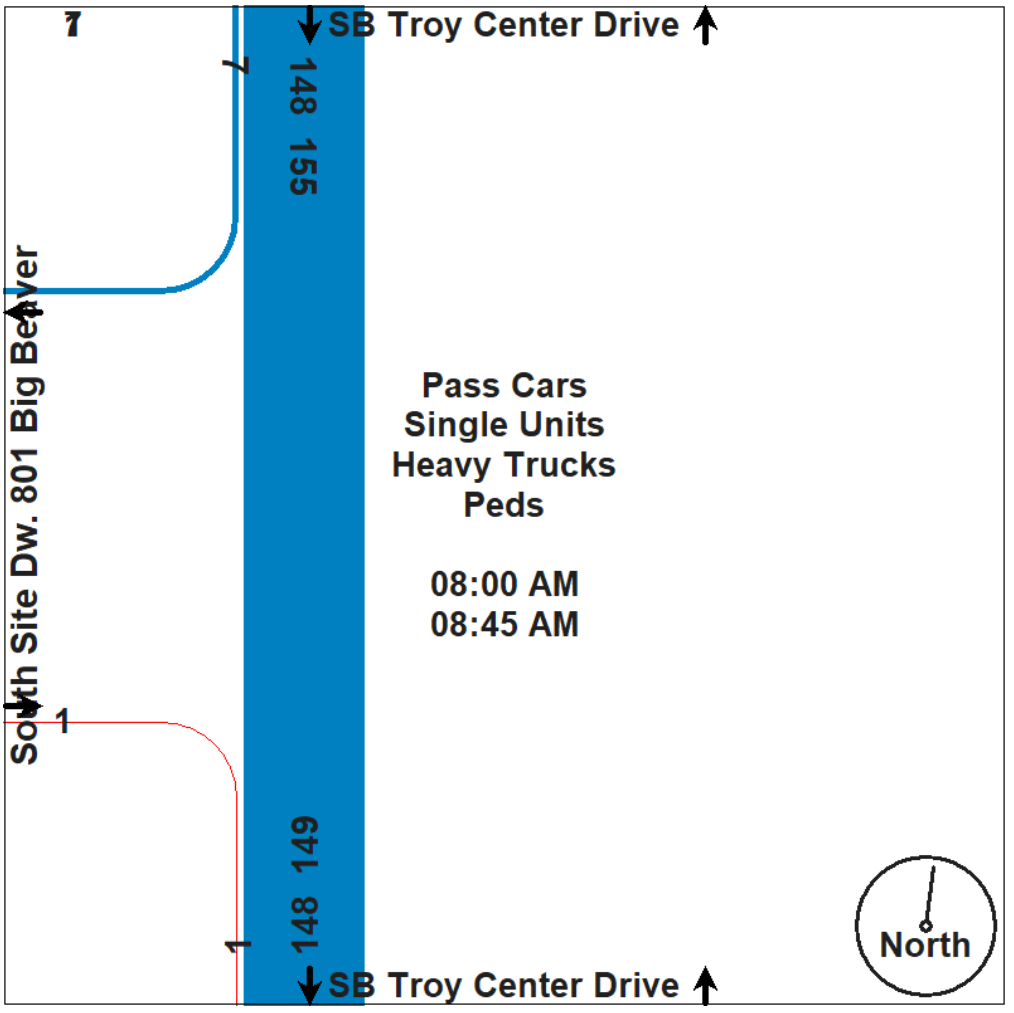
Count By Miovision Video VCU 5DW SE

File Name : TMC_3 SB Troy Center & South Site Dw_8-14-19
Site Code : TMC_3
Start Date : 8/14/2019
Page No : 3

	SB Troy Center Drive Southbound			SB Troy Center Drive Northbound			South Site Dw. 801 Big Beaver Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**3**	41	44	0	0	0	0	0	0	44
08:15 AM	0	32	32	0	0	0	0	0	0	32
08:30 AM	2	29	31	0	0	0	0	0	0	31
08:45 AM	2	**46**	**48**	0	0	0	**1**	0	**1**	**49**
Total Volume	7	148	155	0	0	0	1	0	1	156
% App. Total	4.5	95.5		0	0		100	0		
PHF	.583	.804	.807	.000	.000	.000	.250	.000	.250	.796
Pass Cars	7	147	154	0	0	0	1	0	1	155
% Pass Cars	100	99.3	99.4	0	0	0	100	0	100	99.4
Single Units	0	1	1	0	0	0	0	0	0	1
% Single Units	0	0.7	0.6	0	0	0	0	0	0	0.6
Heavy Trucks	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



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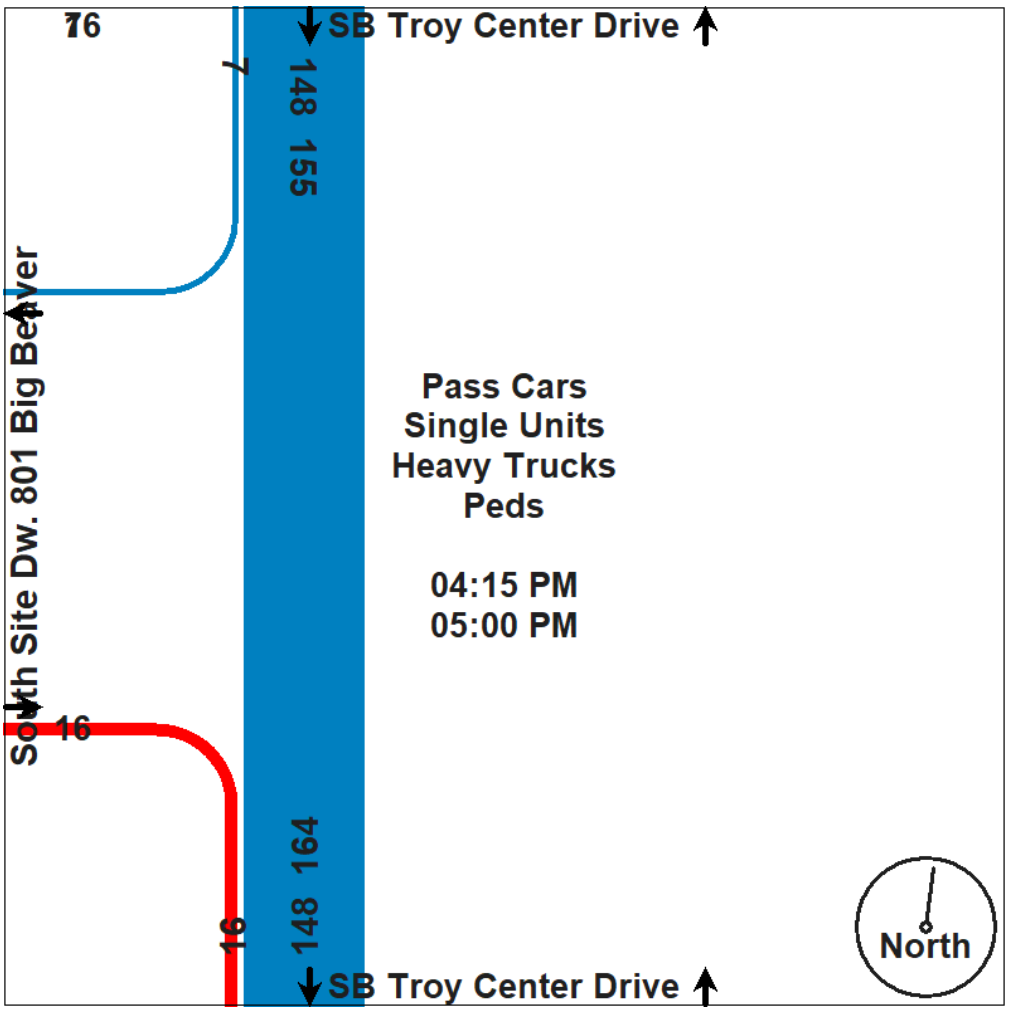
File Name : TMC_3 SB Troy Center & South Site Dw_8-14-19
Site Code : TMC_3
Start Date : 8/14/2019
Page No : 4

	SB Troy Center Drive Southbound			SB Troy Center Drive Northbound			South Site Dw. 801 Big Beaver Eastbound			
Start Time	Right	Thru	App. Total	Thru	Left	App. Total	Right	Left	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	2	29	31	0	0	0	**7**	0	**7**	38
04:30 PM	**4**	34	38	0	0	0	2	0	2	40
04:45 PM	1	34	35	0	0	0	2	0	2	37
05:00 PM	0	**51**	**51**	0	0	0	5	0	5	**56**
Total Volume	7	148	155	0	0	0	16	0	16	171
% App. Total	4.5	95.5		0	0		100	0		
PHF	.438	.725	.760	.000	.000	.000	.571	.000	.571	.763
Pass Cars	7	148	155	0	0	0	16	0	16	171
% Pass Cars	100	100	100	0	0	0	100	0	100	100
Single Units	0	0	0	0	0	0	0	0	0	0
% Single Units	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0
Peds	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0



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File Name : TMC_3 SB Troy Center & South Site Dw_8-14-19
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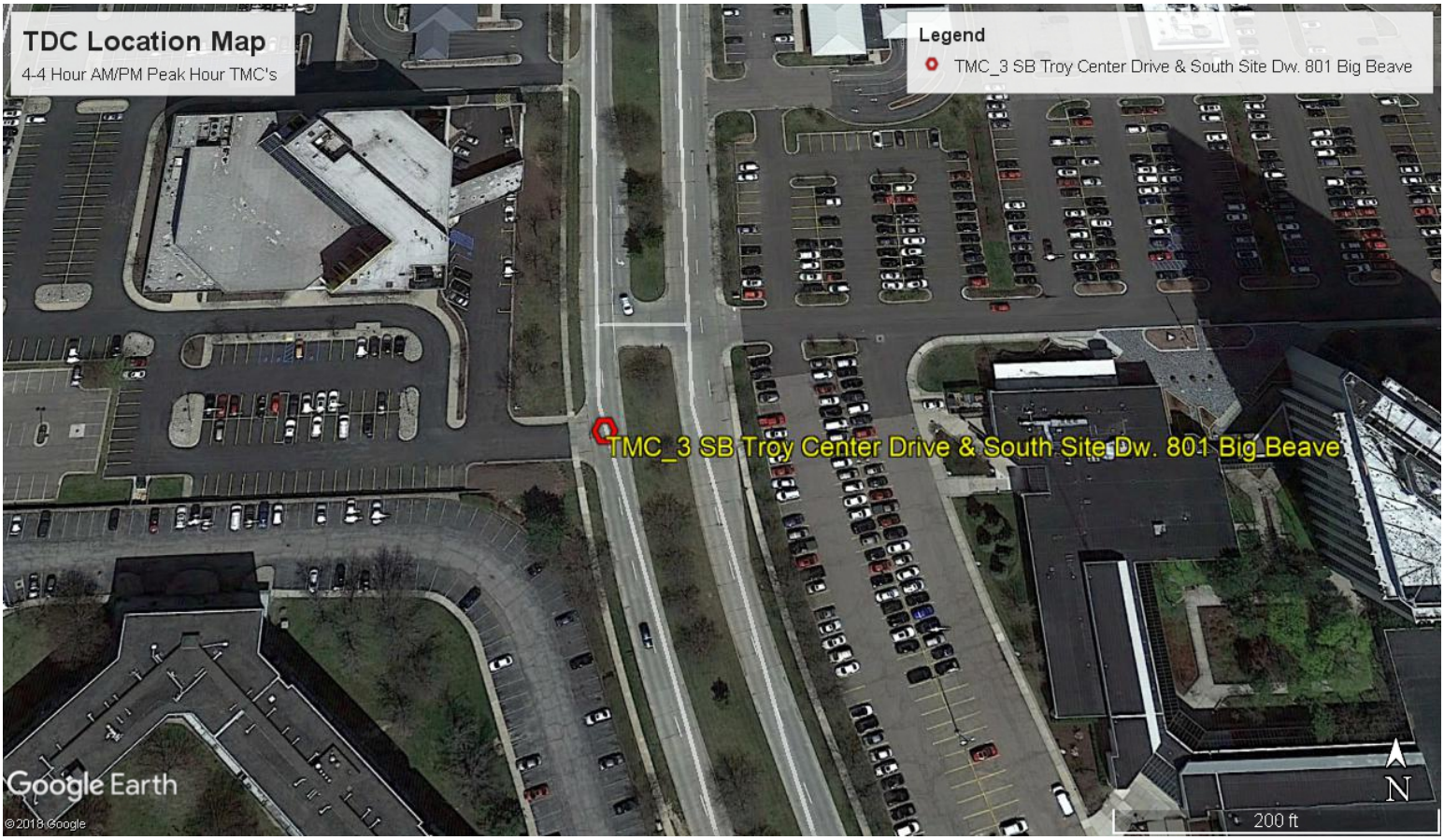
Start Date : 8/14/2019

Aerial Photo



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Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 4PU NE

File Name : TMC_4 NB Troy Center & PNC Dw_8-14-19
Site Code : TMC_4
Start Date : 8/14/2019
Page No : 1

4 Hour traffic study was conducted during typical weekday (Thursday) from 7:00 AM - 9:00 AM morning & 4:00 PM - 6:00 PM afternoon peak hours, while school was not in session.

Groups Printed- Pass Cars - Single Units - Heavy Trucks - Peds

	NB Troy Center Drive Southbound					PNC Dw. Westbound					NB Troy Center Drive Northbound					SB Crossover Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	15	1	0	16	21
07:15 AM	0	0	0	0	0	1	0	0	0	1	5	13	0	0	18	0	24	0	0	24	43
07:30 AM	0	0	0	0	0	1	0	0	1	2	4	5	0	0	9	0	15	0	0	15	26
07:45 AM	0	0	0	0	0	0	0	0	4	4	6	13	0	0	19	0	20	0	0	20	43
Total	0	0	0	0	0	2	0	0	5	7	15	36	0	0	51	0	74	1	0	75	133
08:00 AM	0	0	0	0	0	2	0	0	0	2	10	31	0	0	41	0	16	1	0	17	60
08:15 AM	0	0	0	0	0	3	0	0	0	3	9	25	0	0	34	0	21	1	0	22	59
08:30 AM	0	0	0	0	0	3	1	0	0	4	9	27	0	0	36	0	20	0	0	20	60
08:45 AM	0	0	0	0	0	1	1	0	0	2	7	26	0	0	33	0	22	0	0	22	57
Total	0	0	0	0	0	9	2	0	0	11	35	109	0	0	144	0	79	2	0	81	236
*** BREAK ***																					
04:00 PM	0	0	0	0	0	53	2	0	0	55	2	49	1	1	53	0	10	3	0	13	121
04:15 PM	0	0	0	0	0	29	0	0	0	29	1	32	0	0	33	0	6	8	0	14	76
04:30 PM	0	0	0	0	0	24	1	0	0	25	2	43	1	0	46	0	10	1	0	11	82
04:45 PM	0	0	0	0	0	36	3	0	0	39	4	30	0	0	34	0	9	1	0	10	83
Total	0	0	0	0	0	142	6	0	0	148	9	154	2	1	166	0	35	13	0	48	362
05:00 PM	0	0	0	0	0	40	3	0	0	43	5	52	0	0	57	0	7	2	0	9	109
05:15 PM	0	0	0	0	0	26	2	0	0	28	2	23	0	0	25	0	14	3	0	17	70
05:30 PM	0	0	0	0	0	25	2	0	1	28	10	18	0	0	28	0	13	2	0	15	71
05:45 PM	0	0	0	0	0	20	0	0	1	21	5	24	0	0	29	0	19	1	0	20	70
Total	0	0	0	0	0	111	7	0	2	120	22	117	0	0	139	0	53	8	0	61	320
Grand Total	0	0	0	0	0	264	15	0	7	286	81	416	2	1	500	0	241	24	0	265	1051
Apprch %	0	0	0	0		92.3	5.2	0	2.4		16.2	83.2	0.4	0.2		0	90.9	9.1	0		
Total %	0	0	0	0	0	25.1	1.4	0	0.7	27.2	7.7	39.6	0.2	0.1	47.6	0	22.9	2.3	0	25.2	
Pass Cars	0	0	0	0	0	261	15	0	0	276	81	415	2	0	498	0	237	24	0	261	1035
% Pass Cars	0	0	0	0	0	98.9	100	0	0	96.5	100	99.8	100	0	99.6	0	98.3	100	0	98.5	98.5
Single Units	0	0	0	0	0	2	0	0	0	2	0	1	0	0	1	0	4	0	0	4	7
% Single Units	0	0	0	0	0	0.8	0	0	0	0.7	0	0.2	0	0	0.2	0	1.7	0	0	1.5	0.7
Heavy Trucks	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Heavy Trucks	0	0	0	0	0	0.4	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0.1
Peds	0	0	0	0	0	0	0	0	7	7	0	0	0	1	1	0	0	0	0	0	8
% Peds	0	0	0	0	0	0	0	0	100	2.4	0	0	0	100	0.2	0	0	0	0	0	0.8

TDC Traffic Comments: Non-signalized intersection. Video VCU camera was located within NE ntersection quadrant. Note: Peds. are excluded from peak hour reports. Traffic study was performed for Troy Center Drive Traffic Impact Study for ROWE Professional Services Company.

Traffic Data Collection, LLC

www:tdccounts.com

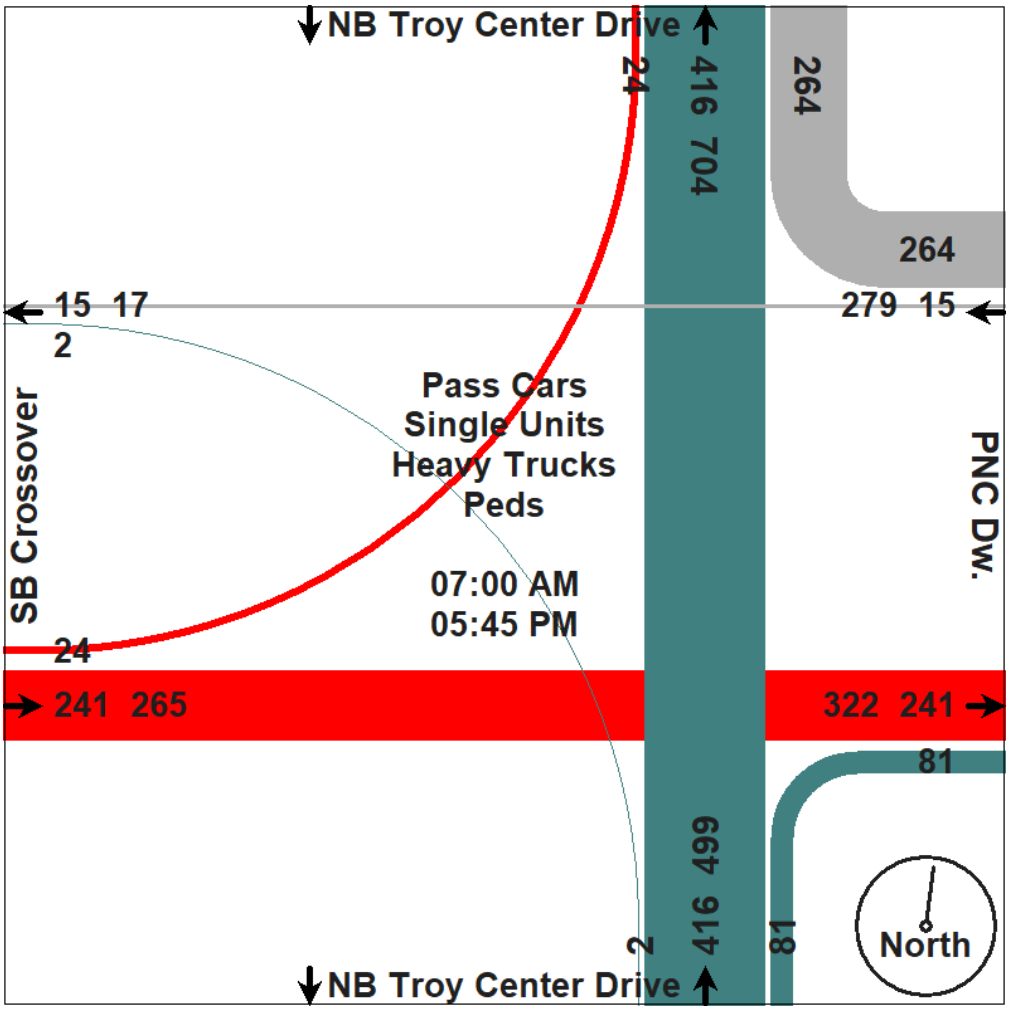
Phone: 586.786-5407

Traffic Study Performed For:

ROWE Professional Services Company

Project: Troy Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather:: Sunny. Dry Deg's 80s
Count By Miovision Video VCU 4PU NE

File Name : TMC_4 NB Troy Center & PNC Dw_8-14-19
Site Code : TMC_4
Start Date : 8/14/2019
Page No : 2



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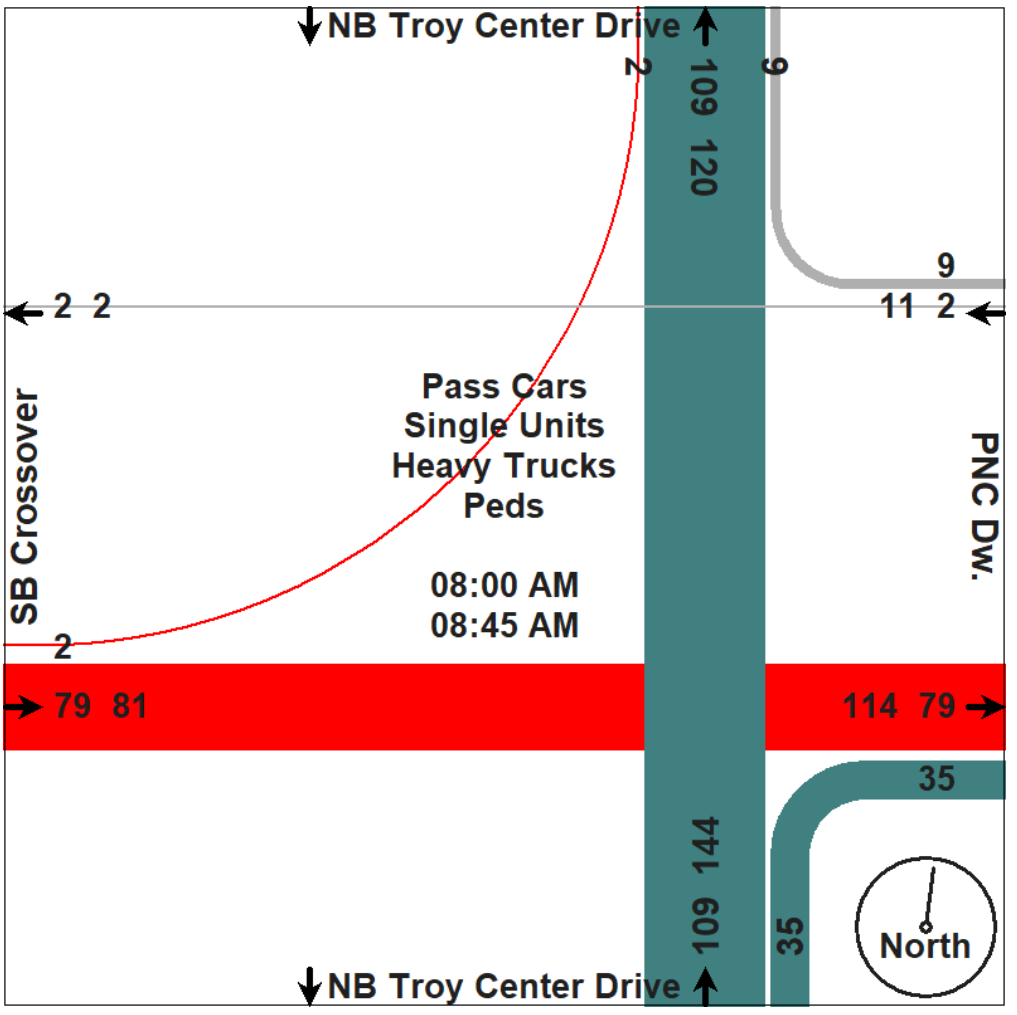
File Name : TMC_4 NB Troy Center & PNC Dw_8-14-19
Site Code : TMC_4
Start Date : 8/14/2019
Page No : 3

	NB Troy Center Drive Southbound				PNC Dw. Westbound				NB Troy Center Drive Northbound				SB Crossover Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 12:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	2	0	0	2	**10**	**31**	0	**41**	0	16	**1**	17	**60**
08:15 AM	0	0	0	0	**3**	0	0	3	9	25	0	34	0	21	1	**22**	59
08:30 AM	0	0	0	0	3	**1**	0	**4**	9	27	0	36	0	20	0	20	60
08:45 AM	0	0	0	0	1	1	0	2	7	26	0	33	0	**22**	0	22	57
Total Volume	0	0	0	0	9	2	0	11	35	109	0	144	0	79	2	81	236
% App. Total	0	0	0		81.8	18.2	0		24.3	75.7	0		0	97.5	2.5		
PHF	.000	.000	.000	.000	.750	.500	.000	.688	.875	.879	.000	.878	.000	.898	.500	.920	.983
Pass Cars	0	0	0	0	7	2	0	9	35	108	0	143	0	77	2	79	231
% Pass Cars	0	0	0	0	77.8	100	0	81.8	100	99.1	0	99.3	0	97.5	100	97.5	97.9
Single Units	0	0	0	0	2	0	0	2	0	1	0	1	0	2	0	2	5
% Single Units	0	0	0	0	22.2	0	0	18.2	0	0.9	0	0.7	0	2.5	0	2.5	2.1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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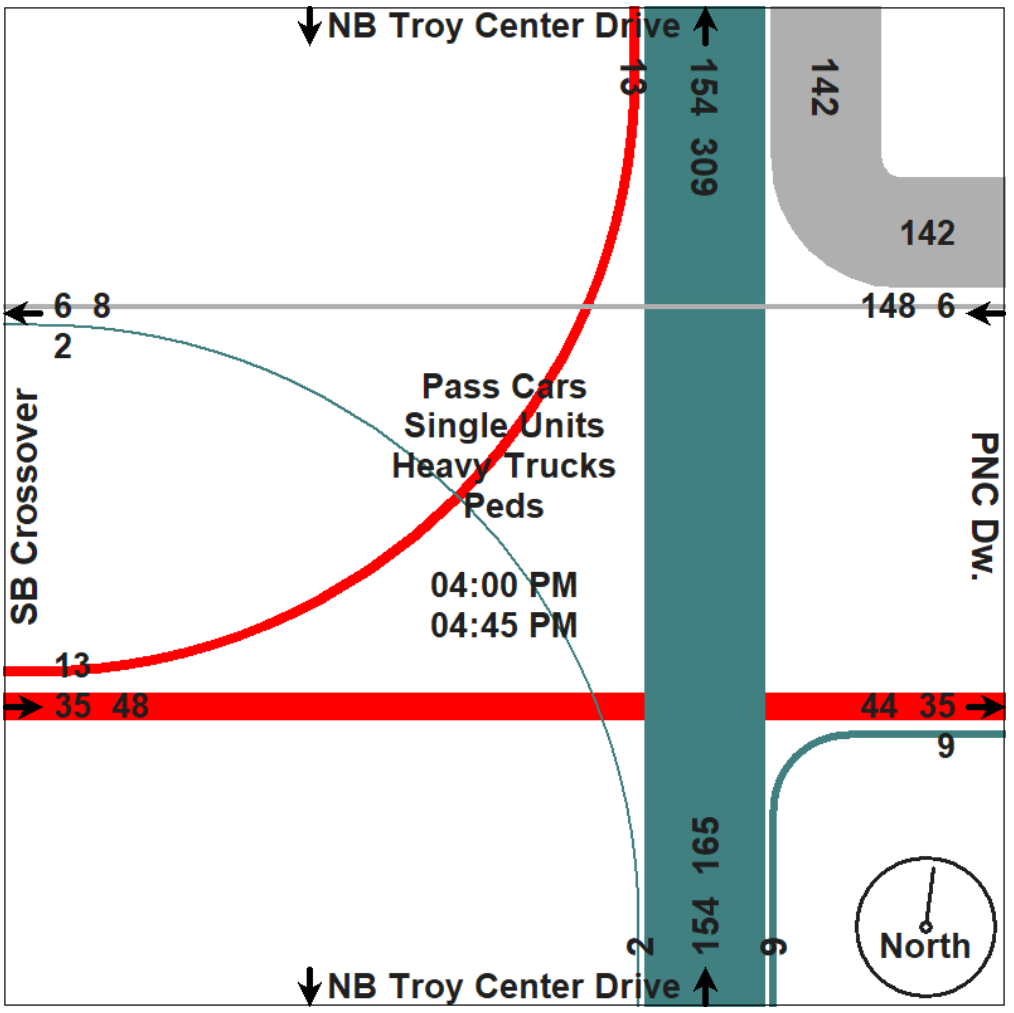
Site Code : TMC_4
Start Date : 8/14/2019
Page No : 4

	NB Troy Center Drive Southbound				PNC Dw. Westbound				NB Troy Center Drive Northbound				SB Crossover Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	**53**	2	0	**55**	2	**49**	**1**	**52**	0	**10**	3	13	**120**
04:15 PM	0	0	0	0	29	0	0	29	1	32	0	33	0	6	**8**	**14**	76
04:30 PM	0	0	0	0	24	1	0	25	2	43	1	46	0	10	1	11	82
04:45 PM	0	0	0	0	36	**3**	0	39	**4**	30	0	34	0	9	1	10	83
Total Volume	0	0	0	0	142	6	0	148	9	154	2	165	0	35	13	48	361
% App. Total	0	0	0		95.9	4.1	0		5.5	93.3	1.2		0	72.9	27.1		
PHF	.000	.000	.000	.000	.670	.500	.000	.673	.563	.786	.500	.793	.000	.875	.406	.857	.752
Pass Cars	0	0	0	0	142	6	0	148	9	154	2	165	0	35	13	48	361
% Pass Cars	0	0	0	0	100	100	0	100	100	100	100	100	0	100	100	100	100
Single Units	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Single Units	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Peds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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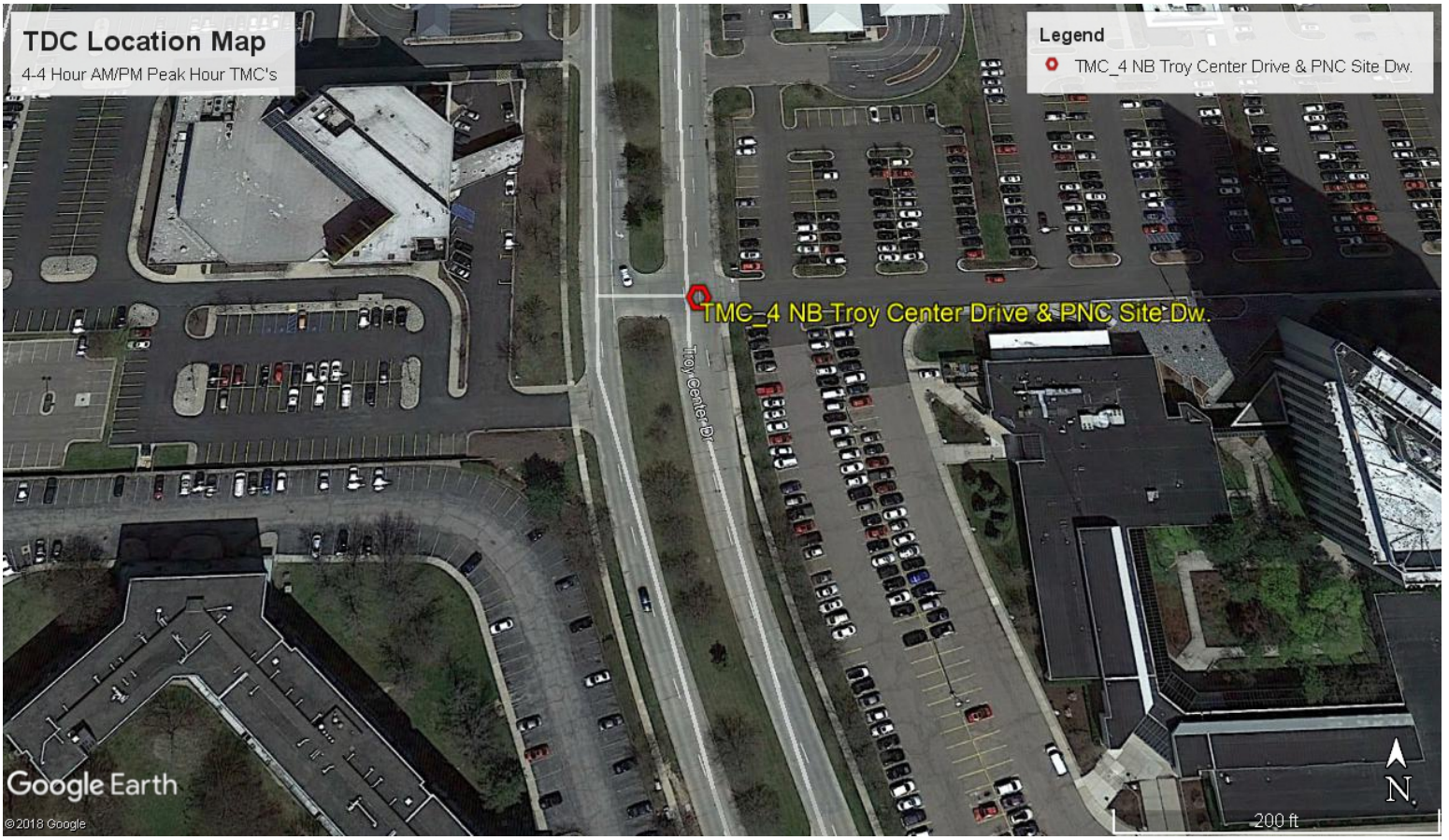
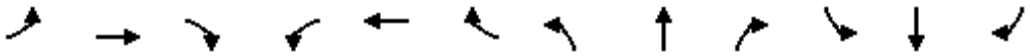
Page No : 5

Aerial Photo



LEVEL OF SERVICE

OUTPUT REPORTS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2055	141	0	0	0	0	0	0	150	607	0
Future Volume (vph)	0	2055	141	0	0	0	0	0	0	150	607	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.4	5.4							5.4	5.4	
Lane Util. Factor		0.91	1.00							0.95	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		5353	1667							1770	1861	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		5353	1667							1770	1861	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2234	153	0	0	0	0	0	0	163	660	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	0	74	47	0
Lane Group Flow (vph)	0	2234	105	0	0	0	0	0	0	73	629	0
Turn Type		NA	Perm						Perm	Split	NA	
Protected Phases		2								3	3	
Permitted Phases			2						4			
Actuated Green, G (s)		68.1	68.1							41.1	41.1	
Effective Green, g (s)		68.1	68.1							41.1	41.1	
Actuated g/C Ratio		0.57	0.57							0.34	0.34	
Clearance Time (s)		5.4	5.4							5.4	5.4	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		3037	946							606	637	
v/s Ratio Prot		c0.42								0.04	c0.34	
v/s Ratio Perm			0.06									
v/c Ratio		0.74	0.11							0.12	0.99	
Uniform Delay, d1		19.3	12.0							27.1	39.2	
Progression Factor		0.50	0.21							1.78	1.22	
Incremental Delay, d2		1.2	0.2							0.0	22.7	
Delay (s)		10.8	2.7							48.3	70.3	
Level of Service		B	A							D	E	
Approach Delay (s)		10.3			0.0			0.0			66.4	
Approach LOS		B			A			A			E	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1968	230	0	0	0	120
Future Volume (vph)	1968	230	0	0	0	120
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.3					6.3
Lane Util. Factor	0.91					0.76
Frt	0.98					0.85
Flt Protected	1.00					1.00
Satd. Flow (prot)	5269					3800
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5269					3800
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2139	250	0	0	0	130
RTOR Reduction (vph)	9	0	0	0	0	49
Lane Group Flow (vph)	2380	0	0	0	0	81
Turn Type	NA					Prot
Protected Phases	2					4
Permitted Phases						
Actuated Green, G (s)	97.9					9.5
Effective Green, g (s)	97.9					9.5
Actuated g/C Ratio	0.82					0.08
Clearance Time (s)	6.3					6.3
Vehicle Extension (s)	0.2					3.0
Lane Grp Cap (vph)	4298					300
v/s Ratio Prot	c0.45					c0.02
v/s Ratio Perm						
v/c Ratio	0.55					0.27
Uniform Delay, d1	3.7					52.0
Progression Factor	0.05					1.00
Incremental Delay, d2	0.4					0.5
Delay (s)	0.5					52.5
Level of Service	A					D
Approach Delay (s)	0.5			0.0	52.5	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	3.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	3565	96	0
Future Volume (vph)	0	0	0	3565	96	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				6.3	6.3	
Lane Util. Factor				0.91	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				5353	3614	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				5353	3614	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	3875	104	0
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	3875	102	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Actuated Green, G (s)				97.1	10.3	
Effective Green, g (s)				97.1	10.3	
Actuated g/C Ratio				0.81	0.09	
Clearance Time (s)				6.3	6.3	
Vehicle Extension (s)				0.2	3.0	
Lane Grp Cap (vph)				4331	310	
v/s Ratio Prot				c0.72	c0.03	
v/s Ratio Perm						
v/c Ratio				0.89	0.33	
Uniform Delay, d1				7.9	51.6	
Progression Factor				0.93	0.65	
Incremental Delay, d2				1.1	0.5	
Delay (s)				8.5	34.2	
Level of Service				A	C	
Approach Delay (s)	0.0			8.5	34.2	
Approach LOS	A			A	C	

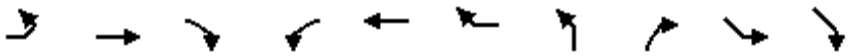
Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations					↑↑↑				↱↱		↱↱↱
Traffic Volume (vph)	0	0	0	0	2755	0	0	0	810	0	1992
Future Volume (vph)	0	0	0	0	2755	0	0	0	810	0	1992
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3				6.0		4.0
Lane Util. Factor					0.91				0.88		0.76
Frt					1.00				0.85		0.85
Flt Protected					1.00				1.00		1.00
Satd. Flow (prot)					5353				2933		3800
Flt Permitted					1.00				1.00		1.00
Satd. Flow (perm)					5353				2933		3800
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2995	0	0	0	880	0	2165
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	21	0	0
Lane Group Flow (vph)	0	0	0	0	2995	0	0	0	859	0	2165
Turn Type					NA				Prot		Free
Protected Phases					2				4		
Permitted Phases											Free
Actuated Green, G (s)					71.1				36.6		120.0
Effective Green, g (s)					71.1				36.6		120.0
Actuated g/C Ratio					0.59				0.31		1.00
Clearance Time (s)					6.3				6.0		
Vehicle Extension (s)					0.2				3.0		
Lane Grp Cap (vph)					3171				894		3800
v/s Ratio Prot					c0.56				c0.29		
v/s Ratio Perm											0.57
v/c Ratio					0.94				0.96		0.57
Uniform Delay, d1					22.6				41.0		0.0
Progression Factor					0.55				1.00		1.00
Incremental Delay, d2					6.4				21.1		0.5
Delay (s)					18.9				62.1		0.5
Level of Service					B				E		A
Approach Delay (s)		0.0			18.9		62.1			0.5	
Approach LOS		A			B		E			A	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SEL	SER
Lane Configurations		↑↑↑	↱		↑↑↑	↱		↱↱		
Traffic Volume (vph)	0	1458	534	0	2755	133	0	788	0	0
Future Volume (vph)	0	1458	534	0	2755	133	0	788	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.8	4.0		4.0	4.0		4.8		
Lane Util. Factor		0.91	1.00		0.91	1.00		0.88		
Frt		1.00	0.85		1.00	0.85		0.85		
Flt Protected		1.00	1.00		1.00	1.00		1.00		
Satd. Flow (prot)		5353	1667		5353	1667		2933		
Flt Permitted		1.00	1.00		1.00	1.00		1.00		
Satd. Flow (perm)		5353	1667		5353	1667		2933		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1585	580	0	2995	145	0	857	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	16	0	0
Lane Group Flow (vph)	0	1585	580	0	2995	145	0	841	0	0
Turn Type		NA	Free		NA	Perm		Prot		
Protected Phases		2			Free			4		
Permitted Phases			Free			Free				
Actuated Green, G (s)		67.7	120.0		120.0	120.0		41.7		
Effective Green, g (s)		67.7	120.0		120.0	120.0		41.7		
Actuated g/C Ratio		0.56	1.00		1.00	1.00		0.35		
Clearance Time (s)		5.8						4.8		
Vehicle Extension (s)		3.0						3.0		
Lane Grp Cap (vph)		3019	1667		5353	1667		1019		
v/s Ratio Prot		0.30			0.56			c0.29		
v/s Ratio Perm			0.35			0.09				
v/c Ratio		0.53	0.35		0.56	0.09		0.83		
Uniform Delay, d1		16.2	0.0		0.0	0.0		35.8		
Progression Factor		0.22	1.00		1.00	1.00		1.00		
Incremental Delay, d2		0.5	0.5		0.3	0.1		5.5		
Delay (s)		4.1	0.5		0.3	0.1		41.4		
Level of Service		A	A		A	A		D		
Approach Delay (s)		3.1			0.2		41.4		0.0	
Approach LOS		A			A		D		A	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations		↑↑↑	↱		↑↑↑	↱		↱↱		
Traffic Volume (vph)	0	1912	334	0	1960	524	0	928	0	0
Future Volume (vph)	0	1912	334	0	1960	524	0	928	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.0	4.0		6.7	4.0		5.4		
Lane Util. Factor		0.91	1.00		0.91	1.00		0.88		
Frt		1.00	0.85		1.00	0.85		0.85		
Flt Protected		1.00	1.00		1.00	1.00		1.00		
Satd. Flow (prot)		5353	1667		5353	1667		2933		
Flt Permitted		1.00	1.00		1.00	1.00		1.00		
Satd. Flow (perm)		5353	1667		5353	1667		2933		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2078	363	0	2130	570	0	1009	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	21	0	0
Lane Group Flow (vph)	0	2078	363	0	2130	570	0	988	0	0
Turn Type		NA	Perm		NA	Free		Prot		
Protected Phases		Free			2			4		
Permitted Phases			Free			Free				
Actuated Green, G (s)		120.0	120.0		62.0	120.0		45.9		
Effective Green, g (s)		120.0	120.0		62.0	120.0		45.9		
Actuated g/C Ratio		1.00	1.00		0.52	1.00		0.38		
Clearance Time (s)					6.7			5.4		
Vehicle Extension (s)					0.2			3.0		
Lane Grp Cap (vph)		5353	1667		2765	1667		1121		
v/s Ratio Prot		0.39			c0.40			c0.34		
v/s Ratio Perm			0.22			0.34				
v/c Ratio		0.39	0.22		0.77	0.34		0.88		
Uniform Delay, d1		0.0	0.0		23.3	0.0		34.5		
Progression Factor		1.00	1.00		0.20	1.00		1.00		
Incremental Delay, d2		0.2	0.2		0.7	0.2		8.3		
Delay (s)		0.2	0.2		5.3	0.2		42.9		
Level of Service		A	A		A	A		D		
Approach Delay (s)		0.2			4.2		42.9		0.0	
Approach LOS		A			A		D		A	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2198	7	0	0	0	0
Future Vol, veh/h	2198	7	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2389	8	0	0	0	0

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	1199
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7.14
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.92
Pot Cap-1 Maneuver	-	-		0	153
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	153
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	0
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	0	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	0	226	4
Future Vol, veh/h	0	1	0	0	226	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	0	246	4

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	125		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.94		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.32		-	-
Pot Cap-1 Maneuver	0	902		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	902		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	9	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	902	-	-
HCM Lane V/C Ratio	0.001	-	-
HCM Control Delay (s)	9	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	0	139	7
Future Vol, veh/h	0	1	0	0	139	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1	0	0	151	8

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	80		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.94		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.32		-	-
Pot Cap-1 Maneuver	0	964		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	964		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	8.7	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	964	-	-
HCM Lane V/C Ratio	0.001	-	-
HCM Control Delay (s)	8.7	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	79	0	0	0	9	0	109	35	0	0	0
Future Vol, veh/h	2	79	0	0	0	9	0	109	35	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	86	0	0	0	10	0	118	38	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	59	156	-	-	-	59	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	59	156	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	-	-	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	-	-	-	3.32	-	-	-
Pot Cap-1 Maneuver	930	735	0	0	0	994	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	946	768	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	921	735	-	-	-	994	-	-	-
Mov Cap-2 Maneuver	921	735	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	937	768	-	-	-	-	-	-	-

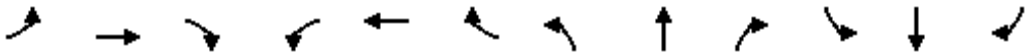
Approach	EB	WB	NB
HCM Control Delay, s	10.5	8.7	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	921	736	994
HCM Lane V/C Ratio	-	-	0.002	0.118	0.01
HCM Control Delay (s)	-	-	8.9	10.5	8.7
HCM Lane LOS	-	-	A	B	A
HCM 95th %tile Q(veh)	-	-	0	0.4	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1912	0	0	2484	0	505
Future Volume (Veh/h)	1912	0	0	2484	0	505
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)	2078	0	0	2700	0	549
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)	313					
pX, platoon unblocked						
vC, conflicting volume			2078		2978	693
vC1, stage 1 conf vol					2078	
vC2, stage 2 conf vol					900	
vCu, unblocked vol			2078		2978	693
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			264		64	386

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	693	693	693	900	900	900	274	274
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	274	274
cSH	1700	1700	1700	1700	1700	1700	386	386
Volume to Capacity	0.41	0.41	0.41	0.53	0.53	0.53	0.71	0.71
Queue Length 95th (ft)	0	0	0	0	0	0	133	133
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	34.2	34.2
Lane LOS							D	D
Approach Delay (s)	0.0			0.0			34.2	
Approach LOS							D	

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱						↱↱	↰↰		
Traffic Volume (vph)	0	2546	172	0	0	0	0	0	418	508	0	0
Future Volume (vph)	0	2546	172	0	0	0	0	0	418	508	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.4	5.4						5.4	5.4		
Lane Util. Factor		0.91	1.00						0.88	0.97		
Frt		1.00	0.85						0.85	1.00		
Flt Protected		1.00	1.00						1.00	0.95		
Satd. Flow (prot)		5353	1667						2933	3614		
Flt Permitted		1.00	1.00						1.00	0.95		
Satd. Flow (perm)		5353	1667						2933	3614		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2767	187	0	0	0	0	0	454	552	0	0
RTOR Reduction (vph)	0	0	61	0	0	0	0	0	61	61	0	0
Lane Group Flow (vph)	0	2767	126	0	0	0	0	0	393	491	0	0
Turn Type		NA	Perm						Perm	Prot		
Protected Phases		2								3		
Permitted Phases			2						4			
Actuated Green, G (s)		68.7	68.7						17.5	17.6		
Effective Green, g (s)		68.7	68.7						17.5	17.6		
Actuated g/C Ratio		0.57	0.57						0.15	0.15		
Clearance Time (s)		5.4	5.4						5.4	5.4		
Vehicle Extension (s)		3.0	3.0						3.0	3.0		
Lane Grp Cap (vph)		3064	954						427	530		
v/s Ratio Prot		c0.52								c0.14		
v/s Ratio Perm			0.08						c0.13			
v/c Ratio		0.90	0.13						0.92	0.93		
Uniform Delay, d1		22.7	11.9						50.6	50.6		
Progression Factor		0.42	0.01						1.00	1.03		
Incremental Delay, d2		0.5	0.0						25.1	13.9		
Delay (s)		10.1	0.2						75.7	65.7		
Level of Service		B	A						E	E		
Approach Delay (s)		9.5			0.0			75.7			65.7	
Approach LOS		A			A			E			E	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	119.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	3271	201	0	0	0	309
Future Volume (vph)	3271	201	0	0	0	309
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.3					6.3
Lane Util. Factor	0.91					0.76
Frt	0.99					0.85
Flt Protected	1.00					1.00
Satd. Flow (prot)	5307					3800
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5307					3800
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3555	218	0	0	0	336
RTOR Reduction (vph)	4	0	0	0	0	1
Lane Group Flow (vph)	3769	0	0	0	0	335
Turn Type	NA					Prot
Protected Phases	2					4
Permitted Phases						
Actuated Green, G (s)	91.1					16.3
Effective Green, g (s)	91.1					16.3
Actuated g/C Ratio	0.76					0.14
Clearance Time (s)	6.3					6.3
Vehicle Extension (s)	0.2					3.0
Lane Grp Cap (vph)	4028					516
v/s Ratio Prot	c0.71					c0.09
v/s Ratio Perm						
v/c Ratio	0.94					0.65
Uniform Delay, d1	12.0					49.1
Progression Factor	0.63					1.00
Incremental Delay, d2	2.4					2.8
Delay (s)	10.0					52.0
Level of Service	B					D
Approach Delay (s)	10.0			0.0	52.0	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	2719	407	0
Future Volume (vph)	0	0	0	2719	407	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				6.3	6.3	
Lane Util. Factor				0.91	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				5353	3614	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				5353	3614	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2955	442	0
RTOR Reduction (vph)	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	2955	437	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Actuated Green, G (s)				88.1	19.3	
Effective Green, g (s)				88.1	19.3	
Actuated g/C Ratio				0.73	0.16	
Clearance Time (s)				6.3	6.3	
Vehicle Extension (s)				0.2	3.0	
Lane Grp Cap (vph)				3929	581	
v/s Ratio Prot				c0.55	c0.12	
v/s Ratio Perm						
v/c Ratio				0.75	0.75	
Uniform Delay, d1				9.5	48.1	
Progression Factor				0.54	1.16	
Incremental Delay, d2				1.0	2.4	
Delay (s)				6.1	58.3	
Level of Service				A	E	
Approach Delay (s)	0.0			6.1	58.3	
Approach LOS	A			A	E	

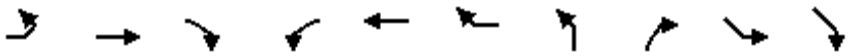
Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Traffic Volume (vph)	0	0	0	0	2257	0	0	0	462	0	3173
Future Volume (vph)	0	0	0	0	2257	0	0	0	462	0	3173
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)					6.3				6.0		4.0
Lane Util. Factor					0.91				0.88		0.76
Frt					1.00				0.85		0.85
Flt Protected					1.00				1.00		1.00
Satd. Flow (prot)					5353				2933		3800
Flt Permitted					1.00				1.00		1.00
Satd. Flow (perm)					5353				2933		3800
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2453	0	0	0	502	0	3449
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	22	0	0
Lane Group Flow (vph)	0	0	0	0	2453	0	0	0	480	0	3449
Turn Type					NA				Prot		Free
Protected Phases					2				4		
Permitted Phases											Free
Actuated Green, G (s)					75.1				32.6		120.0
Effective Green, g (s)					75.1				32.6		120.0
Actuated g/C Ratio					0.63				0.27		1.00
Clearance Time (s)					6.3				6.0		
Vehicle Extension (s)					0.2				3.0		
Lane Grp Cap (vph)					3350				796		3800
v/s Ratio Prot					0.46				0.16		
v/s Ratio Perm											c0.91
v/c Ratio					0.73				0.60		0.91
Uniform Delay, d1					15.5				38.1		0.0
Progression Factor					0.44				1.00		1.00
Incremental Delay, d2					1.3				1.3		1.9
Delay (s)					8.1				39.4		1.9
Level of Service					A				D		A
Approach Delay (s)		0.0			8.1		39.4			1.9	
Approach LOS		A			A		D			A	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SEL	SER
Lane Configurations		↑↑↑	↱		↑↑↑	↱		↱↱		
Traffic Volume (vph)	0	2382	791	0	2257	142	0	680	0	0
Future Volume (vph)	0	2382	791	0	2257	142	0	680	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.8	4.0		4.0	4.0		4.8		
Lane Util. Factor		0.91	1.00		0.91	1.00		0.88		
Frt		1.00	0.85		1.00	0.85		0.85		
Flt Protected		1.00	1.00		1.00	1.00		1.00		
Satd. Flow (prot)		5353	1667		5353	1667		2933		
Flt Permitted		1.00	1.00		1.00	1.00		1.00		
Satd. Flow (perm)		5353	1667		5353	1667		2933		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2589	860	0	2453	154	0	739	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	18	0	0
Lane Group Flow (vph)	0	2589	860	0	2453	154	0	721	0	0
Turn Type		NA	Free		NA	Perm		Prot		
Protected Phases		2			Free			4		
Permitted Phases			Free			Free				
Actuated Green, G (s)		76.4	120.0		120.0	120.0		33.0		
Effective Green, g (s)		76.4	120.0		120.0	120.0		33.0		
Actuated g/C Ratio		0.64	1.00		1.00	1.00		0.28		
Clearance Time (s)		5.8						4.8		
Vehicle Extension (s)		3.0						3.0		
Lane Grp Cap (vph)		3408	1667		5353	1667		806		
v/s Ratio Prot		c0.48			0.46			c0.25		
v/s Ratio Perm			0.52			0.09				
v/c Ratio		0.76	0.52		0.46	0.09		0.89		
Uniform Delay, d1		15.3	0.0		0.0	0.0		41.8		
Progression Factor		0.99	1.00		1.00	1.00		1.00		
Incremental Delay, d2		0.7	0.5		0.2	0.1		12.4		
Delay (s)		15.8	0.5		0.2	0.1		54.2		
Level of Service		B	A		A	A		D		
Approach Delay (s)		12.0			0.2		54.2		0.0	
Approach LOS		B			A		D		A	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations		↑↑↑	↱		↑↑↑	↱		↱↱		
Traffic Volume (vph)	0	2377	685	0	1765	691	0	634	0	0
Future Volume (vph)	0	2377	685	0	1765	691	0	634	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.0	4.0		6.7	4.0		5.4		
Lane Util. Factor		0.91	1.00		0.91	1.00		0.88		
Frt		1.00	0.85		1.00	0.85		0.85		
Flt Protected		1.00	1.00		1.00	1.00		1.00		
Satd. Flow (prot)		5353	1667		5353	1667		2933		
Flt Permitted		1.00	1.00		1.00	1.00		1.00		
Satd. Flow (perm)		5353	1667		5353	1667		2933		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2584	745	0	1918	751	0	689	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	25	0	0
Lane Group Flow (vph)	0	2584	745	0	1918	751	0	664	0	0
Turn Type		NA	Perm		NA	Free		Prot		
Protected Phases		Free			2			4		
Permitted Phases			Free			Free				
Actuated Green, G (s)		120.0	120.0		74.9	120.0		33.0		
Effective Green, g (s)		120.0	120.0		74.9	120.0		33.0		
Actuated g/C Ratio		1.00	1.00		0.62	1.00		0.28		
Clearance Time (s)					6.7			5.4		
Vehicle Extension (s)					0.2			3.0		
Lane Grp Cap (vph)		5353	1667		3341	1667		806		
v/s Ratio Prot		0.48			c0.36			c0.23		
v/s Ratio Perm			0.45			0.45				
v/c Ratio		0.48	0.45		0.57	0.45		0.82		
Uniform Delay, d1		0.0	0.0		13.2	0.0		40.8		
Progression Factor		1.00	1.00		0.10	1.00		1.00		
Incremental Delay, d2		0.2	0.5		0.1	0.1		6.9		
Delay (s)		0.2	0.5		1.4	0.1		47.6		
Level of Service		A	A		A	A		D		
Approach Delay (s)		0.3			1.0		47.6		0.0	
Approach LOS		A			A		D		A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3465	7	0	0	0	7
Future Vol, veh/h	3465	7	0	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3766	8	0	0	0	8

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	1887
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7.14
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.92
Pot Cap-1 Maneuver	-	-		0	51
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	51
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	87.6
HCM LOS		F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	51	-	-
HCM Lane V/C Ratio	0.149	-	-
HCM Control Delay (s)	87.6	-	-
HCM Lane LOS	F	-	-
HCM 95th %tile Q(veh)	0.5	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	10	0	0	197	4
Future Vol, veh/h	0	10	0	0	197	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	11	0	0	214	4

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	109		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.94		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.32		-	-
Pot Cap-1 Maneuver	0	924		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	924		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	8.9	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	924	-	-
HCM Lane V/C Ratio	0.012	-	-
HCM Control Delay (s)	8.9	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	16	0	0	152	7
Future Vol, veh/h	0	16	0	0	152	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	17	0	0	165	8

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	87		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.94		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.32		-	-
Pot Cap-1 Maneuver	0	954		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	954		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	8.8	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	954	-	-
HCM Lane V/C Ratio	0.018	-	-
HCM Control Delay (s)	8.8	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	35	0	0	0	142	0	154	9	0	0	0
Future Vol, veh/h	13	35	0	0	0	142	0	154	9	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	38	0	0	0	154	0	167	10	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	84	177	-	-	-	84	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	84	177	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	-	-	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	-	-	-	3.32	-	-	-
Pot Cap-1 Maneuver	893	716	0	0	0	958	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	915	752	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	749	716	-	-	-	958	-	-	-
Mov Cap-2 Maneuver	749	716	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	768	752	-	-	-	-	-	-	-

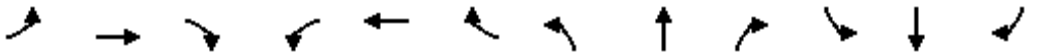
Approach	EB	WB	NB
HCM Control Delay, s	10.2	9.5	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	749	719	958
HCM Lane V/C Ratio	-	-	0.013	0.059	0.161
HCM Control Delay (s)	-	-	9.9	10.3	9.5
HCM Lane LOS	-	-	A	B	A
HCM 95th %tile Q(veh)	-	-	0	0.2	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	2377	0	0	2456	0	221
Future Volume (Veh/h)	2377	0	0	2456	0	221
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)	2584	0	0	2670	0	240
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			Raised		
Median storage veh)				1		
Upstream signal (ft)	313					
pX, platoon unblocked						
vC, conflicting volume			2584		3474	861
vC1, stage 1 conf vol					2584	
vC2, stage 2 conf vol					890	
vCu, unblocked vol			2584		3474	861
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	20
cM capacity (veh/h)			166		35	299

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2
Volume Total	861	861	861	890	890	890	120	120
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	120	120
cSH	1700	1700	1700	1700	1700	1700	299	299
Volume to Capacity	0.51	0.51	0.51	0.52	0.52	0.52	0.40	0.40
Queue Length 95th (ft)	0	0	0	0	0	0	47	47
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	24.9	24.9
Lane LOS							C	C
Approach Delay (s)	0.0			0.0			24.9	
Approach LOS							C	

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2157	148	0	0	0	0	0	0	158	637	0
Future Volume (vph)	0	2157	148	0	0	0	0	0	0	158	637	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.4	5.4							5.4	5.4	
Lane Util. Factor		0.91	1.00							0.95	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		5301	1650							1752	1842	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		5301	1650							1752	1842	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2345	161	0	0	0	0	0	0	172	692	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	0	74	47	0
Lane Group Flow (vph)	0	2345	113	0	0	0	0	0	0	81	662	0
Turn Type		NA	Perm						Perm	Split	NA	
Protected Phases		2								3	3	
Permitted Phases			2						4			
Actuated Green, G (s)		68.1	68.1							41.1	41.1	
Effective Green, g (s)		68.1	68.1							41.1	41.1	
Actuated g/C Ratio		0.57	0.57							0.34	0.34	
Clearance Time (s)		5.4	5.4							5.4	5.4	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		3008	936							600	630	
v/s Ratio Prot		c0.44								0.05	c0.36	
v/s Ratio Perm			0.07									
v/c Ratio		0.78	0.12							0.14	1.05	
Uniform Delay, d1		20.1	12.1							27.2	39.5	
Progression Factor		0.68	0.95							1.00	1.00	
Incremental Delay, d2		0.8	0.1							0.1	50.1	
Delay (s)		14.4	11.6							27.3	89.5	
Level of Service		B	B							C	F	
Approach Delay (s)		14.3			0.0			0.0			78.4	
Approach LOS		B			A			A			E	

Intersection Summary			
HCM 2000 Control Delay	30.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2066	242	0	0	0	126
Future Volume (vph)	2066	242	0	0	0	126
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.3					6.3
Lane Util. Factor	0.91					0.76
Frt	0.98					0.85
Flt Protected	1.00					1.00
Satd. Flow (prot)	5218					3763
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5218					3763
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2246	263	0	0	0	137
RTOR Reduction (vph)	8	0	0	0	0	42
Lane Group Flow (vph)	2501	0	0	0	0	95
Turn Type	NA					Prot
Protected Phases	2					4
Permitted Phases						
Actuated Green, G (s)	107.3					10.1
Effective Green, g (s)	107.3					10.1
Actuated g/C Ratio	0.83					0.08
Clearance Time (s)	6.3					6.3
Vehicle Extension (s)	0.2					3.0
Lane Grp Cap (vph)	4306					292
v/s Ratio Prot	c0.48					c0.03
v/s Ratio Perm						
v/c Ratio	0.58					0.32
Uniform Delay, d1	3.8					56.7
Progression Factor	1.00					1.00
Incremental Delay, d2	0.6					0.6
Delay (s)	4.4					57.4
Level of Service	A					E
Approach Delay (s)	4.4			0.0	57.4	
Approach LOS	A			A	E	

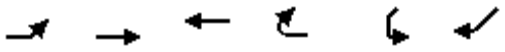
Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	3793	96	0
Future Volume (vph)	0	0	0	3793	96	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				6.3	6.3	
Lane Util. Factor				0.91	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				5301	3579	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				5301	3579	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	4123	104	0
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	4123	102	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Actuated Green, G (s)				109.2	8.2	
Effective Green, g (s)				109.2	8.2	
Actuated g/C Ratio				0.84	0.06	
Clearance Time (s)				6.3	6.3	
Vehicle Extension (s)				0.2	3.0	
Lane Grp Cap (vph)				4452	225	
v/s Ratio Prot				c0.78	c0.03	
v/s Ratio Perm						
v/c Ratio				0.93	0.45	
Uniform Delay, d1				7.5	58.7	
Progression Factor				0.33	1.23	
Incremental Delay, d2				3.4	1.2	
Delay (s)				5.9	73.2	
Level of Service				A	E	
Approach Delay (s)	0.0			5.9	73.2	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations			↑↑↑			↱↱
Traffic Volume (vph)	0	0	2923	0	0	870
Future Volume (vph)	0	0	2923	0	0	870
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)			4.0			6.0
Lane Util. Factor			0.91			*0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			5301			3689
Flt Permitted			1.00			1.00
Satd. Flow (perm)			5301			3689
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	3177	0	0	946
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	3177	0	0	946
Turn Type			NA			Prot
Protected Phases			Free!			4!
Permitted Phases						
Actuated Green, G (s)			130.0			39.0
Effective Green, g (s)			130.0			39.0
Actuated g/C Ratio			1.00			0.30
Clearance Time (s)						6.0
Lane Grp Cap (vph)			5301			1106
v/s Ratio Prot			0.60			c0.26
v/s Ratio Perm						
v/c Ratio			0.60			0.86
Uniform Delay, d1			0.0			42.8
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			8.5
Delay (s)			0.1			51.4
Level of Service			A			D
Approach Delay (s)		0.0	0.1		51.4	
Approach LOS		A	A		D	

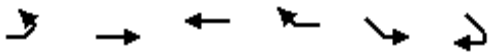
Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↑↑↑↑									↑↑↑	
Traffic Volume (vph)	0	1526	0	0	0	0	0	0	0	0	2923	0
Future Volume (vph)	0	1526	0	0	0	0	0	0	0	0	2923	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.86									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6680									5301	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6680									5301	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1659	0	0	0	0	0	0	0	0	3177	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1659	0	0	0	0	0	0	0	0	3177	0
Turn Type		NA									NA	
Protected Phases		4									2	
Permitted Phases												
Actuated Green, G (s)		39.0									79.0	
Effective Green, g (s)		39.0									79.0	
Actuated g/C Ratio		0.30									0.61	
Clearance Time (s)		6.0									6.0	
Lane Grp Cap (vph)		2004									3221	
v/s Ratio Prot		c0.25									c0.60	
v/s Ratio Perm												
v/c Ratio		0.83									0.99	
Uniform Delay, d1		42.4									25.0	
Progression Factor		1.09									1.21	
Incremental Delay, d2		3.4									12.0	
Delay (s)		49.6									42.2	
Level of Service		D									D	
Approach Delay (s)		49.6			0.0			0.0			42.2	
Approach LOS		D			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	44.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		
Description: West side			

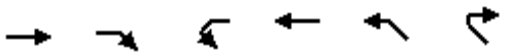
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑↑↑			↰↰	
Traffic Volume (vph)	0	1526	0	0	840	0
Future Volume (vph)	0	1526	0	0	840	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.0			6.0	
Lane Util. Factor		0.86			*0.95	
Frt		1.00			1.00	
Flt Protected		1.00			1.00	
Satd. Flow (prot)		6680			3689	
Flt Permitted		1.00			1.00	
Satd. Flow (perm)		6680			3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1659	0	0	913	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1659	0	0	913	0
Turn Type		NA			Prot	
Protected Phases		Free!			2!	
Permitted Phases						
Actuated Green, G (s)		130.0			79.0	
Effective Green, g (s)		130.0			79.0	
Actuated g/C Ratio		1.00			0.61	
Clearance Time (s)					6.0	
Lane Grp Cap (vph)		6680			2241	
v/s Ratio Prot		0.25			c0.25	
v/s Ratio Perm						
v/c Ratio		0.25			0.41	
Uniform Delay, d1		0.0			13.3	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.0			0.6	
Delay (s)		0.0			13.8	
Level of Service		A			B	
Approach Delay (s)		0.0	0.0		13.8	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	2023	1040	0
Future Volume (vph)	0	0	0	2023	1040	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				4.0	6.0	
Lane Util. Factor				0.91	*0.95	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5301	3689	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5301	3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2199	1130	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2199	1130	0
Turn Type				NA	Prot	
Protected Phases				Free!	4!	
Permitted Phases						
Actuated Green, G (s)				130.0	60.0	
Effective Green, g (s)				130.0	60.0	
Actuated g/C Ratio				1.00	0.46	
Clearance Time (s)					6.0	
Lane Grp Cap (vph)				5301	1702	
v/s Ratio Prot				0.41	c0.31	
v/s Ratio Perm						
v/c Ratio				0.41	0.66	
Uniform Delay, d1				0.0	27.2	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.1	2.1	
Delay (s)				0.1	29.2	
Level of Service				A	C	
Approach Delay (s)	0.0			0.1	29.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	1996	0	0	0	0	0	0	0	0	2023	0
Future Volume (vph)	0	1996	0	0	0	0	0	0	0	0	2023	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.91									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		5301									5301	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		5301									5301	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2170	0	0	0	0	0	0	0	0	2199	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2170	0	0	0	0	0	0	0	0	2199	0
Turn Type		NA									NA	
Protected Phases		4									2	
Permitted Phases												
Actuated Green, G (s)		60.0									58.0	
Effective Green, g (s)		60.0									58.0	
Actuated g/C Ratio		0.46									0.45	
Clearance Time (s)		6.0									6.0	
Lane Grp Cap (vph)		2446									2365	
v/s Ratio Prot		c0.41									c0.41	
v/s Ratio Perm												
v/c Ratio		0.89									0.93	
Uniform Delay, d1		31.9									34.1	
Progression Factor		0.68									0.48	
Incremental Delay, d2		5.1									3.3	
Delay (s)		26.8									19.6	
Level of Service		C									B	
Approach Delay (s)		26.8			0.0			0.0			19.6	
Approach LOS		C			A			A			B	

Intersection Summary					
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.91				
Actuated Cycle Length (s)	130.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	83.8%	ICU Level of Service		E	
Analysis Period (min)	15				
Description: East side					

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1996	0	0	0	0	570
Future Volume (vph)	1996	0	0	0	0	570
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	4.0					6.0
Lane Util. Factor	0.91					0.88
Frt	1.00					1.00
Flt Protected	1.00					1.00
Satd. Flow (prot)	5301					3417
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5301					3417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2170	0	0	0	0	620
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2170	0	0	0	0	620
Turn Type	NA					Prot
Protected Phases	Free!					2!
Permitted Phases						
Actuated Green, G (s)	130.0					58.0
Effective Green, g (s)	130.0					58.0
Actuated g/C Ratio	1.00					0.45
Clearance Time (s)						6.0
Lane Grp Cap (vph)	5301					1524
v/s Ratio Prot	0.41					0.18
v/s Ratio Perm						
v/c Ratio	0.41					0.41
Uniform Delay, d1	0.0					24.4
Progression Factor	1.00					1.00
Incremental Delay, d2	0.1					0.8
Delay (s)	0.1					25.2
Level of Service	A					C
Approach Delay (s)	0.1			0.0	25.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	5.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2308	7	0	0	0	0
Future Vol, veh/h	2308	7	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	2509	8	0	0	0	0

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	1259
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7.16
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.93
Pot Cap-1 Maneuver	-	-		0	138
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	138
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	0
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	-	-	-
HCM Lane V/C Ratio	-	-	-
HCM Control Delay (s)	0	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	0	238	4
Future Vol, veh/h	0	1	0	0	238	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	1	0	0	259	4

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	132		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.96		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.33		-	-
Pot Cap-1 Maneuver	0	890		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	890		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	9.1	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	890	-	-
HCM Lane V/C Ratio	0.001	-	-
HCM Control Delay (s)	9.1	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	0	147	7
Future Vol, veh/h	0	1	0	0	147	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	1	0	0	160	8

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	84		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.96		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.33		-	-
Pot Cap-1 Maneuver	0	955		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	955		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	8.8	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	955	-	-
HCM Lane V/C Ratio	0.001	-	-
HCM Control Delay (s)	8.8	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

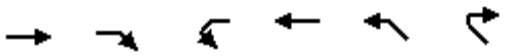
Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	83	0	0	0	9	0	115	37	0	0	0
Future Vol, veh/h	2	83	0	0	0	9	0	115	37	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	2	90	0	0	0	10	0	125	40	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	63	165	-	-	-	63	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	63	165	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	-	-	-	6.96	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	-	-	-	3.33	-	-	-
Pot Cap-1 Maneuver	921	724	0	0	0	985	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	938	758	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	912	724	-	-	-	985	-	-	-
Mov Cap-2 Maneuver	912	724	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	929	758	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	10.7	8.7	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	912	725	985
HCM Lane V/C Ratio	-	-	0.002	0.125	0.01
HCM Control Delay (s)	-	-	9	10.7	8.7
HCM Lane LOS	-	-	A	B	A
HCM 95th %tile Q(veh)	-	-	0	0.4	0



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	1526	570	0	0	0	0
Future Volume (Veh/h)	1526	570	0	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)	1659	620	0	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)	585			197		
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			2279		1969	725
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1835		1488	95
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			290		102	839

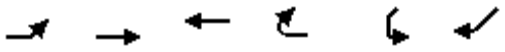
Direction, Lane #	EB 1	EB 2	EB 3	EB 4
Volume Total	474	474	474	857
Volume Left	0	0	0	0
Volume Right	0	0	0	620
cSH	1700	1700	1700	1700
Volume to Capacity	0.28	0.28	0.28	0.50
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0			
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	0	0	140	2923	0	0
Future Volume (Veh/h)	0	0	140	2923	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	152	3177	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)	196			573		
pX, platoon unblocked						
vC, conflicting volume			0		1363	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		1363	0
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	100
cM capacity (veh/h)			1614		125	1081

Direction, Lane #	WB 1	WB 2	WB 3	WB 4
Volume Total	152	1059	1059	1059
Volume Left	152	0	0	0
Volume Right	0	0	0	0
cSH	1614	1700	1700	1700
Volume to Capacity	0.09	0.62	0.62	0.62
Queue Length 95th (ft)	8	0	0	0
Control Delay (s)	7.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.3			
Approach LOS				

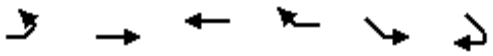
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	370	1996	0	0	0	0
Future Volume (Veh/h)	370	1996	0	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)	402	2170	0	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)		473	280			
pX, platoon unblocked						
vC, conflicting volume	0				1527	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				1527	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	75				100	100
cM capacity (veh/h)	1614				80	1081

Direction, Lane #	EB 1	EB 2	EB 3	EB 4
Volume Total	402	723	723	723
Volume Left	402	0	0	0
Volume Right	0	0	0	0
cSH	1614	1700	1700	1700
Volume to Capacity	0.25	0.43	0.43	0.43
Queue Length 95th (ft)	25	0	0	0
Control Delay (s)	8.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	1.2			
Approach LOS				

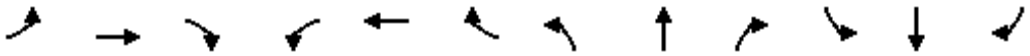
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations			↑↑↑	↱		
Traffic Volume (veh/h)	0	0	2023	590	0	0
Future Volume (Veh/h)	0	0	2023	590	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	2199	641	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)		250				
pX, platoon unblocked						
vC, conflicting volume	2840				2199	733
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2840				2199	733
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	129				38	361

Direction, Lane #	WB 1	WB 2	WB 3	WB 4
Volume Total	733	733	733	641
Volume Left	0	0	0	0
Volume Right	0	0	0	641
cSH	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.43	0.38
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0			
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2674	181	0	0	0	0	0	439	533	0	0
Future Volume (vph)	0	2674	181	0	0	0	0	0	439	533	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.4	5.4						5.4	5.4		
Lane Util. Factor		0.91	1.00						0.88	0.97		
Frt		1.00	0.85						0.85	1.00		
Flt Protected		1.00	1.00						1.00	0.95		
Satd. Flow (prot)		5301	1650						2905	3579		
Flt Permitted		1.00	1.00						1.00	0.95		
Satd. Flow (perm)		5301	1650						2905	3579		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2907	197	0	0	0	0	0	477	579	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2907	197	0	0	0	0	0	477	579	0	0
Turn Type		NA	Perm						Perm	Prot		
Protected Phases		2								3		
Permitted Phases			2						4			
Actuated Green, G (s)		68.6	68.6						17.6	17.6		
Effective Green, g (s)		68.6	68.6						17.6	17.6		
Actuated g/C Ratio		0.57	0.57						0.15	0.15		
Clearance Time (s)		5.4	5.4						5.4	5.4		
Vehicle Extension (s)		3.0	3.0						3.0	3.0		
Lane Grp Cap (vph)		3030	943						426	524		
v/s Ratio Prot		c0.55								c0.16		
v/s Ratio Perm			0.12						c0.16			
v/c Ratio		0.96	0.21						1.12	1.10		
Uniform Delay, d1		24.4	12.5						51.2	51.2		
Progression Factor		0.40	0.53						1.00	1.00		
Incremental Delay, d2		1.2	0.0						80.4	71.2		
Delay (s)		11.1	6.7						131.6	122.4		
Level of Service		B	A						F	F		
Approach Delay (s)		10.8			0.0			131.6			122.4	
Approach LOS		B			A			F			F	

Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	125.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	3435	211	0	0	0	325
Future Volume (vph)	3435	211	0	0	0	325
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.3					6.3
Lane Util. Factor	0.91					0.76
Frt	0.99					0.85
Flt Protected	1.00					1.00
Satd. Flow (prot)	5255					3763
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5255					3763
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3734	229	0	0	0	353
RTOR Reduction (vph)	4	0	0	0	0	1
Lane Group Flow (vph)	3959	0	0	0	0	352
Turn Type	NA					Prot
Protected Phases	2					4
Permitted Phases						
Actuated Green, G (s)	109.0					18.4
Effective Green, g (s)	109.0					18.4
Actuated g/C Ratio	0.78					0.13
Clearance Time (s)	6.3					6.3
Vehicle Extension (s)	0.2					3.0
Lane Grp Cap (vph)	4091					494
v/s Ratio Prot	c0.75					c0.09
v/s Ratio Perm						
v/c Ratio	0.97					0.71
Uniform Delay, d1	13.9					58.3
Progression Factor	1.00					1.00
Incremental Delay, d2	8.4					4.8
Delay (s)	22.3					63.1
Level of Service	C					E
Approach Delay (s)	22.3			0.0	63.1	
Approach LOS	C			A	E	

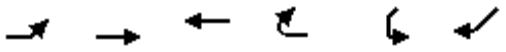
Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	2907	407	0
Future Volume (vph)	0	0	0	2907	407	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				6.3	6.3	
Lane Util. Factor				0.91	*1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				5301	3689	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				5301	3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	3160	442	0
RTOR Reduction (vph)	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	3160	437	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Actuated Green, G (s)				106.3	21.1	
Effective Green, g (s)				106.3	21.1	
Actuated g/C Ratio				0.76	0.15	
Clearance Time (s)				6.3	6.3	
Vehicle Extension (s)				0.2	3.0	
Lane Grp Cap (vph)				4024	555	
v/s Ratio Prot				c0.60	c0.12	
v/s Ratio Perm						
v/c Ratio				0.79	0.79	
Uniform Delay, d1				10.0	57.3	
Progression Factor				0.41	0.99	
Incremental Delay, d2				1.5	2.9	
Delay (s)				5.6	59.7	
Level of Service				A	E	
Approach Delay (s)	0.0			5.6	59.7	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations			↑↑↑			↱↱
Traffic Volume (vph)	0	0	2367	0	0	540
Future Volume (vph)	0	0	2367	0	0	540
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)			4.0			6.0
Lane Util. Factor			0.91			*0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			5301			3689
Flt Permitted			1.00			1.00
Satd. Flow (perm)			5301			3689
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2573	0	0	587
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2573	0	0	587
Turn Type			NA			Prot
Protected Phases			Free!			4!
Permitted Phases						
Actuated Green, G (s)			140.0			61.0
Effective Green, g (s)			140.0			61.0
Actuated g/C Ratio			1.00			0.44
Clearance Time (s)						6.0
Lane Grp Cap (vph)			5301			1607
v/s Ratio Prot			0.49			0.16
v/s Ratio Perm						
v/c Ratio			0.49			0.37
Uniform Delay, d1			0.0			26.5
Progression Factor			1.00			1.00
Incremental Delay, d2			0.0			0.6
Delay (s)			0.0			27.2
Level of Service			A			C
Approach Delay (s)		0.0	0.0		27.2	
Approach LOS		A	A		C	

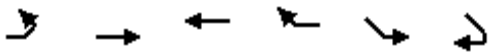
Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↑↑↑↑									↑↑↑	
Traffic Volume (vph)	0	2423	0	0	0	0	0	0	0	0	2367	0
Future Volume (vph)	0	2423	0	0	0	0	0	0	0	0	2367	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.86									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6680									5301	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6680									5301	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2634	0	0	0	0	0	0	0	0	2573	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2634	0	0	0	0	0	0	0	0	2573	0
Turn Type		NA									NA	
Protected Phases		4									2	
Permitted Phases												
Actuated Green, G (s)		61.0									67.0	
Effective Green, g (s)		61.0									67.0	
Actuated g/C Ratio		0.44									0.48	
Clearance Time (s)		6.0									6.0	
Lane Grp Cap (vph)		2910									2536	
v/s Ratio Prot		c0.39									c0.49	
v/s Ratio Perm												
v/c Ratio		0.91									1.01	
Uniform Delay, d1		36.8									36.5	
Progression Factor		0.89									1.46	
Incremental Delay, d2		2.1									21.1	
Delay (s)		34.8									74.4	
Level of Service		C									E	
Approach Delay (s)		34.8			0.0			0.0			74.4	
Approach LOS		C			A			A			E	

Intersection Summary			
HCM 2000 Control Delay	54.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
Description: West side			

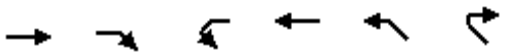
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑↑↑			↰↰	
Traffic Volume (vph)	0	2423	0	0	800	0
Future Volume (vph)	0	2423	0	0	800	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.0			6.0	
Lane Util. Factor		0.86			*0.95	
Frt		1.00			1.00	
Flt Protected		1.00			1.00	
Satd. Flow (prot)		6680			3689	
Flt Permitted		1.00			1.00	
Satd. Flow (perm)		6680			3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2634	0	0	870	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	2634	0	0	870	0
Turn Type		NA			Prot	
Protected Phases		Free!			2!	
Permitted Phases						
Actuated Green, G (s)		140.0			67.0	
Effective Green, g (s)		140.0			67.0	
Actuated g/C Ratio		1.00			0.48	
Clearance Time (s)					6.0	
Lane Grp Cap (vph)		6680			1765	
v/s Ratio Prot		0.39			c0.24	
v/s Ratio Perm						
v/c Ratio		0.39			0.49	
Uniform Delay, d1		0.0			24.9	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.1			1.0	
Delay (s)		0.1			25.9	
Level of Service		A			C	
Approach Delay (s)		0.1	0.0		25.9	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	1847	690	0
Future Volume (vph)	0	0	0	1847	690	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				4.0	6.0	
Lane Util. Factor				0.91	*0.95	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5301	3689	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5301	3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2008	750	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2008	750	0
Turn Type				NA	Prot	
Protected Phases				Free!	4!	
Permitted Phases						
Actuated Green, G (s)				140.0	78.0	
Effective Green, g (s)				140.0	78.0	
Actuated g/C Ratio				1.00	0.56	
Clearance Time (s)					6.0	
Lane Grp Cap (vph)				5301	2055	
v/s Ratio Prot				0.38	0.20	
v/s Ratio Perm						
v/c Ratio				0.38	0.36	
Uniform Delay, d1				0.0	17.2	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.0	0.5	
Delay (s)				0.0	17.7	
Level of Service				A	B	
Approach Delay (s)	0.0			0.0	17.7	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	2473	0	0	0	0	0	0	0	0	1847	0
Future Volume (vph)	0	2473	0	0	0	0	0	0	0	0	1847	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.91									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		5301									5301	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		5301									5301	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2688	0	0	0	0	0	0	0	0	2008	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2688	0	0	0	0	0	0	0	0	2008	0
Turn Type		NA									NA	
Protected Phases		4									2	
Permitted Phases												
Actuated Green, G (s)		78.0									50.0	
Effective Green, g (s)		78.0									50.0	
Actuated g/C Ratio		0.56									0.36	
Clearance Time (s)		6.0									6.0	
Lane Grp Cap (vph)		2953									1893	
v/s Ratio Prot		c0.51									c0.38	
v/s Ratio Perm												
v/c Ratio		0.91									1.06	
Uniform Delay, d1		27.9									45.0	
Progression Factor		1.07									0.42	
Incremental Delay, d2		5.1									28.8	
Delay (s)		34.8									47.6	
Level of Service		C									D	
Approach Delay (s)		34.8			0.0			0.0			47.6	
Approach LOS		C			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	40.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		
Description: East side			

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	2473	0	0	0	0	240
Future Volume (vph)	2473	0	0	0	0	240
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	4.0					6.0
Lane Util. Factor	0.91					0.88
Frt	1.00					1.00
Flt Protected	1.00					1.00
Satd. Flow (prot)	5301					3417
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5301					3417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2688	0	0	0	0	261
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2688	0	0	0	0	261
Turn Type	NA					Prot
Protected Phases	Free!					2!
Permitted Phases						
Actuated Green, G (s)	140.0					50.0
Effective Green, g (s)	140.0					50.0
Actuated g/C Ratio	1.00					0.36
Clearance Time (s)						6.0
Lane Grp Cap (vph)	5301					1220
v/s Ratio Prot	0.51					0.08
v/s Ratio Perm						
v/c Ratio	0.51					0.21
Uniform Delay, d1	0.0					31.3
Progression Factor	1.00					1.00
Incremental Delay, d2	0.1					0.4
Delay (s)	0.1					31.7
Level of Service	A					C
Approach Delay (s)	0.1			0.0	31.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	2.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3639	7	0	0	0	7
Future Vol, veh/h	3639	7	0	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	3955	8	0	0	0	8

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	1982
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7.16
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.93
Pot Cap-1 Maneuver	-	-		0	43
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	43
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	105.9
HCM LOS		F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	43	-	-
HCM Lane V/C Ratio	0.177	-	-
HCM Control Delay (s)	105.9	-	-
HCM Lane LOS	F	-	-
HCM 95th %tile Q(veh)	0.6	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	11	0	0	207	4
Future Vol, veh/h	0	11	0	0	207	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	12	0	0	225	4

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	115		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.96		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.33		-	-
Pot Cap-1 Maneuver	0	912		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	912		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	9	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	912	-	-
HCM Lane V/C Ratio	0.013	-	-
HCM Control Delay (s)	9	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	17	0	0	160	7
Future Vol, veh/h	0	17	0	0	160	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	18	0	0	174	8

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	91		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.96		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.33		-	-
Pot Cap-1 Maneuver	0	945		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	945		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	8.9	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	945	-	-
HCM Lane V/C Ratio	0.02	-	-
HCM Control Delay (s)	8.9	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

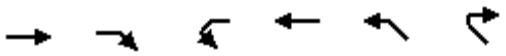
Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	37	0	0	0	149	0	162	9	0	0	0
Future Vol, veh/h	14	37	0	0	0	149	0	162	9	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	15	40	0	0	0	162	0	176	10	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	88	186	-	-	-	88	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	88	186	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	-	-	-	6.96	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	-	-	-	3.33	-	-	-
Pot Cap-1 Maneuver	885	705	0	0	0	950	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	907	742	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	735	705	-	-	-	950	-	-	-
Mov Cap-2 Maneuver	735	705	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	752	742	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	10.3	9.6	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	735	708	950
HCM Lane V/C Ratio	-	-	0.014	0.064	0.17
HCM Control Delay (s)	-	-	10	10.4	9.6
HCM Lane LOS	-	-	B	B	A
HCM 95th %tile Q(veh)	-	-	0	0.2	0.6



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	2423	930	0	0	0	0
Future Volume (Veh/h)	2423	930	0	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)	2634	1011	0	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)	585			197		
pX, platoon unblocked			0.36		0.36	0.36
vC, conflicting volume			3645		3140	1164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			576		364	386

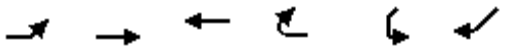
Direction, Lane #	EB 1	EB 2	EB 3	EB 4
Volume Total	753	753	753	1387
Volume Left	0	0	0	0
Volume Right	0	0	0	1011
cSH	1700	1700	1700	1700
Volume to Capacity	0.44	0.44	0.44	0.82
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0			
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	0	0	170	2367	0	0
Future Volume (Veh/h)	0	0	170	2367	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	185	2573	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)	199			573		
pX, platoon unblocked						
vC, conflicting volume			0		1228	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		1228	0
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		100	100
cM capacity (veh/h)			1614		150	1081

Direction, Lane #	WB 1	WB 2	WB 3	WB 4
Volume Total	185	858	858	858
Volume Left	185	0	0	0
Volume Right	0	0	0	0
cSH	1614	1700	1700	1700
Volume to Capacity	0.11	0.50	0.50	0.50
Queue Length 95th (ft)	10	0	0	0
Control Delay (s)	7.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.5			
Approach LOS				

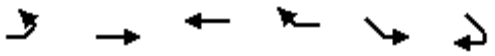
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	750	2473	0	0	0	0
Future Volume (Veh/h)	750	2473	0	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)	815	2688	0	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)		473	281			
pX, platoon unblocked						
vC, conflicting volume	0				2526	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				2526	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	50				100	100
cM capacity (veh/h)	1614				11	1081

Direction, Lane #	EB 1	EB 2	EB 3	EB 4
Volume Total	815	896	896	896
Volume Left	815	0	0	0
Volume Right	0	0	0	0
cSH	1614	1700	1700	1700
Volume to Capacity	0.50	0.53	0.53	0.53
Queue Length 95th (ft)	74	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	2.2			
Approach LOS				

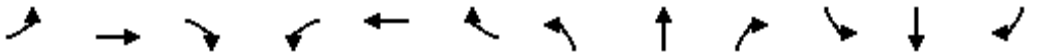
Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations			↑↑↑	↱		
Traffic Volume (veh/h)	0	0	1847	750	0	0
Future Volume (Veh/h)	0	0	1847	750	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	2008	815	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)		252				
pX, platoon unblocked						
vC, conflicting volume	2823				2008	669
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2823				2008	669
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	131				51	398

Direction, Lane #	WB 1	WB 2	WB 3	WB 4
Volume Total	669	669	669	815
Volume Left	0	0	0	0
Volume Right	0	0	0	815
cSH	1700	1700	1700	1700
Volume to Capacity	0.39	0.39	0.39	0.48
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0			
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2188	148	0	0	0	0	0	0	160	637	0
Future Volume (vph)	0	2188	148	0	0	0	0	0	0	160	637	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.4	5.4							5.4	5.4	
Lane Util. Factor		0.91	1.00							0.95	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		5301	1650							1752	1842	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		5301	1650							1752	1842	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2378	161	0	0	0	0	0	0	174	692	0
RTOR Reduction (vph)	0	0	47	0	0	0	0	0	0	75	47	0
Lane Group Flow (vph)	0	2378	114	0	0	0	0	0	0	82	662	0
Turn Type		NA	Perm						Perm	Split	NA	
Protected Phases		2								3	3	
Permitted Phases			2						4			
Actuated Green, G (s)		68.1	68.1							41.1	41.1	
Effective Green, g (s)		68.1	68.1							41.1	41.1	
Actuated g/C Ratio		0.57	0.57							0.34	0.34	
Clearance Time (s)		5.4	5.4							5.4	5.4	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		3008	936							600	630	
v/s Ratio Prot		c0.45								0.05	c0.36	
v/s Ratio Perm			0.07									
v/c Ratio		0.79	0.12							0.14	1.05	
Uniform Delay, d1		20.4	12.1							27.2	39.5	
Progression Factor		0.68	0.99							1.00	1.00	
Incremental Delay, d2		0.9	0.1							0.1	50.1	
Delay (s)		14.8	12.1							27.3	89.5	
Level of Service		B	B							C	F	
Approach Delay (s)		14.6			0.0			0.0			78.2	
Approach LOS		B			A			A			E	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	2076	259	0	0	0	136
Future Volume (vph)	2076	259	0	0	0	136
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.3					6.3
Lane Util. Factor	0.91					0.76
Frt	0.98					0.85
Flt Protected	1.00					1.00
Satd. Flow (prot)	5213					3763
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5213					3763
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2257	282	0	0	0	148
RTOR Reduction (vph)	9	0	0	0	0	41
Lane Group Flow (vph)	2530	0	0	0	0	107
Turn Type	NA					Prot
Protected Phases	2					4
Permitted Phases						
Actuated Green, G (s)	107.1					10.3
Effective Green, g (s)	107.1					10.3
Actuated g/C Ratio	0.82					0.08
Clearance Time (s)	6.3					6.3
Vehicle Extension (s)	0.2					3.0
Lane Grp Cap (vph)	4294					298
v/s Ratio Prot	c0.49					c0.03
v/s Ratio Perm						
v/c Ratio	0.59					0.36
Uniform Delay, d1	3.9					56.7
Progression Factor	1.00					1.00
Incremental Delay, d2	0.6					0.7
Delay (s)	4.5					57.5
Level of Service	A					E
Approach Delay (s)	4.5			0.0	57.5	
Approach LOS	A			A	E	

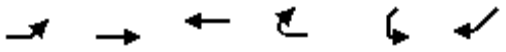
Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	0	0	0	3794	97	0
Future Volume (vph)	0	0	0	3794	97	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				6.3	6.3	
Lane Util. Factor				0.91	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				5301	3579	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				5301	3579	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	4124	105	0
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	4124	103	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Actuated Green, G (s)				109.2	8.2	
Effective Green, g (s)				109.2	8.2	
Actuated g/C Ratio				0.84	0.06	
Clearance Time (s)				6.3	6.3	
Vehicle Extension (s)				0.2	3.0	
Lane Grp Cap (vph)				4452	225	
v/s Ratio Prot				c0.78	c0.03	
v/s Ratio Perm						
v/c Ratio				0.93	0.46	
Uniform Delay, d1				7.5	58.8	
Progression Factor				0.33	1.22	
Incremental Delay, d2				3.4	1.2	
Delay (s)				5.9	72.8	
Level of Service				A	E	
Approach Delay (s)	0.0			5.9	72.8	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	109.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations			↑↑↑			↱↱
Traffic Volume (vph)	0	0	2924	0	0	870
Future Volume (vph)	0	0	2924	0	0	870
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)			4.0			6.0
Lane Util. Factor			0.91			*0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			5301			3689
Flt Permitted			1.00			1.00
Satd. Flow (perm)			5301			3689
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	3178	0	0	946
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	3178	0	0	946
Turn Type			NA			Prot
Protected Phases			Free!			4!
Permitted Phases						
Actuated Green, G (s)			130.0			39.0
Effective Green, g (s)			130.0			39.0
Actuated g/C Ratio			1.00			0.30
Clearance Time (s)						6.0
Lane Grp Cap (vph)			5301			1106
v/s Ratio Prot			0.60			c0.26
v/s Ratio Perm						
v/c Ratio			0.60			0.86
Uniform Delay, d1			0.0			42.8
Progression Factor			1.00			1.00
Incremental Delay, d2			0.1			8.5
Delay (s)			0.1			51.4
Level of Service			A			D
Approach Delay (s)		0.0	0.1		51.4	
Approach LOS		A	A		D	

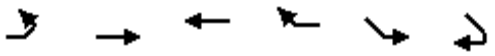
Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↑↑↑↑									↑↑↑	
Traffic Volume (vph)	0	1545	0	0	0	0	0	0	0	0	2924	0
Future Volume (vph)	0	1545	0	0	0	0	0	0	0	0	2924	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.86									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6680									5301	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6680									5301	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1679	0	0	0	0	0	0	0	0	3178	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1679	0	0	0	0	0	0	0	0	3178	0
Turn Type		NA									NA	
Protected Phases		4									2	
Permitted Phases												
Actuated Green, G (s)		39.0									79.0	
Effective Green, g (s)		39.0									79.0	
Actuated g/C Ratio		0.30									0.61	
Clearance Time (s)		6.0									6.0	
Lane Grp Cap (vph)		2004									3221	
v/s Ratio Prot		c0.25									c0.60	
v/s Ratio Perm												
v/c Ratio		0.84									0.99	
Uniform Delay, d1		42.5									25.0	
Progression Factor		1.09									1.21	
Incremental Delay, d2		3.7									12.0	
Delay (s)		50.2									42.3	
Level of Service		D									D	
Approach Delay (s)		50.2			0.0			0.0			42.3	
Approach LOS		D			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		
Description: West side			

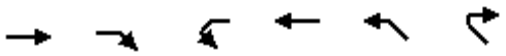
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑↑↑			↰↰	
Traffic Volume (vph)	0	1545	0	0	840	0
Future Volume (vph)	0	1545	0	0	840	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.0			6.0	
Lane Util. Factor		0.86			*0.95	
Frt		1.00			1.00	
Flt Protected		1.00			1.00	
Satd. Flow (prot)		6680			3689	
Flt Permitted		1.00			1.00	
Satd. Flow (perm)		6680			3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1679	0	0	913	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1679	0	0	913	0
Turn Type		NA			Prot	
Protected Phases		Free!			2!	
Permitted Phases						
Actuated Green, G (s)		130.0			79.0	
Effective Green, g (s)		130.0			79.0	
Actuated g/C Ratio		1.00			0.61	
Clearance Time (s)					6.0	
Lane Grp Cap (vph)		6680			2241	
v/s Ratio Prot		0.25			c0.25	
v/s Ratio Perm						
v/c Ratio		0.25			0.41	
Uniform Delay, d1		0.0			13.3	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.0			0.6	
Delay (s)		0.0			13.8	
Level of Service		A			B	
Approach Delay (s)		0.0	0.0		13.8	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	2024	1040	0
Future Volume (vph)	0	0	0	2024	1040	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				4.0	6.0	
Lane Util. Factor				0.91	*0.95	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5301	3689	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5301	3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2200	1130	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2200	1130	0
Turn Type				NA	Prot	
Protected Phases				Free!	4!	
Permitted Phases						
Actuated Green, G (s)				130.0	60.0	
Effective Green, g (s)				130.0	60.0	
Actuated g/C Ratio				1.00	0.46	
Clearance Time (s)					6.0	
Lane Grp Cap (vph)				5301	1702	
v/s Ratio Prot				0.42	c0.31	
v/s Ratio Perm						
v/c Ratio				0.42	0.66	
Uniform Delay, d1				0.0	27.2	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.1	2.1	
Delay (s)				0.1	29.2	
Level of Service				A	C	
Approach Delay (s)	0.0			0.1	29.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	2015	0	0	0	0	0	0	0	0	2024	0
Future Volume (vph)	0	2015	0	0	0	0	0	0	0	0	2024	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.91									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		5301									5301	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		5301									5301	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2190	0	0	0	0	0	0	0	0	2200	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2190	0	0	0	0	0	0	0	0	2200	0
Turn Type		NA									NA	
Protected Phases		4									2	
Permitted Phases												
Actuated Green, G (s)		60.0									58.0	
Effective Green, g (s)		60.0									58.0	
Actuated g/C Ratio		0.46									0.45	
Clearance Time (s)		6.0									6.0	
Lane Grp Cap (vph)		2446									2365	
v/s Ratio Prot		c0.41									c0.42	
v/s Ratio Perm												
v/c Ratio		0.90									0.93	
Uniform Delay, d1		32.1									34.1	
Progression Factor		0.67									0.48	
Incremental Delay, d2		5.4									3.4	
Delay (s)		27.0									19.6	
Level of Service		C									B	
Approach Delay (s)		27.0			0.0			0.0			19.6	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
Description: East side			

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	2015	0	0	0	0	570
Future Volume (vph)	2015	0	0	0	0	570
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	4.0					6.0
Lane Util. Factor	0.91					0.88
Frt	1.00					1.00
Flt Protected	1.00					1.00
Satd. Flow (prot)	5301					3417
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5301					3417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2190	0	0	0	0	620
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2190	0	0	0	0	620
Turn Type	NA					Prot
Protected Phases	Free!					2!
Permitted Phases						
Actuated Green, G (s)	130.0					58.0
Effective Green, g (s)	130.0					58.0
Actuated g/C Ratio	1.00					0.45
Clearance Time (s)						6.0
Lane Grp Cap (vph)	5301					1524
v/s Ratio Prot	0.41					0.18
v/s Ratio Perm						
v/c Ratio	0.41					0.41
Uniform Delay, d1	0.0					24.4
Progression Factor	1.00					1.00
Incremental Delay, d2	0.1					0.8
Delay (s)	0.1					25.2
Level of Service	A					C
Approach Delay (s)	0.1			0.0	25.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2325	23	0	0	0	10
Future Vol, veh/h	2325	23	0	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	2527	25	0	0	0	11

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	1276
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7.16
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.93
Pot Cap-1 Maneuver	-	-		0	134
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	134
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	34.2
HCM LOS		D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	134	-	-
HCM Lane V/C Ratio	0.081	-	-
HCM Control Delay (s)	34.2	-	-
HCM Lane LOS	D	-	-
HCM 95th %tile Q(veh)	0.3	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	11	0	0	254	13
Future Vol, veh/h	0	11	0	0	254	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	12	0	0	276	14

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	145		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.96		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.33		-	-
Pot Cap-1 Maneuver	0	873		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	873		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	9.2	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	873	-	-
HCM Lane V/C Ratio	0.014	-	-
HCM Control Delay (s)	9.2	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	0	152	23
Future Vol, veh/h	0	1	0	0	152	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	1	0	0	165	25

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	95		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.96		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.33		-	-
Pot Cap-1 Maneuver	0	940		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	940		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	8.8	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	940	-	-
HCM Lane V/C Ratio	0.001	-	-
HCM Control Delay (s)	8.8	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

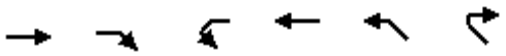
Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	83	0	0	0	9	0	128	37	0	0	0
Future Vol, veh/h	7	83	0	0	0	9	0	128	37	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	8	90	0	0	0	10	0	139	40	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	70	179	-	-	-	70	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	70	179	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	-	-	-	6.96	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	-	-	-	3.33	-	-	-
Pot Cap-1 Maneuver	911	711	0	0	0	975	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	929	748	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	902	711	-	-	-	975	-	-	-
Mov Cap-2 Maneuver	902	711	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	920	748	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	10.7	8.7	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	902	715	975
HCM Lane V/C Ratio	-	-	0.006	0.13	0.01
HCM Control Delay (s)	-	-	9	10.8	8.7
HCM Lane LOS	-	-	A	B	A
HCM 95th %tile Q(veh)	-	-	0	0.4	0



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	1545	570	0	0	0	0
Future Volume (Veh/h)	1545	570	0	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)	1679	620	0	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)	585			197		
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			2299		1989	730
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1842		1494	79
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			287		100	856

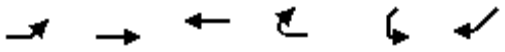
Direction, Lane #	EB 1	EB 2	EB 3	EB 4
Volume Total	480	480	480	860
Volume Left	0	0	0	0
Volume Right	0	0	0	620
cSH	1700	1700	1700	1700
Volume to Capacity	0.28	0.28	0.28	0.51
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0			
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	0	0	140	2924	0	0
Future Volume (Veh/h)	0	0	140	2924	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	152	3178	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)	196			573		
pX, platoon unblocked						
vC, conflicting volume			0		1363	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		1363	0
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		100	100
cM capacity (veh/h)			1614		125	1081

Direction, Lane #	WB 1	WB 2	WB 3	WB 4
Volume Total	152	1059	1059	1059
Volume Left	152	0	0	0
Volume Right	0	0	0	0
cSH	1614	1700	1700	1700
Volume to Capacity	0.09	0.62	0.62	0.62
Queue Length 95th (ft)	8	0	0	0
Control Delay (s)	7.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.3			
Approach LOS				

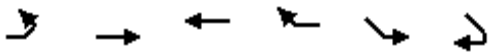
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	370	2015	0	0	0	0
Future Volume (Veh/h)	370	2015	0	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)	402	2190	0	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)		473	280			
pX, platoon unblocked						
vC, conflicting volume	0				1534	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				1534	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	75				100	100
cM capacity (veh/h)	1614				80	1081

Direction, Lane #	EB 1	EB 2	EB 3	EB 4
Volume Total	402	730	730	730
Volume Left	402	0	0	0
Volume Right	0	0	0	0
cSH	1614	1700	1700	1700
Volume to Capacity	0.25	0.43	0.43	0.43
Queue Length 95th (ft)	25	0	0	0
Control Delay (s)	8.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	1.2			
Approach LOS				

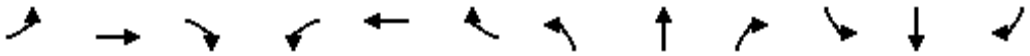
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Volume (veh/h)	0	0	2024	590	0	0
Future Volume (Veh/h)	0	0	2024	590	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	2200	641	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)		250				
pX, platoon unblocked						
vC, conflicting volume	2841				2200	733
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2841				2200	733
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	129				38	361

Direction, Lane #	WB 1	WB 2	WB 3	WB 4
Volume Total	733	733	733	641
Volume Left	0	0	0	0
Volume Right	0	0	0	641
cSH	1700	1700	1700	1700
Volume to Capacity	0.43	0.43	0.43	0.38
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0			
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2723	181	0	0	0	0	0	439	543	0	0
Future Volume (vph)	0	2723	181	0	0	0	0	0	439	543	0	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		5.4	5.4						5.4	5.4		
Lane Util. Factor		0.91	1.00						0.88	0.97		
Frt		1.00	0.85						0.85	1.00		
Flt Protected		1.00	1.00						1.00	0.95		
Satd. Flow (prot)		5301	1650						2905	3579		
Flt Permitted		1.00	1.00						1.00	0.95		
Satd. Flow (perm)		5301	1650						2905	3579		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2960	197	0	0	0	0	0	477	590	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2960	197	0	0	0	0	0	477	590	0	0
Turn Type		NA	Perm						Perm	Prot		
Protected Phases		2								3		
Permitted Phases			2						4			
Actuated Green, G (s)		68.6	68.6						17.6	17.6		
Effective Green, g (s)		68.6	68.6						17.6	17.6		
Actuated g/C Ratio		0.57	0.57						0.15	0.15		
Clearance Time (s)		5.4	5.4						5.4	5.4		
Vehicle Extension (s)		3.0	3.0						3.0	3.0		
Lane Grp Cap (vph)		3030	943						426	524		
v/s Ratio Prot		c0.56								c0.16		
v/s Ratio Perm			0.12						c0.16			
v/c Ratio		0.98	0.21						1.12	1.13		
Uniform Delay, d1		24.9	12.5						51.2	51.2		
Progression Factor		0.40	0.53						1.00	1.00		
Incremental Delay, d2		1.9	0.0						80.4	78.8		
Delay (s)		11.9	6.6						131.6	130.0		
Level of Service		B	A						F	F		
Approach Delay (s)		11.6			0.0			131.6			130.0	
Approach LOS		B			A			F			F	

Intersection Summary			
HCM 2000 Control Delay	41.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.2
Intersection Capacity Utilization	126.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	3447	239	0	0	0	356
Future Volume (vph)	3447	239	0	0	0	356
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	6.3					6.3
Lane Util. Factor	0.91					0.76
Frt	0.99					0.85
Flt Protected	1.00					1.00
Satd. Flow (prot)	5249					3763
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5249					3763
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3747	260	0	0	0	387
RTOR Reduction (vph)	4	0	0	0	0	1
Lane Group Flow (vph)	4003	0	0	0	0	386
Turn Type	NA					Prot
Protected Phases	2					4
Permitted Phases						
Actuated Green, G (s)	107.8					19.6
Effective Green, g (s)	107.8					19.6
Actuated g/C Ratio	0.77					0.14
Clearance Time (s)	6.3					6.3
Vehicle Extension (s)	0.2					3.0
Lane Grp Cap (vph)	4041					526
v/s Ratio Prot	c0.76					c0.10
v/s Ratio Perm						
v/c Ratio	0.99					0.73
Uniform Delay, d1	15.6					57.7
Progression Factor	1.00					1.00
Incremental Delay, d2	12.1					5.3
Delay (s)	27.7					63.0
Level of Service	C					E
Approach Delay (s)	27.7			0.0	63.0	
Approach LOS	C			A	E	

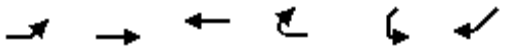
Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	2917	412	0
Future Volume (vph)	0	0	0	2917	412	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				6.3	6.3	
Lane Util. Factor				0.91	*1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				5301	3689	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				5301	3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	3171	448	0
RTOR Reduction (vph)	0	0	0	0	4	0
Lane Group Flow (vph)	0	0	0	3171	444	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases						
Actuated Green, G (s)				106.2	21.2	
Effective Green, g (s)				106.2	21.2	
Actuated g/C Ratio				0.76	0.15	
Clearance Time (s)				6.3	6.3	
Vehicle Extension (s)				0.2	3.0	
Lane Grp Cap (vph)				4021	558	
v/s Ratio Prot				c0.60	c0.12	
v/s Ratio Perm						
v/c Ratio				0.79	0.80	
Uniform Delay, d1				10.2	57.3	
Progression Factor				0.41	0.99	
Incremental Delay, d2				1.5	2.7	
Delay (s)				5.7	59.3	
Level of Service				A	E	
Approach Delay (s)	0.0			5.7	59.3	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	116.4%	ICU Level of Service	H
Analysis Period (min)	15		

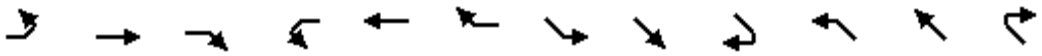
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations			↑↑↑			↱↱
Traffic Volume (vph)	0	0	2377	0	0	540
Future Volume (vph)	0	0	2377	0	0	540
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)			4.0			6.0
Lane Util. Factor			0.91			*0.95
Frt			1.00			1.00
Flt Protected			1.00			1.00
Satd. Flow (prot)			5301			3689
Flt Permitted			1.00			1.00
Satd. Flow (perm)			5301			3689
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2584	0	0	587
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	2584	0	0	587
Turn Type			NA			Prot
Protected Phases			Free!			4!
Permitted Phases						
Actuated Green, G (s)			140.0			61.0
Effective Green, g (s)			140.0			61.0
Actuated g/C Ratio			1.00			0.44
Clearance Time (s)						6.0
Lane Grp Cap (vph)			5301			1607
v/s Ratio Prot			0.49			0.16
v/s Ratio Perm						
v/c Ratio			0.49			0.37
Uniform Delay, d1			0.0			26.5
Progression Factor			1.00			1.00
Incremental Delay, d2			0.0			0.6
Delay (s)			0.0			27.2
Level of Service			A			C
Approach Delay (s)		0.0	0.0		27.2	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

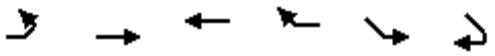
! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↑↑↑↑									↑↑↑	
Traffic Volume (vph)	0	2461	0	0	0	0	0	0	0	0	2377	0
Future Volume (vph)	0	2461	0	0	0	0	0	0	0	0	2377	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.86									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6680									5301	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6680									5301	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2675	0	0	0	0	0	0	0	0	2584	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2675	0	0	0	0	0	0	0	0	2584	0
Turn Type		NA									NA	
Protected Phases		4									2	
Permitted Phases												
Actuated Green, G (s)		61.0									67.0	
Effective Green, g (s)		61.0									67.0	
Actuated g/C Ratio		0.44									0.48	
Clearance Time (s)		6.0									6.0	
Lane Grp Cap (vph)		2910									2536	
v/s Ratio Prot		c0.40									c0.49	
v/s Ratio Perm												
v/c Ratio		0.92									1.02	
Uniform Delay, d1		37.2									36.5	
Progression Factor		0.88									1.46	
Incremental Delay, d2		2.2									22.3	
Delay (s)		34.8									75.5	
Level of Service		C									E	
Approach Delay (s)		34.8			0.0			0.0			75.5	
Approach LOS		C			A			A			E	

Intersection Summary			
HCM 2000 Control Delay	54.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		
Description: West side			

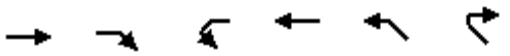
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations		↑↑↑↑			↰↰	
Traffic Volume (vph)	0	2461	0	0	800	0
Future Volume (vph)	0	2461	0	0	800	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)		4.0			6.0	
Lane Util. Factor		0.86			*0.95	
Frt		1.00			1.00	
Flt Protected		1.00			1.00	
Satd. Flow (prot)		6680			3689	
Flt Permitted		1.00			1.00	
Satd. Flow (perm)		6680			3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2675	0	0	870	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	2675	0	0	870	0
Turn Type		NA			Prot	
Protected Phases		Free!			2!	
Permitted Phases						
Actuated Green, G (s)		140.0			67.0	
Effective Green, g (s)		140.0			67.0	
Actuated g/C Ratio		1.00			0.48	
Clearance Time (s)					6.0	
Lane Grp Cap (vph)		6680			1765	
v/s Ratio Prot		0.40			c0.24	
v/s Ratio Perm						
v/c Ratio		0.40			0.49	
Uniform Delay, d1		0.0			24.9	
Progression Factor		1.00			1.00	
Incremental Delay, d2		0.1			1.0	
Delay (s)		0.1			25.9	
Level of Service		A			C	
Approach Delay (s)		0.1	0.0		25.9	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations				↑↑↑	↰↰	
Traffic Volume (vph)	0	0	0	1857	690	0
Future Volume (vph)	0	0	0	1857	690	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)				4.0	6.0	
Lane Util. Factor				0.91	*0.95	
Frt				1.00	1.00	
Flt Protected				1.00	1.00	
Satd. Flow (prot)				5301	3689	
Flt Permitted				1.00	1.00	
Satd. Flow (perm)				5301	3689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	2018	750	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	2018	750	0
Turn Type				NA	Prot	
Protected Phases				Free!	4!	
Permitted Phases						
Actuated Green, G (s)				140.0	78.0	
Effective Green, g (s)				140.0	78.0	
Actuated g/C Ratio				1.00	0.56	
Clearance Time (s)					6.0	
Lane Grp Cap (vph)				5301	2055	
v/s Ratio Prot				0.38	0.20	
v/s Ratio Perm						
v/c Ratio				0.38	0.36	
Uniform Delay, d1				0.0	17.2	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.0	0.5	
Delay (s)				0.0	17.7	
Level of Service				A	B	
Approach Delay (s)	0.0			0.0	17.7	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	2511	0	0	0	0	0	0	0	0	1857	0
Future Volume (vph)	0	2511	0	0	0	0	0	0	0	0	1857	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)		6.0									6.0	
Lane Util. Factor		0.91									0.91	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		5301									5301	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		5301									5301	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2729	0	0	0	0	0	0	0	0	2018	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2729	0	0	0	0	0	0	0	0	2018	0
Turn Type		NA									NA	
Protected Phases		4									2	
Permitted Phases												
Actuated Green, G (s)		78.0									50.0	
Effective Green, g (s)		78.0									50.0	
Actuated g/C Ratio		0.56									0.36	
Clearance Time (s)		6.0									6.0	
Lane Grp Cap (vph)		2953									1893	
v/s Ratio Prot		c0.51									c0.38	
v/s Ratio Perm												
v/c Ratio		0.92									1.07	
Uniform Delay, d1		28.3									45.0	
Progression Factor		1.07									0.42	
Incremental Delay, d2		5.8									31.0	
Delay (s)		36.0									49.9	
Level of Service		D									D	
Approach Delay (s)		36.0			0.0			0.0			49.9	
Approach LOS		D			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		
Description: East side			

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	2511	0	0	0	0	240
Future Volume (vph)	2511	0	0	0	0	240
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000
Total Lost time (s)	4.0					6.0
Lane Util. Factor	0.91					0.88
Frt	1.00					1.00
Flt Protected	1.00					1.00
Satd. Flow (prot)	5301					3417
Flt Permitted	1.00					1.00
Satd. Flow (perm)	5301					3417
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2729	0	0	0	0	261
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2729	0	0	0	0	261
Turn Type	NA					Prot
Protected Phases	Free!					2!
Permitted Phases						
Actuated Green, G (s)	140.0					50.0
Effective Green, g (s)	140.0					50.0
Actuated g/C Ratio	1.00					0.36
Clearance Time (s)						6.0
Lane Grp Cap (vph)	5301					1220
v/s Ratio Prot	0.51					0.08
v/s Ratio Perm						
v/c Ratio	0.51					0.21
Uniform Delay, d1	0.0					31.3
Progression Factor	1.00					1.00
Incremental Delay, d2	0.1					0.4
Delay (s)	0.1					31.7
Level of Service	A					C
Approach Delay (s)	0.1			0.0	31.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	2.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	3667	38	0	0	0	19
Future Vol, veh/h	3667	38	0	0	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	3986	41	0	0	0	21

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	2014
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	7.16
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.93
Pot Cap-1 Maneuver	-	-		0	41
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	41
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	161.1
HCM LOS		F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	41	-	-
HCM Lane V/C Ratio	0.504	-	-
HCM Control Delay (s)	161.1	-	-
HCM Lane LOS	F	-	-
HCM 95th %tile Q(veh)	1.8	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	29	0	0	238	22
Future Vol, veh/h	0	29	0	0	238	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	32	0	0	259	24

Major/Minor	Minor2			Major2	
Conflicting Flow All	-	142		-	0
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	6.96		-	-
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	3.33		-	-
Pot Cap-1 Maneuver	0	877		-	-
Stage 1	0	-		-	-
Stage 2	0	-		-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	877		-	-
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	SB
HCM Control Delay, s	9.3	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	877	-	-
HCM Lane V/C Ratio	0.036	-	-
HCM Control Delay (s)	9.3	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	45	0	0	166	38
Future Vol, veh/h	0	45	0	0	166	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	49	0	0	180	41

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	111	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.96	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.33	-	-
Pot Cap-1 Maneuver	0	918	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	918	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	9.1	0
HCM LOS	A	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	918	-	-
HCM Lane V/C Ratio	0.053	-	-
HCM Control Delay (s)	9.1	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-

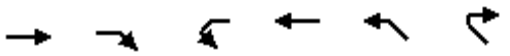
Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	37	0	0	0	149	0	202	9	0	0	0
Future Vol, veh/h	26	37	0	0	0	149	0	202	9	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	0	-	-	50	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	28	40	0	0	0	162	0	220	10	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	110	230	-	-	-	110	-	0	0
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	110	230	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.56	-	-	-	6.96	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.03	-	-	-	3.33	-	-	-
Pot Cap-1 Maneuver	854	666	0	0	0	919	0	-	-
Stage 1	-	-	0	0	0	-	0	-	-
Stage 2	880	710	0	0	0	-	0	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	704	666	-	-	-	919	-	-	-
Mov Cap-2 Maneuver	704	666	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	725	710	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	10.7	9.8	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	WBLn1
Capacity (veh/h)	-	-	704	673	919
HCM Lane V/C Ratio	-	-	0.027	0.074	0.176
HCM Control Delay (s)	-	-	10.3	10.8	9.8
HCM Lane LOS	-	-	B	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0.2	0.6



Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Traffic Volume (veh/h)	2461	930	0	0	0	0
Future Volume (Veh/h)	2461	930	0	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)	2675	1011	0	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)	585			197		
pX, platoon unblocked			0.30		0.30	0.30
vC, conflicting volume			3686		3180	1174
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		0	0
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			479		303	321

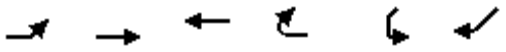
Direction, Lane #	EB 1	EB 2	EB 3	EB 4
Volume Total	764	764	764	1393
Volume Left	0	0	0	0
Volume Right	0	0	0	1011
cSH	1700	1700	1700	1700
Volume to Capacity	0.45	0.45	0.45	0.82
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0			
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	0	0	170	2377	0	0
Future Volume (Veh/h)	0	0	170	2377	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	185	2584	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)	199			573		
pX, platoon unblocked						
vC, conflicting volume			0		1231	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		1231	0
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			89		100	100
cM capacity (veh/h)			1614		149	1081

Direction, Lane #	WB 1	WB 2	WB 3	WB 4
Volume Total	185	861	861	861
Volume Left	185	0	0	0
Volume Right	0	0	0	0
cSH	1614	1700	1700	1700
Volume to Capacity	0.11	0.51	0.51	0.51
Queue Length 95th (ft)	10	0	0	0
Control Delay (s)	7.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.5			
Approach LOS				

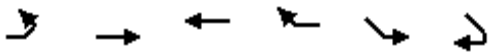
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	750	2511	0	0	0	0
Future Volume (Veh/h)	750	2511	0	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)	815	2729	0	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)		473	281			
pX, platoon unblocked						
vC, conflicting volume	0				2540	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				2540	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	50				100	100
cM capacity (veh/h)	1614				11	1081

Direction, Lane #	EB 1	EB 2	EB 3	EB 4
Volume Total	815	910	910	910
Volume Left	815	0	0	0
Volume Right	0	0	0	0
cSH	1614	1700	1700	1700
Volume to Capacity	0.50	0.54	0.54	0.54
Queue Length 95th (ft)	74	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	2.2			
Approach LOS				

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

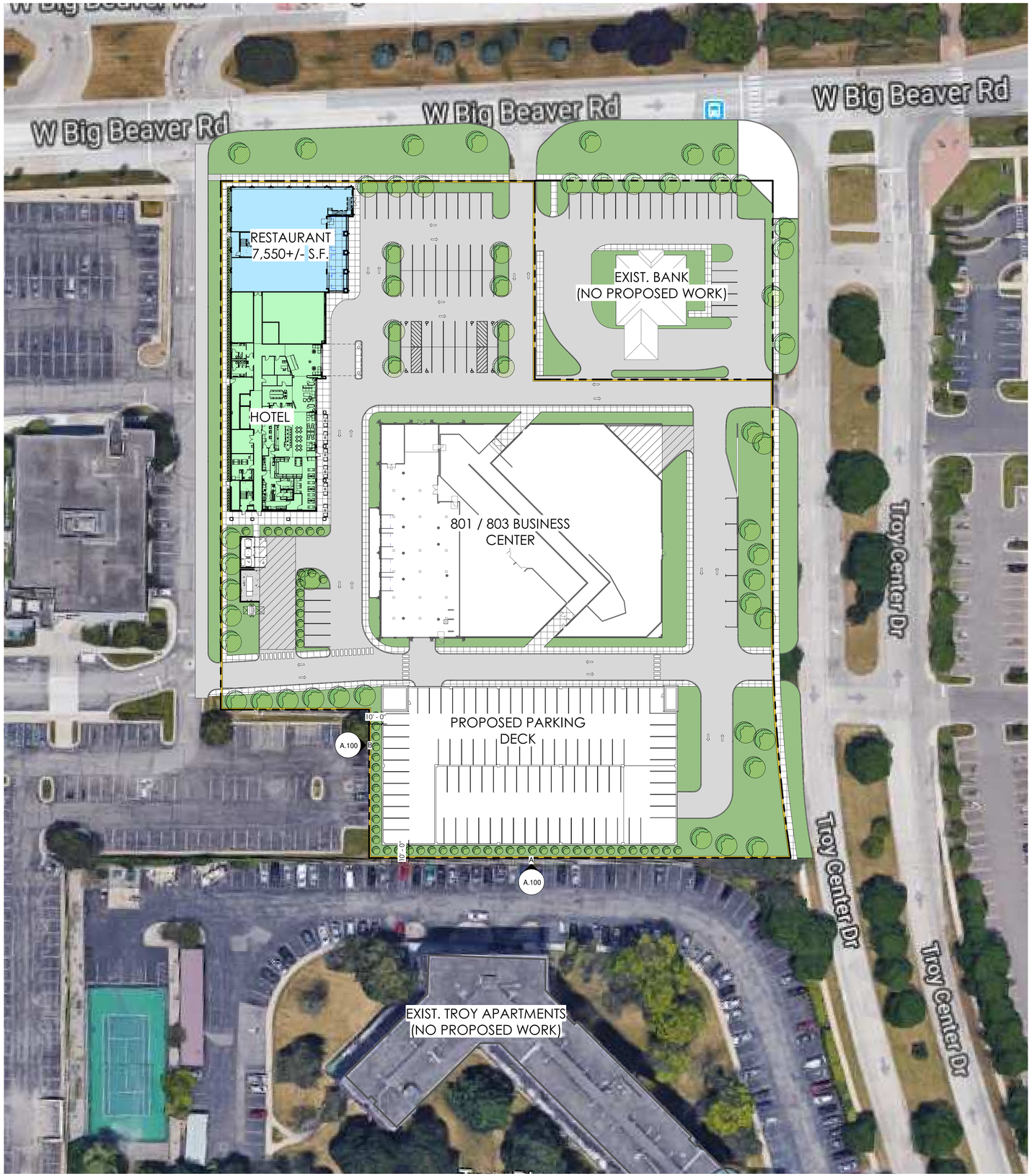


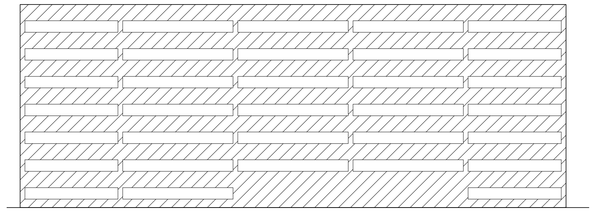
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations			↑↑↑	↱		
Traffic Volume (veh/h)	0	0	1857	750	0	0
Future Volume (Veh/h)	0	0	1857	750	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	2018	815	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		252				
pX, platoon unblocked						
vC, conflicting volume	2833				2018	673
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2833				2018	673
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	130				50	396

Direction, Lane #	WB 1	WB 2	WB 3	WB 4
Volume Total	673	673	673	815
Volume Left	0	0	0	0
Volume Right	0	0	0	815
cSH	1700	1700	1700	1700
Volume to Capacity	0.40	0.40	0.40	0.48
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0			
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

SITE PLANS

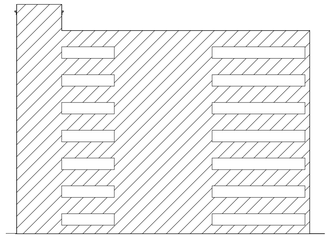




WALL SQUARE FOOTAGE: 19,504
OPENINGS SQUARE FOOTAGE: 6,895
MAXIMUM SQUARE FOOTAGE PERCENTAGE FOR 10 FT SEPARATION DISTANCE = 45%
PROPOSED OPENINGS PERCENTAGE 6,895 / 19,504 = 35%

A.100 South Elevation Allowable Openings

A.100 1" = 30'-0"



WALL SQUARE FOOTAGE: 10,683
OPENINGS SQUARE FOOTAGE: 2,055
MAXIMUM SQUARE FOOTAGE PERCENTAGE FOR 10 FT SEPARATION DISTANCE = 45%
PROPOSED OPENINGS PERCENTAGE 2,055 / 10,683 = 19.2%

B A.100 West Elevation Allowable Openings

B A.100 1" = 30'-0"

Parking Calculations Breakdown

REQUIRED PARKING FOR PROPOSED DESIGN

EXISTING 801/803 BUSINESS CENTER

USABLE SQ. FT. ASSESSED BY THE CITY OF TROY: 122,386 SQ. FT.
(CITY ORDINANCE REQ'S 1 PARKING PER. 300 SQ. FT.)
122,386 SQ. FT. / 300 SQ. FT. = **408** PARKING SPACES

PROPOSED HOTEL W/ RESTAURANT

HOTEL UNIT COUNT:
2ND FLOOR = 11
3RD FLOOR = 31
4TH FLOOR = 31
5TH FLOOR = 31
6TH FLOOR = 31
TOTAL UNITS = 135 UNITS

(CITY ORDINANCE REQ'S 1 PARKING SPACE FOR EA. HOTEL UNIT & 1 PARKING SPACE FOR EA. EMPLOYEE DURING PEEK EMPLOYEE SHIFT)

ESITAMATED PEEK EMPLOYEES PRESENT = 16

TOTAL PARKING FOR PROPOSED HOTEL: 135 + 16 = **151** PARKING SPACES

RESTAURANT SQUARE SQ. FT.: 7,550 SF +/-
(CITY ORDINANCE REQ'S 1 PARKING SPACE PER 2 SEATS IN THE RESTAURANT. SEATING IS TO BE DETERMINED BY OCCUPANT LOAD WITHIN THE CURRENT MBC CODE)

ESTIMATED NUMBER OF MAX. OCCUPANCY (PATRONS & EMPLOYEES): 43 PEOPLE
REQUIRED PARKING FOR PROPOSED RESTURANT: 43/2 = 21.5 ~ **22** PARKING SPACES

TOTAL PARKING REQUIRED

TOTAL PARKING REQ'D FOR EXISTING 801/803 BUSINESS CENTER: 408
TOTAL PARKING REQ'D FOR PROPOSED HOTEL: 135
TOTAL PARKING REQ'D FOR PROPOSED RESTAURANT WITHIN HOTEL: 22
TOTAL PARKING REQ'D **565 PARKING SPACES**

IN ACCORDANCE W/ MBC 2015 SECTION 1106 THE REQ'D ADA PARKING SPACES NEEDS TO 2% OF THE TOTAL REQUIRED PARKING: 566(0.02) = 11.32 ~ **12 ADA SPACES**

Proposed Provided Parking	
Family	Count
Parking Spaces	708

Proposed Provided ADA Parking	
Family	Count
Parking Spaces	15

Off-Street Loading Requirements

EXISTING 801/803 BUSINESS CENTER
- USABLE SQ. FT. ASSESSED BY THE CITY OF TROY: 122,386 SQ. FT.
- OFF-STREET LOADING REQUIREMENTS: (3) SPACES OR 1,500 SQ. FT.
- PROVIDED LOADING AREA: 1,560 SQ. FT.

PROPOSED HOTEL
- EST. USABLE SQ. FT. FOR THE HOTEL: 15,778. SQ. FT. +/-

PROPOSED HOTEL RESTAURANT
- EST. USABLE SQ. FT. FOR HOTEL RESTAURANT: 5,622 SQ. FT. +/-
- TOTAL REQUIRED OFF-STREET LOADING REQUIREMENTS FOR PROPOSED HOTEL & RESTAURANT: 15,778 SQ. FT. + 5,622 SQ. FT. = 21,400 SQ. FT.
- OFF-STREET LOADING REQUIREMENTS: (1) SPACE PROVIDED LOADING AREA: 2,823 SQ. FT.

TABLE 13.09-A OFF-STREET LOADING REQUIREMENTS	
UP TO 5,000 SQ. FT. GFA	1 SPACE
5,001 TO 60,000 SQ. FT. GFA	1 SPACE, PLUS 1 SPACE PER EA. ADDITIONAL 20,000 SQ. FT. GFA
60,001 SQ. FT. GFA & OVER	3 SPACES, PLUS 1 SPACE PER EA. ADDITIONAL 50,000 SQ. FT. GFA

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Client:
Owner

Project:
Project Name

PRELIMINARY NOT FOR CONSTRUCTION

Issued	Description	By

Seal:

Note:
Do not scale drawings. Use calculated dimensions only. Verify existing conditions in field.

North Arrow:
North

Sheet Title:
Site Plan

Project Number:
Project Number

Sheet Number:
A.100

ROWE PROFESSIONAL SERVICES COMPANY

Large Firm Resources. Personal Attention.℠

Memorandum

To: David Hunter, PE, PS

From: Michael J. Labadie, PE and Alyssa Wambold, PE

Date: October 14, 2019

RE: Shared Parking Analysis for Proposed Hotel and Restaurant Addition to 801/803 Big Beaver Business Center Site, Troy, MI

A shared parking analysis was completed for the site in accordance with both Urban Land Institute (ULI) and City of Troy standards. The City of Troy allows for a shared parking analysis based on parking supply rates specified in the City Ordinance and ULI rates for hourly, daily, and monthly variations in parking demand for the various land uses specified. Additionally, ULI rates for employees versus visitors were also utilized for the various land uses within the proposed site.

This analysis was performed in order to determine the number of parking spaces necessary on site in comparison to the resulting number surface spaces available once the proposed hotel and restaurant are completed. The difference is proposed to be included in a new parking deck to be constructed on site.

The uses proposed to be added to the site (that already includes a 122,386-gross-square-foot office building which has approximately 77,874 gross leasable area) are a 140-room business hotel and a 232-seat fine/casual dining restaurant. The hotel has 2,949 square feet (SF) of meeting space, split between four separate rooms of 684 SF, 214 SF, 1,030, and 1,021 SF. This space will either be used by hotel guests or will be used by non-guests during the day while hotel guests are not utilizing the parking facilities.

The ULI shared parking methodologies were implemented to determine an accurate parking demand for the proposed site. It is common for sites with a mixture of uses to have varying peak hourly and monthly parking demands, as well as being shared destinations (i.e. a hotel patron may also visit a restaurant). Therefore, a shared parking analysis is necessary to accurately determine the amount in which the number of required parking spaces could be reduced by, as compared to the sum of the individual parking requirements for each land use on the site.

ROWE analyzed the differences in activity patterns, which include monthly and time of day variances, for each land use. This is because the combination of land uses within the site do not have peak utilization during the same time periods. Time-of-Day factors for weekdays and weekends and monthly adjustment factors for the various land uses can be found in the attached ULI Shared Parking spreadsheets.

The final step of the analysis was to determine the critical parking periods for the site. All hours of operation from 6 a.m. to midnight were analyzed for each month of the year. The result showed that the month of June has the highest peak demands of the year. Furthermore, the overall peak time of the day for the entire site was determined to be 2 p.m. for weekdays and 11 p.m. for weekends. The overall peak period of the proposed site would be 2 p.m. on a weekday, resulting in a maximum demand of 449 required parking spaces. Detailed tables can be found in the attached ULI Shared Parking spreadsheet.

Attachment

\\sem\CAD\Projects\19F0047\Docs\Design\Bostick Hotel and Restaurant Shared Parking.docx

APPENDICES

Table 10/14/2019
Project: Big Beaver Business Center
Description: Mixed-Use Development

SHARED PARKING DEMAND SUMMARY

PEAK MONTH: JUNE -- PEAK PERIOD: 2 PM, WEEKDAY

			Weekday					Weekend					Weekday			Weekend		
	Project Data		Base	Mode	Non-Captive	Project		Base	Mode	Non-Captive	Project		Peak Hr Adj	Peak Mo Adj	Estimated Parking	Peak Hr Adj	Peak Mo Adj	Estimated Parking
Land Use	Quantity	Unit	Rate	Adj	Ratio	Rate	Unit	Rate	Adj	Ratio	Rate	Unit	2 PM	June	Demand	11 PM	June	Demand
Fine/Casual Dining Restaurant	232	Seats	0.43	1.00	1.00	0.43	/seat	0.42	1.00	1.00	0.42	/seat	0.65	0.95	62	0.90	0.95	83
Employee			0.07	1.00	1.00	0.07	/seat	0.08	1.00	1.00	0.08	/seat	0.90	1.00	14	0.85	1.00	16
Hotel-Business	140	rooms	1.00	1.00	1.00	1.00	/rooms	1.00	1.00	1.00	1.00	/rooms	0.60	1.00	84	1.00	1.00	140
Employee			0.21	1.00	1.00	0.21	/rooms	0.21	1.00	1.00	0.21	/rooms	1.00	1.00	30	0.45	1.00	14
Office 100 to 500 ksf	77,874	sf GFA	0.27	1.00	1.00	0.27	/ksf GLA	0.03	1.00	1.00	0.03	/ksf GLA	1.00	1.00	21	0.00	1.00	0
Employee			3.06	1.00	1.00	3.06	/ksf GLA	0.31	1.00	1.00	0.31	/ksf GLA	1.00	1.00	238	0.00	1.00	0
													Customer		167	Customer		223
													Employee		282	Employee		30
													Reserved		0	Reserved		0
													Total		449	Total		253

ULI base data have been modified from default values.

Table
Project:
Description:

10/14/2019

June
Weekday Estimated Peak-Hour Parking Demand

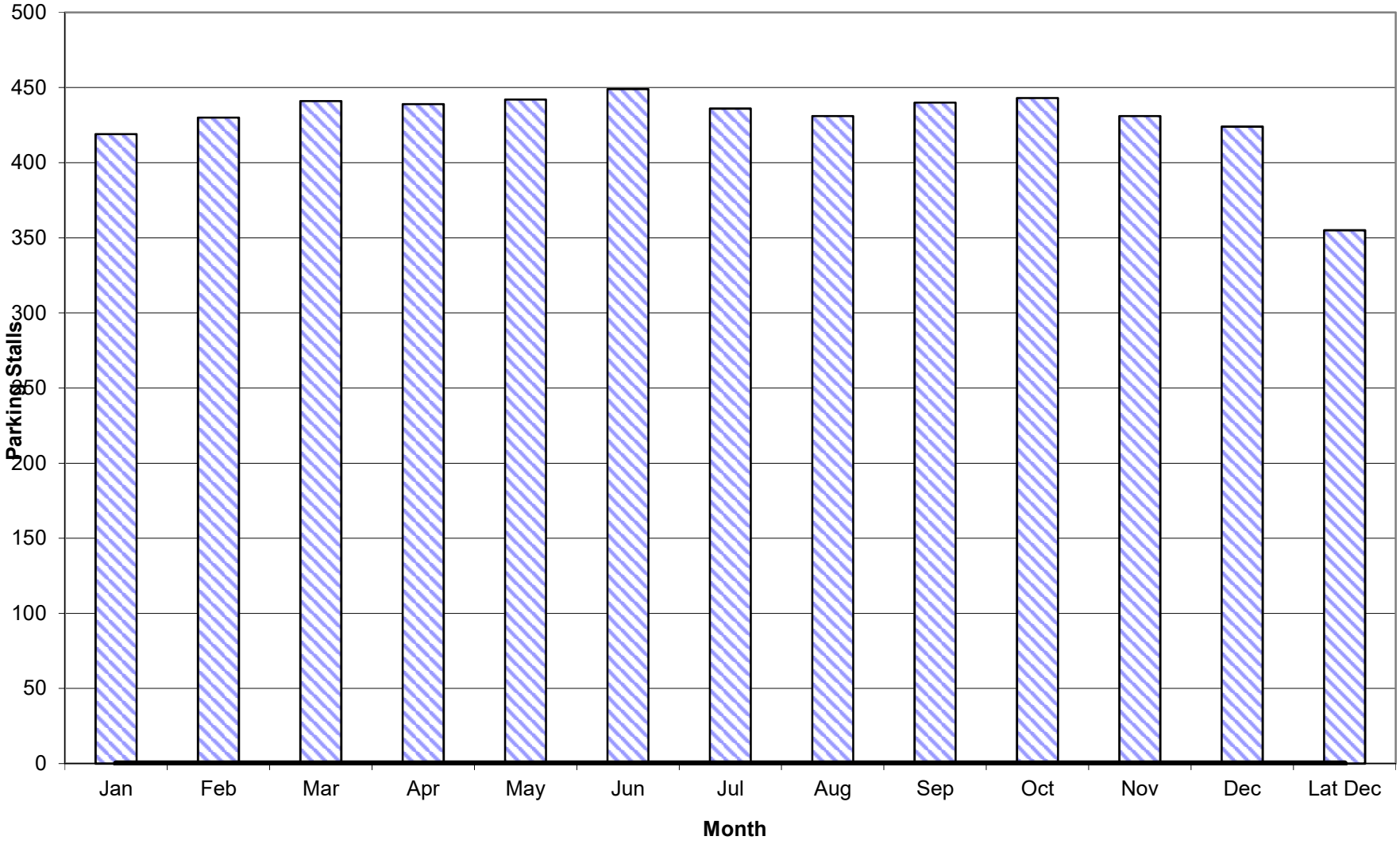
																					Overall Pk	AM Peak Hr	PM Peak Hr	Eve Peak Hr
	Monthly Adj.	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM	2 PM	11 AM	2 PM	6 PM
Fine/Casual Dining Restaurant	95%	-	-	-	-	14	38	71	71	62	38	48	71	90	95	95	95	90	71	24	62	38	62	90
Employee	100%	-	3	8	12	14	14	14	14	14	12	12	16	16	16	16	16	16	14	6	14	14	14	16
Hotel-Business	100%	133	126	112	98	84	84	77	77	84	84	91	98	105	105	112	119	133	140	140	84	84	84	105
Employee	100%	2	9	27	27	30	30	30	30	30	30	27	21	12	6	6	6	6	3	2	30	30	30	12
Office 100 to 500 ksf	100%	-	-	4	13	21	9	3	9	21	9	3	2	1	-	-	-	-	-	-	21	9	21	1
Employee	100%	7	71	179	226	238	238	214	214	238	238	214	119	60	24	17	7	2	-	-	238	238	238	60
TOTAL DEMAND	Customer	133	126	116	111	119	131	151	157	167	131	142	171	196	200	207	214	223	211	164	167	131	167	196
	Employee	9	83	214	265	282	282	258	258	282	280	253	156	88	46	39	29	24	17	8	282	282	282	88
	Reserved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		142	209	330	376	401	413	409	415	449	411	395	327	284	246	246	243	247	228	172	449	413	449	284
ULI base data have been modified from default values.																					449	413	449	284

Footnote(s):

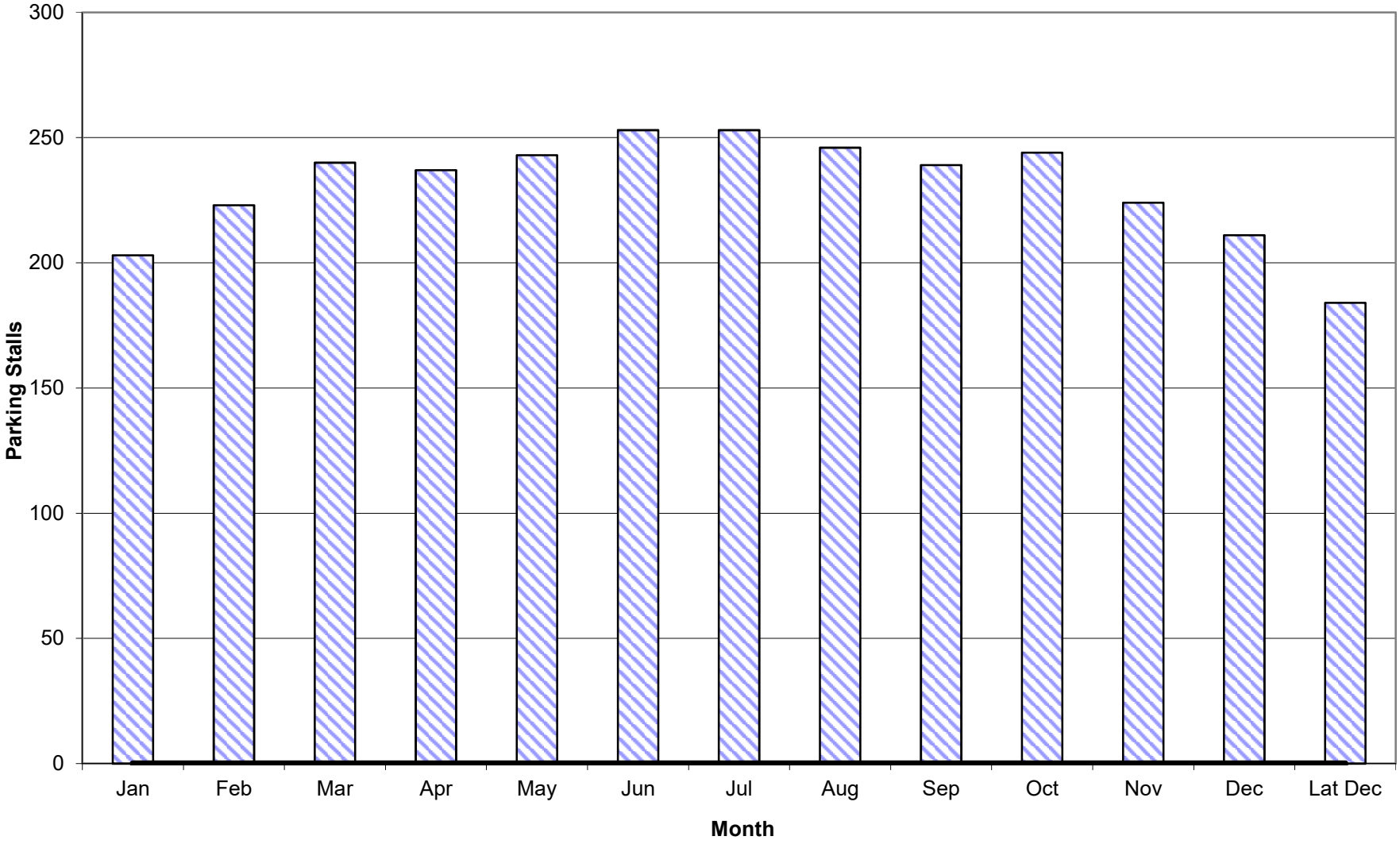
June
Weekend Estimated Peak-Hour Parking Demand

																					Overall Pk	AM Peak Hr	PM Peak Hr	Eve Peak Hr
		6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 AM	11 PM	11 AM	5 PM	11 PM
Fine/Casual Dining Restaurant	95%	-	-	-	-	-	14	46	51	42	42	42	55	83	88	92	83	83	83	46	83	14	55	83
Employee	100%	-	4	6	11	14	14	14	14	14	14	14	19	19	19	19	19	19	16	10	16	14	19	16
Hotel-Business	100%	133	126	112	98	84	84	77	77	84	84	91	98	105	105	112	119	133	140	140	140	84	98	140
Employee	100%	2	9	27	27	30	30	30	30	30	30	27	23	18	17	17	17	14	14	9	14	30	23	14
Office 100 to 500 ksf	100%	-	-	1	2	2	2	2	2	1	1	-	-	-	-	-	-	-	-	-	-	2	-	-
Employee	100%	-	5	14	19	22	24	22	19	14	10	5	2	1	-	-	-	-	-	-	-	24	2	-
TOTAL DEMAND	Customer	133	126	113	100	86	100	125	130	127	127	133	153	188	193	204	202	216	223	186	223	100	153	223
	Employee	2	18	47	57	66	68	66	63	58	54	46	44	38	36	36	36	33	30	19	30	68	44	30
	Reserved	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		135	144	160	157	152	168	191	193	185	181	179	197	226	229	240	238	249	253	205	253	168	197	253
ULI base data have been modified from default values.																					253	168	197	253

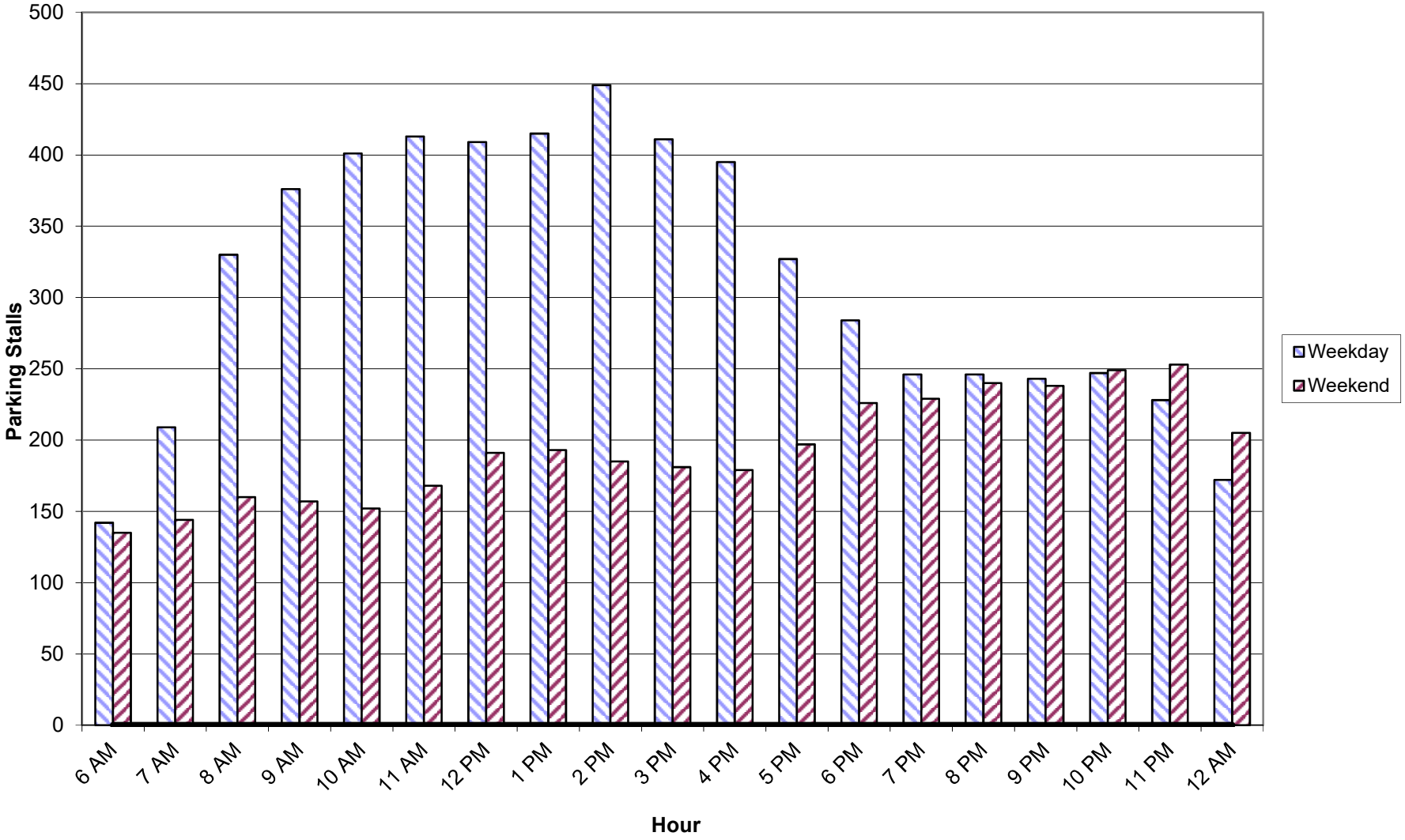
Weekday Month-by-Month Estimated Parking Demand



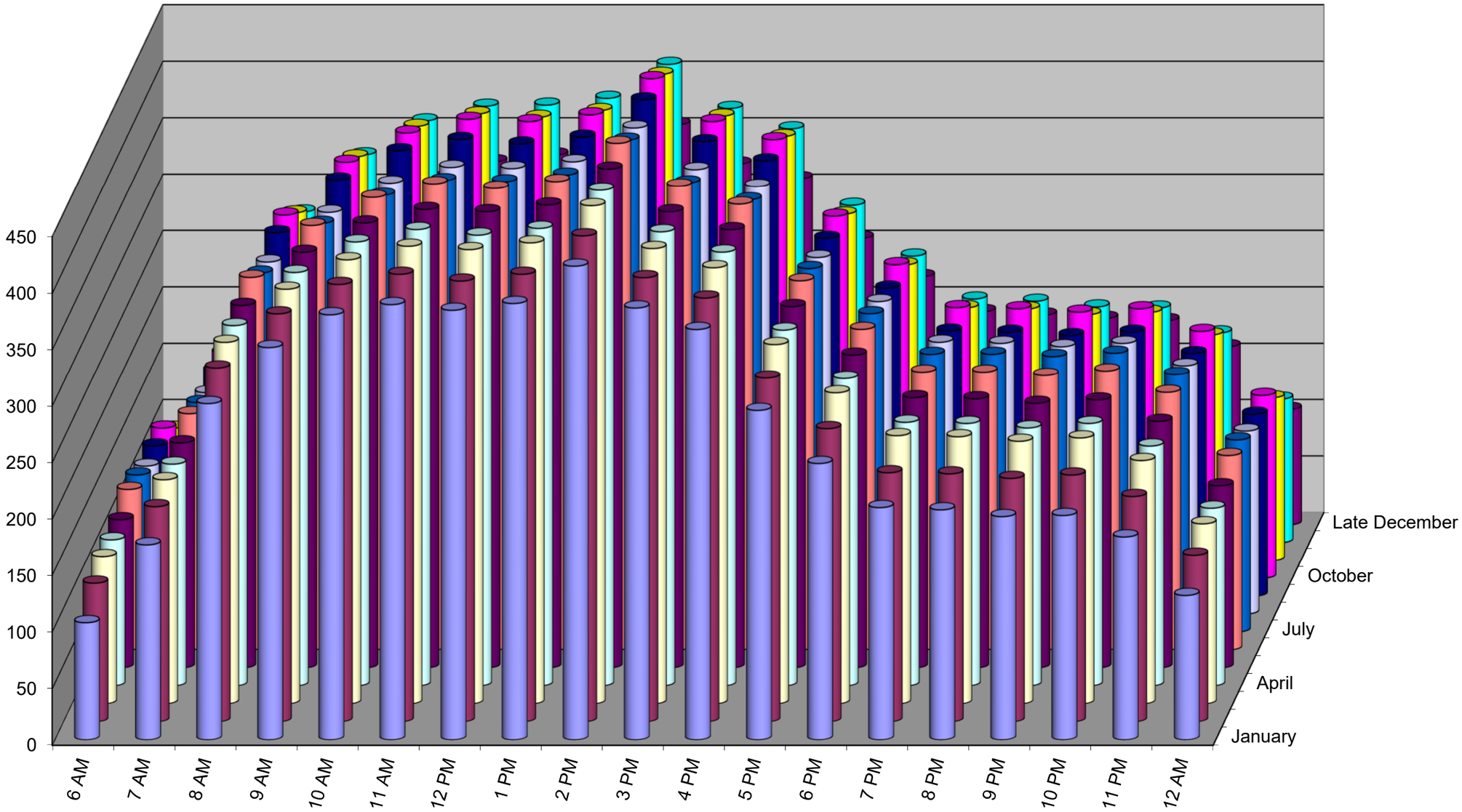
Weekend Month-by-Month Estimated Parking Demand



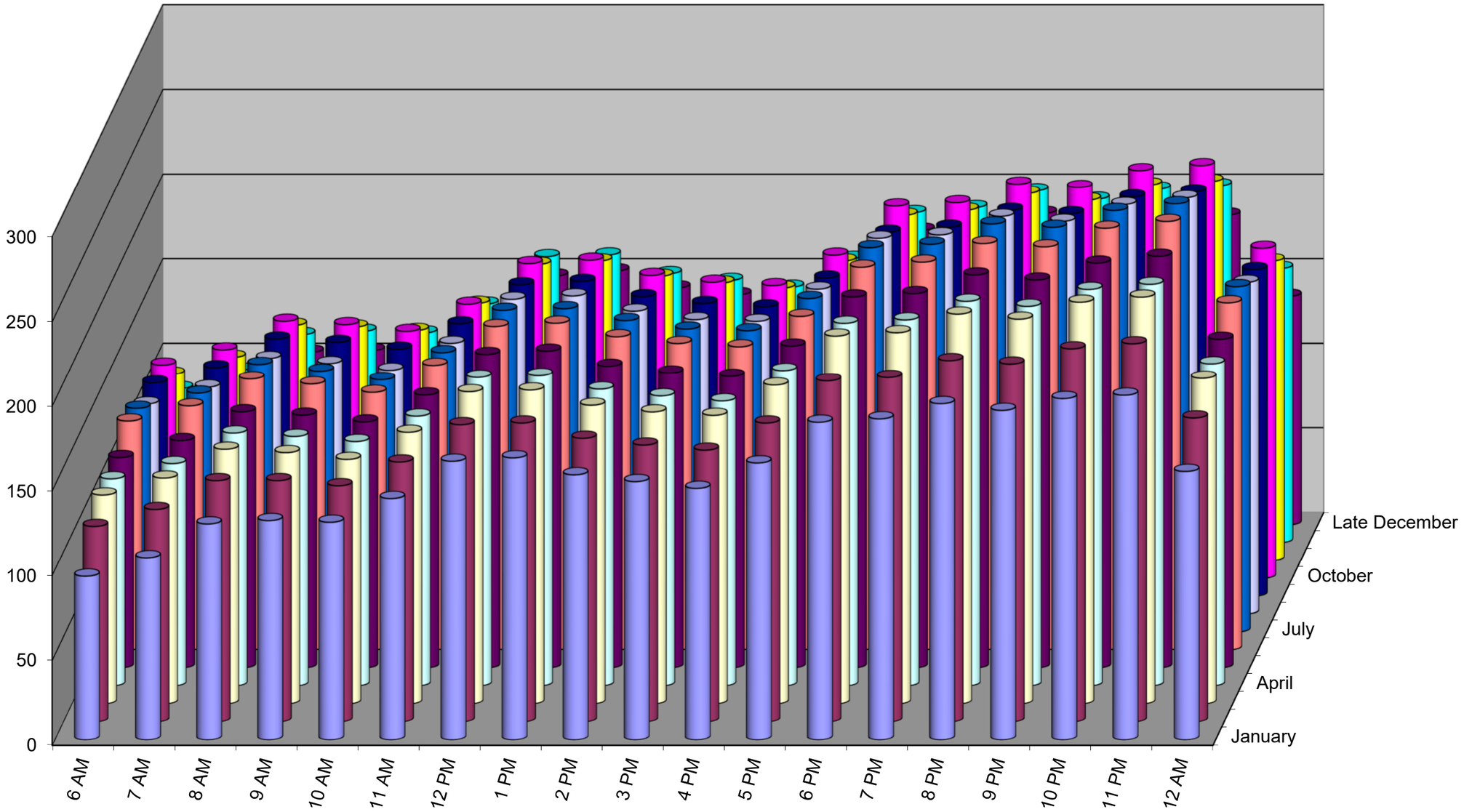
Peak Month Daily Parking Demand by Hour



Weekday Comparison by Month and by Hour



Weekend Comparison by Month and by Hour



memorandum

Date: October 23, 2019

To: Bill Huotari, PE

From: Stephan Maxe, PE &
Stephen Dearing, PE, PTOE

Re: Big Beaver Hyatt & Fords Garage
Preliminary Site Plan Review

We have reviewed the Preliminary Site Plan, Traffic Impact Assessment (TIA) and Shared Parking Analysis for the Hyatt Hotel and Fords Garage restaurant. The proposed site will include a 140 room, 7-story hotel and conference center and a 8,538 SF restaurant. A 361 space 5-story parking structure will be constructed by others to serve the proposed hotel as well as the existing office building. The plans were prepared by PEA Inc, and are dated October 14th, 2019.

OHM does not recommend approval of the preliminary site plan, traffic impact assessment or shared parking analysis at this time, primarily due to concerns about parking discrepancies and traffic impacts.

OHM's comments are as follows:

1. Site Plan Review:

    a. The proposed parking area east of the existing office building consists of angle parking and should indicate one-way traffic.

    b. Sidewalk with overhanging parking spaces shall be 7'. The ADA spaces at the north end of the site and the 2 parking spaces in the southwest lot appear to be overhanging 5' sidewalk.

    c. The southbound to northbound crossover on Troy Center Drive is directly across from the south access to the site. We would recommend that this crossover be relocated farther south to avoid traffic from the site blocking southbound Troy Center when entering the crossover directly.

    d. The conceptual site plan included with the TIS states 708 parking spaces will be provided, adding up the parking spots shown on the plans the total comes to 465.

2. Traffic Impact Assessment Review:

    a. The architectural drawing attached to the TIA and showing the parking calculations differs from the preliminary site plan and the provided parking.

OHM Advisors
34000 PLYMOUTH ROAD
LIVONIA, MICHIGAN 48150
T 734.522.6711
F 734.522.6427
OHM-Advisors.com

b. The figures showing the site generated traffic volumes appear to be incomplete. There is no traffic shown going through the I-75 interchange.

c. The background traffic shows a total for the site driveways of 19 during the AM peak, with 17 entering and 2 exiting. During the PM peak the total is 51, with 17 entering and 34 exiting. According to ITE trip generation calculations the existing office building on site would be expected to generate approximately 76 entering and 13 exiting for a total of 89 during the AM peak. The total is 89 during the PM peak, with 14 exiting and 75 exiting. OHM questions what the building occupancy was at the time of the counts. If substantially unoccupied, the background traffic should be adjusted to reflect the trip generation of a reasonably occupied site.

d. There is a large disparity in the collected turning volumes at Troy Center Drive and Big Beaver when compared to the MDOT study. The counts in 2017 were more than double the counts collected in 2019. These recent counts were likely impacted by Big Beaver and I-75 construction and should not be relied on. The study should instead use the 2017 counts taken for Big Beaver at Town Center and at the crossovers flanking this intersection. Regarding the site driveway volumes, reference the concern noted above.

3. Shared Parking Analysis

a. The analysis method must be revised. While Troy allows for the use of ULI / ITE methodologies for shared parking, the actual parking rates used MUST reflect city zoning ordinance required rates.

b. The analysis states an assumption that the 2,949 SF of conference space will be used by non-guests during the day and by hotel guests at night. The peak period for weekday parking is 2pm which is a time when the conference facilities could well be used based on this assumption. OHM believes that the conference facilities be considered in the parking analysis.

From:	Ron Wilson
To:	Eric Rabin; Brent Savidant
Cc:	Merl Potter
Subject:	RE: Prelim Site Plan Q&A.docx
Date:	Thursday, December 5, 2019 12:57:21 PM
Attachments:	Troy Planning Commission March 2018.docx 2019 Troy Hotels .xlsx

Hi Brent,
If you could have the attached ready to put up on the screen for the Planning Commission meeting next week, that would be most helpful. I may or may not use them.
Ron Wilson - CEO
Hotel Investment Services, Inc.
www.his-corp.com
248-689-4110 Ext 122

From: Eric Rabin
Sent: Tuesday, November 26, 2019 2:24 PM
To: Brent Savidant
Cc: Ron Wilson ; Merl Potter
Subject: Prelim Site Plan Q&A.docx
Brent,

Here is the questionnaire I believe you were referring to, we did send this over with are submittal package.

I have included Ron Wilson, and Merl Potter (Owners rep for hotel, restaurant, and parking deck) on this email in efforts of streamlining coordination for planning commission meeting. We will send you the videos and any PowerPoint slides that we would like to present. Per your suggestion, we will assume the following flow of the presentation.

1) Brent or Ben will present project
2) We will then show brief videos
3) Dennis Bostick probably give brief intro
4) Ron Willson shares
5) Merl Potter (Can share about architecture and construction for parking deck, restaurant, and hotel.
6) Questions

We appreciate your input, and any further insights? It is our goal to send over a full package of what we would like to share early next week.

Let us know any questions you may have?

Thanks,

Eric
561.212.5687

Eric W. Rabin

OTHER BUSINESS

9. HOTELS IN THE CITY OF TROY – Presentation by Ron Wilson of Hotel Investment Services, Inc.

Mr. Savidant gave a brief introduction of Ron Wilson.

Mr. Wilson gave an excellent presentation on the hotel industry, addressing data within the STR (Smith Travel Research) report prepared for the City of Troy. He said the data reveals an overall good and healthy hotel market for the City based on supply and demand, noting the City could well be served by another three to four hotels. Mr. Wilson encouraged the Commission to look for good hotel brands and good hotel operators in their consideration of potential hotels in the City.

Troy Hotels as of 2019

TripAdvior.com Rank	Hotel	Open Date	# of Rooms	Category - Address	Typical Peak Room Rate	Typical Off-Peak Room Rate
9	Embassy Suites by Hilton	May 1987	251	Upper Upscale - 850 Tower Dr.	$ 227	$ 128
6	Marriott	February 1990	350	Upper Upscale - 200 W. Big Beaver Rd.	356	129
	HYATT PLACE		***137***	***Upper Upscale - 801 W. Big Beaver Rd.***	275	129
13	Courtyard	June 1986	147	Upscale - 1525 East Maple Rd.	161	109
4	Hilton Garden Inn	April 2016	114	Upscale - 200 Wilshire Dr.	227	112
2	Homewood Suites by Hilton	September 2002	150	Upscale - 1495 Equity Dr.	151	107
3	Drury Inn & Suites	May 1984	216	Upper Mid - 575 W. Big Beaver	182	105
12	Fairfield Inn & Suites by Marriott	November 2016	90	Upper Mid - 225 Stephenson Highway	176	114
5	Hampton Inn	May 2015	122	Upper Mid - 100 Wilshire Dr.	197	109
7	Holiday Inn Express & Suites	May 2013	117	Upper Mid - 400 Stephenson Highway	135	95
15	Townplace Suites	August 2016	87	Upper Mid - 325 Stephenson Highway	176	109
1	Candlewood Suites	June 1998	118	Midscale - 2550 Troy Center Dr.	103	85
11	Hawthorn Suites by Wyndham	October 1985	152	Midscale - 2600 Livernois	101	99
14	Quality Inn	November 1971	150	Midscale - 2537 Rochester Court	76	69
8	Red Roof Inn	November 1975	109	Economy - 2350 Rochester Court	52	64
10	Sommerset Inn	June 1973	250	Independent - 2601 W. Big Beaver	139	129
			2,423	with Hyatt Place 2,560		
	UNDER DEVELOPMENT	**Building Permit Issued?**				
	Springhill Suites Hotel-Proposed & Approved May 14, 2019	No	123	East Side of Rochester, South of Big Beaver		
	Holiday Inn Hotel -Proposed & Approved Feb. 26, 2019	No	136	East of Crooks, North side of Tower - 900 Tower		
	Home 2 Suites-Proposed & Approved in May 15, 2018	Yes	97	North of Big Beaver, West of Crooks		
	Tru Hotel-Proposed & Approved March 13, 2018	Yes	124	NE corner of Maple and Research adjacent to I-75		
	Marriott Courtyard - Plans just submitted	No	133	North off Crooks		

PRELIMINARY SITE PLANS FOR

HYATT PLACE

PART OF THE NE SECTION 28, T. 2N., R. 11E.

CITY OF TROY, OAKLAND COUNTY, MICHIGAN

OWNER:

801 BOSTICK LLC
801 W. BIG BEAVER ROAD
TROY, MICHIGAN 48084
CONTACT: DENNIS BOSTICK
PHONE: (248) 509-7977
EMAIL: DENNISBOSTICK@ATT.NET

CONTACT: ERIC RABIN
PHONE: (561) 212-5687
EMAIL: ERICRABIN@ATT.NET

ARCHITECT (HOTEL/RESTAURANT):

LEGAT ARCHITECTS
2015 SPRING ROAD, SUITE 175
OAK BROOK, ILLINOIS 60523
CONTACT: APRIL MAIFIELD, AIA, NCARB, LEED AP BD+C
PHONE: (630) 645-1935
EMAIL: AMAIFIELD@LEGAT.COM

ARCHITECT (PARKING DECK):

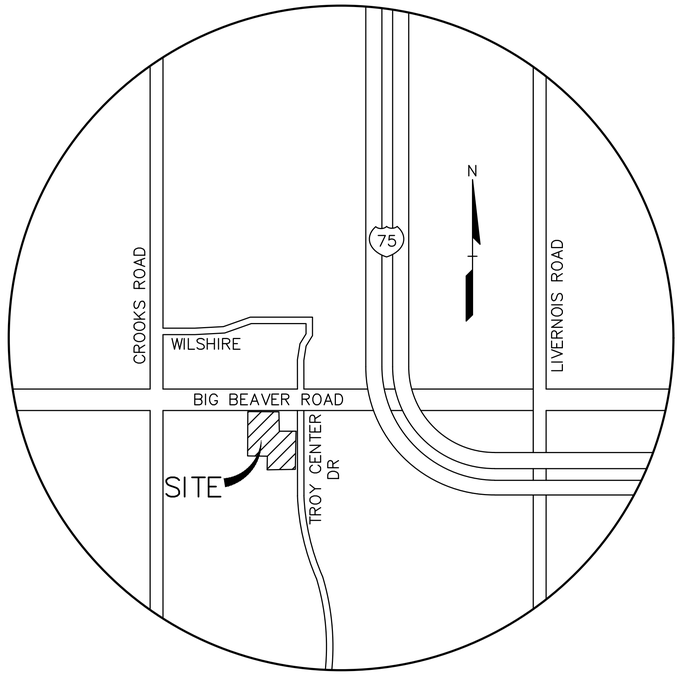
RICH & ASSOCIATES
26877 NORTHWESTERN HIGHWAY, SUITE 208
SOUTHFIELD, MICHIGAN 48033
CONTACT: MATTHEW J. JOBIN, RA
PHONE: (248) 353-5080
FAX: (248-353-3830
EMAIL: RICHASSOC.COM

CIVIL ENGINEER:

PEA, INC.
2430 ROCHESTER CT, SUITE 100
TROY, MI 48083
CONTACT: BECKY KLEIN, PE
PHONE: (248) 689-9090 EXT. 1157
FAX: (248) 689-1044
EMAIL: BKLEIN@PEAINC.COM

LANDSCAPE ARCHITECT:

PEA, INC.
7927 NEMCO WAY, SUITE 115
BRIGHTON, MI 48116
CONTACT: JANET EVANS, P.L.A.,
PHONE: (517) 546-8583
FAX: (517) 546-8973
EMAIL: JEVANS@PEAINC.COM



LOCATION MAP
NO SCALE

INDEX OF DRAWINGS

ARCHITECTURAL DRAWINGS

PARKING DECK ARCHITECTURAL DRAWINGS

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX-TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-4BASE--15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-TBLK-15XXX.DWG

No.	BY	CHK	DESCRIPTION	DATE
			REVISIONS	

STATE OF MICHIGAN
REBECCA L. KLEIN
ENGINEER
NO. 58042
LICENSED PROFESSIONAL ENGINEER

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR VERIFYING THE LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PROFESSIONAL.

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2430 Rochester Ct., Ste. 100
Troy, MI 48083-1872
t: 248.689.9090
f: 248.689.1044
www.peainc.com

BOSTICK 801, LLC
801 W. BIG BEAVER ROAD
TROY, MICHIGAN 48084

HYATT PLACE
COVER SHEET
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E.,
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	DN.	BA	SUR.	GC	P.M.	BK
JJ						

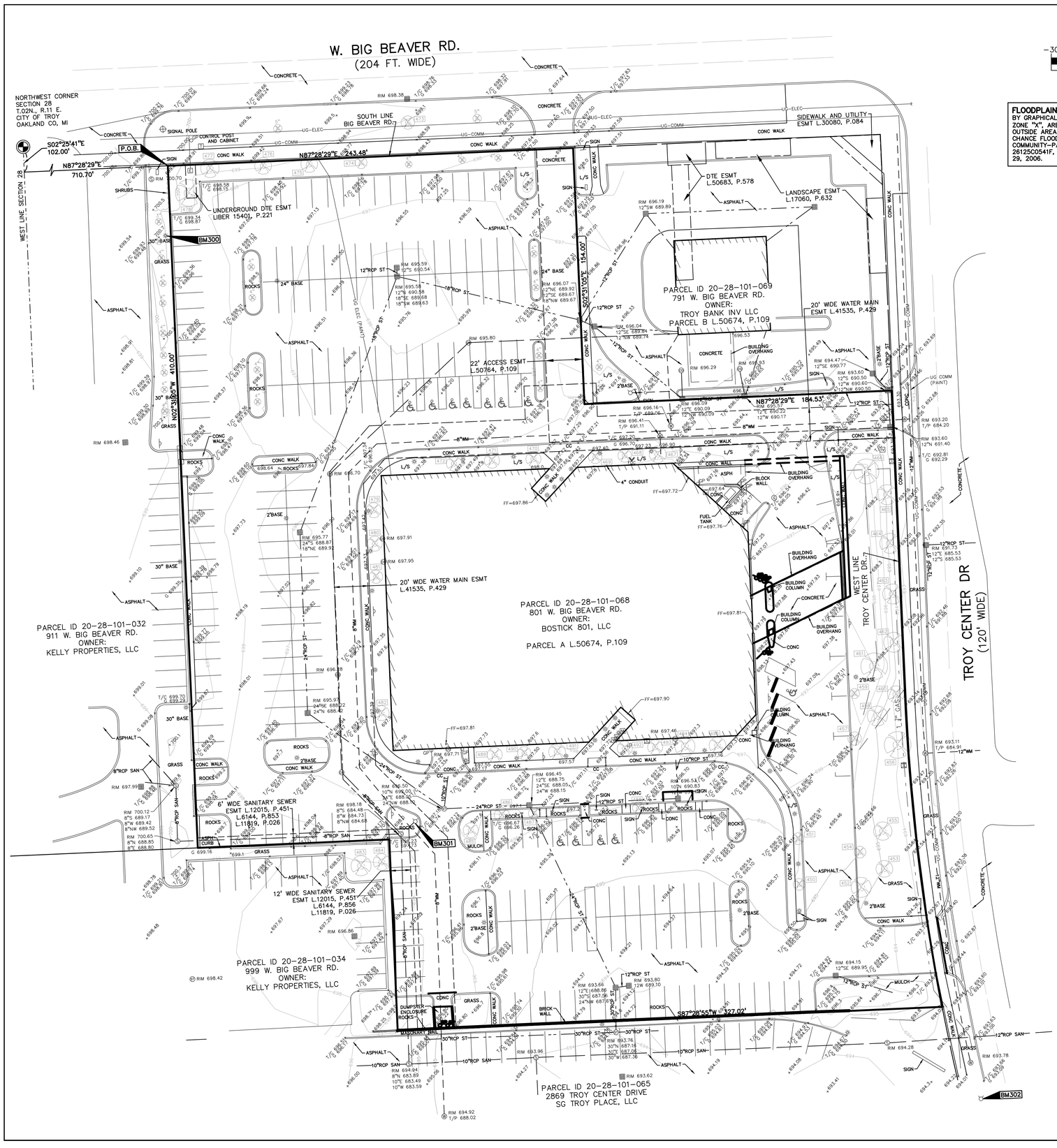
S:\PROJECTS\2019\2019-282\ 801 W BIG BEAVER ROAD - DWG\DWG\SITE PLANS\(C-0.0)COVER-19282.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

SCALE: N.T.S.

DRAWING NUMBER:
C-0.0



GRAPHIC SCALE

−30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

FLOODPLAIN NOTE:
BY GRAPHICAL PLOTTING, SITE IS IN ZONE "X", AREA DETERMINED TO BE OUTSIDE AREA OF 0.2% ANNUAL CHANCE FLOODPLAIN, COMMUNITY–PANEL NUMBER 26125C0541F, DATED SEPTEMBER 29, 2006.

BENCHMARKS
(GPS DERIVED – NAVD88)

BM #300
SET MAG NAIL IN EAST SIDE OF CONCRETE LIGHT POLE BASE. LOCATED ±40' SOUTH AND ±3' WEST OF NORTHWEST PROPERTY CORNER.
ELEV. – 700.47'

BM #301
ARROW ON HYDRANT. LOCATED ±43' SOUTH AND ±11' EAST OF SOUTHWEST BUILDING CORNER #803 W. BIG BEAVER ROAD.
ELEV. – 700.47'

BM #302
ARROW ON HYDRANT. LOCATED ON WEST SIDE OF TROY CENTER DRIVE AND ±50' SOUTH OF SITE.
ELEV. – 696.39

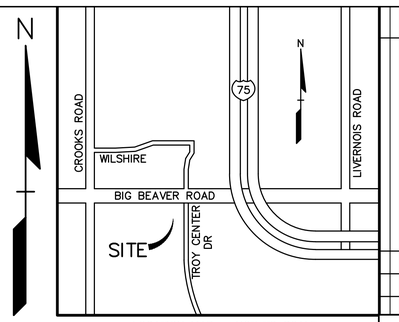
LEGAL DESCRIPTION
(Per ATA National Title Group, LLC, Commitment File No. 63–18617869–SCM, Dated October 10, 2018)

The land referred to in this commitment is described as follows:

City of Troy, County of Oakland, State of Michigan.

Fee Parcel:
A parcel of land being a part of the Northwest 1/4 of Section 28, Town 2 North, Range 11 East, City of Troy, Oakland County, Michigan and being more particularly described as follows: Commencing at the Northwest corner of said Section 28; thence South 02 degrees 25 minutes 41 seconds East 102.00 feet along the Westerly line of said Section 28; thence North 87 degrees 28 minutes 29 seconds East 710.07 feet along the Southerly line of Big Beaver Road, 204 feet wide, said line being parallel to the Northerly line of said Section 28 to the point of beginning of this parcel; thence continuing along the Southerly line of said Big Beaver Road North 87 degrees 28 minutes 29 seconds East 243.48 feet; thence South 02 degrees 31 minutes 05 seconds East 154.00 feet; thence North 87 degrees 28 minutes 29 seconds East 184.53 feet to a point on the Westerly line of Troy Center Drive, 120 feet wide; thence South 02 degrees 31 minutes 05 seconds East 183.64 feet along said Westerly line of Troy Center Drive to a point on a tangent curve to the left; thence along said curve to the left 188.10 feet, said curve having a radius of 1260.00 feet, a central angle of 08 degrees 33 minutes 13 seconds and a chord which bears South 06 degrees 47 minutes 41 seconds East a distance of 187.93 feet to a point on a non–tangent line; thence South 87 degrees 28 minutes 55 seconds West 327.02 feet; thence North 02 degrees 31 minutes 05 seconds West 115.00 feet; thence South 87 degrees 28 minutes 55 seconds West 115.00 feet; thence North 02 degrees 31 minutes 05 seconds West 410.00 feet to the point of beginning of this parcel. The Basis for Bearing for this parcel is the Westerly line of Section 29, Township 2 North, Range 11 East, which bears South 02 degrees 25 minutes 41 seconds East.

Easement Parcel:
Together with the benefit provided by easement for parking purposes contained within the instrument recorded in Liber 50674, Page 109, Oakland County Records.



LOCATION MAP – NOT TO SCALE

LEGEND

IRON FOUND	BRASS PLUG SET	SEC. CORNER FOUND	
IRON SET	MONUMENT FOUND	R RECORDED	
NAIL FOUND	MONUMENT SET	M MEASURED	
NAIL & CAP SET		C CALCULATED	

EXISTING

-OH-ELEC-	ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
-UG-CATV-	UNDERGROUND CABLE TV, CATV PEDESTAL
-UG-PHONE-	TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
-UG-ELEC-	ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
	GAS MAIN, VALVE & GAS LINE MARKER
	WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
	SANITARY SEWER, CLEANOUT & MANHOLE
	STORM SEWER, CLEANOUT & MANHOLE
	COMBINED SEWER & MANHOLE
	SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
	POST INDICATOR VALVE
	WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
M T	MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
?	UNIDENTIFIED STRUCTURE
816.06	SPOT ELEVATION
670	CONTOUR LINE
	FENCE
	GUARD RAIL
	STREET LIGHT
	SIGN
CONC.	CONCRETE
ASPH.	ASPHALT
GRAVEL	GRAVEL SHOULDER
	WETLAND

REFERENCE DRAWINGS

WATER MAIN	CITY OF TROY GIS MAPPING DATED 7–18–19
SANITARY SEWER	CITY OF TROY GIS MAPPING DATED 7–18–19
STORM SEWER	CITY OF TROY GIS MAPPING DATED 7–18–19
ELECTRIC	DTE MAP #313–388 DATED 8–1–19
TELEPHONE	AT&T SKETCH DATED 7–17–19
GAS	XXXXXXXXXX
PETROLEUM	XXXXXXXXXX
CATV	XXXXXXXXXX

*HAVE NOT RECEIVED FRANCHISE UTILITY MAPS AS OF JULY 24, 2019

No.	BY	CHK	DESCRIPTION	DATE
			REVISIONS	

STATE OF MICHIGAN
REBECCA L. KLEIN
ENGINEER
NO. 58042
LICENSED PROFESSIONAL ENGINEER

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BOSTICK 801, LLC
801 W. BIG BEAVER ROAD
TROY, MICHIGAN 48084

HYATT PLACE
TOPOGRAPHIC SURVEY
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E.,
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	DN.	BA	SUR.	GC	P.M.	BK
JJ						

S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD – DWG\DWG\SITE PLANS\C-1.0TOPO-19282.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

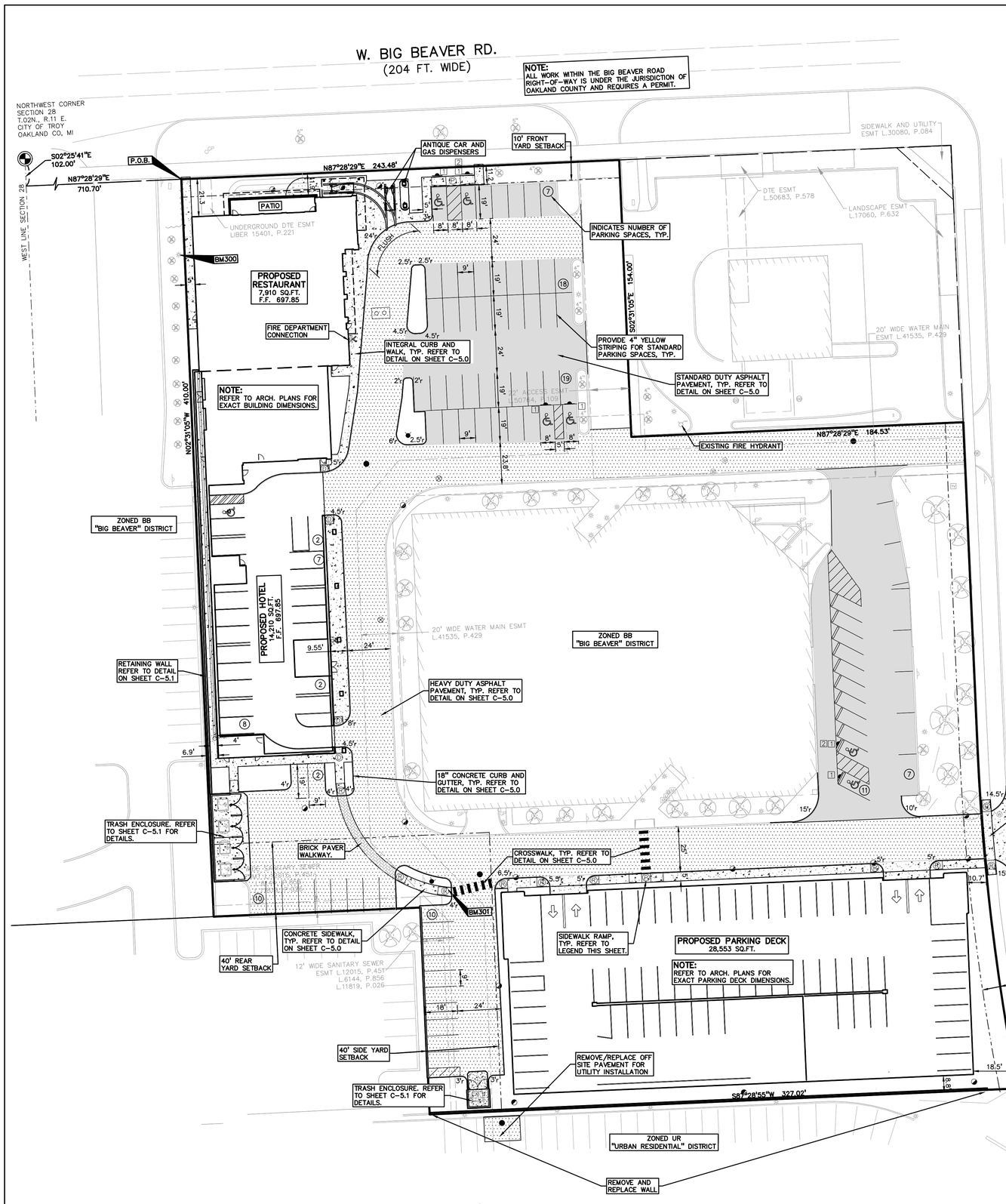
PEA JOB NO. 2019-282

SCALE: 1" = 30'

DRAWING NUMBER:
C-1.0

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX–TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X–BASE–15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X–TBLK–15XXX.DWG



GRAPHIC SCALE

−30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

FLOODPLAIN NOTE:
BY GRAPHICAL PLOTTING, SITE IS IN ZONE "X", AREA DETERMINED TO BE OUTSIDE AREA OF 0.2% ANNUAL CHANCE FLOODPLAIN, COMMUNITY-PANEL NUMBER 26125C0541F, DATED SEPTEMBER 29, 2006.

BENCHMARKS
(GPS DERIVED – NAVD88)

BM #300
SET MAG NAIL IN EAST SIDE OF CONCRETE LIGHT POLE BASE. LOCATED ±40' SOUTH AND ±3' WEST OF NORTHWEST PROPERTY CORNER.
ELEV. – 700.47'

BM #301
ARROW ON HYDRANT. LOCATED ±43' SOUTH AND ±11' EAST OF SOUTHWEST BUILDING CORNER #803 W. BIG BEAVER ROAD.
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ARROW ON HYDRANT. LOCATED ON WEST SIDE OF TROY CENTER DRIVE AND ±50' SOUTH OF SITE.
ELEV. – 696.39

LEGAL DESCRIPTION
(Per ATA National Title Group, LLC, Commitment File No. 63-18617869-SCM, Dated October 10, 2018)

The land referred to in this commitment is described as follows:

City of Troy, County of Oakland, State of Michigan.

Fee Parcel:
A parcel of land being a part of the Northwest 1/4 of Section 28, Town 2 North, Range 11 East, City of Troy, Oakland County, Michigan and being more particularly described as follows: Commencing at the Northwest corner of said Section 28; thence South 02 degrees 25 minutes 41 seconds East 102.00 feet along the Westerly line of said Section 28; thence North 87 degrees 28 minutes 29 seconds East 710.07 feet along the Southerly line of Big Beaver Road, 204 feet wide, said line being parallel to the Northerly line of said Section 28 to the point or beginning of this parcel; thence continuing along the Southerly line of said Big Beaver Road North 87 degrees 28 minutes 29 seconds East 243.48 feet; thence South 02 degrees 31 minutes 05 seconds East 154.00 feet; thence North 87 degrees 28 minutes 29 seconds East 184.53 feet to a point on the Westerly line of Troy Center Drive, 120 feet wide; thence South 02 degrees 31 minutes 05 seconds East 183.64 feet along said Westerly line of Troy Center Drive to a point on a tangent curve to the left; thence along said curve to the left 188.10 feet, said curve having a radius of 1260.00 feet, a central angle of 08 degrees 33 minutes 13 seconds and a chord which bears South 06 degrees 47 minutes 41 seconds East a distance of 187.93 feet to a point on a non-tangent line; thence South 87 degrees 28 minutes 55 seconds West 327.02 feet; thence North 02 degrees 31 minutes 05 seconds West 115.00 feet; thence South 87 degrees 28 minutes 55 seconds West 115.00 feet; thence North 02 degrees 31 minutes 05 seconds West 410.00 feet to the point of beginning of this parcel. The Basis for Bearing for this parcel is the Westerly line of Section 29, Township 2 North, Range 11 East, which bears South 02 degrees 25 minutes 41 seconds East.

Easement Parcel:
Together with the benefit provided by easement for parking purposes contained within the instrument recorded in Liber 50674, Page 109, Oakland County Records.

GENERAL NOTES:

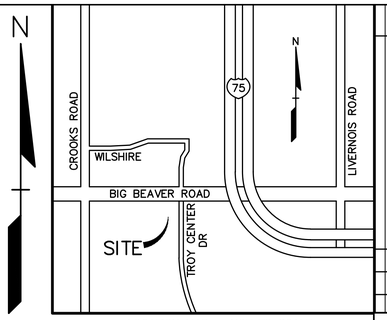
THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT.

1. ALL DIMENSIONS SHOWN ARE TO BACK OF CURB, FACE OF SIDEWALK, OUTSIDE FACE OF BUILDING, PROPERTY LINE, CENTER OF MANHOLE/CATCH BASIN OR CENTERLINE OF PIPE UNLESS OTHERWISE NOTED.
2. REFER TO SHEET C-5.0 FOR ON-SITE PAVING DETAILS.
3. REFER TO SHEET C-5.1 FOR ON-SITE SIDEWALK RAMP DETAILS.
4. 'NO PARKING-FIRE LANE' SIGNS SHALL BE POSTED ALONG ALL FIRE LANES AT 100 FOOT INTERVALS OR AS DIRECTED BY THE FIRE OFFICIAL.
5. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF TROY CURRENT STANDARDS AND REGULATIONS.
6. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
7. ANY WORK WITHIN THE STREET OR HIGHWAY RIGHTS-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AGENCIES HAVING JURISDICTION AND SHALL NOT BEGIN UNTIL ALL NECESSARY PERMITS HAVE BEEN ISSUED FOR THE WORK.
8. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ADJUST THE TOP OF ALL EXISTING AND PROPOSED STRUCTURES (MANHOLES, CATCH BASINS, INLETS, GATE WELLS ETC.) WITHIN GRADED AND /OR PAVED AREAS TO FINAL GRADE SHOWN ON THE PLANS. ALL SUCH ADJUSTMENTS SHALL BE INCIDENTAL TO THE JOB AND WILL NOT BE PAID FOR SEPARATELY.

SIDEWALK RAMP LEGEND:

SIDEWALK RAMP 'TYPE R'	Ⓡ
SIDEWALK RAMP 'TYPE P'	Ⓟ
SIDEWALK RAMP 'TYPE D'	Ⓓ

REFER TO LATEST MDOT R-28 STANDARD RAMP AND DETECTABLE WARNING DETAILS



LOCATION MAP – NOT TO SCALE

LEGEND

IRON FOUND	BRASS PLUG SET
IRON SET	MONUMENT FOUND
NAIL FOUND	MONUMENT SET
NAIL & CAP SET	SEC. CORNER FOUND
	R RECORDED
	M MEASURED
	C CALCULATED

EXISTING	PROPOSED	
-OH-ELEC-		ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
-UG-CATV-		UNDERGROUND CABLE TV, CATV PEDESTAL
-UG-PHONE-		TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
-UG-ELEC-		ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
		GAS MAIN, VALVE & GAS LINE MARKER
		WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
		SANITARY SEWER, CLEANOUT & MANHOLE
		STORM SEWER, CLEANOUT & MANHOLE
		COMBINED SEWER & MANHOLE
		SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
		POST INDICATOR VALVE
		WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
		MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
		UNIDENTIFIED STRUCTURE
816.06	671.21	SPOT ELEVATION
670	671	CONTOUR LINE
		FENCE
		GUARD RAIL
		STREET LIGHT
		SIGN
CONC.		CONCRETE
ASPH.		ASPHALT
GRAVEL		GRAVEL SHOULDER
		WETLAND

STD DUTY | HEAVY DUTY | R.O.W. ONLY

STD DUTY | HEAVY DUTY | DEEP STRENGTH

REFERENCE DRAWINGS

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SANITARY SEWER	CITY OF TROY GIS MAPPING DATED 7-18-19
STORM SEWER	CITY OF TROY GIS MAPPING DATED 7-18-19
ELECTRIC	DTE MAP #J13-388 DATED 8-1-19
TELEPHONE	AT&T SKETCH DATED 7-17-19
GAS	XXXXXXXXXXX
PETROLEUM	XXXXXXXXXXX
CATV	XXXXXXXXXXX

•HAVE NOT RECEIVED FRANCHISE UTILITY MAPS AS OF JULY 24, 2019

SITE DATA TABLE:

SITE AREA: 4.22 ACRES (183,842 SQ.FT.) NET AND GROSS

ZONING: BB, BIG BEAVER ROAD

PROPOSED USE: HOTEL (18,350 SF)/RESTAURANT (8,538 SF)

BUILDING INFORMATION:
MAXIMUM ALLOWABLE BUILDING HEIGHT = 72 FEET (6 STORIES)
PROPOSED BUILDING HEIGHT = 7 STORY

BUILDING FOOTPRINT AREA = 38,530 SQ.FT.

BUILDING LOT COVERAGE = 21%

SETBACK REQUIREMENTS:

BB- BIG BEAVER ROAD (BUILDING FORM D):

FRONT SETBACK (NORTH):	10 FEET REQUIRED	21.3' PROVIDED
FRONT SETBACK (SOUTH):	10 FEET REQUIRED	10.7' PROVIDED
SIDE SETBACK (SOUTH):	NO MINIMUM SETBACK	9.2' PROVIDED
SIDE SETBACK (WEST):	NO MINIMUM SETBACK	5.5' PROVIDED
REAR SETBACK (WEST):	40 FEET REQUIRED	45' PROVIDED
PARKING SETBACK	20 FEET REQUIRED	0' EXISTING SPACES

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX-TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-BASE-15XXX.DWG
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No.	BY	CHK	DESCRIPTION	DATE
			REVISIONS	

STATE OF MICHIGAN
REBECCA L. KLEIN
ENGINEER
NO. 58042
LICENSED PROFESSIONAL ENGINEER

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CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	DN.	BA.	SUR.	GC	P.M.	BK
JJ						

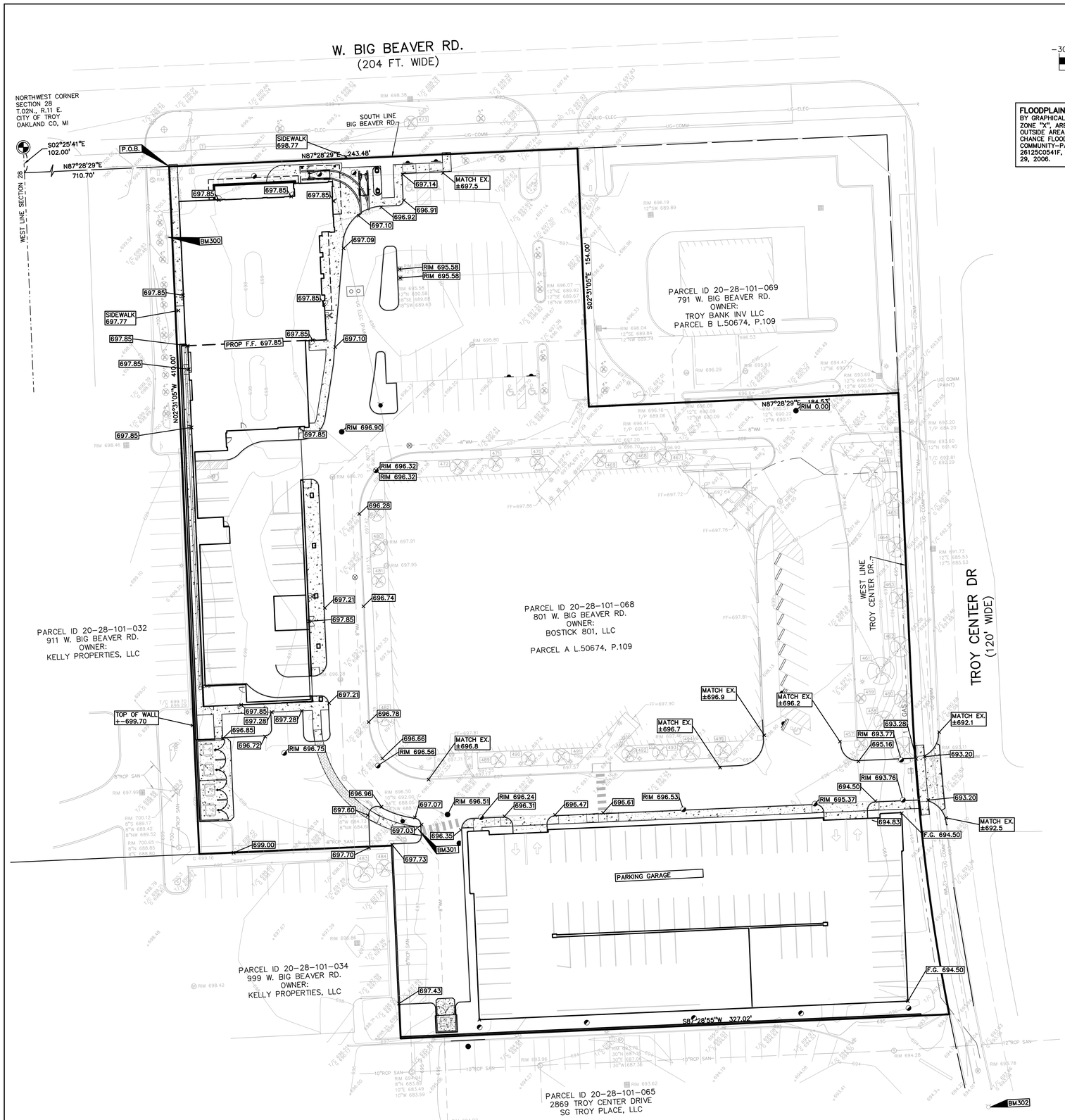
S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD - HYATT\DWG\SITE PLANS\C-2.0(2M-19282).dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

SCALE: 1" = 30'

DRAWING NUMBER:
C-2.0



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(GPS DERIVED – NAVD88)

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SIDEWALK RAMP LEGEND:

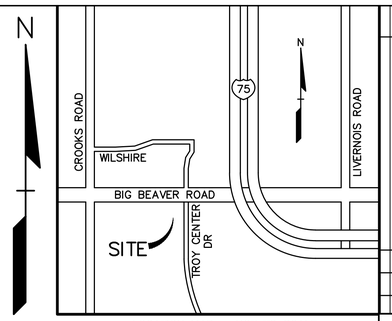
SIDEWALK RAMP 'TYPE R'	Ⓡ
SIDEWALK RAMP 'TYPE F'	Ⓕ
SIDEWALK RAMP 'TYPE P'	Ⓟ
SIDEWALK RAMP 'TYPE C'	Ⓒ
SIDEWALK RAMP 'TYPE D'	Ⓓ
CURB DROP ONLY	Ⓧ

REFER TO LATEST M.D.O.T. R–28 STANDARD RAMP AND DETECTABLE WARNING DETAILS

GENERAL GRADING AND EARTHWORK NOTES:

THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT

1. CONTRACTOR TO FIELD VERIFY ALL EXISTING TREES AND BRUSH AND REMOVE ALL THAT ARE NECESSARY TO GRADE SITE.
2. ALL GRADES ARE TO TOP OF PAVEMENT UNLESS OTHERWISE NOTED.
3. THE STAGING OF CONSTRUCTION ACTIVITIES SHALL OCCUR ONLY WITHIN THE SITE BOUNDARIES. ANY CONSTRUCTION ACTIVITIES OUTSIDE OF THE SITE BOUNDARIES SHALL BE AT THE SOLE RESPONSIBILITY AND RISK OF THE CONTRACTOR.
4. ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL MEET THE REQUIREMENTS OF THE CITY OF TROY AND OAKLAND COUNTY. AN EROSION CONTROL PERMIT MUST BE SECURED FROM THE CITY PRIOR TO CONSTRUCTION.
5. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED OR SODDED IN ACCORDANCE WITH THE LANDSCAPE PLANS. PROVIDE A MINIMUM OF 3" OF TOPSOIL IN THESE AREAS UNLESS OTHERWISE NOTED.
6. THE CONTRACTOR SHALL NOTE EXISTING UNDERGROUND UTILITIES WITHIN AND ADJACENT TO THE SITE. BACKFILL FOR EXISTING UTILITY TRENCHES SHALL BE EXAMINED CRITICALLY. ANY TRENCHES FOUND TO HAVE SOFT, UNSTABLE OR UNSUITABLE BACKFILL MATERIAL, IN THE OPINION OF THE GEOTECHNICAL ENGINEER, THAT ARE TO BE WITHIN THE ZONE OF INFLUENCE OF PROPOSED BUILDINGS OR PAVEMENT SHALL BE COMPLETELY EXCAVATED AND BACKFILLED WITH SUITABLE MATERIAL.



LOCATION MAP – NOT TO SCALE

LEGEND

IRON FOUND	BRASS PLUG SET
IRON SET	MONUMENT FOUND
NAIL FOUND	MONUMENT SET
NAIL & CAP SET	SEC. CORNER FOUND
	R RECORDED
	M MEASURED
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EXISTING	PROPOSED	
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816.06		SPOT ELEVATION
670		CONTOUR LINE
		FENCE
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		SIGN
CONC.		CONCRETE
ASPH.		ASPHALT
GRAVEL		GRAVEL SHOULDER
		WETLAND

671.21
671

STD DUTY	HEAVY DUTY	R.O.W. ONLY
STD DUTY	HEAVY DUTY	DEEP STRENGTH

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PETROLEUM	XXXXXXXXXX
CATV	XXXXXXXXXX

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S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD – CIVIL\DWG\SITE PLANS\C-3.0\PAGE-19282.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

SCALE: 1" = 30'

DRAWING NUMBER:
C-3.0

NOT FOR CONSTRUCTION

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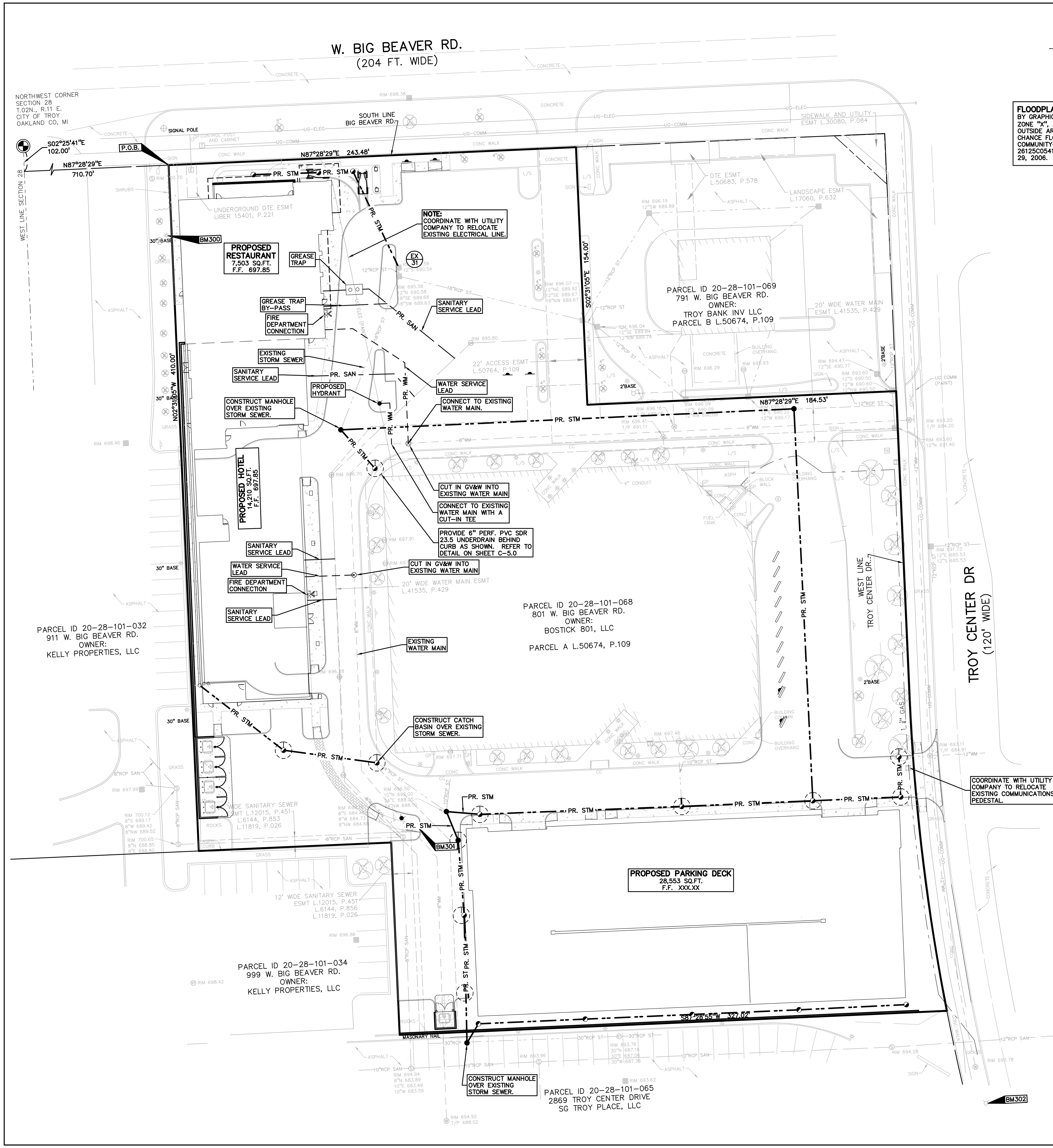
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X–BASE–15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X–TBLK–15XXX.DWG



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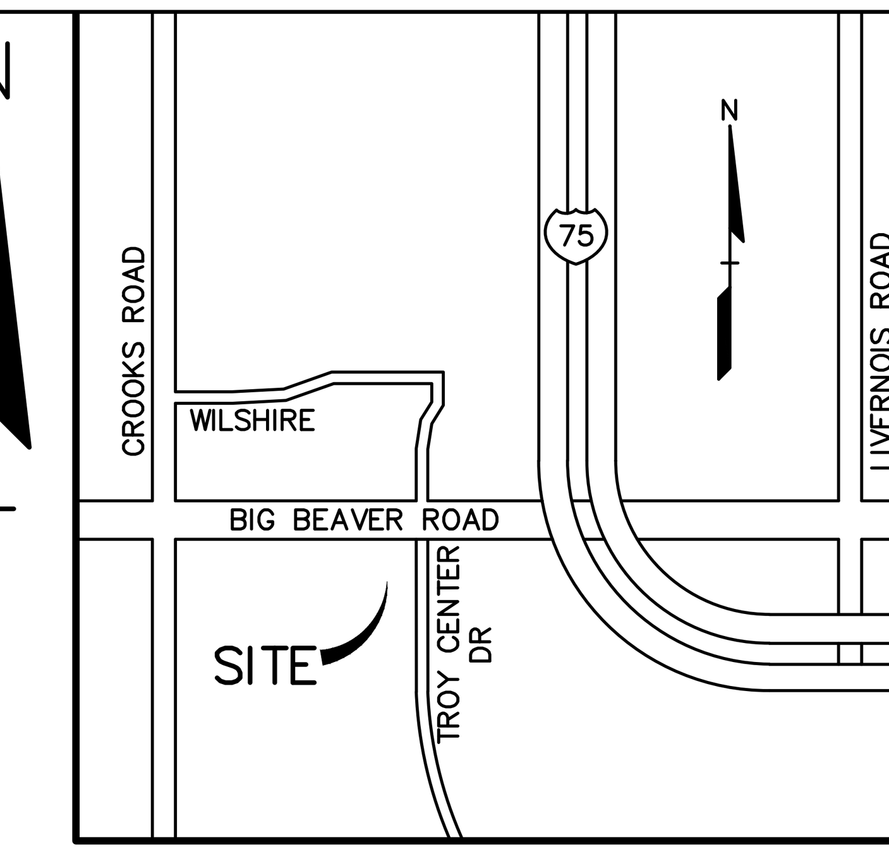
City of Troy, County of Oakland, State of Michigan.

Fee Parcel:
A parcel of land being a part of the Northwest 1/4 of Section 28, Town 2 North, Range 11 East, City of Troy, Oakland County, Michigan and being more particularly described as follows: Commencing at the Northwest corner of said Section 28; thence South 02 degrees 25 minutes 41 seconds East 102.00 feet along the Westerly line of said Section 28; thence North 87 degrees 28 minutes 29 seconds East 710.07 feet along the Southerly line of Big Beaver Road, 204 feet wide, said line being parallel to the Northerly line of said Section 28 to the point of beginning of this parcel; thence continuing along the Southerly line of said Big Beaver Road North 87 degrees 28 minutes 29 seconds East 243.48 feet; thence South 02 degrees 31 minutes 05 seconds East 154.00 feet; thence North 87 degrees 28 minutes 29 seconds East 184.53 feet to a point on the Westerly line of Troy Center Drive, 120 feet wide; thence South 02 degrees 31 minutes 05 seconds East 183.64 feet along said Westerly line of Troy Center Drive to a point on a tangent curve to the left; thence along said curve to the left 188.10 feet, said curve having a radius of 1260.00 feet, a central angle of 08 degrees 33 minutes 13 seconds and a chord which bears South 06 degrees 47 minutes 41 seconds East a distance of 187.93 feet to a point on a non-tangent line; thence South 87 degrees 28 minutes 55 seconds West 327.02 feet; thence North 02 degrees 31 minutes 05 seconds West 115.00 feet; thence South 87 degrees 28 minutes 55 seconds West 115.00 feet; thence North 02 degrees 31 minutes 05 seconds West 410.00 feet to the point of beginning of this parcel. The Basis for Bearing for this parcel is the Westerly line of Section 29, Township 2 North, Range 11 East, which bears South 02 degrees 25 minutes 41 seconds East.

Easement Parcel:
Together with the benefit provided by easement for parking purposes contained within the instrument recorded in Liber 50674, Page 109, Oakland County Records.



LOCATION MAP – NOT TO SCALE

LEGEND

IRON FOUND
IRON SET
NAIL FOUND
NAIL & CAP SET
BRASS PLUG SET
MONUMENT FOUND
MONUMENT SET
SEC. CORNER FOUND
R RECORDED
M MEASURED
C CALCULATED

EXISTING / PROPOSED

ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
UNDERGROUND CABLE TV, CATV PEDESTAL
TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
GAS MAIN, VALVE & GAS LINE MARKER
WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
SANITARY SEWER, CLEANOUT & MANHOLE
STORM SEWER, CLEANOUT & MANHOLE
COMBINED SEWER & MANHOLE
SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
POST INDICATOR VALVE
WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
UNIDENTIFIED STRUCTURE
SPOT ELEVATION
CONTOUR LINE
FENCE
GUARD RAIL
STREET LIGHT
SIGN
CONCRETE — STD DUTY, HEAVY DUTY, R.O.W. ONLY
ASPHALT — STD DUTY, HEAVY DUTY, DEEP STRENGTH
GRAVEL SHOULDER
WETLAND

REFERENCE DRAWINGS

WATER MAIN	CITY OF TROY GIS MAPPING DATED 7-18-19
SANITARY SEWER	CITY OF TROY GIS MAPPING DATED 7-18-19
STORM SEWER	CITY OF TROY GIS MAPPING DATED 7-18-19
ELECTRIC	DTE MAP #313-388 DATED 8-1-19
TELEPHONE	AT&T SKETCH DATED 7-17-19
GAS	XXXXXXXXXXX
PETROLEUM	XXXXXXXXXXX
CATV	XXXXXXXXXXX

*HAVE NOT RECEIVED FRANCHISE UTILITY MAPS AS OF JULY 24, 2019

REVISIONS

No.	BY	CHK	DESCRIPTION	DATE

STATE OF MICHIGAN REBECCA L. KLEIN ENGINEER NO. 58042 LICENSED PROFESSIONAL ENGINEER

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PROFESSIONAL.

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2430 Rochester Ct., Ste. 100
Troy, MI 48083-1872
t: 248.689.9090
f: 248.689.1044
www.peainc.com

BOSTICK 801, LLC
801 W. BIG BEAVER ROAD
TROY, MICHIGAN 48084

HYATT PLACE
PRELIMINARY UTILITY PLAN
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E., CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	JJ	DN.	BA	SUR.	GC	P.M.	BK

S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD – DNH\DWG\SITE PLANS\(C-4.0)UTIL-19282.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

SCALE: 1" = 30'

DRAWING NUMBER:
C-4.0

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX-TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-BASE-15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-TBLK-15XXX.DWG

GENERAL NOTES:

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF TROY AND OAKLAND COUNTY.
2. THE CONTRACTOR MUST CONTACT THE ENGINEER SHOULD THEY ENCOUNTER ANY DESIGN ISSUES DURING CONSTRUCTION. IF THE CONTRACTOR MAKES DESIGN MODIFICATIONS WITHOUT THE WRITTEN DIRECTION OF THE DESIGN ENGINEER, THE CONTRACTOR DOES SO AT HIS OWN RISK.
3. ALL NECESSARY PERMITS, TESTING, BONDS AND INSURANCES ETC., SHALL BE PAID FOR BY THE CONTRACTOR. THE OWNER SHALL PAY FOR ALL CITY INSPECTION FEES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL DURING THE PERIODS OF CONSTRUCTION. THIS SHALL BE CONSIDERED INCIDENTAL TO THE JOB.
5. THE CONTRACTOR SHALL NOTIFY MISS DIG (811) AND REPRESENTATIVES OF OTHER UTILITIES IN THE VICINITY OF THE WORK A MINIMUM OF 72 HOURS PRIOR TO START OF CONSTRUCTION (EXCLUDING WEEKENDS AND HOLIDAYS) FOR LOCATION AND STAKING OF ON-SITE UTILITY LINES. IF NO NOTIFICATION IS GIVEN AND DAMAGE RESULTS, SAID DAMAGE WILL BE REPAIRED AT SOLE EXPENSE OF THE CONTRACTOR. IF EXISTING UTILITY LINES ARE ENCOUNTERED THAT CONFLICT IN LOCATION WITH NEW CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER SO THAT THE CONFLICT MAY BE RESOLVED.
6. CONTRACTOR TO VERIFY THAT THE PLANS AND SPECIFICATIONS ARE THE VERY LATEST PLANS AND SPECIFICATIONS AND FURTHERMORE, VERIFY THAT THESE PLANS AND SPECIFICATIONS HAVE BEEN APPROVED. ALL ITEMS CONSTRUCTED BY THE CONTRACTOR PRIOR TO RECEIVING FINAL APPROVAL, HAVING TO BE ADJUSTED OR RE-DONE, SHALL BE AT THE CONTRACTORS EXPENSE. SHOULD THE CONTRACTOR ENCOUNTER A CONFLICT BETWEEN THESE PLANS AND/OR SPECIFICATIONS, THEY SHALL SEEK CLARIFICATION IN WRITING FROM THE ENGINEER BEFORE COMMENCEMENT OF CONSTRUCTION. FAILURE TO DO SO SHALL BE AT SOLE EXPENSE TO THE CONTRACTOR.
7. ALL PROPERTIES OR FACILITIES IN THE SURROUNDING AREAS, PUBLIC OR PRIVATE, DESTROYED OR OTHERWISE DISTURBED DUE TO CONSTRUCTION, SHALL BE REPLACED AND/OR RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR.
8. MANHOLE, CATCH BASIN, GATE VALVES AND HYDRANT FINISH GRADES MUST BE CLOSELY CHECKED AND APPROVED BY THE ENGINEER BEFORE THE CONTRACTOR'S WORK IS CONSIDERED COMPLETE.
9. CONTRACTOR SHALL REMOVE AND DISPOSE OF OFF-SITE ANY TREES, BRUSH, STUMPS, TRASH OR OTHER UNWANTED DEBRIS AT THE OWNER'S DIRECTION, INCLUDING OLD BUILDING FOUNDATIONS AND FLOORS. BURNING OF TRASH, STUMPS OR OTHER DEBRIS SHALL NOT BE PERMITTED.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADING, SIGNAGE, LIGHTS AND TRAFFIC CONTROL DEVICES TO PROTECT THE WORK AND SAFELY MAINTAIN TRAFFIC IN ACCORDANCE WITH LOCAL REQUIREMENTS AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST EDITION). THE DESIGN ENGINEER, OWNER, CITY AND STATE SHALL NOT BE HELD LIABLE FOR ANY CLAIMS RESULTING FROM ACCIDENTS OR DAMAGES CAUSED BY THE CONTRACTOR'S FAILURE TO COMPLY WITH TRAFFIC AND PUBLIC SAFETY REGULATIONS DURING THE CONSTRUCTION PERIOD.
11. ALL EXCAVATIONS SHALL BE SLOPED, SHORED OR BRACED IN ACCORDANCE WITH MI-OSHA REQUIREMENTS. THE CONTRACTOR SHALL PROVIDE AN ADEQUATELY CONSTRUCTED AND BRACED SHORING SYSTEM FOR EMPLOYEES WORKING IN AN EXCAVATION THAT MAY EXPOSE EMPLOYEES TO THE DANGER OF MOVING GROUND.

PAVING NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF TROY AND M.D.O.T.
2. IN AREAS WHERE NEW PAVEMENTS ARE BEING CONSTRUCTED, THE TOPSOIL AND SOIL CONTAINING ORGANIC MATTER SHALL BE REMOVED PRIOR TO PAVEMENT CONSTRUCTION.
3. ON-SITE FILL CAN BE USED IF THE SPECIFIED COMPACTION REQUIREMENTS CAN BE ACHIEVED. IF ON-SITE SOIL IS USED, IT SHOULD BE CLEAN AND FREE OF FROZEN SOIL, ORGANICS, OR OTHER DELETERIOUS MATERIALS.
4. THE FINAL SUBGRADE/EXISTING AGGREGATE BASE SHOULD BE THOROUGHLY PROOFROLLED USING A FULLY LOADED TANDEM AXLE TRUCK OR FRONT END LOADER UNDER THE OBSERVATION OF A GEOTECHNICAL/PAVEMENT ENGINEER. LOOSE OR YIELDING AREAS THAT CANNOT BE MECHANICALLY STABILIZED SHOULD BE REINFORCED USING GEOGRIDS OR REMOVED AND REPLACED WITH ENGINEERED FILL OR AS DICTATED BY FIELD CONDITIONS.
5. SUBGRADE UNDERCUTTING, INCLUDING BACKFILLING SHALL BE PERFORMED TO REPLACE MATERIALS SUSCEPTIBLE TO FROST HEAVING AND UNSTABLE SOIL CONDITIONS. ANY EXCAVATIONS THAT MAY BE REQUIRED BELOW THE TOPSOIL IN FILL SECTIONS OR BELOW SUBGRADE IN CUT SECTIONS, WILL BE CLASSIFIED AS SUBGRADE UNDERCUTTING.
6. SUBGRADE UNDERCUTTING SHALL BE PERFORMED WHERE NECESSARY AND THE EXCAVATED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ANY SUBGRADE UNDERCUTTING SHALL BE BACKFILLED WITH SAND OR OTHER SIMILAR APPROVED MATERIAL. BACKFILL SHALL BE COMPACTED TO 95% OF THE MAXIMUM UNIT WEIGHT (PER ASTM D-1557) UNLESS OTHERWISE SPECIFIED.
7. BACKFILL UNDER PAVED AREAS SHALL BE AS SPECIFIED ON DETAILS.
8. ANY SUB-GRADE WATERING REQUIRED TO ACHIEVE REQUIRED DENSITY SHALL BE CONSIDERED INCIDENTAL TO THE JOB.
9. FINAL PAVEMENT ELEVATIONS SHOULD BE SO DESIGNED TO PROVIDE POSITIVE SURFACE DRAINAGE. A MINIMUM SURFACE SLOPE OF 1.0 PERCENT IS RECOMMENDED.
10. CONSTRUCTION TRAFFIC SHOULD BE MINIMIZED ON THE NEW PAVEMENT. IF CONSTRUCTION TRAFFIC IS ANTICIPATED ON THE PAVEMENT STRUCTURE, THE INITIAL LIFT THICKNESS COULD BE INCREASED AND PLACEMENT OF THE FINAL LIFT COULD BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED. THIS ACTION WILL ALLOW REPAIR OF LOCALIZED FAILURE, IF ANY DOES OCCUR, AS WELL AS REDUCE LOAD DAMAGE ON THE PAVEMENT SYSTEM.

GENERAL UTILITY NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF TROY AND M.D.O.T.
2. ALL TRENCHES UNDER OR WITHIN FIVE (5) FEET OR THE FORTY-FIVE (45) DEGREE ZONE OF INFLUENCE LINE OF EXISTING AND/OR PROPOSED PAVEMENT, BUILDING PAD OR DRIVE APPROACH SHALL BE BACKFILLED WITH SAND COMPACTED TO AT LEAST NINETY-FIVE (95) PERCENT OF MAXIMUM UNIT WEIGHT (ASTM D-1557). ALL OTHER TRENCHES TO BE COMPACTED TO 90% OR BETTER.
3. WHENEVER EXISTING MANHOLES OR SEWER PIPE ARE TO BE TAPPED, DRILL HOLES 4" CENTER TO CENTER, AROUND PERIPHERY OF OPENING TO CREATE A PLANE OF WEAKNESS JOINT BEFORE BREAKING SECTION OUT.
4. THE LOCATIONS AND DIMENSIONS SHOWN ON THE PLANS FOR EXISTING UTILITIES ARE IN ACCORDANCE WITH AVAILABLE INFORMATION WITHOUT UNCOVERING AND MEASURING. THE DESIGN ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION OR THAT ALL EXISTING UNDERGROUND FACILITIES ARE SHOWN. CONTRACTOR TO FIELD VERIFY UTILITIES.
5. THE CONTRACTOR MUST COORDINATE TO ENSURE ALL REQUIRED PIPES, CONDUITS, CABLES AND SLEEVES ARE PROPERTLY PLACED FOR THE INSTALLATION OF GAS, ELECTRIC, PHONE, CABLE, IRRIGATION, ETC. IN SUCH A MANNER THAT WILL FACILITATE THEIR PROPER INSTALLATION PRIOR TO THE PLACEMENT OF THE PROPOSED PAVEMENT AND LANDSCAPING.
6. REFER TO CITY OF TROY STANDARD DETAILS FOR PIPE BEDDING DETAILS.
7. REFER TO CITY OF TROY STANDARD DETAIL SHEETS FOR ADDITIONAL INFORMATION.

STORM SEWER NOTES:

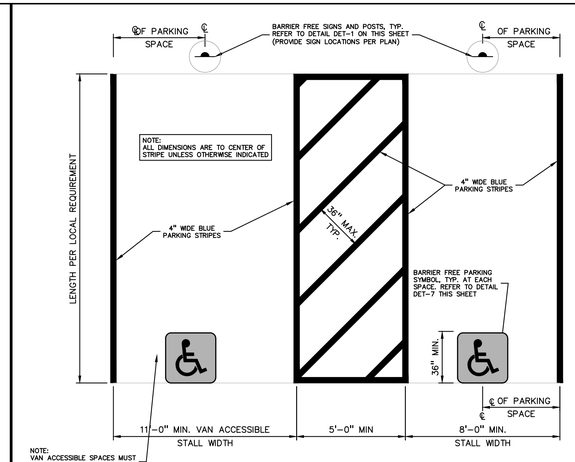
1. ALL STORM SEWER 12" AND LARGER SHALL BE RCP CLASS IV UNLESS OTHERWISE NOTED. REFER TO CITY STANDARD DETAILS SHEETS FOR STANDARD BEDDING DETAILS.
2. JOINTS FOR ALL STORM SEWER 12" AND LARGER SHALL BE MODIFIED TONGUE AND GROOVE JOINT WITH RUBBER GASKETS UNLESS SPECIFIED OTHERWISE (ASTM C-443)

WATER MAIN NOTES:

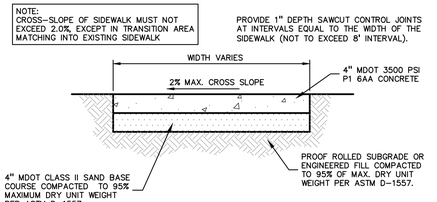
1. ALL WATER MAIN SHALL BE INSTALLED WITH A MINIMUM COVER OF 6.0' BELOW FINISH GRADE. WHEN WATER MAINS MUST DIP TO PASS UNDER A STORM SEWER OR SANITARY SEWER, THE SECTIONS WHICH ARE DEEPER THAN NORMAL SHALL BE KEPT TO A MINIMUM LENGTH BY THE USE OF VERTICAL TWENTY TWO AND A HALF (22.5°) DEGREE BENDS, PROPERLY ANCHORED.
2. ALL TEE'S, BENDS, CONNECTIONS, ETC. ARE CONSIDERED INCIDENTAL TO THE JOB.
3. PHYSICAL CONNECTIONS SHALL NOT BE MADE BETWEEN EXISTING AND NEW WATER MAINS UNTIL TESTING IS SATISFACTORILY COMPLETED.
4. MAINTAIN 10' HORIZONTAL CLEARANCE BETWEEN OUTER EDGE OF WATERMAIN AND ANY SANITARY SEWER OR STRUCTURE.
5. ALL WATER MAIN SHALL BE DUCTILE IRON CLASS 54 WITH POLYETHYLENE WRAP.

SANITARY SEWER NOTES:

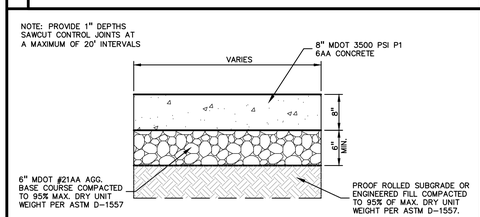
1. DOWNSPOUTS, WEEP TILE, FOOTING DRAINS OR ANY CONDUIT THAT CARRIES STORM OR GROUND WATER SHALL NOT BE ALLOWED TO DISCHARGE INTO A SANITARY SEWER.
2. ALL SANITARY SEWER SHALL BE CONSTRUCTED OF RCP CLASS IV PIPE WITH A MINIMUM DIAMETER OF 12" PER CITY REQUIREMENTS.
3. JOINTS FOR ALL CONCRETE SANITARY SEWER 12" AND LARGER SHALL BE MODIFIED TONGUE AND GROOVE JOINT WITH RUBBER GASKETS UNLESS SPECIFIED OTHERWISE.



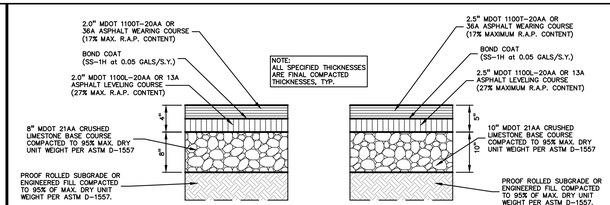
UNIVERSAL BARRIER FREE PARKING STALL DETAIL
NOT TO SCALE



CONCRETE SIDEWALK
NOT TO SCALE



HEAVY DUTY CONCRETE DETAIL
NOT TO SCALE

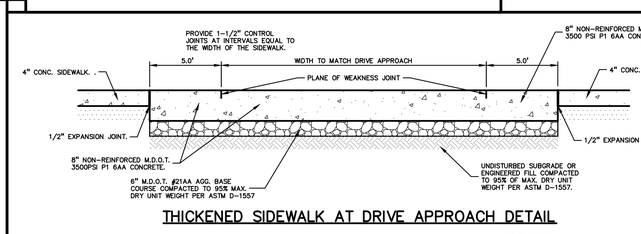


STANDARD DUTY ASPHALT DETAIL
(NOT FOR USE IN THE RIGHT-OF-WAY)
NOT TO SCALE

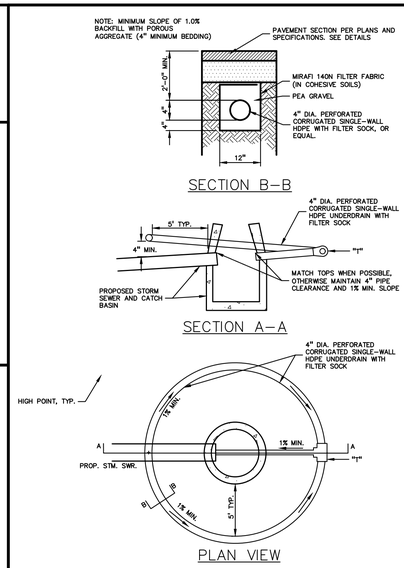
HEAVY DUTY ASPHALT DETAIL
(NOT FOR USE IN THE RIGHT-OF-WAY)
NOT TO SCALE

AGGREGATE BASE NOTE:
THIS PAVEMENT SECTION DESIGN ASSUMES THE USE OF MDOT 21AA CRUSHED LIMESTONE BASE MATERIAL THAT MEETS THE REQUIREMENTS OF MDOT STANDARD SPECIFICATION SECTION 902 FOR AGGREGATES. IF CRUSHED CONCRETE AGGREGATE BASE IS PROPOSED IN LIEU OF THE SPECIFIED CRUSHED LIMESTONE MATERIAL, PEA INC. WILL REQUIRE A MINIMUM 25% INCREASE IN BASE THICKNESS. HOWEVER, IF TESTING DOCUMENTATION IS PROVIDED TO PEA, INC. THAT SHOWS THAT THE CRUSHED CONCRETE MATERIAL MEETS ALL REQUIREMENTS OF MDOT SPECIFICATION SECTION 902, THEN THE 25% INCREASE IN THICKNESS MAY BE REEVALUATED.

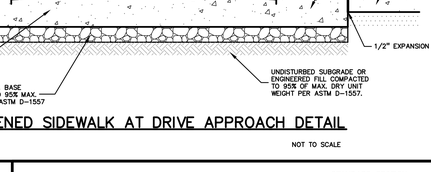
ASPHALT MATERIAL NOTES:
HOT-MIX ASPHALT MIXTURES UTILIZING RECYCLED ASPHALT PAVEMENT (RAP) MUST MEET MDOT SPECIAL PROVISION 12SP501(E). THE BINDER GRADE FOR THIS WORK IS PG58-22. IF ASPHALT MIXES CONTAINING RAP ARE TO BE SUPPLIED FOR THIS PROJECT, THE ASPHALT BINDER MUST BE REVISED PER MDOT TIER 1' OR 'TIER 2' REQUIREMENTS (RAP CONTENT UP TO 27% MAXIMUM). TIER 3 MIXES ARE NOT ACCEPTABLE ON THIS PROJECT. AN ASPHALT MIX DESIGN FOR ALL SPECIFIED MIXES SHOULD BE FORWARDED TO PEA INC. FOR REVIEW PRIOR TO CONSTRUCTION



THICKENED SIDEWALK AT DRIVE APPROACH DETAIL
NOT TO SCALE



RADIAL UNDERDRAIN DETAIL
NOT TO SCALE



NOTE:
PROVIDE CONTROL JOINTS IN CURB AT 10' O.C. AND AT ALL RADIUS RETURNS.
PROVIDE EXPANSION JOINTS AND JOINT SEALANT WHERE CURBS ABUT STRUCTURES.

18"x6" STANDARD CONCRETE CURB AND GUTTER
NOT TO SCALE

INTEGRAL CURB AND SIDEWALK
NOT TO SCALE

NOTES:
1. THE BARRIER FREE PARKING SYMBOL SHALL BE LOCATED IN THE CENTER OF THE PARKING SPACE AND ALONG THE EDGE OF THE ADJACENT DRIVE AISLE, TYP.
2. PARKING SYMBOL STRIPING SHALL HAVE A MINIMUM WIDTH OF 3"
3. CONTRACTOR SHALL ADHERE TO LOCAL/STATE JURISDICTIONAL REQUIREMENTS FOR ALL PAINTING WITHIN ACCESSIBLE SPACES.

BARRIER FREE PARKING SYMBOL DETAIL
(INTERNATIONAL SYMBOL OF ACCESSIBILITY)
NOT TO SCALE

12" x 18" (R7-8) GREEN BORDER AND LEGEND WHITE SYMBOL, BLUE BACKGROUND, REFLECTORIZED

NOTE: MAY ONLY BE USED AT 11' WIDE SPACES LOCATED ON THE LEFT SIDE OF A 5' WIDE AISLE, OR 8' WIDE SPACES LOCATED TO THE LEFT OF 8' WIDE AISLES

6" x 12" (R7-8P) GREEN BORDER AND LEGEND REFLECTORIZED

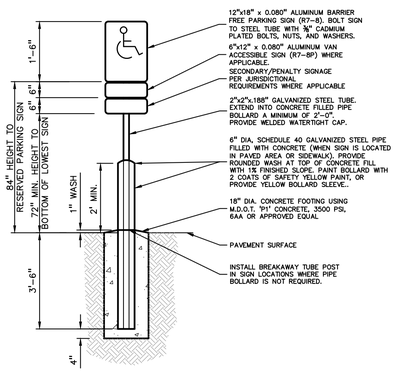
VAN ACCESSIBLE PARKING SIGN DETAIL
NOT TO SCALE

12" x 18" (R7-8) GREEN BORDER AND LEGEND WHITE SYMBOL, BLUE BACKGROUND. REFLECTORIZED

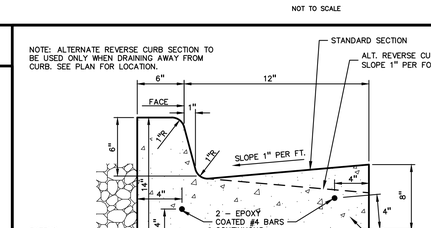
BARRIER FREE PARKING SIGN DETAIL
NOT TO SCALE

BARRIER FREE SIGN NOTES:

1. ONE SIGN IS REQUIRED AT EACH BARRIER FREE PARKING SPACE.
2. ALL SIGNS SHALL COMPLY WITH THE LATEST STANDARDS OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD).
3. WHEN TWO BARRIER FREE PARKING SPACES ARE ADJACENT AND FACING EACH OTHER, TWO SIGNS ARE REQUIRED, BUT CAN BE MOUNTED ON THE SAME POST.
4. SIGN POSTS SHALL BE 2" NOM. SQUARE 14-GAUGE GALVANIZED STEEL TUBE WITH 7/16" HOLES AT 1" CENTERS. POSTS SHALL TELESCOPE INSIDE ANCHOR POSTS A MINIMUM OF 12".
5. ANCHOR POSTS SHALL BE 2.25" NOM. SQUARE 12-GAUGE GALVANIZED STEEL POST, A MINIMUM OF 3 FEET LONG.
6. IF THESE NOTES AND DETAILS CONFLICT WITH LOCAL CODES AND ORDINANCES, THE STRICTER REQUIREMENT SHOULD BE USED.
7. ALTERNATE MATERIALS MAY BE USED IF IN COMPLIANCE WITH A.D.A. GUIDELINES AND LOCAL REQUIREMENTS.



BARRIER FREE SIGN AND POST DETAIL
NOT TO SCALE



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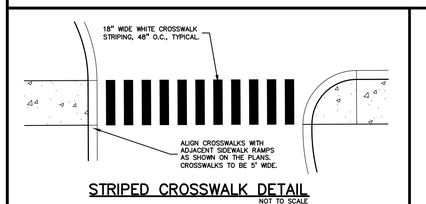
18"x6" STANDARD CONCRETE CURB AND GUTTER
NOT TO SCALE



STRIPED CROSSWALK DETAIL
NOT TO SCALE

MDOT DRIVEWAY OPENING-DETAIL 'M'
NOT TO SCALE

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX-TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-BASE-15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-TBLK-15XXX.DWG

No.	BY	CHK	DESCRIPTION	DATE
			REVISIONS	

STATE OF MICHIGAN
REBECCA L. KLEIN
ENGINEER
NO. 58042
LICENSED PROFESSIONAL ENGINEER

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2430 Rochester Ct., Ste. 100
Troy, MI 48083-1872
t: 248.689.9090
f: 248.689.1044
www.peainc.com

BOSTICK 801, LLC
801 W. BIG BEAVER ROAD
TROY, MICHIGAN 48084

HYATT PLACE
NOTES AND DETAILS
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E., CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	DN.	BA.	SUR.	GC	P.M.	BK
JJ						

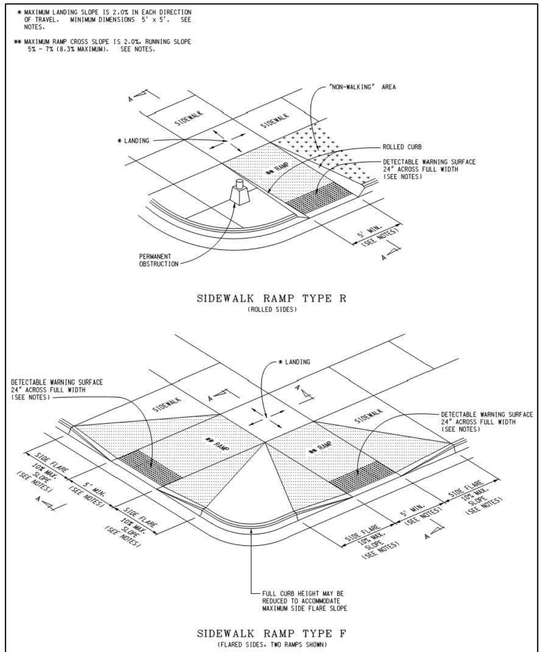
S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD - DWG\DWG\SET PLANS\C-5.0DETAILS-19282.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

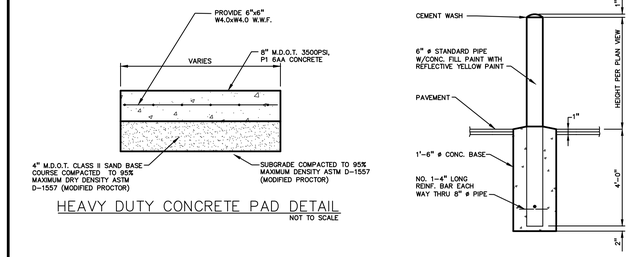
PEA JOB NO. 2019-282

SCALE: 1" = 30'

DRAWING NUMBER:
C-5.0

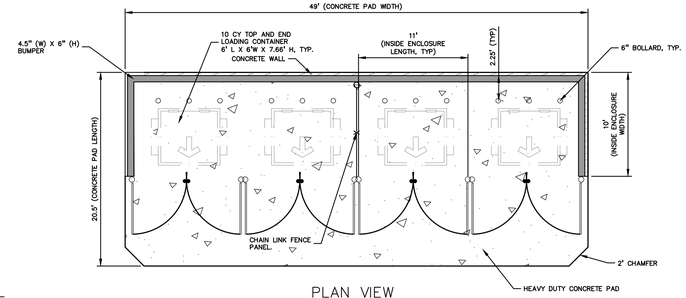


MDOT Michigan Department of Transportation	DEPARTMENT DIRECTOR Kirk T. Steudle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR		
PREPARED BY DESIGN DIVISION	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS		
DRAWN BY: B.L.T.	APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT			
CHECKED BY: K.W.P.		F.H.W.A. APPROVAL	6-27-2017 PLAN DATE	R-28-J SHEET 1 OF 7

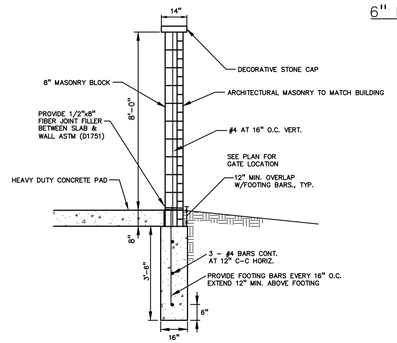


HEAVY DUTY CONCRETE PAD DETAIL
NOT TO SCALE

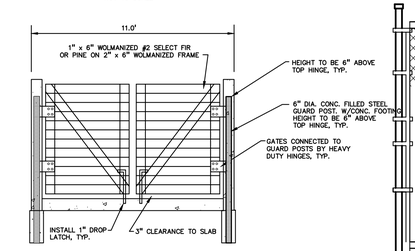
6" DIA. GUARD POST DETAIL
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

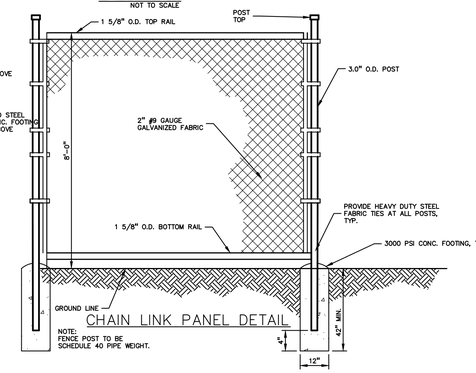


DUMPSTER ENCLOSURE WALL CROSS SECTION



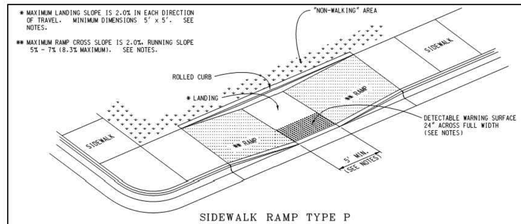
TRASH ENCLOSURE GATE DETAIL
NOT TO SCALE

TRASH ENCLOSURE DETAILS
NOT TO SCALE

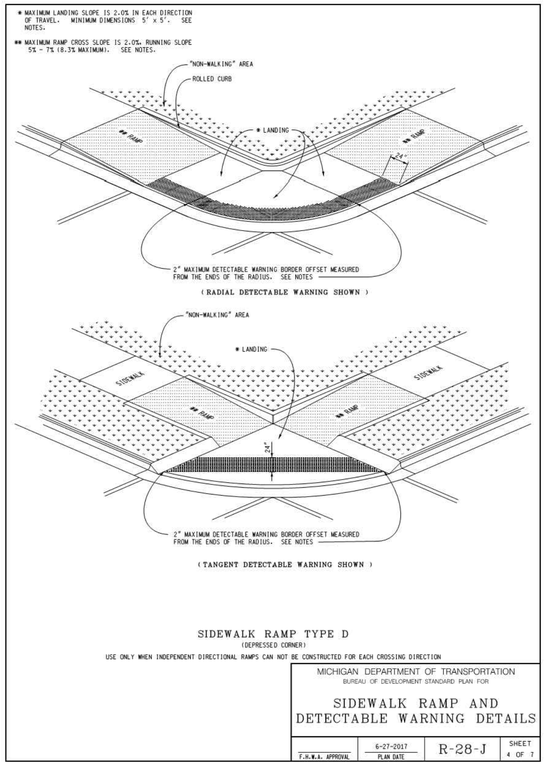


CHAIN LINK PANEL DETAIL

NOTE:
FENCE POST TO BE SCHEDULE 40 PIPE WEIGHT.

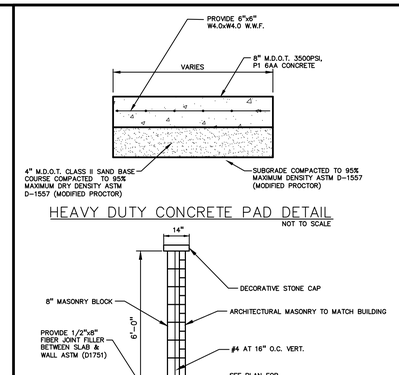


MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR				
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS				
F.H.W.A. APPROVAL	6-27-2017 PLAN DATE	R-28-J	SHEET 3 OF 7	



SIDEWALK RAMP TYPE D
(DEPRESSED CORNER)
USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR				
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS				
F.H.W.A. APPROVAL	6-27-2017 PLAN DATE	R-28-J	SHEET 4 OF 7	



HEAVY DUTY CONCRETE PAD DETAIL
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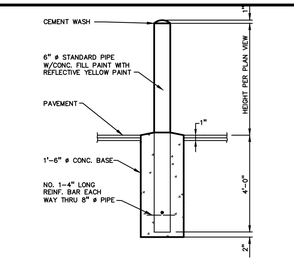

6" DIA. GUARD POST DETAIL
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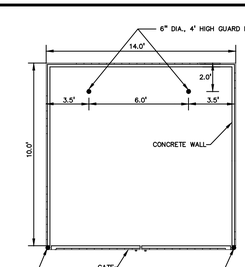
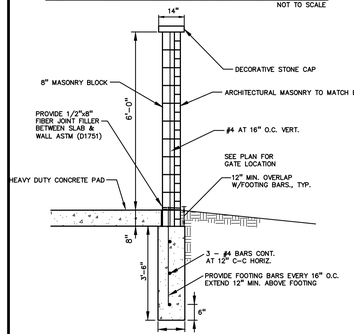
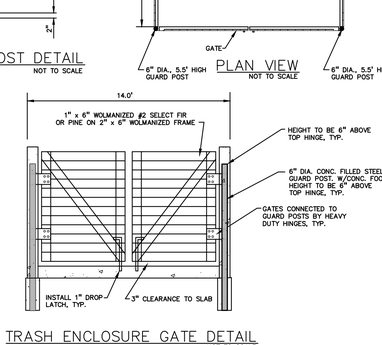


PLAN VIEW
NOT TO SCALE



DUMPSTER ENCLOSURE WALL CROSS SECTION



TRASH ENCLOSURE GATE DETAIL
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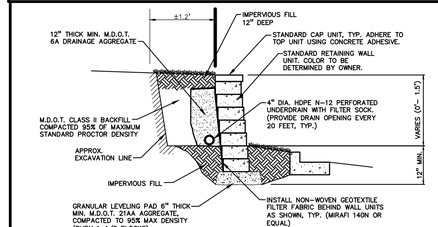
TRASH ENCLOSURE DETAILS
NOT TO SCALE



SECTION Y-Y THROUGH RETAINING WALL
MODULAR CONCRETE UNIT
NOT TO SCALE

NOTE:
DESIGN ASSUMES THE USE OF 'VERSA-LOK' RETAINING WALL SYSTEMS.

CONTACT:
VERSA-LOK RETAINING WALL SYSTEMS
6348 HIGHWAY 36, SUITE #1
OAKDALE, MINNESOTA, 55128
PHONE: (651) 770-3166

OR LOCAL SUPPLIER CONTACT:
GRAND BLANC CEMENT PRODUCTS Co.
(810) 742-5500

NOT FOR CONSTRUCTION

NO.	BY	CHK	DESCRIPTION	DATE
			REVISIONS	

STATE OF MICHIGAN
REBECCA L. KLEIN
ENGINEER
NO. 58042
LICENSED PROFESSIONAL ENGINEER

CAUTION!!
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JJ						

S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD - CIVIL\DWG\SITE PLANS\C-5.1DETAILS-19282.dwg

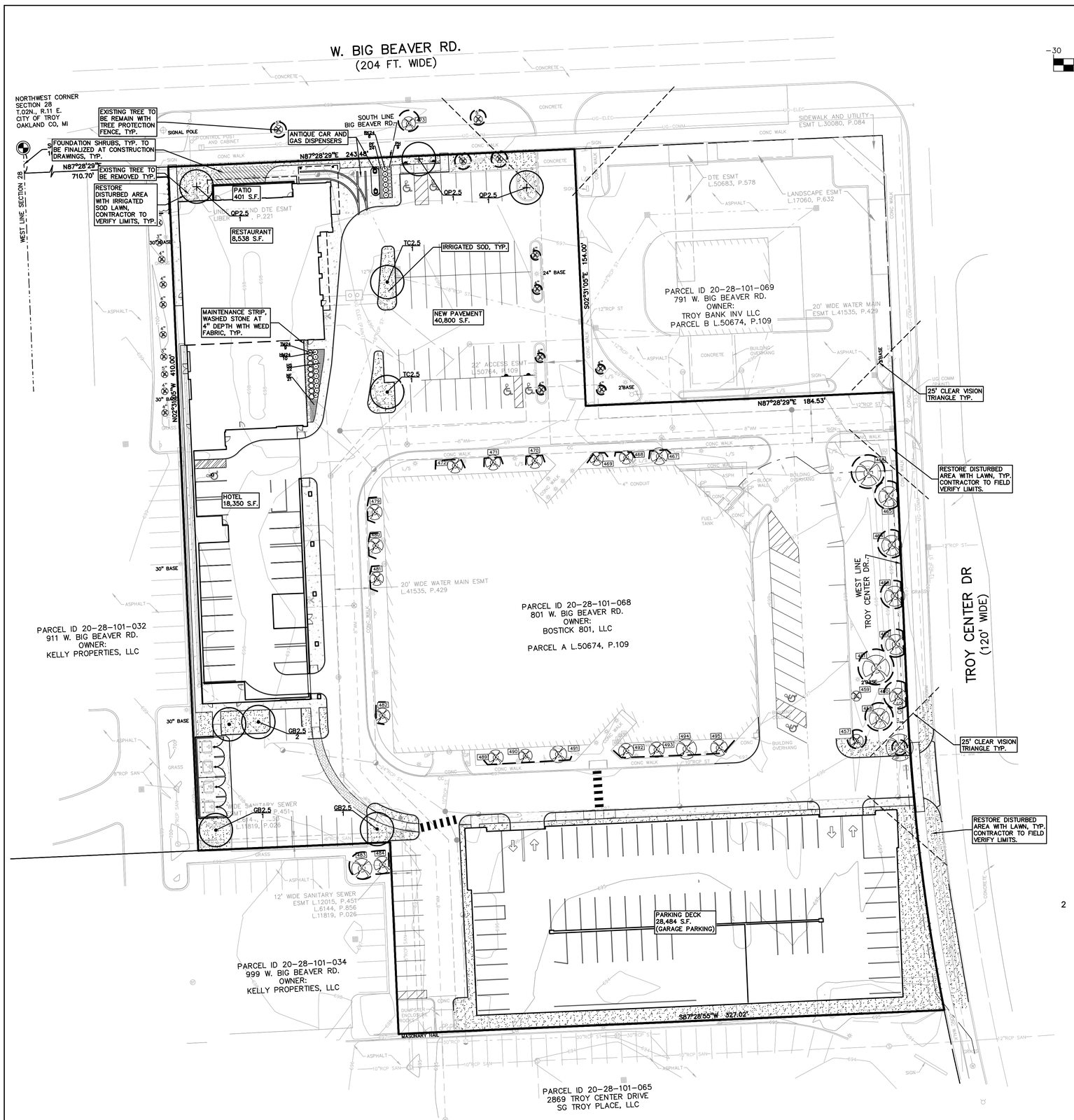
ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

SCALE: 1" = 30'

DRAWING NUMBER:
C-5.1

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX-TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-BASE-15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-TBLK-15XXX.DWG



GRAPHIC SCALE

−30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

KEY:

= EXISTING TREE TO REMAIN WITH TREE PROTECTION FENCE

= PARKING LOT TREES

= GREENBELT TREES

= SHRUBS

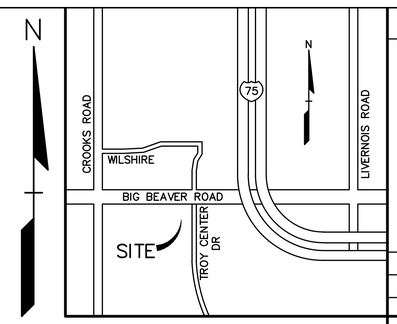
= FOUNDATION SHRUBS

= PERENNIALS PLANT BEDS TO BE IRRIGATED

= IRRIGATED SOD LAWN (CONTRACTOR SHALL REPLACE DISTURBED AREAS WITH LAWN. FIELD VERIFY LIMITS OF DISTURBANCE.)

= DECORATIVE WASHED STONE AT 4" DEPTH OVER WEED BARRIER FABRIC BELOW

TREES TO BE LOCATED MIN. OF 5' AWAY FROM UTILITIES. TYP.



LOCATION MAP – NOT TO SCALE

LANDSCAPE CALCULATIONS:
PER CITY OF TROY ZONING ORDINANCE: BIG BEAVER DISTRICT
SITE TYPE BB: BUILDING FORM D

13.02 E. = GENERAL SITE LANDSCAPE
REQUIRED: 20% OF SITE AREA SHALL BE LANDSCAPE MATERIAL
183,842 SF(4.22 AC) • 20% = 36,768 SF REQUIRED

PROVIDED: 27,089 FT (23,169 SF OR 12.6% LAWN & PLANT BEDS)

13.02 C. PARKING LOT LANDSCAPE
REQUIRED: 13.02 C2.= 1 TREE PER 8 SPACES
65 ON SITE ÷ 17 SHARED = 82/8 = 10 TREES REQ'D
:13.02 C3.= SHRUB HEDGE AT PARKING SPACES
WHEN ADJACENT TO A PUBLIC ROAD; NOT REQ'D

PROVIDED: 6 PROPOSED TREES + 4 EXISTING TREES WITHIN SHARED PARKING AREAS

13.02 D2. = GREENBELT
REQUIRED: 1 TREE / 30 LF OF FRONTAGE ADJ. TO PUBLIC RD.
W BIG BEAVER = 243.48' LF FRONTAGE / 30 = 8 TREES
TROY CENTER DR.=371.74 LF FRONTAGE / 30 = 12 TREES
PROVIDED:
W. BIG BEAVER= 5 EXISTING TREES, 3 CANOPY TREES
TROY CENTER RD.= 12 EXISTING TREES

23.04 2. = AT GRADE EQUIPMENT SCREENING
REQUIRED: SCREEN EQUIPMENT WITH EVERGREEN LANDSCAPE MATERIALS, HT. MINIMUM TO EQUAL EQUIPMENT HT.
PROVIDED; EVERGREEN/ SHRUB HEDGE

TREE REPLACEMENT:
SEE SHEET T-1.0 FOR TREE REPLACEMENT CALCULATIONS

TREE INVENTORY/PRESERVATION CALCULATIONS
PER CITY OF TROY ZONING ORDINANCE, BIG BEAVER DISTRICT SITE TYPE BB

WOODLAND TREES		
WOODLAND TREES REMOVED:	**12**	(REPLACE AT 50% OF REMOVED DBH)
108" DBH x 0.5 =		**54"** REPLACEMENT
WOODLAND TREES SAVED:	23	(CREDIT OF 2X DBH)
226" DBH x 2 =		**452"** CREDIT
54 -	452	= -398
" " DBH REQUIRED FOR WOODLAND REPLACEMENT		
LANDMARK TREES		
LANDMARK TREES REMOVED:	2	(REPLACE AT 100% OF REMOVED DBH)
32" DBH x 1 =		**32"** REPLACEMENT
LANDMARK TREES SAVED:	1	(CREDIT OF 2X DBH)
16" DBH x 2 =		**32"** CREDIT
32 -	32	= 0
-398 " TOTAL DBH REQUIRED FOR REPLACEMENT		
EXEMPT TREES		
(NO REPLACEMENT REQUIRED FOR EXEMPT TREES)		
SAVED EXEMPT TREES:	0	**Trees**
EXEMPT TREES ON SITE:	0	**Trees**

LANDSCAPE WAIVER REQUESTED

1. REQUESTING A VARIANCE FOR THE ADDITIONAL 5.2% OF SITE LANDSCAPING NOT PROVIDED.

DECIDUOUS TREE PLANT LIST:

QUANTITY	SYM	COMMON NAME	SCIENTIFIC NAME	SIZE	SPEC
3	QP2.5	Regal Prince Oak	*Quercus bicolor*	2.5" Cal.	B&B
4	GB2.5	Columnar Ginkgo	*Ginkgo biloba 'Fastigiata'*	2.5" Cal.	B&B
2	TC2.5	Greenspire Linden	*Tilia cordata 'Greenspire'*	2.5" Cal.	B&B
9	TOTAL DECIDUOUS TREES				

SHRUB PLANT LIST:

QUANTITY	SYM	COMMON NAME	SCIENTIFIC NAME	SIZE	SPEC
10	HM24	Endless Summer Hydrangea	*Hydrangea macrophylla 'Endless Summer'*	24" Ht.	Cont.
6	RK24	White Knockout Rose	*Rosa rugosa 'Radwhite'*	24" Ht.	Cont.
9	TM24	Hicks Yew	*Taxus x media 'Hicksii'*		Cont.
25	TOTAL SHRUBS				

PERENNIAL PLANT LIST:

QUANTITY	SYM	COMMON NAME	SCIENTIFIC NAME	SIZE	SPEC
22	HS	Siebold Hosta	*Hosta sieboldiana 'Elegans'*	1 Gal.	Cont.
21	NF	Walkers Low Catmint	*Nepeta x faassenii 'Walkers Low'*	1 Gal.	Cont.
24	PF	Forever Pink Phlox	*Phlox 'Forever Pink'*	1 Gal.	Cont.
9	PH	Dwarf Fountain Grass	*Pennisetum alopecuroides 'Hameln'*	1 Gal.	Cont.
76	TOTAL PERENNIALS				

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX-TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-BASE-15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-TBLK-15XXX.DWG

NO.	BY	CHK	DESCRIPTION	DATE

REVISIONS

STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
NO. 1302
REGISTERED
PROFESSIONAL
LANDSCAPE ARCHITECT

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HYATT PLACE LANDSCAPE PLAN
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E., CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	JJ	DN.	BA	SUR.	GC	P.M.	BK

S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD - HYATT\DWG\LANDSCAPE\SITE PLAN\L-1.0_LANDSCAPE PLAN-1.DWG

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PEA JOB NO. 2019-282

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DRAWING NUMBER:
L-1.0

TREE PROTECTION WILL BE ERECTED PRIOR TO START OF CONSTRUCTION ACTIVITIES AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.

NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE DRIP LINE OF ANY TREE DESIGNATED TO REMAIN; INCLUDING, BUT NOT LIMITED TO PLACING SOLVENTS, BUILDING MATERIAL, CONSTRUCTION EQUIPMENT OR SOIL DEPOSITS WITHIN DRIP LINES.

GRADE CHANGES MAY NO OCCUR WITHIN THE DRIP LINE OF PROTECTED TREES.

DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY DEVICE OR WIRE TO ANY REMAINING TREE.

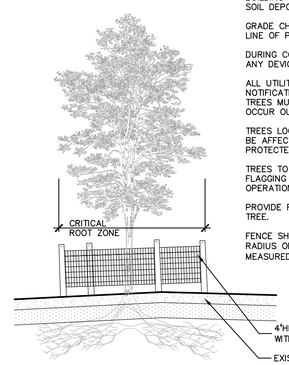
ALL UTILITY SERVICE REQUESTS MUST INCLUDE NOTIFICATION TO THE INSTALLER THAT PROTECTED TREES MUST BE AVOIDED. ALL TRENCHING SHALL OCCUR OUTSIDE OF THE PROTECTIVE FENCING.

TREES LOCATED ON ADJACENT PROPERTY THAT AY BE AFFECTED BY CONSTRUCTION ACTIVITIES MUST BE PROTECTED.

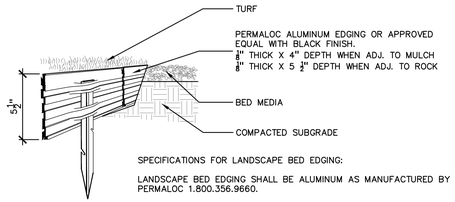
TREES TO BE PRESERVED SHALL BE IDENTIFIED WITH FLAGGING PRIOR TO THE TREE CLEARING OPERATIONS.

PROVIDE FENCE AROUND CRITICAL ROOT ZONE OF TREE.

FENCE SHALL BE PLACED IN A CIRCLE WITH A RADIUS OF 1' PER 1" DIAMETER OF THE TREE MEASURED AT 4.5' ABOVE GROUND.



3 TREE PROTECTION DETAIL
SCALE: 1" = 3'-0"



SPECIFICATIONS FOR LANDSCAPE BED EDGING:

LANDSCAPE BED EDGING SHALL BE ALUMINUM AS MANUFACTURED BY PERMALOC 1.800.356.9660.

(8') EIGHT OR (16') SIXTEEN FOOT SECTIONS SHALL BE USED WITH ONE STAKE PER (38") THIRTY EIGHT INCHES OF EDGING.

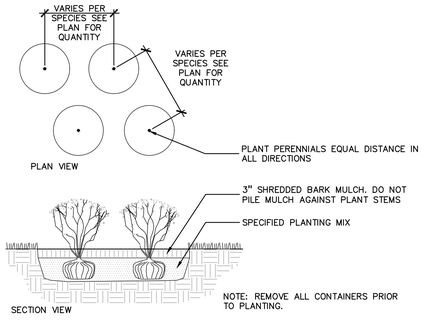
EDGING SHALL BE 3/16" THICK X 4" DEPTH WHEN ADJ. TO MULCH AND 3/16" THICK X 5 1/2" DEPTH WHEN ADJ. TO ROCK, FINISH, BLACK DURAFLEX MEETS AAMA 2603

STAKE SHALL SECURELY ENGAGE EDGING AND SHALL BE ENTIRELY BELOW TOP SURFACE OF EDGING.

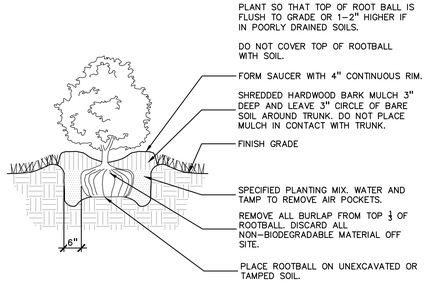
EDGING SHALL HAVE A MINIMUM OF (2") TWO INCHES OF INTERLOCKING OVERLAP BETWEEN SECTIONS.

INSTALL AS PER MANUFACTURER'S SPECIFICATIONS WITH TOP OF EDGING 1/2"-1" ABOVE COMPACTED FINISH GRADE. FINISH GRADE TO BE COMPACTED ON EITHER SIDE OF EDGING TO MAINTAIN STABILITY.

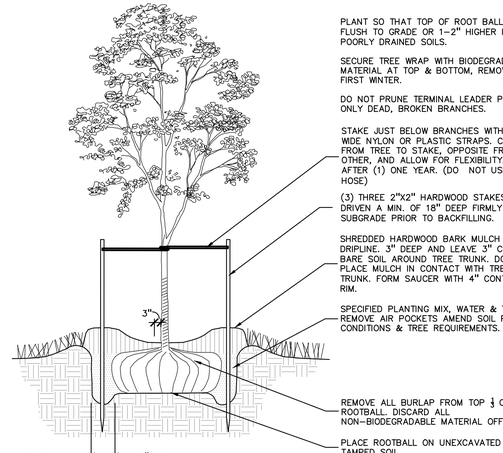
5 ALUMINUM EDGE DETAIL
SCALE: 1/2" = 1'-0"



2 PERENNIAL PLANTING DETAIL
SCALE: 1" = 2'-0"



4 SHRUB PLANTING DETAIL
SCALE: 1" = 2'-0"



1 DECIDUOUS TREE PLANTING DETAIL
SCALE: 1" = 3'-0"

GENERAL LANDSCAPE NOTES:

1. LANDSCAPE CONTRACTOR SHALL VISIT SITE, INSPECT EXISTING SITE CONDITIONS AND REVIEW PROPOSED PLANTING AND RELATED WORK. IN CASE OF DISCREPANCY BETWEEN PLAN AND PLANT LIST, PLAN SHALL GOVERN QUANTITIES. CONTACT LANDSCAPE ARCHITECT WITH ANY CONCERNS.
2. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL ON SITE UTILITIES PRIOR TO BEGINNING CONSTRUCTION ON HIS/HER PHASE OF WORK. ELECTRIC, GAS, TELEPHONE, CABLE TELEVISION MAY BE LOCATED BY CALLING MISS DIG 1-800-482-7171. ANY DAMAGE OR INTERRUPTION OF SERVICES SHALL BE THE RESPONSIBILITY OF CONTRACTOR. CONTRACTOR SHALL COORDINATE ALL RELATED ACTIVITIES WITH OTHER TRADES ON THE JOB AND SHALL REPORT ANY UNACCEPTABLE JOB CONDITIONS TO OWNER'S REPRESENTATIVE PRIOR TO COMMENCING.
3. ALL PLANT MATERIAL TO BE PREMIUM GRADE NURSERY STOCK AND SHALL SATISFY AMERICAN ASSOCIATION OF NURSERYMEN STANDARD FOR NURSERY STOCK. ALL LANDSCAPE MATERIAL SHALL BE NORTHERN GROWN, NO. 1. GRADE.
4. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL QUANTITIES SHOWN ON LANDSCAPE PLAN PRIOR TO PRICING THE WORK.
5. THE OWNER'S REPRESENTATIVE RESERVES THE RIGHT TO REJECT ANY PLANT MATERIAL NOT MEETING SPECIFICATIONS.
6. ALL SINGLE STEM SHADE TREES TO HAVE STRAIGHT TRUNKS AND SYMMETRICAL CROWNS.
7. ALL SINGLE TRUNK SHADE TREES TO HAVE A CENTRAL LEADER; TREES WITH FORKED OR IRREGULAR TRUNKS WILL NOT BE ACCEPTED.
8. ALL MULTI STEM TREES SHALL BE HEAVILY BRANCHED AND HAVE SYMMETRICAL CROWNS. ONE SIDED TREES OR THOSE WITH THIN OR OPEN CROWNS SHALL NOT BE ACCEPTED.
9. ALL EVERGREEN TREES SHALL BE HEAVILY BRANCHED AND FULL TO THE GROUND, SYMMETRICAL IN SHAPE AND NOT SHEARED FOR THE LAST FIVE GROWING SEASONS.
10. ALL TREES TO HAVE CLAY OR CLAY LOAM BALLS, TREES WITH SAND BALLS WILL BE REJECTED.
11. NO MACHINERY IS TO BE USED WITHIN THE DRIP LINE OF EXISTING TREES; HAND GRADE ALL LAWN AREAS WITHIN THE DRIP LINE OF EXISTING TREES.
12. ALL TREE LOCATIONS SHALL BE STAKED BY LANDSCAPE CONTRACTOR AND ARE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION OF THE PLANT MATERIAL.
13. IT IS MANDATORY THAT POSITIVE DRAINAGE IS PROVIDED AWAY FROM ALL BUILDINGS.
14. ALL PLANTING BEDS SHALL RECEIVE 3" SHREDDED HARDWOOD BARK MULCH WITH PRE EMERGENT, SEE SPECIFICATIONS. SHREDDED PALETTE AND DYED MULCH WILL NOT BE ACCEPTED.
15. ALL LANDSCAPED AREAS SHALL RECEIVE 3" COMPACTED TOPSOIL.
16. SEE SPECIFICATIONS FOR ADDITIONAL COMMENTS, REQUIREMENTS, PLANTING PROCEDURES AND WARRANTY STANDARDS.
17. FOR NON-LAWN SEED MIX AREAS, AS NOTED ON PLAN, BRUSH MOW ONCE SEASONALLY FOR INVASIVE SPECIES CONTROL.

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX-TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-BASE-15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-TBLK-15XXX.DWG

No.	BY	CHK	DESCRIPTION	DATE
			REVISIONS	

STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
NO. 1302
REGISTERED LANDSCAPE ARCHITECT

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801 W. BIG BEAVER ROAD
TROY, MICHIGAN 48084

HYATT PLACE
LANDSCAPE DETAILS
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E.,
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	DN.	JJE	SUR.	GC	P.M.	BK

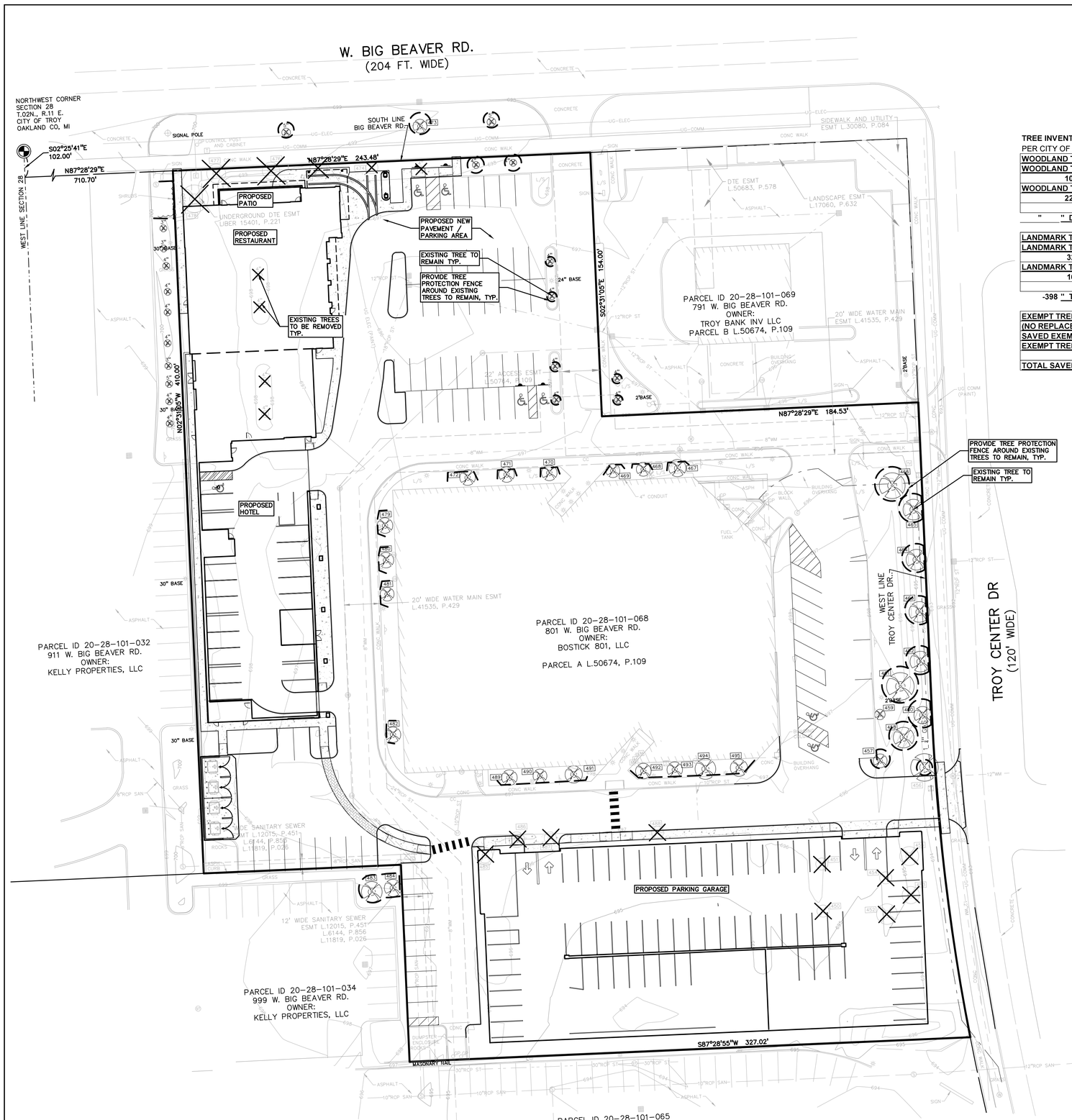
S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD - DWG\DWG\LANDSCAPE\SITE PLAN\(L-1.1) LANDSCAPE DETAILS.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

SCALE: SEE DWG

DRAWING NUMBER:
L-1.1



GRAPHIC SCALE

−30 0 15 30 60 120

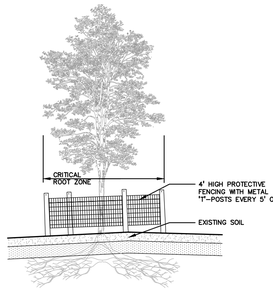
(IN FEET)
1 inch = 30 ft.

TREE INVENTORY/PRESERVATION CALCULATIONS

PER CITY OF TROY ZONING ORDINANCE, BIG BEAVER DISTRICT SITE TYPE BB

WOODLAND TREES			
WOODLAND TREES REMOVED:	**12**	(REPLACE AT 50% OF REMOVED DBH)	
108" DBH x 0.5 =		**54"** REPLACEMENT	
WOODLAND TREES SAVED:	23	(CREDIT OF 2X DBH)	
226" DBH x 2 =		**452"** CREDIT	
54 -	452	=	-398
" " DBH REQUIRED FOR WOODLAND REPLACEMENT			
LANDMARK TREES			
LANDMARK TREES REMOVED:	2	(REPLACE AT 100% OF REMOVED DBH)	
32" DBH x 1 =		**32"** REPLACEMENT	
LANDMARK TREES SAVED:	1	(CREDIT OF 2X DBH)	
16" DBH x 2 =		**32"** CREDIT	
32 -	32	=	0
-398 " TOTAL DBH REQUIRED FOR REPLACEMENT			

EXEMPT TREES		
(NO REPLACEMENT REQUIRED FOR EXEMPT TREES)		
SAVED EXEMPT TREES:	0	**Trees**
EXEMPT TREES ON SITE:	0	**Trees**
TOTAL SAVED TREES 6" AND ABOVE ON SITE:	24	Trees



TREE PROTECTION DETAIL
NOT TO SCALE

TREE PROTECTION WILL BE ERECTED PRIOR TO START OF CONSTRUCTION ACTIVITIES AND SHALL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.

NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE DRIP LINE OF ANY TREE DESIGNATED TO REMAIN INCLUDING, BUT NOT LIMITED TO PLACING SOLVENTS, BUILDING MATERIAL, CONSTRUCTION EQUIPMENT OR SOIL DEPOSITS WITHIN DRIP LINES.

GRADE CHANGES MAY NOT OCCUR WITHIN THE DRIP LINE OF PROTECTED TREES.

DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY DEVICE OR WIRE TO ANY REMAINING TREE.

ALL UTILITY SERVICE REQUESTS MUST INCLUDE NOTIFICATION TO THE INSTALLER THAT PROTECTED TREES MUST BE AVOIDED. ALL TRENCHING SHALL OCCUR OUTSIDE OF THE PROTECTIVE FENCING.

TREES LOCATED ON ADJACENT PROPERTY THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITIES MUST BE PROTECTED.

TREES TO BE PRESERVED SHALL BE IDENTIFIED WITH FLAGGING PRIOR TO THE TREE CLEARING OPERATIONS.

PROVIDE FENCE AROUND CRITICAL ROOT ZONE OF TREE.

FENCE SHALL BE PLACED IN A CIRCLE WITH A RADIUS OF 1' PER 1" DIAMETER OF THE TREE MEASURED AT 4.5' ABOVE GROUND.

TAG	CODE	DBH	COMMON NAME	LATIN NAME	COND	NOTE	CLASS	SAVE / REMOVE
450	HL	7	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	R
451	HL	7	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
452	HL	12	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
453	HL	10	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
454	HL	7	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
455	HL	11	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
456	HL	16	Honeylocust	Gleditsia triacanthos	Good		LANDMARK	R
457	HL	8	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	S
458	HL	12	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	S
459	HL	6	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
460	HL	10	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	S
461	HL	16	Honeylocust	Gleditsia triacanthos	Fair		LANDMARK	S
462	HL	12	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
463	HL	12	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
464	HL	12	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	S
465	HL	12	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	S
466	HL	15	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	S
467	HL	10	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
468	HL	8	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
469	HL	8	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
470	HL	9	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
471	HL	9	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
472	HL	9	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
473	SU	8	Sugar Maple	Acer saccharum	Fair		WOODLAND	S
474	HL	7	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
475	HL	10	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
476	HL	10	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
477	HL	11	Honeylocust	Gleditsia triacanthos	Good		WOODLAND	R
478	HL	16	Honeylocust	Gleditsia triacanthos	Good		LANDMARK	R
479	HL	9	Honeylocust	Gleditsia triacanthos	Poor		WOODLAND	S
480	HL	9	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
481	HL	8	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
482	HL	9	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
483	LL	12	Littleleaf Linden	Tilia Cordata	Good		WOODLAND	S
484	SU	10	Sugar Maple	Acer saccharum	Good		WOODLAND	S
485	HL	9	Honeylocust	Gleditsia triacanthos	Poor		WOODLAND	R
486	HL	9	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	R
487	HL	7	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	R
488	HL	7	Honeylocust	Gleditsia triacanthos	Poor		WOODLAND	R
489	HL	9	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
490	HL	8	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
491	HL	10	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
492	HL	9	Honeylocust	Gleditsia triacanthos	Poor		WOODLAND	S
493	HL	9	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
494	HL	12	Honeylocust	Gleditsia triacanthos	Fair		WOODLAND	S
495	HL	10	Honeylocust	Gleditsia triacanthos	Poor		WOODLAND	S

NOT FOR CONSTRUCTION

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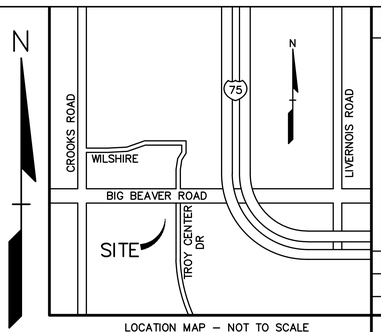

LOCATION MAP – NOT TO SCALE

KEY:

= EXISTING TREE TO REMAIN

= TREE PROTECTION FENCE

= EXISTING TREE TO BE REMOVED

#100 = EXISTING TREE IDENTIFICATION PLAN NUMBER

No.	BY	CHK	DESCRIPTION	DATE
			REVISIONS	

STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
No. 1302
REGISTERED

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TROY, MICHIGAN 48084

HYATT PLACE
TREE PRESERVATIONS AND INVENTORY
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E., CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES. JJ | DN. BA | SUR. GC | P.M. BK

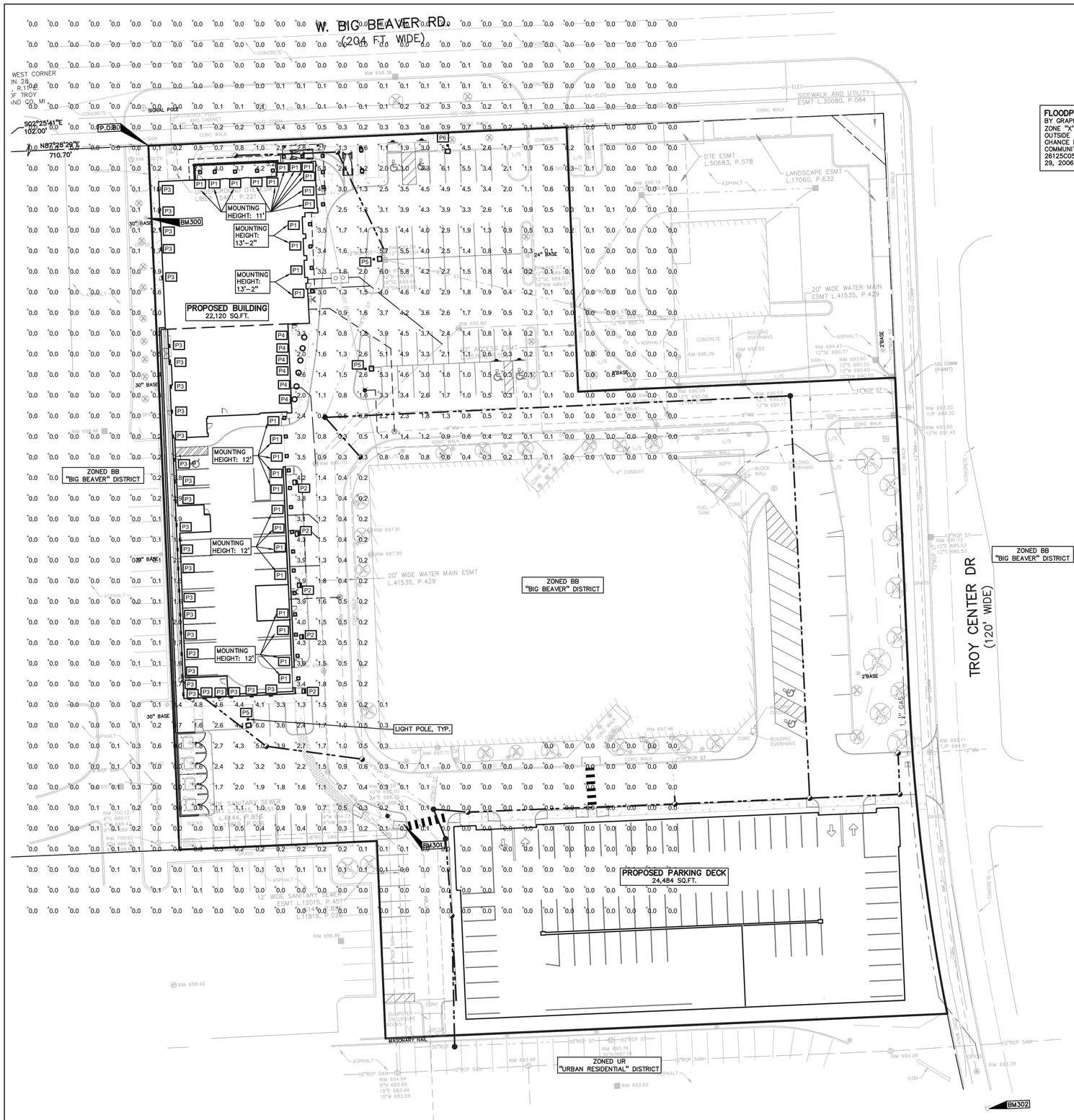
S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD — DWG\DWG\LANDSCAPE\SITE PLANS\T-1.0 TREE PRESERVATION AND INVENTORY.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

SCALE: 1" = 30'

DRAWING NUMBER:
T-1.0



GRAPHIC SCALE

−30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

FLOODPLAIN NOTE:
BY GRAPHICAL PLOTTING, SITE IS IN ZONE "X", AREA DETERMINED TO BE OUTSIDE AREA OF 0.2% ANNUAL CHANCE FLOODPLAIN, COMMUNITY–PANEL NUMBER 26125C0541F, DATED SEPTEMBER 29, 2006.

BENCHMARKS
(GPS DERIVED – NAVD88)

BM #300
SET MAG NAIL IN EAST SIDE OF CONCRETE LIGHT POLE BASE. LOCATED ±40' SOUTH AND ±3' WEST OF NORTHWEST PROPERTY CORNER.
ELEV. – 700.47'

BM #301
ARROW ON HYDRANT. LOCATED ±43' SOUTH AND ±11' EAST OF SOUTHWEST BUILDING CORNER #803 W. BIG BEAVER ROAD.
ELEV. – 700.47'

BM #302
ARROW ON HYDRANT. LOCATED ON WEST SIDE OF TROY CENTER DRIVE AND ±50' SOUTH OF SITE.
ELEV. – 696.39

LEGAL DESCRIPTION
(Per ATA National Title Group, LLC, Commitment File No. 63–18617869–SCM, Dated October 10, 2018)

The land referred to in this commitment is described as follows:

City of Troy, County of Oakland, State of Michigan.

Fee Parcel:
A parcel of land being a part of the Northwest 1/4 of Section 28, Town 2 North, Range 11 East, City of Troy, Oakland County, Michigan and being more particularly described as follows: Commencing at the Northwest corner of said Section 28; thence South 02 degrees 25 minutes 41 seconds East 102.00 feet along the Westerly line of said Section 28; thence North 87 degrees 28 minutes 29 seconds East 710.07 feet along the Southerly line of Big Beaver Road, 204 feet wide, said line being parallel to the Northerly line of said Section 28 to the point of beginning of this parcel; thence continuing along the Southerly line of said Big Beaver Road North 87 degrees 28 minutes 29 seconds East 243.48 feet; thence South 02 degrees 31 minutes 05 seconds East 154.00 feet; thence North 87 degrees 28 minutes 29 seconds East 184.53 feet to a point on the Westerly line of Troy Center Drive, 120 feet wide; thence South 02 degrees 31 minutes 05 seconds East 183.64 feet along said Westerly line of Troy Center Drive to a point on a tangent curve to the left; thence along said curve to the left 188.10 feet, said curve having a radius of 1260.00 feet, a central angle of 08 degrees 33 minutes 13 seconds and a chord which bears South 06 degrees 47 minutes 41 seconds East a distance of 187.93 feet to a point on a non–tangent line; thence South 87 degrees 28 minutes 55 seconds West 327.02 feet; thence North 02 degrees 31 minutes 05 seconds West 115.00 feet; thence South 87 degrees 28 minutes 55 seconds West 115.00 feet; thence North 02 degrees 31 minutes 05 seconds West 410.00 feet to the point of beginning of this parcel. The Basis for Bearing for this parcel is the Westerly line of Section 29, Township 2 North, Range 11 East, which bears South 02 degrees 25 minutes 41 seconds East.

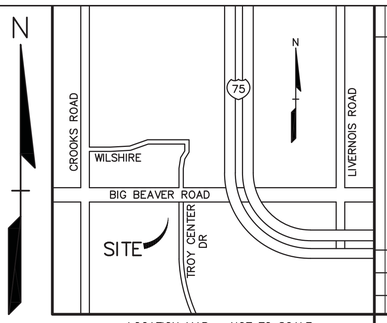
Easement Parcel:
Together with the benefit provided by easement for parking purposes contained within the instrument recorded in Liber 50674, Page 109, Oakland County Records.

GENERAL SITE LIGHTING NOTES:

1. THE LIGHTING PATTERN REPRESENTS ILLUMINATION LEVELS CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRE MAY VARY DUE TO VARIATION IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS, AND OTHER VARIABLE FIELD CONDITIONS.
2. ALL POLES ARE TO BE MOUNTED ON CONCRETE PEDESTALS 2 FEET ABOVE GRADE AS SHOWN IN DETAIL.
3. ALL POLES LOCATED OUTSIDE OF THE PARKING LOT AREA SHALL BE LOCATED 3 FEET FROM BACK OF CURB OR EDGE OF SIDEWALKS AND 5 FEET FROM UNDERGROUND UTILITIES.
4. SHOP DRAWINGS FOR THE ELECTRICAL WIRING OF THE FIXTURES NEED TO BE SUPPLIED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR COORDINATION OF UNDERGROUND CONDUIT AND APPROVAL OF LAYOUT.
5. ALL AREA LIGHT FIXTURES ARE TO BE DIRECTED AWAY FROM NEIGHBORING PROPERTIES AND ROADWAYS.
6. CONTRACTOR SHALL FURNISH, INSTALL AND CONNECT ALL MATERIALS AND EQUIPMENT FOR THIS WORK UNLESS OTHERWISE NOTED.
7. COORDINATE LIGHT FIXTURE PLACEMENT AND INSTALLATION WITH LANDSCAPE.
8. ALL CONDUCTORS SHALL BE IN CONDUIT.
9. REFER TO SHEET SL–1.1 FOR LUMINARIE SCHEDULE AND DETAILS.
10. WAIVER REQUESTED FOR LIGHT TRESPASS ON WEST PROPERTY LINE.

SITE PHOTOMETRIC DATA:

	ALLOWED	PROPOSED
1. MAX FOOT–CANDLE ON SITE:	20 Fc.	6.1 Fc.
2. MAX LIGHT INTENSITY AT BOUNDARY		
2.1. RESIDENTIAL:	0.1 Fc.	N/A
2.2. NON–RESIDENTIAL:	1.0 Fc.	2.1 Fc.
3. MAX FIXTURE HEIGHT		
3.1. POLE MOUNTED:	25 FT.	20 FT
3.2. WALL MOUNTED:	20 FT.	13.17 FT.



LOCATION MAP – NOT TO SCALE

LEGEND

IRON FOUND
IRON SET
NAIL FOUND
NAIL & CAP SET
BRASS PLUG SET
MONUMENT FOUND
MONUMENT SET
SEC. CORNER FOUND
R RECORDED
M MEASURED
C CALCULATED

EXISTING	PROPOSED
ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE	
UNDERGROUND CABLE TV, CATV PEDESTAL	
TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE	
ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE	
GAS MAIN, VALVE & GAS LINE MARKER	
WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE	
SANITARY SEWER, CLEANOUT & MANHOLE	
STORM SEWER, CLEANOUT & MANHOLE	
COMBINED SEWER & MANHOLE	
SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN	
POST INDICATOR VALVE	
WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF	
MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE	
UNIDENTIFIED STRUCTURE	
SPOT ELEVATION	
CONTOUR LINE	
FENCE	
GUARD RAIL	
STREET LIGHT	
SIGN	
CONCRETE	
ASPHALT	
GRAVEL SHOULDER	
WETLAND	

STD DUTY | HEAVY DUTY | R.O.W. ONLY

STD DUTY | HEAVY DUTY | DEEP STRENGTH

REFERENCE DRAWINGS

WATER MAIN	CITY OF TROY GIS MAPPING DATED 7–18–19
SANITARY SEWER	CITY OF TROY GIS MAPPING DATED 7–18–19
STORM SEWER	CITY OF TROY GIS MAPPING DATED 7–18–19
ELECTRIC	DTE MAP #313–388 DATED 8–1–19
TELEPHONE	AT&T SKETCH DATED 7–17–19
GAS	XXXXXXXXXXX
PETROLEUM	XXXXXXXXXX
CATV	XXXXXXXXXX

•HAVE NOT RECEIVED FRANCHISE UTILITY MAPS AS OF JULY 24, 2019

No.	BY	CHK	DESCRIPTION	DATE
			REVISIONS	

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HYATT PLACE
PRELIMINARY PHOTOMETRIC PLAN
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E.,
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	DN.	BA	SUR.	GC	P.M.	BK

S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD – DNH\DWG\SITE PLANS\SL-1.0\PHOTO-19282.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

SCALE: 1" = 30'

DRAWING NUMBER:
SL-1.0

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX–TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X–BASE–15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X–TBLK–15XXX.DWG

LUMEN P1

G1.8.55

JUNO SLIMFORM™ LED SURFACE MOUNT DOWNLIGHTS

FOR J-BOX INSTALLATION
5", 7", 12", 14" SQUARE
JSFSQ SERIES

PERFORMANCE DATA

	JSFSQ 5IN		JSFSQ 7IN		JSFSQ 12IN		JSFSQ 14IN	
	120V	MVOLT	120V	MVOLT	120V	MVOLT	120V	MVOLT
Lumens	700	700	1000	1000	1300	1300	1800	1800
CRI	90CRI		90CRI		90CRI		90CRI	
CCT	27K, 30K, 35K, 40K		27K, 30K, 35K, 40K		27K, 30K, 35K, 40K		27K, 30K, 35K, 40K	
Voltage	120V	120V-277V	120V	120V-277V	120V	120V-277V	120V	120V-277V
Input Power	10W	10W	13W	13W	15W	15W	20W	20W
Input Current	110MA	50MA	150MA	60MA	180MA	80MA	240MA	110MA
Frequency	50/60Hz		50/60Hz		50/60Hz		50/60Hz	
Power Factor	>0.9		>0.9		>0.9		>0.9	

ORDERING INFORMATION

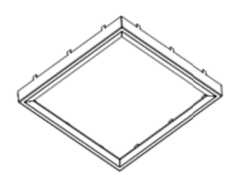
Example: JSFSQ 5IN 07LM 27K 90CRI 120 FRPC WH

Series	Size/Lumens	Color Temperature	CRI	Voltage/Driver	Finish	Emergency Battery[1,2,3]
JSFSQ SlimForm Surface Mount Downlight - Square	5IN 07LM 5", 700 Lumens 7IN 10LM 7", 1000 Lumens 12IN 13LM 12", 1300 Lumens 14IN 18LM 14", 1800 Lumens	27K 2700K 30K 3000K 35K 3500K 40K 4000K	90CRI 90+ CRI	120 FRPC Dedicated 120V, Forward Reverse Phase Dimmnig MVOLT ZT Universal Voltage 120V-277V, 0-10V Dimming	WH White	EL[3] Battery Back-up Option EBX Empty Back Box for Aesthetics

ACCESSORIES

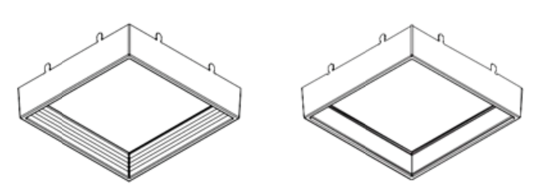
TRIM – Optional, field installable finish trim rings available to change the exterior finish of fixture.
Example: JSFSQTRIM 5IN BL

Series	Size	Finish
JSFSQTRIM SlimForm Accessory Trim - Square	5IN 5 inches 7IN 7 inches	BL Black BZ Bronze SN Satin Nickel


TRIM

SHROUD – Optional, field installable decorative baffle and cone shrouds provides the aesthetic and source shielding similar to the experience of a fully recessed downlight.
Example: JSFSQSHROUD 5IN DB WWH

Series	Size	Shroud Style	Finish
JSFSQSHROUD SlimForm Accessory Shroud - Square	5IN 5 inches 7IN 7 inches	DB Downlight Baffle DC Downlight Cone	WWH White trim, white shroud BWH[4] Black trim, white shroud HZWH Haze trim, white shroud WHZWH Wheat Haze trim, white shroud


BAFFLE SHROUD   CONE SHROUD

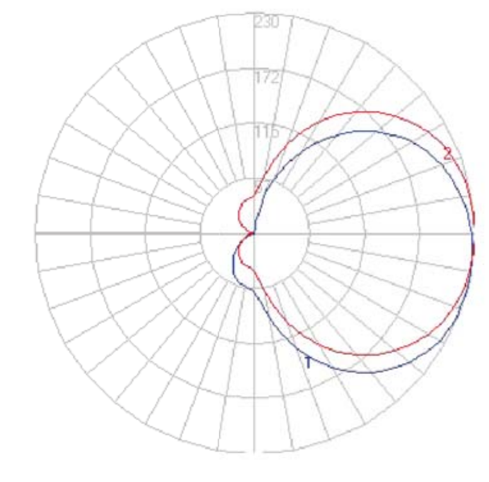
Note:
1 Emergency battery available with 12IN and 14IN only.
2 Emergency battery is only available with MVOLT ZT.
3 Emergency battery option not available in California due to Title 20 restrictions.
4 BWH only available with downlight baffle.

LUMEN P2

BEGA

Photometric Filename: 33509.IES

TEST:	BE_33509
TEST LAB:	BEGA
DATE:	6/2/2017
LUMINAIRE:	33 509
LAMP:	10.5W LED

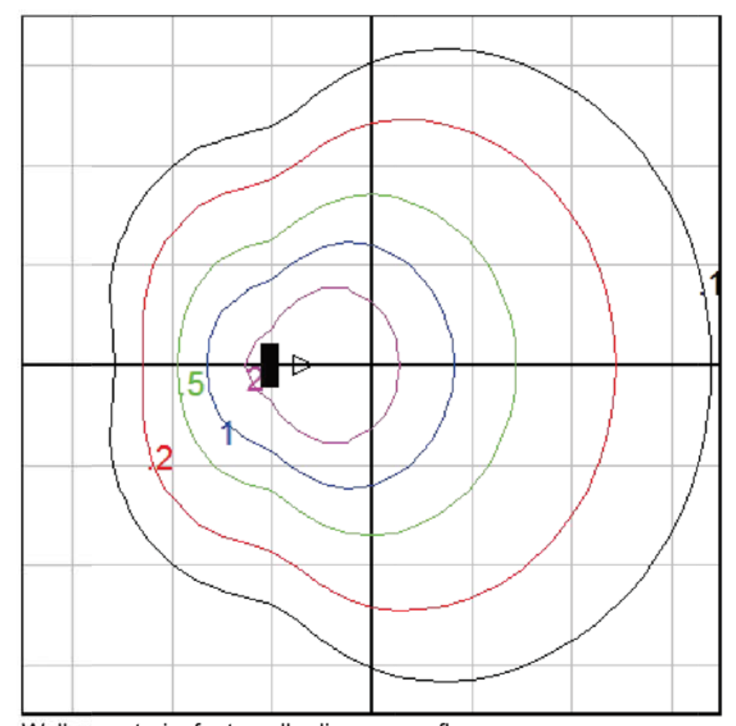


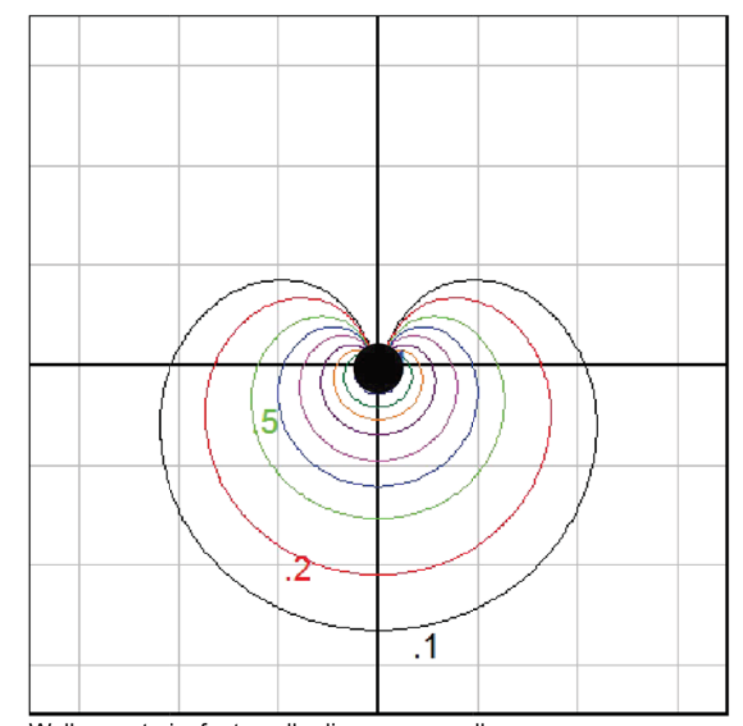
Characteristics

Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	923
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	71
Total Luminaire Watts	13
Ballast Factor	1.00
CIE Type	Semi-Direct
Spacing Criterion (0-180)	3.30
Spacing Criterion (90-270)	1.44
Spacing Criterion (Diagonal)	2.24
Basic Luminous Shape	Rectangular w/Sides
Luminous Length (0-180)	0.21 ft
Luminous Width (90-270)	0.79 ft
Luminous Height	0.78 ft

Zonal Lumen Summary

Zone	Lumens
0-10	6.23
10-20	20.74
20-30	37.91
30-40	55.61
40-50	71.74
50-60	84.58
60-70	92.88
70-80	96.34
80-90	95.38
90-100	89.83
100-110	80.15
110-120	67.16
120-130	52.01
130-140	36.36
140-150	21.97
150-160	10.50
160-170	3.15
170-180	0.25


Wall mount - isofootcandle diagram on floor
Mounting Height = 5 ft. Grid Spacing = 5 ft.

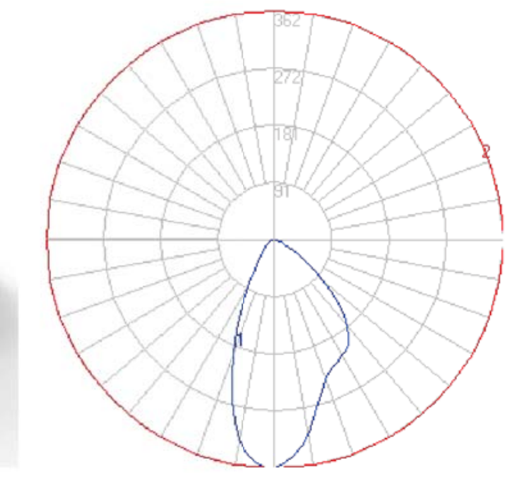

Wall mount - isofootcandle diagram on wall
Grid Spacing = 2 ft.

LUMEN P3

BEGA

Photometric Filename: 22359.IES

TEST:	BE_22359
TEST LAB:	BEGA
DATE:	2/27/2017
LUMINAIRE:	22 359
LAMP:	7.7W LED



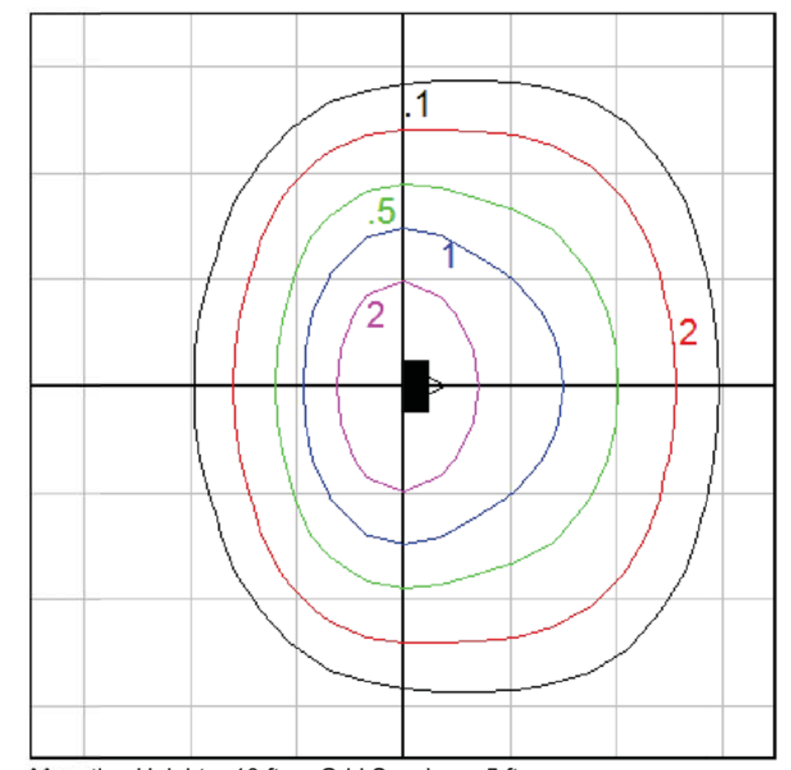
Characteristics

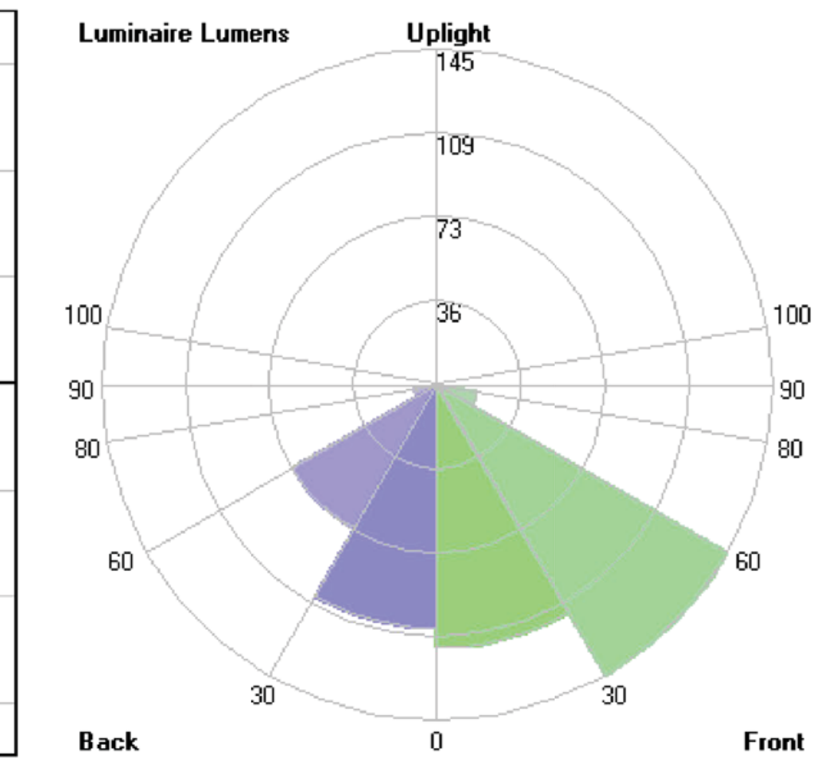
IES Classification	Type I
Longitudinal Classification	Very Short
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	464
Downward Total Efficiency	N.A.
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	46
Total Luminaire Watts	10
Ballast Factor	1.00
Upward Waste Light Ratio	0.00
Max. Cd.	362.3 (180H, 0V)
Max. Cd. (<90 Vert.)	362.3 (180H, 0V)
Max. Cd. (At 90 Deg. Vert.)	0 (0.0%Lum)
Max. Cd. (80 to <90 Deg. Vert.)	2.9 (0.6%Lum)
Cutoff Classification (deprecated)	N.A. (absolute)

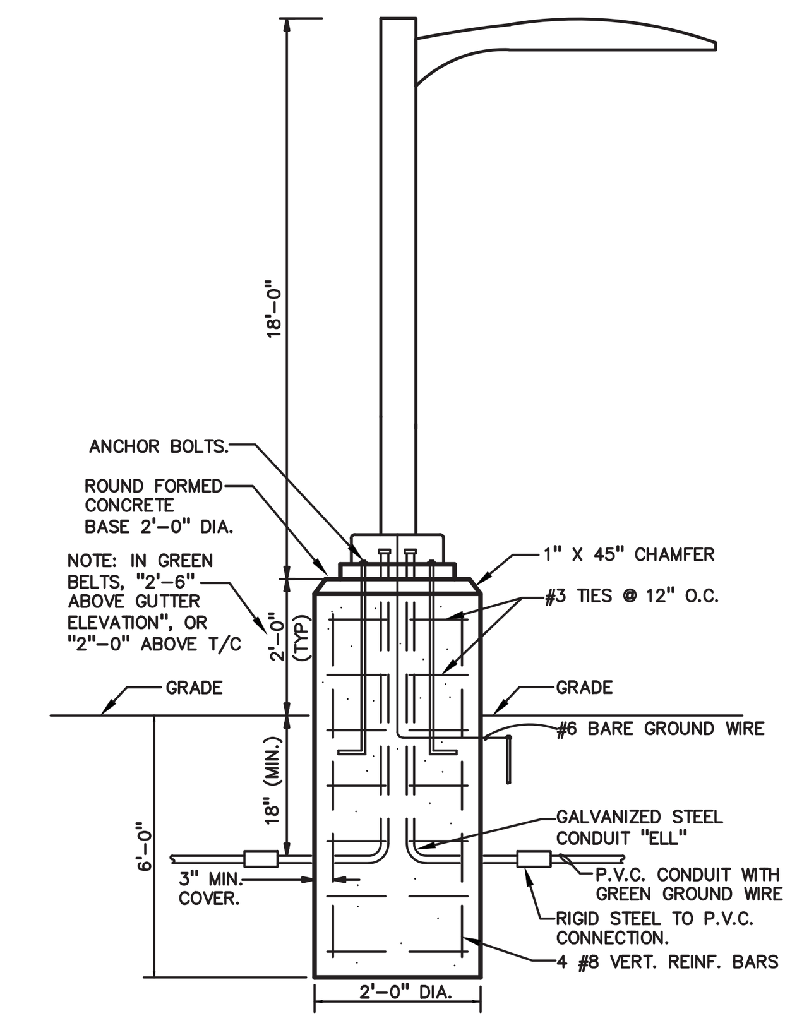
Lum. Classification System (LCS)

LCS Zone	Lumens	%Lamp	%Lum
FL (0-30)	113.7	N.A.	24.5
FM (30-60)	145.0	N.A.	31.3
FH (60-80)	17.5	N.A.	3.8
FVH (80-90)	0.2	N.A.	0.0
BL (0-30)	105.4	N.A.	22.7
BM (30-60)	71.9	N.A.	15.5
BH (60-80)	9.5	N.A.	2.1
BVH (80-90)	0.3	N.A.	0.1
UL (90-100)	0.0	N.A.	0.0
UH (100-180)	0.0	N.A.	0.0
Total	463.5	N.A.	100.0

BUG Rating **B0-U0-G0**


Mounting Height = 10 ft. Grid Spacing = 5 ft.





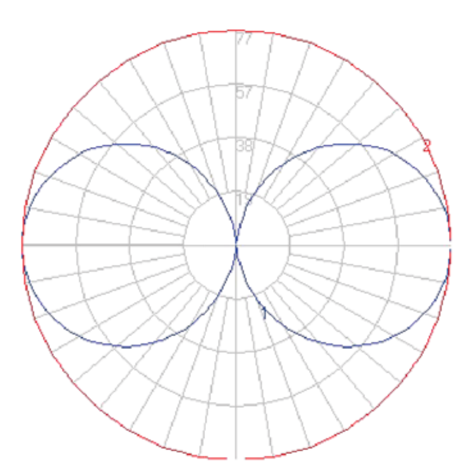
CONCRETE BASE DETAIL
NOT TO SCALE

LUMEN P4

BEGA

Photometric Filename: 77743.IES

TEST:	BE_77743
TEST LAB:	BEGA
DATE:	6/20/2017
LUMINAIRE:	77 743
LAMP:	8.2W LED



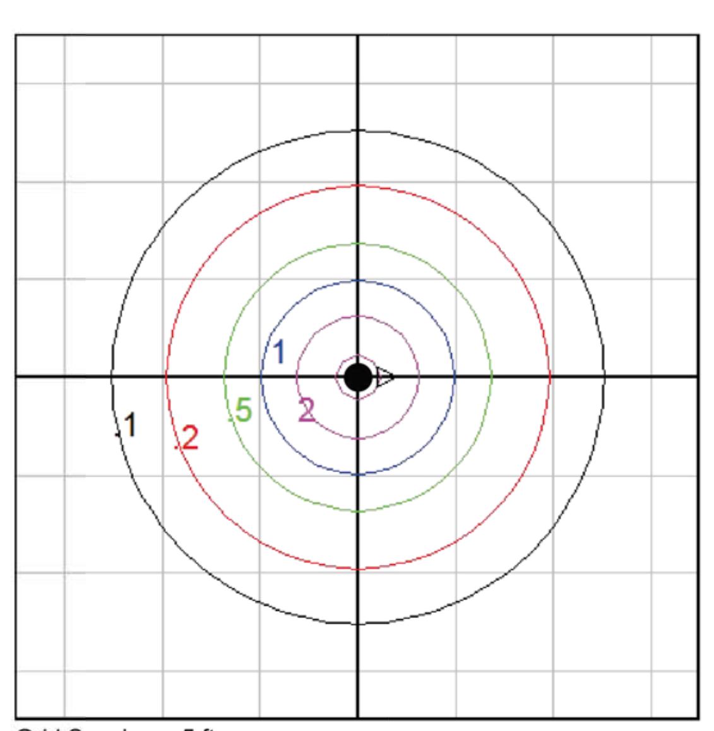
Characteristics

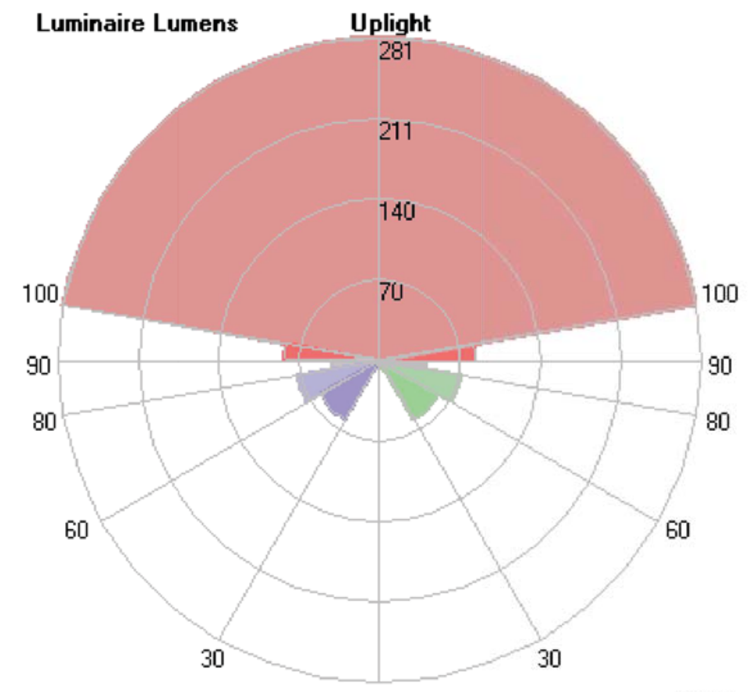
IES Classification	N.A.
Longitudinal Classification	N.A.
Lumens Per Lamp	N.A. (absolute)
Total Lamp Lumens	N.A. (absolute)
Luminaire Lumens	728
Downward Total Efficiency	N.A.
Total Luminaire Efficiency	N.A.
Luminaire Efficacy Rating (LER)	73
Total Luminaire Watts	10
Ballast Factor	1.00
Upward Waste Light Ratio	0.50
Max. Cd.	76.5 (0H, 90V)
Max. Cd. (<90 Vert.)	76.4 (0H, 87.5V)
Max. Cd. (At 90 Deg. Vert.)	76.5 (10.5%Lum)
Max. Cd. (80 to <90 Deg. Vert.)	76.4 (10.5%Lum)
Cutoff Classification (deprecated)	N.A. (absolute)

Lum. Classification System (LCS)

LCS Zone	Lumens	%Lamp	%Lum
FL (0-30)	8.3	N.A.	1.1
FM (30-60)	59.4	N.A.	8.2
FH (60-80)	72.8	N.A.	10.0
FVH (80-90)	41.5	N.A.	5.7
BL (0-30)	8.3	N.A.	1.1
BM (30-60)	59.4	N.A.	8.2
BH (60-80)	72.8	N.A.	10.0
BVH (80-90)	41.5	N.A.	5.7
UL (90-100)	83.0	N.A.	11.4
UH (100-180)	280.8	N.A.	38.6
Total	727.8	N.A.	100.0

BUG Rating B0-U3-G1


Grid Spacing = 5 ft.



LUMEN P5 & P6

D-Series Size 1

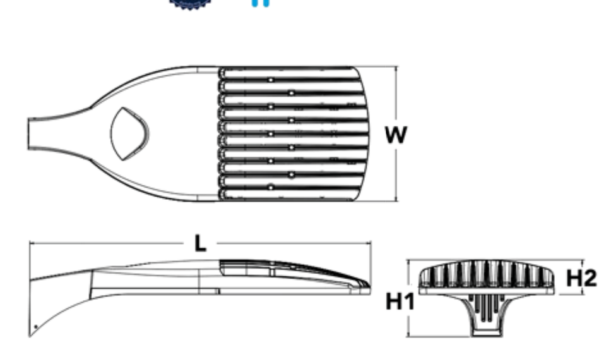
LED Area Luminaire

Catalog Number	
Notes	
Type	

Hit the Tab key or mouse over the page to see all interactive elements.

Specifications

EPA:	1.01 ft² (0.09 m²)
Length:	33" (83.8 cm)
Width:	13" (33.0 cm)
Height H1:	7-1/2" (19.0 cm)
Height H2:	3-1/2"
Weight (max):	27 lbs (12.2 kg)



Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 750W metal halide in pedestrian and area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

A+ Capable options indicated by this color background.

Ordering Information EXAMPLE: DSX1 LED P7 40K T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX1 LED

Series	LEDs	Color temperature	Distribution	Voltage	Mounting
DSX1 LED	Forward optics P1 P4 P7 P2 P5 P8 P3 P6 P9; Rotated optics P10 P12 P11 P13	30K 3000 K 40K 4000 K 50K 5000 K	T1S Type I short; T2S Type II short; T2M Type II medium; T3S Type III short; T3M Type III medium; T4M Type IV medium; TFTM Forward throw medium; T5VS Type V very short; T5S Type V short; T5M Type V medium; T5W Type V wide; BLC Backlight control; LCCO Left corner cutoff; RCCO Right corner cutoff	MVOLT; 120; 208; 240; 277; 347; 480	Shipped included: SPA Square pole mounting; RPA Round pole mounting; WBA Wall bracket; SPUMBA Square pole universal mounting adaptor; RPUMBA Round pole universal mounting adaptor. Shipped separately: KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)

Control options		Other options	Finish (required)
Shipped installed: NLTAIR2 nLight AIR generation 2 enabled; PIRHN Network, high/low motion/ambient sensor; PER NEMA twist-lock receptacle only (controls ordered separate); PER5 Five-pin receptacle only (controls ordered separate); PER7 Seven-pin receptacle only (controls ordered separate); DMG 0-10v dimming wires pulled outside fixture (for use with an external control, ordered separately); DS Dual switching	PIR, PIRH, PIR1FC3V, PIRH1FC3V, FAO [illegible]	Shipped installed: HS House-side shield; SF Single fuse (120, 277, 347V); DF Double fuse (208, 240, 480V); L90 Left rotated optics; R90 Right rotated optics. Shipped separately: BS Bird spikes; EGS External glare shield	DDBXD Dark bronze; DBLXD Black; DNAXD Natural aluminum; DWHXD White; DDBTXD Textured dark bronze; DBLBXD Textured black; DNATXD Textured natural aluminum; DWHGXD Textured white

Schedule

Symbol	Label	QTY	Mounting Height (ft)	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens per Lamp	LLF	Wattage
☐	P1	29	Varies (See sheet SL-1.0 for different mounting heights)	Juno Lighting	JSFSQ 7IN 10LM 30K 90CRI MVOLT ZT WH	7" Square Edgelit (Slimform) Surface Mount, 3000K, 90CRI, MV	N/A	1	JSFSQ_7IN_10LM_30K_90CRI_MVOLT_ZT_WH.ies	1097	0.95	12.9
▭	P2	5	7.33	BEGA Converted by LUMCat V 06.02.2017 / H.R.		33 509 K3	LED 10,5W	1	33509.IES	923	0.95	13
▭	P3	29	9	BEGA Converted by LUMCat V 27.02.2017 / H.R.		22 359 K3	LED 7,7W	1	22359.IES	463	0.95	10
○	P4	6	5	BEGA Converted by LUMCat V 20.06.2017 / H.R.		77 743	LED 8,2W	1	77743.ies	728	0.95	10
☐	P5	3	20	Lithonia Lighting	DSX1 LED P6 40K T4M MVOLT	DSX1 LED P6 40K T4M MVOLT	LED	1	DSX1_LED_P6_40K_T4M_MVOLT.ies	18634	0.95	163
☐	P6	1	20	Lithonia Lighting	DSX1 LED P6 40K T4M MVOLT HS	DSX1 LED P6 40K T4M MVOLT with houseside shield	LED	1	DSX1_LED_P6_40K_T4M_MVOLT_HS.ies	14462	0.95	163

NOT FOR CONSTRUCTION

XREF: S:\PROJECTS\2015\2015XXX\DWG\15XXX-TOPOBASE.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-BASE-15XXX.DWG
XREF: S:\PROJECTS\2015\2015XXX\DWG\CONSTRUCTION\X-TBLK-15XXX.DWG

No.	BY	CHK	DESCRIPTION	DATE

REVISIONS

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PROFESSIONAL.

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BOSTICK 801, LLC
801 W. BIG BEAVER ROAD
TROY, MICHIGAN 48084

HYATT PLACE
PRELIMINARY PHOTOMETRIC DETAILS
PART OF THE NE 1/4 OF SECTION 28, T. 2N., R. 11E., CITY OF TROY, OAKLAND COUNTY, MICHIGAN

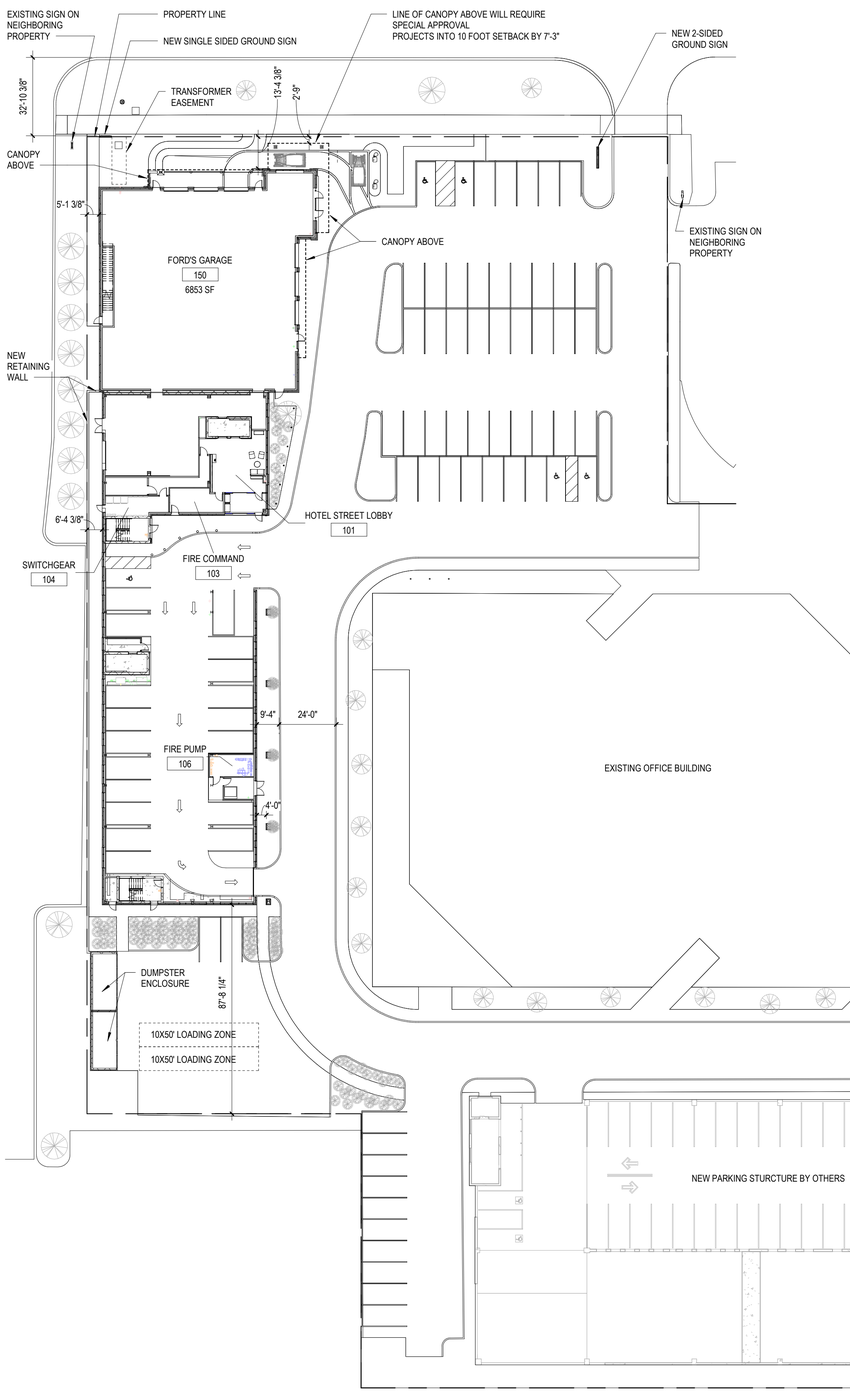
DES.	JJ	DN.	BA	SUR.	GC	P.M.	BK

S:\PROJECTS\2019\2019-282 801 W BIG BEAVER ROAD - DNH\DWG\SITE PLANS\(SL-1.0)PHOTO-19282.dwg

ORIGINAL ISSUE DATE:
OCTOBER 14, 2019

PEA JOB NO. 2019-282

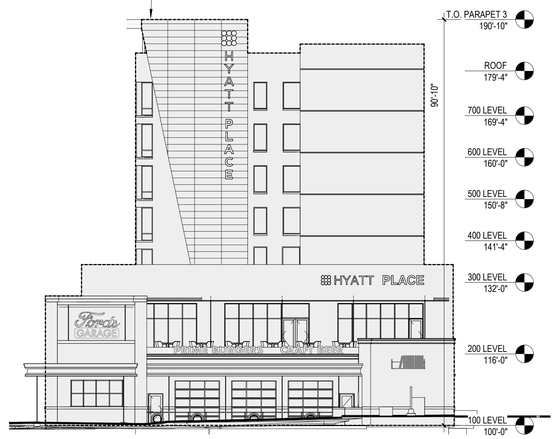
DRAWING NUMBER:
SL-1.1



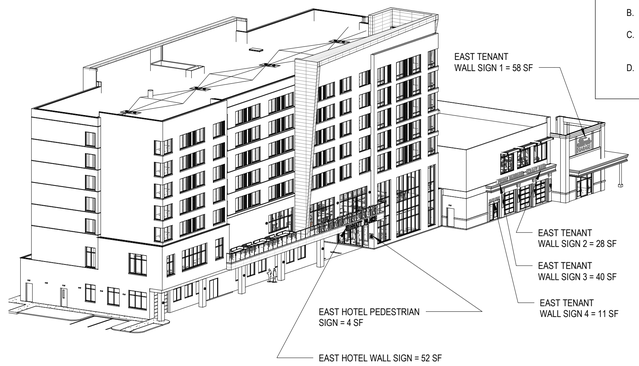
1 SITE PLAN
1" = 30'-0"

FRONT AREA OF THE STRUCTURE = 6,518 SF X 10%
= 651 SQUARE FEET OF ALLOWABLE WALL SIGNS

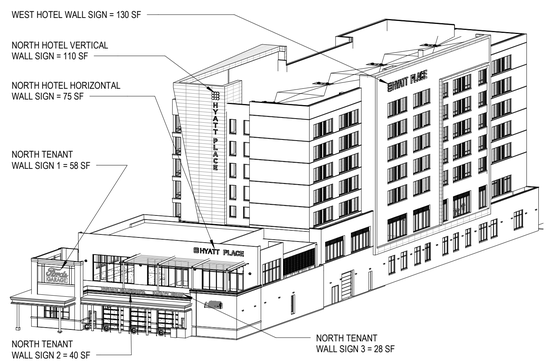
WALL SIGN AREA TOTAL:	
EAST HOTEL SIGN =	52 SF
EAST TENANT SIGN 1 =	58 SF
EAST TENANT SIGN 2 =	28 SF
EAST TENANT SIGN 3 =	40 SF
EAST TENANT SIGN 4 =	11 SF
NORTH HOTEL VERTICAL =	110 SF
NORTH HOTEL HORZ =	75 SF
NORTH TENANT SIGN 1 =	58 SF
NORTH TENANT SIGN 2 =	40 SF
NORTH TENANT SIGN 3 =	28 SF
EAST HOTEL SIGN =	130 SF
TOTAL =	**630 SF**



6 SIGNAGE FRONT STRUCTURE
1/16" = 1'-0"



5 SIGNAGE EXHIBIT SOUTH AND EAST



4 SIGNAGE EXHIBIT NORTH AND WEST

ZONING INFORMATION

DISTRICT REGULATION

1. BB - BIG BEAVER DISTRICT
2. SITE TYPE BB:B, MEDIUM SITE / CLASSIC RETAIL / MIXED USE. ALLOWS HOTEL USE.
   A. TABLE 5.04.C-1 USE GROUPS PERMITTED
      SITE TYPE BB:B / STREET TYPE BB:A: USE GROUP 2 RESIDENTIAL/LODGING = UP PERMITTED IN UPPER STORIES ONLY
      USE GROUP 5 RETAIL/ENTERTAINMENT = P PERMITTED USE GROUP
   B. TABLE 5.04.C-2 BUILDING FORMS PERMITTED
      STIE TYPE BB:B / STREET TYPE BB:A: BUILDING FORM F LARGE FORMAT MIXED USE = P PERMITTED BUILDING FORM
4. FORM BASED F:

A. HEIGHT	REQUIREMENT	ACTUAL/PROPOSED
MINIMUM STORIES =	5 STORIES	7 STORIES
MINIMUM FEET =	55 FEET	90'-10" TO TALLEST PARAPET
MAXIMUM STORIES =	N/A	
MAXIMUM FEET =	N/A	
PLACEMENT FRONT =	10 FEET SETBACK 75% BUILDING REQUIREMENT	13'-4 3/8"
PLACEMENT SIDE =	N/A	5'-1"
PLACEMENT REAR =	40 FEET	87'-8 1/4"
LOT OPEN SPACE =	N/A	
LOT COVERAGE =	30 PERCENT	LOT AREA IS ~ 188,260 SF. EXISTING BUILDING = ~35,111 SF NEW HOTEL/RESTUARANT = 22,120 SF NEW PARKING GARAGE = 28,553 SF TOTAL = 85,784 SF = 45% COVERAGE
LOT ACCESS AND CIRCULATION =	GARAGE ACCESS FROM SIDE YARDS	HOTEL GARAGE ACCESS FROM INTERIOR SITE
LOT PARKING LOCATION =	SURFACE PARKING LOCATED IN REAR YARD OR SIDE YARD	SURFACE PARKING LOCATED IN SIDE AND REAR YARDS

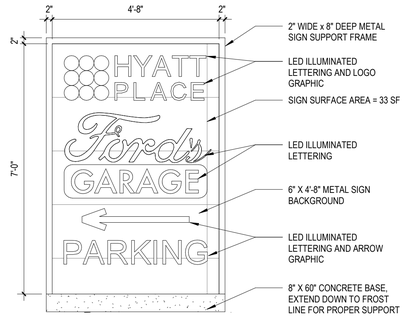
STANDARDS APPLICABLE TO ALL DISTRICTS

1. TABLE 5.03-A-1 USE GROUP CATEGORY PRINCIPAL USE
   USE GROUP 5 RETAIL, ENTERTAINMENT, AND SERVICE USES:
   LODGING USES IN ALL FORM-BASED DISTRICTS ARE PERMITTED SUBJECT TO SPECIAL USE APPROVAL IN COMPLIANCE WITH ARTICLE 9
   RESTAURANTS
   PLACES OF ASSEMBLY
2. BUILDING FORM F IS DESIGNED FOR LARGE-SCALE BUILDINGS OF UNLIMITED HEIGHT WHICH SERVE AS AN ANCHORS WITHIN THE DISTRICT. THEY MAY INCORPORATE A SERIES OF MIXED USES, TYPICALLY ARE SUPPORTED BY LESSER-CLASSIFIED BUILDING FORMS, AND REQUIRE COMPLEX SOLUTIONS FOR PARKING AND ACCESS.

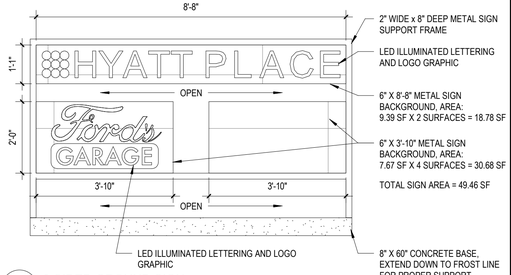
PARKING REQUIREMENTS ARE BEING HANDLED BY THE OWNER, CIVIL ENGINEER, AND PARKING STUDY CONSULTANT. REFER TO THEIR DOCUMENTS FOR RESOLUTION.

SIGNAGE

1. GENERAL BUSINESS SIGNS:
   A. ONE GROUND SIGN FOR EACH BUILDING IS ACCORDANCE WITH TABLE 85.02.06:
      BB ZONING DISTRICT: MINIMUM SETBACK = 0 FEET
      MAXIMUM HEIGHT = 10 FEET
      MAXIMUM AREA = 50 SQUARE FEET
   B. ONE ADDITIONAL GROUND SIGN FOR EACH BUILDING, **NOT TO EXCEED 36 SQUARE FEET IN AREA** IF THE SITE FRONTS ON A MAJOR THOROUGHFARE.
   C. ANY NUMBER OF WALL SIGNS, SUCH THAT THE TOTAL COMBINED AREA OF ALL WALL SIGNS FOR EACH TENANT **SHALL NOT EXCEED 10% OF THE FRONT AREA OF THE STRUCTURE** OR TENANT AREA. WALL SIGNS MUST BE LOCATED ON THE FACE OF THE AREA THAT IS OCCUPIED BY THE TENANT.
   D. ONE PEDESTRIAL-SCALED WALL SIGN OR PROJECTING SIGN PER TENANT, PROVIDED IT **DOES NOT EXCEED 12 SQUARE FEET IN AREA** AND DOES NOT PROJECT MORE THE FORTY EIGHT (48) INCHES FROM THE WALL.



3 SINGLE SIDED GROUND SIGN - "ADDITIONAL GROUND SIGN"
1/2" = 1'-0"



2 2-SIDED GROUND SIGN
1/2" = 1'-0"

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LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

BOSTICK 801 LLC

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STATE OF MICHIGAN
CAIMIR J. FRANKIEWICZ
ARCHITECT
No. 1301052107
LICENSED ARCHITECT

REVISIONS

NO.	DESCRIPTION	DATE

PROJECT NUMBER	219117.00
DATE OF ISSUE	10.09.19
DRAWN BY	ASM
CHECKED BY	ASM

ARCHITECTURAL SITE PLAN

A001
SITE PLAN APPROVAL

1 FIRST FLOOR PLAN
1/8" = 1'-0" A001

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

BOSTICK 801 LLC

HYATT PLACE - TROY

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STATE OF MICHIGAN
CAIMIR J. FRANKIEWICZ
ARCHITECT
No. 1301052107
LICENSED ARCHITECT

REVISIONS

NO.	DESCRIPTION	DATE

PROJECT NUMBER	219117.00
DATE OF ISSUE	10.09.19
DRAWN BY	Author
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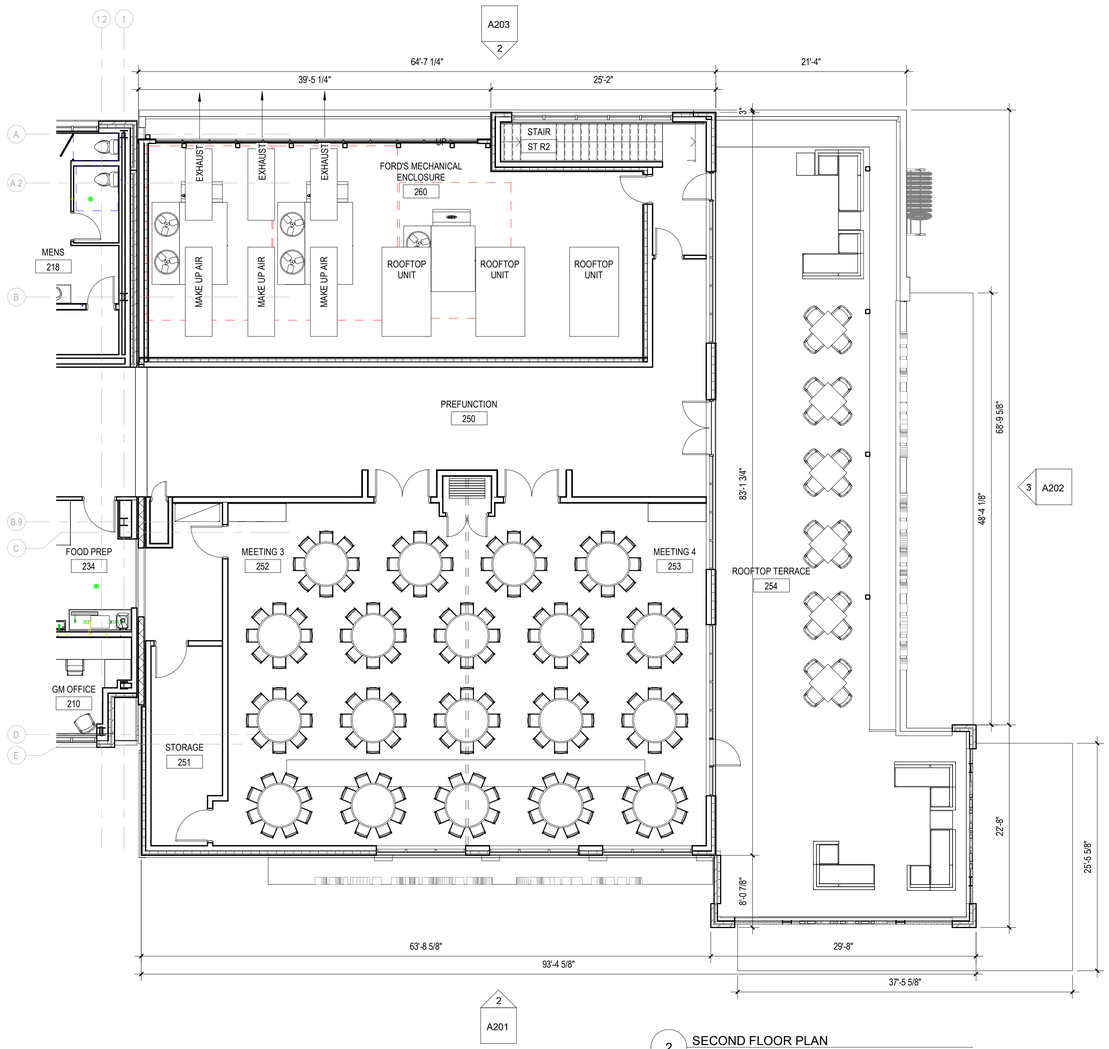
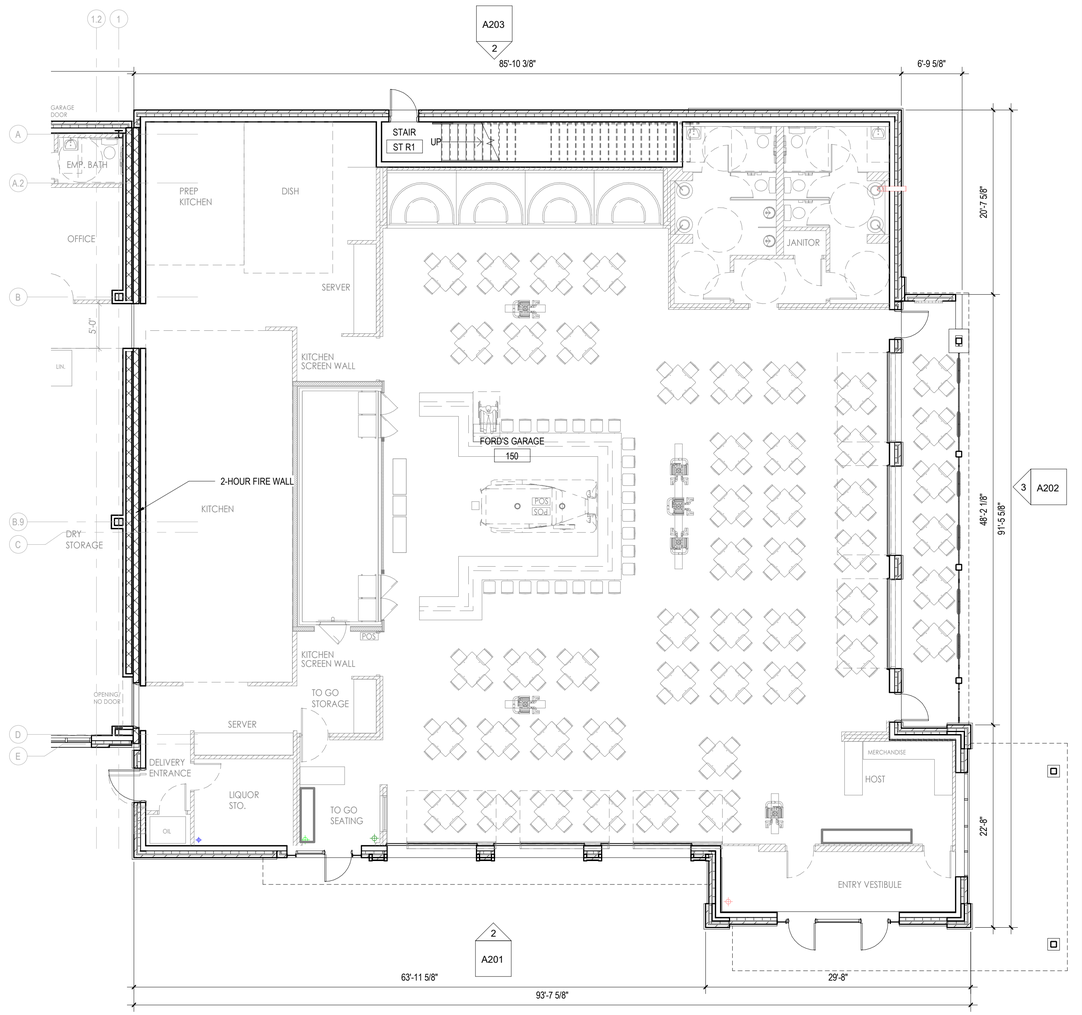
FIRST FLOOR PLAN

A101

SITE PLAN APPROVAL



2 SECOND FLOOR PLAN
1/8" = 1'-0"
A001



1 FIRST FLOOR PLAN
1/8" = 1'-0"
A001

LEGAT ARCHITECTS
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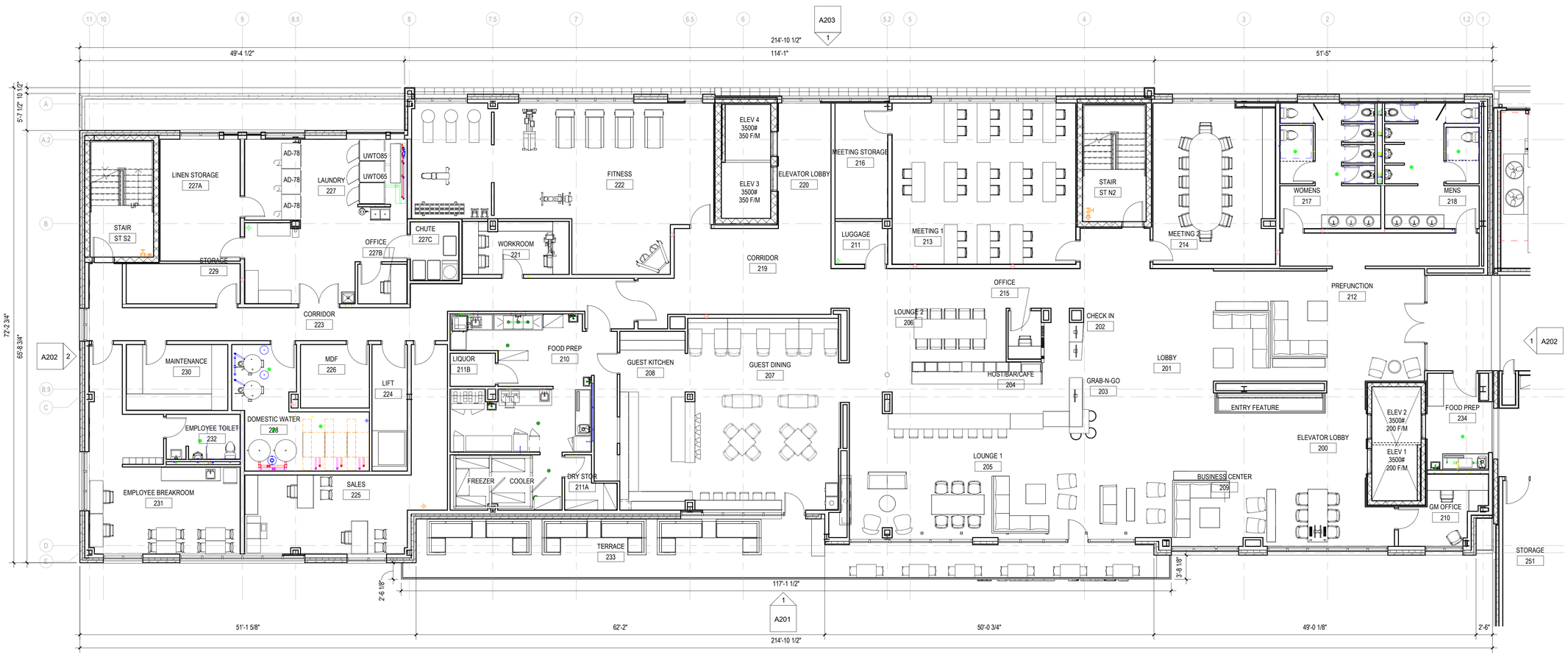
BUILDING 2 FLOOR PLANS

A101B

SITE PLAN APPROVAL



1 SECOND FLOOR PLAN
1/8" = 1'-0"
A001

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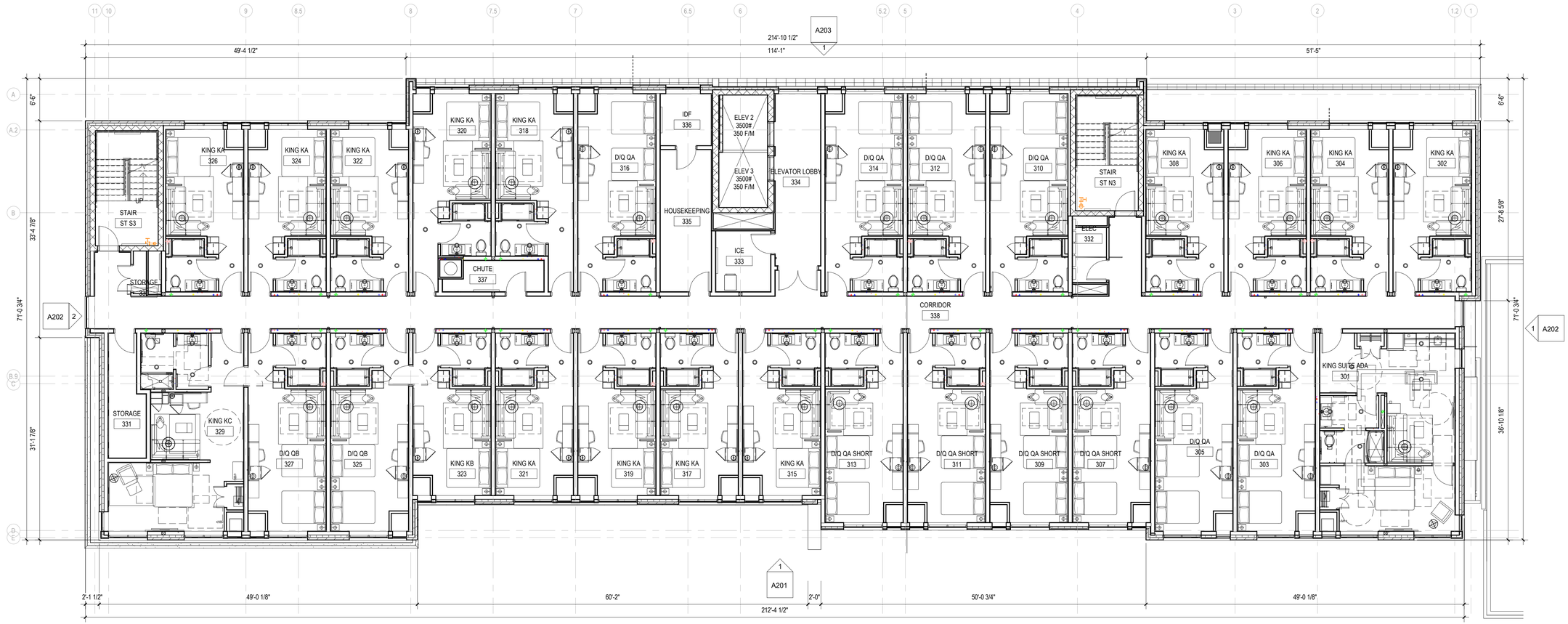
SECOND FLOOR PLAN

A102

SITE PLAN APPROVAL



1 THIRD FLOOR PLAN
1/8" = 1'-0" A001

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

BOSTICK 801 LLC

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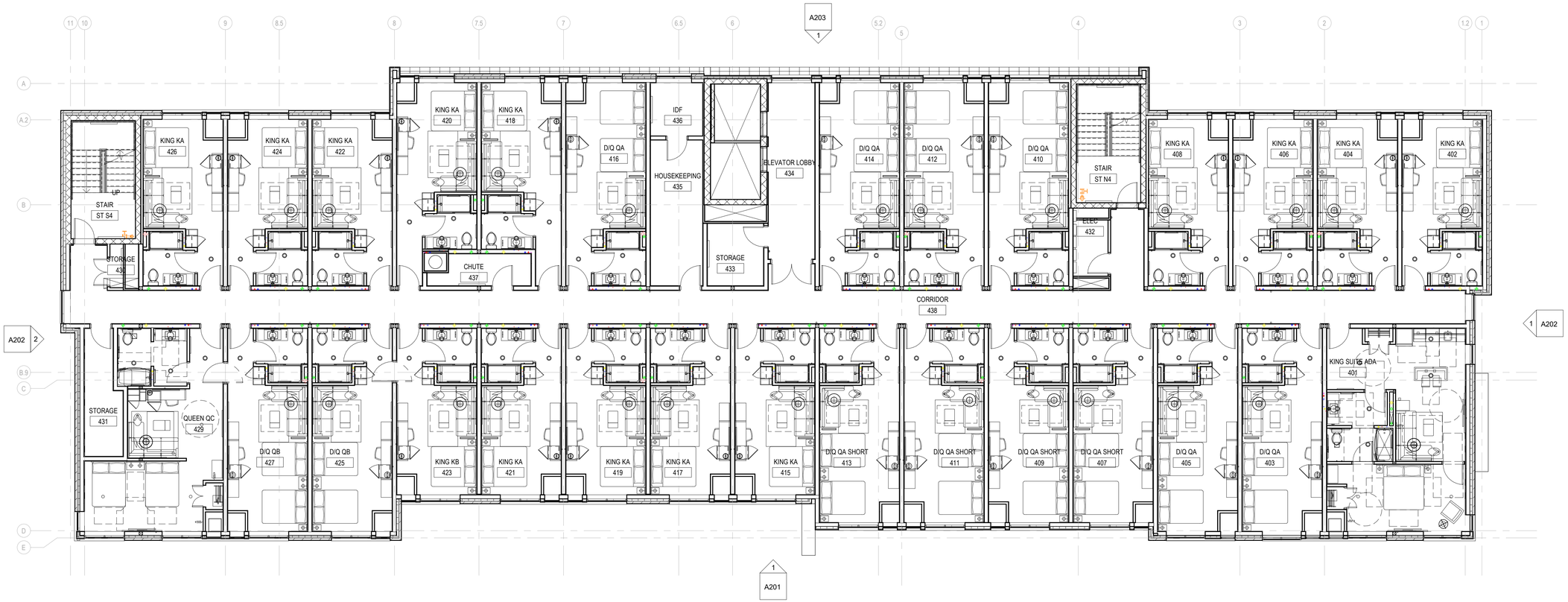
THIRD FLOOR PLAN

A103

SITE PLAN APPROVAL



1 FOURTH FLOOR PLAN
1/8" = 1'-0" A001

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

BOSTICK 801 LLC

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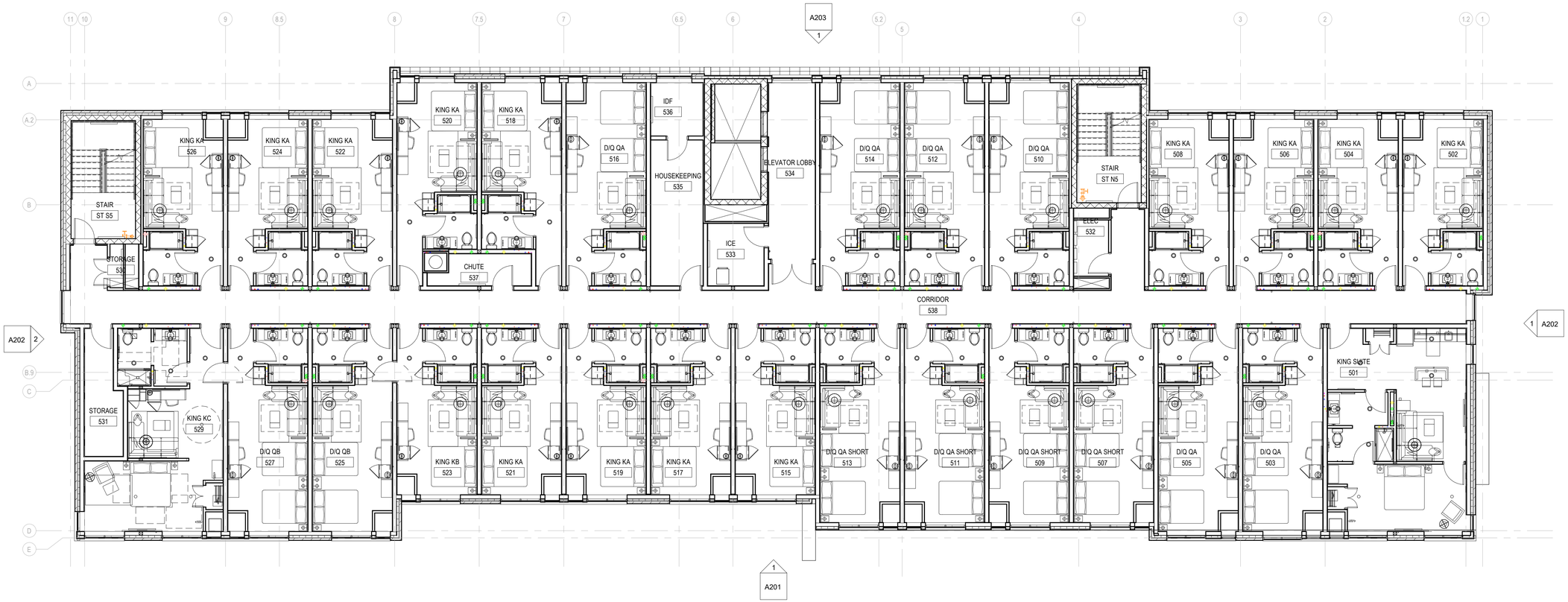
FOURTH FLOOR PLAN

A104

SITE PLAN APPROVAL



1 FIFTH FLOOR PLAN
1/8" = 1'-0" A001

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

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FIFTH FLOOR PLAN

A105

SITE PLAN APPROVAL

1 SIXTH FLOOR PLAN
1/8" = 1'-0" A001

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

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SIXTH FLOOR PLAN

A106

SITE PLAN APPROVAL

1 SEVENTH FLOOR PLAN
1/8" = 1'-0" A001

LEGATARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

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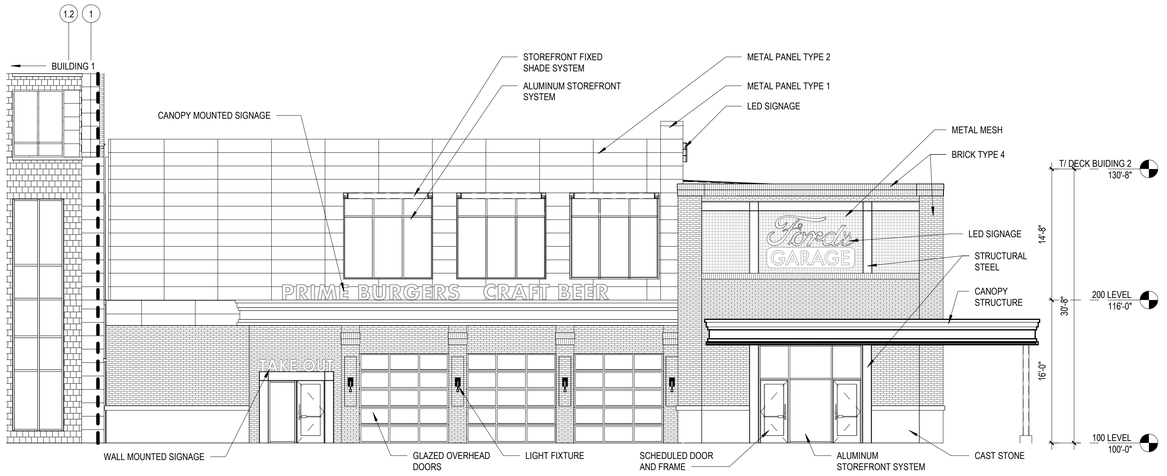
SEVENTH FLOOR PLAN

A107

SITE PLAN APPROVAL



2 BUILDING ELEVATION - BUILDING 2 EAST
1/8" = 1'-0" A101B

1 BUILDING ELEVATION - EAST
1/8" = 1'-0" A101

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

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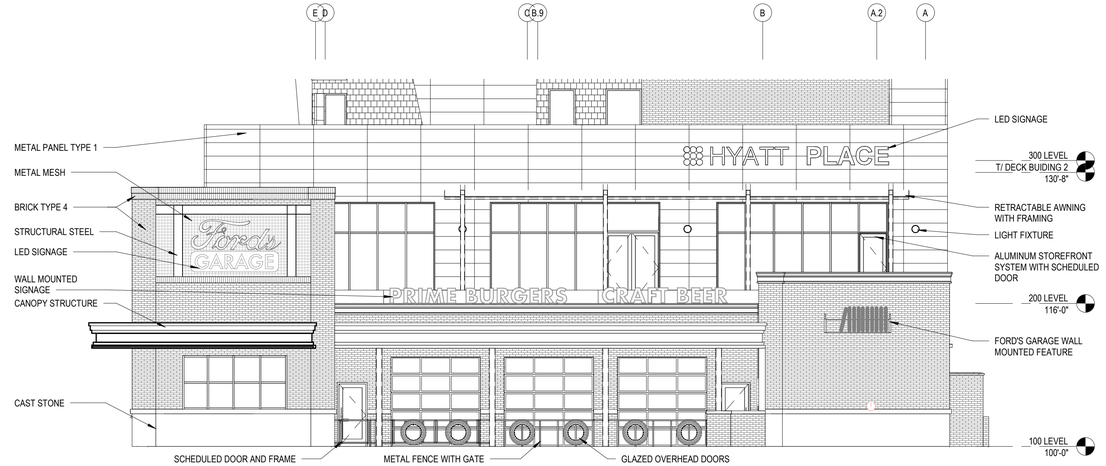
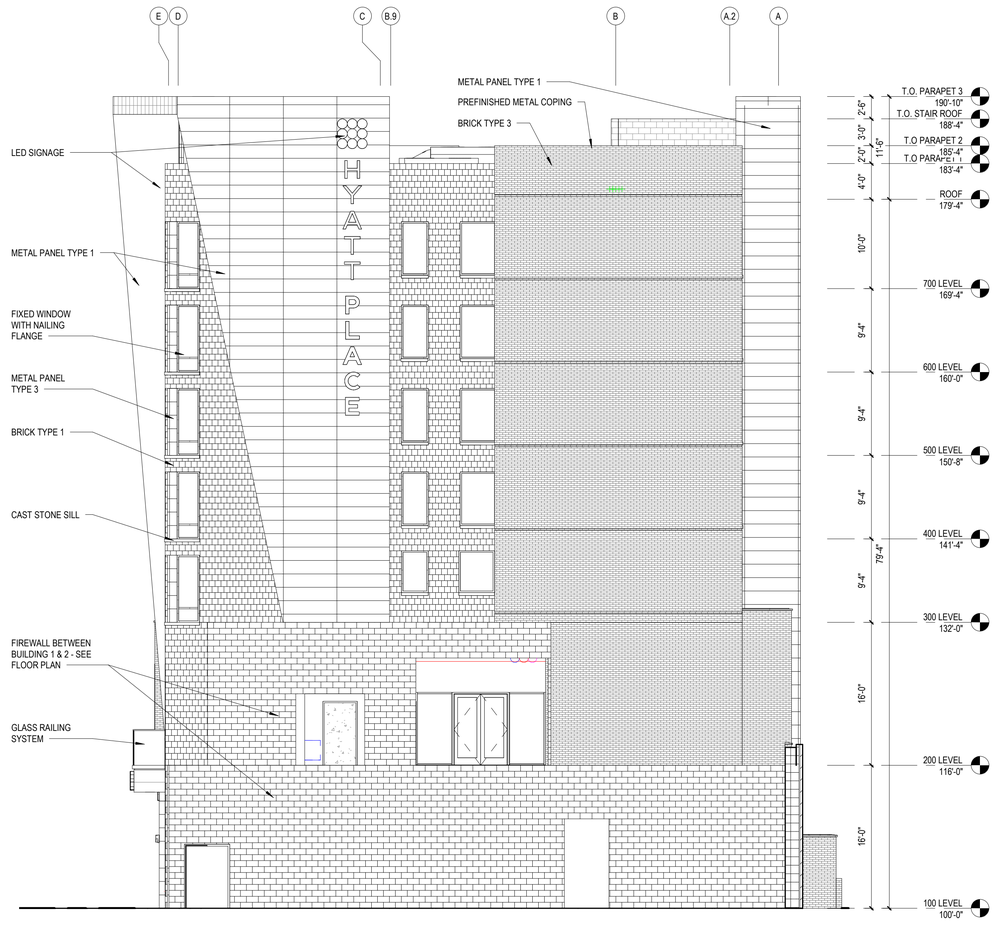
EXTERIOR BUILDING ELEVATIONS

A201
SITE PLAN APPROVAL



3 BUILDING ELEVATION - BUILDING 2 NORTH
1/8" = 1'-0" A101B

2 BUILDING ELEVATION - SOUTH
1/8" = 1'-0" A101



1 BUILDING ELEVATION - NORTH
1/8" = 1'-0" A101

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

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NO.	DESCRIPTION	DATE

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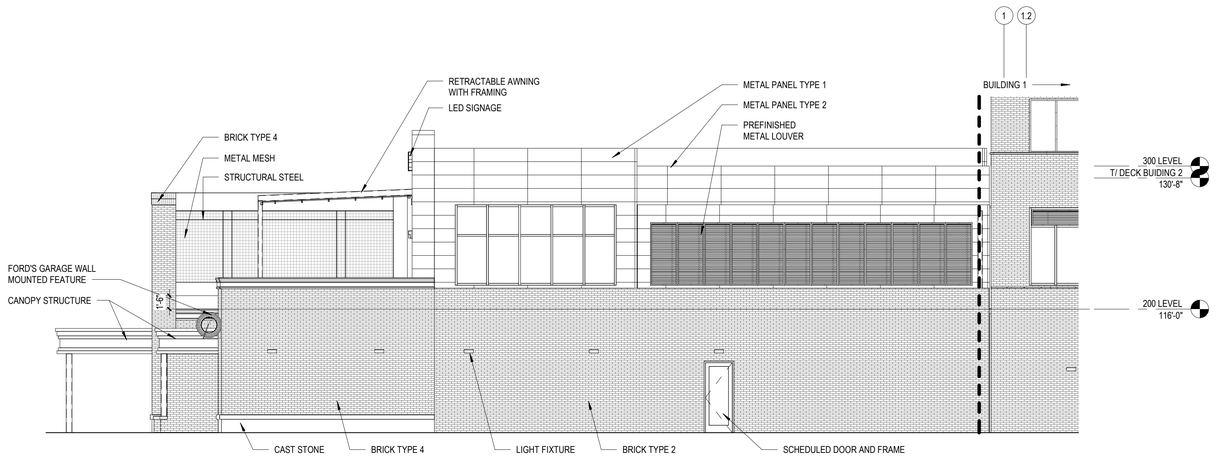
EXTERIOR BUILDING ELEVATIONS

A202

SITE PLAN APPROVAL



2 BUILDING ELEVATION - BUILDING 2 WEST
1/8" = 1'-0" A101B

1 BUILDING ELEVATION - WEST
1/8" = 1'-0" A101

LEGATARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

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EXTERIOR BUILDING ELEVATIONS

A203

SITE PLAN APPROVAL

2 3D VIEW NORTH/EAST

1 3D VIEW NORTH/WEST

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

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PERSPECTIVE VIEWS

A900
SITE PLAN APPROVAL

NORTHEAST CORNER RENDERING

EAST HOTEL ENTRY RENDERING

NORTHWEST CORNER RENDERING

LEGAT ARCHITECTS
DESIGN | PERFORMANCE | SUSTAINABILITY

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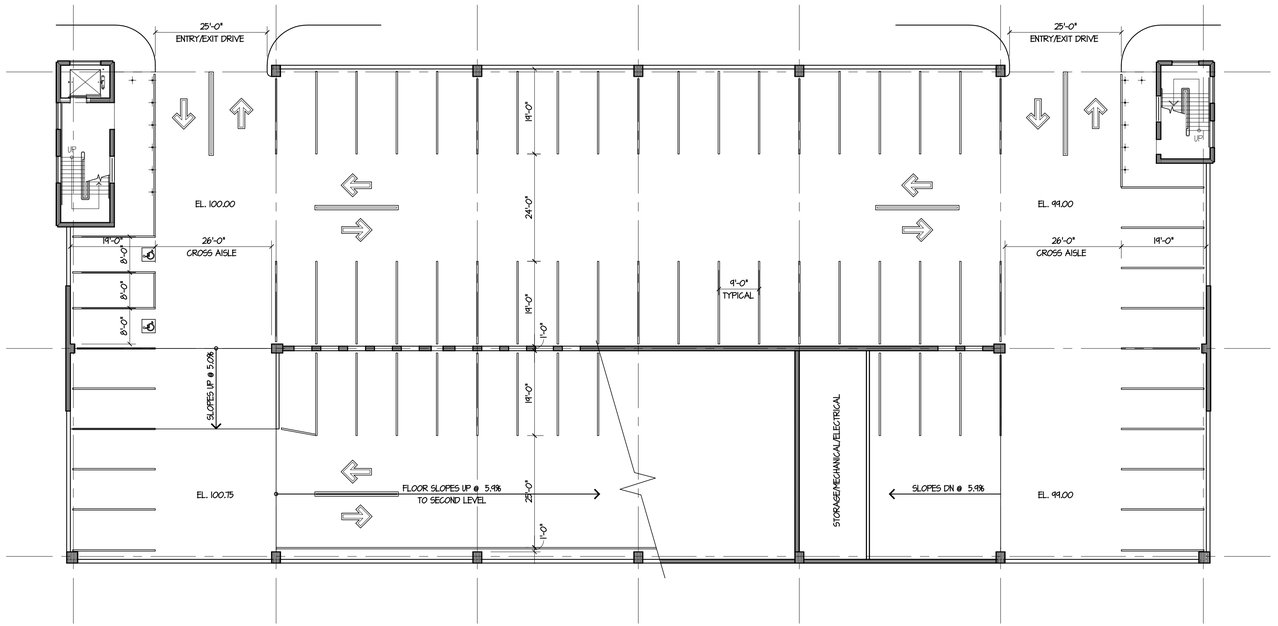
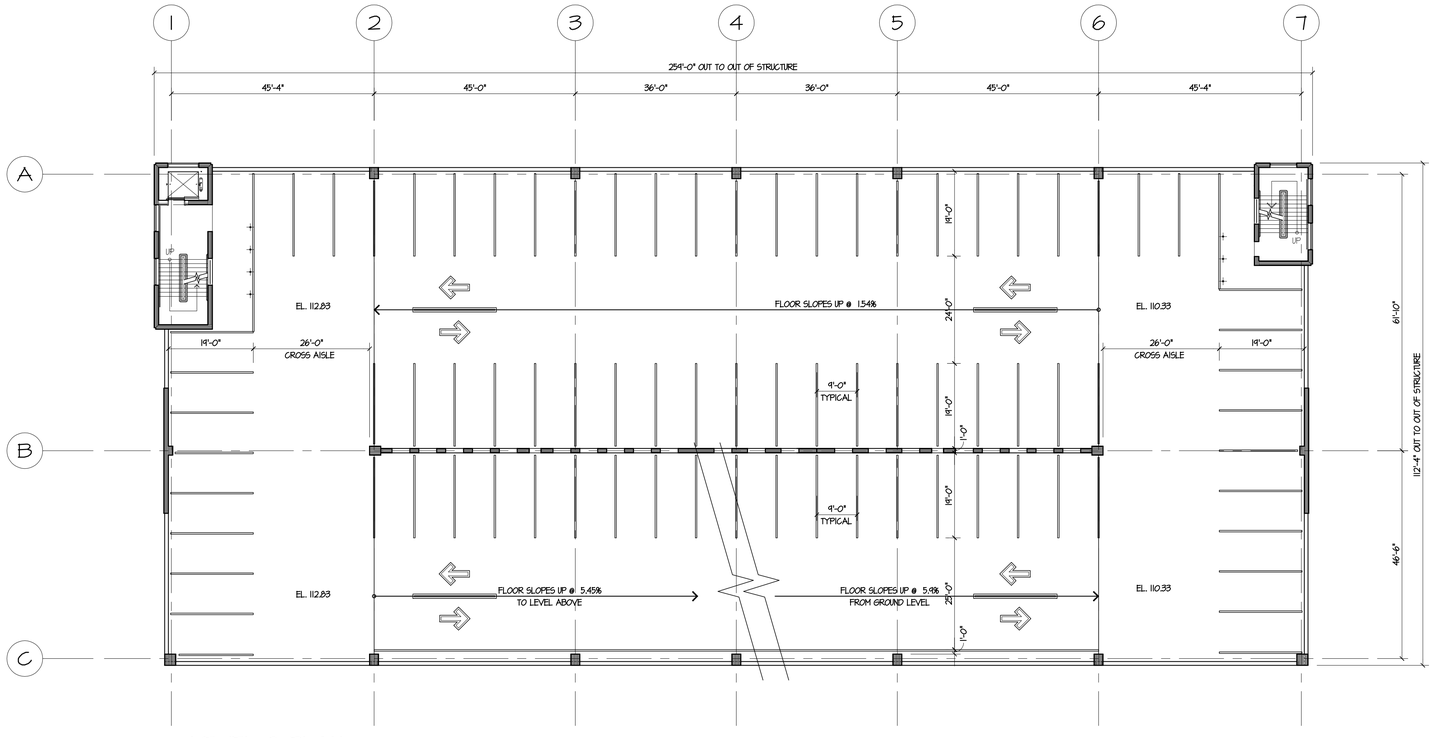
PRELIMINARY RENDERINGS

A901
SITE PLAN APPROVAL



LEVEL 1 PLAN

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



LEVEL 2 PLAN

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

CAR COUNT SUMMARY

LEVEL	STANDARD	BARRIER FREE	TOTAL
1	61	2	63
2	74	0	71
3	74	0	71
4	74	0	71
5	67	0	67
TOTAL	359	2	361

BOSTICK 801, LLC
MIXED-USE DEVELOPMENT

RICH & ASSOCIATES
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STATE OF MICHIGAN
RICHARD W. KINNELL
ARCHITECT
No. 1301032610
LICENSED ARCHITECT
Richard W. Kinnell
10/9/19

Date	ISSUED FOR:	By
10-04-19	SITE PLAN APPROVAL	

Sheet Title:

GROUND + SECOND LEVEL FLOOR PLANS

Drawn By	MJJ
Checked By	
File Name	
Plot Date	

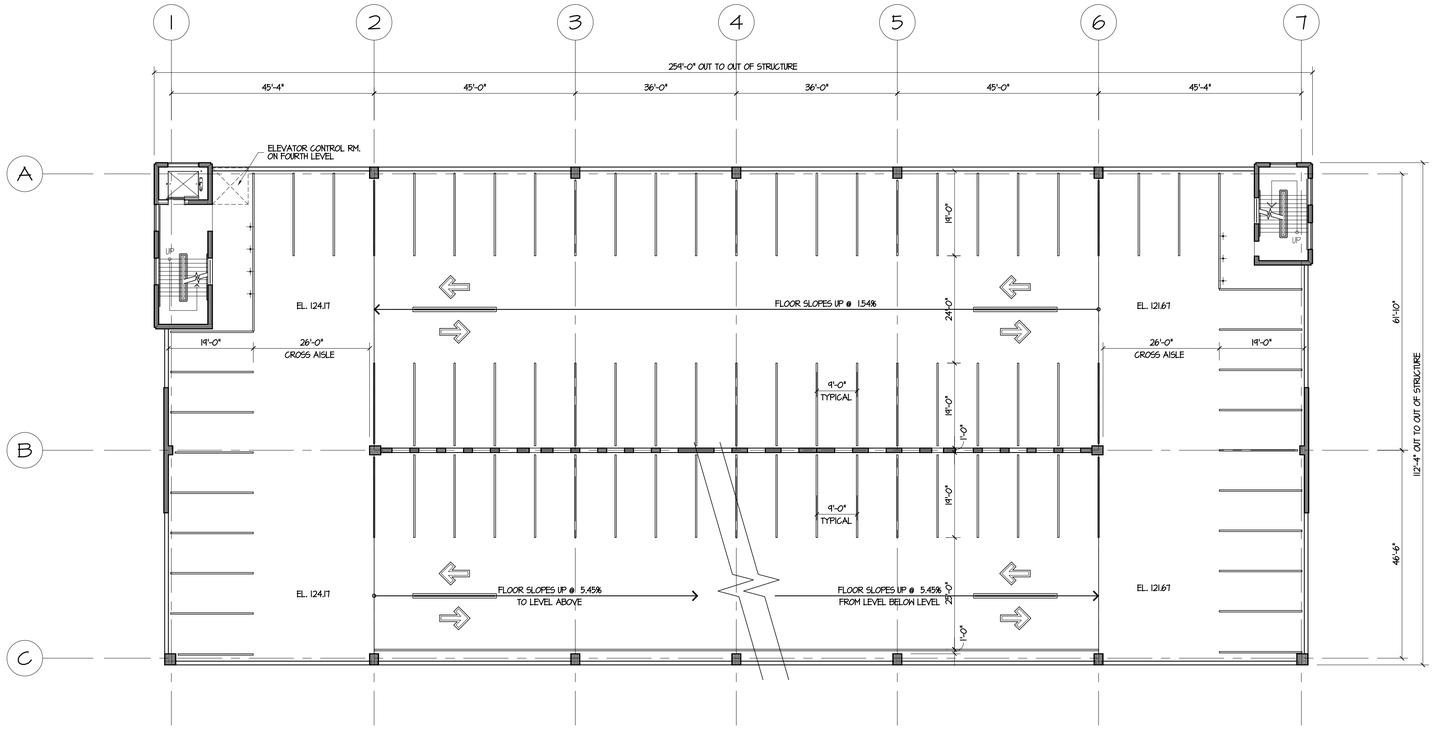
Detail Number / Detail Sheet

File NO	R2010
Date	10-04-19
Scale	AS NOTED
Last Rev.	

NORTH

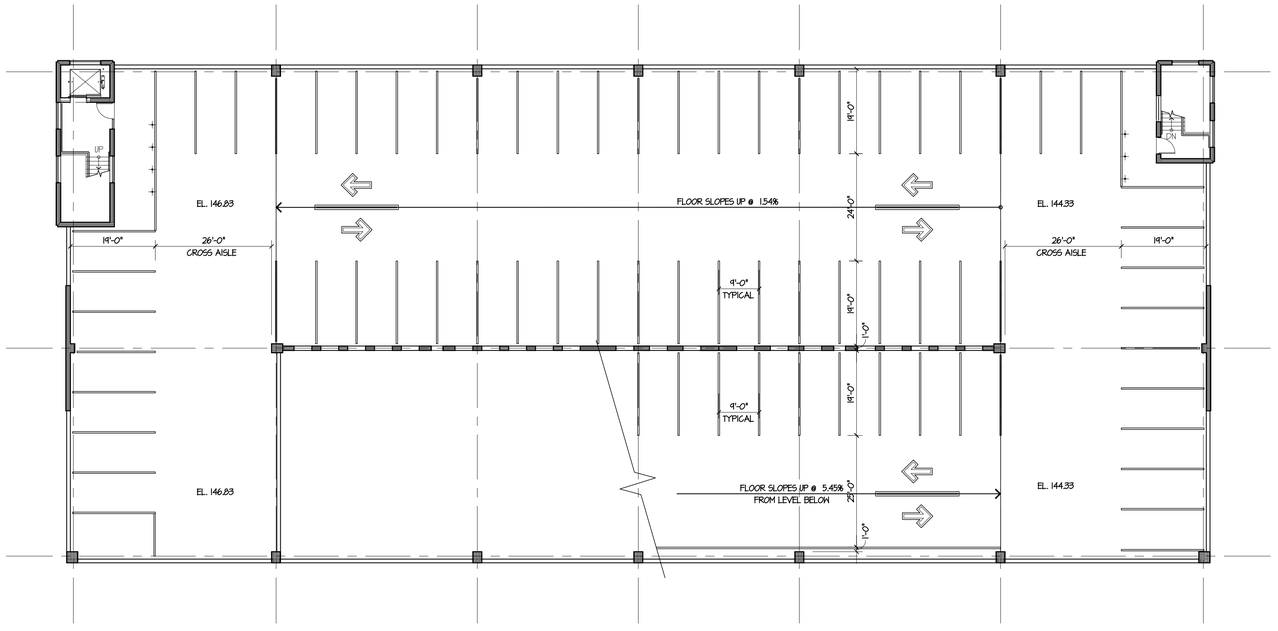
Sheet Number:

A - 1.1



LEVEL 3 & 4 PLANS

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



LEVEL 5 PLAN

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

CAR COUNT SUMMARY			
LEVEL	STANDARD	BARRIER FREE	TOTAL
1	61	2	63
2	74	0	77
3	74	0	77
4	74	0	77
5	67	0	67
TOTAL	359	2	361

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No. 1301032610
LICENSED ARCHITECT

Richard W. Kinnell 10/9/19

Date	ISSUED FOR:	By
10-09-19	SITE PLAN APPROVAL	

Sheet Title:

THIRD, FOURTH + FIFTH LEVEL FLOOR PLANS

Drawn By	MJJ
Checked By	
File Name	
Plot Date	

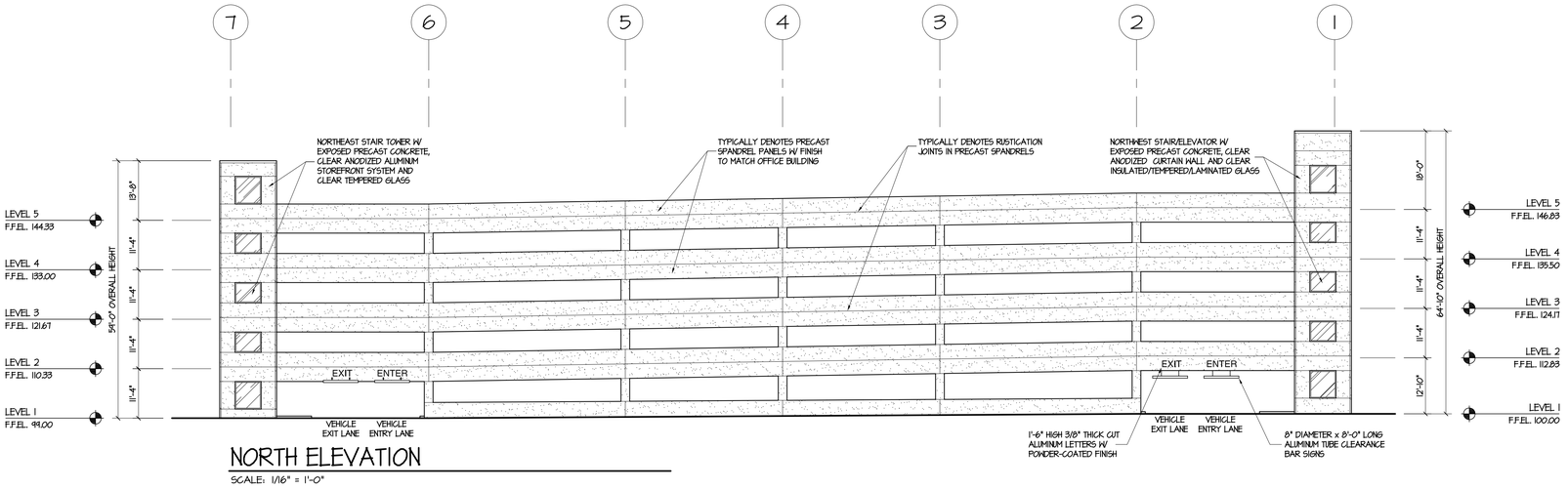
Detail Number / Detail Sheet

File No	R2010
Date	10-09-19
Scale	AS NOTED
Last Rev.	

NORTH

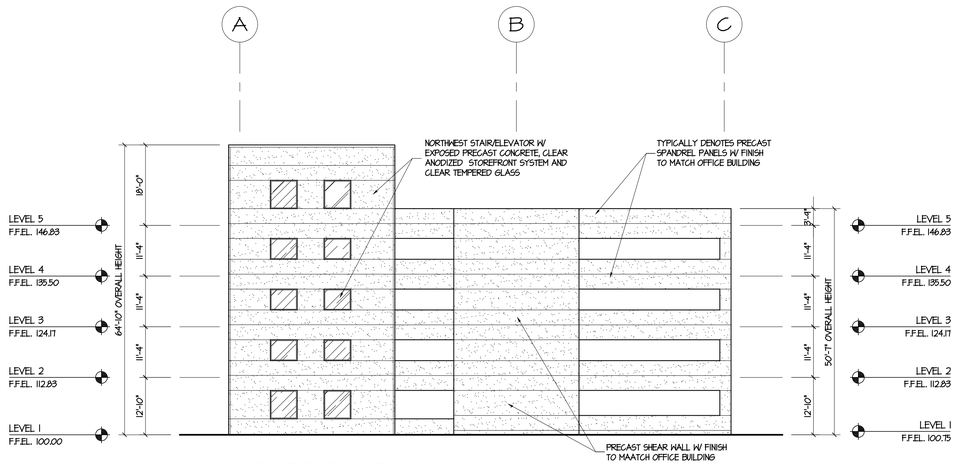
Sheet Number:

A - 1.2



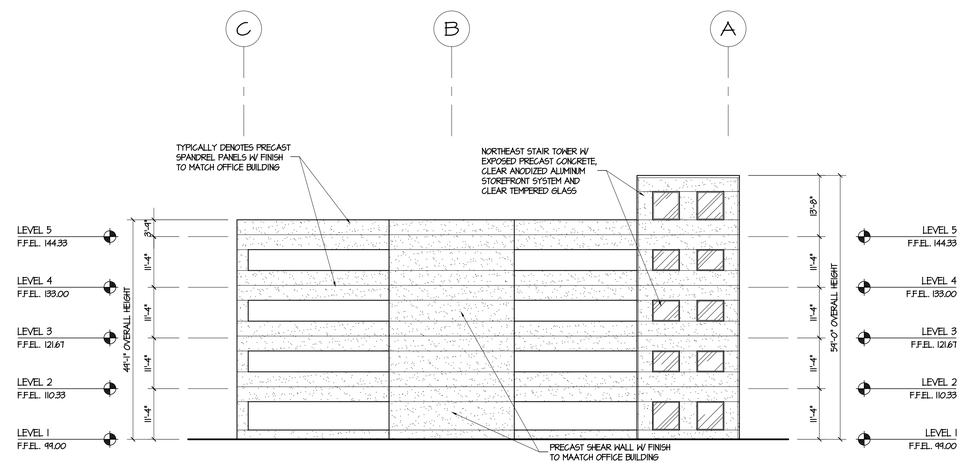
NORTH ELEVATION

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



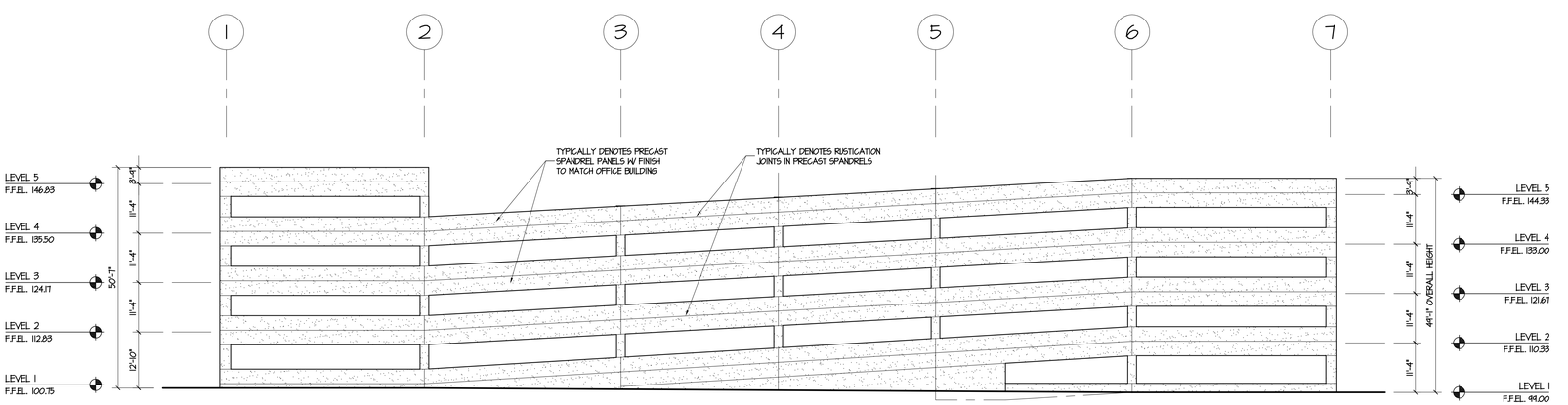
WEST ELEVATION

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



EAST ELEVATION

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



SOUTH ELEVATION

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

BOSTICK 801, LLC

MIXED-USE DEVELOPMENT

RICH & ASSOCIATES

PARKING CONSULTANTS

ARCHITECTS · ENGINEERS · PLANNERS

26877 NORTHWESTERN HWY.
SUITE 208
SOUTHFIELD, MI. 48033

SOUTHFIELD, MI. (248) 353-5080 **LUTZ, FL.** (813) 949-9860

WWW.RICHASSOC.COM

STATE OF MICHIGAN
RICHARD W. KINNELL
ARCHITECT
No. 1301032610
LICENSED ARCHITECT

Richard W. Kinnell
10/9/19

Date	ISSUED FOR:	By
10-09-19	SITE PLAN APPROVAL	

Sheet Title:

ELEVATIONS

Drawn By	M.J.J
Checked By	
File Name	
Plot Date	

Detail Number / Detail Sheet

File NO	R2010
Date	10-09-19
Scale	AS NOTED
Last Rev.	

NORTH

Sheet Number:

A - 1.3

DATE: December 5, 2019

TO: Planning Commission

FROM: R. Brent Savidant, Community Development Director

SUBJECT: PUBLIC HEARING – CONDITIONAL REZONING (CR JPLN2019-003) – Proposed Livernois Court, West of Livernois, North of Big Beaver, (88-20-22-301-008 and 88-20-22-301-009), Section 22, From R-1C (One Family Residential), to BB (Big Beaver Road) District.

The applicant Eureka Building Co. seeks a conditional rezoning of the subject parcel from R-1C (One Family Residential) to BB (Big Beaver) Zoning District. The applicant did not provide a complete Preliminary Site Plan application but did provide a conceptual sketch. The sketches indicate the potential for sixteen (16) units on the subject property. The applicant also voluntarily offered some conditions which are outlined in the attached report.

The site is within the Single Family Residential classification in the City of Troy Master Plan. The Planning Commission is a recommending body for this application.

The attached report prepared by Carlisle/Wortman Associates, Inc. (CWA), the City's Planning Consultant, summarizes the project. CWA prepared the report with input from various City departments including Planning, Engineering, Public Works and Fire. City Management supports the findings of fact contained in the report and the recommendations included therein.

Attachments:

1. Maps
2. Report prepared by Carlisle/Wortman Associates, Inc.
3. Application

G:\CONDITIONAL REZONING\JPCR2019-003 LIVERNOIS COURT\PC Memo 12 10 2019.docx

PROPOSED RESOLUTION

PUBLIC HEARING – CONDITIONAL REZONING (CR JPLN2019-003) – Proposed Livernois Court, West of Livernois, North of Big Beaver, (88-20-22-301-008 and 88-20-22-301-009), Section 22, From R-1C (One Family Residential), to BB (Big Beaver Road) District.

Resolution # PC-2019-12-
Moved by:
Seconded by:

RESOLVED, That the Planning Commission hereby recommends to the City Council that the R-1C to BB conditional rezoning request, as per Section 16.04 of the City of Troy Zoning Ordinance, located on the west side of Livernois, north of Big Beaver, within Section 22, being approximately 7.65 acres in size, be granted for the following reasons:

1. The rezoning of the site to Big Beaver would allow for the potential project to have more flexibility to provide for the consideration of a range of components such as improving walkability and sense of place in the City, and even reducing emphasis on parking. Additionally, Chapter 8 of the City of Troy 2017 Master Plan indicates that here is a lack of availability of innovative housing styles due to the predominance of single-family detached homes. The rezoning of the site to Big Beaver with the creation of a multiple-family residential development would remedy this lack of housing variation, which is consistent with the Master Plan
2. The Form-Based District would permit greater flexibility in use and development of the property.
3. The conditions offered by the applicant reasonably protect the adjacent properties.
4. The rezoning would be compatible with surrounding zoning and land use.
5. The site can be adequately served with municipal water and sewer.
6. The development of the property should not unreasonably impact adjacent properties.

BE IT FURTHER RESOLVED, That the Planning Commission recommends the following site plan design considerations:

Yes:
No:

MOTION PASSED / FAILED

GIS Online

1,189 0 595 1,189 Feet

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

GIS Online

1,189 0 595 1,189 Feet

Note: The information provided by this application has been compiled from recorded deeds, plats, tax maps, surveys, and other public records and data. It is not a legally recorded map survey. Users of this data are hereby notified that the source information represented should be consulted for verification.

Carlisle | Wortman
ASSOCIATES, INC.
117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

Date: November 20, 2019

Conditional Rezoning Analysis
For
City of Troy, Michigan

Project Name: Livernois Road/Big Beaver Rezoning

Location: Parcels 20-22-301-008 and 20-22-301-009
East of Livernois Road, North of Big Beaver Road

Current Zoning: R-1C, One Family Residential

Proposed Rezoning: Conditional Rezoning: Big Beaver Multi-Family Residential

Required Information: As provided within this review

PROJECT AND SITE DESCRIPTION

The applicant is proposing to conditionally rezone parcels 20-22-301-008 and 20-22-301-009 from R-1C, One Family Residential to BB, Big Beaver. Conditions offered by the applicant are as follows:

1. Big Beaver development to occur only in the areas outside of the 100-year floodplain and wetland delineation. The 100-year floodplain and wetland areas are to be treated as conservation and are not to be developed.
2. Proposed parcels to provide a 40-foot egress easement to the parcel to the north in case of future development. Easements shall satisfy ingress/egress guidelines for such development.
3. Big Beaver development is to include only attached multi-family unit buildings. Such buildings shall not exceed 35-feet in height and shall have a minimum setback of 35-feet from R-1C parcels.

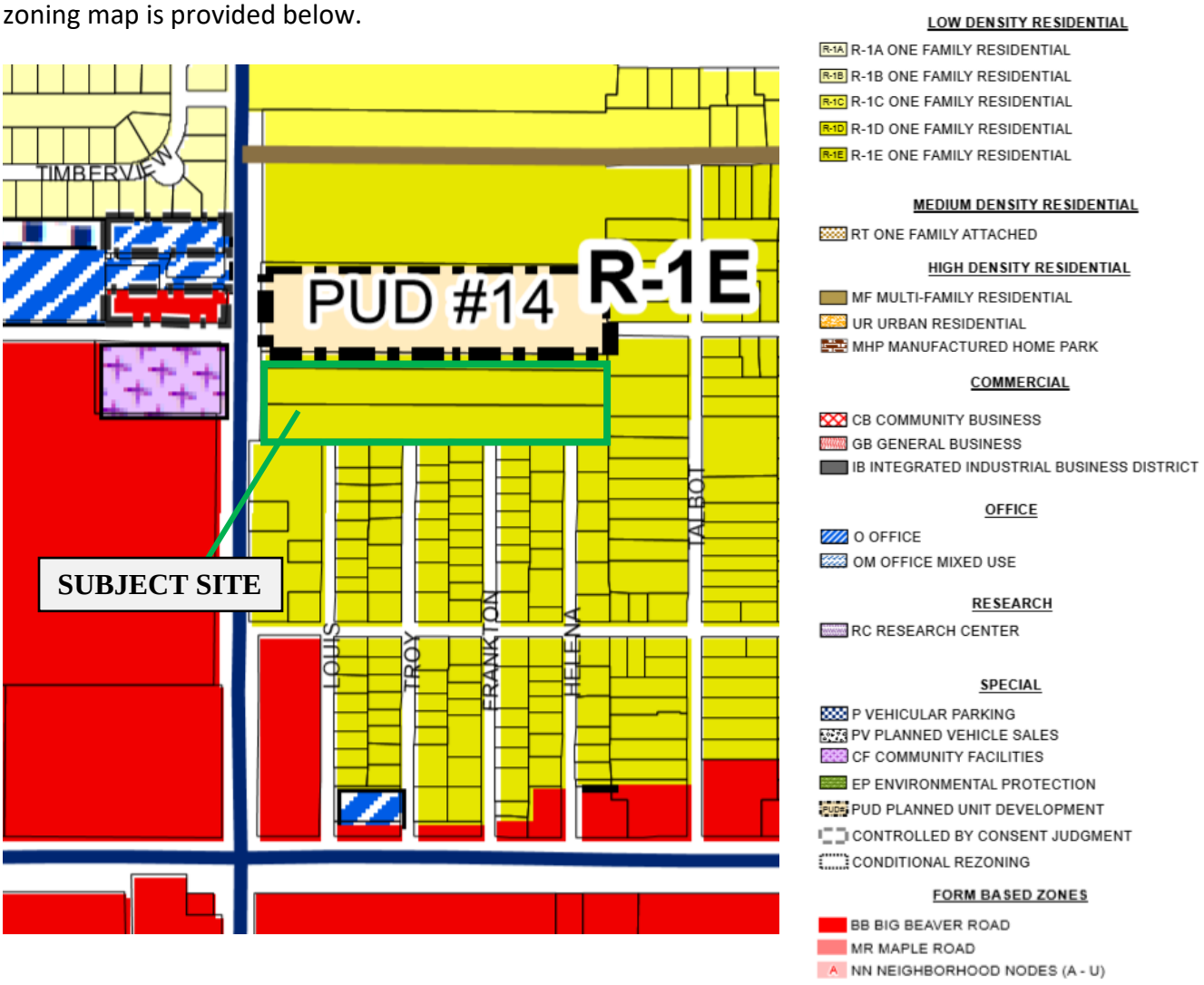
The applicant should indicate how they plan on preserving (conservation easement, land donation, or other means) the wetland and floodplain area.

Although no detailed development plans have been provided at this time, the applicant has submitted a conceptual plan for informational purposes only. If the conditional rezoning is approved, the applicant shall provide a site plan that meets the conditions voluntarily offered, and applicable standards set forth in the Zoning Ordinance including the BB Design Guidelines.

It should also be noted that the conceptual drawings provided include the parcel directly north which is currently zoned as R1-C, one family residential, as they may potentially obtain it for future development.

ZONING

The subject site is currently zoned as R-1C, One Family Residential. An excerpt from the City's zoning map is provided below.



SURROUNDING ZONING AND LAND USE

The subject parcel is currently zoned as R-1C. The Zoning and existing land uses for the subject site and surrounding parcels is listed below.

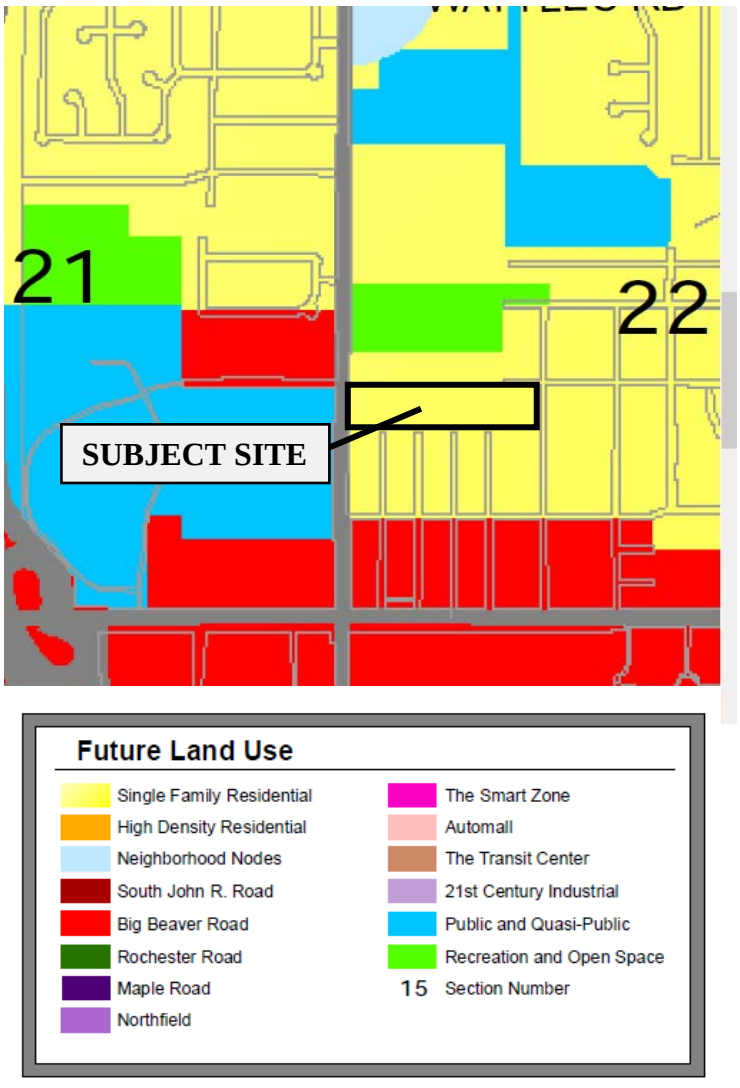
Direction	Zoning	Existing Use
North	R-1C, One Family Residential	One-Family Residential
South	R-1E, One Family Residential	One-Family Residential
East	R-1C, One Family Residential	One-Family Residential
West	CF, Community Facilities	Parks and Recreation

MASTER PLAN

According to the Future Land Use Plan (excerpt shown to the right), this area is planned as Single Family Residential. The existing zoning as One-Family Residential supports this intent and is consistent with existing zoning and future land use goals of those parcels immediately east, north and south.

The proposed land use as BB Multiple Family Residential is more intense than the uses intended, however, it is consistent with future land uses of parcels located to its west.

Due to traffic, surrounding land uses, and limited developable area due to wetland/floodplain it is unlikely that the site will develop as single-family residential.



PROPOSED DEVELOPMENT VS. BY-RIGHT

The stated intent of the BB Big Beaver Zoning District is as follows:

SECTION 5.04, Big Beaver District

Intent. The Big Beaver (BB) District is intended to implement the policies set forth in the Big Beaver Corridor Study, Big Beaver Design Guidelines, and the City's Master Plan. These regulations are intended to promote a unified vision for transforming Big Beaver Road into a world-class destination focused on mixed-use development and increased land use intensity that is oriented as much to the needs of the pedestrian as to those of the automobile. These regulations are also intended to:

1. *Establish a development pattern in which new buildings and building modifications enhance the character of the existing built environment;*
2. *Orient building entrances and storefronts to the street to add visual interest, increase pedestrian traffic, and to reduce crime through increased surveillance;*
3. *Enhance a sense of place and contribute to the sustainability of the City.*
4. *Allow a pattern of development which will encourage transportation alternatives (walking, biking, and transit) to reduce automobile dependence and fuel consumption; and*
5. *Add value to property along the Big Beaver Corridor*

The stated intent of the existing zoning district, R-1C, One Family Residential is as follows:

SECTION 4.06, One-Family Residential Districts R-1A through R-1E

Intent. The Master Plan recognizes that single-family residential neighborhoods are vital components of the City and comprise the majority of the land area within the City. The intent of the R-1A through R-1E Districts is to provide areas for single-family dwellings with the primary distinction being a range of densities, implemented through varying lot sizes. The R-1A through R-1E Districts are further intended to preserve and improve upon the quality of residential neighborhoods while permitting a limit

The table below outlines the development differences of what is currently permitted per R-1C zoning and the conditions offered by the applicant.

	By-Right Existing R-1C Zoning	Permitted and Proposed if rezoned to BB Zoning
Height	2.5 stories and 30 feet	35 feet
Setbacks	Front (Livernois): 30 feet Sides (No sewer): 15/30 feet total Sides (Sewer): 10/20 feet total Rear: 40 feet	Minimum of 35 feet from adjacent R-1C parcels

The applicant has also set forth two (2) additional conditions. First, the proposed parcels are to provide a 40-foot egress easement to the parcel to the north in case of future development. Easements are to satisfy egress guidelines for such development. Second, BB development is to occur only in areas outside of the 100-year floodplain and wetland delineation. Those naturally sensitive areas are to be treated as conservation and are not to be developed under the rezoning request. The applicant should indicate how they plan on preserving (conservation easement, land donation, or other means) the wetland and floodplain area.

REZONING STANDARDS

As set forth in Section 16.03.C, the Planning Commission shall consider the following standards:

1. *The proposed rezoning is consistent with the Master Plan. If the current zoning is in material conflict with the Master Plan, such conflict is due to one of the following:*
    a. *A change in City policy since the Master Plan was adopted.*
    b. *A change in conditions since the Master Plan was adopted.*
    c. *An error in the Master Plan.*

    The proposed land use as BB Multiple Family Residential is more intense than the uses intended, however, it is consistent with future land uses of parcels located to its west. The rezoning of the site to Big Beaver would allow for the potential project to have more flexibility than is currently allowed by the existing zoning district. This flexibility may allow for the consideration of a range of components such as improving walkability and sense of place in the City, and even reducing emphasis on parking. Additionally, Chapter 8 of the City of Troy 2017 Master Plan indicates that here is a lack of availability of innovative housing styles due to the predominance of single-family detached homes. The rezoning of the site to Big Beaver with the creation of a multiple-family residential development would remedy this lack of housing variation.

    As noted due to traffic, surrounding land uses, and limited developable area due to wetland/floodplain it is unlikely that the site will develop as currently zoned single-family residential.

2. *The proposed rezoning will not cause nor increase any non-conformity.*

    The applicant has stated that any new development will be designed in conformity with current City Ordinances and will undergo the site plan review process prior to approval in order to ensure that all standards have been met and conformity is achieved.

3. *Public services and facilities affected by a proposed development will be capable of accommodating service and facility loads caused by use of the development.*

    Due to the condition that is aimed at restricting development from occurring within the wetland and floodplain areas on site, it is not likely that any improvements will overwhelm

any local public services or facilities. The site will likely be easily accommodated by public services and facilities that serve the surrounding, more intense developments.

4. *The rezoning will not impact public health, safety, or welfare.*

   The proposed rezoning is not likely to impact public health, safety, or welfare. Conditions prohibiting development from occurring within the 100-year floodplain ensure that residentially zoned parcels to the east are minimally affected the anticipated project, and that preserved area can serve as a buffer and transition area in perpetuity. Additionally, the applicant has indicated that the site's intended use as multiple-family residential, will provide additional housing options within the City.

5. *The rezoning will ensure compatibility with adjacent uses of land.*

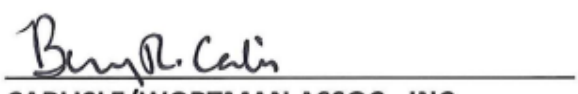
   The rezoning of the site from R-1C, One Family Residential to BB Multiple Family Residential will be more intense than those parcels to the south and east as they are currently zoned and used for single family residential purposes. However, the subject site is in close proximity to the Big Beaver district, less intense than the senior facility to the north, and will act as a transition area between the more intense developments to the less intense residential areas.

RECOMMENDATION

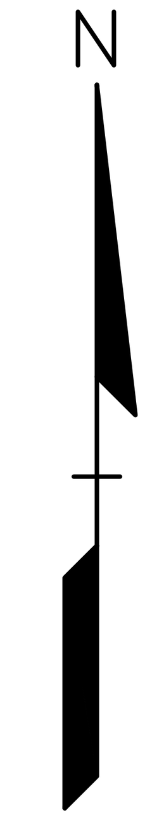
As noted due to traffic, surrounding land uses, and limited developable area due to wetland/floodplain it is unlikely that the site will develop as currently zoned single-family residential.

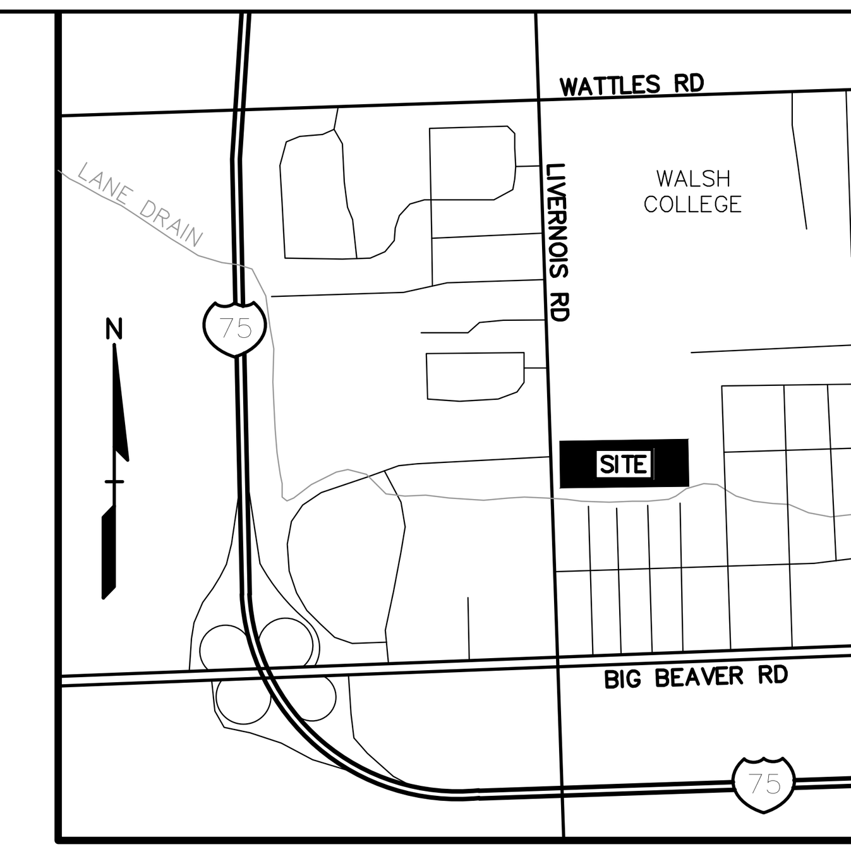
Multiple-family residential, with the applicant's condition of limiting height and the condition that wetlands and 100-year flood plain will be conserved to serve as a buffer to the less intense uses to the south and east, is an appropriate transitional land use. However, the applicant should indicate how they plan on preserving (conservation easement, land donation, or other means) the wetland and floodplain area.

We recommend that the Planning Commission consider the application, hold a public hearing, and consider public comments.



CARLISLE/WORTMAN ASSOC., INC.
Benjamin R. Carlisle, LEED AP, AICP





LOCATION MAP – NOT TO SCALE

LEGAL DESCRIPTIONS

(based upon the City of Troy Assessor's Office Website)

Land in the City of Troy, Oakland County, MI, described as follows:

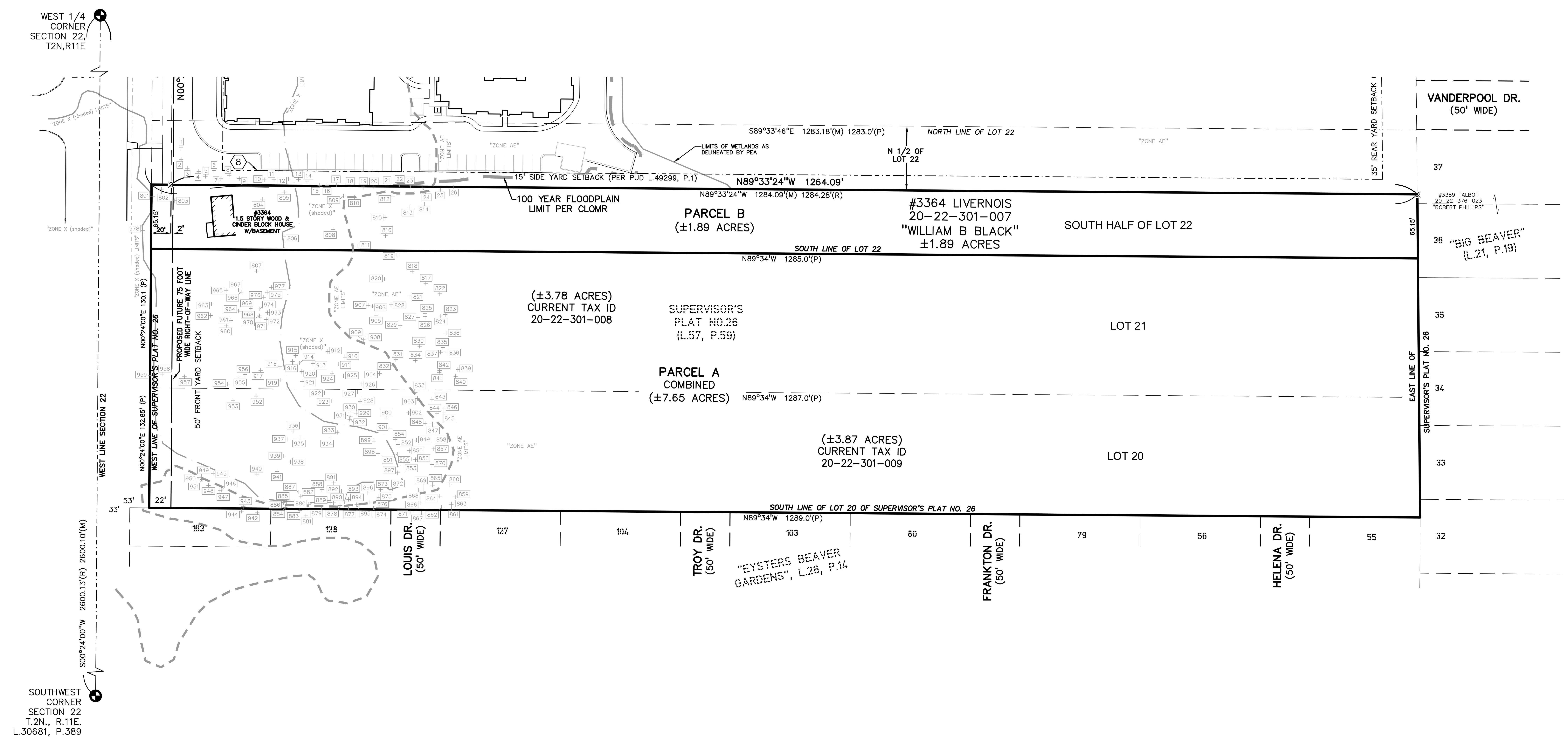
PARCEL (20–22–301–008):
LOT 21 OF "SUPERVISOR'S PLAT NO. 26", AS RECORDED IN LIBER 57, PAGE 59 OF PLATS, EXCEPT THE WEST 20 FEET THEREOF DEEDED FOR ROAD, BEING LANDS IN THE SOUTHWEST 1/4 OF SECTION 22, TOWN 2 NORTH, RANGE 11 EAST, OAKLAND COUNTY RECORDS. 12–21–15 CORR

PARCEL (20–22–31–009):
LOT 20 OF "SUPERVISOR'S PLAT NO. 26", AS RECORDED IN LIBER 57, PAGE 59 OF PLATS, EXCEPT THE WEST 20 FEET THEREOF DEEDED FOR ROAD, BEING LANDS IN THE SOUTHWEST 1/4 OF SECTION 22, TOWN 2 NORTH, RANGE 11 EAST, OAKLAND COUNTY RECORDS. 12–21–15 CORR

PARCEL A (COMBINING PARCELS 20–22–301–008 AND 20–22–301–009):
LOTS 20 AND 21 OF "SUPERVISOR'S PLAT NO. 26", AS RECORDED IN LIBER 57, PAGE 59 OF PLATS, EXCEPT THE WEST 20 FEET THEREOF DEEDED FOR ROAD, BEING LANDS IN THE SOUTHWEST 1/4 OF SECTION 22, TOWN 2 NORTH, RANGE 11 EAST, OAKLAND COUNTY RECORDS.

PARCEL B (20–22–301–007):
THE SOUTH HALF OF LOT 22 OF "SUPERVISOR'S PLAT NO. 26", AS RECORDED IN LIBER 57, PAGE 59 OF PLATS, EXCEPT THE WEST 20 FEET THEREOF DEEDED FOR ROAD, BEING LANDS IN THE SOUTHWEST 1/4 OF SECTION 22, TOWN 2 NORTH, RANGE 11 EAST, OAKLAND COUNTY RECORDS.

GRAPHIC SCALE
–60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft.



LEGEND

IRON FOUND
IRON SET
NAIL FOUND
NAIL & CAP SET
BRASS PLUG SET
MONUMENT FOUND
MONUMENT SET
SEC. CORNER FOUND
R RECORDED
M MEASURED
P PLAT

EXISTING

ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
UNDERGROUND CABLE TV, CATV PEDESTAL
TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
GAS MAIN, VALVE & GAS LINE MARKER
WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
SANITARY SEWER, CLEANOUT & MANHOLE
STORM SEWER, CLEANOUT & MANHOLE
COMBINED SEWER & MANHOLE
CATCH BASIN
INLET (NO INCOMING LINES)
YARD DRAIN (2' DIA. & SMALLER)
POST INDICATOR VALVE
WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
UNIDENTIFIED STRUCTURE
FENCE
GUARD RAIL
LIGHT POLE
SIGN

FLOODPLAIN:
Per Flood Insurance Rate Map Numbers 26125C–0534F, Effective September 29 2006, Subject parcel is in:
ZONE AE – Base Flood Elevations determined
ZONE X (shaded) – Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
ZONE X – Areas to be determined outside of the 0.2% annual chance floodplain.

No.	BY	CHK	DESCRIPTION	DATE

REVISIONS

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE DESIGN PROFESSIONAL.

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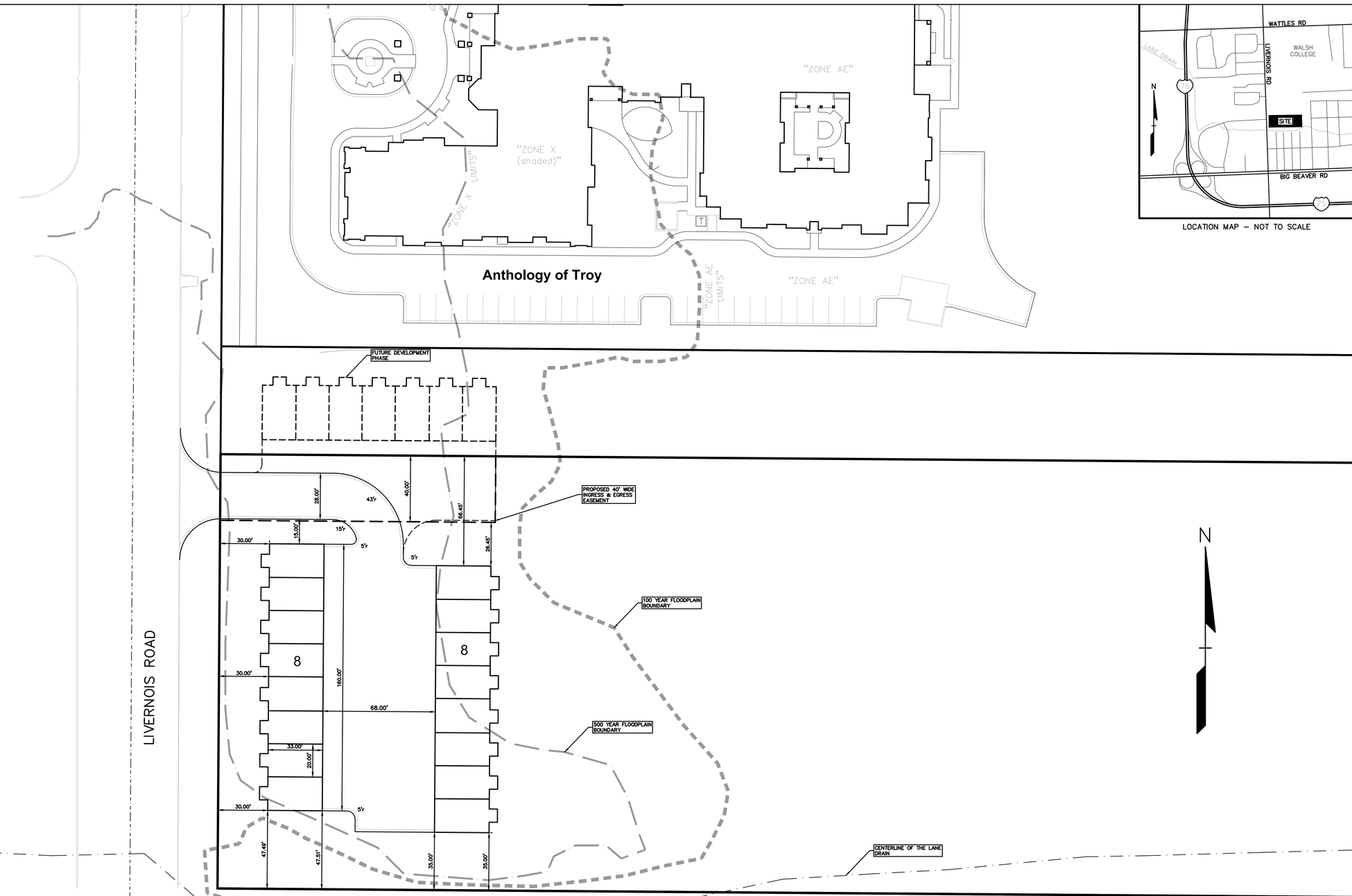
f: 248.689.1044
www.peainc.com

EUREKA BUILDING COMPANY
53976 DEGANO
SHELBY TOWNSHIP, MICHIGAN 48315

LIVERNOIS ROAD PARCEL BOUNDARY | TREE SURVEY
PART OF THE SW 1/4 OF SECTION 22, T. 2N., R. 11E., CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	DN.	DN/ET	SUR.	DN	P.M.	TS

ORIGINAL ISSUE DATE: SEPTEMBER 18, 2019
PEA JOB NO. 2019-384
SCALE: 1"=60'
DRAWING NUMBER: 1



LOCATION MAP – NOT TO SCALE

FLOODPLAIN:
Per Flood Insurance Rate Map Numbers 26125C–0534F,
Effective September 29 2006, Subject parcel is in:
ZONE AE – Base Flood Elevations determined
ZONE X (shaded) – Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
ZONE X – Areas to be determined outside of the 0.2% annual chance floodplain.

LEGEND

- IRON FOUND
- IRON SET
- NAIL FOUND
- NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND
- MONUMENT SET
- SEC. CORNER FOUND
- R RECORDED
- M MEASURED
- P PLAT

EXISTING

- ELEC., PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
- UNDERGROUND CABLE TV, CATV PEDESTAL
- TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
- ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
- GAS MAIN, VALVE & GAS LINE MARKER
- WATERMAIN, HYD., GATE VALVE, TAPPING SLEEVE & VALVE
- SANITARY SEWER, CLEANOUT & MANHOLE
- STORM SEWER, CLEANOUT & MANHOLE
- COMBINED SEWER & MANHOLE
- CATCH BASIN
- INLET (NO INCOMING LINES)
- YARD DRAIN (2' DIA. & SMALLER)
- POST INDICATOR VALVE
- WATER VALVE BOX/HYDRANT VALVE BOX, SERVICE SHUTOFF
- MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
- UNIDENTIFIED STRUCTURE
- FENCE
- GUARD RAIL
- LIGHT POLE
- SIGN

REVISIONS

No.	BY	CHK	DESCRIPTION	DATE

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EUREKA BUILDING COMPANY
53976 DESANO
SHELBY TOWNSHIP, MICHIGAN 48315

LIVERNOIS ROAD PARCEL
CONCEPTUAL SITE PLAN
PART OF THE SW 1/4 OF SECTION 22, T. 2N., R. 11E.,
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

DES.	DN.	DN/ET	SUR.	DN	P.M.	TS

S:\PROJECTS\2019\2019-384 EUREKA LIVERNOIS-TROY\MISC\CONCEPTUAL\C-1.0 SITE PLAN.dwg

ORIGINAL ISSUE DATE:
OCTOBER 07, 2019

PEA JOB NO. 2019-384

SCALE: 1"=20'

DRAWING NUMBER:
C-1.0

Rezoning Statement.

ONE (1) HARD COPY OF A PROPOSED SITE PLAN INDICATING THE SUBJECT PROPERTY AND THE BUILDINGS / USES PROPOSED TO BE CONSTRUCTED

A detailed development is not proposed at this time, since the uses will be tied directly into the requirements of the Big Beaver one family attached. Once the rezoning to Big Beaver is approved, through Planning Department direction the development site plan layouts and associated requirements under the zoning ordinance will be pursued in the ordinary course of action. All site plan, and associated form-based elements, will then be addressed though a site plan submission meeting pursuant to ordinance requirements.

Re-zoning request is subject to the following conditions:

1. BB development to occur only in the areas outside of 100-year flood plain and wetland delineation as per the attached site plan concept. The 100-year flood plain and wetlands areas to be treated as conservation and are not to be developed under the proposed re-zoning request.

2. Proposed parcels to provide 40’ egress easement to parcel to the north in case of future development. Easement to satisfy egress guidelines for such development.

3. BB development to include only attached multifamily unit buildings. Such buildings shall not exceed 35' in height and shall have a minimum setback of 35’ to R-1C parcels.

ONE (1) HARD COPY OF A STATEMENT INDICATING WHY, IN THE OPINION OF THE APPLICANT, THE REZONING REQUESTED IS CONSISTENT WITH THE MASTER PLAN, AND WHY SUCH A REZONING IS CONSISTENT WITH ADJACENT ZONING DISTRICTS AND USES, AND WILL NOT BE DETRIMENTAL TO THE PROPERTY OF OTHER PERSONS LOCATED IN THE VICINITY

The above referenced properties are located within BB zoning areas to the west of Livernois. Re-zoning to BB should meet Troy Master Plan objectives by providing a transition from non-residential area & main artery roadway and lower density residential land use areas. The City of Troy Zoning Ordinance has additional requirements that must be met for all rezoning approvals. More specifically, Section 16.03(C), Rezoning Procedures, of the ordinance provides the following standards for rezoning requests:

C. Standards for Approval. A rezoning may be approved upon a finding and determination that all of the following are satisfied:

1. The proposed rezoning of the subject site from R1-C, One Family Residential District, to BB Multi Family Residential, is consistent with the Land Use of the surrounding areas. The project enables medium density residential development in one of the “Targeted Locations in Troy for Missing Middle housing.” (See Master Plan Chapter 8 Pg. 6)

Rezoning the site to BB would enable the project to satisfy the characteristics of Missing Middle Housing as noted in the Master Plan by providing for: 1. Walkable context and sense of community; Transitional density, by creating housing at densities which fall between traditional single family and multiple family; Smaller, well designed units and efficient use of space; Deemphasizing parking.

2. The proposed rezoning will not cause nor increase any non-conformity.

The proposed rezoning to BB One Family Attached will not cause or increase any non-conformity. It will allocate ~ 5.5 acres of wetland conservation to the east of the parcels. Any new development will be in conformity with current City ordinances and Planning Department site plan review and approval as such the development will of necessity continue and transition the current theme of the neighborhood.

3. Public services and facilities affected by a proposed development will be capable of accommodating service and facility loads caused by use of the development.

The subject site is not large in size (1.5 acres) and any proposed development, in compliance with the RT One Family Attached would be easily accommodated by public services and facilities that serve the surrounding commercial and residential developments.

4. The rezoning will not impact public health, safety, or welfare.

The proposed BB designation for this site, and the associated development review process, is intended to ensure that a project does not impact the public health, safety, or welfare. The very designation of the site is intended to provide affordable housing for young families.

5. The rezoning will ensure compatibility with adjacent uses of land.

The rezoning will continue an ongoing theme in the Livernois Road corridor north of Big Beaver road where a number of BB developments have been approved by the city and constructed in recent years in conformity with the Master Plan and its dictates.

ONE (1) CD CONTAINING AN ELECTRONIC VERSION OF THE COMPLETE REZONING APPLICATION

A flash drive with the complete application is provided

To the City of Troy,

William B. Black

3364 Livernois, Troy, MI 48083

I am the property owner to the north of lots Parcel # 2022301008, 2022301009.

I support their efforts to have the property rezoned to residential multiple family.

Sincerely,

William B. Black

William B. Black

DATE: December 5, 2019

TO: Planning Commission

FROM: R. Brent Savidant, Community Development Director

SUBJECT: PUBLIC HEARING – ZONING ORDINANCE TEXT AMENDMENT (File Number ZOTA 254) – Cluster Square Footage

This item was initiated by Staff based on conversations with the Planning Commission and developers. The One Family Cluster Option incentivizes expanding a variety of housing types in the City via construction of smaller homes that suitable for empty nesters and retirees. Developers have indicated that the maximum 1,500 square foot requirement is too restrictive and is a barrier to providing smaller homes.

The attached report summarizes the issue. The proposed text amendment involves simply raising the minimum square footage from 1,500 square feet to 1,700 square feet.

A Public Hearing is scheduled for this item for the December 10, 2019 Planning Commission meeting.

Attachments:

1. Planning Commission Public Hearing Draft.
2. Memo prepared by Carlisle/Wortman Associates, Inc., dated October 15, 2019.
3. Public input.

G:\ZOTAs\ZOTA 254 Cluster Square Footage\PC Memo 2019 10 12.doc

PROPOSED RESOLUTION

PUBLIC HEARING – ZONING ORDINANCE TEXT AMENDMENT (File Number ZOTA 254) – Cluster Square Footage

Resolution # PC-2019-12-
Moved by:
Seconded by:

RESOLVED, That the Planning Commission hereby recommends to the City Council that Article 10 of Chapter 39 of the Code of the City of Troy, which proposes to increase the maximum square footage for smaller homes qualifying for a density bonus under the One Family Cluster Option from 1,500 square feet to 1,700 square feet, be amended as printed on the proposed Zoning Ordinance Text Amendment.

Yes:
No:
Absent:

MOTION CARRIED / DENIED

G:\ZOTAs\ZOTA 254 Cluster Square Footage\Proposed PC Resolution 12 10 2019.doc

CITY OF TROY

AN ORDINANCE TO AMEND
CHAPTER 39 OF THE CODE
OF THE CITY OF TROY
CITY COUNCIL PUBLIC HEARING DRAFT

The City of Troy ordains:

Section 1. Short Title

This Ordinance shall be known and may be cited as an amendment to Chapter 39, Zoning Ordinance, of the Code of the City of Troy.

Section 2. Amendment

Chapter 39 of the Code of the City of Troy is amended as follows:

Revise Section 10.04.H.2 to read as follows:

2. Housing Diversity and Options. A bonus above the base yield number of units established in 10.04.C.1 may be provided for a development that provides a diverse variety of housing types or provides a type of housing that is desired, but not currently offered in the city. The following requirements shall be met for the all bonus unit in excess of the base yield number of units:
    a. Maximum home square footage shall not exceed ~~1,500~~ 1,700 sq/ft; and
    b. Master first floor bedroom and bathroom shall be provided; and

Section 3. Savings

All proceedings pending, and all rights and liabilities existing, acquired or incurred, at the time this Ordinance takes effect, are hereby saved. Such proceedings may be consummated under and according to the ordinance in force at the time such proceedings were commenced. This ordinance shall not be construed to alter, affect, or abate any pending prosecution, or prevent prosecution hereafter instituted under any ordinance specifically or impliedly repealed or amended by this ordinance adopting this penal regulation, for offenses committed prior to the effective date of this ordinance; and new prosecutions may be instituted and all prosecutions pending at the effective date of this ordinance may be continued, for offenses committed prior to the effective date of this ordinance, under and in accordance with the provisions of any ordinance in force at the time of the commission of such offense.

Section 4. Severability Clause

Should any word, phrase, sentence, paragraph or section of this Ordinance be held invalid or unconstitutional, the remaining provision of this ordinance shall remain in full force and effect.

Section 5. Effective Date

This amendment to the Zoning Ordinance shall take effect seven (7) days after publication, which shall be published within 15 days of adoption, as required the Michigan Zoning Enabling Act (Act 110 of 2006).

This Ordinance is enacted by the Council of the City of Troy, Oakland County, Michigan, at a regular meeting of the City Council held at City Hall, 500 W. Big Beaver, Troy, MI, on the _____ day of _____, 2020.

_____
Ethan Baker, Mayor

_____
Aileen Dickson, City Clerk

G:\ZOTAs\ZOTA 254 Cluster Square Footage\PC Public Hearing Draft ZOTA 254.doc

Carlisle | Wortman
ASSOCIATES, INC.
117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

MEMORANDUM

TO: City of Troy Planning Commission
Mark Miller, AICP, City Manager
R. Brent Savidant, AICP, Planning Director

FROM: Benjamin R. Carlisle, AICP

DATE: October 15, 2019

RE: Transitions and Increasing Square Footage Cap in a Cluster Development

---

The Planning Commission has recently held discussions regarding two potential zoning amendments to address ongoing topics: 1. Transitions, particularly adjacent to single family residential; and 2). Increasing the maximum square footage cap to quality for a density bonus in the cluster development option.

1. Transitions

The Planning Commission recently discussed transitions and frictions points between intense uses adjacent to single-family uses. At that meeting a number of options were presented for the Planning Commission to consider. The direction of the Planning Commission was to consider zoning amendments to ensure an appropriate intensity, height, and bulk transition between areas of potential friction. Due to the uniqueness of Big Beaver zoning, we recommend that right now we only focus on Neighborhood Nodes.

Based upon the direction from the Planning Commission, we offer the following amendments for consideration. These amendments would only apply to Neighborhood Nodes.

Development height, setback, and greenbelt provisions for any non-single family development in Neighborhood Nodes.

1. *Height:*
    a. *Any building, or portion of a building, on a parcel abutting a one-family residentially zoned parcel shall not exceed 2.5-stories, 30 feet in height.*
    b. *Any building, or portion of a building, on a parcel that is not abutting a one-family residentially zoned parcel shall not exceed 3-stories, 38 feet in height.*

2. *Setback and Greenbelt:*
    a. *When a parcel is abutting a one-family residential zoned parcel the building setback from the property line of the one-family residential zoned parcel shall be no less than the height of the proposed building or twenty (20) feet, whichever is greater.*
    b. *When a parcel is abutting a one-family residential zoned parcel a minimum 20-foot landscaped greenbelt shall be maintained from the property line of the one-family residential zoned parcel. The greenbelt shall be landscaped and screened in accordance with 13.02.B.*
    c. *The Planning Commission may deviate from these setback and greenbelt provisions in the course of its site plan review process; however, the Planning Commission shall not permit a setback or greenbelt that is less than required in the building form or Section 13.02.B. In the review of the deviation, the Planning Commission shall consider the following standards:*
        i. *The deviation will not adversely impact public health, safety, and welfare.*
        ii. *The deviation maintains compatibility with adjacent uses.*
        iii. *The deviation is compatible with the Master Plan and in accordance with the goals and objectives of the Master Plan and any associated subarea and corridor plans.*
        iv. *The deviation will not adversely impact essential public facilities and services, such as: streets, pedestrian or bicycle facilities, police and fire protection, drainage systems, refuse disposal, water and sewage facilities, and schools.*
        v. *The deviation will be in compliance with all other zoning ordinance standards.*
        vi. *The deviation will not adversely impact any on-site or off-site natural features.*

2. Housing Diversity and Options

The Planning Commission has questioned why the development community has not taken advantage of the housing diversity and option density bonus for smaller homes. Input from the development community notes that 1,500 sq/ft is too small to consider construction even with the associated density bonus. The Planning Commission has been told that a slight increase to 1,700 sq/ft would greatly assist in utilizing the density bonus. As such, we have proposed revised language to increase the maximum size to receive the density bonus from 1,500 to 1,700 sq/ft.

Revised Language:

Housing Diversity and Options. A bonus above the base yield number of units established in 10.04.C.1 may be provided for a development that provides a diverse variety of housing types or

provides a type of housing that is desired, but not currently offered in the city. The following requirements shall be met for the all bonus unit in excess of the base yield number of units:

a. *Maximum home square footage shall not exceed ~~1,500~~ 1,700 sq/ft; and*
b. *Master first floor bedroom and bathroom shall be provided.*

Based upon discussion and direction of the Planning Commission, we can put this in ordinance form and prepare for a public hearing.

I look forward to discussing this further.

Sincerely,

CARLISLE/WORTMAN ASSOC., INC.
Benjamin R. Carlisle, LEED AP, AICP

From:	Tim Loughrin
To:	Brent Savidant
Subject:	Troy Cluster Ordinance Revision Letter
Date:	Friday, November 22, 2019 3:25:50 PM
Attachments:	image001.jpg image003.jpg RB Troy Cluster Letter.pdf Troy Square Footage Comparison.pdf

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Hi Brent. Per our conversations, attached is a letter in regard to the upcoming review of the City's cluster provisions relating to home square footage. I'm happy to discuss in further detail. Also attached is some market data that backs up our assumptions.

Thanks, have a great weekend.

Tim Loughrin | Director of Land Acquisition

Robertson Brothers Homes | 6905 Telegraph Road, Suite 200| Bloomfield Hills, MI 48301

Direct: 248.282.1428 | Fax: 248.282.1429 | www.robertsonhomes.com

November 21, 2019

Mr. Brent Savidant
City of Troy Community Development Director
500 W Big Beaver Road
Troy, MI 48084

Re: Cluster Ordinance Text Amendment

Mr. Savidant:

It is Robertson's understanding that the City will be considering a text amendment to its Zoning Ordinance relating to the maximum square footage permitted for homes that qualify for a density bonus under the One-Family Cluster Development Option. Our understanding is that the maximum livable square footage may increase to 1,700 square feet from 1,500 square feet under Section 10.04.H.2.a. We applaud this direction as we believe there is an underserved market for those that want to stay in the City of Troy and downsize into a new, first-floor master bedroom home.

In considering the request, we would encourage the City to increase the maximum size of detached units to 1,900 square feet, as we believe the market conditions are such that this is a more appropriate size to justify the high costs to acquire and develop land in the City. In addition, our data indicates that the typical existing homeowner in Troy that would be an ideal buyer for this type of housing would be downsizing from a much larger home (2,800+ square feet), and our experience shows that they are looking for slightly more space than what 1,700 square feet provides.

Our organization would be highly interested in introducing a first-floor detached condominium home option similar to developments we are building in surrounding areas, namely Mill Ridge of Northville, and our Brewster Village community to be constructed next year in Rochester Hills. We believe keeping

residents in the City of Troy, while freeing up existing Colonial style housing for new residents to take advantage of the Troy School District, is a worthy endeavor to undertake. Increasing the maximum square footage for these home types is a critical component to doing just that.

Thank you.

Respectfully,

Tim Loughrin | Director of Land Acquisition
Robertson Brothers Homes
6905 Telegraph Rd, Suite 200, Bloomfield Hills, MI 48301
Direct Dial: 248.282.1428 | Mobile: 248.752.7402
tloughrin@robertsonhomes.com

Architecture Level	2 Story
Status	Sold
Property Type	Residential

Row Labels	Average of List Price	Average of Est Fin Abv Grd SqFt	Average of Sq Ft $	Count of MLS Number
100	$143,267	1653	$87.07	3
150	$188,575	1417	$143.12	4
200	$238,527	1772	$136.26	11
250	$277,264	1868	$150.48	61
300	$332,440	2230	$151.42	68
350	$380,118	2428	$158.12	71
400	$428,192	2641	$164.51	53
450	$477,947	2891	$166.90	56
500	$529,709	3173	$168.27	42
550	$577,474	3309	$176.29	19
600	$624,836	3450	$182.21	19
650	$684,563	3637	$190.99	8
700	$734,400	3848	$192.16	7
750	$783,580	4243	$186.98	5
800	$849,900	3700	$229.70	1
850	$861,333	3874	$223.85	3
1000	$1,075,000	5695	$188.76	1
Grand Total	**$425,718**	**2616**	**$161.75**	**432**

75% (328 of 432) of traditional colonial sales in the last 12 months

Sale Price $300,000 to $600,0000

Average sale price $478,674

Average Square Foot 2875

Architecture Level	1 Story
Status	Sold
Property Type	Residential
Year Built	(All)

Row Labels	Average of List Price	Average of Est Fin Abv Grd SqFt	Average of Sq Ft $	Count of MLS Number
50	$89,000	816	$108.84	2
100	$137,783	1103	$130.06	6
150	$177,668	1106	$163.77	37
200	$228,595	1379	$170.46	77
250	$279,206	1547	$187.53	56
300	$326,949	1822	$185.02	41
350	$374,037	1942	$196.27	30
400	$430,300	2260	$193.71	11
450	$475,775	2372	$202.32	8
650	$659,900	3922	$168.26	1
Grand Total	**$277,476**	**1571**	**$178.72**	**269**

33 % (90 of 269) Ranch homes sold in the last 12 months fell in this range

Sale price $300,000 to $600,0000

Average sales price $401,765

Avergae Square Footage 2099

From:	Tim Loughrin
To:	Brent Savidant
Subject:	Mill Ridge and Brewster Village Projects
Date:	Wednesday, November 27, 2019 3:51:21 PM
Attachments:	image001.jpg image003.jpg Mill Ridge Raleigh Elevations.pdf Raleigh Floor Plan.pdf Phase 1 and 2 Site Plan 11-13-19.pdf 2019.01.24 Illustrative Site Plan.pdf

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Hi Brent. Per our conversation, the link below is to our Mill Ridge of Northville community, which we have recently repositioned from duplex homes to a more desirable detached condominium, at 1,834 square feet. These are all first floor master homes and we have received very good feedback from prospective buyers on the design and layout. I believe this would be a very desirable home product in Troy and is one of the justifications we had made for potentially increasing the maximum size to 1,900 square feet for the proposed cluster ordinance revision.

I've attached a pdf of the site plan and elevation drawings, as well as a site plan of a new community named Brewster Village that we will be building in Rochester Hills next Spring, at the corner of Brewster and Walton. This community will use the same Raleigh plan and elevations.

We would be happy to give you and any Commission or Council members a tour of the Northville model if you have any interest in that, just let me know.

https://www.robertsonhomes.com/communities/northville/mill-ridge-of-northville

Thanks, and have a Happy Thanksgiving.

Tim Loughrin | Director of Land Acquisition

Robertson Brothers Homes | 6905 Telegraph Road, Suite 200| Bloomfield Hills, MI 48301

Direct: 248.282.1428 | Fax: 248.282.1429 | www.robertsonhomes.com

RB
ROBERTSON BROTHERS HOMES
70 Years

Mill Ridge of Northville

Northville Township, Michigan

November 2019

0 25' 50' 100' 150' 200'

North

design studio
LAND
landscape architecture / land planning

18161 W. Thirteen Mile Rd, Suite B-4
Southfield, MI 48076
T:: 248.594.3220
F:: 248.594.3260

Site Data:

Gross Site Area:	7.705 Ac.
Net Site Area:	7.168 Ac.
Proposed Units:	30
Proposed Density:	4.19 Du./Ac.
Building Setbacks:	
- Front Yard:	20' (25' to Garage)
- Building Separation:	20' min.
Road Width:	26'

■ sheet title:

Illustrative Site Plan

■ project title:

Brewster Village

City of Rochester Hills, MI

■ prepared for:

Robertson Brothers Homes
6905 Telegraph Rd. - Suite 200
Bloomfield Hills, MI 48301

Phone: 248.644.3460

■ job number:	■ date:
17031	11.13.2018
■ drawn by:	■ checked by:
EMJ	WTK

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

■ revisions:

01.24.2019 Per Municipal Review

1"= 50'

0 25' 50' 100' 150' 200'

North

sheet no.

-

Mill Ridge of Northville

Albany Elevation

RB Robertson Brothers Homes

Mill RIDGE OF NORTHVILLE

Barrington Elevation

RB ROBERTSON BROTHERS HOMES

Mill RIDGE OF NORTHVILLE

Cranbury Elevation

ROBERTSON BROTHERS HOMES

Mill RIDGE OF NORTHVILLE

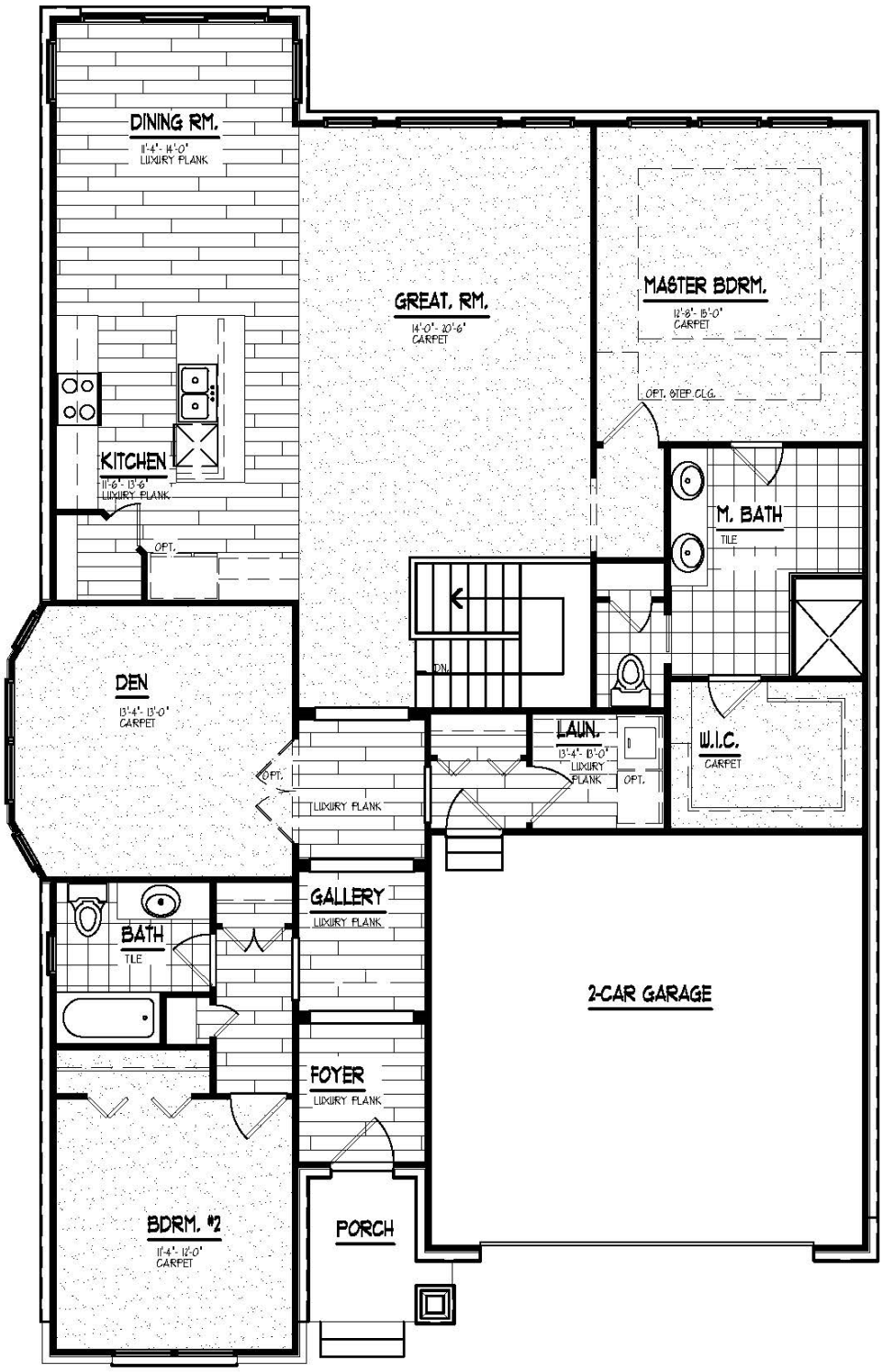
Dorchester Elevation

ROBERTSON BROTHERS HOMES

Mill Ridge of Northville

Raleigh

1,834 sqft.

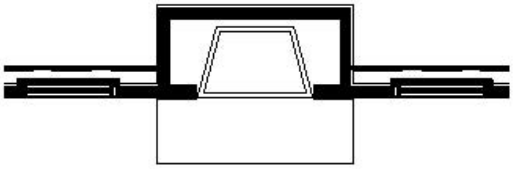


Robertson Brothers Homes

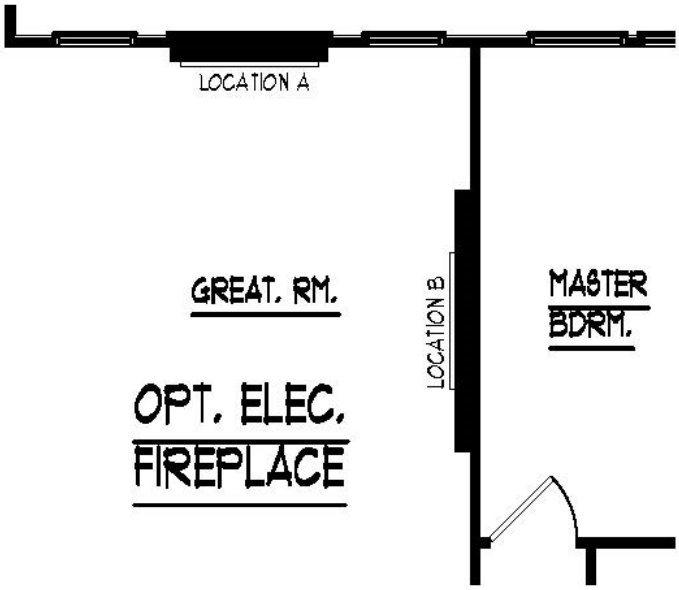
Mill Ridge of Northville

Raleigh

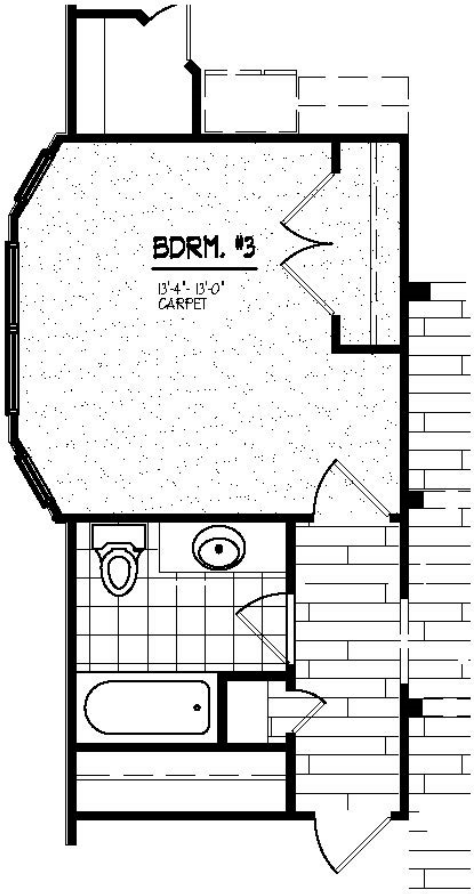
Main Level Options



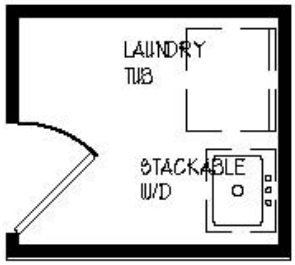
OPT. FIREPLACE



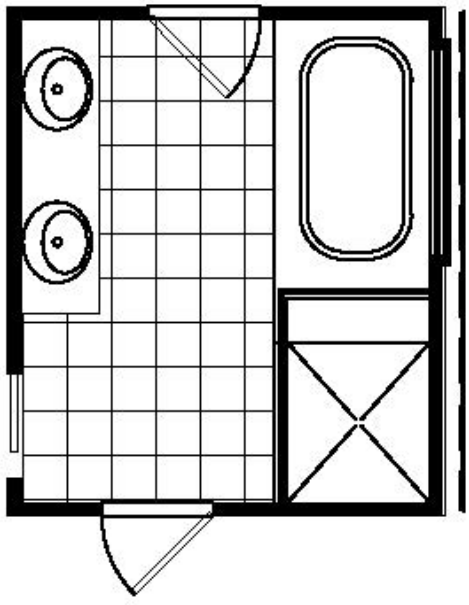
OPT. ELEC. FIREPLACE



OPT. BEDROOM



OPT. LAUNDRY



OPT. M.BATH

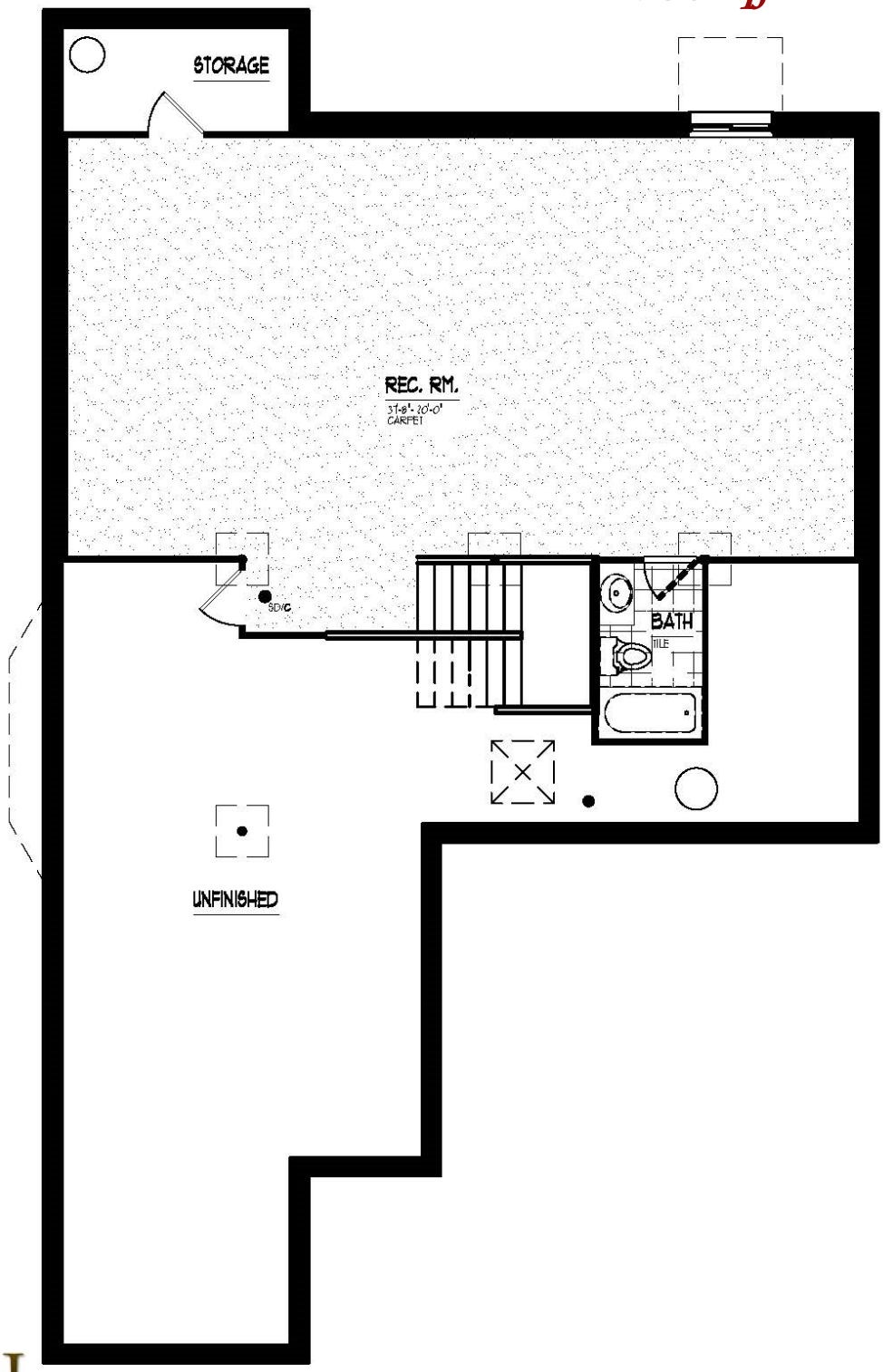
RB ROBERTSON BROTHERS HOMES

Mill Ridge of Northville

Raleigh

Lower Level Option 1

936 sqft.



RB Robertson Brothers Homes

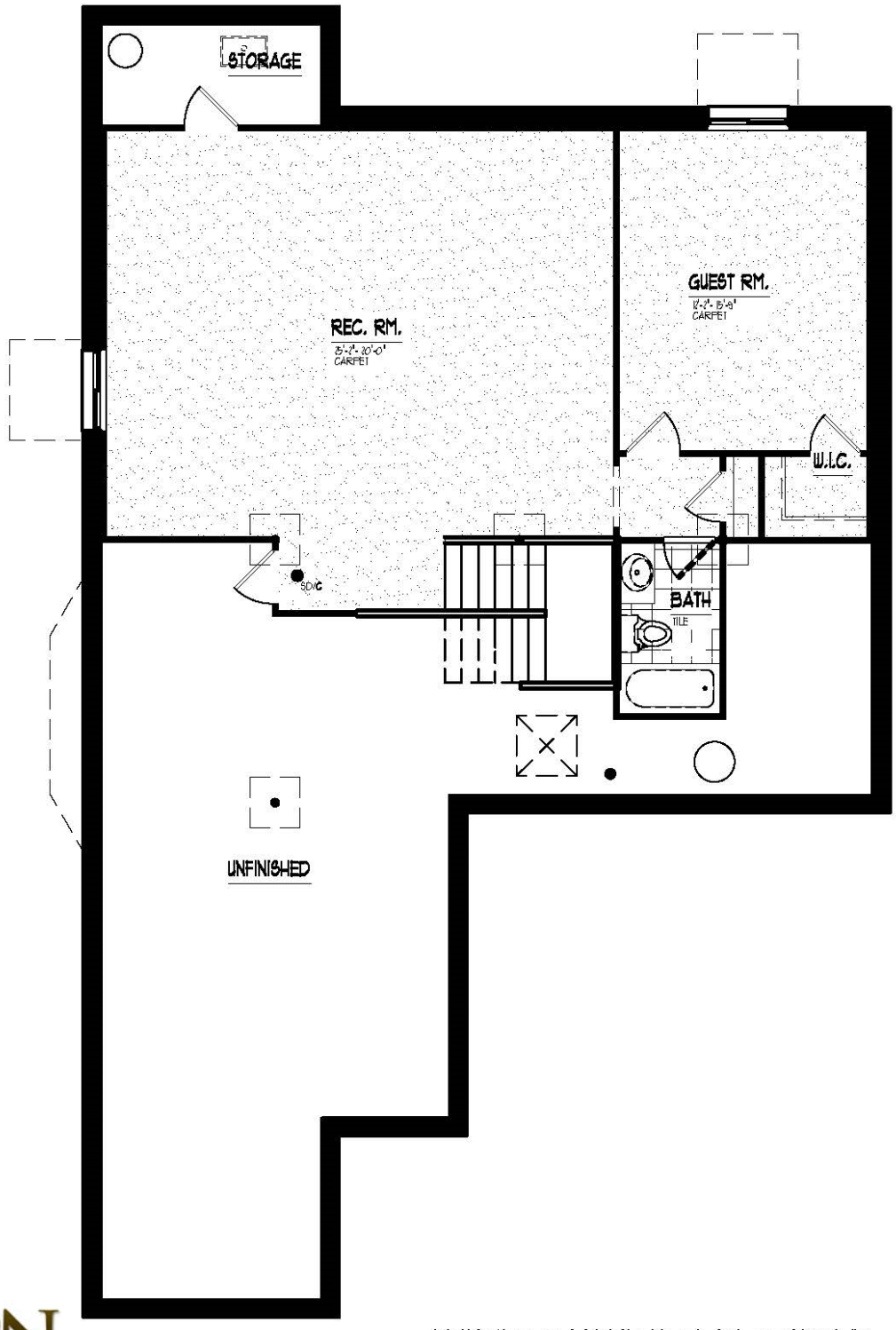
EQUAL HOUSING OPPORTUNITY

Mill Ridge of Northville

Raleigh

Lower Level Option 2

936 sqft.

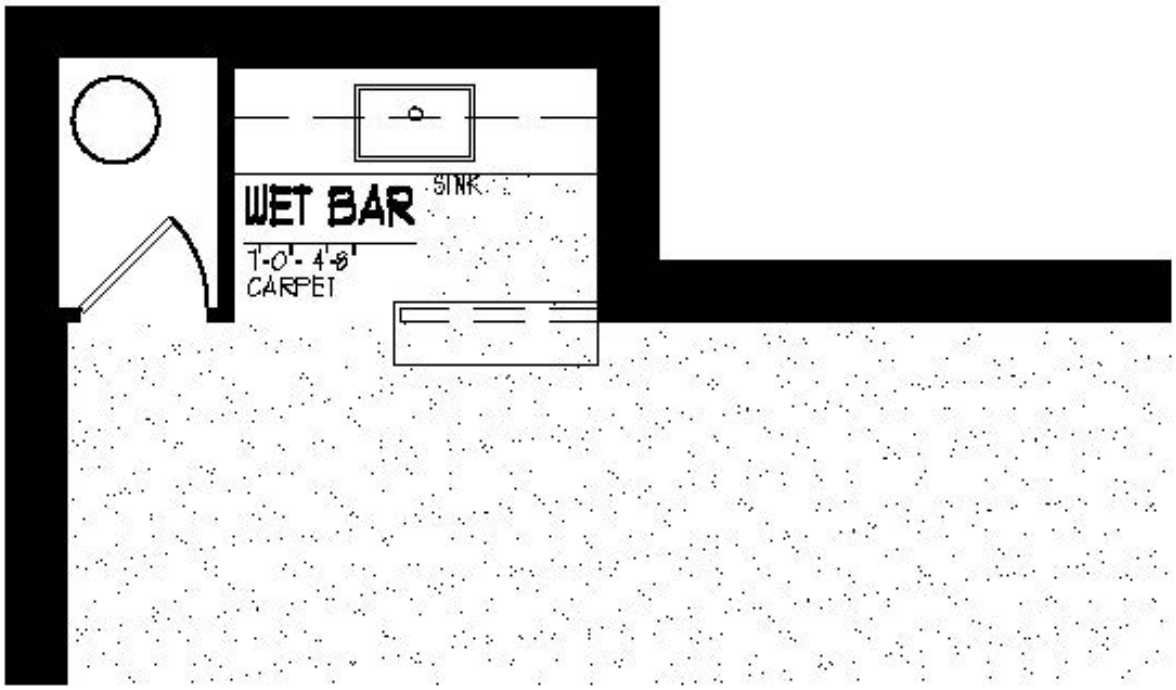


Robertson Brothers Homes

Equal Housing Opportunity

Mill Ridge of Northville

Raleigh
Optional
Lower Level Wet Bar



Robertson Brothers Homes

DATE: December 5, 2019

TO: Planning Commission

FROM: R. Brent Savidant, Community Development Director

SUBJECT: PUBLIC HEARING – ZONING ORDINANCE TEXT AMENDMENT (File Number ZOTA 255) – Transitions in NN (Neighborhood Node) Zoning District

This item was initiated by Staff based on conversations with the Planning Commission and feedback from residents. The intent of the amendment is to protect single family residential property values by ensuring smooth transitions between multi-family and commercial development and single family residential neighborhoods.

The attached memo provides further background.

A Public Hearing is scheduled for this item for the December 10, 2019 Planning Commission meeting.

Attachments:

1. Planning Commission Public Hearing Draft.
2. Memo prepared by Carlisle/Wortman Associates, Inc., dated October 15, 2019.

G:\ZOTAs\ZOTA 255 Transitions in NN\PC Memo 2019 10 12.doc

PROPOSED RESOLUTION

PUBLIC HEARING – ZONING ORDINANCE TEXT AMENDMENT (File Number ZOTA 255) – Transitions in NN (Neighborhood Node) Zoning District

Resolution # PC-2019-12-
Moved by:
Seconded by:

RESOLVED, That the Planning Commission hereby recommends to the City Council that Article 10 of Chapter 39 of the Code of the City of Troy, which includes provisions related to height and setback in the NN Neighborhood Node Zoning District, be amended as printed on the proposed Zoning Ordinance Text Amendment.

Yes:
No:
Absent:

MOTION CARRIED / DENIED

G:\ZOTAs\ZOTA 255 Transitions in NN\Proposed PC Resolution 12 10 2019.doc

CITY OF TROY

AN ORDINANCE TO AMEND
CHAPTER 39 OF THE CODE
OF THE CITY OF TROY
CITY COUNCIL PUBLIC HEARING DRAFT

The City of Troy ordains:

Section 1. Short Title

This Ordinance shall be known and may be cited as an amendment to Chapter 39, Zoning Ordinance, of the Code of the City of Troy.

Section 2. Amendment

Chapter 39 of the Code of the City of Troy is amended as follows:

Revise Section 5.06.E.3 to read as follows:

Height and mass. Building height and mass in the form of building step-backs, recess lines or other techniques shall be graduated so that structures with higher intensity uses are comparable in scale with adjacent structures of lower intensity uses.

c. Height ~~and Mass. Building height and mass in the form of building step-backs, recess lines or other techniques shall be graduated so that structures with higher intensity uses are comparable in scale with adjacent structures of lower intensity uses.~~
   i. Any building, or portion of a building, on a parcel abutting a one-family residentially zoned parcel shall not exceed 2.5-stories, 30 feet in height.
   ii. Any building, or portion of a building, on a parcel that is not abutting a one-family residentially zoned parcel shall not exceed 3-stories, 38 feet in height.

d. Setback and Greenbelt:
   i. When a parcel is abutting a one-family residential zoned parcel the building setback from the property line of the one-family residential zoned parcel shall be no less than the height of the proposed building or twenty (20) feet, whichever is greater.
   ii. When a parcel is abutting a one-family residential zoned parcel a minimum 20-foot landscaped greenbelt shall be maintained from the property line of the one-family residential zoned parcel. The greenbelt shall be landscaped and screened in accordance with 13.02.B.
   iii. The Planning Commission may deviate from these setback and greenbelt provisions in the course of its site plan review process; however, the Planning Commission shall not permit a setback or greenbelt that is less than required in the building form or Section 13.02.B. In the review of the deviation, the Planning Commission shall consider the following standards:

i. The deviation will not adversely impact public health, safety, and welfare.
ii. The deviation maintains compatibility with adjacent uses.
iii. The deviation is compatible with the Master Plan and in accordance with the goals and objectives of the Master Plan and any associated subarea and corridor plans.
iv. The deviation will not adversely impact essential public facilities and services, such as: streets, pedestrian or bicycle facilities, police and fire protection, drainage systems, refuse disposal, water and sewage facilities, and schools.
v. The deviation will be in compliance with all other zoning ordinance standards.
vi. The deviation will not adversely impact any on-site or off-site natural features.

~~d~~ e. Orientation. ~~Primary building facades shall be placed away from the~~ Buildings shall be oriented in such a way as to minimize the impact on abutting residential use.

~~e~~ f. Architectural Features. Similarly sized and patterned architectural features such as windows, doors, arcades, pilasters, cornices, wall offsets, building materials, and other building articulations included on the lower-intensity use shall be incorporated in the transitional features.

Section 3. Savings

All proceedings pending, and all rights and liabilities existing, acquired or incurred, at the time this Ordinance takes effect, are hereby saved. Such proceedings may be consummated under and according to the ordinance in force at the time such proceedings were commenced. This ordinance shall not be construed to alter, affect, or abate any pending prosecution, or prevent prosecution hereafter instituted under any ordinance specifically or impliedly repealed or amended by this ordinance adopting this penal regulation, for offenses committed prior to the effective date of this ordinance; and new prosecutions may be instituted and all prosecutions pending at the effective date of this ordinance may be continued, for offenses committed prior to the effective date of this ordinance, under and in accordance with the provisions of any ordinance in force at the time of the commission of such offense.

Section 4. Severability Clause

Should any word, phrase, sentence, paragraph or section of this Ordinance be held invalid or unconstitutional, the remaining provision of this ordinance shall remain in full force and effect.

Section 5. Effective Date

This amendment to the Zoning Ordinance shall take effect seven (7) days after publication, which shall be published within 15 days of adoption, as required the Michigan Zoning Enabling Act (Act 110 of 2006).

This Ordinance is enacted by the Council of the City of Troy, Oakland County, Michigan, at a regular meeting of the City Council held at City Hall, 500 W. Big Beaver, Troy, MI, on the _____ day of _____, 2020.

_____
Ethan Baker, Mayor

_____
Aileen Dickson, City Clerk

G:\ZOTAs\ZOTA 255 Transitions in NN\PC Public Hearing Draft ZOTA 255.doc

Carlisle | Wortman
ASSOCIATES, INC.
117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

MEMORANDUM

TO: City of Troy Planning Commission
Mark Miller, AICP, City Manager
R. Brent Savidant, AICP, Planning Director

FROM: Benjamin R. Carlisle, AICP

DATE: October 15, 2019

RE: Transitions and Increasing Square Footage Cap in a Cluster Development

---

The Planning Commission has recently held discussions regarding two potential zoning amendments to address ongoing topics: 1. Transitions, particularly adjacent to single family residential; and 2). Increasing the maximum square footage cap to quality for a density bonus in the cluster development option.

1. Transitions

The Planning Commission recently discussed transitions and frictions points between intense uses adjacent to single-family uses. At that meeting a number of options were presented for the Planning Commission to consider. The direction of the Planning Commission was to consider zoning amendments to ensure an appropriate intensity, height, and bulk transition between areas of potential friction. Due to the uniqueness of Big Beaver zoning, we recommend that right now we only focus on Neighborhood Nodes.

Based upon the direction from the Planning Commission, we offer the following amendments for consideration. These amendments would only apply to Neighborhood Nodes.

Development height, setback, and greenbelt provisions for any non-single family development in Neighborhood Nodes.

1. *Height:*
    a. *Any building, or portion of a building, on a parcel abutting a one-family residentially zoned parcel shall not exceed 2.5-stories, 30 feet in height.*
    b. *Any building, or portion of a building, on a parcel that is not abutting a one-family residentially zoned parcel shall not exceed 3-stories, 38 feet in height.*

2. *Setback and Greenbelt:*
    a. *When a parcel is abutting a one-family residential zoned parcel the building setback from the property line of the one-family residential zoned parcel shall be no less than the height of the proposed building or twenty (20) feet, whichever is greater.*
    b. *When a parcel is abutting a one-family residential zoned parcel a minimum 20-foot landscaped greenbelt shall be maintained from the property line of the one-family residential zoned parcel. The greenbelt shall be landscaped and screened in accordance with 13.02.B.*
    c. *The Planning Commission may deviate from these setback and greenbelt provisions in the course of its site plan review process; however, the Planning Commission shall not permit a setback or greenbelt that is less than required in the building form or Section 13.02.B. In the review of the deviation, the Planning Commission shall consider the following standards:*
        i. *The deviation will not adversely impact public health, safety, and welfare.*
        ii. *The deviation maintains compatibility with adjacent uses.*
        iii. *The deviation is compatible with the Master Plan and in accordance with the goals and objectives of the Master Plan and any associated subarea and corridor plans.*
        iv. *The deviation will not adversely impact essential public facilities and services, such as: streets, pedestrian or bicycle facilities, police and fire protection, drainage systems, refuse disposal, water and sewage facilities, and schools.*
        v. *The deviation will be in compliance with all other zoning ordinance standards.*
        vi. *The deviation will not adversely impact any on-site or off-site natural features.*

2. Housing Diversity and Options

The Planning Commission has questioned why the development community has not taken advantage of the housing diversity and option density bonus for smaller homes. Input from the development community notes that 1,500 sq/ft is too small to consider construction even with the associated density bonus. The Planning Commission has been told that a slight increase to 1,700 sq/ft would greatly assist in utilizing the density bonus. As such, we have proposed revised language to increase the maximum size to receive the density bonus from 1,500 to 1,700 sq/ft.

Revised Language:

Housing Diversity and Options. A bonus above the base yield number of units established in 10.04.C.1 may be provided for a development that provides a diverse variety of housing types or

provides a type of housing that is desired, but not currently offered in the city. The following requirements shall be met for the all bonus unit in excess of the base yield number of units:

a. *Maximum home square footage shall not exceed ~~1,500~~ 1,700 sq/ft; and*
b. *Master first floor bedroom and bathroom shall be provided.*

Based upon discussion and direction of the Planning Commission, we can put this in ordinance form and prepare for a public hearing.

I look forward to discussing this further.

Sincerely,

CARLISLE/WORTMAN ASSOC., INC.
Benjamin R. Carlisle, LEED AP, AICP

CITY OF TROY
MICHIGAN
PUBLIC NOTICE
CITY PLANNING COMMISSION

In accordance with the provisions of the Michigan State Law, Notice is hereby given that the Planning Commission of the City of Troy will hold Public Meetings in the City Hall, 500 West Big Beaver Road, Troy, Michigan, (248) 524-3364, on the following dates:

2020 PLANNING COMMISSION REGULAR MEETING DATES

January 14
January 28

February 11
February 25

March 10
March 24

April 14
April 28

May 12
May 26

June 9
June 23

July 14
July 28

August 11
August 25

September 8
September 22

October 13
October 27

November 10

December 8

All meetings are held in City Hall and are open to the public.
The Agenda and City website will reflect any changes in meeting times and/or rooms.

Regular Planning Commission meetings begin at 7:00 p.m. and are held in the Council Board Room. Meetings are subject to be held in the Council Chamber based on anticipated audience capacity.

This notice is hereby posted as required by Section 4 of the Open Meetings Act (MCLA 15.261 et seq.)

_____
R. Brent Savidant, AICP
Community Development Director

Posted: _____, 2019

NOTICE: *People with disabilities needing accommodations for effective participation in this meeting should contact the City Clerk by e-mail at clerk@troymi.gov or by calling (248) 524-3316 at least two working days in advance of the meeting. An attempt will be made to make reasonable accommodations.*