500 West Big Beaver
Troy, MI 48084
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PLANNING COMMISSION
MEETING AGENDA
REGULAR MEETING

Marianna Perakis, Chair, Lakshmi Malalahalli, Vice Chair
Toby Buechner, Carlton Faison, Tyler Fox, Michael W. Hutson, Tom Krent,
Dave Lambert and John J. Tagle

February 11, 2025 **7:00 P.M.** **Council Chambers**

1. ROLL CALL

2. APPROVAL OF AGENDA

3. APPROVAL OF MINUTES – January 28, 2025

4. PUBLIC COMMENT – For Items Not on the Agenda

PRELIMINARY SITE PLAN APPROVAL

5. PRELIMINARY SITE PLAN REVIEW (SP JPLN2025-0006) – Proposed Slick City Action Park, Troy, East side of Crooks, north of Maple, (1820 Crooks & 1749 Northwood), Section 28, Currently Zoned MR (Maple Road) District and IB (Integrated Industrial & Business) District.

6. PRELIMINARY SITE PLAN REVIEW (SP JPLN2024-0014) – Proposed Pinnacle of Troy, Troy, Southwest corner of Crooks and Wattles (3991 Crooks; PIN 88-20-20-226-015, -016, -017, & -106), Section 20, Currently Zoned NN (Neighborhood Node “I”) District.

OTHER ITEMS

7. PLANNING COMMISSION ANNUAL REPORT - 2024

8. PUBLIC COMMENT – For Items on the Agenda

9. PLANNING COMMISSION COMMENT

10. 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*

Televised Live, Government Channel WTRY (10 WideOpenWest and 17 Comcast) Replayed Wednesdays 3:00 pm, 6:00 pm and 11:00 pm

Chair Perakis called the Regular meeting of the Troy City Planning Commission to order at 7:01 p.m. on January 28, 2025, in the Council Chamber of the Troy City Hall. Chair Perakis and Vice Chair Malalahalli presented opening remarks relative to the role of the Planning Commission and procedure for tonight's meeting.

1. ROLL CALL

Present:
Toby Buechner
Carlton M. Faison
Tyler Fox
Michael W. Hutson
Tom Krent
David Lambert
Lakshmi Malalahalli
Marianna Perakis
John J. Tagle

Also Present:
Ben Carlisle, Carlisle Wortman & Associates
R. Brent Savidant, Community Development Director
Julie Quinlan Dufrane, Assistant City Attorney
Kathy L. Czarnecki, Recording Secretary

2. APPROVAL OF AGENDA

Resolution # PC-2025-01-006
Moved by: Faison
Support by: Fox

RESOLVED, To approve the agenda as prepared.

Yes: All present (9)

MOTION CARRIED

3. APPROVAL OF MINUTES – January 14, 2025

Resolution # PC-2025-01-007
Moved by: Buechner
Support by: Malalahalli

RESOLVED, To approve the minutes of January 14, 2025 Regular meeting as submitted.

Yes: Buechner, Faison, Fox, Hutson, Krent, Lambert, Malalahalli, Perakis
Abstain: Tagle

MOTION CARRIED

4. PUBLIC COMMENT – For Items Not on the Agenda

Dante Melotti, Jr., 1097 Kirts Blvd, Troy; addressed Big Beaver corridor vision, encouraged more prominent landscaping to screen parked cars and continuity of landscaping for entire corridor.

PRELIMINARY SITE PLAN APPROVALS

5. PRELIMINARY SITE PLAN REVIEW (SP JPLN2024-0011) – Proposed Big Beaver Mixed Use Development, South side of Big Beaver, East of I-75 (363 W Big Beaver), Section 28, Currently Zoned BB (Big Beaver) Zoning District

Mr. Carlisle reviewed the Preliminary Site Plan application for a mixed use development that retains an existing 4-story office building and proposes the construction of two towers for residential apartment units. He said the applicant is looking for feedback only this evening. Mr. Carlisle addressed the site layout, building design, parking deck, bridge connection between existing office and new apartments, access and circulation, parking, unique landscaping, and elevations.

Mr. Carlisle stated the applicant is seeking a variance from the Zoning Board of Appeals (ZBA) for the 40-foot required rear yard setback. He said the application would come back before the Planning Commission for consideration should the variance be granted by the ZBA.

Mr. Carlisle shared support of the proposed project because the applicant is reusing an existing office building and an oversized parking lot. He asked the Planning Commission to discuss with the applicant the proposed shared parking, parking concerns raised by OHM (City Traffic Consultant), pedestrian accessibility from the parking deck to residential units and use of decorative light fixtures throughout the parking deck.

Board members and the administration discussed:

- Legal nonconformity of the building.
- Pedestrian connection to/from parking deck and residential units.
- Shared parking and number of parking spaces deficient.
- Relationship of project with neighboring properties on site.

Project Architect John Marusich clarified ownership of the subject property. He said the owner intends to keep the bank and existing drive-through, has moved his personal office on site, and has a good relationship with neighboring properties.

Mr. Marusich narrated a question and answer session during a video presentation of the proposed project.

Some comments during discussion related to the following:

- Decorative lighting fixtures.
- Generous green space, unique landscaping, third level terrace amenities.
- Building identity, primary entrance, and apartment towers in relation to street presence.
- Rental units.
- Pedestrian circulation to/from parking to residential units; safety, convenience, signage.
- Design approach of parking deck.
- Concerns identified in OHM memorandum.
- Urban style of living.
- ZBA variance request.

In summary, the applicant was asked to consider:

- Provide three dimensional (3D) rendering to show context of elevation from surrounding buildings.
- Design changes to east elevation.
- Improve pedestrian/vehicular movement and address pedestrian safety; i.e., crosswalk, signage, lighting.
- Address comments identified in OHM memorandum.
- Consider softer design approach of parking deck; color scheme.

6. PRELIMINARY SITE PLAN REVIEW (SP JPLN2025-0006) – Proposed Slick City Action Park: Troy, East side of Crooks, North of Maple (1820 Crooks and 1749 Northwood), Section 28, Currently Zoned MR (Maple Road) District and IB (Integrated Industrial and Business) District

Mr. Buechner recused himself because he is the applicant. Mr. Buechner exited the meeting at 8:20 p.m.

Mr. Carlisle reviewed the Preliminary Site Plan application for Slick City Action Park. He addressed parking lot improvements, parking lot trees, and parking along the south neighboring property line. He said the applicant is requesting consideration for a parking waiver and the use of transparency alternatives.

Mr. Carlisle shared overall support for the development because the applicant is repurposing an existing building and providing a desired use in the community. Mr. Carlisle asked the Planning Commission in its deliberation to consider a parking waiver, location of parking lot trees and the use of transparency alternatives.

Mr. Carlisle said any approval of the application should be subject to the conditions as identified in his report dated January 22, 2025.

Present were Project Architect Stephen Auger and Tim Honoway of Ronnisch Construction Group.

Some comments during discussion related to the following:

- Number of parking spaces; applicant request for 128 spaces.
- Parking on neighboring site to the south.
  - Applicant working together with property owner on easement agreement.
  - Parking for employees only; safety of pedestrian traffic.
- Location of interior parking lot islands.
- Transparency alternatives; combination of glazing/mixed building material, consideration to provide fenestration.
- Color renderings for all building elevations.
- Elevation difference between new and existing buildings.
- Three dimensional (3D) rendering to show context of project with surrounding buildings.
- Operational hours: open 7 days a week; 9 a.m. to 8 p.m.
- The first *Slick City Action Park* to be in Michigan.
- Aesthetic improvements to the front elevation.

Chair Perakis opened the floor for public comment.

- Julie Buechner, 2411 Hampton; stated she and her husband Toby are excited to start their new business venture.

Chair Perakis closed the floor for public comment.

Resolution # PC-2025-01-008

Moved by: Fox
Seconded by: Lambert

RESOLVED, That Preliminary Site Plan Approval, pursuant to Article 8 of the Zoning Ordinance, as requested for the proposed Slick City Action Park: Troy, indoor commercial recreation facility, East side of Crooks, North of Maple (1820 Crooks and 1749 Northwood), Section 28, approximately 3.02 acres in size, Currently Zoned MR (Maple Road) and IB (Integrated Industrial and Business), be postponed, for the applicant to consider the following items:

1. Reorientation of the parking lot trees.
2. Clarity on the trash enclosure and mechanical equipment.
3. Consideration of suggested alterations to the front façade.
4. Provide three-dimensional (3D) rendering that shows the connection between the existing building and the proposed new building.
5. Addition of one (1) tree in the parking lot.
6. Easement for parking on the south side.
7. Widen the first drive aisle to the west of and parallel to the building to twenty-six (26) feet to accommodate fire trucks.

Discussion on the motion on the floor.

There was discussion on providing safety precautions, such as signage and speed bumps, for pedestrian traffic walking from their vehicles parked on the south side of the site to the building entrance because there is no room for a sidewalk.

Vote on the motion on the floor.

Yes: All present (9)

MOTION CARRIED

OTHER ITEMS

7. PUBLIC COMMENT – For Items on the Agenda

Dante Melotti, Jr., 1097 Kirts Blvd, Troy; addressed landscaping and architecture along Big Beaver, noted a residential complex located off Butterfield as a “hidden gem” in Troy.

Mr. Buechner returned to the meeting at 9:10 p.m.

8. PLANNING COMMISSION COMMENT

There were general Planning Commission comments.

9. ADJOURN

The Regular meeting of the Planning Commission adjourned at 9:15 p.m.

Respectfully submitted,

_____
Marianna J. Perakis, Chair

_____
Kathy L. Czarnecki, Recording Secretary

https://d.docs.live.net/2f7ed4fe5f664ea8/Documents/Kathy/COT Planning Commission Minutes/2025/2025 01 28 Draft.docx

ITEM #5

DATE: February 6, 2025

TO: Planning Commission

FROM: R. Brent Savidant, Community Development Director

SUBJECT: PRELIMINARY SITE PLAN REVIEW (SP JPLN2025-0006) – Proposed Slick City Action Park: Troy, East side of Crooks, north of Maple, (1820 Crooks & 1749 Northwood), Section 28, Currently Zoned MR (Maple Road) District and IB (Integrated Industrial & Business) District.

The petitioner Troy Gymnastics Inc & Slick City Troy submitted the above referenced Preliminary Site Plan application for a new Slick City indoor recreational facility. The applicant will utilize an existing 26,608 square foot building with an 11,723 square foot addition to accommodate this use. The Planning Commission is authorized to approve Preliminary Site Plans.

The Planning Commission considered this item on January 28, 2025 and postponed the item and provided feedback and direction (minutes attached).

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. Minutes from January 28, 2025 Planning Commission meeting (excerpt)
4. Preliminary Site Plan

PROPOSED RESOLUTION

PRELIMINARY SITE PLAN REVIEW (SP JPLN2025-0006) – Proposed Slick City Action Park: Troy, East side of Crooks, north of Maple, (1820 Crooks & 1749 Northwood), Section 28, Currently Zoned MR (Maple Road) District and IB (Integrated Industrial & Business) District.

Resolution # PC-2025-02-
Moved by:
Support by:

RESOLVED, That Preliminary Site Plan Approval, pursuant to Article 8 of the Zoning Ordinance, as requested for the proposed Slick City Action Park: Troy indoor commercial recreation facility, East side of Crooks, North of Maple (1820 Crooks & 1749 Northwood), Section 28, approximately 3.02 acres in size, Currently Zoned MR & IB, be (granted, subject to the following conditions):

1. Consolidate lots
2. Obtain parking easement with the neighboring site to the south prior to Final Approval.

_____) or

(denied, for the following reasons: _____) or

(postponed, for the following reasons:_____)

Yes:
No:
Absent:

MOTION CARRIED

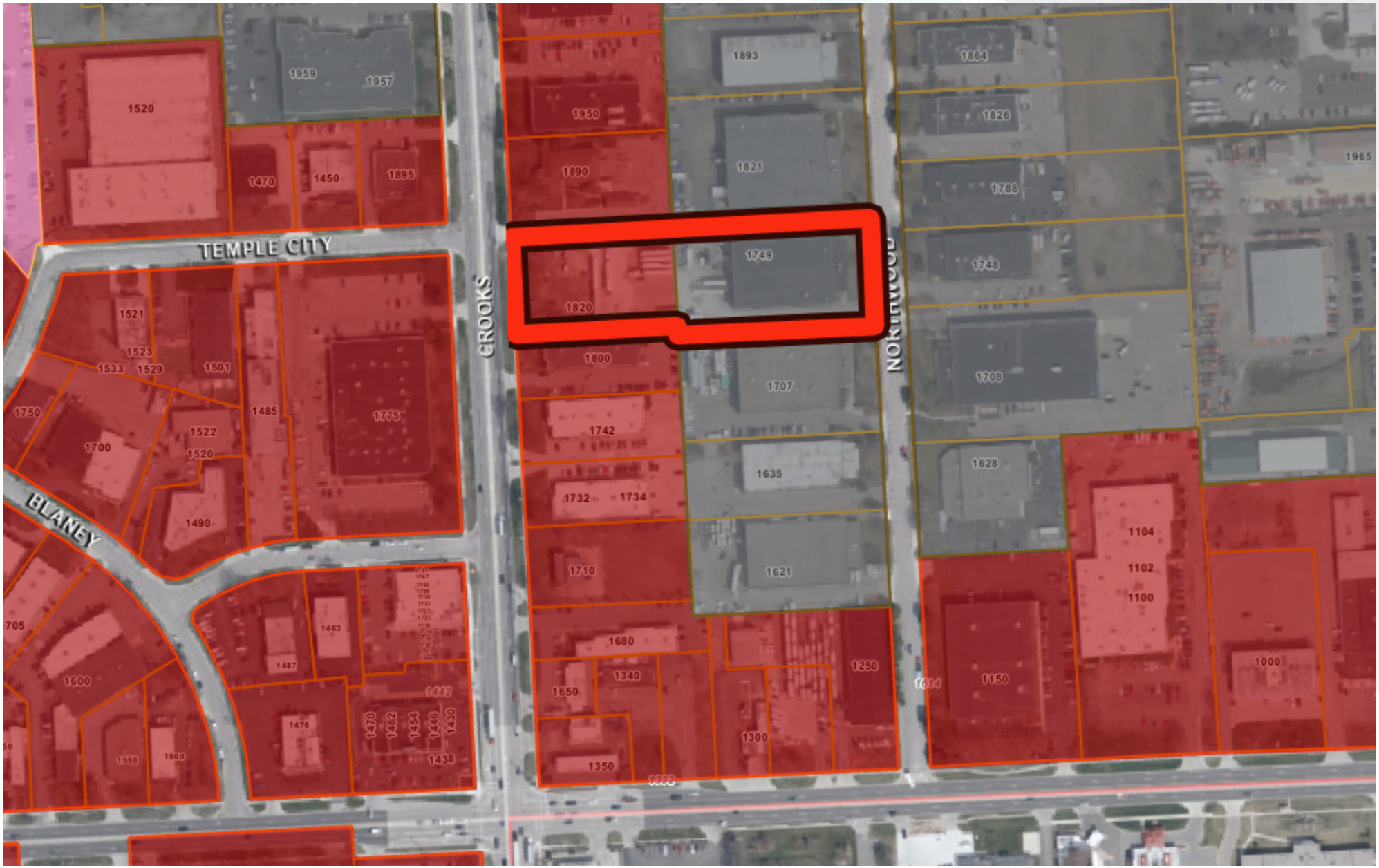
GIS Online

0 350 700 ft

Print Date: 1/23/2025

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



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Print Date: 1/23/2025

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

Date: February 6, 2025

Preliminary Site Plan Review
For
City of Troy, Michigan

Project Name:	Slick City Action Park
Plan Date:	February 4, 2025
Location:	1820 Crooks Rd. & 1749 Northwood Dr.
Zoning:	MR, Maple Road & IB, Integrated Industrial Business District
Action Requested:	Preliminary Site Plan Approval

PROJECT AND SITE DESCRIPTION

The subject site contains two (2) parcels, with one abutting Crooks Road and the other abutting Northwood Drive. The Northwood site is zoned IB, and the Crooks site is zoned Maple Road.

There is currently an existing 26,608 square foot building on the Northwood Drive parcel, which will be expanded towards Crooks as part of this project. The building addition will measure 11,723, for a total new building area of 38,331 square feet. The use of the building is for Slick City Action Park, which is an indoor slide and air court park. Indoor commercial recreation is a permitted use in both districts.

In addition to the renovation and addition to the building, other site improvements include renovation of the existing parking lot and creation of additional parking, updated site landscaping, updated site lighting, sidewalk and pedestrian site improvements, and stormwater management.

Location of Subject Site(s):

Size of Subject Site:
3.00 acres, split between two (2) parcels.

Proposed Use of Subject Site:
Indoor commercial recreation

Current Zoning:
MR, Maple Road & IB, Integrated Industrial Business District

Surrounding Property Details:

Direction	Zoning	Use
North	MR, Maple Road/ IB, Integrated Industrial Business District	Reve Medical Spa/ Premier Creative Group
South	MR, Maple Road/ IB, Integrated Industrial Business District	Entech Staffing Solutions/ Western Global
East	IB, Integrated Industrial and Business	Judy Frankel Antiques
West	MR, Maple Road	AET Integration

NATURAL FEATURES

Topography: The site has been largely graded for previous development. There are minor elevation changes on the ungraded portion of the site to the west.

Wetlands/Floodplain: The site is not encumbered with wetlands or located in a floodplain.

Woodlands: A tree inventory provided on Sheet T-1.0 identifies sixteen (16) existing trees on site. Tree replacement details are outlined in the table below.

Replacement Details		
Protected Tree	**Inches Removed**	**Replacement Required**
Landmark	0 inches	0 inches
Woodland	12 inches	6 inches
Preservation/Mitigation	**Inches Preserved**	**Credit**
Landmark	53 inches	106 inches
Woodland	17 inches	34 inches
Total	**Zero (0) inches required for replacement.**	

Items to be Addressed: *None.*

SITE ARRANGEMENT

The subject site contains two (2) parcels, with one abutting Crooks Road and the other abutting Northwood Drive. There is currently an existing 26,608 square foot building on the Northwood Drive parcel, which will be expanded towards Crooks as part of this project. The building addition will measure 11,723, for a total new building area of 38,331 square feet.

The parcel abutting Crooks is mostly covered with existing pavement and some minor greenery along the road. This parcel will be completely graded to accommodate parking. Landscape trees will be placed throughout the parking area. On the south side of the site, there is a driveway extending from Crooks Road to Northwood Drive. Additional parking will also be provided in this area. The front of the building and the primary entrance fronts on Crooks.

Items to be Addressed: *None.*

AREA, WIDTH, HEIGHT, SETBACKS

The dimensional requirements for the IB district are indicated below:

	Required	Provided	Compliance
Front Setback (Northwood)	30 feet	Over30 feet	Complies
Front Setback (Crooks)	10 feet	304 feet	Existing non-conformity. Applicant is reducing the non-conformity.

Side Setback (south)	10 feet	Over 10 feet	Complies
Side Setback (north)	10 feet	Over 10 feet	Complies
Maximum Building Lot Coverage	40%	29%	Complies
Maximum Building Height	50 feet	22 feet	Complies

Please note that the dimensional measurements are utilizing IB district requirements since the building is located on the IB portion of the site. Due to the addition, a lot consolidation is necessary to meet all required IB setbacks. Lot consolidation shall be a condition of approval.

Items to be Addressed: *Consolidate lots.*

SITE ACCESS AND CIRCULATION

Two access points are proposed: one along Northwood Drive, and one off Crooks. The Crooks access point is shared with the property to the north. The applicant has added a pedestrian sidewalk and access to the site off Crooks.

At the January 28, 2025 Planning Commission meeting, Commissioners asked the applicant to widen the first drive aisle west of and parallel to the building to twenty-six (26) feet to accommodate fire trucks. Revised site plans dated February 4, 2025, reflect this revision.

Items to be Addressed: *None.*

PARKING

Table 13.06-A of the Zoning Ordinance:

	Required	Provided	Compliance
Indoor and outdoor recreational uses of public or private ownership or use: 1 space for each 1,000 SF of enclosed recreational space + 1 space for each employee on the largest typical shift + 2 spaces for each court (tennis, racquetball, etc.), and 4 for each hole of golf	29,515 SF/1,000 = 30 spaces + 10 employees*1 = 10 spaces **40 total spaces required**	128 spaces	See note below
Barrier Free	5 spaces	5 spaces	Complies

Dimensions	19 feet length 9.5 feet width 24 feet aisle width	17 feet length (south side) 9.5 feet width 24 feet aisle width	Does Not Comply

Parking:
Based on the applicants experience with similar indoor recreational uses they find that the proposed parking is needed. Below is the explanation provided by the applicant:

1. Building size will be 38.1k sq ft & ~120 Parking spots which = .317p spots/1000 sq ft
    - My wife & I created and run Troy Gymnastics for almost 20 years. This is my 5th commercial building in Troy near 15 & Crooks. All 5 buildings are a similar use (& size): kids playing. Mathematically, all 5 buildings are between .2+ & .3+ parking spots per thousand square feet. My 4 buildings parking has worked very well. There are days each building is maxed out. This 5th building has a little more parking than the others. I think this is smart and needed. Brand new concept; demand is high.
    - Slick City's executives. There are 10. All came from the kid industry: trampoline parks, ninja, Sky Zones, Zap Zone, etc. They have hundreds of years in this business. Their recommended # for my operation is ~120 spots.
    - Slick City was formed in early 2024. Their model is big box stores with lots of parking. This is new. They have dozens of Franchises open and in the works of opening. They are all in this ~.3 to .35 spaces per 1000 sq ft range.
    - My architect's math:
        - Recreational space-25,760 SF/1000=25.76 spots
        - General Assembly-241 seats/3=80.3 spots
        - Business- Expected 10 employees/1 per= 10 spots
        - Total=116.1 spots
        - 117 spots required, 128 Spots Provided

Dimensions:
Along the south property line, the applicant proposes parking stalls that are 17-feet in length instead of the required 19-feet. With the proposed arrangement, many vehicles parked in this area will overhang roughly 2-feet onto the neighboring property. We ask the applicant to pursue a parking easement with the property owner to the south. If the applicant is unable to obtain a parking easement, they may have to remove that parking.

Loading:
No loading space is required as there are no manufacturing, warehousing, retailing or similar uses on site.

Items to be Addressed: *1). Planning Commission to consider parking waiver; and 2). Obtain parking easement with the neighboring site to the south.*

LANDSCAPING

Landscaping is regulated by Section 13.02:

	Required	Provided	Compliance
Greenbelt: 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.	Crooks: (183 LF/30)= 6 trees Northwood: (199 LF/30)= 7 trees	Crooks: 6 trees Northwood: 7 trees	Complies
Site Landscaping: A minimum of 20% of the site area shall be comprised of landscape material. Up to 25% of the required landscape area may be brick, stone, pavers, or other public plaza elements, but shall not include any parking area or required sidewalks.	20% of site	26%	Complies
Parking Lot Trees: 1 per 8 spaces Landscaping shall be arranged in curbed islands within the parking lot which shall not be less than 200 SF.	127 spaces/8= 16 trees	16 trees; 7 located along lot perimeter	Complies with PC approval

Parking Lot Trees:
Original site plans proposed a total of six (6) parking lot trees within the parking lot, with the rest of the trees arranged along the lot perimeter. At the January 28, 2025 Planning Commission meeting, Commissioners requested that some trees be relocated from the perimeter into parking lot islands. Revised site plans dated February 4, 2025 show nine (9) parking lot trees within the parking lot.

Stormwater Management:
Underground detention details are provided on Sheet C-9.1. We refer to the City Engineer for further review of stormwater management.

Trash Enclosure:
A trash container is shown at the site's southeast corner and will be screened with a CMU block wall.

Mechanical Equipment:
Mechanical equipment is shown at the site's northwest corner and will be screened with evergreen shrubs.

Items to be Addressed: *Planning Commission to consider layout of parking lot trees.*

LIGHTING

The proposed photometric plan complies with all lighting requirements. The site utilizes a combination of three (3) pole lights and nine (9) wall-mounted lights.

***Items to be Addressed**: None.*

FLOOR PLANS AND ELEVATIONS

Floor Plans:
The total building footprint is 38,331 square feet, including 29,515 square feet of "park" area. Near the building entrance, there is a lobby and check in counter, manager's office, restroom, and locker space. Near the building rear, there is a food prep/kitchen space, "front of the house" food area, break room, event space, restrooms, storage rooms, and various utility rooms.

Building Materials:
Material use include masonry block on lowest level, with metal siding above. The materials as described by the applicant:

The project utilizes the materials typical in both the existing building and nearby structures to ensure the building fits the nearby context but utilizes a shift in color and higher amount of transparent windows to create a more appealing building for passerby. The shift from the typical dark blue corrugated siding found at the existing building to a lighter blue to work well with both the existing colors of the building and the proposed signage for the business. The shift in materials and alignment of the windows also establishes a more human scale for visitors as they approach the building.

Elevations:
Elevations are shown on Sheet A.201, with a maximum height of 33'-6". The proposed colors include gray, light blue and dark blue.

Transparency:
The Maple Road District requires 30% transparency for the elevation along Crooks Road. The applicant has proposed a combination of transparency and transparency alternatives. The use of alternatives may be approved by the Planning Commission as stated in Section 5.05.E.3.b. Transparency is measured between two and eight feet above the first-floor elevation.

Our calculations find that 23.4% transparency has been provided along the first floor of the Crooks elevation. In addition, the following alternatives are provided:

1. Change in plane around the building entrance
2. Variations in material and color
3. An additional 500 square feet of transparency provided above the first-floor elevation

***Items to be Addressed:** Planning Commission to consider use of transparency alternatives.*

SITE PLAN REVIEW STANDARDS

The Site Plan review standards provide the Planning Commission with direction when reviewing the proposed site plan and design features of this development.

Section 8.06 outlines Site Plan Review Design Standards.

1. *Development shall ensure compatibility to existing commercial districts and provide a transition between land uses.*
    a. *Building design shall enhance the character of the surrounding area in relation to building and parking placement, landscape and streetscape features, and architectural design.*
    b. *Street fronts shall provide a variety of architectural expression that is appropriate in its context and prevents monotony.*
    c. *Building design shall achieve a compatible transition between areas with different height, massing, scale, and architectural style.*

2. *Development shall incorporate the recognized best architectural building design practices.*
    a. *Foster a lasting impact on the community through the provision of high quality design, construction, and detailing.*
    b. *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.*
    c. *Develop buildings with creativity that includes balanced compositions and forms.*
    d. *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.*
    e. *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.*
    f. *Include community amenities that add value to the development such as patio/ seating areas, water features, art work or sculpture, clock towers, pedestrian plazas with park benches or other features located in areas accessible to the public.*

3. *Enhance the character, environment and safety for pedestrians and motorists.*
    a. *Provide elements that define the street and the pedestrian realm.*
    b. *Create a connection between the public right of way and ground floor activities.*
    c. *Create a safe environment by employing design features to reduce vehicular and pedestrian conflict, while not sacrificing design excellence.*
    d. *Enhance the pedestrian realm by framing the sidewalk area with trees, awnings, and other features.*
    e. *Improve safety for pedestrians through site design measures.*

Items to be Addressed: *Planning Commission to consider if the site plan standards have been met.*

SUMMARY

Overall, we support the development of this site as the applicant is repurposing an existing building and providing a desired use in the community. As part of the deliberation, the Planning Commission should consider the following:

1. Parking waiver
2. Location of parking lot trees
3. Use of transparency alternatives

If the Planning Commission approves the preliminary site plan, we suggest the following conditions:

1. Consolidate lots
2. Obtain parking easement with the neighboring site to the south

Sincerely,

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

CARLISLE/WORTMAN ASSOC., INC.
Shana Kot
Community Planner

6. PRELIMINARY SITE PLAN REVIEW (SP JPLN2025-0006) – Proposed Slick City Action Park: Troy, East side of Crooks, North of Maple (1820 Crooks and 1749 Northwood), Section 28, Currently Zoned MR (Maple Road) District and IB (Integrated Industrial and Business) District

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Mr. Carlisle reviewed the Preliminary Site Plan application for Slick City Action Park. He addressed parking lot improvements, parking lot trees, and parking along the south neighboring property line. He said the applicant is requesting consideration for a parking waiver and the use of transparency alternatives.

Mr. Carlisle shared overall support for the development because the applicant is repurposing an existing building and providing a desired use in the community. Mr. Carlisle asked the Planning Commission in its deliberation to consider a parking waiver, location of parking lot trees and the use of transparency alternatives.

Mr. Carlisle said any approval of the application should be subject to the conditions as identified in his report dated January 22, 2025.

Present were Project Architect Stephen Auger and Tim Honoway of Ronnisch Construction Group.

Some comments during discussion related to the following:

- Number of parking spaces; applicant request for 128 spaces.
- Parking on neighboring site to the south.
  - Applicant working together with property owner on easement agreement.
  - Parking for employees only; safety of pedestrian traffic.
- Location of interior parking lot islands.
- Transparency alternatives; combination of glazing/mixed building material, consideration to provide fenestration.
- Color renderings for all building elevations.
- Elevation difference between new and existing buildings.
- Three dimensional (3D) rendering to show context of project with surrounding buildings.
- Operational hours: open 7 days a week; 9 a.m. to 8 p.m.
- The first *Slick City Action Park* to be in Michigan.
- Aesthetic improvements to the front elevation.

Chair Perakis opened the floor for public comment.

- Julie Buechner, 2411 Hampton; stated she and her husband Toby are excited to start their new business venture.

Chair Perakis closed the floor for public comment.

Resolution # PC-2025-01-008

Moved by: Fox
Seconded by: Lambert

RESOLVED, That Preliminary Site Plan Approval, pursuant to Article 8 of the Zoning Ordinance, as requested for the proposed Slick City Action Park: Troy, indoor commercial recreation facility, East side of Crooks, North of Maple (1820 Crooks and 1749 Northwood), Section 28, approximately 3.02 acres in size, Currently Zoned MR (Maple Road) and IB (Integrated Industrial and Business), be postponed, for the applicant to consider the following items:

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2. Clarity on the trash enclosure and mechanical equipment.
3. Consideration of suggested alterations to the front façade.
4. Provide three-dimensional (3D) rendering that shows the connection between the existing building and the proposed new building.
5. Addition of one (1) tree in the parking lot.
6. Easement for parking on the south side.
7. Widen the first drive aisle to the west of and parallel to the building to twenty-six (26) feet to accommodate fire trucks.

Discussion on the motion on the floor.

There was discussion on providing safety precautions, such as signage and speed bumps, for pedestrian traffic walking from their vehicles parked on the south side of the site to the building entrance because there is no room for a sidewalk.

Vote on the motion on the floor.

Yes: All present (9)

MOTION CARRIED

Slick City Action Park

1820 Crooks Rd/1749 Northwood
Troy, Michigan, 48084

Preliminary Site Plan Application
Architectural Statements
February 2024

AKA 30 ARCHITECTS YEARS
FOUNDED 1994
AUGER KLEIN ALLER
ARCHITECTS INC.
303 E. Third Street, Ste. 100
Rochester, MI 48307
248.814.9160
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Table of Contents

Architectural Design Statements

Architectural Summary

This project includes the renovation of and addition to an existing 1 story, 5,451 sf. office space and a 21,157 sf. industrial space. The renovation and addition will shift the office spaces to usage for recreational gathering with minor food preparation and the 11,700 sf. addition will add to the warehouse portion of the building and adapt the space for active recreational usage aimed towards children. The primary recreational space will have large slides and sport courts similar to other Slick City locations throughout the US. The form and articulation of the proposed addition will blend with the existing building and the surrounding integrated business district. The project will also be merging the 1820 Crooks Rd. and 1749 Northwood Rd parcels, the existing property will have its current parking space expanded, improved, and brought up to the current code for MRF Maple Road. This addition will bring more recreational business into the area while improving the visual for passersby on Crooks Road.

Existing Site Context

The current state of the site along Northwood is buildings similar to the existing structure, masonry shorter structures that connect to larger industrial/business use spaces with corrugated metal siding with 7-10 feet of masonry base. Buildings comply with 50 foot setback and light tree lining to the road. Crooks rd. is comparatively more heavily lined with greenspace on a larger thoroughfare with buildings of about 1-2 stories made of masonry with glazing facing street with foliage. Project will adjust to the context of Northwood side via continuing the 8 foot masonry base and a shift to corrugated metal for the rest of the building height while not stepping closer to the road or removing the existing landscaping, also the exterior of the shorter portion of the building currently facing Northwood will not be changed. As for the Crooks context, the existing site has a mess of greenspace that is unmaintained, alongside a parking lot in need of repaving that has gone largely unmaintained. The project will improve upon the appearance of the site, bringing it to similar visual state to the surrounding context. This will be done by replacing the existing landscaping with a designed landscape barrier between parking and roadway and heavily improving the existing parking via repaving and additional plantings while ensuring form-based code compliance.

Description of Design Concept

Project’s design concept is to have a simple well designed primary façade, and an interior aligned with franchise design standards and similar active play recreational franchises. Site plan design will focus on a welcoming environment that attracts visitors and creates safe means of egress from Crooks rd and the parking lot to the building.

Achievement of Design Concept

Design concept is achieved on the scale of site via proper lighting, accessible sidewalks, and landscape and plantings throughout, all following required ordinances of the City of Troy and Maple Road form-based zoning. The primary façade utilizes a shift in materials, colors and transparency to establish a clear entry to the building and create an appealing building to passerby and visitors alike.

Description of Development Program

The project will primarily focus on indoor active play recreation utilizing slides, play courts, and similar play equipment. Some spaces are separated for group usage for child parties such as birthdays, with other sitting areas that overlook the play space for parents to watch their children and for kids to take a break. Some dining will be providing via minimal on site food preparation. There is business like spaces to support the main program such as the check in area, the lockers for visitors to place belongings, and an office space.

Description of Building Materials

The project utilizes the materials typical in both the existing building and nearby structures to ensure the building fits the nearby context, but utilizes a shift in color and higher amount of transparent windows to create a more appealing building for passerby. The shift from the typical dark blue corrugated siding found at the existing building to a lighter blue to work well with both the existing colors of the building and the proposed signage for the business. The shift in materials and alignment of the windows also establishes a more human scale for visitors as they approach the building.

Description of Transparency Requirements

The project achieves ordinance transparency requirements for Maple Road’s form-based zoning of 30% transparency. This is done via utilizing transparency alternatives of color and material variations through the shift between masonry and corrugated metal and utilizing two different colors for the corrugated metal, and expression of structural systems through a change in plane through the inset entry of 6 feet. These attribute to 532 SF of the required 1248 SF of transparency or 42%, complying to requirements of transparency alternatives attributing to at most 50% of the transparency requirements. The final 716 SF is all achieved via the building’s standard transparency of windows and doors.

02.04 Site Plan Approval–Resubmittal	01.25 Site Plan Approval	Sheet No.	Sheet Description
■	■		Drawing Issued
□	□		For Reference Only
■	■	A.CVR	COVERSHEET
			ARCHITECTURAL
□	□	A.001	PROJECT DATA
□	□	A.002	PROJECT DATA CONTINUED
■	■	ASP.1	PROPOSED ARCHITECTURAL SITE PLAN
■	■	ASP.2	SITE PLAN DETAILS
■	■	A.101	PROPOSED FLOOR PLANS
□	□	FFE.101	PROPOSED FURNITURE, FIXTURES, EQUIPMENT FLOOR PLAN
■	■	A.201	PROPOSED BUILDING ELEVATIONS
■	■	A.202	PROPOSED BUILDING PERSPECTIVE RENDERS
■		A.203	PROPOSED BUILDING PERSPECTIVE RENDERS
□		A.204	PROPOSED BUILDING ISOMETRIC RENDERS
■	■	P.1	PROPOSED PHOTOMETRIC PLAN
			CIVIL
□		C0.0	CIVIL COVER
■	■	C1.0	TOPOGRAPHIC SURVEY
■	■	C3.0	PRELIMINARY DIMENSION PLAN
■	■	C4.1	PRELIMINARY GRADING PLAN–WEST
■	■	C4.2	PRELIMINARY GRADING PLAN–EAST
■	■	C5.0	PRELIMINARY UTILITY PLAN
■	■	C9.0	NOTES AND DETAILS
□	□	C9.1	CONTECH UNDERGROUND DETENTION DETAILS
			LANDSCAPE
■	■	L1.0	LANDSCAPE PLAN
■	■	L1.1	LANDSCAPE DETAILS
■	■	T1.0	TREE PROTECTION PLAN

AKA ARCHITECTS 30 YEARS
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February 4, 2025
Site Plan Approval
Resubmittal

Project

Slick City Action Park

1820 Crooks Rd./1749 Northwood Dr.
Troy, Michigan

Location Map
No Scale

AKA Architects Inc. Project Number 2432.00

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Slick City Action Park 2432

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MATERIAL KEY

SYMBOL	DESCRIPTION
	BRICK
	CMU: HOLLOW
	CMU: SOLID
	CONCRETE
	FINISHED WOOD
	PLYWOOD
	TILE
	MARBLE
	EARTH
	METAL
	STEEL
	LUMBER / WOOD BLOCK'G: CONTONUOUS
	LUMBER / WOOD BLOCK'G: DISCONTINUOUS (SHIM)
	LOOSE OR BATT INSULATION
	RIGID INSULATION
	CARPET
	GYPSUM WALLBOARD
	GRANULAR OR GRAVEL FILL

SYMBOLS KEY

SYMBOL	DESCRIPTION
	PROJECT NORTH VERIFY ORIENTATION ON PLAN SHEETS
X	EXIST COLUMN CENTER LINES
X	NEW COLUMN CENTER LINES
BLDG SECT 1 A.202	BUILDING SECTION CUT SYMBOL
1 A.202	DETAIL CUTS
P1	PARTITION TYPE
3 4 A.501 5 6	INTERIOR ELEVATION
EXIST OFFICE	EXISTING ROOM NAME
ROOM NAME 101	NEW ROOM NAME/NUMBER
	EXIST DOOR TO REMAIN
	ITEMS SCHEDULED FOR DEMOLITION
101	NEW DOOR AND NUMBER
	LEADER LINE
	DIMENSION LINE
X	WINDOW TYPE
1	BULLETIN
1	ADDENDUM
+100'-0"	FINISH FLOOR ELEVATION

ARCHITECTURAL KEYNOTES

1

GENERAL NOTES

1.) ALL APPLICABLE LAWS, ORDINANCES AND REGULATIONS OF ALL AUTHORITIES WITH JURISDICTION OVER THE CONSTRUCTION SHALL APPLY IN THE PERFORMANCE OF ALL WORK ASSOCIATED WITH THIS PROJECT. IN CASE OF CONFLICT, THE MOST STRINGENT CODE SHALL APPLY.

2.) THE CONTRACTOR SHALL SECURE AND ASSUME ALL COSTS OF ALL REQUIRED PLAN REVIEW AND BUILDING PERMIT FEES AND BONDS.

3.) CONTRACTORS AND SUBCONTRACTORS SHALL VERIFY SITE CONDITIONS. ANY INCONSISTENCIES BETWEEN DRAWINGS AND FIELD CONDITIONS SHALL BE RESOLVED WITH ARCHITECT PRIOR TO COMMENCEMENT OF THE WORK.

4.) CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY CONDITIONS DISCOVERED WHERE MODIFICATION OF THE INTENT OF THE DESIGN WOULD PRODUCE BENEFICIAL RESULTS.

5.) CONTRACTOR AND SUBCONTRACTORS TO PROVIDE ALL NECESSARY TEMPORARY PROTECTION TO INSURE THE SAFETY OF THE GENERAL PUBLIC DURING CONSTRUCTION.

6.) THE STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE BUILDING CODES AND DESIGN STANDARDS TO SUPPORT IN-PLACE DESIGN LOADS IN A COMPLETED BUILDING STRUCTURE. PROVIDE ADDITIONAL SUPPORTS OR TEMPORARY SHORING/ BRACING FOR THE STRUCTURE AS NEEDED DUE TO THE FORCES IMPOSED DURING HANDLING AND ERECTION.

7.) CONSTRUCTION METHODS, PROCEDURES, AND SEQUENCES ARE THE CONTRACTORS' RESPONSIBILITY, CONTRACTOR SHALL TAKE ALL NECESSARY MEANS TO MAINTAIN AND PROTECT STRUCTURAL INTEGRITY OF CONSTRUCTION AT ALL STAGES.

8.) THE CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS AND DIMENSIONS PRIOR TO ANY WORK AND SHALL BE RESPONSIBLE FOR ALL WORK AND MATERIALS INCLUDING THOSE FURNISHED BY SUBCONTRACTORS AND OWNERS.

9.) ANY DETAILS OR NOTES REQUIRING FIELD VERIFICATION BY THE CONTRACTOR ARE TO BE DONE DURING THE BID PROCESS. DISCREPANCIES FOUND AFTER THE GENERAL CONTRACTOR IS SELECTED WILL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND CORRECTED AT HIS EXPENSE.

10.) APPROVED PLANS SHALL BE KEPT IN A PLAN BOX AND SHALL NOT BE USED BY WORKMEN. ALL CONSTRUCTION SETS SHALL REFLECT SAME INFORMATION. CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS IN GOOD CONDITION ON THE PREMISES AT ALL TIMES.

11.) CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION, TESTING AND BALANCING OF HVAC SYSTEM. SUPPLY AND RETURN DUCTS SHALL BE DAMPERED IF REQUIRED. PROVIDE FIRE DAMPERS ON ALL RETURN OPENINGS IN RATED CONSTRUCTION, TYPICAL.

12.) IF ANY GENERAL NOTE CONFLICTS WITH ANY DETAIL OR NOTE ON THE PLANS OR IN THE SPECIFICATIONS, THE STRICTEST PROVISION SHALL GOVERN.

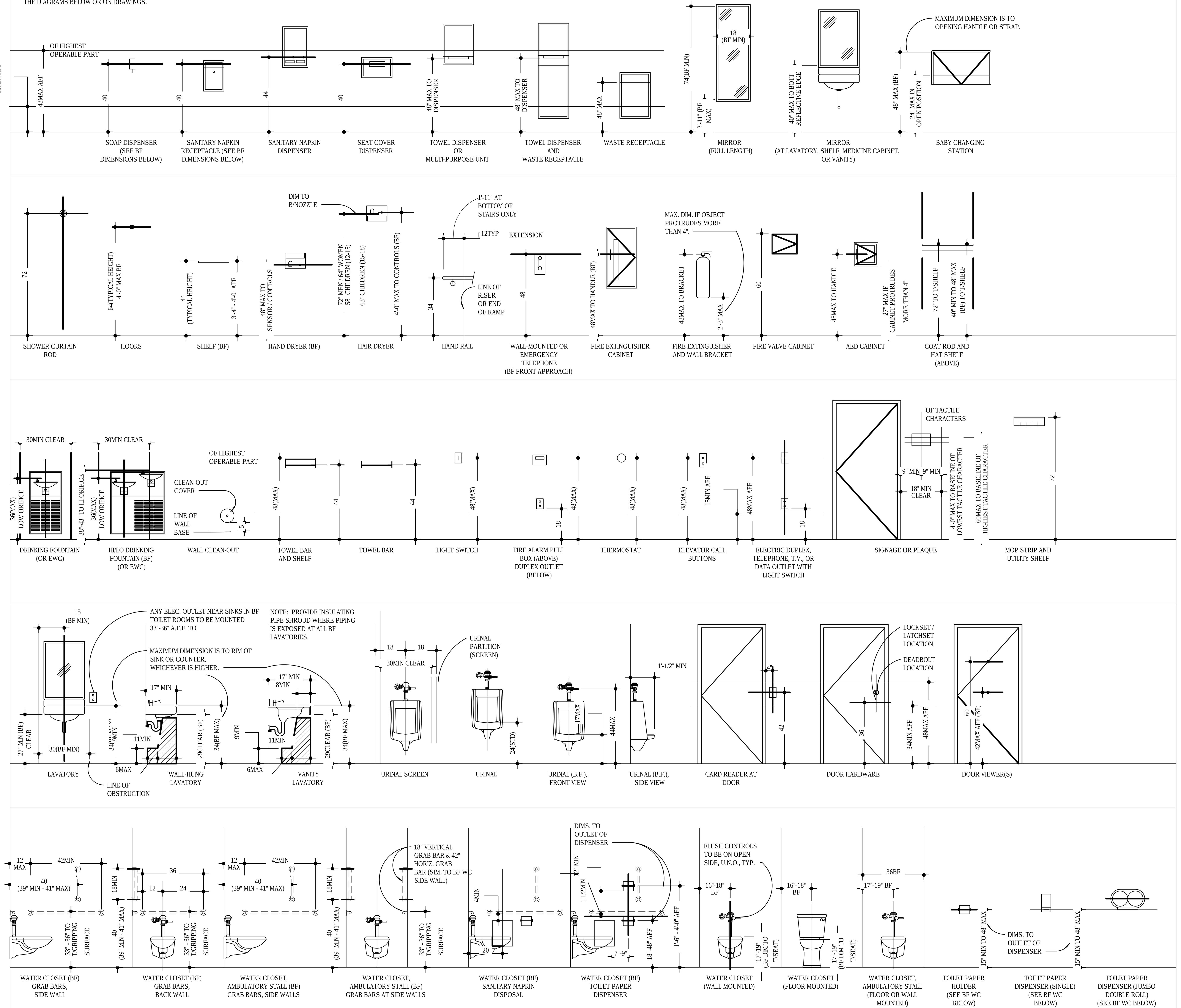
FINISH LEGEND

P1	WALL FINISH
F1	FLOOR FINISH
B1	BASE FINISH
XX - X	EXTENT OF FINISH MATERIAL
XX - X	FLOOR
XX - X	TRANSITION
XX - X	BASE
XX - X	WALL
XX - X	ALIGN
	DIRECTIONAL TRANSITION - SEE FINISH SCHEDULE
	TRANSITION STRIP - SEE FINISH SCHEDULE

TYPICAL MOUNTING HEIGHT LEGEND

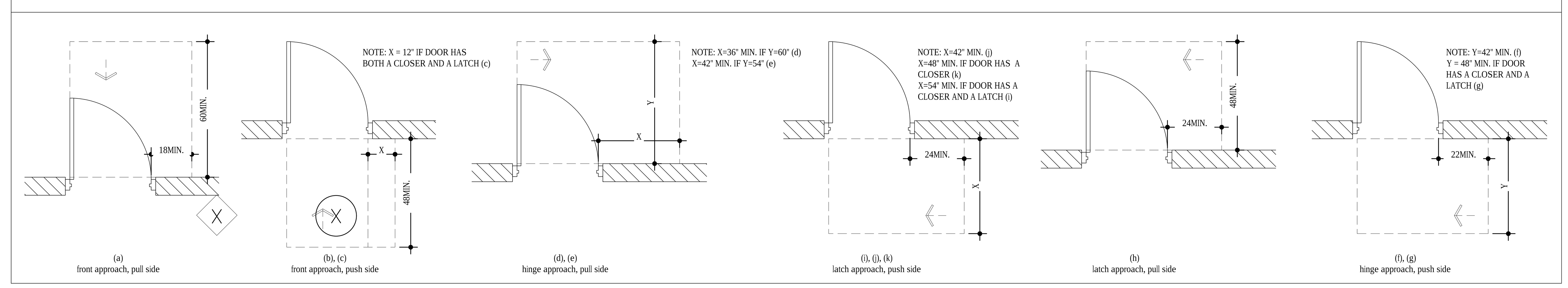
GENERAL NOTES:

1. MOUNTING HEIGHTS SHOWN ARE PROPOSED FOR ALL ACCESSORIES AND FIXTURES REQUIRED UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS FOR SPECIFIC CONDITIONS.
2. PROVIDE IN-WALL BLOCKING FOR ALL WALL-MOUNTED COMPONENTS.
3. BF DENOTES BARRIER-FREE REQUIREMENTS.
4. ALL DIMENSIONS FROM FLOOR ARE TAKEN FROM FINISH FLOOR.
5. CONTRACTOR IS TO NOTIFY ARCHITECT IF ACCESSORY TO BE PROVIDED IS NOT ILLUSTRATED IN THE DIAGRAMS BELOW OR ON DRAWINGS.



OF HIGHEST OPERABLE PART
SOAP DISPENSER (SEE BF DIMENSIONS BELOW)
SANITARY NAPKIN RECEPTACLE (SEE BF DIMENSIONS BELOW)
SANITARY NAPKIN DISPENSER
SEAT COVER DISPENSER
TOWEL DISPENSER OR MULTI-PURPOSE UNIT
TOWEL DISPENSER AND WASTE RECEPTACLE
WASTE RECEPTACLE
MIRROR (FULL LENGTH)
MIRROR (AT LAVATORY, SHELF, MEDICINE CABINET, OR VANITY)
MAXIMUM DIMENSION IS TO OPENING HANDLE OR STRAP.
BABY CHANGING STATION
SHOWER CURTAIN ROD
HOOKS
SHELF (BF)
HAND DRYER (BF)
HAIR DRYER
HAND RAIL
WALL-MOUNTED OR EMERGENCY TELEPHONE (BF FRONT APPROACH)
FIRE EXTINGUISHER CABINET
FIRE EXTINGUISHER AND WALL BRACKET
FIRE VALVE CABINET
AED CABINET
COAT ROD AND HAT SHELF (ABOVE)
DRINKING FOUNTAIN (OR EWC)
HI/LO DRINKING FOUNTAIN (BF) (OR EWC)
WALL CLEAN-OUT
TOWEL BAR AND SHELF
TOWEL BAR
LIGHT SWITCH
FIRE ALARM PULL BOX (ABOVE) DUPLEX OUTLET (BELOW)
THERMOSTAT
ELEVATOR CALL BUTTONS
ELECTRIC DUPLEX, TELEPHONE, T.V., OR DATA OUTLET WITH LIGHT SWITCH
SIGNAGE OR PLAQUE
MOP STRIP AND UTILITY SHELF
LAVATORY
WALL-HUNG LAVATORY
VANITY LAVATORY
URINAL SCREEN
URINAL
URINAL (B.F.), FRONT VIEW
URINAL (B.F.), SIDE VIEW
CARD READER AT DOOR
DOOR HARDWARE
DOOR VIEWER(S)
WATER CLOSET (BF) GRAB BARS, SIDE WALL
WATER CLOSET (BF) GRAB BARS, BACK WALL
WATER CLOSET, AMBULATORY STALL (BF) GRAB BARS, SIDE WALLS
WATER CLOSET, AMBULATORY STALL (BF) GRAB BARS AT SIDE WALLS
WATER CLOSET (BF) SANITARY NAPKIN DISPOSAL
WATER CLOSET (BF) TOILET PAPER DISPENSER
WATER CLOSET (WALL MOUNTED)
WATER CLOSET (FLOOR MOUNTED)
WATER CLOSET, AMBULATORY STALL (FLOOR OR WALL MOUNTED)
TOILET PAPER HOLDER (SEE BF WC BELOW)
TOILET PAPER DISPENSER (SINGLE) (SEE BF WC BELOW)
TOILET PAPER DISPENSER (JUMBO DOUBLE ROLL) (SEE BF WC BELOW)

TYPICAL MOUNTING HEIGHT LEGEND



NOTE: X = 12" IF DOOR HAS BOTH A CLOSER AND A LATCH (c)
NOTE: X=36" MIN. IF Y=60" (d) X=42" MIN. IF Y=54" (e)
NOTE: X=42" MIN. (j) X=48" MIN. IF DOOR HAS A CLOSER (k) X=54" MIN. IF DOOR HAS A CLOSER AND A LATCH (j)
NOTE: Y=42" MIN. (l) Y = 48" MIN. IF DOOR HAS A CLOSER AND A LATCH (g)
(a) front approach, pull side
(b), (c) front approach, push side
(d), (e) hinge approach, pull side
(i), (j), (k) latch approach, push side
(h) latch approach, pull side
(f), (g) hinge approach, push side

STANDARD ABBREVIATIONS

AC	-	ACOUSTIC CEILING PANEL
AD	-	ADDENDUM
AES	-	ARCHITECTURALLY EXPOSED STRUCTURAL STEEL
AFF	-	ABOVE FINISHED FLOOR
ALT	-	ALTERNATE
ALU	-	ALUMINUM
AN	-	ANODIZED
AP	-	ACRYLIC PANELS
BR	-	BOARD
BF	-	BARRIER FREE
BLD	-	BUILDING
BOS	-	BOTTOM OF STEEL
BUL	-	BULLETIN
CB	-	CONCRETE BRICK
CG	-	CORNER GUARD
CJ	-	CONTROL JOINTS
CL	-	CENTER LINE
CL	-	CEILING
CL	-	CLOSET
CMU	-	CONCRETE MASONRY UNIT
COL	-	COLUMN
CONC	-	CONCRETE
CONC-S	-	CONCRETE – SEALED
CPT	-	CARPET
CPTB	-	CARPET BASE
CW	-	COLD WATER
DCMU	-	DECORATIVE CONCRETE MASONRY UNIT
DEFS	-	DIRECT-APPLIED EXTERIOR FINISH SYSTEM
DEMO	-	DEMOLISH, DEMOLITION
DF	-	DRAPERY FABRIC
DIA	-	DIAMETER
DIM	-	DIMENSION
DN	-	DOWN
DS	-	DOWNSPOUT
DW	-	DISHWASHER
DWG(S)	-	DRAWING(S)
EA	-	EACH
EIFS	-	EXTERIOR INSULATION AND FINISH SYSTEM
EJ	-	EXPANSION JOINT
EL	-	ELEVATION
EM	-	EMERGENCY
EOS	-	EDGE OF SLAB
EQ	-	EQUAL
EQUIP	-	EQUIPMENT
EWC	-	ELECTRIC WATER COOLER
EX	-	EXISTING
EXIST	-	EXISTING
EXP	-	EXPANSION
FAB	-	FABRIC
FD	-	FLOOR DRAIN
FE	-	FIRE EXTINGUISHER
FEC	-	FIRE EXTINGUISHER CABINET
FHC	-	FIRE HOSE CABINET
FDN	-	FOUNDATION
FRP	-	FIBERGLASS REINFORCED PANEL
FRT	-	FIRE RETARDANT TREATED
FT	-	FOOT, FEET
FWC	-	FABRIC WALL COVERING
FWP	-	FABRIC WRAPPED PANEL
FWTP	-	FABRIC WRAPPED TACKABLE PANEL
GA	-	GAUGE
GALV	-	GALVANIZED
GB	-	GYPSUM BOARD
GFRC	-	GLASS FIBER REINFORCED CONCRETE
GL	-	GLASS
GLBL	-	GLASS BLOCK
GLT	-	GLASS TILE
GMB	-	GLASS MARKER BOARD
HM	-	HOLLOW METAL
HW	-	HOT WATER
HORZ	-	HORIZONTALLY
HPC	-	HIGH PERFORMANCE COATING
HT	-	HEIGHT
IIC	-	IMPACT ISOLATION CLASS
IN	-	INCH, INCHES
INCL	-	INCLUDING, INCLUSIVE
INSUL	-	INSULATION
JC	-	JANITOR'S CLOSET
LAV	-	LAVATORY
LF	-	LINEAL FOOT / FEET
LIN	-	LINOLEUM
LLH	-	LONG LEG HORIZONTAL
LLV	-	LONG LEG VERTICAL
LTS	-	LINOLEUM TACKABLE SURFACE
LVT	-	LUXURY VINYL TILE
MAT	-	ENTRANCE MAT
MAX	-	MAXIMUM
MB	-	MARKER BOARD
MECH	-	MECHANICAL
MFR	-	MANUFACTURER
MIN	-	MINIMUM
MISC	-	MISCELLANEOUS
MJ	-	MOVEMENT JOINT
MO	-	MASONRY OPENING
MTL	-	METAL
MW	-	MICROWAVE OVEN
NAF	-	NO ADDITIONAL FINISH
NIC	-	NOT IN CONTRACT
NTS	-	NOT TO SCALE
OC	-	ON CENTER
OD	-	OUTSIDE DIAMETER
OFCI	-	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	-	OWNER FURNISHED, OWNER INSTALLED
OPP	-	OPPOSITE
P	-	PAINT
PFN	-	PRE-FINISHED
PL	-	PLASTIC LAMINATE
PSF	-	POUNDS PER SQUARE FOOT
PSI	-	POUNDS PER SQUARE INCH
PVC	-	POLYVINYL CHLORIDE
QSSM	-	QUARTZ SOLID SURFACING MATERIAL
QT	-	QUARRY TILE
QTB	-	QUARRY TILE BASE
QZ	-	QUARTZ, NATURAL STONE
RB	-	RESILIENT BASE
REF	-	REFRIGERATOR
REINF	-	REINFORCED, REINFORCING
REQD	-	REQUIRED
RES	-	RESILIENT FLOORING
RD	-	ROOF DRAIN
RF	-	RUBBER FLOORING
RO	-	ROUGH OPENING
RP	-	RESIN PANEL
RTR	-	RESILIENT TREADS/RISERS
SF	-	SPORT FLOORING
SIM	-	SIMILAR
SPEC	-	SPECIFICATION
SQFT	-	SQUARE FEET
SS	-	STAINLESS STEEL
SSM	-	SOLID SURFACE MATERIAL
STC	-	SOUND TRANSMISSION COEFFICIENT
ST	-	STONE
STN	-	STAIN
T	-	TILE (CERAMIC, PORCELAIN)
TB	-	TILE BASE (CERAMIC, PORCELAIN)
TBD	-	TO BE DETERMINED
T&G	-	TONGUE AND GROOVE
THK	-	THICKNESS
THOLD	-	THRESHOLD
TOS	-	TOP OF STEEL
TRANS	-	TRANSPARENT
TYP	-	TYPICAL
TZ	-	TERRAZZO
TZT	-	TERRAZZO TILE
UL	-	UNDERWRITER'S LABORATORY
UNO	-	UNLESS NOTED OTHERWISE
UPH	-	UPHOLSTERY
UR	-	URINAL
VCT	-	VINYL COMPOSITION TILE
VERT	-	VERTICAL
VIF	-	VERIFY IN FIELD
WC	-	WATER CLOSET
WD	-	WOOD
WDB	-	WOOD BASE
WDF	-	WOOD FLOORING
WLC	-	WALL COVERING
WPFG	-	WATERPROOFING
WP	-	WORK POINT
WD	-	WOOD

RONNISCH Construction Group

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PROJECT
Slick City Action Park

1749 Northwood Dr
Troy, MI

DATE ISSUED	ISSUED FOR
02/04/25	SPA Resubmit

DRAWN
CHECKED
APPROVED

SHEET
Project Data

scale as shown

FILE NUMBER
2432

SHEET NUMBER
A.001

Applicant:

Toby Buechner
Slick City Action Park

Legal Description

PARCEL 1:
THE LAND IS DESCRIBED AS FOLLOWS: SITUATED IN THE CITY OF TROY, COUNTY OF OAKLAND, STATE OF MICHIGAN

TAX ID: 20-28-302-019 CONTAINING: 76,017 SQ FT OR 1.75 ACRES

PARCEL 2:
THE LAND IS DESCRIBED AS FOLLOWS: SITUATED IN THE CITY OF TROY, COUNTY OF OAKLAND, STATE OF MICHIGAN

TAX ID: 20-28-302-008 CONTAINING: 55,443 SQ FT OR 1.27 ACRES

Project Description:

Proposed 11,723 SF addition to existing 11,725 SF building on 1749 Northwood. The building currently consists of a 5451 SF office space and a 21,157 SF industrial space. The existing industrial space and some of the office space will be converted to recreational usage, along with the planned addition. The form and articulation of the proposed addition will blend with the existing building and the surrounding integrated business district. The project will also be merging the 1820 Crooks Rd. and 1749 Northwood Rd parcels, the existing property will have its current parking expanded, improved, and brought up to current code for MRF Maple Road. This addition will bring more recreational business into the area while improving the visual for passerby on Crooks Road.
Zoned IB - Integrated Industrial Business, MRF Maple Road

Estimated Development Time:

Construction is scheduled to finish in Late 2025 with opening opening in Early 2026

Schedule of Regulations (City of Troy, Michigan)

STANDARD	REQUIRED	PROPOSED	COMPLIES
Lot Area	NA	3.02 Acres (1.27+1.75) (131517 S.F.)	Yes
Lot Width	NA	183 FT., 199 FT.	Yes
Yard Setbacks	West Side(Front): 50 FT.	W. Side: 315 FT	Yes
	North Side: 15 FT.	N. Side: 31 FT	Yes
	South Side: 15 FT.	S. Side: 41 FT	Yes
	East Side(Front): 50 FT.	E. Side: 59 FT 3 IN	Yes
Lot Coverage	Max 40 %	29% (38,248 SF/131,460 SF)	Yes
Building Height	50'-0" (Max)	33'-2"	Yes
Lightpost Height	30'-0" (Max)	25'-0"	Yes
Parking	Total Spaces Required 119.8(120) Spaces	Proposed-128 Spaces	Yes
	Recreational 1 Space/1000 SF = 29.5 Spaces	30 spaces	Yes
	Employee 1 Space/Employee on Shift = 10 Spaces	10 spaces	Yes
	General Assembly 1 Space/3 Seats = 80.3 Spaces	88 spaces	Yes
Parking (Setbacks)	NA - Site does not abut residential district	0 FT	NA
Loading&Unloading	NA	No Manufacturing, Storage, Warehousing, Retailing or Wholesaling Uses. Recreation Use Only.	NA
Landscaping Requirements	Landscaped Open Space: Min. 20% of total site area (131,517 S.F.) shall be landscaped open space. 26,303 SF Required.	Total 33,206 SF Landscaped Space	Yes
	0 Replacement Trees	0 Replacement Trees	Yes
Parking Lot Landscaping Requirements -	16 Trees 1 Tree/8 Additional Spaces	16 Additional Trees	Yes

Existing Land Use Areas

Existing Hardscape	26,608 S.F.
Existing Paved	61,700 S.F.
Landscaping	43,152 S.F.
Totals	131,460 S.F.

Proposed Land Use Areas

Proposed Hardscape	38,351 S.F.
Proposed Paved	54,603 S.F.
Landscaping	38,726 S.F.
Totals	131,460 S.F.

General Notes

1. Site is currently zoned Integrated Industrial Business (IB)(Northwood), Maple Road(MRF)(Crooks)
2. Site layout is based on official Oakland County data, preexisting architectural drawings and professional surveys.
3. Site topography is represented on aforementioned survey.
4. This site does not involve equipment with the potential of emitting air contaminants such as smoke, open fire, gasses, or noises.
5. Hazardous materials do not exist, nor are they stored on this site.
6. This site has been prepared in accordance with the provisions in the wetlands protection ordinances and as such shall not pollute, impair or destroy wetlands as no wetlands exist on the site
7. All new utility lines shall be buried underground.
8. Final number and location of fire lane signage and fire hydrants shall be coordinated with the City of Troy Fire Department.
9. All site lighting shall conform to local codes and ordinances. Exterior lighting shall be fully shielded and directed downward to prevent off-site glare. Light intensity at base will not exceed twenty (20) foot-candles during business hours and ten (10) foot-candles after business hours. Site illumination shall not exceed 1.0 foot-candle along property lines. All measurements of foot-candles over the entire area will be done five (5) feet above the surface.

Deviations from Underlying Zoning Districts

1. If parcels not combined then coverage on Northwood parcel will exceed code
2. Existing parking to South not compliant with code, easement will be gained with property owner of 1707 Northwood to allow for parking overhang.

Parking:

1. All spaces provided 9.5' x 19' typical
2. All physically Handicapped (P.H.) spaces provided 9.5' x 19' typical w/ 8' wide access aisles for van accessibility
3. All drive aisles 24' minimum for 2-way traffic.
10. Parcel Boundaries to be redrafted between Parcel 20-28-302-019 & Parcel 20-28-302-008 with intent of merging parcels. All setbacks measured to current parcel boundaries.
11. Building & Site signage shall be cohesive with the proposed architecture and site landscape design. (to be submitted under separate signage application)
12. Existing parking off of Northwood Rd is too small for both an access lane to be two-way and for ordinance required parking spaces by 6". Easement with neighbor over overhang of cars onto property will be gained.
13. Parking lot fronts on a public roadway and shall be screened by a landscaped berm at least three (3) feet in height along the perimeter of the road right-of-way. Alternative landscape plantings or a solid wall that does not exceed three (3) feet in height may be approved, where it is found that space limitations or visibility for vehicular circulation prevent construction of a landscape berm.

FLOOR PLAN LEGEND

- SHADED AREA INDICATES EXISTING CONSTRUCTION TO REMAIN (NIC)
- GYPSUM BOARD WALL WITH METAL STUDS (UNO)
- PRECAST CONCRETE WALL - REFER TO STRUCTURAL DOCUMENTS
- CONCRETE MASONRY UNIT - REFER TO STRUCTURAL DOCUMENTS
- BRICK WALL - REFER TO STRUCTURAL DOCUMENTS
- CAST-IN-PLACE CONCRETE WALL - REFER TO STRUCTURAL DOCUMENTS
- PROPERTY LINE
- LINE OF CONSTRUCTION ABOVE
- (P1) PARTITION TYPE - REFER TO A005
- (E) EMERGENCY BLUE PHONE
- FE WALL MOUNTED FIRE EXTINGUISHER
- FEC FIRE EXTINGUISHER CABINET - SURFACE MOUNTED
- RFEC FIRE EXTINGUISHER CABINET - RECESSED MOUNTED
- RRFEC RATED FIRE EXTINGUISHER CABINET - RECESSED MOUNTED
- CR CARD READER
- FCR FUTURE CARD READER
- DO BARRIER FREE DOOR OPERATOR
- IC INTERCOM
- CUH CABINET UNIT HEATER - WALL MOUNTED
- RCUH CABINET UNIT HEATER - RECESSED MOUNTED
- MASONRY MOVEMENT JOINT
- CJ CONTROL JOINT
- EJ EXPANSION JOINT
- NON- COMBUSTIBLE PLYWOOD BLOCKING FOR WALL MONITORS - REFER TO AV DRAWINGS

Code Compliance Chart

1. CODE COMPLIANCE
2015 MICHIGAN BUILDING CODE.
2015 MICHIGAN ENERGY CODE
2021 MICHIGAN MECHANICAL CODE
2021 MICHIGAN PLUMBING CODE
2023 NATIONAL ELECTRICAL CODE
ICC A117.1-2009

2. USE & OCCUPANCY CLASSIFICATION MBC CHAPTER 3
A-3 - AMUSEMENT ARCADES/GYMNASIUM
B - BUSINESS

3. CONSTRUCTION TYPE MBC CHAPTER 6
CONSTRUCTION TYPE 2B

4. FIRE SUPPRESSION MBC 903
PROPOSED FULLY SUPPRESSED

5. FIRE ALARMS MBC 907

6. ALLOWABLE BUILDING HEIGHT AND AREAS MBC TABLES 504.3 & 506.2
A-3 & B TYPE 2B, SPRINKLERED:
BUILDING HEIGHT: 75 FT. ALLOWED; ~32 FT. PROPOSED (BUILDING COMPLIES)
NUMBER OF STORIES: 3 STORIES ALLOWED (E); 1 STORY EXISTING (BUILDING COMPLIES)
AREA FACTOR: 38,000 S.F.,44,422 WITH FRONTAGE INCREASES (E) ALLOWED; 41,002 S.F. EXISTING (BUILDING COMPLIES)

7. OCCUPANT LOAD MBC 1004, 1004.4, 1004.6 TABLE 1004.1.2
A-3
EXERCISE ROOM(PARK AREA): 29,515 SF/50 GROSS = 590.3 OCCUPANTS
ASSEMBLY, UNCONCENTRATED: 3,940 SF/15 NET = 262.7 OCCUPANTS

B
ACCESSORY STORAGE/UTILITY: 1,055/300=3.4 OCCUPANTS
KITCHENS:1,240/200=6.2 OCCUPANTS
OFFICE SPACES: 2,230/100=22.3 OCCUPANTS

TOTAL: 884.9 OCCUPANTS

8. EXIT ACCESS & NUMBER OF EXITS MBC 1006 TABLE 1006.2.1, TABLE 1006.3.1, 1017.2
COMMON PATH OF EGRESS TRAVEL (1006.2.1, TABLE 1006.2.1):
E OCCUPANCY: 75 FT. MAXIMUM WITH SUPPRESSION
B OCCUPANCY: 100 FT. MAXIMUM WITH SUPPRESSION
CURRENT FURTHEST COMMON PATH: 53 FT

NUMBER OF EXITS (1006, TABLE 1006.3.1):
OCCUPANT LOAD 500-1000 = MIN. 3 REQUIRED 6 PROVIDED

EXIT ACCESS TRAVEL DISTANCE (TABLE 1017.2):
B OCCUPANCIES W/ SPRINKLER = 300 FT MAX. FROM MOST REMOTE POINT
A OCCUPANCIES W/SPRINKLER = 250 FT MAX FROM MOST REMOTE POINT
CURRENT FURTHEST PATH: 150 FT

9. REQUIRED FIRE RESISTANCE OF BUILDING ELEMENTS MBC 508, CHAPTER 7, 1022, 1022, 30056.4 AND TABLE 601

TYPE 2B CONSTRUCTION	
PRIMARY STRUCTURAL FRAME	0 HRS.
BEARING WALLS	0 HRS.
EXTERIOR	0 HRS.
INTERIOR	0 HRS.
NON-BEARING WALLS & PARTITIONS	0 HRS.
FLOOR CONSTRUCTION & SECONDARY MEMBERS	0 HRS.
ROOF CONSTRUCTION & SECONDARY MEMBERS	0 HRS.

10. SPACES REQUIRING FIRE RESISTANCE RATING SEPARATION (MBC, 508.2.4, 508.3 AND TABLE 508.4):
NO SEPARATION OF SPATIAL USES REQUIRED

11. ROOF COVERING MATERIAL MBC TABLE 1505.1
CLASS C ROOF ASSEMBLY

12. BUILDING OCCUPANCY LOAD ACTUAL PROGRAM (MBC & LARA 2022)

USE	AREA(SF)	FACTOR	OCCUPANTS
A-3	29,515	50 GROSS	590.3
	3,940	15 NET	262.7
B	2,250	LARGEST STAFF: 10	10
TOTAL			863

13. REQUIRED PLUMBING FIXTURES (MPC, TABLE 403.1):
ASSEMBLY A3:
DINING AREAS
WATER CLOSETS:
MALE: 1 PER 75 (131.4 OCCUPANTS = 1.75 REQUIRED)
FEMALE: 1 PER 75 (131.4 OCCUPANTS = 1.75 REQUIRED)
LAVATORIES:
MALE: 1 PER 200 (131.4 OCCUPANTS = .65 REQUIRED)
FEMALE: 1 PER 200 (131.4 OCCUPANTS = .65 REQUIRED)
DRINKING FOUNTAIN: 1 PER 500 (262.7 OCCUPANTS = .52 REQUIRED)
SERVICE SINK: 1 REQUIRED

PARK AREA
WATER CLOSETS:
MALE: 1 PER 125 (295.2 OCCUPANTS = 2.36 REQUIRED)
FEMALE: 1 PER 65 (295.2 OCCUPANTS = 4.54 REQUIRED
LAVATORIES:
MALE: 1 PER 200 (295.2 OCCUPANTS = 1.47 REQUIRED)
FEMALE: 1 PER 200 (295.2 OCCUPANTS = 1.47 REQUIRED)
DRINKING FOUNTAIN:1 PER 500(590.3 OCCUPANTS = 1.18 REQUIRED)
SERVICE SINK: 1 REQUIRED

BUSINESS B:
WATER CLOSETS:
MALE: 1/25 FOR < 50 (5 OCCUPANTS = .2 REQUIRED)
FEMALE: 1/25 FOR < 50 (5 OCCUPANTS = .2 REQUIRED)
LAVATORIES:
MALE: 1/40 FOR < 80 (5 OCCUPANTS = .13 REQUIRED)
FEMALE: 1/40 FOR < 80 (5 OCCUPANTS = .13 REQUIRED)
DRINKING FOUNTAIN: 1 PER 100 (10 OCCUPANTS = .1 REQUIRED)
SERVICE SINK: 1 REQUIRED

TOTAL:
WATER CLOSETS:
MALE: 4.31(5) REQUIRED, 6 PROVIDED
FEMALE: 6.49(7) REQUIRED, 8 PROVIDED
LAVATORIES:
MALE: 2.25(3) REQUIRED, 6 PROVIDED
FEMALE: 2.25(3) REQUIRED, 6 PROVIDED
DRINKING FOUNTAINS:1.8(2) REQUIRED, 2 PROVIDED
SERVICE SINK:1 REQUIRED, 1 PROVIDED

14. 2015 MICHIGAN UNIFORM ENERGY CODE (CHAPTER 5) & ANSI/ASHRAE/IESNA STANDARD 90.1-2013
BUILDING ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 5 (TABLE 5.5-5)

	INSULATION MIN R-VALUE	ASSEMBLY MAXIMUM
ROOFS		
ABOVE DECK	R-30.0 C.I.	U-0.032
METAL BUILDING	R-19.0 + R-11 Ls OR R-25 + R-8 Ls	U-0.037
ATTIC AND OTHER	R-49.0	U-0.021
WALLS, ABOVE-GRADE		
MASS	R-11.4 C.I.	U-0.090
METAL BUILDING	R-0 + R-19 C.I.	U-0.050
STEEL-FRAMED	R-13 + R-10 C.I.	U-0.055
WOOD-FRAMED AND OTHER	R-13 + R-7.5 C.I. OR R-19 + R-5 C.I.	U-0.051
WALLS, BELOW-GRADE		
BELOW GRADE WALLS	R-7.5 C.I.	C-0.119
FLOORS		
MASS	R-14.6 C.I.	U-0.057
STEEL JOISTS	R-30	U-0.038
WOOD FRAMED AND OTHER	R-30	U-0.033
SLAB-ON-GRADE FLOORS		
UNHEATED	R-15 FOR 24"	F-0.520
HEATED	R-20 FOR 48"	F-0.688
VERTICAL GLAZING		
NONMETAL FRAMING (ALL)		U-0.32, SHGC-0.40
METAL FRAMING (FIXED)		U-0.42, SHGC-0.40
METAL FRAMING (OPERABLE)		U-0.50, SHGC-040
METAL FRAMING (ENTRANCE DOOR)		U-0.77, SHGC-0.40

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ARCHITECTS INC.
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248.814.9160
WWW.AKA-ARCHITECTS.NET

PROJECT
Slick City Action Park

1749 Northwood Dr
Troy, MI

DATE ISSUED	ISSUED FOR
02/04/25	SPA Resubmit

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SHEET
Project Data Continued

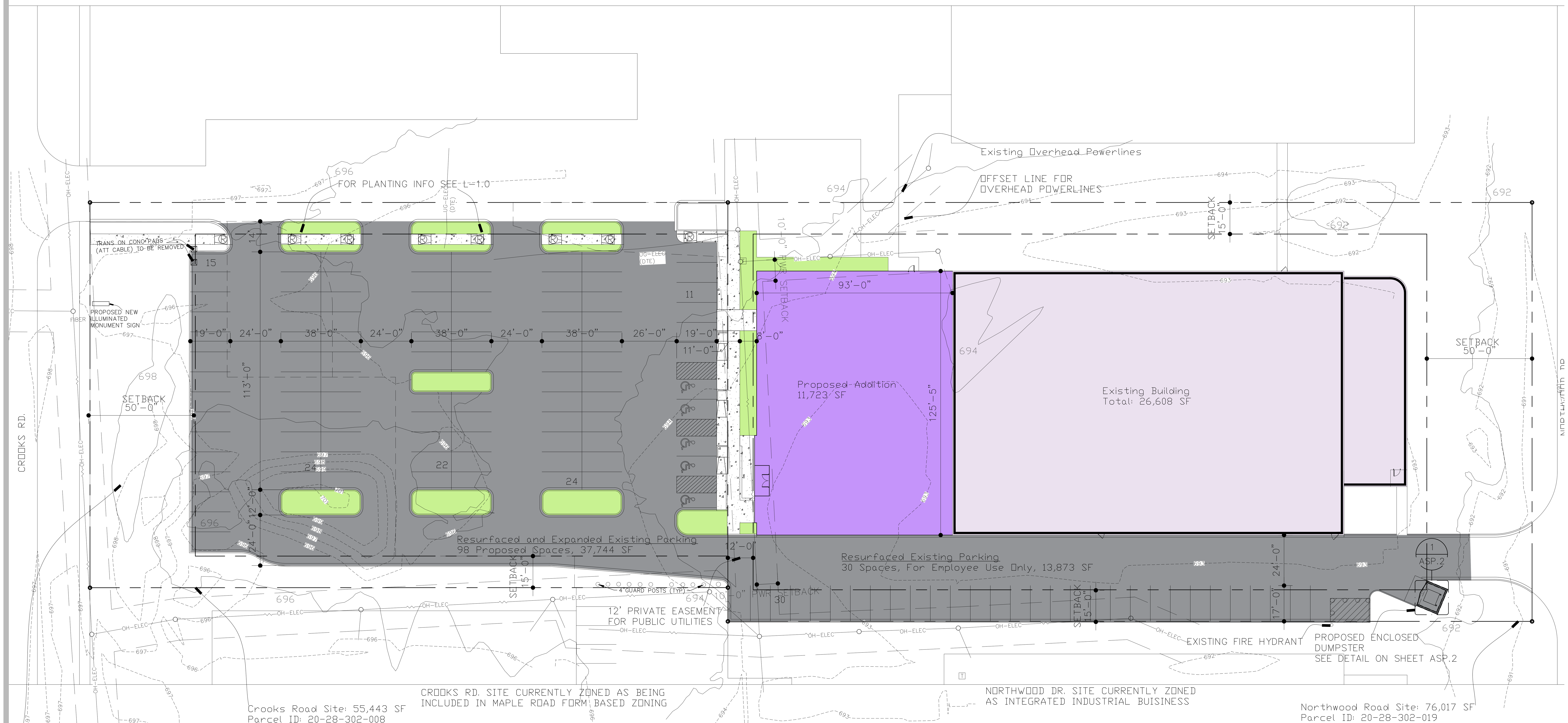
scale as shown

FILE NUMBER
2432

SHEET NUMBER
A.002

Legend

- Existing Building
- Proposed Addition
- Added Greenscape
- Resurfaced/Additional Parking
- Restriped Existing Parking



13.02.C.3.B
Parking lots that front on a public roadway shall be screened by a landscaped berm at least three (3) feet in height along the perimeter of the road right-ofway. Alternative landscape plantings or a solid wall that does not exceed three (3) feet in height may be approved, where it is found that space limitations or visibility for vehicular circulation prevent construction of a landscape berm.

Total Area: 131,460 SF, 3.02 Acres
Maximum coverage=40%

Current(Northwood site) 35% Coverage
With Addition: 50%
Upon merging of Parcels coverage drops to 29%

1 ASP Site Plan
SCALE: 1/20" = 1'-0"

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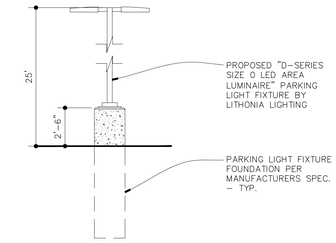
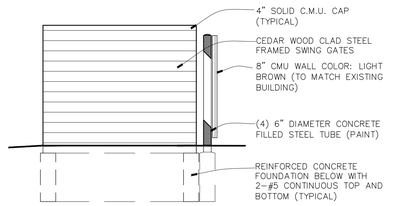
SHEET
Architectural Site Plan
scale as shown

FILE NUMBER
2432

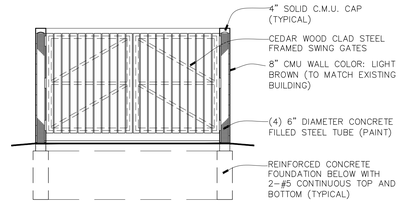
SHEET NUMBER
ASP-1



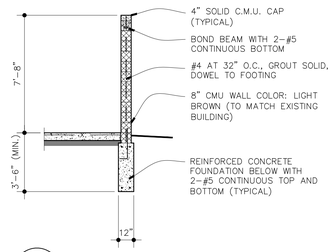
4 ASP.2 Typical Parking Lot Light Pole Detail
SCALE: 1/4" = 1'-0"



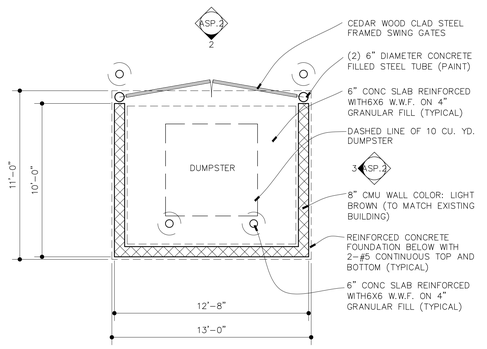
3 ASP.2 Trash Enclosure Elevation
SCALE: 1/4"=1'-0"



2 ASP.2 Trash Enclosure Elevation



5 ASP.2 Trash Enclosure Wall Section
SCALE: 1/4"=1'-0"



1 ASP.2 Trash Enclosure Plan
SCALE: 1/4"=1'-0"

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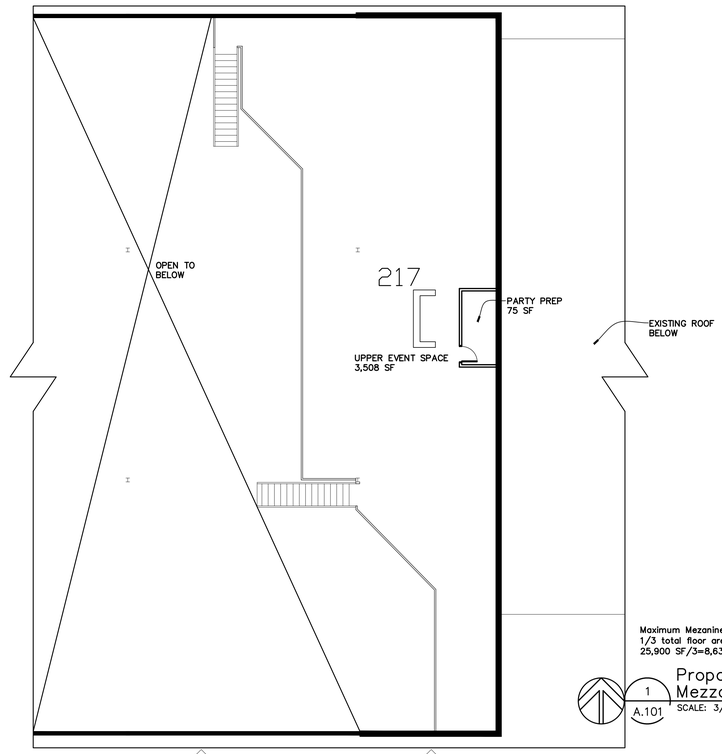
Site Details

scale as shown

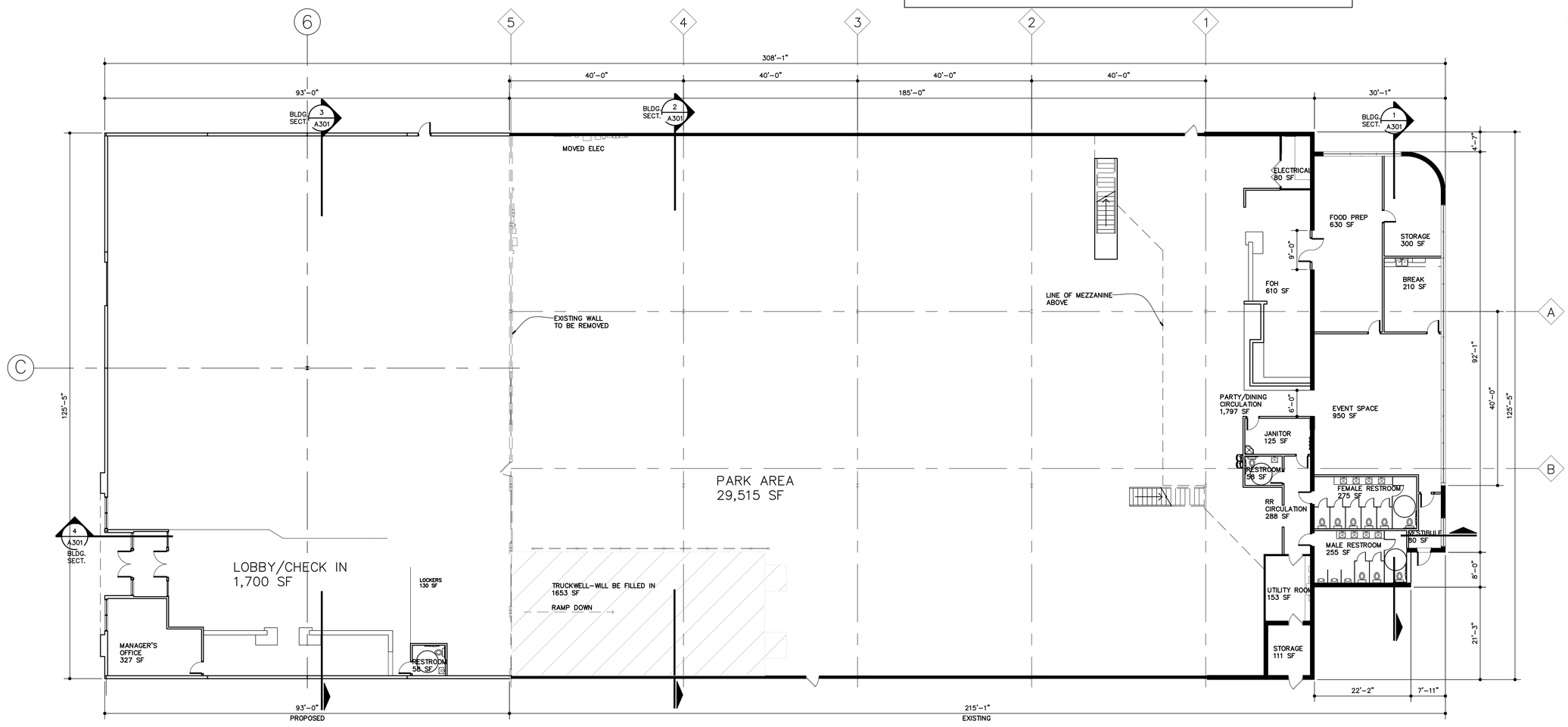
FILE NUMBER
2432

SHEET NUMBER
ASP.2



Maximum Mezanine Space
1/3 total floor area of room its located within
25,900 SF/3=8,633 SF

1 A.101 Proposed Mezzanine Plan
SCALE: 3/32" = 1'-0"



1 A.101 Proposed First Floor Plan
SCALE: 3/32" = 1'-0"

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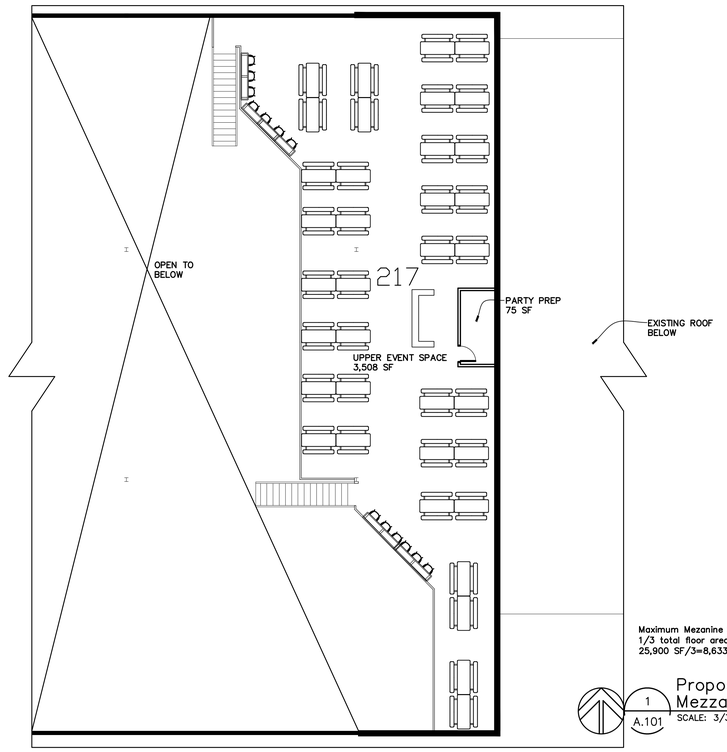
SHEET
Proposed First
Floor Plan

scale as shown

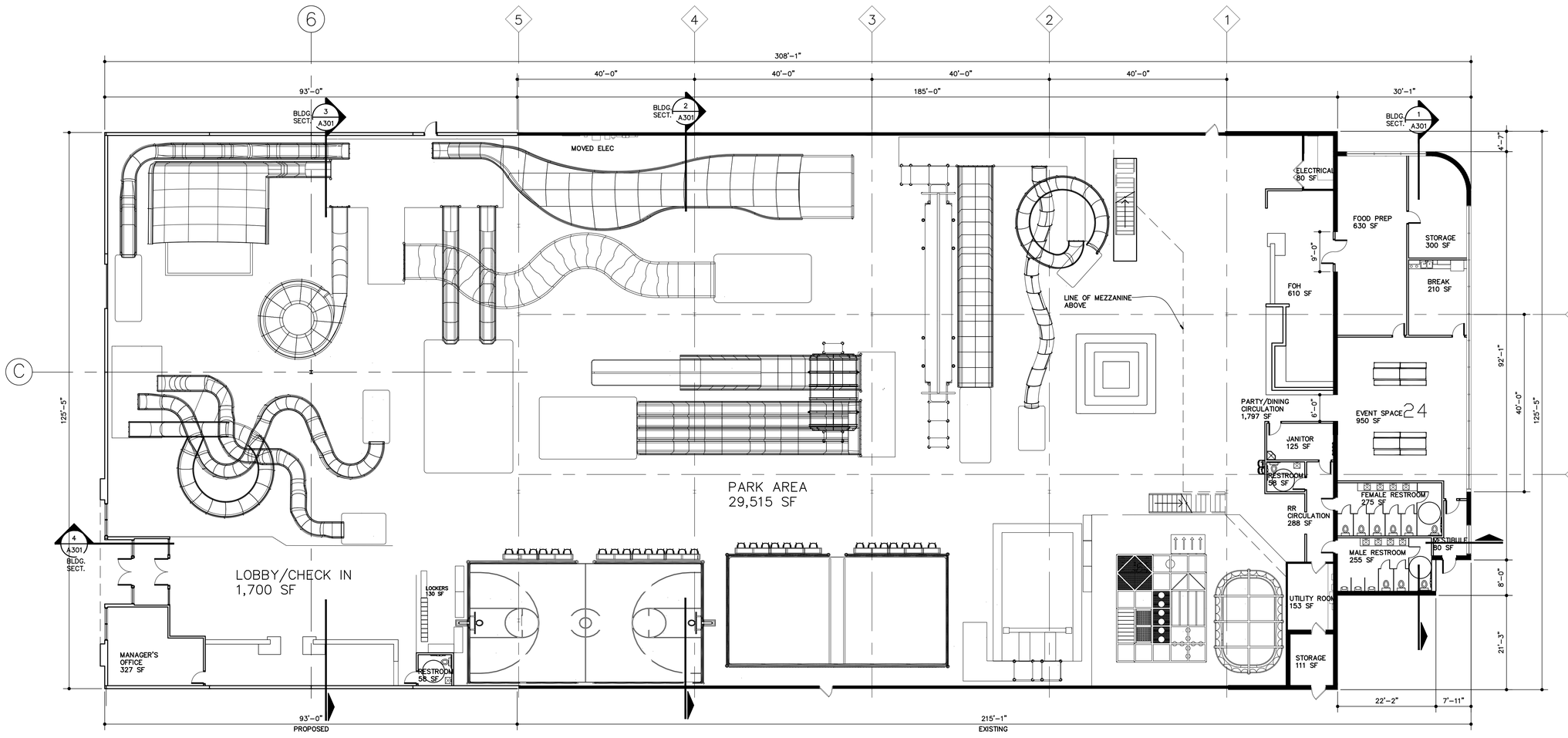
FILE NUMBER
2432

SHEET NUMBER
A.101



Maximum Mezanine Space
1/3 total floor area of room its located within
25,900 SF/3=8,633 SF

1 A.101 Proposed FFE Mezzanine Plan
SCALE: 3/32" = 1'-0"



1 A.101 Proposed FFE First Floor Plan
SCALE: 3/32" = 1'-0"

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SHEET
Proposed Furniture, Fixtures, Equipment Floor Plan
scale as shown

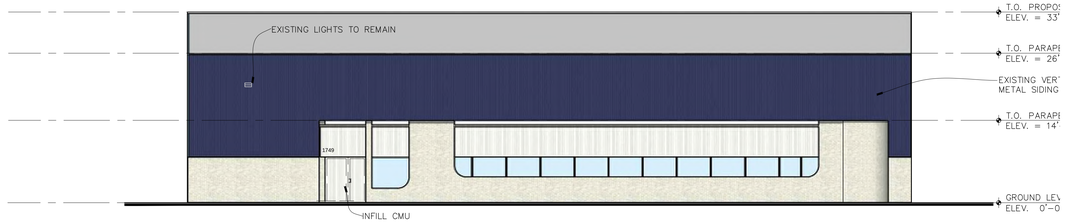
FILE NUMBER
2432

SHEET NUMBER
FFE.101

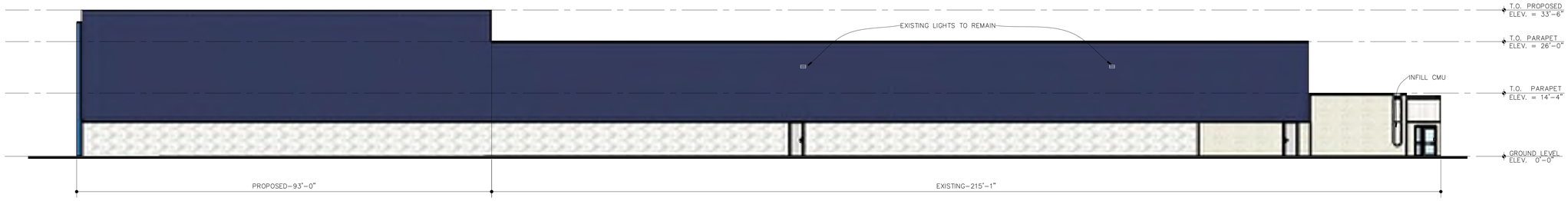
Total area of Western Facade: 4,160 SF
Required Transparency: at least 1,248 SF(30%)
Current Transparency: 1,265 SF (30%)

Maximum Sign Size: 416 SF(10%)
Current Sign Size: 254 SF(6%)

4 A.201 Building Elevation – West
SCALE: 3/32" = 1'-0"



3 A.201 Building Elevation – East
SCALE: 3/32" = 1'-0"



2 A.201 Building Elevation – South
SCALE: 3/32" = 1'-0"

1 A.201 Building Elevation – North
SCALE: 3/32" = 1'-0"

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APPROVED

SHEET
Proposed Building
Elevations

scale as shown

FILE NUMBER
2432

SHEET NUMBER
A.201

2 A.202 Building Rendering
West Facade From NW
NO SCALE

3 A.202 Building Rendering
West Facade From SW
NO SCALE

1 A.202 Building Rendering
View from Crooks Rd.
NO SCALE

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SHEET
Proposed Building
Renderings

scale as shown

FILE NUMBER
2432

SHEET NUMBER
A.202

2 A.203 Building Rendering View From NE
NO SCALE

1 A.203 Building Rendering Northwood Entrance
NO SCALE

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Action Park

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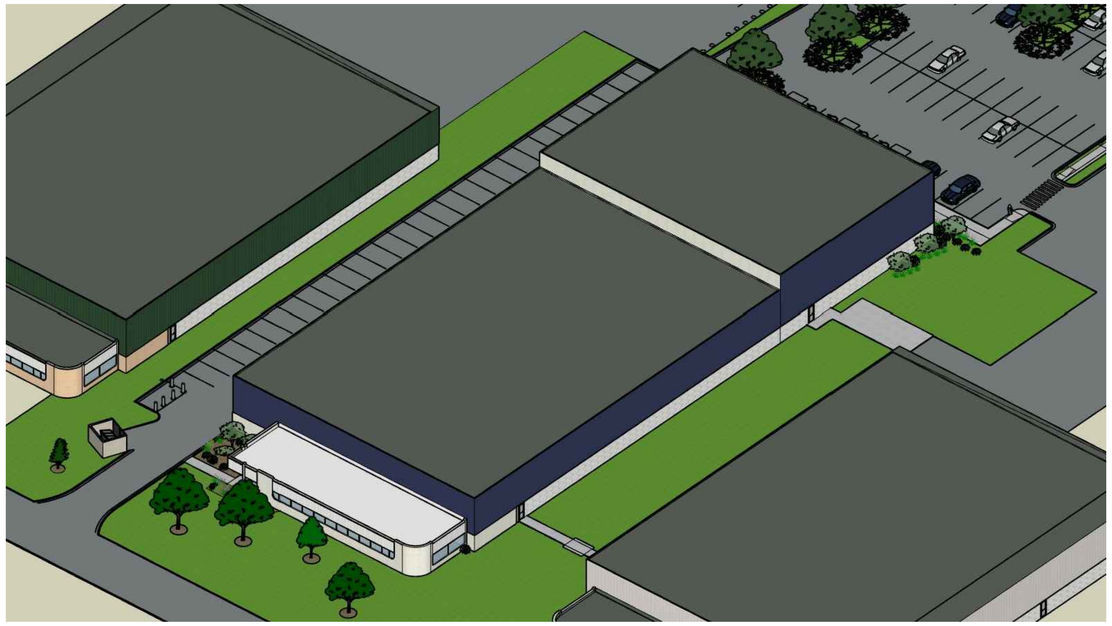
DRAWN
CHECKED
APPROVED

SHEET
Proposed Building Renderings

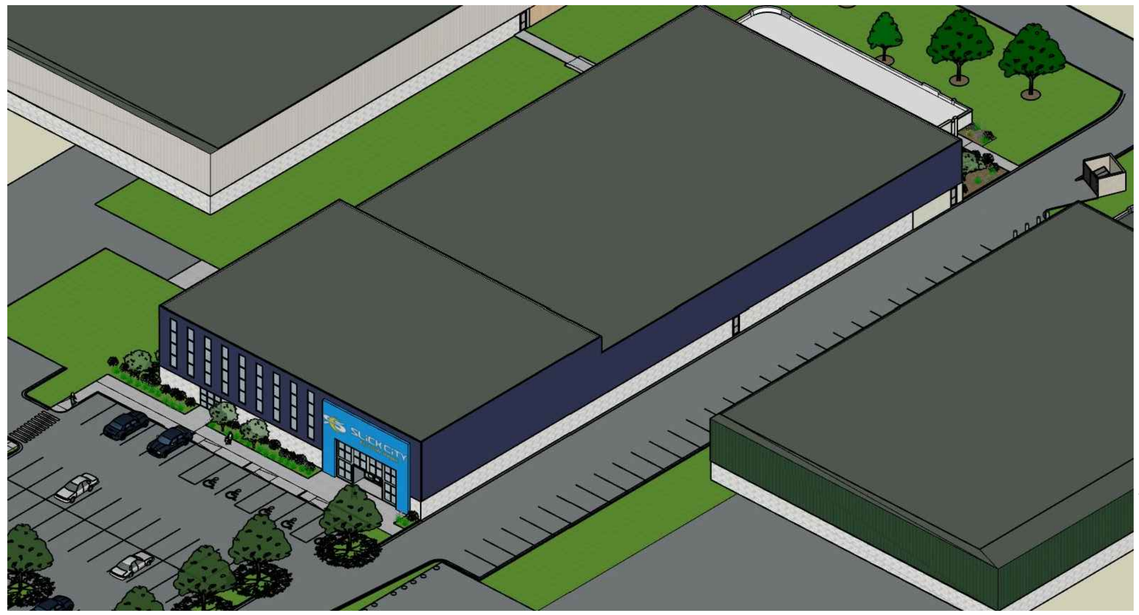
scale as shown

FILE NUMBER
2432

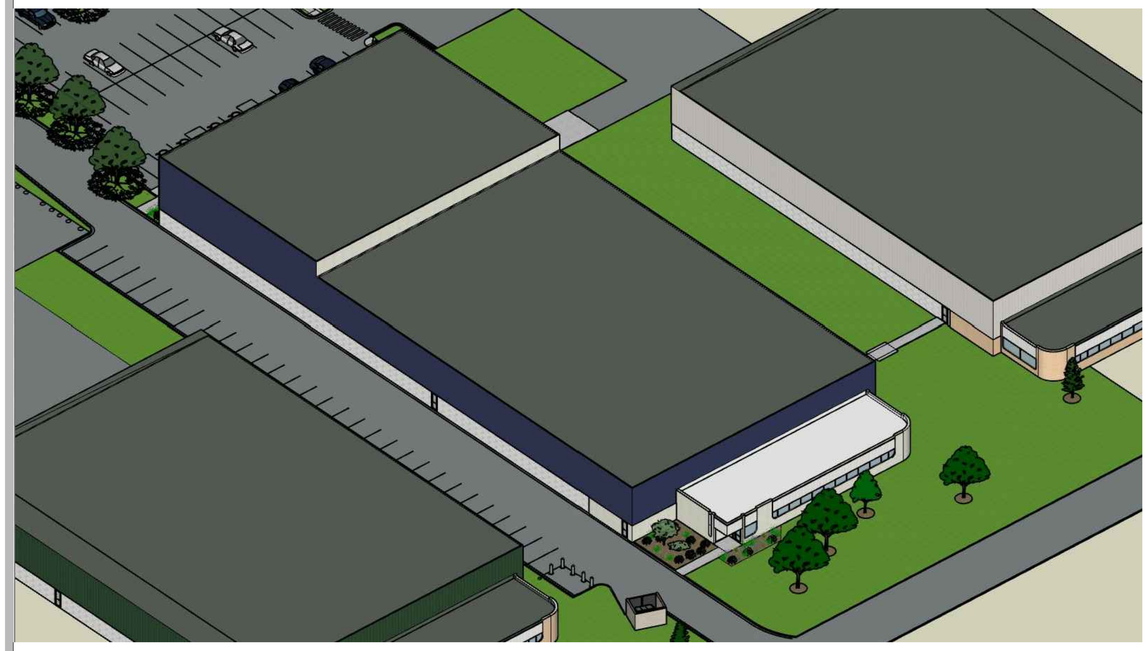
SHEET NUMBER
A.203



4 A.204 Building Rendering View From NE
NO SCALE



2 A.204 Building Rendering View From SW
NO SCALE



3 A.204 Building Rendering View From SE
NO SCALE

1 A.204 Building Rendering View From NW
NO SCALE

RONNISCH Construction Group

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Slick City Action Park

1749 Northwood Dr
Troy, MI

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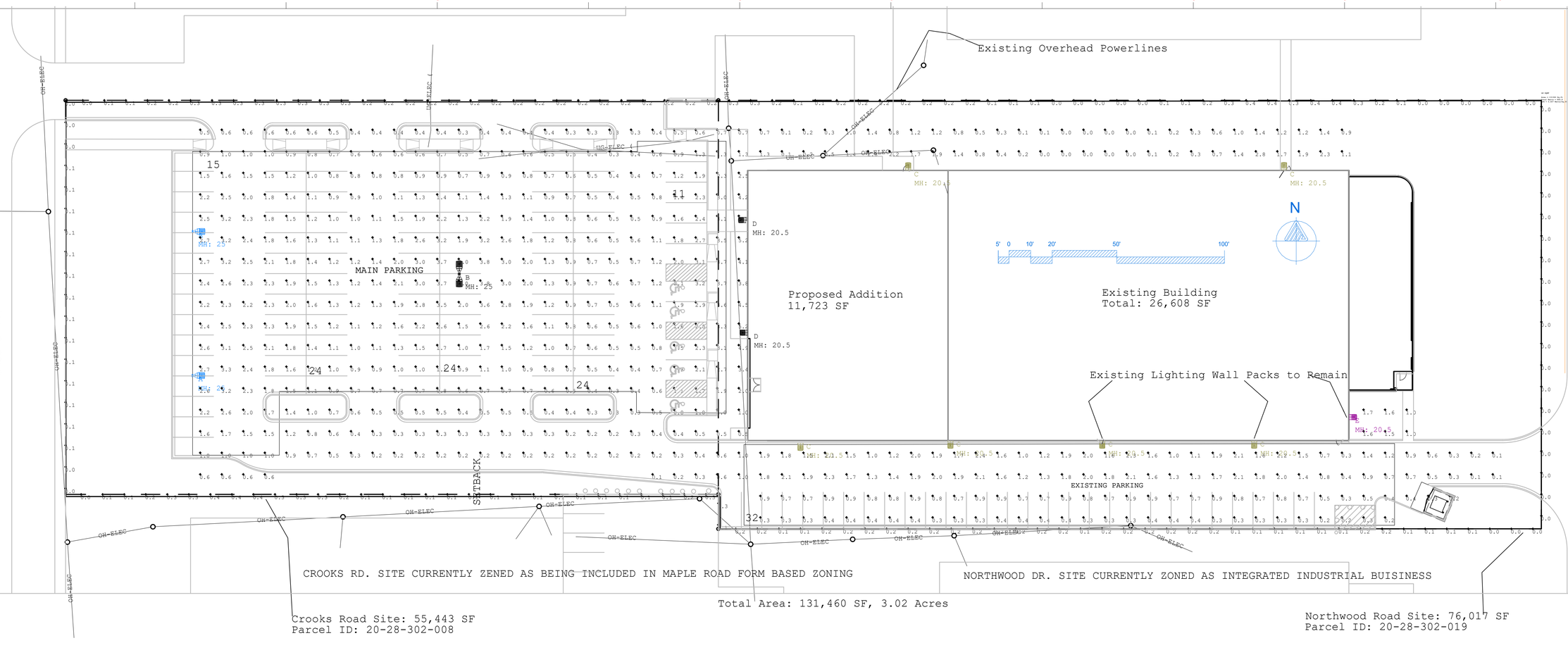
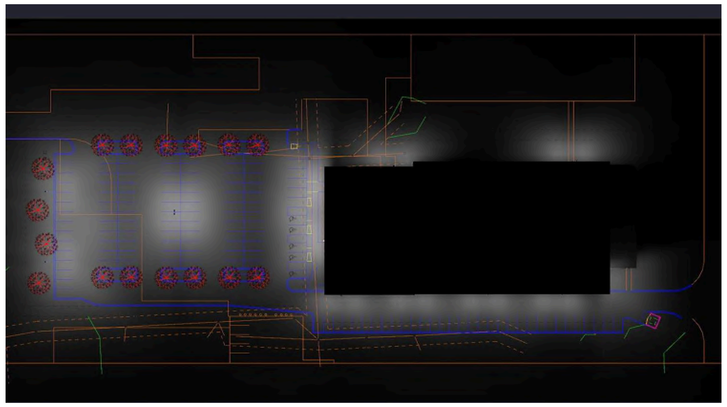
SHEET
Proposed Building Isometric Views

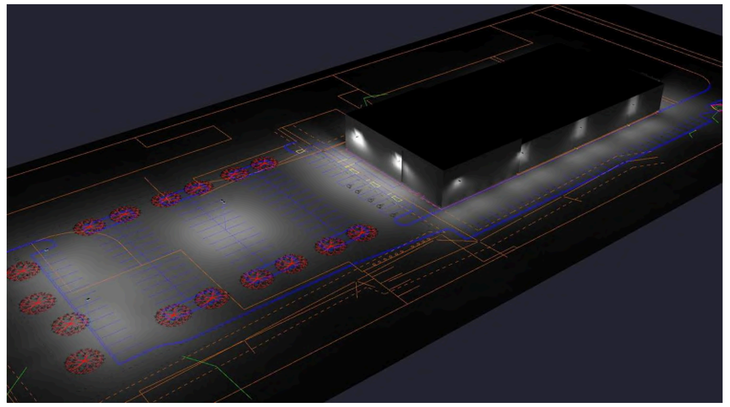
scale as shown

FILE NUMBER
2432

SHEET NUMBER
A.204







Luminaire Schedule									
Symbol	Qty	Label	Arrangement	LLF	Description	Arr. Lum. Lumens	BUG Rating	Lum. Watts	Total Watts
	2	A	Single	0.950	VISIONAIRE VSX-II_T4_32LD_10_40K7_VOLT-SINGLE @ 25' MTG. HT. (N)	13683	B3-U0-G3	104.8	209.6
	1	B	Back-Back	0.950	VISIONAIRE VSX-II_T5W_32LD_10_40K7_VOLT-D180° @ 25' MTG.HT. (N)	26630	B4-U0-G2	104.8	209.6
	6	C	Single	0.950	VISIONAIRE VSX-II_T3_16LD_7_40K7_CLS_VOLT-WM @ 20.5' MTG. HT.	3846	B1-U0-G1	34	204
	2	D	Single	0.950	VISIONAIRE VSX-II_T4_32LD_10_40K7_VOLT-WM @ 20.5' MTG. HT.	13683	B3-U0-G3	104.8	209.6
	1	E	Single	0.950	VISIONAIRE VSX-II_T4_16LD_7_40K7_VOLT-WM @ 20.5' MTG.HT.	4944	B1-U0-G1	34	34

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
GRID @ GRADE	Illuminance	Fc	1.24	5.2	0.0	N.A.	N.A.
PROPERTY LINE	Illuminance	Fc	0.14	0.4	0.0	N.A.	N.A.
EXISTING PARKING	Illuminance	Fc	1.07	2.4	0.2	5.35	12.00
MAIN PARKING	Illuminance	Fc	1.56	3.8	0.3	5.20	12.67

www.visionairelighting.com
Phone: (310) 512-6480 Fax: (310) 512-6486
19645 Rancho Way-Rancho Domiguez, CA. 90220

POINT-BY-POINT CALCULATION
Illuminance at Grade (Footcandles), unless otherwise specified.

VISIONAIRE LIGHTING

PHOTOMETRIC STUDY

DRAWING NUMBER :	**GR120524CL-SLICK CITY TROY-01**
LAYOUT DESIGNER :	GR
DESIGNER EMAIL :	gabrielrocha@visionairelighting.com
PROJECT DATE :	12/05/24
REVISION DATE :	-
REP :	CLARUS LIGHTING
NOTE/S:	-

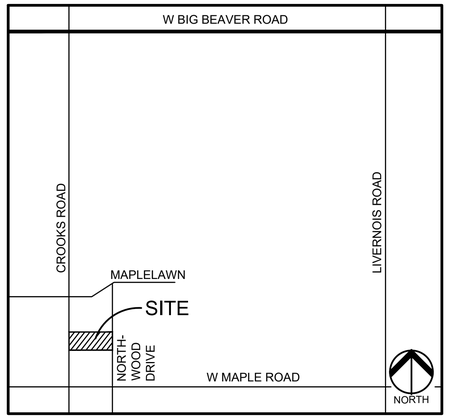
PRELIMINARY SITE PLANS

SLICK CITY ACTION PARK

1749 NORTHWOOD DRIVE

TROY, OAKLAND COUNTY, MI

PERMIT / APPROVAL SUMMARY		
DATE SUBMITTED	DATE APPROVED	PERMIT / APPROVAL
		TROY PLANNING COMMISSION
		TROY ENGINEERING
		TROY SESC PERMIT



LOCATION MAP
NO SCALE

INDEX OF DRAWINGS	
NUMBER	TITLE
	COVER SHEET
C-1.0	TOPOGRAPHIC SURVEY
C-3.0	PRELIMINARY SITE PLAN
C-4.0	PRELIMINARY GRADING PLAN
C-6.0	PRELIMINARY UTILITY PLAN
C-9.0	NOTES AND DETAILS
L-1.0	PRELIMINARY LANDSCAPE PLAN
L-1.1	LANDSCAPE DETAILS
T-1.0	TREE PRESERVATION PLAN

DESIGN TEAM

OWNER

SLICK CITY ACTION PARK
ADDRESS
CITY, STATE ZIP
CONTACT: TOBY BUECHNER
PHONE: XXX.XXX.XXXX
EMAIL: TOBYBUECHNER@YAHOO.COM

CIVIL ENGINEER

PEA GROUP
1849 POND RUN
AUBURN HILLS, MI 48326
CONTACT: JOHN STEBELTON, PE
PHONE: 844.813.2949
EMAIL: JSTEBELTON@PEAGROUP.COM

ARCHITECT

AUGER KLEIN ALLER ARCHITECTS, INC.
303 E. THIRD STREET, SUITE 100
ROCHESTER, MI 48307
CONTACT: MICHAEL SCHMIDT
PHONE: 248.814.9160
EMAIL: M.SCHMIDT@AKA-ARCHITECTS.NET

LANDSCAPE ARCHITECT

PEA GROUP
7927 NEMCO WAY, STE. 115
BRIGHTON, MI 48116
CONTACT: JANET EVANS, PLA
PHONE: 844.813.2949
EMAIL: JEVANS@PEAGROUP.COM

PEA GROUP

REVISIONS	
DESCRIPTION	DATE
ORIGINAL ISSUE DATE	2/4/2025

NOT FOR CONSTRUCTION

TAG NO.	CODE	DBH	COMMON NAME	LATIN NAME	COND	COMMENTS
1272	C	6	Catalpa	Catalpa speciosa	Fair	Many grapevines, x1
1273	C	6	Catalpa	Catalpa speciosa	Fair	
1274	BW	6	Black Walnut	Juglans nigra	Fair	x16
1275	BW	6	Black Walnut	Juglans nigra	Fair	x6
1276	WW	7	Weeping Willow	Salix babylonica	Fair	x3
1277	WW	6	Weeping Willow	Salix babylonica	Fair	x4
1278	BW	7	Black Walnut	Juglans nigra	Fair	x3
1279	CT	8	Cottonwood	Populus deltoides	Fair	x3
1280	W	9	Willow	Salix Spp.	Good	x23
1281	EE	6	Siberian Elm	Ulmus pumila	Fair	
1282	CA	6	Crab Apple	Malus caronaria	Good	
1283	AU	10	Austrian Pine	Pinus nigra	Fair	
1284	HL	17	Honeylocust	Gleditsia triacanthos	Good	
1285	HL	19	Honeylocust	Gleditsia triacanthos	Good	
1286	C	13	Catalpa	Catalpa speciosa	Good	x1
1287	HL	17	Honeylocust	Gleditsia triacanthos	Good	

REFERENCE DRAWINGS:

WATER MAIN	TROY GIS ONLINE, DATED 10/31/24 1950 CROOKS REDLINE AS-BUILTS, 123NET, OID:L31-BIB8EC6E/C6F, DATED 3/15/22
SANITARY SEWER	TROY GIS ONLINE, DATED 10/31/24 1950 CROOKS REDLINE AS-BUILTS, 123NET, OID:L31-BIB8EC6E/C6F, DATED 3/15/22
STORM SEWER	TROY GIS ONLINE, DATED 10/31/24 1950 CROOKS REDLINE AS-BUILTS, 123NET, OID:L31-BIB8EC6E/C6F, DATED 3/15/22
COMM	CLEAR RATE, EMAIL DATED 10/30/24 EVERSTREAM, EMAIL DATED 11/5/24 1950 CROOKS REDLINE AS-BUILTS, 123NET, OID:L31-BIB8EC6E/C6F, DATED 3/15/22
ELECTRIC	DTE MAP #313-384, DATED 11/8/24 1950 CROOKS REDLINE AS-BUILTS, 123NET, OID:L31-BIB8EC6E/C6F, DATED 3/15/22
TELEPHONE	ATT, MAP A1, EMAIL DATED 10/29/24
GAS	1950 CROOKS REDLINE AS-BUILTS, 123NET, OID:L31-BIB8EC6E/C6F, DATED 3/15/22
CATV	WOW CABLE SKETCH, EMAIL DATED 10/30/24
FLOOD PLAIN	FEMA F.I.R.M. MAP 26125C0541F, DATED 9/29/06

LEGEND:

- EX. OH, ELEC, POLE & GUY WIRE
- EX. U.G. CABLE TV & PEDESTAL
- EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
- EX. U.G. ELEC,MANHOLE, METER & HANDHOLE
- EX. GAS LINE
- EX. GAS VALVE & GAS LINE MARKER
- EX. TRANSFORMER & IRRIGATION VALVE
- EX. WATER MAIN
- EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
- EX. WATER VALVE BOX & SHUTOFF
- EX. SANITARY SEWER
- EX. SANITARY CLEANOUT & MANHOLE
- EX. COMBINED SEWER MANHOLE
- EX. STORM SEWER
- EX. CLEANOUT & MANHOLE
- EX. SQUARE, ROUND & BEEHIVE CATCH BASIN
- EX. YARD DRAIN & ROOF DRAIN
- EX. UNIDENTIFIED STRUCTURE
- EX. MAILBOX, SIGN & LIGHTPOLE
- EX. FENCE
- EX. GUARD RAIL
- EX. DEC. TREE, CONIFEROUS TREE & SHRUB
- EX. TREE TAG, & TREE LINE
- EX. SPOT ELEVATION
- EX. CONTOUR
- EX. WETLAND
- IRON FOUND / SET
- NAIL FOUND / NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND / SET
- SECTION CORNER FOUND
- R M C — RECORDED / MEASURED / CALCULATED

BENCHMARKS:
(GPS DERIVED - NAVD88)

PEA BM 108 - (CITY OF TROY REF BM #1651)
ARROW ON TOP OF HYDRANT#28-121 AT SOUTHEAST CORNER AT #1707 NORTHWOOD.
ELEV.-691.64

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ELEV.- 694.69

PEA BM 106 - (CITY OF TROY REF BM #1653)
ARROW ON TOP OF HYDRANT#28-124 AT #1821 NORTHWOOD..
ELEV.- 695.54

LEGAL DESCRIPTION:
(Per the City of Troy)

PARCEL ID 20-28-302-008
T2N, R11E, SEC 28 MAPLE GARDEN ESTATES SUB LOT 15

PARCEL ID 20-28-302-019
T2N, R11E, SEC 28 NORTHWOOD INDUSTRIAL PARK N 59 FT OF LOT 4 & ALL OF LOT 5

FLOODPLAIN NOTE:
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PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN — JOHN K STEBELTON — LICENSED PROFESSIONAL ENGINEER — License No. 6201311659

NORTH

0 15 30 60
SCALE: 1" = 30'

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CLIENT
AUGER KLEIN ALLER ARCHITECTS, INC.
303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS
- -

ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
TOPOGRAPHIC SURVEY

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	JKS
DES.	KMM

DRAWING NUMBER:
C-1.0

NOT FOR CONSTRUCTION

SITE DATA TABLE:

SITE AREA: 2.97 ACRES (129,203 SF.) GROSS

ZONING: EAST LOT: IB (INTEGRATED INDUSTRIAL BUSINESS DISTRICT)
WEST LOT: MR (MAPLE ROAD)

PROPOSED USE: GYMNASIUM, BUSINESS (11,723 SF)

BUILDING INFORMATION:
MAXIMUM ALLOWABLE BUILDING HEIGHT = 45 FEET (3 STORIES)
PROPOSED BUILDING HEIGHT = 33 FEET (1 STORY)

BUILDING FOOTPRINT AREA = 38,034 SF. (EXIST + PROPOSED)

BUILDING LOT COVERAGE = 37,672/129,203 = 29%

SETBACK REQUIREMENTS:	REQUIRED:	PROPOSED:
SIDE (SOUTH):	10'	29.39'
FRONT (EAST):	30'	49.67'
FRONT (WEST):	30	304.97'
SIDE (NORTH):	10'	30.41'

PARKING CALCULATIONS:
USAGE: BUSINESS
REQUIRED BUSINESS PARKING = 1 SPACE PER EMPLOYEE
= 10 EMPLOYEES = 10 SPACES

USAGE: RECREATIONAL
REQUIRED RECREATION PARKING = 1 SPOT PER 1000 SF.
= 25,760 SF/1000 = 26 SPACES

USAGE: GENERAL ASSEMBLY
REQUIRED GENERAL PARKING = 1 SPACE FOR EVERY 3 SEAT
= 241 SEATS/3 = 81 SPACES

TOTAL REQUIRED PARKING SPACES = 10 + 26 + 81 = 117 SPACES
TOTAL PROPOSED PARKING SPACES = 125 SPACES INC. 5 H/C SPACES

OPEN SPACE:
MINIMUM OPEN SPACE REQUIRED = 20%
PROVIDED OPEN SPACE = 345,43 SF./129,203 SF. = 27%

SITE SOILS INFORMATION:
ACCORDING TO THE USDA NATURAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY FOR OAKLAND COUNTY, THE SITE CONSISTS OF THE FOLLOWING SOIL TYPES:

URBAN LAND–BLOUNT–LENAWEE COMPLEX

SIGN LEGEND:

'STOP' SIGN	1
'BARRIER FREE PARKING' SIGN	2
'VAN ACCESSIBLE' SIGN	3
'NO PARKING FIRE LANE' SIGN	4

REFER TO DETAIL SHEET FOR SIGN DETAILS

SIDEWALK RAMP LEGEND:

SIDEWALK RAMP 'TYPE R' (R)
CURB DROP ONLY (X)

REFER TO LATEST MDOT R-28 STANDARD RAMP AND DETECTABLE WARNING DETAILS

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 NOTES & DETAILS SHEET FOR ON-SITE PAVING DETAILS.
3. REFER TO NOTES & DETAILS SHEET FOR ON-SITE SIDEWALK RAMP DETAILS

BENCHMARKS:

(GPS DERIVED - NAVD88)

PEA BM 108 - (CITY OF TROY REF BM #1651)
ARROW ON TOP OF HYDRANT#28-121 AT SOUTHEAST CORNER AT #1707 NORTHWOOD.
ELEV.-691.64

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ARROW ON TOP OF HYDRANT#28-123 AT #1749 NORTHWOOD.
ELEV. - 694.69

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ARROW ON TOP OF HYDRANT#28-124 AT #1821 NORTHWOOD..
ELEV.- 695.54

LEGAL DESCRIPTION:

(Per the City of Troy)

PARCEL ID 20-28-302-008
T2N, R11E, SEC 28 MAPLE GARDEN ESTATES SUB LOT 15

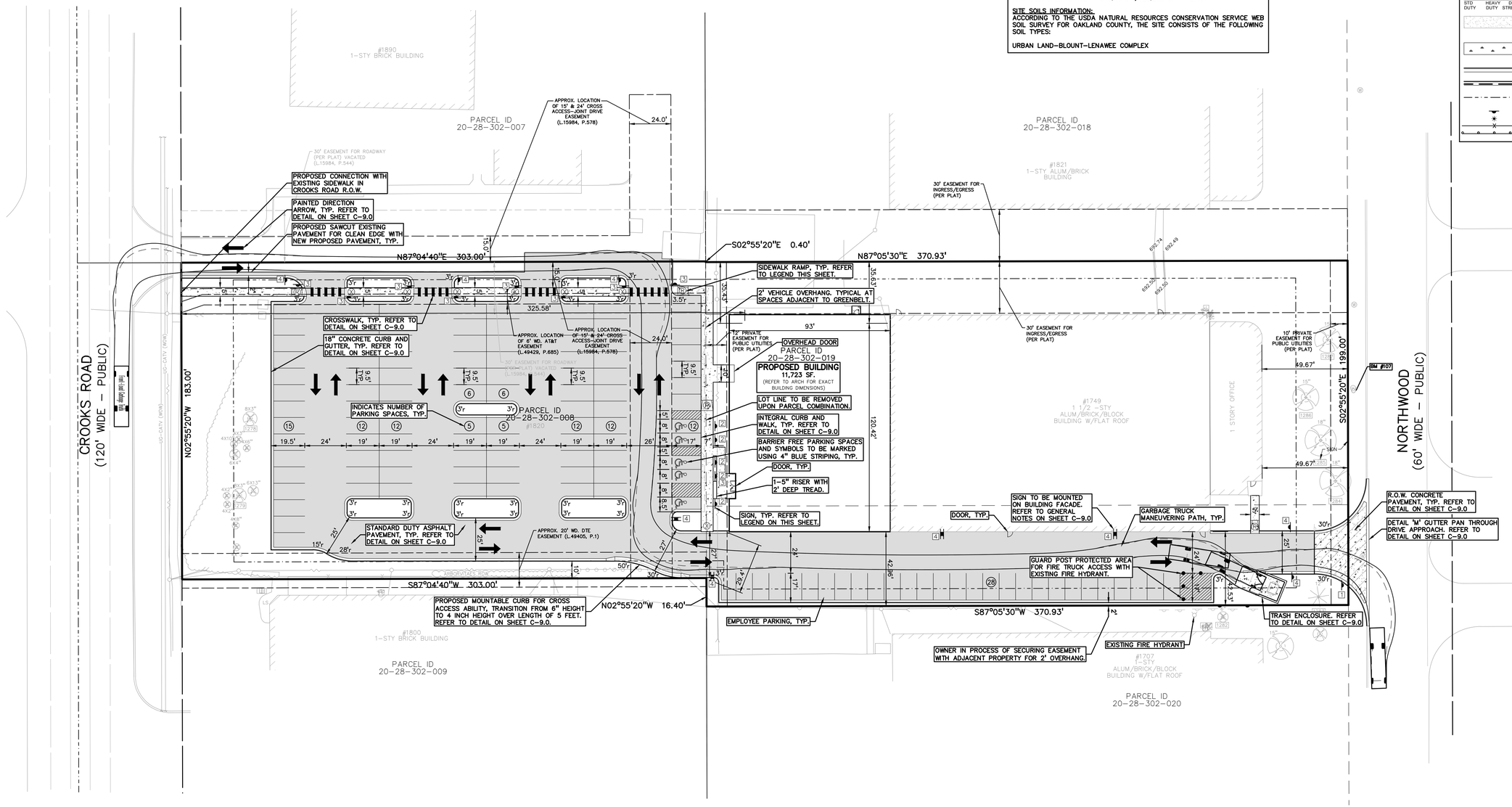
PARCEL ID 20-28-302-019
T2N, R11E, SEC 28 NORTHWOOD INDUSTRIAL PARK N 59 FT OF LOT 4 & ALL OF LOT 5

FLOODPLAIN NOTE:

BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FLOOD INSURANCE RATE MAP NUMBER 26125C0541F, DATED SEPTEMBER 29, 2006.

LEGEND:

- CONCRETE PAVEMENT (STD DUTY / HEAVY DUTY / R.O.W. ONLY)
- ASPHALT PAVEMENT (STD DUTY / HEAVY DUTY / DEEP STRENGTH)
- GRAVEL
- WETLAND
- CONCRETE CURB AND GUTTER
- REVERSE GUTTER PAN
- SETBACK LINE
- SIGN
- LIGHTPOLE
- FENCE
- GUARD RAIL



PEA GROUP
t: 844.813.2949
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STATE OF MICHIGAN
JOHN K STEBELTON
LICENSED PROFESSIONAL ENGINEER
License No. 6201311659

NORTH

0 15 30 60
SCALE: 1" = 30'

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CLIENT
AUGER KLEIN ALLER ARCHITECTS, INC.
303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS
-

ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
PRELIMINARY DIMENSION PLAN

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	JKS
DES.	KMM

DRAWING NUMBER:
C-3.0

NOT FOR CONSTRUCTION

SIDEWALK RAMP LEGEND:

SIDEWALK RAMP 'TYPE R' Ⓡ

CURB DROP ONLY ⓧ

REFER TO LATEST MDOT R-28 STANDARD RAMP AND DETECTABLE WARNING DETAILS

GRADING LEGEND:

+696.91	EXISTING SPOT ELEVATION
622.50	PROPOSED SPOT ELEVATION: TYPICALLY TOP OF PAVEMENT IN PAVED AREAS, GUTTER GRADE IN CURB LINES.
670	EXISTING CONTOUR
922	PROPOSED CONTOUR
	PROPOSED REVERSE GUTTER PAN
	PROPOSED RIDGE LINE
	PROPOSED SWALE/DITCH

ABBREVIATIONS

T/C = TOP OF CURB	F = FLUSH WALK
T/P = TOP OF PAVEMENT	G = GUTTER GRADE
T/S = TOP OF SIDEWALK	FF = FINISH FLOOR
T/W = TOP OF WALL	FG = FINISH GRADE
B/W = BOTTOM OF WALL	RIM = RIM ELEVATION

BENCHMARKS:
(GPS DERIVED - NAVD88)

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ARROW ON TOP OF HYDRANT#28-123 AT #1749 NORTHWOOD.
ELEV.- 694.69

PEA BM 106 - (CITY OF TROY REF BM #1653)
ARROW ON TOP OF HYDRANT#28-124 AT #1821 NORTHWOOD..
ELEV.- 695.54

LEGAL DESCRIPTION:
(Per the City of Troy)

PARCEL ID 20-28-302-008
T2N, R11E, SEC 28 MAPLE GARDEN ESTATES SUB LOT 15

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T2N, R11E, SEC 28 NORTHWOOD INDUSTRIAL PARK N 59 FT OF LOT 4 & ALL OF LOT 5

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PEA GROUP
t: 844.813.2949
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NORTH

0 10 20 40
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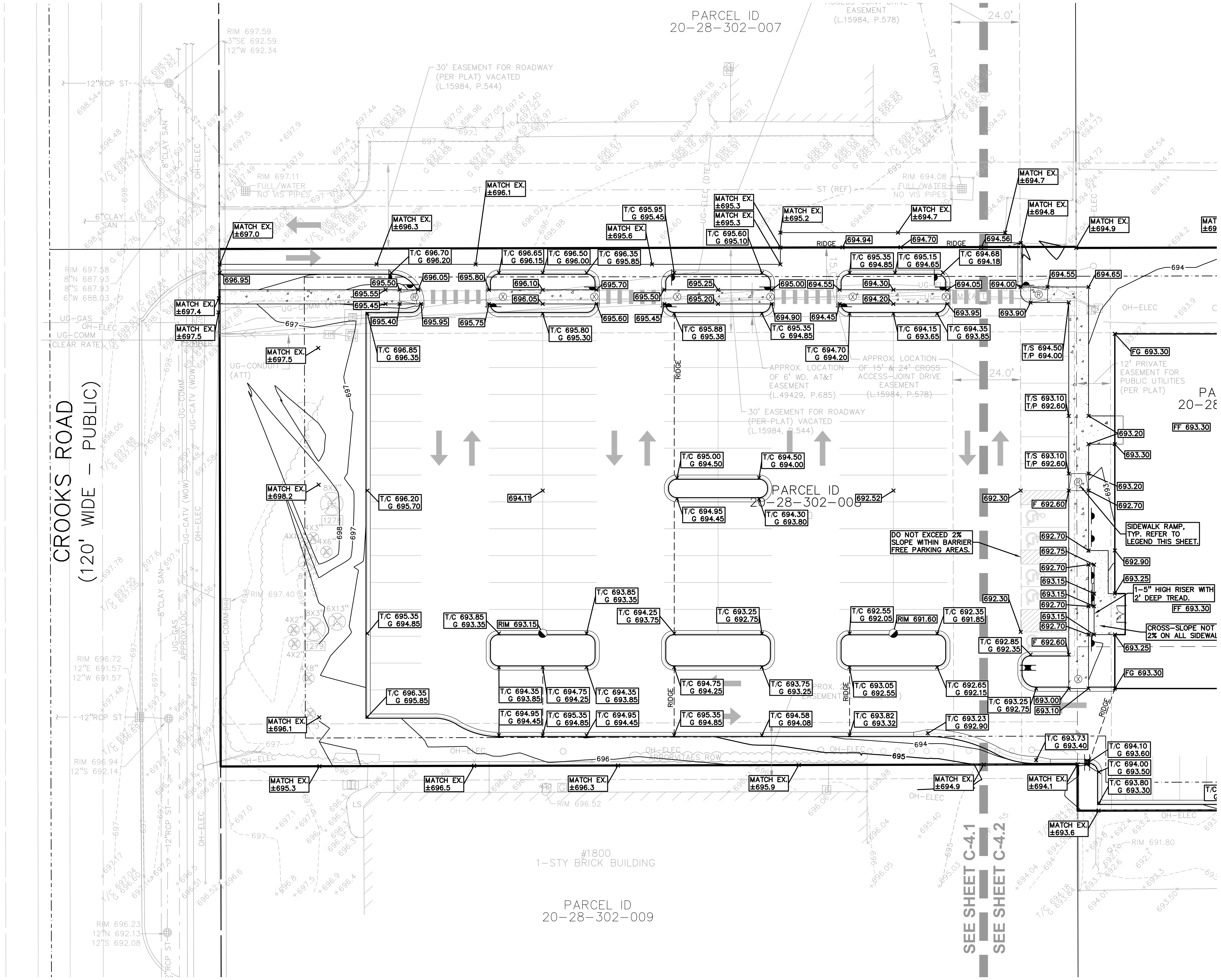

CLIENT

AUGER KLEIN ALLER ARCHITECTS, INC.
303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE

SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS

-	-

ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE

PRELIMINARY GRADING PLAN - WEST

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	JKS
DES.	KMM

DRAWING NUMBER:

NOT FOR CONSTRUCTION C-4.1

SIDEWALK RAMP LEGEND:

SIDEWALK RAMP 'TYPE R' Ⓡ

CURB DROP ONLY Ⓧ

REFER TO LATEST MDOT R-28 STANDARD RAMP AND DETECTABLE WARNING DETAILS

GRADING LEGEND:

- +696.91 / 622.50 — EXISTING SPOT ELEVATION; PROPOSED SPOT ELEVATION: TYPICALLY TOP OF PAVEMENT IN PAVED AREAS, GUTTER GRADE IN CURB LINES.
- 670 — EXISTING CONTOUR
- 922 — PROPOSED CONTOUR
- PROPOSED REVERSE GUTTER PAN
- PROPOSED RIDGE LINE
- PROPOSED SWALE/DITCH

ABBREVIATIONS

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T/P = TOP OF PAVEMENT	G = GUTTER GRADE
T/S = TOP OF SIDEWALK	FF = FINISH FLOOR
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NORTH

0 10 20 40
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CLIENT
AUGER KLEIN ALLER ARCHITECTS, INC.
303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS
- -

ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
PRELIMINARY GRADING PLAN - EAST

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	JKS
DES.	KMM

DRAWING NUMBER:
C-4.2

NOT FOR CONSTRUCTION

Site Drainage Data				
Select County:	Oakland			
Proposed 100 YEAR				
Natural Greenspace area:	0.00	acre	C =	0.20
Select NCRS Soil type:	B			
Improved Greenspace area:	0.17	acre	C =	0.20
Select NCRS Soil type:	B			
Wooded Area:	0.00	acre	C =	0.20
Select NCRS Soil type:	B			
Impervious Area:	1.10	acre	C =	0.95
Greenbelt Area:	0.17	acre	C =	0.20
Total Area (A):	1.27	acre		
Weighted Coefficient of Runoff (C):		0.85		
Rainfall Intensity				
Flood Control Time of Concentration, Tc =		10.00	minutes	
				55

DETENTION NOTE:

THE PROPERTY IN THE NORTHWOOD INDUSTRIAL SUBDIVISION HAS A REGIONAL DETENTION BASIN THAT ACCOUNTS FOR THE REQUIRED VOLUME OF THAT PROPERTY. UNDERGROUND DETENTION WILL PROVIDE PROVIDE THE OAKLAND COUNTY 100-YEAR VOLUME FOR THE 1820 CROOKS PROPERTY ONLY. THIS IS APPROXIMATELY 10,000 CF. PER CALCULATIONS PROVIDED ON THIS SHEET.

1/30/2025 Detcalcs V2.00

Rainfall Intensity		
Time of Concentration (T_C)	10.00	min
Since Tc <= 15 min, I1 = 2.0 in/hr		
I1 = 30.2 /[(T + 9.17)^.81]	2.00	in/hr
I10 = 50.12 / [(T + 9.17)^.81]	4.58	in/hr
I100 = 83.3/[(T + 9.17)^.81]	7.62	in/hr
CPVC: Channel Protection Volume Control Volume		
Vcpvc = (4719)CA	5,112	cf
CPRC: Channel Protection Rate Control Volume: Extended Detention		
VED= (6897)CA	7,471	cf
CPRC Allowable Outlet Rate		
$Q_{VED} = V_{ED}$ / (48*60*60)	0.04	cfs
100-Year Allowable Outlet Rate		
Since A < 2.0 Ac, Qvrr = 1.0		
Q_{VRR} =	1.00	cfs/ac
100-Year Peak Allowable Discharge		
Area, A =	1.27	ac
$Q_{100P} = Q_{VRR}(A)$	1.27	cfs
100-Year Runoff Volume		
V100R = (18,985)CA	20,565	cf
100-Year Peak Inflow		
$Q_{100IN} = C(I_{100})A$	8.25	cfs
Storage Curve Factor (Vs/Vr)		
R = 0.206-0.15 x ln(Q100P/Q100IN)	0.486	
100-Year Storage Volume		
Vs = R(V100R)	9,994	cf
No infiltration will be provided, so no CPVC deduction is taken.		
V100D = Vs	9,994	cf
V_{100D} must be larger or equal to V_{ED} :		
Is V_{100D}>= V_{ED} ?	Yes	
V_{100D} =	9,994	cf

UTILITY LEGEND:

- EX. OH. ELEC, POLE & GUY WIRE
- EX. U.G. CABLE TV & PEDESTAL
- EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
- EX. U.G. ELEC,MANHOLE, METER & HANDHOLE
- EX. GAS LINE
- EX. GAS VALVE & GAS LINE MARKER
- EX. TRANSFORMER & IRRIGATION VALVE
- EX. WATER MAIN
- EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
- EX. WATER VALVE BOX & SHUTOFF
- EX. SANITARY SEWER
- EX. SANITARY CLEANOUT & MANHOLE
- EX. COMBINED SEWER MANHOLE
- EX. STORM SEWER
- EX. CLEANOUT & MANHOLE
- EX. SQUARE, ROUND, & BEEHIVE CATCH BASIN
- EX. YARD DRAIN & ROOF DRAIN
- EX. UNIDENTIFIED STRUCTURE
- PROPOSED WATER MAIN
- PROPOSED HYDRANT AND GATE VALVE
- PROPOSED TAPPING SLEEVE, VALVE & WELL
- PROPOSED POST INDICATOR VALVE
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY CLEANOUT & MANHOLE
- PROPOSED STORM SEWER
- PROPOSED STORM SEWER CLEANOUT & MANHOLE
- PROPOSED CATCH BASIN, INLET & YARD DRAIN

BENCHMARKS:
(GPS DERIVED - NAVD88)

PEA BM 108 - (CITY OF TROY REF BM #1651)
ARROW ON TOP OF HYDRANT#28-121 AT SOUTHEAST CORNER AT #1707 NORTHWOOD.
ELEV.-691.64

PEA BM 107 - (CITY OF TROY REF BM #1652)
ARROW ON TOP OF HYDRANT#28-123 AT #1749 NORTHWOOD.
ELEV.- 694.69

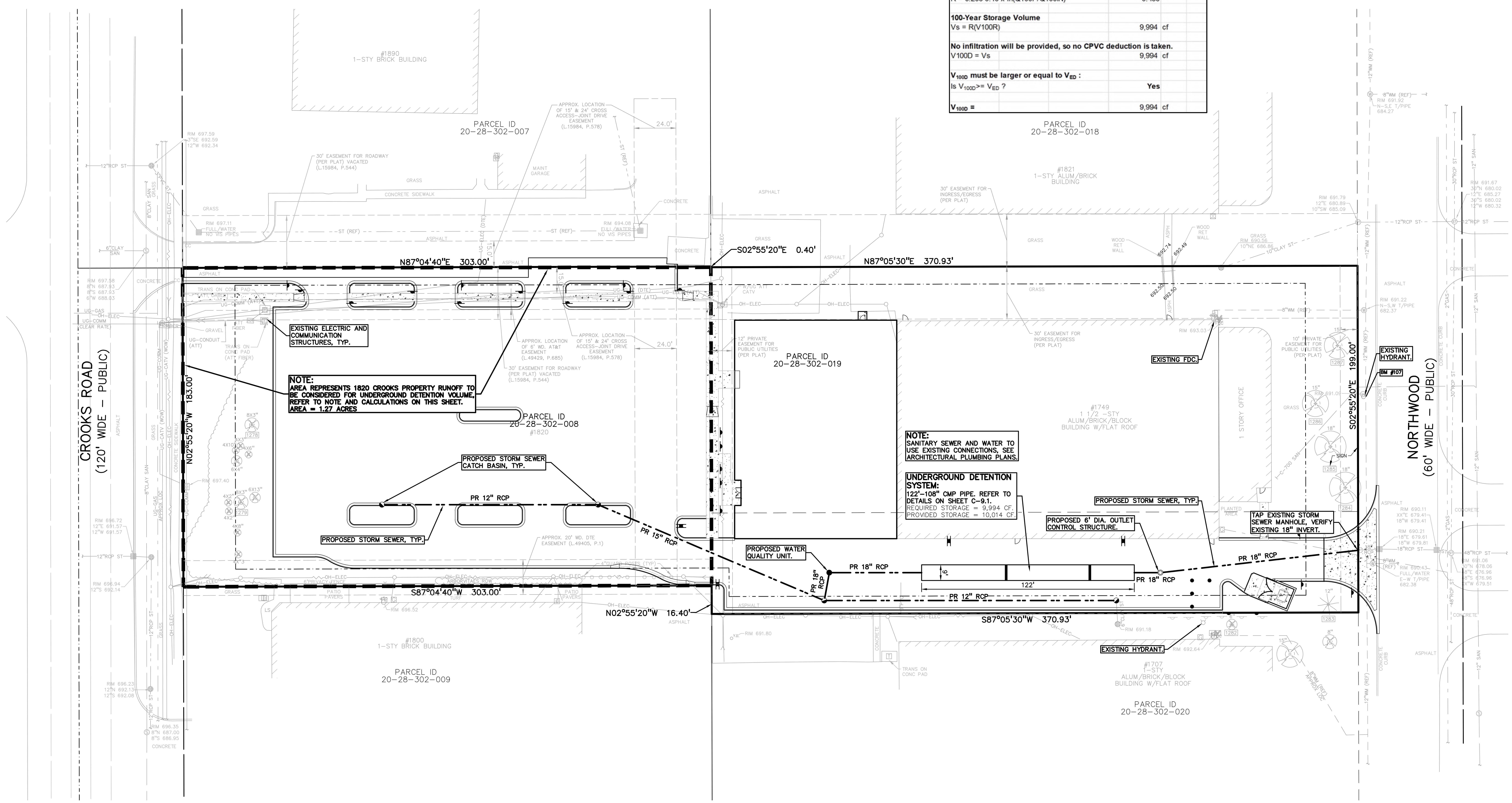
PEA BM 106 - (CITY OF TROY REF BM #1653)
ARROW ON TOP OF HYDRANT#28-124 AT #1821 NORTHWOOD..
ELEV.- 695.54

LEGAL DESCRIPTION:
(Per the City of Troy)

PARCEL ID 20-28-302-008
T2N, R11E, SEC 28 MAPLE GARDEN ESTATES SUB LOT 15

PARCEL ID 20-28-302-019
T2N, R11E, SEC 28 NORTHWOOD INDUSTRIAL PARK N 59 FT OF LOT 4 & ALL OF LOT 5

FLOODPLAIN NOTE:
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FLOOD INSURANCE RATE MAP NUMBER 26125C0541F, DATED SEPTEMBER 29, 2006.



NORTH

0 15 30 60
SCALE: 1" = 30'

Know what's below. Call before you dig.

CAUTION!!
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JOHN K STEBELTON
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CLIENT
AUGER KLEIN ALLER ARCHITECTS, INC.
303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS

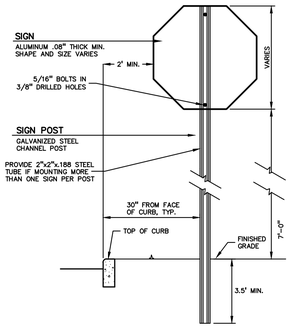
ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
PRELIMINARY UTILITY PLAN

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	JKS
DES.	KMM

DRAWING NUMBER:
C-5.0

NOT FOR CONSTRUCTION

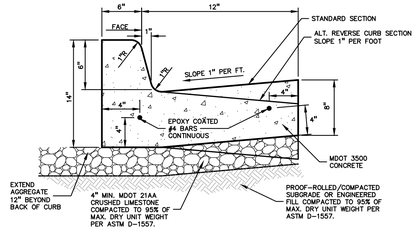


SIGN AND POST INSTALLATION IN LANDSCAPED AREAS

NOT TO SCALE

NOTE:
ALTERNATE REVERSE CURB SECTION TO BE USED ONLY WHEN DRAINING AWAY FROM CURB. SEE PLAN FOR LOCATION.

NOTE:
PROVIDE CONTROL JOINTS IN CURB AT 10' O.C. PROVIDE EXPANSION JOINT AND JOINT SEALANT AT END OF RADIUS RETURNS PER MDOT AND ACA STANDARDS. PROVIDE EXPANSION JOINTS AND JOINT SEALANT WHERE CURBS ABUT STRUCTURES.



18"x6" STANDARD CONCRETE CURB AND GUTTER

NOT TO SCALE

FIRE LANE SIGNS: APPROVED "NO PARKING FIRE LANE" SIGN MUST BE INSTALLED AND MAINTAINED IN COMPLIANCE WITH THE CRITERIA SET FORTH IN THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. SOME OF THE CRITERIA IS AS FOLLOWS: (TROY CITY CODE CHAPTER 106)

- SIGN SHALL BE RED LETTERING ON WHITE BACKGROUND AND SHALL READ, "FIRE LANE, NO PARKING, NO STOPPING, NO STANDING, TOW AWAY ZONE"
- SIGNS SHALL BE SPACED NO FURTHER THAN 100 FEET APART.
- SIGNS SHALL BE INSTALLED AT A RIGHT ANGLE 90° TO CURB
- SIGN SHALL BE SEVEN (7) FEET FROM THE BOTTOM OF SIGN TO GRADE
- SIGNS SHALL BE DOUBLE FACED WHERE THE POSSIBILITY EXIST FOR LEFT WHEEL TO CURB PARKING.
- SIGNS SHALL BE 12 INCES IN WIDTH AND 18 INCHES IN HEIGHT.

CITY OF TROY FIRE LANE SIGN DETAIL

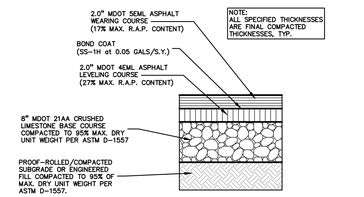
NOT TO SCALE

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 GROUP WILL REQUIRE A MINIMUM 25% INCREASE IN BASE THICKNESS. HOWEVER, IF TESTING DOCUMENTATION IS PROVIDED TO PEA GROUP 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 PG64-28. 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 GROUP FOR REVIEW PRIOR TO CONSTRUCTION

ASPHALT MIX DESIGN CHART

COMMERCIAL ADT 0-300	COMMERCIAL ADT 301-1000	COMMERCIAL ADT 1001-3400	COMMERCIAL ADT ≥3401	APPLICATION RATE (LB/YD²) MINIMUM – MAXIMUM	COURSE APPLICATION
2EL	2EML	2EMH	2EH	435-550	BASE
3EL	3EML	3EMH	3EH	330-410	BASE AND/OR LEVELING
4EL	4EML	4EMH	4EH	220-275	LEVELING AND/OR TOP
5EL	5EML	5EMH	5EH	165-220	TOP
PG 58-28	PG 64-28	PG 64-28	PG 70-28P		



STANDARD DUTY ASPHALT DETAIL

(NOT FOR USE IN THE RIGHT-OF-WAY)

NOT TO SCALE

30" x 30"
WHITE ON RED REFLECTORIZED
7'-0" MOUNTING HEIGHT
(R1-1)

STOP SIGN DETAIL

NOT TO SCALE

30" x 30"
BLACK ON YELLOW REFLECTORIZED
7'-0" MOUNTING HEIGHT
(W11-2)

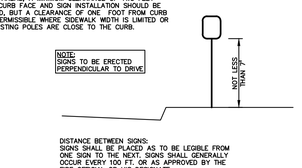
24" x 12"
BLACK ON YELLOW REFLECTORIZED
MOUNTING BELOW W11-2
(W16-7P)

CROSSWALK SIGN DETAIL

NOT TO SCALE

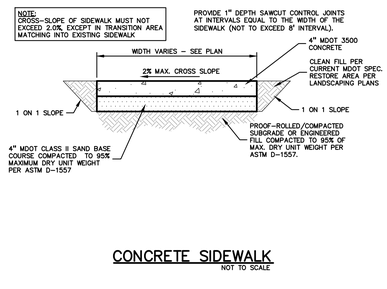
LATERAL CLEARANCE:
IN URBAN AREAS, A MINIMUM CLEARANCE OF TWO FEET BETWEEN CURB FACE AND SIGN INSTALLATION SHOULD BE MAINTAINED, BUT A CLEARANCE OF ONE FOOT FROM CURB FACE IS PERMISSIBLE WHERE SIDEWALK WIDTH IS LIMITED OR WHERE EXISTING POLES ARE CLOSE TO THE CURB.

NOTE:
SIGNS TO BE ERECTED
PERPENDICULAR TO DRIVE



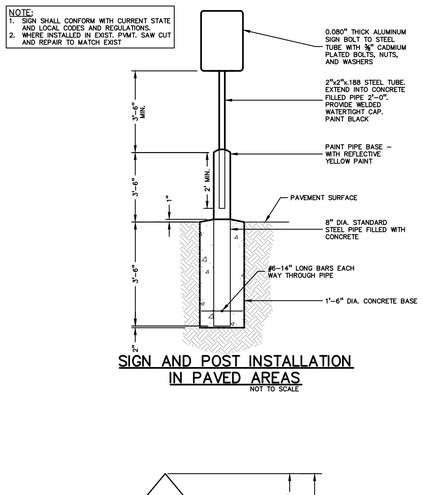
NOTE:
CROSS-SLOPE OF SIDEWALK MUST NOT EXCEED 2.0% EXCEPT IN TRANSITION AREA MATCHING INTO EXISTING SIDEWALK

PROVIDE 1" DEPTH SAWCUT CONTROL JOINTS AT INTERVALS EQUAL TO THE WIDTH OF THE SIDEWALK (NOT TO EXCEED 8' INTERVAL).



CONCRETE SIDEWALK

NOT TO SCALE



6" DIA. GUARD POST DETAIL

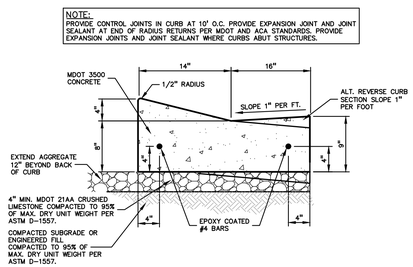
NOT TO SCALE

NOTE:
1. SIGN SHALL CONFORM WITH CURRENT STATE AND LOCAL CODES AND REGULATIONS.
2. WHERE INSTALLED IN EXIST. PVMT, SAW CUT AND REPAIR TO MATCH EXIST

SIGN AND POST INSTALLATION IN PAVED AREAS

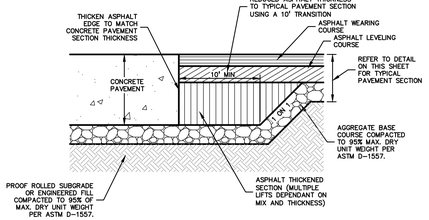
NOT TO SCALE

NOTE:
PROVIDE CONTROL JOINTS IN CURB AT 10' O.C. PROVIDE EXPANSION JOINT AND JOINT SEALANT AT END OF RADIUS RETURNS PER MDOT AND ACA STANDARDS. PROVIDE EXPANSION JOINTS AND JOINT SEALANT WHERE CURBS ABUT STRUCTURES.



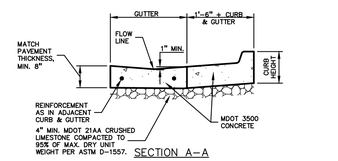
4" MOUNTABLE CURB AND GUTTER DETAIL

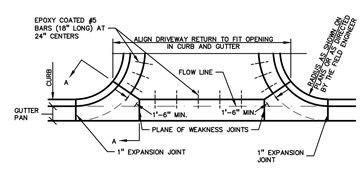
NOT TO SCALE



THICKENED EDGE ASPHALT DETAIL

NOT TO SCALE

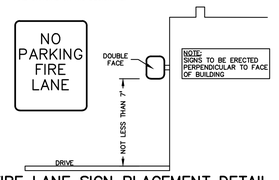




MDOT DRIVEWAY OPENING–DETAIL 'M'

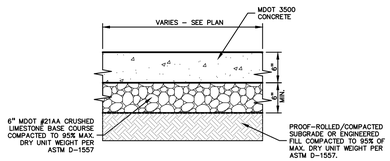
NOT TO SCALE

DISTANCE BETWEEN SIGNS:
SIGNS SHALL BE PLACED AS TO BE LEGIBLE FROM ONE SIGN TO THE NEXT. SIGNS SHALL GENERALLY OCCUR EVERY 100 FT. OR AS APPROVED BY THE FIRE OFFICIAL OR HIS DESIGNATE.



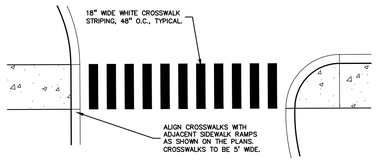
FIRE LANE SIGN PLACEMENT DETAIL

NOT TO SCALE



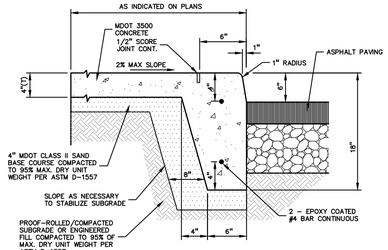
STANDARD DUTY CONCRETE DETAIL

NOT TO SCALE



STRIPED CROSSWALK DETAIL

NOT TO SCALE



CONTRACTION JOINTS TO BE 1/4 DEEP, SPACED AT INTERVALS TO MATCH SIDEWALK WIDTH (SAWCUT). 1/2-INCH PRE-MOLDED FILLER EXPANSION JOINTS WITH JOINT SEALANT SHALL BE PLACED ONLY WHERE SIDEWALK ABUTS A STRUCTURE.

INTEGRAL CURB AND SIDEWALK

NOT TO SCALE

PEA GROUP
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STATE OF MICHIGAN
JOHN K STEBELTON
LICENSED PROFESSIONAL ENGINEER
License No. 6201311659

NORTH

0 15 30 60

SCALE: 1" = 30'

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

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CLIENT
AUGER KLEIN

ALLER ARCHITECTS, INC.
303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS
- -

ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
NOTES AND DETAILS

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	JKS
DES.	KMM

DRAWING NUMBER:
C-9.0

NOT FOR CONSTRUCTION

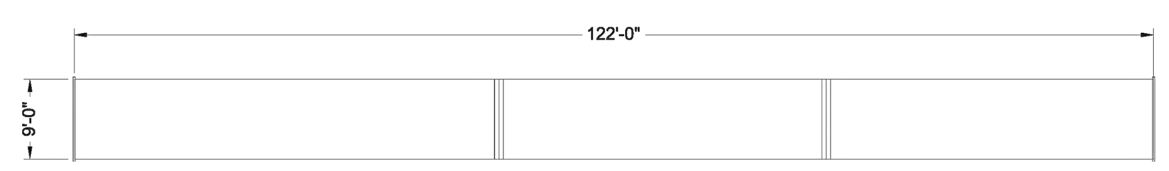
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20/HS25
- APPROX. LINEAR FOOTAGE = 122 LF

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = **9,994 CF**
- PIPE STORAGE VOLUME = 7,761 CF
- BACKFILL STORAGE VOLUME = 2,252 CF
- TOTAL STORAGE PROVIDED = 10,014 CF
- STONE VOID = 40%

PIPE DETAILS
- DIAMETER = 108"
- CORRUGATION = 5x1
- GAGE = 14
- COATING = ALT2
- WALL TYPE = PERFORATED
- BARREL SPACING = 36"

BACKFILL DETAILS
- WIDTH AT ENDS = 12"
- ABOVE PIPE = 0"
- WIDTH AT SIDES = 12"
- BELOW PIPE = 0"



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 20'

C:\EXPORTS\TEMPLATES\CMP_V10.DWG 10/18/2019 10:02 AM

DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

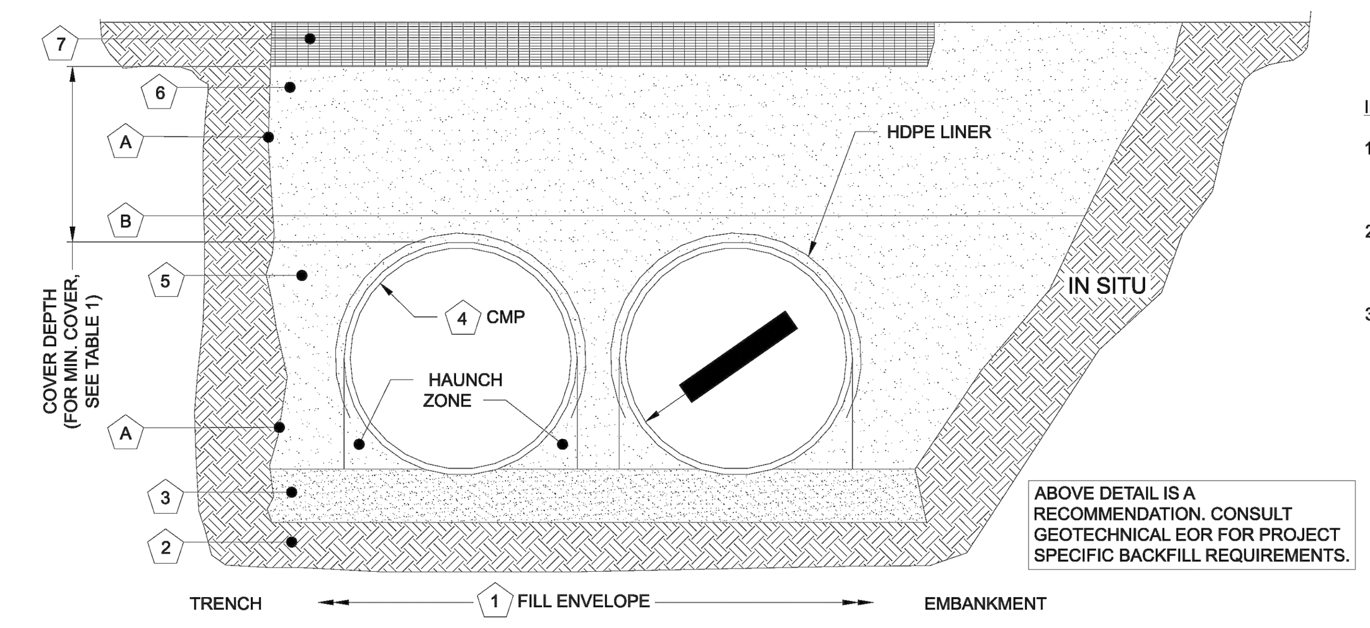
DYO63496 Slick City Troy
UGDET
Troy, MI
DETENTION SYSTEM

PROJECT No.: 45093	SEQ. No.: 63496	DATE: 12/17/2024
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: 1		

TABLE 1:

DIAMETER, D	MIN. COVER	CORR. PROFILE
6"-10"	12"	1 1/2" x 1/4"
12"-48"	12"	2 2/3" x 1/2"
>48"-96"	12"	3" x 1", 5" x 1"
>96"	D/8	3" x 1", 5" x 1"

- STRUCTURAL BACKFILL MUST EXTEND TO LIMITS OF THE TABLE
- TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT.



INSTALLATION NOTES

1. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES.
2. OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.
3. AN HDPE MEMBRANE LINER WILL BE PLACED ON THE CROWN OF EACH PIPE TO PROVIDE AN IMPERMEABLE BARRIER AGAINST ENVIRONMENTAL CHANGES THAT MAY ADVERSELY AFFECT THE SYSTEM OVER TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL TECHNICAL DETAILS.

TABLE 2: PERFORATED STANDARD

CMP RETENTION STANDARD BACKFILL SPECIFICATIONS

	MATERIAL LOCATION	MATERIAL SPECIFICATION	DESCRIPTION	
1	FILL ENVELOPE WIDTH	PER ENGINEER OF RECORD	MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE. THE SUGGESTED MINIMUM TRENCH WIDTH, OR EOR RECOMMENDATION: PIPE ≤ 12": D + 16" PIPE > 12": 1.5D + 12"	MINIMUM EMBANKMENT WIDTH (IN FEET) FOR INITIAL FILL ENVELOPE: PIPE < 24": 3.0D PIPE 24" - 144": D + 4'0" PIPE > 144": D + 10'0"
2	FOUNDATION	**AASHTO 26.5.2** - PER ENGINEER OF RECORD	PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND FOUNDATION BROUGHT BACK TO GRADE WITH A FILL MATERIAL APPROVED BY THE ENGINEER OF RECORD.	
3	BEDDING	**AASHTO M 43: 3, 357, 4, 467, 5, 56, 57**	ENGINEER OF RECORD TO DETERMINE IF BEDDING IS REQUIRED. PIPE MAY BE PLACED ON THE TRENCH BOTTOM OF A RELATIVELY LOOSE, NATIVE SUITABLE WELL GRADED GRANULAR MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, 2" MIN DEPTH. THE BEDDING MATERIAL MAY BE SUITABLE OPEN GRADED GRANULAR BEDDING CONFORMING TO AASHTO SOIL CLASSIFICATIONS A1, A2, OR A3 WITH MAXIMUM PARTICLE SIZE OF 3" PER AASHTO 26.3.8.1	
4	CORRUGATED METAL PIPE			
5	BACKFILL	FREE-DRAINING, ANGULAR, NATURALLY OCCURRING WASHED-STONE PER **AASHTO M 43: 3, 357, 4, 467, 5, 56, 57** OR APPROVED EQUAL *	HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION WITHOUT SOFT SPOTS. BACKFILL SHALL BE PLACED IN 8" +/- LOOSE LIFTS AND COMPACTED TO 90% STANDARD PROCTOR PER AASHTO T 99. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHOULD BE ADVANCED ALONG THE LENGTH OF THE SYSTEM TO AVOID DIFFERENTIAL LOADING. WHERE CONVENTIONAL COMPACTION TESTING IS NOT PRACTICAL, THE MATERIAL SHALL BE MECHANICALLY COMPACTED UNTIL NO FURTHER YIELDING OF MATERIAL IS OBSERVED UNDER THE COMPACTOR. **IN AREAS WITH HIGH WATER TABLE FLUCTUATIONS THAT INTERACT WITH THE PIPE ZONE, CONSIDER INSTALLING A GEOTEXTILE SEPARATION LAYER TO PREVENT SOIL MIGRATION.	
6	COVER MATERIAL	UP TO MIN. COVER - **AASHTO M 145: A-1, A-2, A-3** ABOVE MIN. COVER - PER ENGINEER OF RECORD	COVER MATERIAL MAY INCLUDE NON-BITUMINOUS, GRANULAR ROADBASE MATERIAL WITHIN MIN COVER LIMITS	
7	RIGID OR FLEXIBLE PAVEMENT (IF APPLICABLE)	PER ENGINEER OF RECORD	FLEXIBLE PAVEMENT SHOULD NOT BE COUNTED AS PART OF THE FILL HEIGHT OVER THE CMP. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD.	
A	OPTIONAL SIDE GEOTEXTILE	NONE	GEOTEXTILE LAYER IS RECOMMENDED ON SIDES OF EXCAVATION TO PREVENT SOIL MIGRATION.	
B	GEOTEXTILE BETWEEN LAYERS	NONE	IF SOIL TYPES DIFFER AT ANY POINT ABOVE PIPE INVERT, A GEOTEXTILE LAYER IS RECOMMENDED TO BE PLACED BETWEEN THE LAYERS TO PREVENT SOIL MIGRATION.	

NOTES:
- FOR MULTIPLE BARREL INSTALLATIONS, THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE THE PIPE DIAMETER /2 BUT NO LESS THAN 12" FOR DIAMETERS <72". FOR 72" AND LARGER DIAMETERS, THE MINIMUM SPACING IS 36". CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING.
- * APPROVED REGIONAL EQUIVALENTS FOR SECTION 5 INCLUDE CA-7, MIDOT 6AA, 6A, OR 5G, PROVIDED THEY MEET THE PARTICLE SIZES INDICATED.

MANUFACTURER RECOMMENDED BACKFILL
NOT TO SCALE

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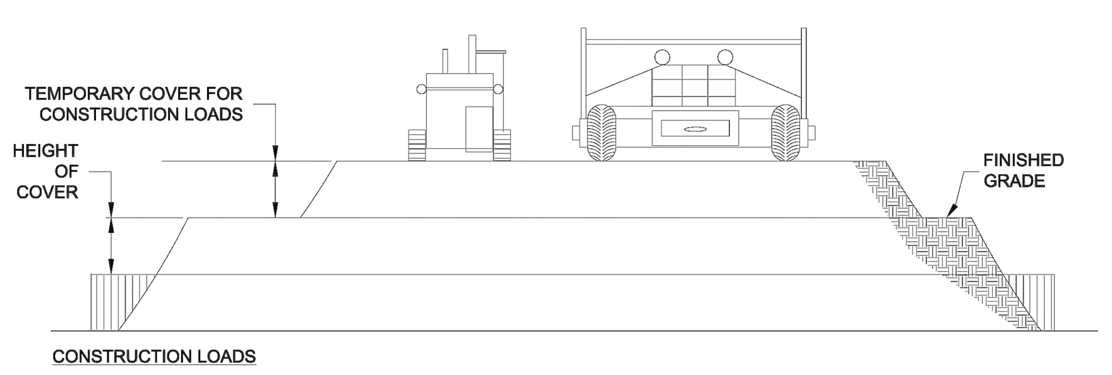
CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO63496 Slick City Troy
UGDET
Troy, MI
DETENTION SYSTEM

PROJECT No.: 45093 SEQ. No.: 63496 DATE: 12/17/2024 DESIGNED: DYO DRAWN: DYO CHECKED: DYO APPROVED: DYO SHEET NO.: 1



CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM
SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

APPLICABLE POLYMER COATED: AASHTO M-245 OR ASTM A-762

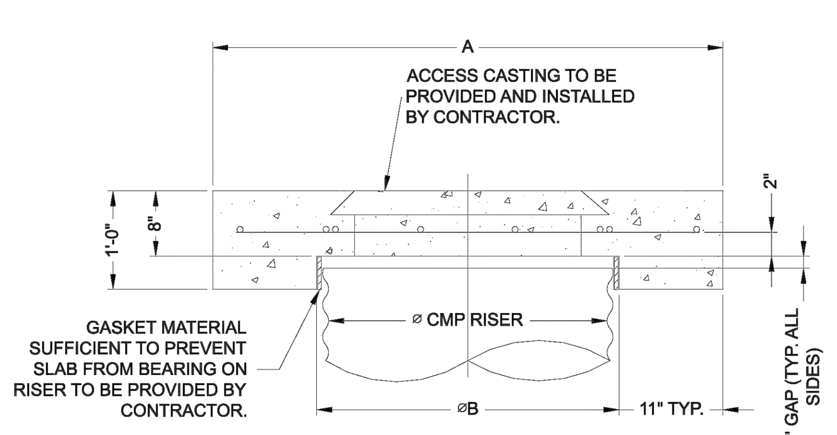
ALUMINUM: AASHTO M-196 OR ASTM B-745
APPLICABLE

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.
APPLICABLE REQUIREMENTS

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

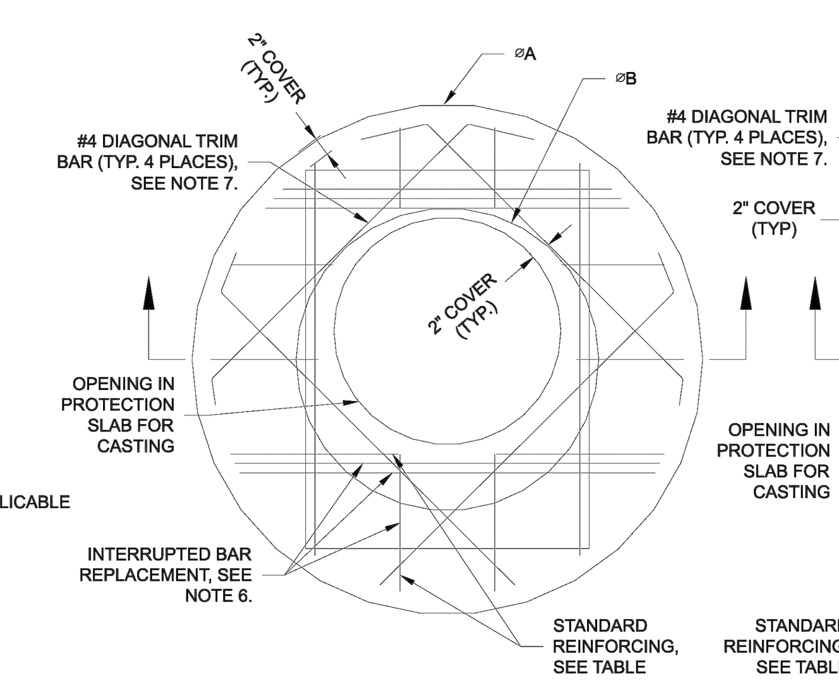


SECTION VIEW

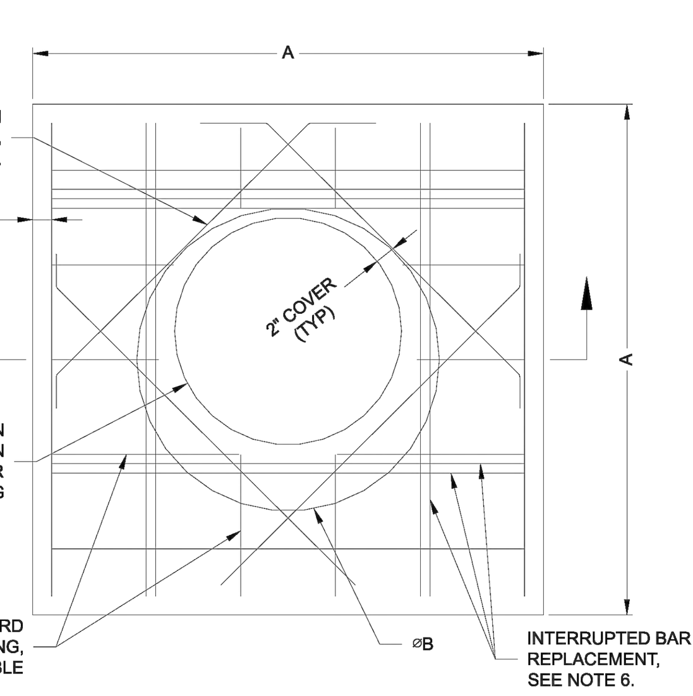
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

REINFORCING TABLE

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL
SCALE: N.T.S.

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DYO63496 Slick City Troy
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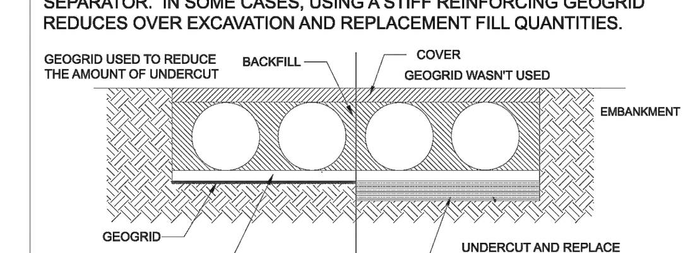
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

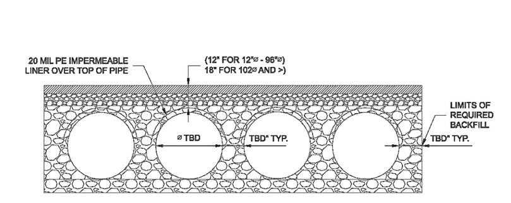
IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.



GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

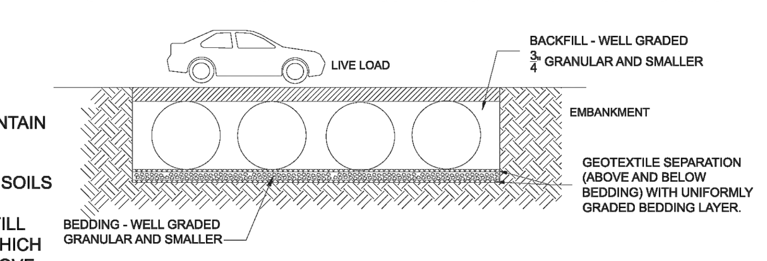
THE RESISTIVITY OF A PROJECT SITE MAY CHANGE OVER TIME DUE TO THE USE OF VARIOUS SALTING, DE-ICING, AND AGRICULTURAL AGENTS APPLIED ON OR NEAR THE AREA. TO MITIGATE THE POTENTIAL IMPACT OF THESE AGENTS, AN HDPE MEMBRANE LINER WILL BE INSTALLED ON THE CROWN OF EACH PIPE, CREATING AN IMPERMEABLE BARRIER. THIS MEASURE IS DESIGNED TO PROTECT THE SYSTEM FROM ENVIRONMENTAL CHANGES THAT COULD LEAD TO PREMATURE CORROSION AND REDUCE THE OVERALL SERVICE LIFE.



IN-SITU TRENCH WALL

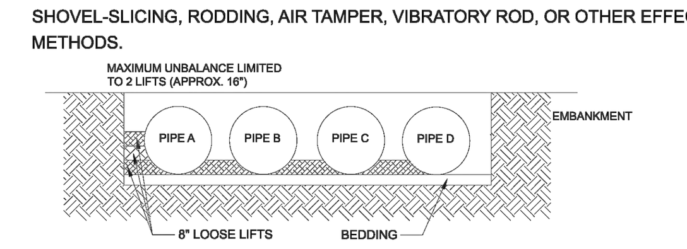
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



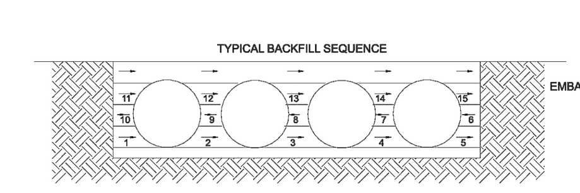
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

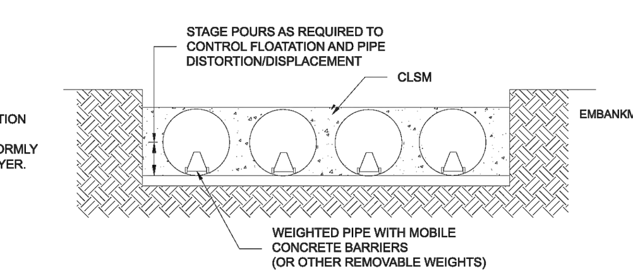


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

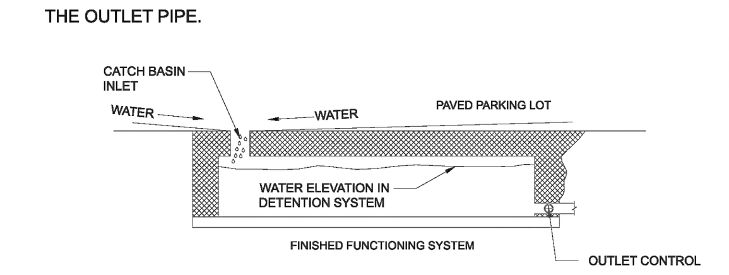


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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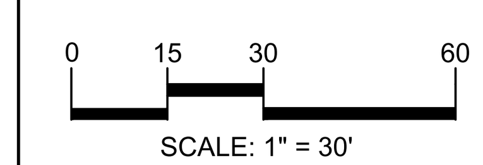


811 Know what's below. Call before you dig.

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.

CLIENT
AUGER KLEIN ALLER ARCHITECTS, INC.
303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS
\- -

ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
CONTECH UNDERGROUND DETENTION DETAILS

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	JKS
DES.	KMM

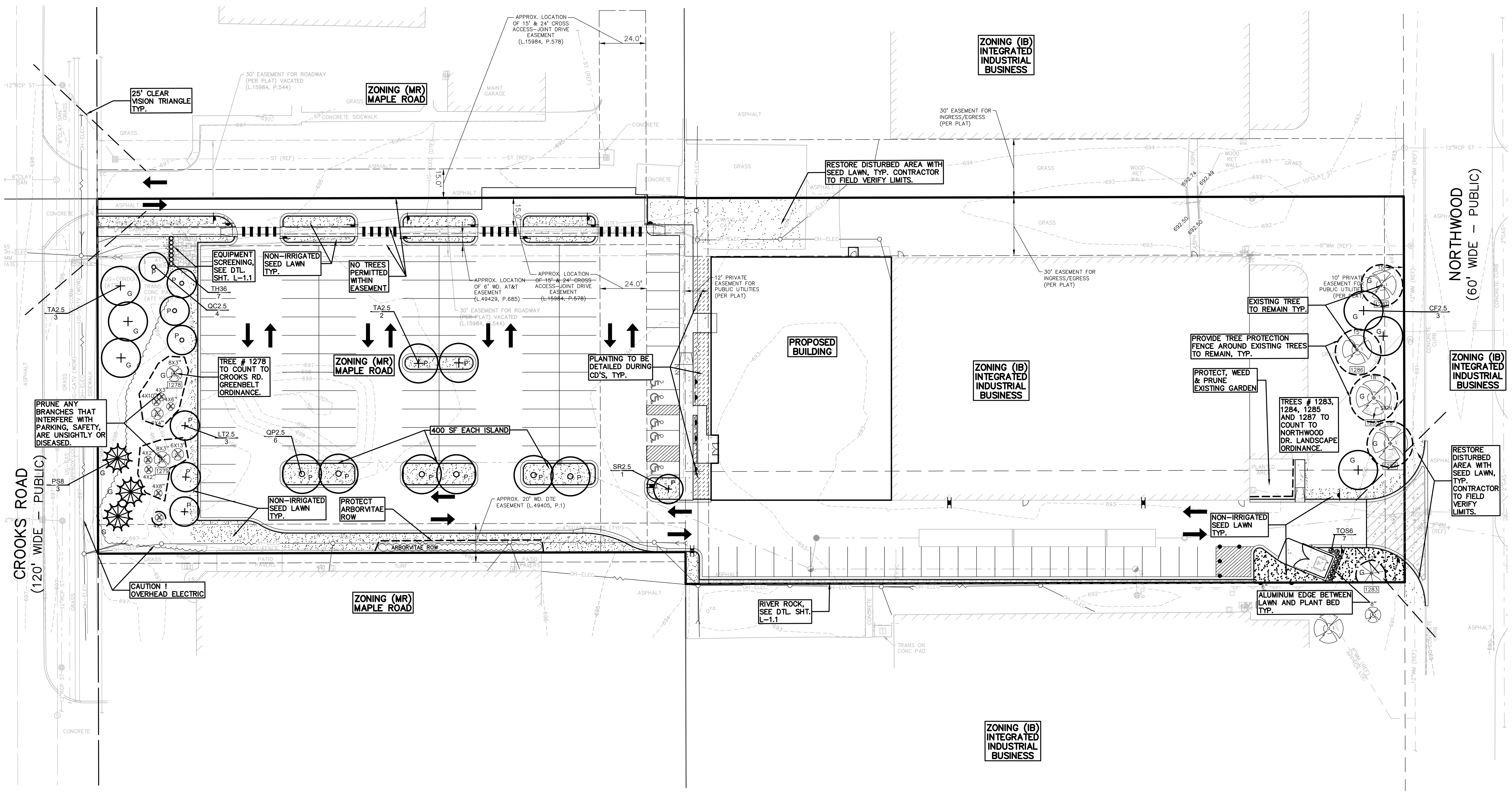
DRAWING NUMBER:
C-9.1

GENERAL PLANTING 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.
18. CONTRACTOR SHALL NOT INSTALL PLANTS UNDER BUILDING OVERHANG AND SHALL NOTIFY LANDSCAPE ARCHITECT IF DRAWINGS CONFLICT WITH BUILDING OVERHANGS.
19. TREES SHALL NOT CONFLICT/ BLOCK PROPOSED REGULATORY/ DIRECTION SIGNAGE, MONUMENT SIGNS, ADDRESS OR LIGHT POLES. SHIFT TREES AS NECESSARY TYP.

PLANT SCHEDULE

CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER	SPACING	DESIGNATION
DECIDUOUS TREES							
CF2.5	3	CORNUS FLORIDA 'APPALACHIAN SPRING'	APPALACHIAN SPRING DOGWOOD	2.5" CAL.	B&B	PER PLAN	NATIVE
LT2.5	3	LIRIODENDRON TULIPIFERA	TULIP POPLAR	2.5" CAL.	B&B	PER PLAN	NATIVE
QC2.5	4	QUERCUS ROBUR X ALBA 'CRIMSCHMIDT'	CRIMSON SPIRE™ OAK	2.5" CAL.	B&B	PER PLAN	NATIVE
QP2.5	6	QUERCUS ROBUR X BICOLOR 'LONG'	REGAL PRINCE® OAK	2.5" CAL.	B&B	PER PLAN	NATIVE
SR2.5	1	SYRINGA RETICULATA 'IVORY SILK'	IVORY SILK JAPANESE TREE LILAC	2.5" CAL.	B&B	PER PLAN	NON-NATIVE
TA2.5	5	TILIA AMERICANA 'AMERICAN SENTRY'	AMERICAN SENTRY LINDEN	2.5" CAL.	B&B	PER PLAN	NATIVE
	22	SUBTOTAL:					
EVERGREEN TREES							
PS8	3	PINUS STROBUS	EASTERN WHITE PINE	8` HT.	B&B	PER PLAN	NATIVE
	3	SUBTOTAL:					
SHRUBS							
TH36	7	TAXUS X MEDIA 'HICKSII'	HICKS ANGLO-JAPANESE YEW	3` HT.	CONT.	30" O.C.	NON-NATIVE
TOS6	7	THUJA OCCIDENTALIS 'SMARAGD'	EMERALD GREEN ARBORVITAE	6` HT.	B&B	36"O.C.	NATIVE
	14	SUBTOTAL:					



= DECIDUOUS TREES

= EVERGREEN TREES

= EXISTING TREES TO REMAIN WITH TREE PROTECTION FENCE

= PLANTINGS TO BE DETAILED AT CD'S

= IRRIGATED SEED LAWN

= RESTORE SEED LAWN

= RIVER ROCK OVER WEED FABRIC SEE LANDSCAPE DETAIL L-1.1

LETTER DESIGNATION FOR LANDSCAPE ORDINANCE TREES

G = GREENBELT TREES
P = PARKING LOT TREES

LANDSCAPE CALCULATIONS:
PER CITY OF TROY ZONING ORDINANCE; MR-MAPLE ROAD AND IB INTEGRATED INDUSTRIAL BUSINESS

PARKING LOT LANDSCAPING = P
REQUIRED: 1 TREE / 8 PARKING SPACES AND MINIMUM 200 SF PARKING ISLAND WITH TREES INSIDE ISLAND.
125 PARKING SPACES / 8 = 15.6 TREES

PROVIDED: 16 PROPOSED TREES

GREENBELT = G
REQUIRED: 1 TREE / 30 LF OF FRONTAGE

CROOKS RD.: 183 LF FRONTAGE/30 = 6.1 TREES
NORTHWOOD: 199 LF FRONTAGE/30 = 6.6 TREES

PROVIDED: CROOKS RD: 3 PROPOSED DEC, 3 PROPOSED EVG AND 1 EXISTING TREE
NORTHWOOD DR: 3 PROPOSED DEC TREES AND 4 EXISTING TREES

GENERAL SITE LANDSCAPE
REQUIRED: 20% OF SITE AREA SHALL BE LANDSCAPE MATERIAL (SECTION 13.02 E)
129,203 SQ FT * 20% = 25,841 SQ FT

PROVIDED: 33,609 \ SQ FT OF SOFT-SCAPE

AT GRADE EQUIPMENT SCREENING
REQUIRED: SCREEN EQUIPMENT WITH EVERGREEN LANDSCAPE MATERIALS, HT. MINIMUM TO EQUAL EQUIPMENT HT.

PROVIDED: EVERGREEN SHRUBS AT UTILITIES

REPLACEMENT TREES
SEE SHT. T-1.0 FOR EXISTING TREE LIST, CALCULATIONS AND TREE PRESERVATION PLAN.

REQUIRED: TREE CREDIT EXISTS THEREFORE NONE REQUIRED OR PROVIDED

PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN JANET L. EVANS LANDSCAPE ARCHITECT NO. 1380 REGISTERED LANDSCAPE ARCHITECT

NORTH

0 15 30 60
SCALE: 1" = 30'

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CLIENT
AUGER KLEIN ALLER ARCHITECTS, INC.
303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS

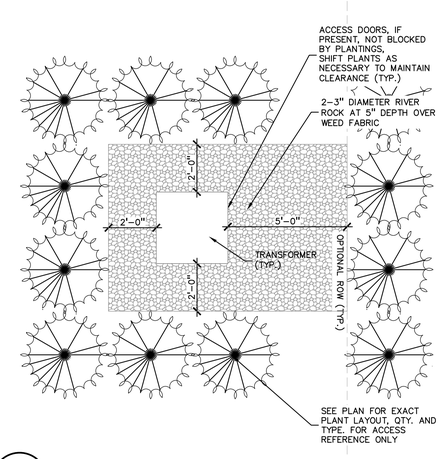
ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
PRELIMINARY LANDSCAPE PLAN

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	CAL
DES.	JLE

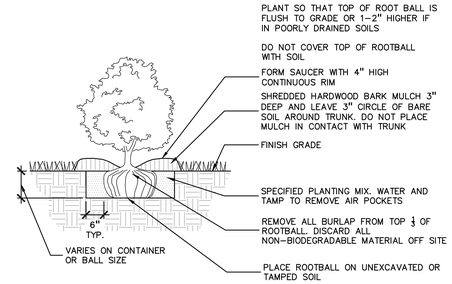
DRAWING NUMBER:
L-1.0

NOT FOR CONSTRUCTION



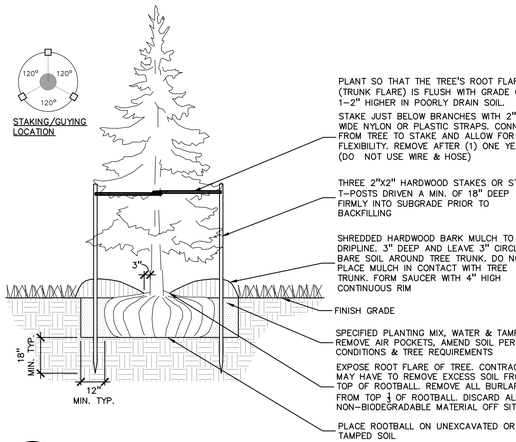
6 EQUIPMENT SCREENING DETAIL

SCALE: 1" = 3'–0"



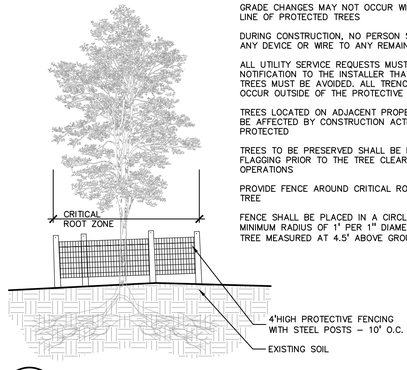
3 SHRUB PLANTING DETAIL

SCALE: 1" = 2'–0"



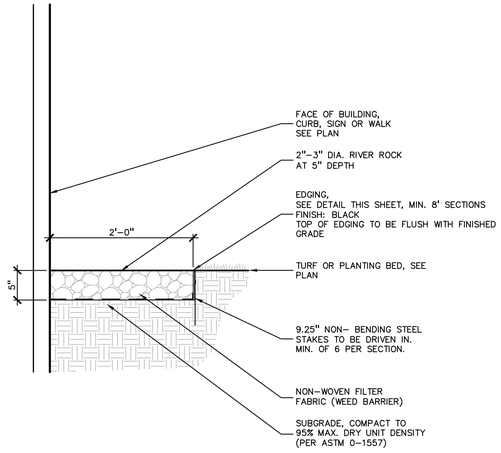
5 EVERGREEN TREE PLANTING DETAIL

SCALE: 1" = 3'–0"



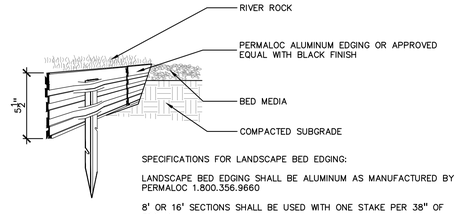
2 TREE PROTECTION DETAIL

SCALE: 1" = 3'–0"



7 ROCK MAINTENANCE STRIP

SCALE: 1" = 1'–0"



SPECIFICATIONS FOR LANDSCAPE BED EDGING:

LANDSCAPE BED EDGING SHALL BE ALUMINUM AS MANUFACTURED BY PERMALOC 1.800.356.9660

8' OR 16' SECTIONS SHALL BE USED WITH ONE STAKE PER 38" 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 MEETING AAMA 2603

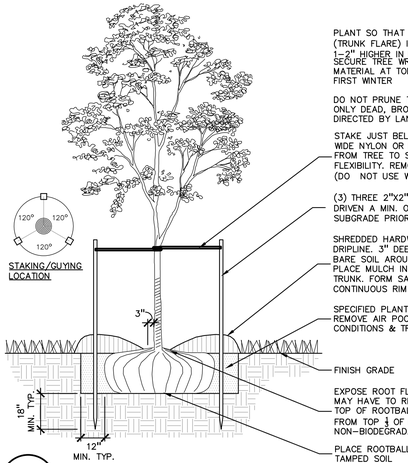
STAKE SHALL SECURELY ENGAGE EDGING AND SHALL BE ENTIRELY BELOW TOP SURFACE OF EDGING

EDGING SHALL HAVE A MINIMUM OF 2" OF INTERLOCKING OVERLAP BETWEEN SECTIONS

INSTALL AS PER MANUFACTURER'S SPECIFICATIONS WITH TOP OF EDGING 1"–2" ABOVE COMPACTED FINISH GRADE. FINISH GRADE TO BE COMPACTED ON BOTH SIDES OF EDGING TO MAINTAIN STABILITY

4 ALUMINUM EDGE DETAIL

SCALE: 1/2" = 1'–0"



1 DECIDUOUS TREE PLANTING DETAIL

SCALE: 1" = 3'–0"

NOT FOR CONSTRUCTION

PEA GROUP
t: 844.813.2949
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STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
REGISTERED
NO. 7390
LANDSCAPE ARCHITECT

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303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

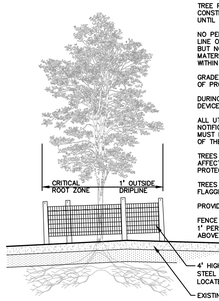
REVISIONS
- -

ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
LANDSCAPE DETAILS

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	CAL
DES.	JLE

DRAWING NUMBER:
L-1.1



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.

1 TREE PROTECTION DETAIL
NOT TO SCALE

EXISTING TREE LIST

R = DENOTES A TREE TO BE REMOVED
S = TREE TO BE SAVED

TAG	DBH	COMMON NAME	LATIN NAME	COND	NOTES	CLASS	SAVE / REMOVE	ON-SITE	REPLACE
~~1272~~	~~6~~	~~Catalpa~~	~~Catalpa speciosa~~	~~Fair~~	~~Many grapevines, x1~~	~~INVASIVE~~	R	~~Y~~	-
~~1273~~	~~6~~	~~Catalpa~~	~~Catalpa speciosa~~	~~Fair~~		~~INVASIVE~~	R	~~Y~~	-
~~1274~~	~~6~~	~~Black Walnut~~	~~Juglans nigra~~	~~Fair~~	~~x16~~	~~WOODLAND~~	R	~~Y~~	REPLACE
~~1275~~	~~6~~	~~Black Walnut~~	~~Juglans nigra~~	~~Fair~~	~~x6~~	~~WOODLAND~~	R	~~Y~~	REPLACE
~~1276~~	~~7~~	~~Weeping Willow~~	~~Salix babylonica~~	~~Fair~~	~~x3~~	~~INVASIVE~~	R	~~Y~~	-
~~1277~~	~~6~~	~~Weeping Willow~~	~~Salix babylonica~~	~~Fair~~	~~x4~~	~~INVASIVE~~	R	~~Y~~	-
1278	7	Black Walnut	Juglans nigra	Fair	x3	WOODLAND	S	Y	-
1279	8	Cottonwood	Populus deltoides	Fair	x3	INVASIVE	S	Y	-
~~1280~~	~~9~~	~~Willow~~	~~Salix Spp.~~	~~Good~~	~~x23~~	~~INVASIVE~~	R	~~Y~~	-
~~1281~~	~~6~~	~~Siberian Elm~~	~~Ulmus pumila~~	~~Fair~~		~~INVASIVE~~	R	~~Y~~	-
1282	6	Crab Apple	Malus caronaria	Good		WOODLAND	S	N	-
1283	10	Austrian Pine	Pinus nigra	Fair		WOODLAND	S	Y	-
1284	17	Honeylocust	Gleditsia triacanthos	Good		LANDMARK	S	Y	-
1285	19	Honeylocust	Gleditsia triacanthos	Good		LANDMARK	S	Y	-
1286	13	Catalpa	Catalpa speciosa	Good	x1	INVASIVE	S	Y	-
1287	17	Honeylocust	Gleditsia triacanthos	Good		LANDMARK	S	Y	-

TREE INVENTORY/PRESERVATION CALCULATIONS

WOODLAND TREES					
WOODLAND TREES REMOVED:		**2**	(REPLACE AT 50% OF REMOVED DBH)		
12" DBH x 0.5 =			**6"** REPLACEMENT		
WOODLAND TREES SAVED:		2	(CREDIT OF 2X DBH)		
17" DBH x 2 =			**34"** CREDIT		
6	-	34	=	-28	
28"	**DBH CREDIT FOR WOODLAND PRESERVATION**				

LANDMARK TREES					
LANDMARK TREES REMOVED:		0	(REPLACE AT 100% OF REMOVED DBH)		
'' DBH x 1 =			'' REPLACEMENT		
LANDMARK TREES SAVED:		3	(CREDIT OF 2X DBH)		
53" DBH x 2 =			**106"** CREDIT		
0	-	106	=	-106	
106"	**DBH CREDIT FOR LANDMARK PRESERVATION**				

0	**TOTAL DBH REQUIRED FOR REPLACEMENT**

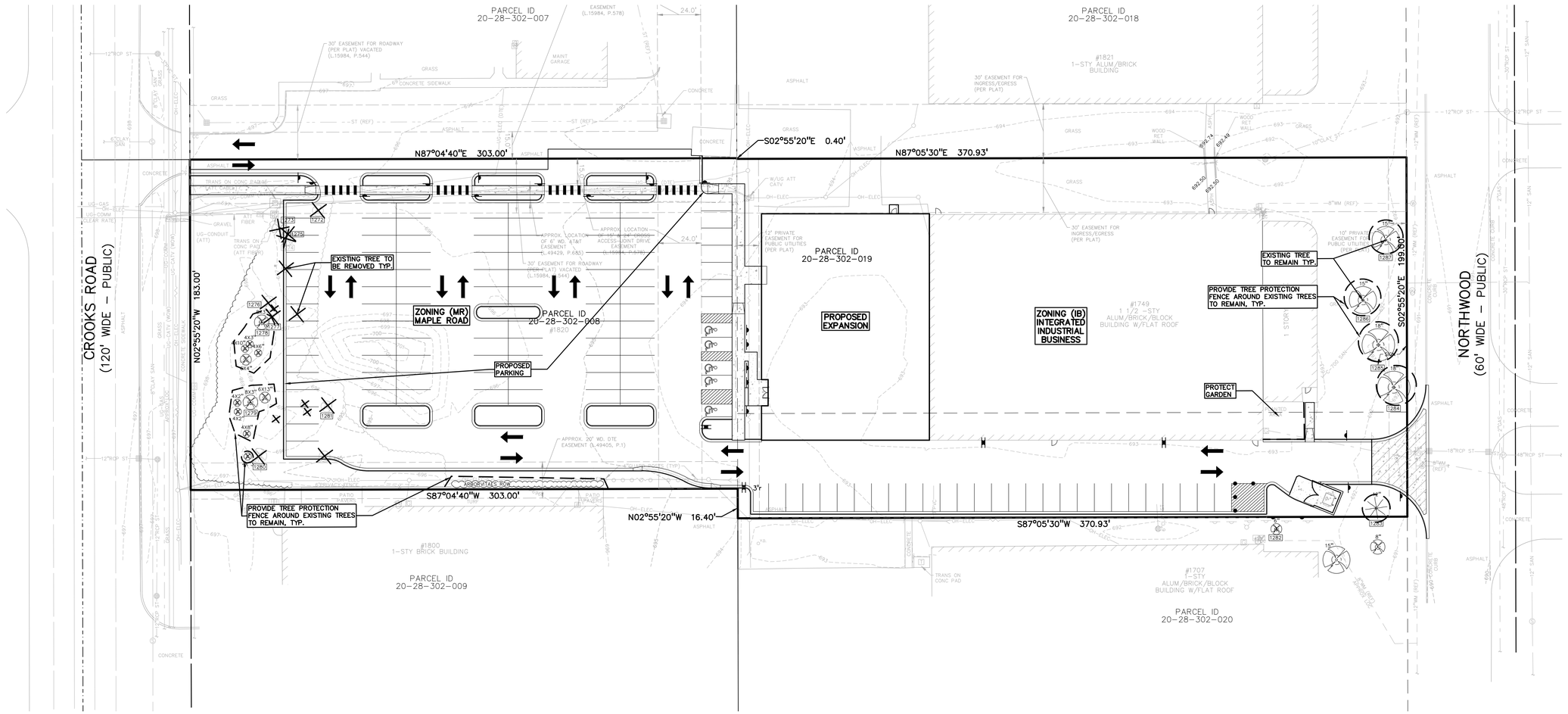
EXEMPT TREES		
(NO REPLACEMENT REQUIRED FOR EXEMPT TREES)		
SAVED EXEMPT TREES:	2	**Trees**
EXEMPT TREES ON SITE:	8	**Trees**
TOTAL SAVED TREES 6" AND ABOVE ON SITE:	7	Trees

KEY:

= EXISTING TREES TO REMAIN WITH TREE PROTECTION FENCE

= EXISTING TREES TO BE REMOVED

2782 = TREE IDENTIFICATION NUMBER SEE THIS SHEET FOR SPECIES, SIZE AND PRESERVATION STATUS



PEA GROUP
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STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
No. 1302
REGISTERED LANDSCAPE ARCHITECT

NORTH

0 15 30 60
SCALE: 1" = 30'

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CLIENT
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303 E. THIRD STREET
ROCHESTER, MI

PROJECT TITLE
SLICK CITY
1749 NORTHWOOD
TROY, MI

REVISIONS
- -

ORIGINAL ISSUE DATE:
FEBRUARY 4, 2025

DRAWING TITLE
TREE PRESERVATION PLAN

PEA JOB NO.	24-1658.01
P.M.	JRH
DN.	CAL
DES.	JLE

DRAWING NUMBER:
T-1.0

NOT FOR CONSTRUCTION

ITEM #6

DATE: February 6, 2025

TO: Planning Commission

FROM: R. Brent Savidant, Community Development Director

SUBJECT: PRELIMINARY SITE PLAN REVIEW (SP JPLN2024-0014) – Proposed Pinnacle of Troy, Troy, Southwest corner of Crooks and Wattles (3991 Crooks; PIN 88-20-20-226-015, -016, -017, & -106), Section 20, Currently Zoned NN (Neighborhood Node "I") District.

The petitioner David Donnellon submitted the above referenced Preliminary Site Plan application for a attached residential development featuring 36 units in 12 buildings. The subject site is 5.38 acres in area. The Planning Commission is authorized to approve this Preliminary Site Plan.

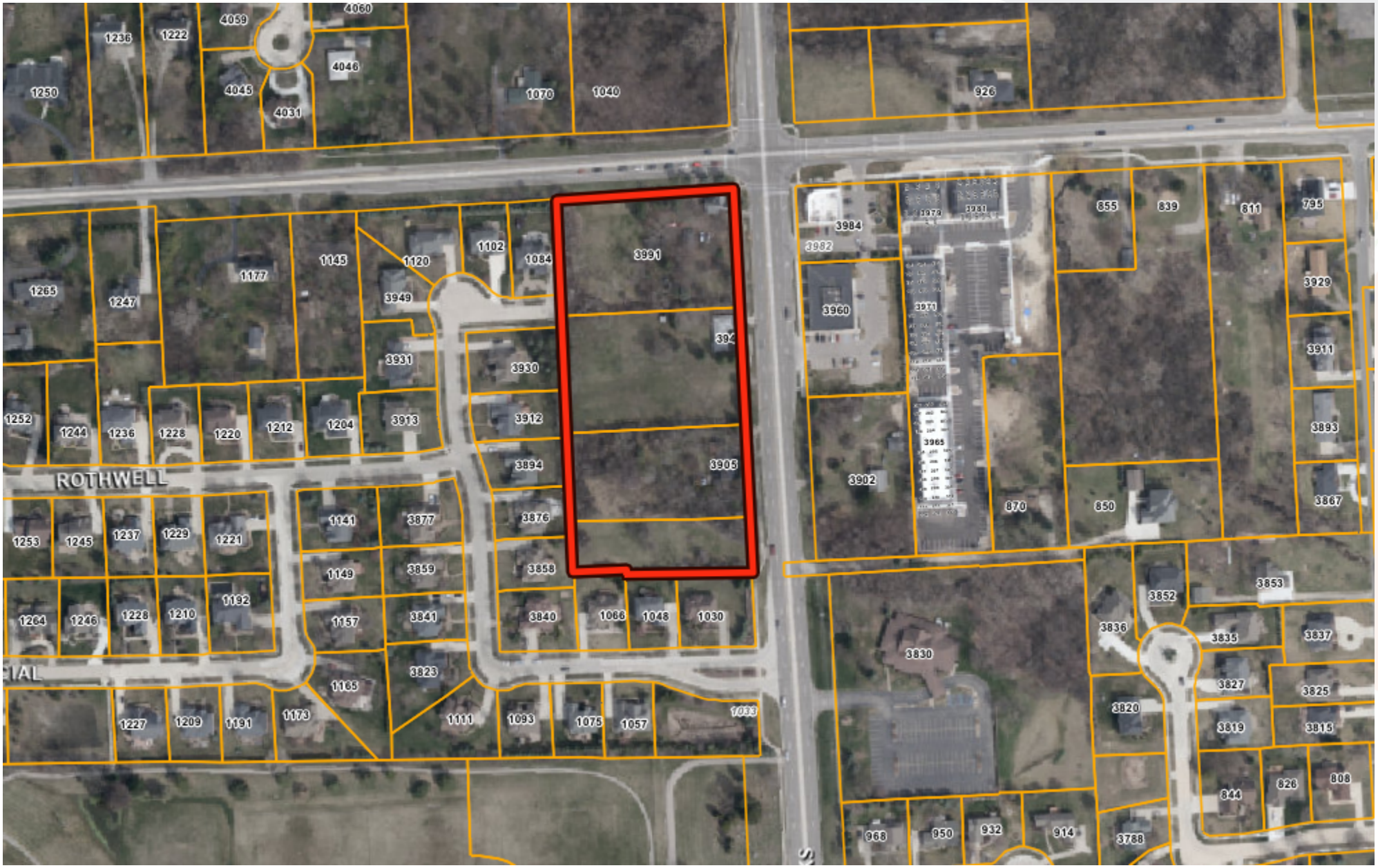
The applicant seeks a height variance for the units from the Zoning Board of Appeals. Therefore the Planning Commission may discuss the item and provide feedback but may not take action on this item at the February 11 meeting.

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 Study, prepared by Colliers dated June 2, 2024
4. Traffic memo prepared by OHM Advisors, dated June 18, 2024
5. Preliminary Site Plan Application.

GIS Online

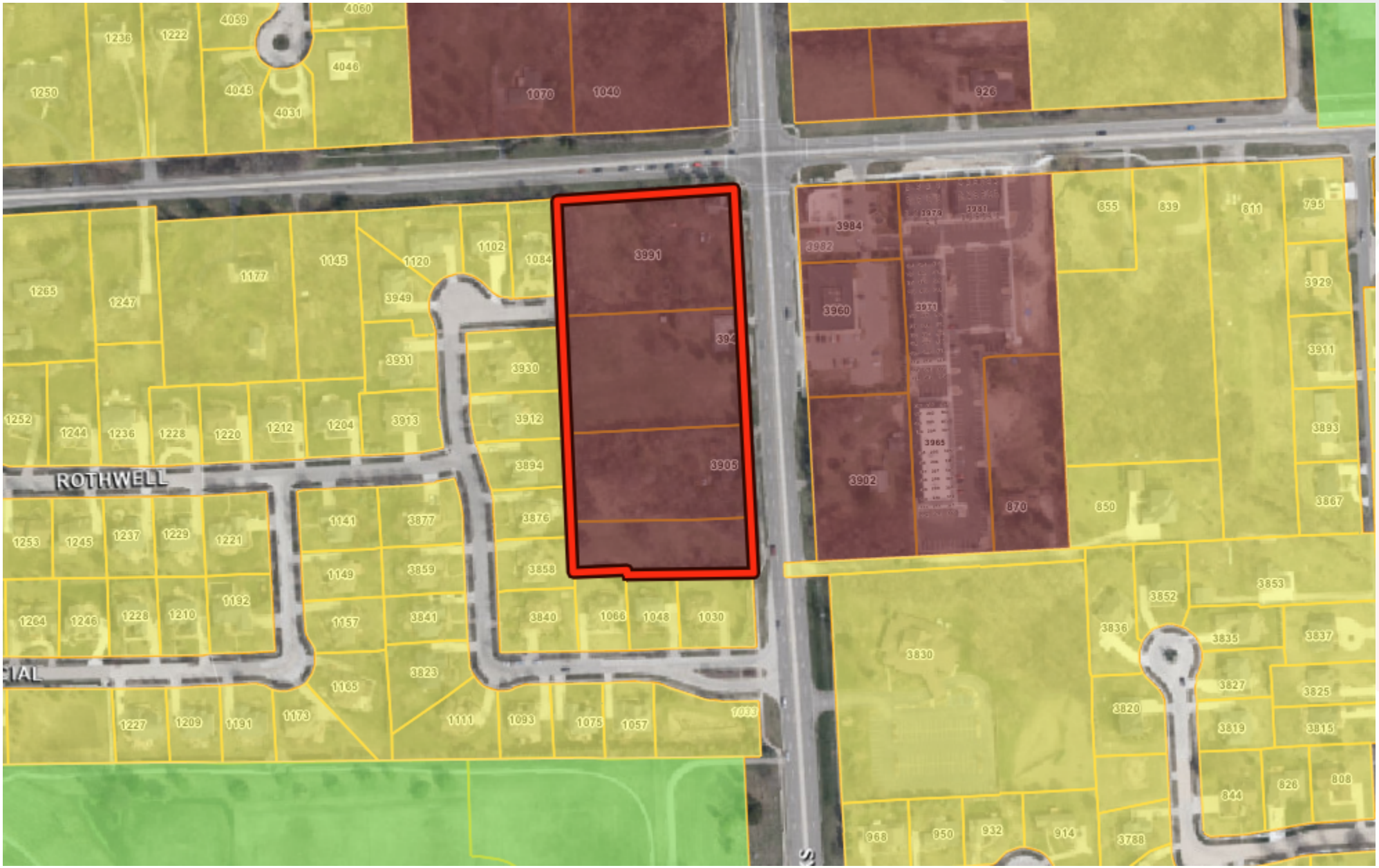


0 350 700 ft

Print Date: 2/6/2025

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



0 350 700 ft

Print Date: 2/6/2025

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: February 6, 2025

Consideration of a Preliminary Site Plan
For
City of Troy, Michigan

Applicant: David Donnellon

Project Name: Pinnacle of Troy

Location: SW Corner of Crooks & Wattles

Plan Date: January 21, 2025

Zoning: NN, Neighborhood Nodes ("F")

Action Requested: No action

SITE DESCRIPTION

An application has been submitted to construct a new one-family attached/multiple-family development at the southwest corner of Wattles and Crooks Roads. The 5.38 acre site is largely undeveloped, with the exception of three (3) single family homes facing Crooks Road. The applicant proposes to develop a total of thirty-six (36) units, split between twelve (12) buildings. Each building has between two (2) to four (4) units. Each unit is 2.5 stories with a minimum of three (3) bedrooms. The site has one (1) access point off Crooks Road and contains three (3) internal dead-end streets. As part of the project, the applicant seeks a height variance from the Zoning Board of Appeals (ZBA).

The site includes four (4) parcels, each zoned NN, Neighborhood Nodes (F), Site Type B, in which attached residential is a permitted use.

Please note that the applicant is seeking a height variance (more discussion below). Planning Commission is asked to review the site plan, but shall not grant preliminary site plan approval until a variance decision is reached by the ZBA.

Site Location:

Proposed Use of Subject Site:
One-family attached/Multiple-family residential.

Current Zoning:
The property is currently zoned NN, Neighborhood Nodes (F) Form Based District, Site Type B, Street Type A.

Surrounding Property Details:

Direction	Zoning	Use
North	NN, Neighborhood Nodes (F)	Undeveloped land
South	R1-B, One Family Residential	Single family residential
East	NN, Neighborhood Nodes (F)	7-Eleven

		Cucina Lab Torino Italian Restaurant Troy Dental Studio Undeveloped land
West	R1-B, One Family Residential	Single family residential

MASTER PLAN

Development in the Neighborhood Nodes has been a frequent topic of conversation amongst the Planning Commission, City Officials, and the general public. The City of Troy 2040 Master Plan, recently adopted in May 2024, outlines specific intentions for each of the Neighborhood Nodes. Page 91 of the Master Plan states the following regarding the southwest corner of Neighborhood Node (F), where the subject site is located:

"Due to the existing traffic patterns along both Crooks and Wattles, incorporation of a park use, or low intensity and scale residential, including the expansion of the Stonehaven subdivision into the southwest corner of this node, utilizing the already existing entrances from Crooks and Wattles would be appropriate. If a continuation of Stonehaven is not possible, any future development of this corner shall limit access to Crooks and Wattles, to not increase existing traffic conflicts. The City may consider rezoning the southwest corner to a one-family attached or single-family zoned designation."

Items to be Addressed: *Planning Commission to discuss the project's compatibility with the City's vision for the subject site, as described in the 2040 Master Plan.*

NATURAL FEATURES

Topography/Wetlands/Drain: The subject site is largely undeveloped, although there are three (3) existing single-family homes located on the 5.38 acres. The site's elevation declines from north to south, with elevations reaching as high as 744 feet above sea level in the northwest corner, and as low as 731 feet in the southeast corner. The site is not located in a floodplain and contains no wetlands.

Woodlands: The applicant is removing 75 regulated trees, which total 929 inches. They are preserving 17 regulated trees, which total 190 inches. A list of existing trees has been provided on Sheet T-1.1.

Replacement Details		
Protected Tree	**Inches Removed**	**Replacement Required**
Landmark	481 inches	481 inches
Woodland	488 inches	244 inches
Preservation/Mitigation	**Inches Preserved**	**Credit**
Landmark	13 inches	26 inches
Woodland	177 inches	354 inches
Total	**345 inches required for replacement.**	

	(725 inch replacement - 380 inch credit)

In a previous review dated November 26, 2024, we raised concerns over the vast number of replacement trees proposed between the sidewalks on Wattles and Crooks and the building frontages. Our concerns pertained to the likelihood that these trees will survive the harsh environmental conditions (salt, oil, etc) experienced on a major intersection.

In a memo dated January 20, 2025, the applicant responded by stating: "Extra care will be taken to provide evergreens with an anti-desiccant spray to protect evergreens from winter damage and reduce water loss. Evergreens can also be wrapped in burlap in the winter months to protect against sunscald and frost cracks, per ANSI, American Nursery Stock Standard, best practices."

One of the intents of the form-based districts is to create a pedestrian friendly area and an engaging experience from the road. The Planning Commission should consider if a row of arborvitae that screens the fronts of the buildings from Wattles and Crooks meets the intent of the form-based districts.

Items to be Addressed: *Does the use of arborvitae meet the intent of the form-based district.*

Row of arborvitae between building and ROW

AREA, WIDTH, HEIGHT, SETBACKS

The proposed site is regulated by the standards of Building Form C:

	Required	Provided	Compliance
Front (Wattles)	10-foot build-to line	15 feet	Needs relief from Planning Commission. See Discussion Below
Front (Crooks)	10-foot build-to line	14 feet	Needs relief from Planning Commission. See Discussion Below
Side (West)	N/A, building may be placed up to property line	30 feet	Complies
Rear (South)	30 feet minimum	30 feet	Complies

Building Height (Neighborhood Nodes)	2.5 stories, 30 feet	33 feet	Does Not Comply. See Discussion Below
Open Space	15%	34.6%	Complies
Parking	Parking behind or to side of building	Parking in garages, driveways, and on internal roads	Complies

Front Setbacks:
Due to its location at the southwest corner of Wattles and Crooks Roads, the subject site is considered to have two (2) front yards. Both yards are required to have a 10-foot front setback, which the applicant has exceeded by proposing fourteen (14) along Crooks and fifteen (15) feet along Wattles.

Building Form C permits the Planning Commission to adjust the building line to a maximum of thirty (30) feet beyond the property line for projects incorporating a permanent front yard, enclosed space that shall incorporate a permanent wall or landscaping area along the required building line. The applicant is proposing a patio with landscaping, including the screening noted above.

Building Height:
The applicant is aware that the proposed building height of thirty-three (33) feet exceeds the amount permitted by three (3) feet. The applicant is also aware that building height in the Neighborhood Nodes has been a particularly sensitive subject for the Planning Commission and community at large. They have chosen to seek a building height variance from the City's Zoning Board of Appeals (ZBA).

The applicant is informed of the process to follow for a project that requires both site plan and variance approval, as outlined in Section 15.06. The steps for this process are as follows:

> *The Planning Commission shall review the site plan, including site layout and other design features, but shall not grant Preliminary Site Plan Approval nor make a recommendation on the variance. The Planning Commission shall then transmit the site plan and the minutes related to said site plan to the Zoning Board of Appeals. The Zoning Board of Appeals shall transmit its decision related to the application to the Planning Commission. The Planning Commission shall then take action on the site plan.*

Items to be Addressed: *1). Planning Commission consideration of increased front setbacks; and 2). Planning Commission shall review the site plan, but shall not grant preliminary site plan approval until a variance decision is reached by the ZBA.*

SITE LAYOUT

The proposed development includes thirty-six (36) residential units, split between twelve (12) buildings. Each building contains two (2) to four (4) units. The site has one (1) point of access via Crooks Road, and there are three (3) internal dead-end streets on site. A 5-foot wide sidewalk system is provided throughout, connecting to the existing sidewalk along Wattles and Crooks Roads.

While all units face the internal roads, those units along Wattles and Crooks are designed to have additional doors and walkways facing the thoroughfares. An outdoor amenity area is located in the site's southeast corner; however, this area is located above an underground detention system, and therefore no permanent structures may be erected there.

The number of units on site has led to a particularly tight layout. In previous reviews, we raised concerns regarding the close proximity of turnarounds and guest parking spaces to neighboring units. Similarly, we raised concerns over the tightly packed planting areas and lack of outdoor amenities. Over time, the applicant has addressed some of our concerns, although the layout remains tightly packed.

Items to be Addressed: *None.*

PARKING

	Required	Provided	Compliance
Multi-Family Residential: 2 spaces per each dwelling unit	36 units*2= 72 spaces	90 spaces total (72 unit spaces + 18 guest spaces)	Exceeds Amount Permitted. See Discussion Below

Excess Parking:

The amount of parking proposed by the applicant exceeds the required number by more than 20%. We recognize that excessive parking reduces aesthetic standards and contributes to high and unnecessary rates of stormwater runoff. For these reasons, the City requires applicants to receive approval when exceeding parking requirements by more than 20%.

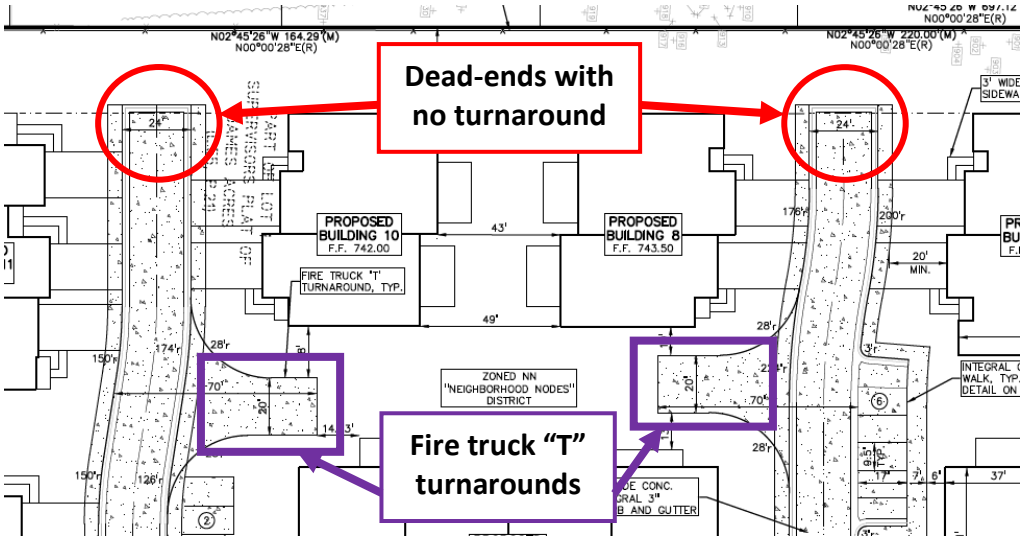
In a previous review, we informed the applicant that parking would need to be reduced or documented evidence justifying the parking need would be required to receive approval from the Planning Commission. Since then, five (5) spaces have been removed from the site plan; however, parking still exceeds 20%, and no evidence-based justification has been provided. It appears that the applicant intends to discuss this with the Planning Commission without documented evidence.

Items to be Addressed: *Reduce parking or provide documented evidence justifying the need for excess parking.*

TRAFFIC and CIRCULATION

Vehicular Traffic:

The subject site has one (1) point of access via Crooks Road. Within the site, there is one (1) main drive that provides access to three (3) separate dead-end streets. Although two-way traffic is utilized throughout the site, we have concerns with the awkward navigation of the dead-end streets. No turnaround is provided where these streets end; instead, each street ends with just grass. See the image below.



In order to shift direction where the street ends, a driver will be required to reverse until they can either turn around in someone's driveway or reverse until they reach the "T" turnaround provided for the Fire Department halfway down the street. In either case, the driver might find themselves reversing towards an approaching vehicle.

In a previous review, we asked the applicant to clarify how trash vehicles or delivery trucks would navigate the ends of these roads. In a response memo dated January 20, 2025, the applicant stated: "The vehicular maneuvering space at the end of dead-end driveway meets the National Fire Department Standards for "T" turnarounds and has been accepted by the Troy Fire Department." "All trash and delivery vehicles will use the code compliant turn around space to maneuver in and out of this area."

We have also asked the applicant to shift the truck "T" turnarounds north to the dead end. This would provide additional buffer from the Stonehaven subdivision and allow for a turnaround at the end of the dead ends. In addition, we have concerns that the proposed locations will be used for guest parking and may not remain clear for fire access.

Pedestrian Access:
A 5-foot wide sidewalk system is provided throughout the site, which connects to the existing sidewalk along Wattles and Crooks Roads. Five (5) crosswalks are provided to allow for direct pedestrian access across each internal street. Units abutting Wattles and Crooks Roads have a personal 3-foot wide sidewalk connecting them to the sidewalk system along these main roads.

***Items to be Addressed**: Planning Commission to discuss the layout and proposed street design.*

LANDSCAPING

A landscaping plan has been provided on Sheet L-1.0. The following table discusses the development's compliance with the landscape requirements set forth in Section 13.02.

	Required	Provided	Compliance
Greenbelt Landscaping: One (1) deciduous tree for every thirty (30) lineal feet, or fraction thereof, of frontage abutting a public road right-of-way.	Wattles: (332/30)= 11 trees Crooks: (712/30)= 24 trees	Wattles: 11 trees Crooks: 24 trees	Complies
Site Landscaping: A minimum of 20% of the site area shall be comprised of landscape material.	20%	41.4%	Complies
Screening Between Uses: South/Single-family: One (1) large evergreen tree per ten (10) lineal feet West/Single-family: One (1) large evergreen tree per ten (10) lineal feet	South: (337 LF/10)= 34 large trees West: (697 LF/10)= 70 large trees	South: 34 large trees West: 70 large trees	South: Complies West: Complies
Parking Lot Trees: One (1) tree for every eight (8) spaces	23 spaces/8= 3 trees	3 trees	Complies

Proposed Fence:
As mentioned, the subject site abuts single-family residential homes to the south and west. In addition to the landscape screening provided along these property lines, the applicant proposes to construct a 5-foot tall black aluminum decorative fence.

Mechanical Equipment:
Details provided on Sheet L-1.3 indicate that landscape screening will be provided around transformers once their location is finalized. Sheet L-1.3 states "See plan for plant type, quantity and layout. Note: utilities may be located adjacent to bldg units."

Trash Enclosure:
There will be no dumpsters on site. Each residential unit will receive personal trash containers that will be collected on the dedicated trash day.

Stormwater Management:
An underground detention area is shown in the site's southeast corner. We refer to the City Engineer for review.

Outdoor Amenities:
One (1) outdoor amenity area is shown at the southeast corner of the site. The applicant states that benches and a bike rack will be placed in this area, plus any additional amenities chosen at the discretion of the homeowners. However, due to the underground detention system directly below, no amenities requiring foundations are permitted in this area. The applicant states that residents may utilize the nearby Boulan Park for recreation amenities that are not provided directly on site.

***Items to be Addressed**: Planning Commission to discuss amenity areas.*

LIGHTING

A photometric plan has been provided. All lighting levels are compliant with ordinance standards. One (1) pole light is proposed near the access point off Crooks.

All other lights on site are wall-mounted lights located on the building facades. Because they are not downward directed, the design of these fixtures qualifies them as 'decorative lighting.' Decorative fixtures may be approved when it can be proven that there will be no off-site glare through the use of low wattage lamps and the proposed fixtures will be more consistent with the character of the site.

***Items to be Addressed:** Planning Commission consideration of decorative lighting.*

FLOOR PLAN AND ELEVATIONS

Floor Plans:
The applicant proposes a total of thirty-six (36) units, split between twelve (12) buildings. Four (4) different floor plans are provided on Sheet A-2 and each unit will match one of these floor plans. Each unit is 2.5 stories. Technically, each unit has a basement, two (2) full stories, and a half-story "loft area" at the top.

Each unit comes with a 2-car garage in the front of the home and an outdoor patio in the back. Each unit contains five (5) restrooms, and either three (3) or four (4) bedrooms, depending on the model. The third level/loft area shows a restroom, reading nook, play area, possible bunk beds, and walk-in closet. The applicant has conveyed that the layout of the loft will be decided by the homeowner. Similarly, the area of each home will be based upon the buyer's preference; although, the average area of each home should fall between 2,600 and 3,200 square feet.

Elevations:
The overall building height is thirty-three (33) feet. As previously mentioned, the applicant seeks a dimensional variance for a building height greater than thirty (30) feet.

Transparency:
Transparency calculations were provided by the applicant in a memo dated January 20, 2025. Transparency requirements and compliance are outlined in the table below.

Elevation	Façade Area	Required	Provided	Compliance
Crooks	352 SF	176 SF (50%)	216 SF (61.3%)	Complies
Wattles	385 SF	192.5 SF (50%)	207 SF (53.8%)	Complies

Building Materials:
Primary building materials include brick, estate stone, and vinyl siding. The roof features Landmark Pro shingles and MBCI Double-Lok roof panels. Other materials include glass windows, black window frames, and gunmetal garage doors. The brick is a deep red color, with the remaining materials being a mix of black, dark gray, and light gray. Premium colors are used for some materials, such as the Landmark Pro shingles.

Items to be Addressed: *Provide 3D colored renderings of site and surrounding area, as required by Section 8.05.*

DESIGN STANDARDS AND SITE PLAN REVIEW STANDARDS

Section 8.06 outlines Site Plan Review Design Standards.

1. *Development shall ensure compatibility with existing commercial districts and provide a transition between land uses.*
    a. *Building design shall enhance the character of the surrounding area in relation to building and parking placement, landscape and streetscape features, and architectural design.*
    b. *Street fronts shall provide a variety of architectural expression that is appropriate in its context and prevents monotony.*
    c. *Building design shall achieve a compatible transition between areas with different height, massing, scale, and architectural style.*

2. *Development shall incorporate the recognized best architectural building design practices.*
    a. *Foster a lasting impact on the community through the provision of high quality design, construction, and detailing.*
    b. *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.*
    c. *Develop buildings with creativity that includes balanced compositions and forms.*
    d. *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.*
    e. *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.*
    f. *Include community amenities that add value to the development such as patio/ seating areas, water features, art work or sculpture, clock towers, pedestrian plazas with park benches or other features located in areas accessible to the public.*

3. *Enhance the character, environment and safety for pedestrians and motorists.*
    a. *Provide elements that define the street and the pedestrian realm.*
    b. *Create a connection between the public right of way and ground floor activities.*
    c. *Create a safe environment by employing design features to reduce vehicular and pedestrian conflict, while not sacrificing design excellence.*
    d. *Enhance the pedestrian realm by framing the sidewalk area with trees, awnings, and other features.*
    e. *Improve safety for pedestrians through site design measures.*

Items to be Addressed: *None.*

SUMMARY

Please note that the applicant is seeking a height variance. The Planning Commission is asked to review the site plan, but shall not grant preliminary site plan approval until a variance decision is reached by the ZBA.

The following items should be addressed by the applicant:

1. *Reduce parking or provide documented evidence justifying the need for excess parking.*
2. *Provide 3D colored renderings of site and surrounding area, as required by Section 8.05.*

At the upcoming meeting, the following items shall be addressed by the Planning Commission:

1. *Planning Commission to discuss the project's compatibility with the City's vision for the subject site, as described in the 2040 Master Plan.*

2. *Planning Commission to discuss if the use of arborvitae meet the intent of the form-based district.*
3. *Planning Commission to consider increased front setbacks.*
4. *Planning Commission to discuss the proposed layout and street design.*
5. *Planning Commission to discuss amenity areas.*
6. *Planning Commission to consider decorative lighting.*

Respectfully,

CARLISLE/WORTMAN ASSOC., INC.
Benjamin R. Carlisle, AICP, LEED AP
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Engineering
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Traffic Impact Study

June 6, 2024

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City of Troy, Oakland County, Michigan

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Colliers Engineering & Design

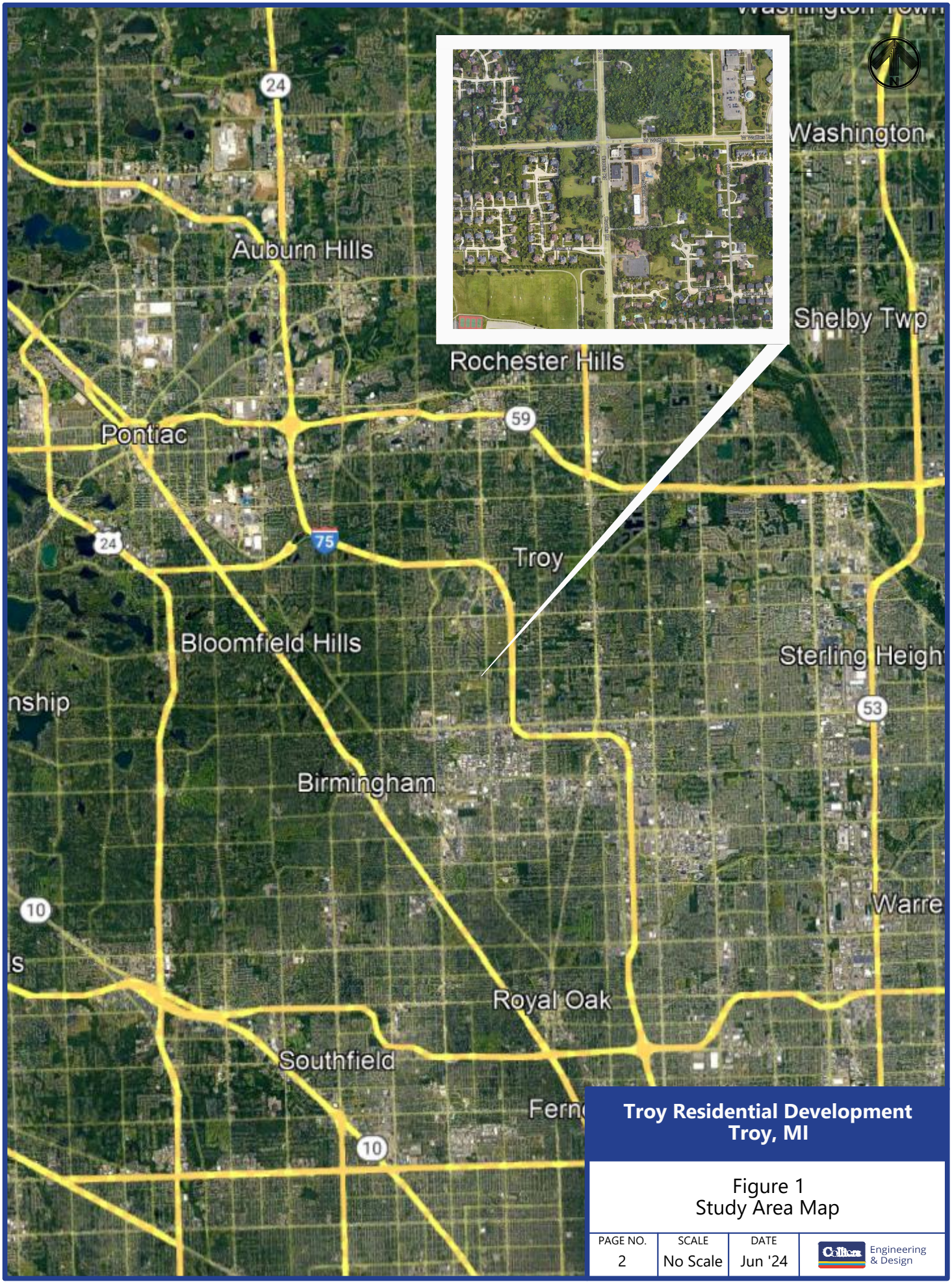
Introduction

This report presents the methodologies, analyses, results, and recommendations of a Traffic Impact Study (TIS) for the proposed Choice Group residential development project in the City of Troy, Oakland County, Michigan. The project site is located in the southwest quadrant of the Crooks Road & Wattles Road intersection as shown on **Figure 1** and is currently occupied by three single-family homes. The proposed development plans would raze the existing three single family homes and construct 40 single-family attached homes with site access provided via a single driveway to Crooks Road.

Crooks Road is under jurisdiction of the Road Commission for Oakland County (RCOC); whereby access permitting will be subject to RCOC review and standards. The project is also subject to city review and standards through the site plan approval process. In accordance with the RCOC *Permit Rules, Specifications and Guidelines* and City Zoning Ordinance, a Traffic Impact Study (TIS) has been required for site access permitting and project approvals.

The purpose of this study is to identify the traffic related impacts, if any, of the proposed project on the adjacent road network. This study therefore includes analysis of the site access points as well as key off-site intersections surrounding the site. Analysis of the site access points will determine appropriate lane configurations as well as traffic control to process site traffic safely and efficiently. Key off-site intersections are analyzed to determine if new site-generated traffic passing through these locations would require improvements to mitigate any impacted traffic operations.

The scope of this study was developed based on Colliers Engineering & Design (CED) knowledge of the study area, understanding of the development program, accepted traffic engineering practice, and information published by the Institute of Transportation Engineers (ITE). Additionally, CED solicited input regarding the proposed scope of work from RCOC and the city's traffic consultant, OHM. The study analyses were completed using Synchro and SimTraffic, Version 12 traffic analysis software and in accordance with the methodologies and practices published by ITE and the applicable requirements of RCOC and the city. This report is intended for use by RCOC and the city to guide decisions related to development project approvals, access permitting, and identifying future roadway improvement needs.



Troy Residential Development
Troy, MI

Figure 1
Study Area Map

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Roadway Data

Road Network

Vehicle transportation for the proposed development will be provided primarily via Crooks Road and Wattles Road. The study intersections are identified below, and further details on the study roadways are summarized in **Table 1**.

Table 1: Roadway Summary

Roadway Data	Crooks Road	Wattles Road
Functional Class	Principal Arterial	Minor Arterial
Direction	N-S	E-W
Speed Limit (mph)	45	40
Jurisdiction	RCOC	City
Cross Section	5-Lane	2-Lane
AADT	23,950	11,500
AM Peak Hour Volume	2,170	890
PM Peak Hour Volume	2,530	1,155

Study Intersections

Crooks Road & Wattles Road

At the intersection of Crooks Road & Wattles Road, the NB and SB approaches each have a left-turn lane, two through lanes, and exclusive right-turn lane. The EB and WB approaches each have an exclusive left-turn lane, one through lane, and exclusive right-turn lane. The intersection is traffic signal controlled with lagging permissive-protected left-turn phasing for all approaches. Vehicle and pedestrian actuation are provided for all approaches and movements and marked crosswalks are provided for crossing all legs. The intersection operates under the county's adaptive SCATS traffic signal control system.

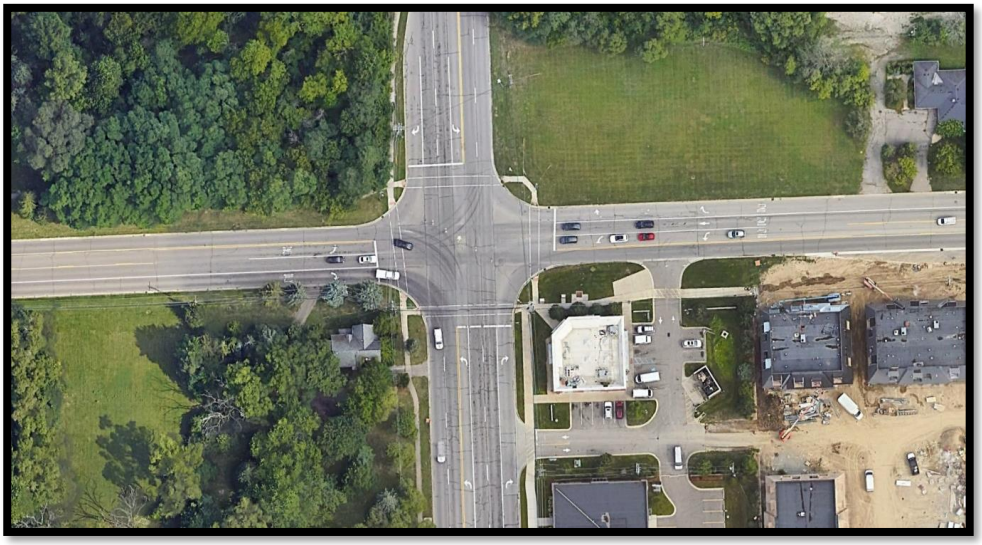


Figure 2: Crooks Road & Wattles Road Intersection

Other Study Intersections

- Crooks Road & 7/11 Drive
- Crooks Road & Troy Dental Studio Drive
- Crooks Road & Salma Drive
- Crooks Road & West Hills Site Drive

Existing Traffic Data

Existing weekday AM (7:00 to 9:00) and PM (4:00 to 6:00) peak hour turning movement counts were collected by CED and CED subconsultant Quality Counts (QC) at the study intersections on Thursday, May 16th, 2024. Data were collected in 15-minute intervals to establish the current peak hour traffic volumes. Major weather events, holidays, and other local special events were avoided.

During collection of the manual intersection turning movement counts, pedestrian data and commercial truck percentages were also recorded and used in the traffic analysis. Peak hour factors (PHFs) and commercial truck percentages were calculated by approach based on the requirements of MDOT's *Electronic Traffic Control Device Guidelines*. Traffic volumes along Crooks Road were balanced upward between intersections. All relevant traffic volume data are included in **Appendix A** and the resulting 2024 baseline peak hour volumes utilized for this study are summarized on **Figure 4.**

2024 Existing Conditions

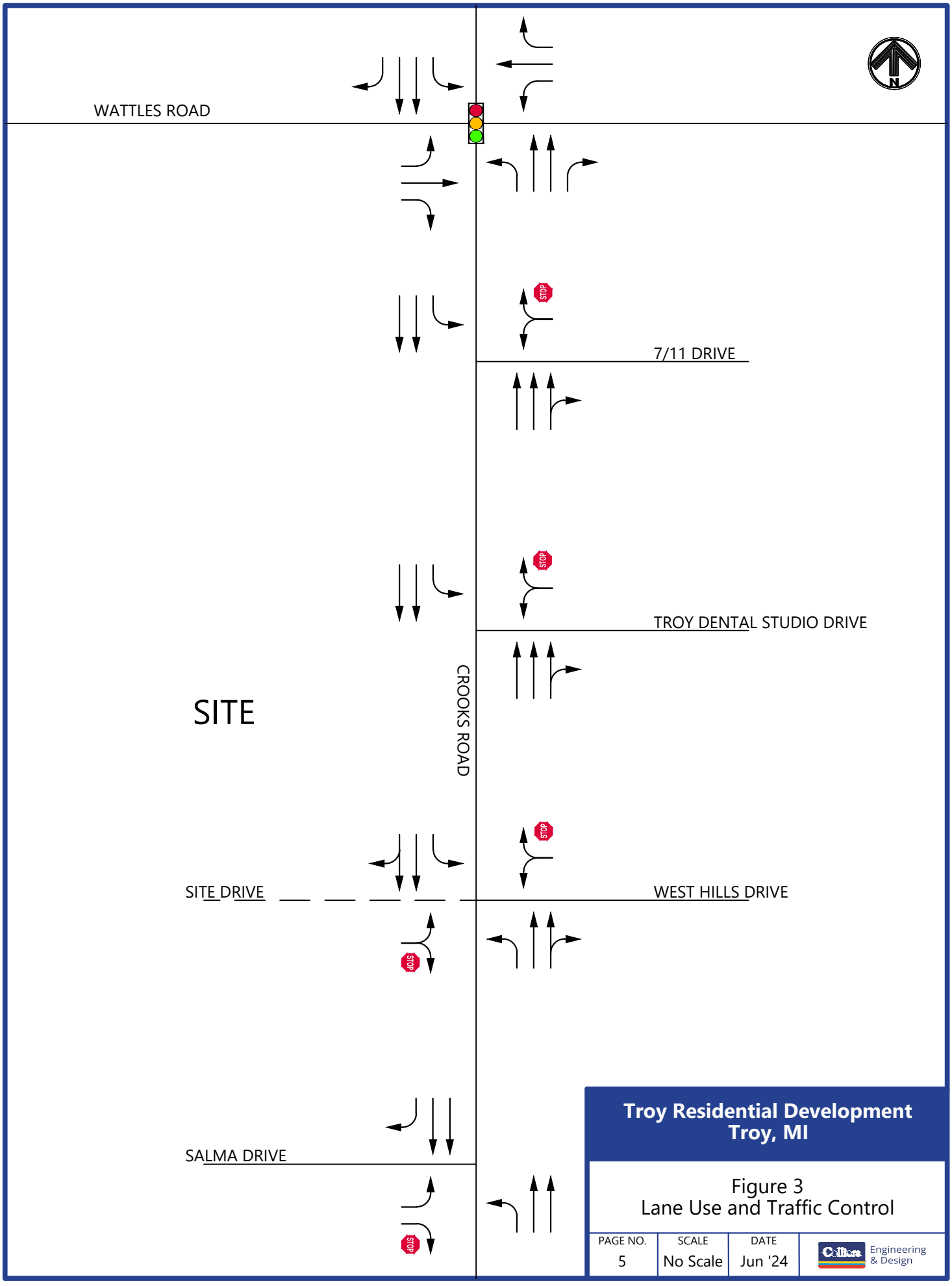
Analysis Methodologies

The performance of the study intersections was evaluated through a qualitative measure of operating conditions called Levels of Service (LOS). Six LOS are defined with letter designations from A to F with LOS A representing minimal delay, and LOS F indicating failing conditions. Typically, LOS D is considered acceptable in suburban/urban areas.

The LOS measurement for both signalized and unsignalized intersections is average control delay, which is quantified in terms of seconds of delay per vehicle. Control delay includes deceleration delay, stopped delay, queue move-up delay, and acceleration delay. The LOS criteria for unsignalized and signalized intersections taken from the HCM are included in Appendix B.

The LOS and delay calculations are based on the procedures and methodologies outlined in the Transportation Research Board's *Highway Capacity Manual, 7th Edition (HCM7)* which sets forth nationally accepted standards regarding traffic operations and capacity analysis. Traffic signal timings were modeled per traffic signal timing permits provided by RCOC and were optimized under each analysis scenario to represent the adaptive nature of the SCATS system.

Simulations of the study network were also observed using SimTraffic in order to identify potential issues related to vehicle queuing, traffic flow between intersections, and the overall study network. The existing conditions SimTraffic models were calibrated in accordance with the procedures outlined in the MDOT *Electronic Traffic Control Device Guidelines*.



Troy Residential Development
Troy, MI

Figure 3
Lane Use and Traffic Control

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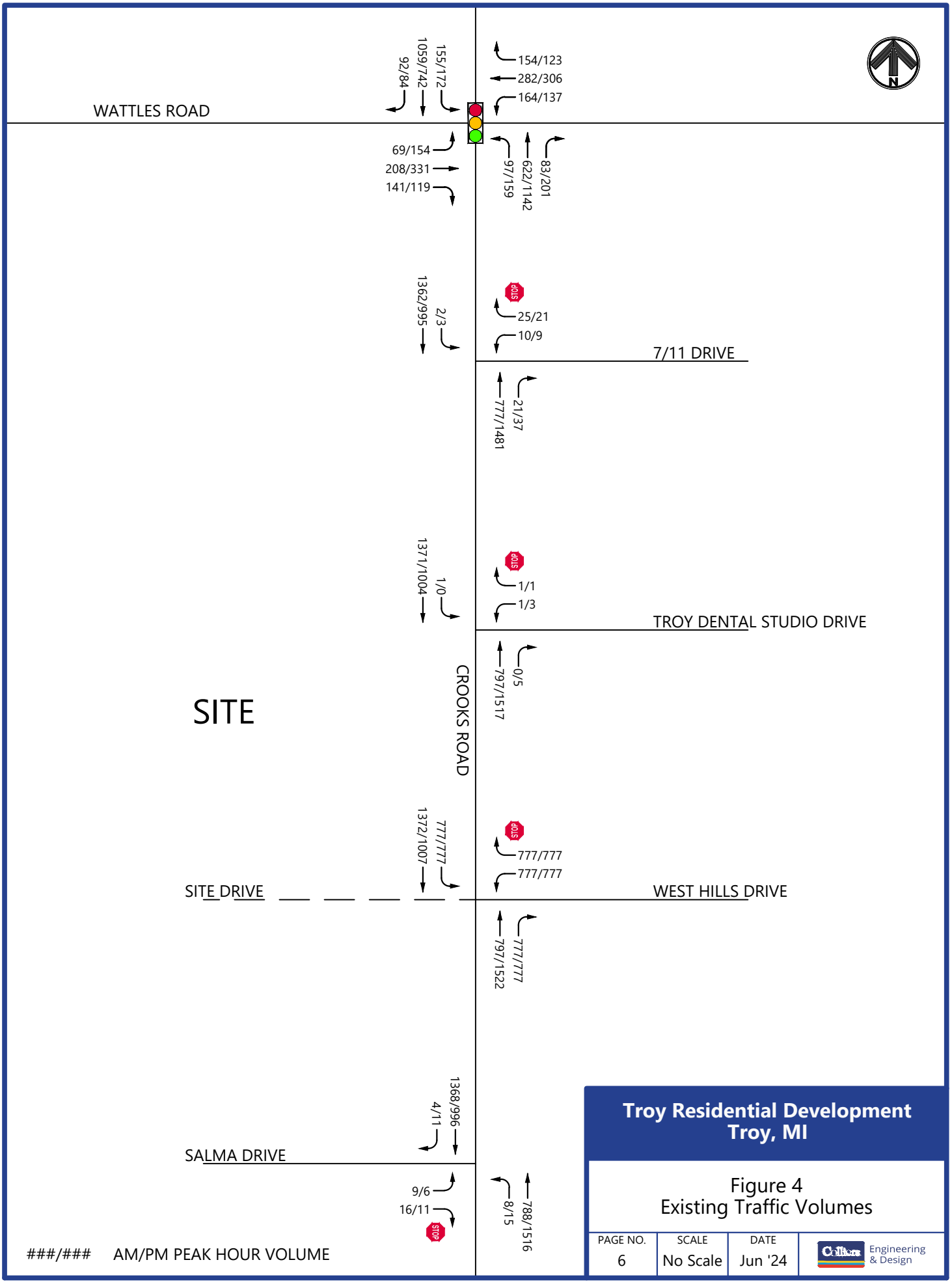

Troy Residential Development
Troy, MI

Figure 4
Existing Traffic Volumes

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Existing Traffic Conditions

Existing peak hour vehicle delays and LOS were calculated at the study intersections based on the existing lane configurations and traffic control shown on **Figure 3**, the existing traffic volumes shown on **Figure 4**, and the methodologies presented in the HCM. The results of the analysis of existing conditions are presented in **Appendix B**, summarized in **Table 2** and described in further detail below.

Table 2: Existing Conditions

Intersection	Control	Approach	Movement	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
Crooks Road & Wattles Road	Signal	EB	Left	71.2	E	65.6	E
			Thru	61.0	E	70.1	E
			Right	56.4	E	44.7	D
		WB	Left	98.5	F	85.6	F
			Thru	64.6	E	66.3	E
			Right	49.9	D	47.5	D
		NB	Left	37.2	D	33.1	C
			Thru	54.8	D	46.7	D
			Right	41.0	D	31.5	C
		SB	Left	26.3	C	47.0	D
			Thru	46.3	D	53.5	D
			Right	29.2	C	39.4	D
		Overall		**52.7**	**D**	**52.6**	**D**
Crooks Road & 7/11 Drive	STOP (Minor)	WB	Left/Right	17.9	C	31.6	D
		NB	Thru/Right	Free		Free	
		SB	Left	13.3	B	23.3	C
			Thru	Free		Free	
Crooks Road & Troy Dental Studio Drive	STOP (Minor)	WB	Left/Right	24.5	C	40.9	E
		NB	Thru/Right	Free		Free	
		SB	Left	13.1	B	0.0	A
			Thru	Free		Free	
Grand River Avenue & Grand River Plaza E. Drive / Cleary Drive	STOP (Minor)	EB	Left	32.2	D	25.8	D
			Right	15.3	C	12.3	B
		NB	Left	12.9	B	10.5	B
			Thru	Free		Free	
		SB	Thru/Right	Free		Free	

The results of the existing conditions analysis indicate that all approaches and movements at the study intersections are currently operating acceptably at a LOS D or better with the exception of the following:

- The EB and WB left and through movements at the intersection of Crooks Road & Wattles Road which currently operate at a LOS E or F during both peak hours. Additionally, the EB right-turn movement operates at a LOS E during the AM peak hour at the intersection.
- The STOP controlled Troy Dental Studio Drive approach which currently operates at a LOS E during the PM peak hour.

Observation of peak hour simulations indicates moderate vehicle queues and occasional cycle failures for several of the approaches and movements indicated above to operate at a LOS E or F.

However, the queues dissipate and are not present throughout the duration of the peak hours. A long vehicle queue is also observed on the 7/11 Drive during the PM peak hour as vehicle queues for the NB approach from the Crooks Road & Wattles Road intersection extend back past the driveway for approximately 25 minutes of the peak hour.

Crash Analysis

A crash analysis was performed at the study intersection of Crooks Road & Wattles Road and along the study roadways within the vicinity of the subject site to determine if any discernable crash patterns could be identified. Five years of crash data (January 1, 2018 through December 31, 2022) were used in the analysis. Data and UD-10 crash reports were obtained from the Michigan Traffic Crash Facts (MTCF) database.

Crash frequency per year and crash rate per million entering vehicles were calculated at the study intersections and compared to crash frequency and crash rates published by the Southeast Michigan Council of Governments (SEMCOG). The crash rate normalizes crash frequency based on exposure (number of vehicles traversing the intersection). The ADT used for the crash rate calculations were determined based on application of a K-factor to the PM peak hour traffic volumes at the intersection. The results of the intersection crash analysis are summarized in **Table 3**.

Table 3: Intersection Crash Analysis Results

Crash Type	No Injury (O)	Possible Injury (C)	Minor Injury (B)	Incapacitating Injury (A)	Fatal (K)	Total	%
Single Vehicle	0	1	0	0	0	**1**	**1.5%**
Rear-end	30	4	5	0	0	**39**	**60.0%**
Sideswipe/same-direction	7	0	0	0	0	**7**	**10.8%**
Other/unknown	1	0	0	0	0	**1**	**1.5%**
Angle	1	0	0	0	0	**1**	**1.5%**
Head-on left-turn	6	9	1	0	0	**16**	**24.6%**
Total	**45**	**14**	**6**	**0**	**0**	**65**	
%	**69.2%**	**21.5%**	**9.2%**	**0.0%**	**0.0%**		
Crash Frequency (crashes per year)						**13.00**	
Crash Rate (crashes per million entering vehicles)						**0.84**	

The study intersection experienced 65 crashes during the analysis period resulting in a crash frequency of 13.00 crashes per year which is lower than the average frequency of 17.60 published by SEMCOG for signalized intersections with similar ADT. The intersection experienced a crash rate of 0.84 crashes per million entering vehicles which is also lower than the SEMCOG average of 1.09. The leading crash types consisted of rear-end crashes (60%), head-on left-turn crashes (25%), and sideswipe-same crashes (11%). The remaining crash types accounted for approximately 5% of total crashes.

Crash severity was also analyzed as shown in **Table 3** to evaluate the qualitative safety performance of the intersection. Overall, there were zero A-level or fatal crashes at the study intersection during the five-year study and 69% of crashes at the intersection resulted in property damage only (PDO).

The number of head-on left-turn crashes at the intersection is elevated. Review of the UD-10 reports indicate 12 of the 16 head-on left-turn crashes involved vehicles turning left from the NB or

SB approaches and indicate drivers choosing inadequate gaps to turn during the permissive portion of the phase. Therefore, protected only left-turn phasing should be considered at the intersection.

Non intersection related crashes which occurred on Crooks Road within the vicinity of the site between Wattles Road and Salma Drive were also reviewed. Along this stretch of Crooks Road there were nine crashes that occurred during the five-year study period, all of which were angle, head-on left-turn, or backing crashes related to vehicles entering or exiting driveways on the east side of the road. The angle crashes all involved vehicles turning left out of driveways with four of them occurring at the 7/11 Driveway, one at the Troy Dental Studio Driveway, and one at Salma Drive. The head-on left-turn crashes all involved vehicles turning left into driveways with one occurring at the 7/11 driveway and one occurring at the Troy Dental Studio driveway. The backing crash occurred from a vehicle backing out onto Barilane Street. Many of the UD-10 crash reports related to the 7/11 and Troy Dental Studio driveways indicate vehicle queues from the signalized intersection of Crooks Road & Wattles Road blocking drive approaches and vehicles trying to turn between stopped vehicles.

No-Build Conditions

No-Build Traffic Volumes

Traffic impact studies typically include an evaluation of traffic operations in the future as they would be without the proposed development. This no-build condition serves to identify any mitigation that may be required, regardless of the project, and as a baseline for comparison of future buildout conditions. This scenario is comprised of existing traffic conditions, plus ambient traffic growth, plus traffic from approved developments in the study area that have yet to be constructed. At the time of this study the following developments within the study area were identified by the city's traffic consultant to be included under no-build conditions:

1. Westington I & II Residential Development
2. West Hills Residential Development
3. Premier Academy Daycare and Preschool
4. Westbrook Residential Development

The vehicle trips that would be generated by the Westington and West Hills development were assigned to the study intersections based on the respective traffic study completed for each development. Where a traffic study was not completed for Premier Academy and Westbrook, the number of vehicle trips was forecast based on data published by ITE in *Trip Generation, 11th Edition* as summarized in **Table 4.**

Table 4: No-Build Site Trip Generation

Land Use	ITE Code	Amount	Units	ADT	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Westbrook	220	152	Dwellings	1,050	17	53	70	54	32	86
Premier Academy	565	196	Students	745	73	65	138	62	70	132

The vehicle trips that would be generated by the no-build developments were assigned to the study road network based on existing peak hour traffic patterns, the proposed site access plans for each development, and ITE methodologies. These methods indicate that new trips will return to their direction of origin. Specifically, traffic patterns leaving the study area in the AM peak hour and entering the study area in the PM peak hour were utilized. These patterns are best representative of residential and daycare commuting patterns which are predominantly outbound in the morning and inbound in the afternoon. The resultant site trip distribution is summarized in **Table 5.**

Table 5: No-Build Site Trip Distribution

RESIDENTIAL / DAYCARE TRIPS		
To/From	**Via**	**AM/PM**
North	Crooks Road	27%
South	Crooks Road	43%
East	Wattles Road	15%
West	Wattles Road	15%
Total		**100%**

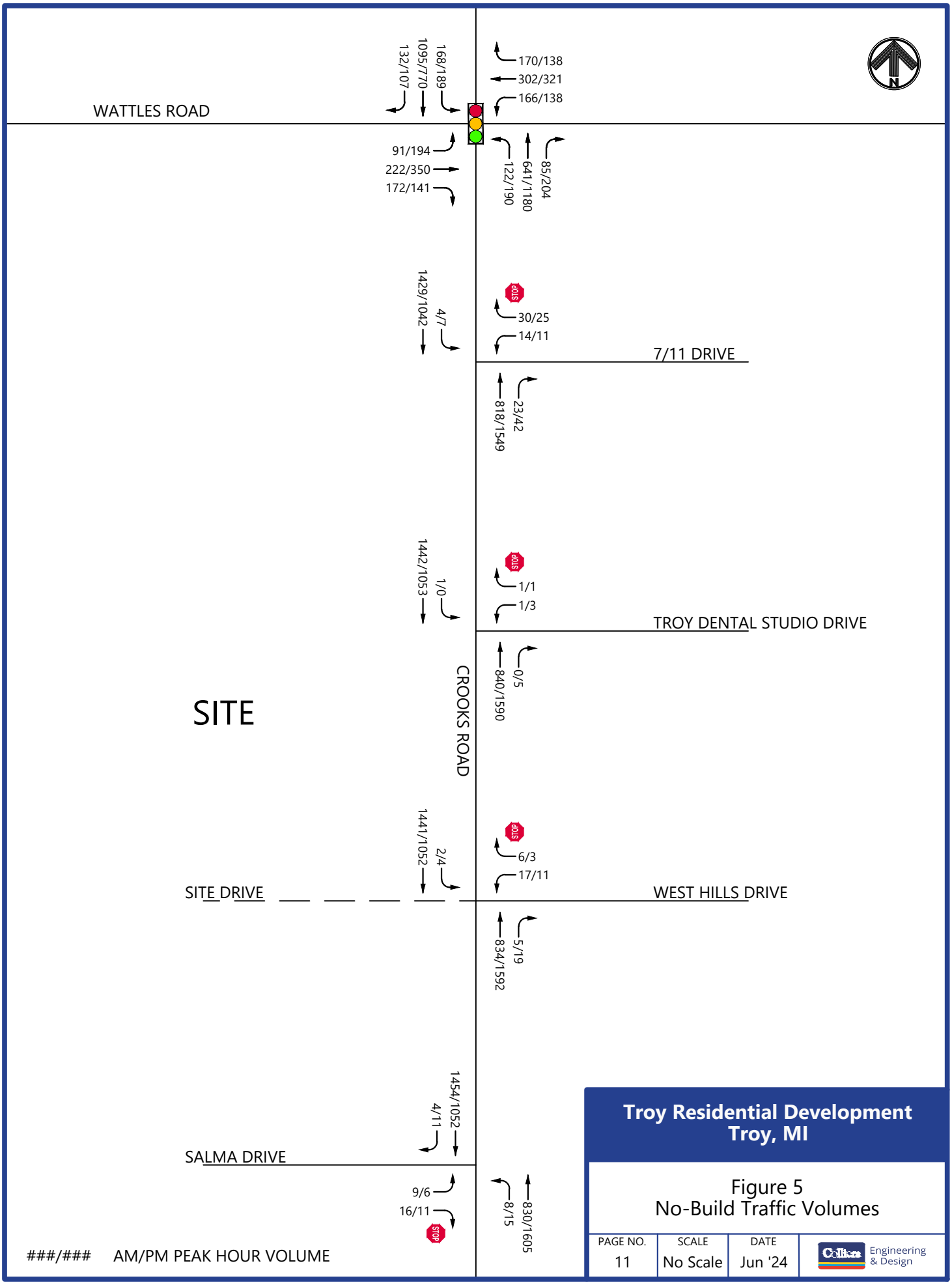
In addition to background developments, an ambient growth factor is applied to existing traffic volumes to account for future projects in the study area and population increases, as well as growth in regular traffic volumes due to development projects outside the study area. For this study an ambient background growth rate of 0.5% per year was utilized. MDOT has consistently applied this growth rate to other projects in southeast Michigan and across the State and was applied to the existing 2024 traffic volumes for a period of two years to forecast the no-build traffic volumes ***without the proposed development.*** The resultant 2026 no-build traffic volumes are summarized on **Figure 5.**

No-Build Traffic Conditions

No-build peak hour vehicle delays and LOS were calculated at the study intersections based on the existing lane configurations and traffic control shown on **Figure 3**, the no-build traffic volumes shown on **Figure 5**, and the methodologies presented in the HCM7. The results of the analysis of no-build conditions are presented in **Appendix C**, summarized in **Table 6**, and described in further detail below.

The results of the no-build conditions analysis indicate that all approaches and movements would continue to operate similar to existing conditions during both peak hours with the exception of the following:

- The EB left-turn movement at the intersection of Crooks Road & Wattles Road which would be reduced to a LOS F during the PM peak hour.
- The STOP controlled 7/11 approach which would be reduced to a LOS E during the PM peak hour.
- The STOP controlled left-turn movement from Salma Drive which would be reduced to a LOS E during the AM peak hour.
- The STOP controlled West Hills Drive approach which would operate at a LOS E during the PM peak hour.



Troy Residential Development
Troy, MI

Figure 5
No-Build Traffic Volumes

PAGE NO.	SCALE	DATE	
11	No Scale	Jun '24	Cullen Engineering & Design

Table 6: No-Build Traffic Conditions

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				Existing		No-Build		Existing		No-Build	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Crooks Road & Wattles Road	Signal	EB	Left	71.2	E	72.4	E	65.6	E	88.9	F
			Thru	61.0	E	62.6	E	70.1	E	74.3	E
			Right	56.4	E	58.5	E	44.7	D	44.6	D
		WB	Left	98.5	F	77.6	E	85.6	F	82.7	F
			Thru	64.6	E	70.2	E	66.3	E	68.5	E
			Right	49.9	D	49.8	D	47.5	D	47.3	D
		NB	Left	37.2	D	41.0	D	33.1	C	35.4	D
			Thru	54.8	D	54.2	D	46.7	D	46.8	D
			Right	41.0	D	40.4	D	31.5	C	30.7	C
		SB	Left	26.3	C	28.9	C	47.0	D	50.6	D
			Thru	46.3	D	45.7	D	53.5	D	52.6	D
			Right	29.2	C	29.4	C	39.4	D	39.3	D
		Overall		**52.7**	**D**	**52.0**	**D**	**52.6**	**D**	**54.3**	**D**
Crooks Road & 7/11 Drive	STOP (Minor)	WB	Left/Right	17.9	C	20.2	C	31.6	D	37.0	E
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left	13.3	B	13.8	B	23.3	C	25.5	D
			Thru	Free		Free		Free		Free	
Crooks Road & Troy Dental Studio Drive	STOP (Minor)	WB	Left/Right	17.6	C	18.4	C	40.9	E	45.3	E
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left	13.1	B	13.5	B	0.0	A	0.0	A
			Thru	Free		Free		Free		Free	
Crooks Road & Salma Drive	STOP (Minor)	EB	Left	32.2	D	35.7	E	25.8	D	27.6	D
			Right	15.3	C	16.1	C	12.3	B	12.7	B
		NB	Left	12.9	B	13.6	B	10.5	B	10.8	B
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	
Crooks Road & West Hills Drive / Site Drive	STOP (Minor)	EB	Left/Right			21.1	C			38.4	E
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left			9.9	A			14.9	B
			Thru	Free		Free		Free		Free	

Review of network simulations continue to indicate moderate vehicle queues and occasional cycle failures for several of the approaches and movements indicated above to operate at a LOS E or F. However, the queues continue to dissipate and are not present throughout the duration of the peak hours. A long vehicle queue is also continued to be observed on the 7/11 Drive during the PM peak hour as vehicle queues for the NB approach from the Crooks Road & Wattles Road intersection extend back past the driveway for approximately 26 minutes of the peak hour.

Build Conditions

The proposed development plan includes construction of 40 single-family attached homes with site access provided via a single driveway to Crooks Road.

Site Trip Generation

The number of AM and PM peak hour vehicle trips that will be generated by the proposed development expansion was forecast based on the rates and equations published by ITE in *Trip Generation, 11th Edition*. The proposed use was matched to the ITE land use category that most closely matches the proposed operation. For this study, ITE *Land Use #220, Multifamily Housing (Low-Rise)* was utilized. For land use #220 ITE published both average rates and regression equations and the regression equations were utilized in accordance with the guidelines outlined in the ITE *Trip Generation Handbook*. The resultant trip generation forecast for the proposed development is shown in **Table 7**.

Table 7: Site Trip Generation

Land Use	ITE Code	Amount	Units	ADT	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise)	220	40	Dwellings	332	8	27	35	24	14	38

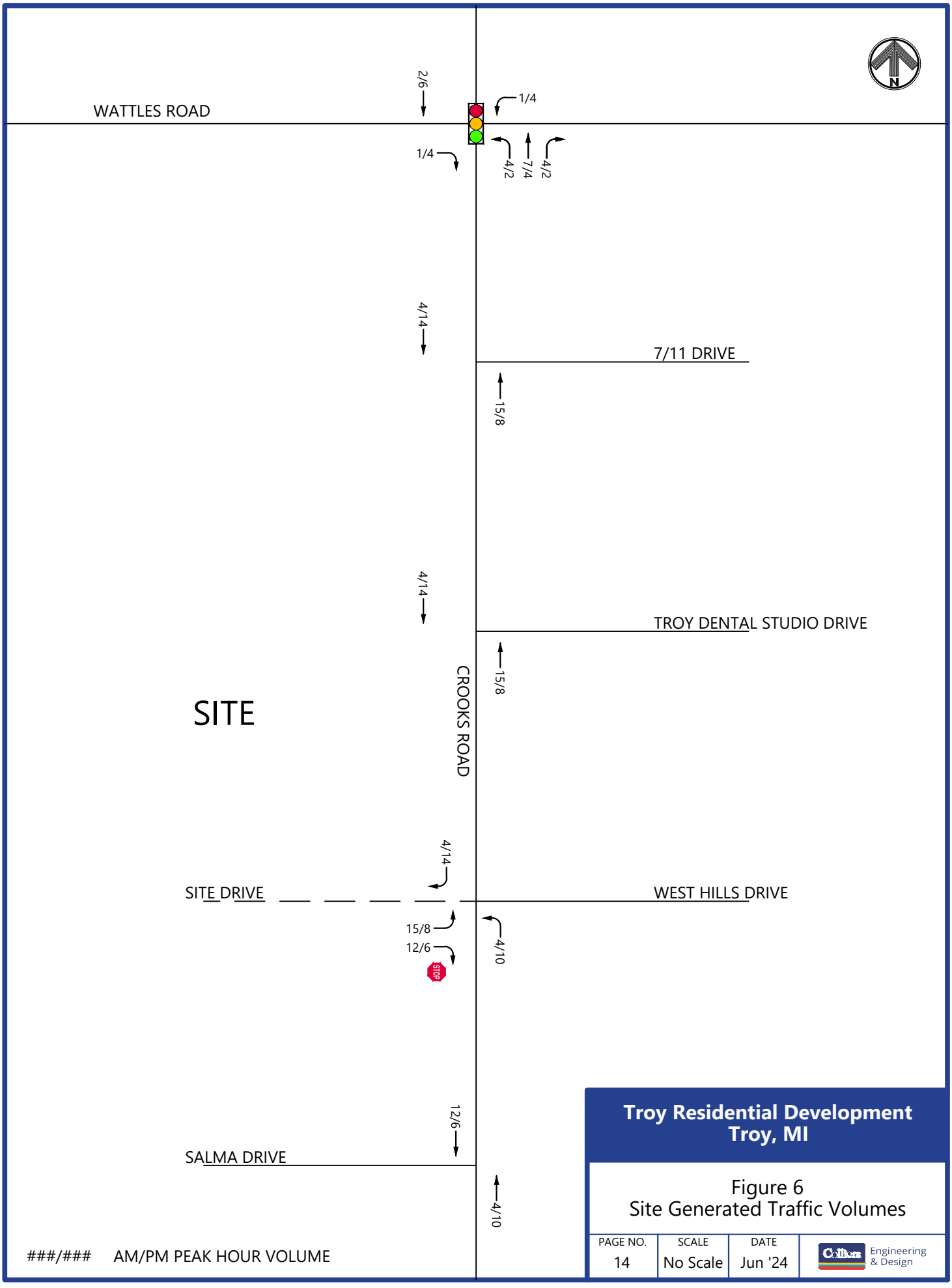
Trip Distribution

The vehicle trips that would be generated by the proposed development were assigned to the study road network based on the site trip distribution methodologies and assumptions previously described under no-build conditions as summarized in **Table 5**. The site-generated vehicle trips were assigned to the study network as shown on **Figure 6**. These trips were added to the 2026 no-build traffic volumes shown on **Figure 5** to calculate the future build traffic volumes shown on **Figure 7**.

Build Conditions

Future build peak hour vehicle delays and LOS with the proposed development were calculated based on existing lane configurations and traffic control shown on **Figure 3**, build traffic volumes shown on **Figure 7**, and HCM& methodologies. SimTraffic simulations were also utilized to evaluate traffic flow and vehicle queues throughout the study network. The build conditions results are included in **Appendix D** and summarized in **Table 8**.

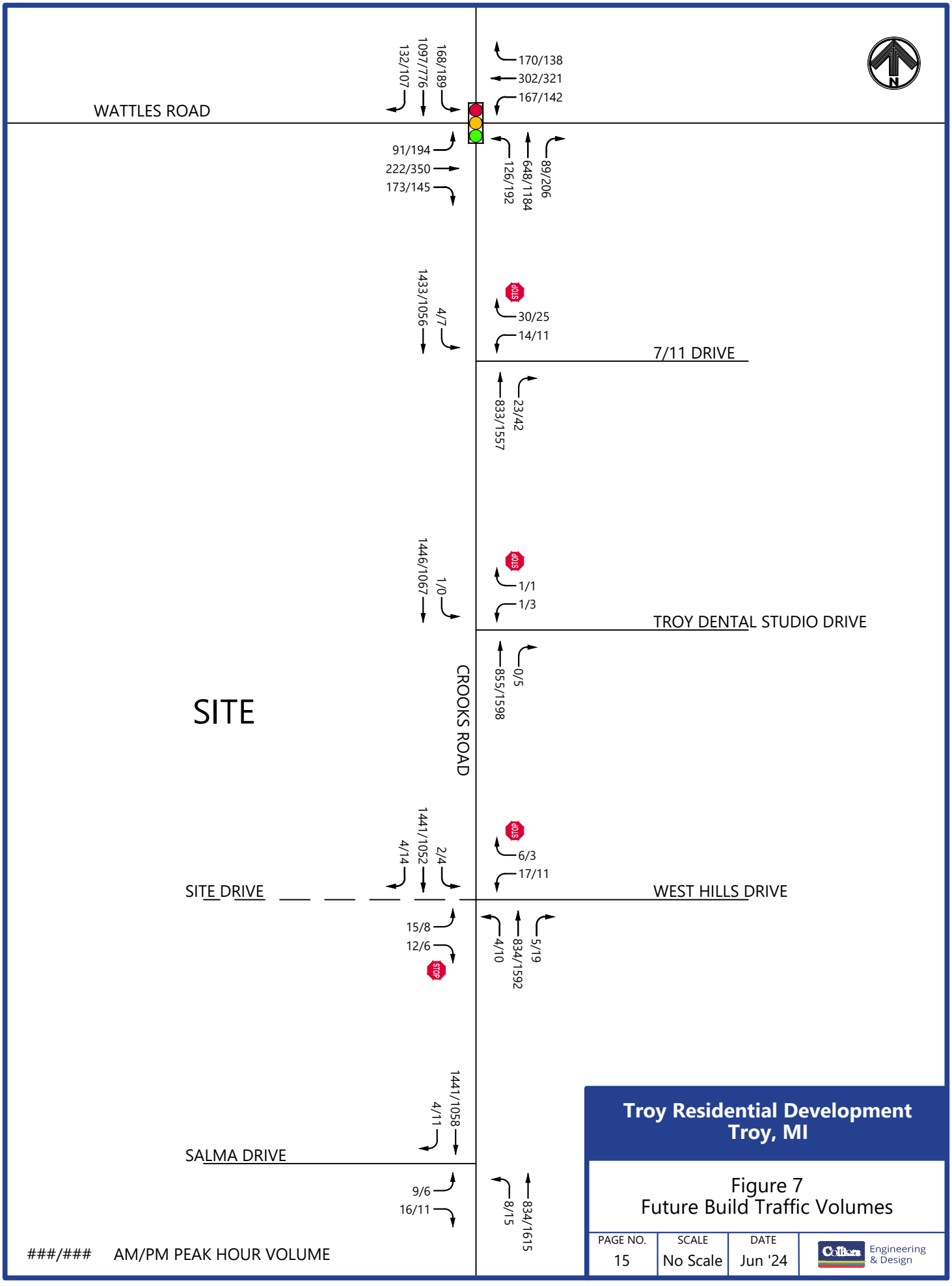
The results of the build conditions analysis indicate that all movements at the off-site intersections will operate in a manner similar to the no-build condition. No signalized movement at the intersection of Crooks Road & Wattles Road would experience an increase in delay greater than 1.3 seconds per vehicle. Additionally, no movement at the off-site STOP controlled study intersections would experience a delay greater than 0.5 seconds per vehicle. These changes in operation would not be discernable to existing traffic on the adjacent road network. At the proposed site driveway to Crooks Road, the STOP controlled approach and opposing West Hills drive would operate at a LOS F during both peak hours.



Troy Residential Development
Troy, MI

Figure 6
Site Generated Traffic Volumes

PAGE NO.	SCALE	DATE	
14	No Scale	Jun '24	Engineering & Design



Troy Residential Development
Troy, MI

Figure 7
Future Build Traffic Volumes

PAGE NO.	SCALE	DATE	
15	No Scale	Jun '24	Colliers Engineering & Design

Table 8: Build Traffic Conditions

Intersection	Control	Approach	Movement	AM Peak Hour				PM Peak Hour			
				No-Build		Build		No-Build		Build	
				Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Crooks Road & Wattles Road	Signal	EB	Left	72.4	E	72.4	E	88.9	F	85.6	F
			Thru	62.6	E	62.6	E	74.3	E	74.2	E
			Right	58.5	E	58.7	E	44.6	D	44.8	D
		WB	Left	77.6	E	78.9	E	82.7	F	83.6	F
			Thru	70.2	E	70.2	E	68.5	E	68.5	E
			Right	49.8	D	49.8	D	47.3	D	47.3	D
		NB	Left	41.0	D	41.2	D	35.4	D	35.8	D
			Thru	54.2	D	54.0	D	46.8	D	46.8	D
			Right	40.4	D	40.2	D	30.7	C	30.7	C
		SB	Left	28.9	C	29.1	C	50.6	D	51.1	D
			Thru	45.7	D	45.7	D	52.6	D	52.5	D
			Right	29.4	C	29.3	C	39.3	D	39.1	D
		Overall		**52.0**	**D**	**52.1**	**D**	**54.3**	**D**	**54.2**	**D**
Crooks Road & 7/11 Drive	STOP (Minor)	WB	Left/Right	20.2	C	20.5	C	37.0	E	37.5	E
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left	13.8	B	14.0	B	25.5	D	25.8	D
			Thru	Free		Free		Free		Free	
Crooks Road & Troy Dental Studio Drive	STOP (Minor)	WB	Left/Right	18.4	C	18.6	C	45.3	E	45.8	E
		NB	Thru/Right	Free		Free		Free		Free	
		SB	Left	13.5	B	13.7	B	0.0	A	0.0	A
			Thru	Free		Free		Free		Free	
Crooks Road & Salma Drive	STOP (Minor)	EB	Left	35.7	E	36.2	E	27.6	D	27.8	D
			Right	16.1	C	16.2	C	12.7	B	12.7	B
		NB	Left	13.6	B	13.7	B	10.8	B	10.9	B
			Thru	Free		Free		Free		Free	
		SB	Thru/Right	Free		Free		Free		Free	
Crooks Road & West Hills Drive / Site Drive	STOP (Minor)	EB	Left/Right			132.7	F			88.5	F
		WB	Left/Right	21.1	C	81.2	F	38.4	E	272.7	F
		NB	Left			13.6	B			10.8	B
			Thru/Right	Free		Free		Free		Free	
		SB	Left	9.9	A	9.9	A	14.9	B	14.9	B
			Thru	Free		Free		Free		Free	

Traffic operations were also simulated using SimTraffic to evaluate network operations and vehicle queues. These simulations indicate build conditions which are similar to no-build conditions with moderate vehicle queues and occasional cycle failures at the intersection of Crooks Road & Wattles Road. The 7/11 driveway continues to be blocked for 27 minutes of the peak hour; however, the cross-access connection with the adjacent property to the south provides access to the Troy Dental Studio Drive which is further south of the intersection and blocked far less frequently. Therefore, during peak periods of congestion vehicles can utilize this driveway to turn onto Crooks Road.

On the STOP controlled site driveway and West Hills drive approaches, 95th percentile queue lengths are calculated to be 54 (2 vehicles) or less during the peak periods, which is not significant and will not disrupt internal site circulation. As a result, the proposed development plan will not have a significant impact on existing traffic operations along the adjacent road network and will operate acceptably. Additionally, the driveway is proposed to be located near the property boundary

furthest from the signalized intersection of Crooks Road & Wattles Road. Therefore, the proposed site plan is consistent with best practices in access management and no improvements are recommended in the build condition.

Trip Generation Comparison

A trip generation comparison was also completed with other existing and proposed development projects in the area. Trips generated by each development were forecast based on the rates and equations published by ITE in *Trip Generation, 11th Edition.* The existing / proposed uses were matched to the ITE land use categories that most closely match their operations. For the 7/11, pass-by trips were removed as these cars are already present on the existing road network and only the forecast number of new trips is shown. The results of the trip generation comparison are summarized in **Table 9** and indicate that the proposed development would generate less trips then all existing / proposed developments in the area with the exception of the West Hills development.

Table 9: Trip Generation Comparison

Land Use	ITE Code	Amount	Units	ADT	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Stone Haven Woods	210	80	Dwellings	822	15	46	61	51	30	81
West Hills	220	30	Dwellings	268	8	24	32	21	12	33
Westington Phase I & II	220	132	Dwellings	921	15	49	64	49	28	77
Westbrook	220	152	Dwellings	1,050	17	53	70	54	32	86
Premier Academy	565	196	Students	745	73	65	138	62	70	132
7/11	851	3,770	GSF	1,207	54	40	94	35	46	81
3960 Crooks Road (Troy Dental Studio & Cucina Lab Torino)	720	6,000	GSF	150	15	4	19	6	15	21
	931	3,800	GSF	319	2	1	3	20	10	30
	Total			469	17	5	22	26	25	51
Proposed Development	**220**	**40**	**Dwellings**	**332**	**8**	**27**	**35**	**24**	**14**	**38**

Conclusions

Based on the information outlined herein regarding the proposed development and resulting traffic operations, there would be minimal impact to traffic operations on the adjacent road network and the proposed site driveway will operate acceptably. This conclusion is based on the following key items:

1. All approaches and movements at the study intersections are currently operating acceptably at a LOS D or better with the exception of the following:
    a. The EB and WB left and through movements at the intersection of Crooks Road & Wattles Road which currently operate at a LOS E or F during both peak hours. Additionally, the EB right-turn movement operates at a LOS E during the AM peak hour at the intersection.
    b. The STOP controlled Troy Dental Studio Drive approach which currently operates at a LOS E during the PM peak hour.
2. Review of crash data indicate a pattern of head-on left-turn crashes at the intersection of Crooks Road & Wattles Road, particularly for the NB and SB approaches. Protected only left-turn phasing should be considered at this intersection.

3. An ambient traffic growth of 0.5% was applied to establish 2026 no-build traffic volumes without the proposed development. Several background developments were also identified in the study area and included in this study.
4. No-build conditions analysis indicate that all approaches and movements would continue to operate similar to existing conditions during both peak hours with the exception of the following:
    a. The EB left-turn movement at the intersection of Crooks Road & Wattles Road which would be reduced to a LOS F during the PM peak hour.
    b. The STOP controlled 7/11 approach which would be reduced to a LOS E during the PM peak hour.
    c. The STOP controlled left-turn movement from Salma Drive which would be reduced to a LOS E during the AM peak hour.
    d. The STOP controlled West Hills Drive approach which would operate at a LOS E during the PM peak hour.
5. Future build conditions analyses indicate that all movements at the off-site intersections will operate in a manner similar to the no-build condition. No signalized movement at the intersection of Crooks Road & Wattles Road would experience an increase in delay greater than 0.9 seconds per vehicle. Additionally, no movement at the STOP controlled study intersections would experience a delay greater than 0.5 seconds per vehicle. These changes in operation would not be discernable to existing traffic on the adjacent road network.
6. At the proposed site driveway to Crooks Road, the STOP controlled approach and opposing West Hills drive would operate at a LOS F during both peak hours; however, 95th percentile queue lengths are calculated to be 54 (2 vehicles) or less during the peak periods, which is not significant and will not disrupt internal site circulation.
7. The driveway is proposed to be located near the property boundary furthest from the signalized intersection of Crooks Road & Wattles Road. Therefore, the proposed site plan is consistent with best practices in access management and no improvements are recommended in the build condition.

Colliers
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Appendix

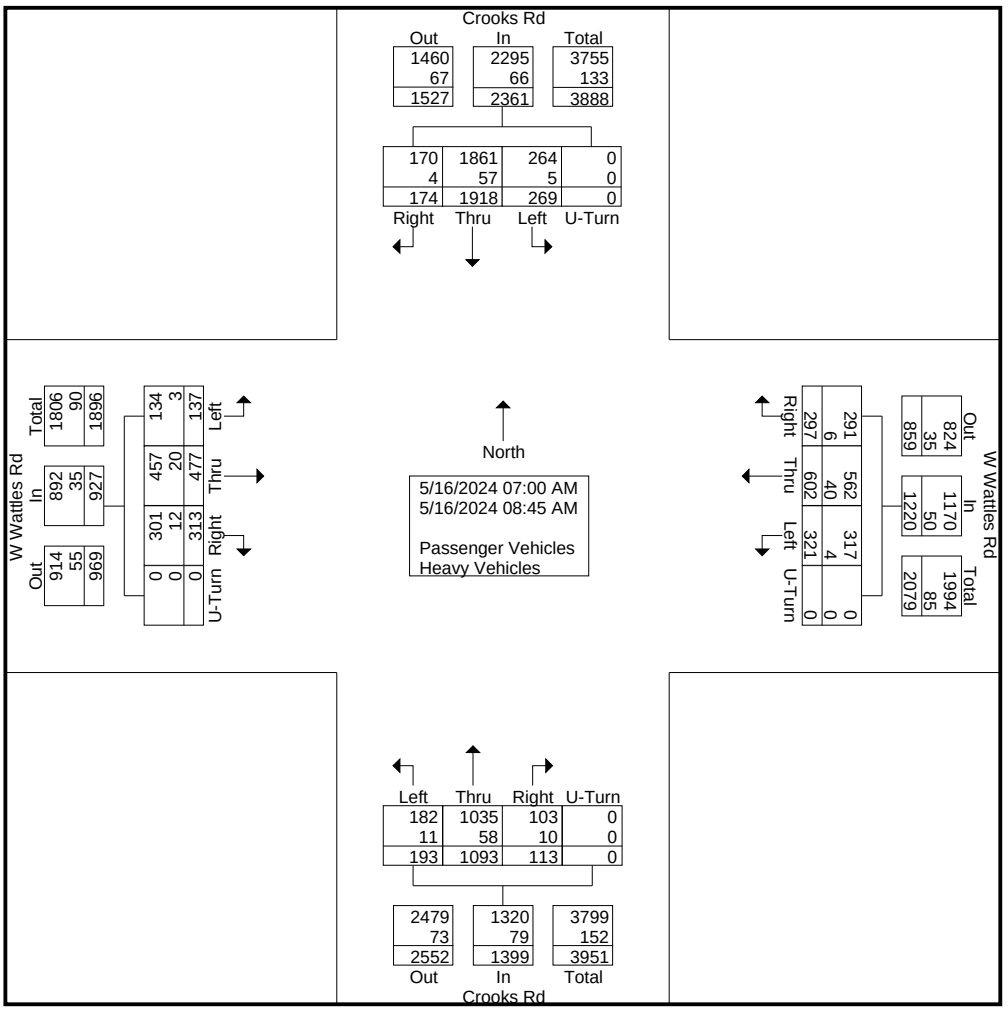
Appendix A | Traffic Count Data

TRUE DATA TO IMPROVE MOBILITY

File Name : 16568101 - Crooks Rd -- W Wattles Rd
Site Code : 16568101
Start Date : 5/16/2024
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

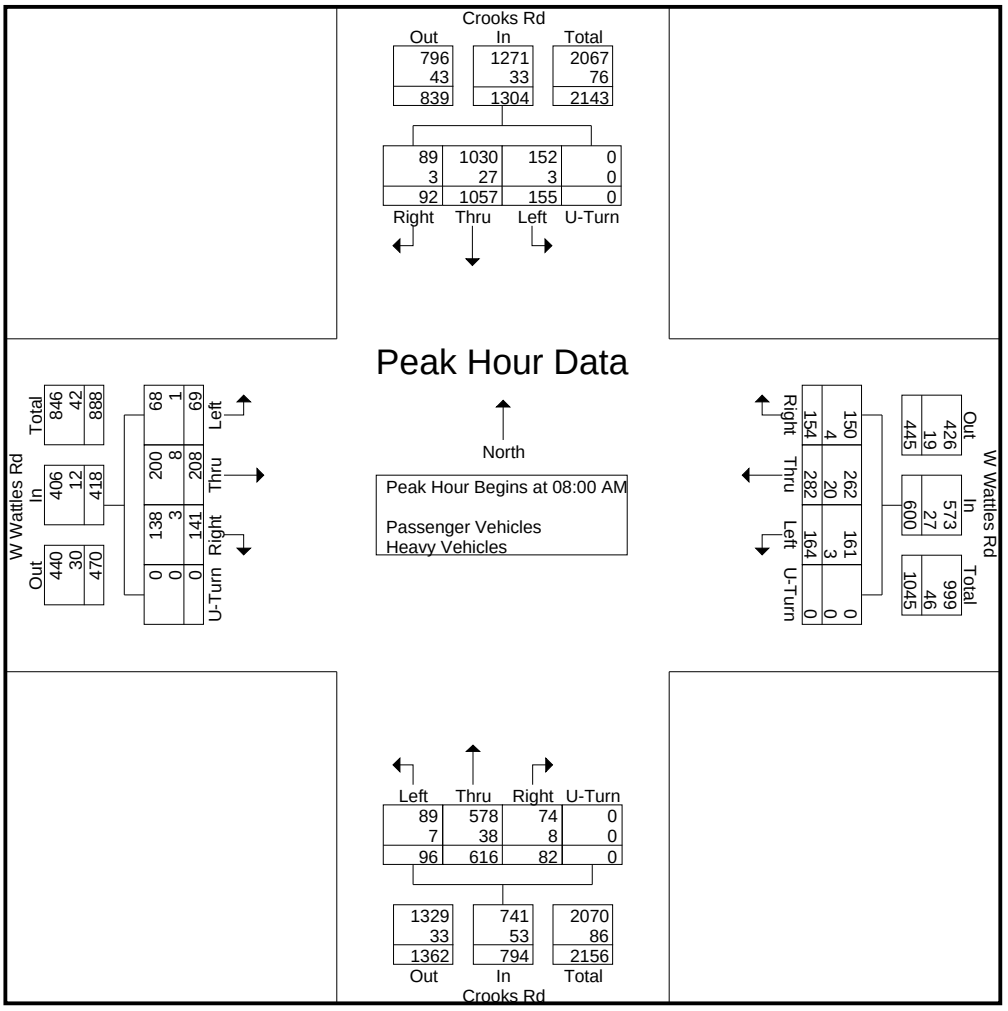
	Crooks Rd Southbound					W Wattles Rd Westbound					Crooks Rd Northbound					W Wattles Rd Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
07:00 AM	23	141	18	0	182	41	88	35	0	164	3	83	32	0	118	34	63	9	0	106	570
07:15 AM	16	204	27	0	247	27	92	33	0	152	5	106	17	0	128	42	95	10	0	147	674
07:30 AM	26	237	28	0	291	29	72	37	0	138	13	133	33	0	179	48	55	23	0	126	734
07:45 AM	17	279	41	0	337	46	68	52	0	166	10	155	15	0	180	48	56	26	0	130	813
Total	82	861	114	0	1057	143	320	157	0	620	31	477	97	0	605	172	269	68	0	509	2791
08:00 AM	21	232	38	0	291	28	58	33	0	119	19	132	24	0	175	29	58	12	0	99	684
08:15 AM	30	278	31	0	339	51	73	37	0	161	20	175	32	0	227	42	48	16	0	106	833
08:30 AM	26	259	40	0	325	36	74	45	0	155	15	147	28	0	190	40	49	23	0	112	782
08:45 AM	15	288	46	0	349	39	77	49	0	165	28	162	12	0	202	30	53	18	0	101	817
Total	92	1057	155	0	1304	154	282	164	0	600	82	616	96	0	794	141	208	69	0	418	3116
Grand Total	174	1918	269	0	2361	297	602	321	0	1220	113	1093	193	0	1399	313	477	137	0	927	5907
Apprch %	7.4	81.2	11.4	0		24.3	49.3	26.3	0		8.1	78.1	13.8	0		33.8	51.5	14.8	0		
Total %	2.9	32.5	4.6	0	40	5	10.2	5.4	0	20.7	1.9	18.5	3.3	0	23.7	5.3	8.1	2.3	0	15.7	
Passenger Vehicles	170	1861	264	0	2295	291	562	317	0	1170	103	1035	182	0	1320	301	457	134	0	892	5677
% Passenger Vehicles	97.7	97	98.1	0	97.2	98	93.4	98.8	0	95.9	91.2	94.7	94.3	0	94.4	96.2	95.8	97.8	0	96.2	96.1
Heavy Vehicles	4	57	5	0	66	6	40	4	0	50	10	58	11	0	79	12	20	3	0	35	230
% Heavy Vehicles	2.3	3	1.9	0	2.8	2	6.6	1.2	0	4.1	8.8	5.3	5.7	0	5.6	3.8	4.2	2.2	0	3.8	3.9



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568101 - Crooks Rd -- W Wattles Rd
Site Code : 16568101
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					W Wattles Rd Westbound					Crooks Rd Northbound					W Wattles Rd Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	21	232	38	0	291	28	58	33	0	119	19	132	24	0	175	29	**58**	12	0	99	684
08:15 AM	**30**	278	31	0	339	**51**	73	37	0	161	20	**175**	**32**	0	**227**	**42**	48	16	0	106	**833**
08:30 AM	26	259	40	0	325	36	74	45	0	155	15	147	28	0	190	40	49	**23**	0	**112**	782
08:45 AM	15	**288**	**46**	0	**349**	39	**77**	**49**	0	**165**	**28**	162	12	0	202	30	53	18	0	101	817
Total Volume	92	1057	155	0	1304	154	282	164	0	600	82	616	96	0	794	141	208	69	0	418	3116
% App. Total	7.1	81.1	11.9	0		25.7	47	27.3	0		10.3	77.6	12.1	0		33.7	49.8	16.5	0		
PHF	.767	.918	.842	.000	.934	.755	.916	.837	.000	.909	.732	.880	.750	.000	.874	.839	.897	.750	.000	.933	.935
Passenger Vehicles	89	1030	152	0	1271	150	262	161	0	573	74	578	89	0	741	138	200	68	0	406	2991
% Passenger Vehicles	96.7	97.4	98.1	0	97.5	97.4	92.9	98.2	0	95.5	90.2	93.8	92.7	0	93.3	97.9	96.2	98.6	0	97.1	96.0
Heavy Vehicles	3	27	3	0	33	4	20	3	0	27	8	38	7	0	53	3	8	1	0	12	125
% Heavy Vehicles	3.3	2.6	1.9	0	2.5	2.6	7.1	1.8	0	4.5	9.8	6.2	7.3	0	6.7	2.1	3.8	1.4	0	2.9	4.0

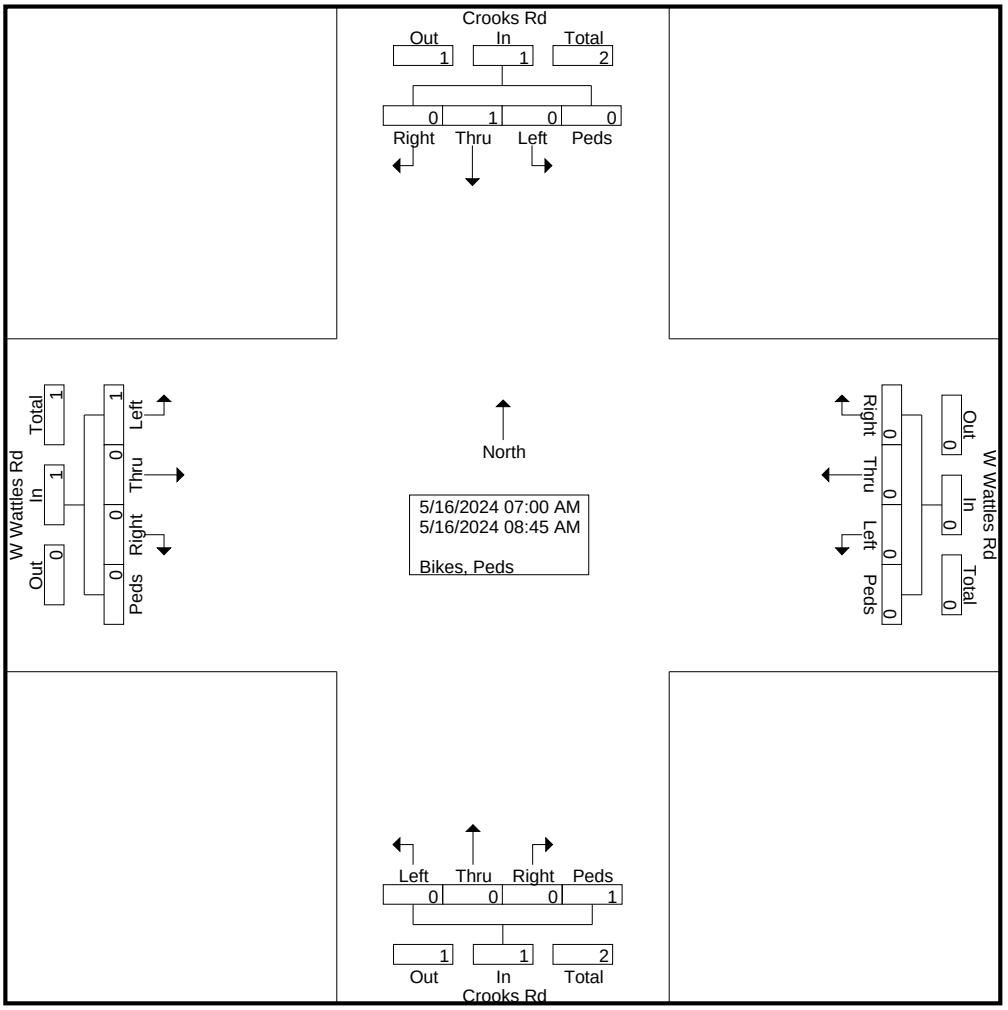


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568101 - Crooks Rd -- W Wattles Rd
Site Code : 16568101
Start Date : 5/16/2024
Page No : 1

Groups Printed- Bikes, Peds

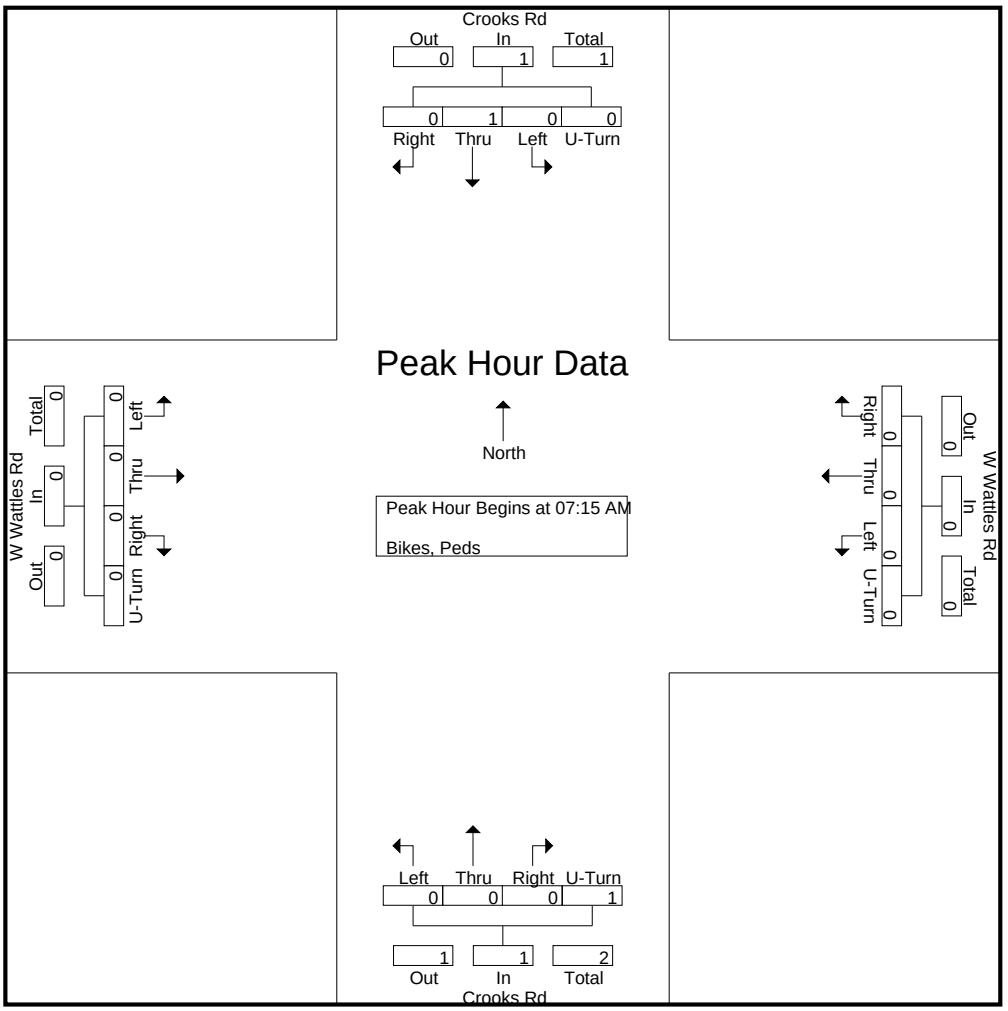
	Crooks Rd Southbound					W Wattles Rd Westbound					Crooks Rd Northbound					W Wattles Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
Grand Total	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	1	0	1	3
Apprch %	0	100	0	0		0	0	0	0		0	0	0	100		0	0	100	0		
Total %	0	33.3	0	0	33.3	0	0	0	0	0	0	0	0	33.3	33.3	0	0	33.3	0	33.3	



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568101 - Crooks Rd -- W Wattles Rd
Site Code : 16568101
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					W Wattles Rd Westbound					Crooks Rd Northbound					W Wattles Rd 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
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0	0	**1**
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
% App. Total	0	100	0	0		0	0	0	0		0	0	0	100		0	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.500

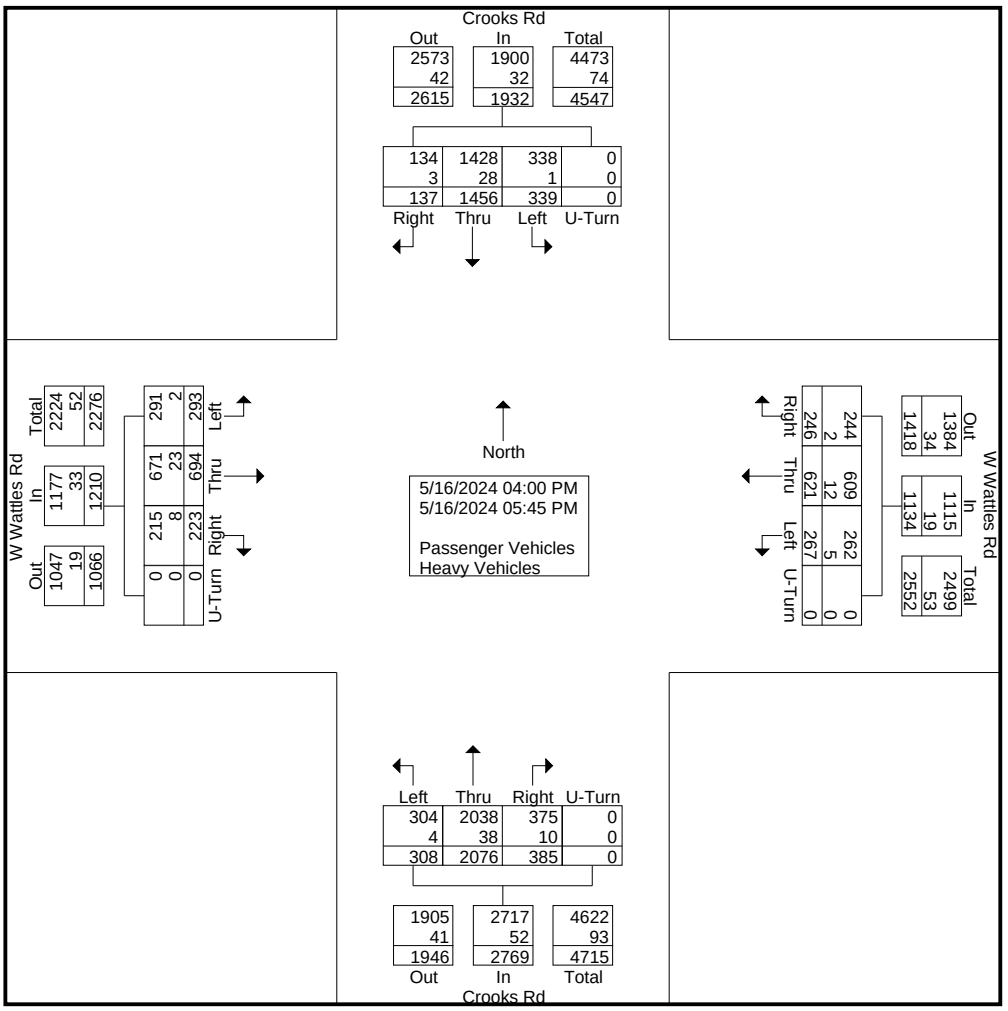


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568102 - Crooks Rd -- W Wattles Rd
Site Code : 16568102
Start Date : 5/16/2024
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

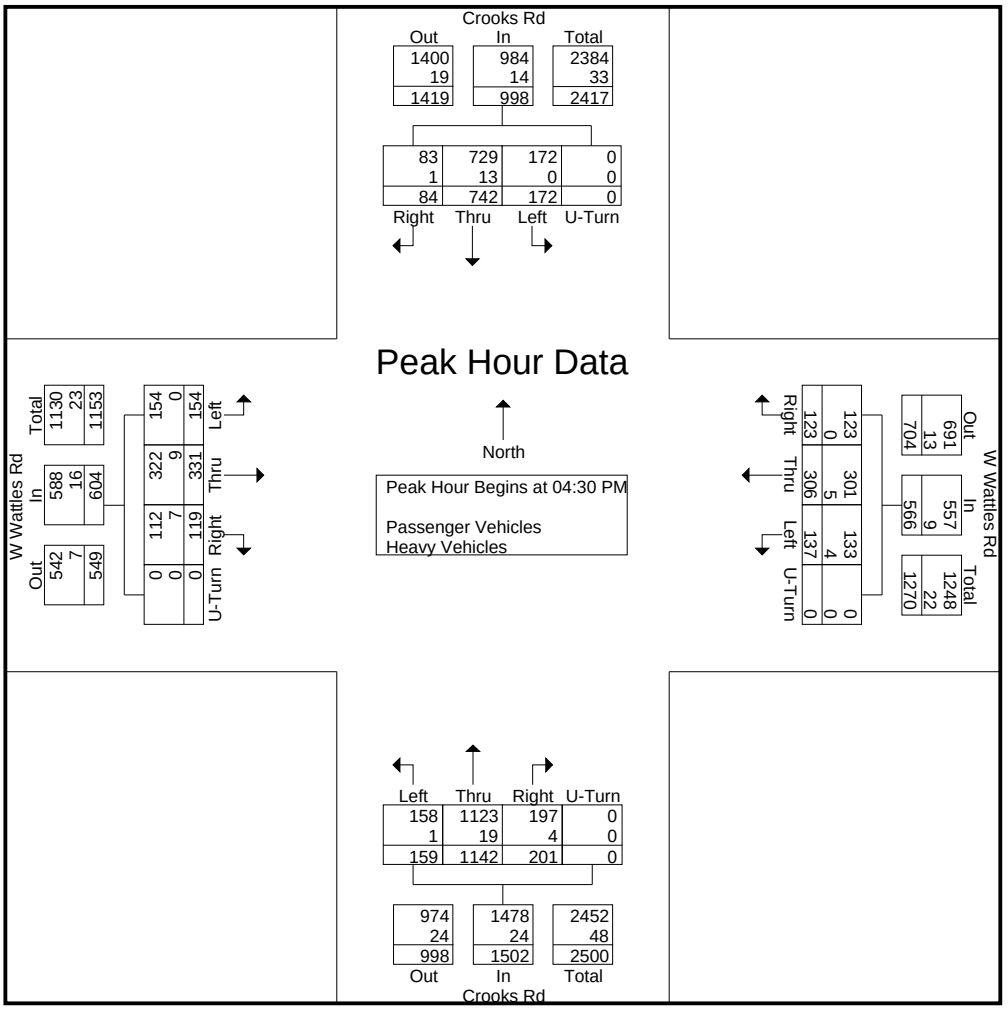
	Crooks Rd Southbound					W Wattles Rd Westbound					Crooks Rd Northbound					W Wattles Rd Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
04:00 PM	13	183	49	0	245	30	81	30	0	141	54	245	40	0	339	28	68	30	0	126	851
04:15 PM	21	172	37	0	230	30	82	30	0	142	34	253	34	0	321	30	94	48	0	172	865
04:30 PM	28	191	45	0	264	31	80	40	0	151	40	282	27	0	349	20	81	33	0	134	898
04:45 PM	15	183	43	0	241	25	77	37	0	139	42	284	50	0	376	37	62	39	0	138	894
Total	77	729	174	0	980	116	320	137	0	573	170	1064	151	0	1385	115	305	150	0	570	3508
05:00 PM	25	186	42	0	253	28	78	30	0	136	64	292	38	0	394	30	94	47	0	171	954
05:15 PM	16	182	42	0	240	39	71	30	0	140	55	284	44	0	383	32	94	35	0	161	924
05:30 PM	10	154	39	0	203	27	76	41	0	144	53	226	33	0	312	21	101	41	0	163	822
05:45 PM	9	205	42	0	256	36	76	29	0	141	43	210	42	0	295	25	100	20	0	145	837
Total	60	727	165	0	952	130	301	130	0	561	215	1012	157	0	1384	108	389	143	0	640	3537
Grand Total	137	1456	339	0	1932	246	621	267	0	1134	385	2076	308	0	2769	223	694	293	0	1210	7045
Apprch %	7.1	75.4	17.5	0		21.7	54.8	23.5	0		13.9	75	11.1	0		18.4	57.4	24.2	0		
Total %	1.9	20.7	4.8	0	27.4	3.5	8.8	3.8	0	16.1	5.5	29.5	4.4	0	39.3	3.2	9.9	4.2	0	17.2	
Passenger Vehicles	134	1428	338	0	1900	244	609	262	0	1115	375	2038	304	0	2717	215	671	291	0	1177	6909
% Passenger Vehicles	97.8	98.1	99.7	0	98.3	99.2	98.1	98.1	0	98.3	97.4	98.2	98.7	0	98.1	96.4	96.7	99.3	0	97.3	98.1
Heavy Vehicles	3	28	1	0	32	2	12	5	0	19	10	38	4	0	52	8	23	2	0	33	136
% Heavy Vehicles	2.2	1.9	0.3	0	1.7	0.8	1.9	1.9	0	1.7	2.6	1.8	1.3	0	1.9	3.6	3.3	0.7	0	2.7	1.9



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568102 - Crooks Rd -- W Wattles Rd
Site Code : 16568102
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					W Wattles Rd Westbound					Crooks Rd Northbound					W Wattles Rd Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	**28**	**191**	**45**	0	**264**	31	**80**	**40**	0	**151**	40	282	27	0	349	20	81	33	0	134	898
04:45 PM	15	183	43	0	241	25	77	37	0	139	42	284	**50**	0	376	**37**	62	39	0	138	894
05:00 PM	25	186	42	0	253	28	78	30	0	136	**64**	**292**	38	0	**394**	30	**94**	**47**	0	**171**	**954**
05:15 PM	16	182	42	0	240	**39**	71	30	0	140	55	284	44	0	383	32	94	35	0	161	924
Total Volume	84	742	172	0	998	123	306	137	0	566	201	1142	159	0	1502	119	331	154	0	604	3670
% App. Total	8.4	74.3	17.2	0		21.7	54.1	24.2	0		13.4	76	10.6	0		19.7	54.8	25.5	0		
PHF	.750	.971	.956	.000	.945	.788	.956	.856	.000	.937	.785	.978	.795	.000	.953	.804	.880	.819	.000	.883	.962
Passenger Vehicles	83	729	172	0	984	123	301	133	0	557	197	1123	158	0	1478	112	322	154	0	588	3607
% Passenger Vehicles	98.8	98.2	100	0	98.6	100	98.4	97.1	0	98.4	98.0	98.3	99.4	0	98.4	94.1	97.3	100	0	97.4	98.3
Heavy Vehicles	1	13	0	0	14	0	5	4	0	9	4	19	1	0	24	7	9	0	0	16	63
% Heavy Vehicles	1.2	1.8	0	0	1.4	0	1.6	2.9	0	1.6	2.0	1.7	0.6	0	1.6	5.9	2.7	0	0	2.6	1.7

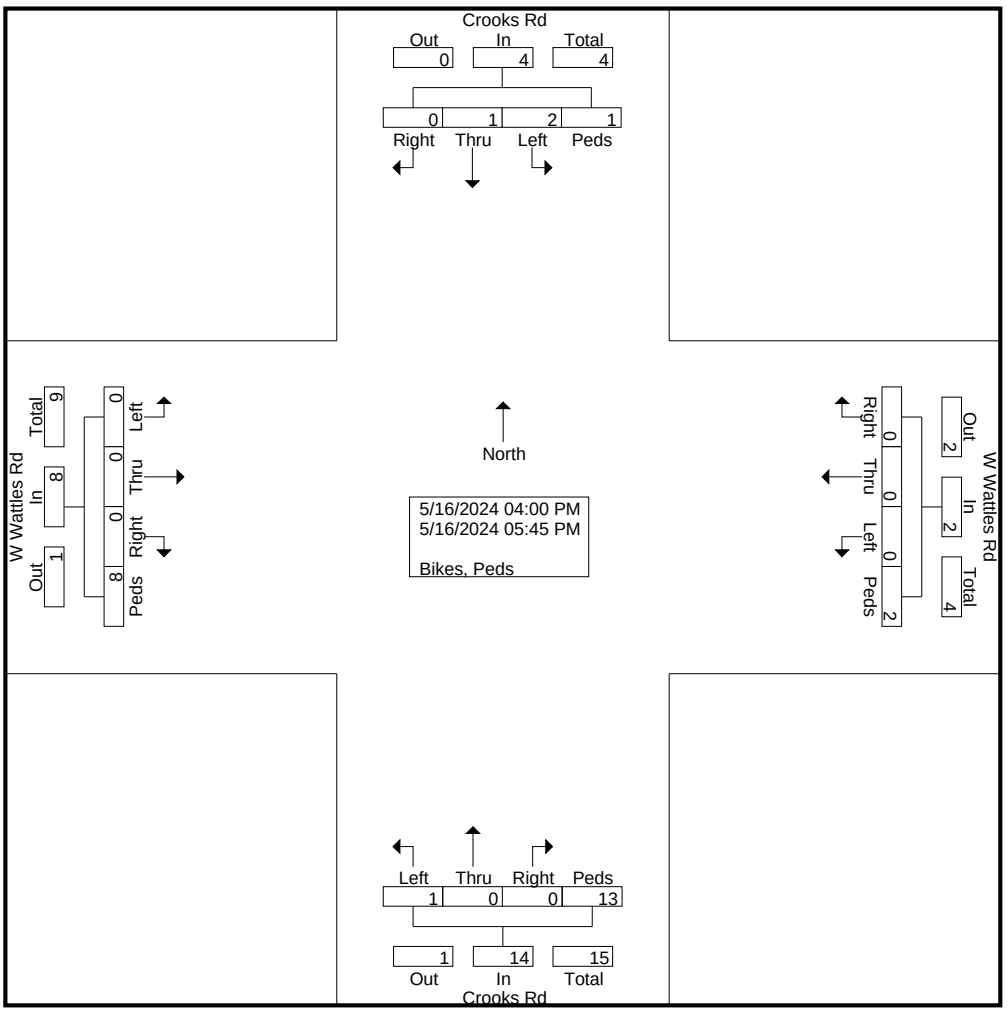


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568102 - Crooks Rd -- W Wattles Rd
Site Code : 16568102
Start Date : 5/16/2024
Page No : 1

Groups Printed- Bikes, Peds

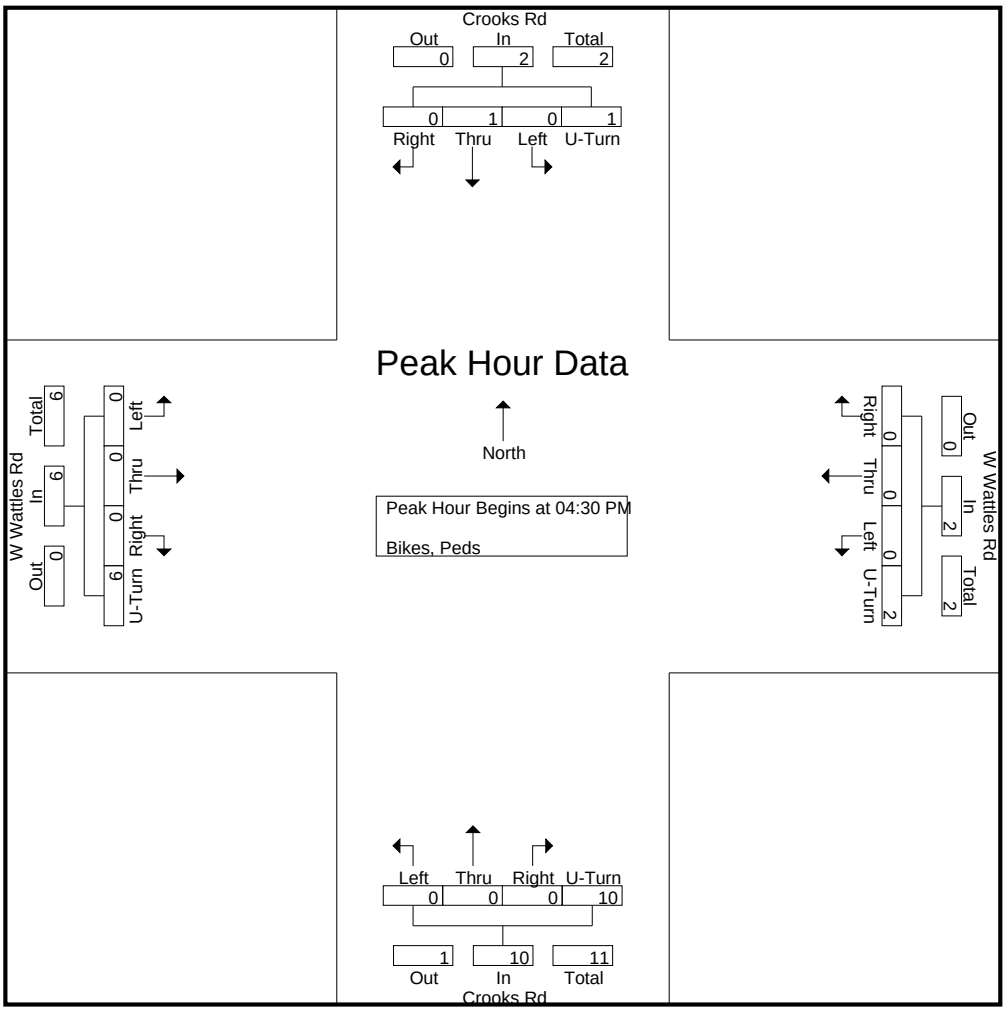
	Crooks Rd Southbound					W Wattles Rd Westbound					Crooks Rd Northbound					W Wattles Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	1	1	4
04:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	2	2	0	0	0	2	2	5
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	1	0	0	1	0	0	0	0	0	0	0	1	5	6	0	0	0	4	4	11
05:00 PM	0	0	0	1	1	0	0	0	2	2	0	0	0	3	3	0	0	0	3	3	9
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	5
05:30 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
05:45 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	2	1	3	0	0	0	2	2	0	0	0	8	8	0	0	0	4	4	17
Grand Total	0	1	2	1	4	0	0	0	2	2	0	0	1	13	14	0	0	0	8	8	28
Apprch %	0	25	50	25		0	0	0	100		0	0	7.1	92.9		0	0	0	100		
Total %	0	3.6	7.1	3.6	14.3	0	0	0	7.1	7.1	0	0	3.6	46.4	50	0	0	0	28.6	28.6	



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568102 - Crooks Rd -- W Wattles Rd
Site Code : 16568102
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					W Wattles Rd Westbound					Crooks Rd Northbound					W Wattles Rd 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
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	2	2	0	0	0	2	2	5
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
05:00 PM	0	0	0	**1**	1	0	0	0	**2**	**2**	0	0	0	3	3	0	0	0	**3**	**3**	**9**
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**	**5**	0	0	0	0	0	5
Total Volume	0	1	0	1	2	0	0	0	2	2	0	0	0	10	10	0	0	0	6	6	20
% App. Total	0	50	0	50		0	0	0	100		0	0	0	100		0	0	0	100		
PHF	.000	.250	.000	.250	.500	.000	.000	.000	.250	.250	.000	.000	.000	.500	.500	.000	.000	.000	.500	.500	.556

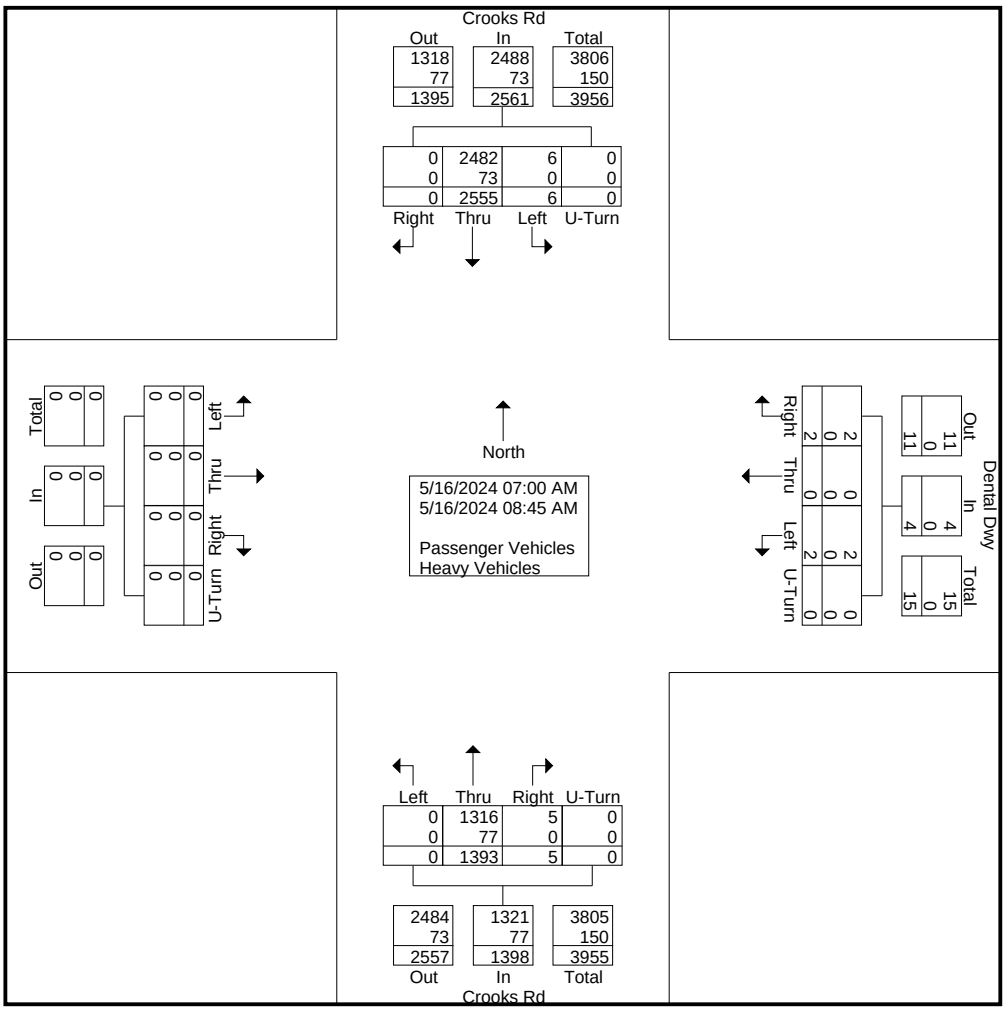


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568103 - Crooks Rd -- Dental Dwy
Site Code : 16568103
Start Date : 5/16/2024
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

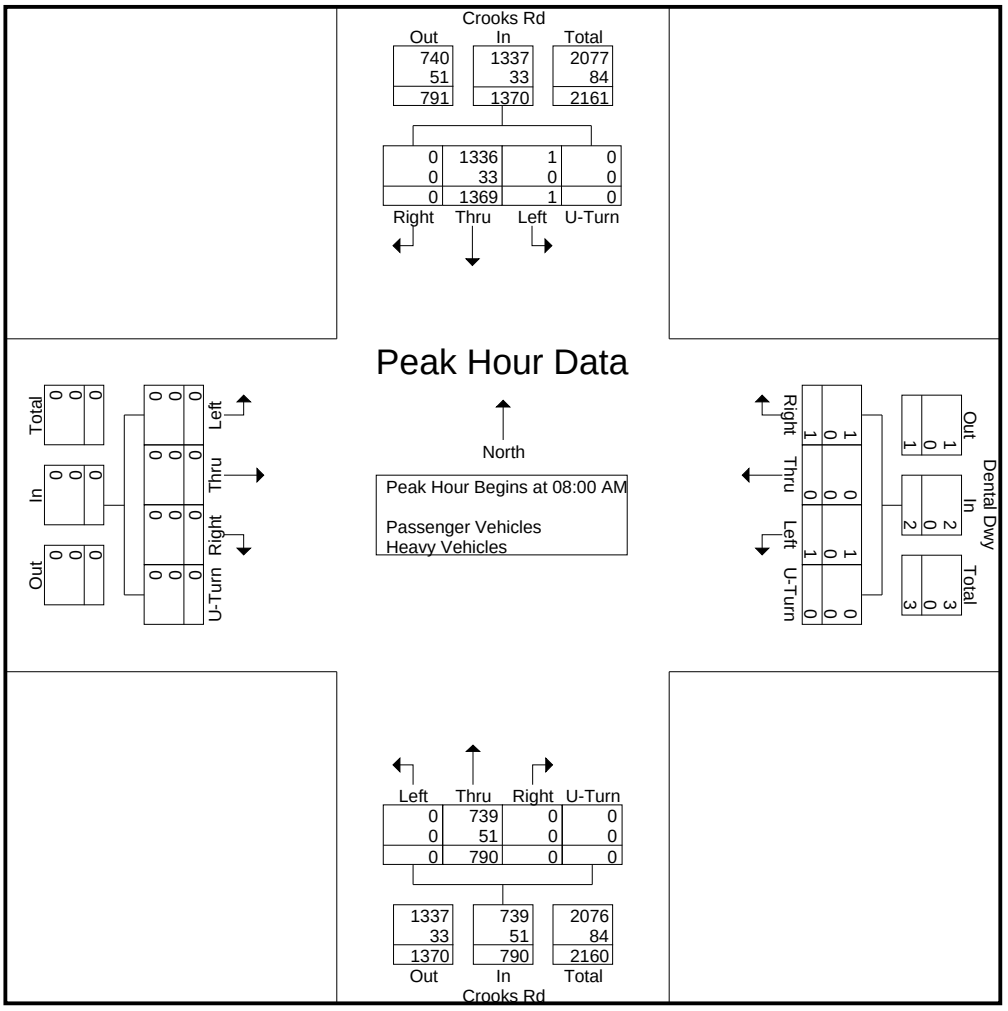
	Crooks Rd Southbound					Dental Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
07:00 AM	0	213	1	0	214	0	0	0	0	0	0	114	0	0	114	0	0	0	0	0	328
07:15 AM	0	275	1	0	276	0	0	0	0	0	0	137	0	0	137	0	0	0	0	0	413
07:30 AM	0	322	2	0	324	1	0	0	0	1	2	180	0	0	182	0	0	0	0	0	507
07:45 AM	0	376	1	0	377	0	0	1	0	1	3	172	0	0	175	0	0	0	0	0	553
Total	0	1186	5	0	1191	1	0	1	0	2	5	603	0	0	608	0	0	0	0	0	1801
08:00 AM	0	296	0	0	296	0	0	0	0	0	0	183	0	0	183	0	0	0	0	0	479
08:15 AM	0	356	0	0	356	0	0	0	0	0	0	222	0	0	222	0	0	0	0	0	578
08:30 AM	0	346	1	0	347	0	0	0	0	0	0	201	0	0	201	0	0	0	0	0	548
08:45 AM	0	371	0	0	371	1	0	1	0	2	0	184	0	0	184	0	0	0	0	0	557
Total	0	1369	1	0	1370	1	0	1	0	2	0	790	0	0	790	0	0	0	0	0	2162
Grand Total	0	2555	6	0	2561	2	0	2	0	4	5	1393	0	0	1398	0	0	0	0	0	3963
Apprch %	0	99.8	0.2	0		50	0	50	0		0.4	99.6	0	0		0	0	0	0		
Total %	0	64.5	0.2	0	64.6	0.1	0	0.1	0	0.1	0.1	35.2	0	0	35.3	0	0	0	0	0	
Passenger Vehicles	0	2482	6	0	2488	2	0	2	0	4	5	1316	0	0	1321	0	0	0	0	0	3813
% Passenger Vehicles	0	97.1	100	0	97.1	100	0	100	0	100	100	94.5	0	0	94.5	0	0	0	0	0	96.2
Heavy Vehicles	0	73	0	0	73	0	0	0	0	0	0	77	0	0	77	0	0	0	0	0	150
% Heavy Vehicles	0	2.9	0	0	2.9	0	0	0	0	0	0	5.5	0	0	5.5	0	0	0	0	0	3.8



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568103 - Crooks Rd -- Dental Dwy
Site Code : 16568103
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					Dental Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	296	0	0	296	0	0	0	0	0	0	183	0	0	183	0	0	0	0	0	479
08:15 AM	0	356	0	0	356	0	0	0	0	0	0	**222**	0	0	**222**	0	0	0	0	0	**578**
08:30 AM	0	346	**1**	0	347	0	0	0	0	0	0	201	0	0	201	0	0	0	0	0	548
08:45 AM	0	**371**	0	0	**371**	**1**	0	**1**	0	**2**	0	184	0	0	184	0	0	0	0	0	557
Total Volume	0	1369	1	0	1370	1	0	1	0	2	0	790	0	0	790	0	0	0	0	0	2162
% App. Total	0	99.9	0.1	0		50	0	50	0		0	100	0	0		0	0	0	0		
PHF	.000	.923	.250	.000	.923	.250	.000	.250	.000	.250	.000	.890	.000	.000	.890	.000	.000	.000	.000	.000	.935
Passenger Vehicles	0	1336	1	0	1337	1	0	1	0	2	0	739	0	0	739	0	0	0	0	0	2078
% Passenger Vehicles	0	97.6	100	0	97.6	100	0	100	0	100	0	93.5	0	0	93.5	0	0	0	0	0	96.1
Heavy Vehicles	0	33	0	0	33	0	0	0	0	0	0	51	0	0	51	0	0	0	0	0	84
% Heavy Vehicles	0	2.4	0	0	2.4	0	0	0	0	0	0	6.5	0	0	6.5	0	0	0	0	0	3.9

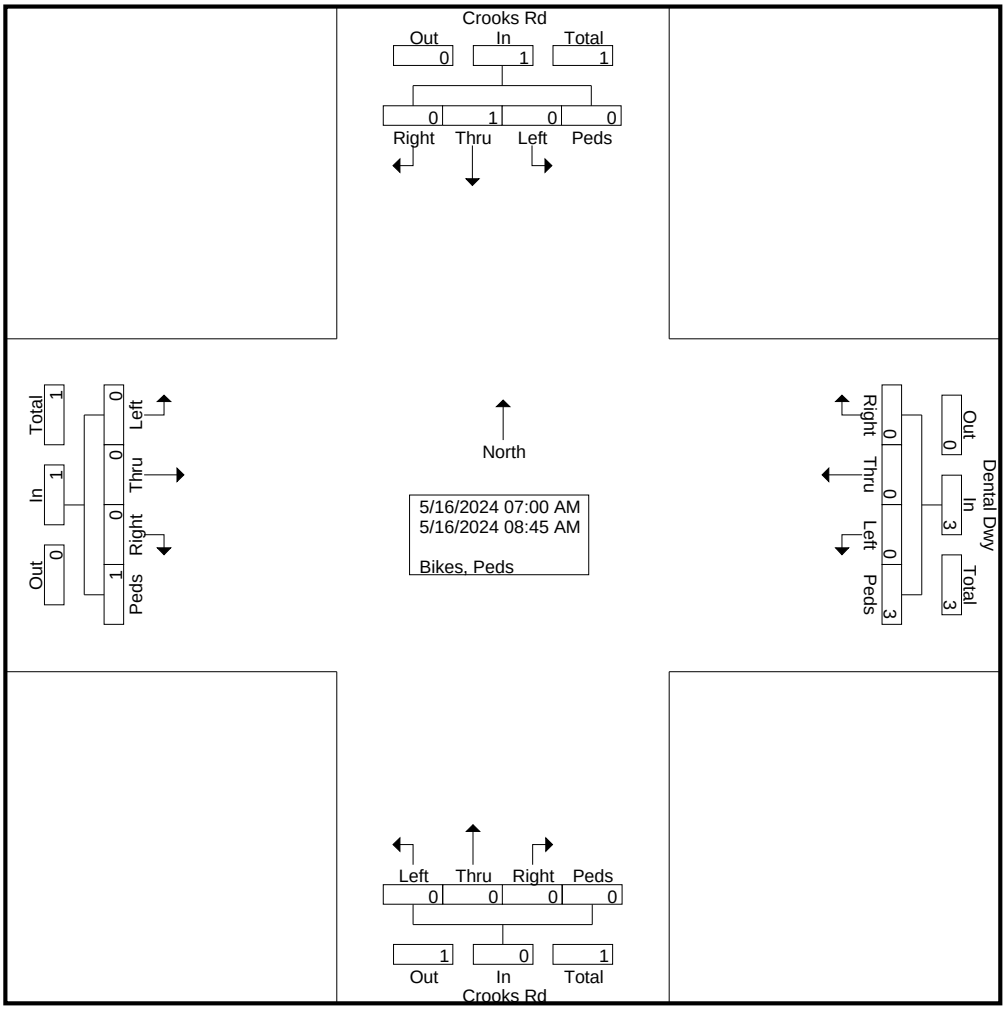


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568103 - Crooks Rd -- Dental Dwy
Site Code : 16568103
Start Date : 5/16/2024
Page No : 1

Groups Printed- Bikes, Peds

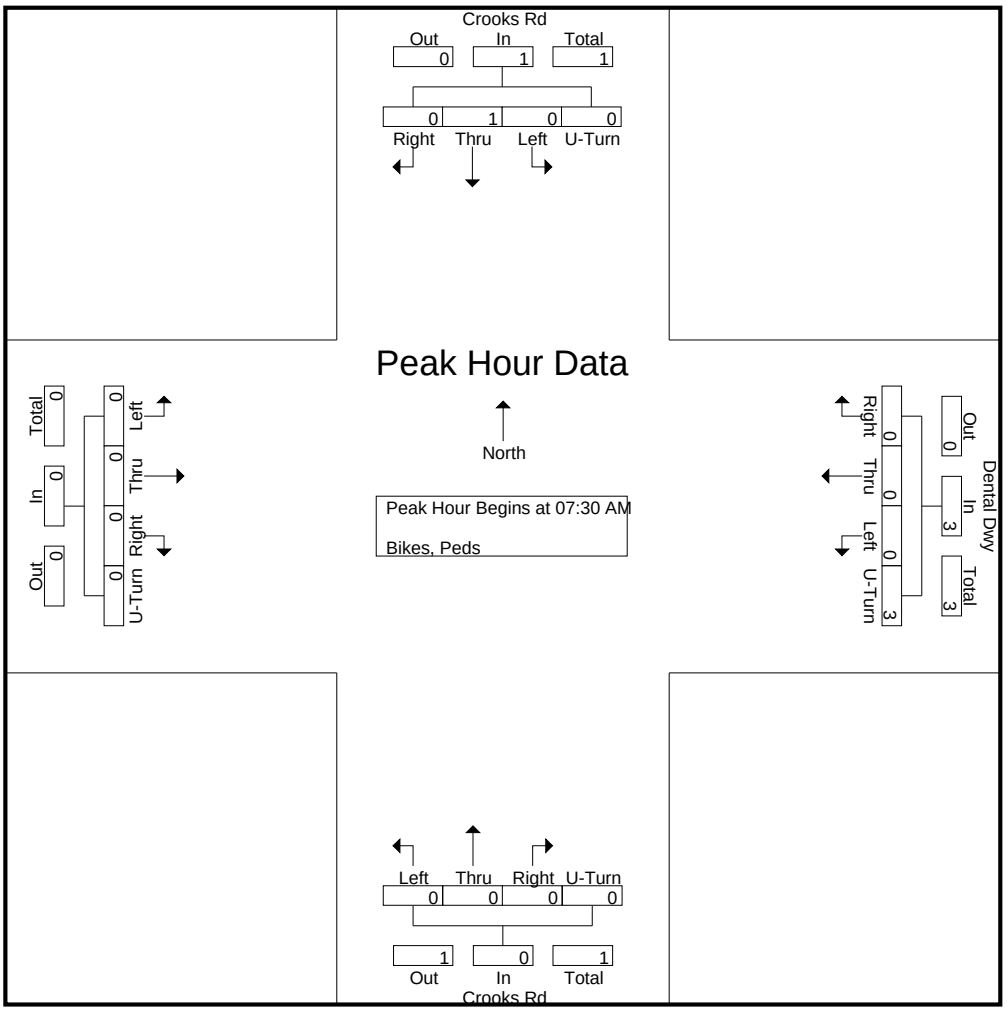
	Crooks Rd Southbound					Dental Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	2
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	3
Grand Total	0	1	0	0	1	0	0	0	3	3	0	0	0	0	0	0	0	0	1	1	5
Apprch %	0	100	0	0		0	0	0	100		0	0	0	0		0	0	0	100		
Total %	0	20	0	0	20	0	0	0	60	60	0	0	0	0	0	0	0	0	20	20	



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568103 - Crooks Rd -- Dental Dwy
Site Code : 16568103
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					Dental Dwy Westbound					Crooks Rd Northbound					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
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
08:00 AM	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	**2**	**2**	0	0	0	0	0	0	0	0	0	0	**2**
Total Volume	0	1	0	0	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	4
% App. Total	0	100	0	0		0	0	0	100		0	0	0	0		0	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.375	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500

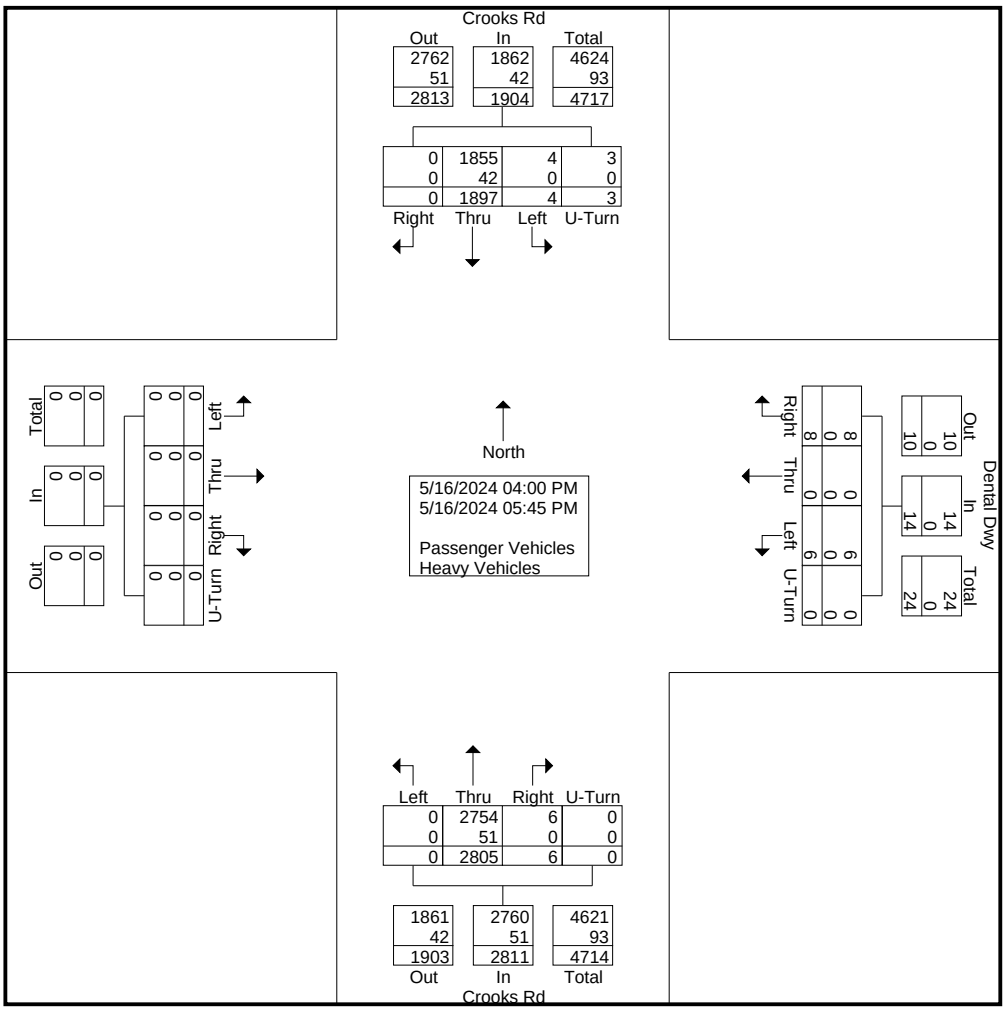


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568104 - Crooks Rd -- Dental Dwy
Site Code : 16568104
Start Date : 5/16/2024
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

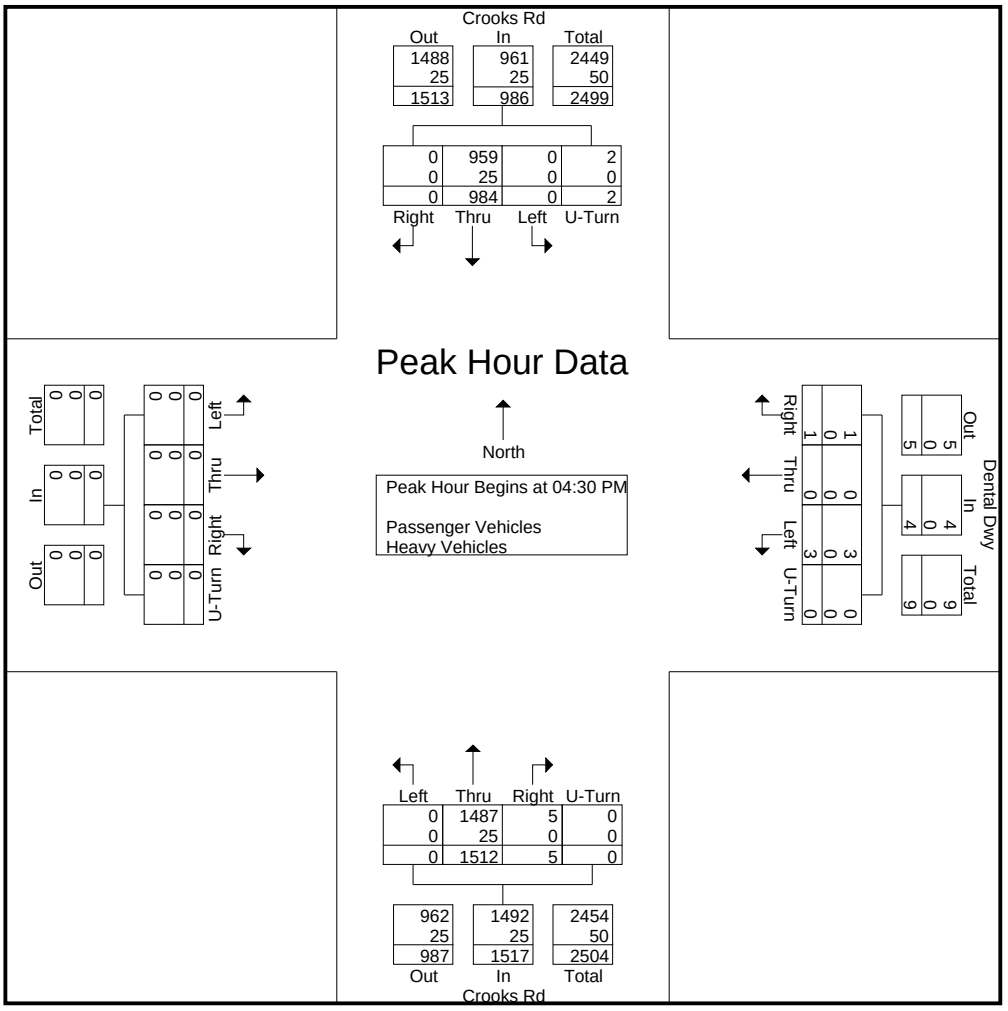
	Crooks Rd Southbound					Dental Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
04:00 PM	0	236	3	0	239	2	0	1	0	3	0	354	0	0	354	0	0	0	0	0	596
04:15 PM	0	229	0	0	229	2	0	2	0	4	0	324	0	0	324	0	0	0	0	0	557
04:30 PM	0	246	0	2	248	0	0	3	0	3	3	338	0	0	341	0	0	0	0	0	592
04:45 PM	0	258	0	0	258	1	0	0	0	1	0	372	0	0	372	0	0	0	0	0	631
Total	0	969	3	2	974	5	0	6	0	11	3	1388	0	0	1391	0	0	0	0	0	2376
05:00 PM	0	240	0	0	240	0	0	0	0	0	0	409	0	0	409	0	0	0	0	0	649
05:15 PM	0	240	0	0	240	0	0	0	0	0	2	393	0	0	395	0	0	0	0	0	635
05:30 PM	0	217	0	1	218	0	0	0	0	0	0	314	0	0	314	0	0	0	0	0	532
05:45 PM	0	231	1	0	232	3	0	0	0	3	1	301	0	0	302	0	0	0	0	0	537
Total	0	928	1	1	930	3	0	0	0	3	3	1417	0	0	1420	0	0	0	0	0	2353
Grand Total	0	1897	4	3	1904	8	0	6	0	14	6	2805	0	0	2811	0	0	0	0	0	4729
Apprch %	0	99.6	0.2	0.2		57.1	0	42.9	0		0.2	99.8	0	0		0	0	0	0		
Total %	0	40.1	0.1	0.1	40.3	0.2	0	0.1	0	0.3	0.1	59.3	0	0	59.4	0	0	0	0	0	
Passenger Vehicles	0	1855	4	3	1862	8	0	6	0	14	6	2754	0	0	2760	0	0	0	0	0	4636
% Passenger Vehicles	0	97.8	100	100	97.8	100	0	100	0	100	100	98.2	0	0	98.2	0	0	0	0	0	98
Heavy Vehicles	0	42	0	0	42	0	0	0	0	0	0	51	0	0	51	0	0	0	0	0	93
% Heavy Vehicles	0	2.2	0	0	2.2	0	0	0	0	0	0	1.8	0	0	1.8	0	0	0	0	0	2



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568104 - Crooks Rd -- Dental Dwy
Site Code : 16568104
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					Dental Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	246	0	**2**	248	0	0	**3**	0	**3**	**3**	338	0	0	341	0	0	0	0	0	592
04:45 PM	0	**258**	0	0	**258**	**1**	0	0	0	1	0	372	0	0	372	0	0	0	0	0	631
05:00 PM	0	240	0	0	240	0	0	0	0	0	0	**409**	0	0	**409**	0	0	0	0	0	**649**
05:15 PM	0	240	0	0	240	0	0	0	0	0	2	393	0	0	395	0	0	0	0	0	635
Total Volume	0	984	0	2	986	1	0	3	0	4	5	1512	0	0	1517	0	0	0	0	0	2507
% App. Total	0	99.8	0	0.2		25	0	75	0		0.3	99.7	0	0		0	0	0	0		
PHF	.000	.953	.000	.250	.955	.250	.000	.250	.000	.333	.417	.924	.000	.000	.927	.000	.000	.000	.000	.000	.966
Passenger Vehicles	0	959	0	2	961	1	0	3	0	4	5	1487	0	0	1492	0	0	0	0	0	2457
% Passenger Vehicles	0	97.5	0	100	97.5	100	0	100	0	100	100	98.3	0	0	98.4	0	0	0	0	0	98.0
Heavy Vehicles	0	25	0	0	25	0	0	0	0	0	0	25	0	0	25	0	0	0	0	0	50
% Heavy Vehicles	0	2.5	0	0	2.5	0	0	0	0	0	0	1.7	0	0	1.6	0	0	0	0	0	2.0

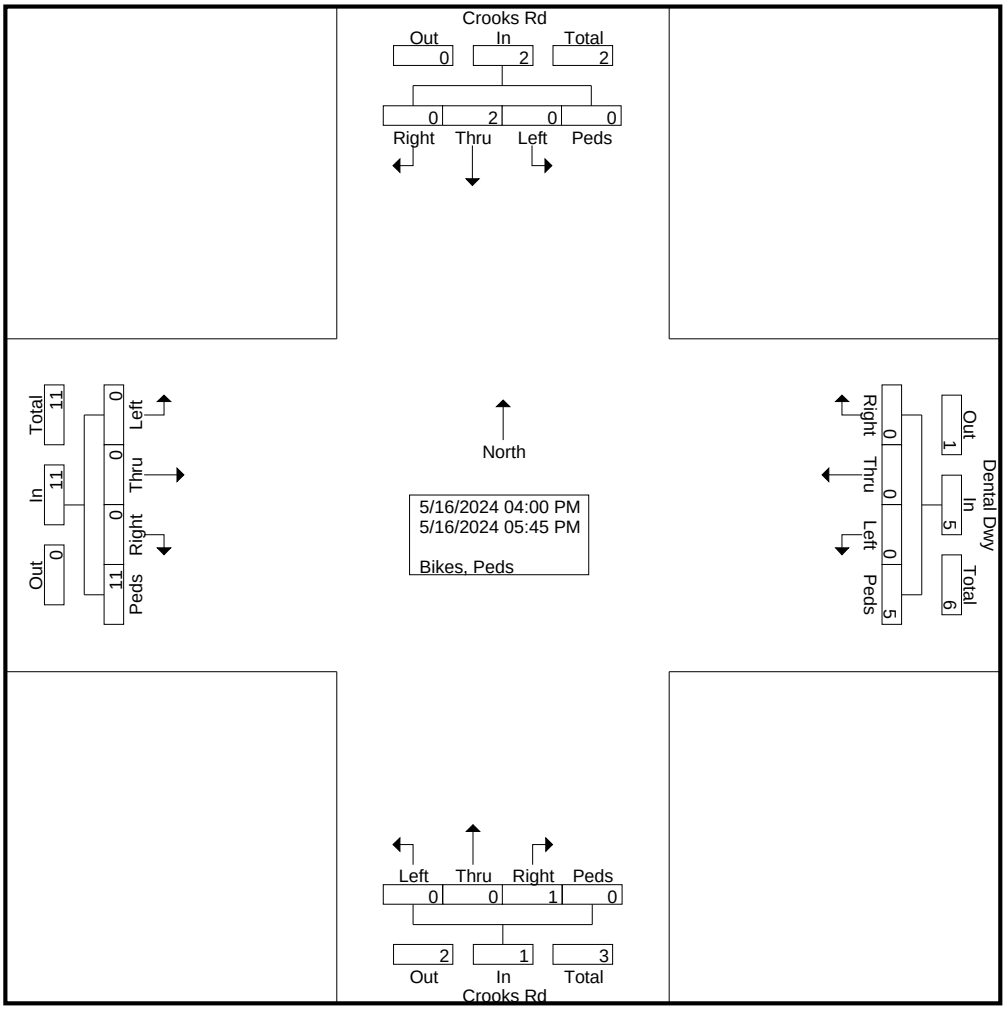


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568104 - Crooks Rd -- Dental Dwy
Site Code : 16568104
Start Date : 5/16/2024
Page No : 1

Groups Printed- Bikes, Peds

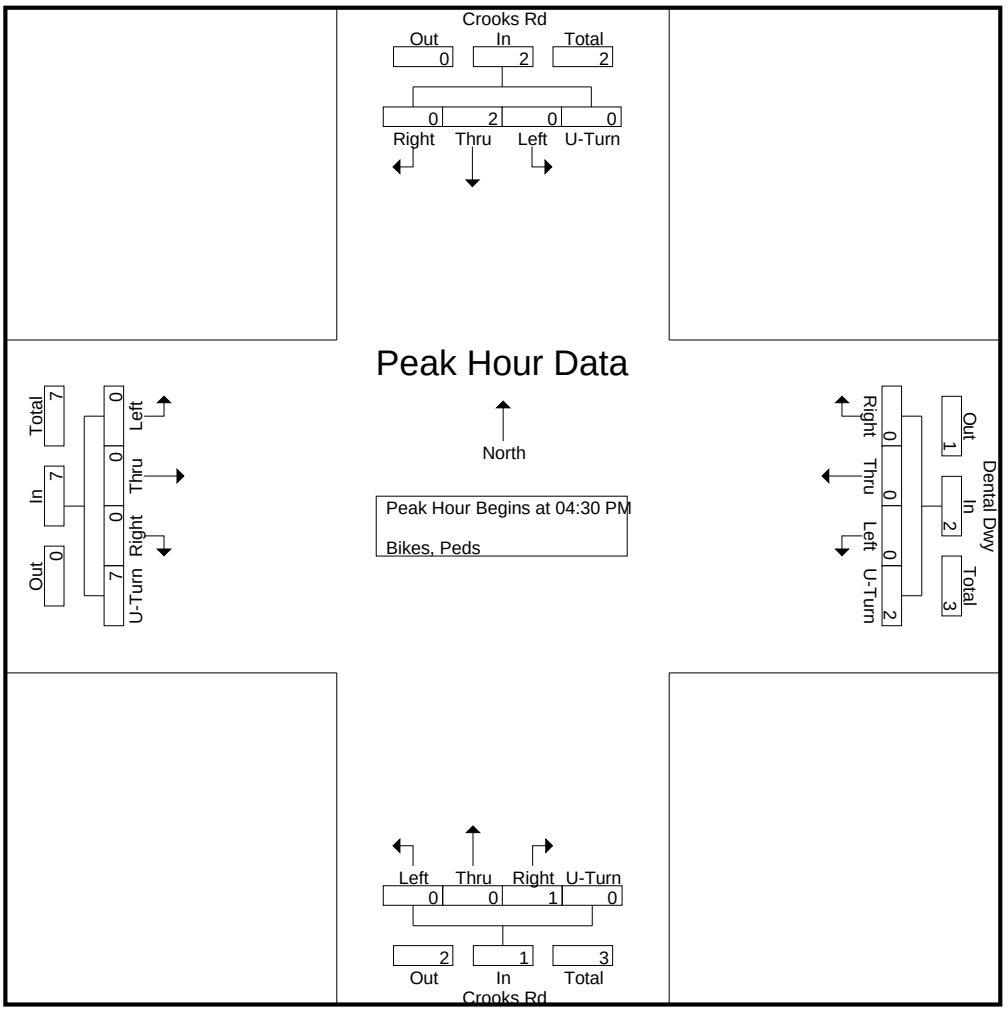
	Crooks Rd Southbound					Dental Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	2	3
04:30 PM	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	2	0	0	2	0	0	0	1	1	1	0	0	0	1	0	0	0	4	4	8
05:00 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5
05:30 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	1	1	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	7	7	11
Grand Total	0	2	0	0	2	0	0	0	5	5	1	0	0	0	1	0	0	0	11	11	19
Apprch %	0	100	0	0		0	0	0	100		100	0	0	0		0	0	0	100		
Total %	0	10.5	0	0	10.5	0	0	0	26.3	26.3	5.3	0	0	0	5.3	0	0	0	57.9	57.9	



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568104 - Crooks Rd -- Dental Dwy
Site Code : 16568104
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					Dental Dwy Westbound					Crooks Rd Northbound					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
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	**2**	0	0	**2**	0	0	0	0	0	**1**	0	0	0	**1**	0	0	0	1	1	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
05:00 PM	0	0	0	0	0	0	0	0	**2**	**2**	0	0	0	0	0	0	0	0	0	0	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**	**5**	**5**
Total Volume	0	2	0	0	2	0	0	0	2	2	1	0	0	0	1	0	0	0	7	7	12
% App. Total	0	100	0	0		0	0	0	100		100	0	0	0		0	0	0	100		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.250	.250	.250	.000	.000	.000	.250	.000	.000	.000	.350	.350	.600

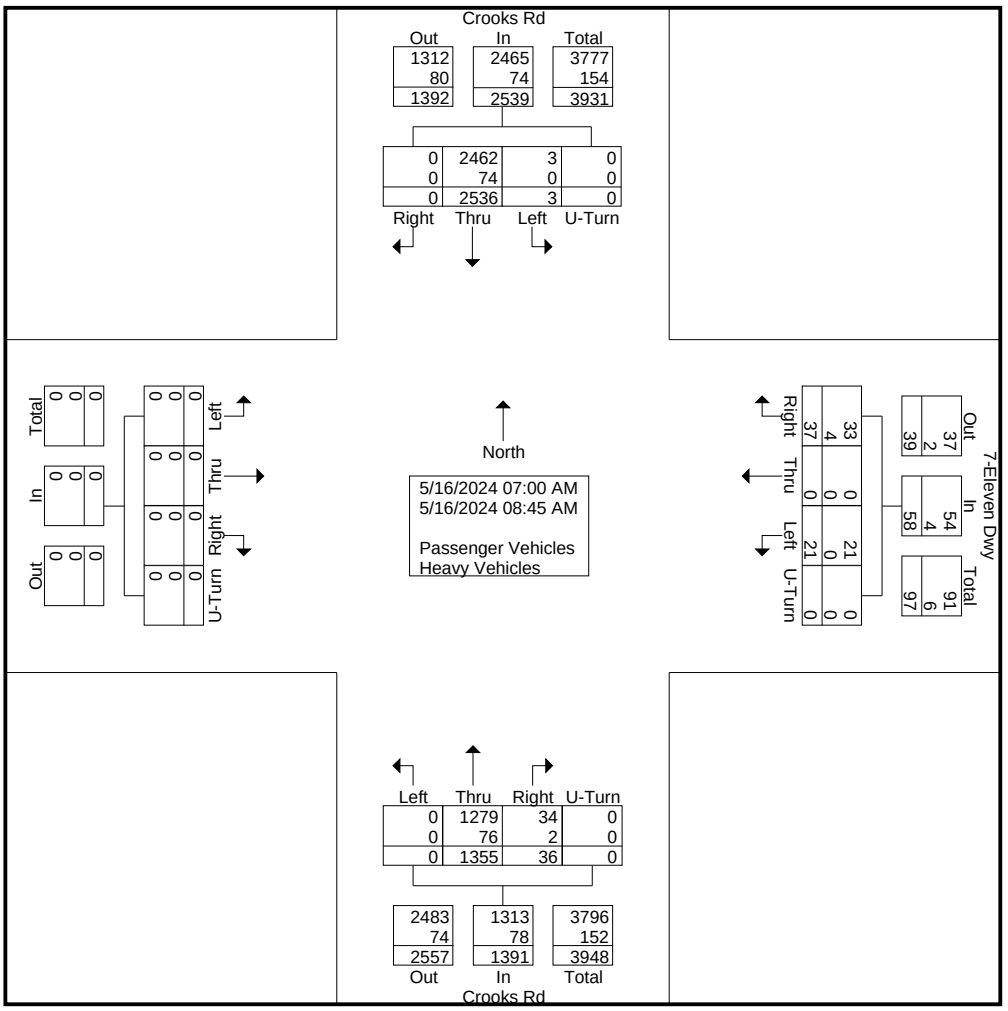


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568105 - Crooks Rd -- 7-Eleven Dwy
Site Code : 16568105
Start Date : 5/16/2024
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

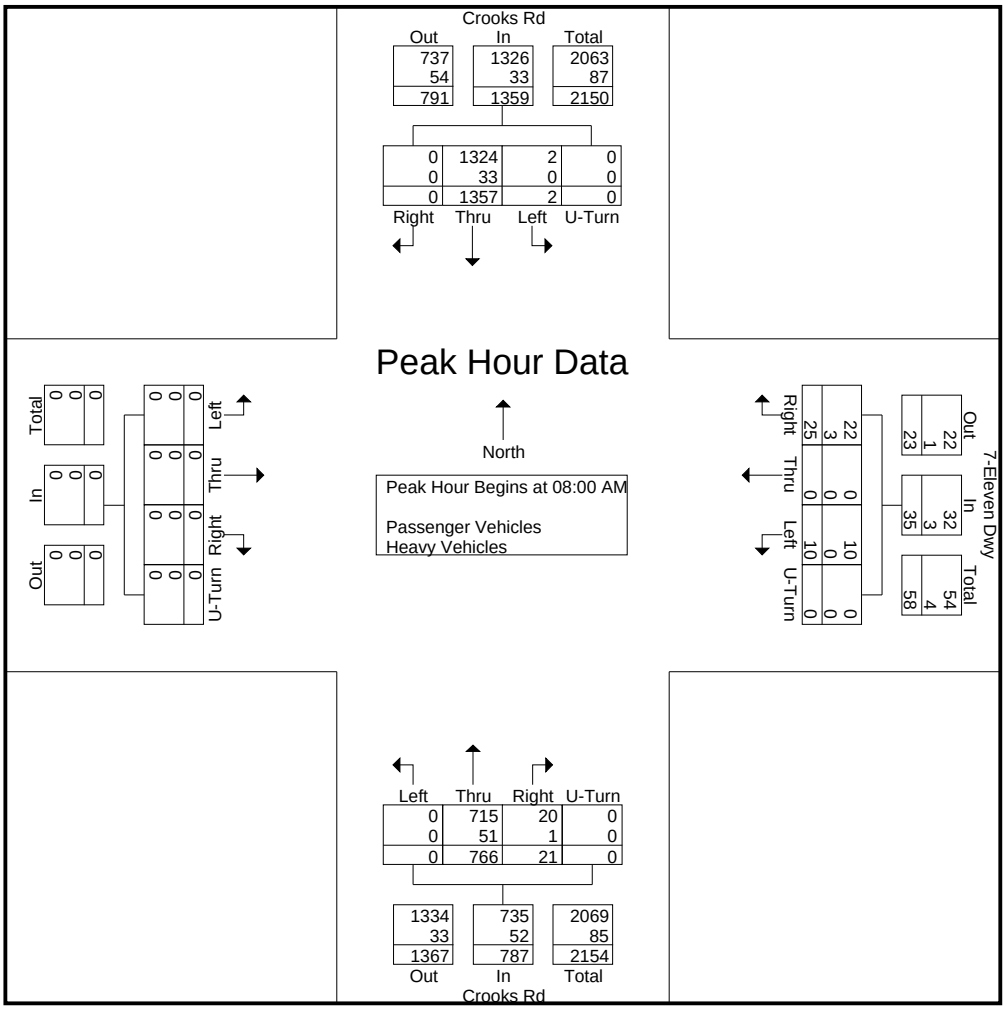
	Crooks Rd Southbound					7-Eleven Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
07:00 AM	0	207	0	0	207	3	0	4	0	7	2	112	0	0	114	0	0	0	0	0	328
07:15 AM	0	277	0	0	277	2	0	1	0	3	4	133	0	0	137	0	0	0	0	0	417
07:30 AM	0	321	0	0	321	2	0	5	0	7	7	172	0	0	179	0	0	0	0	0	507
07:45 AM	0	374	1	0	375	5	0	1	0	6	2	172	0	0	174	0	0	0	0	0	555
Total	0	1179	1	0	1180	12	0	11	0	23	15	589	0	0	604	0	0	0	0	0	1807
08:00 AM	0	293	1	0	294	5	0	1	0	6	6	172	0	0	178	0	0	0	0	0	478
08:15 AM	0	356	0	0	356	9	0	0	0	9	7	216	0	0	223	0	0	0	0	0	588
08:30 AM	0	343	0	0	343	3	0	4	0	7	4	187	0	0	191	0	0	0	0	0	541
08:45 AM	0	365	1	0	366	8	0	5	0	13	4	191	0	0	195	0	0	0	0	0	574
Total	0	1357	2	0	1359	25	0	10	0	35	21	766	0	0	787	0	0	0	0	0	2181
Grand Total	0	2536	3	0	2539	37	0	21	0	58	36	1355	0	0	1391	0	0	0	0	0	3988
Apprch %	0	99.9	0.1	0		63.8	0	36.2	0		2.6	97.4	0	0		0	0	0	0		
Total %	0	63.6	0.1	0	63.7	0.9	0	0.5	0	1.5	0.9	34	0	0	34.9	0	0	0	0	0	
Passenger Vehicles	0	2462	3	0	2465	33	0	21	0	54	34	1279	0	0	1313	0	0	0	0	0	3832
% Passenger Vehicles	0	97.1	100	0	97.1	89.2	0	100	0	93.1	94.4	94.4	0	0	94.4	0	0	0	0	0	96.1
Heavy Vehicles	0	74	0	0	74	4	0	0	0	4	2	76	0	0	78	0	0	0	0	0	156
% Heavy Vehicles	0	2.9	0	0	2.9	10.8	0	0	0	6.9	5.6	5.6	0	0	5.6	0	0	0	0	0	3.9



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568105 - Crooks Rd -- 7-Eleven Dwy
Site Code : 16568105
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					7-Eleven Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	293	**1**	0	294	5	0	1	0	6	6	172	0	0	178	0	0	0	0	0	478
08:15 AM	0	356	0	0	356	**9**	0	0	0	9	**7**	**216**	0	0	**223**	0	0	0	0	0	**588**
08:30 AM	0	343	0	0	343	3	0	4	0	7	4	187	0	0	191	0	0	0	0	0	541
08:45 AM	0	**365**	1	0	**366**	8	0	**5**	0	**13**	4	191	0	0	195	0	0	0	0	0	574
Total Volume	0	1357	2	0	1359	25	0	10	0	35	21	766	0	0	787	0	0	0	0	0	2181
% App. Total	0	99.9	0.1	0		71.4	0	28.6	0		2.7	97.3	0	0		0	0	0	0		
PHF	.000	.929	.500	.000	.928	.694	.000	.500	.000	.673	.750	.887	.000	.000	.882	.000	.000	.000	.000	.000	.927
Passenger Vehicles	0	1324	2	0	1326	22	0	10	0	32	20	715	0	0	735	0	0	0	0	0	2093
% Passenger Vehicles	0	97.6	100	0	97.6	88.0	0	100	0	91.4	95.2	93.3	0	0	93.4	0	0	0	0	0	96.0
Heavy Vehicles	0	33	0	0	33	3	0	0	0	3	1	51	0	0	52	0	0	0	0	0	88
% Heavy Vehicles	0	2.4	0	0	2.4	12.0	0	0	0	8.6	4.8	6.7	0	0	6.6	0	0	0	0	0	4.0

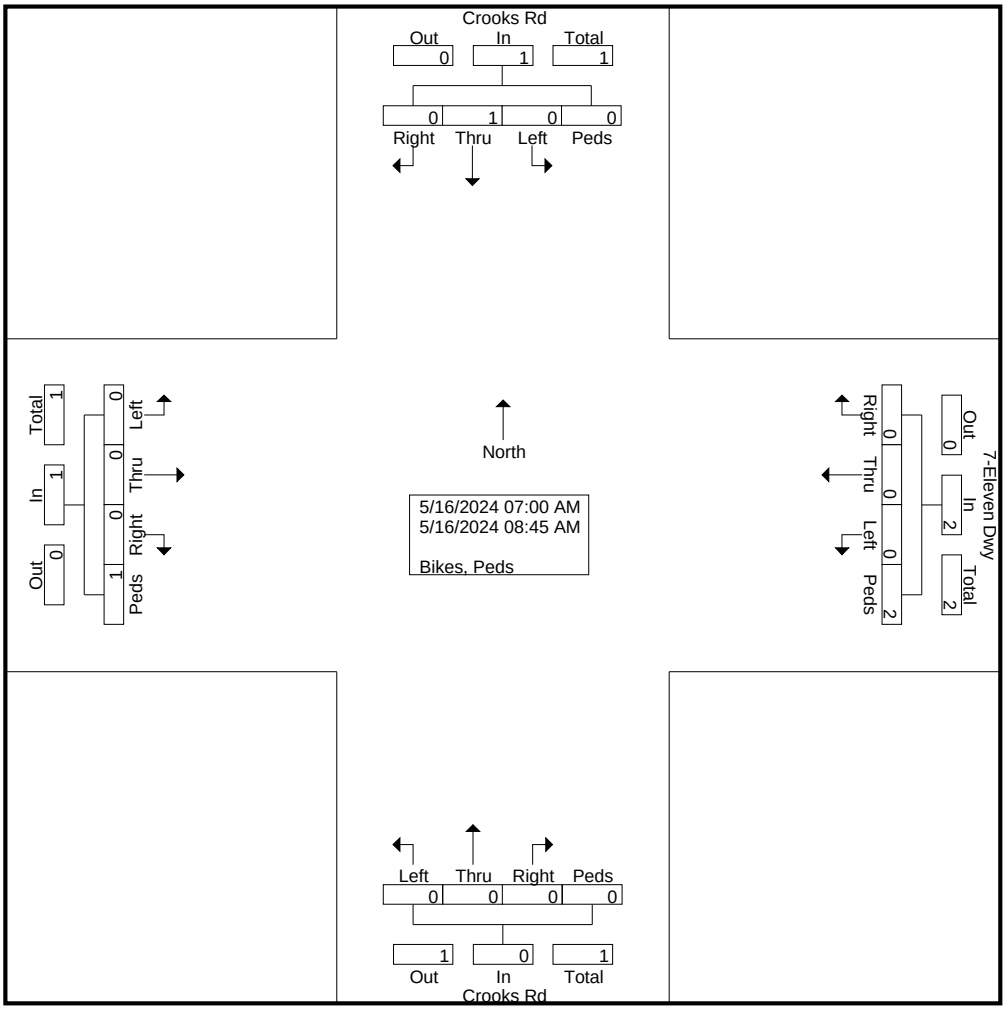


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568105 - Crooks Rd -- 7-Eleven Dwy
Site Code : 16568105
Start Date : 5/16/2024
Page No : 1

Groups Printed- Bikes, Peds

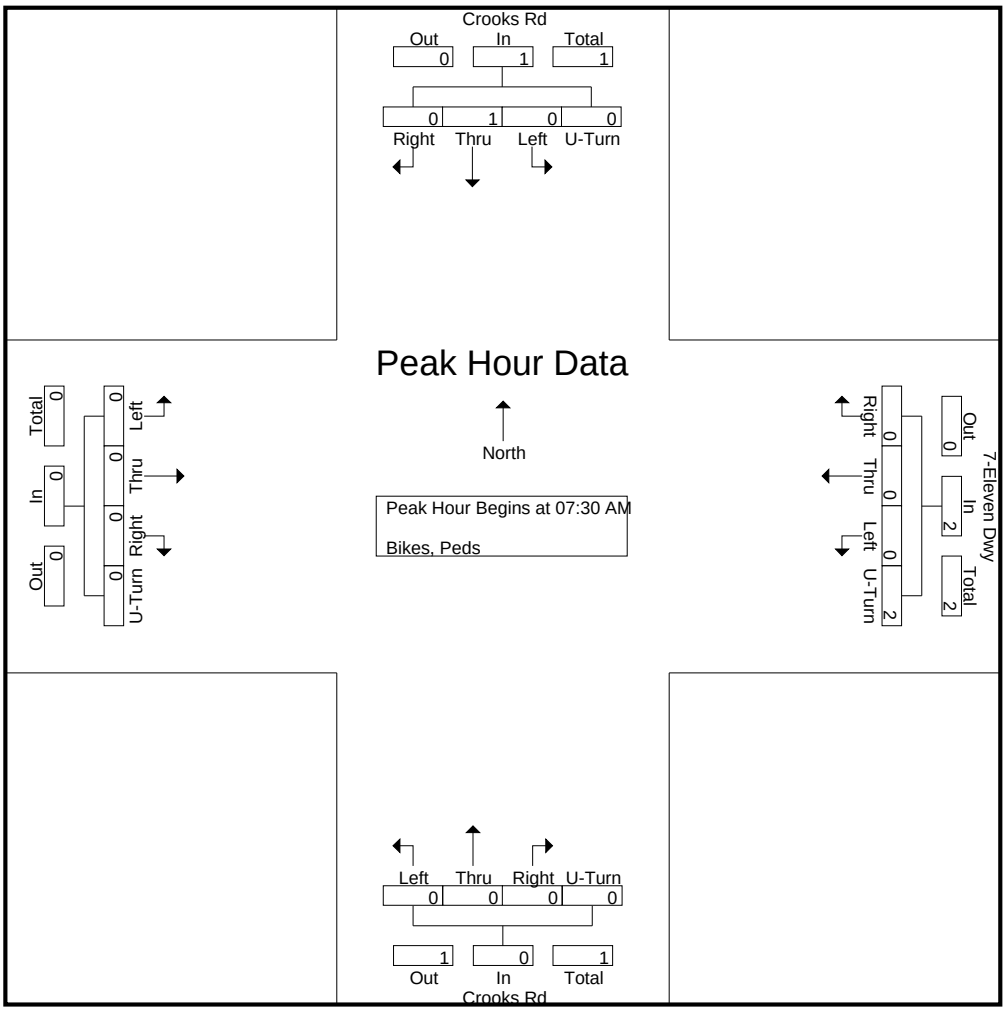
	Crooks Rd Southbound					7-Eleven Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	3
Grand Total	0	1	0	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	1	1	4
Apprch %	0	100	0	0		0	0	0	100		0	0	0	0		0	0	0	100		
Total %	0	25	0	0	25	0	0	0	50	50	0	0	0	0	0	0	0	0	25	25	



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568105 - Crooks Rd -- 7-Eleven Dwy
Site Code : 16568105
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					7-Eleven Dwy Westbound					Crooks Rd Northbound					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
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	**1**	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	**2**	**2**	0	0	0	0	0	0	0	0	0	0	**2**
Total Volume	0	1	0	0	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	3
% App. Total	0	100	0	0		0	0	0	100		0	0	0	0		0	0	0	0		
PHF	.000	.250	.000	.000	.250	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.375

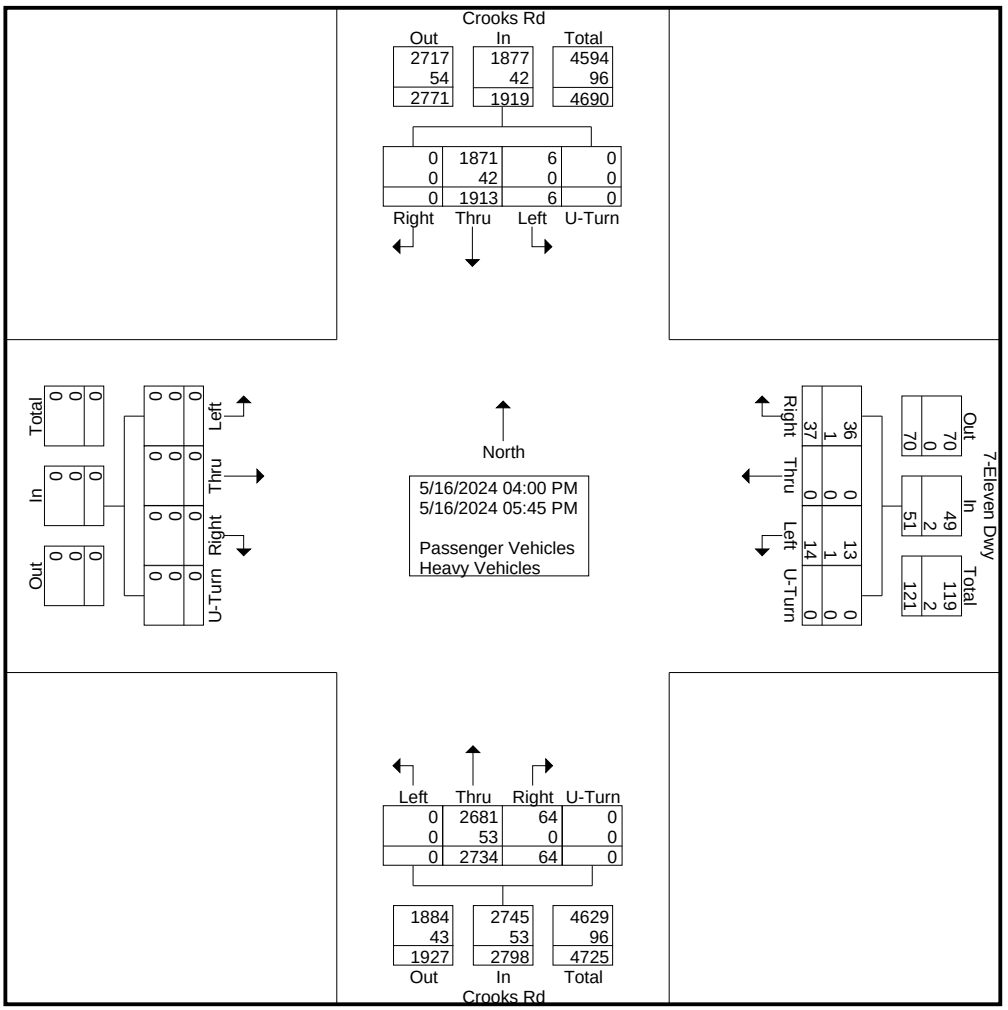


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568106 - Crooks Rd -- 7-Eleven Dwy
Site Code : 16568106
Start Date : 5/16/2024
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

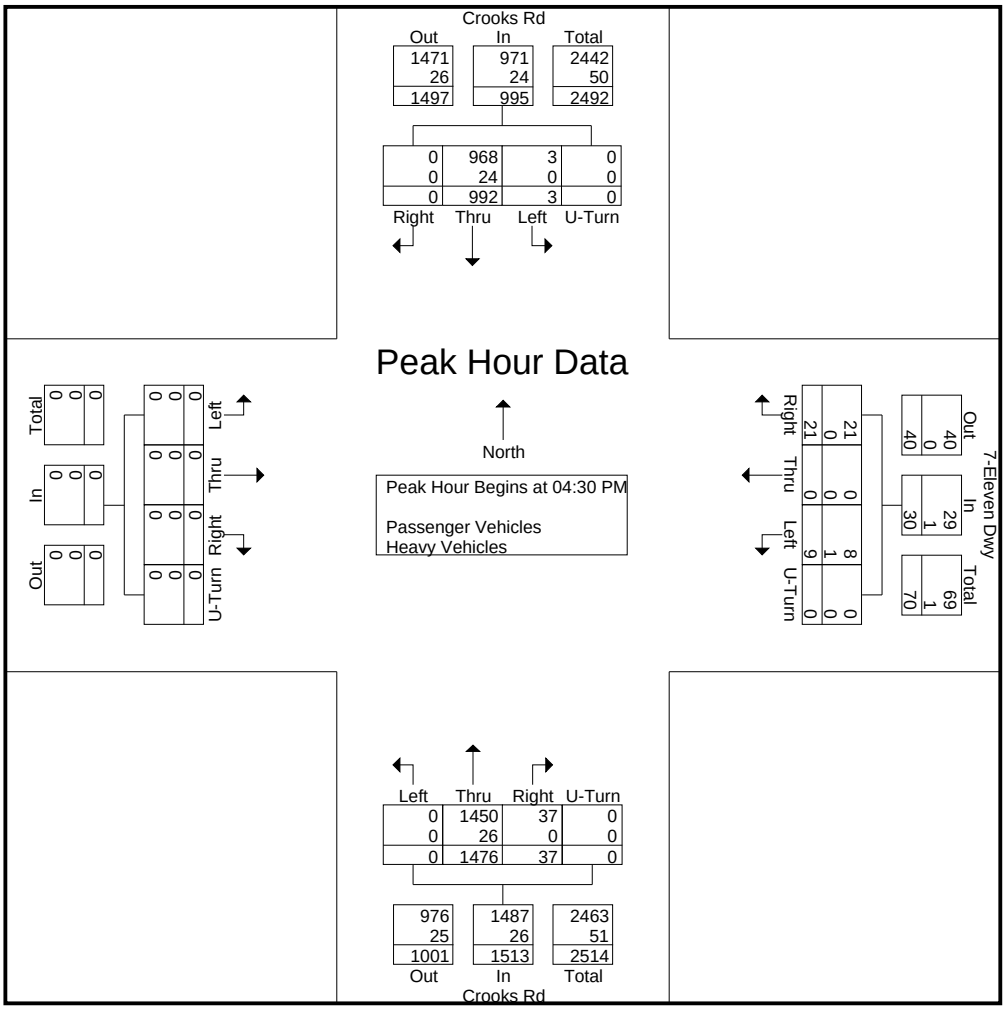
	Crooks Rd Southbound					7-Eleven Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
04:00 PM	0	243	0	0	243	5	0	1	0	6	6	338	0	0	344	0	0	0	0	0	593
04:15 PM	0	227	2	0	229	4	0	1	0	5	8	319	0	0	327	0	0	0	0	0	561
04:30 PM	0	249	1	0	250	7	0	2	0	9	12	337	0	0	349	0	0	0	0	0	608
04:45 PM	0	257	0	0	257	4	0	3	0	7	8	369	0	0	377	0	0	0	0	0	641
Total	0	976	3	0	979	20	0	7	0	27	34	1363	0	0	1397	0	0	0	0	0	2403
05:00 PM	0	243	1	0	244	4	0	3	0	7	9	394	0	0	403	0	0	0	0	0	654
05:15 PM	0	243	1	0	244	6	0	1	0	7	8	376	0	0	384	0	0	0	0	0	635
05:30 PM	0	217	0	0	217	6	0	2	0	8	8	307	0	0	315	0	0	0	0	0	540
05:45 PM	0	234	1	0	235	1	0	1	0	2	5	294	0	0	299	0	0	0	0	0	536
Total	0	937	3	0	940	17	0	7	0	24	30	1371	0	0	1401	0	0	0	0	0	2365
Grand Total	0	1913	6	0	1919	37	0	14	0	51	64	2734	0	0	2798	0	0	0	0	0	4768
Apprch %	0	99.7	0.3	0		72.5	0	27.5	0		2.3	97.7	0	0		0	0	0	0		
Total %	0	40.1	0.1	0	40.2	0.8	0	0.3	0	1.1	1.3	57.3	0	0	58.7	0	0	0	0	0	
Passenger Vehicles	0	1871	6	0	1877	36	0	13	0	49	64	2681	0	0	2745	0	0	0	0	0	4671
% Passenger Vehicles	0	97.8	100	0	97.8	97.3	0	92.9	0	96.1	100	98.1	0	0	98.1	0	0	0	0	0	98
Heavy Vehicles	0	42	0	0	42	1	0	1	0	2	0	53	0	0	53	0	0	0	0	0	97
% Heavy Vehicles	0	2.2	0	0	2.2	2.7	0	7.1	0	3.9	0	1.9	0	0	1.9	0	0	0	0	0	2



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568106 - Crooks Rd -- 7-Eleven Dwy
Site Code : 16568106
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					7-Eleven Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	249	**1**	0	250	**7**	0	2	0	**9**	**12**	337	0	0	349	0	0	0	0	0	608
04:45 PM	0	**257**	0	0	**257**	4	0	**3**	0	7	8	369	0	0	377	0	0	0	0	0	641
05:00 PM	0	243	1	0	244	4	0	3	0	7	9	**394**	0	0	**403**	0	0	0	0	0	**654**
05:15 PM	0	243	1	0	244	6	0	1	0	7	8	376	0	0	384	0	0	0	0	0	635
Total Volume	0	992	3	0	995	21	0	9	0	30	37	1476	0	0	1513	0	0	0	0	0	2538
% App. Total	0	99.7	0.3	0		70	0	30	0		2.4	97.6	0	0		0	0	0	0		
PHF	.000	.965	.750	.000	.968	.750	.000	.750	.000	.833	.771	.937	.000	.000	.939	.000	.000	.000	.000	.000	.970
Passenger Vehicles	0	968	3	0	971	21	0	8	0	29	37	1450	0	0	1487	0	0	0	0	0	2487
% Passenger Vehicles	0	97.6	100	0	97.6	100	0	88.9	0	96.7	100	98.2	0	0	98.3	0	0	0	0	0	98.0
Heavy Vehicles	0	24	0	0	24	0	0	1	0	1	0	26	0	0	26	0	0	0	0	0	51
% Heavy Vehicles	0	2.4	0	0	2.4	0	0	11.1	0	3.3	0	1.8	0	0	1.7	0	0	0	0	0	2.0

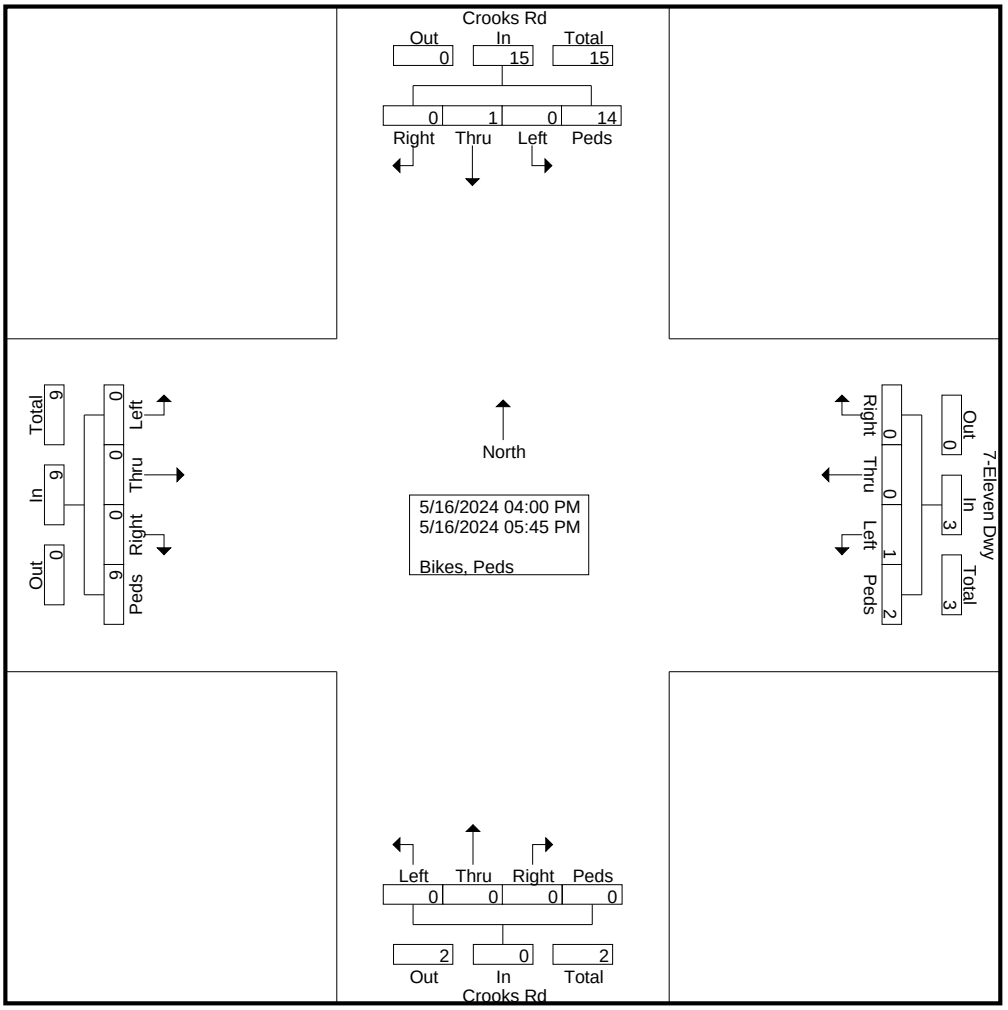


TRUE DATA TO IMPROVE MOBILITY

File Name : 16568106 - Crooks Rd -- 7-Eleven Dwy
Site Code : 16568106
Start Date : 5/16/2024
Page No : 1

Groups Printed- Bikes, Peds

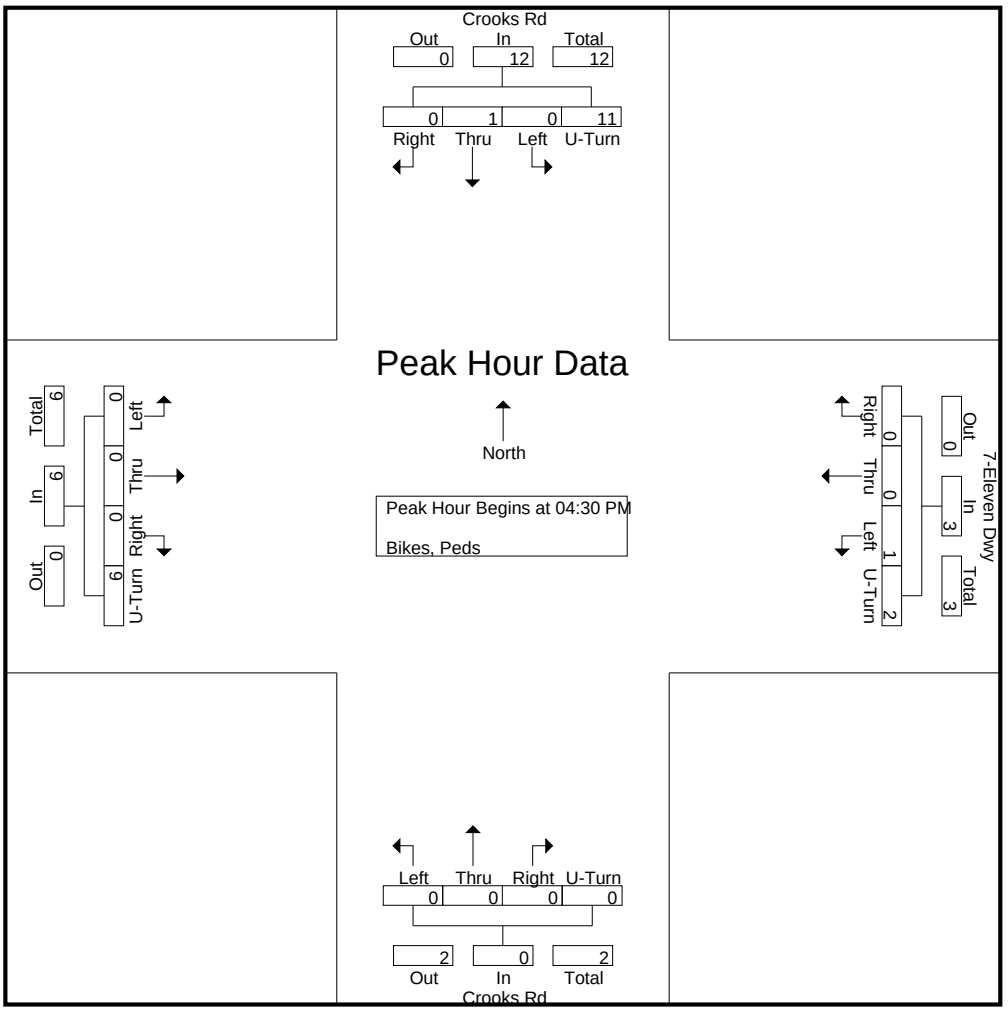
	Crooks Rd Southbound					7-Eleven Dwy Westbound					Crooks Rd Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	5
04:30 PM	0	1	0	2	3	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	1	0	5	6	0	0	1	0	1	0	0	0	0	0	0	0	0	3	3	10
05:00 PM	0	0	0	4	4	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	6
05:15 PM	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	10
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	9	9	0	0	0	2	2	0	0	0	0	0	0	0	0	6	6	17
Grand Total	0	1	0	14	15	0	0	1	2	3	0	0	0	0	0	0	0	0	9	9	27
Apprch %	0	6.7	0	93.3		0	0	33.3	66.7		0	0	0	0		0	0	0	100		
Total %	0	3.7	0	51.9	55.6	0	0	3.7	7.4	11.1	0	0	0	0	0	0	0	0	33.3	33.3	



TRUE DATA TO IMPROVE MOBILITY

File Name : 16568106 - Crooks Rd -- 7-Eleven Dwy
Site Code : 16568106
Start Date : 5/16/2024
Page No : 2

	Crooks Rd Southbound					7-Eleven Dwy Westbound					Crooks Rd Northbound					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
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	**1**	0	2	3	0	0	**1**	0	1	0	0	0	0	0	0	0	0	0	0	4
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
05:00 PM	0	0	0	4	4	0	0	0	**2**	**2**	0	0	0	0	0	0	0	0	0	0	6
05:15 PM	0	0	0	**5**	**5**	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**	**5**	**10**
Total Volume	0	1	0	11	12	0	0	1	2	3	0	0	0	0	0	0	0	0	6	6	21
% App. Total	0	8.3	0	91.7		0	0	33.3	66.7		0	0	0	0		0	0	0	100		
PHF	.000	.250	.000	.550	.600	.000	.000	.250	.250	.375	.000	.000	.000	.000	.000	.000	.000	.000	.300	.300	.525



Colliers Engineering & Design
20700 Civic Center Drive, Suite 170
Southfield, MI 48076

File Name : Crooksk Road & Salma Drive TMC
Site Code : 00000000
Start Date : 5/16/2024
Page No : 1

Groups Printed- All Vehicles

	Crooks Road Southbound					Westbound					Crooks Road Northbound					Salma Drive 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	1	212	0	0	213	0	0	0	0	0	0	114	1	0	115	2	0	1	0	3	331
07:15 AM	0	273	0	0	273	0	0	0	0	0	0	135	2	0	137	3	0	2	0	5	415
07:30 AM	2	321	0	0	323	0	0	0	0	0	0	179	1	0	180	3	0	0	0	3	506
07:45 AM	1	376	0	0	377	0	0	0	0	0	0	174	2	0	176	5	0	1	0	6	559
Total	4	1182	0	0	1186	0	0	0	0	0	0	602	6	0	608	13	0	4	0	17	1811
08:00 AM	2	295	0	0	297	0	0	0	0	0	0	182	2	0	184	5	0	2	0	7	488
08:15 AM	1	357	0	0	358	0	0	0	0	0	0	221	3	0	224	4	0	3	0	7	589
08:30 AM	1	345	0	0	346	0	0	0	0	0	0	200	2	0	202	4	0	2	0	6	554
08:45 AM	0	371	0	0	371	0	0	0	0	0	0	185	1	0	186	3	0	2	0	5	562
Total	4	1368	0	0	1372	0	0	0	0	0	0	788	8	0	796	16	0	9	0	25	2193
*** BREAK ***																					
04:00 PM	2	235	0	0	237	0	0	0	0	0	0	355	2	0	357	2	0	1	0	3	597
04:15 PM	1	228	0	0	229	0	0	0	0	0	0	321	3	0	324	2	0	2	0	4	557
04:30 PM	2	248	0	0	250	0	0	0	0	0	0	337	4	0	341	3	0	1	0	4	595
04:45 PM	2	259	0	0	261	0	0	0	0	0	0	372	3	0	375	3	0	2	0	5	641
Total	7	970	0	0	977	0	0	0	0	0	0	1385	12	0	1397	10	0	6	0	16	2390
05:00 PM	4	239	0	0	243	0	0	0	0	0	0	408	5	0	413	2	0	1	0	3	659
05:15 PM	3	240	0	0	243	0	0	0	0	0	0	394	3	0	397	3	0	2	0	5	645
05:30 PM	3	218	0	0	221	0	0	0	0	0	0	314	3	0	317	2	0	0	0	2	540
05:45 PM	1	232	0	0	233	0	0	0	0	0	0	301	1	0	302	1	0	1	0	2	537
Total	11	929	0	0	940	0	0	0	0	0	0	1417	12	0	1429	8	0	4	0	12	2381
Grand Total	26	4449	0	0	4475	0	0	0	0	0	0	4192	38	0	4230	47	0	23	0	70	8775
Apprch %	0.6	99.4	0	0		0	0	0	0		0	99.1	0.9	0		67.1	0	32.9	0		
Total %	0.3	50.7	0	0	51	0	0	0	0	0	0	47.8	0.4	0	48.2	0.5	0	0.3	0	0.8	

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File Name : Crooksk Road & Salma Drive TMC
Site Code : 00000000
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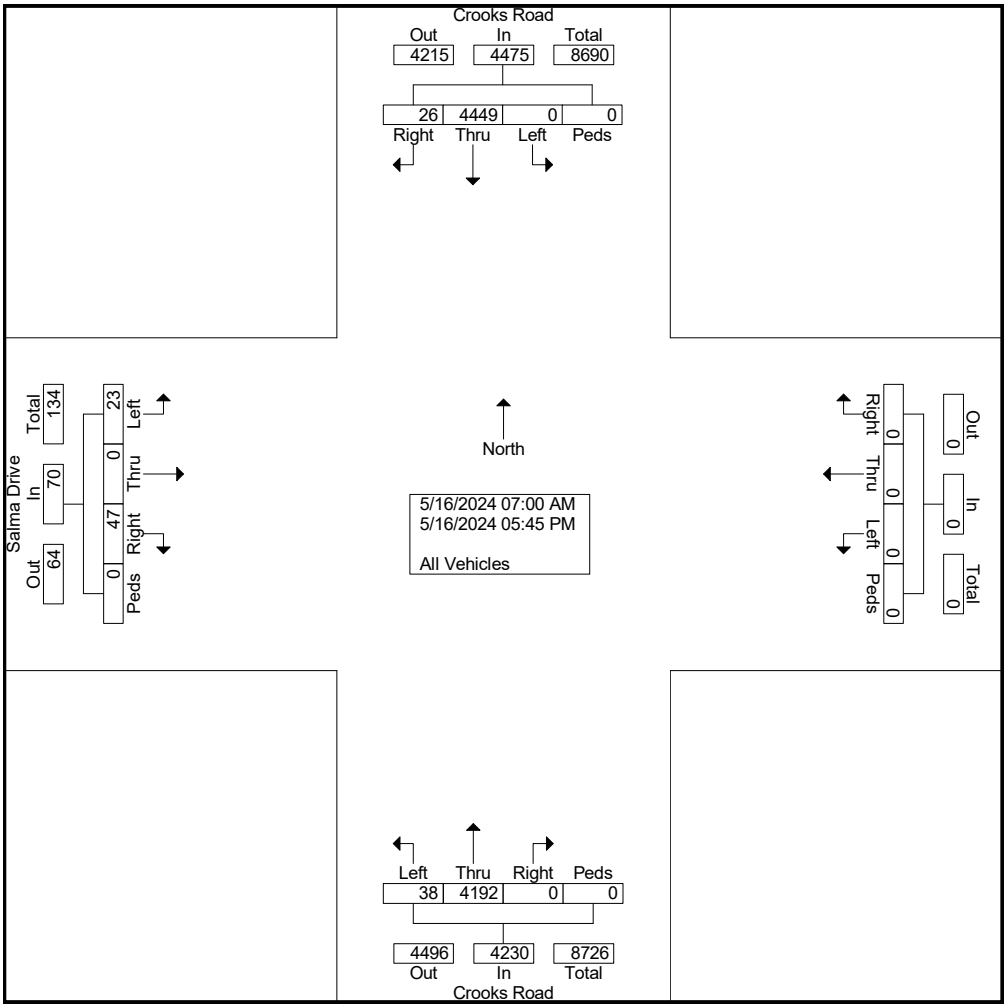
Page No : 2



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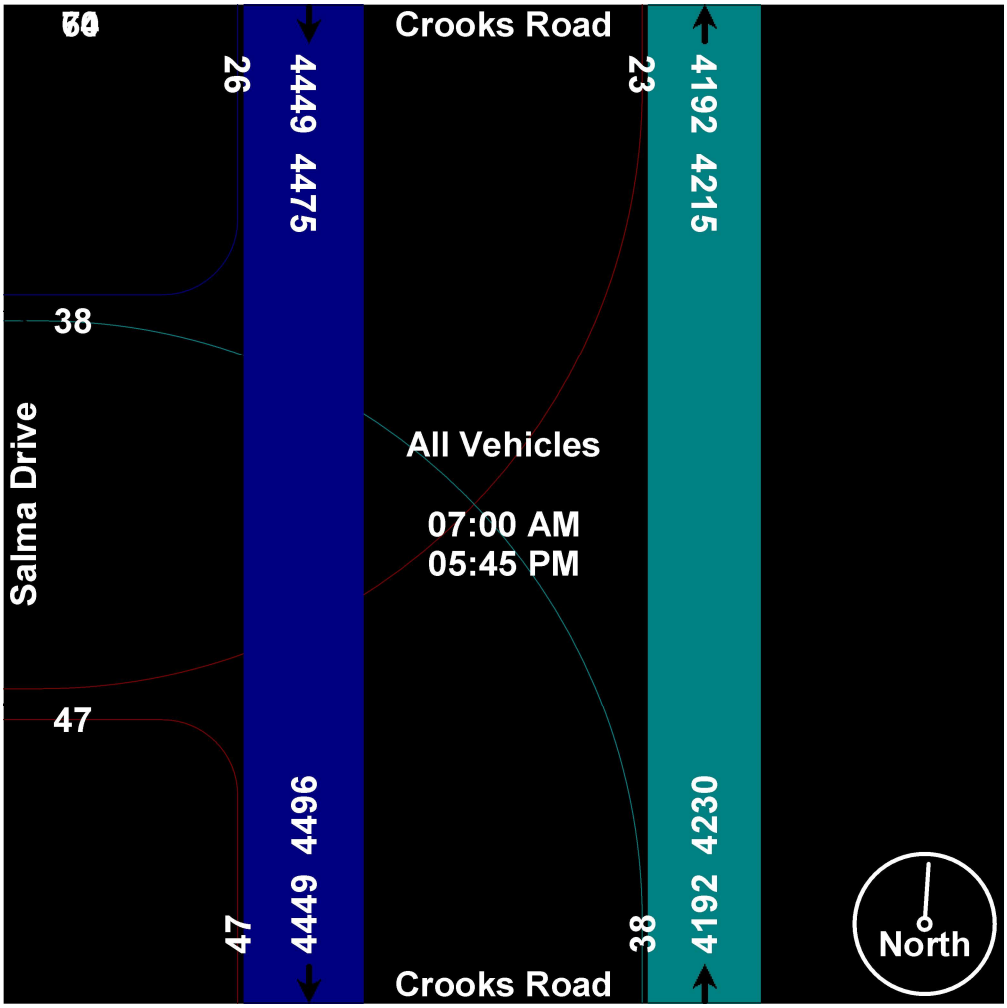
File Name : Crooksk Road & Salma Drive TMC
Site Code : 00000000
Start Date : 5/16/2024
Page No : 3



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20700 Civic Center Drive, Suite 170
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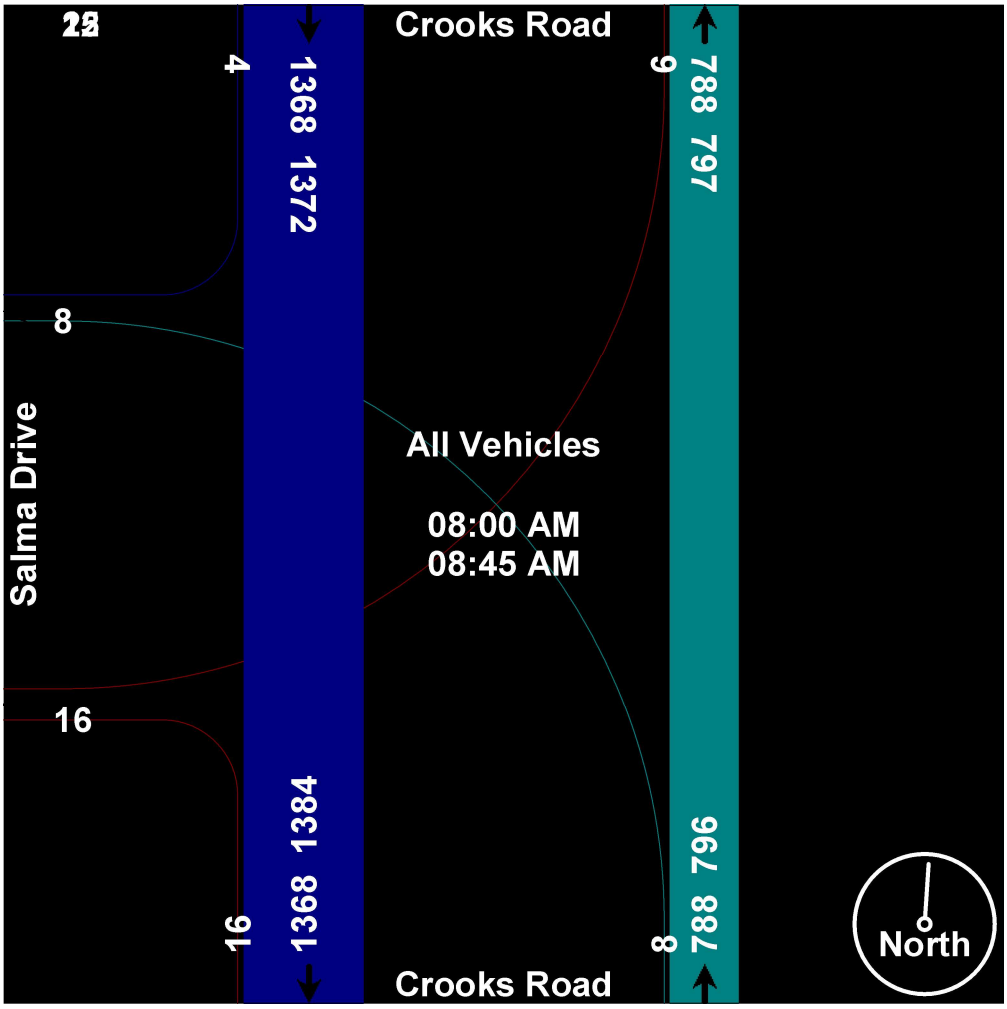
File Name : Crooksk Road & Salma Drive TMC
Site Code : 00000000
Start Date : 5/16/2024
Page No : 4

	Crooks Road Southbound					Westbound					Crooks Road Northbound					Salma Drive 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
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	**2**	295	0	0	297	0	0	0	0	0	0	182	2	0	184	**5**	0	2	0	**7**	488
08:15 AM	1	357	0	0	358	0	0	0	0	0	0	**221**	**3**	0	**224**	4	0	**3**	0	7	**589**
08:30 AM	1	345	0	0	346	0	0	0	0	0	0	200	2	0	202	4	0	2	0	6	554
08:45 AM	0	**371**	0	0	**371**	0	0	0	0	0	0	185	1	0	186	3	0	2	0	5	562
Total Volume	4	1368	0	0	1372	0	0	0	0	0	0	788	8	0	796	16	0	9	0	25	2193
% App. Total	0.3	99.7	0	0		0	0	0	0		0	99	1	0		64	0	36	0		
PHF	.500	.922	.000	.000	.925	.000	.000	.000	.000	.000	.000	.891	.667	.000	.888	.800	.000	.750	.000	.893	.931



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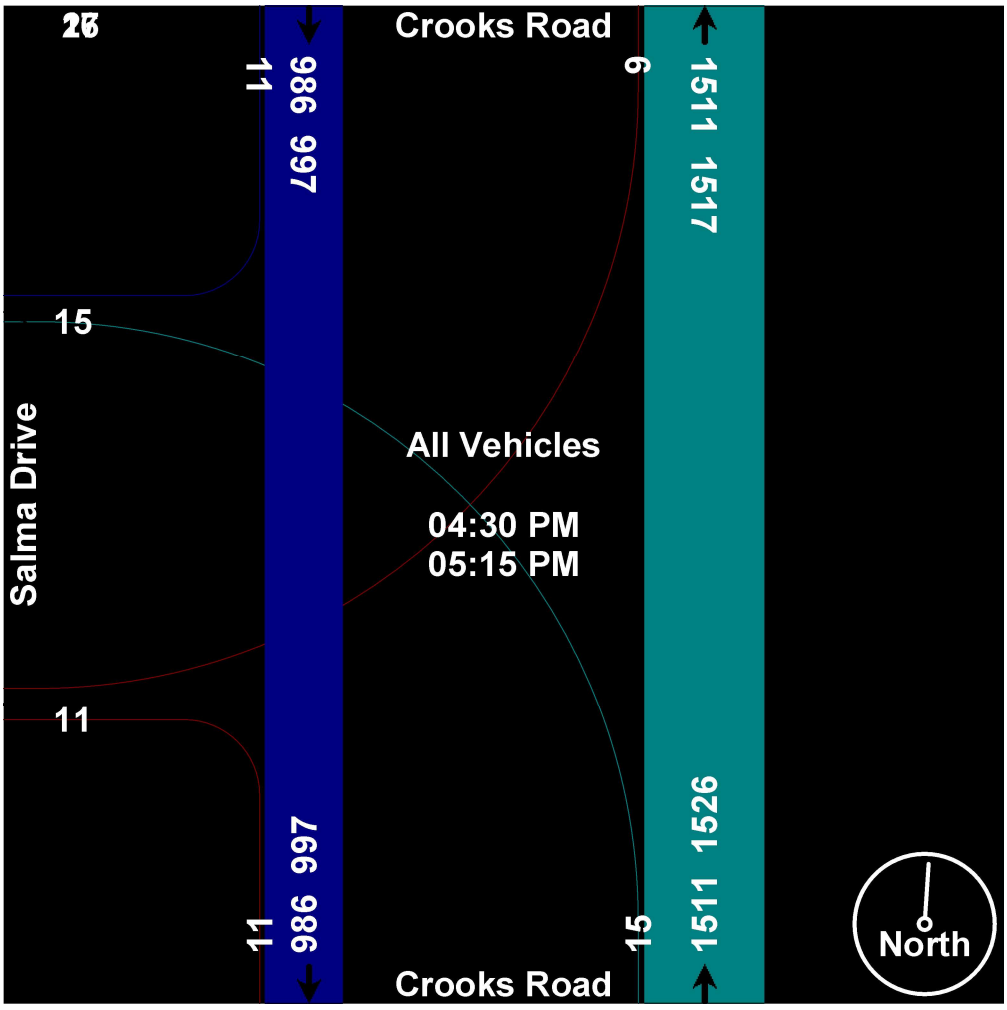
Southfield, MI 48076

File Name : Crooksk Road & Salma Drive TMC
Site Code : 00000000
Start Date : 5/16/2024
Page No : 5

	Crooks Road Southbound					Westbound					Crooks Road Northbound					Salma Drive 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
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	2	248	0	0	250	0	0	0	0	0	0	337	4	0	341	**3**	0	1	0	4	595
04:45 PM	2	**259**	0	0	**261**	0	0	0	0	0	0	372	3	0	375	3	0	**2**	0	**5**	641
05:00 PM	**4**	239	0	0	243	0	0	0	0	0	0	**408**	**5**	0	**413**	2	0	1	0	3	**659**
05:15 PM	3	240	0	0	243	0	0	0	0	0	0	394	3	0	397	3	0	2	0	5	645
Total Volume	11	986	0	0	997	0	0	0	0	0	0	1511	15	0	1526	11	0	6	0	17	2540
% App. Total	1.1	98.9	0	0		0	0	0	0		0	99	1	0		64.7	0	35.3	0		
PHF	.688	.952	.000	.000	.955	.000	.000	.000	.000	.000	.000	.926	.750	.000	.924	.917	.000	.750	.000	.850	.964



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Appendix B | Existing Conditions Data

Level of Service Criteria for Signalized Intersections

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio	
	≤ 1.0	> 1.0
≤10	A	F
>10-20	B	F
>20-35	C	F
>35-55	D	F
>55-80	E	F
>80	F	F

LOS A describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If LOS A is the result of favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

A lane group can incur a delay less than 80 s/veh when the volume-to-capacity ratio exceeds 1.0. This condition typically occurs when the cycle length is short, the signal progression is favorable, or both. As a result, both the delay and volume-to-capacity ratio are considered when lane group LOS is established. A ratio of 1.0 or more indicates cycle capacity is fully utilized and represents failure from a capacity perspective (just as delay in excess of 80 s/veh represents failure from a delay perspective).

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council.

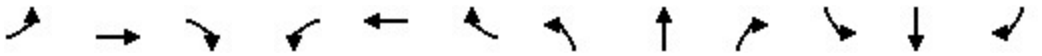
Level of Service Criteria for Two-Way-Stop-Controlled Intersections

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio	
	≤ 1.0	> 1.0
≤10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

LOS for TWSC intersection is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement), as well as the major-street left turns. LOS is not defined for the intersection as a whole or for major-street approaches for three primary reasons: (a) major street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at a typical TWSC intersection skews the weighted average of all movements, resulting in very low overall average delay for all vehicles; and (c) the resulting low delay can mask LOS deficiencies of minor movements. LOS F is assigned to a movement if its volume-to-capacity ratio exceeds 1.0, regardless of the control delay.

The LOS criteria for TWSC intersections differ somewhat from the criteria used for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than they are at signals.

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	208	141	164	282	154	97	622	83	155	1059	92
Future Volume (veh/h)	69	208	141	164	282	154	97	622	83	155	1059	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1922	1922	1922	1891	1891	1891	1953	1953	1953
Adj Flow Rate, veh/h	74	224	152	180	310	169	111	715	95	167	1139	99
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.87	0.87	0.87	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	5	5	5	7	7	7	3	3	3
Cap, veh/h	102	270	229	197	355	301	503	875	390	756	1324	591
Arrive On Green	0.03	0.14	0.14	0.07	0.18	0.18	0.25	0.24	0.24	0.36	0.36	0.36
Sat Flow, veh/h	1860	1953	1655	1830	1922	1629	1801	3593	1602	1860	3711	1655
Grp Volume(v), veh/h	74	224	152	180	310	169	111	715	95	167	1139	99
Grp Sat Flow(s),veh/h/ln	1860	1953	1655	1830	1922	1629	1801	1796	1602	1860	1856	1655
Q Serve(g_s), s	1.2	14.5	11.3	7.9	20.4	12.3	2.2	24.4	6.2	1.9	37.0	5.3
Cycle Q Clear(g_c), s	1.2	14.5	11.3	7.9	20.4	12.3	2.2	24.4	6.2	1.9	37.0	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	102	270	229	197	355	301	503	875	390	756	1324	591
V/C Ratio(X)	0.72	0.83	0.66	0.91	0.87	0.56	0.22	0.82	0.24	0.22	0.86	0.17
Avail Cap(c_a), veh/h	186	482	409	197	475	402	503	1545	689	756	1596	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.9	54.5	53.1	58.2	51.5	48.2	36.9	46.4	39.5	26.2	38.8	28.6
Incr Delay (d2), s/veh	9.3	6.5	3.3	40.3	13.0	1.6	0.2	8.4	1.5	0.1	7.5	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	7.5	4.9	8.0	10.9	5.1	2.7	11.6	2.6	3.3	17.5	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	71.2	61.0	56.4	98.5	64.6	49.9	37.2	54.8	41.0	26.3	46.3	29.2
LnGrp LOS	E	E	E	F	E	D	D	D	D	C	D	C
Approach Vol, veh/h		450			659			921			1405	
Approach Delay, s/veh		61.1			70.1			51.3			42.7	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	53.2	37.7	15.2	23.9	38.4	52.5	9.2	29.9
Change Period (Y+Rc), s	* 6.1	* 6.1	5.9	5.9	* 6.1	* 6.1	5.9	5.9
Max Green Setting (Gmax), s	* 8.9	* 56	9.1	32.1	* 8.9	* 56	9.1	32.1
Max Q Clear Time (g_c+I1), s	3.9	26.4	9.9	16.5	4.2	39.0	3.2	22.4
Green Ext Time (p_c), s	0.2	5.2	0.0	1.5	0.1	7.3	0.1	1.6

Intersection Summary	
HCM 7th Control Delay, s/veh	52.7
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	25	777	21	2	1362
Future Vol, veh/h	10	25	777	21	2	1362
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	88	88	93	93
Heavy Vehicles, %	9	9	7	7	2	2
Mvmt Flow	15	37	883	24	2	1465

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1631	453	0	0	907	0
Stage 1	895	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Critical Hdwy	6.43	7.28	-	-	5.34	-
Critical Hdwy Stg 1	6.78	-	-	-	-	-
Critical Hdwy Stg 2	5.98	-	-	-	-	-
Follow-up Hdwy	3.74	3.99	-	-	3.12	-
Pot Cap-1 Maneuver	108	459	-	-	434	-
Stage 1	274	-	-	-	-	-
Stage 2	405	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	108	459	-	-	434	-
Mov Cap-2 Maneuver	195	-	-	-	-	-
Stage 1	274	-	-	-	-	-
Stage 2	402	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	17.9	0	0.13
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	331	5	-
HCM Lane V/C Ratio	-	-	0.158	0.005	-
HCM Control Delay (s/veh)	-	-	17.9	13.3	0.1
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	0.6	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	797	0	1	1371
Future Vol, veh/h	1	1	797	0	1	1371
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	50	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	60	60	89	89	92	92
Heavy Vehicles, %	0	0	7	0	0	2
Mvmt Flow	2	2	896	0	1	1490

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1643	448	0	0	896	0
Stage 1	896	-	-	-	-	-
Stage 2	747	-	-	-	-	-
Critical Hdwy	6.25	7.1	-	-	5.3	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.9	-	-	3.1	-
Pot Cap-1 Maneuver	117	482	-	-	446	-
Stage 1	291	-	-	-	-	-
Stage 2	422	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	117	482	-	-	446	-
Mov Cap-2 Maneuver	208	-	-	-	-	-
Stage 1	291	-	-	-	-	-
Stage 2	421	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	17.55	0	0.01
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	290	446	-
HCM Lane V/C Ratio	-	-	0.011	0.002	-
HCM Control Delay (s/veh)	-	-	17.6	13.1	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0	0	-

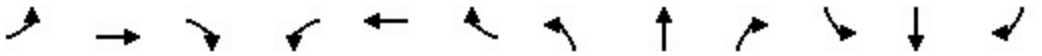
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	16	8	788	1368	4
Future Vol, veh/h	9	16	8	788	1368	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	-	75
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	93	93
Heavy Vehicles, %	0	0	0	7	2	0
Mvmt Flow	10	18	9	885	1471	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1932	735	1475	0	-	0
Stage 1	1471	-	-	-	-	-
Stage 2	461	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	59	366	463	-	-	-
Stage 1	181	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	58	366	463	-	-	-
Mov Cap-2 Maneuver	142	-	-	-	-	-
Stage 1	177	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	21.4	1	0.13	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	463	-	142	366	-	-
HCM Lane V/C Ratio	0.019	-	0.071	0.049	-	-
HCM Control Delay (s/veh)	12.9	-	32.2	15.3	-	-
HCM Lane LOS	B	-	D	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	0.2	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	331	119	137	306	123	159	1142	201	172	742	84
Future Volume (veh/h)	154	331	119	137	306	123	159	1142	201	172	742	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1969	1969	1969	1969	1969	1969	1984	1984	1984
Adj Flow Rate, veh/h	175	376	135	146	326	131	167	1202	212	181	781	88
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	1	1	1
Cap, veh/h	242	414	351	173	369	313	622	1369	611	386	954	426
Arrive On Green	0.09	0.21	0.21	0.06	0.19	0.19	0.29	0.37	0.37	0.17	0.25	0.25
Sat Flow, veh/h	1860	1953	1655	1875	1969	1668	1875	3741	1668	1890	3770	1682
Grp Volume(v), veh/h	175	376	135	146	326	131	167	1202	212	181	781	88
Grp Sat Flow(s),veh/h/ln	1860	1953	1655	1875	1969	1668	1875	1870	1668	1890	1885	1682
Q Serve(g_s), s	6.2	24.4	9.1	6.1	21.0	9.0	2.8	39.0	12.0	7.1	25.4	5.4
Cycle Q Clear(g_c), s	6.2	24.4	9.1	6.1	21.0	9.0	2.8	39.0	12.0	7.1	25.4	5.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	242	414	351	173	369	313	622	1369	611	386	954	426
V/C Ratio(X)	0.72	0.91	0.38	0.84	0.88	0.42	0.27	0.88	0.35	0.47	0.82	0.21
Avail Cap(c_a), veh/h	242	467	396	187	471	399	622	1522	679	386	1534	684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	50.0	44.0	58.8	51.4	46.6	32.8	38.5	29.9	46.1	45.7	38.3
Incr Delay (d2), s/veh	10.2	20.1	0.7	26.8	14.9	0.9	0.2	8.2	1.6	0.9	7.8	1.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	14.0	3.8	5.9	11.7	3.8	3.8	18.7	5.0	5.1	12.6	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	65.6	70.1	44.7	85.6	66.3	47.5	33.1	46.7	31.5	47.0	53.5	39.4
LnGrp LOS	E	E	D	F	E	D	C	D	C	D	D	D
Approach Vol, veh/h		686			603			1581			1050	
Approach Delay, s/veh		64.0			66.9			43.2			51.2	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.8	53.7	14.1	33.4	43.5	39.0	17.2	30.3
Change Period (Y+Rc), s	* 6.1	* 6.1	5.9	5.9	* 6.1	* 6.1	5.9	5.9
Max Green Setting (Gmax), s	* 13	* 53	9.1	31.1	* 13	* 53	9.1	31.1
Max Q Clear Time (g_c+I1), s	9.1	41.0	8.1	26.4	4.8	27.4	8.2	23.0
Green Ext Time (p_c), s	0.2	6.6	0.0	1.1	0.2	5.5	0.0	1.4

Intersection Summary	
HCM 7th Control Delay, s/veh	52.6
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	21	1481	37	3	995
Future Vol, veh/h	9	21	1481	37	3	995
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	94	94	95	95
Heavy Vehicles, %	3	3	2	0	0	3
Mvmt Flow	11	25	1576	39	3	1047

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2125	807	0	0	1615	0
Stage 1	1595	-	-	-	-	-
Stage 2	530	-	-	-	-	-
Critical Hdwy	6.31	7.16	-	-	5.3	-
Critical Hdwy Stg 1	6.66	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.68	3.93	-	-	3.1	-
Pot Cap-1 Maneuver	58	277	-	-	199	-
Stage 1	104	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	57	277	-	-	199	-
Mov Cap-2 Maneuver	91	-	-	-	-	-
Stage 1	104	-	-	-	-	-
Stage 2	523	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	31.55	0	0.59
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	171	11	-
HCM Lane V/C Ratio	-	-	0.211	0.016	-
HCM Control Delay (s/veh)	-	-	31.6	23.3	0.5
HCM Lane LOS	-	-	D	C	A
HCM 95th %tile Q(veh)	-	-	0.8	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	1517	5	0	1004
Future Vol, veh/h	3	1	1517	5	0	1004
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	50	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	60	60	93	93	95	95
Heavy Vehicles, %	0	0	2	0	0	3
Mvmt Flow	5	2	1631	5	0	1057

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2162	818	0	0	1637	0
Stage 1	1634	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Critical Hdwy	6.25	7.1	-	-	5.3	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.9	-	-	3.1	-
Pot Cap-1 Maneuver	57	277	-	-	195	-
Stage 1	101	-	-	-	-	-
Stage 2	544	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	57	277	-	-	195	-
Mov Cap-2 Maneuver	89	-	-	-	-	-
Stage 1	101	-	-	-	-	-
Stage 2	544	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	40.86	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	107	195	-
HCM Lane V/C Ratio	-	-	0.062	-	-
HCM Control Delay (s/veh)	-	-	40.9	0	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	11	15	1516	996	11
Future Vol, veh/h	6	11	15	1516	996	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	-	75
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	93	93	95	95
Heavy Vehicles, %	0	0	0	2	3	0
Mvmt Flow	7	13	16	1630	1048	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1896	524	1060	0	-	0
Stage 1	1048	-	-	-	-	-
Stage 2	847	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	63	503	665	-	-	-
Stage 1	303	-	-	-	-	-
Stage 2	386	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	61	503	665	-	-	-
Mov Cap-2 Maneuver	180	-	-	-	-	-
Stage 1	296	-	-	-	-	-
Stage 2	386	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	17.1	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	665	-	180	503	-	-
HCM Lane V/C Ratio	0.024	-	0.039	0.026	-	-
HCM Control Delay (s/veh)	10.5	-	25.8	12.3	-	-
HCM Lane LOS	B	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

Intersection: 1: Crooks Road & Wattles Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	126	288	111	248	350	95	153	194	178	69	218	436
Average Queue (ft)	53	147	43	121	203	38	71	143	124	25	94	259
95th Queue (ft)	100	245	89	213	322	77	137	187	176	55	175	390
Link Distance (ft)		1062			1853		98	98	98	98		1098
Upstream Blk Time (%)							7	34	21	0		
Queuing Penalty (veh)							15	68	42	0		
Storage Bay Dist (ft)	350		625	500		1000					500	
Storage Blk Time (%)												0
Queuing Penalty (veh)												0

Intersection: 1: Crooks Road & Wattles Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	428	175
Average Queue (ft)	236	58
95th Queue (ft)	379	168
Link Distance (ft)	1098	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)	26	0
Queuing Penalty (veh)	24	1

Intersection: 2: Crooks Road & 7/11 Drive

Movement	WB	NB	NB	NB	SB	SB
Directions Served	LR	T	T	T	LT	T
Maximum Queue (ft)	190	100	199	146	67	67
Average Queue (ft)	53	9	71	34	3	3
95th Queue (ft)	165	52	167	112	30	28
Link Distance (ft)	356		136	136	98	98
Upstream Blk Time (%)	0		2	1	0	0
Queuing Penalty (veh)	0		6	2	1	0
Storage Bay Dist (ft)		75				
Storage Blk Time (%)			9			
Queuing Penalty (veh)			18			

Intersection: 3: Crooks Road & Troy Dental Studio Drive

Movement	WB	NB	NB	SB
Directions Served	LR	T	T	L
Maximum Queue (ft)	25	75	24	6
Average Queue (ft)	3	5	1	0
95th Queue (ft)	17	39	13	4
Link Distance (ft)	352	529	529	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				50
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 4: Crooks Road & Salma Drive

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	31	26	32
Average Queue (ft)	7	7	5
95th Queue (ft)	25	22	23
Link Distance (ft)	383		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		200	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 177

Intersection: 1: Crooks Road & Wattles Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	322	447	136	200	402	104	158	175	175	134	297	416
Average Queue (ft)	138	238	33	104	226	39	87	150	149	57	164	243
95th Queue (ft)	273	382	81	180	350	82	147	169	168	107	275	349
Link Distance (ft)		1062			1853		98	98	98	98		1098
Upstream Blk Time (%)							9	42	36	2		
Queuing Penalty (veh)							32	159	137	7		
Storage Bay Dist (ft)	350		625	500		1000					500	
Storage Blk Time (%)	0	3										0
Queuing Penalty (veh)	0	8										0

Intersection: 1: Crooks Road & Wattles Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	406	175
Average Queue (ft)	225	66
95th Queue (ft)	343	185
Link Distance (ft)	1098	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)	33	0
Queuing Penalty (veh)	28	0

Intersection: 2: Crooks Road & 7/11 Drive

Movement	WB	NB	NB	NB	NB	SB	SB
Directions Served	LR	T	T	T	TR	LT	T
Maximum Queue (ft)	248	100	211	200	33	102	119
Average Queue (ft)	138	38	161	136	2	10	8
95th Queue (ft)	321	116	219	213	29	57	55
Link Distance (ft)	356		136	136	136	98	98
Upstream Blk Time (%)	9		14	8	0	2	0
Queuing Penalty (veh)	0		72	38	0	12	1
Storage Bay Dist (ft)		75					
Storage Blk Time (%)		0	24				
Queuing Penalty (veh)		2	90				

Intersection: 3: Crooks Road & Troy Dental Studio Drive

Movement	WB	NB	NB	NB
Directions Served	LR	T	T	TR
Maximum Queue (ft)	44	240	207	50
Average Queue (ft)	6	59	27	3
95th Queue (ft)	30	174	122	31
Link Distance (ft)	352	529	529	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				50
Storage Blk Time (%)			2	
Queuing Penalty (veh)			9	

Intersection: 4: Crooks Road & Salma Drive

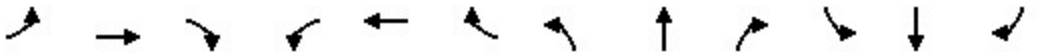
Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	34	25	37
Average Queue (ft)	4	6	6
95th Queue (ft)	19	21	26
Link Distance (ft)	383		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		200	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 594

Colliers Engineering & Design

Appendix C | No-Build Conditions Data



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	222	172	166	302	170	122	641	85	168	1095	132
Future Volume (veh/h)	91	222	172	166	302	170	122	641	85	168	1095	132
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1922	1922	1922	1891	1891	1891	1953	1953	1953
Adj Flow Rate, veh/h	98	239	185	182	332	187	140	737	98	181	1177	142
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.87	0.87	0.87	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	5	5	5	7	7	7	3	3	3
Cap, veh/h	126	285	241	222	371	314	447	899	401	704	1361	607
Arrive On Green	0.04	0.15	0.15	0.09	0.19	0.19	0.22	0.25	0.25	0.33	0.37	0.37
Sat Flow, veh/h	1860	1953	1655	1830	1922	1629	1801	3593	1602	1860	3711	1655
Grp Volume(v), veh/h	98	239	185	182	332	187	140	737	98	181	1177	142
Grp Sat Flow(s),veh/h/ln	1860	1953	1655	1830	1922	1629	1801	1796	1602	1860	1856	1655
Q Serve(g_s), s	2.9	15.5	14.0	7.9	21.9	13.6	4.2	25.2	6.3	2.9	38.2	7.7
Cycle Q Clear(g_c), s	2.9	15.5	14.0	7.9	21.9	13.6	4.2	25.2	6.3	2.9	38.2	7.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	126	285	241	222	371	314	447	899	401	704	1361	607
V/C Ratio(X)	0.78	0.84	0.77	0.82	0.90	0.59	0.31	0.82	0.24	0.26	0.86	0.23
Avail Cap(c_a), veh/h	186	437	371	222	430	365	447	1545	689	704	1596	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.7	54.0	53.4	56.5	51.2	47.8	40.6	46.0	38.9	28.7	38.2	28.5
Incr Delay (d2), s/veh	11.6	8.6	5.1	21.1	19.0	2.0	0.4	8.3	1.4	0.2	7.5	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	8.2	6.1	7.0	12.3	5.6	3.6	11.9	2.6	3.8	18.1	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	72.4	62.6	58.5	77.6	70.2	49.8	41.0	54.2	40.4	28.9	45.7	29.4
LnGrp LOS	E	E	E	E	E	D	D	D	D	C	D	C
Approach Vol, veh/h		522			701			975			1500	
Approach Delay, s/veh		63.0			66.7			50.9			42.1	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	49.5	38.6	17.0	24.8	34.4	53.8	10.8	31.0
Change Period (Y+Rc), s	* 6.1	* 6.1	5.9	5.9	* 6.1	* 6.1	5.9	5.9
Max Green Setting (Gmax), s	* 12	* 56	9.1	29.1	* 12	* 56	9.1	29.1
Max Q Clear Time (g_c+I1), s	4.9	27.2	9.9	17.5	6.2	40.2	4.9	23.9
Green Ext Time (p_c), s	0.2	5.4	0.0	1.5	0.1	7.4	0.1	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	52.0
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	30	818	23	4	1429
Future Vol, veh/h	14	30	818	23	4	1429
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	88	88	93	93
Heavy Vehicles, %	9	9	7	7	2	2
Mvmt Flow	21	45	930	26	4	1537

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1719	478	0	0	956	0
Stage 1	943	-	-	-	-	-
Stage 2	777	-	-	-	-	-
Critical Hdwy	6.43	7.28	-	-	5.34	-
Critical Hdwy Stg 1	6.78	-	-	-	-	-
Critical Hdwy Stg 2	5.98	-	-	-	-	-
Follow-up Hdwy	3.74	3.99	-	-	3.12	-
Pot Cap-1 Maneuver	96	442	-	-	411	-
Stage 1	256	-	-	-	-	-
Stage 2	386	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	94	442	-	-	411	-
Mov Cap-2 Maneuver	180	-	-	-	-	-
Stage 1	256	-	-	-	-	-
Stage 2	379	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	20.19	0	0.29
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	302	10	-
HCM Lane V/C Ratio	-	-	0.217	0.01	-
HCM Control Delay (s/veh)	-	-	20.2	13.8	0.3
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	0.8	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	840	0	1	1442
Future Vol, veh/h	1	1	840	0	1	1442
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	50	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	60	60	89	89	92	92
Heavy Vehicles, %	0	0	7	0	0	2
Mvmt Flow	2	2	944	0	1	1567

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1730	472	0	0	944	0
Stage 1	944	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Critical Hdwy	6.25	7.1	-	-	5.3	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.9	-	-	3.1	-
Pot Cap-1 Maneuver	104	465	-	-	423	-
Stage 1	272	-	-	-	-	-
Stage 2	403	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	104	465	-	-	423	-
Mov Cap-2 Maneuver	193	-	-	-	-	-
Stage 1	272	-	-	-	-	-
Stage 2	402	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	18.38	0	0.01
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	272	423	-
HCM Lane V/C Ratio	-	-	0.012	0.003	-
HCM Control Delay (s/veh)	-	-	18.4	13.5	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	16	8	830	1454	4
Future Vol, veh/h	9	16	8	830	1454	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	-	75
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	93	93
Heavy Vehicles, %	0	0	0	7	2	0
Mvmt Flow	10	18	9	933	1563	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2048	782	1568	0	-	0
Stage 1	1563	-	-	-	-	-
Stage 2	484	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	50	342	427	-	-	-
Stage 1	161	-	-	-	-	-
Stage 2	591	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	49	342	427	-	-	-
Mov Cap-2 Maneuver	127	-	-	-	-	-
Stage 1	158	-	-	-	-	-
Stage 2	591	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	23.17	0.13	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	427	-	127	342	-	-
HCM Lane V/C Ratio	0.021	-	0.079	0.053	-	-
HCM Control Delay (s/veh)	13.6	-	35.7	16.1	-	-
HCM Lane LOS	B	-	E	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	0.2	-	-

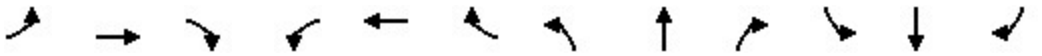
Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	6	834	5	2	1441
Future Vol, veh/h	17	6	834	5	2	1441
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	89	89	92	92
Heavy Vehicles, %	0	0	7	0	0	2
Mvmt Flow	18	7	937	6	2	1566

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1727	471	0	0	943	0
Stage 1	940	-	-	-	-	-
Stage 2	788	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	81	544	-	-	736	-
Stage 1	345	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	81	544	-	-	736	-
Mov Cap-2 Maneuver	208	-	-	-	-	-
Stage 1	345	-	-	-	-	-
Stage 2	413	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	21.13	0	0.01
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	248	736	-
HCM Lane V/C Ratio	-	-	0.101	0.003	-
HCM Control Delay (s/veh)	-	-	21.1	9.9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	194	350	141	138	321	138	190	1180	204	189	770	107
Future Volume (veh/h)	194	350	141	138	321	138	190	1180	204	189	770	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1969	1969	1969	1969	1969	1969	1984	1984	1984
Adj Flow Rate, veh/h	220	398	160	147	341	147	200	1242	215	199	811	113
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	1	1	1
Cap, veh/h	244	430	364	174	382	324	588	1399	624	354	989	441
Arrive On Green	0.09	0.22	0.22	0.06	0.19	0.19	0.27	0.37	0.37	0.16	0.26	0.26
Sat Flow, veh/h	1860	1953	1655	1875	1969	1668	1875	3741	1668	1890	3770	1682
Grp Volume(v), veh/h	220	398	160	147	341	147	200	1242	215	199	811	113
Grp Sat Flow(s),veh/h/ln	1860	1953	1655	1875	1969	1668	1875	1870	1668	1890	1885	1682
Q Serve(g_s), s	9.7	26.0	10.9	6.2	22.0	10.1	4.9	40.4	12.0	8.6	26.3	6.9
Cycle Q Clear(g_c), s	9.7	26.0	10.9	6.2	22.0	10.1	4.9	40.4	12.0	8.6	26.3	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	430	364	174	382	324	588	1399	624	354	989	441
V/C Ratio(X)	0.90	0.93	0.44	0.84	0.89	0.45	0.34	0.89	0.34	0.56	0.82	0.26
Avail Cap(c_a), veh/h	244	452	383	201	456	386	588	1522	679	354	1534	684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.4	49.7	43.8	58.7	51.1	46.3	35.1	38.1	29.2	48.5	45.1	37.9
Incr Delay (d2), s/veh	32.5	24.6	0.8	23.9	17.5	1.0	0.3	8.7	1.5	2.0	7.6	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	15.4	4.5	5.8	12.5	4.2	4.8	19.4	5.0	5.9	13.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	88.9	74.3	44.6	82.7	68.5	47.3	35.4	46.8	30.7	50.6	52.6	39.3
LnGrp LOS	F	E	D	F	E	D	D	D	C	D	D	D
Approach Vol, veh/h		778			635			1657			1123	
Approach Delay, s/veh		72.3			66.9			43.3			50.9	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.6	54.7	14.2	34.5	41.2	40.2	17.5	31.1
Change Period (Y+Rc), s	* 6.1	* 6.1	5.9	5.9	* 6.1	* 6.1	5.9	5.9
Max Green Setting (Gmax), s	* 13	* 53	10.1	30.1	* 13	* 53	10.1	30.1
Max Q Clear Time (g_c+I1), s	10.6	42.4	8.2	28.0	6.9	28.3	11.7	24.0
Green Ext Time (p_c), s	0.1	6.2	0.1	0.6	0.3	5.8	0.0	1.3

Intersection Summary	
HCM 7th Control Delay, s/veh	54.3
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	25	1549	42	7	1042
Future Vol, veh/h	11	25	1549	42	7	1042
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	94	94	95	95
Heavy Vehicles, %	3	3	2	0	0	3
Mvmt Flow	13	30	1648	45	7	1097

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2233	846	0	0	1693	0
Stage 1	1670	-	-	-	-	-
Stage 2	563	-	-	-	-	-
Critical Hdwy	6.31	7.16	-	-	5.3	-
Critical Hdwy Stg 1	6.66	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.68	3.93	-	-	3.1	-
Pot Cap-1 Maneuver	50	261	-	-	183	-
Stage 1	93	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	47	261	-	-	183	-
Mov Cap-2 Maneuver	81	-	-	-	-	-
Stage 1	93	-	-	-	-	-
Stage 2	485	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	36.99	0	1.62
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	155	24	-
HCM Lane V/C Ratio	-	-	0.28	0.04	-
HCM Control Delay (s/veh)	-	-	37	25.5	1.5
HCM Lane LOS	-	-	E	D	A
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	1590	5	0	1053
Future Vol, veh/h	3	1	1590	5	0	1053
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	50	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	60	60	93	93	95	95
Heavy Vehicles, %	0	0	2	0	0	3
Mvmt Flow	5	2	1710	5	0	1108

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2267	858	0	0	1715	0
Stage 1	1712	-	-	-	-	-
Stage 2	554	-	-	-	-	-
Critical Hdwy	6.25	7.1	-	-	5.3	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.9	-	-	3.1	-
Pot Cap-1 Maneuver	49	261	-	-	178	-
Stage 1	90	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	49	261	-	-	178	-
Mov Cap-2 Maneuver	79	-	-	-	-	-
Stage 1	90	-	-	-	-	-
Stage 2	528	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	45.3	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	96	178	-
HCM Lane V/C Ratio	-	-	0.069	-	-
HCM Control Delay (s/veh)	-	-	45.3	0	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	11	15	1605	1052	11
Future Vol, veh/h	6	11	15	1605	1052	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	-	75
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	93	93	95	95
Heavy Vehicles, %	0	0	0	2	3	0
Mvmt Flow	7	13	16	1726	1107	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2003	554	1119	0	-	0
Stage 1	1107	-	-	-	-	-
Stage 2	895	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	53	481	632	-	-	-
Stage 1	282	-	-	-	-	-
Stage 2	364	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	52	481	632	-	-	-
Mov Cap-2 Maneuver	166	-	-	-	-	-
Stage 1	275	-	-	-	-	-
Stage 2	364	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	17.96	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	632	-	166	481	-	-
HCM Lane V/C Ratio	0.026	-	0.043	0.027	-	-
HCM Control Delay (s/veh)	10.8	-	27.6	12.7	-	-
HCM Lane LOS	B	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	3	1592	19	4	1052
Future Vol, veh/h	11	3	1592	19	4	1052
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	125	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	93	93	95	95
Heavy Vehicles, %	0	0	2	0	0	3
Mvmt Flow	12	3	1712	20	4	1107

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2284	866	0	0	1732	0
Stage 1	1722	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	34	301	-	-	369	-
Stage 1	132	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	34	301	-	-	369	-
Mov Cap-2 Maneuver	106	-	-	-	-	-
Stage 1	132	-	-	-	-	-
Stage 2	534	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	38.36	0	0.06
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	123	369	-
HCM Lane V/C Ratio	-	-	0.124	0.011	-
HCM Control Delay (s/veh)	-	-	38.4	14.9	-
HCM Lane LOS	-	-	E	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Intersection: 1: Crooks Road & Wattles Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	164	303	153	257	388	122	154	205	178	76	266	525
Average Queue (ft)	76	163	56	128	216	45	93	151	137	28	104	313
95th Queue (ft)	142	265	116	226	349	92	157	189	180	62	205	451
Link Distance (ft)		1062			1853		98	98	98	98		1098
Upstream Blk Time (%)							16	39	27	0		
Queuing Penalty (veh)							35	84	57	0		
Storage Bay Dist (ft)	350		625	500		1000					500	
Storage Blk Time (%)		0			0							0
Queuing Penalty (veh)		0			0							0

Intersection: 1: Crooks Road & Wattles Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	532	175
Average Queue (ft)	298	82
95th Queue (ft)	445	203
Link Distance (ft)	1098	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)	35	0
Queuing Penalty (veh)	46	1

Intersection: 2: Crooks Road & 7/11 Drive

Movement	WB	NB	NB	NB	SB	SB
Directions Served	LR	T	T	T	LT	T
Maximum Queue (ft)	303	99	193	170	113	121
Average Queue (ft)	111	20	88	52	13	11
95th Queue (ft)	286	82	184	139	64	63
Link Distance (ft)	356		136	136	98	98
Upstream Blk Time (%)	4		4	1	1	0
Queuing Penalty (veh)	0		11	2	6	1
Storage Bay Dist (ft)		75				
Storage Blk Time (%)		0	12			
Queuing Penalty (veh)		1	24			

Intersection: 3: Crooks Road & Troy Dental Studio Drive

Movement	WB	NB	NB	SB	SB
Directions Served	LR	T	T	L	T
Maximum Queue (ft)	25	103	58	18	19
Average Queue (ft)	1	8	2	1	1
95th Queue (ft)	11	51	22	9	10
Link Distance (ft)	352	195	195		136
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				50	
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 4: Crooks Road & Salma Drive

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	42	35	27
Average Queue (ft)	7	8	6
95th Queue (ft)	28	25	23
Link Distance (ft)	383		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		200	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Crooks Road & West Hills Drive

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	49	12
Average Queue (ft)	19	0
95th Queue (ft)	48	6
Link Distance (ft)	354	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		125
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 270

Intersection: 1: Crooks Road & Wattles Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	375	705	293	280	425	126	151	167	183	157	376	412
Average Queue (ft)	208	354	50	124	231	49	99	149	151	64	207	258
95th Queue (ft)	392	667	178	267	358	99	160	165	169	120	356	372
Link Distance (ft)		1062			1853		98	98	98	98		1098
Upstream Blk Time (%)		0					14	44	39	3		
Queuing Penalty (veh)		0					56	174	154	12		
Storage Bay Dist (ft)	350		625	500		1000					500	
Storage Blk Time (%)	0	14		0								
Queuing Penalty (veh)	2	48		2								

Intersection: 1: Crooks Road & Wattles Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	396	175
Average Queue (ft)	235	80
95th Queue (ft)	354	201
Link Distance (ft)	1098	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)	36	0
Queuing Penalty (veh)	38	0

Intersection: 2: Crooks Road & 7/11 Drive

Movement	WB	NB	NB	NB	NB	SB	SB
Directions Served	LR	T	T	T	TR	LT	T
Maximum Queue (ft)	379	100	216	208	62	122	137
Average Queue (ft)	279	41	168	147	2	32	21
95th Queue (ft)	445	117	218	211	22	108	93
Link Distance (ft)	356		136	136	136	98	98
Upstream Blk Time (%)	44		17	10		11	0
Queuing Penalty (veh)	0		89	54		57	2
Storage Bay Dist (ft)		75					
Storage Blk Time (%)		1	26				
Queuing Penalty (veh)		2	100				

Intersection: 3: Crooks Road & Troy Dental Studio Drive

Movement	WB	NB	NB	NB
Directions Served	LR	T	T	TR
Maximum Queue (ft)	40	200	187	73
Average Queue (ft)	6	76	37	6
95th Queue (ft)	27	182	131	48
Link Distance (ft)	352	195	195	
Upstream Blk Time (%)		0	0	
Queuing Penalty (veh)		2	1	
Storage Bay Dist (ft)				50
Storage Blk Time (%)			2	
Queuing Penalty (veh)			11	

Intersection: 4: Crooks Road & Salma Drive

Movement	EB	EB	NB	SB
Directions Served	L	R	L	R
Maximum Queue (ft)	38	27	43	4
Average Queue (ft)	7	6	11	0
95th Queue (ft)	26	21	35	3
Link Distance (ft)	383			
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		200	150	75
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Crooks Road & West Hills Drive

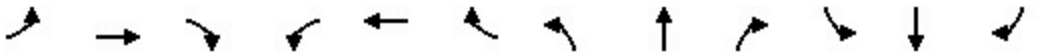
Movement	WB	NB	NB	SB
Directions Served	LR	T	TR	L
Maximum Queue (ft)	87	65	16	32
Average Queue (ft)	26	3	1	3
95th Queue (ft)	75	28	11	18
Link Distance (ft)	364	278	278	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				125
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 805

Colliers Engineering & Design

Appendix D | Build Conditions Data



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	222	173	167	302	170	126	648	89	168	1097	132
Future Volume (veh/h)	91	222	173	167	302	170	126	648	89	168	1097	132
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1922	1922	1922	1891	1891	1891	1953	1953	1953
Adj Flow Rate, veh/h	98	239	186	184	332	187	145	745	102	181	1180	142
Peak Hour Factor	0.93	0.93	0.93	0.91	0.91	0.91	0.87	0.87	0.87	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	5	5	5	7	7	7	3	3	3
Cap, veh/h	126	285	241	222	371	314	446	908	405	699	1364	608
Arrive On Green	0.04	0.15	0.15	0.09	0.19	0.19	0.22	0.25	0.25	0.33	0.37	0.37
Sat Flow, veh/h	1860	1953	1655	1830	1922	1629	1801	3593	1602	1860	3711	1655
Grp Volume(v), veh/h	98	239	186	184	332	187	145	745	102	181	1180	142
Grp Sat Flow(s),veh/h/ln	1860	1953	1655	1830	1922	1629	1801	1796	1602	1860	1856	1655
Q Serve(g_s), s	2.9	15.5	14.1	8.1	21.9	13.6	4.6	25.4	6.6	3.0	38.3	7.7
Cycle Q Clear(g_c), s	2.9	15.5	14.1	8.1	21.9	13.6	4.6	25.4	6.6	3.0	38.3	7.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	126	285	241	222	371	314	446	908	405	699	1364	608
V/C Ratio(X)	0.78	0.84	0.77	0.83	0.90	0.59	0.33	0.82	0.25	0.26	0.87	0.23
Avail Cap(c_a), veh/h	186	437	371	222	430	365	446	1545	689	699	1596	712
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.7	54.0	53.4	56.6	51.2	47.8	40.8	45.8	38.8	28.9	38.1	28.4
Incr Delay (d2), s/veh	11.6	8.5	5.2	22.3	19.0	2.0	0.4	8.2	1.5	0.2	7.5	0.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	8.2	6.1	7.2	12.3	5.6	3.8	12.0	2.7	3.8	18.1	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	72.4	62.6	58.7	78.9	70.2	49.8	41.2	54.0	40.2	29.1	45.7	29.3
LnGrp LOS	E	E	E	E	E	D	D	D	D	C	D	C
Approach Vol, veh/h		523			703			992			1503	
Approach Delay, s/veh		63.0			67.0			50.7			42.1	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	49.2	39.0	17.0	24.9	34.3	53.9	10.8	31.0
Change Period (Y+Rc), s	* 6.1	* 6.1	5.9	5.9	* 6.1	* 6.1	5.9	5.9
Max Green Setting (Gmax), s	* 12	* 56	9.1	29.1	* 12	* 56	9.1	29.1
Max Q Clear Time (g_c+I1), s	5.0	27.4	10.1	17.5	6.6	40.3	4.9	23.9
Green Ext Time (p_c), s	0.2	5.5	0.0	1.5	0.1	7.4	0.1	1.2

Intersection Summary	
HCM 7th Control Delay, s/veh	52.1
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	30	833	23	4	1433
Future Vol, veh/h	14	30	833	23	4	1433
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	88	88	93	93
Heavy Vehicles, %	9	9	7	7	2	2
Mvmt Flow	21	45	947	26	4	1541

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1739	486	0	0	973	0
Stage 1	960	-	-	-	-	-
Stage 2	779	-	-	-	-	-
Critical Hdwy	6.43	7.28	-	-	5.34	-
Critical Hdwy Stg 1	6.78	-	-	-	-	-
Critical Hdwy Stg 2	5.98	-	-	-	-	-
Follow-up Hdwy	3.74	3.99	-	-	3.12	-
Pot Cap-1 Maneuver	93	437	-	-	403	-
Stage 1	250	-	-	-	-	-
Stage 2	385	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	91	437	-	-	403	-
Mov Cap-2 Maneuver	176	-	-	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	378	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	20.52	0	0.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	297	10	-
HCM Lane V/C Ratio	-	-	0.221	0.011	-
HCM Control Delay (s/veh)	-	-	20.5	14	0.3
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	0.8	0	-

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	1	855	0	1	1446
Future Vol, veh/h	1	1	855	0	1	1446
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	50	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	60	60	89	89	92	92
Heavy Vehicles, %	0	0	7	0	0	2
Mvmt Flow	2	2	961	0	1	1572

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1749	480	0	0	961	0
Stage 1	961	-	-	-	-	-
Stage 2	788	-	-	-	-	-
Critical Hdwy	6.25	7.1	-	-	5.3	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.9	-	-	3.1	-
Pot Cap-1 Maneuver	101	459	-	-	415	-
Stage 1	265	-	-	-	-	-
Stage 2	402	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	101	459	-	-	415	-
Mov Cap-2 Maneuver	189	-	-	-	-	-
Stage 1	265	-	-	-	-	-
Stage 2	401	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	18.61	0	0.01
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	268	415	-
HCM Lane V/C Ratio	-	-	0.012	0.003	-
HCM Control Delay (s/veh)	-	-	18.6	13.7	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	16	8	834	1466	4
Future Vol, veh/h	9	16	8	834	1466	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	-	75
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	93	93
Heavy Vehicles, %	0	0	0	7	2	0
Mvmt Flow	10	18	9	937	1576	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2063	788	1581	0	-	0
Stage 1	1576	-	-	-	-	-
Stage 2	487	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	48	338	422	-	-	-
Stage 1	159	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	47	338	422	-	-	-
Mov Cap-2 Maneuver	125	-	-	-	-	-
Stage 1	155	-	-	-	-	-
Stage 2	590	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	23.43	0.13	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	422	-	125	338	-	-
HCM Lane V/C Ratio	0.021	-	0.081	0.053	-	-
HCM Control Delay (s/veh)	13.7	-	36.2	16.2	-	-
HCM Lane LOS	B	-	E	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	0.2	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	15	0	12	17	0	6	4	834	5	2	1441	4
Future Vol, veh/h	15	0	12	17	0	6	4	834	5	2	1441	4
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	-	-	-	-	-	-	100	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	89	89	89	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	7	0	0	2	0
Mvmt Flow	16	0	13	18	0	7	4	937	6	2	1566	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2050	2525	785	1736	2524	471	1571	0	0	943	0	0
Stage 1	1573	1573	-	949	949	-	-	-	-	-	-	-
Stage 2	478	952	-	788	1575	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	33	28	340	57	28	544	425	-	-	736	-	-
Stage 1	117	172	-	284	342	-	-	-	-	-	-	-
Stage 2	543	341	-	355	172	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	28	340	54	28	544	425	-	-	736	-	-
Mov Cap-2 Maneuver	32	28	-	54	28	-	-	-	-	-	-	-
Stage 1	117	172	-	281	338	-	-	-	-	-	-	-
Stage 2	531	337	-	341	171	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	32.72	81.19	0.06	0.01
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	425	-	-	54	71	736	-	-
HCM Lane V/C Ratio	0.011	-	-	0.543	0.353	0.003	-	-
HCM Control Delay (s/veh)	13.6	-	-	132.7	81.2	9.9	-	-
HCM Lane LOS	B	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0	-	-	2.1	1.3	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	194	350	145	142	321	138	192	1184	206	189	776	107
Future Volume (veh/h)	194	350	145	142	321	138	192	1184	206	189	776	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1969	1969	1969	1969	1969	1969	1984	1984	1984
Adj Flow Rate, veh/h	220	398	165	151	341	147	202	1246	217	199	817	113
Peak Hour Factor	0.88	0.88	0.88	0.94	0.94	0.94	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	2	2	2	2	2	2	1	1	1
Cap, veh/h	248	430	364	178	382	324	581	1402	625	348	995	444
Arrive On Green	0.09	0.22	0.22	0.07	0.19	0.19	0.27	0.37	0.37	0.15	0.26	0.26
Sat Flow, veh/h	1860	1953	1655	1875	1969	1668	1875	3741	1668	1890	3770	1682
Grp Volume(v), veh/h	220	398	165	151	341	147	202	1246	217	199	817	113
Grp Sat Flow(s),veh/h/ln	1860	1953	1655	1875	1969	1668	1875	1870	1668	1890	1885	1682
Q Serve(g_s), s	9.7	26.0	11.2	6.5	22.0	10.1	5.1	40.6	12.1	8.7	26.5	6.9
Cycle Q Clear(g_c), s	9.7	26.0	11.2	6.5	22.0	10.1	5.1	40.6	12.1	8.7	26.5	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	430	364	178	382	324	581	1402	625	348	995	444
V/C Ratio(X)	0.89	0.93	0.45	0.85	0.89	0.45	0.35	0.89	0.35	0.57	0.82	0.25
Avail Cap(c_a), veh/h	248	452	383	201	456	386	581	1522	679	348	1534	684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.1	49.7	43.9	58.6	51.1	46.3	35.5	38.1	29.2	48.9	44.9	37.7
Incr Delay (d2), s/veh	29.4	24.6	0.9	25.0	17.5	1.0	0.4	8.7	1.5	2.2	7.6	1.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	15.4	4.6	6.1	12.5	4.2	4.9	19.5	5.1	6.0	13.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	85.6	74.2	44.8	83.6	68.5	47.3	35.8	46.8	30.7	51.1	52.5	39.1
LnGrp LOS	F	E	D	F	E	D	D	D	C	D	D	D
Approach Vol, veh/h		783			639			1665			1129	
Approach Delay, s/veh		71.2			67.2			43.4			50.9	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.2	54.8	14.4	34.5	40.7	40.4	17.8	31.1
Change Period (Y+Rc), s	* 6.1	* 6.1	5.9	5.9	* 6.1	* 6.1	5.9	5.9
Max Green Setting (Gmax), s	* 13	* 53	10.1	30.1	* 13	* 53	10.1	30.1
Max Q Clear Time (g_c+I1), s	10.7	42.6	8.5	28.0	7.1	28.5	11.7	24.0
Green Ext Time (p_c), s	0.1	6.1	0.1	0.6	0.3	5.9	0.0	1.3

Intersection Summary	
HCM 7th Control Delay, s/veh	54.2
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	25	1557	42	7	1056
Future Vol, veh/h	11	25	1557	42	7	1056
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	83	83	94	94	95	95
Heavy Vehicles, %	3	3	2	0	0	3
Mvmt Flow	13	30	1656	45	7	1112

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2249	851	0	0	1701	0
Stage 1	1679	-	-	-	-	-
Stage 2	571	-	-	-	-	-
Critical Hdwy	6.31	7.16	-	-	5.3	-
Critical Hdwy Stg 1	6.66	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.68	3.93	-	-	3.1	-
Pot Cap-1 Maneuver	49	259	-	-	181	-
Stage 1	92	-	-	-	-	-
Stage 2	510	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	46	259	-	-	181	-
Mov Cap-2 Maneuver	80	-	-	-	-	-
Stage 1	92	-	-	-	-	-
Stage 2	480	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	37.45	0	1.66
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	153	24	-
HCM Lane V/C Ratio	-	-	0.283	0.041	-
HCM Control Delay (s/veh)	-	-	37.5	25.8	1.5
HCM Lane LOS	-	-	E	D	A
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	1	1598	5	0	1067
Future Vol, veh/h	3	1	1598	5	0	1067
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	50	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	60	60	93	93	95	95
Heavy Vehicles, %	0	0	2	0	0	3
Mvmt Flow	5	2	1718	5	0	1123

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2283	862	0	0	1724	0
Stage 1	1721	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Critical Hdwy	6.25	7.1	-	-	5.3	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.9	-	-	3.1	-
Pot Cap-1 Maneuver	48	260	-	-	176	-
Stage 1	89	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	48	260	-	-	176	-
Mov Cap-2 Maneuver	78	-	-	-	-	-
Stage 1	89	-	-	-	-	-
Stage 2	523	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s/v	45.85	0	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	95	176	-
HCM Lane V/C Ratio	-	-	0.07	-	-
HCM Control Delay (s/veh)	-	-	45.8	0	-
HCM Lane LOS	-	-	E	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	11	15	1615	1058	11
Future Vol, veh/h	6	11	15	1615	1058	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	200	150	-	-	75
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	93	93	95	95
Heavy Vehicles, %	0	0	0	2	3	0
Mvmt Flow	7	13	16	1737	1114	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2014	557	1125	0	-	0
Stage 1	1114	-	-	-	-	-
Stage 2	901	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	52	479	628	-	-	-
Stage 1	280	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	51	479	628	-	-	-
Mov Cap-2 Maneuver	165	-	-	-	-	-
Stage 1	273	-	-	-	-	-
Stage 2	362	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s/v	18.06	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	628	-	165	479	-	-
HCM Lane V/C Ratio	0.026	-	0.043	0.027	-	-
HCM Control Delay (s/veh)	10.9	-	27.8	12.7	-	-
HCM Lane LOS	B	-	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	6	11	0	3	10	1592	19	4	1052	14
Future Vol, veh/h	8	0	6	11	0	3	10	1592	19	4	1052	14
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	-	-	-	-	-	-	100	-	-	125	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	93	93	93	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	3	0
Mvmt Flow	9	0	7	12	0	3	11	1712	20	4	1107	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2001	2877	561	2306	2874	866	1122	0	0	1732	0	0
Stage 1	1123	1123	-	1744	1744	-	-	-	-	-	-	-
Stage 2	877	1754	-	562	1131	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	36	17	476	21	17	301	630	-	-	369	-	-
Stage 1	222	283	-	92	142	-	-	-	-	-	-	-
Stage 2	314	140	-	484	281	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	35	16	476	20	16	301	630	-	-	369	-	-
Mov Cap-2 Maneuver	35	16	-	20	16	-	-	-	-	-	-	-
Stage 1	220	280	-	90	140	-	-	-	-	-	-	-
Stage 2	305	138	-	472	278	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s/v	88.51	272.72	0.07	0.06
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	630	-	-	58	25	369	-	-
HCM Lane V/C Ratio	0.017	-	-	0.264	0.6	0.011	-	-
HCM Control Delay (s/veh)	10.8	-	-	88.5	272.7	14.9	-	-
HCM Lane LOS	B	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	1.8	0	-	-

Intersection: 1: Crooks Road & Wattles Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	177	297	147	237	384	109	162	194	195	59	346	519
Average Queue (ft)	74	159	58	125	207	43	101	147	136	26	108	300
95th Queue (ft)	148	265	114	213	335	91	160	178	183	51	248	454
Link Distance (ft)		1062			1853		98	98	98	98		1098
Upstream Blk Time (%)							18	38	26			
Queuing Penalty (veh)							39	82	57			
Storage Bay Dist (ft)	350		625	500		1000					500	
Storage Blk Time (%)		0									0	1
Queuing Penalty (veh)		0									0	2

Intersection: 1: Crooks Road & Wattles Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	510	175
Average Queue (ft)	281	79
95th Queue (ft)	435	200
Link Distance (ft)	1098	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)	32	0
Queuing Penalty (veh)	43	1

Intersection: 2: Crooks Road & 7/11 Drive

Movement	WB	NB	NB	NB	SB	SB
Directions Served	LR	T	T	T	LT	T
Maximum Queue (ft)	298	100	204	157	114	111
Average Queue (ft)	144	23	92	50	13	10
95th Queue (ft)	345	87	192	139	64	63
Link Distance (ft)	356		136	136	98	98
Upstream Blk Time (%)	12		4	1	1	0
Queuing Penalty (veh)	0		11	2	10	1
Storage Bay Dist (ft)		75				
Storage Blk Time (%)		1	12			
Queuing Penalty (veh)		2	25			

Intersection: 3: Crooks Road & Troy Dental Studio Drive

Movement	WB	NB	NB	SB
Directions Served	LR	T	T	L
Maximum Queue (ft)	31	112	76	24
Average Queue (ft)	4	10	4	2
95th Queue (ft)	21	61	39	12
Link Distance (ft)	352	188	188	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		1		
Storage Bay Dist (ft)				50
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 4: Crooks Road & Salma Drive

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	46	34	46
Average Queue (ft)	10	9	6
95th Queue (ft)	32	26	27
Link Distance (ft)	383		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		200	150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Crooks Road & Site Drive/West Hills Drive

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	T	L	TR
Maximum Queue (ft)	61	56	27	19	24	6
Average Queue (ft)	23	20	2	1	2	0
95th Queue (ft)	52	48	12	18	13	5
Link Distance (ft)	330	354		284		188
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100		125	
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Network Summary

Network wide Queuing Penalty: 275

Intersection: 1: Crooks Road & Wattles Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	375	714	289	269	445	125	174	192	181	139	361	500
Average Queue (ft)	223	349	82	124	247	44	107	151	151	60	165	276
95th Queue (ft)	408	721	360	236	391	94	170	172	169	116	282	424
Link Distance (ft)		1062			1853		98	98	98	98		1098
Upstream Blk Time (%)		2					19	45	40	3		
Queuing Penalty (veh)		0					77	177	157	11		
Storage Bay Dist (ft)	350		625	500		1000					500	
Storage Blk Time (%)	0	15										0
Queuing Penalty (veh)	2	54										1

Intersection: 1: Crooks Road & Wattles Road

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	472	175
Average Queue (ft)	260	87
95th Queue (ft)	413	208
Link Distance (ft)	1098	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		100
Storage Blk Time (%)	38	0
Queuing Penalty (veh)	40	0

Intersection: 2: Crooks Road & 7/11 Drive

Movement	WB	NB	NB	NB	NB	SB	SB
Directions Served	LR	T	T	T	TR	LT	T
Maximum Queue (ft)	371	100	207	217	79	130	138
Average Queue (ft)	271	54	169	147	4	39	26
95th Queue (ft)	439	131	219	219	38	121	100
Link Distance (ft)	356		136	136	136	98	98
Upstream Blk Time (%)	36		19	11	0	13	1
Queuing Penalty (veh)	0		100	61	0	72	4
Storage Bay Dist (ft)		75					
Storage Blk Time (%)		2	28				
Queuing Penalty (veh)		7	108				

Intersection: 3: Crooks Road & Troy Dental Studio Drive

Movement	WB	NB	NB	NB
Directions Served	LR	T	T	TR
Maximum Queue (ft)	40	204	200	125
Average Queue (ft)	11	82	50	10
95th Queue (ft)	37	197	162	66
Link Distance (ft)	352	188	188	
Upstream Blk Time (%)		2	1	
Queuing Penalty (veh)		13	7	
Storage Bay Dist (ft)				50
Storage Blk Time (%)			4	
Queuing Penalty (veh)			20	

Intersection: 4: Crooks Road & Salma Drive

Movement	EB	EB	NB	NB
Directions Served	L	R	L	T
Maximum Queue (ft)	55	18	28	6
Average Queue (ft)	12	6	7	0
95th Queue (ft)	45	19	26	4
Link Distance (ft)	383			541
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		200	150	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Crooks Road & Site Drive/West Hills Drive

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	70	61	31	154	99	30	4	4
Average Queue (ft)	26	14	6	11	6	4	0	0
95th Queue (ft)	54	44	25	72	52	20	3	3
Link Distance (ft)	331	364		284	284		188	188
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			100			125		
Storage Blk Time (%)				1				
Queuing Penalty (veh)				0				

Network Summary

Network wide Queuing Penalty: 910

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memorandum

Date: June 18, 2024

To: Scott Finlay, PE

From: Stephen Dearing, PE, PTOE & Lauren Hull, EIT

Re: Proposed Troy Residential Development
Traffic Impact Study Review

We have reviewed the traffic impact study for the proposed Troy Residential development in Troy, Michigan. The study was prepared by Colliers Engineering & Design and is dated June 6, 2024.

OHM's comments are as follows:

1. Traffic Impact Study:

    a. In Figure 4 Existing Traffic Volumes, several turning movements are labeled with volumes of 777, these appear to be placeholder volumes based on Figure 7 Future Build Traffic Volumes. Adjust Figure 4 to represent the existing traffic volumes for all intersections within the study area.

    b. The TIS acknowledges that the area signals are part of RCOC's SCATS adaptive signal system. It should be made clear that any evaluation of existing, background or future conditions assumes that signal timing are optimized for splits for the analyses, not rely on initial settings.

    c. Protected left-turn phasing is mentioned at the intersection of Wattles Road at Crooks Road; however, this was not modeled. While this may lead to a decrease in crashes, it will likely lead to an increase in delay. This scenario needs to be modeled and discussed in the study.

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January 20, 2025

Mr. Brent Savidant, AICP
Community Development Director
City of Troy Planning Department
500 W. Big Beaver
Troy, MI 48084

Re. Preliminary Site Plan Review Discussion
The Pinnacle of Troy Development
Carlisle Wortman Review Letter 11-27-24

Dear Mr. Savidant:

As the applicant and client representative for the project, I would like to thank you for having your staff forward the Planning Consultant's report regarding our submittal of the one-family attached development called the Pinnacle of Troy. We are confident that we are submitting a very good development on a nice small parcel in a very nice, quiet, up-scale area of Troy that is consistent with the intent of the Master Plan 2040.

The consultant's report is very thorough in regard to the description of the project, its master planning references and its zoning ordinance references of compliance, non-compliance and general layout characteristics. As requested, we have revised the plans and clarified items where appropriate. The following is a summary of the points to be discussed mentioned in the planner's report:

Site Description:

To begin, we would like to ask everyone re-label the type of development that is being presented. It can not only be referred to as multiple-family, but more importantly, that it can be referred to as one-family attached homes that are owned by the residents. This perspective is more in keeping with the list of uses being referenced in the Master Plan and the Neighborhood Node. We just want to be sure that the reference is not construed to include rental townhouses or apartments as seen being proposed and built in the southeast and northwest quadrants of this Node. As we go through this review process, may we keep in mind that these units are one-family attached homes.

In the same initial paragraph of the report, there is a statement that these homes are three (3) stories. We believe the more correct reference should be that the units are two-and-one-half (2.5) stories. The Neighborhood Node regulations specifically prohibit three (3) story buildings next to single-family residential zoning classifications.

Master Plan:

The owner and his consultants are also very familiar with the discussion that has gone into the review of the development options for various Neighborhood Nodes. We discussed the various options listed in the referenced paragraph from the Master Plan. The owner, understanding the desires of the city officials and the residents, chose the one-family attached option out of respect for everyone who participated in the planning update process. We have also followed the recommendation that the staff and Planning Commissioners generally suggest to developers which is to meet with the neighbors. The owner and his consultants have met three times with the neighbors to review this project. we have taken steps to address their concerns. The neighbors liked the final plan we have submitted. As a matter of fact, they sent a letter to you stating their acceptance of this project. We anticipate that the Planning Commissioners will also receive a copy of this letter.

Items to be Addressed: We should be able to conclude that this project meets the intent of the Master Plan and we look forward to the discussion with the Planning Commissioners

Natural Features:

Since the site is a 5.38-acre partially wooded site that is not located in a floodplain or wetlands, grading efforts have been made to preserve the maximum number of existing trees, especially those in the landscape buffers on the south and west sides of the property. There are 17 regulated trees being preserved and 138 replacement trees have been added as required. With the inclusion of the required trees per the zoning ordinance, there are 280 trees provided.

	Req'd Number of Trees	Provided:
Screening	104	104 (Incl. 8 existing evg. trees; 4 on the south, 4 on the west)
Parking Lot	3	3
Greenbelt	35	35
Replacement	138	138 (44 trees and includes 94, 6' ht. evergreens) Note that PEA confirmed with you that 6' high upright evergreens were acceptable as replacement trees.
Total	**280**	**280**

In regard to the planning strip, extra care will be taken to provide evergreens with an anti-desiccant spray to protect evergreens from winter damage and to reduce water loss. Evergreens can also be wrapped in burlap in the winter months to protect against sunscald and frost cracks, per ANSI, American Nursery Stock Standard best practices.

The evergreens are shown in a min. 5' wide mulched bed with edging separating the plant bed and lawn area. Note that 90% of the upright evergreens proposed along Crooks and Wattles are not proposed directly adjacent to a sidewalk or patio. Additional lawn/green space is provided on one or both sides of the evergreen plant bed.

In terms of the planting bed functioning as a screen, it seemed only logical since the use is residential and the area on the Crooks and Wattles sides of the units have multiple functions. The primary function is for pedestrian access to the homes. We were also considering other planting options and chose to use the technique approved on the project on Livernois just south of Square Lake.

Area, Width, Height, Setback:

The report addresses these elements of the project in a chart and then in a narrative associated with each topic. In the chart, there is reference to the build-to line. We understand that the Crooks and Wattles build-to lines exceed 10 feet. We anticipate that the Planning Commissioners will approve these dimensions as they have in other residential projects that have been approved in other Node zoning classifications.

We are open to discussing the Height variance issue before going to the ZBA and we have eliminated several guest parking spaces to be more in compliance with the zoning regulation. We have outlined these changes later in this letter.

Layout:

We reviewed the comments presented by the consultant and have revised the plan where the zoning regulation has been cited and even some code compliant items. In a few cases, we have respected the property owner's rights on the basis that the items are code compliant. We have addressed the consultant's concerns as follows:

- The proposed driveways are not in easements as referred to by the consultant. They are just circulation drives with sidewalks adjacent to them. In non-residential properties, the driveways are required to be 24 feet wide for two-way traffic as specified in the zoning ordinance and in the fire department regulations. Sidewalks, parking spaces, landscaping, etc. are at the owner's discretion whether it is for any of the uses or any combination of uses in a Node zoning classification. We have also noted similar arrangements in other Node locations that have been approved and constructed.

- The vehicular maneuvering space at the end of dead-end driveway meets the National Fire Department Standards for "T" turnarounds and has been accepted by the Troy Fire Department. We also know that all dead ends of any type have some form of turning movement. These turnarounds are half the dimension and half the pavement area of all the options that were considered. This design, therefore, was also chosen based on its environmental impact. In the case of delivery trucks and sanitation trucks, these vehicles are capable of doing these maneuvers and do so on a weekly basis.

- There are no structures shown within any utility easement. Structures can be built adjacent to an easement. Property owners know that they are not permitted to build structures in easements. If property owners place any non-structural improvement over an easement, they understand that any removal of such items for maintenance purposes will have to be replaced at the owner's expense.

- We agree that tree removal is an issue. We also know that tree removal is the product of urbanization. Fortunately, trees are the most renewable resource and we were able to meet the zoning requirements by preparing a plan that meets the regulations for replacement trees. We have also taken care to be sure that the planting areas are adjacent to grass areas except in those nominal locations where there is a patio on one side of the planting strip. All new landscaping trees are being planted as recommended by the ANSI, American Nursery Stock Standard, best practices.

- The two buildings with 10- and 12-foot separation have been separated as recommended by the consultant.

- We checked and verified that 75% of the drive approaches in front of the garages are deeper than 20'. We

anticipate that the Planning Commission will allow the few driveways that are 20 feet deep as they have in other developments recently.

- We agree with the consultant's observations about the separation between the turnaround lane and the patios. As recommended, we have increased the separations of patios and buildings at buildings 8, 9 and 10. The side elevation of building 5 has only one window. It is in the half-bath. We determined that 9 feet is adequate in this situation.

Front Setback:

- The setbacks on Crooks and Wattles are similar to the development on Livernois just south of Square Lake. We anticipate that the Planning Commissioners will grant a similar adjustment since the two developments are residential developments. The evergreens soften the starkness of the busy street. The same is true for the placement of the porches that also function as some outdoor space for the residents. Finally, the sidewalk is necessary to gain access to the front door on the units that face Crooks and Wattles. We are not sure if the consultant picked up on these points, so we are making some design modifications on the façade to enhance this feature

  We should also agree that the 10-foot build-to-line is more appropriate for non-residential uses. The office building and 7-11 store across Crooks Road fits the intent of this build-to-line regulation and the intent of the Neighborhood Node to create mixed use economic neighborhoods.

  In regard to the one building that is noted as having a side elevation oriented to Wattles, we have modified the plan for this unit to have a porch and front door on the north elevation at the west end of the unit and increased the transparency on this elevation.

- We believe this project has been designed exhibiting these Building Form C elements. They are also consistent with other Node projects that have been approved in Troy.

Building Height:

- We understand that we need to apply for a variance because a small area at the ridge of the homes are three feet over the 30-foot limit. We believe we have good reason to ask for this variance in order to be in keeping with the neighbors' homes to the west. The homes in Stonehaven are equal to and even exceed 33 feet in height. The Pinnacle homes have been designed to emulate their homes in area, height, style and value. We have met this goal with the two and half story, steep sloped roof with a maximum height of 33 feet. We could have designed contemporary flat roof homes and met the height restriction but contemporary homes do not match the luxurious brick and stone image of the Stonehaven homes. The attached graphic, Height Analysis for Three Neighborhood Nodes, comparing homes adjacent to some Neighborhood Nodes adds credence to the variance request. Ultimately, the Pinnacle homes do meet the criteria outlined in Article 8, Section 8.06 Site Plan Review Standards for this area of the City of Troy.

Items to be Addressed: 1) the side elevation has been modified to have a front image to the unit; 2) the parking in the front yard has been removed; and 3) the applicant will go to the ZBA as outlined in Section 15.06 of the zoning ordinance.

Parking:

- The owner and consultants recognize that the parking requirements exceed 20% of the required parking. We have removed 5 spaces from this plan and the plan will contain three (3) spaces over the spaces that are permitted. We would request that the Planning Commissioners would grant these 3 additional spaces.

Items to be Addressed: We are open to having this discussion with the Planning Commissioners to see what is acceptable to everyone.

Traffic and Circulation:

Vehicular Traffic:

- As discussed earlier in this letter, the turnarounds are approved patterns noted in the National Fire Standards and have been approved in many communities as well as in the City of Troy for all vehicular movements where streets and drives have no outlets. In reference to the concern that these T turnarounds are a half a block in length, the actual length of that half block is about 75' or less. We also want to note that the National Fire Standards require that these turnaround driveways do not exceed 150 feet. This maneuvering option for the Pinnacle, therefore, is code compliant and it is the best of three options that were considered for this development.

Pedestrian Access:

- Pedestrian access seems appropriate according to the consultant's report.

Items to be Addressed: 1) the fire truck maneuvering drive being less than 75 feet in length is also very adequate for all smaller delivery trucks; 2) the layout of proposed driveways are code compliant and necessary to meet the recent Master Plan update and the least intensity development permitted by the Neighborhood Node.

Landscaping:

Under this heading there are references to landscaping elements and other minor site improvements that we agree on. A brief summary of these points are as follows:

- As noted in the table provided by the consultant, the landscaping is in compliance with the zoning regulations.
- In reference to the note on a fence along the south and west sides of the site, the consultant has noted that it is placed properly and is in compliance with the zoning regulations. We also determined that this fence was very acceptable to the neighbors.
- In reference to the mechanical equipment, the report notes that such equipment will be screened by some landscaping and therefore it is in compliance with the zoning regulations.
- The trash for this site will be maintained by each individual homeowner and appropriate trash receptacles will be set in front of each home on trash collection day. The trash vehicle will use the T turnarounds to maneuver along the driveways.
- Stormwater management is subject to city engineering review and any and all modification that may be noted by the engineering department will be addressed.

- The open grass area over the stormwater detention area constitutes a passive recreational outdoor amenity. The owner and the homeowners will determine at their discretion what amenities will be placed in this open area before the development is turned over to the homeowners' association. It should also be noted that this development is within 300 feet of Boulan Park containing many amenities that would likely be provided in this passive recreation area. Finally, because this park is being placed over the stormwater detention facility, improvements that require foundations are not permitted. As a result, buildings, gazebos and game surfaces cannot be placed in this area. The owner, however, will place benches and a bike rack in this park. For these reasons, we believe this amenity meets the requirements of the zoning regulations.

Items to be Addressed: 1) Trash pickup will be at each home with the trash vehicle maneuvering on the code compliant driveways; and 2) the passive recreational area is available for any non-organized gaming activity or just sitting and enjoying bright sunny days. It can be determined that these components of the development meet the regulations of the zoning ordinance.

Lighting:

- The lighting for this development consists of two components: 1) a single 20-foot-high light pole with two 2-foot arms to hold a LED, non-glare, down light to light the entrance drive leading into the development; and 2) standard residential wall fixtures on either side of the garage door and one on the wall by each door leading into the homes. A photometric plan is being submitted with this report for city staff review.

Floor Plans and Elevations:

Floor Plans:

- The consultant has interpreted the function of the floor plans being presented correctly. These plans are meant to be options for the purchaser to select. The purchaser may choose the half-story to be a flex room, a bedroom, a loft, a hobby space, storage space and/or not include the half level in the construction of the home at all. These homes may be two-and-a-half-story homes or just two-story homes. All homes will have a basement. The area of the homes, based on the purchaser's options will be between 2,600 s. f. and 3,200 s.f. in an effort to be comparable to the homes in Stonehaven which are between 2,900 s. f. and 3,600 s. f.

Elevations:

- In regard to the nominal 3-foot variance we will be requesting, we only wish to emulate the adjacent homes to this development and add value to the area. The recent revision to the zoning ordinance, though appropriate for apartments, mixed use and commercial developments across Crooks and Wattles, has imposed a hardship on this development of one-family attached units. To be in harmony with and meet the general characteristics of the adjacent residential homes, the Pinnacle units have been designed to emulate the adjacent homes in area, height, style and value.

Transparency:

- Per Section 5.06.E.2.a.i., the first floor of any front façade facing a right-of-way shall be no less than fifty (50%) percent windows and doors. The wall area of the two widths of the homes is

either 352 s. f. or 385 s. f. The area of the windows for each home is 216 s. f. and 207 s.f. respectively. The units that face Crook and Wattles, therefore, contain between 61% and 54% transparency in regard to windows and doors.

Building Materials:

- The materials selected for this project are the same materials: brick, chiseled stone, smooth stone, siding and shingles that are used on the homes in Stonehaven. The colors of the homes in the Pinnacle are premium colors and slightly different than in Stonehaven. The reason for these choices and not going with the current trends of black, charcoal and white is that the Pinnacle of Troy is being more respectful of the homes in Stonehaven while yet being the transitional zoning use between the major thoroughfare to its single-family neighbor.

Items to be addressed; The area of the homes and the transparency calculations meet both the intent of the Master Plan 2040 and the dimensional requirements of the zoning ordinance.

Design Standards and Site Plan Review Standards:

1. This property has been designed to be a transitional planning use between the major thoroughfares and Stonehaven.
   a. The buildings in the Pinnacle do enhance the character of the adjacent subdivision.
   b. The street fronts do show a variety of architectural features.
   c. The building designs have a compatible transition between areas with different height, massing, scale, and architectural style.
2. This development of luxury one-family attached homes does incorporate the recognized best architectural building design practices.
   a. The Pinnacle does foster a lasting impact on the community through the provision of high-quality design, construction, and detailing.
   b. The Pinnacle does provide high quality, durable materials, such as but not limited to stone, brick, glass, siding and metal comparable to the homes in Stonehaven.
   c. The Pinnacle does have buildings with creative elements that will result in balanced compositions and forms.
   d. The Pinnacle was designed to have roofs that are appropriate to the architectural style of the buildings and create an appropriate visual exterior mass of the building given the context of the site and to emulate the design of Stonehaven.
   e. This project does not include commercial buildings; therefore, this criterion does not apply.
   f. The passive recreational area does include some community amenities listed that add value to the development.
3. This development being as small as it is, will enhance the character, environment and safety for pedestrians and motorists. The streets are so short that vehicles can hardly go 10 mph when maneuvering through the development and the homeowner's association can set speed limits on the drives.
   a. Change in pavement patterns between curbs, drives and sidewalks along with pedestrian crossing markings provide elements that define the vehicular realm and the pedestrian realm.
   b. Sidewalks create a connection between the public right-of-way and ground floor activities.
   c. The pedestrian sidewalks along the perimeter if the site and within the development create a safe environment by employing design features to reduce vehicular and pedestrian conflict, while not sacrificing design excellence.

d. This criterion that enumerates the need to enhance the pedestrian realm by framing the sidewalk area with trees, awnings, and other features applies more to commercial developments but some aspects like lining the drives and the adjacent thoroughfares with trees has been accomplished.
e. Improve safety for pedestrians through site design measures has been accomplished with the placement of sidewalks both on the interior and exterior of this development and the appropriated connections between both.

Items to be addressed: Though there are no points to be discussed, we want to reiterate the fact that we have worked very hard to make this project reflect the best of the design criteria of the zoning ordinance and also the best attributes of our neighbors' homes in Stonehaven. We appreciate their support of this project.

Summary

1. *Clarify plant schedule to confirm landscape plan meets ordinance requirements. If not, provide the required additional trees on site, or reduce the number of trees removed to reduce mitigation amount.*
   We have checked the plant schedule to confirm that the landscape plan meets ordinance requirements. We note that we have provided the required additional trees on site with a total of 104 screening trees that are required and provided on the south and west sides (this includes 8 existing evergreen trees). We have shown 3 parking lot trees that are required and provided and 35 greenbelt trees that are required and provided. We show 138 replacement trees that are required and provided which includes 44, 2.5" dec. or 8' ht. evergreen trees and 94, 6-foot-high upright evergreen.
   A total of 280 trees are required and provided as stated above.
2. *Describe how mitigation trees will survive within the harsh environment of a planting strip 5- feet wide adjacent to a sidewalk.*
   Extra care will be taken to provide evergreens with an anti-desiccant spray to protect evergreens from winter damage and to reduce water loss. Evergreens can also be wrapped in burlap in the winter months to protect against sunscald and frost cracks, per ANSI, American Nursery Stock Standard, best practices.
   The evergreens are proposed in a min. 5' wide mulched bed with edging separating the plant bed and lawn area. Note that 90% of the upright evergreens proposed along Crooks and Wattles are not proposed directly adjacent to a sidewalk or patio. Additional lawn/green space is provided on each side of the planting strip since the sidewalk undulates and is not directly adjacent to most of the proposed evergreen plant beds.
3. *Describe how the dense screening of landscaping between the building and public street meets the intent of the neighborhood node district.*
   The screening is appropriate for residential uses and this use is meeting the intent of the Master Plan 2040.
4. *Address the Wattles Road side elevation for building at corner of Crooks and Wattles.*
   We have revised the side elevation of the noted unit to create the image that meets the zoning ordinance.
5. *Remove parking in front of buildings on Wattles Road.*
   The two parking spaces have been removed.
6. *Applicant to confirm how trash vehicles, or delivery trucks are to navigate at the end of the dead ends.*
   All trash and delivery vehicles will use the code compliant turn around space to maneuver in and out of this area.

7. *Provide a photometric plan in compliance with Section 13.05.*
   The photometric plan is part of this submittal. The lighting for this project is very minimal. There is only one pole light at the entrance and all other lighting are coach lights on the homes.
8. *Reduce parking or provide documented evidence justifying the need for excess parking.*
   Parking has been reduced and the 3 spaces that remain will be reviewed with the Planning Commissioners on the basis that a few extra spaces are appropriate for this single-family attached development.
9. *Confirm arrangement for trash pickup.*
   Individual residents will place their trash at the curb on trash pickup day.
10. *Elaborate on types of outdoor amenities being proposed.*
    Park benches and bike rack will be placed in the park when the grass has taken hold. All other amenities will be based on the homeowners and the developers mutually agreed upon list of suggested improvements. It has been noted earlier that there are adequate outdoor amenities at Boulan Park.
11. *Provide transparency calculations of Section 5.06.E.2.*
    The transparency calculations have been addressed earlier in this letter and they exceed the minimum 50% requirement of the zoning ordinance for each unit type.
12. *Provide square footage of each unit.*
    The area of the units has been addressed earlier in this letter.

We look forward to reviewing this very nice, transitional zoning development adjacent to a beautiful subdivision of homes of exceptional value in the beautiful northwestern portion of Troy. The growth of Troy since its incorporation has set these standards and the Pinnacle of Troy attests to those standards.

Respectfully,

David Donnellon
J & A Architectural Engineering

Attachment: Height Analysis for Three Neighborhood Nodes

Height Analysis for Three Neighborhood Nodes

The Enclave homes are 30’ to 32’ high

Mt. Vernon ranches are 13’ and colonials are 24’ high

The Mt. Vernon homes are very nice but are not as high as the Enclave homes. Neither home utilizes the half story option as permitted in both residential districts and the Neighborhood Node District. The developers just chose not to add the half level function thus there was no need for higher roofs.

The Livernois project units are 38’ to 40’ high

homes to the west are 23’ to 28’ high

The Livernois project towers over the neighbors and this is one of the reasons for the City to quickly revise the Neighborhood Node zoning regulations on height. Unfortunately, ordinances cannot anticipate all potential circumstances so these excessively high townhouses are a result. Now applying the 30-foot restriction to the property at Crooks and Wattles has an untended consequence of limiting the height when a little extra height is appropriate.

Stonehaven homes are 33’ to 38’ high

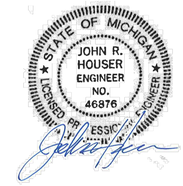
Pinnacle homes 27’ to 33’ high

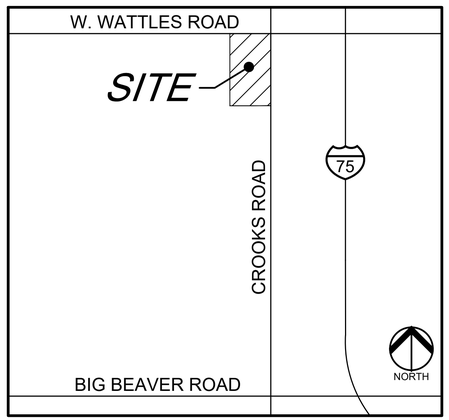
The Stonehaven homes are luxury homes in every detail which includes height, area, materials, details and value. The Pinnacle homes have been designed to emulate the Stonehaven homes in a slightly smaller foot print but using the permitted half story to achieve parity in all of these same design elements. Since achieving the parity is not possible and the height regulation is not a self imposed regulation, the request for a variance is justified to grant relief for this hardship.

PRELIMINARY SITE PLANS

SWC CROOKS & WATTLES

TROY, OAKLAND COUNTY, MICHIGAN





LOCATION MAP
NO SCALE

INDEX OF DRAWINGS	
NUMBER	TITLE
	COVER SHEET
C-1.0	TOPOGRAPHIC SURVEY
C-2.0	PRELIMINARY SITE PLAN
C-3.0	PRELIMINARY GRADING PLAN
C-4.0	PRELIMINARY UTILITY PLAN
C-5.0	NOTES AND DETAILS
L-1.0	PRELIMINARY LANDSCAPE PLAN
L-1.1	LANDSCAPE PLAN ENLARGEMENT
L-1.2	LANDSCAPE PLAN ENLARGEMENT
L-1.3	LANDSCAPE DETAILS
L-1.4	LANDSCAPE AMENITY OPTIONS
T-1.0	TREE PRESERVATION PLAN
T-1.1	EXISTING TREE LIST
	ARCHITECTURAL PLANS
A-1	COLORED ELEVATION
A-2	COLORED FLOOR PLANS
A-3	BLACK & WHITE ELEVATIONS
A-4	MATERIAL BOARD
	PHOTOMETRIC PLAN 1 OF 2
	PHOTOMETRIC PLAN 2 OF 2

DESIGN TEAM

OWNER

THE CHOICE GROUP
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EMAIL: JEVANS@PEAGROUP.COM

PEA GROUP

REVISIONS	
DESCRIPTION	DATE
ORIGINAL ISSUE DATE	5/17/2024
CITY COMMENTS	10/11/2024
REVISED PER CITY COMMENTS	1/16/2025

NOT FOR CONSTRUCTION

PEA GROUP | SWC CROOKS & WATTLES | PEA JOB NO. 2023-1219 | PRELIMINARY SITE PLANS

LEGAL DESCRIPTION
PARCEL ID 20-20-226-015, 3991 CROOKS ROAD
(Per Devon Title Agency (Issuing agent Stewart Title Guaranty Company), Commitment #10017859, Commitment Date: November 8th, 2023)

Land situated in the City of Troy, County of Oakland, State of Michigan described as follows:

The North 217.80 feet of Lot 19, AMENDED PLAT OF LOTS 1 THROUGH 7 OF SUPERVISOR'S PLAT OF JAMES ACRES, according to the plat thereof, as recorded in Liber 283 of Plats, Pages 1 and 2, Oakland County Records.

Formerly described as:

The North 244.80 feet of Lot 1, except the North 27 feet and the East 27 feet in road, SUPERVISOR'S PLAT OF JAMES ACRES, according to the plat thereof, as recorded in Liber 55 of Plats, Page 21, Oakland County Records; Containing 1.66± Acres.

LEGAL DESCRIPTION
PARCEL ID 20-20-226-016, 3941 CROOKS ROAD
(Per Devon Title Agency (Issuing agent Stewart Title Guaranty Company), Commitment #10017860, Commitment Date: November 8th, 2023)

Land situated in the City of Troy, County of Oakland, State of Michigan described as follows:

The South 220 feet of the North 437.80 feet of Lot 19, AMENDED PLAT OF LOTS 1 THROUGH 7, SUPERVISOR'S PLAT OF JAMES ACRES, according to the plat thereof, as recorded in Liber 283 of Plats, Pages 1 and 2, Oakland County Records.

Previously described as:

The South 220 feet of the North 464.80 feet of Lot 1, except the East 27 feet taken for Crooks Road, SUPERVISOR'S PLAT OF JAMES ACRES, according to the plat thereof, as recorded in Liber 55, Page 21, Oakland County Records; Containing 1.68± Acres.

LEGAL DESCRIPTION
PARCEL ID 20-20-226-106, VACANT CROOKS ROAD
(Per Devon Title Agency (Issuing agent Stewart Title Guaranty Company), Commitment #10017862, Commitment Date: November 7th, 2023)

Land situated in the City of Troy, County of Oakland, State of Michigan described as follows:

Amended plat of Lots 1 through 7, Supervisor's Plat of James Acres; Part of lot 19; Beginning at a point distant South 02°46'01" East (Recorded as South) 673.89 feet and South 88°40'18" West (Recorded as North 88°33'41" West) 60.02 feet from the Northeast Section corner; thence South 02°46'01" East (Recorded as South) 100.03 feet; thence South 88°40'18" West (Recorded as North 88°33'41" West) 237.17 feet; thence North 02°45'33" West (Recorded as North 00°00'28" East) 5.00 feet; thence South 88°40'18" West (Recorded as North 88°33'41" West) 95.03 feet; thence North 02°45'33" West (Recoreded as North 00°00'28" East) 95.03 feet; thence North 88°40'18" East (Recorded as South 88°33'41" East) 332.19 feet to beginning.

Formerly described as:

South 110 feet of Lot 1, except the East 27 feet thereof taken for Crooks Road, Supervisor's Plat of James Acres Subdivision, as recorded in Liber 55, page 21 of Plats, Oakland County Records; Containing 0.75± Acres.

LEGAL DESCRIPTION PARCEL A
(DEEDED AREA Per Liber 11096, Page 571)
Note: Deeded area was not split and remains part of 20-20-226-017 in City and County Records.

West 100 feet of Lots 1, except the North 464.8 feet and excepting the South 110 feet, Supervisor's Plat of James Acres, as recorded in Liber 55 of Plats, Page 21, Oakland County Records.

LEGAL DESCRIPTION PARCEL A
(AS SURVEYED per PEA Group)

Land situated in the City of Troy, County of Oakland, State of Michigan described as follows:

Part of lot 19 of Amended plat of Lots 1 through 7, Supervisor's Plat of James Acres; COMMENCING at the Northeast Corner of Section 20, T.02N., R.11E., thence along the east line of said Section 20, South 02°46'01" East (Recorded as South), 673.89 feet; thence South 88°40'18" West (Recorded as North 88°33'41" West), 60.02 feet to the westerly line of Crooks Road (60 foot half width); thence continuing South 88°40'18" West (Recorded as North 88°33'41" West), 262.16 feet to the POINT OF BEGINNING; thence continuing South 88°40'18" West (Recorded as North 88°33'41" West), 100.03 feet; thence North 02°45'26" West (Recorded as North 00°00'28" East), 164.29 feet; thence North 88°56'53" East, 100.00 feet; thence South 02°45'26" East, 167.29 feet to the POINT OF BEGINNING. Containing 0.38± Acres.

Formerly described as:

West 100 feet of Lot 1, except the North 464.8 feet and excepting the South 110 feet, Supervisor's Plat of James Acres, as recorded in Liber 55 of Plats, Page 21, Oakland County Records.

LEGEND:

- EX. OH, ELEC, POLE & GUY WIRE
- EX. U.G, CABLE TV & PEDESTAL
- EX. U.G, COMMUNICATION LINE, PEDESTAL & MANHOLE
- EX. U.G, ELEC,MANHOLE & METER
- EX. GAS LINE
- EX. GAS VALVE & GAS LINE MARKER
- EX. TRANSFORMER & IRRIGATION VALVE
- EX. WATER MAIN
- EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
- EX. WATER VALVE BOX & SHUTOFF
- EX. SANITARY SEWER
- EX. SANITARY CLEANOUT & MANHOLE
- EX. COMBINED SEWER MANHOLE
- EX. STORM SEWER
- EX. CLEANOUT, MANHOLE & CULVERT
- EX. SQUARE, ROUND & BEEHIVE CATCH BASIN
- EX. YARD DRAIN, ROOF DRAIN & DOWNSPOUT
- EX. UNIDENTIFIED STRUCTURE
- EX. MAILBOX, SIGN & GUARD POST
- EX. LIGHT POLE, GROUND LIGHT & YARD LIGHT
- EX. FENCE
- EX. GUARD RAIL
- EX. DEC. TREE, CONIFEROUS TREE & SHRUB
- EX. TREE TAG, & TREE LINE
- EX. SPOT ELEVATION
- EX. CONTOUR
- EX. WETLAND
- IRON FOUND / SET
- NAIL FOUND / NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND / SET
- SECTION CORNER FOUND
- (P) (R) (M) PLAT / RECORDED / MEASURED

REFERENCE DRAWINGS:

ELECTRIC	DTE MAP #313-394 (FROM PEA JOB NO. 23-0880)
CABLE	AT&T MAP A1, DATED 01/17/2024 LEVEL 3 MAP, EMAIL DATED 01/10/2024
FIBER OPTIC	COMCAST MAP, EMAIL DATED 01/15/2024
GAS	CONSUMERS MAP 0261201, DATED 01/10/2024
STORM SEWER	CITY OF TROY GIS MAP DATED 01/11/2024
SANITARY SEWER	CITY OF TROY GIS MAP DATED 01/11/2024
WATER MAIN	CITY OF TROY GIS MAP DATED 01/11/2024

FLOODPLAIN NOTE:
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X'; AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FLOOD INSURANCE RATE MAP NUMBER 26125C0533F, DATED 09/29/2006.

BENCHMARKS:
(GPS DERIVED - NAVD88)

BM #304
DIMPLE ON AN ARROW ON A HYDRANT LOCATED AT THE SOUTHWEST CORNER OF WATTLES ROAD & CROOKS ROAD.
ELEV. - 744.27

BM #305
SET BENCH TIE IN THE NORTHWEST FACE OF A POWER POLE LOCATED ON THE SOUTH SIDE OF WATTLES ROAD, APPROX. 235' WEST FROM THE CENTERLINE OF CROOKS ROAD.
ELEV. - 774.09

BM #306
DIMPLE ON AN ARROW ON A HYDRANT LOCATED OF THE WEST SIDE OF CROOKS ROAD, APPROX. 105' NORTH FROM THE CENTERLINE OF SALMA DRIVE.
ELEV. - 738.46

NOTE:
MEASURED BEARINGS BASED ON MICHIGAN STATE PLANE COORDINATE, ZONE 2113, GRID NORTH

WETLAND NOTE:
THERE ARE NO REGULATED WETLANDS ON SITE.

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STATE OF MICHIGAN
JOHN R. HOUSER
ENGINEER
NO. 46876
LICENSED PROFESSIONAL ENGINEER

NORTH

0 15 30 60
SCALE: 1" = 30'

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

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO GUARANTEE IS 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.

LOCATION MAP

CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS	
CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
TOPOGRAPHIC SURVEY

PEA JOB NO.	23-1219
P.M.	JRH
DN.	KS
DES.	KS

DRAWING NUMBER:
C-1.0

NOT FOR CONSTRUCTION

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. 'NO PARKING-FIRE LANE' SIGNS SHALL BE POSTED ALONG ALL FIRE LANES AT 100 FOOT INTERVALS OR AS DIRECTED BY THE FIRE OFFICIAL.
3. REFER TO SHEET C-5.0 FOR ON-SITE PAVING DETAILS.

SITE DATA TABLE:

TOTAL SITE AREA: 5.38 ACRES (234,329 SF)

ZONING: NN, NEIGHBORHOOD NODES – NODE I

PROPOSED USE: MULTI-FAMILY RESIDENTIAL

BUILDING INFORMATION:
BUILDING FORM 'C'

MAXIMUM ALLOWABLE BUILDING HEIGHT = 30' (2.5 STORIES)
PROPOSED BUILDING HEIGHT = 33'**
**VARIANCE REQUESTED

MAXIMUM LOT COVERAGE = 30%
BUILDING LOT COVERAGE = 62,704 / 234,329 = 26.8%

BUILDING SETBACK:	REQUIRED:	PROPOSED:
FRONT (NORTH):	10'	15.00'
FRONT (EAST):	10'	14.00'
REAR (SOUTH):	30'	30.00'
REAR (WEST):	30'	30.00'

PARKING CALCULATIONS:
MULTI-FAMILY RESIDENTIAL = 2 SPACES PER UNIT
REQUIRED PARKING = 36*2 = 72 SPACES
PROPOSED PARKING = 90 SPACES
(72 DRIVEWAY/GARAGE SPACES PLUS 18 GUEST SPACES)

OPEN SPACE CALCULATIONS:
OPEN SPACE REQUIRED = 15%
OPEN SPACE PROVIDED = 83,145 / 234,329 = 35.5%

BENCHMARKS:
(GPS DERIVED - NAVD88)

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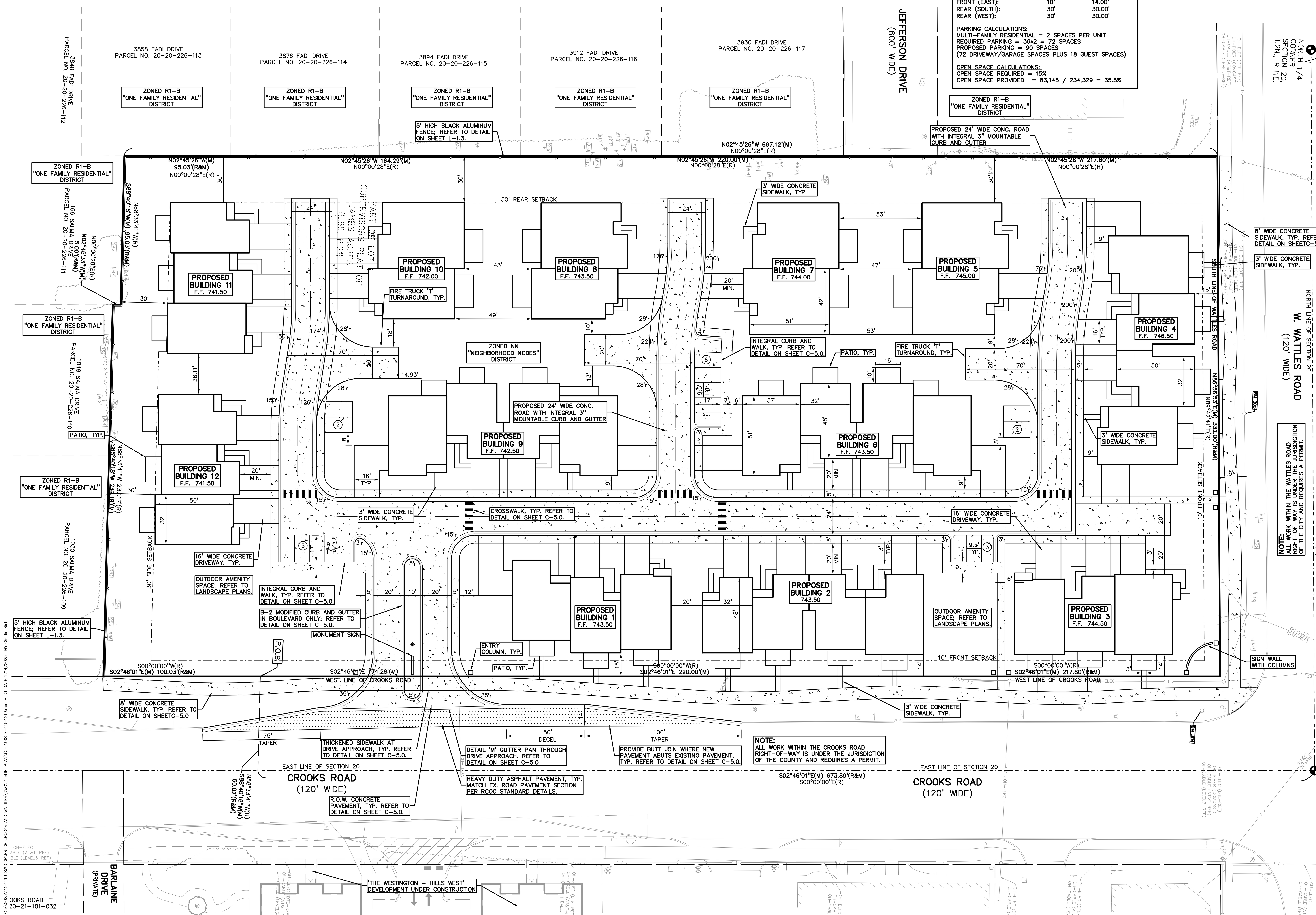
DIMPLE ON AN ARROW ON A HYDRANT LOCATED OF THE WEST SIDE OF CROOKS ROAD, APPROX. 105' NORTH FROM THE CENTERLINE OF SALMA DRIVE.
ELEV.- 738.46

LEGEND:

CONCRETE PAVEMENT (STD DUTY, HEAVY DUTY, R.O.W. ONLY)
ASPHALT PAVEMENT (STD DUTY, HEAVY DUTY, DEEP STRENGTH)
GRAVEL
WETLAND
CONCRETE CURB AND GUTTER
REVERSE GUTTER PAN
SETBACK LINE
SIGN
LIGHTPOLE
FENCE
GUARD RAIL

FLOODPLAIN NOTE:
BY GRAPHICAL PLOTTING, SITE IS WITHIN ZONE 'X', AREA DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN PER FLOOD INSURANCE RATE MAP NUMBER 26125C0533F, DATED 09/29/2006.



NORTH

SCALE: 1" = 30'

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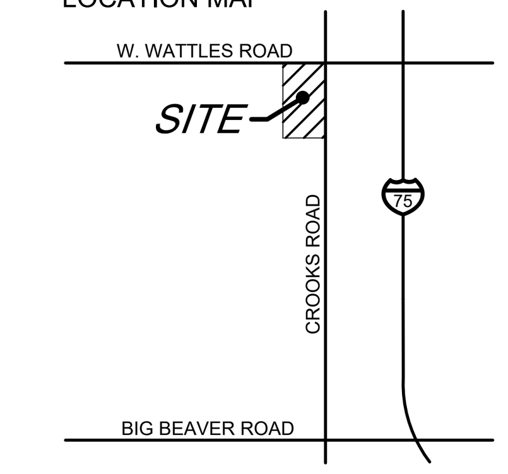
LOCATION MAP



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CLIENT

THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE

SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS	
CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

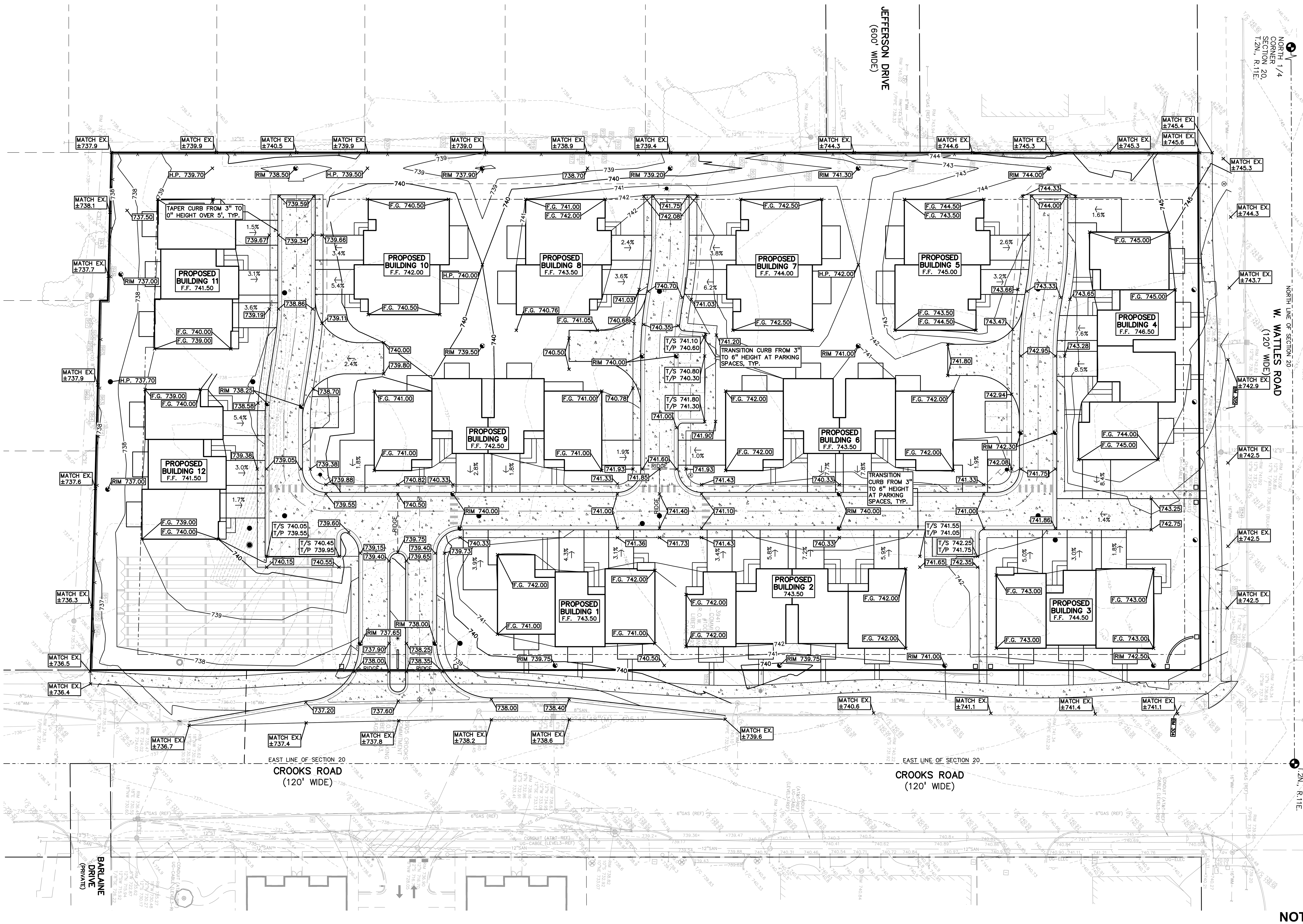
ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
PRELIMINARY SITE PLAN

PEA JOB NO.	23-1219
P.M.	JRH
DN.	KS
DES.	KS
DRAWING NUMBER:	

NOT FOR CONSTRUCTION

C-2.0



GRADING LEGEND:

+696.91	EXISTING SPOT ELEVATION
622.50	PROPOSED SPOT ELEVATION: TYPICALLY TOP OF PAVEMENT IN PAVED AREAS, GUTTER GRADE IN CURB LINES.
670	EXISTING CONTOUR
922	PROPOSED CONTOUR
	PROPOSED REVERSE GUTTER PAN
	PROPOSED RIDGE LINE
	PROPOSED SWALE/DITCH

ABBREVIATIONS

T/C = TOP OF CURB
T/P = TOP OF PAVEMENT
T/S = TOP OF SIDEWALK
T/W = TOP OF WALL
B/W = BOTTOM OF WALL
G = GUTTER GRADE
FF = FINISH FLOOR
FG = FINISH GRADE
RIM = RIM ELEVATION

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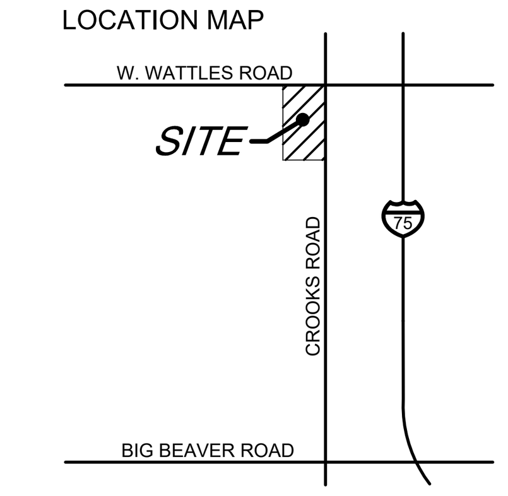

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TROY, MICHIGAN 48083

PROJECT TITLE

SWC CROOKS & WATTLES
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REVISIONS	
CITY COMMENTS	10/11/24
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ORIGINAL ISSUE DATE:
MAY 17, 2024

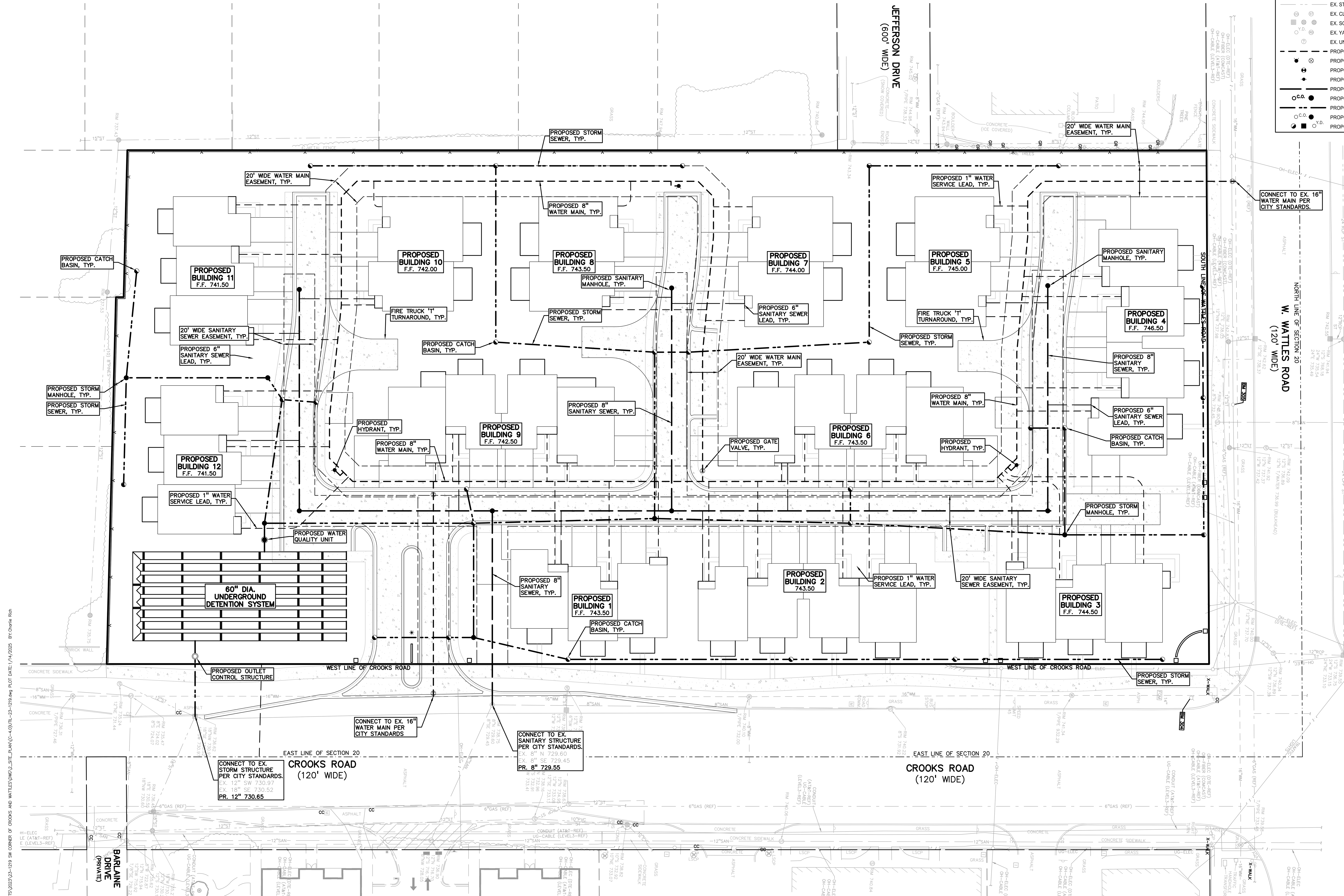
DRAWING TITLE

PRELIMINARY GRADING PLAN

PEA JOB NO.	23-1219
P.M.	JRH
DN.	KS
DES.	KS

DRAWING NUMBER:
C-3.0

NOT FOR CONSTRUCTION



UTILITY LEGEND:

—OH—ELEC—	EX. OH. ELEC, POLE & GUY WIRE
—UG—CATV—	EX. U.G. CABLE TV & PEDESTAL
—UG—COMM—	EX. U.G. COMMUNICATION LINE, PEDESTAL & MANHOLE
—UG—ELEC—	EX. U.G. ELEC,MANHOLE, METER & HANDHOLE
	EX. GAS LINE
	EX. GAS VALVE & GAS LINE MARKER
	EX. TRANSFORMER & IRRIGATION VALVE
	EX. WATER MAIN
	EX. HYDRANT, GATE VALVE & POST INDICATOR VALVE
	EX. WATER VALVE BOX & SHUTOFF
	EX. SANITARY SEWER
	EX. SANITARY CLEANOUT & MANHOLE
	EX. COMBINED SEWER MANHOLE
	EX. STORM SEWER
	EX. CLEANOUT & MANHOLE
	EX. SQUARE, ROUND, & BEEHIVE CATCH BASIN
Y.D.	EX. YARD DRAIN & ROOF DRAIN
	EX. UNIDENTIFIED STRUCTURE
	PROPOSED WATER MAIN
	PROPOSED HYDRANT AND GATE VALVE
	PROPOSED TAPPING SLEEVE, VALVE & WELL
	PROPOSED POST INDICATOR VALVE
	PROPOSED SANITARY SEWER
C.O.	PROPOSED SANITARY CLEANOUT & MANHOLE
	PROPOSED STORM SEWER
C.O.	PROPOSED STORM SEWER CLEANOUT & MANHOLE
Y.D.	PROPOSED CATCH BASIN, INLET & YARD DRAIN

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[illegible]

NORTH

0 15 30 60
SCALE: 1" = 30'

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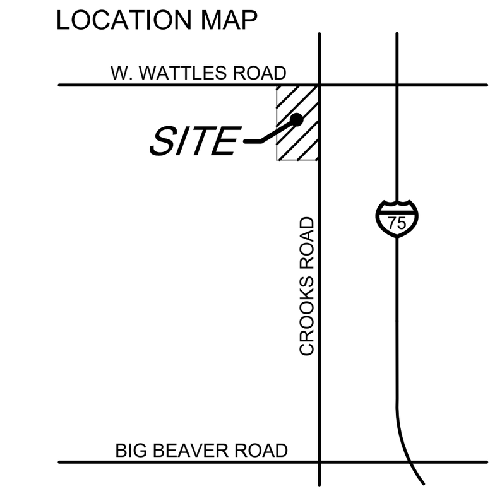

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PROJECT TITLE
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CITY OF TROY, OAKLAND COUNTY, MICHIGAN

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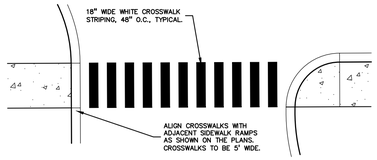
ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
PRELIMINARY UTILITY PLAN

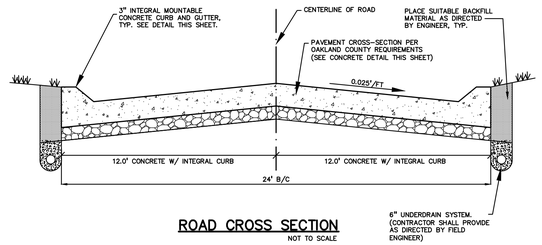
PEA JOB NO.	23-1219
P.M.	JRH
DN.	KS
DES.	KS

DRAWING NUMBER:
C-4.0

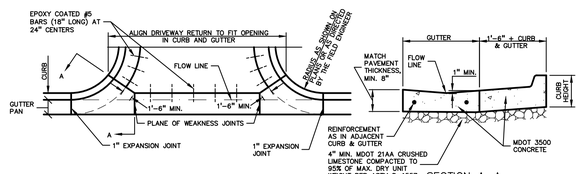
NOT FOR CONSTRUCTION



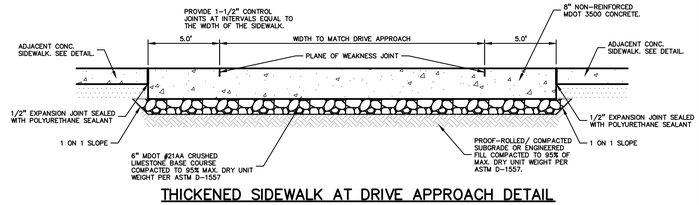
STRIPED CROSSWALK DETAIL
NOT TO SCALE



ROAD CROSS SECTION
NOT TO SCALE



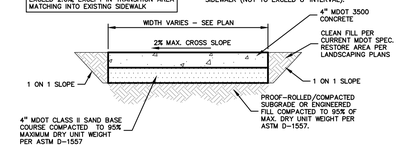
MDOT DRIVEWAY OPENING–DETAIL 'M'
NOT TO SCALE



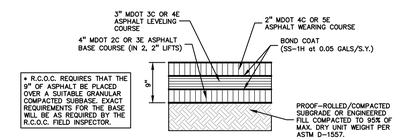
THICKENED SIDEWALK AT DRIVE APPROACH DETAIL
NOT TO SCALE

NOTE:
CROSS-SLOPE OF SIDEWALK MUST NOT EXCEED 2.0%, EXCEPT IN TRANSITION AREA MATCHING INTO EXISTING SIDEWALK

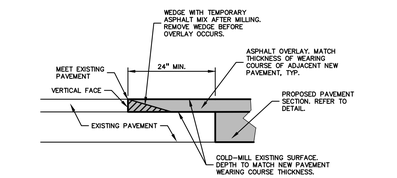
PROVIDE 1" DEPTH SAWCUT CONTROL JOINTS AT INTERVALS EQUAL TO THE WIDTH OF THE SIDEWALK (NOT TO EXCEED 8' INTERVAL).



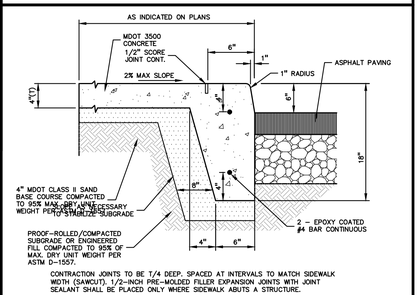
CONCRETE SIDEWALK
NOT TO SCALE



RIGHT-OF-WAY ASPHALT PAVEMENT DETAIL
NOT TO SCALE

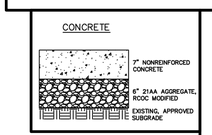


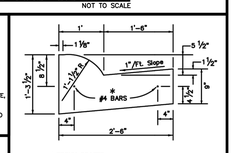
BUTT JOINT DETAIL
NOT TO SCALE



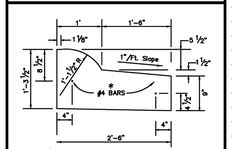
CONTRACTION JOINTS TO BE T/4 DEEP, SPACED AT INTERVALS TO MATCH SIDEWALK WIDTH (SAWCUT). 1/2-INCH PRE-MOLDED FILLER EXPANSION JOINTS WITH JOINT SEALANT SHALL BE PLACED ONLY WHERE SIDEWALK ABUTS A STRUCTURE.

INTEGRAL CURB AND SIDEWALK
NOT TO SCALE

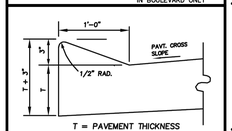




B-2 MODIFIED CURB & GUTTER
NOTE: TO BE USED IN BOULEVARD ONLY



B-2 MODIFIED REVERSE GUTTER
NOTE: TO BE USED IN BOULEVARD ONLY



INTEGRAL MOUNTABLE CURB DETAIL

NOT FOR CONSTRUCTION

PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN
JOHN R. HOUSER
ENGINEER
NO. 46876
LICENSED PROFESSIONAL ENGINEER

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

CAUTION!!
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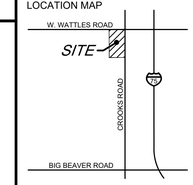
LOCATION MAP



CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS

CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
NOTES AND DETAILS

PEA JOB NO.	23-1219
P.M.	JRH
DN.	KS
DES.	KS

DRAWING NUMBER:
C-5.0

S:\PROJECTS\2023\23-1219 SW CORNER OF CROOKS AND WATTLES\DWG\2_SITE_PLAN\C-5.0DETAIL-23-1219.dwg PLOT DATE:1/14/2025 BY:Charlie Rich

PLANT SCHEDULE L-1.0

CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER	SPACING
DECIDUOUS TREES						
ARB2.5	10	ACER RUBRUM 'BOWHALL'	BOWHALL RED MAPLE	2.5" CAL.	B&B	PER PLAN
GBF2.5	2	GINKGO BILOBA 'FASTIGIATA'	FASTIGIATE MAIDENHAIR TREE	2.5" CAL.	B&B	PER PLAN
PCC2.5	6	PRUNUS CERASIFERA 'CRIPOIZAM'	CRIMSON POINTE PLUM(WHITE FLOWER)	2.5" CAL.	B&B	PER PLAN
TB2.5	6	TILIA AMERICANA 'BOULEVARD'	BOULEVARD AMERICAN LINDEN	2.5" CAL.	B&B	PER PLAN
ZS2.5	7	ZELKOVA SERRATA 'GREEN VASE'	GREEN VASE JAPANESE ZELKOVA	2.5" CAL.	B&B	PER PLAN
	31	SUBTOTAL:				
EVERGREEN TREES						
AB8	16	ABIES BALSAMEA	BALSAM FIR	8' HT.	B&B	PER PLAN
AC8	23	ABIES CONCOLOR	WHITE FIR	8' HT.	B&B	PER PLAN
JH6	94	JUNIPERUS CHINENSIS 'HETZII COLUMNARIS'	HETZI COLUMN JUNIPER (UPRIGHT EVERGREEN)	6' HT.	B&B	PER PLAN
PA8	6	PICEA ABIES	NORWAY SPRUCE	8' HT.	B&B	PER PLAN
PG8	29	PICEA GLAUCA	WHITE SPRUCE	8' HT.	B&B	PER PLAN
PGD8	11	PICEA GLAUCA 'DENSATA'	BLACK HILLS SPRUCE	8' HT.	B&B	PER PLAN
PO8	9	PICEA OMORIKA	SERBIAN SPRUCE	8' HT.	B&B	PER PLAN
PN8	10	PINUS NIGRA	AUSTRIAN PINE	8' HT.	B&B	PER PLAN
PS8	4	PINUS STROBUS	EASTERN WHITE PINE	8' HT.	B&B	PER PLAN
	202	SUBTOTAL:				
ORNAMENTAL TREES						
ACA8	8	AMELANCHIER CANADENSIS	SHADBLOW SERVICEBERRY	8' HT.	B&B	PER PLAN
CCA8	8	CERCIS CANADENSIS 'ACE OF HEARTS'	ACE OF HEARTS EASTERN REDBUD	8' HT.	B&B	PER PLAN
CK8	4	CORNUS KOUSA	KOUSA DOGWOOD	8' HT.	B&B	PER PLAN
MRS2.5	5	MAGNOLIA STELLATA 'ROYAL STAR'	ROYAL STAR MAGNOLIA	2.5" CAL.	B&B	PER PLAN
MJ2.5	10	MAGNOLIA X 'JANE'	JANE MAGNOLIA	2.5" CAL.	B&B	PER PLAN
SR2.5	4	SYRINGA RETICULATA 'IVORY SILK'	IVORY SILK JAPANESE TREE LILAC	2.5" CAL.	B&B	PER PLAN
	39	SUBTOTAL:				

LANDSCAPE CALCULATIONS:

PER CITY OF TROY ZONING ORDINANCE:
ZONING: NEIGHBORHOOD NODES (NN) – NODE 1
PROPOSED USE: MULTI-FAMILY RESIDENTIAL

SCREENING (S)
GROUP 2: RESIDENTIAL/LODGING USES ABUT GROUP 1: RESIDENTIAL USES. SCREEN ALT 1 OR 2 REQUIRED. SCREEN ALT 2: 1 LARGE EVG TREE PER 10LF

REQUIRED: SOUTH BOUNDARY: 337 LF / 10 = 34 EVG TREES
WEST BOUNDARY: 697 LF / 10 = 70 EVG TREE

PROVIDED: SOUTH BOUNDARY: 30 PROPOSED EVG TREES AND 4 EXISTING EVG TREES
WEST BOUNDARY: 66 PROPOSED EVG TREES AND 4 EXISTING EVG TREES

PARKING LOT LANDSCAPE (P)
1 TREE PER 8 PARKING SPACES
LANDSCAPING TO BE 5' FROM CURB WHERE THERE IS VEHICLE OVERHANG AND 3' WHERE THERE IS NOT.
REQUIRED: 23 PARKING SPACES / 8 = 3 DEC TREES

PROVIDED: 3 DEC TREES

GREENBELT (G)
1 DEC TREE PER 30 LF OF FRONTAGE ABUTTING A PUBLIC ROW (INCLUDES DRIVES)
REQUIRED: CROOKS RD : 712 LF / 30 = 24 TREES
WATTLES RD: 332 LF / 30 = 11 TREES

PROVIDED: CROOKS RD : 24 PROPOSED DEC TREES
WATTLES RD: 11 PROPOSED DEC TREES

GENERAL SITE LANDSCAPE
20% OF THE TOTAL SITE AREA IS TO BE LANDSCAPED
REQUIRED: 234,329 SF SITE AREA X 20% = 46,866 SF LANDSCAPED AREA

PROVIDED: 97,091 SF LANDSCAPED AREA (41.4%)

TREE REPLACEMENT (R)
REQUIRED:

WOODLAND TREES			
WOODLAND TREES REMOVED:	51	(REPLACE AT 50% OF REMOVED DBH)	
488" DBH x 0.5 =		244" REPLACEMENT	
WOODLAND TREES SAVED:	16	(CREDIT OF 2X DBH)	
177" DBH x 2 =		354" CREDIT	
244 - 354 = -110			
110" DBH CREDIT FOR WOODLAND PRESERVATION			
LANDMARK TREES			
LANDMARK TREES REMOVED:	25	(REPLACE AT 100% OF REMOVED DBH)	
481" DBH x 1 =		481" REPLACEMENT	
LANDMARK TREES SAVED:	1	(CREDIT OF 2X DBH)	
13" DBH x 2 =		26" CREDIT	
481 - 26 = 455			
455" DBH REQUIRED FOR LANDMARK REPLACEMENT			
345" TOTAL DBH REQUIRED FOR REPLACEMENT			
EXEMPT TREES			
(NO REPLACEMENT REQUIRED FOR EXEMPT TREES)			
SAVED EXEMPT TREES:	4	Trees	
EXEMPT TREES ON SITE:	82	Trees	
TOTAL SAVED TREES 6" AND ABOVE ON SITE:	21	Trees	

REQUIRED: 345" / 2.5" = 138, 2.5" OR 6' HT. UPRIGHT EVG.

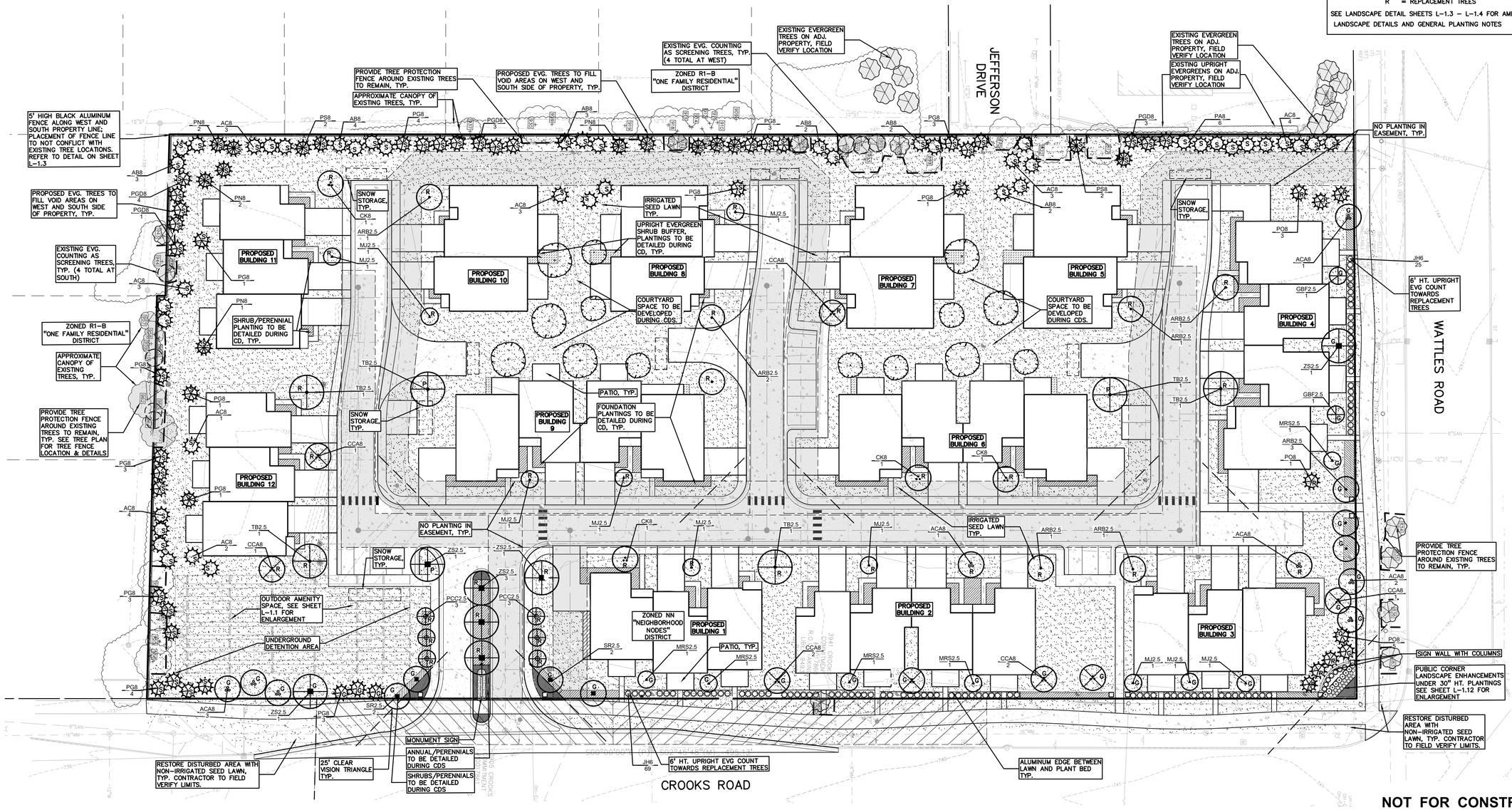
PROVIDED: 44, 2.5" DEC OR 8' HT. EVG TREES (2.5" X 44 = 110" DBH)
94, 6' UPRIGHT EVG. (ARBORVITAE/JUNIPER) (2.5 " X 94 =235" DBH)
(ALONG CROOKS AND WATTLES)
= 345" TOTAL DBH PROVIDED

KEY:

= REQUIRED DECIDUOUS TREES
= REQUIRED EVERGREEN TREES
= REQUIRED REPLACEMENT UPRIGHT EVERGREENS
= POTENTIAL COURTYARD TREE TO BE DETAILED DURING CD'S
= IRRIGATED SEED LAWN
= NON-IRRIGATED SEED LAWN
= UTILITY EASEMENT AREA NO TREES TO BE LOCATED HERE
= SHRUB/PERENNIALS FOUNDATION PLANTS TO BE DETAILED DURING CD'S
= UPRIGHT EVERGREEN SHRUB BUFFER TO BE DETAILED DURING CD'S
= ANNUALS/ PERENNIALS TO BE DETAILED DURING CD'S
= EXISTING DECIDUOUS TREE TO REMAIN
= EXISTING EVERGREEN TREE TO REMAIN
= TREE PROTECTION FENCE

LETTER DESIGNATION FOR ORDINANCE REQUIRED MATERIAL
S = SCREENING LANDSCAPING
G = GREENBELT TREES
P = PARKING LOT TREES
R = REPLACEMENT TREES

SEE LANDSCAPE DETAIL SHEETS L-1.3 – L-1.4 FOR AMENITY OPTIONS
LANDSCAPE DETAILS AND GENERAL PLANTING NOTES



S:\PROJECTS\2023\23-1219 SW CORNER OF CROOKS AND WATTLES\DWG\2_SITE_PLAN\L-1.0_LANDSCAPE PLAN-23-1219.dwg PLOT DATE: 1/15/2025 BY: Janet Evans

PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
NO. 1330
REGISTERED LANDSCAPE ARCHITECT

NORTH

0 15 30 60
SCALE: 1" = 30'

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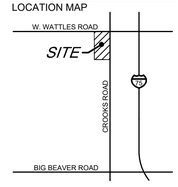

CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS	
CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
PRELIMINARY LANDSCAPE PLAN

PEA JOB NO.	23-1219
P.M.	JRH
DN.	JLE
DES.	JLE

DRAWING NUMBER:
L-1.0

NOT FOR CONSTRUCTION

KEY:

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= EXISTING DECIDUOUS TREE TO REMAIN

= EXISTING EVERGREEN TREE TO REMAIN

= IRRIGATED SEED LAWN

= NON-IRRIGATED SEED LAWN

= UTILITY EASEMENT AREA
NO TREES TO BE LOCATED HERE

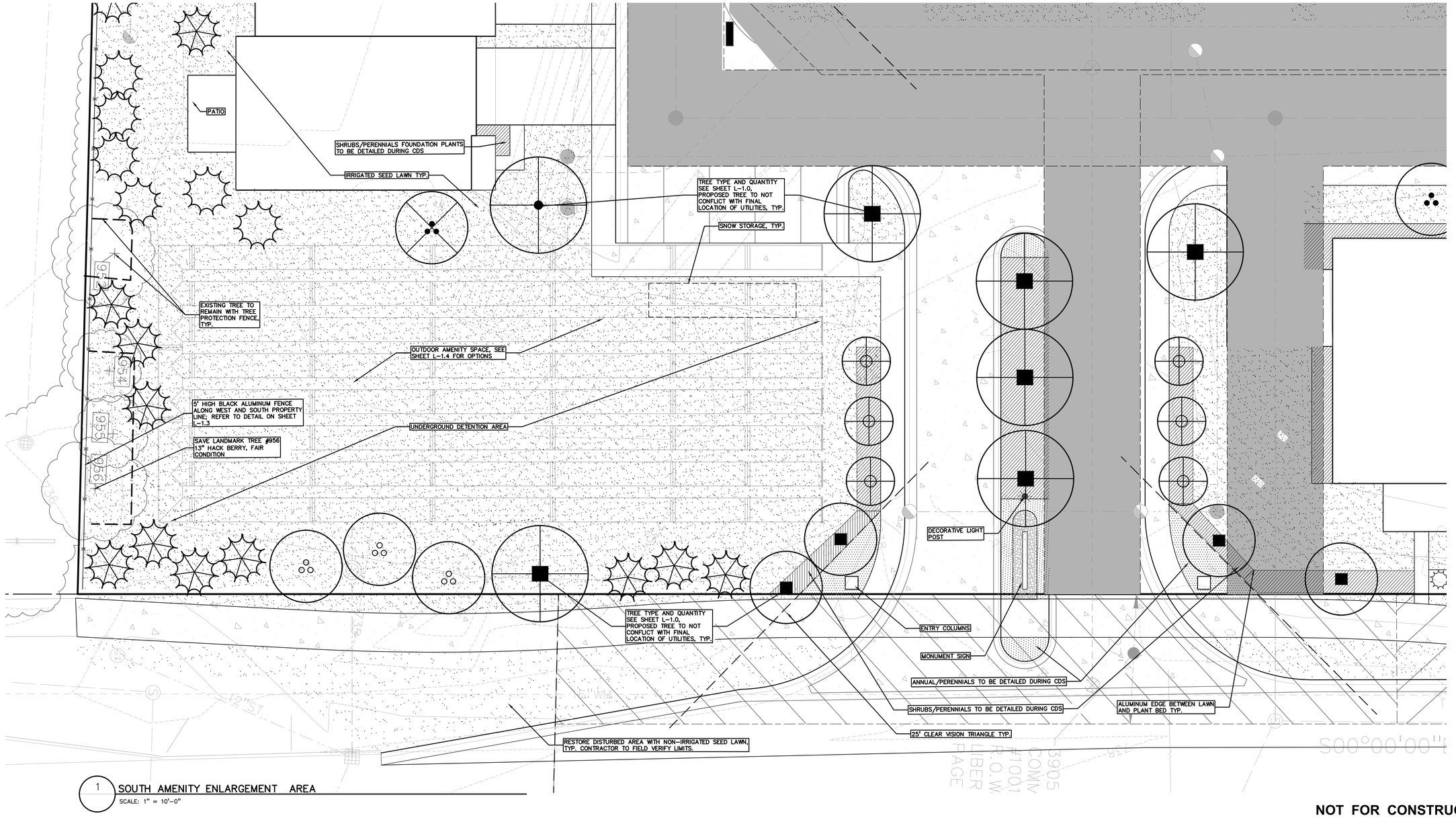
= SHRUB/PERENNIALS FOUNDATION PLANTS
TO BE DETAILED DURING CD'S

= UPRIGHT EVERGREEN SHRUB BUFFER
TO BE DETAILED DURING CD'S

= ANNUALS/ PERENNIALS
TO BE DETAILED DURING CD'S

= TREE PROTECTION FENCE

SEE LANDSCAPE DETAIL SHEETS L-1.3 - L-1.4 FOR AMENITY OPTIONS
LANDSCAPE DETAILS AND GENERAL PLANTING NOTES



1 SOUTH AMENITY ENLARGEMENT AREA
SCALE: 1" = 10'-0"

NOT FOR CONSTRUCTION

PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
NO. 1350
REGISTERED LANDSCAPE ARCHITECT

NORTH

0 5 10 20
SCALE: 1" = 10'

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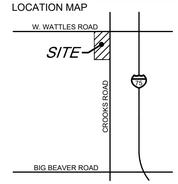

CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS	
CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

ORIGINAL ISSUE DATE:
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DRAWING TITLE
LANDSCAPE PLAN ENLARGEMENT

PEA JOB NO.	23-1219
P.M.	JRH
DN.	JLE
DES.	JLE

DRAWING NUMBER:
L-1.1

S:\PROJECTS\2023\23-1219 SW CORNER OF CROOKS AND WATTLES\DWG\2_SITE_PLAN\L-1.0_LANDSCAPE PLAN-23-1219.dwg PLOT DATE: 1/16/2025 BY: Janet Evans

KEY:

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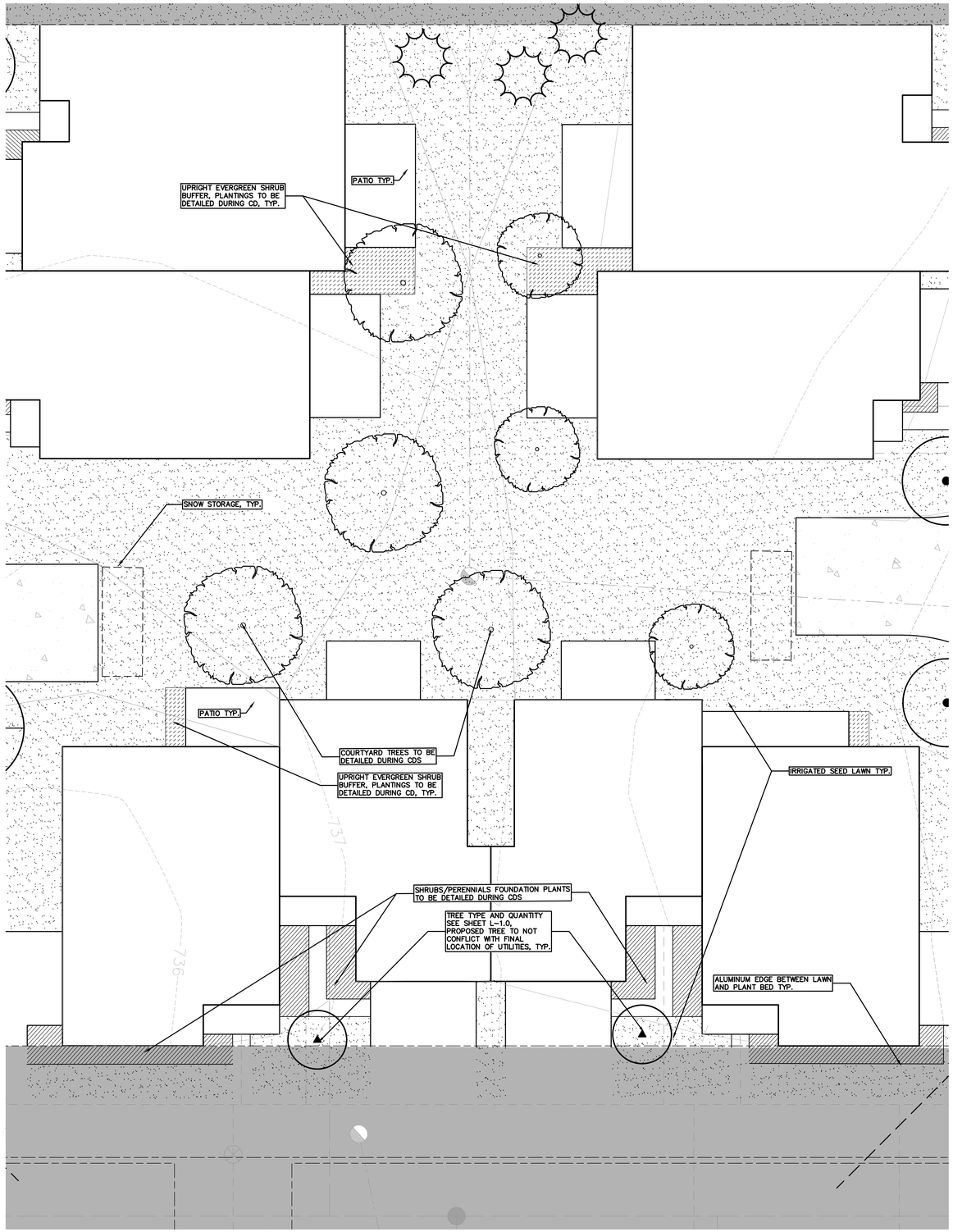
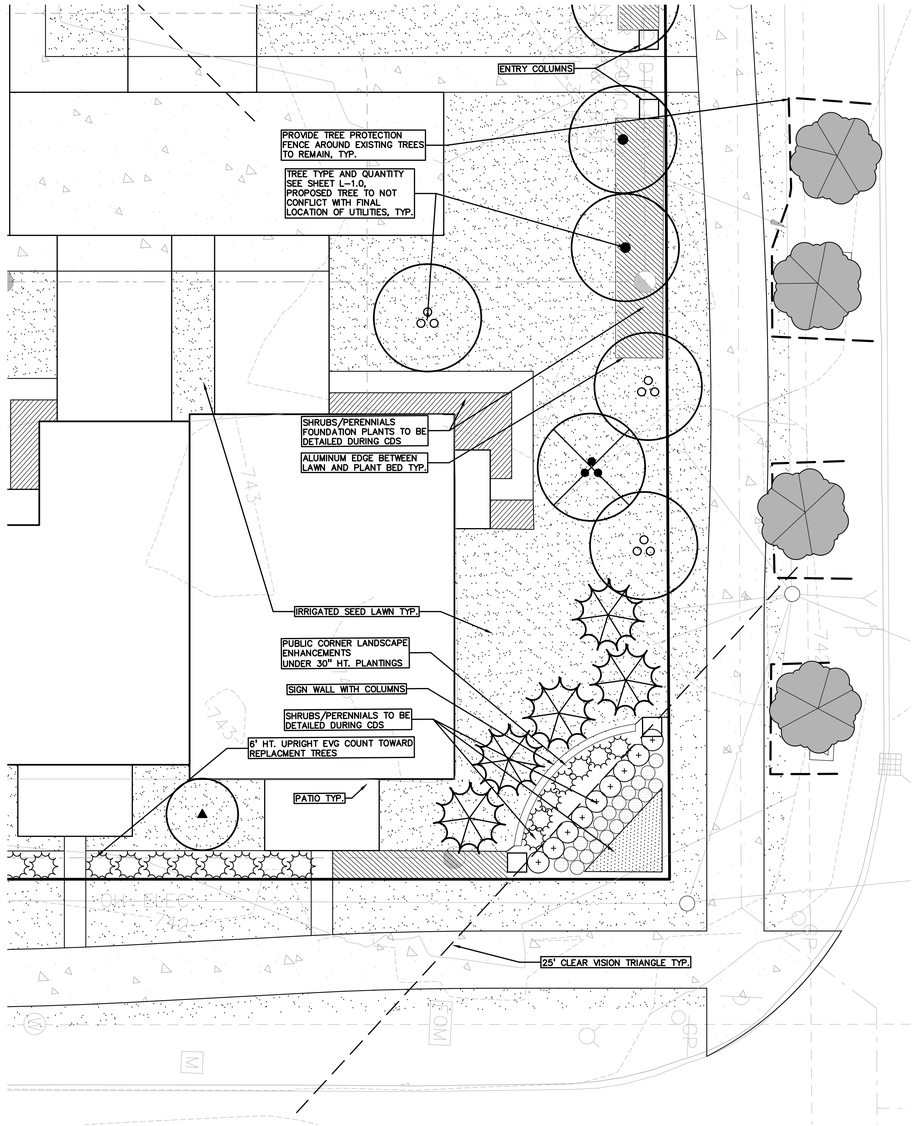
= TREE PROTECTION FENCE

SEE LANDSCAPE DETAIL SHEETS L-1.3 - L-1.4 FOR AMENITY OPTIONS
LANDSCAPE DETAILS AND GENERAL PLANTING NOTES



2 TYPICAL PLANTING AT UNIT
SCALE: 1" = 10'-0"



1 NORTH EAST CORNER ENLARGEMENT
SCALE: 1" = 10'-0"

PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
NO. 1390
REGISTERED LANDSCAPE ARCHITECT

NORTH

0 5 10 20
SCALE: 1" = 10'

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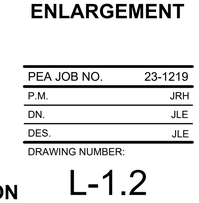

CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

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DRAWING TITLE
LANDSCAPE PLAN ENLARGEMENT

PEA JOB NO.	23-1219
P.M.	JRH
DN.	JLE
DES.	JLE

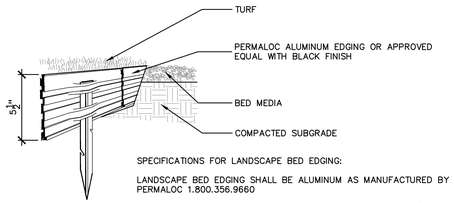
DRAWING NUMBER:
L-1.2

NOT FOR CONSTRUCTION

S:\PROJECTS\2023\23-1219 SW CORNER OF CROOKS AND WATTLES\SWC\2_SITE_PLAN\(L-1.0)LANDSCAPE PLAN-23-1219.dwg PLOT DATE: 1/14/2025 BY: Janet Evans

GENERAL PLANTING 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.
18. CONTRACTOR SHALL NOT INSTALL PLANTS UNDER BUILDING OVERHANG AND SHALL NOTIFY LANDSCAPE ARCHITECT IF DRAWINGS CONFLICT WITH BUILDING OVERHANGS.
19. TREES SHALL NOT CONFLICT/ BLOCK PROPOSED REGULATORY/ DIRECTION SIGNAGE, MONUMENT SIGNS, ADDRESS OR LIGHT POLES. SHIFT TREES AS NECESSARY TYP.



SPECIFICATIONS FOR LANDSCAPE BED EDGING:

LANDSCAPE BED EDGING SHALL BE ALUMINUM AS MANUFACTURED BY PERMALOC 1.800.356.9660

8' OR 16' SECTIONS SHALL BE USED WITH ONE STAKE PER 38" OF EDGING

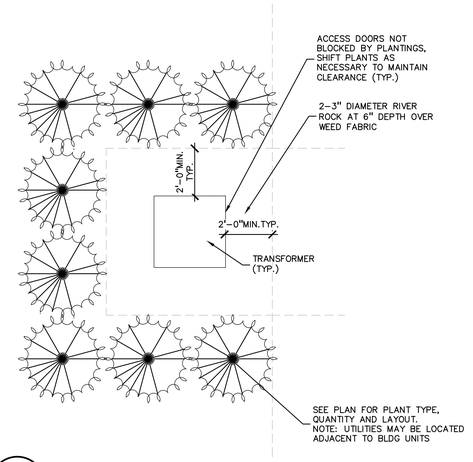
EDGING SHALL BE ⅜" THICK X 4" DEPTH WHEN ADJ. TO MULCH AND ⅜" THICK X 5 ½" DEPTH WHEN ADJ. TO ROCK, FINISH: BLACK DURAFLEX MEETING AAMA 2603

STAKE SHALL SECURELY ENGAGE EDGING AND SHALL BE ENTIRELY BELOW TOP SURFACE OF EDGING

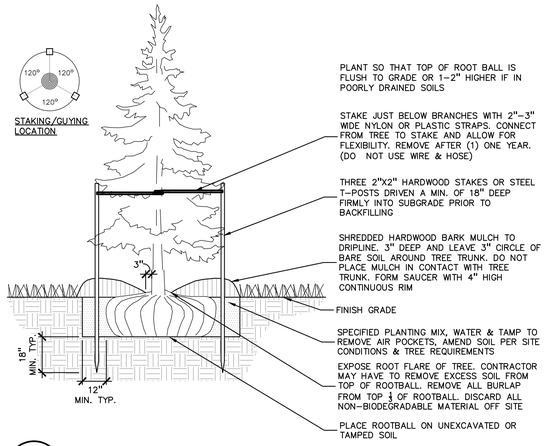
EDGING SHALL HAVE A MINIMUM OF 2" OF INTERLOCKING OVERLAP BETWEEN SECTIONS

INSTALL AS PER MANUFACTURER'S SPECIFICATIONS WITH TOP OF EDGING ½"-1" ABOVE COMPACTED FINISH GRADE. FINISH GRADE TO BE COMPACTED ON BOTH SIDES OF EDGING TO MAINTAIN STABILITY

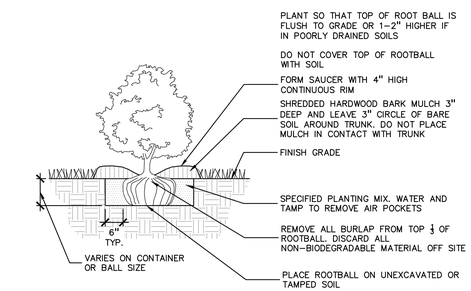
6 ALUMINUM EDGE DETAIL
SCALE: 1/2" = 1'-0"



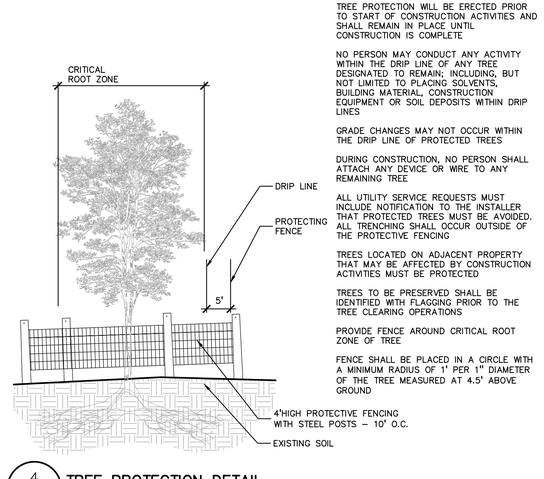
3 TRANSFORMER SCREENING DETAIL FOR ACCESS REF. ONLY
SCALE: 1" = 3'-0"



5 EVERGREEN TREE PLANTING DETAIL
SCALE: 1" = 3'-0"



2 SHRUB PLANTING DETAIL
SCALE: 1" = 2'-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 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

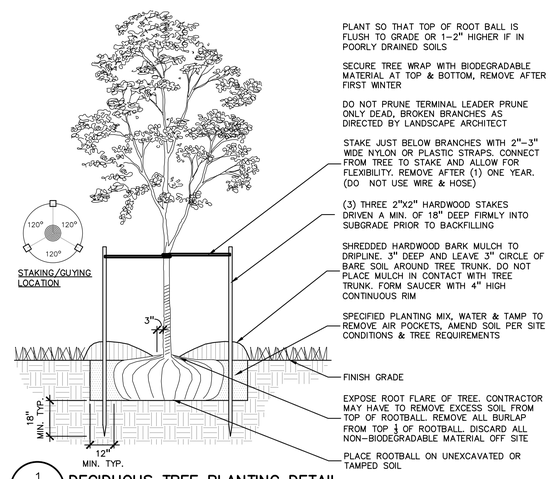
TREES LOCATED ON ADJACENT PROPERTY THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITIES MUST BE PROTECTED

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 MINIMUM RADIUS OF 1' PER 1" DIAMETER OF THE TREE MEASURED AT 4.5' ABOVE GROUND

4 TREE PROTECTION DETAIL
SCALE: 1" = 3'-0"



1 DECIDUOUS TREE PLANTING DETAIL
SCALE: 1" = 3'-0"

NOT FOR CONSTRUCTION

PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN · JANET L. EVANS · LANDSCAPE ARCHITECT · NO. 1390 · REGISTERED · LANDSCAPE ARCHITECT

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CAUTION!!
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LOCATION MAP

CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS	
CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
LANDSCAPE DETAILS

PEA JOB NO.	23-1219
P.M.	JRH
DN.	JLE
DES.	JLE

DRAWING NUMBER:
L-1.3

S:\PROJECTS\2023\23-1219 SW CORNER OF CROOKS AND WATTLES\DWG\2_SITE_PLAN\(L-1.3) LANDSCAPE DETAILS-23-1219.dwg PLOT DATE: 1/14/2025 BY: Janet Evans

BENCH: TRIO BENCH
BY: FORMS+SURFACES
PHONE: 412-781-9003

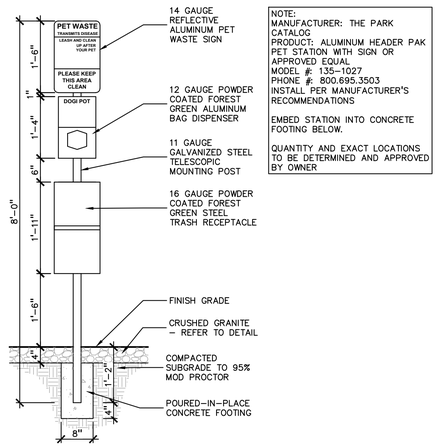
COLOR: ALUMINUM, POWDER COATED, OWNER TO SELECT/APPROVE COLOR
QUANTITY: QTY. TO BE APPROVED BY OWNER

BENCH: 72" PLAINWELL, ALUMINUM
BY: LANDSCAPE FORMS OR APPROVED EQUAL
PHONE: 800-521-2546

COLOR: TITANIUM OR SILVER, POWDER COATED, OWNER TO SELECT/APPROVE COLOR
QUANTITY: QTY. TO BE APPROVED BY OWNER

4 BENCH IMAGE DETAIL OPTIONS

NOT TO SCALE



NOTE:
MANUFACTURER: THE PARK CATALOG
PRODUCT: ALUMINUM HEADER PAK PET STATION WITH SIGN OR APPROVED EQUAL
MODEL #: 135-1027
PHONE #: 800.695.3503
INSTALL PER MANUFACTURER'S RECOMMENDATIONS

EMBED STATION INTO CONCRETE FOOTING BELOW.

QUANTITY AND EXACT LOCATIONS TO BE DETERMINED AND APPROVED BY OWNER

3 PET STATION DETAIL OPTION

SCALE: 1 1/2" = 1'-0"

BIKE RACK: "TRIO" OR APPROVED EQUIVALENT
QUANTITY: X, APPROVED BY OWNER
BY FORMS AND SURFACES
WWW.FORMS-SURFACES.COM
800-451-0410
QUANTITY AND TYPE TO BE APPROVED BY OWNER

2 BIKE RACK DETAIL OPTION

NOT TO SCALE

ALUMINUM FENCE: PREMIER – VICTORIA
COLOR: BLACK, 5' HT.
QUANTITY: APPROVED BY OWNER
BY PRECISION FENCEWORKS
HTTPS://PRECISIONFENCEWORKS.COM/ALUMINUM-FENCES/
770-725-0777
QUANTITY AND TYPE TO BE APPROVED BY OWNER

1 ALUMINUM FENCE OPTION

NOT TO SCALE

PRELIMINARY SITE AMENITY OPTIONS, OWNER TO APPROVE
NOT FOR CONSTRUCTION

PEA GROUP
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www.peagroup.com

STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
NO. 1302
REGISTERED LANDSCAPE ARCHITECT

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LOCATION MAP

CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS

CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
LANDSCAPE AMENITY OPTIONS

PEA JOB NO.	23-1219
P.M.	JRH
DN.	JLE
DES.	JLE

DRAWING NUMBER:
L-1.4

TREE INVENTORY/PRESERVATION CALCULATIONS

WOODLAND TREES				
WOODLAND TREES REMOVED:	**51**	(REPLACE AT 50% OF REMOVED DBH)		
488" DBH x 0.5 =		**244"** REPLACEMENT		
WOODLAND TREES SAVED:	16	(CREDIT OF 2X DBH)		
177" DBH x 2 =		**354"** CREDIT		
244 -	354	=	-110	
110" DBH CREDIT FOR WOODLAND PRESERVATION				

LANDMARK TREES				
LANDMARK TREES REMOVED:	25	(REPLACE AT 100% OF REMOVED DBH)		
481" DBH x 1 =		**481"** REPLACEMENT		
LANDMARK TREES SAVED:	1	(CREDIT OF 2X DBH)		
13" DBH x 2 =		**26"** CREDIT		
481 -	26	=	455	
455" DBH REQUIRED FOR LANDMARK REPLACEMENT				

345" TOTAL DBH REQUIRED FOR REPLACEMENT

EXEMPT TREES			
(NO REPLACEMENT REQUIRED FOR EXEMPT TREES)			
SAVED EXEMPT TREES:	4	**Trees**	
EXEMPT TREES ON SITE:	82	**Trees**	
TOTAL SAVED TREES 6" AND ABOVE ON SITE:		21	Trees

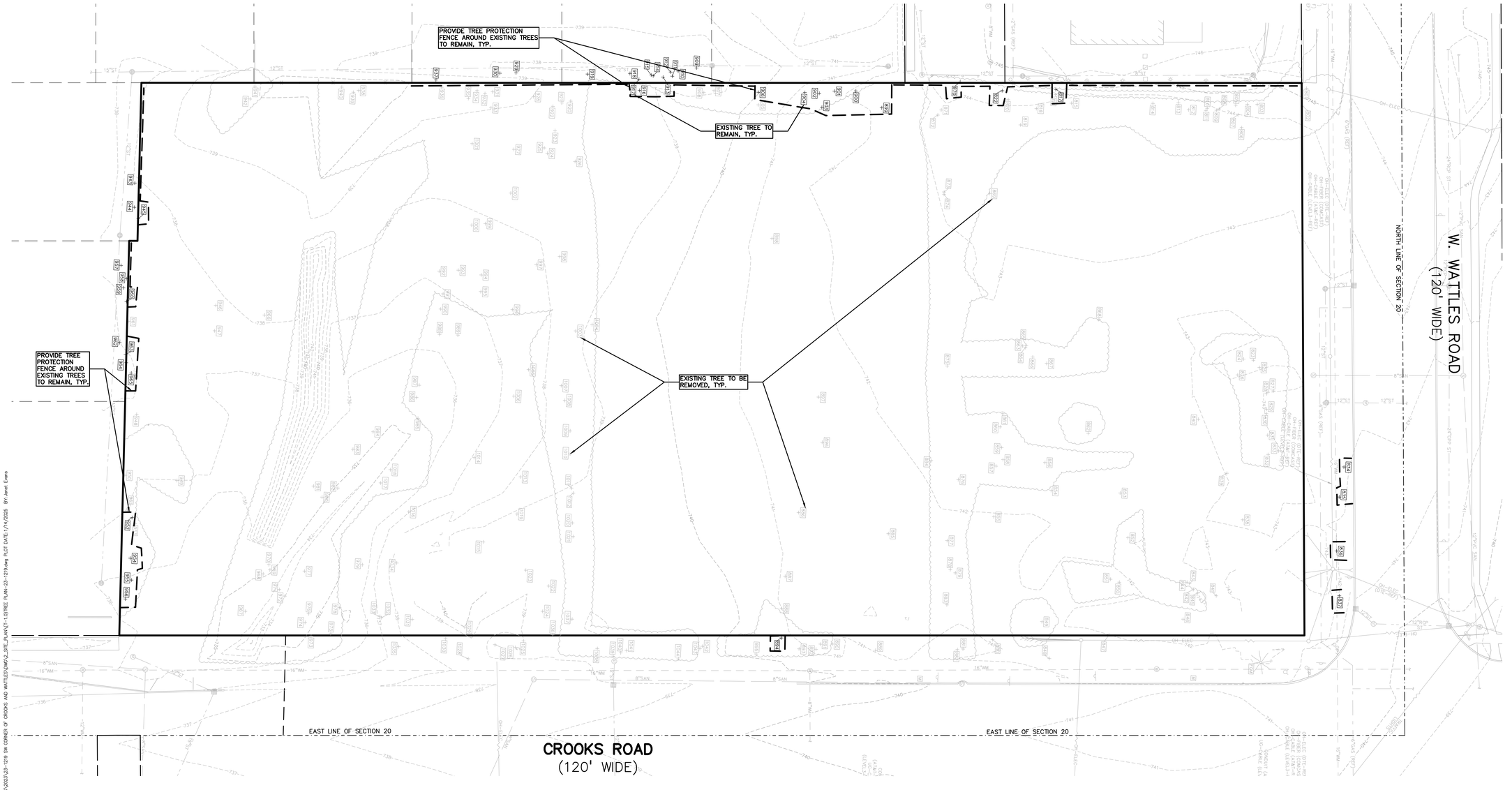
KEY:

1013 = EXISTING TREE TO REMAIN

1013 = EXISTING TREE TO BE REMOVED

= TREE PROTECTION FENCE

SEE DETAIL SHEET FOR TREE FENCE DETAIL
SEE LANDSCAPE PLAN FOR TREE REPLACEMENT
SEE T-1.1 FOR EXISTING TREE LIST



PEA GROUP
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STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
NO. 1300
REGISTERED LANDSCAPE ARCHITECT

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LOCATION MAP

CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS	
CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
TREE PRESERVATION PLAN

PEA JOB NO.	23-1219
P.M.	JRH
DN.	JLE
DES.	JLE

DRAWING NUMBER:
T-1.0

NOT FOR CONSTRUCTION

S:\PROJECTS\2023\23-1219 SW CORNER OF CROOKS AND WATTLES\DWG\L_SITE_PLAN\T-1.0\TREE PLAN-23-1219.dwg PLOT DATE: 1/16/2025 BY: Janet Evans

TAG	DBH	COMMON NAME	LATIN NAME	COND	NOTES	CLASS	SAVE / REMOVE	ON-SITE	REPLACE
801	7	Norway Maple	Acer platanoides	Good		INVASIVE	R	N	-
802	28	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
803	6	Tree-of-Heaven	Ailanthus Altissima	Good		INVASIVE	R	Y	-
804	32	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
805	6	Tree-of-Heaven	Ailanthus Altissima	Good	x2	INVASIVE	R	Y	-
806	6	Tree-of-Heaven	Ailanthus Altissima	Good		INVASIVE	R	Y	-
807	6	Tree-of-Heaven	Ailanthus Altissima	Good		INVASIVE	R	Y	-
808	6	Tree-of-Heaven	Ailanthus Altissima	Fair		INVASIVE	R	Y	-
809	6	Tree-of-Heaven	Ailanthus Altissima	Fair		INVASIVE	R	Y	-
810	6	Tree-of-Heaven	Ailanthus Altissima	Fair		INVASIVE	R	Y	-
811	6	Tree-of-Heaven	Ailanthus Altissima	Fair		INVASIVE	R	Y	-
812	21	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
813	6	Black Walnut	Juglans nigra	Good		WOODLAND	R	Y	REPLACE
814	31	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
815	27	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
816	9	White Mulberry	Morus alba	Good		INVASIVE	R	Y	-
817	24	Silver Maple	Acer saccharinum	Good		INVASIVE	S	Y	-
818	6	Black Walnut	Juglans nigra	Good		WOODLAND	R	Y	REPLACE
819	27	Siberian Elm	Ulmus pumila	Very poor		INVASIVE	R	Y	-
820	7	White Mulberry	Morus alba	Fair		INVASIVE	R	Y	-
821	8	Hackberry	Celtis occidentalis	Good		WOODLAND	S	Y	-
822	10	Hackberry	Celtis occidentalis	Good		WOODLAND	S	Y	-
823	14	(Eastern) White Pine	Pinus strobus	Good		WOODLAND	R	Y	REPLACE
824	14	Scotch Pine	Pinus sylvestris	Fair		WOODLAND	R	Y	REPLACE
825	18	Blue Spruce	Picea pungens	Very poor		LANDMARK	R	Y	REPLACE
826	8	White Mulberry	Morus alba	Good		INVASIVE	R	Y	-
827	7	Blue Spruce	Picea pungens	Poor		WOODLAND	R	Y	-
828	11	Blue Spruce	Picea pungens	Poor		WOODLAND	R	Y	-
829	10	Blue Spruce	Picea pungens	Poor		WOODLAND	R	Y	-
830	9	Blue Spruce	Picea pungens	Poor		WOODLAND	R	Y	-
831	15	Blue Spruce	Picea pungens	Very poor		WOODLAND	R	Y	REPLACE
832	18	Blue Spruce	Picea pungens	Fair		LANDMARK	R	Y	REPLACE
833	7	Kentucky coffeetree	Gymnocladus dioicus	Good		WOODLAND	R	Y	REPLACE
834	13	White Spruce	Picea glauca	Fair		WOODLAND	S	N	-
835	12	Blue Spruce	Picea pungens	Good		WOODLAND	S	N	-
836	16	Blue Spruce	Picea pungens	Good		WOODLAND	S	N	-
837	16	Blue Spruce	Picea pungens	Good		WOODLAND	S	N	-
838	32	Norway Maple	Acer platanoides	Good		INVASIVE	R	Y	-
839	34	Honeylocust	Gleditsia triacanthos	Good		LANDMARK	R	Y	REPLACE
840	21	Honeylocust	Gleditsia triacanthos	Good		LANDMARK	R	Y	REPLACE
841	8	White Mulberry	Morus alba	Good	x2	INVASIVE	R	Y	-
842	8	White Mulberry	Morus alba	Good		INVASIVE	R	Y	-
843	6	White Mulberry	Morus alba	Good		INVASIVE	R	Y	-
844	6	White Mulberry	Morus alba	Good	x1	INVASIVE	R	Y	-
845	6	Siberian Elm	Ulmus pumila	Good		INVASIVE	R	Y	-
846	13	Bradford Pear	Pyrus calleryanna	Fair		LANDMARK	R	Y	REPLACE
847	17	Domestic Apple	Malus sylvestris	Fair		LANDMARK	R	Y	REPLACE
848	12	Domestic Apple	Malus sylvestris	Fair	x1	LANDMARK	R	N	REPLACE
849	16	Blue Spruce	Picea pungens	Poor		WOODLAND	R	Y	-
850	6	(Eastern) White Pine	Pinus strobus	Good		WOODLAND	R	Y	REPLACE
851	7	(Eastern) White Pine	Pinus strobus	Good		WOODLAND	R	Y	REPLACE
852	19	Norway Maple	Acer platanoides	Good		INVASIVE	R	Y	-
853	39	Silver Maple	Acer saccharinum	Good		INVASIVE	R	Y	-
854	30	Silver Maple	Acer saccharinum	Good		INVASIVE	R	Y	-
855	9	Bradford Pear	Pyrus calleryanna	Fair		WOODLAND	R	Y	REPLACE
856	7	White Mulberry	Morus alba	Good	x1	INVASIVE	R	Y	-
857	17	Blue Spruce	Picea pungens	Fair		WOODLAND	R	Y	REPLACE
858	8	White Spruce	Picea glauca	Poor		WOODLAND	R	Y	-
859	10	Blue Spruce	Picea pungens	Fair		WOODLAND	R	Y	REPLACE
860	36	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
861	20	Siberian Elm	Ulmus pumila	Poor	x1	INVASIVE	R	Y	-
862	17	White Spruce	Picea glauca	Poor		WOODLAND	R	Y	-
863	6	Norway Maple	Acer platanoides	Good		INVASIVE	R	Y	-
864	6	Norway Maple	Acer platanoides	Good		INVASIVE	R	Y	-
865	6	Norway Maple	Acer platanoides	Good		INVASIVE	R	Y	-
866	6	Norway Maple	Acer platanoides	Good		INVASIVE	R	Y	-
867	6	(Eastern) White Pine	Pinus strobus	Fair		WOODLAND	R	Y	REPLACE
868	30	Siberian Elm	Ulmus pumila	Very poor		INVASIVE	R	Y	-
869	31	Siberian Elm	Ulmus pumila	Very poor		INVASIVE	R	Y	-
870	8	Box elder	Acer negundo	Fair		INVASIVE	S	Y	-
871	13	Sweet cherry	Prunus avium	Good	-	WOODLAND	R	Y	REPLACE
872	8	White Mulberry	Morus alba	Fair		INVASIVE	R	Y	-
873	13	Hackberry	Celtis occidentalis	Good		LANDMARK	R	Y	REPLACE
874	17	White Mulberry	Morus alba	Good	x1	INVASIVE	R	Y	-
875	14	Hackberry	Celtis occidentalis	Fair		LANDMARK	R	Y	REPLACE
876	9	White Spruce	Picea glauca	Fair		WOODLAND	R	Y	REPLACE
877	18	White Mulberry	Morus alba	Fair		INVASIVE	R	Y	-
878	9	Hackberry	Celtis occidentalis	Good		WOODLAND	R	Y	REPLACE
879	38	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
880	27	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	N	-
881	6	Sweet cherry	Prunus avium	Fair	x1	WOODLAND	R	N	REPLACE
882	6	White Mulberry	Morus alba	Good		INVASIVE	R	N	-
883	19	Sweet cherry	Prunus avium	Good		LANDMARK	R	Y	REPLACE
884	38	English walnut	Juglans regia	Good		LANDMARK	R	Y	REPLACE
885	17	Japanese Maple	Acer palmatum	Poor		WOODLAND	R	Y	-
886	18	Blue Spruce	Picea pungens	Fair		LANDMARK	R	Y	REPLACE
887	26	White Spruce	Picea glauca	Fair		LANDMARK	R	Y	REPLACE
888	22	White Spruce	Picea glauca	Fair		LANDMARK	R	Y	REPLACE
889	22	Blue Spruce	Picea pungens	Fair		LANDMARK	R	N	REPLACE
890	6	White Mulberry	Morus alba	Good		INVASIVE	R	N	-
891	14	Blue Spruce	Picea pungens	Poor		WOODLAND	R	N	-
892	12	Blue Spruce	Picea pungens	Poor		WOODLAND	R	N	-
893	11	White Spruce	Picea glauca	Fair		WOODLAND	R	N	REPLACE
894	15	White Spruce	Picea glauca	Fair		WOODLAND	S	N	-
895	17	White Spruce	Picea glauca	Poor		WOODLAND	R	N	-
896	20	Blue Spruce	Picea pungens	Poor		LANDMARK	R	Y	-
897	23	Honeylocust	Gleditsia triacanthos	Good		LANDMARK	R	Y	REPLACE
898	9	Crab Apple	Malus caronaria	Fair		WOODLAND	R	Y	REPLACE
899	33	Siberian Elm	Ulmus pumila	Fair		INVASIVE	S	Y	-
900	17	Norway Spruce	Picea Abies	Good		WOODLAND	S	Y	-
901	13	Norway Spruce	Picea Abies	Good		WOODLAND	S	Y	-
902	13	Norway Spruce	Picea Abies	Good		WOODLAND	S	Y	-
903	37	Siberian Elm	Ulmus pumila	Fair		INVASIVE	S	Y	-
904	17	Norway Spruce	Picea Abies	Good		WOODLAND	S	Y	-
905	32	Siberian Elm	Ulmus pumila	Fair		INVASIVE	S	Y	-
906	10	Norway Spruce	Picea Abies	Good		WOODLAND	S	Y	-

TAG	DBH	COMMON NAME	LATIN NAME	COND	NOTES	CLASS	SAVE / REMOVE	ON-SITE	REPLACE
907	14	Blue Spruce	Picea pungens	Poor		WOODLAND	R	Y	-
908	15	Blue Spruce	Picea pungens	Poor		WOODLAND	R	Y	-
909	9	Siberian Elm	Ulmus pumila	Good		INVASIVE	S	N	-
910	6	Siberian Elm	Ulmus pumila	Good		INVASIVE	S	N	-
911	8	Siberian Elm	Ulmus pumila	Good		INVASIVE	S	N	-
912	8	Siberian Elm	Ulmus pumila	Good		INVASIVE	S	N	-
913	9	Siberian Elm	Ulmus pumila	Fair		INVASIVE	S	N	-
914	6	Siberian Elm	Ulmus pumila	Fair		INVASIVE	S	N	-
915	8	Siberian Elm	Ulmus pumila	Good	x2	INVASIVE	S	N	-
916	13	White Spruce	Picea glauca	Fair		WOODLAND	S	Y	-
917	6	Siberian Elm	Ulmus pumila	Fair		INVASIVE	S	N	-
918	10	Siberian Elm	Ulmus pumila	Good	x1	INVASIVE	S	N	-
919	8	Box elder	Acer negundo	Good		INVASIVE	S	N	-
920	13	Black Walnut	Juglans nigra	Good		WOODLAND	R	Y	REPLACE
921	13	Black Walnut	Juglans nigra	Fair		WOODLAND	R	Y	REPLACE
922	7	Black Walnut	Juglans nigra	Good		WOODLAND	R	Y	REPLACE
923	6	Black Walnut	Juglans nigra	Good		WOODLAND	R	Y	REPLACE
924	6	Thornapple/Haw thorne	Cragaegus spp.	Poor	x1	WOODLAND	R	Y	-
925	6	Thornapple/Haw thorne	Cragaegus spp.	Poor		WOODLAND	R	Y	-
926	6	Green Ash	Fraxinus pennsylvanica	Good		INVASIVE	R	Y	-
927	8	Box elder	Acer negundo	Good		INVASIVE	R	Y	-
928	18	White Mulberry	Morus alba	Good		INVASIVE	R	Y	-
929	8	Box elder	Acer negundo	Fair		INVASIVE	S	N	-
930	6	American Elm	Ulmus americana	Fair		INVASIVE	S	N	-
931	11	Siberian Elm	Ulmus pumila	Very poor		INVASIVE	R	Y	-
932	12	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
933	24	Siberian Elm	Ulmus pumila	Very poor		INVASIVE	R	Y	-
934	13	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
935		Siberian Elm	Ulmus pumila	Good		INVASIVE	R	Y	-
936	12	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
937	6	European Alder	Alnus glutinosa	Fair		INVASIVE	S	N	-
938	12	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
939	9	Black Walnut	Juglans nigra	Fair		WOODLAND	R	Y	REPLACE
940	16	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
941	20	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
942	31	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
943	14	Norway Spruce	Picea Abies	Good		WOODLAND	S	N	-
944	13	Norway Spruce	Picea Abies	Good		WOODLAND	S	N	-
945	15	Norway Spruce	Picea Abies	Good		WOODLAND	S	Y	-
946	13	American Elm	Ulmus americana	Fair		INVASIVE	R	Y	-
947	8	Black Walnut	Juglans nigra	Good		WOODLAND	R	Y	REPLACE
948	33	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
949	29	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
950	7	Hackberry	Celtis occidentalis	Fair	x3	WOODLAND	R	Y	REPLACE
951	8	Hackberry	Celtis occidentalis	Fair		WOODLAND	R	Y	REPLACE
952	8	Hackberry	Celtis occidentalis	Fair	x3	WOODLAND	S	Y	-
953	22	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
954	9	Crab Apple	Malus caronaria	Very poor	x1	WOODLAND	S	Y	-
955	10	Hackberry	Celtis occidentalis	Fair	x2	WOODLAND	S	Y	-
956	13	Hackberry	Celtis occidentalis	Fair	x2	LANDMARK	S	Y	-
957	7	Blue Spruce	Picea pungens	Good		WOODLAND	S	N	-
958	9	Blue Spruce	Picea pungens	Good		WOODLAND	S	N	-
959	8	Blue Spruce	Picea pungens	Good		WOODLAND	S	N	-
960	9	Blue Spruce	Picea pungens	Good		WOODLAND	S	Y	-
961	9	Blue Spruce	Picea pungens	Good		WOODLAND	R	Y	REPLACE
962	10	Blue Spruce	Picea pungens	Good		WOODLAND	S	N	-
963	10	Blue Spruce	Picea pungens	Good		WOODLAND	S	Y	-
964	7	Blue Spruce	Picea pungens	Good		WOODLAND	S	Y	-
965	8	Blue Spruce	Picea pungens	Good		WOODLAND	S	Y	-
966	13	Crab Apple	Malus caronaria	Fair	x1	LANDMARK	R	Y	REPLACE
967	17	Hackberry	Celtis occidentalis	Good		LANDMARK	R	Y	REPLACE
968	10	Siberian Elm	Ulmus pumila	Fair	x1	INVASIVE	R	Y	-
969	23	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
970	9	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
971	11	American Elm	Ulmus americana	Fair		INVASIVE	R	Y	-
972	13	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
973	29	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
974	8	Hackberry	Celtis occidentalis	Fair	x2	WOODLAND	R	Y	REPLACE
975	6	Norway Spruce	Picea Abies	Good		WOODLAND	R	Y	REPLACE
976	14	Siberian Elm	Ulmus pumila	Very poor		INVASIVE	R	Y	-
977	11	Black Walnut	Juglans nigra	Fair		WOODLAND	R	Y	REPLACE
978	12	Red Pine	Pinus resinosa	Good		WOODLAND	R	Y	REPLACE
979	46	Silver Maple	Acer saccharinum	Good		INVASIVE	R	Y	-
980	7	American Elm	Ulmus americana	Fair		INVASIVE	R	Y	-
981	6	Box elder	Acer negundo	Good		INVASIVE	R	Y	-
982	6	Hackberry	Celtis occidentalis	Fair	x1	WOODLAND	R	Y	REPLACE
983	7	Hackberry	Celtis occidentalis	Fair		WOODLAND	R	Y	REPLACE
984	28	Silver Maple	Acer saccharinum	Good	x3	INVASIVE	R	Y	-
985	18	Box elder	Acer negundo	Fair		INVASIVE	R	Y	-
986	9	Box elder	Acer negundo	Fair		INVASIVE	R	Y	-
987	7	Hackberry	Celtis occidentalis	Fair	x1	WOODLAND	R	Y	REPLACE
988	13	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
989	6	Hackberry	Celtis occidentalis	Good	x2	WOODLAND	R	Y	REPLACE
990	16	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
991	10	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
992	29	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
993	17	Sugar Maple	Acer saccharum	Good	x2	LANDMARK	R	Y	REPLACE
994	21	Sugar Maple	Acer saccharum	Fair	x2	LANDMARK	R	Y	REPLACE
995	9	(Eastern) White Pine	Pinus strobus	Good		WOODLAND	R	Y	REPLACE
996	12	Red Pine	Pinus resinosa	Good		WOODLAND	R	Y	REPLACE
997	26	Box elder	Acer negundo	Fair		INVASIVE	R	Y	-
998	11	Hackberry	Celtis occidentalis	Fair		WOODLAND	R	Y	REPLACE
999	13	Box elder	Acer negundo	Fair		INVASIVE	R	Y	-
1000	16	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
1001	6	Box elder	Acer negundo	Fair		INVASIVE	R	Y	-
1002	8	Hackberry	Celtis occidentalis	Fair		WOODLAND	R	Y	REPLACE
1003	8	Green Ash	Fraxinus pennsylvanica	Fair		INVASIVE	R	Y	-
1004	6	Box elder	Acer negundo	Fair		INVASIVE	R	Y	-
1005	8	White birch	Betula papyrifera	Good		WOODLAND	R	Y	REPLACE
1006	22	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
1007	6	White Mulberry	Morus alba	Good		INVASIVE	R	Y	-
1008	11	Wild Black Cherry	Prunus serotina	Fair		WOODLAND	R	Y	REPLACE
1009	21	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
1010	20	Siberian Elm	Ulmus pumila	Very poor		INVASIVE	R	Y	-
1011	14	American Elm	Ulmus americana	Good		INVASIVE	R	Y	-
1012	6	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-

TAG	DBH	COMMON NAME	LATIN NAME	COND	NOTES	CLASS	SAVE / REMOVE	ON-SITE	REPLACE
1013	10	Black Walnut	Juglans nigra	Good		WOODLAND	R	Y	REPLACE
1014	13	Littleleaf Linden	Tilia Cordata	Good		WOODLAND	R	Y	REPLACE
1015	7	Black Walnut	Juglans nigra	Fair		WOODLAND	R	Y	REPLACE
1016	8	White birch	Betula papyrifera	Fair	-	WOODLAND	R	Y	REPLACE
1017	6	Red Cedar	Juniperus virginiana	Poor		INVASIVE	R	Y	-
1018	6	Red Cedar	Juniperus virginiana	Poor		INVASIVE	R	Y	-
1019	6	White Mulberry	Morus alba	Good		INVASIVE	R	Y	-
1020	17	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
1021	18	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	Y	-
1022	26	Siberian Elm	Ulmus pumila	Poor	x1	INVASIVE	R	Y	-
1023	13	Crab Apple	Malus caronaria	Fair		LANDMARK	R	Y	REPLACE
1024	12	Crab Apple	Malus caronaria	Fair		LANDMARK	R	Y	REPLACE
1025	11	English walnut	Juglans regia	Good		WOODLAND	R	N	REPLACE
1026	8	Blue Spruce	Picea pungens	Good		WOODLAND	R	N	REPLACE
1027	30	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	N	-
1028	19	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	N	-
1029	12	Blue Spruce	Picea pungens	Good		WOODLAND	R	Y	REPLACE
1030	17	English walnut	Juglans regia	Good		WOODLAND	R	N	REPLACE
1031	7	Red Cedar	Juniperus virginiana	Good		INVASIVE	R	Y	-
1032	11	American Elm	Ulmus americana	Fair		INVASIVE	R	Y	-
1033	12	American Elm	Ulmus americana	Fair		INVASIVE	R	Y	-
1034	15	Black Walnut	Juglans nigra	Good		WOODLAND	R	Y	REPLACE
1035	31	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	N	-
1036	21	Siberian Elm	Ulmus pumila	Poor		INVASIVE	R	Y	-
1037	15	Red Cedar	Juniperus virginiana	Good		INVASIVE	R	Y	-
1038	22	Scotch Pine	Pinus sylvestris	Good		LANDMARK	R	N	REPLACE
1039	19	Scotch Pine	Pinus sylvestris	Good		LANDMARK	R	N	REPLACE
1040	11	Scotch Pine	Pinus sylvestris	Good		WOODLAND	R	N	REPLACE
1041	19	Red Pine	Pinus resinosa	Good		LANDMARK	R	N	REPLACE
1042	12	Blue Spruce	Picea pungens	Poor		WOODLAND	R	N	-
1043	9	Siberian Elm	Ulmus pumila	Fair		INVASIVE	R	N	-
1044	21	Blue Spruce	Picea pungens	Poor		LANDMARK	R	N	-

STRIKE OUT INDICATES TREE TO BE REMOVED
SEE SHEET L-1.0 FOR TREE REPLACEMENT INFORMATION

PEA GROUP
t: 844.813.2949
www.peagroup.com

STATE OF MICHIGAN
JANET L. EVANS
LANDSCAPE ARCHITECT
No. 1301
REGISTERED LANDSCAPE ARCHITECT

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

CAUTION!!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. NO REPRESENTATION IS 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.

LOCATION MAP

CLIENT
THE CHOICE GROUP
2265 LIVERNOIS ROAD, SUITE 500
TROY, MICHIGAN 48083

PROJECT TITLE
SWC CROOKS & WATTLES
CITY OF TROY, OAKLAND COUNTY, MICHIGAN

REVISIONS

CITY COMMENTS	10/11/24
REVISED PER CITY COMMENTS	1/16/25

ORIGINAL ISSUE DATE:
MAY 17, 2024

DRAWING TITLE
EXISTING TREE LIST

PEA JOB NO.	23-1219
P.M.	JRH
DN.	JLE
DES.	JLE

DRAWING NUMBER:
T-1.1

NOT FOR CONSTRUCTION

S:\PROJECTS\2023\23-1219 SW CORNER OF CROOKS AND WATTLES\DWG\23_SITE_PLAN.DWG [T-1.0]TREE PLAN-23-1219.dwg PLOT DATE: 1/14/2025 BY: Janet Evans

PINNACLE OF TROY

REVISIONS:	DATE:

CONSTRUCTION: ☐

PERMIT: ☐

BIDDING: ☐

PRELIMINARY: ■

DRAWN BY: P.G.B.

DO NOT SCALE DRAWINGS
USE DIMENSIONS INDICATED

ArciDes, inc.
Architectural Design, Planning
23169 Farmington Road, Farmington, Mich. 48336 248 910 3833
ARCHITECTURAL ENGINEERING
3250 W. Big Beaver Road, Suite 233
Troy, MI 48084 248-252-5475
David Donnellon, Arch 248-225-1436

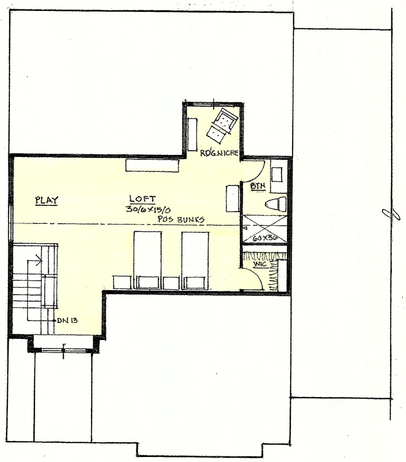
PROPOSED RESIDENTIAL DEVELOPMENT
S.W. CORNER CROOKS AND WATTLES
Troy, Michigan
CHOICE GROUP
Troy, Michigan

DRAWING TITLE:

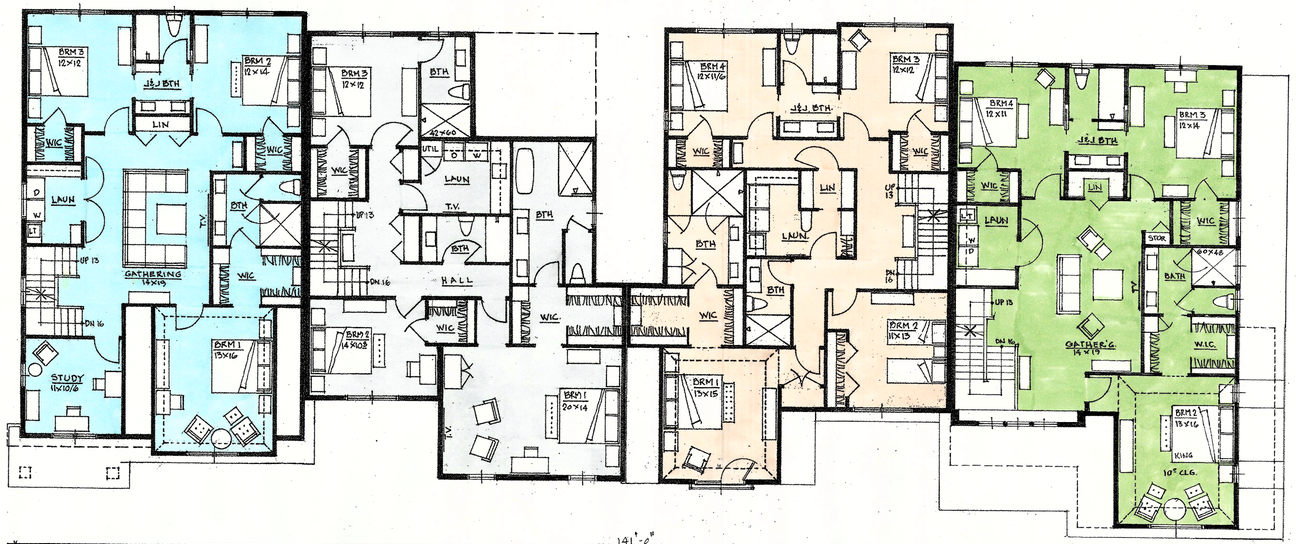
SEAL

PROJECT NUMBER: 21012

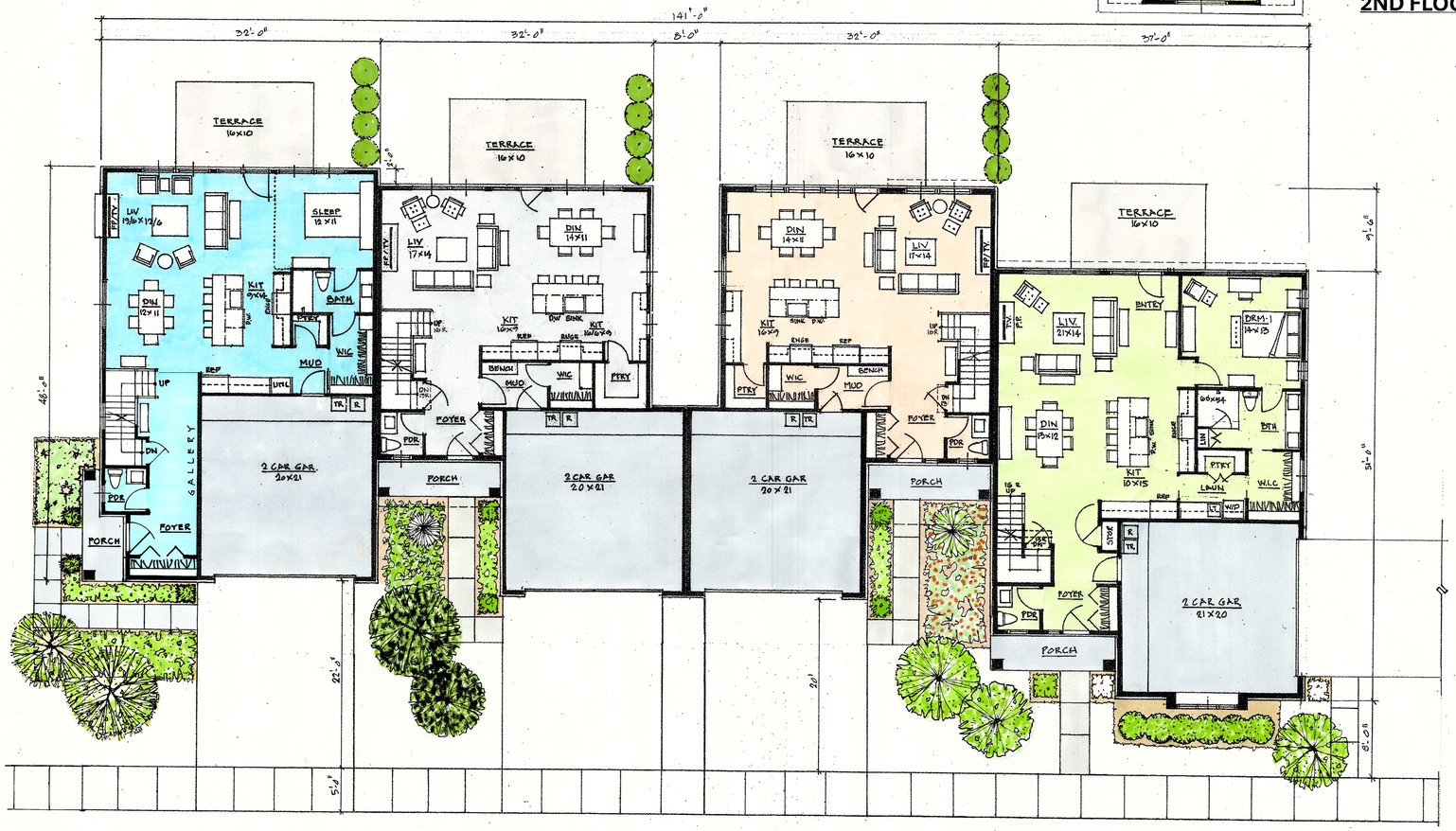
SHEET NUMBER: A-1



THIRD FLOOR LOFT PLAN



2ND FLOOR PLANS



1ST FLOOR PLANS

REVISED PER CITY COMMENTS 01-20-2025

REVISIONS:	DATE:

CONSTRUCTION: ☐
PERMIT: ☐
BIDDING: ☐

PRELIMINARY: ☒
DRAWN BY: P.G.B.

DO NOT SCALE DRAWINGS
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ArciDes, inc.
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23169 Farmington Road, Farmington, Mich. 48336 248 910 3833
3250 W. Big Beaver Road, Suite 233
Troy, MI 48084 248-282-2475
David Donnellon, Arch 248-226-1488
JGA ARCHITECTURAL ENGINEERING

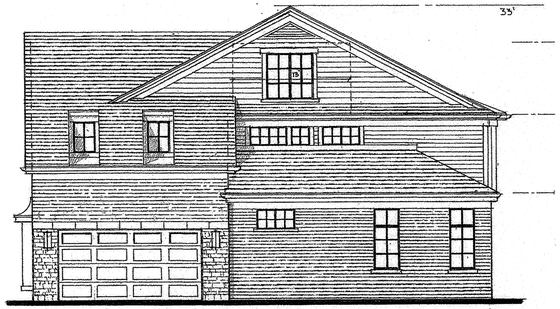
PROPOSED RESIDENTIAL DEVELOPMENT
S.W. CORNER CROOKS AND WATTLES
Troy, Michigan
CHOICE GROUP
Troy, Michigan

DRAWING TITLE:
FLOOR PLANS
SCALE: 1/8"= 1'- 0"
BLDG'S. 2 & 4

SEAL

PROJECT NUMBER: 21012
SHEET NUMBER: **A-2**

FRONT ELEVATION



RIGHT SIDE ELEVATION

CROOKS ROAD ELEVATION

LEFT SIDE ELEVATION

REVISIONS:	DATE:
REVISED PER CITY COMMENTS	01-20-2025

CONSTRUCTION: ☐
PERMIT: ☐
BIDDING: ☐

PRELIMINARY: ☒
DRAWN BY: P.G.B.

DO NOT SCALE DRAWINGS
USE DIMENSIONS INDICATED

ArciDes, inc.
Architectural Design, Planning
23169 Farmington Road, Farmington, Mich. 48336 248 910 3833
3250 W. Big Beaver Road, Suite 233
Troy, MI 48084
David Donnellon, Arch
248-282-6475
248-225-1436
ARCHITECTURAL ENGINEERING

PROPOSED RESIDENTIAL DEVELOPMENT
S.W. CORNER CROOKS AND WATTLES
Troy, Michigan
CHOICE GROUP
Troy, Michigan

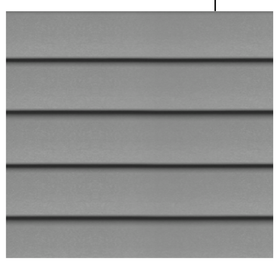
DRAWING TITLE:
ELEVATIONS
SCALE: 1/8"= 1'- 0"

BRAL

PROJECT NUMBER:
21012

SHEET NUMBER:
A-3

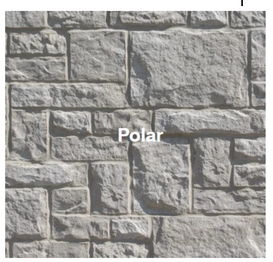
LANDMARK PRO MAX DEF
COLOR: DRIFTWOOD



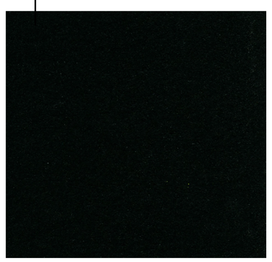
CAMDEN POINTE
COLOR: PEWTER

GUNMETAL GARAGE DOORS

GLEN-GERY
ADRIAN QUEEN
COLOR: BURGUNDY



SHOLDICE STONE
ESTATE STONE
COLOR: POLAR



BLACK WINDOW FRAMES

MBCI
DOUBLE-LOK
COLOR: SLATE GRAY

REVISIONS:	DATE:

CONSTRUCTION: ☐
PERMIT: ☐
BIDDING: ☐

PRELIMINARY: ■
DRAWN BY:

DO NOT SCALE DRAWINGS
USE DIMENSIONS INDICATED

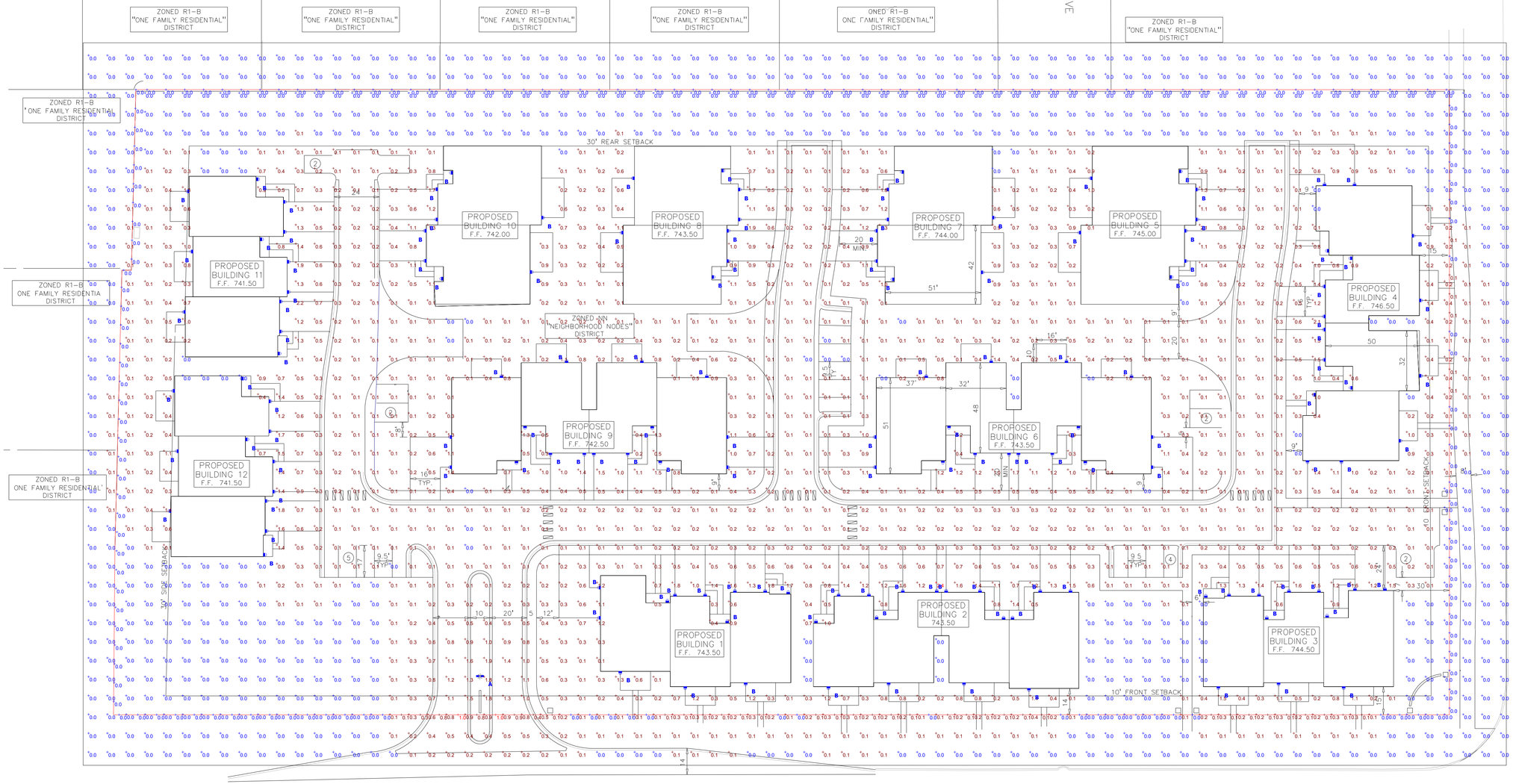
ArciDes, inc.
Architectural Design, Planning
23169 Farmington Road, Farmington, Mich. 48336 248 910 3833
3250 W. Big Beaver Road, Suite 233
Troy, MI 48084 248-282-6475
David Donnellon, Arch 248-225-1436
ARCHITECTURAL ENGINEERING

PROPOSED RESIDENTIAL DEVELOPMENT
S.W. CORNER CROOKS AND WATTLES
Troy, Michigan
CHOICE GROUP
Troy, Michigan

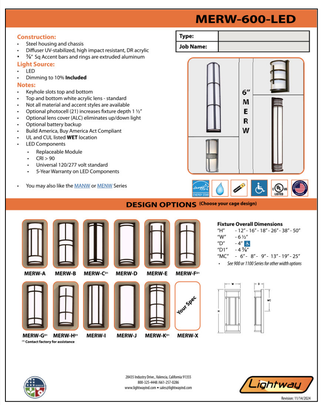
DRAWING TITLE:
MATERIALS BOARD

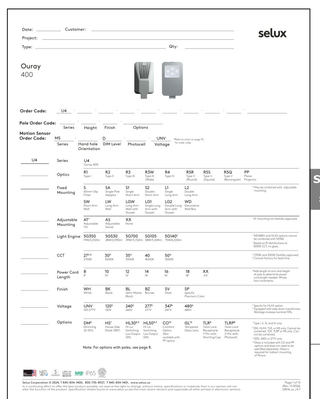
SEAL

PROJECT NUMBER: 21012
SHEET NUMBER: **A- 4**



Plan View
Scale - 1" = 30ft





Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Overall Site	+	0.2 fc	2.4 fc	0.0 fc	N/A	N/A
Boundary @ 5'	+	0.0 fc	1.0 fc	0.0 fc	N/A	N/A

Schedule

Symbol	Label	QTY	Manufacturer	Catalog	Description	Lamp Output	LLF	Input Power	Mounting Height
	A	1	Selux Corporation	U4-R3-XX-XX-5G530-30-XX-UNV-S2	Gray formed aluminum housing, patterned specular reflector , clear plastic optics, no lens enclosure, TWIN HEAD, S2 DOUBLE SHORT ARM MOUNTING	2950	0.9	56	20'
	B	144	LIGHTWAY INDUSTRIES , INC	MERW-612LED-FIP-2-K-B1-WSA-DIMLO-21-01.	4-3/8"L. X 6-1/2"W. X 12"H. LED WALL SCONCE DIFFUSED LENS	1108	0.9	16.95	6.5'

General Note
1. SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
2. SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTOR.
3. CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: 0' - 0" & 5' - 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 CONTROLS@GASSERBUSH.COM OR 734-266-6705.

Alternates Note
THE USE OF FIXTURE ALTERNATES MUST BE RESUBMITTED TO THE CITY FOR APPROVAL.

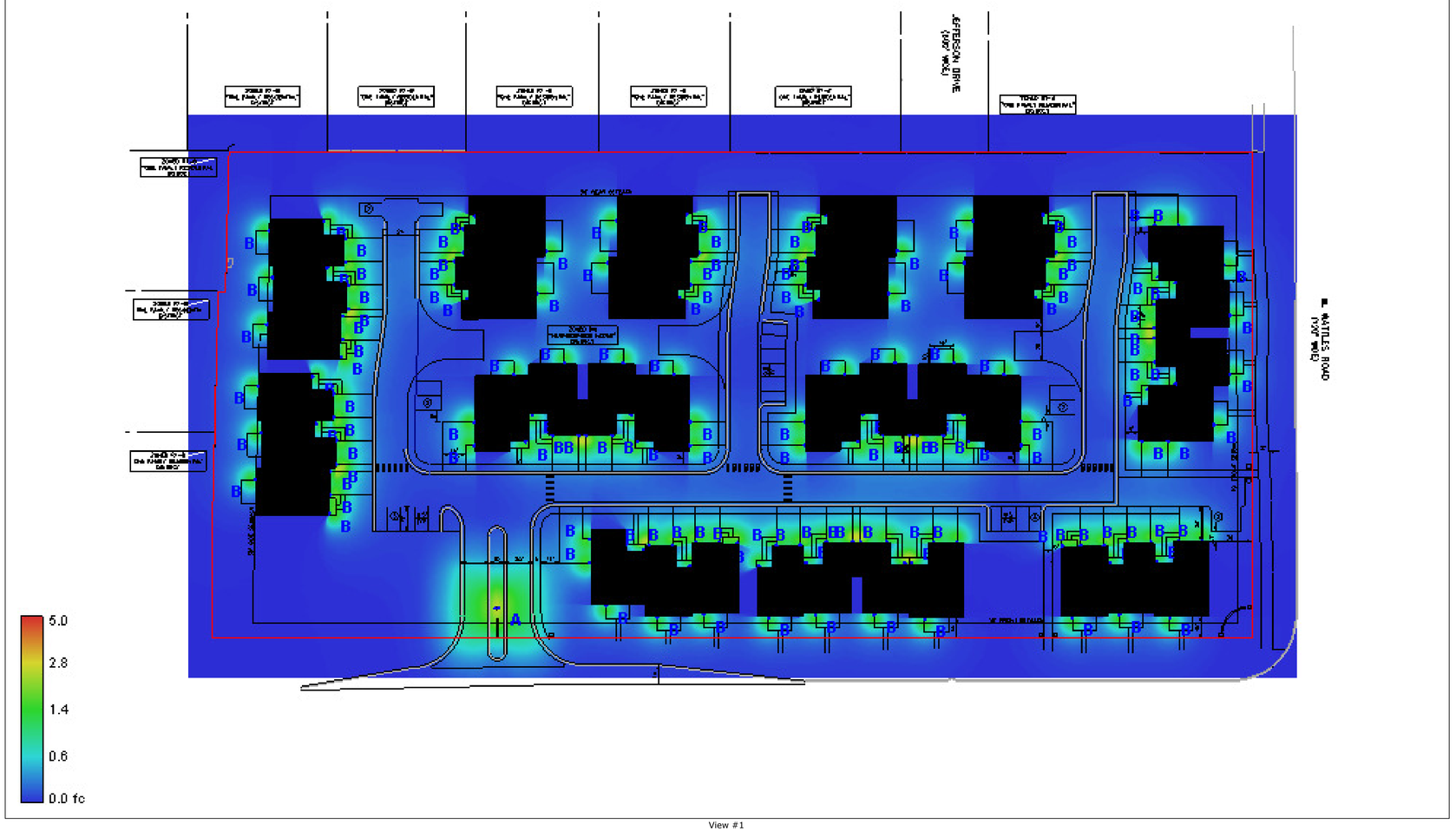
Ordering Note
FOR INQUIRIES CONTACT GASSER BUSH AT QUOTES@GASSERBUSH.COM OR 734-266-6705.

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

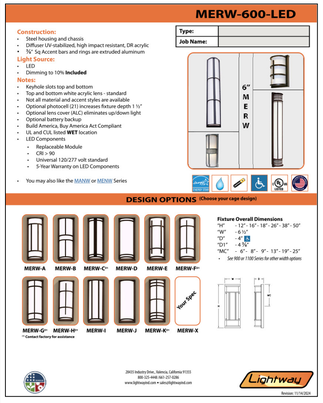
Mounting Height Note
MOUNTING HEIGHT IS MEASURED FROM GRADE TO FACE OF FIXTURE. POLE HEIGHT SHOULD BE CALCULATED AS THE MOUNTING HEIGHT LESS BASE HEIGHT.

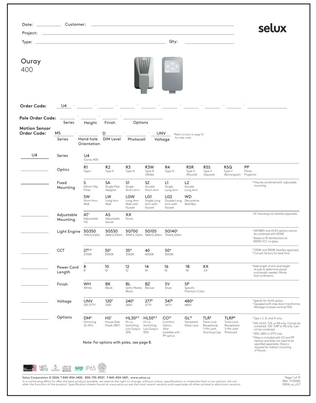
PINNACLE OF TROY
PHOTOMETRIC LAYOUT
GASSER BUSH ASSOCIATES
WWW.GASSERBUSH.COM

Designer KS
Date 01/03/2025
Scale Not to Scale
Drawing No. #24-37675_V1



View #1





Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Overall Site	+	0.2 fc	2.4 fc	0.0 fc	N/A	N/A
Boundary @ 5'	+	0.0 fc	1.0 fc	0.0 fc	N/A	N/A

Schedule

Symbol	Label	QTY	Manufacturer	Catalog	Description	Lamp Output	LLF	Input Power	Mounting Height
	A	1	Selux Corporation	U4-R3-XX-XX-5G530-30-XX-UNV-S2	Gray formed aluminum housing, patterned specular reflector , clear plastic optics, no lens enclosure, TWIN HEAD, S2 DOUBLE SHORT ARM MOUNTING	2950	0.9	56	20'
	B	144	LIGHTWAY INDUSTRIES, INC	MERW-612LED-FIP-2-K-B1-WSA-DIMLO-21-01.	4-3/8"L. X 6-1/2"W. X 12"H. LED WALL SCONCE DIFFUSED LENS	1108	0.9	16.95	6.5'

General Note

1. SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
2. SEE LUMINAIRE SCHEDULE FOR LIGHT LOSS FACTOR.
3. CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: 0' - 0" & 5' - 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 CONTROLS@GASSERBUSH.COM OR 734-266-6705.

Alternates Note

THE USE OF FIXTURE ALTERNATES MUST BE RESUBMITTED TO THE CITY FOR APPROVAL.

Ordering Note

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

Drawing Note

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

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.

PINNACLE OF TROY
PHOTOMETRIC LAYOUT
GASSER BUSH ASSOCIATES
WWW.GASSERBUSH.COM

Designer
KS
Date
01/03/2025
Scale
Not to Scale
Drawing No.
#24-37675_V1

ITEM #7

500 West Big Beaver
Troy, MI 48084
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PLANNING COMMISSION 2024 ANNUAL REPORT

The Michigan Planning Enabling Act requires that municipal planning commissions prepare an annual written report to the legislative body concerning operations and the status of planning activities undertaken during the calendar year. In accordance, the following information has been compiled:

PLANNING COMMISSION

In 2024 the Planning Commission consisted of Dave Lambert (Chair), Marianna Perakis (Vice Chair), Toby Buechner, Carlton Faison, Tyler Fox, Michael Hutson, Tom Krent, Lakshmi Malalahalli and John Tagle.

Tyler Fox was Zoning Board of Appeals (ZBA) Representative.

The Planning Commission held 19 meetings during the year.

John Tagle and Michael Hutson served on the Sustainable Design Review Committee.

PLANNING COMMISSION TRAINING

Planning Commission members Krent and Lambert attended training sessions at the Michigan Association of Planning (MAP) Annual Conference, held in September, 2024.

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PLANNING COMMISSION 2024 ANNUAL REPORT

SITE PLAN REVIEWS

The Planning Commission considered the following applications in 2024:

Project	Description	PC Action
SP JPLN2023-0033	Proposed Premier Academy Troy Daycare Center and Preschool, Northwest Corner of Crooks and Wattles PIN88-20-17-476-056, -057, -061, Section 17, Zoned NN "I"	Granted Preliminary Site Plan Approval on 02-13
SP JPLN2024-0001	Livernois/Elmwood Business Park, Northeast corner of Livernois and Elmwood (PIN 88-20-34-153-041), Section 34, Zoned IB	Granted Preliminary Site Plan Approval on 03-12
SV JPLN2024-0002	Vacate Alley, North of Elmwood and East of Livernois, Abutting PIN 88-20-34-153-042 & -043 to the west and PIN 88-20-34-153-041 to the east, Northfield Park Subdivision, Section 34	Recommended Approval to City Council on 03-12
SP JPLN2024-0004	Proposed Outdoor Bounce House, North of Fourteen Mile and West of John R PIN 88-20-35-400-017, Section 35, Zoned GB	Granted Preliminary Site Plan Approval on 04-09
SP JPLN2023-0031	Wattles Square Apartments, South side of Wattles and East of John R PIN 88-20-24-10-039, Section 24, Zoned NN "F"	Granted Preliminary Site Plan Approval on 04-23
SU JPLN2024-0010	Motor City Church addition and site improvements, South side of Wattles, East of Coolidge (1349 W. Wattles), Section 20, Zoned R-1B	Granted Preliminary Site Plan Approval on 05-14
PUD 020 JPLN2023-0021	The Village of Hastings PUD, East side of Livernois North of Square Lake, Section 3, Currently zoned NN "Q" and R-1B	Recommended Approval to City Council for CDP and PDP to be granted on 05-28
SP JPLN2023-0031	Wattles Square Apartments, South side of Wattles and East of John R PIN 88-20-24-10-039, Section 24, Zoned NN "F"	Granted Preliminary Site Plan Approval on 05-28
SU JPLN2024-006	Jax Kar Wash, South side of Long Lake, East of Livernois (102 East Long Lake Road), Section 15, Zoned NN "M"	Granted Special Use & Preliminary Site Plan Approval on 05-28
SP JPLN2024-0009	Town Haven Site Condominium, 19 units, South of Wattles, West of Rochester PIN 88-20-22-226-023 & -024, Section 22, Zoned R-1C	Granted Preliminary Site Condominium Approval on 06-11
SP JPLN2024-0020	City of Troy Cricket Field, West of Crooks, South of Wattles (Boulan Park, 3671 Crooks), Section 20, Zoned CF	Granted Preliminary Site Plan Approval on 06-25
SV JPLN2024-0002	Vacate Right-of-Way, West of Rochester, between Lovell and Hannah, Abutting 801 Hannah PIN 88-20-03-276-001, Clark Estates Subdivision, Section 3	Recommended Denial to City Council on 07-09

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PLANNING COMMISSION
2024 ANNUAL REPORT

SU JPLN2024-003	Starbucks with drive through, North side of Big Beaver, West of John R (1735 E. Big Beaver), Section 23, Zoned CB	Granted Special Use & Preliminary Site Plan Approval on 07-23
SP JPLN2023-0028	John R Commons Townhome Development, West side of John R, North of Big Beaver PIN 88-20-23-476-017	Granted Preliminary Site Plan Approval on 07-23
SP JPLN2023-0020	Rookery of Troy Mixed Use Development, West of Dequindre, South of Long Lake PIN 88-20-13-228-003 & -015, Section 13, Zoned NN "J"	Granted Preliminary Site Plan Approval 08-13
SU JPLN2024-024	Aston Martin Dealership, North side of Maplelawn, West of Crooks (1744 Maplelawn), PIN 88-20-29-401-017, Section 29, Zoned IB	Granted Special Use & Preliminary Site Plan Approval on 08-27
PUD JPLN2024-0012	Somerset West Concept Development Plan, North side of Big Beaver, West side of Coolidge (3100 W Big Beaver), PIN 88-20-19-476-002, -003, & 88-20-19-430-004	Presentation to introduce project; No Action Taken
SP JPLN2024-0023	Somerset Park Apartments Administration and Leasing Center and New Gold Cart Storage Garage, East of Coolidge, South of Big Beaver (2401 Golfview), PIN 88-20-29-176-002, Section 29, Zoned MF	Granted Preliminary Site Plan Approval 09-10
SP JPLN2024-0022	Wilshire Center, Single Family Attached and Multifamily Development, North side of Wilshire, East of Crooks and North of Big Beaver, PIN 88-20-21-326-010, Section 21, Zoned BB	Postponed on 10-08
SU JPLN2024-025	Adult Foster Care Small Group Home (Up to 10 Residents), West side of John R, South side of Abbotsford (5589 John R), PIN 88-20-12-152-003, Section 12, Zoned R-1C	Granted Special Use & Preliminary Site Plan Approval on 11-12
SU JPLN2024-007	El Car Wash, Northwest corner of Long Lake and Dequindre (2955 & 2995 E Long Lake), Section 12, Zoned NN "J"	Motion to Approve Failed on 11-12
SP JPLN2024-0016	Elevate Troy Mixed Use Development, South of Big Beaver, East of Todd (1787 & 1985 W Big Beaver, PIN 88-20-29-226-003, -002, & -020, Section 29, Zoned BB	Granted Preliminary Site Plan Approval 11-12
SU JPLN2024-021	Residence Inn Hotel, South side of Butterfield, East of Coolidge (2125 & 2155 Butterfield), Section 29, Zoned BB	Postponed on 11-26

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PLANNING COMMISSION 2024 ANNUAL REPORT

ZONING ORDINANCE AMENDMENTS

The Planning Commission considered the following amendment applications in 2024:

Amendment	Description	PC Action
CR JPLN2024-001	Bachard Lofts Conditional Rezoning, North side of Maple, West side of Stephenson (1441 E. Maple), PIN 88-20-26-351-016, Section 26, Proposed rezoning from O to IB	Recommended Rezoning for Approval on 08-27

CITY OF TROY MASTER PLAN

The Planning Commission considered the Master Plan at the following Regular meetings in 2024:

Date	Action
03/12/2024	Discussion on Proposed Neighborhood Node Classifications
04/09/2024	Public Heating – City of Troy Draft Master Plan Adopted Language and Intent Statement for Neighborhood Node F & L
02/27/2024	Neighborhood Node Subcommittee Meeting 1
07/02/2024	Neighborhood Node Subcommittee Meeting 2
09/03/2024	Neighborhood Node Subcommittee Meeting 3