DOWNTOWN MADISON HEIGHTS STREETSCAPING & CONCEPTUAL ENGINEERING PLAN: 11 MILE ROAD

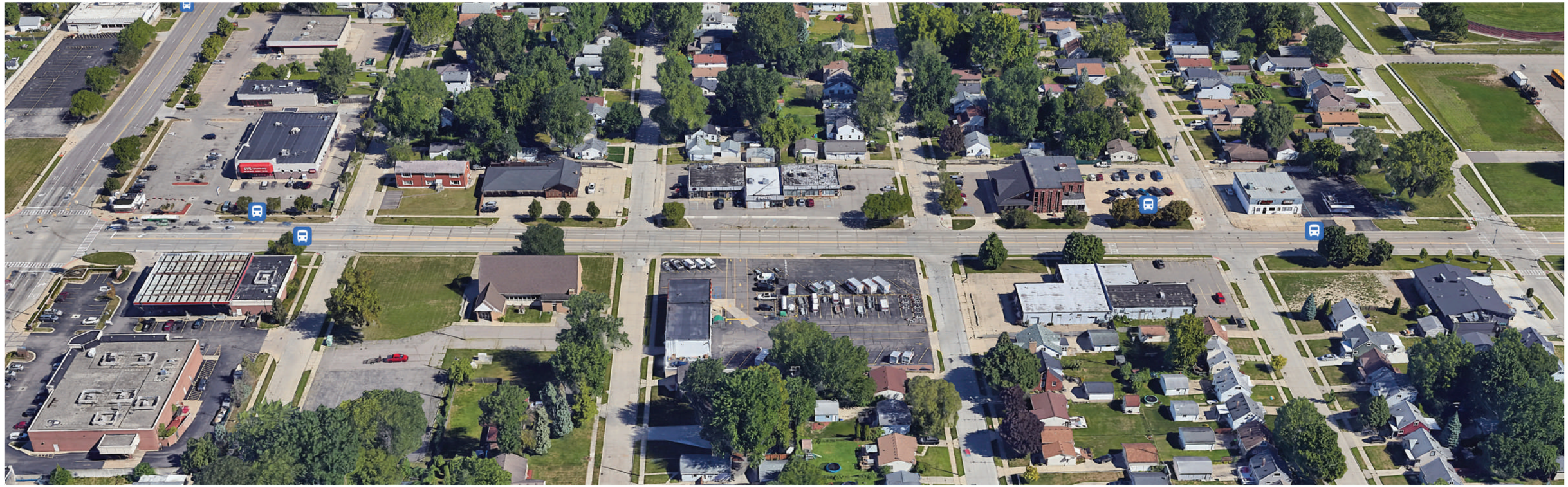
SUMMARY DOCUMENT

FEBRUARY 2024

MADISON HEIGHTS MICHIGAN

MKSK

NF ENGINEERS



Client Team:

City of Madison Heights Staff Members:
Melissa Marsh, City Manager
Giles Tucker, Community Development Director
Matt Lonnerstater, City Planner
Cheryl Rottmann, City Clerk

Design Team:

MKSK: Landscape Architecture
Matt McGrath, Associate Principal
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Nowak & Fraus: Civil Engineering
Brad Brickel, Principal

Fleis & VandenBrink: Traffic Engineering
Julie Kroll, Associate

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APPENDIX

PURPOSE

This document is a summary of design efforts focused on creating a cohesive streetscape environment for portions of 11 Mile Road in Madison Heights, Michigan. The focus of the study is to explore options to improve the pedestrian environment, slow traffic, and spur economic development opportunities within the Downtown Development Authority area of Madison Heights.

The plan includes elements for streetscape improvements and explores a full range of site amenities including gateway elements, trees and landscaping, seating areas, site furnishings, traffic calming measures, pedestrian crosswalks, and on-street parking.

The areas of study are the right-of-way environments along 11 Mile Rd extending from Stephenson Highway to Lorenz St and include a specific focus area between Groveland St to Lorenz St. The focus area study includes specific recommendations for curb cut closures and possible vehicular circulation adjustment within private parcels adjacent to 11 Mile Rd.

Finally, this document includes preliminary engineering drawings, a traffic analysis memo, and conceptual cost estimates to assist with funding and implementation strategies.

HOW TO USE

This document begins with a general description of the project, and includes an existing conditions analysis, identification of opportunities and constraints, stakeholder feedback and a review of the preferred design option.

Additional information includes design detail on proposed elements, such as the gateway opportunities, amenity areas, pedestrian circulation routes, and traffic and parking summaries.

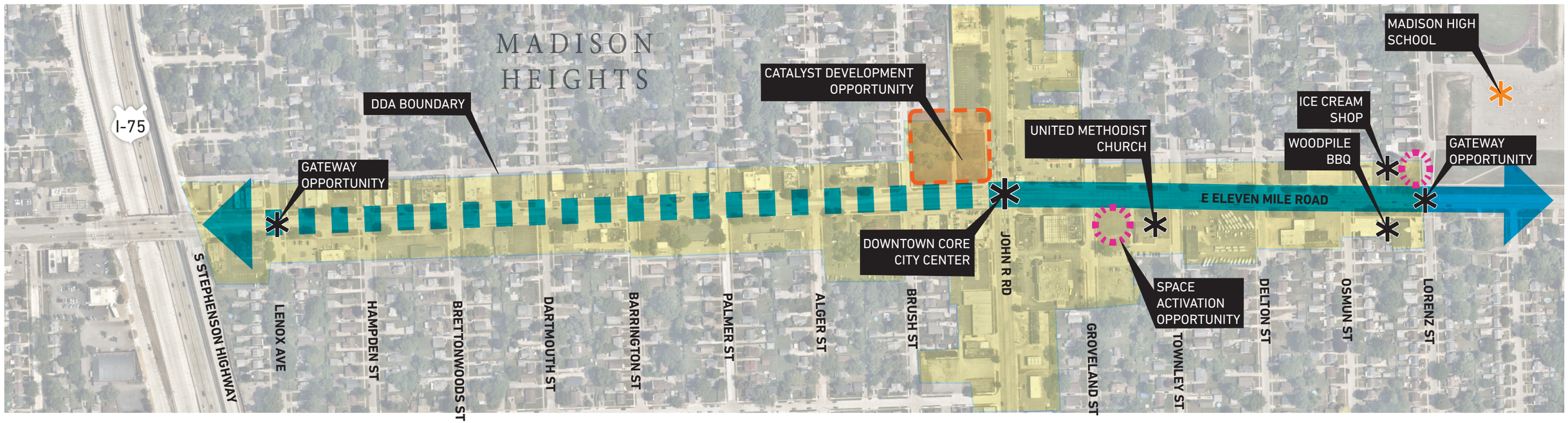
Finally, the appendix sections include more technical information including preliminary engineering plans, traffic summary, recommended planting and preliminary cost estimates.

Existing Conditions on 11 Mile at Lorenz

Project Overview:

As outlined in recent master planning efforts, the City of Madison Heights has prioritized developing an improved streetscape environment along 11 Mile Road, focusing on areas between John R. Road and Lorenz Street. This effort is part of a larger plan to facilitate future development within the 11 Mile corridor extending from Lorenz Street to I-75. This plan will guide the vision and design for future improvement projects that promote a more walkable, pedestrian friendly, and attractive downtown district.

FULL CORRIDOR



FOCUS AREA

Project Goals & Objectives
As part of an initial project kick off and visioning session, the Design Team worked with City staff to refine project goals, review challenges, and develop conceptual options to meet project needs

The following project goals were established to help inform project development:

1. CREATE ENHANCED PHYSICAL ENVIRONMENTS WITHIN THE CORRIDOR FOCUSING ON

- Pedestrians
- Cyclists
- Transit Users
- Automobile drivers

2. PROMOTE THE IDENTITY OF MADISON HEIGHTS THROUGH GATEWAY FEATURES AND OTHER AMENITIES

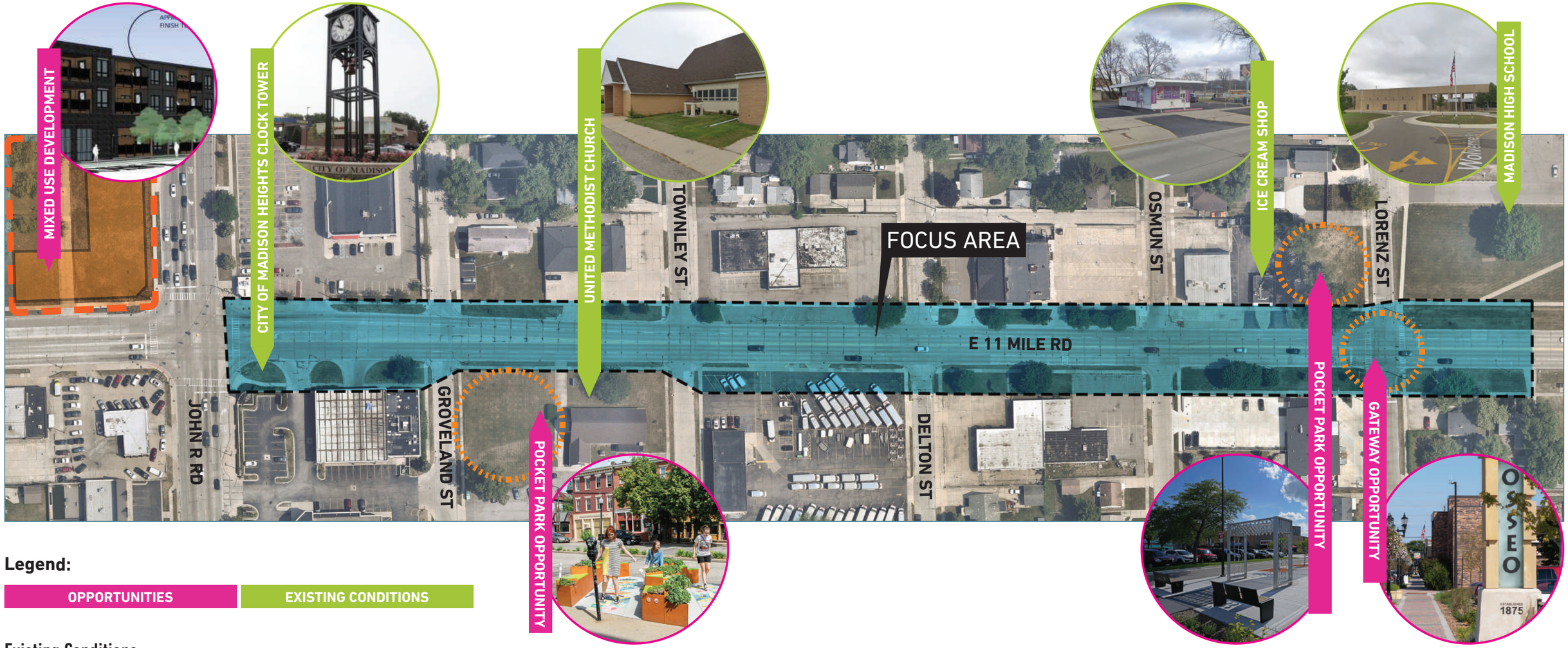
3. MAXIMIZE RIGHT OF WAY ENVIRONMENTS TO ALLOW FOR A BETTER USE OF PUBLIC SPACE

4. ENHANCE PARKING AND ACCESS TO BUSINESSES ALONG THE CORRIDOR

5. IMPROVE SAFETY FOR ALL USERS

6. DEVELOP DESIGN CONTENT TO HELP INFORM FUNDING AND IMPLEMENTATION STRATEGIES

Design Context Images



Legend:

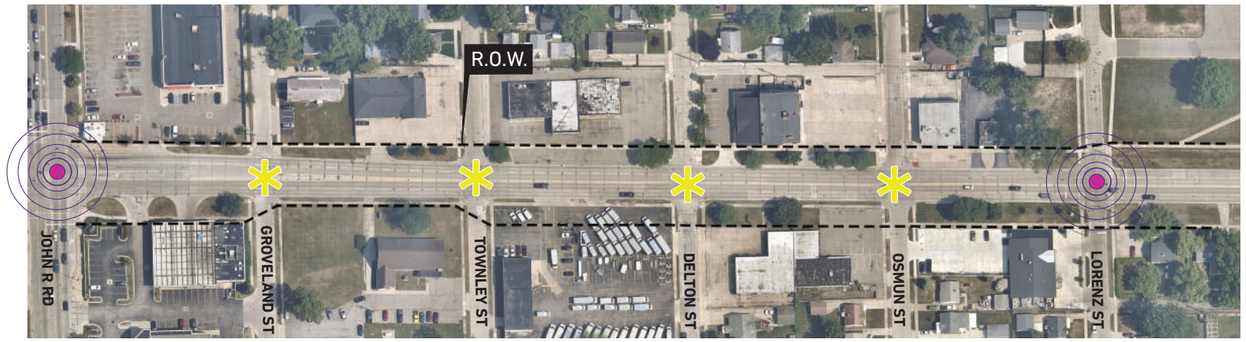
OPPORTUNITIES | EXISTING CONDITIONS

Existing Conditions

The current streetscape features several challenges, including numerous curb cuts, disjointed sidewalks, high speed traffic, and few street trees or pedestrian amenities.

Future Opportunities

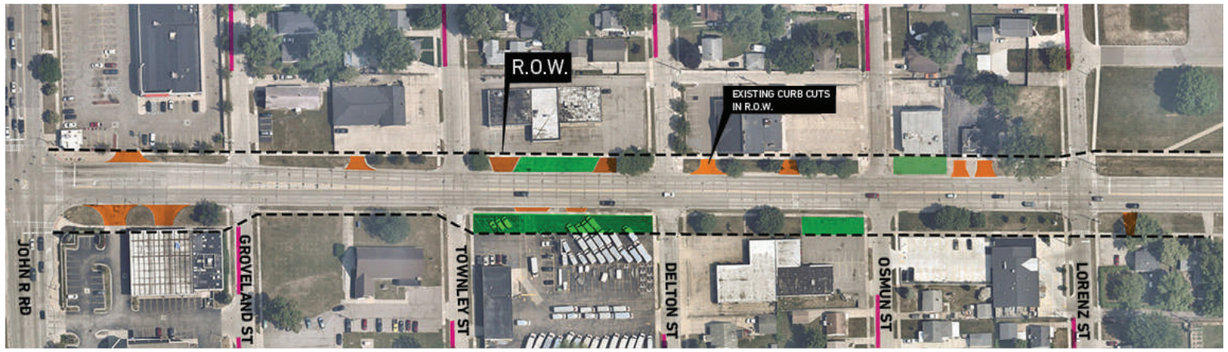
Opportunities include improved sidewalk environments, enhanced pedestrian safety, the establishment of gateway elements, traffic calming and pedestrian amenities such as pocket parks and bike facilities.



Signalized Intersections with Crosswalk Striping

Non-Signalized Intersections with no Crosswalk Striping

STREETSCAPE ANALYSIS - INTERSECTION CONDITIONS

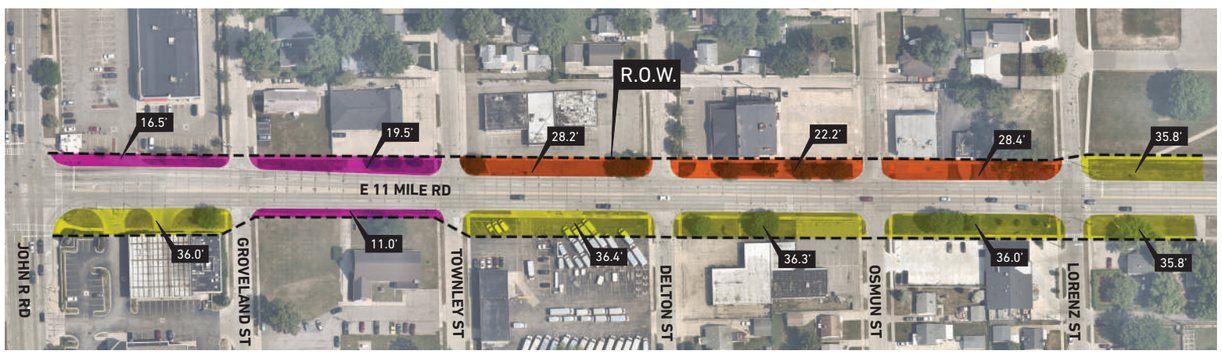


Curb Cut Locations in R.O.W.

Existing Parking in R.O.W.

Existing Parking on Side Streets

STREETSCAPE ANALYSIS - EXISTING CURB CUT LOCATIONS



Small R.O.W. 10'-20'

Medium R.O.W. 20'-30'

Large R.O.W. >30'

STREETSCAPE ANALYSIS - EXISTING RIGHT-OF-WAY WIDTHS

Existing Lane Widths Vary From 11'-6" to 12'-0"

Inventory and analysis efforts identified opportunity areas and site constraints which were used to help inform initial design concepts.

Highlighting existing curb cuts and parking conditions illustrated existing challenges, including pedestrian safety, vehicular circulation, and disjointed access to businesses, and parking. Reviewing these existing features allowed the project team to determine how proposed streetscape improvements may impact existing property owners and helped drive design options that meet project goals and were sensitive to the needs of local businesses.

In some areas parking for businesses interfere with sidewalks and pedestrian environments creating safety concerns.

Poor sidewalk conditions pose additional safety concerns.

Design Studies

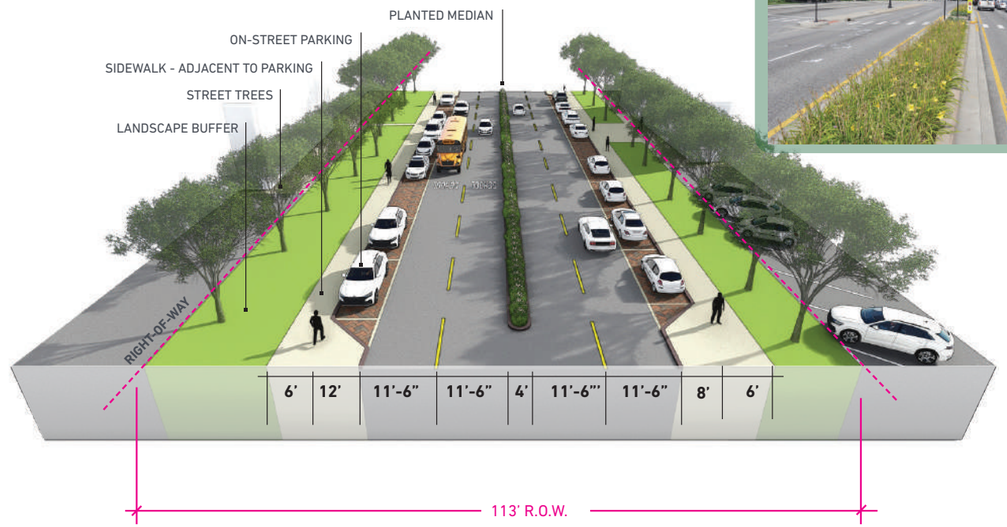
Following the initial data collection and analysis process, the Design Team worked with City staff to develop conceptual roadway design options to meet project needs.

Through the development of these studies, three distinct concepts were tested against the defined project objectives. Key elements of all the options include:

- Improved and consistent sidewalk conditions
- Reduced vehicle lane widths
- On-street parking zones
- Landscaped medians and street tree plantings
- Bump-out zones and intersections to reduce crossing widths

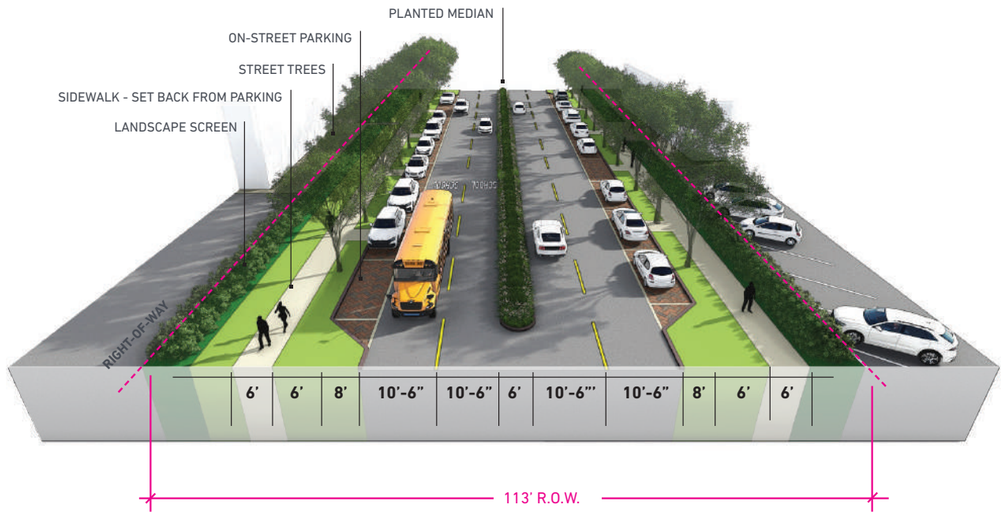
Further details on each option are highlighted below:

STUDY OPTION: LANDSCAPE BUFFER



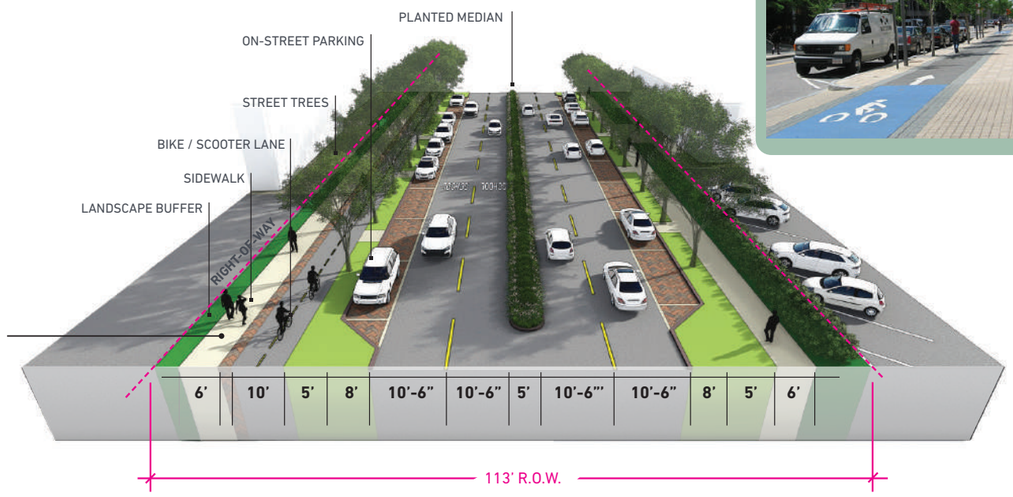
Option: Landscape Buffer has the sidewalk located adjacent to parallel parking with a tree lawn between back of sidewalk and the edge of the right-of-way.

STUDY OPTION: TREE LAWN



Option: Tree Lawn incorporates a tree lawn between edge of parking and edge of sidewalk. Plant bed buffers are proposed along the right-of-way line to provide screening between the parking areas and streetscape.

STUDY OPTION: MULTI-USE PATH



Option: Multi-Use Path includes a 10' wide multi-use path in addition to the proposed tree lawns and sidewalks.

Engagement Session Purpose:

As part of the planning effort the project team invited key stakeholders, including business owners and city officials to an engagement session on Thursday, October 26th. The intent of the meeting was to review conceptual design options and visual preferences of program elements to help solicit feedback and ultimately guide the direction of the design process.

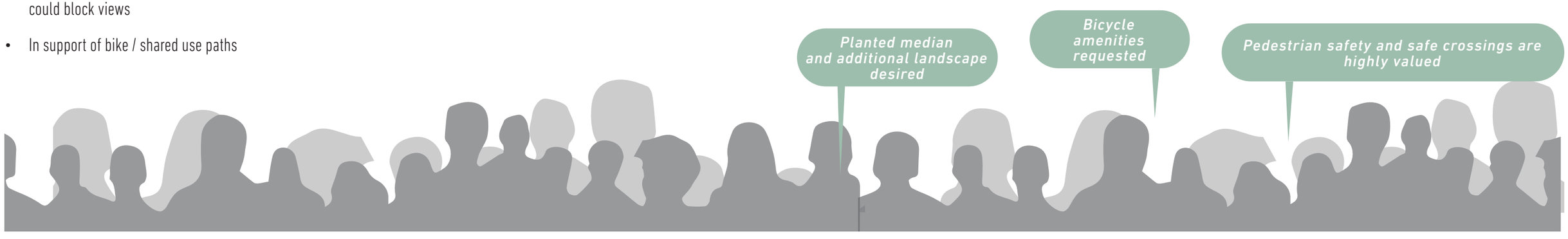
Event Details:

Date: Thursday, October 26th, 2023
Location: Woodpile BBQ - 630 E. Eleven Mile Road, Madison Heights, MI
Event: Stakeholder Engagement Open House

Summarized Comments:

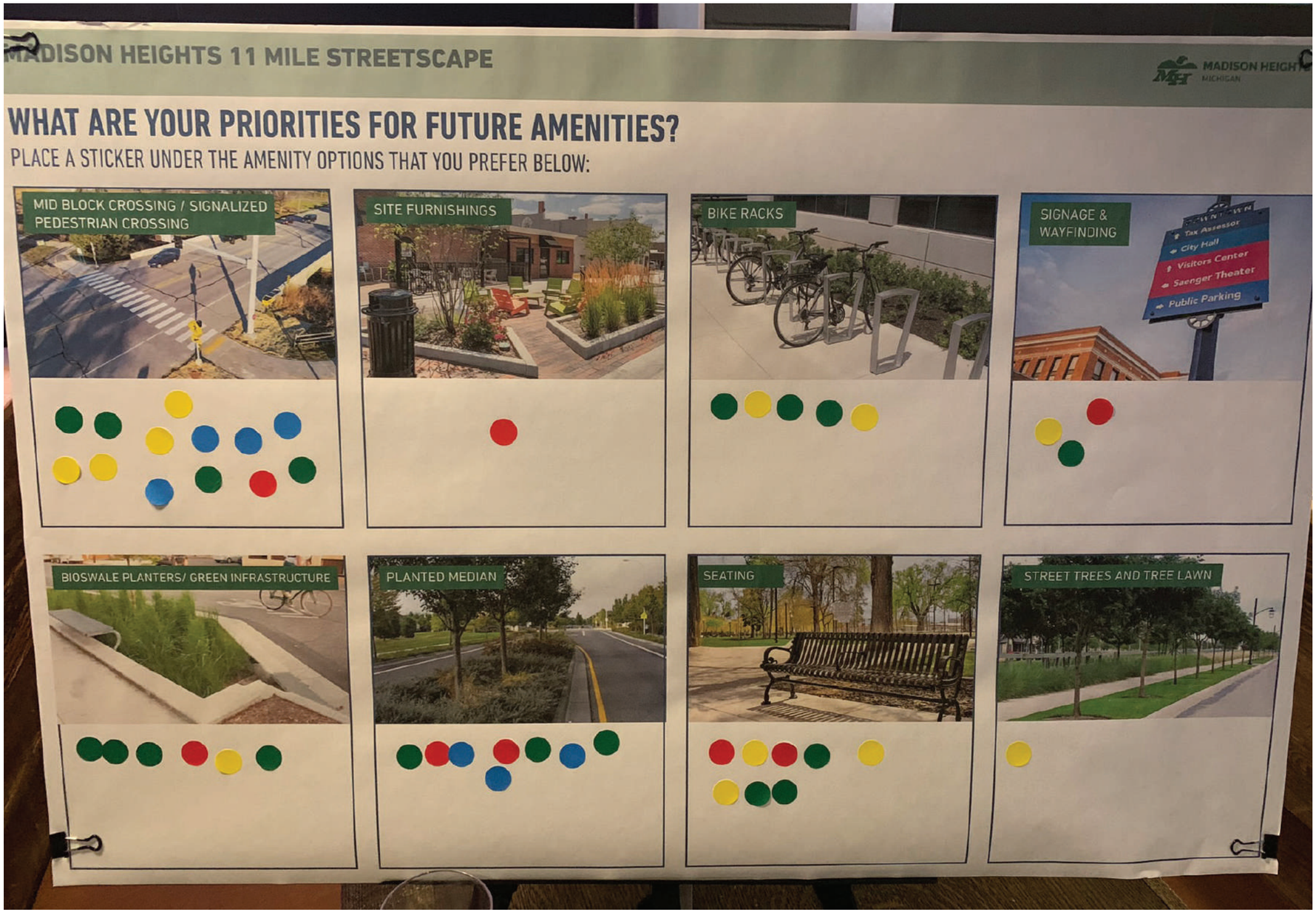
- Pedestrian safety and safe crossings are highly valued
- Planted median and additional landscape are desired
- Bicycle amenities are requested
- Public art is desired
- Green infrastructure should be incorporated in future designs
- Like the idea of ornamental trees behind street trees for added color / interest (specifically cherry blossom mentioned)
- In favor of added on street parking
- In support of medians for traffic calming purposes
- Concerned about locating trees too close to intersections that could block views
- In support of bike / shared use paths

ENGAGEMENT SESSION PARTICIPANTS



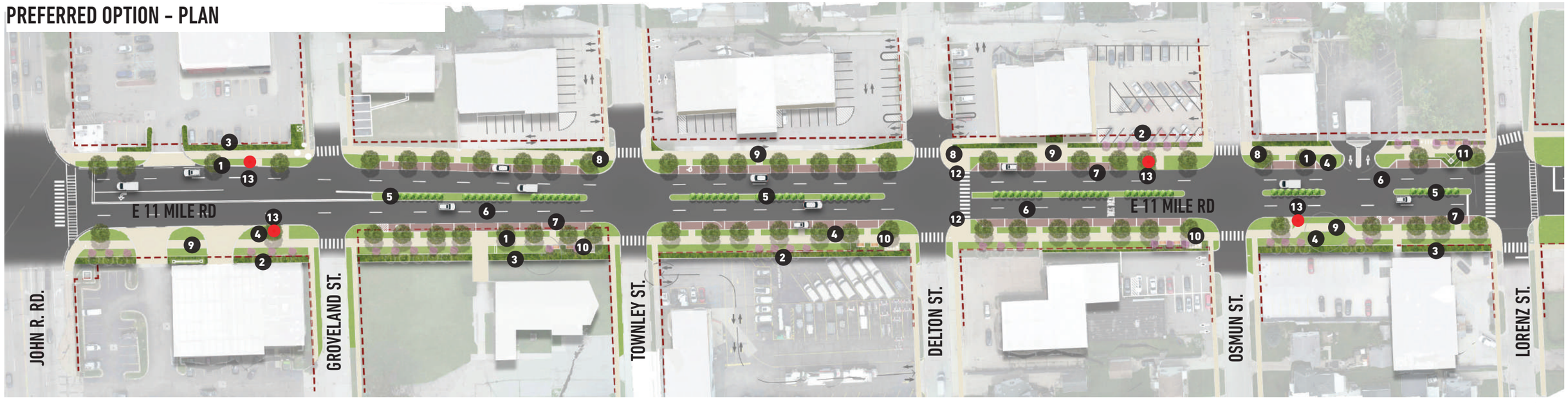
During the stakeholder engagement session, a visual preference survey was conducted to solicit feedback on desired amenities and elements to be considered as part of the corridor study.

The image to the right shows the result of the survey and includes a comparison of the preferred images. (There is no significance to the colors of dots).



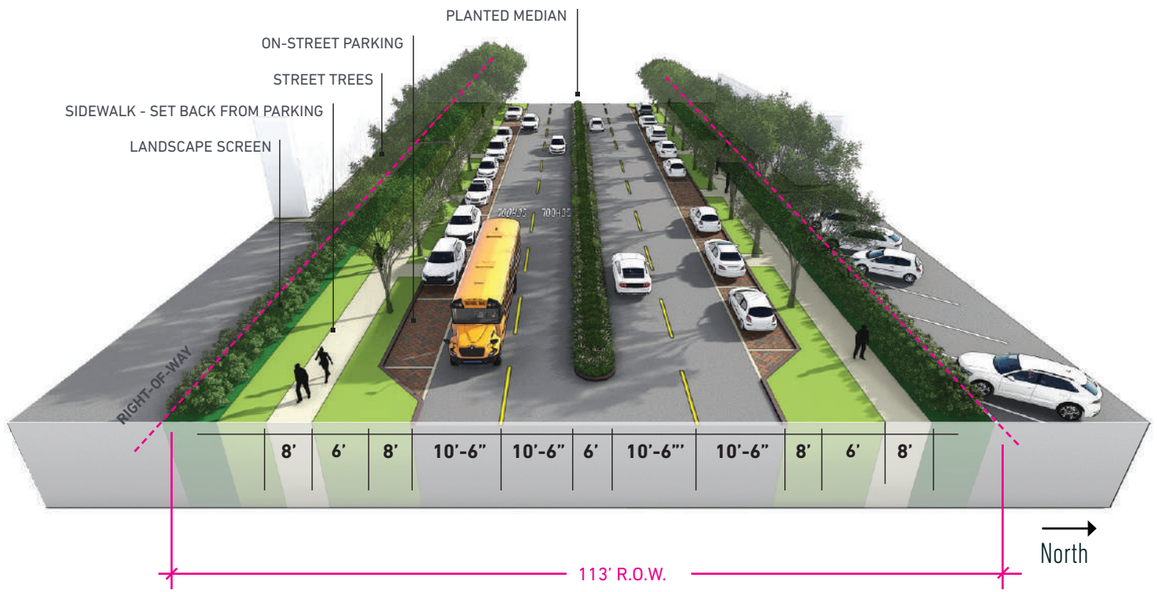
VISUAL PREFERENCE SURVEY BOARD - STAKEHOLDER ENGAGEMENT SESSION

PREFERRED OPTION - PLAN



North

PREFERRED OPTION



Preferred Option

Following the results of the stakeholder engagement session, Option Treelawn, was determined to be the preferred design section for the study area.

This option achieved the goals of the project by allowing for significant on-street parking and introducing a planted median within the road section, helping slow traffic and address parking needs.

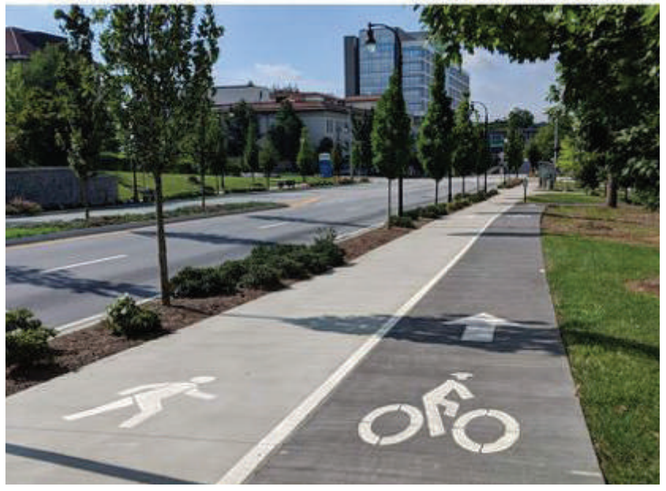
Additionally, this option provided a "landscape" buffer to adjacent parking areas helping screen views. Sidewalk widths were increased to 8' to potentially accommodate bike users.

This option is shown as "Option 1" in Appendix A4-A7.

LEGEND

1. Deciduous Canopy Tree
2. Ornamental Tree
3. Plant Buffer
4. Tree Lawn
5. Median with Plantings
6. Reduced Width Vehicle Travel Lanes
7. Parallel Parking Stalls
8. Traffic Calming Bumpouts
9. 8' Wide Pedestrian Walk
10. Amenity Areas
11. Gateway Area
12. Pedestrian Activated Crossing Signals
13. Bus Stops

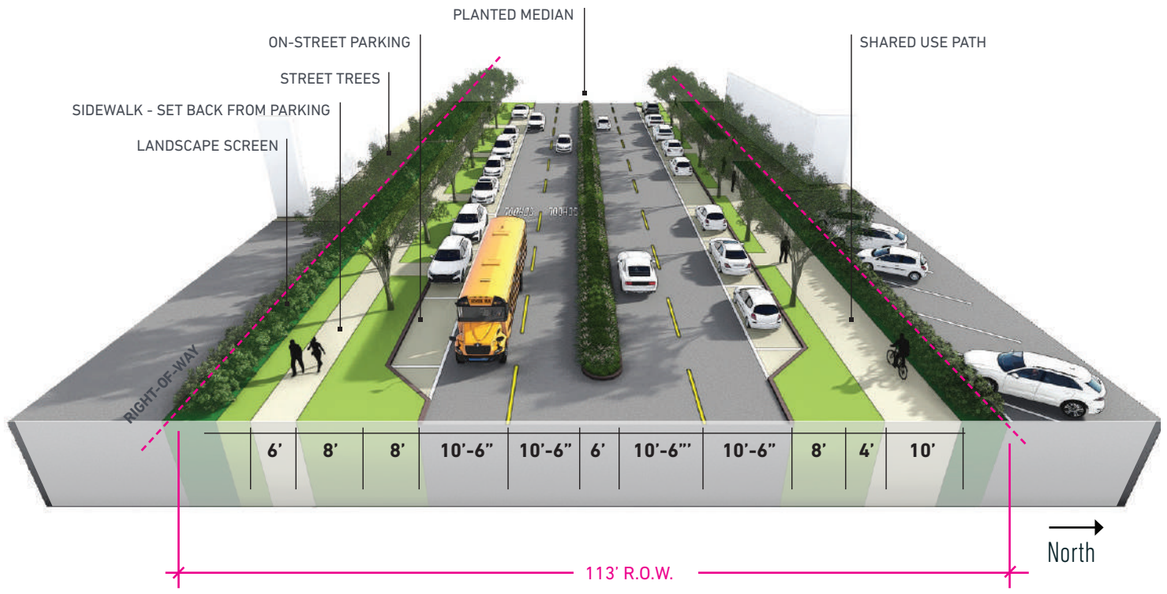
A shared use path is typically wider than a traditional sidewalk and is designed to accommodate pedestrians and cyclists.



Lane markings and changes in material can be used to define various uses.

Providing thoughtful solutions for transit riders, pedestrians, scooters, and bicyclists can improve the mobility, access, and safety.

PREFERRED OPTION - WITH SHARED USE PATH



Preferred Option – With Shared Use Path

An alternate consideration of the perferred option included the addition of a 10' wide Shared Use Path along the north side of the study corridor.

A shared use path provides a travel area separate from motorized traffic for bicyclists, scooter users, pedestrians, skaters, wheelchair users, joggers, and other users.

Shared use paths can provide a low-stress experience for people using the network for transportation or recreation and are fully separated from vehicular traffic. Shared use paths differ from cycle tracks in that they are can include pedestrians even if the primary anticipated users are cyclists and scooters.

This option is shown as "Option 2" in Appendix A8- A11.

PARKING & CIRCULATION - FOCUS AREA

Parking and access to adjacent businesses and property owners was a key issue during the design study. Within the focus area, the Design Team developed conceptual plans to illustrate how site access to adjacent parcels could be re-configured to allow for proposed right of way improvements. In some cases, closing curb cuts along 11 Mile were a proposed way of creating a more cohesive streetscape helping improve pedestrian safety.

The diagram below illustrates locations where curb cuts could be removed (shown with a blue "X") and how internal circulation could be adjust to accommodate the right of way improvements (shown in red).

As a result of adding the on-street parking there was a net gain of approximately 19 parking spaces within the focus area parking spaces

213-241 E. ELEVEN MILE ROAD - PARKING TABLE

PARKING TYPE	QUANTITY
APPROXIMATE EXISTING PARKING LOT SPACES	29
PROPOSED SURFACE LOT SPACES	21
PROPOSED PARALLEL PARKING SPACES	9
PROPOSED NEW PARKING SPACES	**30 (NET GAIN OF 1**

307-341 E. ELEVEN MILE ROAD - PARKING TABLE

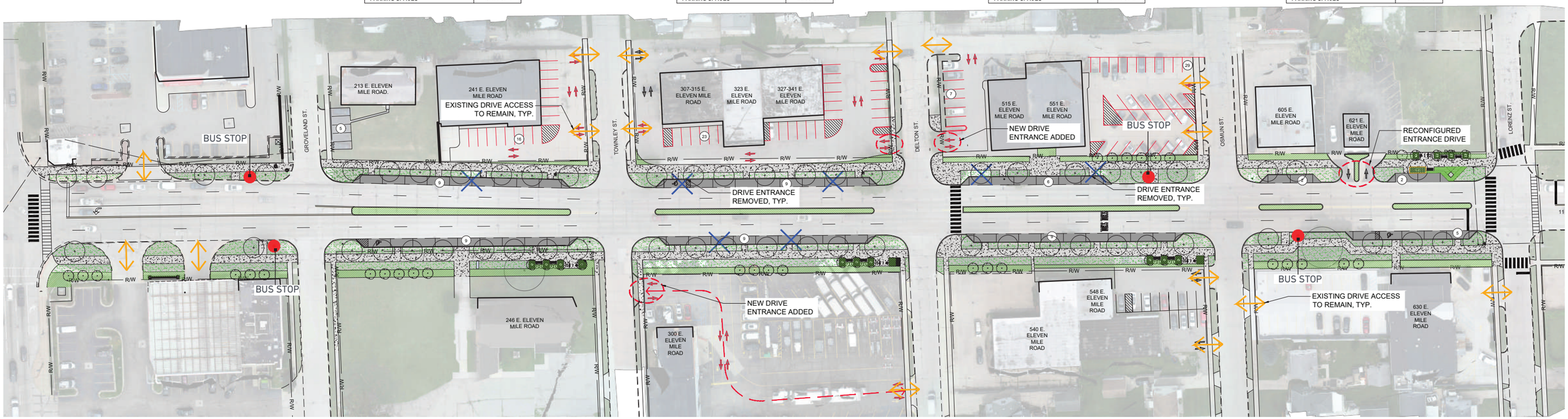
PARKING TYPE	QUANTITY
APPROXIMATE EXISTING PARKING LOT SPACES	39
PROPOSED SURFACE LOT SPACES	23
PROPOSED PARALLEL PARKING SPACES (INCLUDING 1 ADA SPACE)	9
PROPOSED NEW PARKING SPACES	**32 (NET LOSS OF 7**

515-551 E. ELEVEN MILE ROAD - PARKING TABLE

PARKING TYPE	QUANTITY
APPROXIMATE EXISTING PARKING LOT SPACES	40
PROPOSED SURFACE LOT SPACES	36
PROPOSED PARALLEL PARKING SPACES	6
PROPOSED NEW PARKING SPACES	**42 (NET GAIN OF 2**

605-621 E. ELEVEN MILE ROAD - PARKING TABLE

PARKING TYPE	QUANTITY
APPROXIMATE EXISTING PARKING LOT SPACES	28
PROPOSED SURFACE LOT SPACES	N/A
PROPOSED PARALLEL PARKING SPACES	4
PROPOSED NEW PARKING SPACES	**4 (NET GAIN OF 4**



LEGEND

SYMBOL	DESCRIPTION
	DRIVE AISLES REMOVED
	DRIVE AISLES ADDED AND/OR RELOCATED
	PROPOSED DECIDUOUS TREE PLANTING
	PROPOSED ENHANCED LANDSCAPE AREA
	PROPOSED ENHANCED SIDEWALKS
	PROPOSED ON STREET PARALLEL PARKING
	EXISTING CURBING TO REMAIN

246 E. ELEVEN MILE ROAD - PARKING TABLE

PARKING TYPE	QUANTITY
APPROXIMATE EXISTING PARKING LOT SPACES	N/A
PROPOSED SURFACE LOT SPACES	N/A
PROPOSED PARALLEL PARKING SPACES (INCLUDING 1 ADA SPACE)	9
PROPOSED NEW PARKING SPACES	**9 (NET GAIN OF 9)**

300 E. ELEVEN MILE ROAD - PARKING TABLE

PARKING TYPE	QUANTITY
APPROXIMATE EXISTING PARKING LOT SPACES	36
PROPOSED SURFACE LOT SPACES	32
PROPOSED PARALLEL PARKING SPACES	9
PROPOSED NEW PARKING SPACES	**41 (NET GAIN OF 5)**

540-548 E. ELEVEN MILE ROAD - PARKING TABLE

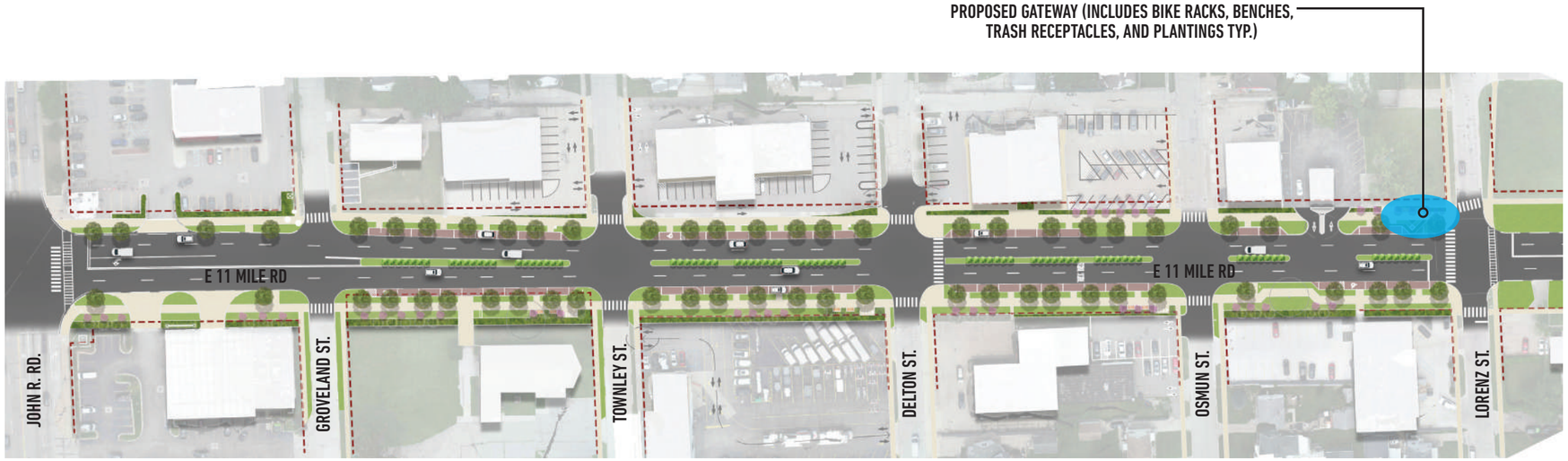
PARKING TYPE	QUANTITY
APPROXIMATE EXISTING PARKING LOT SPACES	37
PROPOSED SURFACE LOT SPACES	28
PROPOSED PARALLEL PARKING SPACES	9
PROPOSED NEW PARKING SPACES	**37 (NO CHANGE)**

630 E. ELEVEN MILE ROAD - PARKING TABLE

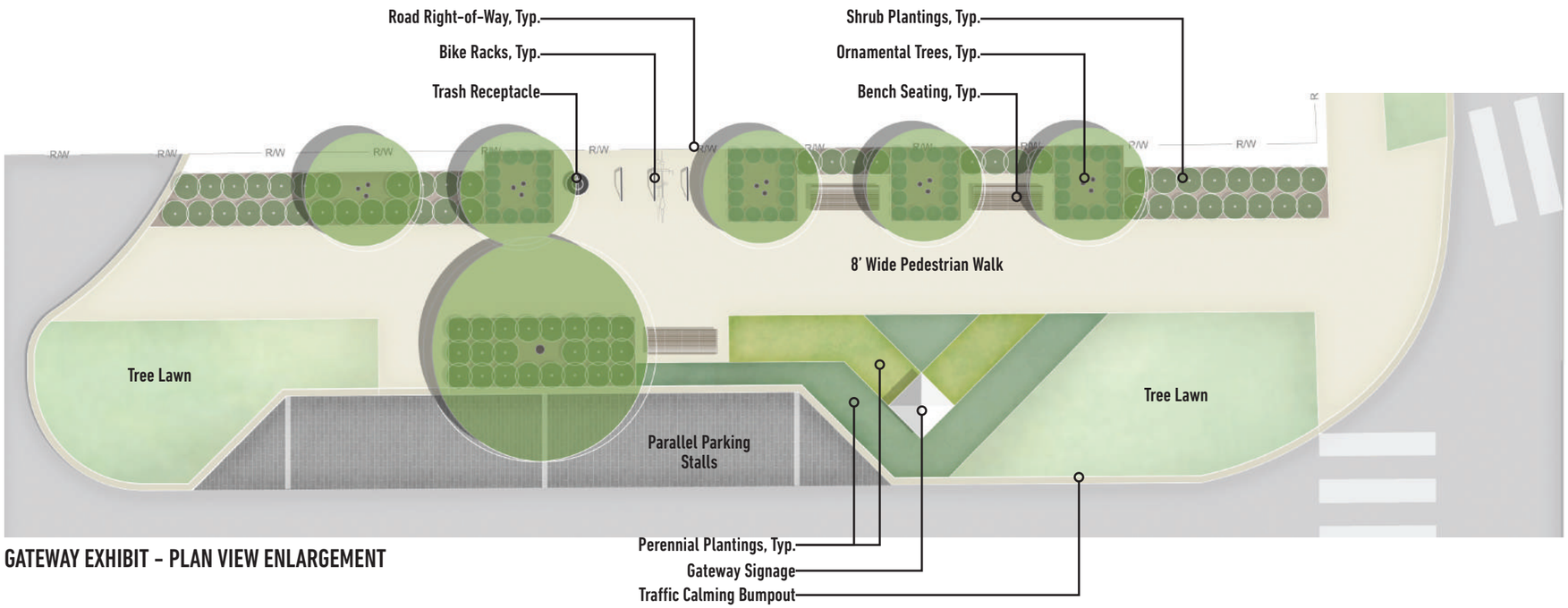
PARKING TYPE	QUANTITY
APPROXIMATE EXISTING PARKING LOT SPACES	31
PROPOSED SURFACE LOT SPACES	N/A
PROPOSED PARALLEL PARKING SPACES (INCLUDING 1 ADA SPACE)	5
PROPOSED NEW PARKING SPACES	**5 (NET GAIN OF 5)**

North

0 30' 60'
SCALE IN FEET



GATEWAY AREA EXHIBIT - LOCATION MAP



GATEWAY EXHIBIT - PLAN VIEW ENLARGEMENT

Part of the design effort included identifying areas within the corridor that could serve as visual gateways to the Madison Heights community. Working with City staff, the Design Team proposed the intersection of 11 Mile Rd and Lorenz St as an intuitive location for a community gateway feature element.

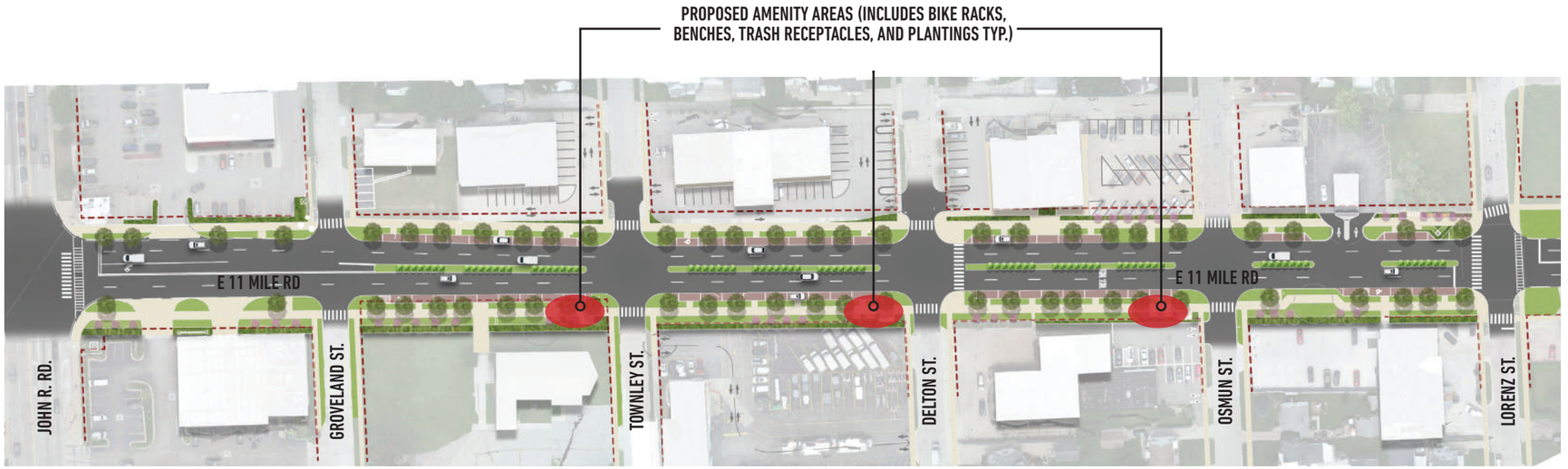
The concept shown below provides a location for a gateway sign piece set within a small pocket park with seating and bike amenities.

GATEWAY EXHIBIT- PRECEDENTS

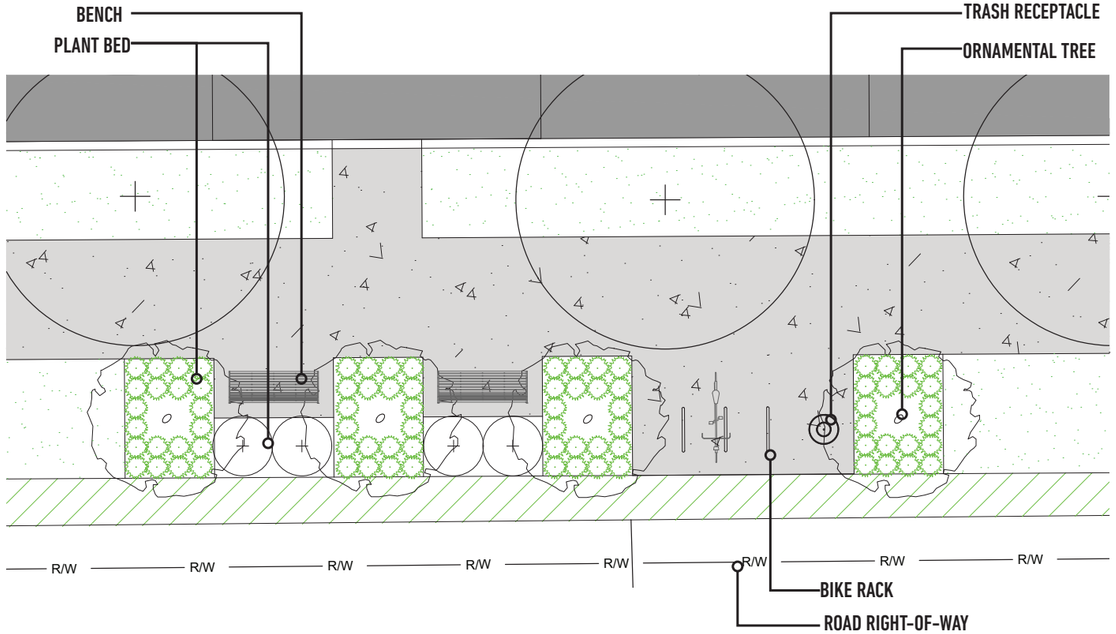
The gateway feature is designed to enhance the arrival experience in Madison Heights by incorporating pedestrian amenities such as benches and bike racks.

These amenities not only contribute to traffic calming but also foster a stronger sense of place within the community.

GATEWAY EXHIBIT – 3D RENDERINGS



AMENITY AREA EXHIBIT - PREFERRED OPTION - LOCATION MAP



AMENITY AREA EXHIBIT - PREFERRED OPTION - PLAN VIEW ENLARGEMENT

The Design Team explored various options for pedestrian-oriented amenity areas to be integrated into the streetscape.

These "pocket parks" feature amenities such as bike racks, seating areas, trash receptacles, and enhanced planting, including ornamental trees, perennials, and ornamental grasses.

AMENITY AREA EXHIBIT - BEST PRACTICE IMAGES

Encouraging the integration of “pocket parks” along the 11 Mile corridor support the project’s overarching goals of enhancing walkability, fostering community identity, and creating inviting public spaces where pedestrians can gather, relax, and enjoy the surroundings.

These pocket parks will not only help enhance the streetscape but also provide opportunities for social interaction and recreation, contributing to a more vibrant and pedestrian-friendly environment overall.

AMENITY AREA EXHIBIT – 3D RENDERINGS

PLANT DESIGN EXHIBIT - STREETSCAPE

LOW EVERGREEN SHRUB

DECIDUOUS FLOWERING SHRUB

Parking Buffer: Flowering deciduous shrubs, evergreen shrubs and ornamental trees are proposed in the plant bed between the back of walk and parking areas. The intent is to create an attractive yet low maintenance screen to the parking areas.

DECIDUOUS CANOPY TREES

Street Trees: Street trees to have an upright growth habit, be tolerant of urban conditions and comply with the City of Madison Heights Department of Public Services recommendations.

This graphic shows recommended planting types within the proposed streetscape section. The planting strategy for the corridor is designed to be simple yet effective, with the goals of using proven low maintenance plant species that can tolerate streetscape environments and provide four season visual appeal.

Refer to the appendix for full tree, shrub, and ornamental grass species recommendations.

LOW DECIDUOUS OR EVERGREEN SHRUB

ORNAMENTAL GRASSES

Median Plantings: Proposed median plantings include a combination of low deciduous shrubs, evergreen shrubs and ornamental grasses tolerant of urban conditions and salt spray. Selected species to display four season ornamental appeal.

SEATING

PRODUCT: 970 BENCH
MANUFACTURER: MAGLIN

PRODUCT: LILLY BENCH
MANUFACTURER: VICTOR STANLEY

PRODUCT: VIBE CONTOUR BENCH
MANUFACTURER: ANOVA

BIKE RACKS

PRODUCT: 300 SERIES - 350 BIKE RACK
MANUFACTURER: MAGLIN

PRODUCT: FREESIA BIKE RACK
MANUFACTURER: VICTOR STANLEY

PRODUCT: VIBE STEEL BIKE RACK
MANUFACTURER: ANOVA

TRASH RECEPTACLES

PRODUCT: 650 TRASH CONTAINER
MANUFACTURER: MAGLIN

PRODUCT: S-42 TRASH RECEPTACLE
MANUFACTURER: VICTOR STANLEY

PRODUCT: VIBE TRASH RECEPTACLE
MANUFACTURER: ANOVA

During the design process, a key aspect involved selecting a range of street furnishings that met the project's requirements and aligned with the desired design aesthetics.

The elements shown here were presented during stakeholder engagement sessions and were chosen based on popular preferences and feedback gathered from stakeholders.

PROBABLE COST OF AMENITIES:

FURNISHINGS:

6' BENCH	$1,750 / EA.
BIKE RACK	$500 / EA.
TRASH RECEPTACLE	$1,000 / EA.

*Note: Unit price values derived from recent bid pricing and MKSK assumption of work effort required. MKSK has no control over the cost of labor, materials, or the contractors methods of determining bid prices, or over competitive bidding or market conditions. Therefore, MKSK cannot guarantee that bids or construction cost will not vary from any estimates of probable construction cost prepared by them.

PREFERRED OPTION - FULL CORRIDOR PLAN VIEW RENDERING

As part of the full design effort the project team looked at developing a consistent streetscape approach within the broader context of the 11 Mile corridor. The exhibits shown on the following pages illustrate how the proposed roadway section developed in the project focus area could be applied to 11 Mile Road from John R Road to the S Stephenson Highway.

As with the focus area, these studies include areas to reduce curb cuts, add planting medians, on street parking, and creating enhanced pedestrian environments.

LEGEND

1. Deciduous Canopy Tree
2. Ornamental Tree
3. Plant Buffer
4. Tree Lawn
5. Median with Plantings
6. Reduced Width Vehicle Travel Lanes
7. Parallel Parking Stalls
8. Traffic Calming Bumpouts
9. 8' Wide Pedestrian Walk
10. Bus Stops

LEGEND

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7. Parallel Parking Stalls
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9. 8' Wide Pedestrian Walk
10. Bus Stops

KEY PLAN

SYMBOL	DESCRIPTION
	CURB CUTS REMOVED
	DRIVE ACCESS ADDED AND/OR RELOCATED
	EXISTING ACCESS TO REMAIN

SYMBOL	DESCRIPTION
	PROPOSED DECIDUOUS TREE PLANTING
	PROPOSED ORNAMENTAL TREE PLANTING
	PROPOSED ENHANCED LANDSCAPE AREA

SYMBOL	DESCRIPTION
	PROPOSED ENHANCED SIDEWALKS
	PROPOSED ON STREET PARALLEL PARKING
	EXISTING CURBING TO REMAIN

LEGEND

1. Deciduous Canopy Tree
2. Ornamental Tree
3. Plant Buffer
4. Tree Lawn
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6. Reduced Width Vehicle Travel Lanes
7. Parallel Parking Stalls
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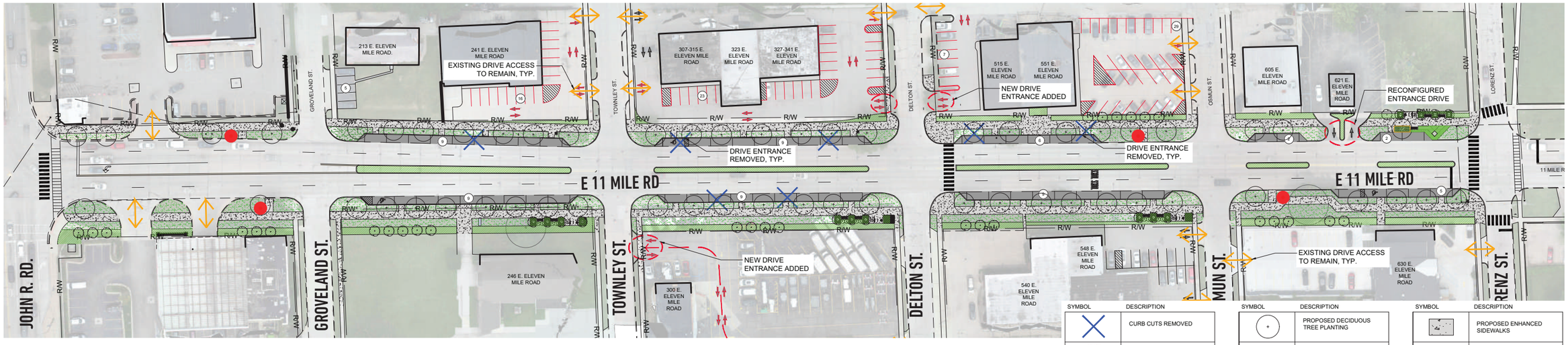


SYMBOL	DESCRIPTION
	CURB CUTS REMOVED
	DRIVE ACCESS ADDED AND/OR RELOCATED
	EXISTING ACCESS TO REMAIN

SYMBOL	DESCRIPTION
	PROPOSED DECIDUOUS TREE PLANTING
	PROPOSED ORNAMENTAL TREE PLANTING
	PROPOSED ENHANCED LANDSCAPE AREA

SYMBOL	DESCRIPTION
	PROPOSED ENHANCED SIDEWALKS
	PROPOSED ON STREET PARALLEL PARKING
	EXISTING CURBING TO REMAIN

APPENDIX

The project team put together a list of recommended tree species for deciduous canopy street trees as well as recommendations for a secondary row of ornamental and columnar trees in select areas (amenity areas, gateway areas). These trees were chosen for their ability to thrive in urban areas with limited green space, their ability to withstand salt, and their hardiness in tough conditions.

UPRIGHT DECIDUOUS CANOPY STREET TREES

SKYLINE HONEY LOCUST
GLEDITSIA TRAICANTHOS

PIN OAK
QUERCUS PALUSTRIS

PRINCETON ELM
ULMUS AMERICANA

BOULEVARD LINDEN
TILIA AMERICANA 'BOULEVARD'

REDPOINTE MAPLE
ACER RUBRUM 'REDPOINTE

COLUMNAR TREES

AUTUMN BLAZE MAPLE
ACER X FREEMANII

PRINCETON SENTRY GINKGO
GINKGO BILOBA 'PRINCETON SENTRY

COLUMNAR HORNBEAM
CARPINUS BETULUS 'FASTIGIATA'

ORNAMENTAL TREES

EASTERN REDBUD (SINGLE STEM)
CERCIS CANADENSIS

AUTUMN BRILLIANCE SERVICEBERRY
AMELANCHIER GRANDIFLORA

SUMMER STARS DOGWOOD
CORNUS KOUSA

MARILEE CRABAPPLE
MALUS 'JARMIN'

MEDIAN SHRUBS

LITTLE LIME HYDRANGEA
HYDRANGEA PANICULATA 'JANE'

GRO-LOW SUMAC
RHUS AROMATICA 'GRO-LOW'

ANTHONY WATERER SPIREA
SPIREA JAPONICA

RED TWIG DOGWOOD
CORNUS SERICEA

PLANT BUFFER

ARROWWOOD VIBURNUM
VIBURNUM DENTATUM

EVERLOW YEW
TAXUS X MEDIA 'EVERLOW'

FEATHER REED GRASS
CALAMAGROSTIS X ACUTIFLORA

MAIDEN GRASS
MISCANTHUS SINENSIS

This sheet shows the recommended shrub and grass plantings for the median plantings, the plant buffers near the road right-of-way, and the amenity area plantings. This plant palette was chosen due to the plants hardiness to survive in an urban environment and for their ability to provide interest for all four seasons.

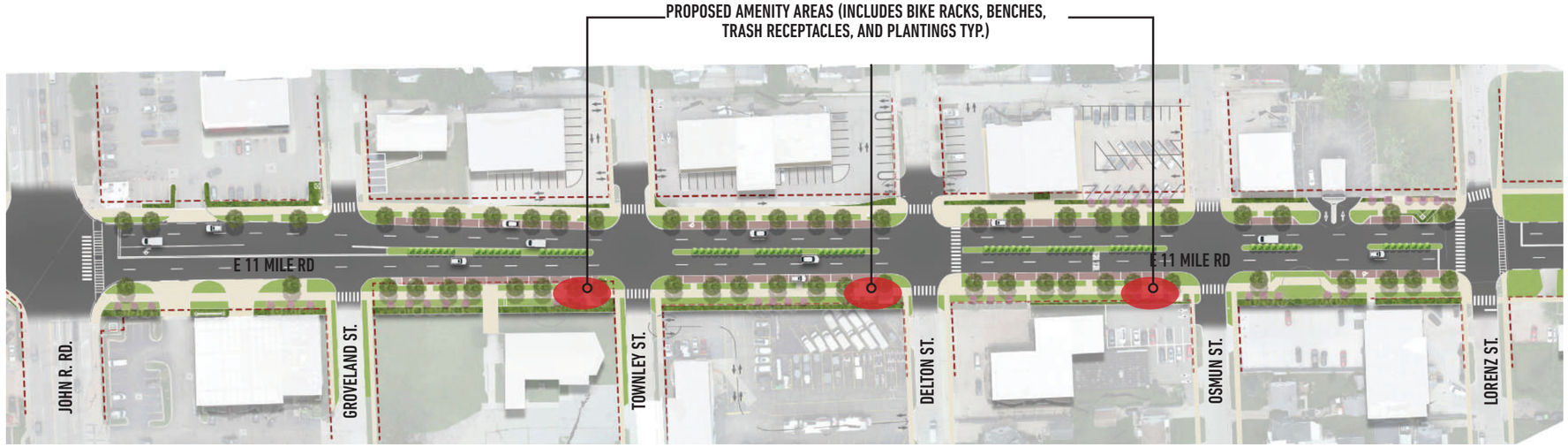
Included below is a probable cost for proposed plantings and site furnishings. A full cost estimate was provided for the focus area but these unit prices will help the client determine a future budget when plans begin to progress outside of the focus area.

PROBABLE COST OF PLANTINGS

PLANTINGS:

3" DECIDUOUS CANOPY STREET TREE	$1,000 / EA.
8-10' HT. ORNAMENTAL TREE	$825 / EA.
5 GAL. SHRUB	$75 / EA.
2 GAL. ORNAMENTAL GRASS	$30 / EA.
1 GAL. PERENNIAL	$20 / EA.

*Note: Unit price values derived from recent bid pricing and MKSK assumption of work effort required. MKSK has no control over the cost of labor, materials, or the contractors methods of determining bid prices, or over competitive bidding or market conditions. Therefore, MKSK cannot guarantee that bids or construction cost will not vary from any estimates of probable construction cost prepared by them.



AMENITY AREA EXHIBIT - LOCATION MAP

This is sheet shows alternate amenity areas studied by the project team.

ALTERNATE AMENITY AREAS - OPTION 1

ALTERNATE AMENITY AREA - OPTION 2

BEST PRACTICE IMAGES

MADISON HEIGHTS MICHIGAN | MKSK | NF ENGINEERS

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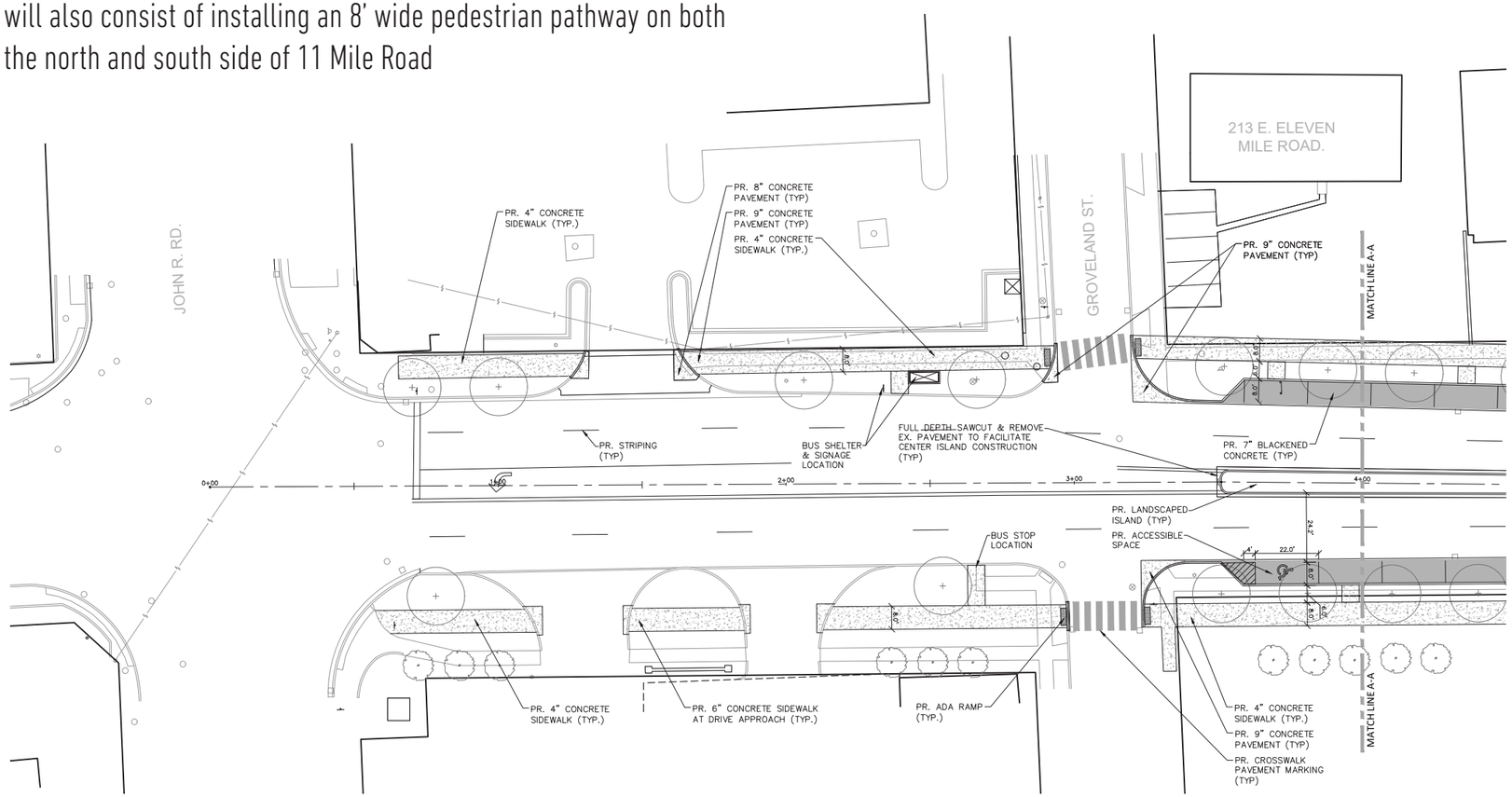

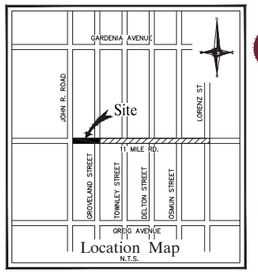

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- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PAVEMENT

LEGEND

- MANHOLE — EXISTING SANITARY SEWER
- SAN. CLEAN OUT
- HYDRANT, GATE VALVE — EXISTING WATERMAIN
- MANHOLE, CATCH BASIN — EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
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STATE OF MICHIGAN — BRAD W. BRICKEL — ENGINEER NO. 54071 — LICENSED PROFESSIONAL ENGINEER

PROJECT
2024 Downtown Streetscape-
11 Mile Rd.
(John R. Rd.- Lorenz St.)

CLIENT
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300 W. 13 Mile Rd.
Madison Hts., MI 48071
Contact:
Mr. Giles Tucker
Ph: 248-583-0831
Fax: 248-583-4143

PROJECT LOCATION
Part of the SW ¼ of Section 13, T. 1 N., R. 11 E., City of Madison Heights, Oakland County, MI

SHEET
Conceptual Engineering Plan (Option 1 - Pedestrian Pathway)

811 Know what's below Call before you dig.

DATE	ISSUED/REVISED
02-12-24	ISSUED FOR CITY REVIEW
04-04-24	REVISED PER CITY REVIEW

DRAWN BY: R. Johnson
DESIGNED BY: B. Brickel
APPROVED BY: B. Brickel
DATE: January 24, 2024
SCALE: 1" = 20'
20 10 0 10 20 30
NFE JOB NO. N753
SHEET NO. C1

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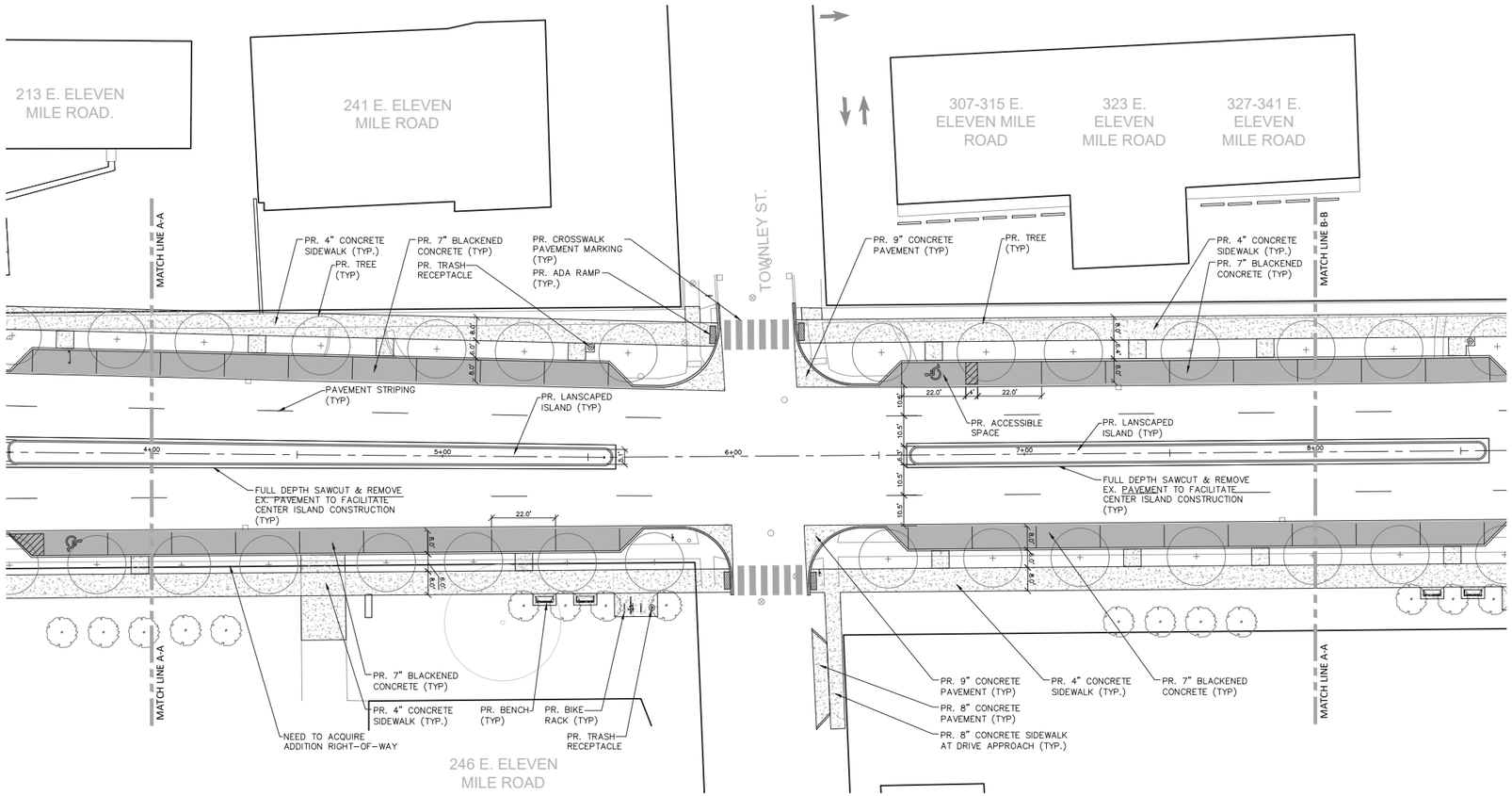

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NFE JOB NO. N753 — SHEET NO. C2

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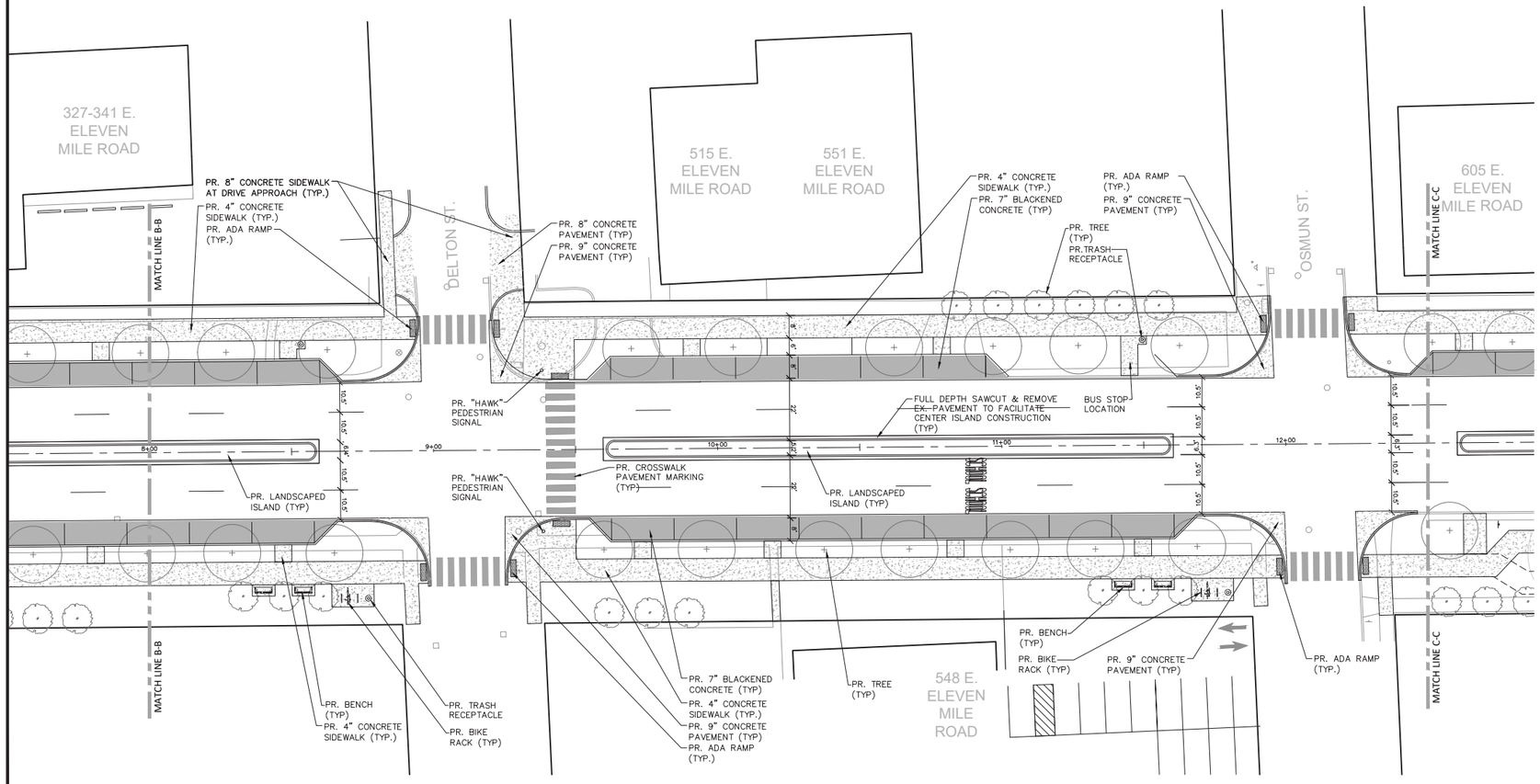

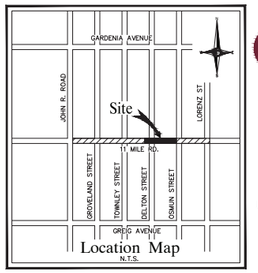

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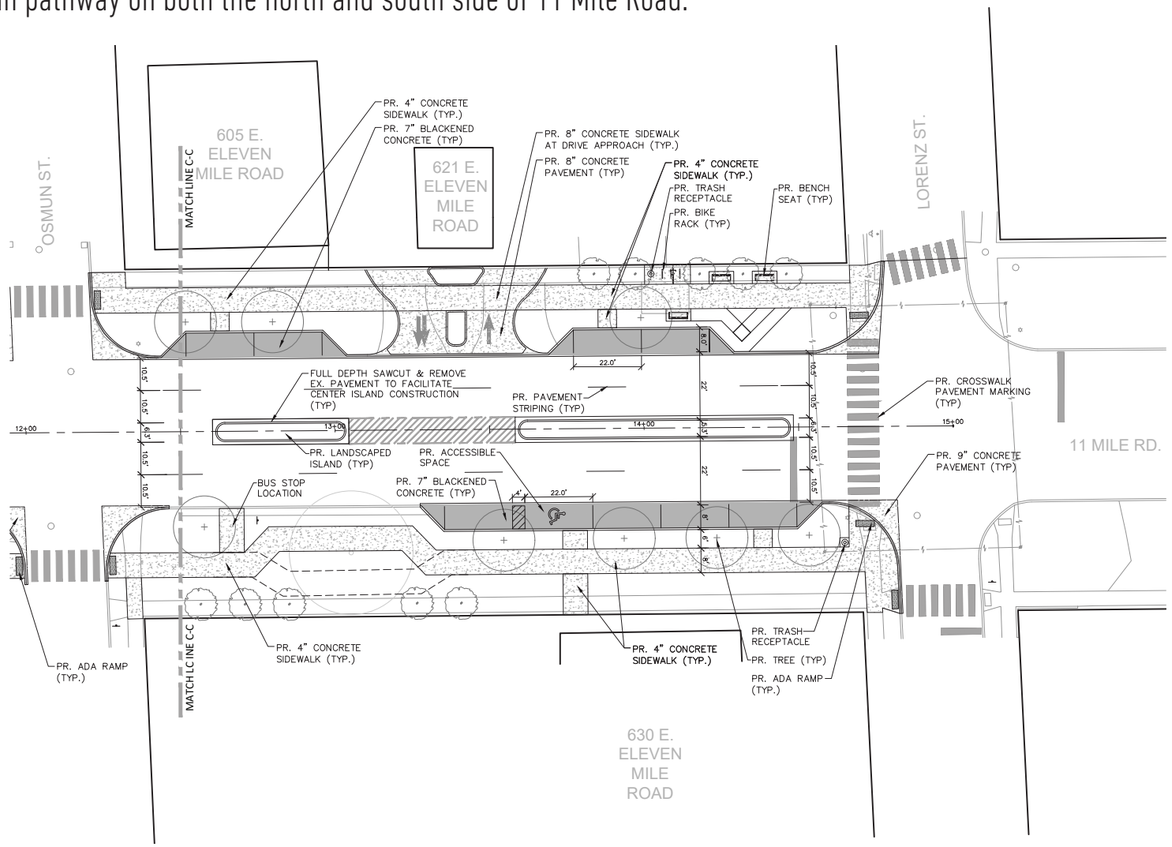

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SHEET

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NFE JOB NO. N753 — SHEET NO. C4

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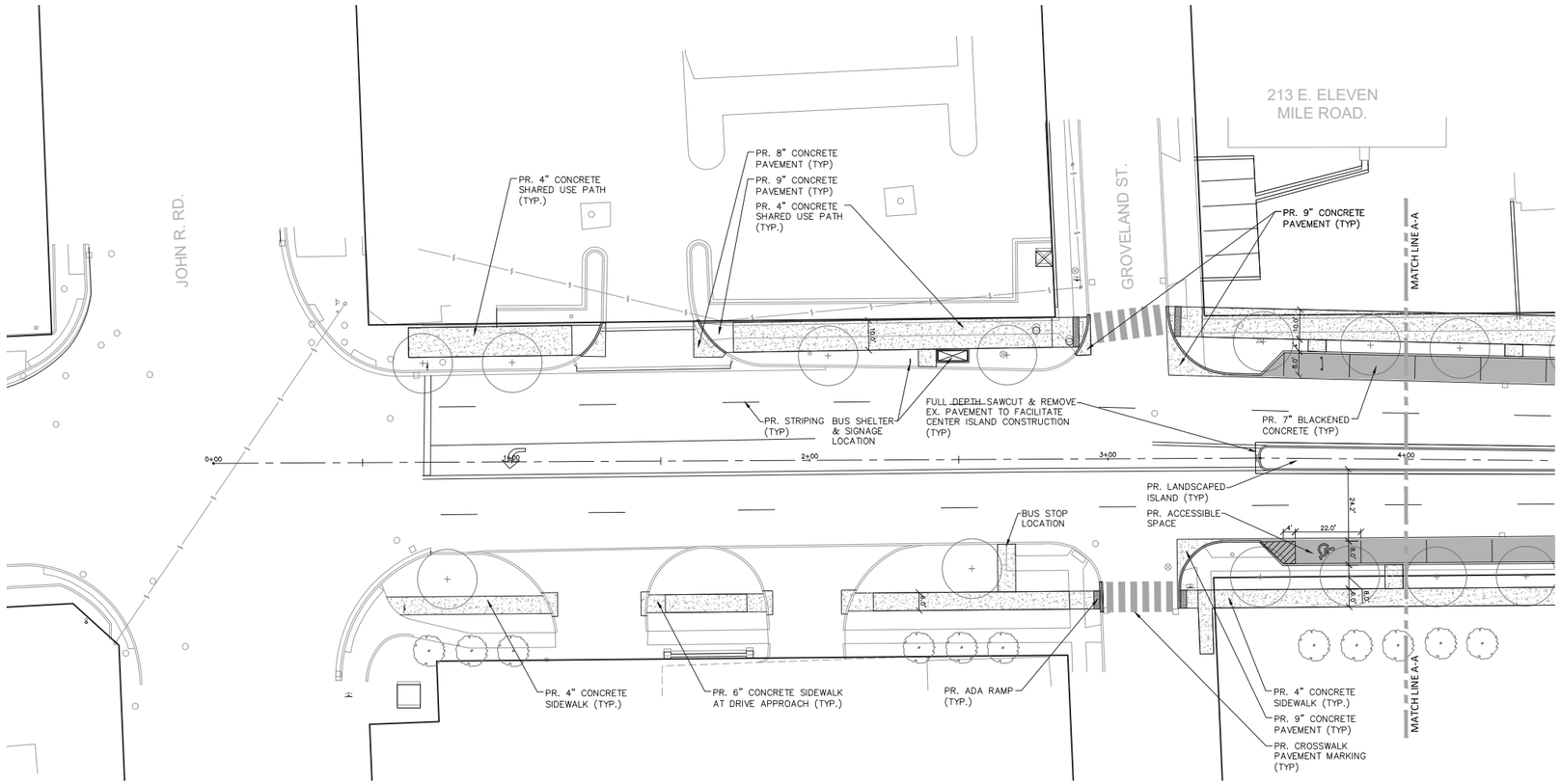

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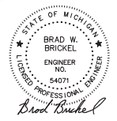

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SHEET
Conceptual Engineering Plan (Option 2 - Shared Use Pathway)

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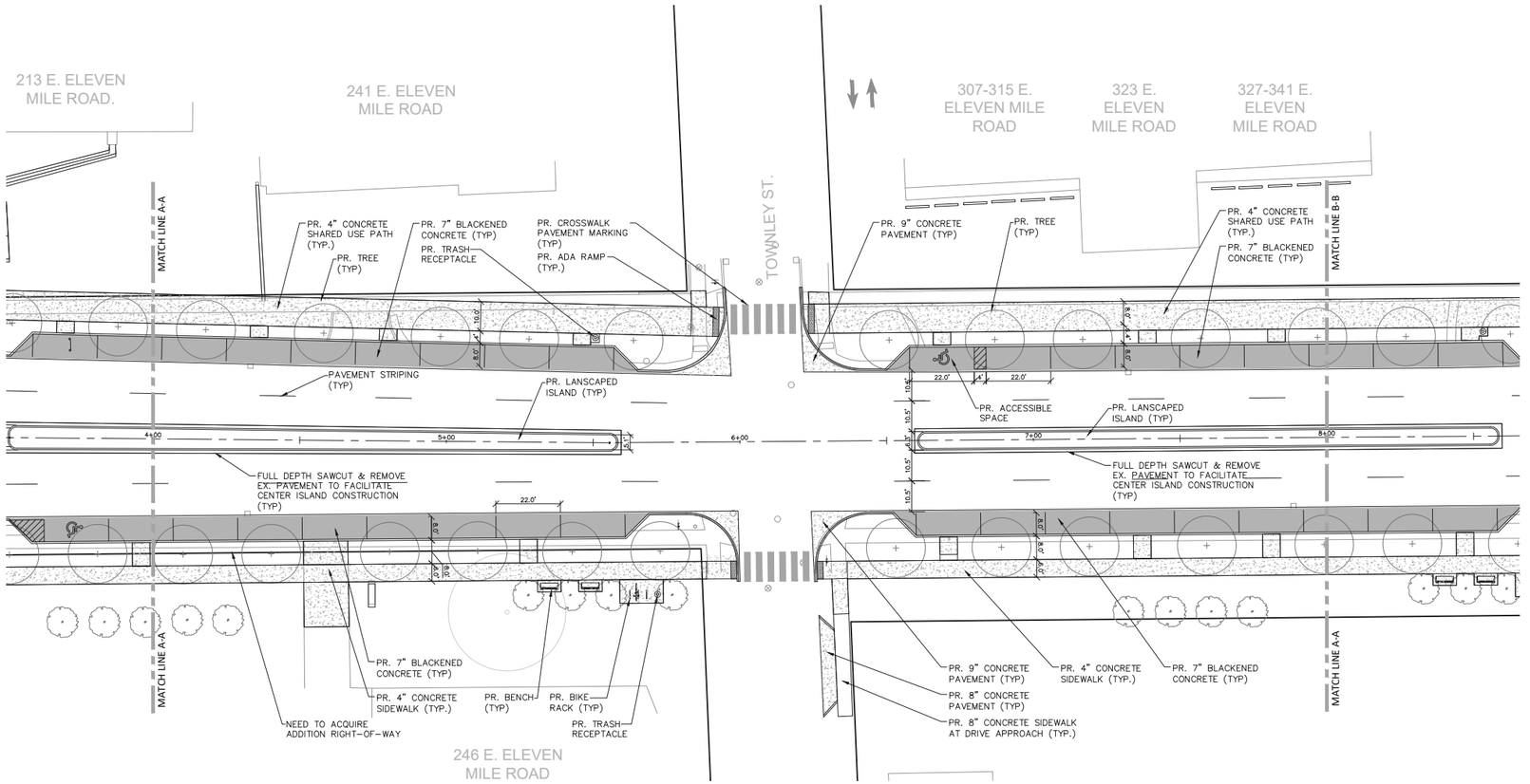

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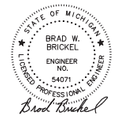

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Conceptual Engineering Plan (Option 2)

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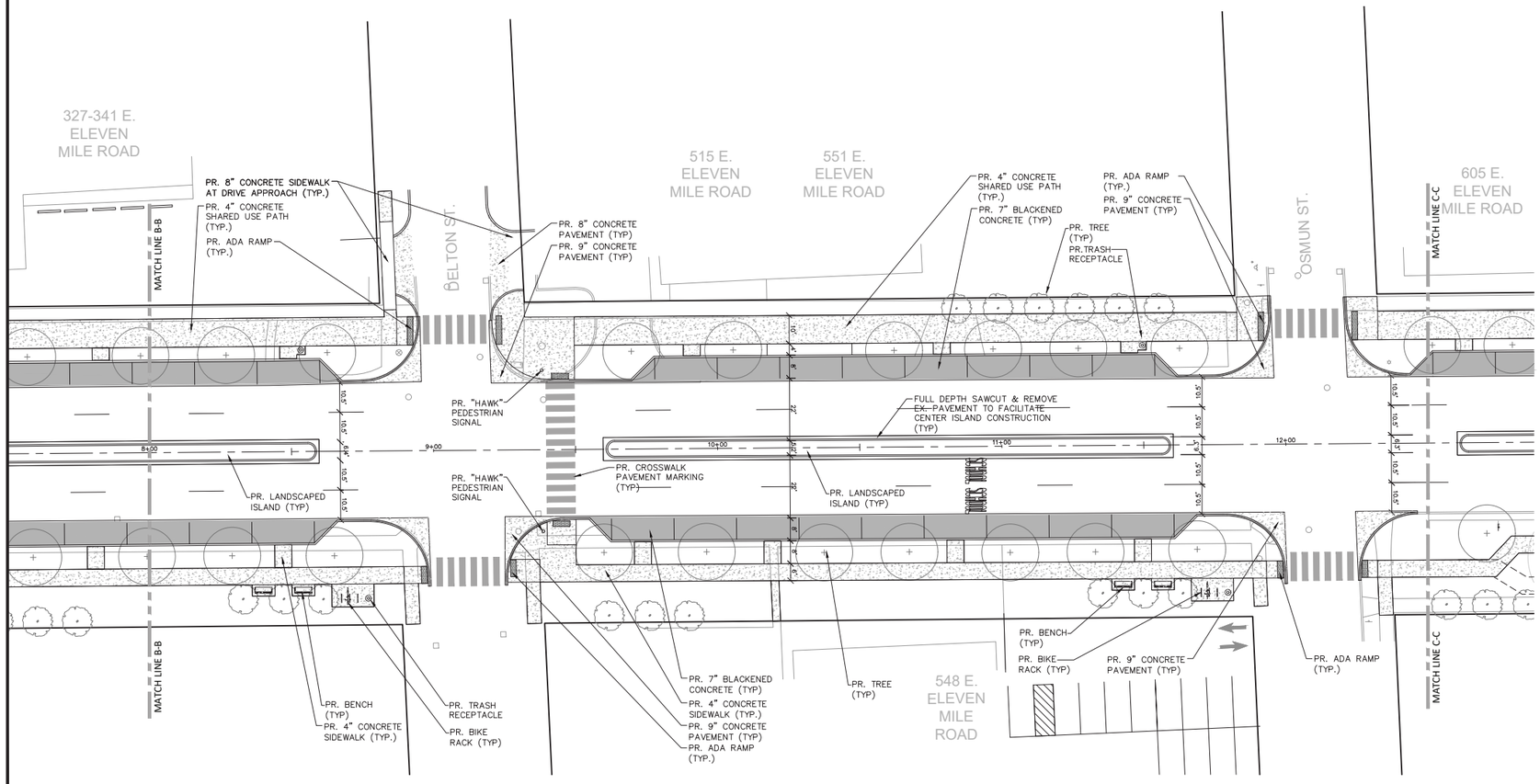
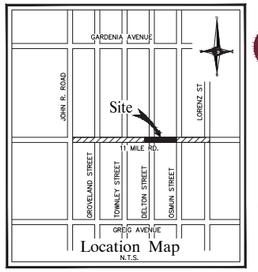




OPTION 2

CONSTRUCT NEW PARALLEL PARKING SPACES ALONG THE ROADWAY FRONTAGE FROM GROVELAND AVENUE TO LORENZ AVENUE. INSTALL NEW STREETSCAPE PLANTINGS AND AMENITIES ALONG WITH A NEW CENTERLINE PLANTER. THIS WILL ALSO CONSIST OF INSTALLING A 10 FOOT WIDE SHARED USE PATHWAY ON THE NORTH SIDE AND A 6 FOOT WIDE PEDESTRIAN PATHWAY ON THE SOUTH SIDE OF 11 MILE ROAD.

PAVING LEGEND

- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PAVEMENT

LEGEND

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

NF ENGINEERS
CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL. (248) 332-7931
FAX. (248) 332-8257
WWW.NOWAKFRAUS.COM

SEAL

STATE OF MICHIGAN — BRAD W. BRICKEL — ENGINEER NO. 54071 — LICENSED PROFESSIONAL ENGINEER

PROJECT
2024 Downtown Streetscape-
11 Mile Rd.
(John R. Rd.- Lorenz St.)

CLIENT
City of Madison Heights
300 W. 13 Mile Rd.
Madison Hts., MI 48071
Contact:
Mr. Giles Tucker
Ph: 248-583-0831
Fax: 248-583-4143

PROJECT LOCATION
Part of the SW ¼ of
Section 13, T. 1 N., R. 11 E.,
City of Madison Heights,
Oakland County, MI

SHEET
Conceptual
Engineering Plan
(Option 2)

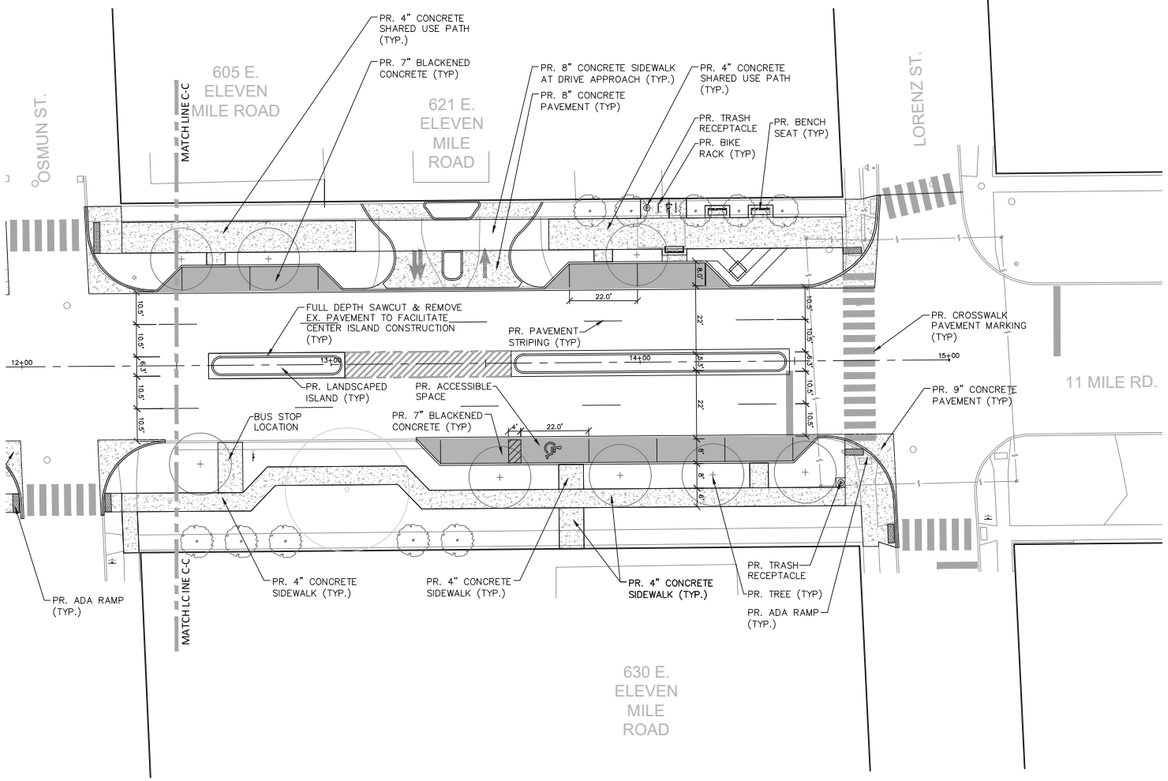
811 Know what's below Call before you dig.

DATE	ISSUED/REVISED
02-12-24	ISSUED FOR CITY REVIEW

DRAWN BY: R. Johnson
DESIGNED BY: B. Brickel
APPROVED BY: B. Brickel
DATE: January 24, 2024
SCALE: 1" = 20'
NFE JOB NO. N753
SHEET NO. C3

Option 2

Construct new parallel parking spaces along the roadway frontage from Groveland Avenue to Lorenz Street. Install new streetscape plantings and amenities along with a new centerline planter. This will also consist of installing a 10' wide shared use pathway on the north and side and a 6' wide pedestrian pathway on the south side of 11 Mile Road



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PAVING LEGEND

- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PAVEMENT

LEGEND

- MANHOLE — EXISTING SANITARY SEWER
- SAN. CLEAN OUT
- HYDRANT, GATE VALVE — EXISTING WATERMAIN
- MANHOLE, CATCH BASIN — EXISTING STORM SEWER
- EX. R. Y. CATCH BASIN
- UTILITY POLE, GUY POLE, GUY WIRE — EXISTING BURIED CABLES
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SEAL

STATE OF MICHIGAN — BRAD W. BRICKEL — ENGINEER NO. 54071 — LICENSED PROFESSIONAL ENGINEER

PROJECT
2024 Downtown Streetscape-
11 Mile Rd.
(John R. Rd.- Lorenz St.)

CLIENT
City of Madison Heights
300 W. 13 Mile Rd.
Madison Hts., MI 48071
Contact:
Mr. Giles Tucker
Ph: 248-583-0831
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PROJECT LOCATION
Part of the SW $\frac{1}{4}$ of
Section 13, T. 1 N., R. 11 E.,
City of Madison Heights,
Oakland County, MI

SHEET
Conceptual
Engineering Plan
(Option 2)

811 Know what's below Call before you dig.

DATE	ISSUED/REVISED
02-12-24	ISSUED FOR CITY REVIEW
04-04-24	REVISED PER CITY REVIEW

DRAWN BY: R. Johnson
DESIGNED BY: B. Brickel
APPROVED BY: B. Brickel
DATE: January 24, 2024
SCALE: 1" = 20'

NFE JOB NO. N753
SHEET NO. C4

CIVIL ENGINEERS

LAND SURVEYORS

LAND PLANNERS

11 Mile Streetscape Project - Option 1
11 Mile Road - John R Rd. to Lorenz St.
City of Madison Heights, Oakland County, MI
Engineer's Opinion of Probable Cost (Budget Purposes Only)

City of Madison Heights
300 W 13 Mile Road
Madison Heights, Michigan 48071

Engineer's Estimate
Nowak & Fraus Engineers
46777 Woodward Avenue
Pontiac, MI 48342

Roadway Length - 1,405 LF

Item	Quantity		*Unit Price	Amount
Section I - Pavement				
Earth Excavation	1,100	C.Y.	$28.00	$30,800.00
Pavement Removal	1,400	S.Y.	$15.00	$21,000.00
Curb & Gutter Removal	1,700	L.F.	$12.50	$21,250.00
Sidewalk Removal	2,250	S.Y.	$11.00	$24,750.00
Bumper Block Removal	11	EA.	$50.00	$550.00
Drive Approach Removal	300	S.Y.	$14.00	$4,200.00
Remove & Relocate Light Pole	10	EA.	$5,000.00	$50,000.00
Tree Removal	15	EA.	$2,000.00	$30,000.00
Root Grinding	15	EA.	$500.00	$7,500.00
Striping Removal	3,000	L.F.	$1.00	$3,000.00
8" Concrete Drive Approach w/ Integral C& G	175	S.Y.	$65.00	$11,375.00
9" Concrete Pavement	250	S.Y.	$70.00	$17,500.00
7" Blackened Concrete Pavement w/ Integral C& G	1,250	S.Y.	$70.00	$87,500.00
18" Concrete Curb	3,250	L.F.	$25.00	$81,250.00
4" Concrete Sidewalk	20,800	S.F.	$6.50	$135,200.00
6" Concrete Sidewalk Ramp	2,500	S.F.	$11.50	$28,750.00
8" Concrete Sidewalk	1,400	S.F.	$10.00	$14,000.00
Aggregate Base, 4" CIP - 21 AA	2,560	S.Y.	$15.00	$38,400.00
Aggregate Base, 6" CIP - 21 AA	1,650	S.Y.	$25.00	$41,250.00
24" White Overlay Cold Plastic (Crosswalk)	1,200	L.F.	$16.00	$19,200.00
Parking Lot Striping	1	LSUM	$2,000.00	$2,000.00
4" Polyurea Paint (White or Yellow)	1,300	L.F.	$2.00	$2,600.00
School Symbol Overlay Cold Plastic	2	EA.	$600.00	$1,200.00
LT Arrow Symbol Overlay Cold Plastic	1	EA.	$250.00	$250.00
Pedestrian Hawk Signal	1	LSUM	$150,000.00	$150,000.00
Silt Sack	21	EA.	$150.00	$3,150.00
Maintaining Traffic & Const. Signing	1	LSUM	$20,000.00	$20,000.00
Structure Adjustments	10	EA.	$500.00	$5,000.00
			Sub Total Section I:	**$851,675.00**

Item	Quantity		*Unit Price	Amount
Section II - Landscape				
Deciduous Canopy Tree (3" Cal.)	56	EA.	$900.00	$50,400.00
Ornamental Tree (2" Cal.)	44	EA.	$750.00	$33,000.00
Deciduous Shrub (7 Gal.)	289	EA.	$85.00	$24,565.00
Deciduous Shrub (5 Gal.)	125	EA.	$65.00	$8,125.00
Ornamental Grass (2 Gal.)	658	EA.	$30.00	$19,740.00
Perennial (1 Gal.)	492	EA.	$20.00	$9,840.00
Shredded Hardwood Mulch (3" Depth)	1,697	S.Y.	$5.00	$8,485.00
Organic Soil Mix - Turf (6" Depth)	12,806	C.F.	$2.00	$25,612.00
Organic Soil Mix - Plant Beds (12" Depth)	14,555	C.F.	$2.00	$29,110.00
Organic Soil Mix - Trees (24" Depth)	1,432	C.F.	$2.00	$2,864.00
Seed Lawn (Bed prep, fertilizer, seed & cover)	2,846	S.Y.	$1.75	$4,980.50
Gateway Signage Pier	1	LSUM	$40,000.00	$40,000.00
Bus Shelter	1	LSUM	$7,500.00	$7,500.00
Trash Receptacles	8	EA.	$1,000.00	$8,000.00
Benches	9	EA.	$1,000.00	$9,000.00
Bike Racks	12	EA.	$500.00	$6,000.00
Revised 4/5/2024			**Sub Total Section II:**	**$287,221.50**
*Design and Inspection is not included in the total. This represents anticipated construction cost for budgeting purposes only.			**Overall Total:**	**$1,138,896.50**

CIVIL ENGINEERS

LAND SURVEYORS

LAND PLANNERS

11 Mile Streetscape Project - Option 2
11 Mile Road - John R Rd. to Lorenz St.
City of Madison Heights, Oakland County, MI
Engineer's Opinion of Probable Cost (Budget Purposes Only)

City of Madison Heights
300 W 13 Mile Road
Madison Heights, Michigan 48071

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Revised 4/5/2024		**Sub Total Section II:**	**$287,221.50**
*Design and Inspection is not included in the total. This represents anticipated construction cost for budgeting purposes only.		**Overall Total:**	**$1,138,896.50**

Madison Heights - 11 Mile Streetscape - NFE Job N753

F&V Comments, December 18, 2023

1. **Lane width: We are proposing 10.5' wide lanes with a 6' wide center island**
   - We went with 10ft lanes and 8ft parking on Maple Rd in Birmingham. Lots of complaints about the difficulty parking. With 2 lanes at 10.5ft, I don't see this as an issue here.
2. **Speed Limit**
   - Existing Speed limit 35 mph.
   - Can't reduce speed limit without a speed and safety study.
   - Reducing the lane widths will help reduce the speeds, or reducing the number of lanes (4 to 2) would likely further reduce the speeds through the area.

3. **Proximity of center islands to intersections to allow proper turning movements, etc.**
   - You'll want to run auto-turn at all of the intersections to make sure ingress and egress trucks can make the movements. One concern with the narrow median is vehicle will try to use it as a turn lane, but it'll be too narrow and creates the potential for rear-end and sideswipe crashes.
   - One thing we ran into in Birmingham is that people continue to make U-turns at the narrow medians to access on-street parking, driveways and intersections. The medians are too narrow for turning movements, which then creates issues for landscaping and potential for crashes.
   - Would they consider narrowing to a two-lane section with median?

4. **Parallel parking space dimensions, 8'x22' (need to maximize parking due to loss of ROW parking) Are the angled ends to be 45 degree?**
   - 45 degrees is OK.
   - Optional parking can be 20' with 4' boxes

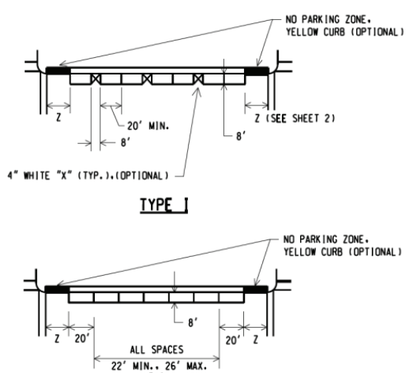


TABLE R211 ON-STREET PARKING SPACES

Total number of metered or designated parking spaces	Minimum required number of *accessible* parking spaces
1 to 25	1.
26 to 50	2.
51 to 75	3.
76 to 100	4.
101 to 150	5.
151 to 200	6.
201 and over	4 percent of total.

   - You'll need to add ADA parking per PROWAG requirements. The number of spaces required is based upon the "block perimeter". Since there is no commercial parking on the adjacent streets, you'll need to add one ADA parking space per block, per side of the road.

5. **Proximity of parking spaces to the PC of crosswalks of the intersections. For both backup movements and forward movements.**
   - I would suggest adding crosswalks on all intersection legs.
   - I don't see any location for a true mid-block crossing. But all of the intersections should have enhanced crosswalks.
   - No parking is permitted within 20' feet of a marked crosswalk at unsignalized intersections per Michigan Vehicle Code. We've also had sight distance issues in Birmingham on S. Eton and have prohibited parking withing 30' of the intersection or 20' of the crosswalk, whichever is greater.

6. **The location of proposed new driveways where curb cuts were removed. The blue X is where existing driveways are located.**
   - I would recommend eliminating the driveway access within the intersection influence area. Recommended driveway access spacing is 115 feet minimum from the intersection.

7. **Mid-Block crossing treatments, design requirements (RRFB, HAWK) , cost estimate**
   - There isn't a location for a true mid-block. There is no controlled crossing locations along the corridor, therefore an RRFB could be considered at either Townley or Delton
   - Locate at the intersection with the highest pedestrian demand or potential ped demand
   - RRFB cost is about 30k installed. HAWK is about 100-150k, this might be an option if there are more peds.

Other Notes:

- Have you talked to SEMCOG about the TAP grant? We recently applied for one in Birmingham and they provided feedback regarding what they would be looking for in the application and how best to get funded.
- Have you considered adding bike lanes?
- Ped countdown signals should be considered at Lorez, either as part of the TAP or a HISP

177-NS11225 1 OF 2

carmanah®

SC315-G

Cabinet-Based Rectangular Rapid Flashing Beacon

Rectangular rapid flashing beacons (RRFBs) improve pedestrian safety by increasing yield rates to 72-96% at crosswalks.*

- The benchmark for RRFBs, the SC315-G meets MUTCD requirements, including IA-21, and is Buy America compliant
- Audible pushbutton or passive pedestrian activation
- Solar ~~or AC-powered~~
- Energy Balance Report™ (EBR) prepared for every location to ensure battery longevity

Superior Design and Technology

The SC315-G is a cabinet-based system with a separate, high-power solar panel. This design enables the SC315-G to work with audible pushbutton stations, passive activation sensors, and remote monitoring, as well as operate at higher intensities and increased activations in challenging environments. MUTCD interim approval IA-21 flash pattern and multiple configurations enable the SC315-G to handle all crosswalk applications.

Easy Installation

All components, including the battery or AC power supply, Energy Management System (EMS) and optional audible pushbutton controller are housed in a compact, lockable, purpose-built enclosure. It also incorporates a wire routing and termination system, and all components are wired at the factory for an efficient installation.

Advanced User Interface

The SC315-G comes with an on-board user interface for quick configuration and status monitoring. It allows for simple in-the-field adjustment of flash pattern, duration, intensity, ambient auto adjust, night dimming, and many more. Settings are automatically sent wirelessly to all units in the system.

Compatibility

Compatible with Carmanah RRFBs and the R820-E, R820-F, and R820-G circular beacons. Interchange solar and AC power models within the same application.

Reliable

Designed with Carmanah's industry-leading solar modeling tools to provide dependable year-after-year operation. We prepare an Energy Balance Report (EBR) for every location.

Trusted for 20+ Years

With thousands of installations, Carmanah's systems are the benchmark in traffic applications and other transportation applications worldwide.

* U.S. Department of Transportation Federal Highways Administration, Publication No. FHWA-HRT-10-043 - "Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks"

177-NS11225 2 OF 2

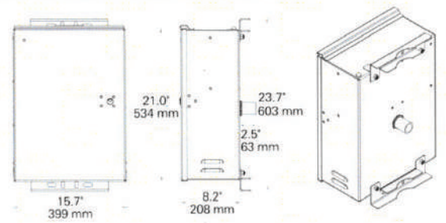
carmanah®

SC315-G

Cabinet-Based Rectangular Rapid Flashing Beacon

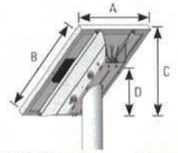
1.844.412.8395 | traffic@carmanah.com | carmanah.com

CABINET DIMENSIONS

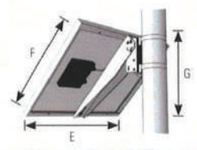


SOLAR PANEL MOUNTING

4.5" Diameter Round Top of Pole Mount



Side of Pole Mount

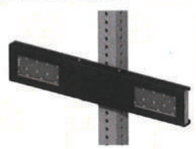


PANELS*	A	B	C	D	E	F	G
20 W	-	-	-	-	13.6" (345 mm)	18.5" (470 mm)	13.8" (350 mm)
50 W	21.2" (538 mm)	26.3" (668 mm)	19.6" (497 mm)	10.0" (254 mm)	26.3" (668 mm)	21.2" (538 mm)	16.0" (405 mm)
80 W	30.7" (780 mm)	26.5" (672 mm)	19.7" (500 mm)	10.0" (254 mm)	30.7" (780 mm)	26.5" (672 mm)	19.7" (500 mm)

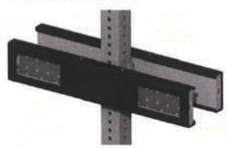
*** Carmanah will conduct a site assessment and provide an Energy Balance Report™ to determine the correct solar panel and battery size.**

LIGHT BAR CONFIGURATION

Uni-directional Configuration



Bi-directional Configuration



ACTIVATION OPTIONS

Standard Pushbutton

Audible Pushbutton Station

Passive Activation Sensor

BEACON SPECIFICATIONS

Optical	MUTCD interim approval IA-21 and MUTCDC compliant
	Purpose-built light bar optics = maximum efficiency and no stray light Exceeds SAE J595 class 1 intensity by 2.5 to 3x when used as recommended Meets SAE J578 chromaticity
	3 in (76 mm) x 7 in (178 mm) clear, UV-rated polycarbonate lens with yellow LEDs
	High-power LEDs: +90% lumen maintenance (L90) based on IES LM-80
	Side-emitting pedestrian confirmation LEDs
	Independent, stainless steel mounting brackets make back-to-back installation simple and enable in-field aiming for maximum effectiveness
	Yellow, black, or green powder coated light bar covers

SYSTEM SPECIFICATIONS

On-Board User Interface (OBUI)	Adjustable system settings with auto-scrolling LED display on our latest EMS
	System test, status, and fault detection: battery, solar, button, beacon, radio, day/night
	Flash patterns: RFB (WW+S), RFB1 (WW+S legacy), RFB2 (WSDOT), 0.5 sec. alternating (MUTCD), 0.5 sec. unison (MUTCD), 0.5 sec. x3 alternating (MUTCD), 0.1 sec. unison, 0.25 sec. unison, 0.1 sec. x3 quick flashes unison, 0.1 sec. x3 quick flashes alternating, steady on
	Input: momentary for pushbutton activation, normally open switch, normally closed switch
	Flash duration: 5 sec. to 1 hr.
	Intensity setting: 20 to 1400 mA for multiple RRFBs, circular beacons, or LED enhanced signs
	Nighttime dimming: 10 to 100% of daytime intensity
	Ambient Auto Adjust: increases intensity during bright daytime
	Automatic Light Control: reduces intensity if the battery is extremely low
	Temperature correction: yellow beacons
	Calendar: internal time clock function
	Radio settings: enable/disable, selectable channel from 1 to 14
	Output: enabled when beacons flashing daytime and nighttime, or nighttime only E.g., for relay control of overhead lighting
	Activation counts and data reporting via OBUI or optional USB connection
Beacon Communication	Encrypted, wireless radio with 2.4 GHz mesh technology
	Wireless update of settings from any unit to all systems on the same radio channel
	User-selectable multiple channels to group different beacons and ensure a robust wireless signal
	Communicates with all other Gen III radio-enabled systems including our R820-E, -F, and -G circular beacons
	Instantaneous wireless activation: <150 ms
	Wireless range: 1000 ft (305 m)
	Integrated, vandal-resistant antenna
Power System	Solar or AC-powered
	AC: 100-240 VAC input, 6-14 AWG Replaceable AC-DC power supply, circuit breaker, terminal block wiring
Energy Collection	20, 50, or 80 W high-efficiency photovoltaic solar panel
	45 deg tilt for optimal energy collection
	Maximum Power Point Tracking with Temperature Compensation (MPPT-TC) battery charger for optimal energy collection in all solar and battery conditions
Energy Storage	12 V battery system with multiple sizes: 35, 55, 100 Ahr
	Replaceable, recyclable, sealed, maintenance-free, best-in-class AGM batteries offer the widest temperature range and longest life
	Battery design life: +5 yrs.
Cabinet Construction	Weatherproof, gasketed enclosure with vents for ambient air transfer (NEMA 3R)
	Lockable, hinged door with #2 lock Optional padlockable latch
	Corrosion-resistant aluminum with stainless steel hardware
	Raw aluminum finish or yellow, black, or green powder coated
	Prewired to minimize installation time
	High-efficiency optics and EMS = the most compact, lightweight system
Environmental	-35 to 165° F (-37 to 74° C) system operating temperature
	-40 to 140° F (-40 to 60° C) battery operating temperature
	150 mph (241 kph) wind speed as per AASHTO LTS-6
Activation	Pushbutton: ADA-compliant, piezo-driven with visual LED and two-tone audible confirmation
	Audible pushbutton station: ADA-compliant, piezo-driven with visual LED and customizable voice message confirmation
	Passive activation: microwave-based sensor detects pedestrian
Warranty	**5-year limited warranty, excluding batteries**

ADA | ITE | IMSA Your Partner in PUBLIC SAFETY | MUTCD IA-21 | Buy America Compliant | Buy America Compliant

Specifications subject to local environmental conditions, and may be subject to change.

Document: SPEC_TRA_SC315-G_RevB

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SC315-G

RECTANGULAR RAPID FLASHING BEACON

carmanah® Traffic

MUTCD-compliant, pedestrian-activated warning beacon for uncontrolled marked crosswalks

- Improve pedestrian safety by increasing driver yield rates
- Passive activation: microwave-based sensor detects pedestrian
- Audible push button station
- Solar power performance even in partially shaded applications
- Solar and AC-powered models wirelessly communicate and can be used together in the same application
- Meets and exceeds MUTCD requirements, including IA-21

RRFBs have been found to provide vehicle yielding rates between 72 and 96 percent for crosswalk applications, including 4 lane roadways with average daily traffic (ADT) exceeding 12,000*.

Superior Design and Technology
The SC315-G is a cabinet-based system with a separate, high-power solar panel. This design enables the SC315-G to work with audible push button stations, passive activation sensors, and remote monitoring, as well as operate at higher intensities and increased activations in challenging environments. MUTCD interim approval IA-21 flash pattern and multiple configurations enable the SC315-G to handle all crosswalk applications.

Easy Installation
All components, including the battery or AC power supply, Energy Management System (EMS) and optional audible push button controller are housed in a compact, lockable, purpose-built enclosure. It also incorporates a wire routing and termination system, and all components are wired at the factory for an efficient installation.

Advanced User-Interface
The SC315-G comes with an on-board user interface for quick configuration and status monitoring. It allows for simple in-the-field adjustment of flash pattern, duration, intensity, ambient auto adjust, night dimming, and many more. Settings are automatically sent wirelessly to all units in the system.

Compatibility
Compatible with Carmanah RRFBs and the R820-E, R820-F, and R820-G circular beacons. Interchange solar and AC power models within the same application.

Trusted
With thousands of installations, Carmanah's beacons are the benchmark in traffic applications and other transportation applications worldwide.

WE SIMPLIFY PLANNING.
Contact us to get your Energy Balance Report and purchase specifications.

1.844.412.8395
traffic@carmanah.com
carmanahtraffic.com

REPRESENTED IN YOUR REGION BY:

177-NS11343 2 OF 2

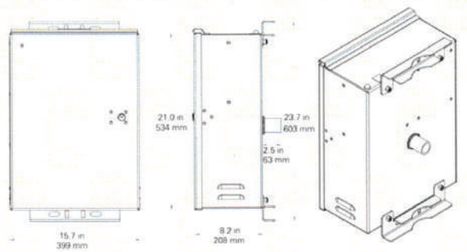
SC315-G

RECTANGULAR RAPID FLASHING BEACON

carmanah® Traffic

1.844.412.8395 | traffic@carmanah.com | carmanahtraffic.com

CABINET DIMENSIONS



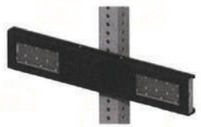
SOLAR PANEL MOUNTING

~~4.5" Diameter Round Top of Pole Mount (50 W and 80 W panels)~~

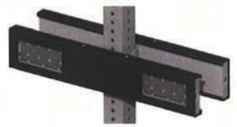
~~Side of Pole Mount (20 W, 50 W, and 80 W panels)~~

LIGHT BAR CONFIGURATION

~~Uni-directional Configuration~~



~~Bi-directional Configuration~~



ACTIVATION OPTIONS

Push Button

~~Audible Push Button Station~~

~~Passive Activation Sensor~~

IMSA Your Partner in PUBLIC SAFETY | apbp Association of Pedestrian and Bicycle Professionals | ite | America Walks

Specifications subject to local environmental conditions, and may be subject to change.
All Carmanah products are manufactured in facilities that are certified to ISO quality standards.
US Patent No 6,573,659. Other patents pending.
"Carmanah" and Carmanah logo are trademarks of Carmanah Technologies Corp.

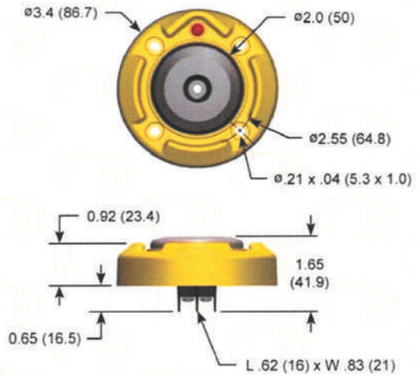
Document: SPEC_TRA_SC315-G_RevA

On-Board User Interface (OBUI)	Adjustable system settings with auto-scrolling LED display on our latest EMS
	System test, status, and fault detection: battery, solar, button, beacon, radio, day/night
	Flash patterns: RFB1 (WW+S), RFB2 (WSDOT), 0.5 sec. alternating (MUTCD), 0.5 sec. unison (MUTCD), 0.1 sec. unison, 0.25 sec. unison, 0.1 sec. x3 quick flashes unison, 0.1 sec. x3 quick flashes alternating
	Input: momentary for push button activation, normally open switch, normally closed switch
	Flash duration: 5 sec. to 1 hr.
	Intensity setting: 20 to 1400 mA for multiple RRFBs, circular beacons, or LED enhanced signs
	Nighttime dimming: 10 to 100% of daytime intensity
	Ambient Auto Adjust: increases intensity during bright daytime
	Automatic Light Control: reduces intensity if the battery is extremely low
	Temperature correction: yellow or red beacons
	Calendar: internal time clock function
	Radio settings: enable/disable, selectable channel from 1 to 14
	Output: enabled when beacons flashing daytime and nighttime, or nighttime only
	Activation counts and data reporting via OBUI or optional USB connection
Optical	MUTCD interim approval IA-21 and MUTCDC compliant
	Purpose-built light bar optics = maximum efficiency and no stray light Exceeds SAE J595 class 1 intensity by 2.5 to 3x when used as recommended Meets SAE J578 chromaticity
	3 in (76 mm) x 7 in (178 mm) clear, UV-rated polycarbonate lens with yellow LEDs
	High-power LEDs: +90% lumen maintenance (L90) based on IES LM-80
	Side-emitting pedestrian confirmation LEDs
	Independent, stainless steel mounting brackets make back-to-back installation simple and enable in-field aiming for maximum effectiveness
	~~Yellow,~~ black, ~~or green~~ powder coated light bar covers
Connectivity	Encrypted, wireless radio with 2.4 GHz mesh technology
	Wireless update of settings from any unit to all systems on the same radio channel
	User-selectable multiple channels to group different beacons and ensure a robust wireless signal
	Communicates with all other Gen III radio-enabled systems including our R820-E, -F, and -G circular beacons
	Instantaneous wireless activation: <150 ms
	Wireless range: 1000 ft (305 m)
	Integrated, vandal-proof antenna
Power System	~~Solar or~~ AC-powered
	AC: 90-264 VAC input, 6-14 AWG Replaceable AC-DC power supply, circuit breaker, terminal block wiring
Energy Collection	~~20, 50, or 80 W high-efficiency photovoltaic solar panel~~
	~~45 deg tilt for optimal energy collection~~
	~~Maximum Power Point Tracking with Temperature Compensation (MPPT-TC) battery charge for optimal energy collection in all solar and battery conditions~~
Energy Storage	~~12 V battery system with multiple sizes: 33, 35, 75, 100 Ah+~~
	~~Replaceable, recyclable, sealed, maintenance-free, best-in-class AGM batteries offer the widest temperature range and longest life~~
	~~Battery design life: +5 yrs.~~
Cabinet Construction	Weatherproof, gasketed enclosure with vents for ambient air transfer (NEMA 3R)
	Lockable, hinged door with #2 lock
	Corrosion-resistant aluminum with stainless steel hardware
	Raw aluminum finish or yellow, black, or green powder coated
	Prewired to minimize installation time
	High-efficiency optics and EMS = the most compact, lightweight system
Environmental	-40 to 165° F (-40 to 74° C) system operating temperature
	~~-40 to 162° F (-40 to 72° C) battery operating temperature~~
	150 mph (241 kph) wind speed as per AASHTO LTS-6
Activation	**Push button:** ADA-compliant, piezo-driven with visual LED and two-tone audible confirmation
	~~**Audible push button station:** ADA-compliant, piezo-driven with visual LED and customizable voice message confirmation~~
	~~**Passive activation:** microwave-based sensor detects pedestrian~~
Warranty	**5-year limited warranty**

POLARA ENGINEERING INC. 9153 STELLAR CT. CORONA, CA 92883 (888) 340-4872

BDSP-014 – BullDog III Series Vandal Resistant ADA Compliant Push Button for TS1 Cabinets with Relay Isolators

This button is a highly vandal resistant button with essentially no moving parts. It is pressure activated, but can withstand an impact from a baseball bat or hammer. When the switch activates, you hear a beep and the LED will flash. When the button is released you will hear a second beep. BDSP-014 meets the relay driving requirements of older electromechanical relay based PED isolators found in some TS1 Cabinets.



Body Material: Aluminum, Powder Coated

Button material: 316 Stainless Steel

Piezo Driven Solid State Switch:
- Operating Force: 3.0 lbs. Maximum
- Operating Temperature: -30°F to +165°F (-34°C to +74°C)
- Operating Voltage: 12-36 VDC, 9-25 VAC RMS (18 VDC Typ.)
- MTBF: 8,800,000 hours Typ.
- Switch Operating Life: Greater than 300 million operations
- "Off" Current: 15µA Typ.
- "On" Resistance: 5Ω Typ.
- Maximum "On" Current: 350 mA (over-current protected) Typ.
- Maximum "On" Time: 11 sec. Typ.
- Debounce Time: 85 ms Typ.

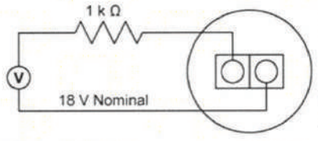
LED Operation: Approx 0.025 sec. LED flash each time button is pressed.

LED Specifications:
- Luminous Intensity: 0.3 Lux @ 1meter Minimum (Red)
- Viewing Angle: 155° Typ.

Beeper:
- Volume: 68 dB @ 1 meter Typ.
- Beep on Press: 2.6 kHz
- Beep on Release: 2.3 kHz
- Beep Length: 50 ms Typ.

Warranty: 5 Years, free from manufacturers defects

Suggested Test Circuit



Product Ordering Information

BDSP-014-B Black Body
BDSP-014-G Green Body
BDSP-014-Y Yellow Body

BDSP-014-Y model shown.
Dimensions are in inches (millimeters).

Design Compliance

Test Type	Compliance
Activation Force	MUTCD 2009 – 4E
Temperature and Humidity	NEMA TS 2
Transient Voltage Protection	NEMA TS 2
Transient Suppression	IEC 61000-4-4, IEC 61000-4-5
Lightning and Power Protection	GR-1089-CORE, 6000V-400A 25 reps, 60VAC-15 minutes
Electronic Noise	FCC Title 47, Part 15, Class A
Mechanical Shock and Vibration	NEMA TS 2
Ingress of Water	NEMA 250 – 6P, Rain, Snow, etc.
Ingress of Water	NEMA 250 – 6P, Submersion
Salt Spray and Corrosion	NEMA 250 – 6P
Ingress of Foreign Objects	NEMA 250 – 6P
Electrical Reliability	NEMA TS 4

Notes:
1) Applicable sections only of referenced standards.
2) All specifications subject to change without notice.

 Doc. BDSP-014 Rev. C-23706 06/14/12 Page 1 of 2 www.polara.com

RATHCO SAFETY SUPPLY, INC.

36" X 36"
FLUORESCENT YELLOW-GREEN
W11-2