Banner Scottsdale Hospital

Zoning Allocation & Conditional Use Permit



Banner Health®

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Development Team

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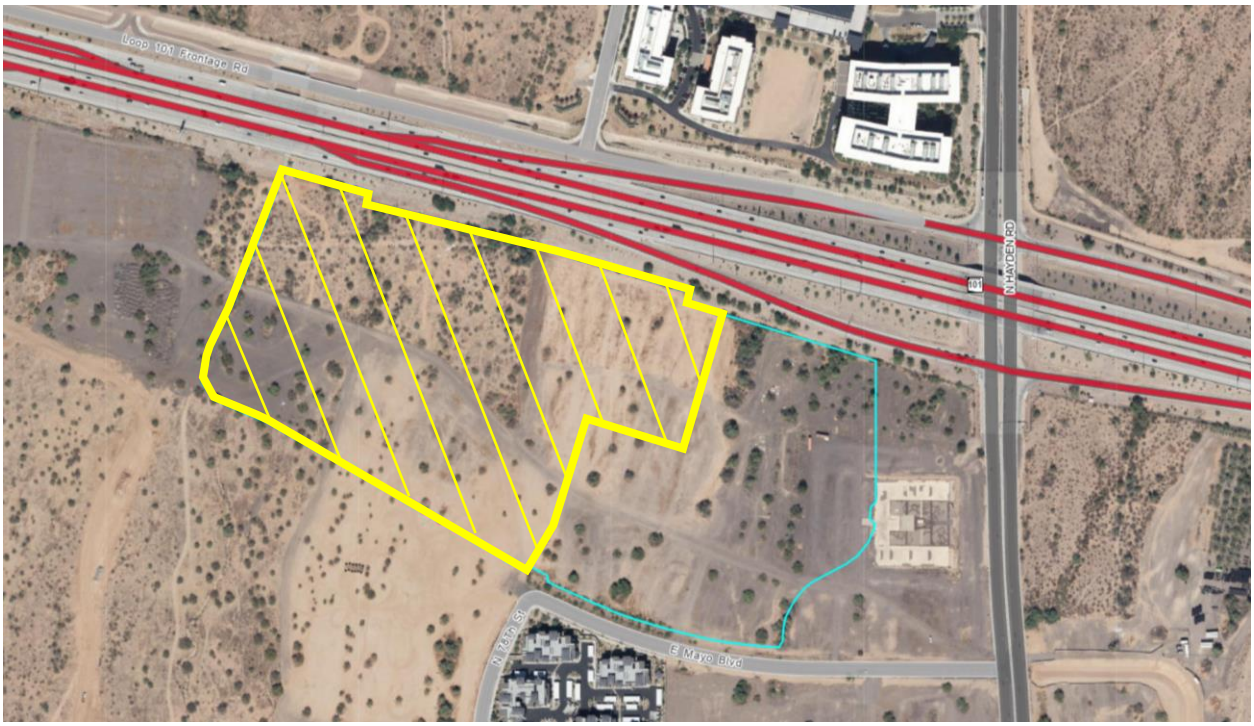
1. Introduction

Banner Health ("Banner") is submitting Zoning Allocation and Conditional Use Permit Applications (collectively, "Applications") to facilitate development of a new Banner Health Scottsdale Hospital with related medical services (collectively, "Hospital" or "Project") on the approximate 31.5 gross acres generally located at the northeast corner of Mayo Boulevard & the Miller Road alignment ("Site"), just south of State Route 101. The Site is comprised of the western two-thirds of Lot 2 of the Final Plat for Hayden 101 as recorded with the Maricopa County Assessor at recording number 2025-0260158. See Aerial Map. The remaining acreage within Lot 2 will be developed with the new Banner Health Center *Plus* ("Health Center *Plus*") and (future expansion of the Health Center *Plus*), an outpatient medical office and services facility, which is approved and under construction. (The Health Center *Plus* not a part of this Application.)

Banner Health has been a fixture in Scottsdale's healthcare community for more than 45 years with 24 locations currently serving the community. Banner acquired the 48 acres located generally at the northeast corner of Hayden Road and Mayo Boulevard in 2023 as the home for Banner's Scottsdale Medical Campus, which has long been part of Banner's strategic growth plan. The Banner Scottsdale Medical Campus will serve Banner's existing 50,000 members in the north Scottsdale area and meet the needs of the growing northeast Valley region, which is expected to add 100,000 new residents by 2030. The first phase of the Banner Scottsdale Medical Campus, Banner's Health Center *Plus*, recently broke ground on the land immediately adjacent to the Hospital Site and will open within two years.

The Banner Health Scottsdale Hospital represents phase 2 of the Banner Scottsdale Medical Campus and is the subject of this Application. The Banner Health Scottsdale Hospital is planned to be, at full build out, a 640,000 square-foot state-of-the-art 300 bed hospital facility with related medical services, which will help to continue to develop Banner's care network in Scottsdale by adding emergency specialties. Banner has carefully chosen the programming for this facility to provide an optimum level of health care and medical service. The Banner Health Scottsdale Hospital fulfills Banner's mission of making health care easier so life can be better.

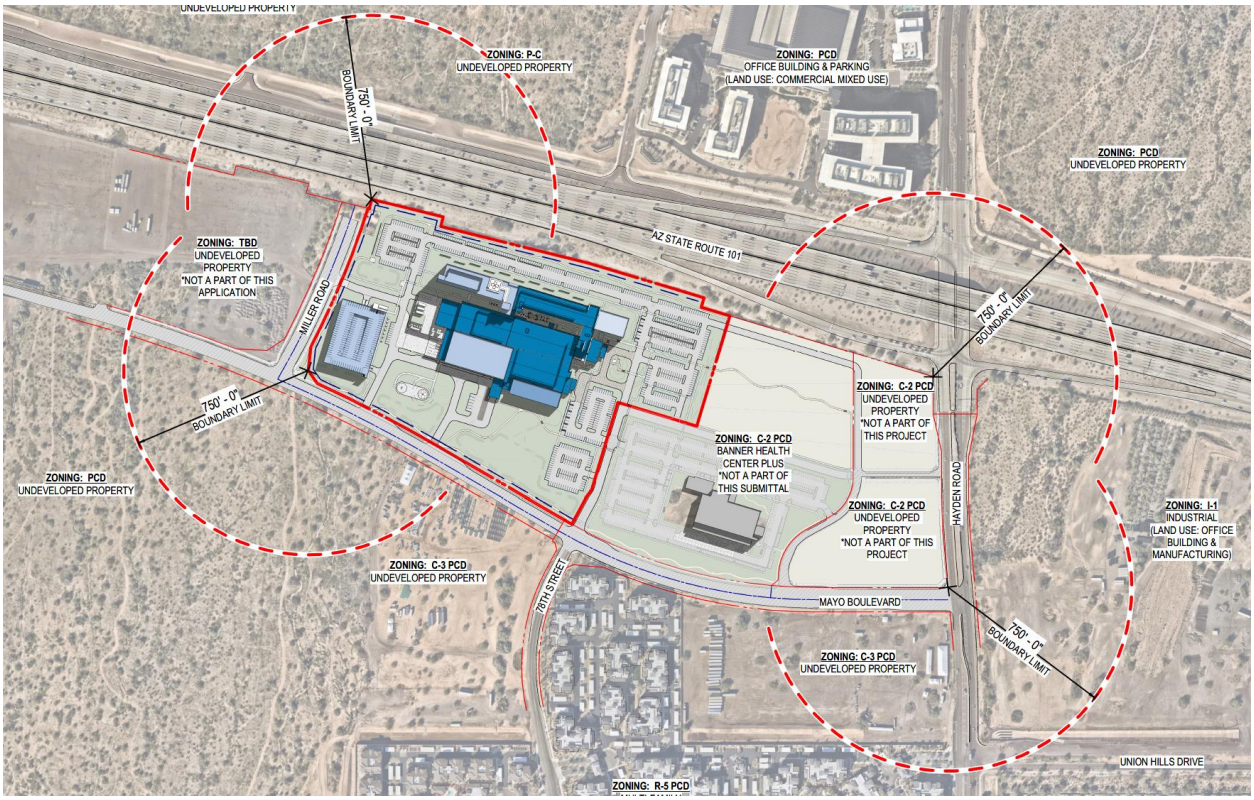


Aerial Map

2. Site, Context, and Zoning History

The Site is currently vacant, undeveloped land and is generally located west of Hayden Road between State Route 101 to the north and Mayo Boulevard to the south, east of the Miller Road alignment. The Site is adjacent to the Nationwide/Cavasson campus located to the north across State Route 101, to the east by the planned Health Center *Plus* and future retail and commercial uses, to the southeast across Mayo Boulevard by San Artes apartment community, to the south across the Mayo Boulevard alignment by vacant, undeveloped land owned by the Arizona State Land Department, and to the west across the Miller Road alignment by ASM campus currently under construction.

Notable uses in the surrounding area include the planned Axon global world headquarters campus to the east across Hayden Road, the Fairmont Scottsdale Princess and the TPC Scottsdale golf course to the south, and Optima McDowell Mountain condominiums to the west. See Context Aerial Map.



Context Aerial Map

The Site is within Planning Unit IV of the Crossroads East Planned Community District ("Crossroads East PCD"). The Crossroads East PCD encompasses approximately 1,000 acres generally located between Legacy Boulevard and Princess Boulevard (north-south) and Hayden Road and Scottsdale Road (east-west), bounding both sides of State Route 101. At the time of the original Crossroads East PCD approval in 2002, the Crossroads East PCD encompassed land wholly managed under trust by the Arizona State Land Department. In the time since, numerous properties within the Crossroads East PCD have been sold at public auction and are developed, under development, or planned for development. The Site was part of a larger parcel sold at public auction by the Arizona State Land Department in 2022 to Hayden Loop 101, an entity controlled by the Van Tuyl Companies and De Rito Partners ("VT / DRP").

3. Zoning Allocation Request

The Site is part of the Crossroads East PCD and was zoned P-C in Case No. 19-ZN-2002#6 ("Zoning Approval"). The Property is subject to the approved Crossroads East Development Plan and associated Land Use Budget, along with underlying Development Agreement, as amended. Pursuant to the requirements of the Crossroads East PCD and associated Development Agreement, the allocation of comparable zoning designations from the Land Use Budget of C-2 and I-1 were affirmed for the Property in May 2023 in Ordinance No. 4594. In accordance with the terms of the Zoning Approval and the Development Agreement, and with consent of the Arizona State Land Department as required therein, Banner requests to modify the comparable zoning designation for the Site from C-2 and I-1 to C-O, as follows:

- Relinquish and return to the Crossroads East Land Use Budget approximately 6.78 acres of I-1 (See Zone Exhibit 1) and approximately 24.88 acres C-2 (See Zone Exhibit 3) comparable zoning; and

- Assign approximately 31.66 acres of C-O (See Zone Exhibit 2) comparable zoning from the Crossroads East Land Use Budget to the Site.

The requested C-O land use designation is an approved land use designation for the Site per the Crossroads East Development Plan and is available for allocation to the Site. The proposed comparable zoning allocation is allowed pursuant to the existing Crossroads East PCD zoning framework and Development Agreement. The Arizona State Land Department has authorized the allocation of the remaining C-O comparable zoning from the Crossroads East Land Use Budget to the Site. No modifications to the approved P-C zoning or Development Plan for Crossroads East PCD, or terms of the underlying Development Agreement (as amended), are requested or required.

4. Conditional Use Permit Request

Banner seeks approval of a Conditional Use Permit in support of the development of the Hospital and Helipad as part of Banner's overall medical campus ("Medical Campus"), thus providing numerous healthcare specialties on the same campus allowing patients to benefit from seamless coordination across the care continuum:

> Conditional Use Permit (CUP) to allow for a Hospital and Off-Airport Helipad within the C-O zoning district (Table 11.201.A Land Use of the Zoning Ordinance)

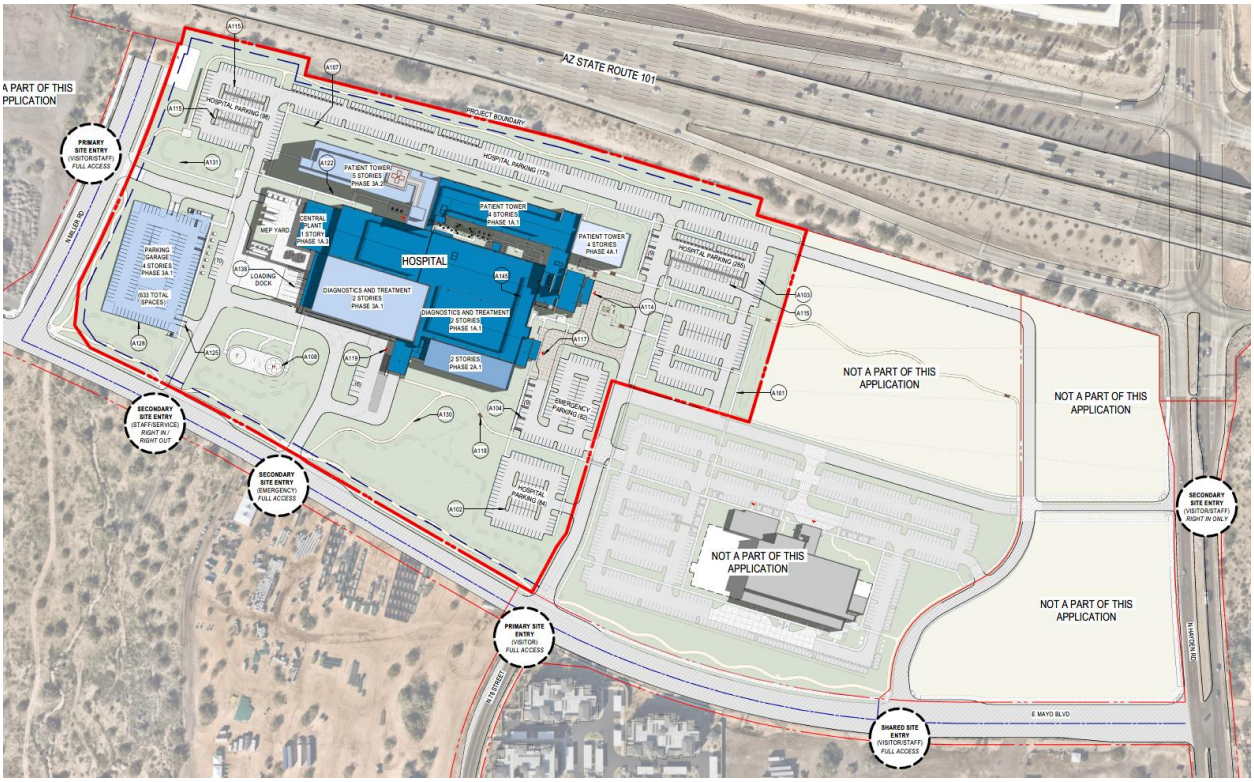
This Application seeks approval of a Conditional Use Permit to accommodate the Hospital, along with an off-airport helipad ("Helipad") utilizing the existing P-C zoning with the Commercial Office land use designation.

5. Project Overview

The Hospital is planned on the approximate 31.5 acres generally located at the northeast corner of Mayo Boulevard & the Miller Road alignment. The Project includes a full-service hospital, including but not limited to, emergency, inpatient, and acute care. The Hospital building is generally positioned in the middle of the Site, with associated site improvements, such as landscaping, open space and trail network, hardscape, and parking surrounding it. The statutorily required helipads are located near the midpoint of the Site along Mayo Boulevard.

Primary vehicular access to the Hospital is planned along Mayo Boulevard, with secondary access planned along Hayden Road and Miller Road. Parking for the ultimate buildout of the Hospital will be accommodated via a combination of surface and structured parking distributed around the perimeter of the buildings to allow patients, visitors, and staff safe and convenient pedestrian access. Hardscape pathways are planned to provide connectivity and safe access to the facilities' various entries/exits for patients, visitors, and staff.

More specifically, the first phase of the Hospital is planned to include a 4-story patient tower, a 2-story diagnostics & treatment building that will house emergency, surgery, laboratory, pharmacy, and associated support services, a 1-story central utility plant and MEP yard, at-grade Helipad, loading dock, surface parking, landscaping, hardscape, and other associated site improvements. Phase 2 is planned to include a second 2-story diagnostics & treatment facility. Phase 3 is planned to include a 5-story patient tower, along with rooftop Helipad. Finally, Phase 4 is planned to include a 4-story patient tower and 4-story parking garage. At full build- out, the Hospital will accommodate approximately 300 licensed patient beds. Phasing and development may change depending on community needs.



Planning, Design, & Functionality

The Hospital will provide comprehensive emergency, inpatient, and acute care, along with other related medical and ancillary services. The Hospital is designed using site-adapted Banner corporate design themes, which have been developed to maximize functional and operational efficiencies and provide state-of-the-art treatment spaces focused on exceptional patient care. Soothing color palettes, bespoke landscape

design, natural trails, and accessible parking will make the facility a new healthcare landmark for the City of Scottsdale.

Design decisions were carefully evaluated by the integrated project delivery team comprised of Banner Health Design & Construction, Banner Health System clinical experts, SmithGroup, NexCore, Okland Construction Company, and construction sub-trades. Banner seeks to expand its innovative approach to full-service healthcare through development of the Banner Health Scottsdale Hospital applying learning from the other 30-hospitals that Banner operates.

The Project includes design and engineering strategies that promote health, healing, and wellness, while conserving water and energy, and respecting the natural ecosystem of the Site.

Health, Wellness, & Connectivity

The Hospital is purposely designed to promote health, wellness, & connectivity. Banner strives to lift the human spirit and support wellness through both the internal and outward design, as well as orientation to the great community. To achieve these goals, two "green" spines have been established on the campus, one in a north/south direction, and the other in an east/west direction, to provide connectivity between the buildings and the parking infrastructure, open spaces, and perimeter sidewalks. Both spines connect into an overall wellness path that encircles the Hospital and the larger medical campus, which includes emergency, surgery, laboratory, pharmacy, and associated support services. The walking path may be used for patients, visitors, and staff alike and will provide an excellent way of reflection and relieving stress. Appropriately spaced nodes may be established along these paths to pace the journey, as well as to provide ample respite space outside of the Hospital. Additional visual connectivity has been thoughtfully integrated to capture the natural desert environment, open space, and McDowell Mountains.

Landscaping & Palette Design

The general site design focuses on exterior landscape improvements along the perimeter roadways and points of entry. The character of the design includes a natural desert palette with species and forms that are native to the general Sonoran region. Visual and physical wayfinding cues guide patients and visitors to parking areas that connect to pedestrian walks linking to building entries. Areas of respite with shade and seating are located throughout the Project and adjacent to building entries, serving as gathering spaces for visitors and staff at different scales with flexible programming opportunities. Landscape micro-basins and bio-swales contribute aesthetic and ecological benefits while also retaining water and conveying it to larger detention/retention areas. The landscape planting along the Mayo Boulevard trail corridor and internal walking paths will be Sonoran native planting focused on providing ample pedestrian shade while promoting wildlife, such as local pollinators like butterflies and hummingbirds.



Landscape planting design will consist primarily of trees, shrubs, cacti, accents, and ground cover plants. Mature native trees and cacti will be salvaged and relocated on site as part of the new landscape planting design to the greatest extent possible. Plant materials will be strategically selected based on characteristics of low water-use and low maintenance requirements. Stone top-dress and plant species selection will enhance and celebrate the native, desert character of the area to create a cohesive visual experience across the Site that blends into the contextual environment. Plant selections at building entries, staff/visitor amenity spaces, and pedestrian linkages will include a mixture of scale, form, texture, and color to celebrate the dynamic forms of the Sonoran Desert and provide seasonal interest. Select high visibility areas are planned to receive increased masses and specimen materials. Plant densities will be highest within impact

areas to encourage recognition of arrival points. Similar densities will occur along pedestrian walks and common areas for aesthetics and staff and visitor comfort. Tree and plant size and quantities will meet or exceed to City requirements throughout Project.

Hardscape

Premium paving materials will be used at the visitor and vehicular entries to the parking lot to further layer and define site wayfinding and reinforce the architectural design language of the Project. The perimeter wellness trail will be constructed with stabilized decomposed granite to blend in with the adjacent desert ground plane, reduce the use of concrete, and increase the porosity of the Site. The overall site paving material palette will balance aesthetics with durability, maintenance, and ease of construction.

Parking

Parking complies with City's requirement of 1.5 parking spaces per bed (450 required at buildout). Banner is providing additional parking based on Banner's extensive experience developing and operating hospitals—1,190 total parking spaces are planned, with the requisite number of ADA parking spaces clustered near the Hospital's main entry. Various surface parking areas may be canopied covered and include solar. In addition, Electrical Vehicle Charging stations are planned as part of development of the Site. Specifically, 18 Electrical Vehicle (EV) ready charging stations and 46 EV capable charging stations are planned as part of development of the Site. The parking planned by Banner results in an excess of the requirement under the Zoning Ordinance. As with its other medical campuses, Banner will closely monitor its parking demand to ensure the appropriate amount of parking. Parking will be phased as appropriate within each of the four phases of development.

Loading Dock, Central Plant, & MEP

The loading dock, central plant, and MEP areas are located on the west side of the Hospital. The loading dock also includes refuse compactors, a raised delivery truck area and a ramp down to the bottom of the dock. The central plant and MEP yard will

be physically sized in Phase 1 for the ultimate build-out and will be equipped when each subsequent phase comes online. The loading dock and central plant will support all phases of the Hospital, as well as overall Medical Campus, as necessary.

6. Architectural Character

Architectural Design & Theme

The Banner Health Scottsdale Hospital has been designed with unmatched quality, which mirrors the quality of care and commitment to the community that Banner provides in all of their facilities. The Hospital building is designed to complement the Banner Health Center *Plus* to create a cohesive, integrated design across the Banner Scottsdale Medical Campus.

This Project has been designed to be rooted in its Southwestern context and use quality materials and massing strategies that are sensitive to the local surroundings in terms of scale and context adjacent to the Loop 101 freeway corridor. The Project builds off the design themes that were established with the Banner Health Center *Plus* at New River Trails (located at 75th Avenue and the Loop 101 Freeway), and Banner's system-wide legacy of high-quality architecture at its many medical center, outpatient and cancer center projects, and specifically the campuses of Banner Ironwood, Banner Ocotillo, and Banner Gateway. The architecture and building massing are integrated with Site and building programming strategies aimed to provide relief stress for patients, enhance wayfinding for staff and visitors, communicate a premium care delivery environment, and integrate seamlessly into the natural desert environment.





This Project will be one of Banner's most significant investments into the Scottsdale healthcare marketplace, and one of Banner's largest investments more broadly. To maximize the investment potential, the facility's design plays an important role in communicating the mission of delivering a high quality of care to this community. A focus on health and wellness will elevate the experience of those visiting the facility. To emphasize placemaking and connectivity with the community, the natural desert site will be celebrated as well as the direct views of the neighboring McDowell Mountain Preserve.

Design perspectives are included below and as part of the included exhibits along with building elevations that visually represent the approach to design and the adherence to the City's design guidelines.

Building Design

The blend of quality building materials, which include masonry block, metals, and synthetic finishes, combined with the composition of windows and shading elements, provide for proper and appropriate massing and scale, creating a comfortable environment on-site, as well as along the surrounding streetscapes.

The color palette is comprised of a range of natural earth tones, with the intent of staying away from large amounts of warm or dark colors. Light sand and tan colors are complimented by the cooler glass and small areas of metal panels. This approach gives the building a lighter feel, relying on the rich texture of the various materials to promote a sense of elegance and quality commensurate with the consistent visual identity of Banner's facilities. To celebrate the natural environment, synthetic cor-ten metal panels will be used with the cool synthetic zinc metal panels.

Curtainwall and storefront high-performance glazing will be maximized in areas of highest public impact to connect users to the natural context on-site, as well as long range to the views outward from the Site. Glazing in staff circulation and break areas will also be maximized to allow for proper respite, collaboration, and recharge spaces.

Synthetic stucco (EIFS) of a similar color complement broken up by horizontal and vertical score lines is a predominant material on the east and west sides of the building. Punched window openings, areas of metal panel, canopies and other subtle accents provide a rich composition intended to create visual interest and avoid creating monolithic elevations.

Metal panel accents are used throughout the exterior of the building to provide a visual break from the predominant masonry or stucco exterior materials. These panels are used in a way that breaks the building's cornice line with the intent of reducing the building scale and mass.




Banner Health
Encanto
Medical Center





Sustainability

Banner has a long-standing history of celebrating health & wellness with the Hospital design, along with being sensitive to fiscal responsibility and hyper focus on positive outcomes for health, wellness, and patient care. Specific strategies will be developed through the design that promote energy efficiency, water/waste reduction without compromising patient care, and a respect for the natural surroundings. Banner, as a long-term community partner, intends on developing a facility that is sustainable.

Banner is a proponent of sustainable strategies and will incorporate many LEED system goals, as well as those promoted within the International Green Construction Code, to ensure Banner's commitment to health, wellness and well-being onsite. The design team is using the AIA's Framework for Design Excellence to solicit and evaluate effective solutions for the Project and its commitment—Integration, Equitable Communities, Ecosystems, Water, Economy, Energy, Well-being, Resources, Change, and Discovery. Banner will invest resources in the sustainable strategies that have the most beneficial impact for the Banner Scottsdale Medical Campus.

7. Conditional Use Permit Approval Criteria & Justification

Banner seeks approval of the following entitlements in support of the development of the Hospital and Helipad:

> Conditional Use Permit (CUP) to allow for a Hospital and Off-Airport Helipad within the C-O zoning district (Table 11.201.A Land Use of the Zoning Ordinance)

In accordance with Section 1.401 of the Zoning Ordinance, a Conditional Use Permit may be granted after the Planning Commission has made a recommendation to the City Council after finding:

A. That the granting of such conditional use permit will not be materially detrimental to the public health, safety or welfare. In reaching this conclusion, the Planning Commission and the City Council's consideration shall include, but not be limited to, the following factors:

1. Damage or nuisance arising from noise, smoke, odor, dust, vibration or illumination.

RESPONSE:

Hospital

Smoke, Odor, Dust, & Vibration. The Hospital will not have a detrimental impact in terms of smoke, odor, dust, vibration, or other pollutants beyond that of ambient conditions. The Hospital is highly regulated and will be consistent with, if not more environmentally friendly, than the existing and planned uses in the area, which include commercial and industrial uses. As stated, the Property is adjacent to the Nationwide / Cavasson campus, the recently permitted Health Center *Plus*, the planned Axon global world headquarters campus, and the ASM campus currently under construction. In addition, the Property is bounded by State Route 101—a regional thoroughfare, which

carries thousands of cars per day, generating smoke, odor, dust, and vibration 24-hours per day, 7-days a week.

Noise & Illumination. Specific to emergency medical service (ambulance) use of lights and sirens, Banner's emergency medical dispatch protocols have proven to safely and effectively categorize requests for medical response by types of call and level of medical acuity and urgency. Banner has successfully used these emergency medical dispatch categorizations to prioritize the calls that justify a lights and sirens response, while saving lives and improving patient outcomes—and, while promoting roadway safety. Lights and sirens are primarily used for when the time saved by a lights and sirens operation is anticipated to be clinically important to a patient's outcome—lights and sirens can compensate for any minutes lost with time-sensitive emergencies (as compared to non-lights and sirens transport). When lights and sirens are utilized during transport, emergency medical service will turn them off before turning onto Mayo Boulevard, which is consistent with Banner's other facilities and other medical facilities across the City.

The Hospital has been designed to comply with all City lighting requirements. The Site is immediately adjacent to State Route 101—a major regional thoroughfare with tall overhead light fixtures—along with the Nationwide/ Cavasson campus. The proposed building and Site lighting have been designed to be sensitive to the surrounding community and desert environment. The Hospital's lighting, both architectural and within the landscape areas, will be designed to minimize glare and invasive overflow, to conserve energy, and consider context and reflect the character of the area.

Helipad

Smoke, Odor, & Illumination. The Helipads will not have a detrimental impact in terms of smoke, odor, or illumination beyond that of ambient conditions. The Property is located within the Scottsdale Airpark Area, which is designed to accommodate significant air traffic landings and takeoffs. The neighboring Scottsdale Airpark sees numerous flights in- and out-bound daily, which far exceed any impact that may be created by Banner. Additionally, the Property

is bounded by State Route 101—a regional thoroughfare, which carries thousands of cars per day, generating smoke, odor, illumination, noise, and vibration 24-hours per day, 7-days a week.

Noise, Vibration, & Dust. Banner employs emergency preparedness protocols that indicate the need for air transport based on the time, distance, and services available. Banner's guidelines designate the use of helicopter medical evacuation services when a patient meets standard transport protocols, and a significant amount of time would be saved when compared to traditional ground transport (e.g., patients requiring expeditious and critical interventions, unstable vital signs that require the fastest available modality, availability of a team that can provide needed intra-transport care, etc.).

Banner anticipates approximately 8 to 10 takeoffs/landings per month. Landings/takeoffs of helicopters will generate some noise and degree of vibration; however, given the infrequency and locations of the helipads located away from residential, it will result in negligible impact on adjacent existing and planned properties.

The Helipads will be constructed on a concrete apron, which Banner will keep free of dust minimizing the amount of dust generated by helicopter activities consistent with Banner's other facilities.

Pursuant to CFR Title 14 Parts 77 and 157, private individuals and organizations proposing construction or alterations must submit certain applications to provide operating procedures, evaluation of obstruction, safety analysis, etc. for FAA determination. Banner will submit all required applications to the FAA to ensure the helipads are compliant with navigation safety standards.

The granting of this Application will not be material detrimental to the health, safety, or welfare of the general public.

2. ***Impact on surrounding areas resulting from an unusual volume or character of traffic.***

RESPONSE:

The Hospital is located at the intersection of State Route 101, a regional thoroughfare, and Hayden Road, an arterial roadway, which allows for the anticipated traffic generated by the Hospital to be managed and dispersed to the adjoining roadway network, as set forth in the Project's Traffic Impact Analysis (TIA). Traffic generated by the Hospital will be directed onto Mayo Boulevard serving as a direct connection to Hayden Road, ultimately connecting to State Route 101, along with a direct connection from the Hospital to Hayden Road. Importantly, there are no access ways or streets which lead into surrounding residential areas.

The TIA evaluated the traffic impact from the Project from the projected opening day in 2025, through 2040, when the Project is expected to reach full buildout. Recommendations included:

- Provide dedicated right-in/right-out turn lanes.

- Enlarged driveways to provide separate left and right turn egress lanes to reduce vehicle queues within the parking lot.

The construction of the above mitigation strategies, in addition to right turn lanes at the planned share drive closest to Hayden Road, the primary Hospital entrance and the western-most drive to the medical office building along Mayo Boulevard, and the service/ambulance entrance, are anticipated to be constructed in the initial phase of development. Banner will work closely with the City of Scottsdale traffic and engineering departments to ensure that the traffic anticipated in this area is dispersed in the safest and most efficient manner possible, while minimizing wait times at the signalized intersection of Hayden Road & Mayo Boulevard. The Hospital and Helipads will not generate an impact on surrounding areas resulting from an unusual volume of traffic,

given the existing and planned development in and around the Property.

B. ***The characteristics of the proposed conditional use are reasonably compatible with the types of uses permitted in the surrounding areas.***

RESPONSE:

As mentioned elsewhere in this narrative, this Hospital is the second phase of the Banner Scottsdale Medical Campus, with the medical office building already under construction. The Hospital will complement the medical office building already under construction and is compatible with the employment and industrial uses in the area. Further, the medical office and hospital is meant to serve existing and planned residents, providing additional, state-of-the-art medical resources in the North Scottsdale and North Phoenix area. The proposed Hospital and Helipad uses are compatible with the types of uses that exist and are permitted in the surrounding areas, including the Mayo Hospital, HonorHealth Shea, and HonorHealth Thompson Peak medical campuses

8. Additional Conditions for Specific Conditional Uses-Hospitals

Section 1.403.J.2 prescribes additional conditions that must be met when a Hospital is evaluated for a Conditional Use Permit. Each of the additional conditions are shown below, and the manner in which this application satisfies the criteria is shown in bold text.

1. ***The application shall include written proof the proposal meets all state and county regulations.***

   RESPONSE:

   The Hospital and Helipad meet all required Federal, State, County and City regulations. There are regulations from the FAA for development within the Airpark Area, and regulations from FEMA regarding floodplain development. Additionally, hospitals are highly regulated, including State requirements for medical reporting and licensing and local regulations for permitting and inspections.

2. ***Building height (excluding rooftop appurtenances). Maximum: seventy-five (75) feet.***

   RESPONSE:

   The Hospital will comply with the maximum height limit of 75 feet.

3. Required open space.

a. Minimum open space: 0.24 multiplied by the net lot area, distributed as follows.

RESPONSE:

The Property is 1,257,577 square-feet, requiring 301,818 square-feet of open space. Banner is providing significantly more open space at 545,850 square-feet of open space (or, more than 80% otherwise required by the Zoning Ordinance). The open space is evenly distributed through the Site and will be landscaped with trees, shrubs, cacti, accents, and ground cover plant species that enhance and celebrate the native, desert character of the area to create a cohesive visual experience across the Site that blends into the contextual environment.

i. Frontage open space minimum: 0.75 multiplied by the minimum open space, except as follows:

(1) Minimum: thirty (30) square feet per one (1) linear foot of public street frontage.

RESPONSE:

Mayo Boulevard and the Miller Road alignment have approximately 1,299 and 681-feet of linear frontage, respectively, totaling approximately 1,980-feet. 1,980-linear feet of frontage results in approximately 59,490 square-feet of open space (+/- 1,980-linear feet x 30 SF). The Project provides 106,335 square-feet of frontage open space, which is well in excess of the Zoning Ordinance requirement—this is in addition to the nearly 440,000 square-feet of other open space (general, frontage, courtyard) provided throughout the Site.

(2) Not required to exceed fifty (50) square feet per one (1) linear foot of public street frontage.

ii. The remainder of the minimum open space, less the frontage open space, shall be provided as common open space.

RESPONSE:

The remainder of open space is provided in the form of open space, landscape, and hardscape, coupled with the architecture, results in a development that is contextually sensitive to the adjoining properties.

4. Yards. When the height of the building exceeds sixty (60) feet the following yard requirements shall apply. If building height is less than sixty (60) feet the district yard requirements shall apply.

RESPONSE:

The Project complies with all applicable yard requirements.

a. Side Yard.

i. A side yard of not less than 100 feet shall be maintained where the side of the lot abuts a single-family residential district, or abuts an alley which is adjacent to a single-family residential district, shown on Table 4.100.A., or the single-family residential portion of a Planned Community P-C or any portion of a Planned Residential Development PRD with an underlying single-family residential district comparable to the residential districts shown on Table 4.100.A. The 100 feet may include the width of the alley.

RESPONSE:

Not Applicable—the rear yard of the Property does not abut a multi-or single-family residential district.

ii. A side yard of not less than seventy-five (75) feet shall be maintained where the side lot abuts a multiple-family residential district. The seventy-five (75) feet may include any alley adjacent to the multiple-family residential district.

RESPONSE:

Not Applicable—the rear yard of the Property does not abut a multi-family residential district.

b. Rear Yard.

i. A rear yard of not less than one hundred (100) feet shall be maintained where the rear lot abuts a single-family residential district or abuts an alley which is adjacent to the single-family residential district, shown on Table 4.100.A., or the single-family residential portion of a Planned Community P-C or any portion of a Planned Residential Development PRD with an underlying single-family residential district comparable to the residential districts shown on Table 4.100.A. The one hundred (100) feet may include the width of the alley.

RESPONSE:

Not Applicable—the rear yard of the Property does not abut a single-family residential district.

ii. A rear yard of not less than seventy-five (75) feet shall be maintained where the rear lot abuts a multiple-family residential district or abuts an alley which is adjacent to the multiple-family residential district. The seventy-five (75) feet may include the width of the alley.

RESPONSE:

Not Applicable—the rear yard of the Property does not abut a multi-family residential district.

9. Conclusion

The proposed Banner Health Medical Campus will be a high-value employment center at this important location in the City of Scottsdale. The campus is planned to serve the healthcare needs of the existing and future population of North Scottsdale and North Phoenix, and the hospital is a critical component to bringing quality care to the area. The proposed Banner development advances the goals and policies stated within General Plan and the Scottsdale Airpark Character Area Plan. It is consistent with the vision and approved zoning for the Crossroads East Planned Community District and incorporates design principles that are sensitive to the unique desert and built environment. Moreover, this project meets the criteria for a Planned Commercial Development, as well as furthers the City's goals and values of providing the community access to an exceptional healthcare provider.

BANNER HEALTH CENTER SCOTTSDALE

DRAFT Traffic Impact and Mitigation Analysis

Prepared For: Banner Health

Hunter Venne

Project No.: 1124152

July 14, 2025



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I. EXECUTIVE SUMMARY AND INTRODUCTION

A. Purpose of Report

The purpose of this Traffic Impact and Mitigation Analysis ("Report") is to evaluate the traffic impacts of a proposed new Hospital and parking garage to be constructed on approximately 29 acres located just west of the northwest corner of Mayo Boulevard and Hayden Road (the "Hospital Campus"). The Hospital Campus constitutes approximately 29 acres of a larger scale development planned for approximately 73.2 acres located at the northwest corner of Mayo Boulevard & Hayden Road in Scottsdale, Arizona ("Overall Site"). The Hospital Campus is designated as a hospital and a parking garage, which requires a land use budget modification and a conditional use permit. The opening year was assumed to be 2030 for the purposes of this Report. The report assumes a City of Scottsdale (City) Category II Traffic Impact and Mitigation Analysis for the Hospital Campus development to determine the offsite infrastructure needs for the Hospital Campus and to determine if and when traffic signals will be warranted for the Hospital Campus by 2030 as well as the Overall Site by 2040. Note the signal warrant was evaluated for the assumed opening day of the hospital 2030 as well as the horizon year (2040) when the Overall Site and surrounding developments are anticipated to be complete. The capacity analysis focuses on 2040 with the Overall Site completion and known surrounding developments completions to confirm the offsite infrastructure needs already planned.

A Traffic Impact & Mitigation Analysis for the Overall Site was prepared by Kimley Horn & Associates and accepted by the City on June 14, 2023, and is included in **Appendix E** of this Report ("Kimley-Horn TIMA"). In the Kimley-Horn study, approximately 48 acres of the Overall Site were assumed to be developed for medical uses. The hospital and parking garage are a portion of the larger planned medical uses. An additional report was prepared by Dibble for a joint Banner Health and NexCore Medical Office Building, Banner Health Center Plus ("MOB+"). The MOB+ approved TIMA is included in **Appendix F**. It is important to note that the new proposed hospital and garage as well as the MOB were already accounted for as a part of the background traffic for the future horizon year of 2040 as requested by the City when the report was prepared. Therefore, the 2040 Total traffic presented in this report, matches the 2040 Total traffic for the MOB+ report. This was done to evaluate the full buildout offsite transportation infrastructure needs, which would allow the improvements to efficiently be designed and built with for the construction of Mayo Boulevard and Miller Road along the frontage of the Overall Site prior to the completion of the Hospital Campus.

B. Executive Summary

Site Location and Study Area

The Hospital Campus is located within the City of Scottsdale, west of Hayden Road between Loop 101 and Mayo Boulevard. This Report includes the analysis of the following intersections:

- Mayo Boulevard & 78th Street
- Hayden Road & Mayo Boulevard
- Mayo Boulevard & Miller Road
- Loop 101 & Hayden Traffic Interchange (TI)
- Five access points to the Overall Site

Development Description

The proposed 618,000 SF hospital with 300 beds and parking garage will be developed in multiple phases that are assumed to be completed by 2030 for the purposes of this report. The planning level numbers from the Kimley Horn TIMA were used for the remainder of the Overall Site and included as a part of the background traffic for the purposes of this Report.

Principal Findings

At full buildout of the Hospital Campus, it is anticipated that multiple off-site improvements will be completed by the master developer of the Overall Site, including installing a traffic signal at Mayo Boulevard & Hayden Road, and at Mayo Boulevard & Miller Road. The signal at Mayo Boulevard & Hayden Road was MUTCD 10th Edition (2009) Part 4 warranted with the completion of the MOB+, therefore, it is assumed the signal will already be constructed by the completion of the Hospital Campus. The MOB+ TIMA found that a signal was not warranted at Mayo Boulevard and Miller Avenue nor Mayo Boulevard and 78th Street with the completion of the MOB+, but they were found to be warranted by the horizon year 2040 without the completion of the Axon development. The peak hour (warrant 3) signal warrant was therefore analyzed for the full build out of the NWC Development including the Hospital Campus.

The results of the signal warrant analysis are summarized in **Table 1**.

Table 1 –Signal Warrant Results

Intersection	Total Traffic 2040 w/o Axon
Mayo Blvd & Miller Rd	Yes (Both Peaks)
Mayo Blvd & 78th St	Yes (Both Peaks)

Development of the Hospital Campus is not anticipated to create excessive delays or significant increases in delays at the surrounding intersections. With the current site plan and recommended site access, the adjacent intersections and site driveways are anticipated to operate acceptably by 2040 with the completion of the Hospital Campus as well as the full buildout of the Overall Site with full access provided at driveways B, C and D as well as 78th Street and Mayo.

Recommendations

Based on the analysis of this Report there are no new recommendations for the Overall Site driveways. Although the traffic signal is not warranted by 2030, it will be needed by 2040 as other developments and the Overall Site are built in the area. It would therefore be beneficial to install a signal at 78th Street and Mayo Boulevard access point alongside this project.

Recommendations for 78th Street and Mayo Boulevard as well as the adjacent intersections are as follows:

Mayo Boulevard & 78th Street

A signal is not warranted with the completion of the Hospital Campus only, however, a signal is warranted by 2040 with the completion of the Hospital Campus, the Overall Site and surrounding developments. It would be beneficial to install the signal alongside the completion of the Hospital Campus as it will be warranted by the horizon year of 2040 when the surrounding developments and the Overall Site are anticipated to be complete.

Mayo Boulevard & Miller Road

A signal is warranted by 2040 with all the developments, including the Hospital Campus at this intersection from both a vehicle capacity and delay perspective. A roundabout is planned for this intersection with future development as the right-of-way becomes available. If a round-about is ruled out, a signal is warranted. The right-of-way for the intersection should be evaluated to determine if a roundabout can be installed, if not, a traffic signal should be considered.

II. PROPOSED DEVELOPMENT

A. Off-Site Development

In addition to the development planned for the Overall Site, there are several other off-site developments planned in the area. The Kimley Horn TIMA for the Overall Site includes planning level traffic assumptions for the Overall Site that included a planned Hospital Campus as well as other proposed land uses such as office, retail and hotels. The Kimley Horn TIMA can be found in **Appendix E**. The Kimley-Horn TIMA also incorporates additional planned developments within the area such as Cavasson, HonorHealth Hospital Campus, Axon Campus and Optima McDowell Mountain Village into the background traffic. The independent traffic studies for each of those developments were used to generate the background traffic numbers. Those same assumptions were utilized in this Report. At the time of this Report, it is unknown if or when the Axon development will be constructed. A traffic signal at Mayo Boulevard and Hayden Road was planned as a part of the Axon development. If the Axon development is delayed or is no longer built on the east side of the intersection of Mayo Boulevard and Hayden Road, the traffic signal will be built with the MOB+ project as a part of a master infrastructure project by others. This report assumes the traffic signal will already be built by the completion of the Hospital Campus, therefore, this report evaluates the need for a traffic signal at the intersections of both 78th Street and Miller Road with Mayo Boulevard. Kimley Horn also provided Dibble with their total 2040 traffic numbers for the surrounding intersections that excluded the Banner Health traffic. The traffic numbers provided, also included all the previously mentioned proposed developments in the area. These traffic numbers can be found in **Appendix D**.

B. Description of On-Site Development

Land Use and Intensity

The Hospital Campus is planned to be developed with a 618,000 SF Hospital with 300 beds. The hospital is anticipated to be built in phases, but for the purposes of this Report, the full build out of the Hospital Campus is evaluated. It is important to note that the full build out of the hospital campus was previously evaluated in the MOB+ TIMA as requested by City of Scottsdale. The Hospital Campus were accounted for in the background traffic. This was requested by the City in order to determine the overall offsite improvement needs, of particular note for the Mayo Boulevard as well as all access Hospital Campus access points design and construction that will precede the completion of the Hospital Campus.

Location

The proposed Hospital Campus development is located within the City of Scottsdale, west of Hayden Road between Loop 101 and Mayo Boulevard. This location is shown in **Figure 1**.

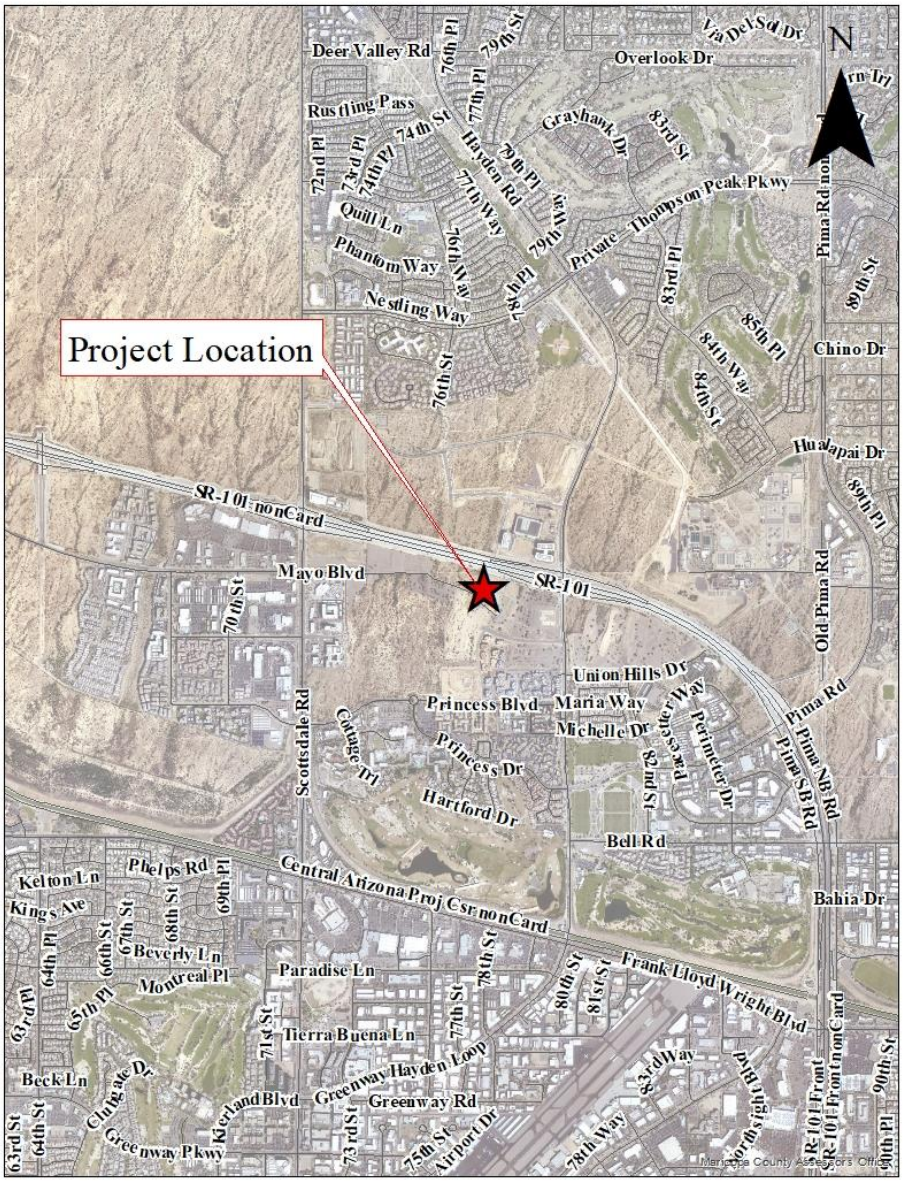


Figure 1 – Vicinity Map

Site Plan

The Overall Site is planned to have six driveways to access the Overall Site as described in the MOB+ approved TIMA. One driveway is planned to provide future full access on Miller Road (Driveway A), but will provide right-in/right-out/left-out only until Miller Road connects to the north. Four access points are initially modeled to provide full access on Mayo Boulevard (Driveways B-D and 78th Street). The sixth proposed access point (Driveway E) is on Hayden Road to provide more direct access from the freeway. Driveway E will be a right-in only access point due to the proximity to the Loop 101 ramps as well as the Mayo Boulevard and Hayden Road intersection to prevent unsafe weaving traffic exiting the site. The location of Driveway E was determined with ADOT and City of Scottsdale during the MOB+ TIMA coordination. The proposed driveways are shown in **Figure 2** followed by the current site plan in **Figure 3**.

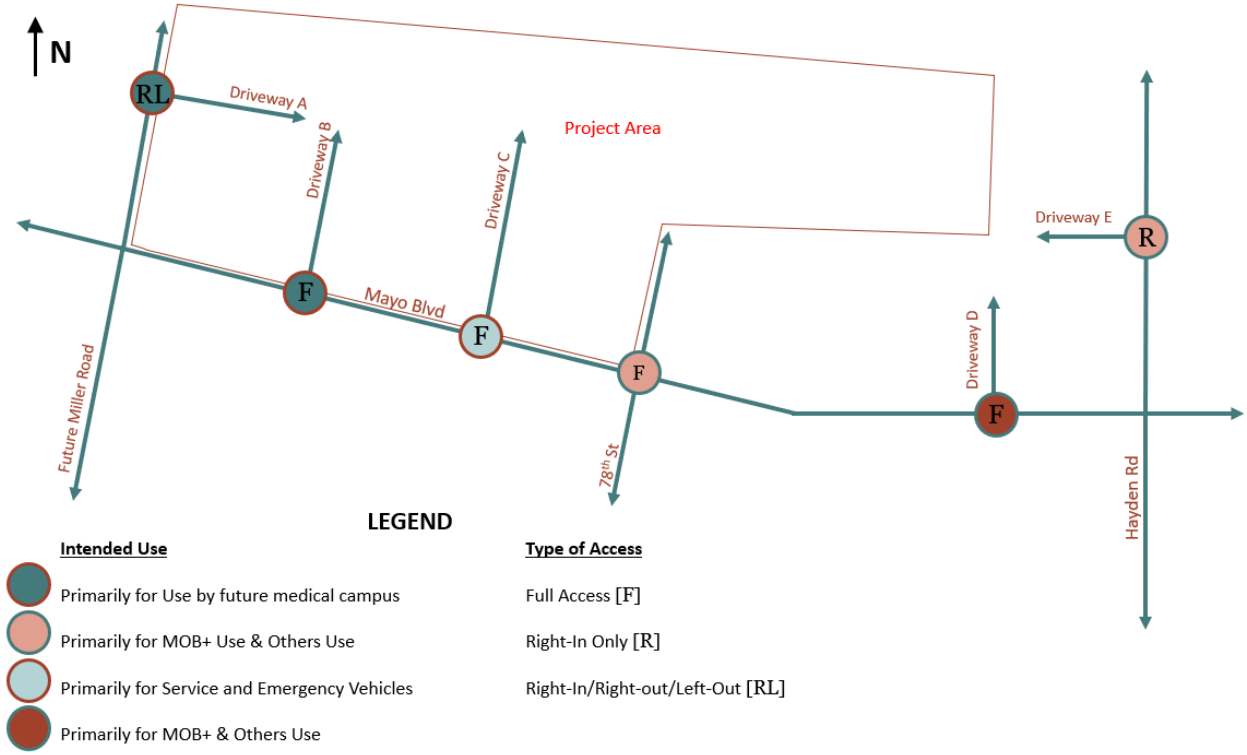


Figure 2 – Overall Site Access

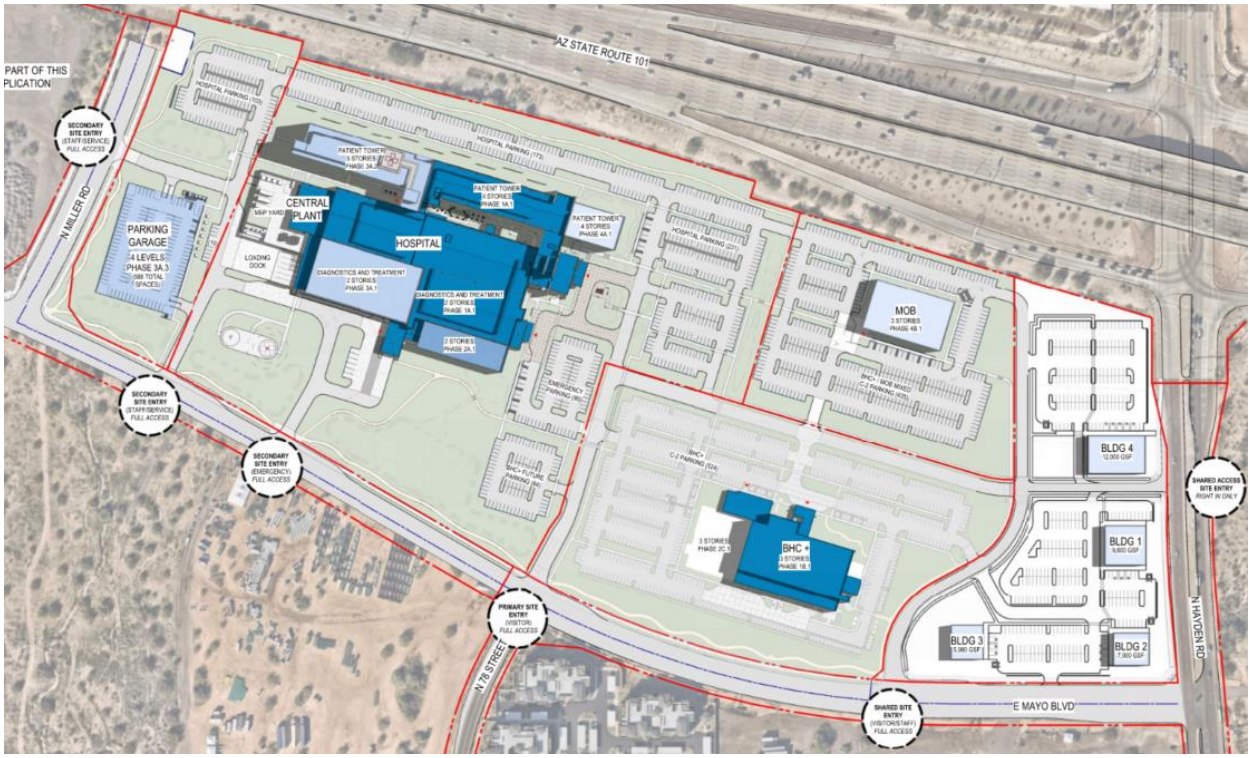


Figure 3 – Hospital Campus Plan

Phasing and Timing

The hospital will be developed in more than one phase, however, the report focuses on the projected 2040 horizon year with the full Hospital Campus build out. Conservative planning level numbers from the Kimley Horn TIMA are used for the future developments between the Hospital Campus and Hayden Road and included as a part of the background traffic for the purposes of this Report.

III. AREA CONDITIONS

A. Study Area

Area of Influence

The Hospital Campus is located within the City of Scottsdale, west of Hayden Road between Loop 101 and Mayo Boulevard. This Hospital Campus planned for a portion of the Overall Site are anticipated to serve the surrounding population. There are several smaller clinics as well as other hospitals within a 5-mile radius of this site. This was considered for the trip distribution for the Hospital Campus as well as the medical services provided at other locations.

Area of Significant Traffic Impact

The area with the most traffic impact due to the addition of the remainder of the Hospital Campus planned for a portion of the Overall Site will occur along Loop 101, Hayden Road, Scottsdale Road, and Mayo Boulevard roadways. These are the major travel routes that vehicles will likely take to reach and leave the site.

This study focuses on the capacity analysis for the Overall Site driveways and the following surrounding intersections:

- Mayo Boulevard & 78th Street
- Hayden Road & Mayo Boulevard
- Mayo Boulevard & Miller Road
- Five additional access points to the Overall Site
- Loop 101 & Hayden Road

B. Study Area Land Use

Existing Land Uses and Zoning

The Hospital Campus is currently zoned as Planned Community District-Central Business District (P-C C-2).

Anticipated Future Development

As previously mentioned, the Kimley Horn TIMA included development plans for a larger Hospital Campus on the Overall Site. The planned developments analyzed in Kimley Horn TIMA include retail, senior living, office, hotel, and restaurant land uses. The trips generated by these developments (excluding the Hospital Campus) in the Kimley Horn TIMA were used in this Report as background traffic. Surrounding offsite developments include the Axon development and the Optima McDowell Mountain development. The background traffic provided from the Kimley Horn TIMA can be found in **Appendix D**. It should be noted that the Axon development may be delayed or it may not be built. At the request of the City, this Report therefore reflects scenarios that include this development and exclude this development.

C. Site Accessibility

Existing Roadway System

Roadway Segments

Hayden Road is currently a divided, four-lane, north-south minor arterial roadway. There are two northbound and two southbound lanes with a 40-mph posted speed limit in each direction and a raised median down the middle. There is curb and gutter on both sides of the road. There is a sidewalk with large gaps and a bike lane on the west side of the road with little sidewalk and no bike lane on the east side of the road. The east side of the road has a 5-foot-wide shoulder that tapers out as it nears the intersection with Loop 101.

Miller Road is not currently built but is anticipated to be a major collector. The future Miller Road alignment is expected to connect as the north leg of the Princess Boulevard & Princess Drive intersection then extend north under Loop 101 providing a grade separation. Miller Road is anticipated to be constructed as a 4-lane roadway with a two-way left-turn lane down the middle and a bike lane in each direction. It is assumed Miller Road will have a posted speed limit of 40 mph.

78th Street is currently a 2-lane divided road with a two-way left-turn lane down the middle classified by the City of Scottsdale as a minor collector. The road is built between Princess Boulevard and Mayo Boulevard. There is curb, gutter, and sidewalk on both sides of the road. There is also a bike lane and a posted speed limit of 30 mph in each direction.

Mayo Boulevard is currently a 2-lane divided road with a two-way left-turn lane down the middle classified by the City of Scottsdale as a major collector. The road is built between Hayden Road & 78th Street. There is currently curb and gutter on the south side of the road and bike lanes on both sides of the road. This road is expected to be extended to the west to connect with the Mayo Boulevard & Scottsdale Road intersection. There is a posted speed limit of 30 mph east of Scottsdale Road.

Intersections

Mayo Boulevard & 78th Street is currently a 2-way free-flowing intersection. This results in a curved roadway with a name transition between the two directions. This intersection is anticipated to be built out with the west leg being an extension of Mayo Boulevard and the south leg being stop-controlled.

Hayden Road & Mayo Boulevard is a 3-leg stop-controlled intersection with the west leg being stop controlled and the north and south legs being free-flow. There is one dedicated left turn lane (300' storage length) and one dedicated right turn lane (170' storage length) on the eastbound approach. There is one dedicated left turn lane (150' storage length) and two through lanes on the northbound approach. There are two through lanes on the southbound approach with a dedicated right turn lane (185' storage length).

Loop 101 Eastbound Ramps & Hayden Road is part of a diamond traffic interchange (TI). The eastbound approach currently provides a dedicated left turn lane, a shared left/right turn lane and a dedicated right turn lane. There are two northbound through lanes and a dedicated northbound right turn lane. There are dual lefts and two through lanes for the southbound approach. The eastbound on ramp provides two lanes that eventually merge to one lane before merging onto the freeway.

Loop 101 Westbound Ramps & Hayden Road is part of a diamond TI. The westbound approach currently provides a dedicated left turn lane, a shared through left turn lane, a shared through/right turn lane and a dedicated right turn lane. The northbound approach provides a single left turn lane and two through lanes. There are four through lanes and a dedicated right turn lane for the southbound approach. The westbound on ramp provides two lanes that eventually merge to one lane before merging onto the freeway.

Future Roadway System

There are a few improvements already planned for this area. It is anticipated that a third southbound through lane will extend south of the Loop 101 to the Mayo Boulevard intersection where the third through lane will transition to a right-turn only lane. Mayo Boulevard is anticipated to be constructed with two travel lanes and a bike lane in each direction and a center two-way left turn lane between 73rd Place and Hayden Road. Miller Road is anticipated to be constructed with two travel lanes and a bike lane in each direction with a two-way left-turn lane.

The eastbound off-ramp at the Hayden Road and Loop 101 TI will be improved with the MOB+ project to add an additional eastbound right turn lane.

There are also multiple proposed developments planned in the surrounding area that are anticipated to make improvements to the surrounding roadway network. The anticipated developments and the associated improvements with each one are listed below.

The eastbound off-ramp at the Hayden Road and Loop 101 TI will be improved with the MOB+ project to add an additional eastbound right turn lane.

General Recommendations made in the Kimley Horn TIMA: The northbound approach at Hayden Road & Mayo Boulevard is to be remarked to provide dual northbound left lanes when this intersection becomes signalized. At Miller Road & Mayo Boulevard, the eastbound approach is to have dual left turn lanes with 400 feet of storage. The Miller Road & Mayo Boulevard intersection is recommended to have dedicated right and turn lanes with 250 feet for all approaches.

Axon Development: At Hayden Road & Mayo Boulevard, there should be a third northbound through lane that is expected to continue north to the Loop 101 WB Ramp & Scottsdale Road intersection. There should also be dual westbound right turn lanes at this intersection. Additionally, this development is anticipated to construct Mayo Boulevard east of Hayden Road with two travel lanes in each direction. It is also anticipated this development will construct a traffic signal at Mayo Boulevard and Hayden Road. If this development is delayed or it is not constructed, the traffic signal will still likely be warranted due to the other developments planned in the area.

Optima McDowell Mountain: A dedicated westbound right turn lane is anticipated to be built at Scottsdale Road & Mayo Boulevard. A third westbound lane along Mayo Boulevard is anticipated to be built along Optima McDowell Mountain's frontage. This will become a dedicated westbound right turn lane at Scottsdale Road & Mayo Boulevard.

It is assumed these roadway improvements are constructed and open for public use by 2040 since the City of Scottsdale Transportation Master Plan, 2016 mentions a few of these improvements are anticipated to be completed by 2030. This includes widening Hayden to a six-lane road in this area and constructing Mayo Boulevard as a four-lane road in this area. For the purposes of this Report, the driveways are assumed to have a speed limit of 25 mph with two-lane roads at the driveway entrances.

Traffic Volumes and Conditions

The anticipated 2040 traffic volumes for this area were obtained and adjusted by Kimley Horn from the 2035 MAG model as described in the Kimley Horn TIMA (see **Appendix E**). These volumes were combined with the trips generated by the surrounding developments and were provided to Dibble. The combined volumes are used as the background traffic in this Report.

Transit Service

There are existing bus services along Mayo Boulevard to the west of this site, along Scottsdale Road, and along Bell Road south of this site. The closest bus stop is located at Scottsdale Road & Mayo Boulevard about 2/3 of a mile away from this site. There are no plans at this time to extend the bus route along Mayo Boulevard according to the City of Scottsdale Transportation Master Plan, 2008.

IV. PROJECTED TRAFFIC

A. Site Traffic

Trip Generation

The trip generation for this project was calculated using the ITE Trip Generation Manual, 11th edition. These values are for the typical peak hour times of the adjacent street (between 7:00 and 9:00 for the morning peak hour and between 4:00 and 6:00 for the afternoon peak hour). The hospital and the medical-dental office building land use codes were used for the trip generation calculations

The trips generated by the Hospital Campus development are shown in **Table 2**. The total trips generated are slightly less than the trips generated in the Kimley Horn TIMA. Kimley Horn used planning level numbers prior to having a developed site plan for the development to calculate the trip generation numbers.

Table 2 –Trip Generation

LUC	Description	Units	Quant	Weekday			AM Peak			PM Peak		
				Total	Ingress	Egress	Total	Ingress	Egress	Total	Ingress	Egress
610	Hospital	Beds	300	6787	3394	3393	537	387	150	507	167	340

Trip Distribution

The trip distribution was assessed based on the surrounding population within a 5-10 mile radius. It is assumed that most people will attempt to exit the same way they had entered with minor changes due to limited access driveways. When reviewing the surrounding street network, the main freeway used to access the study area is the Loop 101 with the closest exit ramps located both east and west of the site at Hayden Road and Scottsdale Road. The main arterials and collectors are Scottsdale Road, Hayden Road, and Mayo Boulevard. To access the site, the traffic will either enter from Miller Road, Mayo Boulevard, or Hayden Road. The trip distribution is summarized in **Figure 4**.

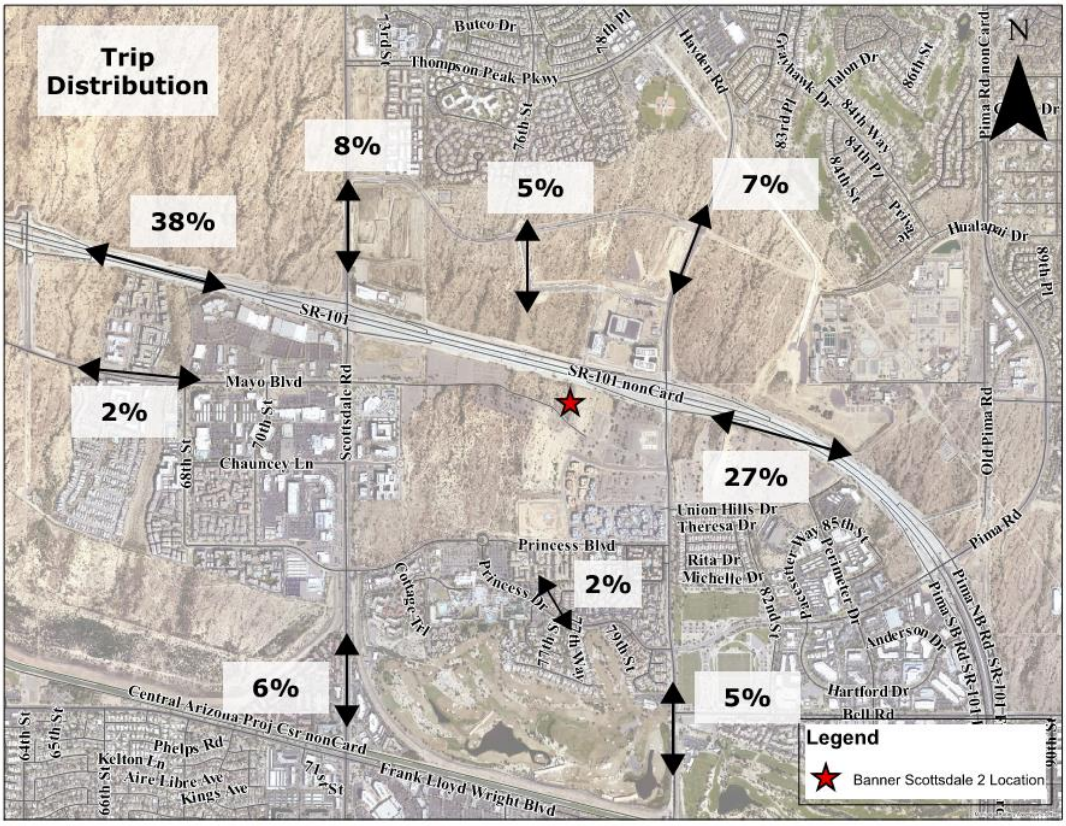


Figure 4 – Trip Distribution

Modal Split

Most traffic will likely travel to and from the site via passenger car since the surrounding area does not have heavy residential areas. If a bus route is added or extended to provide a stop near the hospital, some trips may arrive via public transportation. It is assumed in this report that all trips will be made via passenger vehicle in order to analyze the worst-case scenario.

Trip Assignment

The trip assignment is shown in **Figure 5**. The Hospital Campus trips will likely distribute across all the site access points with a larger portion of the traffic using Driveway B where the parking garage is anticipated as well as 78th Street which leads to the main entrance of the hospital. Driveway C will provide access for emergency vehicles and deliveries primarily. The access point will not provide direct access to any of the parking lots, therefore, it is not anticipated to be heavily used by passenger vehicles.



Figure 5 – Trip Assignment

B. Background Traffic

Method of Projections

One horizon year is projected for the purposes of this Report. The horizon year projects into 2040 when the Hospital Campus are anticipated to be complete and operational. The traffic studies for the surrounding developments from the Kimley Horn TIMA indicate that the surrounding developments are anticipated to be completed by 2040. The anticipated 2040 traffic volumes for this area were obtained and adjusted by Kimley Horn from the 2035 MAG model as described in Kimley Horn TIMA. These volumes were combined with the trips generated by the surrounding developments. These combined volumes are used as the background traffic in this Report. Note that the trips generated by the parcels to the east of this site along Hayden Road were assigned to use two of the driveways studied in this Report as well as a driveway not studied in this Report.

Estimated Volumes

Figure 6 and **Figure 7** show the calculated background traffic volumes used for the Future (2040) analysis with and without the Axon development. Note, the scenario excluding Axon development was an additional scenario requested by City of Scottsdale for evaluation of the impacts of the Hospital Campus with and without the site for signal warrant analysis and offsite improvement needs along Mayo Boulevard. The TI was, therefore, not evaluated for the scenario without Axon. This is when all four phases of the Overall Site are anticipated to be completed.

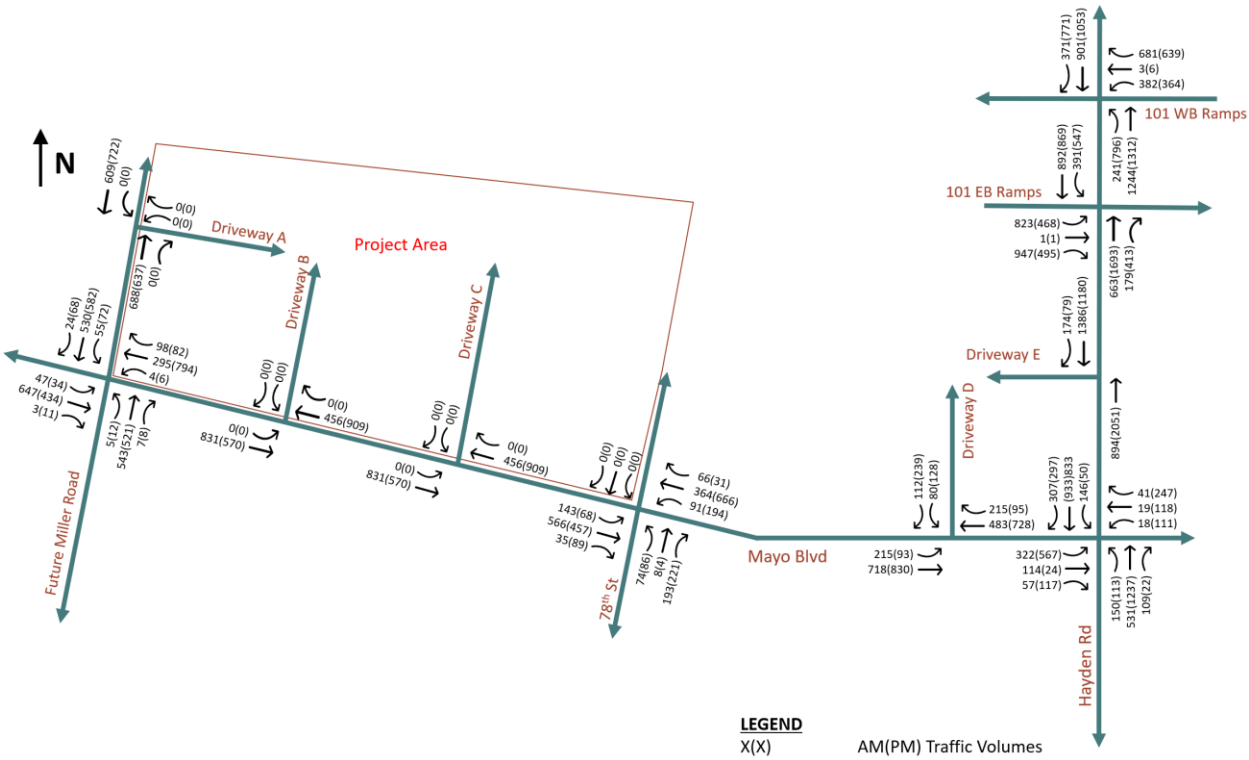


Figure 6 – Future Background Traffic w/Axon (2040)

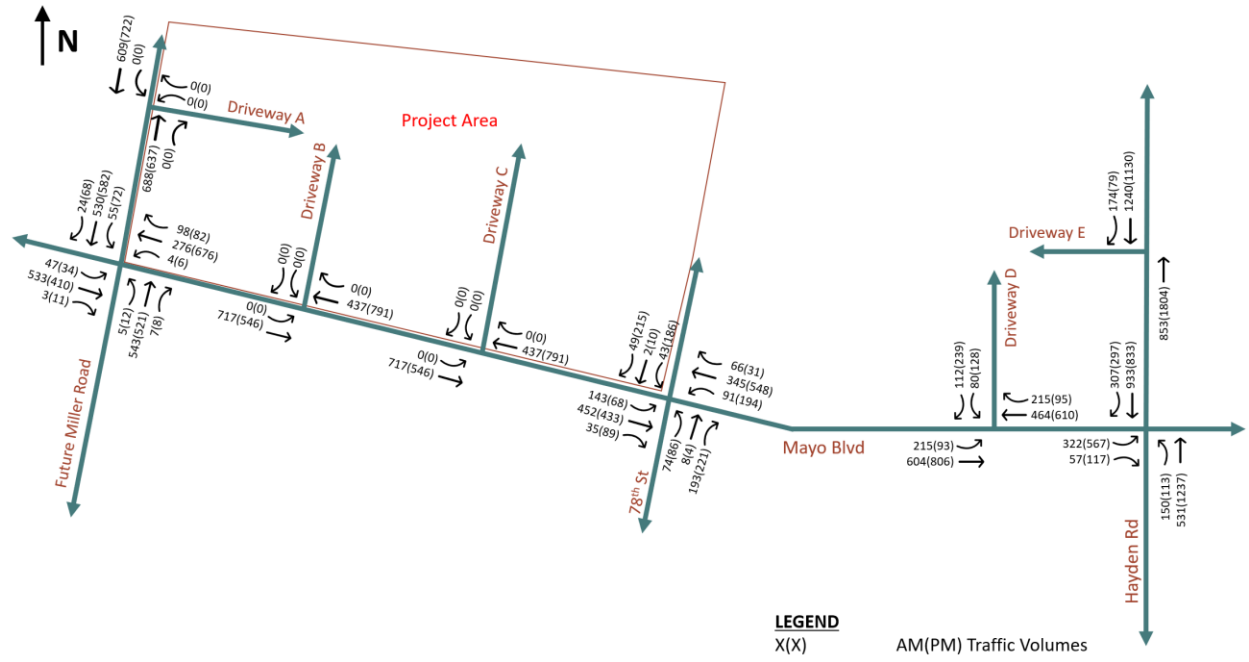


Figure 7 – Future Background Traffic w/o Axon (2040)

C. Total Traffic

The background traffic and anticipated site traffic were combined to calculate the total anticipated traffic for 2040 with and without Axon. **Figure 8** and **Figure 9** show the anticipated total traffic for the 2040 horizon year.

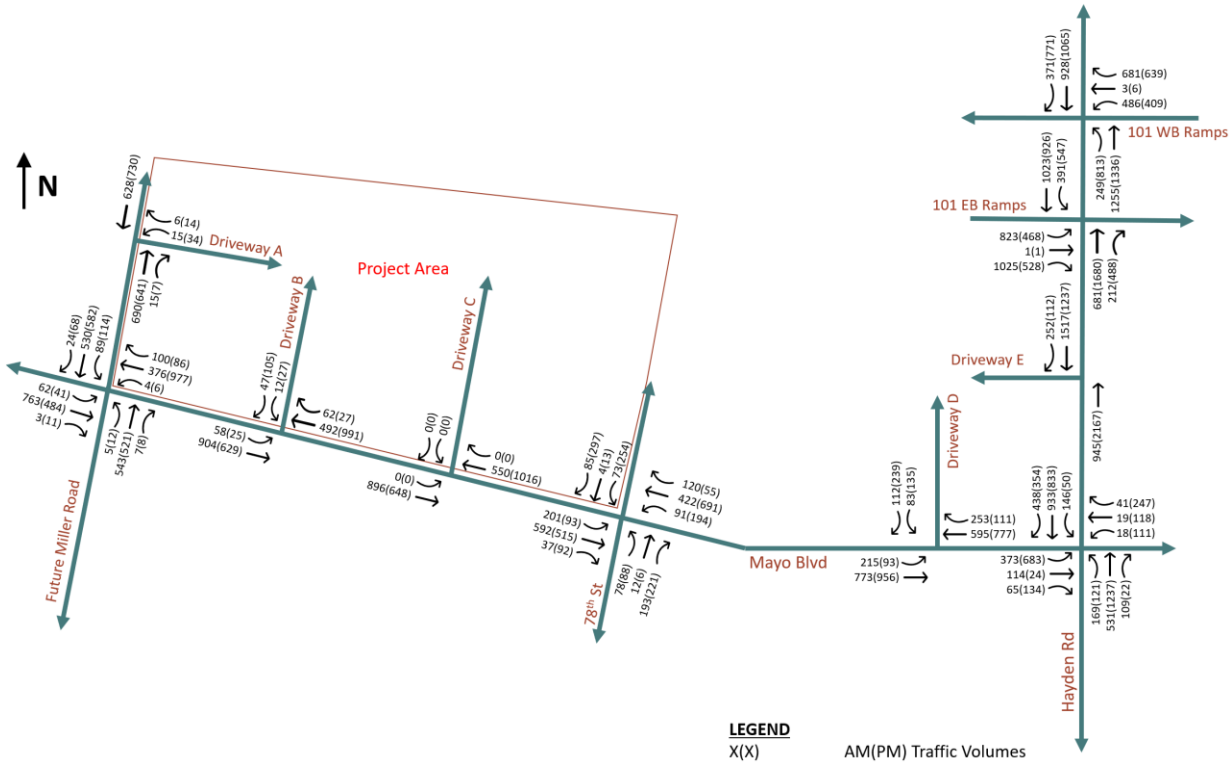


Figure 8 – Future Total Traffic (2040)

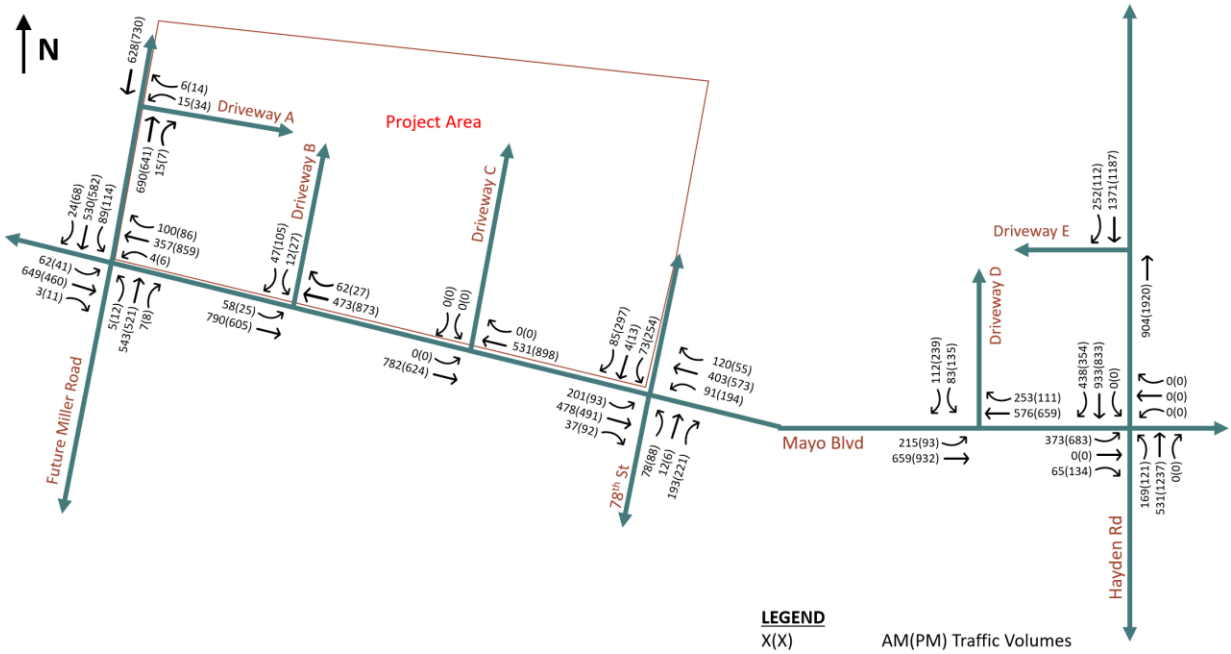


Figure 9 – Future Total Traffic w/o Axon (2040)

V. TRAFFIC ANALYSIS

A. Site Access

The Overall Site is planned to have six access points for the portion of the development bound by Miller Road, Hayden Road, Loop 101, and Mayo Boulevard. One of these is planned to provide full access from Miller Road (Driveway A). Four of these access points are planned to provide direct access from Mayo Boulevard (Driveway B, C, D and 78th Street). The Mayo Boulevard and 78th Street access as well as Driveway B are expected to primarily provide access to patients and staff entering or exiting the site for the Hospital Campus in addition to Driveways A, D, and E. Mayo Boulevard & Driveway D is a proposed full access driveway and will be shared with the future retail, office and hotel uses directly adjacent to Hayden Road. Driveway E will provide the most direct access to the future planned emergency room for hospital patients. The close proximity to the Loop 101 interchange is vital in providing quick access to the planned hospital when needed. This access has been approved for right in access only by both ADOT and City of Scottsdale. **Figure 10** provides a schematic layout of the proposed site driveways.

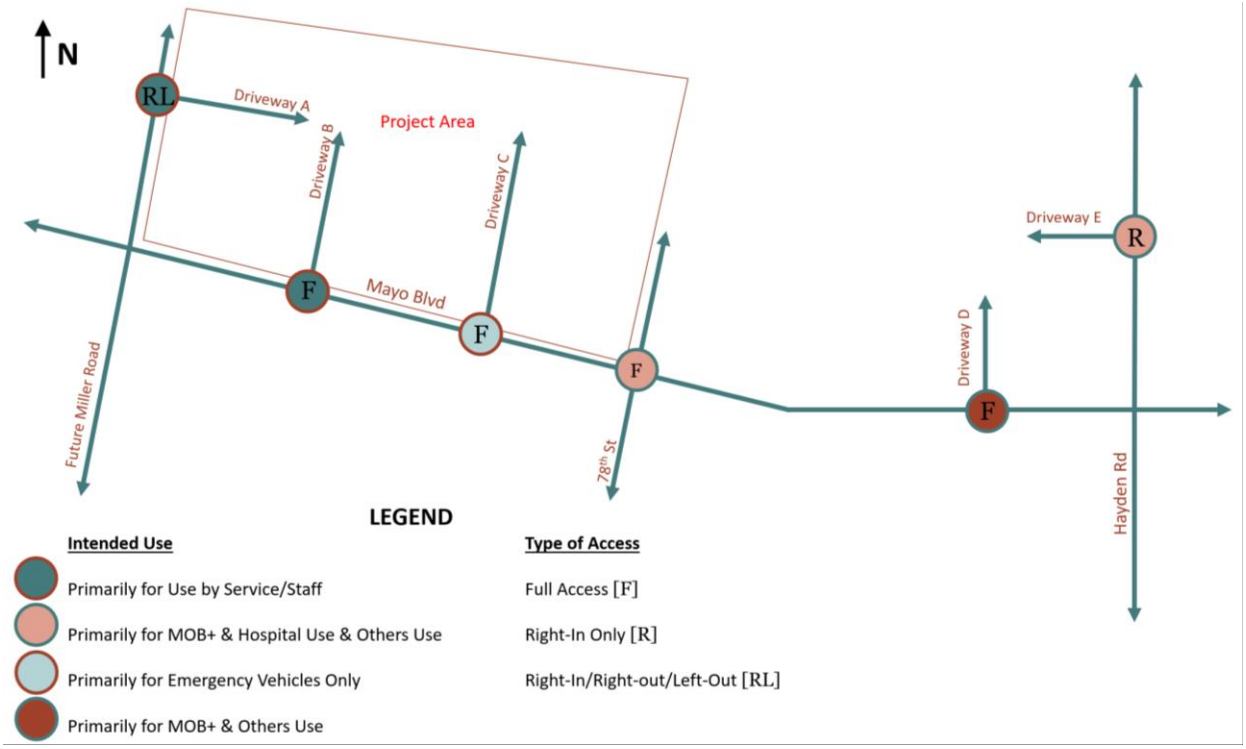


Figure 10 – Site Access

B. Turn Lane Warrants

The following turn lane warrants were completed in accordance with the City of Scottsdale 2018 Design Standards and Policies Manual Chapter 5 Section 3. The manual states that dedicated right turn lanes are required at all street intersections on major arterials while dedicated left turn lanes are required at all street intersections on major collectors and arterials. Note the turn lane warrants were previously evaluated for the "MOB+" development and the results have not changed as the Hospital Campus traffic was accounted for in the background traffic. The westbound right turn lanes at Driveways B, C, and D and at Mayo and 78th Street as well as the southbound right turn lane at Driveway E are notated as planned based on the "MOB+" approved TIMA. Additionally, the Kimley Horn TIMA was approved by the City of Scottsdale with comments and stipulations. One of the comments requires right turn lanes at all driveways along Mayo Boulevard and Miller Road. The results are summarized in **Table 3** for right turn lanes and in **Table 4** for left turn lanes. Turning movements that have an existing dedicated turn lane are not included in these

tables. Dedicated turn lanes planned or warranted in the following tables were assumed to be built in the capacity analysis included in this Report.

Table 3 –Right Turn Lane Warrants

Intersection	Access	Turning Movement	Lane Warranted Due to City Prescriptive Requirements?
Miller Rd & Driveway A	Full	NBR	No
		SBR	No
Mayo Blvd & Driveway B	Full	EBR	No
		WBR	Planned
Mayo Blvd & 78th St	Full	EBR	No
		WBR	Planned
		NBR	No
		SBR	No
Mayo Blvd & Driveway C	Full	EBR	No
		WBR	Planned
Mayo Blvd & Driveway D	Full	EBR	No
		WBR	Planned
Hayden Rd & Driveway E	RI	SBR	Planned
Hayden Rd & Mayo Blvd	Full	WBR	Planned*
		NBR	No
Mayo Blvd & Miller Rd	Full	EBR	Planned
		WBR	Planned
		NBR	Planned
		SBR	Planned

City Prescriptive Requirements includes a right turn lane on all major arterials and a left turn lane on all major collectors or arterials in accordance with the City of Scottsdale Design Standards and Policies Manual, 2018 Chapter 5

RI = Right-In Only

Planned = already planned by other developments, does not yet exist

**Planned to be a dual*

The MOB+ approved TIMA included an additional mitigation as requested by ADOT during review. This included the addition of an eastbound right turn lane at the Loop 101 and Hayden Road traffic interchange (TI). The capacity analysis in this report assumes the eastbound right turn lane for the eastbound off ramp of the TI as this will be constructed with the completion of the MOB+ and prior to the completion of the hospital and parking garage.

Table 4 –Left Turn Lane Warrants

Intersection	Access	Turning Movement	Lane Warranted Due to City Prescriptive Requirements?
Miller Rd & Driveway A	Full	NBL	Yes
		SBL	Planned
Mayo Blvd & Driveway B	Full	EBL	Planned
		WBL	Yes
Mayo Blvd & 78th St	Full	EBL	Planned
		WBL	Planned
		NBL	Yes
		SBL	Yes
Mayo Blvd & Driveway C	Full	EBL	Yes
		WBL	Planned
Mayo Blvd & Driveway D	Full	EBL	Yes
		WBL	Planned
Hayden Rd & Mayo Blvd	Full	EBL	Exists*
		WBL	Yes
		NBL	Exists*
		SBL	Planned*
Mayo Blvd & Miller Rd	Full	EBL	Planned
		WBL	Planned
		NBL	Planned
		SBL	Planned

City Prescriptive Requirements includes a left turn lane on all major arterials and a left turn lane on all major collectors or arterials in accordance with the City of Scottsdale Design Standards and Policies Manual, 2018 Chapter 5

Planned = already planned by other developments, does not yet exist

**Planned to be a dual*

A. Traffic Signals

The intersection of Hayden Road & Mayo Boulevard is already planned to be signalized with the addition of the MOB+ or Axon (whichever is built first). It is also already anticipated that Mayo Boulevard & Miller Road will be a roundabout or signalized intersection for future developments. Based on City of Scottsdale comments for the approved Master Plan TIMA, a roundabout is to be built at the intersection once the right-of-way is available unless it is ruled out, in which case, a traffic signal would be considered. If the signal or roundabout are not constructed prior to the hospital and parking garage project due to other surrounding developments, the signal or roundabout is anticipated to be needed with the completion of the hospital.

All other intersections studied in this Report are anticipated to operate acceptably given the conditions and mitigations mentioned in this report. As previously mentioned, the Axon development may be delayed or the project may not be built. The Axon development is currently responsible for the signal at Mayo Boulevard and Hayden Road, however if the MOB+ and/or the remainder of the Overall Site is built before Axon, the signal is warranted with the completion of the MOB+ as determined in the MOB+ approved TIMA. Therefore, a signal will be built at the intersection prior to the completion of the hospital. The

capacity analysis for this report was therefore conducted assuming the traffic signal will already be built either with the Axon development or the MOB+ prior to the completion of the hospital.

The MOB+ TIMA found that the signal at 78th Street and Mayo Boulevard as well as Miller Road and Mayo Boulevard were not warranted with the completion of the MOB+ only. A signal warrant analysis for the peak hour was therefore conducted based on the Manual on Uniform Traffic Control Devices (MUTCD) with the addition of the hospital for both the opening year of the hospital 2030 and the projected 2040 horizon year. The warrant was evaluated without the Axon development traffic. The results are summarized in **Table 5**. The warrant analysis is also included in **Appendix F**.

Table 5 – MUTCD Signal Warrant Results

Intersection	Total Traffic 2030 w/o Axon	Total Traffic 2040 w/o Axon
Mayo Blvd & Miller Rd	No (Both Peaks)	Yes (Both Peaks)
Mayo Blvd & 78th St	No (Both Peaks)	Yes (Both Peaks)

Per City of Scottsdale's direction during a comment resolution meeting for the MOB+ approved TIMA on May 22, 2024, the intersection at Mayo Boulevard and Miller Road will operate as an all-way stop control intersection until the right-of-way is obtained to construct a roundabout at the intersection. If a roundabout is ruled out, a signal should be installed in its place.

B. Capacity and Level of Service

The capacity analysis was conducted using Synchro 11 software. **Table 6** through **Table 9** summarize the level of service (LOS) results for the analyzed turning movements for the 2040 horizon year both without site traffic (background traffic) and with site traffic (total traffic), respectively. Note that a level of service "E" or "F" is typically considered a "failing" level of service during peak traffic times and will sometimes require some sort of mitigation to bring the level of service back to a "D" or better, if possible. However, sometimes it is not feasible nor warranted to mitigate due to a number of considerations including the current traffic demand. Additionally, sometimes it is simply not feasible to invest in a lot of additional capacity improvements to support one or both peak hour traffic times at one or two locations. Especially, when it is put into the context of all the other capacity or capacity utilization improvements that will be provided for this proposed development.

As stated in the previous section, the intersection of Mayo Boulevard and Miller Road is to operate as an stop controlled intersection until such time that the right-of-way is obtained to construct a roundabout at the intersection or a traffic signal if the roundabout is ruled out. **Table 8,** and **Table 9** assume the intersection will still be stop controlled to show how that scenario is anticipated to operate by 2040. A roundabout should be constructed by 2040, however, or a signal should be installed if the roundabout is ruled out. **Table 10** summarizes the LOS and Delay results for both a roundabout and a signal for 2040 (with Axon development worst case scenario).

The southbound left turning movement at Driveway D experiences what would be considered an undesirable level of service for the 2040 horizon year both with and without the Axon development. It is important to note that this delay is experienced on site and the vehicle queues do not exceed more than 2-3 vehicles (roughly 40-60 feet) depending on the peak hour.

Additionally, some of the turning movements at the 101 and Hayden Road interchange are experiencing undesirable LOS for the opening day Background traffic scenario in 2040. The completion of the Hospital

Campus adds more delay to the turning movements that are already experiencing undesirable LOS. These turning movements include the eastbound left movements during the morning and afternoon peak hour as well as the northbound left during both peak hours and the southbound left during the afternoon peak hour.

Table 6 –Opening Day Background w/Axon (2040) LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Mayo Blvd & 78th St	AM	6.6	A	8.3	A	6.5	A	6.5	A	8.1	A	5.7	A	2.1	A	12.4	B	5.0	A	5.0	A	11.8	-	5.2	A	5.2	A
	PM	12.3	B	13.0	B	10.1	B	10.1	B	20.3	C	11.2	B	4.1	A	19.2	B	4.6	A	4.6	A	25.4	-	8.8	A	8.8	A
Mayo Blvd & Driveway D	AM	-	-	10.9	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	31.3	D	-	-	10.9	B
	PM	-	-	10.5	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	41.0	E	-	-	15.4	C
Hayden Rd & Mayo Blvd	AM	23.1	C	46.5	D	28.3	C	7.9	A	51.7	D	46.0	D	1.1	A	48.4	D	14.0	B	14.0	B	49.8	D	19.8	B	3.0	A
	PM	30.4	C	39.4	D	14.1	B	3.2	A	51.3	D	37.0	D	7.0	A	44.7	D	30.7	C	30.7	C	45.2	D	36.7	D	7.3	A
Mayo Blvd & Miller Rd	AM	121.8	F	17.5	C	262.2	F	42.7	E	16.3	C	42.5	E	39.5	E	15.7	C	177.9	F	35.6	E	18.4	C	158.3	F	37.5	E
	PM	210.5	F	20.4	C	131.6	F	37.1	E	16.4	C	468.0	F	176.9	F	18.0	C	207.2	F	43.2	E	22.1	C	246.8	F	81.4	F
Hayden Rd & 101 WB Ramps	AM	40.2	D	-	-	-	-	-	-	65.2	E	12.6	B	12.1	B	65.2	E	52.2	D	-	-	-	-	41.2	D	7.0	A
	PM	94.1	F	-	-	-	-	-	-	54.8	D	11.4	B	10.6	B	400.1	F	11.5	B	-	-	-	-	50.7	D	66.1	E
Hayden Rd & 101 EB Ramps	AM	43.7	D	109.1	F	8.9	A	8.8	A	-	-	-	-	-	-	-	-	39.6	D	6.7	A	48.1	D	29.0	C	-	-
	PM	56.4	E	121.5	F	12.7	B	12.6	B	-	-	-	-	-	-	-	-	43.8	D	8.7	A	145.2	F	36.9	D	-	-

Table 7 –Opening Day Background w/o Axon (2040) LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Mayo Blvd & 78th St	AM	6.5	A	8.8	A	6.3	A	6.3	A	7.8	A	5.9	A	2.2	A	11.6	B	4.7	A	4.7	A	11.0	-	4.9	-	4.9	-
	PM	11.5	B	12.3	B	10.2	B	10.2	B	20.5	C	10.9	B	4.3	A	17.6	B	4.3	A	4.3	A	23.0	-	4.7	-	4.7	-
Mayo Blvd & Driveway D	AM	-	-	10.7	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	28.6	D	-	-	10.7	B
	PM	-	-	9.8	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	32.5	D	-	-	13.9	B
Hayden Rd & Mayo Blvd	AM	14.5	B	39.1	D	-	-	0.8	A	-	-	-	-	-	-	40.0	D	3.8	A	-	-	-	-	12.9	B	2.2	A
	PM	15.3	B	34.8	C	-	-	4.8	A	-	-	-	-	-	-	38.9	D	7.8	A	-	-	-	-	16.1	B	2.8	A
Mayo Blvd & Miller Rd	AM	93.3	F	17.2	C	150.9	F	30.8	D	15.7	C	36.0	E	35.2	E	15.1	C	164.2	F	32.9	D	17.6	C	145.3	F	34.5	D
	PM	171	F	19.8	C	111.6	F	33.9	D	16.3	C	343.3	F	125.6	F	17.4	C	205.9	F	41.8	E	21.3	C	241.2	F	77.9	F

Table 8 – Future (2040) Total Traffic LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Miller & Driveway A	AM	-	-	-	-	-	-	-	-	16.7	C	-	-	10.9	B	-	-	0.0	A	0.0	A	0.0	A	0.0	A	-	-
	PM	-	-	-	-	-	-	-	-	17.2	C	-	-	10.7	B	-	-	0.0	A	0.0	A	0.0	A	0.0	A	-	-
Mayo Blvd & Driveway B	AM	-	-	8.9	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	17.0	C	-	-	10.3	B
	PM	-	-	11.0	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	24.2	C	-	-	14.6	B
Mayo Blvd & Driveway C	AM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Mayo Blvd & 78th St	AM	7.3	A	10.9	B	6.6	A	6.6	A	8.1	A	5.9	A	1.9	A	15.7	B	5.8	A	5.8	A	16.2	B	5.8	A	5.8	A
	PM	16.9	B	20.7	C	14.1	B	14.1	B	32.6	C	15.2	B	4.3	A	21.7	C	4.3	A	4.3	A	31.9	C	13.1	B	13.1	B
Mayo Blvd & Driveway D	AM	-	-	12.2	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	39.7	E	-	-	11.5	B
	PM	-	-	10.9	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	53.7	F	-	-	16.2	C
Mayo Blvd & Driveway E	AM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Hayden Rd & Mayo Blvd	AM	23.6	C	47.1	D	27.8	C	7.4	A	52.9	D	46.9	D	1.1	A	49.8	D	14.8	B	14.8	B	51.0	D	21.2	C	3.4	A
	PM	33.2	C	39.8	D	13.3	B	13.3	B	55.2	E	39.7	D	7.3	A	47.9	D	34.6	C	34.6	C	48.3	D	42.5	D	8.2	A
Mayo Blvd & Miller Rd	AM	172.6	F	19.8	C	420.5	F	74.3	F	17.0	C	80.6	F	57.5	F	16.8	C	214.8	F	42.1	E	23.6	C	192.8	F	45.2	E
	PM	291	F	21.2	C	182.3	F	43.1	E	16.6	C	690.6	F	287.9	F	18.5	C	217.8	F	45.6	E	29.9	D	258.4	F	89.2	F
Hayden Rd & 101 WB Ramps	AM	45.5	D	-	-	-	-	-	-	96.8	F	12.3	B	11.9	B	72.4	E	53.2	D	-	-	-	-	41.1	D	6.9	A
	PM	97.6	F	-	-	-	-	-	-	55.3	E	10.8	B	10.1	B	417.6	F	12.0	B	-	-	-	-	52.1	D	66.6	E
Hayden Rd & 101 EB Ramps	AM	47.5	D	127.6	F	9.5	A	9.4	A	-	-	-	-	-	-	-	-	39.9	D	6.6	A	47.1	D	34.7	C	-	-
	PM	60.1	E	144.5	F	13.6	B	13.5	B	-	-	-	-	-	-	-	-	48.0	D	10.1	B	145.8	F	41.7	D	-	-

Table 9 – Future (2040) Total Traffic w/o Axon LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Miller & Driveway A	AM	-	-	-	-	-	-	-	-	16.7	C	-	-	10.9	B	-	-	0.0	A	0.0	A	0.0	A	0.0	A	-	-
	PM	-	-	-	-	-	-	-	-	17.2	C	-	-	10.7	B	-	-	0.0	A	0.0	A	0.0	A	0.0	A	-	-
Mayo Blvd & Driveway B	AM	-	-	8.9	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	16.1	C	-	-	10.2	B
	PM	-	-	10.3	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	21.2	C	-	-	13.5	B
Mayo Blvd & Driveway C	AM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Mayo Blvd & 78th St	AM	7.2	A	11.2	B	6.3	A	6.3	A	7.7	A	6.0	A	1.9	A	14.6	B	5.4	A	5.4	A	15.0	B	5.4	A	5.4	A
	PM	15.7	B	17.7	B	13.6	B	13.6	B	30.6	C	14.1	B	4.2	A	21.2	C	4.3	A	4.3	A	30.8	C	9.2	A	9.2	A
Mayo Blvd & Driveway D	AM	-	-	12.0	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	35.9	E	-	-	11.4	B
	PM	-	-	10.2	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	41.1	E	-	-	14.5	B
Mayo Blvd & Driveway E	AM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Hayden Rd & Mayo Blvd	AM	15.3	B	39.9	D	-	-	0.8	A	-	-	-	-	-	-	41.3	D	4.2	A	4.2	A	-	-	14.1	B	2.6	A
	PM	17.4	B	35.1	D	-	-	5.5	A	-	-	-	-	-	-	42.0	D	9.6	A	9.6	A	-	-	18.7	B	3.2	A
Mayo Blvd & Miller Rd	AM	134.8	F	19.4	C	293.2	F	48.7	E	16.5	C	66.9	F	51.2	F	16.3	C	202.2	F	39.4	E	22.4	C	178.4	F	41.6	E
	PM	240.4	F	20.7	C	157.8	F	39.5	E	16.5	C	556.5	F	224.7	F	18.1	C	215.3	F	44.5	E	28.5	D	253.9	F	85.7	F

Table 10 – Future (2040) Total Traffic Miller & Mayo Roundabout & Signal w/Axon LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Roundabout																											
Mayo Blvd & Miller Rd	AM	14.8	C	17.9	C	20.0	C	20.0	C	10.3	B	10.6	B	10.6	B	17.7	C	18.5	C	18.5	C	9.6	A	10.2	B	10.2	B
	PM	25.6	D	12.6	B	13.1	B	13.1	B	26.3	D	33.2	D	33.2	D	11.7	B	12.1	B	12.1	B	35.6	E	40.8	E	40.8	E
Signal																											
Mayo Blvd & Miller Rd	AM	11.9	B	9.9	A	11.2	B	11.2	B	8.8	A	8.3	A	8.3	A	11.4	B	13.5	B	13.5	B	17.8	B	13.4	B	13.4	B
	PM	12.8	B	14.1	B	11.2	B	11.2	B	10.3	B	13.2	B	13.2	B	11.5	B	12.4	B	12.4	B	17.5	B	13.2	B	13.2	B

C. Site Circulation and Parking

The traffic accessing the Overall Site will generally be split between all driveways except for Driveway C and E, depending on where the traffic is traveling to across the Overall Site. Driveway C will be used for emergency vehicles and deliveries mainly and does not provide any direct access to parking on site. Driveway E is intended for ingress only and provides a direct route to the emergency room for those traveling southbound on Hayden Road from the north or the 101. The remaining driveways provide direct access to the parking around site depending on staff, patient and visitor destinations on site. 78th Street and Mayo Boulevard will provide access to the main entrance of the hospital. Driveways A and B will provide the closest access to the planned parking garage on the northeast corner of Mayo Boulevard and Miller Road. See **Appendix G** for the Development Circulation Plan.

VI. IMPROVEMENT ANALYSIS

A. Mitigation Analysis

The development team for the Overall Site met with ADOT to discuss mitigation options for the 101 and Hayden Road TI as a part of the Overall Site traffic study coordination. The eastbound off ramps and the northbound left turns at the TI were experiencing the most delays for both the morning and afternoon peak hours by 2040 when the area is more built out. ADOT recognizes that the Overall Site is not the only contributor of the delays at the intersection as there are many developments planned for the area, therefore, widening the bridge at the TI will not be required of the Overall Site development. To help mitigate delays and queues for the eastbound off ramp turning movements as well as provide an opportunity to reallocate signal timing for other turning movements by increasing the eastbound capacity, the development team and ADOT discussed the option of providing an additional eastbound turn lane for the off ramp. The new configuration will match the westbound ramps with dual left turn lanes, a shared through/right turn lane and a dedicated right turn lane. The resulting level of service and delay benefits with the addition of the lane are summarized in the MOB+ TIMA. The Hospital Campus were included in the background traffic for the MOB+ traffic study with slightly higher traffic calculations due to the use of planning level numbers. The comparison of the 2040 background traffic capacity analysis to the total traffic capacity analysis results with the Axon development show that the westbound left sees an 11 seconds increase in delay with the Hospital Campus traffic added to the background traffic. Since the ramp is already built out with four lanes, it is recommended to evaluate the signal timing as the developments are built in this area to balance to balance the signal timing with the approach demands at the interchange.

VII. FINDINGS

A. Site Accessibility

The proposed site accesses are anticipated to operate acceptably with the given conditions and the construction of the turn lanes and traffic signals, and roundabout mentioned in the Report.

B. Traffic Impacts

The addition of this Hospital Campus is anticipated to have a minimal impact along Mayo Boulevard and Hayden Road.

C. Need for Improvements

Mayo Boulevard & 78th Street

This intersection no longer operates with an acceptable level of service as a two-way stop-controlled intersection with Mayo Boulevard traffic free flowing by 2040. A traffic signal becomes warranted with the addition of the Hospital Campus. This intersection should maintain two egress southbound lanes for a dedicated left turn lane and a dedicated right turn lane to minimize the vehicle queue. A westbound right turn lane should be provided at this driveway.

Mayo Boulevard & Miller Road

This intersection operates with an undesirable level of service with and without the addition of the Hospital Campus traffic by 2040. The Hospital Campus traffic do make the delays worse. A roundabout if right-of-way is available, or a warranted traffic signal should be installed before the completion of the Hospital Campus as well as the surrounding developments. As previously stated, the roundabout should be installed unless it is ruled out.

Miller Road & Driveway A

This driveway operates with an acceptable level of service as a right-in/right-out and left-in only driveway. A preliminary assessment was conducted as a part of the MOB+ TIMA for sight visibility for a left-out at the driveway. Based on the preliminary design plans for Miller Road under Loop 101, there will be adequate visibility for a driver to turn left from Driveway A onto Miller Road. A southbound left from Miller Road to Driveway A, is not likely to be feasible with the available width for the roadway passing under Loop 101.

In general, it is recommended to provide a dedicated right-turn lane for driveways along Mayo Boulevard and Miller Road. The City of Scottsdale also approved the NWC Hayden Road and Mayo Boulevard TIMA with a comment requiring all site driveways along Mayo Boulevard and Miller Road. Therefore, as stated in the MOB+ TIMA, a westbound right turn lane should still be provided at this driveway.

Mayo Boulevard & Driveway B

This driveway operates with an acceptable level of service as a right-in/right-out only driveway. In general, it is recommended to provide a dedicated right-turn lane for driveways along Mayo Boulevard and Miller Road. The City of Scottsdale also approved the NWC Hayden Road and Mayo Boulevard TIMA with a comment requiring right turn lanes at all site driveways along Mayo Boulevard and Miller Road. Therefore, a westbound right turn lane should be provided at this driveway.

Mayo Boulevard & Driveway D

This driveway should also maintain two egress southbound lanes for a dedicated left turn lane and a dedicated right turn lane to minimize the vehicle queues. The City of Scottsdale also approved the NWC Hayden Road and Mayo Boulevard TIMA with a comment requiring right turn lanes for all site driveways along Mayo Boulevard and Miller Road. Therefore, a westbound right turn lane should be provided at this driveway.

Hayden Road & Driveway E

As determined in the MOB+ TIMA, this driveway shall include a southbound right turn lane to account for any potential queue for the southbound right turn lane and to avoid conflicts with the Loop 101 egress ramp traffic.

D. Compliance with Applicable City Codes

The City of Scottsdale Design Standards and Policies Manual, 2018 was referenced throughout this analysis as mentioned throughout this Report.

VIII. RECOMMENDATIONS

A. Roadway Improvements

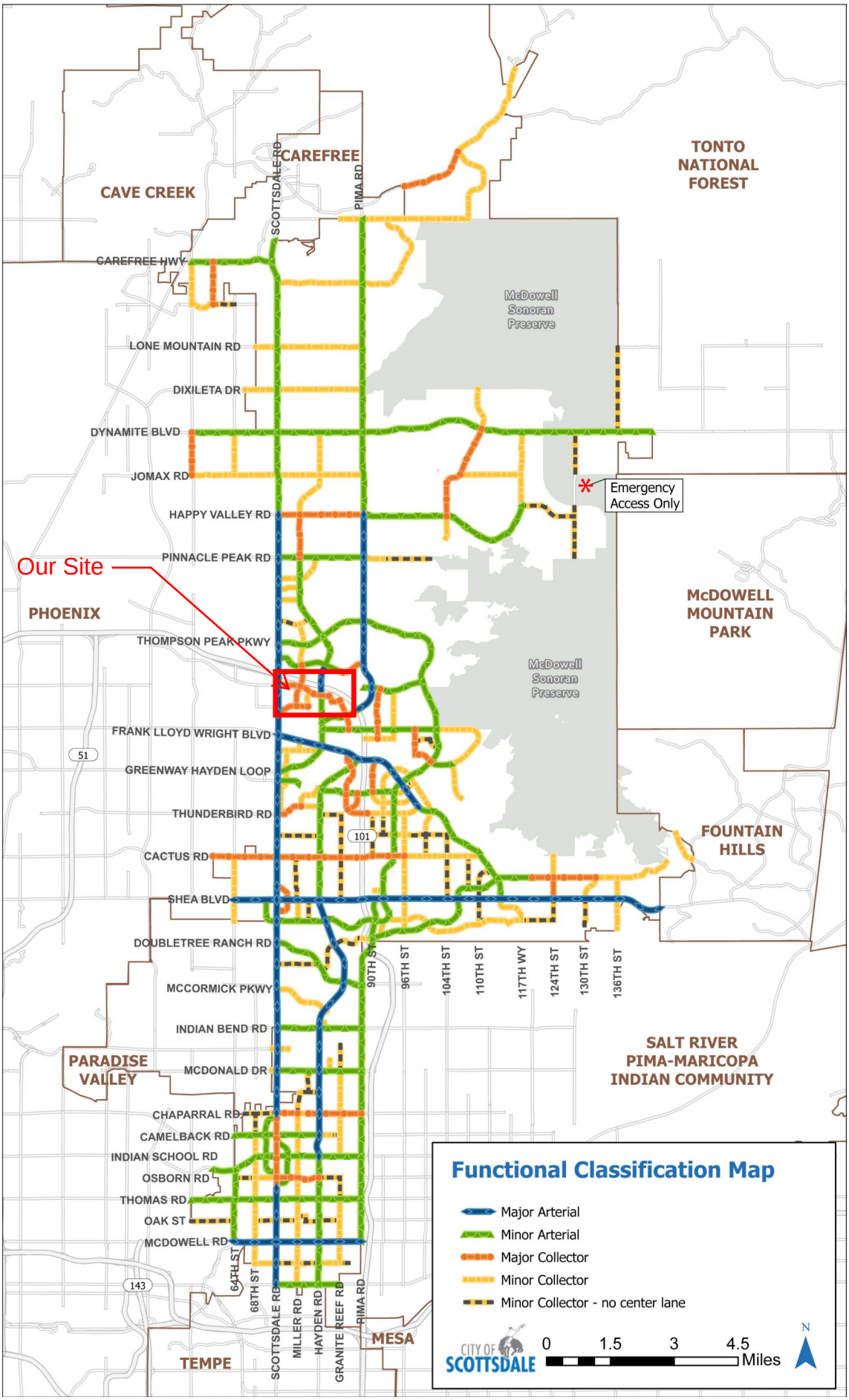
Based on the analysis of this Report there are no new recommendations for the Overall Site driveways. Although the traffic signal is not warranted by 2030, it will be needed by 2040 as other developments and the Overall Site are built in the area. It would therefore be beneficial to install a signal at 78th Street and Mayo Boulevard access point alongside this project.

Recommendations for 78th Street and Mayo Boulevard as well as the adjacent intersections are as follows:

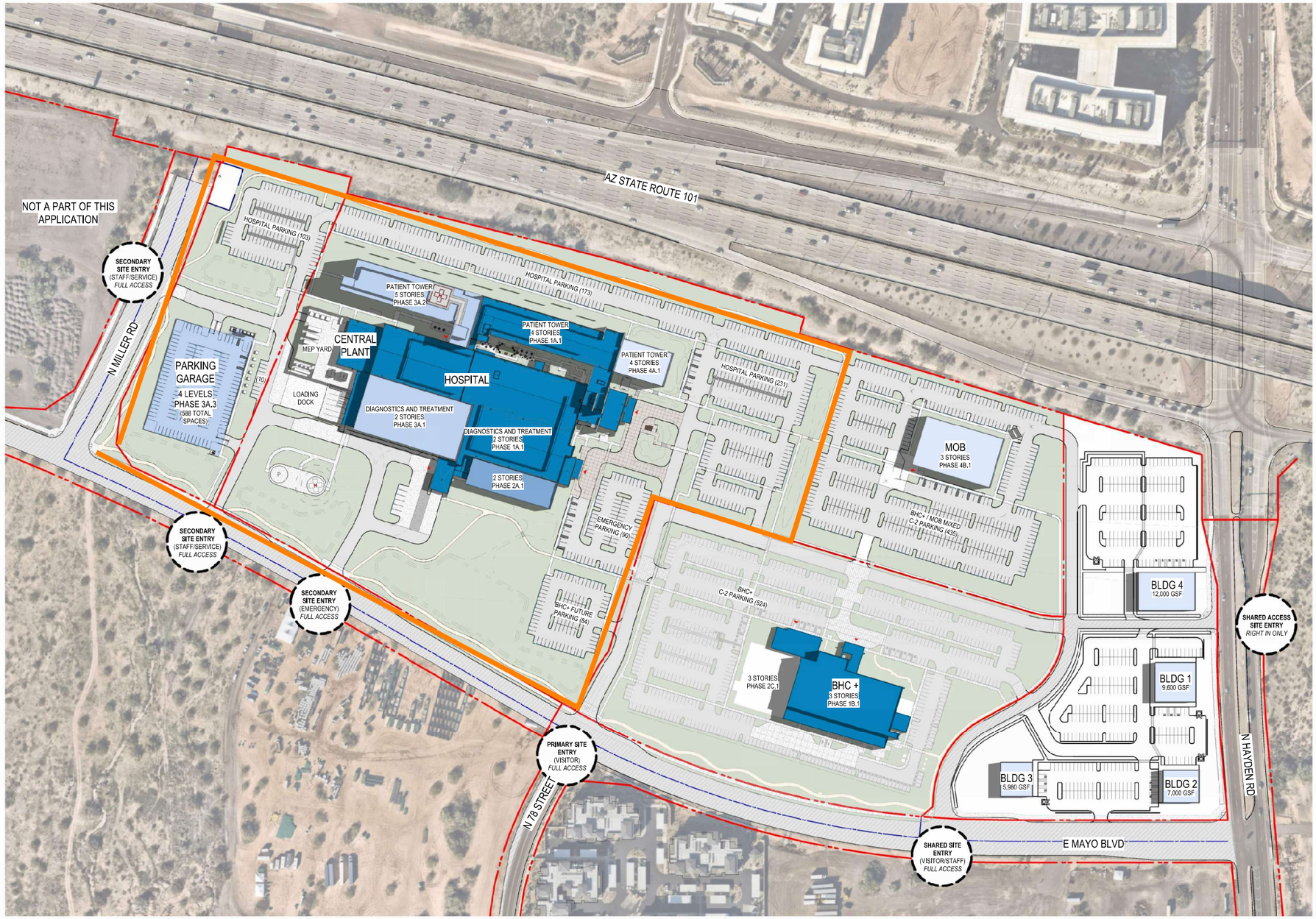
Mayo Boulevard & 78th Street
A signal is not warranted with the completion of the Hospital Campus only, however, a signal is warranted by 2040 with the completion of the Hospital Campus, the Overall Site and surrounding developments. It would be beneficial to install the signal alongside the completion of the Hospital Campus as it will be warranted by the horizon year of 2040 when the surrounding developments and the Overall Site are anticipated to be complete.

Mayo Boulevard & Miller Road
A signal is warranted by 2040 with all the developments, including the Hospital Campus at this intersection from both a vehicle capacity and delay perspective. A roundabout is planned for this intersection with future development as the right-of-way becomes available. If a round-about is ruled out, a signal is warranted. The right-of-way for the intersection should be evaluated to determine if a roundabout can be installed, if not, a traffic signal should be considered.

Appendix A Scottsdale Roadway Functional Classification Map


CAREFREE
CAVE CREEK
TONTO NATIONAL FOREST
SCOTTSDALE RD
PIMA RD
CAREFREE HWY
McDowell Sonoran Preserve
LONE MOUNTAIN RD
DIXILETA DR
DYNAMITE BLVD
JOMAX RD
Emergency Access Only
HAPPY VALLEY RD
PINNACLE PEAK RD
Our Site
PHOENIX
McDOWELL MOUNTAIN PARK
THOMPSON PEAK PKWY
McDowell Sonoran Preserve
FRANK LLOYD WRIGHT BLVD
51
GREENWAY HAYDEN LOOP
THUNDERBIRD RD
101
FOUNTAIN HILLS
CACTUS RD
SHEA BLVD
DOUBLETREE RANCH RD
90TH ST
96TH ST
104TH ST
110TH ST
117TH WY
124TH ST
130TH ST
136TH ST
MCCORMICK PKWY
INDIAN BEND RD
SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY
PARADISE VALLEY
MCDONALD DR
CHAPARRAL RD
CAMELBACK RD
INDIAN SCHOOL RD
OSBORN RD
THOMAS RD
OAK ST
MCDOWELL RD
64TH ST
68TH ST
143
SCOTTSDALE RD
MILLER RD
HAYDEN RD
GRANITE REEF RD
PIMA RD
MESA
TEMPE
Functional Classification Map
Major Arterial
Minor Arterial
Major Collector
Minor Collector
Minor Collector - no center lane
CITY OF SCOTTSDALE
0
1.5
3
4.5
Miles
N

Appendix B Site Plan



OVERALL DEVELOPMENT SITE PLAN
SCALE: 1" = 120'-0"

NORTH

0 120' 240' 360'
GRAPHIC SCALE: 1" = 120' - 0"

Plot Date: 8/26/2024 10:30:07 AM Author

SITE DATA

PARKING DATA

Banner Scottsdale Medical Center

SCOTTSDALE CAMPUS HOSPITAL
NW Corner of Hayden Rd. and Mayo Blvd.
Scottsdale, Arizona 85255

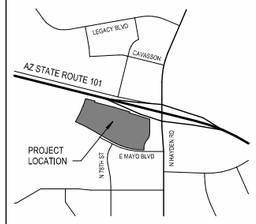
SMITHGROUP
455 NORTH THIRD STREET
SUITE 250
PHOENIX, AZ 85004
602.265.2200
smithgroup.com

ISSUED FOR	REV	DATE
ENTITLEMENT REVIEW		09MAY23

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

VICINITY MAP



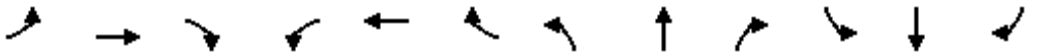
SHEET TITLE
OVERALL DEVELOPMENT SITE PLAN

PROJECT NUMBER
CUP_A1.1.1

SHEET NUMBER

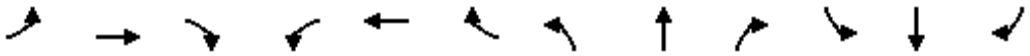
Appendix C Synchro Reports

Background Traffic w/Axon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	382	3	681	241	1244	0	0	901	371
Future Volume (vph)	0	0	0	382	3	681	241	1244	0	0	901	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	240		0	0		190
Storage Lanes	0		0	2		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.91	1.00	1.00	0.86	1.00
Frt					0.851	0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1506	1504	1770	5085	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1506	1504	1770	5085	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					370	370						403
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			661			409			989	
Travel Time (s)		10.6			10.0			7.0			16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	415	3	740	262	1352	0	0	979	403
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	415	373	370	262	1352	0	0	979	403
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					3		1	6			2	
Permitted Phases				3		3						2

Lane Group	Ø5	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	7
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3	3	3	1	6			2	2
Switch Phase												
Minimum Initial (s)				7.0	7.0	7.0	12.0	5.0			16.0	16.0
Minimum Split (s)				47.0	47.0	47.0	18.0	46.0			46.0	46.0
Total Split (s)				25.0	25.0	25.0	24.0	37.0			37.0	37.0
Total Split (%)				20.8%	20.8%	20.8%	20.0%	30.8%			30.8%	30.8%
Maximum Green (s)				18.0	18.0	18.0	18.0	31.0			31.0	31.0
Yellow Time (s)				4.3	4.3	4.3	4.4	4.4			4.4	4.4
All-Red Time (s)				2.7	2.7	2.7	1.6	1.6			1.6	1.6
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				7.0	7.0	7.0	6.0	6.0			6.0	6.0
Lead/Lag				Lead	Lead	Lead	Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	5.0	5.0			2.0	2.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Walk Time (s)				7.0	7.0	7.0		5.0			5.0	5.0
Flash Dont Walk (s)				33.0	33.0	33.0		35.0			35.0	35.0
Pedestrian Calls (#/hr)				0	0	0		0			0	0
Act Effct Green (s)				17.4	17.4	17.4	18.0	31.0			30.4	30.4
Actuated g/C Ratio				0.14	0.14	0.14	0.15	0.26			0.25	0.25
v/c Ratio				0.84	0.70	0.69	0.99	1.03			0.60	0.57
Control Delay				65.2	12.6	12.1	65.2	48.4			41.2	7.0
Queue Delay				0.0	0.0	0.0	0.0	3.9			0.0	0.0
Total Delay				65.2	12.6	12.1	65.2	52.2			41.2	7.0
LOS				E	B	B	E	D			D	A
Approach Delay					31.3			54.3			31.2	
Approach LOS					C			D			C	
Queue Length 50th (ft)				162	2	0	139	~418			193	0
Queue Length 95th (ft)				#234	103	100	m#245	m#417			231	81
Internal Link Dist (ft)		619			581			329			909	
Turn Bay Length (ft)							240					190
Base Capacity (vph)				514	540	540	265	1313			1655	707
Starvation Cap Reductn				0	0	0	0	14			0	0
Spillback Cap Reductn				0	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.81	0.69	0.69	0.99	1.04			0.59	0.57

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 98 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 160			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 40.2		Intersection LOS: D	
Intersection Capacity Utilization 67.2%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø5	Ø7
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	24.0	34.0
Total Split (%)	20%	28%
Maximum Green (s)	18.0	27.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

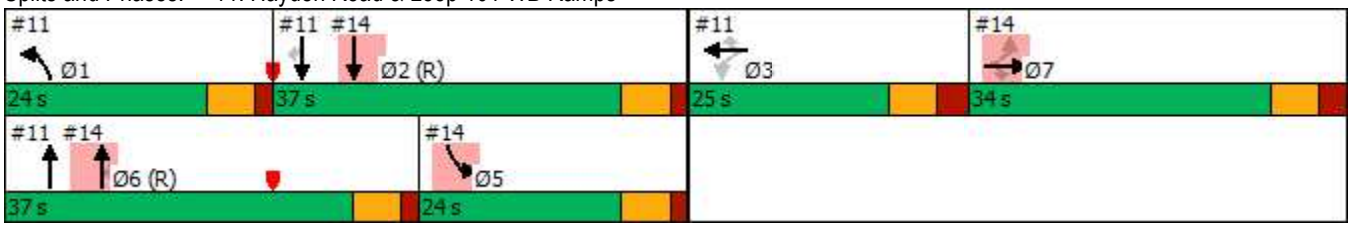
Queue shown is maximum after two cycles.

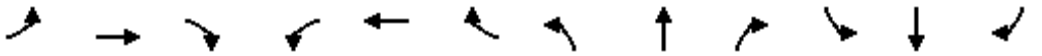
\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

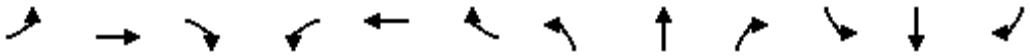
Splits and Phases: 11: Hayden Road & Loop 101 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	823	1	947	0	0	0	0	663	179	391	892	0
Future Volume (vph)	823	1	947	0	0	0	0	663	179	391	892	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		215	245		0
Storage Lanes	2		1	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt		0.850	0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	1504	1504	0	0	0	0	6408	1583	3433	5085	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	1504	1504	0	0	0	0	6408	1583	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		515	514						195			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		604			554			812			409	
Travel Time (s)		9.2			8.4			13.8			7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	895	1	1029	0	0	0	0	721	195	425	970	0
Shared Lane Traffic (%)			50%									
Lane Group Flow (vph)	895	516	514	0	0	0	0	721	195	425	970	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						6		5	2	
Permitted Phases	7		7						6			

Lane Group	Ø1	Ø3
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	3
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	7	7					6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					5.0	5.0	12.0	16.0	
Minimum Split (s)	47.0	47.0	47.0					46.0	46.0	18.0	46.0	
Total Split (s)	34.0	34.0	34.0					37.0	37.0	24.0	37.0	
Total Split (%)	28.3%	28.3%	28.3%					30.8%	30.8%	20.0%	30.8%	
Maximum Green (s)	27.0	27.0	27.0					31.0	31.0	18.0	31.0	
Yellow Time (s)	4.3	4.3	4.3					4.4	4.4	4.4	4.4	
All-Red Time (s)	2.7	2.7	2.7					1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0					6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag					Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0					5.0	5.0	2.0	2.0	
Recall Mode	None	None	None					C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0	7.0					5.0	5.0		5.0	
Flash Dont Walk (s)	33.0	33.0	33.0					35.0	35.0		35.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	28.2	28.2	28.2					31.0	31.0	17.4	30.4	
Actuated g/C Ratio	0.24	0.24	0.24					0.26	0.26	0.14	0.25	
v/c Ratio	1.11	0.69	0.69					0.44	0.35	0.86	0.75	
Control Delay	109.1	8.9	8.8					38.2	6.7	48.1	28.9	
Queue Delay	0.0	0.0	0.0					1.4	0.0	0.0	0.1	
Total Delay	109.1	8.9	8.8					39.6	6.7	48.1	29.0	
LOS	F	A	A					D	A	D	C	
Approach Delay		55.4						32.6			34.8	
Approach LOS		E						C			C	
Queue Length 50th (ft)	~422	1	0					136	0	144	100	
Queue Length 95th (ft)	#550	110	108					168	58	m#237	116	
Internal Link Dist (ft)		524			474			732			329	
Turn Bay Length (ft)									215	245		
Base Capacity (vph)	806	747	746					1655	553	514	1313	
Starvation Cap Reductn	0	0	0					0	0	0	18	
Spillback Cap Reductn	0	0	0					693	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	1.11	0.69	0.69					0.75	0.35	0.83	0.75	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 98 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 160			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 43.7		Intersection LOS: D	
Intersection Capacity Utilization 67.2%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø1	Ø3
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	24.0	25.0
Total Split (%)	20%	21%
Maximum Green (s)	18.0	18.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	5.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

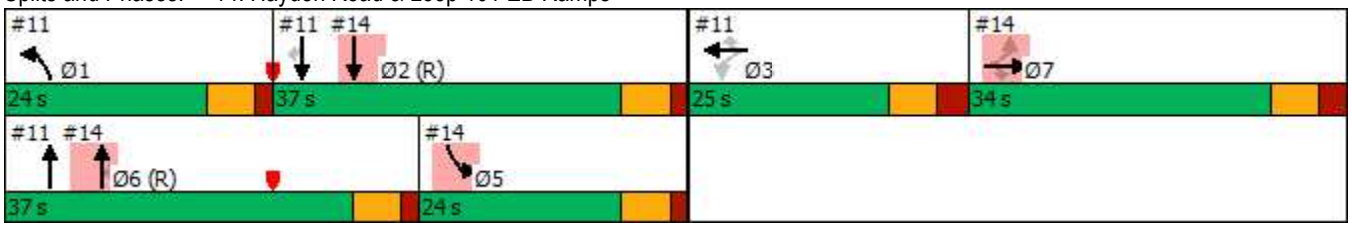
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Hayden Road & Loop 101 EB Ramps



Intersection	
Intersection Delay, s/veh	121.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	647	3	4	295	98	5	543	7	55	530	24
Future Vol, veh/h	47	647	3	4	295	98	5	543	7	55	530	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	703	3	4	321	107	5	590	8	60	576	26
Number of Lanes	1	2	0	1	2	0	1	2	0	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	176.8	40.8	128.2	105.9
HCM LOS	F	E	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	96%	0%	100%	99%	0%	100%	50%	0%	100%
Vol Right, %	0%	0%	4%	0%	0%	1%	0%	0%	50%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	362	188	47	431	219	4	197	196	55	353
LT Vol	5	0	0	47	0	0	4	0	0	55	0
Through Vol	0	362	181	0	431	216	0	197	98	0	353
RT Vol	0	0	7	0	0	3	0	0	98	0	0
Lane Flow Rate	5	393	204	51	469	238	4	214	213	60	384
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.018	1.267	0.657	0.168	1.48	0.75	0.015	0.717	0.696	0.197	1.216
Departure Headway (Hd)	12.746	12.246	12.22	12.292	11.792	11.782	13.357	12.857	12.508	12.642	12.142
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	283	299	298	294	314	309	270	282	290	286	303
Service Time	10.446	9.946	9.92	9.992	9.492	9.482	11.057	10.557	10.208	10.342	9.842
HCM Lane V/C Ratio	0.018	1.314	0.685	0.173	1.494	0.77	0.015	0.759	0.734	0.21	1.267
HCM Control Delay	15.7	177.9	35.6	17.5	262.2	42.7	16.3	42.5	39.5	18.4	158.3
HCM Lane LOS	C	F	E	C	F	E	C	E	E	C	F
HCM 95th-tile Q	0.1	17.7	4.3	0.6	25.1	5.7	0	5	4.8	0.7	16.3

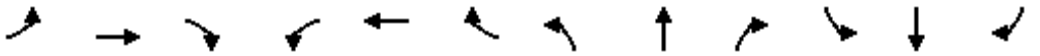
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	322	114	57	18	19	41	150	531	109	146	933	307
Future Volume (vph)	322	114	57	18	19	41	150	531	109	146	933	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		170	150		130	150		0	355		0
Storage Lanes	2		1	1		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.88	0.97	0.91	0.91	0.97	0.95	1.00
Frt			0.850			0.850		0.975				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	2787	3433	4958	0	3433	3539	1583
Flt Permitted	0.950			0.678			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	1263	3539	2787	3433	4958	0	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			62			95		45				334
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		700			1025			944			517	
Travel Time (s)		15.9			23.3			16.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	350	124	62	20	21	45	163	577	118	159	1014	334
Shared Lane Traffic (%)												
Lane Group Flow (vph)	350	124	62	20	21	45	163	695	0	159	1014	334
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8		8						6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	27.0	49.5	49.5	22.5	22.5	22.5	17.0	55.5		15.0	53.5	53.5
Total Split (%)	22.5%	41.3%	41.3%	18.8%	18.8%	18.8%	14.2%	46.3%		12.5%	44.6%	44.6%
Maximum Green (s)	22.5	45.0	45.0	18.0	18.0	18.0	12.5	51.0		10.5	49.0	49.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0			0	0
Act Effct Green (s)	15.4	24.8	24.8	7.3	7.3	7.3	10.0	51.5		9.4	50.9	50.9
Actuated g/C Ratio	0.16	0.25	0.25	0.07	0.07	0.07	0.10	0.52		0.09	0.51	0.51
v/c Ratio	0.66	0.14	0.14	0.22	0.08	0.15	0.47	0.27		0.49	0.56	0.34
Control Delay	46.5	28.3	7.9	51.7	46.0	1.1	48.4	14.0		49.8	19.8	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	46.5	28.3	7.9	51.7	46.0	1.1	48.4	14.0		49.8	19.8	3.0
LOS	D	C	A	D	D	A	D	B		D	B	A
Approach Delay		37.9			23.8			20.5			19.2	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	111	32	0	13	6	0	52	85		51	233	0
Queue Length 95th (ft)	163	55	30	38	20	0	89	129		89	355	50
Internal Link Dist (ft)		620			945			864			437	
Turn Bay Length (ft)	400		170	150		130	150			355		
Base Capacity (vph)	785	1620	758	231	647	587	436	2594		366	1815	974
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.45	0.08	0.08	0.09	0.03	0.08	0.37	0.27		0.43	0.56	0.34

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 99.3			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 23.1		Intersection LOS: C	
Intersection Capacity Utilization 57.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Hayden Road & Mayo Blvd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	566	35	91	364	66	74	8	193	43	2	49
Future Volume (vph)	143	566	35	91	364	66	74	8	193	43	2	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991				0.850		0.856			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3507	0	1770	3539	1583	1770	1595	0	1770	1593	0
Flt Permitted	0.518			0.404			0.721			0.621		
Satd. Flow (perm)	965	3507	0	753	3539	1583	1343	1595	0	1157	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				72		210			53	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		337			945			1455			417	
Travel Time (s)		7.7			21.5			33.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	615	38	99	396	72	80	9	210	47	2	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	653	0	99	396	72	80	219	0	47	55	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	78.0	78.0		78.0	78.0	78.0	42.0	42.0		42.0	42.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%	65.0%	35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	73.5	73.5		73.5	73.5	73.5	37.5	37.5		37.5	37.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	13.7	13.7		13.7	13.7	13.7	7.6	7.6		7.6	7.6	
Actuated g/C Ratio	0.45	0.45		0.45	0.45	0.45	0.25	0.25		0.25	0.25	
v/c Ratio	0.36	0.41		0.29	0.25	0.10	0.24	0.40		0.16	0.13	
Control Delay	8.3	6.5		8.1	5.7	2.1	12.4	5.0		11.8	5.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.3	6.5		8.1	5.7	2.1	12.4	5.0		11.8	5.2	
LOS	A	A		A	A	A	B	A		B	A	
Approach Delay		6.8			5.6			7.0			8.3	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	13	30		8	16	0	10	1		6	0	
Queue Length 95th (ft)	43	61		30	36	11	37	35		25	17	
Internal Link Dist (ft)		257			865			1375			337	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	965	3507		753	3539	1583	1333	1585		1149	1582	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.16	0.19		0.13	0.11	0.05	0.06	0.14		0.04	0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 30.6			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 53.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 37: 78th Street & Mayo Blvd



Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	683	0	0	609
Future Vol, veh/h	0	0	683	0	0	609
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	742	0	0	662

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1073	371	0	0	-	-
Stage 1	742	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	215	626	-	-	0	-
Stage 1	432	-	-	-	0	-
Stage 2	700	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	215	626	-	-	-	-
Mov Cap-2 Maneuver	333	-	-	-	-	-
Stage 1	432	-	-	-	-	-
Stage 2	700	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	831	456	0	0	0
Future Vol, veh/h	0	831	456	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	903	496	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	496	0	-	0	948	248
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	452	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1064	-	-	-	259	752
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	608	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1064	-	-	-	259	752
Mov Cap-2 Maneuver	-	-	-	-	388	-
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	608	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1064	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	831	456	0	0	0
Future Vol, veh/h	0	831	456	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	903	496	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	496	0	-	0	948	248
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	452	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1064	-	-	-	259	752
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	608	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1064	-	-	-	259	752
Mov Cap-2 Maneuver	-	-	-	-	388	-
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	608	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1064	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	215	718	483	215	80	112
Future Vol, veh/h	215	718	483	215	80	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	234	780	525	234	87	122

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	759	0	-	0	1383	263
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	858	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	848	-	-	-	135	735
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	376	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	848	-	-	-	98	735
Mov Cap-2 Maneuver	-	-	-	-	222	-
Stage 1	-	-	-	-	404	-
Stage 2	-	-	-	-	376	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	19.4
HCM LOS			C

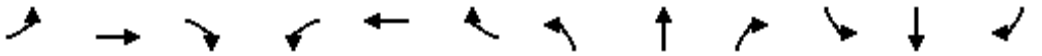
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	848	-	-	-	222	735
HCM Lane V/C Ratio	0.276	-	-	-	0.392	0.166
HCM Control Delay (s)	10.9	-	-	-	31.3	10.9
HCM Lane LOS	B	-	-	-	D	B
HCM 95th %tile Q(veh)	1.1	-	-	-	1.8	0.6

Intersection	
Intersection Delay, s/veh	210.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	434	11	6	794	82	12	521	8	72	582	68
Future Vol, veh/h	34	434	11	6	794	82	12	521	8	72	582	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	472	12	7	863	89	13	566	9	78	633	74
Number of Lanes	1	2	0	1	2	0	1	2	0	1	2	0

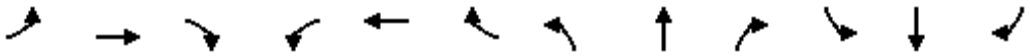
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	93	350.5	147.9	164.4
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	96%	0%	100%	93%	0%	100%	76%	0%	100%
Vol Right, %	0%	0%	4%	0%	0%	7%	0%	0%	24%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	347	182	34	289	156	6	529	347	72	388
LT Vol	12	0	0	34	0	0	6	0	0	72	0
Through Vol	0	347	174	0	289	145	0	529	265	0	388
RT Vol	0	0	8	0	0	11	0	0	82	0	0
Lane Flow Rate	13	378	197	37	314	169	7	575	377	78	422
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.048	1.325	0.691	0.135	1.109	0.594	0.023	1.95	1.26	0.276	1.428
Departure Headway (Hd)	14.597	14.097	14.066	15.353	14.853	14.804	13.347	12.847	12.681	14.102	13.602
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	247	261	259	235	248	245	270	288	290	257	270
Service Time	12.297	11.797	11.766	13.053	12.553	12.504	11.047	10.547	10.381	11.802	11.302
HCM Lane V/C Ratio	0.053	1.448	0.761	0.157	1.266	0.69	0.026	1.997	1.3	0.304	1.563
HCM Control Delay	18	207.2	43.2	20.4	131.6	37.1	16.4	468	176.9	22.1	246.8
HCM Lane LOS	C	F	E	C	F	E	C	F	F	C	F
HCM 95th-tile Q	0.2	17.6	4.6	0.5	11.8	3.4	0.1	38.6	17.1	1.1	20.9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	364	6	639	796	1312	0	0	1053	771
Future Volume (vph)	0	0	0	364	6	639	796	1312	0	0	1053	771
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	240		0	0		190
Storage Lanes	0		0	2		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.91	1.00	1.00	0.86	1.00
Frt					0.853	0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1509	1504	1770	5085	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1509	1504	1770	5085	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					348	347						567
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			661			409			989	
Travel Time (s)		10.6			10.0			7.0			16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	396	7	695	865	1426	0	0	1145	838
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	396	355	347	865	1426	0	0	1145	838
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					3		1	6			2	
Permitted Phases				3		3						2

Lane Group	Ø5	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	7
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3	3	3	1	6			2	2
Switch Phase												
Minimum Initial (s)				7.0	7.0	7.0	12.0	5.0			16.0	16.0
Minimum Split (s)				47.0	47.0	47.0	18.0	89.5			46.0	46.0
Total Split (s)				31.0	31.0	31.0	38.0	47.0			32.0	32.0
Total Split (%)				25.8%	25.8%	25.8%	31.7%	39.2%			26.7%	26.7%
Maximum Green (s)				24.0	24.0	24.0	32.0	41.0			26.0	26.0
Yellow Time (s)				4.3	4.3	4.3	4.4	4.4			4.4	4.4
All-Red Time (s)				2.7	2.7	2.7	1.6	1.6			1.6	1.6
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				7.0	7.0	7.0	6.0	6.0			6.0	6.0
Lead/Lag				Lead	Lead	Lead	Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	5.0	5.0			2.0	2.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Walk Time (s)				7.0	7.0	7.0	5.0	5.0			0.0	0.0
Flash Dont Walk (s)				33.0	33.0	33.0	20.0	35.0			45.0	45.0
Pedestrian Calls (#/hr)				0	0	0	0	0			0	0
Act Effct Green (s)				19.4	19.4	19.4	32.0	41.0			26.0	26.0
Actuated g/C Ratio				0.16	0.16	0.16	0.27	0.34			0.22	0.22
v/c Ratio				0.71	0.66	0.65	1.83	0.82			0.82	1.06
Control Delay				54.8	11.4	10.6	400.1	10.5			50.7	66.1
Queue Delay				0.0	0.0	0.0	0.0	1.0			0.0	0.0
Total Delay				54.8	11.4	10.6	400.1	11.5			50.7	66.1
LOS				D	B	B	F	B			D	E
Approach Delay					26.8			158.2			57.2	
Approach LOS					C			F			E	
Queue Length 50th (ft)				150	5	0	~983	116			247	~348
Queue Length 95th (ft)				196	97	89	m#1161	m150			291	#595
Internal Link Dist (ft)		619			581			329			909	
Turn Bay Length (ft)							240					190
Base Capacity (vph)				686	580	578	472	1737			1388	787
Starvation Cap Reductn				0	0	0	0	119			0	0
Spillback Cap Reductn				0	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.58	0.61	0.60	1.83	0.88			0.82	1.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 205			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.83			
Intersection Signal Delay: 94.1		Intersection LOS: F	
Intersection Capacity Utilization 121.2%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø5	Ø7
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	23.0	19.0
Total Split (%)	19%	16%
Maximum Green (s)	17.0	12.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	2.0
Recall Mode	None	None
Walk Time (s)	0.0	7.0
Flash Dont Walk (s)	30.0	33.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

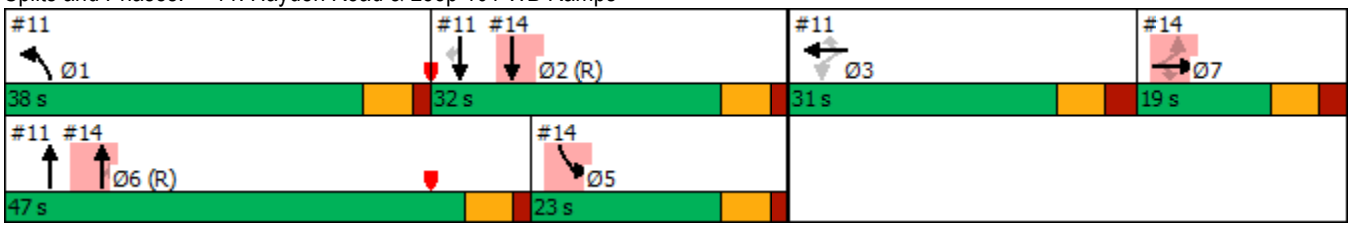
Queue shown is maximum after two cycles.

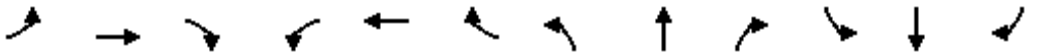
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

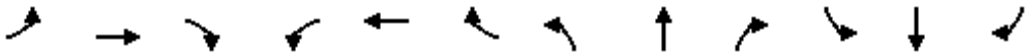
Splits and Phases: 11: Hayden Road & Loop 101 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	468	1	495	0	0	0	0	1639	413	547	869	0
Future Volume (vph)	468	1	495	0	0	0	0	1639	413	547	869	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		215	245		0
Storage Lanes	2		1	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt		0.851	0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	1506	1504	0	0	0	0	6408	1583	3433	5085	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	1506	1504	0	0	0	0	6408	1583	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		269	269						379			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		604			554			812			409	
Travel Time (s)		9.2			8.4			13.8			7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	509	1	538	0	0	0	0	1782	449	595	945	0
Shared Lane Traffic (%)			50%									
Lane Group Flow (vph)	509	270	269	0	0	0	0	1782	449	595	945	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						6		5	2	
Permitted Phases	7		7						6			

Lane Group	Ø1	Ø3
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	3
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	7	7					6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					5.0	5.0	12.0	16.0	
Minimum Split (s)	47.0	47.0	47.0					89.5	89.5	18.0	46.0	
Total Split (s)	19.0	19.0	19.0					47.0	47.0	23.0	32.0	
Total Split (%)	15.8%	15.8%	15.8%					39.2%	39.2%	19.2%	26.7%	
Maximum Green (s)	12.0	12.0	12.0					41.0	41.0	17.0	26.0	
Yellow Time (s)	4.3	4.3	4.3					4.4	4.4	4.4	4.4	
All-Red Time (s)	2.7	2.7	2.7					1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0					6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag					Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0					5.0	5.0	2.0	2.0	
Recall Mode	None	None	None					C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0	7.0					5.0	5.0	0.0	0.0	
Flash Dont Walk (s)	33.0	33.0	33.0					35.0	35.0	30.0	45.0	
Pedestrian Calls (#/hr)	0	0	0					0	0	0	0	
Act Effct Green (s)	16.6	16.6	16.6					41.0	41.0	17.0	26.0	
Actuated g/C Ratio	0.14	0.14	0.14					0.34	0.34	0.14	0.22	
v/c Ratio	1.07	0.62	0.61					0.81	0.57	1.22	0.86	
Control Delay	111.2	12.7	12.6					39.7	8.7	145.2	36.9	
Queue Delay	10.3	0.0	0.0					4.1	0.0	0.0	0.0	
Total Delay	121.5	12.7	12.6					43.8	8.7	145.2	36.9	
LOS	F	B	B					D	A	F	D	
Approach Delay		65.5						36.7			78.7	
Approach LOS		E						D			E	
Queue Length 50th (ft)	~231	1	0					363	37	~267	98	
Queue Length 95th (ft)	#390	90	89					411	132	m#378	152	
Internal Link Dist (ft)		524			474			732			329	
Turn Bay Length (ft)									215	245		
Base Capacity (vph)	474	439	439					2189	790	486	1101	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	23	0	0					328	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	1.13	0.62	0.61					0.96	0.57	1.22	0.86	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 205			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.83			
Intersection Signal Delay: 56.4		Intersection LOS: E	
Intersection Capacity Utilization 121.2%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø1	Ø3
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	38.0	31.0
Total Split (%)	32%	26%
Maximum Green (s)	32.0	24.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	5.0	2.0
Recall Mode	None	None
Walk Time (s)	5.0	7.0
Flash Dont Walk (s)	20.0	33.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

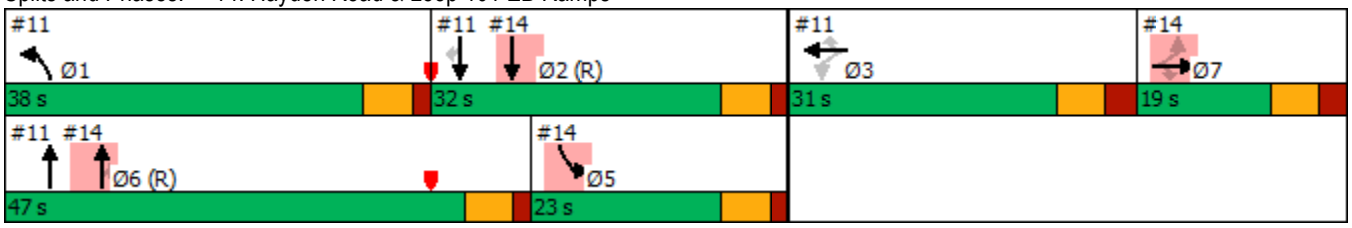
Queue shown is maximum after two cycles.

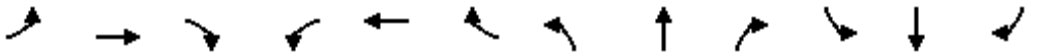
\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Hayden Road & Loop 101 EB Ramps





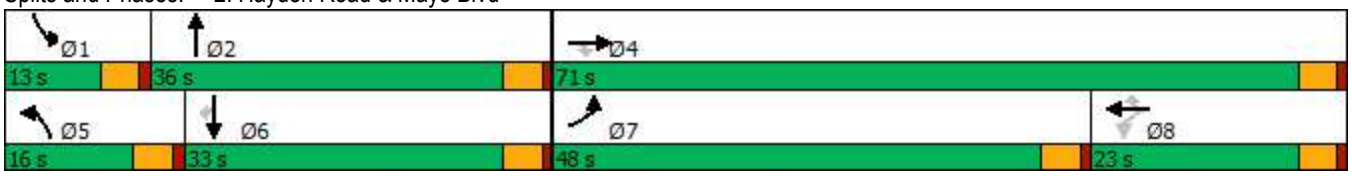
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	567	24	117	111	118	247	113	1237	22	50	833	297
Future Volume (vph)	567	24	117	111	118	247	113	1237	22	50	833	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		170	150		130	150		0	355		0
Storage Lanes	2		1	1		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.88	0.97	0.91	0.91	0.97	0.95	1.00
Frt			0.850			0.850		0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	2787	3433	5070	0	3433	3539	1583
Flt Permitted	0.950			0.739			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	1377	3539	2787	3433	5070	0	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127			268		2				294
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		700			1025			944			517	
Travel Time (s)		15.9			23.3			16.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	616	26	127	121	128	268	123	1345	24	54	905	323
Shared Lane Traffic (%)												
Lane Group Flow (vph)	616	26	127	121	128	268	123	1369	0	54	905	323
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8		8						6

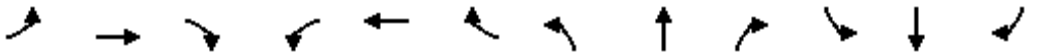
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	48.0	71.0	71.0	23.0	23.0	23.0	16.0	36.0		13.0	33.0	33.0
Total Split (%)	40.0%	59.2%	59.2%	19.2%	19.2%	19.2%	13.3%	30.0%		10.8%	27.5%	27.5%
Maximum Green (s)	43.5	66.5	66.5	18.5	18.5	18.5	11.5	31.5		8.5	28.5	28.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0			0	0
Act Effct Green (s)	21.9	39.9	39.9	13.5	13.5	13.5	8.8	33.9		6.9	29.6	29.6
Actuated g/C Ratio	0.24	0.43	0.43	0.15	0.15	0.15	0.10	0.37		0.08	0.32	0.32
v/c Ratio	0.75	0.02	0.17	0.60	0.25	0.42	0.38	0.73		0.21	0.79	0.46
Control Delay	39.4	14.1	3.2	51.3	37.0	7.0	44.7	30.7		45.2	36.7	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	39.4	14.1	3.2	51.3	37.0	7.0	44.7	30.7		45.2	36.7	7.3
LOS	D	B	A	D	D	A	D	C		D	D	A
Approach Delay		32.5			24.8			31.9			29.7	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	173	4	0	67	35	0	35	263		15	253	12
Queue Length 95th (ft)	250	12	30	136	67	38	70	#418		38	#451	89
Internal Link Dist (ft)		620			945			864			437	
Turn Bay Length (ft)	400		170	150		130	150			355		
Base Capacity (vph)	1645	2594	1194	280	721	781	435	1867		321	1139	708
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.37	0.01	0.11	0.43	0.18	0.34	0.28	0.73		0.17	0.79	0.46

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 92			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 30.4		Intersection LOS: C	
Intersection Capacity Utilization 62.6%		ICU Level of Service B	
Analysis Period (min) 15			

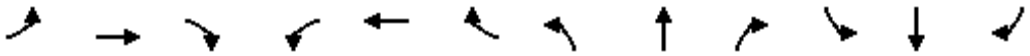
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Hayden Road & Mayo Blvd





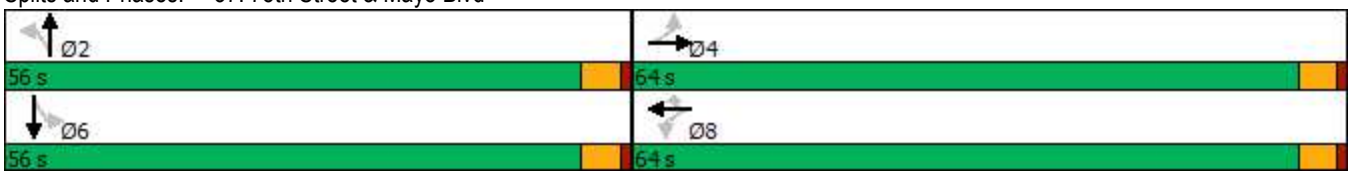
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	457	89	194	666	31	86	4	221	186	10	215
Future Volume (vph)	68	457	89	194	666	31	86	4	221	186	10	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976				0.850		0.852			0.857	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3454	0	1770	3539	1583	1770	1587	0	1770	1596	0
Flt Permitted	0.332			0.403			0.566			0.568		
Satd. Flow (perm)	618	3454	0	751	3539	1583	1054	1587	0	1058	1596	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				34		240			160	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		337			945			1455			417	
Travel Time (s)		7.7			21.5			33.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	497	97	211	724	34	93	4	240	202	11	234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	594	0	211	724	34	93	244	0	202	245	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	64.0	64.0		64.0	64.0	64.0	56.0	56.0		56.0	56.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%	53.3%	46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	59.5	59.5		59.5	59.5	59.5	51.5	51.5		51.5	51.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	28.1	28.1		28.1	28.1	28.1	20.2	20.2		20.2	20.2	
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.34	0.34		0.34	0.34	
v/c Ratio	0.25	0.36		0.59	0.43	0.04	0.26	0.35		0.56	0.38	
Control Delay	13.0	10.1		20.3	11.2	4.1	19.2	4.6		25.4	8.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	13.0	10.1		20.3	11.2	4.1	19.2	4.6		25.4	8.8	
LOS	B	B		C	B	A	B	A		C	A	
Approach Delay		10.5			12.9			8.7			16.3	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	12	52		43	69	0	20	1		49	18	
Queue Length 95th (ft)	53	138		159	178	14	81	51		174	95	
Internal Link Dist (ft)		257			865			1375			337	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	547	3063		665	3135	1406	891	1379		895	1374	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.14	0.19		0.32	0.23	0.02	0.10	0.18		0.23	0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 59.1			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 65.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 37: 78th Street & Mayo Blvd



Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	637	0	0	722
Future Vol, veh/h	0	0	637	0	0	722
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	692	0	0	785

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1085	346	0	0	-	-
Stage 1	692	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	211	650	-	-	0	-
Stage 1	458	-	-	-	0	-
Stage 2	651	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	211	650	-	-	-	-
Mov Cap-2 Maneuver	337	-	-	-	-	-
Stage 1	458	-	-	-	-	-
Stage 2	651	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	570	909	0	0	0
Future Vol, veh/h	0	570	909	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	620	988	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	988	0	-	0	1298	494
Stage 1	-	-	-	-	988	-
Stage 2	-	-	-	-	310	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	695	-	-	-	153	521
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	717	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	695	-	-	-	153	521
Mov Cap-2 Maneuver	-	-	-	-	258	-
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	717	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	695	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	570	909	0	0	0
Future Vol, veh/h	0	570	909	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	620	988	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	988	0	-	0	1298	494
Stage 1	-	-	-	-	988	-
Stage 2	-	-	-	-	310	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	695	-	-	-	153	521
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	717	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	695	-	-	-	153	521
Mov Cap-2 Maneuver	-	-	-	-	258	-
Stage 1	-	-	-	-	321	-
Stage 2	-	-	-	-	717	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	695	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	93	830	728	95	128	239
Future Vol, veh/h	93	830	728	95	128	239
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	902	791	103	139	260

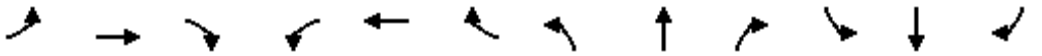
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	894	0	-	0	1444	396
Stage 1	-	-	-	-	791	-
Stage 2	-	-	-	-	653	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	755	-	-	-	~ 123	603
Stage 1	-	-	-	-	407	-
Stage 2	-	-	-	-	480	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	755	-	-	-	~ 107	603
Mov Cap-2 Maneuver	-	-	-	-	233	-
Stage 1	-	-	-	-	352	-
Stage 2	-	-	-	-	480	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	24.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	755	-	-	-	233	603
HCM Lane V/C Ratio	0.134	-	-	-	0.597	0.431
HCM Control Delay (s)	10.5	-	-	-	41	15.4
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0.5	-	-	-	3.4	2.2

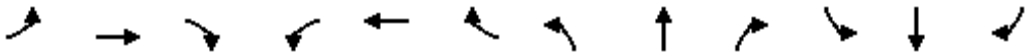
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Background Traffic w/o Axon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	395	3	681	179	1253	0	0	927	371
Future Volume (vph)	0	0	0	395	3	681	179	1253	0	0	927	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	240		0	0		190
Storage Lanes	0		0	2		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.91	1.00	1.00	0.86	1.00
Frt					0.851	0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1506	1504	1770	5085	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1506	1504	1770	5085	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					370	370						403
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			661			409			989	
Travel Time (s)		10.6			10.0			7.0			16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	429	3	740	195	1362	0	0	1008	403
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	429	373	370	195	1362	0	0	1008	403
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					3		1	6			2	
Permitted Phases				3		3						2

Lane Group	Ø5	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	7
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3	3	3	1	6			2	2
Switch Phase												
Minimum Initial (s)				7.0	7.0	7.0	12.0	5.0			16.0	16.0
Minimum Split (s)				47.0	47.0	47.0	18.0	46.0			46.0	46.0
Total Split (s)				25.0	25.0	25.0	20.0	35.0			45.0	45.0
Total Split (%)				20.8%	20.8%	20.8%	16.7%	29.2%			37.5%	37.5%
Maximum Green (s)				18.0	18.0	18.0	14.0	29.0			39.0	39.0
Yellow Time (s)				4.3	4.3	4.3	4.4	4.4			4.4	4.4
All-Red Time (s)				2.7	2.7	2.7	1.6	1.6			1.6	1.6
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				7.0	7.0	7.0	6.0	6.0			6.0	6.0
Lead/Lag				Lead	Lead	Lead	Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	5.0	5.0			2.0	2.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Walk Time (s)				7.0	7.0	7.0		5.0			5.0	5.0
Flash Dont Walk (s)				33.0	33.0	33.0		35.0			35.0	35.0
Pedestrian Calls (#/hr)				0	0	0		0			0	0
Act Effct Green (s)				17.8	17.8	17.8	14.0	29.0			36.4	36.4
Actuated g/C Ratio				0.15	0.15	0.15	0.12	0.24			0.30	0.30
v/c Ratio				0.84	0.69	0.69	0.95	1.11			0.52	0.53
Control Delay				65.5	12.4	11.9	64.3	76.5			35.3	5.6
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				65.5	12.4	11.9	64.3	76.5			35.3	5.6
LOS				E	B	B	E	E			D	A
Approach Delay					31.7			75.0			26.8	
Approach LOS					C			E			C	
Queue Length 50th (ft)				168	2	0	124	~451			181	0
Queue Length 95th (ft)				#246	103	100	m#153	m#410			215	71
Internal Link Dist (ft)		619			581			329			909	
Turn Bay Length (ft)							240					190
Base Capacity (vph)				522	543	543	206	1228			2082	786
Starvation Cap Reductn				0	0	0	0	5			0	0
Spillback Cap Reductn				0	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.82	0.69	0.68	0.95	1.11			0.48	0.51

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 98 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 160			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.21			
Intersection Signal Delay: 46.3		Intersection LOS: D	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø5	Ø7
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	30.0	30.0
Total Split (%)	25%	25%
Maximum Green (s)	24.0	23.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

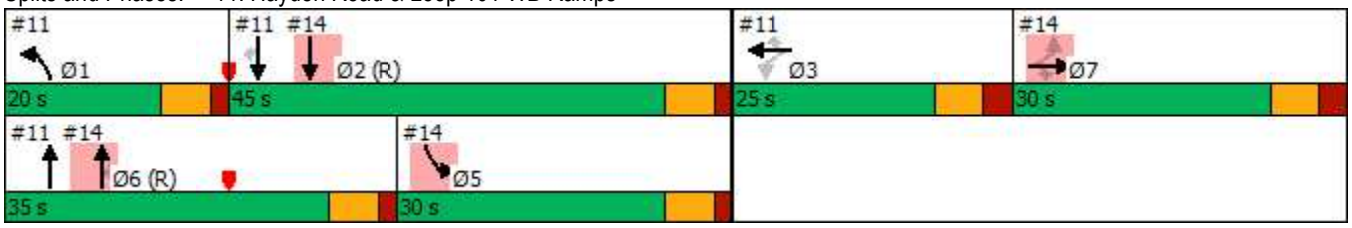
Queue shown is maximum after two cycles.

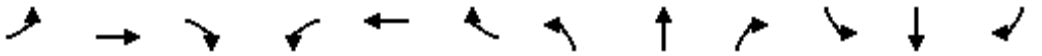
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

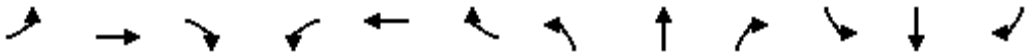
Splits and Phases: 11: Hayden Road & Loop 101 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	823	1	773	0	0	0	0	609	199	391	930	0
Future Volume (vph)	823	1	773	0	0	0	0	609	199	391	930	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		215	245		0
Storage Lanes	2		1	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt		0.850	0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	1504	1504	0	0	0	0	6408	1583	3433	5085	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	1504	1504	0	0	0	0	6408	1583	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		420	420						216			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		604			554			812			409	
Travel Time (s)		9.2			8.4			13.8			7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	895	1	840	0	0	0	0	662	216	425	1011	0
Shared Lane Traffic (%)			50%									
Lane Group Flow (vph)	895	421	420	0	0	0	0	662	216	425	1011	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						6		5	2	
Permitted Phases	7		7						6			

Lane Group	Ø1	Ø3
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	3
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	7	7					6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					5.0	5.0	12.0	16.0	
Minimum Split (s)	47.0	47.0	47.0					46.0	46.0	18.0	46.0	
Total Split (s)	30.0	30.0	30.0					35.0	35.0	30.0	45.0	
Total Split (%)	25.0%	25.0%	25.0%					29.2%	29.2%	25.0%	37.5%	
Maximum Green (s)	23.0	23.0	23.0					29.0	29.0	24.0	39.0	
Yellow Time (s)	4.3	4.3	4.3					4.4	4.4	4.4	4.4	
All-Red Time (s)	2.7	2.7	2.7					1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0					6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag					Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0					5.0	5.0	2.0	2.0	
Recall Mode	None	None	None					C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0	7.0					5.0	5.0		5.0	
Flash Dont Walk (s)	33.0	33.0	33.0					35.0	35.0		35.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	25.8	25.8	25.8					29.0	29.0	21.4	36.4	
Actuated g/C Ratio	0.22	0.22	0.22					0.24	0.24	0.18	0.30	
v/c Ratio	1.21	0.65	0.64					0.43	0.40	0.69	0.66	
Control Delay	149.6	9.2	9.1					39.5	7.1	38.9	25.6	
Queue Delay	0.0	0.0	0.0					3.0	0.0	0.0	0.1	
Total Delay	149.6	9.2	9.1					42.4	7.1	38.9	25.7	
LOS	F	A	A					D	A	D	C	
Approach Delay		81.6						33.7			29.6	
Approach LOS		F						C			C	
Queue Length 50th (ft)	~470	1	0					126	0	164	104	
Queue Length 95th (ft)	#598	102	102					158	61	m215	121	
Internal Link Dist (ft)		524			474			732			329	
Turn Bay Length (ft)									215	245		
Base Capacity (vph)	737	652	652					1548	546	686	1652	
Starvation Cap Reductn	0	0	0					0	0	0	69	
Spillback Cap Reductn	0	0	0					752	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	1.21	0.65	0.64					0.83	0.40	0.62	0.64	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 98 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 160			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.21			
Intersection Signal Delay: 52.8		Intersection LOS: D	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø1	Ø3
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	20.0	25.0
Total Split (%)	17%	21%
Maximum Green (s)	14.0	18.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	5.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

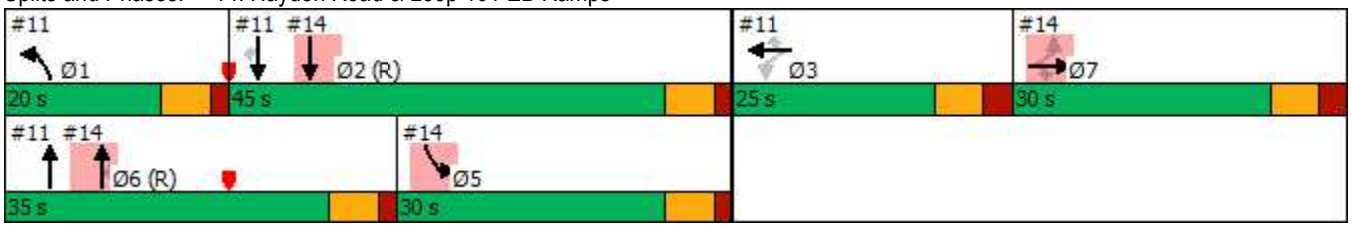
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Hayden Road & Loop 101 EB Ramps

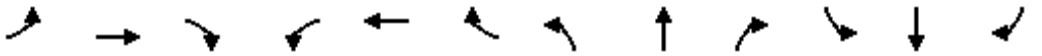


Intersection	
Intersection Delay, s/veh	93.3
Intersection LOS	F

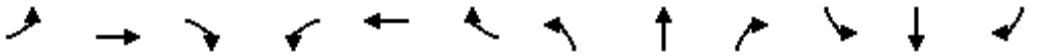
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	533	3	4	276	98	5	543	7	55	530	24
Future Vol, veh/h	47	533	3	4	276	98	5	543	7	55	530	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	579	3	4	300	107	5	590	8	60	576	26
Number of Lanes	1	2	0	1	2	0	1	2	0	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	102.9	35.4	118.4	97.3
HCM LOS	F	E	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	96%	0%	100%	98%	0%	100%	48%	0%	100%
Vol Right, %	0%	0%	4%	0%	0%	2%	0%	0%	52%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	362	188	47	355	181	4	184	190	55	353
LT Vol	5	0	0	47	0	0	4	0	0	55	0
Through Vol	0	362	181	0	355	178	0	184	92	0	353
RT Vol	0	0	7	0	0	3	0	0	98	0	0
Lane Flow Rate	5	393	204	51	386	196	4	200	207	60	384
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.018	1.237	0.641	0.166	1.202	0.611	0.015	0.66	0.661	0.193	1.187
Departure Headway (Hd)	12.138	11.638	11.612	12.068	11.568	11.557	12.8	12.3	11.939	12.014	11.514
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	297	315	313	299	317	314	281	296	306	301	319
Service Time	9.838	9.338	9.312	9.768	9.268	9.257	10.5	10	9.639	9.714	9.214
HCM Lane V/C Ratio	0.017	1.248	0.652	0.171	1.218	0.624	0.014	0.676	0.676	0.199	1.204
HCM Control Delay	15.1	164.2	32.9	17.2	150.9	30.8	15.7	36	35.2	17.6	145.3
HCM Lane LOS	C	F	D	C	F	D	C	E	E	C	F
HCM 95th-tile Q	0.1	17.4	4.1	0.6	16.4	3.8	0	4.3	4.4	0.7	16



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	322	0	57	0	0	0	150	531	0	0	933	307
Future Volume (vph)	322	0	57	0	0	0	150	531	0	0	933	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		170	150		130	150		0	355		0
Storage Lanes	2		1	1		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.88	0.97	0.91	0.91	0.97	0.95	1.00
Frt			0.850									0.850
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	1583	1863	3539	3278	3433	5085	0	3614	3539	1583
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	1583	1863	3539	3278	3433	5085	0	3614	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			186									334
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		700			1025			944			517	
Travel Time (s)		15.9			23.3			16.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	350	0	62	0	0	0	163	577	0	0	1014	334
Shared Lane Traffic (%)												
Lane Group Flow (vph)	350	0	62	0	0	0	163	577	0	0	1014	334
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm		Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8		8						6

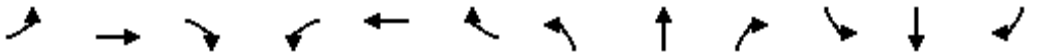


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	27.0	49.5	49.5	22.5	22.5	22.5	17.0	61.0		9.5	53.5	53.5
Total Split (%)	22.5%	41.3%	41.3%	18.8%	18.8%	18.8%	14.2%	50.8%		7.9%	44.6%	44.6%
Maximum Green (s)	22.5	45.0	45.0	18.0	18.0	18.0	12.5	56.5		5.0	49.0	49.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0			0	0
Act Effct Green (s)	14.1		14.1				9.5	63.2			49.1	49.1
Actuated g/C Ratio	0.16		0.16				0.11	0.73			0.57	0.57
v/c Ratio	0.62		0.15				0.43	0.15			0.50	0.32
Control Delay	39.1		0.8				40.0	3.8			12.9	2.2
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	39.1		0.8				40.0	3.8			12.9	2.2
LOS	D		A				D	A			B	A
Approach Delay		33.3						11.8			10.3	
Approach LOS		C						B			B	
Queue Length 50th (ft)	92		0				43	28			161	0
Queue Length 95th (ft)	140		0				76	46			253	39
Internal Link Dist (ft)		620			945			864			437	
Turn Bay Length (ft)	400		170				150					
Base Capacity (vph)	897		916				498	3723			2015	1045
Starvation Cap Reductn	0		0				0	0			0	0
Spillback Cap Reductn	0		0				0	0			0	0
Storage Cap Reductn	0		0				0	0			0	0
Reduced v/c Ratio	0.39		0.07				0.33	0.15			0.50	0.32

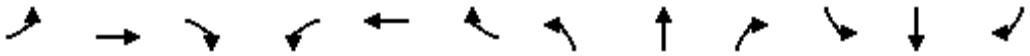
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 86.3			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 14.5		Intersection LOS: B	
Intersection Capacity Utilization 50.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Hayden Road & Mayo Blvd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	452	35	91	345	66	74	8	193	43	2	49
Future Volume (vph)	143	452	35	91	345	66	74	8	193	43	2	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989				0.850		0.856			0.855	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3500	0	1770	3539	1583	1770	1595	0	1770	1593	0
Flt Permitted	0.529			0.456			0.721			0.621		
Satd. Flow (perm)	985	3500	0	849	3539	1583	1343	1595	0	1157	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				72		210			53	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		337			945			1455			417	
Travel Time (s)		7.7			21.5			33.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	155	491	38	99	375	72	80	9	210	47	2	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	529	0	99	375	72	80	219	0	47	55	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	77.0	77.0		77.0	77.0	77.0	43.0	43.0		43.0	43.0	
Total Split (%)	64.2%	64.2%		64.2%	64.2%	64.2%	35.8%	35.8%		35.8%	35.8%	
Maximum Green (s)	72.5	72.5		72.5	72.5	72.5	38.5	38.5		38.5	38.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	12.0	12.0		12.0	12.0	12.0	7.5	7.5		7.5	7.5	
Actuated g/C Ratio	0.42	0.42		0.42	0.42	0.42	0.26	0.26		0.26	0.26	
v/c Ratio	0.38	0.36		0.28	0.25	0.10	0.23	0.38		0.16	0.12	
Control Delay	8.8	6.3		7.8	5.9	2.2	11.6	4.7		11.0	4.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.8	6.3		7.8	5.9	2.2	11.6	4.7		11.0	4.9	
LOS	A	A		A	A	A	B	A		B	A	
Approach Delay		6.9			5.7			6.6			7.7	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	13	23		8	15	0	9	1		5	0	
Queue Length 95th (ft)	41	48		28	34	11	35	33		24	16	
Internal Link Dist (ft)		257			865			1375			337	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	985	3500		849	3539	1583	1343	1595		1157	1593	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.16	0.15		0.12	0.11	0.05	0.06	0.14		0.04	0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 28.8			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 6.5		Intersection LOS: A	
Intersection Capacity Utilization 50.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 37: 78th Street & Mayo Blvd



Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	688	0	0	609
Future Vol, veh/h	0	0	688	0	0	609
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	748	0	0	662

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1079	374	0	0	-	-
Stage 1	748	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	213	623	-	-	0	-
Stage 1	429	-	-	-	0	-
Stage 2	700	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	213	623	-	-	-	-
Mov Cap-2 Maneuver	331	-	-	-	-	-
Stage 1	429	-	-	-	-	-
Stage 2	700	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	717	437	0	0	0
Future Vol, veh/h	0	717	437	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	779	475	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	475	0	-	0	865	238
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	390	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1083	-	-	-	293	763
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	653	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1083	-	-	-	293	763
Mov Cap-2 Maneuver	-	-	-	-	417	-
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	653	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1083	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	717	437	0	0	0
Future Vol, veh/h	0	717	437	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	779	475	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	475	0	-	0	865	238
Stage 1	-	-	-	-	475	-
Stage 2	-	-	-	-	390	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	1083	-	-	-	293	763
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	653	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1083	-	-	-	293	763
Mov Cap-2 Maneuver	-	-	-	-	417	-
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	653	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1083	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	215	604	464	215	80	112
Future Vol, veh/h	215	604	464	215	80	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	234	657	504	234	87	122

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	738	0	-	0	1301	252
Stage 1	-	-	-	-	504	-
Stage 2	-	-	-	-	797	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	864	-	-	-	153	748
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	404	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	864	-	-	-	112	748
Mov Cap-2 Maneuver	-	-	-	-	238	-
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	404	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	18.2
HCM LOS			C

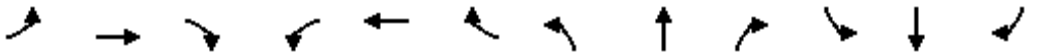
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	864	-	-	-	238	748
HCM Lane V/C Ratio	0.27	-	-	-	0.365	0.163
HCM Control Delay (s)	10.7	-	-	-	28.6	10.7
HCM Lane LOS	B	-	-	-	D	B
HCM 95th %tile Q(veh)	1.1	-	-	-	1.6	0.6

Intersection	
Intersection Delay, s/veh	171
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	410	11	6	676	82	12	521	8	72	582	68
Future Vol, veh/h	34	410	11	6	676	82	12	521	8	72	582	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	37	446	12	7	735	89	13	566	9	78	633	74
Number of Lanes	1	2	0	1	2	0	1	2	0	1	2	0

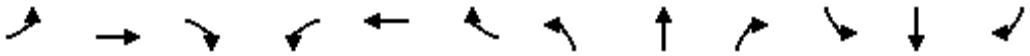
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	79.5	253.2	146.6	160
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	96%	0%	100%	93%	0%	100%	73%	0%	100%
Vol Right, %	0%	0%	4%	0%	0%	7%	0%	0%	27%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	347	182	34	273	148	6	451	307	72	388
LT Vol	12	0	0	34	0	0	6	0	0	72	0
Through Vol	0	347	174	0	273	137	0	451	225	0	388
RT Vol	0	0	8	0	0	11	0	0	82	0	0
Lane Flow Rate	13	378	197	37	297	161	7	490	334	78	422
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.048	1.327	0.692	0.136	1.052	0.566	0.023	1.664	1.118	0.274	1.419
Departure Headway (Hd)	14.016	13.516	13.485	14.747	14.247	14.194	13.241	12.741	12.554	13.543	13.043
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	257	272	271	245	258	257	272	289	291	267	283
Service Time	11.716	11.216	11.185	12.447	11.947	11.894	10.941	10.441	10.254	11.243	10.743
HCM Lane V/C Ratio	0.051	1.39	0.727	0.151	1.151	0.626	0.026	1.696	1.148	0.292	1.491
HCM Control Delay	17.4	205.9	41.8	19.8	111.6	33.9	16.3	343.3	125.6	21.3	241.2
HCM Lane LOS	C	F	E	C	F	D	C	F	F	C	F
HCM 95th-tile Q	0.2	18.2	4.6	0.5	10.8	3.2	0.1	29.4	13.3	1.1	21.3



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	357	6	639	733	1330	0	0	1060	771
Future Volume (vph)	0	0	0	357	6	639	733	1330	0	0	1060	771
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	240		0	0		190
Storage Lanes	0		0	2		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.91	1.00	1.00	0.86	1.00
Frt					0.853	0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1509	1504	1770	5085	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1509	1504	1770	5085	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					348	347						653
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			661			409			989	
Travel Time (s)		10.6			10.0			7.0			16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	388	7	695	797	1446	0	0	1152	838
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	388	355	347	797	1446	0	0	1152	838
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					3		1	6			2	
Permitted Phases				3		3						2

Lane Group	Ø5	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	7
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3	3	3	1	6			2	2
Switch Phase												
Minimum Initial (s)				7.0	7.0	7.0	12.0	5.0			16.0	16.0
Minimum Split (s)				47.0	47.0	47.0	18.0	89.5			46.0	46.0
Total Split (s)				35.0	35.0	35.0	32.0	47.0			33.0	33.0
Total Split (%)				29.2%	29.2%	29.2%	26.7%	39.2%			27.5%	27.5%
Maximum Green (s)				28.0	28.0	28.0	26.0	41.0			27.0	27.0
Yellow Time (s)				4.3	4.3	4.3	4.4	4.4			4.4	4.4
All-Red Time (s)				2.7	2.7	2.7	1.6	1.6			1.6	1.6
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				7.0	7.0	7.0	6.0	6.0			6.0	6.0
Lead/Lag				Lead	Lead	Lead	Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	5.0	5.0			2.0	2.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Walk Time (s)				7.0	7.0	7.0		5.0			5.0	5.0
Flash Dont Walk (s)				33.0	33.0	33.0		35.0			35.0	35.0
Pedestrian Calls (#/hr)				0	0	0		0			0	0
Act Effct Green (s)				19.6	19.6	19.6	26.0	41.0			27.0	27.0
Actuated g/C Ratio				0.16	0.16	0.16	0.22	0.34			0.22	0.22
v/c Ratio				0.69	0.66	0.65	2.08	0.83			0.80	0.97
Control Delay				53.5	11.1	10.4	514.7	11.7			48.9	35.6
Queue Delay				0.0	0.0	0.0	0.0	0.9			0.0	0.0
Total Delay				53.5	11.1	10.4	514.7	12.7			48.9	35.6
LOS				D	B	B	F	B			D	D
Approach Delay					26.0			191.0			43.3	
Approach LOS					C			F			D	
Queue Length 50th (ft)				147	5	0	~946	120			246	180
Queue Length 95th (ft)				188	94	87	#1194	150			289	#481
Internal Link Dist (ft)		619			581			329			909	
Turn Bay Length (ft)							240					190
Base Capacity (vph)				801	618	616	383	1737			1441	862
Starvation Cap Reductn				0	0	0	0	104			0	0
Spillback Cap Reductn				0	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.48	0.57	0.56	2.08	0.89			0.80	0.97

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 205			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 2.08			
Intersection Signal Delay: 102.0		Intersection LOS: F	
Intersection Capacity Utilization 117.7%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø5	Ø7
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	18.0	20.0
Total Split (%)	15%	17%
Maximum Green (s)	12.0	13.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

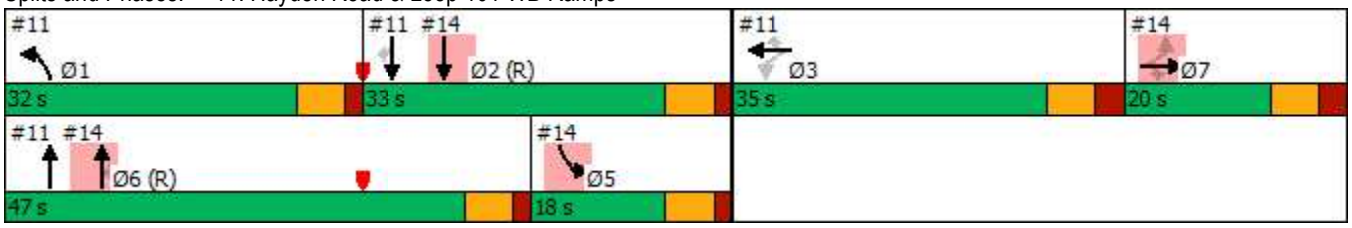
Intersection Summary

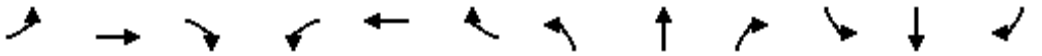
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

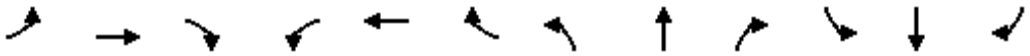
Splits and Phases: 11: Hayden Road & Loop 101 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	468	1	412	0	0	0	0	1594	443	547	869	0
Future Volume (vph)	468	1	412	0	0	0	0	1594	443	547	869	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		215	245		0
Storage Lanes	2		1	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt		0.851	0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	1506	1504	0	0	0	0	6408	1583	3433	5085	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	1506	1504	0	0	0	0	6408	1583	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		224	224						418			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		604			554			812			409	
Travel Time (s)		9.2			8.4			13.8			7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	509	1	448	0	0	0	0	1733	482	595	945	0
Shared Lane Traffic (%)			50%									
Lane Group Flow (vph)	509	225	224	0	0	0	0	1733	482	595	945	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						6		5	2	
Permitted Phases	7		7						6			

Lane Group	Ø1	Ø3
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	3
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	7	7					6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					5.0	5.0	12.0	16.0	
Minimum Split (s)	47.0	47.0	47.0					89.5	89.5	18.0	46.0	
Total Split (s)	20.0	20.0	20.0					47.0	47.0	18.0	33.0	
Total Split (%)	16.7%	16.7%	16.7%					39.2%	39.2%	15.0%	27.5%	
Maximum Green (s)	13.0	13.0	13.0					41.0	41.0	12.0	27.0	
Yellow Time (s)	4.3	4.3	4.3					4.4	4.4	4.4	4.4	
All-Red Time (s)	2.7	2.7	2.7					1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0					6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag					Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0					5.0	5.0	2.0	2.0	
Recall Mode	None	None	None					C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0	7.0					5.0	5.0		5.0	
Flash Dont Walk (s)	33.0	33.0	33.0					35.0	35.0		35.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	21.4	21.4	21.4					41.0	41.0	12.0	27.0	
Actuated g/C Ratio	0.18	0.18	0.18					0.34	0.34	0.10	0.22	
v/c Ratio	0.83	0.50	0.50					0.79	0.59	1.73	0.83	
Control Delay	61.3	10.4	10.3					38.9	8.3	365.5	33.2	
Queue Delay	15.0	0.0	0.0					4.1	0.0	0.0	0.0	
Total Delay	76.2	10.4	10.3					43.0	8.3	365.5	33.2	
LOS	E	B	B					D	A	F	C	
Approach Delay		45.3						35.4			161.6	
Approach LOS		D						D			F	
Queue Length 50th (ft)	198	1	0					350	34	~328	87	
Queue Length 95th (ft)	#354	80	78					397	132	#447	142	
Internal Link Dist (ft)		524			474			732			329	
Turn Bay Length (ft)									215	245		
Base Capacity (vph)	611	452	452					2189	816	343	1144	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	96	0	0					373	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	0.99	0.50	0.50					0.95	0.59	1.73	0.83	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 205			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 2.08			
Intersection Signal Delay: 78.7		Intersection LOS: E	
Intersection Capacity Utilization 117.7%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø1	Ø3
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	32.0	35.0
Total Split (%)	27%	29%
Maximum Green (s)	26.0	28.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	5.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

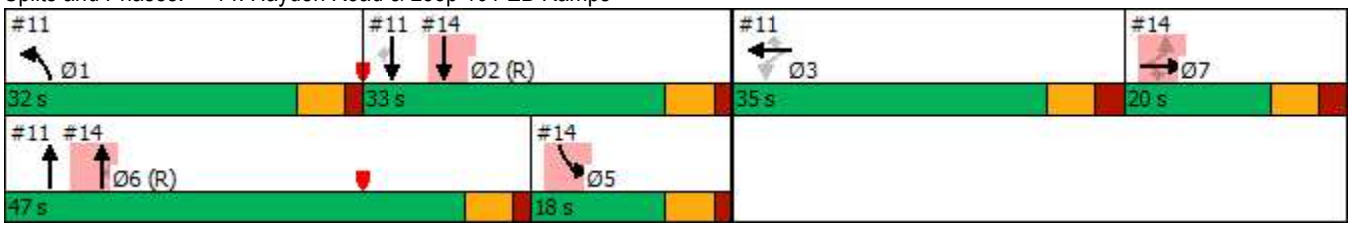
Intersection Summary

Queue shown is maximum after two cycles.

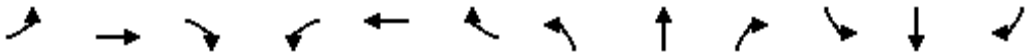
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 14: Hayden Road & Loop 101 EB Ramps



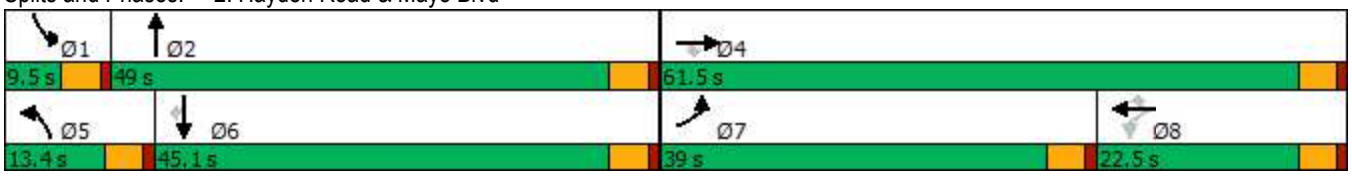
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	567	0	117	0	0	0	113	1237	0	0	833	297
Future Volume (vph)	567	0	117	0	0	0	113	1237	0	0	833	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		170	150		130	150		0	355		0
Storage Lanes	2		1	1		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.88	0.97	0.91	0.91	0.97	0.95	1.00
Frt			0.850									0.850
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	1583	1863	3539	3278	3433	5085	0	3614	3539	1583
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	1583	1863	3539	3278	3433	5085	0	3614	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146									323
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		700			1025			944			517	
Travel Time (s)		15.9			23.3			16.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	616	0	127	0	0	0	123	1345	0	0	905	323
Shared Lane Traffic (%)												
Lane Group Flow (vph)	616	0	127	0	0	0	123	1345	0	0	905	323
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm		Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8		8						6



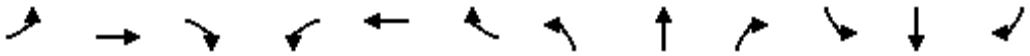
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	39.0	61.5	61.5	22.5	22.5	22.5	13.4	49.0		9.5	45.1	45.1
Total Split (%)	32.5%	51.3%	51.3%	18.8%	18.8%	18.8%	11.2%	40.8%		7.9%	37.6%	37.6%
Maximum Green (s)	34.5	57.0	57.0	18.0	18.0	18.0	8.9	44.5		5.0	40.6	40.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0			0	0
Act Effct Green (s)	19.9		19.9				8.0	53.3			40.7	40.7
Actuated g/C Ratio	0.24		0.24				0.10	0.65			0.50	0.50
v/c Ratio	0.74		0.26				0.37	0.41			0.52	0.34
Control Delay	34.8		4.8				38.9	7.8			16.1	2.8
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	34.8		4.8				38.9	7.8			16.1	2.8
LOS	C		A				D	A			B	A
Approach Delay		29.7						10.4			12.6	
Approach LOS		C						B			B	
Queue Length 50th (ft)	152		0				30	106			159	0
Queue Length 95th (ft)	208		31				60	165			246	44
Internal Link Dist (ft)		620			945			864			437	
Turn Bay Length (ft)	400		170				150					
Base Capacity (vph)	1445		1145				372	3296			1754	947
Starvation Cap Reductn	0		0				0	0			0	0
Spillback Cap Reductn	0		0				0	0			0	0
Storage Cap Reductn	0		0				0	0			0	0
Reduced v/c Ratio	0.43		0.11				0.33	0.41			0.52	0.34

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 82.2			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 55.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Hayden Road & Mayo Blvd



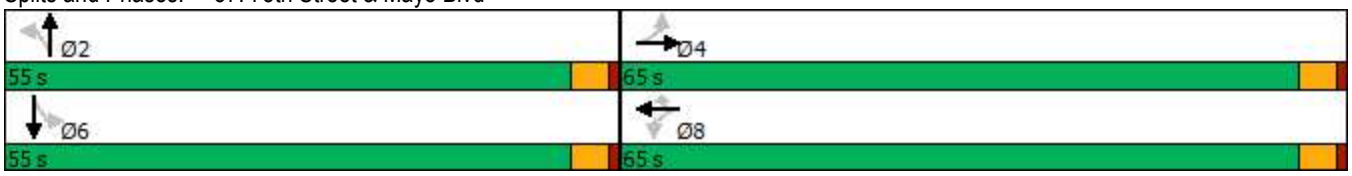
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	433	89	194	548	31	86	4	221	186	10	215
Future Volume (vph)	68	433	89	194	548	31	86	4	221	186	10	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974				0.850		0.852			0.857	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3447	0	1770	3539	1583	1770	1587	0	1770	1596	0
Flt Permitted	0.401			0.418			0.576			0.578		
Satd. Flow (perm)	747	3447	0	779	3539	1583	1073	1587	0	1077	1596	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				34		240			233	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		337			945			1455			417	
Travel Time (s)		7.7			21.5			33.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	471	97	211	596	34	93	4	240	202	11	234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	568	0	211	596	34	93	244	0	202	245	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	65.0	65.0		65.0	65.0	65.0	55.0	55.0		55.0	55.0	
Total Split (%)	54.2%	54.2%		54.2%	54.2%	54.2%	45.8%	45.8%		45.8%	45.8%	
Maximum Green (s)	60.5	60.5		60.5	60.5	60.5	50.5	50.5		50.5	50.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	25.8	25.8		25.8	25.8	25.8	19.7	19.7		19.7	19.7	
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.46	0.35	0.35		0.35	0.35	
v/c Ratio	0.22	0.36		0.59	0.37	0.05	0.25	0.34		0.54	0.35	
Control Delay	12.3	10.2		20.5	10.9	4.3	17.6	4.3		23.0	4.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	12.3	10.2		20.5	10.9	4.3	17.6	4.3		23.0	4.7	
LOS	B	B		C	B	A	B	A		C	A	
Approach Delay		10.5			13.0			8.0			13.0	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	12	47		41	53	0	19	1		45	2	
Queue Length 95th (ft)	52	133		158	146	15	75	48		162	52	
Internal Link Dist (ft)		257			865			1375			337	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	678	3132		707	3213	1440	919	1394		923	1401	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.11	0.18		0.30	0.19	0.02	0.10	0.18		0.22	0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 56.2			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 64.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 37: 78th Street & Mayo Blvd



Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	637	0	0	722
Future Vol, veh/h	0	0	637	0	0	722
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	692	0	0	785

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1085	346	0	0	-	-
Stage 1	692	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	211	650	-	-	0	-
Stage 1	458	-	-	-	0	-
Stage 2	651	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	211	650	-	-	-	-
Mov Cap-2 Maneuver	337	-	-	-	-	-
Stage 1	458	-	-	-	-	-
Stage 2	651	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	546	791	0	0	0
Future Vol, veh/h	0	546	791	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	593	860	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	860	0	-	0	1157	430
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	777	-	-	-	190	573
Stage 1	-	-	-	-	375	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	777	-	-	-	190	573
Mov Cap-2 Maneuver	-	-	-	-	299	-
Stage 1	-	-	-	-	375	-
Stage 2	-	-	-	-	728	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	777	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	546	791	0	0	0
Future Vol, veh/h	0	546	791	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	593	860	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	860	0	-	0	1157	430
Stage 1	-	-	-	-	860	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	777	-	-	-	190	573
Stage 1	-	-	-	-	375	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	777	-	-	-	190	573
Mov Cap-2 Maneuver	-	-	-	-	299	-
Stage 1	-	-	-	-	375	-
Stage 2	-	-	-	-	728	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	777	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	93	806	610	95	128	239
Future Vol, veh/h	93	806	610	95	128	239
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	876	663	103	139	260

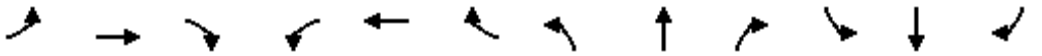
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	766	0	-	0	1303	332
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	640	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	843	-	-	-	152	664
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	487	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	843	-	-	-	~ 134	664
Mov Cap-2 Maneuver	-	-	-	-	266	-
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	487	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	20.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	843	-	-	-	266	664
HCM Lane V/C Ratio	0.12	-	-	-	0.523	0.391
HCM Control Delay (s)	9.9	-	-	-	32.5	13.9
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.4	-	-	-	2.8	1.9

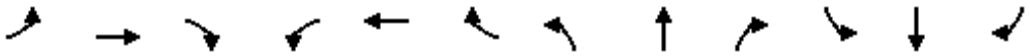
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Total Traffic w/Axon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	486	3	681	249	1255	0	0	928	371
Future Volume (vph)	0	0	0	486	3	681	249	1255	0	0	928	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	240		0	0		190
Storage Lanes	0		0	2		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.91	1.00	1.00	0.86	1.00
Frt					0.851	0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1506	1504	1770	5085	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1506	1504	1770	5085	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					370	370						403
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			661			409			989	
Travel Time (s)		10.6			10.0			7.0			16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	528	3	740	271	1364	0	0	1009	403
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	528	373	370	271	1364	0	0	1009	403
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					3		1	6			2	
Permitted Phases				3		3						2

Lane Group	Ø5	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	7
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3	3	3	1	6			2	2
Switch Phase												
Minimum Initial (s)				7.0	7.0	7.0	12.0	5.0			16.0	16.0
Minimum Split (s)				47.0	47.0	47.0	18.0	46.0			46.0	46.0
Total Split (s)				25.0	25.0	25.0	24.0	37.0			37.0	37.0
Total Split (%)				20.8%	20.8%	20.8%	20.0%	30.8%			30.8%	30.8%
Maximum Green (s)				18.0	18.0	18.0	18.0	31.0			31.0	31.0
Yellow Time (s)				4.3	4.3	4.3	4.4	4.4			4.4	4.4
All-Red Time (s)				2.7	2.7	2.7	1.6	1.6			1.6	1.6
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				7.0	7.0	7.0	6.0	6.0			6.0	6.0
Lead/Lag				Lead	Lead	Lead	Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	5.0	5.0			2.0	2.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Walk Time (s)				7.0	7.0	7.0		5.0			5.0	5.0
Flash Dont Walk (s)				33.0	33.0	33.0		35.0			35.0	35.0
Pedestrian Calls (#/hr)				0	0	0		0			0	0
Act Effct Green (s)				18.0	18.0	18.0	18.0	31.0			31.0	31.0
Actuated g/C Ratio				0.15	0.15	0.15	0.15	0.26			0.26	0.26
v/c Ratio				1.03	0.69	0.69	1.02	1.04			0.61	0.57
Control Delay				96.8	12.3	11.9	72.4	50.0			41.0	6.9
Queue Delay				0.0	0.0	0.0	0.0	3.2			0.1	0.0
Total Delay				96.8	12.3	11.9	72.4	53.2			41.1	6.9
LOS				F	B	B	E	D			D	A
Approach Delay					47.3			56.4			31.4	
Approach LOS					D			E			C	
Queue Length 50th (ft)				~224	2	0	~149	~425			200	0
Queue Length 95th (ft)				#336	103	100	m#252	m#408			238	81
Internal Link Dist (ft)		619			581			329			909	
Turn Bay Length (ft)							240					190
Base Capacity (vph)				514	540	540	265	1313			1655	707
Starvation Cap Reductn				0	0	0	0	11			0	0
Spillback Cap Reductn				0	0	0	0	0			64	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				1.03	0.69	0.69	1.02	1.05			0.63	0.57

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 98 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 160			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.16			
Intersection Signal Delay: 45.5		Intersection LOS: D	
Intersection Capacity Utilization 72.9%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø5	Ø7
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	24.0	34.0
Total Split (%)	20%	28%
Maximum Green (s)	18.0	27.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

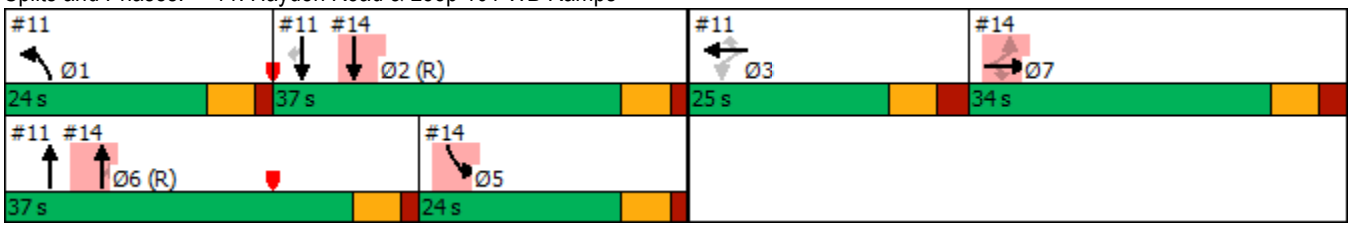
Queue shown is maximum after two cycles.

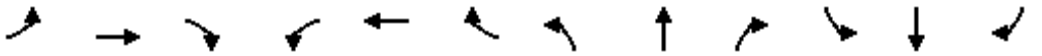
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

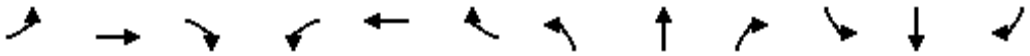
Splits and Phases: 11: Hayden Road & Loop 101 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	823	1	1025	0	0	0	0	681	212	391	1023	0
Future Volume (vph)	823	1	1025	0	0	0	0	681	212	391	1023	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		215	245		0
Storage Lanes	2		1	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt		0.850	0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	1504	1504	0	0	0	0	6408	1583	3433	5085	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	1504	1504	0	0	0	0	6408	1583	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		557	557						230			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		604			554			812			409	
Travel Time (s)		9.2			8.4			13.8			7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	895	1	1114	0	0	0	0	740	230	425	1112	0
Shared Lane Traffic (%)			50%									
Lane Group Flow (vph)	895	558	557	0	0	0	0	740	230	425	1112	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						6		5	2	
Permitted Phases	7		7						6			

Lane Group	Ø1	Ø3
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	3
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	7	7					6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					5.0	5.0	12.0	16.0	
Minimum Split (s)	47.0	47.0	47.0					46.0	46.0	18.0	46.0	
Total Split (s)	34.0	34.0	34.0					37.0	37.0	24.0	37.0	
Total Split (%)	28.3%	28.3%	28.3%					30.8%	30.8%	20.0%	30.8%	
Maximum Green (s)	27.0	27.0	27.0					31.0	31.0	18.0	31.0	
Yellow Time (s)	4.3	4.3	4.3					4.4	4.4	4.4	4.4	
All-Red Time (s)	2.7	2.7	2.7					1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0					6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag					Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0					5.0	5.0	2.0	2.0	
Recall Mode	None	None	None					C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0	7.0					5.0	5.0		5.0	
Flash Dont Walk (s)	33.0	33.0	33.0					35.0	35.0		35.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	27.0	27.0	27.0					31.0	31.0	18.0	31.0	
Actuated g/C Ratio	0.22	0.22	0.22					0.26	0.26	0.15	0.26	
v/c Ratio	1.16	0.72	0.72					0.45	0.40	0.83	0.85	
Control Delay	127.6	9.5	9.4					38.3	6.6	47.1	34.6	
Queue Delay	0.0	0.0	0.0					1.5	0.0	0.0	0.2	
Total Delay	127.6	9.5	9.4					39.9	6.6	47.1	34.7	
LOS	F	A	A					D	A	D	C	
Approach Delay		62.0						32.0			38.2	
Approach LOS		E						C			D	
Queue Length 50th (ft)	~422	1	0					140	0	144	129	
Queue Length 95th (ft)	#550	116	115					172	62	m165	m141	
Internal Link Dist (ft)		524			474			732			329	
Turn Bay Length (ft)									215	245		
Base Capacity (vph)	772	770	770					1655	579	514	1313	
Starvation Cap Reductn	0	0	0					0	0	0	13	
Spillback Cap Reductn	0	0	0					690	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	1.16	0.72	0.72					0.77	0.40	0.83	0.86	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 98 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 160			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.16			
Intersection Signal Delay: 47.5		Intersection LOS: D	
Intersection Capacity Utilization 72.9%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø1	Ø3
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	24.0	25.0
Total Split (%)	20%	21%
Maximum Green (s)	18.0	18.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	5.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

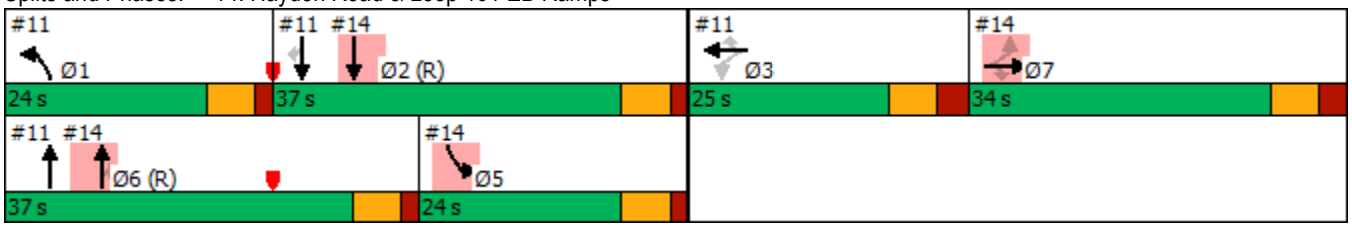
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Hayden Road & Loop 101 EB Ramps

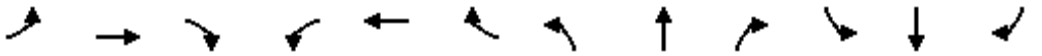


Intersection	
Intersection Delay, s/veh	172.6
Intersection LOS	F

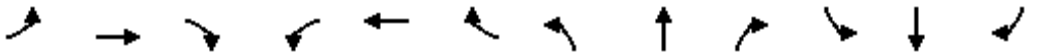
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	62	763	3	4	376	100	5	543	7	89	530	24
Future Vol, veh/h	62	763	3	4	376	100	5	543	7	89	530	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	829	3	4	409	109	5	590	8	97	576	26
Number of Lanes	1	2	0	1	2	0	1	2	0	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	282.9	69.2	154.5	123.3
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	96%	0%	100%	99%	0%	100%	56%	0%	100%
Vol Right, %	0%	0%	4%	0%	0%	1%	0%	0%	44%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	362	188	62	509	257	4	251	225	89	353
LT Vol	5	0	0	62	0	0	4	0	0	89	0
Through Vol	0	362	181	0	509	254	0	251	125	0	353
RT Vol	0	0	7	0	0	3	0	0	100	0	0
Lane Flow Rate	5	393	204	67	553	280	4	272	245	97	384
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.019	1.351	0.7	0.234	1.843	0.932	0.016	0.944	0.828	0.339	1.294
Departure Headway (Hd)	13.84	13.34	13.314	13.115	12.615	12.606	14.062	13.562	13.252	13.952	13.452
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	260	275	274	276	293	291	256	270	274	259	273
Service Time	11.54	11.04	11.014	10.815	10.315	10.306	11.762	11.262	10.952	11.652	11.152
HCM Lane V/C Ratio	0.019	1.429	0.745	0.243	1.887	0.962	0.016	1.007	0.894	0.375	1.407
HCM Control Delay	16.8	214.8	42.1	19.8	420.5	74.3	17	80.6	57.5	23.6	192.8
HCM Lane LOS	C	F	E	C	F	F	C	F	F	C	F
HCM 95th-tile Q	0.1	19	4.8	0.9	35.6	8.9	0	8.8	6.7	1.4	17.3



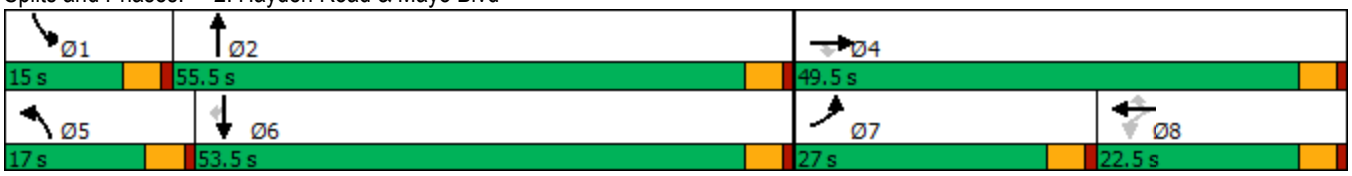
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	373	114	65	18	19	41	169	531	109	146	933	438
Future Volume (vph)	373	114	65	18	19	41	169	531	109	146	933	438
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		170	150		130	150		0	355		0
Storage Lanes	2		1	1		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.88	0.97	0.91	0.91	0.97	0.95	1.00
Frt			0.850			0.850		0.975				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	2787	3433	4958	0	3433	3539	1583
Flt Permitted	0.950			0.678			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	1263	3539	2787	3433	4958	0	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			71			95		45				476
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		700			1025			944			517	
Travel Time (s)		15.9			23.3			16.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	405	124	71	20	21	45	184	577	118	159	1014	476
Shared Lane Traffic (%)												
Lane Group Flow (vph)	405	124	71	20	21	45	184	695	0	159	1014	476
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8		8						6

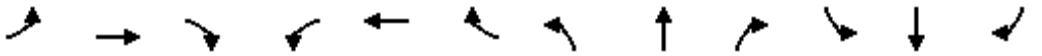


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	27.0	49.5	49.5	22.5	22.5	22.5	17.0	55.5		15.0	53.5	53.5
Total Split (%)	22.5%	41.3%	41.3%	18.8%	18.8%	18.8%	14.2%	46.3%		12.5%	44.6%	44.6%
Maximum Green (s)	22.5	45.0	45.0	18.0	18.0	18.0	12.5	51.0		10.5	49.0	49.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0			0	0
Act Effct Green (s)	17.1	26.5	26.5	7.3	7.3	7.3	10.5	51.6		9.4	50.5	50.5
Actuated g/C Ratio	0.17	0.26	0.26	0.07	0.07	0.07	0.10	0.51		0.09	0.50	0.50
v/c Ratio	0.70	0.13	0.15	0.22	0.08	0.16	0.52	0.27		0.50	0.57	0.46
Control Delay	47.1	27.8	7.4	52.9	46.9	1.1	49.8	14.8		51.0	21.2	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	47.1	27.8	7.4	52.9	46.9	1.1	49.8	14.8		51.0	21.2	3.4
LOS	D	C	A	D	D	A	D	B		D	C	A
Approach Delay		38.4			24.4			22.1			18.9	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	131	32	0	13	6	0	60	89		52	246	0
Queue Length 95th (ft)	188	54	32	39	20	0	102	134		91	368	59
Internal Link Dist (ft)		620			945			864			437	
Turn Bay Length (ft)	400		170	150		130	150			355		
Base Capacity (vph)	772	1592	751	227	637	579	429	2550		360	1766	1028
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.52	0.08	0.09	0.09	0.03	0.08	0.43	0.27		0.44	0.57	0.46

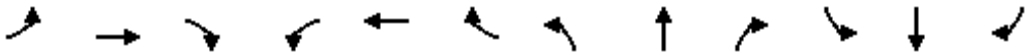
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 101.1			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 23.6		Intersection LOS: C	
Intersection Capacity Utilization 59.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Hayden Road & Mayo Blvd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	592	37	91	422	120	78	12	193	73	4	85
Future Volume (vph)	201	592	37	91	422	120	78	12	193	73	4	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991				0.850		0.859			0.856	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3507	0	1770	3539	1583	1770	1600	0	1770	1595	0
Flt Permitted	0.488			0.389			0.695			0.619		
Satd. Flow (perm)	909	3507	0	725	3539	1583	1295	1600	0	1153	1595	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				130		210			92	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		337			945			1455			417	
Travel Time (s)		7.7			21.5			33.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	218	643	40	99	459	130	85	13	210	79	4	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	218	683	0	99	459	130	85	223	0	79	96	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	78.0	78.0		78.0	78.0	78.0	42.0	42.0		42.0	42.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%	65.0%	35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	73.5	73.5		73.5	73.5	73.5	37.5	37.5		37.5	37.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	18.3	18.3		18.3	18.3	18.3	9.5	9.5		9.5	9.5	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.25	0.25		0.25	0.25	
v/c Ratio	0.49	0.40		0.28	0.27	0.15	0.26	0.40		0.27	0.20	
Control Delay	10.9	6.6		8.1	5.9	1.9	15.7	5.8		16.2	5.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	10.9	6.6		8.1	5.9	1.9	15.7	5.8		16.2	5.8	
LOS	B	A		A	A	A	B	A		B	A	
Approach Delay		7.6			5.5			8.5			10.5	
Approach LOS		A			A			A			B	
Queue Length 50th (ft)	24	36		10	23	0	13	2		12	1	
Queue Length 95th (ft)	79	81		36	53	17	52	45		50	29	
Internal Link Dist (ft)		257			865			1375			337	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	909	3507		725	3539	1583	1184	1481		1055	1467	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.24	0.19		0.14	0.13	0.08	0.07	0.15		0.07	0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 37.5			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 7.3		Intersection LOS: A	
Intersection Capacity Utilization 54.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 37: 78th Street & Mayo Blvd



Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	6	690	15	0	628
Future Vol, veh/h	15	6	690	15	0	628
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	7	750	16	0	683

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1100	383	0	0	-	-
Stage 1	758	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	206	615	-	-	0	-
Stage 1	423	-	-	-	0	-
Stage 2	691	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	206	615	-	-	-	-
Mov Cap-2 Maneuver	325	-	-	-	-	-
Stage 1	423	-	-	-	-	-
Stage 2	691	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	325	615	-
HCM Lane V/C Ratio	-	-	0.05	0.011	-
HCM Control Delay (s)	-	-	16.7	10.9	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	58	904	492	62	12	47
Future Vol, veh/h	58	904	492	62	12	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	983	535	67	13	51

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	602	0	-	0	1153	268
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	618	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	971	-	-	-	191	730
Stage 1	-	-	-	-	551	-
Stage 2	-	-	-	-	500	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	971	-	-	-	179	730
Mov Cap-2 Maneuver	-	-	-	-	313	-
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	500	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	971	-	-	-	313	730
HCM Lane V/C Ratio	0.065	-	-	-	0.042	0.07
HCM Control Delay (s)	9	-	-	-	17	10.3
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	896	550	0	0	0
Future Vol, veh/h	0	896	550	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	974	598	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	598	0	-	0	1085	299
Stage 1	-	-	-	-	598	-
Stage 2	-	-	-	-	487	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	975	-	-	-	211	697
Stage 1	-	-	-	-	512	-
Stage 2	-	-	-	-	583	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	975	-	-	-	211	697
Mov Cap-2 Maneuver	-	-	-	-	344	-
Stage 1	-	-	-	-	512	-
Stage 2	-	-	-	-	583	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	975	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	215	773	595	253	83	112
Future Vol, veh/h	215	773	595	253	83	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	234	840	647	275	90	122

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	922	0	-	0	1535	324
Stage 1	-	-	-	-	647	-
Stage 2	-	-	-	-	888	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	736	-	-	-	107	672
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	362	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	736	-	-	-	~ 73	672
Mov Cap-2 Maneuver	-	-	-	-	191	-
Stage 1	-	-	-	-	329	-
Stage 2	-	-	-	-	362	-

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	23.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	736	-	-	-	191	672
HCM Lane V/C Ratio	0.318	-	-	-	0.472	0.181
HCM Control Delay (s)	12.2	-	-	-	39.7	11.5
HCM Lane LOS	B	-	-	-	E	B
HCM 95th %tile Q(veh)	1.4	-	-	-	2.3	0.7

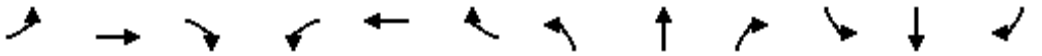
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	291
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	484	11	6	977	86	12	521	8	114	582	68
Future Vol, veh/h	41	484	11	6	977	86	12	521	8	114	582	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	45	526	12	7	1062	93	13	566	9	124	633	74
Number of Lanes	1	2	0	1	2	0	1	2	0	1	2	0

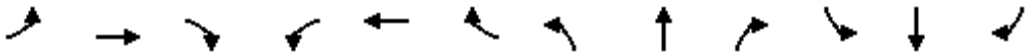
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	125.2	531.7	155.6	166.3
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	96%	0%	100%	94%	0%	100%	79%	0%	100%
Vol Right, %	0%	0%	4%	0%	0%	6%	0%	0%	21%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	347	182	41	323	172	6	651	412	114	388
LT Vol	12	0	0	41	0	0	6	0	0	114	0
Through Vol	0	347	174	0	323	161	0	651	326	0	388
RT Vol	0	0	8	0	0	11	0	0	86	0	0
Lane Flow Rate	13	378	197	45	351	187	7	708	447	124	422
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.048	1.348	0.704	0.165	1.252	0.666	0.023	2.452	1.532	0.442	1.445
Departure Headway (Hd)	15.037	14.537	14.506	15.478	14.978	14.934	13.601	13.101	12.955	15.487	14.987
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	240	253	251	233	246	244	265	283	286	234	245
Service Time	12.737	12.237	12.206	13.178	12.678	12.634	11.301	10.801	10.655	13.187	12.687
HCM Lane V/C Ratio	0.054	1.494	0.785	0.193	1.427	0.766	0.026	2.502	1.563	0.53	1.722
HCM Control Delay	18.5	217.8	45.6	21.2	182.3	43.1	16.6	690.6	287.9	29.9	258.4
HCM Lane LOS	C	F	E	C	F	E	C	F	F	D	F
HCM 95th-tile Q	0.2	17.8	4.7	0.6	15.1	4.2	0.1	54.5	24.9	2.1	19.9



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	409	6	639	813	1336	0	0	1065	771
Future Volume (vph)	0	0	0	409	6	639	813	1336	0	0	1065	771
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	240		0	0		190
Storage Lanes	0		0	2		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.91	1.00	1.00	0.86	1.00
Frt					0.853	0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1509	1504	1770	5085	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1509	1504	1770	5085	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					348	347						566
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			661			409			989	
Travel Time (s)		10.6			10.0			7.0			16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	445	7	695	884	1452	0	0	1158	838
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	445	355	347	884	1452	0	0	1158	838
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					3		1	6			2	
Permitted Phases				3		3						2

Lane Group	Ø5	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	7
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3	3	3	1	6			2	2
Switch Phase												
Minimum Initial (s)				7.0	7.0	7.0	12.0	5.0			16.0	16.0
Minimum Split (s)				47.0	47.0	47.0	18.0	89.5			46.0	46.0
Total Split (s)				31.0	31.0	31.0	38.0	47.0			32.0	32.0
Total Split (%)				25.8%	25.8%	25.8%	31.7%	39.2%			26.7%	26.7%
Maximum Green (s)				24.0	24.0	24.0	32.0	41.0			26.0	26.0
Yellow Time (s)				4.3	4.3	4.3	4.4	4.4			4.4	4.4
All-Red Time (s)				2.7	2.7	2.7	1.6	1.6			1.6	1.6
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				7.0	7.0	7.0	6.0	6.0			6.0	6.0
Lead/Lag				Lead	Lead	Lead	Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	5.0	5.0			2.0	2.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Walk Time (s)				7.0	7.0	7.0	5.0	5.0			0.0	0.0
Flash Dont Walk (s)				33.0	33.0	33.0	20.0	35.0			45.0	45.0
Pedestrian Calls (#/hr)				0	0	0	0	0			0	0
Act Effct Green (s)				20.8	20.8	20.8	32.0	41.0			26.0	26.0
Actuated g/C Ratio				0.17	0.17	0.17	0.27	0.34			0.22	0.22
v/c Ratio				0.75	0.65	0.63	1.87	0.84			0.83	1.07
Control Delay				55.3	10.8	10.1	417.6	10.8			51.2	66.6
Queue Delay				0.0	0.0	0.0	0.0	1.2			0.9	0.0
Total Delay				55.3	10.8	10.1	417.6	12.0			52.1	66.6
LOS				E	B	B	F	B			D	E
Approach Delay					27.8			165.5			58.2	
Approach LOS					C			F			E	
Queue Length 50th (ft)				169	5	0	~1014	117			251	~349
Queue Length 95th (ft)				221	97	89	m#1171	m156			295	#596
Internal Link Dist (ft)		619			581			329			909	
Turn Bay Length (ft)							240					190
Base Capacity (vph)				686	580	578	472	1737			1388	786
Starvation Cap Reductn				0	0	0	0	120			0	0
Spillback Cap Reductn				0	0	0	0	0			67	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.65	0.61	0.60	1.87	0.90			0.88	1.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 205			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.87			
Intersection Signal Delay: 97.6		Intersection LOS: F	
Intersection Capacity Utilization 122.1%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø5	Ø7
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	23.0	19.0
Total Split (%)	19%	16%
Maximum Green (s)	17.0	12.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	2.0
Recall Mode	None	None
Walk Time (s)	0.0	7.0
Flash Dont Walk (s)	30.0	33.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

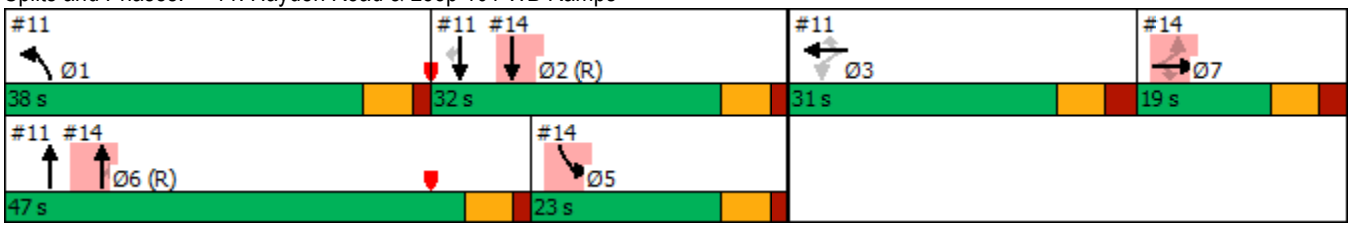
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

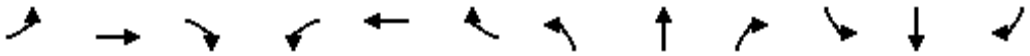
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Hayden Road & Loop 101 WB Ramps



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	468	1	528	0	0	0	0	1680	488	547	926	0
Future Volume (vph)	468	1	528	0	0	0	0	1680	488	547	926	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		215	245		0
Storage Lanes	2		1	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt		0.851	0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	1506	1504	0	0	0	0	6408	1583	3433	5085	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	1506	1504	0	0	0	0	6408	1583	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		287	287						437			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		604			554			812			409	
Travel Time (s)		9.2			8.4			13.8			7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	509	1	574	0	0	0	0	1826	530	595	1007	0
Shared Lane Traffic (%)			50%									
Lane Group Flow (vph)	509	288	287	0	0	0	0	1826	530	595	1007	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						6		5	2	
Permitted Phases	7		7						6			

Lane Group	Ø1	Ø3
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	3
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	7	7					6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					5.0	5.0	12.0	16.0	
Minimum Split (s)	47.0	47.0	47.0					89.5	89.5	18.0	46.0	
Total Split (s)	19.0	19.0	19.0					47.0	47.0	23.0	32.0	
Total Split (%)	15.8%	15.8%	15.8%					39.2%	39.2%	19.2%	26.7%	
Maximum Green (s)	12.0	12.0	12.0					41.0	41.0	17.0	26.0	
Yellow Time (s)	4.3	4.3	4.3					4.4	4.4	4.4	4.4	
All-Red Time (s)	2.7	2.7	2.7					1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0					6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag					Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0					5.0	5.0	2.0	2.0	
Recall Mode	None	None	None					C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0	7.0					5.0	5.0	0.0	0.0	
Flash Dont Walk (s)	33.0	33.0	33.0					35.0	35.0	30.0	45.0	
Pedestrian Calls (#/hr)	0	0	0					0	0	0	0	
Act Effct Green (s)	15.2	15.2	15.2					41.0	41.0	17.0	26.0	
Actuated g/C Ratio	0.13	0.13	0.13					0.34	0.34	0.14	0.22	
v/c Ratio	1.17	0.65	0.65					0.83	0.64	1.22	0.91	
Control Delay	144.1	13.6	13.5					40.5	10.1	145.8	41.7	
Queue Delay	0.6	0.0	0.0					7.4	0.0	0.0	0.0	
Total Delay	144.6	13.6	13.5					48.0	10.1	145.8	41.7	
LOS	F	B	B					D	B	F	D	
Approach Delay		75.1						39.4			80.4	
Approach LOS		E						D			F	
Queue Length 50th (ft)	~251	1	0					376	50	~269	112	
Queue Length 95th (ft)	#390	94	93					425	166	m#375	#249	
Internal Link Dist (ft)		524			474			732			329	
Turn Bay Length (ft)									215	245		
Base Capacity (vph)	435	441	441					2189	828	486	1101	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	26	0	0					337	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	1.24	0.65	0.65					0.99	0.64	1.22	0.91	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 205			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.87			
Intersection Signal Delay: 60.1		Intersection LOS: E	
Intersection Capacity Utilization 122.1%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø1	Ø3
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	38.0	31.0
Total Split (%)	32%	26%
Maximum Green (s)	32.0	24.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	5.0	2.0
Recall Mode	None	None
Walk Time (s)	5.0	7.0
Flash Dont Walk (s)	20.0	33.0
Pedestrian Calls (#/hr)	0	0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

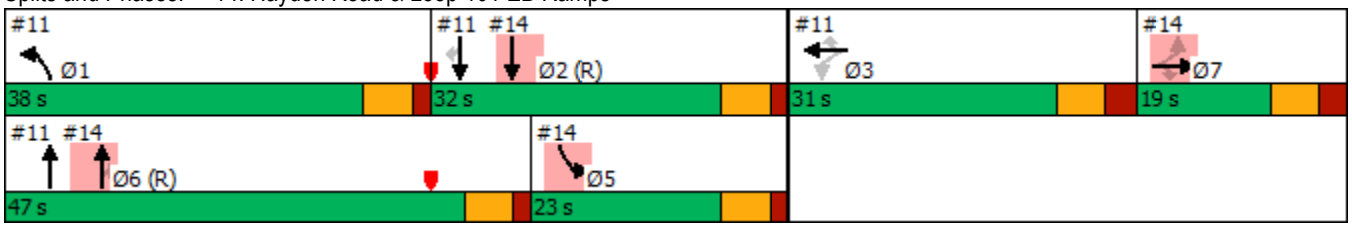
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.

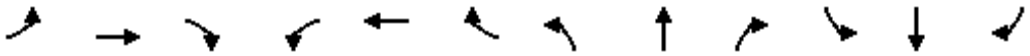
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Hayden Road & Loop 101 EB Ramps



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	683	24	134	111	118	247	121	1237	22	50	833	354
Future Volume (vph)	683	24	134	111	118	247	121	1237	22	50	833	354
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		170	150		130	150		0	355		0
Storage Lanes	2		1	1		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.88	0.97	0.91	0.91	0.97	0.95	1.00
Frt			0.850			0.850		0.997				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	1770	3539	2787	3433	5070	0	3433	3539	1583
Flt Permitted	0.950			0.739			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	1377	3539	2787	3433	5070	0	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			268		2				350
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		700			1025			944			517	
Travel Time (s)		15.9			23.3			16.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	742	26	146	121	128	268	132	1345	24	54	905	385
Shared Lane Traffic (%)												
Lane Group Flow (vph)	742	26	146	121	128	268	132	1369	0	54	905	385
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8		8						6

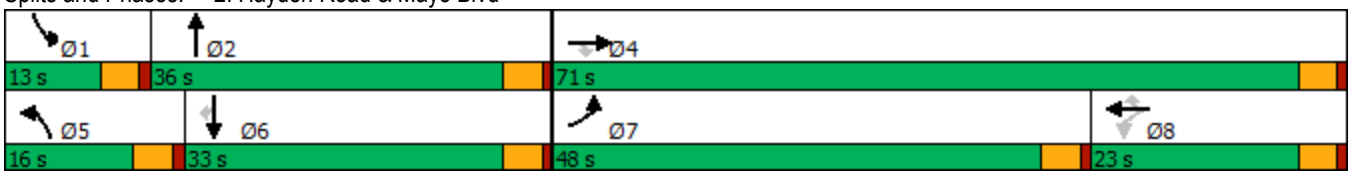


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	48.0	71.0	71.0	23.0	23.0	23.0	16.0	36.0		13.0	33.0	33.0
Total Split (%)	40.0%	59.2%	59.2%	19.2%	19.2%	19.2%	13.3%	30.0%		10.8%	27.5%	27.5%
Maximum Green (s)	43.5	66.5	66.5	18.5	18.5	18.5	11.5	31.5		8.5	28.5	28.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0			0	0
Act Effct Green (s)	26.6	45.0	45.0	13.8	13.8	13.8	9.1	34.0		7.0	29.5	29.5
Actuated g/C Ratio	0.27	0.46	0.46	0.14	0.14	0.14	0.09	0.35		0.07	0.30	0.30
v/c Ratio	0.79	0.02	0.18	0.62	0.25	0.43	0.41	0.77		0.22	0.84	0.53
Control Delay	39.8	13.3	2.9	55.2	39.7	7.3	47.9	34.6		48.3	42.5	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	39.8	13.3	2.9	55.2	39.7	7.3	47.9	34.6		48.3	42.5	8.2
LOS	D	B	A	E	D	A	D	C		D	D	A
Approach Delay		33.1			26.5			35.7			32.9	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	221	4	0	72	37	0	41	291		17	282	16
Queue Length 95th (ft)	306	11	30	144	71	39	77	#459		39	#490	107
Internal Link Dist (ft)		620			945			864			437	
Turn Bay Length (ft)	400		170	150		130	150			355		
Base Capacity (vph)	1561	2460	1144	266	684	754	412	1774		305	1072	723
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.48	0.01	0.13	0.45	0.19	0.36	0.32	0.77		0.18	0.84	0.53

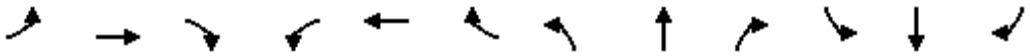
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 97.2			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 33.2		Intersection LOS: C	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Hayden Road & Mayo Blvd



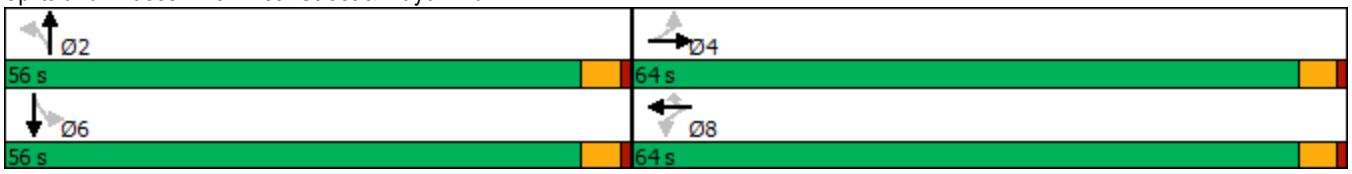
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	515	92	194	691	55	88	6	221	254	13	297
Future Volume (vph)	93	515	92	194	691	55	88	6	221	254	13	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977				0.850		0.854			0.856	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3458	0	1770	3539	1583	1770	1591	0	1770	1595	0
Flt Permitted	0.301			0.348			0.450			0.554		
Satd. Flow (perm)	561	3458	0	648	3539	1583	838	1591	0	1032	1595	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24				60		240			149	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		337			945			1455			417	
Travel Time (s)		7.7			21.5			33.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	560	100	211	751	60	96	7	240	276	14	323
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	660	0	211	751	60	96	247	0	276	337	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	64.0	64.0		64.0	64.0	64.0	56.0	56.0		56.0	56.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%	53.3%	46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	59.5	59.5		59.5	59.5	59.5	51.5	51.5		51.5	51.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	35.0	35.0		35.0	35.0	35.0	29.2	29.2		29.2	29.2	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47	0.39	0.39		0.39	0.39	
v/c Ratio	0.39	0.41		0.70	0.45	0.08	0.30	0.32		0.69	0.47	
Control Delay	20.7	14.1		32.6	15.2	4.3	21.7	4.3		31.9	13.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	20.7	14.1		32.6	15.2	4.3	21.7	4.3		31.9	13.1	
LOS	C	B		C	B	A	C	A		C	B	
Approach Delay		15.0			18.1			9.2			21.6	
Approach LOS		B			B			A			C	
Queue Length 50th (ft)	26	87		67	106	0	28	2		97	55	
Queue Length 95th (ft)	95	201		222	240	22	90	51		265	175	
Internal Link Dist (ft)		257			865			1375			337	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	442	2733		511	2792	1261	615	1232		758	1211	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.23	0.24		0.41	0.27	0.05	0.16	0.20		0.36	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 75.1			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 71.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 37: 78th Street & Mayo Blvd



Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	14	641	7	0	730
Future Vol, veh/h	34	14	641	7	0	730
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	15	697	8	0	793

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1098	353	0	0	-	-
Stage 1	701	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	207	643	-	-	0	-
Stage 1	453	-	-	-	0	-
Stage 2	648	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	207	643	-	-	-	-
Mov Cap-2 Maneuver	333	-	-	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	648	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	333	643	-
HCM Lane V/C Ratio	-	-	0.111	0.024	-
HCM Control Delay (s)	-	-	17.2	10.7	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	629	991	27	27	105
Future Vol, veh/h	25	629	991	27	27	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	684	1077	29	29	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1106	0	-	0	1473	539
Stage 1	-	-	-	-	1077	-
Stage 2	-	-	-	-	396	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	627	-	-	-	118	487
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	649	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	627	-	-	-	113	487
Mov Cap-2 Maneuver	-	-	-	-	217	-
Stage 1	-	-	-	-	276	-
Stage 2	-	-	-	-	649	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	16.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	627	-	-	-	217	487
HCM Lane V/C Ratio	0.043	-	-	-	0.135	0.234
HCM Control Delay (s)	11	-	-	-	24.2	14.6
HCM Lane LOS	B	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5	0.9

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	648	1016	0	0	0
Future Vol, veh/h	0	648	1016	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	704	1104	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1104	0	-	0	1456	552
Stage 1	-	-	-	-	1104	-
Stage 2	-	-	-	-	352	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	628	-	-	-	121	477
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	683	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	628	-	-	-	121	477
Mov Cap-2 Maneuver	-	-	-	-	223	-
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	683	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	628	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	93	956	777	111	135	239
Future Vol, veh/h	93	956	777	111	135	239
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	1039	845	121	147	260

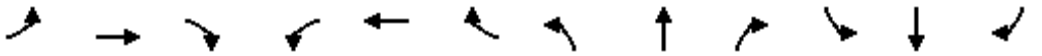
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	966	0	-	0	1567	423
Stage 1	-	-	-	-	845	-
Stage 2	-	-	-	-	722	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	709	-	-	-	~ 102	579
Stage 1	-	-	-	-	382	-
Stage 2	-	-	-	-	442	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	709	-	-	-	~ 88	579
Mov Cap-2 Maneuver	-	-	-	-	211	-
Stage 1	-	-	-	-	328	-
Stage 2	-	-	-	-	442	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	29.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	709	-	-	-	211	579
HCM Lane V/C Ratio	0.143	-	-	-	0.695	0.449
HCM Control Delay (s)	10.9	-	-	-	53.7	16.2
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.5	-	-	-	4.4	2.3

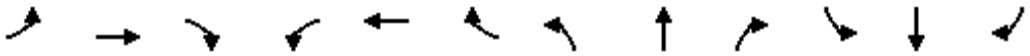
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Total Traffic w/o Axon



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	504	3	681	245	1249	0	0	933	371
Future Volume (vph)	0	0	0	504	3	681	245	1249	0	0	933	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	240		0	0		190
Storage Lanes	0		0	2		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.91	1.00	1.00	0.86	1.00
Frt					0.851	0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1506	1504	1770	5085	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1506	1504	1770	5085	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					370	370						403
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			661			409			989	
Travel Time (s)		10.6			10.0			7.0			16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	548	3	740	266	1358	0	0	1014	403
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	548	373	370	266	1358	0	0	1014	403
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					3		1	6			2	
Permitted Phases				3		3						2

Lane Group	Ø5	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	7
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3	3	3	1	6			2	2
Switch Phase												
Minimum Initial (s)				7.0	7.0	7.0	12.0	5.0			16.0	16.0
Minimum Split (s)				47.0	47.0	47.0	18.0	46.0			46.0	46.0
Total Split (s)				25.0	25.0	25.0	20.0	35.0			45.0	45.0
Total Split (%)				20.8%	20.8%	20.8%	16.7%	29.2%			37.5%	37.5%
Maximum Green (s)				18.0	18.0	18.0	14.0	29.0			39.0	39.0
Yellow Time (s)				4.3	4.3	4.3	4.4	4.4			4.4	4.4
All-Red Time (s)				2.7	2.7	2.7	1.6	1.6			1.6	1.6
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				7.0	7.0	7.0	6.0	6.0			6.0	6.0
Lead/Lag				Lead	Lead	Lead	Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	5.0	5.0			2.0	2.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Walk Time (s)				7.0	7.0	7.0		5.0			5.0	5.0
Flash Dont Walk (s)				33.0	33.0	33.0		35.0			35.0	35.0
Pedestrian Calls (#/hr)				0	0	0		0			0	0
Act Effct Green (s)				19.2	19.2	19.2	14.0	29.0			37.8	37.8
Actuated g/C Ratio				0.16	0.16	0.16	0.12	0.24			0.32	0.32
v/c Ratio				1.00	0.68	0.67	1.29	1.11			0.50	0.52
Control Delay				88.8	11.7	11.3	172.5	71.7			34.3	5.5
Queue Delay				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay				88.8	11.7	11.3	172.5	71.7			34.3	5.5
LOS				F	B	B	F	E			C	A
Approach Delay					44.3			88.2			26.1	
Approach LOS					D			F			C	
Queue Length 50th (ft)				~241	2	0	~243	~448			182	0
Queue Length 95th (ft)				#353	103	100	m#263	m#369			217	71
Internal Link Dist (ft)		619			581			329			909	
Turn Bay Length (ft)							240					190
Base Capacity (vph)				549	552	551	206	1228			2082	786
Starvation Cap Reductn				0	0	0	0	2			0	0
Spillback Cap Reductn				0	0	0	0	0			74	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				1.00	0.68	0.67	1.29	1.11			0.50	0.51

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 98 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 160			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.36			
Intersection Signal Delay: 54.8		Intersection LOS: D	
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø5	Ø7
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	30.0	30.0
Total Split (%)	25%	25%
Maximum Green (s)	24.0	23.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

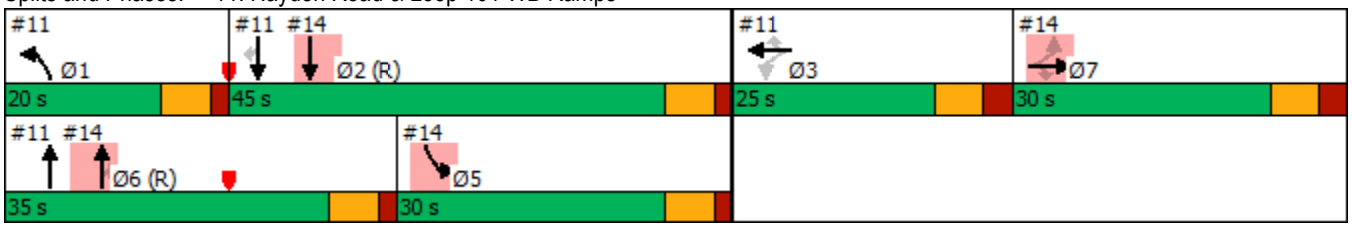
Queue shown is maximum after two cycles.

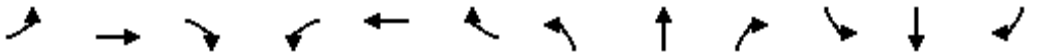
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

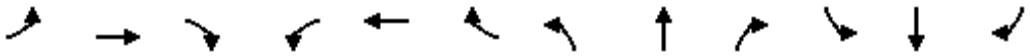
Splits and Phases: 11: Hayden Road & Loop 101 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	823	1	1038	0	0	0	0	671	196	391	1046	0
Future Volume (vph)	823	1	1038	0	0	0	0	671	196	391	1046	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		215	245		0
Storage Lanes	2		1	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt		0.850	0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	1504	1504	0	0	0	0	6408	1583	3433	5085	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	1504	1504	0	0	0	0	6408	1583	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		542	542						213			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		604			554			812			409	
Travel Time (s)		9.2			8.4			13.8			7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	895	1	1128	0	0	0	0	729	213	425	1137	0
Shared Lane Traffic (%)			50%									
Lane Group Flow (vph)	895	565	564	0	0	0	0	729	213	425	1137	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						6		5	2	
Permitted Phases	7		7						6			

Lane Group	Ø1	Ø3
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	3
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	7	7					6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					5.0	5.0	12.0	16.0	
Minimum Split (s)	47.0	47.0	47.0					46.0	46.0	18.0	46.0	
Total Split (s)	30.0	30.0	30.0					35.0	35.0	30.0	45.0	
Total Split (%)	25.0%	25.0%	25.0%					29.2%	29.2%	25.0%	37.5%	
Maximum Green (s)	23.0	23.0	23.0					29.0	29.0	24.0	39.0	
Yellow Time (s)	4.3	4.3	4.3					4.4	4.4	4.4	4.4	
All-Red Time (s)	2.7	2.7	2.7					1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0					6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag					Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0					5.0	5.0	2.0	2.0	
Recall Mode	None	None	None					C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0	7.0					5.0	5.0		5.0	
Flash Dont Walk (s)	33.0	33.0	33.0					35.0	35.0		35.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	23.0	23.0	23.0					29.0	29.0	22.8	37.8	
Actuated g/C Ratio	0.19	0.19	0.19					0.24	0.24	0.19	0.32	
v/c Ratio	1.36	0.78	0.78					0.47	0.39	0.65	0.71	
Control Delay	210.6	13.1	13.0					40.1	7.1	40.4	29.9	
Queue Delay	0.0	0.0	0.0					3.2	0.0	0.0	0.1	
Total Delay	210.6	13.1	13.0					43.3	7.1	40.4	30.0	
LOS	F	B	B					D	A	D	C	
Approach Delay		100.4						35.1			32.8	
Approach LOS		F						D			C	
Queue Length 50th (ft)	~470	15	14					140	0	166	135	
Queue Length 95th (ft)	#598	153	152					173	61	m193	m147	
Internal Link Dist (ft)		524			474			732			329	
Turn Bay Length (ft)									215	245		
Base Capacity (vph)	657	726	726					1548	544	686	1652	
Starvation Cap Reductn	0	0	0					0	0	0	53	
Spillback Cap Reductn	0	0	0					693	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	1.36	0.78	0.78					0.85	0.39	0.62	0.71	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 98 (82%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 160			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.36			
Intersection Signal Delay: 63.5		Intersection LOS: E	
Intersection Capacity Utilization 73.9%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø1	Ø3
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	20.0	25.0
Total Split (%)	17%	21%
Maximum Green (s)	14.0	18.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	5.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

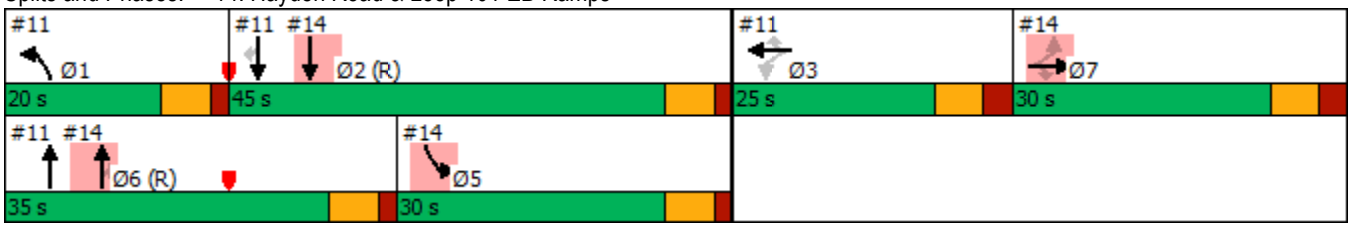
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 14: Hayden Road & Loop 101 EB Ramps



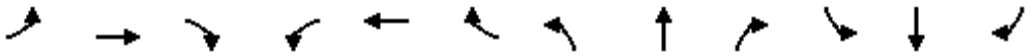
Intersection	
Intersection Delay, s/veh	134.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	62	649	3	4	357	100	5	543	7	89	530	24
Future Vol, veh/h	62	649	3	4	357	100	5	543	7	89	530	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	705	3	4	388	109	5	590	8	97	576	26
Number of Lanes	1	2	0	1	2	0	1	2	0	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	194.3	59	145.4	114.1
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	96%	0%	100%	99%	0%	100%	54%	0%	100%
Vol Right, %	0%	0%	4%	0%	0%	1%	0%	0%	46%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	5	362	188	62	433	219	4	238	219	89	353
LT Vol	5	0	0	62	0	0	4	0	0	89	0
Through Vol	0	362	181	0	433	216	0	238	119	0	353
RT Vol	0	0	7	0	0	3	0	0	100	0	0
Lane Flow Rate	5	393	204	67	470	238	4	259	238	97	384
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.019	1.324	0.686	0.231	1.549	0.785	0.015	0.886	0.794	0.331	1.263
Departure Headway (Hd)	13.317	12.817	12.79	12.905	12.405	12.395	13.628	13.128	12.809	13.272	12.772
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	270	287	284	280	296	293	264	279	286	273	288
Service Time	11.017	10.517	10.49	10.605	10.105	10.095	11.328	10.828	10.509	10.972	10.472
HCM Lane V/C Ratio	0.019	1.369	0.718	0.239	1.588	0.812	0.015	0.928	0.832	0.355	1.333
HCM Control Delay	16.3	202.2	39.4	19.4	293.2	48.7	16.5	66.9	51.2	22.4	178.4
HCM Lane LOS	C	F	E	C	F	E	C	F	F	C	F
HCM 95th-tile Q	0.1	18.8	4.6	0.9	26.3	6.1	0	7.8	6.2	1.4	17.1

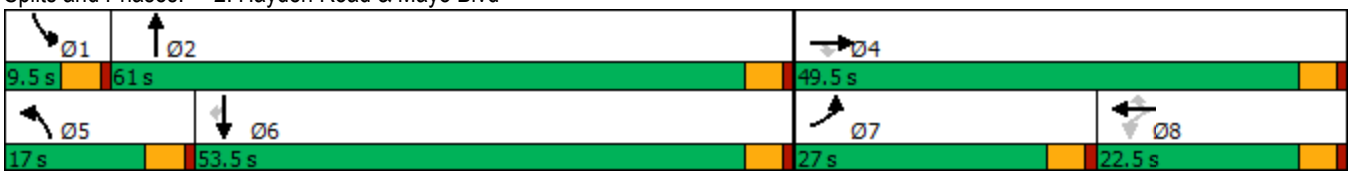
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	373	0	65	0	0	0	169	531	0	0	933	438
Future Volume (vph)	373	0	65	0	0	0	169	531	0	0	933	438
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		170	150		130	150		0	355		0
Storage Lanes	2		1	1		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.88	0.97	0.91	0.91	0.97	0.95	1.00
Frt			0.850									0.850
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	1583	1863	3539	3278	3433	5085	0	3614	3539	1583
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	1583	1863	3539	3278	3433	5085	0	3614	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			186									476
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		700			1025			944			517	
Travel Time (s)		15.9			23.3			16.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	405	0	71	0	0	0	184	577	0	0	1014	476
Shared Lane Traffic (%)												
Lane Group Flow (vph)	405	0	71	0	0	0	184	577	0	0	1014	476
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm		Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8		8						6



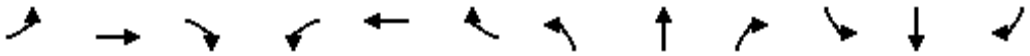
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	27.0	49.5	49.5	22.5	22.5	22.5	17.0	61.0		9.5	53.5	53.5
Total Split (%)	22.5%	41.3%	41.3%	18.8%	18.8%	18.8%	14.2%	50.8%		7.9%	44.6%	44.6%
Maximum Green (s)	22.5	45.0	45.0	18.0	18.0	18.0	12.5	56.5		5.0	49.0	49.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0			0	0
Act Effct Green (s)	15.6		15.6				10.1	63.7			49.1	49.1
Actuated g/C Ratio	0.18		0.18				0.11	0.72			0.56	0.56
v/c Ratio	0.67		0.16				0.47	0.16			0.52	0.44
Control Delay	39.9		0.8				41.3	4.2			14.1	2.6
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	39.9		0.8				41.3	4.2			14.1	2.6
LOS	D		A				D	A			B	A
Approach Delay		34.0						13.2			10.4	
Approach LOS		C						B			B	
Queue Length 50th (ft)	109		0				50	31			173	0
Queue Length 95th (ft)	161		0				86	50			266	47
Internal Link Dist (ft)		620			945			864			437	
Turn Bay Length (ft)	400		170				150					
Base Capacity (vph)	876		899				486	3665			1967	1091
Starvation Cap Reductn	0		0				0	0			0	0
Spillback Cap Reductn	0		0				0	0			0	0
Storage Cap Reductn	0		0				0	0			0	0
Reduced v/c Ratio	0.46		0.08				0.38	0.16			0.52	0.44

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 88.4			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 52.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Hayden Road & Mayo Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	478	37	91	403	120	78	12	193	73	4	85
Future Volume (vph)	201	478	37	91	403	120	78	12	193	73	4	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989				0.850		0.859			0.856	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3500	0	1770	3539	1583	1770	1600	0	1770	1595	0
Flt Permitted	0.498			0.442			0.695			0.619		
Satd. Flow (perm)	928	3500	0	823	3539	1583	1295	1600	0	1153	1595	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				130		210			92	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		337			945			1455			417	
Travel Time (s)		7.7			21.5			33.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	218	520	40	99	438	130	85	13	210	79	4	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	218	560	0	99	438	130	85	223	0	79	96	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	77.0	77.0		77.0	77.0	77.0	43.0	43.0		43.0	43.0	
Total Split (%)	64.2%	64.2%		64.2%	64.2%	64.2%	35.8%	35.8%		35.8%	35.8%	
Maximum Green (s)	72.5	72.5		72.5	72.5	72.5	38.5	38.5		38.5	38.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	16.7	16.7		16.7	16.7	16.7	9.2	9.2		9.2	9.2	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47	0.26	0.26		0.26	0.26	
v/c Ratio	0.50	0.34		0.26	0.26	0.16	0.25	0.39		0.27	0.20	
Control Delay	11.2	6.3		7.7	6.0	1.9	14.6	5.4		15.0	5.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	11.2	6.3		7.7	6.0	1.9	14.6	5.4		15.0	5.4	
LOS	B	A		A	A	A	B	A		B	A	
Approach Delay		7.7			5.5			8.0			9.8	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)	23	27		9	21	0	12	2		11	1	
Queue Length 95th (ft)	77	63		34	50	17	49	43		47	27	
Internal Link Dist (ft)		257			865			1375			337	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	928	3500		823	3539	1583	1225	1525		1091	1514	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.23	0.16		0.12	0.12	0.08	0.07	0.15		0.07	0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 35.6			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 54.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 37: 78th Street & Mayo Blvd



Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	6	690	15	0	628
Future Vol, veh/h	15	6	690	15	0	628
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	7	750	16	0	683

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1100	383	0	0	-	-
Stage 1	758	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	206	615	-	-	0	-
Stage 1	423	-	-	-	0	-
Stage 2	691	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	206	615	-	-	-	-
Mov Cap-2 Maneuver	325	-	-	-	-	-
Stage 1	423	-	-	-	-	-
Stage 2	691	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	325	615	-
HCM Lane V/C Ratio	-	-	0.05	0.011	-
HCM Control Delay (s)	-	-	16.7	10.9	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	58	790	473	62	12	47
Future Vol, veh/h	58	790	473	62	12	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	859	514	67	13	51

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	581	0	-	0	1070	257
Stage 1	-	-	-	-	514	-
Stage 2	-	-	-	-	556	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	989	-	-	-	216	742
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	538	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	989	-	-	-	202	742
Mov Cap-2 Maneuver	-	-	-	-	336	-
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	538	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	989	-	-	-	336	742
HCM Lane V/C Ratio	0.064	-	-	-	0.039	0.069
HCM Control Delay (s)	8.9	-	-	-	16.1	10.2
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.2

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	782	531	0	0	0
Future Vol, veh/h	0	782	531	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	850	577	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	577	0	-	0	1002	289
Stage 1	-	-	-	-	577	-
Stage 2	-	-	-	-	425	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	993	-	-	-	239	708
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	627	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	993	-	-	-	239	708
Mov Cap-2 Maneuver	-	-	-	-	368	-
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	627	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	993	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	215	659	576	253	83	112
Future Vol, veh/h	215	659	576	253	83	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	234	716	626	275	90	122

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	901	0	-	0	1452	313
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	826	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	750	-	-	-	121	683
Stage 1	-	-	-	-	495	-
Stage 2	-	-	-	-	390	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	750	-	-	-	~ 83	683
Mov Cap-2 Maneuver	-	-	-	-	204	-
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	390	-

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	21.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	750	-	-	-	204	683
HCM Lane V/C Ratio	0.312	-	-	-	0.442	0.178
HCM Control Delay (s)	12	-	-	-	35.9	11.4
HCM Lane LOS	B	-	-	-	E	B
HCM 95th %tile Q(veh)	1.3	-	-	-	2.1	0.6

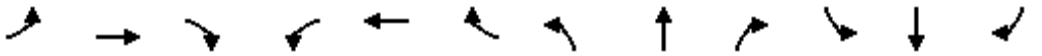
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Intersection Delay, s/veh	240.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	460	11	6	859	86	12	521	8	114	582	68
Future Vol, veh/h	41	460	11	6	859	86	12	521	8	114	582	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	45	500	12	7	934	93	13	566	9	124	633	74
Number of Lanes	1	2	0	1	2	0	1	2	0	1	2	0

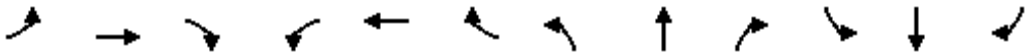
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	3	3
HCM Control Delay	108.9	423.2	153.6	162.6
HCM LOS	F	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	96%	0%	100%	93%	0%	100%	77%	0%	100%
Vol Right, %	0%	0%	4%	0%	0%	7%	0%	0%	23%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	347	182	41	307	164	6	573	372	114	388
LT Vol	12	0	0	41	0	0	6	0	0	114	0
Through Vol	0	347	174	0	307	153	0	573	286	0	388
RT Vol	0	0	8	0	0	11	0	0	86	0	0
Lane Flow Rate	13	378	197	45	333	179	7	622	405	124	422
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.048	1.345	0.702	0.165	1.189	0.635	0.023	2.15	1.38	0.44	1.44
Departure Headway (Hd)	14.674	14.174	14.143	15.068	14.568	14.521	13.522	13.022	12.861	14.743	14.243
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	245	261	257	240	253	250	266	286	287	247	257
Service Time	12.374	11.874	11.843	12.768	12.268	12.221	11.222	10.722	10.561	12.443	11.943
HCM Lane V/C Ratio	0.053	1.448	0.767	0.188	1.316	0.716	0.026	2.175	1.411	0.502	1.642
HCM Control Delay	18.1	215.3	44.5	20.7	157.8	39.5	16.5	556.5	224.7	28.5	253.9
HCM Lane LOS	C	F	E	C	F	E	C	F	F	D	F
HCM 95th-tile Q	0.2	18.1	4.7	0.6	13.8	3.9	0.1	44.7	20.4	2.1	20.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	417	6	639	792	1307	0	0	1067	771
Future Volume (vph)	0	0	0	417	6	639	792	1307	0	0	1067	771
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	240		0	0		190
Storage Lanes	0		0	2		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.97	0.95	0.95	1.00	0.91	1.00	1.00	0.86	1.00
Frt					0.853	0.850						0.850
Flt Protected				0.950			0.950					
Satd. Flow (prot)	0	0	0	3433	1509	1504	1770	5085	0	0	6408	1583
Flt Permitted				0.950			0.950					
Satd. Flow (perm)	0	0	0	3433	1509	1504	1770	5085	0	0	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					348	347						652
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		699			661			409			989	
Travel Time (s)		10.6			10.0			7.0			16.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	453	7	695	861	1421	0	0	1160	838
Shared Lane Traffic (%)						50%						
Lane Group Flow (vph)	0	0	0	453	355	347	861	1421	0	0	1160	838
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2	1	1	2			2	1
Detector Template				Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)				20	100	20	20	100			100	20
Trailing Detector (ft)				0	0	0	0	0			0	0
Detector 1 Position(ft)				0	0	0	0	0			0	0
Detector 1 Size(ft)				20	6	20	20	6			6	20
Detector 1 Type				Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					3		1	6			2	
Permitted Phases				3		3						2

Lane Group	Ø5	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	5	7
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase				3	3	3	1	6			2	2
Switch Phase												
Minimum Initial (s)				7.0	7.0	7.0	12.0	5.0			16.0	16.0
Minimum Split (s)				47.0	47.0	47.0	18.0	89.5			46.0	46.0
Total Split (s)				35.0	35.0	35.0	32.0	47.0			33.0	33.0
Total Split (%)				29.2%	29.2%	29.2%	26.7%	39.2%			27.5%	27.5%
Maximum Green (s)				28.0	28.0	28.0	26.0	41.0			27.0	27.0
Yellow Time (s)				4.3	4.3	4.3	4.4	4.4			4.4	4.4
All-Red Time (s)				2.7	2.7	2.7	1.6	1.6			1.6	1.6
Lost Time Adjust (s)				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)				7.0	7.0	7.0	6.0	6.0			6.0	6.0
Lead/Lag				Lead	Lead	Lead	Lead	Lead			Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0	2.0	5.0	5.0			2.0	2.0
Recall Mode				None	None	None	None	C-Min			C-Min	C-Min
Walk Time (s)				7.0	7.0	7.0		5.0			5.0	5.0
Flash Dont Walk (s)				33.0	33.0	33.0		35.0			35.0	35.0
Pedestrian Calls (#/hr)				0	0	0		0			0	0
Act Effct Green (s)				22.1	22.1	22.1	26.0	41.0			27.0	27.0
Actuated g/C Ratio				0.18	0.18	0.18	0.22	0.34			0.22	0.22
v/c Ratio				0.72	0.63	0.62	2.25	0.82			0.80	0.97
Control Delay				52.4	10.0	9.3	587.9	11.0			49.1	35.9
Queue Delay				0.0	0.0	0.0	0.0	0.9			0.6	0.0
Total Delay				52.4	10.0	9.3	587.9	11.9			49.7	35.9
LOS				D	B	A	F	B			D	D
Approach Delay					26.4			229.2			43.9	
Approach LOS					C			F			D	
Queue Length 50th (ft)				172	5	0	~1049	116			248	182
Queue Length 95th (ft)				215	92	84	m#1267	m152			292	#482
Internal Link Dist (ft)		619			581			329			909	
Turn Bay Length (ft)							240					190
Base Capacity (vph)				801	618	616	383	1737			1441	861
Starvation Cap Reductn				0	0	0	0	119			0	0
Spillback Cap Reductn				0	0	0	0	0			72	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.57	0.57	0.56	2.25	0.88			0.85	0.97

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 205			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 2.25			
Intersection Signal Delay: 118.0		Intersection LOS: F	
Intersection Capacity Utilization 120.9%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø5	Ø7
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	18.0	20.0
Total Split (%)	15%	17%
Maximum Green (s)	12.0	13.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lag	Lag
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

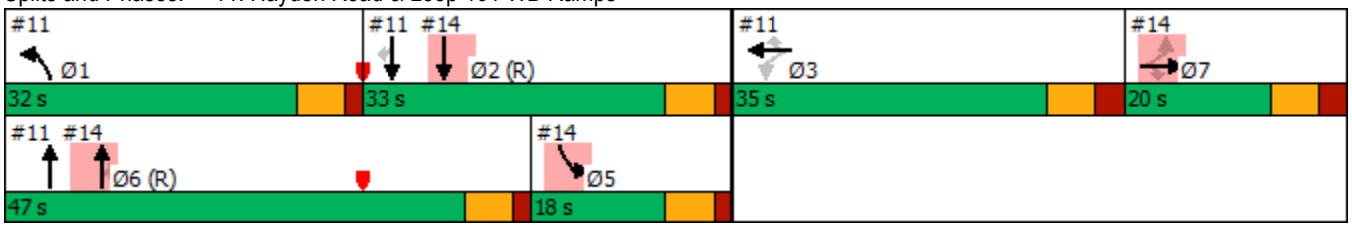
Queue shown is maximum after two cycles.

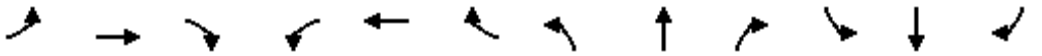
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

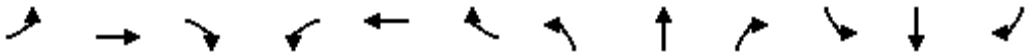
Splits and Phases: 11: Hayden Road & Loop 101 WB Ramps





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	468	1	534	0	0	0	0	1630	405	547	936	0
Future Volume (vph)	468	1	534	0	0	0	0	1630	405	547	936	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		215	245		0
Storage Lanes	2		1	0		0	0		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt		0.851	0.850						0.850			
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3433	1506	1504	0	0	0	0	6408	1583	3433	5085	0
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3433	1506	1504	0	0	0	0	6408	1583	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		290	290						374			
Link Speed (mph)		45			45			40			40	
Link Distance (ft)		604			554			812			409	
Travel Time (s)		9.2			8.4			13.8			7.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	509	1	580	0	0	0	0	1772	440	595	1017	0
Shared Lane Traffic (%)			50%									
Lane Group Flow (vph)	509	291	290	0	0	0	0	1772	440	595	1017	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1					2	1	1	2	
Detector Template	Left	Thru	Right					Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20					100	20	20	100	
Trailing Detector (ft)	0	0	0					0	0	0	0	
Detector 1 Position(ft)	0	0	0					0	0	0	0	
Detector 1 Size(ft)	20	6	20					6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94						94			94	
Detector 2 Size(ft)		6						6			6	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						6		5	2	
Permitted Phases	7		7						6			

Lane Group	Ø1	Ø3
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases	1	3
Permitted Phases		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	7	7					6	6	5	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0					5.0	5.0	12.0	16.0	
Minimum Split (s)	47.0	47.0	47.0					89.5	89.5	18.0	46.0	
Total Split (s)	20.0	20.0	20.0					47.0	47.0	18.0	33.0	
Total Split (%)	16.7%	16.7%	16.7%					39.2%	39.2%	15.0%	27.5%	
Maximum Green (s)	13.0	13.0	13.0					41.0	41.0	12.0	27.0	
Yellow Time (s)	4.3	4.3	4.3					4.4	4.4	4.4	4.4	
All-Red Time (s)	2.7	2.7	2.7					1.6	1.6	1.6	1.6	
Lost Time Adjust (s)	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0					6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag					Lead	Lead	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0					5.0	5.0	2.0	2.0	
Recall Mode	None	None	None					C-Min	C-Min	None	C-Min	
Walk Time (s)	7.0	7.0	7.0					5.0	5.0		5.0	
Flash Dont Walk (s)	33.0	33.0	33.0					35.0	35.0		35.0	
Pedestrian Calls (#/hr)	0	0	0					0	0		0	
Act Effct Green (s)	18.9	18.9	18.9					41.0	41.0	12.0	27.0	
Actuated g/C Ratio	0.16	0.16	0.16					0.34	0.34	0.10	0.22	
v/c Ratio	0.94	0.60	0.60					0.81	0.56	1.73	0.89	
Control Delay	77.3	11.6	11.5					39.5	8.5	365.9	38.2	
Queue Delay	44.7	0.0	0.0					8.1	0.0	0.0	0.0	
Total Delay	121.9	11.6	11.5					47.6	8.5	365.9	38.2	
LOS	F	B	B					D	A	F	D	
Approach Delay		63.1						39.8			159.1	
Approach LOS		E						D			F	
Queue Length 50th (ft)	203	1	0					360	35	~330	104	
Queue Length 95th (ft)	#377	94	92					409	128	#449	#182	
Internal Link Dist (ft)		524			474			732			329	
Turn Bay Length (ft)									215	245		
Base Capacity (vph)	541	481	481					2189	787	343	1144	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	100	0	0					395	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	1.15	0.60	0.60					0.99	0.56	1.73	0.89	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 2:SBT and 6:NBT, Start of Green			
Natural Cycle: 205			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 2.25			
Intersection Signal Delay: 84.1		Intersection LOS: F	
Intersection Capacity Utilization 120.9%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.

Lane Group	Ø1	Ø3
Detector Phase		
Switch Phase		
Minimum Initial (s)	12.0	7.0
Minimum Split (s)	18.0	47.0
Total Split (s)	32.0	35.0
Total Split (%)	27%	29%
Maximum Green (s)	26.0	28.0
Yellow Time (s)	4.4	4.3
All-Red Time (s)	1.6	2.7
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?		
Vehicle Extension (s)	5.0	2.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		33.0
Pedestrian Calls (#/hr)		0
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

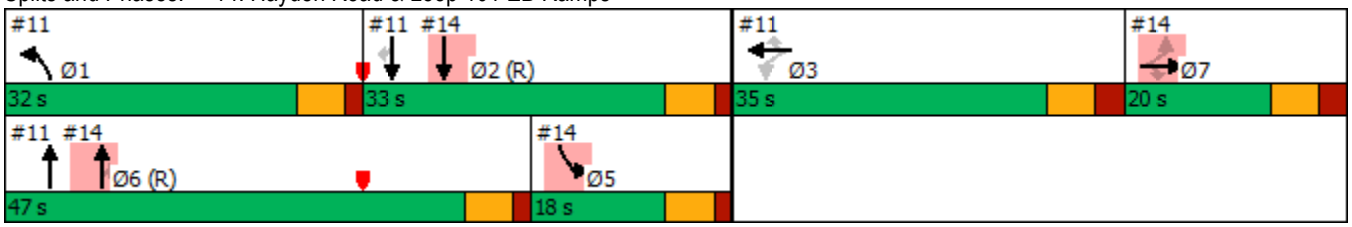
Intersection Summary

Queue shown is maximum after two cycles.

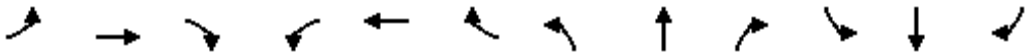
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 14: Hayden Road & Loop 101 EB Ramps



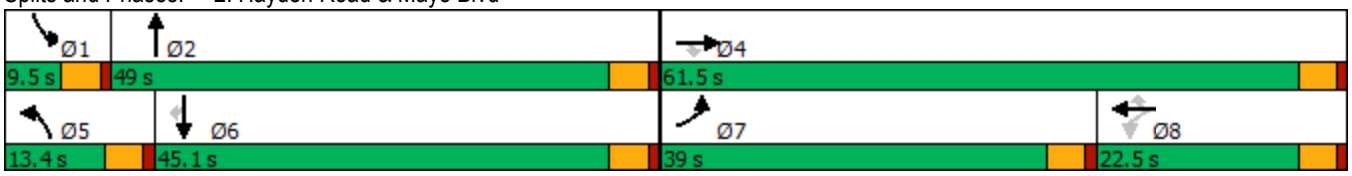
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	683	0	134	0	0	0	121	1237	0	0	833	354
Future Volume (vph)	683	0	134	0	0	0	121	1237	0	0	833	354
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		170	150		130	150		0	355		0
Storage Lanes	2		1	1		2	2		0	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.88	0.97	0.91	0.91	0.97	0.95	1.00
Frt			0.850									0.850
Flt Protected	0.950						0.950					
Satd. Flow (prot)	3433	3539	1583	1863	3539	3278	3433	5085	0	3614	3539	1583
Flt Permitted	0.950						0.950					
Satd. Flow (perm)	3433	3539	1583	1863	3539	3278	3433	5085	0	3614	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146									385
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		700			1025			944			517	
Travel Time (s)		15.9			23.3			16.1			8.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	742	0	146	0	0	0	132	1345	0	0	905	385
Shared Lane Traffic (%)												
Lane Group Flow (vph)	742	0	146	0	0	0	132	1345	0	0	905	385
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot		Perm	Perm		Perm	Prot	NA		Prot	NA	Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8		8						6

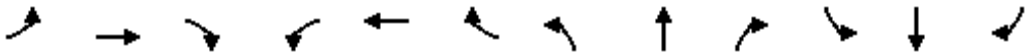


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	22.5	22.5	22.5	9.5	22.5		9.5	22.5	22.5
Total Split (s)	39.0	61.5	61.5	22.5	22.5	22.5	13.4	49.0		9.5	45.1	45.1
Total Split (%)	32.5%	51.3%	51.3%	18.8%	18.8%	18.8%	11.2%	40.8%		7.9%	37.6%	37.6%
Maximum Green (s)	34.5	57.0	57.0	18.0	18.0	18.0	8.9	44.5		5.0	40.6	40.6
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0			0	0
Act Effct Green (s)	24.0		24.0				8.2	53.5			40.8	40.8
Actuated g/C Ratio	0.28		0.28				0.09	0.62			0.47	0.47
v/c Ratio	0.78		0.27				0.40	0.43			0.54	0.41
Control Delay	35.1		5.5				42.0	9.6			18.7	3.2
Queue Delay	0.0		0.0				0.0	0.0			0.0	0.0
Total Delay	35.1		5.5				42.0	9.6			18.7	3.2
LOS	D		A				D	A			B	A
Approach Delay		30.2						12.5			14.0	
Approach LOS		C						B			B	
Queue Length 50th (ft)	193		0				35	128			182	0
Queue Length 95th (ft)	255		41				68	191			272	51
Internal Link Dist (ft)		620			945			864			437	
Turn Bay Length (ft)	400		170				150					
Base Capacity (vph)	1373		1096				354	3143			1666	949
Starvation Cap Reductn	0		0				0	0			0	0
Spillback Cap Reductn	0		0				0	0			0	0
Storage Cap Reductn	0		0				0	0			0	0
Reduced v/c Ratio	0.54		0.13				0.37	0.43			0.54	0.41

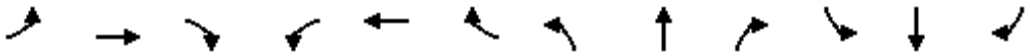
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 86.6			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 17.4		Intersection LOS: B	
Intersection Capacity Utilization 58.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Hayden Road & Mayo Blvd





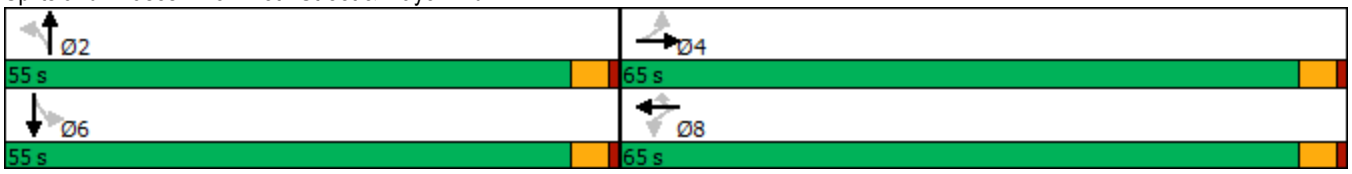
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	491	92	194	573	55	88	6	221	254	13	297
Future Volume (vph)	93	491	92	194	573	55	88	6	221	254	13	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976				0.850		0.854			0.856	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3454	0	1770	3539	1583	1770	1591	0	1770	1595	0
Flt Permitted	0.368			0.362			0.456			0.559		
Satd. Flow (perm)	685	3454	0	674	3539	1583	849	1591	0	1041	1595	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26				60		240			217	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		337			945			1455			417	
Travel Time (s)		7.7			21.5			33.1			9.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	534	100	211	623	60	96	7	240	276	14	323
Shared Lane Traffic (%)												
Lane Group Flow (vph)	101	634	0	211	623	60	96	247	0	276	337	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	65.0	65.0		65.0	65.0	65.0	55.0	55.0		55.0	55.0	
Total Split (%)	54.2%	54.2%		54.2%	54.2%	54.2%	45.8%	45.8%		45.8%	45.8%	
Maximum Green (s)	60.5	60.5		60.5	60.5	60.5	50.5	50.5		50.5	50.5	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	32.9	32.9		32.9	32.9	32.9	28.1	28.1		28.1	28.1	
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.46	0.39	0.39		0.39	0.39	
v/c Ratio	0.32	0.40		0.69	0.39	0.08	0.29	0.32		0.68	0.45	
Control Delay	17.7	13.6		30.6	14.1	4.2	21.2	4.3		30.8	9.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.7	13.6		30.6	14.1	4.2	21.2	4.3		30.8	9.2	
LOS	B	B		C	B	A	C	A		C	A	
Approach Delay		14.2			17.3			9.0			18.9	
Approach LOS		B			B			A			B	
Queue Length 50th (ft)	24	78		62	80	0	26	2		90	31	
Queue Length 95th (ft)	86	188		211	190	22	91	52		267	132	
Internal Link Dist (ft)		257			865			1375			337	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	558	2818		549	2882	1300	633	1247		776	1245	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.18	0.22		0.38	0.22	0.05	0.15	0.20		0.36	0.27	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 72			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 15.7		Intersection LOS: B	
Intersection Capacity Utilization 70.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 37: 78th Street & Mayo Blvd



Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	34	14	641	7	0	730
Future Vol, veh/h	34	14	641	7	0	730
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	15	697	8	0	793

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1098	353	0	0	-	-
Stage 1	701	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	-	-
Pot Cap-1 Maneuver	207	643	-	-	0	-
Stage 1	453	-	-	-	0	-
Stage 2	648	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	207	643	-	-	-	-
Mov Cap-2 Maneuver	333	-	-	-	-	-
Stage 1	453	-	-	-	-	-
Stage 2	648	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBT
Capacity (veh/h)	-	-	333	643	-
HCM Lane V/C Ratio	-	-	0.111	0.024	-
HCM Control Delay (s)	-	-	17.2	10.7	-
HCM Lane LOS	-	-	C	B	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	25	605	873	27	27	105
Future Vol, veh/h	25	605	873	27	27	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	658	949	29	29	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	978	0	-	0	1332	475
Stage 1	-	-	-	-	949	-
Stage 2	-	-	-	-	383	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	701	-	-	-	146	536
Stage 1	-	-	-	-	337	-
Stage 2	-	-	-	-	659	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	701	-	-	-	140	536
Mov Cap-2 Maneuver	-	-	-	-	252	-
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	659	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	701	-	-	-	252	536
HCM Lane V/C Ratio	0.039	-	-	-	0.116	0.213
HCM Control Delay (s)	10.3	-	-	-	21.2	13.5
HCM Lane LOS	B	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4	0.8

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	624	898	0	0	0
Future Vol, veh/h	0	624	898	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	678	976	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	976	0	-	0	1315	488
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	339	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	703	-	-	-	149	526
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	693	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	703	-	-	-	149	526
Mov Cap-2 Maneuver	-	-	-	-	258	-
Stage 1	-	-	-	-	326	-
Stage 2	-	-	-	-	693	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	703	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	93	932	659	111	135	239
Future Vol, veh/h	93	932	659	111	135	239
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	100	0	100
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	1013	716	121	147	260

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	837	0	-	0	1425	358
Stage 1	-	-	-	-	716	-
Stage 2	-	-	-	-	709	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	793	-	-	-	~ 126	638
Stage 1	-	-	-	-	445	-
Stage 2	-	-	-	-	449	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	793	-	-	-	~ 110	638
Mov Cap-2 Maneuver	-	-	-	-	240	-
Stage 1	-	-	-	-	388	-
Stage 2	-	-	-	-	449	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	24.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	793	-	-	-	240	638
HCM Lane V/C Ratio	0.127	-	-	-	0.611	0.407
HCM Control Delay (s)	10.2	-	-	-	41.1	14.5
HCM Lane LOS	B	-	-	-	E	B
HCM 95th %tile Q(veh)	0.4	-	-	-	3.6	2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Total Traffic w/Axon
Mayo Blvd & Miller Rd
Signal

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	899	522	603	699
Demand Flow Rate, veh/h	917	532	615	714
Vehicles Circulating, veh/h	691	675	1013	426
Vehicles Exiting, veh/h	449	953	595	781
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	19.0	10.5	18.1	9.9
Approach LOS	C	B	C	A

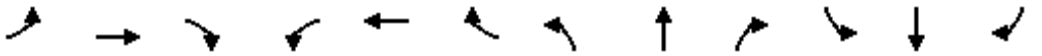
Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.471	0.529
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113
Entry Flow, veh/h	431	486	250	282	289	326	336	378
Cap Entry Lane, veh/h	673	697	681	704	529	556	821	839
Entry HV Adj Factor	0.981	0.981	0.981	0.981	0.981	0.981	0.978	0.981
Flow Entry, veh/h	423	477	245	277	284	320	329	371
Cap Entry, veh/h	660	683	668	691	519	545	803	822
V/C Ratio	0.640	0.698	0.367	0.400	0.547	0.586	0.409	0.451
Control Delay, s/veh	17.9	20.0	10.3	10.6	17.7	18.5	9.6	10.2
LOS	C	C	B	B	C	C	A	B
95th %tile Queue, veh	5	6	2	2	3	4	2	2

Intersection	
Intersection Delay, s/veh	25.6
Intersection LOS	D

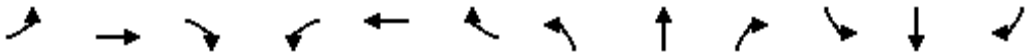
Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	583	1162	588	831
Demand Flow Rate, veh/h	595	1185	599	847
Vehicles Circulating, veh/h	779	636	709	1103
Vehicles Exiting, veh/h	1171	672	665	718
Follow-Up Headway, s	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.9	29.9	11.9	38.3
Approach LOS	B	D	B	E

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.471	0.529	0.470	0.530
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.113
Entry Flow, veh/h	280	315	557	628	282	317	398	449
Cap Entry Lane, veh/h	630	655	701	724	664	688	494	522
Entry HV Adj Factor	0.979	0.982	0.980	0.980	0.979	0.983	0.982	0.981
Flow Entry, veh/h	274	309	546	616	276	311	391	441
Cap Entry, veh/h	617	643	687	710	650	676	485	512
V/C Ratio	0.444	0.481	0.794	0.867	0.425	0.461	0.806	0.860
Control Delay, s/veh	12.6	13.1	26.3	33.2	11.7	12.1	35.6	40.8
LOS	B	B	D	D	B	B	E	E
95th %tile Queue, veh	2	3	8	10	2	2	8	9

Total Traffic w/Axon
Mayo Blvd & Miller Rd
Roundabout



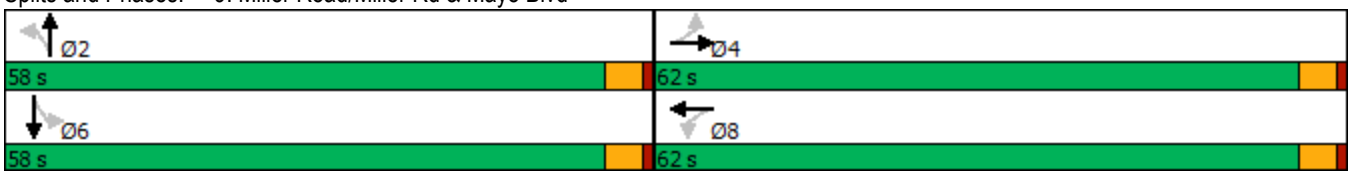
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	763	3	4	376	100	5	543	7	89	530	24
Future Volume (vph)	62	763	3	4	376	100	5	543	7	89	530	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		250	250		250	250		250
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.999			0.968			0.998			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3536	0	1770	3426	0	1770	3532	0	1770	3518	0
Flt Permitted	0.461			0.279			0.378			0.381		
Satd. Flow (perm)	859	3536	0	520	3426	0	704	3532	0	710	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					38			1			5	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		2264			949			2008			642	
Travel Time (s)		51.5			21.6			34.2			10.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	829	3	4	409	109	5	590	8	97	576	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	832	0	4	518	0	5	598	0	97	602	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes						Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

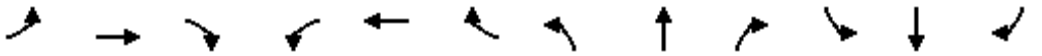


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	62.0	62.0		62.0	62.0		58.0	58.0		58.0	58.0	
Total Split (%)	51.7%	51.7%		51.7%	51.7%		48.3%	48.3%		48.3%	48.3%	
Maximum Green (s)	57.5	57.5		57.5	57.5		53.5	53.5		53.5	53.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	20.1	20.1		20.1	20.1		15.9	15.9		15.9	15.9	
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.35	0.35		0.35	0.35	
v/c Ratio	0.18	0.53		0.02	0.34		0.02	0.48		0.39	0.49	
Control Delay	10.2	11.2		8.8	8.8		11.4	13.5		17.8	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.2	11.2		8.8	8.8		11.4	13.5		17.8	13.4	
LOS	B	B		A	A		B	B		B	B	
Approach Delay		11.1			8.8			13.5			14.0	
Approach LOS		B			A			B			B	
Queue Length 50th (ft)	9	71		1	36		1	58		17	58	
Queue Length 95th (ft)	36	159		5	88		7	124		62	125	
Internal Link Dist (ft)		2184			869			1928			562	
Turn Bay Length (ft)	250			250			250			250		
Base Capacity (vph)	841	3464		509	3357		681	3416		687	3403	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.24		0.01	0.15		0.01	0.18		0.14	0.18	

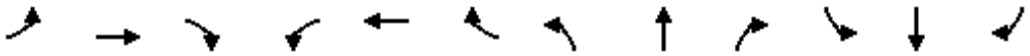
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 45.5			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 12.0		Intersection LOS: B	
Intersection Capacity Utilization 60.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 9: Miller Road/Miller Rd & Mayo Blvd





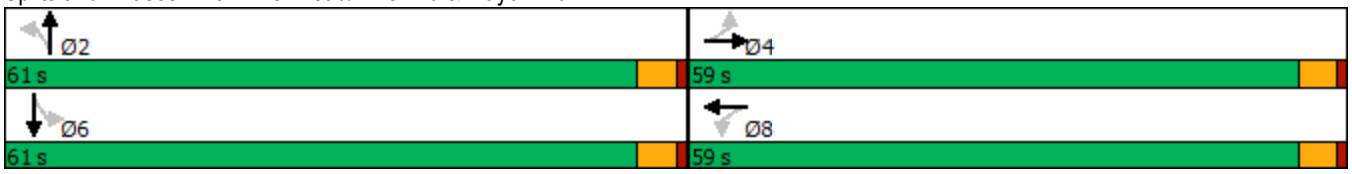
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	484	11	6	977	86	12	521	8	114	582	68
Future Volume (vph)	41	484	11	6	977	86	12	521	8	114	582	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		250	250		250	250		250
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.997			0.988			0.998			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3529	0	1770	3497	0	1770	3532	0	1770	3483	0
Flt Permitted	0.151			0.430			0.286			0.369		
Satd. Flow (perm)	281	3529	0	801	3497	0	533	3532	0	687	3483	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			10			2			14	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		2264			949			2008			642	
Travel Time (s)		51.5			21.6			34.2			10.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	526	12	7	1062	93	13	566	9	124	633	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	538	0	7	1155	0	13	575	0	124	707	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes						Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		



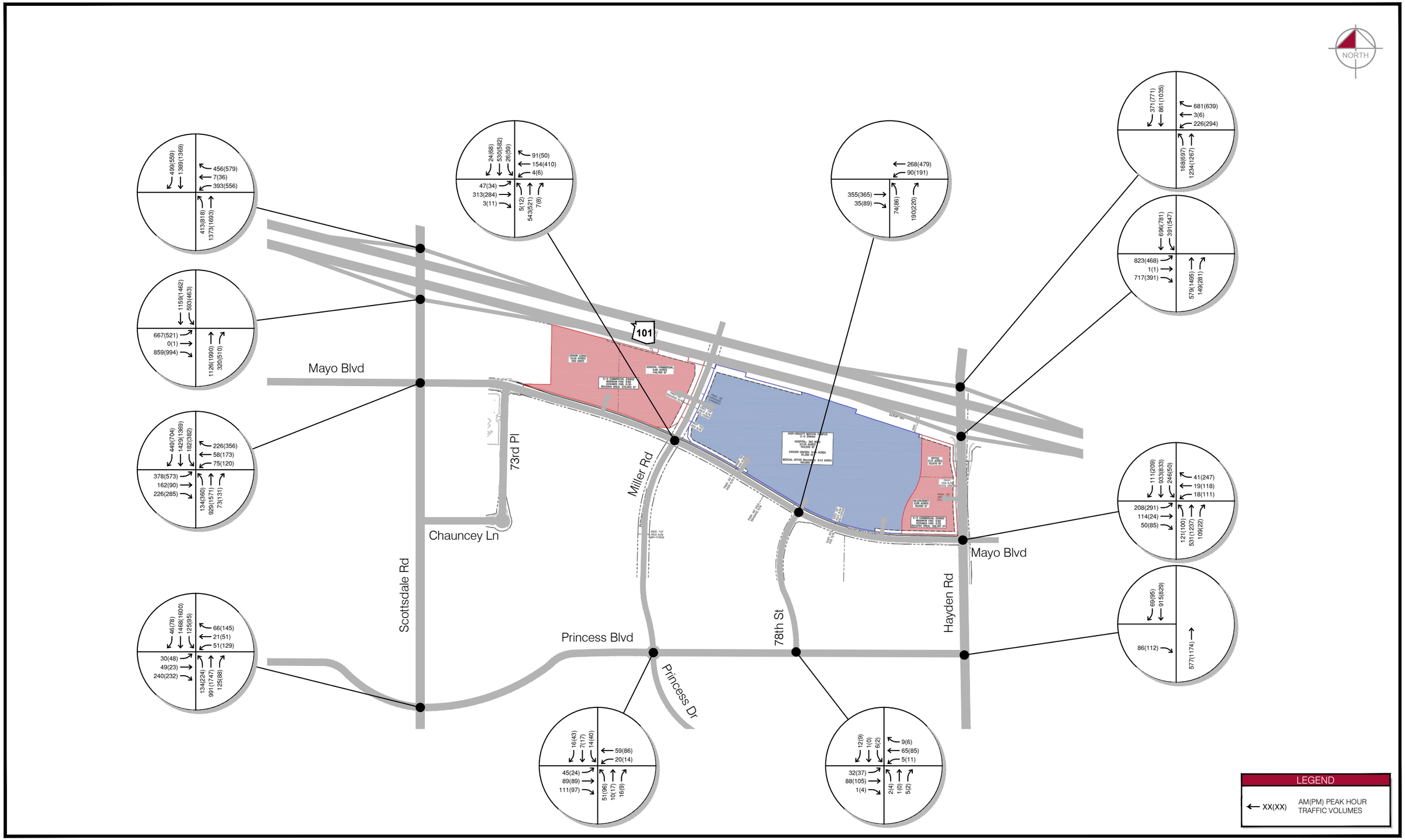
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	59.0	59.0		59.0	59.0		61.0	61.0		61.0	61.0	
Total Split (%)	49.2%	49.2%		49.2%	49.2%		50.8%	50.8%		50.8%	50.8%	
Maximum Green (s)	54.5	54.5		54.5	54.5		56.5	56.5		56.5	56.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	30.8	30.8		30.8	30.8		23.1	23.1		23.1	23.1	
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.36	0.36		0.36	0.36	
v/c Ratio	0.33	0.31		0.02	0.68		0.07	0.45		0.50	0.55	
Control Delay	19.9	11.0		10.3	15.4		16.8	17.4		25.9	18.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.9	11.0		10.3	15.4		16.8	17.4		25.9	18.4	
LOS	B	B		B	B		B	B		C	B	
Approach Delay		11.7			15.4			17.4			19.5	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)	9	56		1	153		3	79		34	101	
Queue Length 95th (ft)	45	125		9	317		17	171		108	212	
Internal Link Dist (ft)		2184			869			1928			562	
Turn Bay Length (ft)	250			250			250			250		
Base Capacity (vph)	240	3017		684	2991		464	3078		598	3037	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.18		0.01	0.39		0.03	0.19		0.21	0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 63.6			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 67.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 9: Miller Road/Miller Rd & Mayo Blvd



Appendix D Background Traffic Exhibit



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March 2023

Figure

2040 Total Traffic Without Banner Site Traffic

NWC Hayden Road & Mayo Boulevard | Traffic Impact & Mitigation Analysis

Appendix E Kimley Horn TIMA Report

TRAFFIC IMPACT AND MITIGATION ANALYSIS

NWC Hayden Road and Mayo Boulevard

Scottsdale, Arizona

Prepared for:

Hayden Loop 101 Investors, LLC

Kimley»Horn

TRAFFIC IMPACT AND MITIGATION ANALYSIS

NWC Hayden Road and Mayo Boulevard
Scottsdale, Arizona

Prepared for:

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Prepared By:

Kimley-Horn and Associates, Inc.
7740 North 16th Street, Suite 300
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ACCEPTED WITH COMMENTS
CITY OF SCOTTSDALE
TRANSPORTATION DEPARTMENT

DATE: 6/14/2023

REVIEWER: P Murphy

37-SA-2023 v2 rec. 5/18/23

291268016
April 2023
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1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

This report documents a traffic impact and mitigation analysis (TIMA) performed for the master plan associated with a proposed mixed-use development located on the northwest corner of the intersection of Hayden Road and Mayo Boulevard in Scottsdale, Arizona. The site is anticipated to include hospital, medical office, retail, senior living, office, and restaurant land uses. This report documents a 2040 build out analysis of the key street intersections in the area.

1.2 REPORT PURPOSE AND OBJECTIVES

Kimley-Horn and Associates, Inc. has been retained by Hayden Loop 101 Investors, LLC to perform the TIMA for the proposed development.

The purpose of this study is to address traffic and transportation impacts of the proposed development on surrounding streets and intersections. This traffic impact analysis was prepared based on the Category 3 TIMA criteria set forth by the City of Scottsdale. The specific objectives of this study are:

- To evaluate lane requirements on all existing roadway links and at all existing intersections within the study area;
- To determine future level of service (LOS) for all existing intersections within the study area and recommend any capacity-related improvements;
- To determine appropriate functional classification and cross-section at buildout of all study area roadways; and
- To evaluate the need for auxiliary lanes at all study area intersections.

1.3 PRINCIPAL FINDINGS AND RECOMMENDATIONS

The proposed development is expected to add 30,854 new daily trips, 1,878 new AM peak hour trips, and 2,570 new PM peak hour trips to the roadway network. The purpose of this report was to review key street intersections for a 2040 buildout scenario to determine appropriate intersection geometry. It is recommended that volumes in the area be monitored and additional analysis be considered with detailed site plans or adjacent development plans.

- The intersections of Mayo Boulevard with Miller Road and 78th Street were evaluated as standard intersections with this report. The addition of traffic signal control is anticipated to be necessary at the Miller Road & Mayo Boulevard intersection. The intersection of 78th Street & Mayo Boulevard operates acceptably as a two-way stop-controlled intersection except for the northbound and southbound left-turn movements. Traffic signal warrants should be reviewed with a more detailed site plan. Alternate intersection configurations could also be considered at these intersections. Previous documents have contemplated roundabouts in addition to a standard intersection configuration. At the City's request, the intersection of Miller Road & Mayo Boulevard was also evaluated as a roundabout and the LOS was satisfactory under that condition.

- At the Loop 101 TI, Hayden Road was constructed to accommodate a third southbound through lane. It is anticipated that a third southbound through lane will extend south of the Loop 101 to the Mayo Boulevard intersection where the third through lane is anticipated to transition to a right-turn only lane. The Axon signing and pavement marking plans include a third northbound through lane at the intersection of Hayden Road and Mayo Boulevard that is anticipated to continue north to the Loop 101 TI. Hayden Road has three travel lanes in each direction north of the Loop 101.

- Mayo Boulevard is anticipated to be constructed to a City of Scottsdale urban major collector cross-section between 73rd Place and Hayden Road with two travel lanes and bike lanes in each direction and a two-way left-turn lane.

- Miller Road is anticipated to be constructed to an urban major collector cross-section with two travel lanes and bike lanes in each direction and a two-way left-turn lane.

- The unsignalized and signalized intersections are anticipated to operate at an overall acceptable level of service in the 2040 total traffic condition except for the Hayden Road & Loop 101 TI during the PM peak hour. The overall level of service at the Hayden Road & Loop 101 TI is driven by the delay associated with the northbound left-turn movement. Considerations for improvement to the northbound left-turn movement for the 2040 total traffic condition are discussed in additional detail with the next item.

- The Hayden Road & Loop 101 northbound left-turn storage should be reconfigured and coordinated with the Axon development to extend the left-turn storage. The signing and pavement marking plans associated with the Axon development include proposed 355-foot dual southbound left-turn lanes at the intersection of Hayden Road & Mayo Boulevard. The northbound left-turn lane storage at the Hayden Road & Loop 101 traffic interchange could provide approximately 550 feet of storage to maximize the available space between intersections; however, there may be an ability to extend the storage further if the dual southbound left-turn length is reduced at the Hayden Road and Mayo Boulevard intersection into the Axon development. As an additional consideration, the inside through lane at the Hayden Rd & Loop 101 TI may be able to be utilized as a second northbound left-turn lane, and two northbound through lanes would be maintained through the TI. Traffic volumes should be monitored and coordination with surrounding development should occur.

- The westbound left-turn lane at the intersection of Scottsdale Road & Princess Boulevard may require additional storage in future traffic conditions. Volumes are recommended to be monitored at this location. Consider refining the storage length with development of the land on the northeast corner of the intersection.

- It is recommended that the northbound approach to the intersection of Hayden Road & Mayo Boulevard by re-striped to provided dual left-turn lanes. The pavement marking modifications should occur at or after the time of signalization of the intersection.

- It is recommended that the eastbound approach to the intersection of Hayden Road & Mayo Boulevard provide dual left-turn lanes with 400 feet of storage in each lane. The Crossroads East Planning Unit VII Circulation Plan indicated that there may be an ability to provide two full-access driveway locations along Mayo Boulevard between 78th Street and Hayden Road; however, a single

full-access driveway location is recommended given the eastbound left-turn storage demand at the Hayden Road & Mayo Boulevard intersection. It is recommended that the full-access driveway be located approximately at the midpoint of the approximate 1,600-foot Mayo Boulevard roadway segment between 78th Street and Hayden Road to provide full access to both sides of Mayo Boulevard. Cross access should be considered between the restaurant/office portion of the plan and medical campus portion of the current proposed plan.

- It is recommended that 250 feet of left-turn lane and right-turn lane storage be provided along all approaches to the intersection of Miller Road & Mayo Boulevard. This more conservative recommendation is provided due to the higher level of uncertainty associated with the background traffic volumes at the intersection. When the intersection is constructed, a reassignment of traffic volumes will occur to utilize the Miller Road underpass.

- The future westbound right-turn lane at the intersection of Scottsdale Road & Mayo Boulevard is anticipated to be constructed by the Optima McDowell Mountain Village development. A continuous right-turn lane should be provided to accommodate the anticipated queue demand of 575 feet, while not interfering with the planned roundabout at the intersection of 73rd Place and Mayo Boulevard.

- Access spacing, turn lane warrants, and storage recommendations at driveway locations should be reviewed with development of detailed site plans.

- It is recommended that sight triangles be provided at all intersections to give drivers exiting the site a clear view of oncoming traffic. The landscaping within sight triangles must not obstruct drivers' views of the adjacent travel lanes.

2.0 PROPOSED DEVELOPMENT

2.1 SITE LOCATION

The proposed development is located on the northwest corner of the intersection of Hayden Road and Mayo Boulevard in the City of Scottsdale, Arizona. The project location is shown in **Figure 1**.

2.2 LAND USE AND SITE PLAN

The overall development consists of hospital, medical office, retail, senior living, office, and restaurant land uses. The total site area is approximately 73.2 acres. **Table 1** illustrates the land uses of the proposed development.

Table 1. Land Uses

General Description	ITE Land Use	Size
Senior Adult Housing-Multifamily	252	250 Dwelling Units
Hospital	610	352 Beds
General Office Building	710	32,670 Square Feet
Medical-Dental Office Building	720	276,100 Square Feet
Shopping Plaza (40-150k)	821	144,780 Square Feet
High-Turnover (Sit-Down) Restaurant	932	30,000 Square Feet

The layout of the site is illustrated in **Figure 2**.

2.3 SITE ACCESSIBILITY

The site will be accessed locally via Mayo Boulevard, Miller Road, and Hayden Road. Regional access is expected to be provided by Pima Freeway (Loop 101) and by the other arterial streets in the vicinity such as Scottsdale Road.

2.4 SITE CIRCULATION

The site plan is shown in previously referenced **Figure 2**.

The site is anticipated to construct a full-access driveway on the north leg of the intersection of 78th Street and Mayo Boulevard to provide access to the site. Additional access to the development is anticipated to be provided along Mayo Boulevard, Hayden Road, and the future Miller Road alignment. Anticipated site access points included in this study are preliminary and do not necessarily reflect the ultimate access point locations. Final access locations and provisions to the site will be determined with a more detailed site plan.

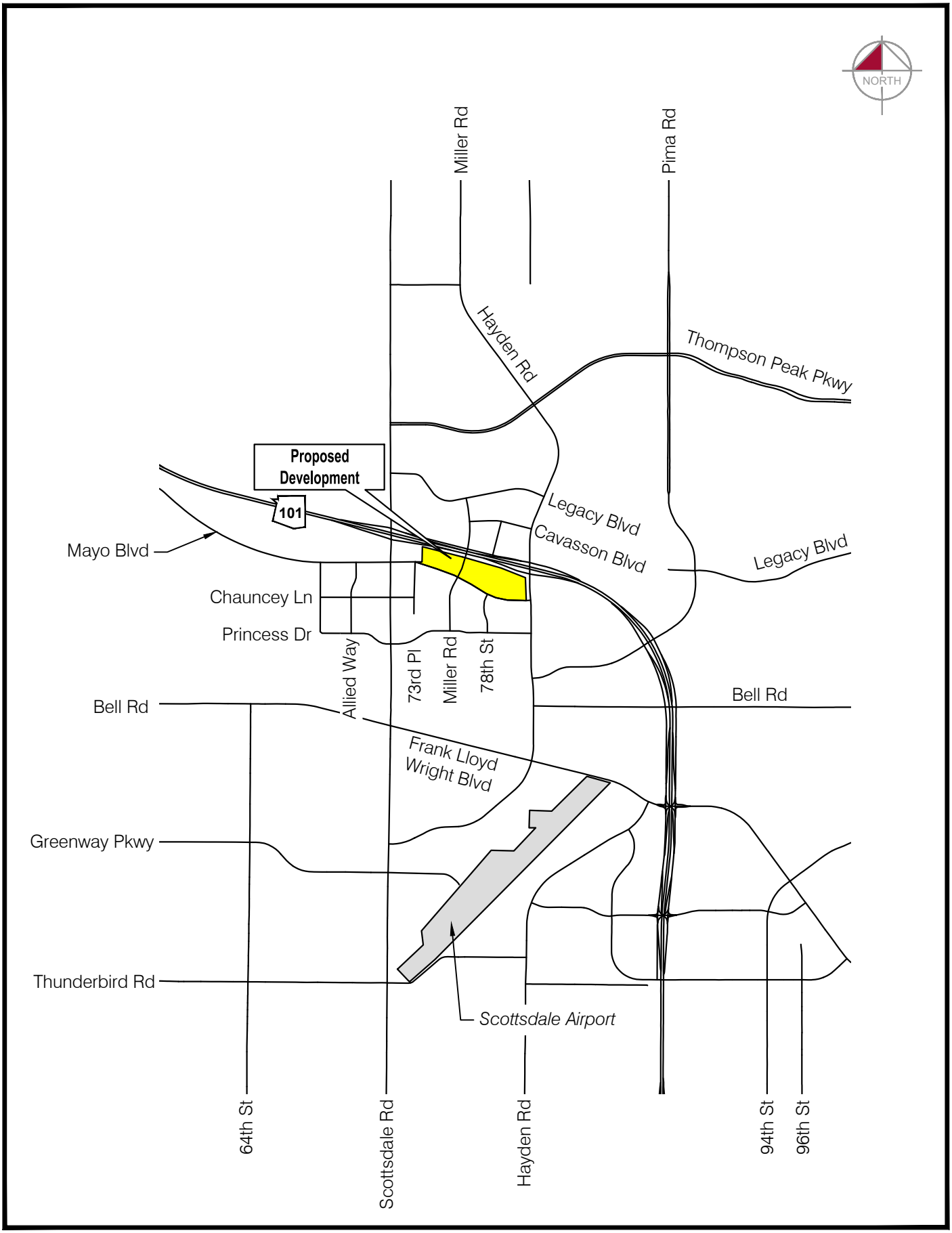

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Figure 1
Vicinity Map

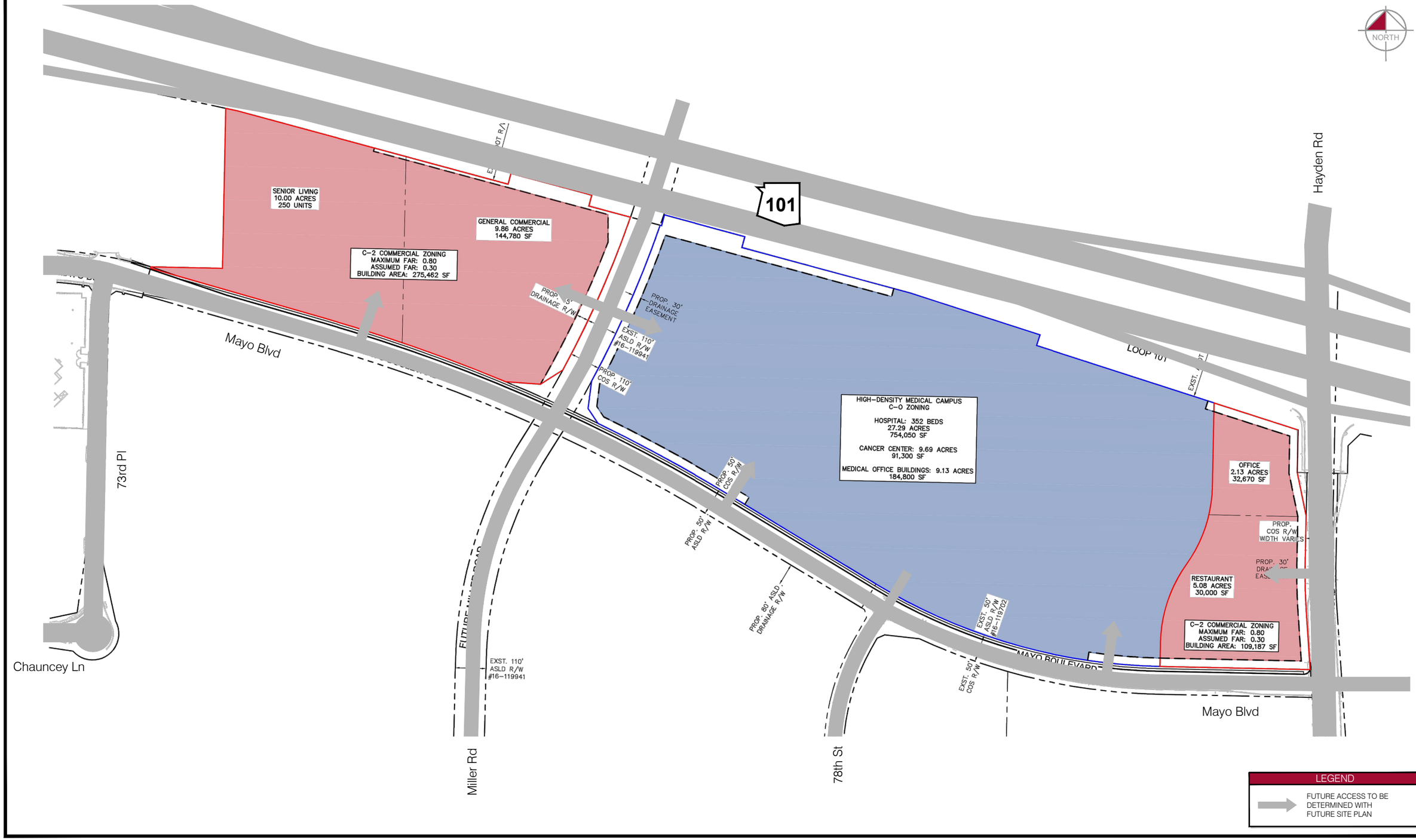

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Figure 2
Site Plan

3.0 STUDY AREA

3.1 STUDY AREA

The study area includes the following existing intersections:

- Scottsdale Road & Loop 101 WB Ramps;
- Scottsdale Road & Loop 101 EB Ramps;
- Hayden Road & Loop 101 WB Ramps;
- Hayden Road & Loop 101 EB Ramps;
- Scottsdale Road & Mayo Boulevard;
- Scottsdale Road and Princess Boulevard;
- Princess Drive & Princess Boulevard;
- 78th Street & Princess Boulevard;
- 78th Street & Mayo Boulevard;
- Hayden Road & Mayo Boulevard; and
- Hayden Road & Princess Boulevard.

Additionally, the future intersection of Miller Road and Mayo Boulevard was analyzed.

3.2 ADJACENT LAND USE

The area in the vicinity of the site primarily includes retail, residential, and undeveloped land uses. The land north, east, and south of the site is largely undeveloped, with commercial and residential land uses located further from the site. The land west of the site contains various retail land uses. Loop 101 borders the north of the site.

The following adjacent developments are anticipated to be built prior to the proposed site:

The **Cavasson** development is currently under construction on the northwest corner of Hayden Road and Loop 101. An addendum to the approved Cavasson Master TIMA was approved on October 23, 2020. The development contains shopping center, office building, hotel, restaurant, and multifamily residential land uses and is planned to be constructed in three phases, with Phase 1, Phase 2, and Phase 3 constructing the southeast, southwest, and northern portions of the site, respectively. Phase 1 is currently under construction. All phases of the development are anticipated to be completed by the year 2030. The Cavasson site traffic assignment volumes were included in the 2040 background traffic volumes in this study. Relevant excerpts from the Cavasson TIMA addendum are included in the **Appendix**.

The **HonorHealth Medical Campus** development is proposed on the northeast corner of Hayden Road and Loop 101. The site was previously proposed to be a Banner Health Medical Campus. A TIMA, titled *Banner Scottsdale Transportation Impact & Mitigation Study* (Banner Health TIMA), was accepted for the former development plan on September 20, 2022. The Banner Health site consisted of hospital and medical-dental office land uses. Due to the similar land uses between the former Banner Health campus and the new HonorHealth campus, the full buildout site traffic assignment volumes from the Banner Health TIMA were included in the 2040 background traffic volumes in this study. Relevant excerpts from the Banner Health TIMA are included in the **Appendix**.

The **Axon Campus** development is proposed on the northeast corner of Hayden Road and Mayo Boulevard. An enhanced traffic impact statement for the Axon Campus development was submitted on September 10, 2020. The development proposes warehousing and general office land uses and is anticipated to be completed by 2035. The Axon Campus development is anticipated to construct an additional northbound travel lane on Hayden Road from Mayo Boulevard to the Loop 101 WB Ramps as well as construct Mayo Boulevard with two travel lanes in each direction east of Hayden Road as part of the development's offsite improvements. The Axon Campus site traffic assignment volumes were included in the 2040 background traffic volumes in this study. The signing and pavement marking plans associated with the development offsite improvements include dual southbound left-turn lanes and dual westbound right-turn lanes at the intersection of Hayden Road and Mayo Boulevard. A third northbound through lane is also reflected in the plans along with the addition of traffic signal control at the intersection. Relevant excerpts from the Axon Campus enhanced traffic statement and signing and pavement marking plans are included in the **Appendix**.

The **Optima McDowell Mountain Village** development is proposed on the northeast corner of Scottsdale Road and Mayo Boulevard. A TIMA for the development was submitted in August 2022 and has since been accepted by the City of Scottsdale. The development proposes mid-rise multifamily residential housing and retail land uses and is anticipated to be completed by 2025. The Optima McDowell Mountain Village development is anticipated to widen Mayo Boulevard to three lanes per direction along its site frontage as part of its offsite improvements. The Optima McDowell Mountain Village site traffic assignment volumes were included in the 2040 background traffic volumes in this study. Relevant excerpts from the Optima McDowell Mountain Village TIMA are included in the **Appendix**.

The **Crossroads East Planning Unit VII** is located on the southwest corner of the intersection of Hayden Road and Mayo Boulevard and includes the area bound by Hayden Road, Princess Boulevard, and the future Mayo Boulevard and Miller Road alignments. A traffic master plan was completed by Kimley-Horn for the planning unit in May 2018. Planning Unit VII is anticipated to include residential, office, and retail land uses. A multifamily residential development was under construction or had been constructed at the time of this analysis. Planning Unit VII traffic assignment volumes were projected for the intersection of 78th Street and Mayo Boulevard and included in the 2040 background traffic volumes. According to the Planning Unit VII circulation plan, the geometry concept shows the intersections of Mayo Boulevard with Miller Road and 78th Street with roundabout or standard intersection configuration options. For the purposes of this study, the intersections were evaluated as standard intersections. The alternate intersection configuration could be considered with development of detailed site plans. Relevant excerpts from the Crossroads East Planning Unit VII traffic master plan are included in the **Appendix**.

4.0 EXISTING CONDITIONS

4.1 PHYSICAL CHARACTERISTICS

The existing roadway network within the study area includes the Loop 101, Scottsdale Road, Hayden Road, Princess Boulevard, Princess Drive, Mayo Boulevard, and 78th Street. The existing intersection lane use and traffic control are shown in **Figure 3**.

Loop 101 extends east-west in the vicinity of the site and borders the site to the north. Loop 101 has traffic interchanges (TIs) with Scottsdale Road and Hayden Road in the vicinity of the site.

Scottsdale Road extends north-south with three travel lanes and a bike lane in each direction and a raised median. Curb, gutter, and sidewalk are in place along both sides of Scottsdale Road. The posted speed limit is 45 miles per hour (mph) within the vicinity of the site. The City of Scottsdale classifies Scottsdale Road as a major arterial roadway in the vicinity of the site. The City of Scottsdale Functional Classification Map is included in the **Appendix**.

Hayden Road extends north-south with two travel lanes and a bike lane in each direction and a raised median adjacent to the site. Hayden Road becomes Greenway-Hayden Loop south of the site and transitions to become Miller Road north of the Loop 101. Curb, gutter, and sidewalk are generally in place along both sides of Hayden Road north of the Loop 101 TI and south of Mayo Boulevard. The posted speed limit is 45 mph north of Loop 101 and 40 mph south of Loop 101. The City of Scottsdale classifies Hayden Road as a minor arterial roadway.

At the Loop 101 TI, Hayden Road was constructed to accommodate a third southbound through lane. It is anticipated that a third southbound through lane will extend south of the Loop 101 to the Mayo Boulevard intersection, where the third through lane is anticipated to transition to a right-turn only lane. The Axon signing and pavement marking plans include a third northbound through lane at the intersection of Hayden Road and Mayo Boulevard that is anticipated to continue north to the Loop 101 TI. Hayden Road has three travel lanes in each direction north of the Loop 101.

Princess Boulevard extends east-west with two travel lanes in each direction and a raised median. Princess Boulevard becomes Princess Drive west of Scottsdale Road and terminates at Hayden Road to the east. Concrete curb, gutter, and sidewalk are in place along the south side of Princess Boulevard between Scottsdale Road and 78th Street and along both sides of Princess Boulevard west of Scottsdale Road and east of 78th Street. The posted speed limit is generally 30 mph in the vicinity of the site. The City of Scottsdale classifies Princess Boulevard as a major collector roadway.

Princess Drive is a curvilinear roadway with two travel lanes in each direction and a raised median. Princess Drive extends south from Princess Boulevard and curves east before turning into Pima Road at Loop 101. Concrete curb, gutter, and sidewalk are in place along both sides of Princess Drive. The posted speed limit is 25 mph within the vicinity of the site.

Mayo Boulevard is a discontinuous roadway that currently extends east-west with three eastbound travel lanes, two westbound travel lanes, bike lanes in each direction, and a raised median in the vicinity of the Scottsdale Road intersection. Mayo Boulevard currently extends east of Scottsdale Road to 73rd Place

and between 78th Street and Hayden Road. Concrete curb, gutter, and sidewalk are in place on both sides of Mayo Boulevard west of 73rd Place. The posted speed limit is 45 mph west of Scottsdale Road and 30 mph east of 78th Street. The City of Scottsdale classifies Mayo Boulevard as a major collector roadway east of Scottsdale Road. The City of Phoenix classifies Mayo Boulevard as an arterial roadway with an "A" cross-section west of Scottsdale Road. Mayo Boulevard is anticipated to be constructed to a City of Scottsdale urban major collector cross-section between 73rd Place and Hayden Road with two travel lanes and bike lanes in each direction and a two-way left-turn lane. Mayo Road is then anticipated to transition to a City of Phoenix "A" cross-section between 73rd Place and Scottsdale Road to match the street section on the west side of Scottsdale Road. Relevant City of Scottsdale and City of Phoenix cross-sections are included in the **Appendix**.

78th Street extends north-south with one travel lane and a bike lane in each direction. A two-way left-turn lane is present for approximately 620 feet north of Princess Boulevard. 78th Street terminates at Mayo Boulevard to the north and Princess Boulevard to the south. Concrete curb, gutter, and sidewalk are in place along the west side of 78th Street for approximately 620 feet north of Princess Boulevard and along the entire east side. The posted speed limit is 30 mph. The City of Scottsdale classifies 78th Street as a minor collector roadway.

The future ***Miller Road*** alignment will extend generally north-south between Princess Boulevard and Legacy Boulevard. Miller Road will tie into the existing Princess Drive to the south and the future 76th Street to the north. The existing Miller Road Underpass will provide grade separation for traffic on Miller Road and the Loop 101, allowing for free flow on both facilities. The City of Scottsdale classifies Miller Road as a major collector roadway in the vicinity of the site. Miller Road is anticipated to be constructed to an urban major collector cross-section with two travel lanes and bike lanes in each direction and a two-way left-turn lane.

The following existing intersections are analyzed in this report:

- Scottsdale Road & Loop 101 WB Ramps (signalized; protected left-turn phasing);
- Scottsdale Road & Loop 101 EB Ramps (signalized; protected left-turn phasing);
- Scottsdale Road & Mayo Boulevard (signalized; NB/SB protected left-turn phasing, EB/WB split phasing);
- Scottsdale Road & Princess Boulevard (signalized; protected + permitted left-turn phasing);
- Princess Drive & Princess Boulevard (roundabout);
- 78th Street & Princess Boulevard (all-way stop control);
- Hayden Road & Loop 101 WB Ramps (signalized; protected left-turn phasing);
- Hayden Road & Loop 101 EB Ramps (signalized; protected left-turn phasing);
- Hayden Road & Mayo Boulevard (eastbound stop-control); and
- Hayden Road & Princess Boulevard (eastbound stop-control).

4.2 TRAFFIC VOLUMES

Turning movement counts were collected at the intersections of Scottsdale Road & Loop 101 WB Ramps, Scottsdale Road & Loop 101 EB Ramps, Scottsdale Road & Mayo Boulevard, Scottsdale Road & Princess Boulevard, Princess Drive & Princess Boulevard, 78th Street & Princess Boulevard, Hayden Road & Loop 101 WB Ramps, Hayden Road & Loop 101 EB Ramps, Hayden Road & Mayo Boulevard,

and Hayden Road & Princess Boulevard on Thursday, October 27, 2022. The counts were performed between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM.

Additionally, 24-hour bidirectional traffic counts were collected on Scottsdale Road and Hayden Road north of Mayo Boulevard on Thursday, October 27, 2022. Copies of the traffic counts are attached in the **Appendix.**

The City of Scottsdale generally requires that collected volumes be adjusted to account for seasonal variations in traffic volumes. Based on the monthly adjustment factors provided in the City of Scottsdale average daily segment traffic volume map (0.99 for the 2020 map and 1.00 for the 2018 map), the collected counts are representative of annual average conditions since they were taken in October. The results of these traffic counts are shown in **Figure 3**. The City of Scottsdale 2020 and 2018 average daily segment traffic volume maps are included in the **Appendix**. The 2018 map was looked at in addition to the 2020 map for purposes of reviewing monthly adjustment factors since the 2020 adjustment factors were during atypical conditions with the COVID pandemic; however, there was not a discernable difference in the monthly factors. With both maps, October was representative of typical conditions.

4.3 LEVEL OF SERVICE

The LOS at the existing study area intersections was evaluated using the traffic counts collected on Thursday, October 27, 2022. The LOS for the intersections was evaluated using the *Highway Capacity Manual 6th Edition* methodology for unsignalized and signalized intersections using *Synchro 11* analysis software. The intersections at the traffic interchanges of Loop 101 with Scottsdale Road and Hayden Road were analyzed using Synchro methodology for signalized traffic interchanges. The existing intersection geometry and control, shown in **Figure 3**, was used to obtain the LOS. Signalized intersections were evaluated using the existing signal timing data provided by City of Scottsdale. The results of this analysis are shown in **Table 2** and **Table 3**. LOS analysis worksheets and existing signal timing data are included in the **Appendix**.

Table 2. Existing Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
Princess Drive & Princess Boulevard												
AM Peak	A		A					A	A	A		
PM Peak	A		A					A	A	A		
78th Street & Princess Boulevard												
AM Peak	A			A	A		A	A		A	A	
PM Peak	A			A	A		A	A		A	A	
Hayden Road & Princess Boulevard												
AM Peak		-			-	-			B			
PM Peak		-			-	-			A			
Hayden Road & Mayo Boulevard												
AM Peak	A	-			-	-	B		B			
PM Peak	A	-			-	-	C		A			

The existing unsignalized intersections operate at a satisfactory LOS.

Table 3. Existing Level of Service: Signalized Intersections

Intersection	NB			SB			EB			WB			Intersection
	L	T	R	L	T	R	L	T	R	L	T	R	LOS
Scottsdale Road & Loop 101 WB Ramps													
AM Peak	B	A			C	A				D	D	B	B
PM Peak	B	A			D	C				D	E	D	C
Scottsdale Road & Loop 101 EB Ramps													
AM Peak		D	B	B	A		E	D	D				C
PM Peak		C	B	C	A		D	E	D				C
Hayden Road & Loop 101 WB Ramps													
AM Peak	D	C			C	A				E	B	B	C
PM Peak	F	B			D	A				E	B	B	D
Hayden Road & Loop 101 EB Ramps													
AM Peak		D	A	C	B		D	C	A				C
PM Peak		C	A	F	B		D	D	A				D
Scottsdale Road & Mayo Boulevard													
AM Peak	D	C	C	E	E	E	D	D	E	D	D	E	D
PM Peak	D	D	C	E	E	F	E	D	F	D	D	E	F
Scottsdale Road & Princess Boulevard													
AM Peak	C	D	D	A	C	B	D	D	F	E	D	E	D
PM Peak	C	D	C	B	C	B	D	D	F	E	D	F	E

The existing signalized intersections operate at an overall satisfactory LOS except for the intersections of Scottsdale Road with Mayo Boulevard and Princess Boulevard during the PM peak hour. The intersection of Scottsdale Road & Mayo Boulevard currently operates with split east-west left-turn phasing due to the low traffic volumes associated with the east leg of the intersection in the existing condition. The intersections are anticipated to operate at acceptable levels of service with signal timing adjustments,

including the change from split phasing to protected left-turn phasing at the Scottsdale Road & Mayo Boulevard intersection.

4.4 CRASH HISTORY

Crash data at the existing study area intersections was obtained from the City of Scottsdale for the years 2019 to 2021. The City of Scottsdale also provided the 2020 Traffic Volume & Collision Report, revised June 2022, which contains segment and intersection crash volumes and rates for 2018 to 2020. The crash data provided by the City of Scottsdale is included in the **Appendix**.

Table 4 summarizes the number of crashes by injury severity at each intersection, and **Table 5** summarizes the number of crashes by crash type at each intersection for the years 2019 to 2021.

Table 4. Crashes by Injury Severity

Intersection	Injury Severity						Total
	No Injury	Possible Injury	Non-Incapacitating Injury	Incapacitating Injury	Fatal Injury	Not Reported/ Unknown	
Scottsdale Road & Loop 101 TI	5	0	1	0	0	0	6
Scottsdale Road & Mayo Boulevard	38	6	3	2	0	1	50
Scottsdale Road & Princess Boulevard	47	13	11	1	0	1	73
Hayden Road & Loop 101 TI	34	5	2	0	0	0	41
Hayden Road & Mayo Boulevard	2	0	1	0	0	0	3
Hayden Road & Princess Boulevard	1	1	0	0	0	0	2

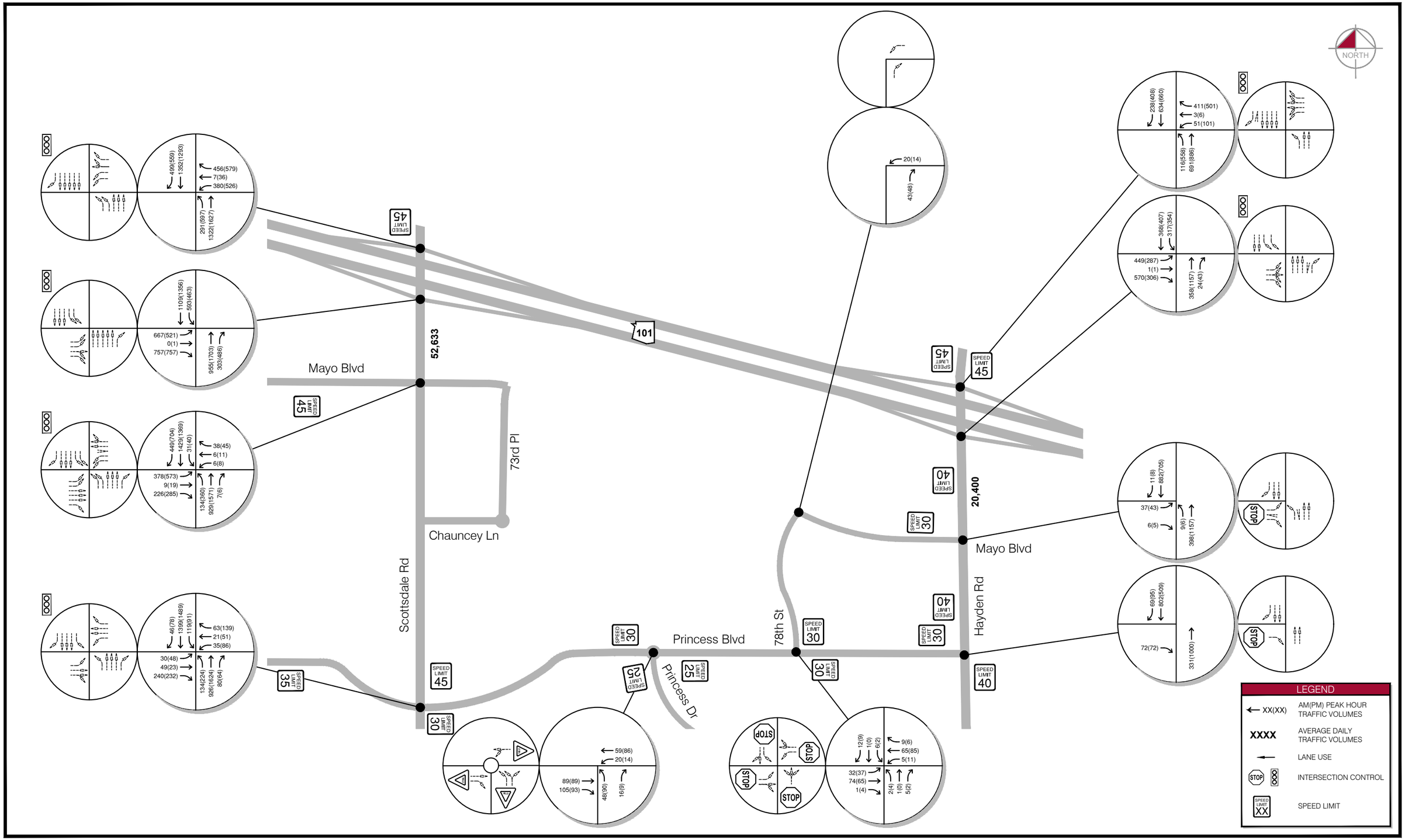
Table 5. Crashes by Crash Type

Intersection	Crash Type											Total
	Single Vehicle	Angle	Left Turn	Rear End	Head-on	Sideswipe (same direction)	Sideswipe (opposite direction)	Rear-to-Side	Rear-to-Rear	Other	Unknown	
Scottsdale Road & Loop 101 TI	0	3	0	0	1	2	0	0	0	0	0	6
Scottsdale Road & Mayo Boulevard	2	3	5	31	0	9	0	0	0	0	0	50
Scottsdale Road & Princess Boulevard	5	6	13	43	0	5	0	0	0	1	0	73
Hayden Road & Loop 101 TI	3	7	2	28	0	1	0	0	0	0	0	41
Hayden Road & Mayo Boulevard	0	0	1	1	0	1	0	0	0	0	0	3
Hayden Road & Princess Boulevard	1	0	0	0	0	1	0	0	0	0	0	2

Based on the 2020 intersection crash rate data provided in the COS 2020 Traffic Volume & Collision Report, the Scottsdale Road & Loop 101 TI has the fifth highest crash rate of all intersections and interchanges within the City of Scottsdale, with a rate of 1.56 crashes per million entering vehicles. It is worth noting that the number of TIs included in the COS crash data is limited, and the data is largely comprised of standard intersections.

The City of Scottsdale average intersection crash rate was 0.54 crashes per million entering vehicles across 202 intersections included with the data. The average crash rate at major arterial/major arterial intersections was 1.03 crashes per million entering vehicles. The average crash rate at the intersection of a minor arterial roadway with a major arterial or minor arterial roadway was 0.60 and 0.58 crashes per million entering vehicles, respectively. The average crash rate at the intersection of a major collector roadway with a major arterial, minor arterial, or major collector roadway was 0.56, 0.66, and 0.74 crashes per million entering vehicles, respectively.

The intersection of Scottsdale Road & Princess Boulevard had the 46th highest crash rate at 0.81 crashes per million entering vehicles, the Hayden Road & Loop 101 TI had the 59th highest crash rate at 0.74 crashes per million entering vehicles, and the intersection of Scottsdale Road & Mayo Boulevard had the 85th highest crash rate at 0.55 crashes per million entering vehicles.



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April 2023

Figure 3
Existing Conditions

5.0 PROJECTED TRAFFIC

5.1 SITE TRAFFIC FORECASTS

5.1.1 TRIP GENERATION

The Institute of Transportation Engineers' (ITE) *Trip Generation, 11th Edition* was used to obtain daily and peak hour trip generation rates and inbound-outbound percentages, which were then used to estimate the number of daily and peak hour trips that can be attributed to the proposed development. The trip generation characteristics of the site are summarized in **Table 6**. Trip generation calculations can be found in the **Appendix**.

Table 6. Project Trip Generation

Land Use	ITE Code	Quantity	Units	Daily Total	AM Peak			PM Peak		
					In	Out	Total	In	Out	Total
Senior Adult Housing-Multifamily	252	250	DUs	810	17	33	50	35	28	63
Hospital	610	352	Beds	7,858	454	176	630	196	399	595
General Office Building	710	32,760	SF	440	56	8	64	11	55	66
Medical-Dental Office Building	720	276,100	SF	9,700	607	142	749	209	626	835
Shopping Plaza (40-150k)	821	144,780	SF	9,776	155	95	250	368	383	751
High-Turnover (Sit-Down) Restaurant	932	30,000	SF	3,216	158	129	287	166	106	272
Trips Subtotal				**31,800**	**1,447**	**583**	**2,030**	**985**	**1,596**	**2,581**
Internal Capture Trip Reductions				-946	-76	-76	-152	-6	-6	-12
Total Trips				**30,854**	**1,371**	**507**	**1,878**	**979**	**1,591**	**2,570**

The proposed development is expected to generate 31,800 daily trips, with 2,030 trips occurring in the AM peak hour and 2,581 trips occurring in the PM peak hour. Owing to the proposed land uses, trip reductions are anticipated and justified below.

5.1.2 TRIP REDUCTIONS

It is reasonable to expect that internal trip interaction will result considering the hospital, medical office building, office building, and restaurant land uses. To account for this interaction, the methodology for estimating internally captured trips described in the *ITE Trip Generation Handbook, 3rd Edition* was used. The worksheets calculating internal capture using the ITE method and the resulting internal trip generation are shown in the **Appendix**. Interaction is also anticipated with the retail and senior adult residential uses; however, reductions were not considered for those uses to remain conservative since the uses are anticipated to be located on the west side of Miller Road.

Taking into consideration internal capture trips, the proposed development is expected to add 30,854 new daily trips, 1,878 new AM peak hour trips, and 2,570 new PM peak hour trips to the roadway network.

5.1.3 TRIP DISTRIBUTION

Daily trips were distributed over the cardinal directions based on the Maricopa Association of Governments' (MAG) estimate of total households within an 11.5-mile radius of the site. This radius is based on the average employment-based trip length as reported in the *2017 National Household Travel Survey*.

Percent to and from:	2020	2040
North	11 %	13 %
East	9 %	9 %
South	31 %	29 %
West	49 %	49 %

The results of this distribution were used as a basis for determining the ultimate trip distribution for the site. In addition to the MAG land use database for current and future land use projections, the ultimate surrounding roadway system was also taken into consideration when trip distribution was determined; therefore, the distribution shown above was further refined by considering the future roadway network near the site. **Figure 4** illustrates the trip distribution for the study area.

5.1.4 SITE TRAFFIC ASSIGNMENT

Trips generated by the proposed development were assigned to the roadway network based on the trip distribution and the likely travel patterns to and from the site. **Figure 5** shows the results of the site traffic assignment.

5.2 FUTURE TRAFFIC FORECASTING

The background traffic volumes for the buildout year 2040 were calculated based on the 2022 traffic counts and anticipated adjacent site traffic. Adjacent site traffic volumes from the previously discussed Cavasson, HonorHealth Medical Campus, Axon Campus, and Optima McDowell Mountain Village were included in the analysis. A 15% adjustment was applied to these site assignment volumes to account for an internal interaction factor between the sites. Additionally, since the Crossroads East Planning Unit VII traffic master plan did not include intersection volumes, turning movement volumes were estimated at the intersection of 78th Street & Mayo Boulevard based on the trip generation and anticipated traffic patterns to and from the development.

The City of Scottsdale provided 2040 average daily traffic (ADT) volumes from the MAG model that were used in concert with the 2035 transportation network map as a basis for providing additional future traffic growth projections. Review of the MAG traffic volume projections indicated that an additional adjustment to the Miller Road volumes was appropriate for consistency with the magnitude of the 2040 buildout traffic volumes. An additional 500 vehicles per hour were added to the through traffic volumes along Miller Road north of Princess Boulevard in the 2040 background traffic scenario. The 2035 transportation network map was provided by the City during development of the Crossroads East Planning Unit VII circulation plan. The 2035 network included higher level of granularity as the City model had five traffic analysis

zones where the MAG model had one traffic analysis zone, TAZ 1745. The Mayo Boulevard traffic volume projections were higher with the 2035 traffic model projections than the 2040 MAG projections. The 2035 projections appear to be a more refined traffic volume projection. Therefore, the Mayo Boulevard through volumes were increased by an additional 20% for consistency with the 2035 model projections.

The adjusted adjacent site traffic volumes were added to the existing turning movements to obtain background traffic volumes for the year 2040. The resulting 2040 background traffic volumes are shown in **Figure 6**. The adjacent site traffic assignment volumes with the adjustments described above is shown in the **Appendix**.

5.3 TOTAL TRAFFIC

The results of the site traffic assignment were added to the 2040 background traffic volumes shown in **Figure 6** to produce total traffic volumes for the study area. These total traffic volumes are shown in **Figure 7**.

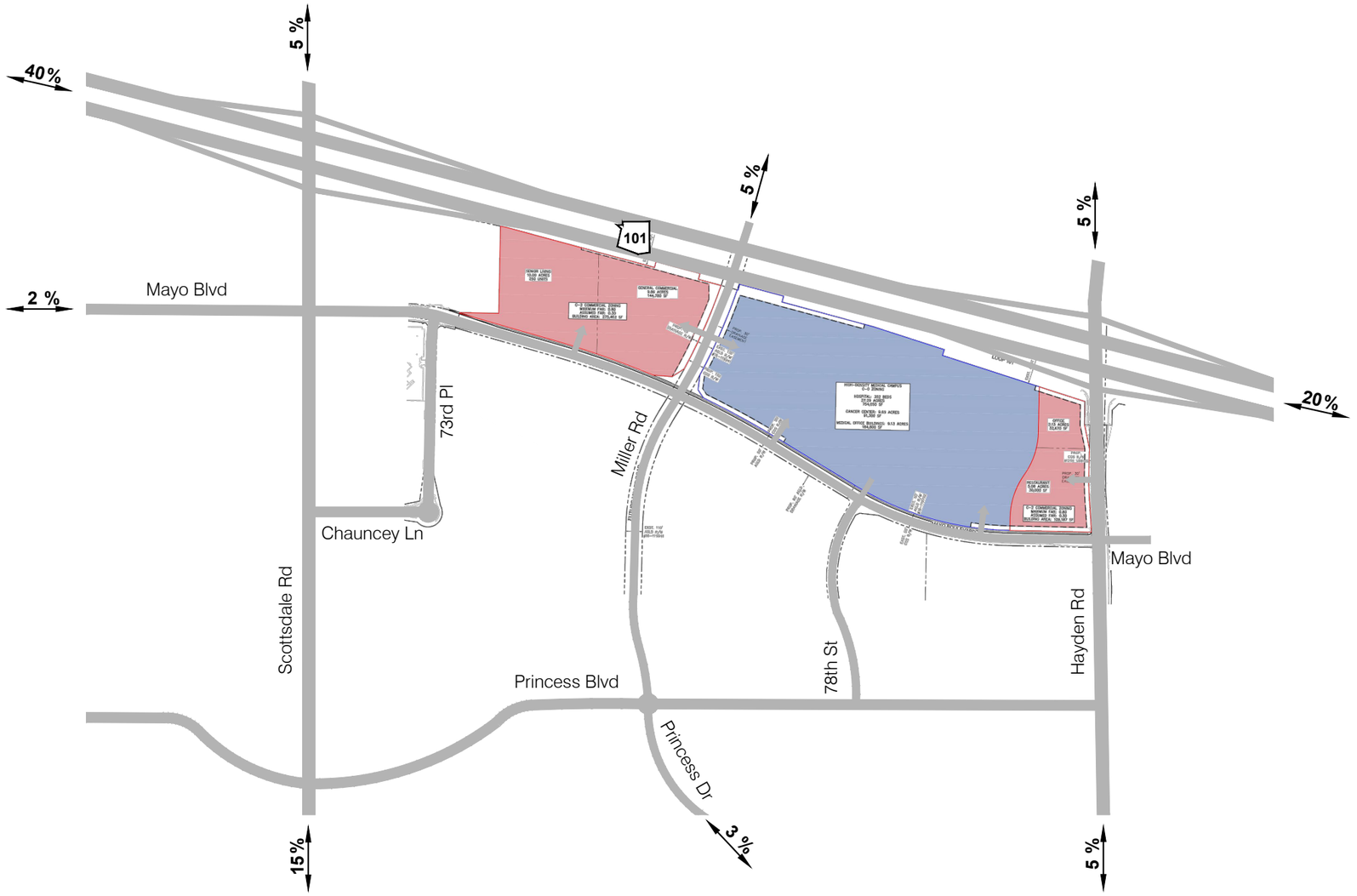

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Figure 4
Trip Distribution

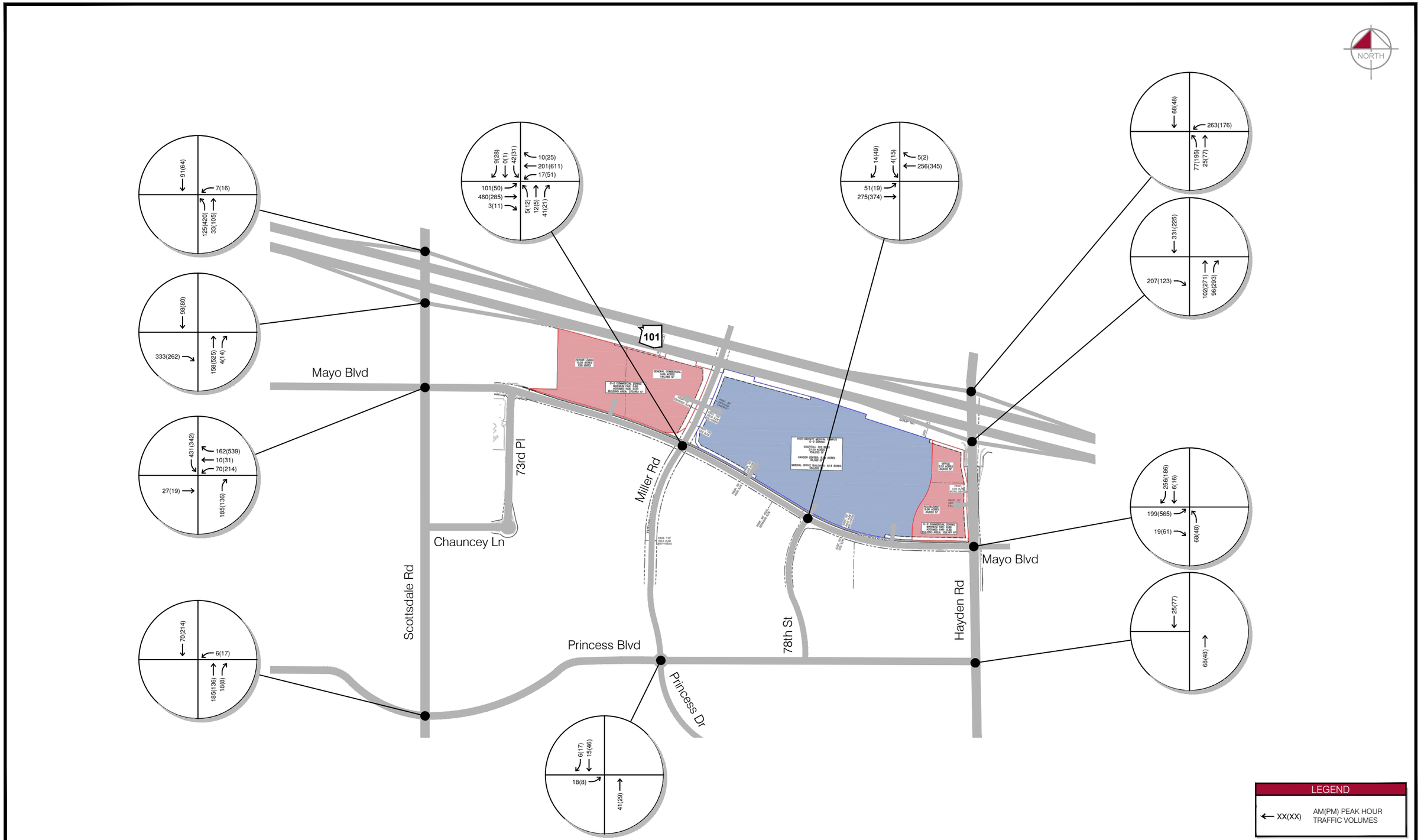

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Figure 5
Site Traffic Assignment

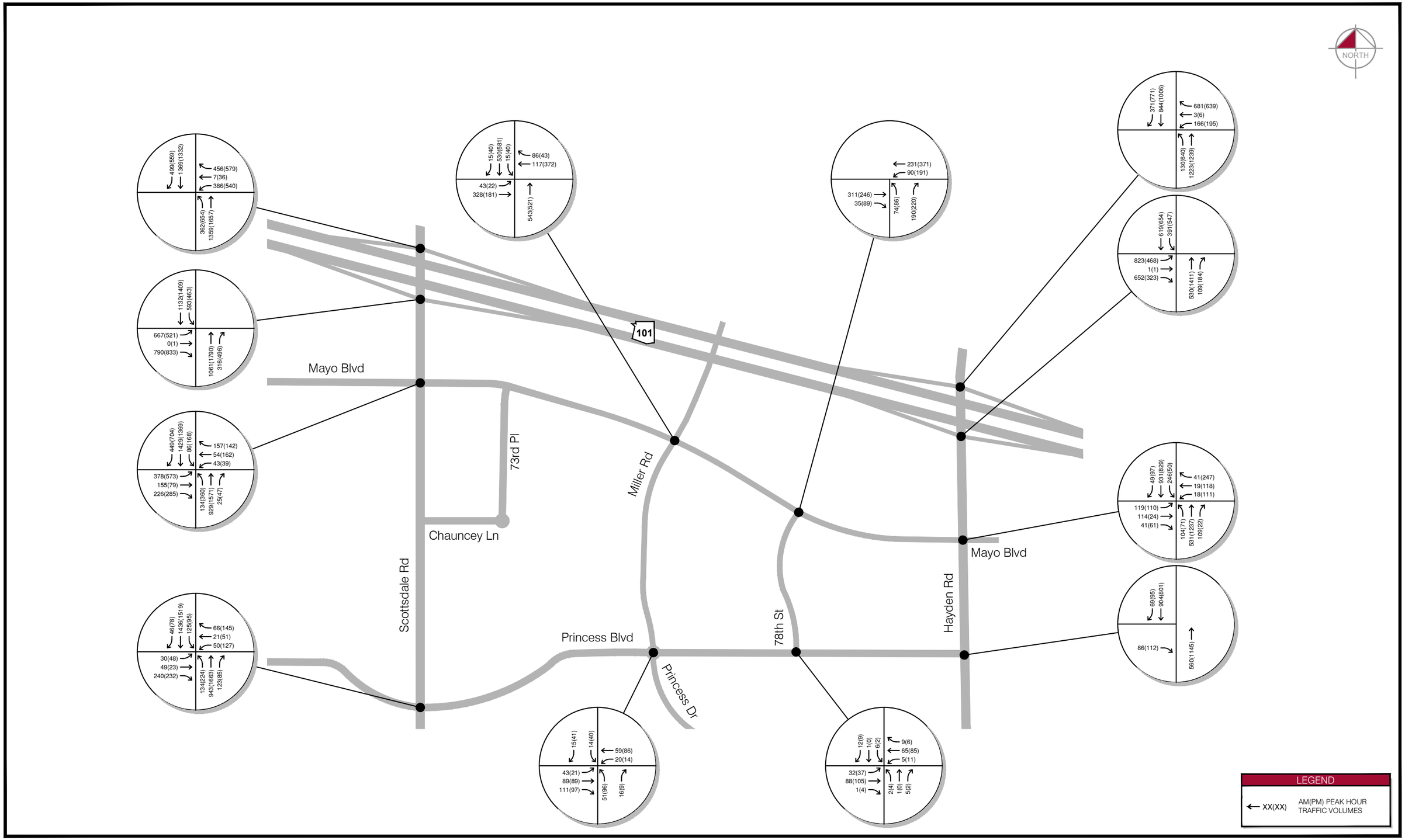

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Figure 6
2040 Background Traffic

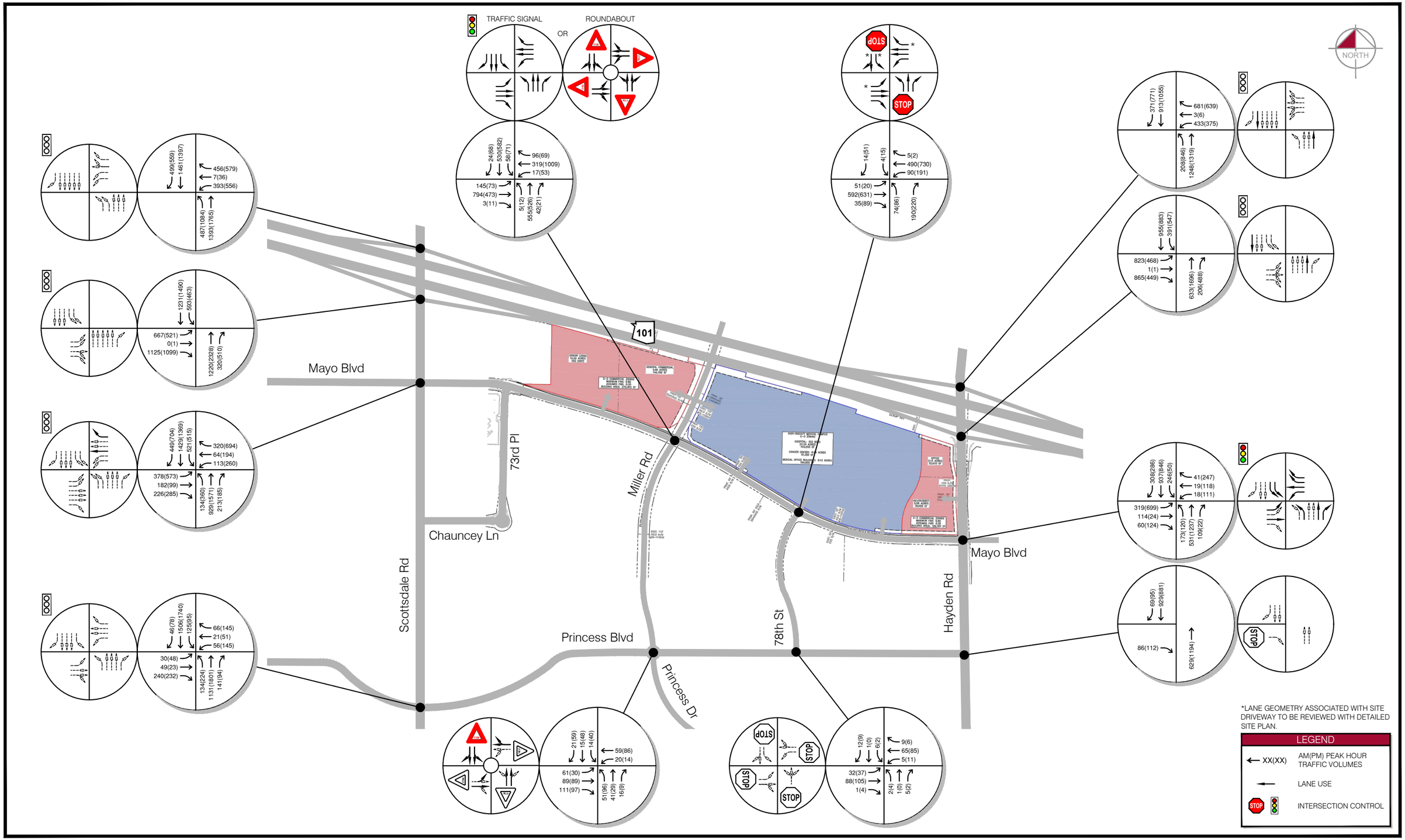

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Figure 7
2040 Total Traffic and Geometry

6.0 TRAFFIC AND IMPROVEMENT ANALYSIS

6.1 LEVEL OF SERVICE ANALYSIS

The LOS for the study area intersections for 2040 was evaluated using the *Highway Capacity Manual 6th Edition* methodology for unsignalized and signalized intersections using *Synchro 11* analysis software. The intersections at the traffic interchanges of Loop 101 with Scottsdale Road and Hayden Road were analyzed using Synchro methodology for signalized traffic interchanges. The existing signal timing data provided by the City of Scottsdale was used as a basis for evaluating and optimizing future traffic signal operations in the background and total traffic conditions. LOS analysis worksheets and signal timing assumptions are included in the **Appendix**.

6.1.1 2040 BACKGROUND TRAFFIC LEVEL OF SERVICE ANALYSIS

The unsignalized intersections in the study area were evaluated based on the 2040 background traffic shown in **Figure 6** and the future geometry shown in **Figure 7**. The results of this analysis are shown in **Table 7**.

Table 7. 2040 Background Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
Princess Drive/Miller Road & Princess Boulevard												
AM Peak	A		A	A		A	A		A	A		A
PM Peak	A		A	A		A	A		A	A		A
78th Street & Princess Boulevard												
AM Peak	A			A		A	A		A	A		
PM Peak	A			A		A	A		A	A		
Hayden Road & Princess Boulevard												
AM Peak		-			-	-			B			
PM Peak		-			-	-			B			
78th Street & Mayo Boulevard												
AM Peak	B		B					-	-	A	-	
PM Peak	C		B					-	-	A	-	

The unsignalized intersections are expected to operate at a satisfactory LOS in 2040 background traffic conditions.

The signalized intersections in the study area were evaluated based on the 2040 background traffic shown in **Figure 6** and the future geometry shown in **Figure 7**. Additionally, a right-turn overlap phase was considered at the southbound and westbound approaches to the intersection of Scottsdale Road and Mayo Boulevard as well as at the westbound approach to the intersection of Hayden Road and Mayo Boulevard. The results of this analysis are shown in **Table 8**.

Table 8. 2040 Background Level of Service: Signalized Intersections

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
Scottsdale Road & Loop 101 WB Ramps													
AM Peak	D	A			D	A				D	D	B	C
PM Peak	D	A			D	B				D	D	B	C
Scottsdale Road & Loop 101 EB Ramps													
AM Peak		D	B	D	B		C	B	B				C
PM Peak		D	B	E	B		C	D	C				D
Hayden Road & Loop 101 WB Ramps													
AM Peak	D	C			C	A				C	A	A	C
PM Peak	E	A			D	D				D	A	A	C
Hayden Road & Loop 101 EB Ramps													
AM Peak		C	A	D	B		D	D	A				C
PM Peak		D	B	D	C		E	D	A				C
Scottsdale Road & Mayo Boulevard													
AM Peak	E	D	C	E	D	C	E	D	E	D	D	D	D
PM Peak	E	D	C	E	D	D	E	D	E	D	D	D	D
Scottsdale Road & Princess Boulevard													
AM Peak	C	D	D	B	C	B	D	D	E	E	D	E	D
PM Peak	D	D	C	D	D	C	D	D	E	E	D	E	D
Hayden Road & Mayo Boulevard													
AM Peak	E	B	A	D	A	A	E	E	D	E	D	E	C
PM Peak	E	C	B	E	A	A	E	D	E	E	E	F	D
Miller Road & Mayo Boulevard													
AM Peak	A	A	A	A	A	A	A	A	A	A	A	A	A
PM Peak	A	A	A	A	A	A	A	A	A	A	A	A	A

The signalized intersections are expected to operate at a satisfactory overall LOS in 2040 background traffic conditions.

6.1.2 2040 TOTAL TRAFFIC LEVEL OF SERVICE ANALYSIS

The unsignalized intersections in the study area were evaluated based on the 2040 total traffic and geometry shown in **Figure 7**. The results of this analysis are shown in **Table 9**.

Table 9. 2040 Total Traffic Level of Service: Unsignalized Intersections

Intersection	NB			SB			EB			WB		
	L	T	R	L	T	R	L	T	R	L	T	R
Princess Drive/Miller Road & Princess Boulevard												
AM Peak	A		A	A		A	A		A	A		A
PM Peak	A		A	A		A	A		A	A		A
78th Street & Princess Boulevard												
AM Peak	A			A		A	A			A		A
PM Peak	A			A		A	A			A		A
Hayden Road & Princess Boulevard												
AM Peak		-			-	-			B			
PM Peak		-			-	-			B			
78th Street & Mayo Boulevard												
AM Peak	E	A	B	D		A	A	-	-	A	-	-
PM Peak	F	A	B	F		A	A	-	-	B	-	-

The unsignalized intersections are expected to operate at a satisfactory overall LOS in 2040 total traffic conditions except for the northbound and southbound left-turn movements at the intersection of 78th Street & Mayo Boulevard. It is common for left-turn movements from a two-way stop-controlled minor street to experience a poor level of service during peak hours due to a reduction in acceptable gaps in major street through traffic. It is anticipated that the intersection operates at an acceptable level of service outside of peak hours. For comparative purposes, the intersection of 78th Street & Mayo Boulevard was also analyzed with traffic signal control below. Alternate intersection configurations could be evaluated at the intersection of 78th Street & Mayo Boulevard with development of a detailed site plan.

The signalized intersections in the study area were evaluated based on the 2040 total traffic and geometry shown in **Figure 7**. A right-turn overlap phase was considered at the southbound and westbound approaches to the intersection of Scottsdale Road and Mayo Boulevard as well as at the westbound approach to the intersection of Hayden Road and Mayo Boulevard, which was consistent with the 2040 background traffic analysis. The results of this analysis are shown in **Table 10**.

Table 10. 2040 Total Traffic Level of Service: Signalized Intersections

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
Scottsdale Road & Loop 101 WB Ramps													
AM Peak	D	A			D	A				D	D	B	C
PM Peak	E	A			D	C				D	E	B	D
Scottsdale Road & Loop 101 EB Ramps													
AM Peak		D	B	D	B		C	C	C				C
PM Peak		E	A	E	C		C	E	D				D
Hayden Road & Loop 101 WB Ramps													
AM Peak	D	D			D	A				C	A	A	C
PM Peak	F	B			D	D				D	B	A	E
Hayden Road & Loop 101 EB Ramps													
AM Peak		D	A	D	C		D	D	A				C
PM Peak		C	A	D	C		D	D	A				C
Scottsdale Road & Mayo Boulevard													
AM Peak	E	D	D	E	D	C	E	D	D	E	D	C	D
PM Peak	E	D	C	E	D	B	E	C	D	E	D	E	D
Scottsdale Road & Princess Boulevard													
AM Peak	D	D	C	B	C	B	D	D	E	E	D	E	D
PM Peak	D	D	C	D	D	B	D	D	E	E	D	E	D
Hayden Road & Mayo Boulevard													
AM Peak	E	B	B	E	A	A	E	D	D	E	E	D	C
PM Peak	E	D	C	E	B	B	E	D	D	E	F	E	D
Miller Road & Mayo Boulevard													
AM Peak	B	B	A	B	B	A	A	A	A	B	A	A	A
PM Peak	B	B	B	B	B	B	B	A	A	A	A	A	B
78th Street & Mayo Boulevard													
AM Peak	A	A	B	A	A	A	A	A	A	A	A	A	A
PM Peak	B	A	B	B	A	B	A	A	A	A	A	A	A

The signalized intersections are expected to operate at a satisfactory overall LOS in 2040 total traffic conditions except for the intersection of Hayden Road & Loop 101 WB Ramps during the PM peak hour. The poor LOS is driven by the northbound left-turn movement, which is constrained to a single turn lane. The interchange cannot accommodate dual left-turn lanes without substantial changes to the existing interchange geometry. Consideration could be given to repurposing one of the northbound through lanes as a northbound left-turn lane in the future as described in the left-turn storage analysis section.

The City requested that the intersection of Miller Road & Mayo Boulevard also be analyzed as a roundabout. Therefore, the intersection was analyzed as a roundabout in addition to a signalized intersection. The results of the roundabout analysis are shown in **Table 11**.

Table 11. 2040 Total Traffic Level of Service: Roundabout Alternative

Intersection	NB			SB			EB			WB			Intersection LOS
	L	T	R	L	T	R	L	T	R	L	T	R	
Miller Road & Mayo Boulevard													
AM Peak	C	C		A	A		C	C		B	A		B
PM Peak	B	A		E	E		B	B		D	D		C

The intersection of Miller Road & Mayo Boulevard is expected to operate at a satisfactory overall LOS in 2040 total traffic conditions.

6.2 LEFT-TURN STORAGE ANALYSIS

The City of Scottsdale requires left-turn lanes at all street intersections on major collector and arterial roadways. Turn lane lengths are to be determined based on the anticipated turning volume and the traffic control type. The City of Scottsdale recommends that left-turn lanes be constructed with a standard storage length of 150 feet. The minimum storage length is 100 feet per City of Scottsdale guidelines. Left-turn lanes should be constructed with a reverse curve length per COS Standard Detail 2225. Where raised median is not present, an appropriate striping gap of 100 feet should be provided for the turn lane opening.

The signalized and unsignalized intersections in the study area were analyzed to determine the left-turn storage needed to accommodate the expected traffic volumes in the buildout year 2040. The left-turn storage calculations at the traffic interchanges utilized ADOT turn lane criteria. Per ADOT TGP 430, ADOT calculates storage length by summing queue length multiplied by a factor of 1.5 to 2 times plus braking distance. The left-turn storage calculations at the remaining intersections utilized AASHTO turn lane criteria. Additionally, Synchro 95th percentile queues were analyzed at the traffic interchanges, and HCM 95th percentile queues were analyzed at all other intersections. **Table 12** provides the recommended left-turn storage at the study area intersections. The recommended storage lengths are based on total traffic volumes shown in **Figure 7**. The calculations associated with these conclusions and the relevant COS and ADOT standards are included in the **Appendix**.

Table 12. Left-Turn Storage

Intersection and Approach	*Existing Storage Length*	Calculated Queue Length	Desired (Minimum) Braking Distance	95th Percentile Storage Length	**Recommended Storage**
Scottsdale Road & Loop 101 WB Ramps					
Northbound Approach	625 feet (Dual)	685 feet (Dual)	200 feet (85 feet)	501 feet (Dual)	625 feet (Dual) [(1)(3)]
Westbound Approach	315 feet (Dual)	355 feet (Dual)	200 feet (85 feet)	260 feet (Dual)	315 feet (Dual) [(1)(2)]
Scottsdale Road & Loop 101 EB Ramps					
Southbound Approach	710 feet (Dual)	375 feet (Dual)	200 feet (85 feet)	381 feet (Dual)	710 feet (Dual) [(1)]
Eastbound Approach	200 feet (Dual)	420 feet (Dual)	200 feet (85 feet)	265 feet (Dual)	200 feet (Dual) [(2)]
Hayden Road & Loop 101 WB Ramps					
Northbound Approach	385 feet	1060 feet	200 feet (85 feet)	1312 feet	550 feet [(3)]
Westbound Approach	495 feet (LT) 495 feet (Th/LT)	280 feet (LT) 280 feet (Th/LT)	200 feet (85 feet)	275 feet (LT) 275 feet (Th/LT)	495 feet (LT) [(1)(2)] 495 feet (Th/LT)

Intersection and Approach	*Existing Storage Length*	Calculated Queue Length	Desired (Minimum) Braking Distance	95th Percentile Storage Length	**Recommended Storage**
Hayden Road & Loop 101 EB Ramps					
Southbound Approach	545 feet (Dual)	345 feet (Dual)	200 feet (85 feet)	312 feet (Dual)	545 feet (Dual) [(1)]
Eastbound Approach	430 feet (LT) 430 feet (LT/Th/RT)	690 feet (LT) 690 feet (LT/Th/RT)	200 feet (85 feet)	710 feet (LT) 710 feet (LT/Th/RT)	430 feet (LT) [(2)(4)] 430 feet (LT/Th/RT)
Scottsdale Road & Mayo Boulevard					
Northbound Approach	240 feet (Dual)	225 feet (Dual)	N/A	275 feet (Dual)	240 feet (Dual) [(1)(4)]
Southbound Approach	165 feet (Dual)	325 feet (Dual)	N/A	375 feet (Dual)	165 feet (Dual) [(3)]
Eastbound Approach	325 feet (Dual)	350 feet (Dual)	N/A	450 feet (Dual)	325 feet (Dual) [(4)]
Westbound Approach	165 feet (Dual)	175 feet (Dual)	N/A	200 feet (Dual)	165 feet (Dual) [(3)]
Scottsdale Road & Princess Boulevard					
Northbound Approach	250 feet	300 feet	N/A	300 feet	250 feet [(4)]
Southbound Approach	235 feet	200 feet	N/A	125 feet	235 feet [(1)]
Eastbound Approach	205 feet	100 feet	N/A	75 feet	205 feet [(1)]
Westbound Approach	165 feet	225 feet	N/A	225 feet	225 feet
Hayden Road & Mayo Boulevard					
Northbound Approach	150 feet	125 feet (Dual)	N/A	150 feet (Dual)	150 feet (Dual)
Southbound Approach	-	175 feet (Dual)	N/A	200 feet (Dual)	355 feet (Dual) [(4)(5)]
Eastbound Approach	300 feet	400 feet (Dual)	N/A	525 feet (Dual)	400 feet (Dual)
Westbound Approach	-	175 feet	N/A	575 feet	150 feet [(4)(5)]
78th Street & Princess Boulevard					
Southbound Approach	100 feet	50 feet	N/A	25 feet	100 feet [(1)]
Eastbound Approach	110 feet	50 feet	N/A	25 feet	110 feet [(1)]
Westbound Approach	100 feet	50 feet	N/A	25 feet	100 feet [(1)]

Intersection and Approach	*Existing Storage Length*	Calculated Queue Length	Desired (Minimum) Braking Distance	95th Percentile Storage Length	**Recommended Storage**
Miller Road & Mayo Boulevard					
Northbound Approach	-	50 feet	N/A	25 feet	250 feet
Southbound Approach	-	75 feet	N/A	50 feet	250 feet
Eastbound Approach	-	125 feet	N/A	50 feet	250 feet
Westbound Approach	-	75 feet	N/A	25 feet	250 feet
78th Street & Mayo Boulevard					
Northbound Approach	-	200 feet	N/A	150 feet	200 feet [4]
Westbound Approach	-	125 feet	N/A	25 feet	150 feet [4]

LT = Exclusive left-turn lane.

Th/LT = Shared through/left-turn lane.

LT/Th/RT = Shared left-turn/through/right-turn lane.

Dual = Two left-turn lanes.

[1] Calculated or 95% Percentile Storage Length value less than or equal to existing.

[2] Additional storage available beyond striped turn lane.

[3] Turn lane is geometrically constrained.

[4] Site does not contribute or minimally contributes traffic to movement.

[5] Value represents proposed storage per adjacent site traffic report/roadway plan.

The left-turn lanes should provide the storage recommended in **Table 12** and an appropriate reverse curve length per COS Standard Detail 2225 with development of detailed site plans or with adjacent development.

The Hayden Road & Loop 101 northbound left-turn storage should be reconfigured and coordinated with the Axon development to extend the left-turn storage. The signing and pavement marking plans associated with the Axon development include proposed 355-foot dual southbound left-turn lanes at the intersection of Hayden Road & Mayo Boulevard. The northbound left-turn lane storage at the Hayden Road & Loop 101 traffic interchange could provide approximately 550 feet of storage to maximize the available space between intersections; however, the storage may be extended further if the dual southbound left-turn length is reduced at the Hayden Road and Mayo Boulevard intersection into the Axon development. The Axon TIA and calculations from this report indicate that the 355 feet of dual southbound left-turn storage may be more than necessary for typical peak hour conditions. As an additional consideration, the inside through lane at the Hayden Rd & Loop 101 TI may be able to be utilized as a second northbound left-turn lane, and two northbound through lanes would be maintained through the TI. Traffic volumes should be monitored and coordination with surrounding development should occur.

The westbound left-turn lane at the intersection of Scottsdale Road & Princess Boulevard may require additional storage in future traffic conditions. Volumes are recommended to be monitored at this location. The storage length should be refined with development of the land on the northeast corner of the intersection.

It is recommended that the northbound approach to the intersection of Hayden Road & Mayo Boulevard by re-striped to provided dual left-turn lanes. The pavement marking modifications should occur at or after the time of signalization of the intersection.

It is recommended that the eastbound approach to the intersection of Hayden Road & Mayo Boulevard provide dual left-turn lanes with 400 feet of storage in each lane. The Crossroads East Planning Unit VII Circulation Plan indicated that there may be an ability to provide two full-access driveway locations along Mayo Boulevard between 78th Street and Hayden Road; however, a single full-access driveway location is recommended given the eastbound left-turn storage demand at the Hayden Road & Mayo Boulevard intersection. It is recommended that the full-access driveway be located approximately at the midpoint of the approximate 1,600-foot Mayo Boulevard roadway segment between 78th Street and Hayden Road to provide full access to both sides of Mayo Boulevard. Cross access should be considered between the restaurant/office portion of the plan and medical campus portion of the current proposed plan.

It is recommended that 250 feet of left-turn storage be provided along all approaches to the intersection of Miller Road & Mayo Boulevard. This more conservative recommendation is provided due to the higher level of uncertainty associated with the background traffic volumes at the intersection. When the intersection is constructed, a reassignment of traffic volumes will occur to utilize the Miller Road underpass.

Southbound and eastbound left-turn storage at the intersection of 78th Street & Mayo Boulevard should be determined with a more detailed site plan along with turn storage recommendations at all other site driveway locations.

6.3 RIGHT-TURN LANES

Right-turn lanes are often recommended on roadways where right-turning vehicles create delays or safety concerns for other traffic movements. The need for a right-turn lane depends on the speed of traffic on the road, the volume of traffic turning right, and the through traffic volume in the same lane as the right-turning traffic.

6.3.1 INTERSECTIONS

The City of Scottsdale recommends a right-turn deceleration lane at all street intersections on major arterial roadways and on other roadways based on anticipated turning volumes and traffic control. The City of Scottsdale recommends that right-turn lanes be constructed with a standard storage length of 150 feet. The minimum storage length for right-turn lanes per City of Scottsdale requirements is 100 feet. Right-turn lanes should be constructed with a reverse curve length per COS Standard Detail 2225.

The signalized and unsignalized intersections in the study area were analyzed to determine the right-turn storage needed to accommodate the expected traffic volumes in the horizon year 2040. The right-turn storage calculations at the traffic interchanges utilized ADOT turn lane criteria. Per ADOT TGP 430, ADOT calculates storage length by summing queue length multiplied by a factor of 1.5 to 2 times plus braking distance. The right-turn storage calculations at the remaining intersections utilized AASHTO turn lane criteria. Additionally, Synchro 95th percentile queues were analyzed at the traffic interchanges, and HCM 95th percentile queues were analyzed at all other intersections. **Table 13** provides the recommended right-turn storage at the study area intersections. The recommended storage lengths are based on total traffic volumes shown in **Figure 7**. The calculations associated with these conclusions and the relevant COS and ADOT standards are included in the **Appendix**.

Table 13. Right-Turn Storage

Intersection and Approach	*Existing Storage Length*	Calculated Queue Length	Desired (Minimum) Braking Distance	95th Percentile Storage Length	**Recommended Storage**
Scottsdale Road & Loop 101 WB Ramps					
Southbound Approach	400 feet	425 feet	200 feet (85 feet)	313 feet	400 feet [(1)(4)]
Westbound Approach	320 feet (RT) 320 feet (Th/RT)	255 feet (RT) 255 feet (Th/RT)	200 feet (85 feet)	189 feet (RT) 189 feet (Th/RT)	320 feet (RT) [(1)(4)] 320 feet (Th/RT)
Scottsdale Road & Loop 101 EB Ramps					
Northbound Approach	600 feet	400 feet	200 feet (85 feet)	173 feet	600 feet [(1)]
Eastbound Approach	205 feet (RT) 205 feet (Th/RT)	495 feet (RT) 495 feet (Th/RT)	200 feet (85 feet)	556 feet (RT) 556 feet (Th/RT)	205 feet (RT) [(2)] 205 feet (Th/RT)

Intersection and Approach	*Existing Storage Length*	Calculated Queue Length	Desired (Minimum) Braking Distance	95th Percentile Storage Length	**Recommended Storage**
Hayden Road & Loop 101 WB Ramps					
Southbound Approach	180 feet	585 feet	200 feet (85 feet)	563 feet	180 feet [4]
Westbound Approach	500 feet (RT) 500 feet (Th/RT)	300 feet (RT) 300 feet (Th/RT)	200 feet (85 feet)	73 feet (RT) 73 feet (Th/RT)	500 feet (RT) [1][4] 500 feet (Th/RT)
Hayden Road & Loop 101 EB Ramps					
Northbound Approach	200 feet	375 feet	200 feet (85 feet)	128 feet	200 feet [1]
Eastbound Approach	435 feet (RT) 435 feet (LT/Th/RT)	510 feet (RT) 510 feet (LT/Th/RT)	200 feet (85 feet)	180 feet (RT) 180 feet (LT/Th/RT)	435 feet (RT) [1][2] 435 feet (LT/Th/RT)
Scottsdale Road & Mayo Boulevard					
Northbound Approach	155 feet	225 feet	N/A	225 feet	155 feet [3]
Southbound Approach	340 feet	600 feet	N/A	375 feet	340 feet [4]
Eastbound Approach	330 feet	275 feet	N/A	250 feet	330 feet [1][4]
Westbound Approach	-	575 feet	N/A	700 feet	575 feet [6]
Scottsdale Road & Princess Boulevard					
Northbound Approach	250 feet	175 feet	N/A	125 feet	250 feet [1]
Southbound Approach	250 feet	125 feet	N/A	50 feet	250 feet [1]
Westbound Approach	80 feet	175 feet	N/A	175 feet	80 feet [4]
Hayden Road & Mayo Boulevard					
Northbound Approach	-	150 feet	N/A	50 feet	210 feet [4][5]
Southbound Approach	185 feet	300 feet	N/A	125 feet	185 feet (Trap) [2]
Eastbound Approach	165 feet	150 feet	N/A	125 feet	165 feet [1]
Westbound Approach	-	125 feet (Dual)	N/A	450 feet (Dual)	130 feet (Dual) [4][5]

Intersection and Approach	*Existing Storage Length*	Calculated Queue Length	Desired (Minimum) Braking Distance	95th Percentile Storage Length	**Recommended Storage**
Miller Road & Mayo Boulevard					
Northbound Approach	-	50 feet	N/A	25 feet	250 feet
Southbound Approach	-	75 feet	N/A	25 feet	250 feet
Eastbound Approach	-	50 feet	N/A	25 feet	250 feet
Westbound Approach	-	75 feet	N/A	25 feet	250 feet
78th Street & Mayo Boulevard					
Northbound Approach	-	200 feet	N/A	50 feet	200 feet (4)
Eastbound Approach	-	75 feet	N/A	25 feet	150 feet (4)

RT = Exclusive right-turn lane.

Th/RT = Shared through/right-turn lane.

LT/Th/RT = Shared left-turn/through/right-turn lane.

Dual = Two right-turn lanes.

Trap = Through lane that transitions to right-turn only lane.

(1) Calculated or 95% Percentile Storage Length value less than or equal to existing.

(2) Additional storage available beyond striped turn lane.

(3) Turn lane is geometrically constrained.

(4) Site does not contribute or minimally contributes traffic to movement.

(5) Value represents proposed storage per adjacent site traffic report/roadway plan.

(6) Turn lane anticipated to be constructed by Optima McDowell Mountain Village development. Proposed storage not clearly stated in traffic report. A continuous right-turn lane should be provided to accommodate the anticipated queue demand, while not interfering with the planned roundabout at the intersection of 73rd Place and Mayo Boulevard.

The right-turn lanes should provide the storage recommended in **Table 13** and an appropriate reverse curve length per COS Standard Detail 2225 with development of detailed site plans or with adjacent development.

The future westbound right-turn lane at the intersection of Scottsdale Road & Mayo Boulevard is anticipated to be constructed by the Optima McDowell Mountain Village development. A continuous right-turn lane should be provided to accommodate the anticipated queue demand of 575 feet, while not interfering with the planned roundabout at the intersection of 73rd Place and Mayo Boulevard.

It is recommended that the anticipated third southbound through lane along Hayden Road, south of the Loop 101, transition to a right-turn only lane at the Mayo Boulevard intersection.

It is recommended that 250 feet of right-turn storage be provided along all approaches to the intersection of Miller Road & Mayo Boulevard. This more conservative recommendation is provided due to the higher

level of uncertainty associated with the background traffic volumes at the intersection. When the intersection is constructed, a reassignment of traffic volumes will occur to utilize the Miller Road underpass.

Westbound right-turn lane warrants and storage at the intersection of 78th Street & Mayo Boulevard should be determined with a more detailed site plan along with turn storage recommendations at all other site driveway locations.

6.4 SIGHT TRIANGLES

Per City of Scottsdale DSPM Section 5-3.123D, it is recommended that sight triangles be provided at all intersections to give drivers exiting the site a clear view of oncoming traffic. The landscaping within sight triangles must not obstruct drivers' views of the adjacent travel lanes.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed development is expected to add 30,854 new daily trips, 1,878 new AM peak hour trips, and 2,570 new PM peak hour trips to the roadway network. The purpose of this report was to review key street intersections for a 2040 buildout scenario to determine appropriate intersection geometry. It is recommended that volumes in the area be monitored and additional analysis be considered with detailed site plans or adjacent development plans.

The intersections of Mayo Boulevard with Miller Road and 78th Street were evaluated as standard intersections with this report. The addition of traffic signal control is anticipated to be necessary at the Miller Road & Mayo Boulevard intersection. The intersection of 78th Street & Mayo Boulevard operates acceptably as a two-way stop-controlled intersection except for the northbound and southbound left-turn movements. Traffic signal warrants should be reviewed with a more detailed site plan. Alternate intersection configurations could also be considered at these intersections. Previous documents have contemplated roundabouts in addition to a standard intersection configuration. At the City's request, the intersection of Miller Road & Mayo Boulevard was also evaluated as a roundabout and the LOS was satisfactory under that condition.

At the Loop 101 TI, Hayden Road was constructed to accommodate a third southbound through lane. It is anticipated that a third southbound through lane will extend south of the Loop 101 to the Mayo Boulevard intersection where the third through lane is anticipated to transition to a right-turn only lane. The Axon signing and pavement marking plans include a third northbound through lane at the intersection of Hayden Road and Mayo Boulevard that is anticipated to continue north to the Loop 101 TI. Hayden Road has three travel lanes in each direction north of the Loop 101.

Mayo Boulevard is anticipated to be constructed to a City of Scottsdale urban major collector cross-section between 73rd Place and Hayden Road with two travel lanes and bike lanes in each direction and a two-way left-turn lane.

Miller Road is anticipated to be constructed to an urban major collector cross-section with two travel lanes and bike lanes in each direction and a two-way left-turn lane.

The unsignalized and signalized intersections are anticipated to operate at an overall acceptable level of service in the 2040 total traffic condition except for the Hayden Road & Loop 101 TI during the PM peak hour. The overall level of service at the Hayden Road & Loop 101 TI is driven by the delay associated with the northbound left-turn movement. Considerations for improvement to the northbound left-turn movement for the 2040 total traffic condition are discussed in additional detail with the next item.

The Hayden Road & Loop 101 northbound left-turn storage should be reconfigured and coordinated with the Axon development to extend the left-turn storage. The signing and pavement marking plans associated with the Axon development include proposed 355-foot dual southbound left-turn lanes at the intersection of Hayden Road & Mayo Boulevard. The northbound left-turn lane storage at the Hayden Road & Loop 101 traffic interchange could provide approximately 550 feet of storage to maximize the available space between intersections; however, there may be an ability to extend the storage further if the dual southbound left-turn length is reduced at the Hayden Road and Mayo Boulevard intersection into the Axon development. As an additional consideration, the inside through lane at the Hayden Rd & Loop

101 TI may be able to be utilized as a second northbound left-turn lane, and two northbound through lanes would be maintained through the TI. Traffic volumes should be monitored and coordination with surrounding development should occur.

The westbound left-turn lane at the intersection of Scottsdale Road & Princess Boulevard may require additional storage in future traffic conditions. Volumes are recommended to be monitored at this location. Consider refining the storage length with development of the land on the northeast corner of the intersection.

It is recommended that the northbound approach to the intersection of Hayden Road & Mayo Boulevard by re-striped to provided dual left-turn lanes. The pavement marking modifications should occur at or after the time of signalization of the intersection.

It is recommended that the eastbound approach to the intersection of Hayden Road & Mayo Boulevard provide dual left-turn lanes with 400 feet of storage in each lane. The Crossroads East Planning Unit VII Circulation Plan indicated that there may be an ability to provide two full-access driveway locations along Mayo Boulevard between 78th Street and Hayden Road; however, a single full-access driveway location is recommended given the eastbound left-turn storage demand at the Hayden Road & Mayo Boulevard intersection. It is recommended that the full-access driveway be located approximately at the midpoint of the approximate 1,600-foot Mayo Boulevard roadway segment between 78th Street and Hayden Road to provide full access to both sides of Mayo Boulevard. Cross access should be considered between the restaurant/office portion of the plan and medical campus portion of the current proposed plan.

It is recommended that 250 feet of left-turn lane and right-turn lane storage be provided along all approaches to the intersection of Miller Road & Mayo Boulevard. This more conservative recommendation is provided due to the higher level of uncertainty associated with the background traffic volumes at the intersection. When the intersection is constructed, a reassignment of traffic volumes will occur to utilize the Miller Road underpass.

The future westbound right-turn lane at the intersection of Scottsdale Road & Mayo Boulevard is anticipated to be constructed by the Optima McDowell Mountain Village development. A continuous right-turn lane should be provided to accommodate the anticipated queue demand of 575 feet, while not interfering with the planned roundabout at the intersection of 73rd Place and Mayo Boulevard.

Access spacing, turn lane warrants, and storage recommendations at driveway locations should be reviewed with development of detailed site plans.

It is recommended that sight triangles be provided at all intersections to give drivers exiting the site a clear view of oncoming traffic. The landscaping within sight triangles must not obstruct drivers' views of the adjacent travel lanes.

APPENDIX

- Adjacent Site Traffic Study/Plan Excerpts
- Traffic Counts
- City of Scottsdale Average Daily Segment Volume Maps
- City of Scottsdale Signal Timing Data
- Existing AM Traffic Capacity Analysis
- Existing PM Traffic Capacity Analysis
- City of Scottsdale Crash Data
- Trip Generation and Reductions
- Adjusted Adjacent Site Traffic Assignment
- 2040 Background AM Traffic Capacity Analysis
- 2040 Background PM Traffic Capacity Analysis
- 2040 Total AM Traffic Capacity Analysis
- 2040 Total PM Traffic Capacity Analysis
- AASHTO Storage Calculations
- ADOT Storage Calculations
- Relevant City of Scottsdale Standards
- Relevant ADOT Standards
- Relevant City of Phoenix Standards

Adjacent Site Traffic Study/Plan Excerpts

CivTech

October 12, 2020

NWGH, LLC

ICO:
Mr. James K. Rost, Vice-President
Nationwide Reality Investors
375 North Front Street, Suite 200
Phone: 614.857.2330
Email: rostj@nationwide.com

Registered Professional Engineer (Civil)
CERTIFICATE NO.
35879
DAWN D.
CARTIER
Date Signed 10-13-2020
ARIZONA, U.S.A.

RE: MASTER TRAFFIC IMPACT AND MITIGATION ANALYSIS FOR THE NRI – SCOTTSDALE DEVELOPMENT – SCOTTSDALE, ARIZONA

Dear Mr. Rost:

CivTech is pleased to present this addendum to the Master Traffic Impact and Analysis for the Cavasson Development located on the northwest corner of Hayden Road and Loop 101, south of Legacy Boulevard in Scottsdale, Arizona.

BACKGROUND

The Cavasson development is a ±134-acre project located on the southwest corner of Hayden Road and Legacy Boulevard in Scottsdale, Arizona. This development is separated into three (3) phases. Phase 1 consists of a 135-key hotel, 350 multi-family residential dwelling units, 11,000 square feet of retail with 6,000 square feet of restaurant attached, and 740,000 square feet of office space. Previously, the approved TIMA considered all of Phase 2 and Phase 3 to be included in a single buildout phase (in its entirety noted as Phase 2). Therefore, the TIMA Phase 2 included both the Cavasson Phase 2 and Phase 3 plans of development.

This second buildout phase of Cavasson was to consist of multiple hotels totaling 265 keys, 1,250 multi-family dwelling units, 183,000 square feet of retail with 6,000 square feet of restaurant attached, and 1,060,000 square feet of office space. Previously, there was not a comprehensive site plan available that depicted the exact location of each of the land uses for the buildout condition, so it was assumed that of all the Phase 3 site trips, approximately 77% of them would be located north of Cavasson Boulevard and 23% of them would be located in the southwest quadrant known as Phase 2. The north half of the site, noted as Phase 3 in the plan of development, as provided in an updated site plan, will now consist of 67,500 square feet of retail, 219,000 square feet of office space, 18,000 square feet of fast-casual restaurant, a 265-key hotel and approximately 400 multi-family residential units.

There are 15 access points and internal intersections that are associated with this project which will be-reanalyzed in this addendum. The land uses and sizes in the northeast quadrant of the site have changed from the approved Cavasson TIMA, sealed May 17, 2019. Along with the updated land uses

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and sizes, two additional connections have been added since the previous TIMA. The purpose of this addendum is to compare the previous trip generation with an updated trip generation with the revised land uses to determine is the queue storage length recommendations and other recommended offsite improvements from the previous TIA are sufficient. The proposed site plan can be found in **Attachment A**.

FUTURE ROADWAY CONDITIONS

Miller Road will be expanded from the northern subdivision, south to Legacy Boulevard, during the construction of Phase 1. This expansion will provide access to the Cavasson development and the surrounding Crossroads East development. By phase 2 opening year 2030, Miller Road will be constructed south as an underpass for the Loop 101 and will terminate at Princess Boulevard, creating a new four-legged intersection.

Internal to the site, Cavasson Boulevard has been constructed east-west bisecting the north and south halves of the site. Claret Drive has been constructed north-south to connect the Loop 101 Frontage Road to Cavasson Boulevard and will continue north, connecting to Legacy Boulevard. Construction of both Cavasson Boulevard and Claret Drive south of Cavasson Boulevard were contemplated with Phase 1 and are nearing completion. The north connection of Claret Drive, as well as construction of two additional north-south roadways, connecting Claret Drive to Legacy Boulevard, will be a part of phase 3.

SITE ACCESS

The site can be accessed via Miller Road alignment, Hayden Road, Legacy Boulevard and Westbound SR-101 Frontage Road.

- **Access *A*** is a proposed full unsignalized access located north of the westbound SR-101 Frontage Road along the future Miller Road alignment. Access A is planned to directly service Phase II of the proposed Cavasson development and may need to be restricted in the future if sight distance cannot be achieved after the construction of the Miller Road underpass.
- **Access *B*** is the proposed full movement signalized site access (Cavasson Boulevard and Miller Road intersection) which is located between the SR-101 Frontage Road and Legacy Boulevard. Access B is generally located north of Access A and south of Access C along the Miller Road Alignment. Access B is planned to be constructed as part of the Phase I development and will serve as one of the primary access points into the proposed Cavasson development.
- **Access *C*** is a proposed restricted ¾ unsignalized access providing left-in/right-in/right-out movements only. Access C is located south of Legacy Boulevard and north of Access B along the Miller Road Alignment. Access C is planned to be constructed as part of Phase II of the Cavasson development.
- **Access *D*** is a proposed full movement unsignalized access located east of Miller Road. Access D is planned to be constructed as part of the Phase II development.
- **Access *E*** is a proposed full movement unsignalized access located between Miller Road and Hayden Road, located generally east of Access D and west of Access F along Legacy Boulevard. Access E is planned to be constructed as part of the Phase II development.

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Table 2 – New Phase 3 Trip Generation Summary

Proposed Use	ITE LUC	Size	Units	Weekday Trips						
				Daily	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out	Total
Shopping Center	820	67.5	KSF	2,548	39	24	63	123	134	257
General Office Building	710	218.5	KSF	2,264	200	32	232	38	201	239
Hotel or motel	310	265	Rooms	2,564	75	52	127	88	85	173
Fast Casual Restaurant	930	17.5	KSF	5,516	24	12	36	136	111	247
Apartments	220	400	DU	2,984	41	137	178	128	75	203
			Subtotals	15,876	379	257	636	513	606	1,119
			Internal Capture Reduction	*(2,858)*	*(30)*	*(21)*	*(51)*	*(104)*	*(120)*	*(224)*
			External Trips	**13,018**	**349**	**236**	**585**	**409**	**486**	**895**
			Difference in Trips	*-6,092*	*-338*	*-238*	*-576*	*-337*	*-446*	*-783*

With the updated Phase 3 land use densities and intensities, the new northern half of the Cavasson development is anticipated to generate 13,018 external daily trips with 585 trips occurring during the AM peak hour (349 in/236 out) and 895 trips occurring during the PM peak hour (409 in/486 out).

This new site plan is anticipated to generate 6,092 fewer weekday daily trips with 576 fewer trips occurring during the AM peak hour (338 fewer in/238 fewer out) and 783 fewer trips occurring during the PM peak hour (337 fewer in/446 fewer out) when compared to the trip generation included in the May 2019 TIMA. The site generated trips resulting from the new trip generation, which includes all trips produced by the site during both phase 1, phase 2, and phase 3 have been included as **Attachment C**.

QUEUE STORAGE ANALYSIS

Adequate turn storage should be supplied on any approach where turn lanes are permitted and/or warranted. A queuing analysis was performed for all warranted/recommended and existing intersection turn lanes where site traffic is expected as well as left turn lanes adjacent to the site. According to the methodology documented in *A Policy on Geometric Design of Highways and Streets* (the AASHTO "Green Book"*)*, the storage length for a turn lane is typically estimated as the length required to hold the average number of arriving vehicles per two minutes, where unsignalized, or per one-and-a half signal cycles, where signalized.[1] The formulas used for the calculations are shown below.

For signalized intersections, the storage length is determined by the following formula:

[1] *The American Association of Highway and Transportation Officials on pages 714-715 of its publication,* Geometric Design of Highways and Streets *("AASHTO Green Book"), indicates that storage length for a turn lane, exclusive of taper, "should usually be based on one and one-half to two times the average number of vehicles that would store per cycle" at a signalized intersection.*

Conclusions

The following conclusions and recommendations have been documented in this statement:

- With the new Phase 3 land use densities and intensities, the new northern half of the Cavasson development is anticipated to generate 13,018 external daily trips with 585 trips occurring during the AM peak hour (349 in/236 out) and 895 trips occurring during the PM peak hour (409 in/486 out).
    - This new site plan is anticipated to generate 6,092 fewer weekday daily trips with 576 fewer trips occurring during the AM peak hour (338 fewer in/238 fewer out) and 783 fewer trips occurring during the PM peak hour (337 fewer in/446 fewer out) when compared to the trip generation included in the May 2019 TIMA.
    - All proposed turn lanes will only require the City of Scottsdale minimum turn lane requirement with the exception of the northbound left turn lane at Access H, which will require 155 feet of queue length, the westbound left turn lane at Hayden Road and Legacy Boulevard, which will require 205 feet and the eastbound right turn lane at the same intersection, which will require 255 feet.
        - The northbound left turn, eastbound left turn and eastbound right turn approaches at the intersection of Hayden Road and Cavasson Boulevard are all recommended to be constructed with dual turn lanes, each striped at 150 feet. Dual left turn lanes are also recommended on the northbound and eastbound approaches at the intersection of Hayden Road and Legacy Boulevard as well as the northbound approach at the intersection of Miller Road and Legacy Boulevard.

Thank you for allowing CivTech to assist you on this project. We wish you the best as you proceed with the development. Please call me if you have any questions about this statement and/or if we can be of further assistance.

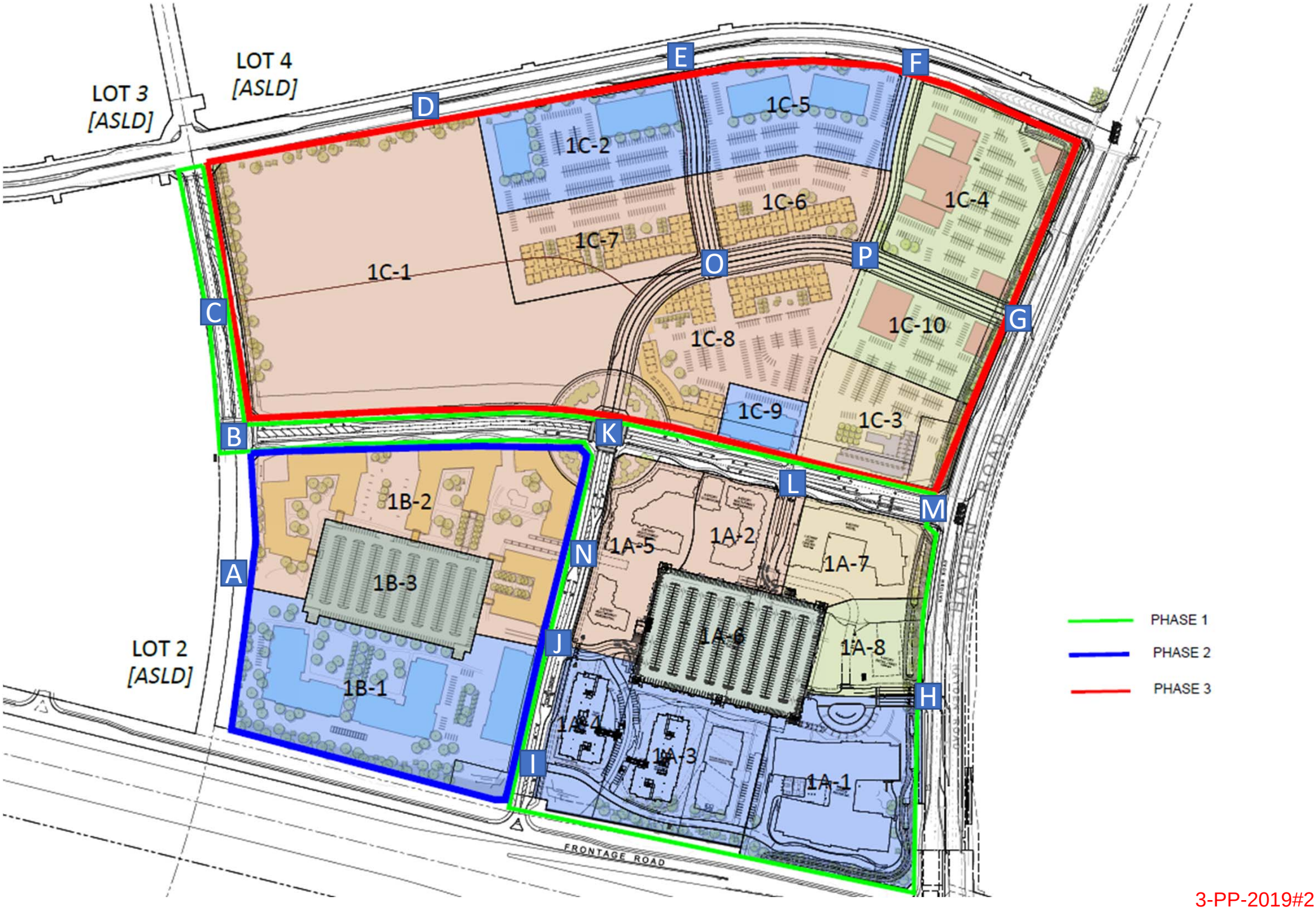
Sincerely,

CivTech

Dawn D Cartier, P.E., PTOE
Project Manager/President

Attachments:

A. Site Plan
B. Original and New Trip Generations
C. New site generated trips and total trips
D. Queue Storage Analysis



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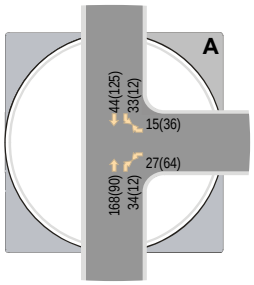
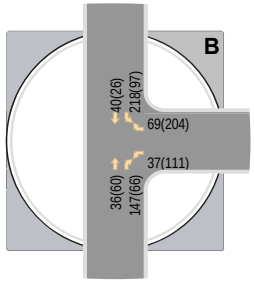
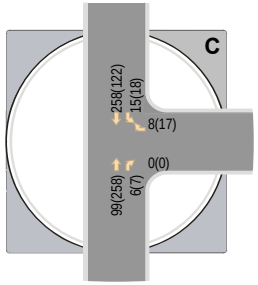
Site Access Volumes



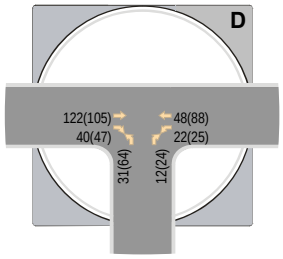
Miller Rd & Access A



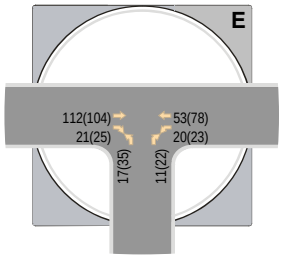
Miller Rd & Access B



Miller Rd & Access C



Access D & Legacy Blvd



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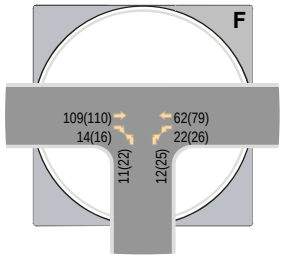

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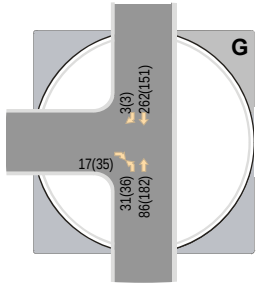

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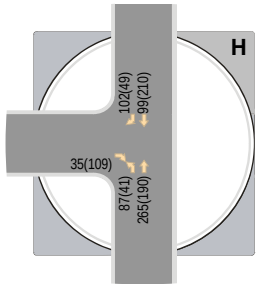

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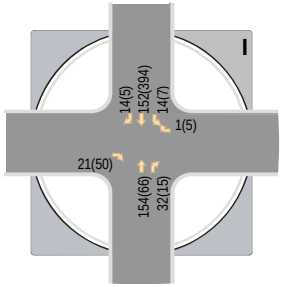

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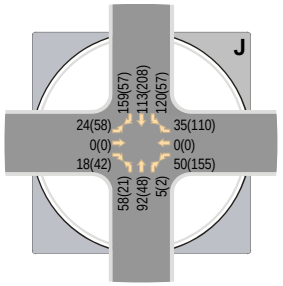

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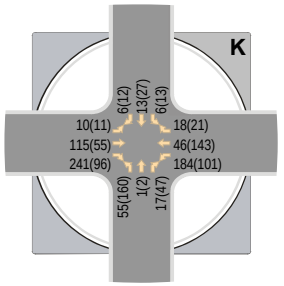

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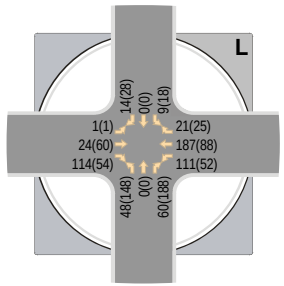

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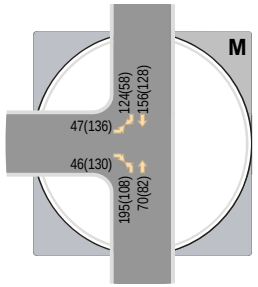

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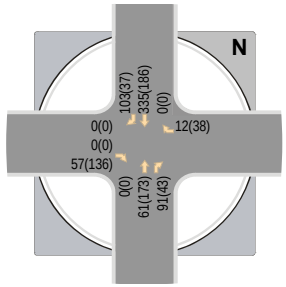

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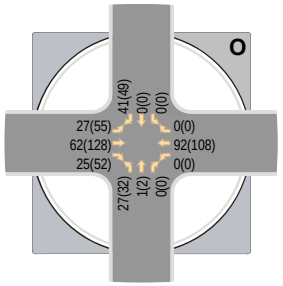

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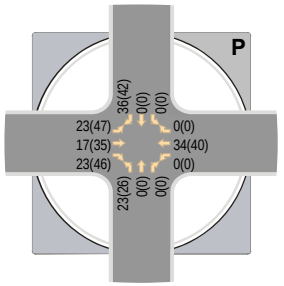

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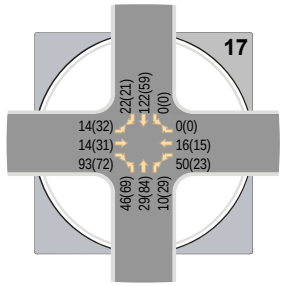
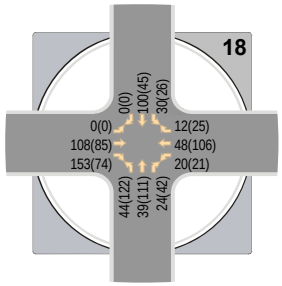


Hayden Rd. & Legacy Blvd.



Miller Rd. & Legacy Blvd.

3-PP-2019#2
10/23/20

Banner Scottsdale
Transportation Impact & Mitigation Study
City of Scottsdale

Project No.: 1121151

Date: July 2022

ACCEPTED
WITH COMMENT

Study was submitted without certification of seal of a registered professional engineer. (DSPM 5-1.1003)

DIBBLE

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I. Introduction and Summary

A. Purpose of report & study objectives

The purpose of this traffic study is to determine the traffic impacts of a proposed Banner Health medical campus project within the City of Scottsdale. The proposed Banner Health medical campus is proposed to be developed on an approximately 45-acre parcel of State Trust Land located on the east side of Hayden Road between Loop 101 and the Cavasson Boulevard extension (the "Banner Property"). The Banner Property is located on a portion of a parcel referred to as Planning Unit 9 of the Crossroads East Planned Community District. The remaining portion of Planning Unit 9, also approximately 45 acres, is located north of the Cavasson Boulevard extension and east of Hayden Road and is referred to as Parcel B1 within this traffic study.

This report also compares the difference between the previously anticipated land use trip generation for the Banner Property and the proposed land use for the Banner medical campus. The report further includes analysis that assumes the development of Parcel B1 and evaluates potential future traffic impacts.

B. Executive summary

1. Site Locations & Study Area

The Banner Property is located within the City of Scottsdale, east of Hayden Road between Loop 101 and Cavasson Boulevard. **Figure 1** shows the Banner Property location. This study includes the analysis of the following intersections:

- Loop 101 EB Ramp & Hayden Road
- Loop 101 WB Ramp & Hayden Road
- Main Entrance & Hayden Road
- Cavasson Boulevard & Hayden Road
- Legacy Boulevard & Hayden Road
- Cavasson Boulevard & Driveway 1
- Cavasson Boulevard & Driveway 2

2. Development Description

The Banner Health medical campus project will be developed in three phases ("Banner Project"). The first phase includes two buildings (Phase 1-A and 1-B). Phase 1-A will be a 340,000 SF hospital building with 108 beds in a 4-story hospital building and a 2-story Diagnostic & Treatment building block to house emergency, surgery, laboratory, Pharmacy and associated support services. Phase 1-B will include a 3-story, 120,000 SF Medical Office Building that will be separate from the hospital. The estimated completion date for Phases 1-A and 1-B is 2025. Phase 2 of the Banner Project is anticipated to include a 3-story, 90,000 SF Cancer Center along with a 4-level parking structure. For the purposes of this report, Phase 2 is assumed to be completed in 2032. The final Phase 3 is planned to expand on the Phase 1-A hospital building and will add an additional 162 to 192 beds for a total bed capacity of 270-300 beds at full build out of the hospital. For the purposes of this report, Phase 3 is assumed to be completed in 2045.

3. Principal Findings

Through capacity and improvement analysis, it was found that providing right turn lanes at all site driveways into the Banner Property is beneficial. It was also determined that for the two site driveways along Cavasson Boulevard, it is beneficial to provide separate egress left and right turn lanes to reduce vehicle queues within the parking lot.

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Through the capacity analysis, it was found that the background traffic growth has impacts to the intersection of Cavasson Boulevard & Hayden Road by 2032 (Phase 2 timeframe) without the addition of Banner traffic or Parcel B1. During the morning peak hour, the delay is 64.6 seconds with a LOS E by 2032. The northbound left begins to fail for the background traffic with the addition of Parcel B1 by 2025 (Phase 1 timeframe). The delay with the addition of Parcel B1 is 83.6 second (LOS F) during the morning peak hour and 77.2 seconds (LOS E) during the afternoon peak hour. The addition of the site traffic also has some impacts to the northbound left turn lane at Cavasson Boulevard & Hayden Road due to the addition of the east leg of the intersection as well as overall increased traffic to the intersection. Without the addition of Parcel B1, the northbound left turn has a delay of 79.3 seconds (LOS E) for the morning peak and 91.9 seconds (LOS F) for the afternoon peak hour by Phase 1 opening day 2025. With the addition of both Banner Phase 1 and Parcel B1, the morning peak hour delay is 67.7 seconds (LOS E) and the afternoon peak hour delay is 82.5 seconds (LOS F). The turning movement delay was found to decrease to an acceptable delay for the background traffic only scenarios as well as with the addition of the Banner traffic scenarios when the northbound and southbound left turns are made a protected/permissive. The queue length was also significantly reduced so as not to exceed the storage length of the northbound left turn lane. The LOS becomes a D with 45.5 second delay in the morning peak hour and C with a 34.5 second delay in the afternoon peak hour for the northbound left background traffic scenario by 2025 with the improvement and remaining an acceptable level of service for by 2032 and 2042. Once Parcel B1 is added to the background traffic and the improvement is made to the intersection, the delay is decreased to 18 seconds (LOS B) for the morning peak and 31 seconds (LOS C) for the afternoon peak hour by 2025. Note the signal timing was also optimized in all scenarios. The LOS and delay remain at an acceptable level of service by 2032 and 2042. Once the Banner traffic is added at the protected/permissive improvements are added, the delay is decreased to 19.6 seconds (LOS B) and 30.2 (LOS C) for the morning and afternoon peak hour without Parcel B1 by Phase 1 opening day (2025). The turn remains at an acceptable level of service by Phases 2 & 3 opening days.

The westbound left turns at Cavasson Boulevard and Hayden Road will exceed 300 vehicles per hour during the afternoon peak hour with the Banner Project. Per the City's guidelines, dual left turn lanes should be considered. Through capacity analysis, it was determined that dual left turn lanes would provide the most efficiency for the westbound left turning vehicles and create more space for left turning vehicles to queue.

The northbound left turn lane for the Loop 101 interchange for the westbound ramps is currently at a LOS D with a 41.7 second delay during the afternoon peak hour and a queue that exceeds the capacity of the turn lane. Once background traffic is increased to accommodate more development in the area and Parcel B1 traffic is added, the northboubd left turn increases to a 79.7 second delay (LOS E) by 2025. Pavement already exists at the the Loop 101 and Hayden interchange that could accommodate an additional through lane in the northbound and southbound directions. Reconfiguring pavement markings to incorporate this currently unused pavement to add an additional through lane in the north and south direction would benefit traffic as well as making the northbound left turn a protected/permissive left turn instead of a protected left turn. This would allow for more throughput traffic capacity in the northbound and southbound directions and thus allow for more of the signal cycle length to be dedicated to the northbound left turning movement. Making the left turn a protected/permissive left also allows additional vehicles to make a left when there are gaps in the throughput traffic. It is also important to note that based on the traffic counts collected in the field, the northbound left does already exceeds the 300 vehicles per hour threshold in the afternoon peak hour. Per the City guidelines, the intersection meets the threshold today for investigating a dual northbound left turn lane.

4. Conclusions

The Banner Project includes three phases that are anticipated to be completed over the next 20 years. Phase 1 of the Banner Project is anticipated to generate 7,485 weekday trips, 601 morning peak hour trips and 633 afternoon peak hour trips. Phase 2 of the Banner Project is anticipated to generate 2,867 weekday trips, 241

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morning peak hour trips and 256 afternoon peak hour trips. Phase 3 of the Banner Project is anticipated to generate 3,183 weekday trips, 242 morning peak hour trips and 254 afternoon peak hour trips. The three phases combined are anticipated to generate 13,535 weekday trips, 1,084 morning peak hour trips and 1,143 afternoon peak hour trips total for the Banner Project.

A significant portion of the Banner Project traffic is anticipated to use the intersection of Hayden Road & Cavasson Boulevard. Providing dual left turns for the eastbound and westbound approaches significantly benefits the delay and level of service for all turning movements at the intersection. The eastbound approach already has dual left turn lanes and it is recommended for the dual lefts to remain. The westbound approach is recommended to have dual left turn lanes based on the City's guidelines. The dual westbound lefts also significantly reduce delay and queues for westbound left turning vehicles

The future development of Parcel B1 and the associated north/south connector road between Cavasson Blvd. and Hualapai Drive will help to lower the traffic demand at the intersection of Hayden Road & Cavasson Boulevard by providing alternative routes for site traffic to access Pima Road and the Loop 101.

5. Recommendations

The following list includes the recommendations for site access to the Banner Property:

- Provide northbound right turn lane with a minimum 100-foot storage length at the main entrance along Hayden Road.
- Provide eastbound right turn lane with a minimum 100-foot storage length at the west site driveway along Cavasson Boulevard for Phase 1.
- The east driveway onto the Banner site is not anticipated to have a lot of use until Phases 2 and 3 are constructed. It is therefore recommended to plan for a future eastbound right turn lane with 100-foot storage and further investigate when the right turn lane will be needed with the future phases and as Cavasson Boulevard continues to develop.
- Provide dedicated northbound left turn lanes at two site driveways along Cavasson Boulevard for egress traffic as well as a dedicated northbound right turn lane.

The following list includes all recommendations of off-site improvements for Base traffic that will also improve traffic once Banner traffic is added:

- Reconfigure pavement markings to make the additional unused pavement a shared through/right southbound lane if not already planned at Hayden Road & the Loop 101 westbound interchange.
- Change the northbound left turn lane at Hayden Road and Cavasson Boulevard to a protected/permissive left turn lane by phase 1 opening day (2025) to reduce delay and queues for the turning movement.

The following list includes all recommendations of off-site improvements to accommodate Banner Project site traffic:

- Cavasson Boulevard along the north boundary of the Banner Property is recommended to be a two-lane roadway section to be widened at the intersection of Hayden Road.
- Provide dual westbound left turn lanes with at least 300-foot storage length at Hayden Road & Cavasson Boulevard and a westbound shared through/right turn lane.
- Reconfigure pavement markings for the 1st eastbound right turn lane to be a through lane at Hayden Road & Cavasson Boulevard while maintaining the eastbound dual left turn lane and outer dedicated right turn lane.
- When updating the signal at Hayden Road & Cavasson to accommodate the new east leg of Cavasson, provide protected/permissive southbound left turn indications. The dual eastbound left

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turn lanes will need to be updated to protected left indications. The dual westbound left turn lanes will also require protected left turn indications.

- Provide a southbound left turn lane at the main entrance on Hayden Road with a storage length that fits within the constraints of available space within the existing median.

II. Proposed Development

A. Off-Site Development

The proposed development of the Banner Project will include the design and construction of the currently non-existent east leg of the Hayden Road & Cavasson Boulevard intersection. Cavasson Boulevard, as collector road, will be constructed along the length of Banner Property and terminate with a temporary turn-around at the east end of the Banner Property. The construction of the east leg of Cavasson Boulevard will include the addition of a southbound left turn lane at the intersection as well as restriping the west leg to accommodate a through lane at the intersection. Additionally, the main entrance to the Banner Project will be located along Hayden Road to align with the Hayden Road entrance for the new Nationwide/Cavasson development on the west side of Hayden Road. Due to the proximity of the Loop 101, the main entrance will have limited access to include left-in, right-in and right-out. Left-out will be restricted at this access location.

B. Description of On-Site Development

1. Lane Use & Intensity

The Banner Project will have 3 main access locations. As previously mentioned, one main entrance driveway with ¾ access along Hayden Road as well as two driveways along Cavasson Boulevard will be constructed.

2. Location

The Banner Project site is located within the City of Scottsdale, east of Hayden Road between Loop 101 and Cavasson Boulevard. **Figure 1** shows the project location.

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Figure 1 – Site Location

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IV. Projected Traffic

A. Site Traffic

1. Trip Generation

The trip generation for each phase of the Banner Project were calculated using the ITE Trip Generation Manual, 11th Edition. The calculations are summarized in **Table 3**.

Table 3 – Trip Generation

Phase	Land Use	Land Use Code	Quant	Units	Weekday			Morning Peak			Afternoon Peak		
					Total	Ingress	Egress	Total	Ingress	Egress	Total	Ingress	Egress
1	Hospital	610	340	1000 SF	3662	1831	1831	279	187	92	292	102	190
	Medical Dental Office	720	120	1000 SF	3823	1912	1911	322	261	61	341	85	256
	Phase 1 Total				**7485**	**3743**	**3742**	**601**	**448**	**153**	**633**	**187**	**446**
2	Medical Dental Office	720	90	1000 SF	2867	1434	1433	241	195	46	256	64	192
	Phase 2 Total				**2867**	**1434**	**1433**	**241**	**195**	**46**	**256**	**64**	**192**
3	Hospital	610	295.5	1000 SF	3183	1592	1591	242	162	80	254	89	165
	Phase 3 Total				**3183**	**1592**	**1591**	**242**	**162**	**80**	**254**	**89**	**165**
Total for All Phases					**13535**	**6769**	**6766**	**1084**	**805**	**279**	**1143**	**340**	**803**

2. Trip Distribution

The trip distribution was determined based on anticipated patient origins as well as employees. Most traffic is anticipated to arrive from the east and west on the Loop 101. Some traffic is anticipated to arrive from the north of the Banner Property along Scottsdale Road, Hayden Road and Pima Road. Some traffic is also anticipated to arrive from the south from Scottsdale Road and Hayden Road.

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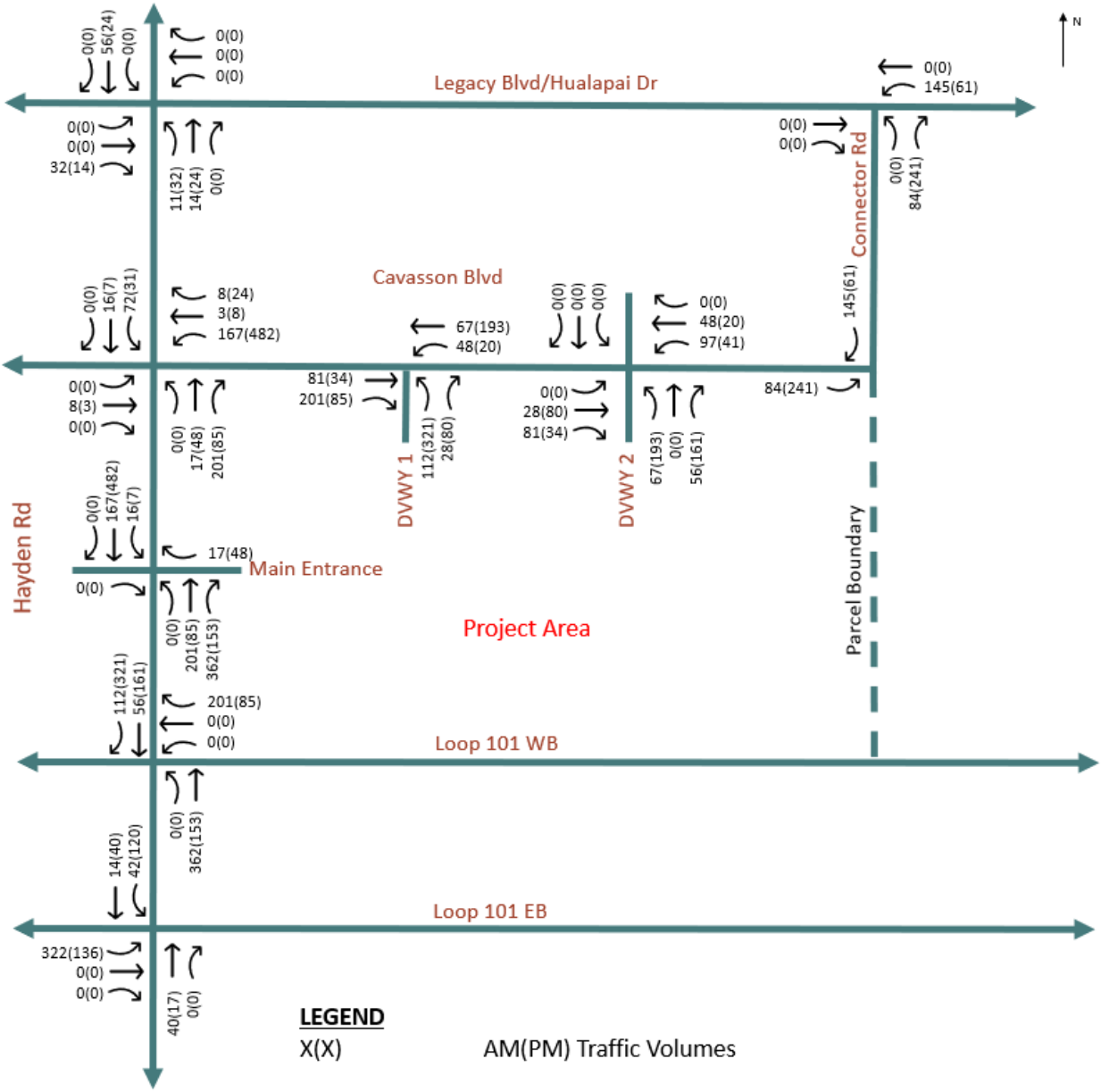

Figure 11 – Trip Assignment All Phases Combined w/Parcel B1

B. Through Traffic

1. Method of Projection

The background traffic for this study was determined using a few different resources. The first source of data came from traffic data that was collected by Field Data Services (FDS) of Arizona as previously mentioned.

The existing traffic was increased by a growth rate of 1% per year for each horizon year. This growth rate was determined based on the remaining empty land within the vicinity of the project. The increased traffic for each horizon year are summarized in the following tables.

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CivTech



September 10, 2020

Charles Huellmantel
Huellmantell & Affiliates
605 South Ash Avenue
Tempe, Arizona 85281
Telephone: (480) 921-2800
Email: charles@huellmantel.com

RE: ENHANCED TRAFFIC STATEMENT FOR THE AXON CAMPUS – SCOTTSDALE, ARIZONA

Dear Mr. Huellmantel:

CivTech is pleased to present this enhanced traffic statement for the proposed Axon Campus (`project site') located in on the south and west side of Loop 101, north of the Mayo Boulevard/Union Hills alignment and east of Hayden Road in Scottsdale, Arizona. The proposed project would develop one (1) parcel on approximately 70 acres that was previously proposed as a part of the Crossroads East PCD (Parcel 13). The previous assumptions for this parcel included industrial, manufacturing and warehousing uses totaling approximately 1.5 million square feet. The Axon Campus is an allowable use for Parcel 13 with the PCD. The proposed trip generation assumptions utilized during the Crossroads East TIA prepared for the PCD zoning process with the Arizona State Land Department (ASLD) were similar in scale. The proposed site plan can be found in **Attachment A**.

PURPOSE AND SCOPE

The purpose of this traffic statement is to determine if the relocated Mayo Boulevard, which is now proposed in a different location than originally shown within the Crossroads East TIA, can utilize roundabouts to help realign the roadway and provide more developable land for the Axon Campus. The location and potential size of roundabouts used in the relocation will be reviewed to determine if adequate spacing is provided from the arterial street network to avoid queueing through the roundabout. The typical section required for Mayo Boulevard east of Hayden Road with the Axon Campus is also being reviewed as part of this statement.

The Crossroads east TIA was approved by the City of Scottsdale on September 23, 2011 with a stipulation that the developer provide an additional lane in the northbound direction on Hayden Road fronting the project. This lane has been considered within the analysis. A trip generation comparison will be conducted as well as a capacity analysis to determine if there are additional changes to the surrounding roadway network that are needed due to the development of this parcel.

Table 1 - Trip Generation Summary

Land Use	ITE Code	Land Use Name	Quantity Units+	AM Distribution		PM Distribution	
				In	Out	In	Out
Previous Assumption (Crossroads East)							
Industrial Park	130	Industrial Park	490.766 KSF	82%	18%	21%	79%
Manufacturing	140	Manufacturing	490.766 KSF	78%	22%	36%	64%
Warehousing	150	Warehousing	490.766 KSF	79%	21%	25%	75%
Proposed							
General Office Building	710	General Office building	780.000 KSF	86%	14%	16%	84%
Warehousing	150	Warehousing	130.000 KSF	77%	23%	27%	73%

Land Use	ADT		AM Peak Hour				PM Peak Hour			
	Avg. Rate*	Total	Avg. Rate*	In	Out	Total	Avg. Rate*	In	Out	Total
Previous Assumption (Crossroads East)										
Industrial Park	5.25	2,576	0.49	196	43	239	0.79	81	305	386
Manufacturing	3.87	1,900	0.82	313	88	402	0.77	137	243	380
Warehousing	3.13	1,534	0.19	74	20	94	0.18	23	68	91
Total		**6,010**		**583**	**151**	**732**		**241**	**616**	**857**
Proposed										
General Office Building	9.98	7,782	0.97	654	106	760	1.03	128	673	801
Warehousing	1.93	250	0.31	32	9	41	0.33	12	31	43
Total		**8,032**		**686**	**115**	**801**		**140**	**704**	**844**
Difference (Proposed-Previous Assumption)		**1,797**		**103**	**-36**	**66**		**-101**	**88**	**-13**
Difference (%)		**30%**		**18%**	**-24%**	**9%**		**42%**	**14%**	**-2%**

Notes: *All average rates were calculated by dividing total trips generated using regression equation by the number of dwelling units. (See below.)
+ KSF = 1,000 square feet

CALCULATIONS (Equations shown only where applicable)			
Land Use [Units]	*Daily*	*AM Peak Hour*	*PM Peak Hour*
General Office Building [X = 780 SF]	FC: LN(T)=0.97*LN(X)+2.5 [9.98]	FC: T=0.94*X+26.49 [0.97]	FC: LN(T)=0.95*LN(X)+0.36 [1.03]
Warehousing [X = 130 SF]	FC: T=1.58*X+45.54 [1.93]	FC: T=0.12*X+25.32 [0.31]	FC: T=0.12*X+27.82 [0.33]

The proposed Axon Campus development could generate up to 8,032 weekday daily trips with 801 trips occurring during the AM peak hour (686 in/115 out) and 844 trips occurring during the PM peak hour (140 in/704 out)

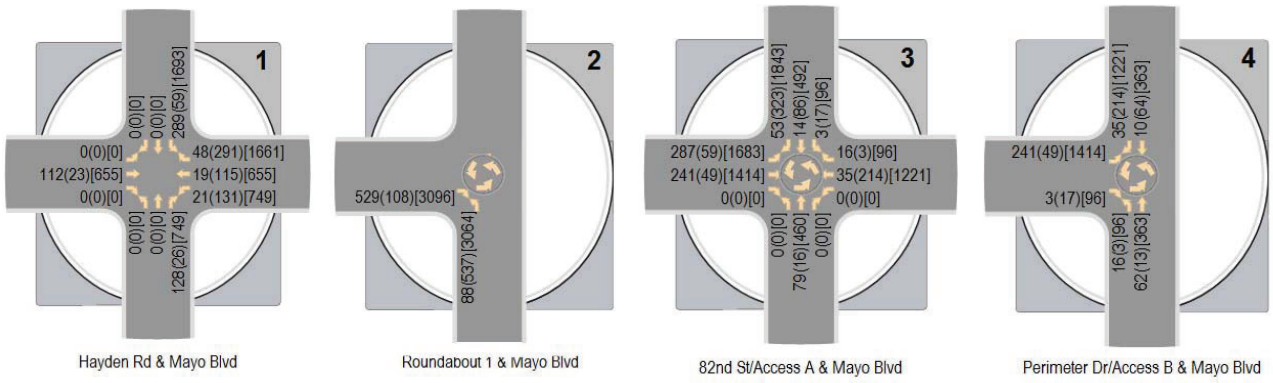
The Axon Campus is expected to generate 1,797 additional external daily trips as compared to the original Crossroads East TIA, with 66 additional trips generated during the AM peak hour (103 trips in/-36 trips out) and 13 fewer trips generated during the PM peak hour (-101 trips in/88 trips out).

TRIP DISTRIBUTION AND ASSIGNMENT

A single trip distribution pattern was taken from the previously approved Crossroads East TIA. It is expected that the development will generate trips based on future population within a 10-mile radius of the site. Future total population within a 10-mile radius of the site, as predicted by the 2030 socio-economic data compiled by the Maricopa Association of Governments (MAG), was used in that study as a basis to estimate trip distribution for the development.

Based on this information and the local street network, distribution percentages were assigned to the study roadway network. The resulting trip distribution percentages were applied to the generated trips to determine the AM and PM peak hour site traffic at the intersections within the study area and are illustrated in **Figure 1**.

Figure 1 – Site Trip Distribution



BACKGROUND TRAFFIC GROWTH PROJECTIONS

Background traffic along Hayden Road was determined by growing the existing 2020 traffic volumes by 2.1% per year to the opening year 2035. This gives a growth factor of 1.366 applied to the existing Hayden Road volumes.

CivTech recently conducted a traffic study for the Cavasson development, located on the southwest corner of Hayden Road and Legacy Boulevard. This development is anticipated to produce additional traffic on Hayden Road by the horizon year 2035. This anticipated additional traffic was added to the grown existing volumes to represent future traffic on the surrounding roadway network.

Along with the Cavasson development, Mayo Boulevard is currently being constructed so that it connects west to Scottsdale Road. The original Crossroads East TIA projected volumes for this portion of Mayo Boulevard between Hayden Road and Scottsdale Road. In order to have a more conservative estimate of approach traffic volumes, the eastbound and westbound volumes from Crossroads East for this portion of Mayo Boulevard were included in place of the existing volumes since the roadway is not yet completed and existing traffic that was present is likely construction vehicles. The horizon year for Crossroads East TIA was 2030, so the volumes used in the Axon Campus background traffic were grown by 2.1% per year for 5 years in order to represent the 2035 horizon year as projected for the Cavasson development.

Background traffic calculations as well as the Cavasson and Crossroads East volumes referenced above are located within **Attachment C**.

one-and-a half signal cycles, where signalized.[1] The formulas used for the calculations are shown below.

For signalized intersections, the storage length is determined by the following formula:

Storage Length = [1.5 x (veh/hr)/(cycles/hr)] x 25 feet

For unsignalized intersections, the storage length is determined by the following formula:

Storage Length = [(veh/hr)/(30 periods/hr)] x 25 feet

The total projected traffic volumes were utilized for the calculations. From this, the resulting turn lane storage for turn movements using AASHTO guidelines were calculated and are summarized in **Table** . Calculations for the AASHTO queue storage length recommendations and the 50th percentile HCM 2016 queue storage length recommendations are provided in **Appendix E**. The 50th percentile HCM 2016 queue storage lengths are given in vehicles and multiplied by 25 feet per vehicle to determine the storage length.

Table 6 – Queue Storage Lengths

ID	Intersection	Intersection Control	Movement	Queue Storage		
				AASHTO	HCM(2)	Recommended
1	Hayden Road & Mayo Boulevard	Signalized	NB Left	50′	35′	150′
			SB Left	900′	45′	(1)300′
			EB Left	50′	225′	150′
			WB Left	225′	85′	150′
			SB Right	75′	160′	200′
			WB Right	1025′	390′	(3)

(1) A minimum of 150-feet of queue storage is recommended at all signalized intersections.
(2) HCM 50th percentile queue reported in vehicles/lane, assuming 1 vehicle ~ 25 feet.
(3) Westbound right-turn lane is a through trap lane that will provide more then the calculated queue storage.

The recommended storage lengths in **Table 6** is provided for study horizon year 2035 using the total traffic projections.

[1] *The American Association of Highway and Transportation Officials on pages 714-715 of its publication,* Geometric Design of Highways and Streets *("AASHTO Green Book"), indicates that storage length for a turn lane, exclusive of taper, "should usually be based on one and one-half to two times the average number of vehicles that would store per cycle" at a signalized intersection.*

Conclusions

The following conclusions and recommendations have been documented in this statement:

- The proposed Axon Campus development could generate up to 8,032 weekday daily trips with 801 trips occurring during the AM peak hour (686 in/115 out) and 844 trips occurring during the PM peak hour (140 in/704 out).
- The Axon Campus is expected to generate 1,797 additional external daily trips as compared to the original Crossroads East TIA, with 66 additional trips generated during the AM peak hour (103 trips in/-36 trips out) and 13 fewer trips generated during the PM peak hour (-101 trips in/88 trips out).
- All proposed intersections are anticipated to operate at acceptable levels of service.
- All intersections are anticipated to operate at acceptable levels of service with the proposed intersection lane configuration and the following roadway typical sections:
    - Mayo Boulevard should be constructed with a four-lane section, two lanes in each direction of travel between Hayden Road and 82nd Street. This will require the construction of a two-lane roundabout approximately 400 feet east of the Hayden Road alignment.
    - Mayo Boulevard could be reduced to provide a two-lane section, one lane in each direction of travel from 82nd Street to Perimeter Drive.
- Queue storage recommendations and proposed lane configuration recommendation have been provided in **Attachment E**.

Thank you for allowing CivTech to assist you on this project. We wish you the best as you proceed with the development. Please call me if you have any questions about this statement and/or if we can be of further assistance.

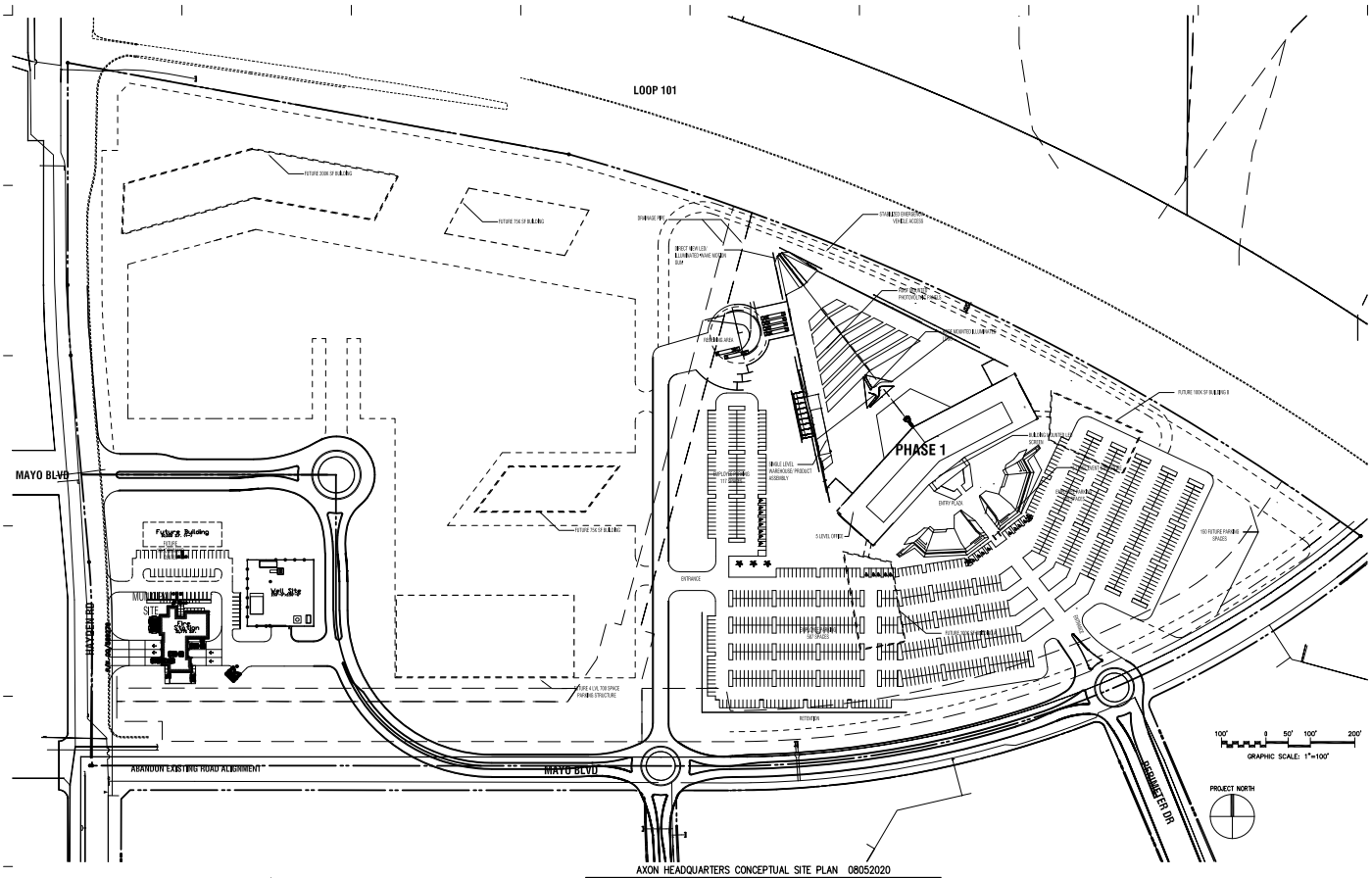
Sincerely,

CivTech

Dawn D Cartier, P.E., PTOE
Project Manager/President

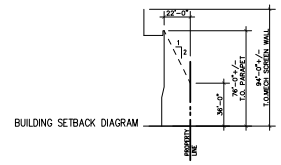
Attachments:

A. Site Plan
B. Existing Conditions Analysis
C. Background Growth Calculations
D. 2035 Analysis Worksheets
E. Queue Storage Analysis



AXON HEADQUARTERS CONCEPTUAL SITE PLAN 08052020

1"=100'



BUILDING SETBACK DIAGRAM

AXON CORPORATE HEADQUARTERS	FUTURE BLDG A PROPOSED		
BLDG HEIGHT		76'-0" +/- TO PARAPET
ZONING		PCD
OFFICE (B OCC)	275,000SF +/- @1/300	825 Spaces
PARKING REQUIRED		3077 Spaces
ADA REQUIRED 4%		109 Spaces

AXON CORPORATE HEADQUARTERS	FUTURE BLDG		
BLDG HEIGHT		76'-0" +/- TO PARAPET
ZONING		PCD
OFFICE (B OCC)	75,000SF +/- @1/300	225 Spaces
PARKING REQUIRED		1682 Spaces
ADA REQUIRED 4%		76 Spaces

AXON CORPORATE HEADQUARTERS	BLDG B PROPOSED		
BLDG HEIGHT		76'-0" +/- TO PARAPET
ZONING		PCD
OFFICE (B OCC)	100,000SF +/- @1/300	308 Spaces
PARKING REQUIRED		1627 Spaces
ADA REQUIRED 4%		66 Spaces

AXON CORPORATE HEADQUARTERS	BLDG A PROPOSED		
BLDG HEIGHT		76'-0" +/- TO PARAPET
ZONING		PCD
OFFICE (B OCC)	100,000SF +/- @1/300	300 Spaces
PARKING REQUIRED		1327 Spaces
ADA REQUIRED 4%		54 Spaces

AXON CORPORATE HEADQUARTERS	PHASE 1		
BLDG HEIGHT		76'-0" +/- TO PARAPET
ZONING		PCD
OFFICE (B OCC)	250,000SF +/- @1/300	767 Spaces
ASSEMBLY/ WAREHOUSE (F-1)	130,000SF +/- @1/200	260 Spaces
PARKING REQUIRED		1027 Spaces
ADA REQUIRED 4%		42 Spaces
PARKING PROVIDED		1027 Spaces
ADA PROVIDED		21 Spaces*

*Reduction to 2% (26 spaces) will be requested per Sec. 5.7.10.C.2.vi of City Scottsdale Zoning code for Phase 1.

SMITHGROUP
455 NORTH THIRD STREET
SUITE 250
PHOENIX, AZ 85004
602.265.2200
www.smithgroup.com

AXON

NOT FOR CONSTRUCTION

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—	-	—

01/13/2020

ASP05

13-ZN-2020
9/11/2020

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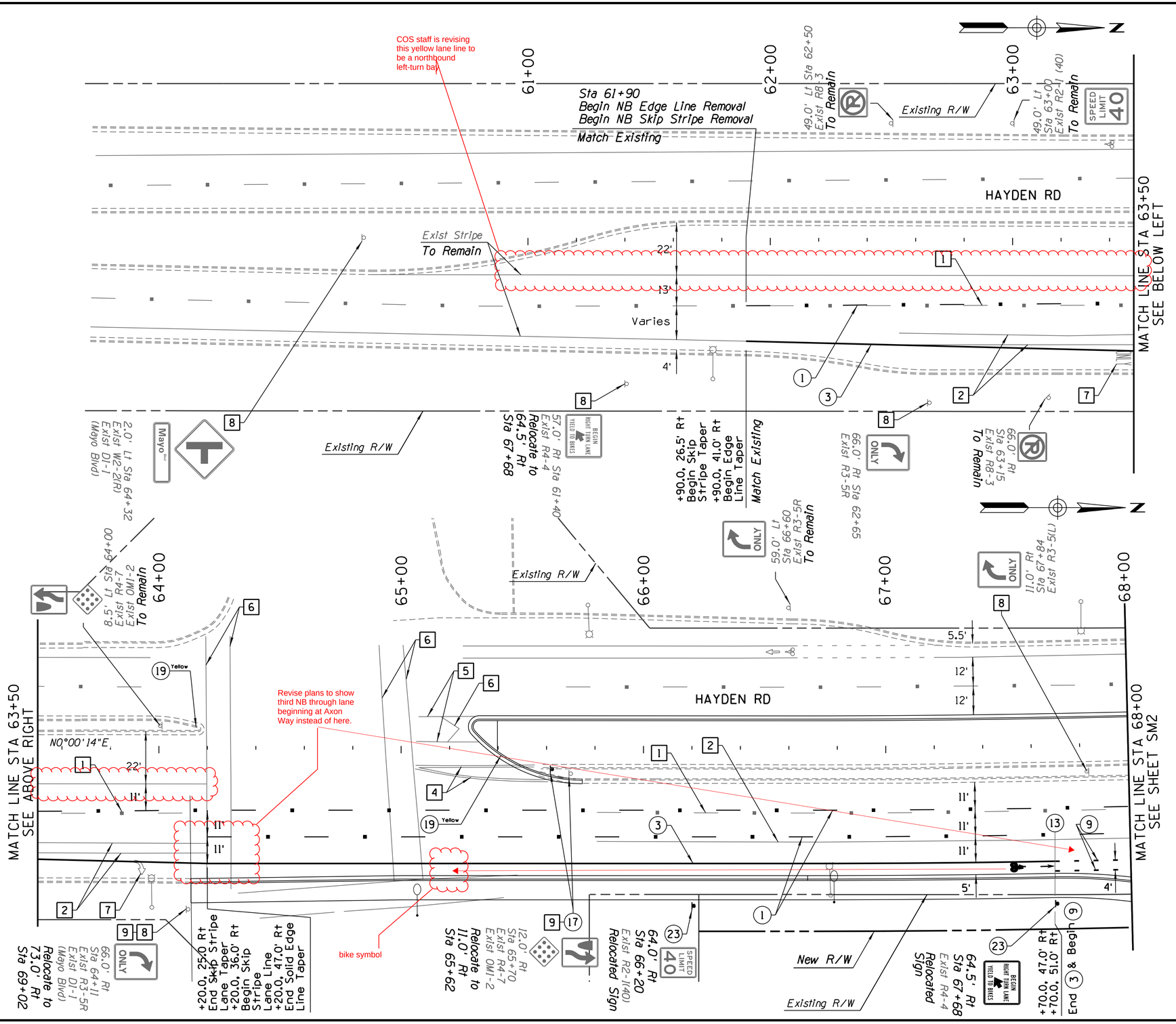

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REMOVAL & RELOCATION NOTES

	DESCRIPTION	UNIT	QUAN
1	Remove Existing 4" Skip Stripe with Raised Pavement Markers	LF	459
2	Remove Existing 4" Solid Stripe	LF	334
4	Remove Existing 4" Dbl Yellow Solid Stripe	LF	105
5	Remove Existing 8" Stripe	LF	50
6	Remove Existing 12" Stripe	LF	407
7	Remove Existing Pvmt Marking Arrow or Legend	EA	2
8	Remove Sign, Post, & Post Base	EA	4
9	Remove & Relocate Existing Sign Remove Post & Post Base	EA	3

CONSTRUCTION NOTES

	DESCRIPTION	UNIT	QUAN
1	4" White Skip Stripe with Type G Markers per COS Std Dtl 2132	LF	990
3	8" Solid White Line	LF	580
9	8" White Skip Stripe 2' Stripe with 6' Gap	LF	60
13	New Bicycle Pvmt Symbol & Arrow per Detail TA	EA	1
17	New Median Nose Signing, Type A per COS Std Dtl 2133-1	EA	1
19	New Median Nose Paint & Markers per COS Std Dtl 2226 or Dtl TE	LF	80
23	Relocated Existing Sign New Sign Post and Foundation per COS Std Dtl 2131	EA	2

GENERAL NOTES

1. All dimensions are measured to lip of gutter or center of lane line, unless otherwise shown.

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ARIZONA811
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DATE	REVISION	BY

ENGINEER
41977 KAREN C. HOBBS
Registered Professional Engineer
Date Signed 07/20/2022
Expires 3/31/23

CITY OF SCOTTSDALE ARIZONA

PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

SHEET TITLE
SIGNING AND PAVEMENT MARKING

PROJECT TITLE
AXON WAY
HAYDEN RD TO PERIMETER DR

SCALE	DESIGNED	DATE	BID NO.	SHT.
HORIZ. 1"=20'	DK/KH	07/2022		SM1
VERT. N/A	DRAWN TML	AS-BUILT	PROJECT NO. 4474-21-6	68 OF 148

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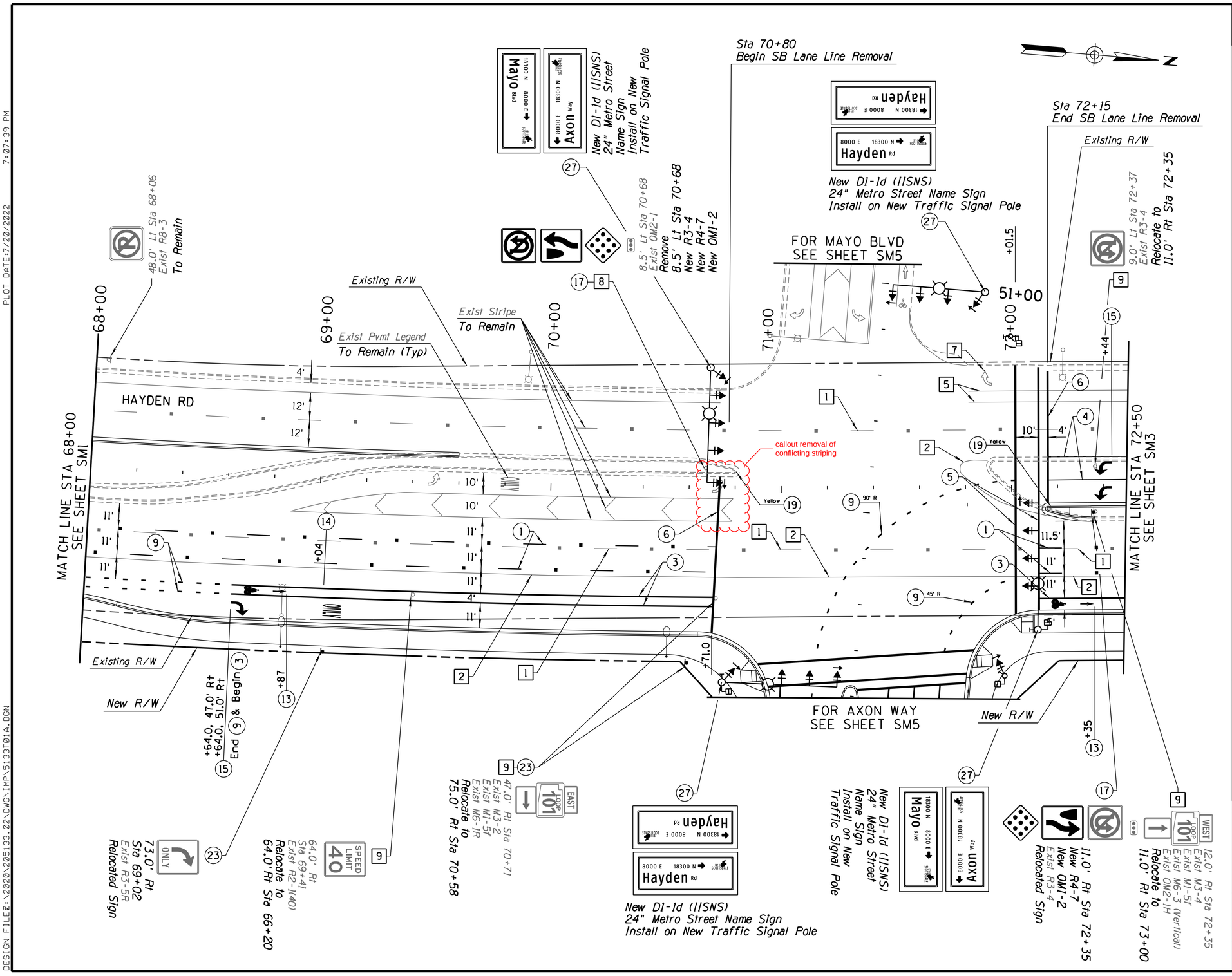

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REMOVAL & RELOCATION NOTES

	DESCRIPTION	UNIT	QUAN
1	Remove Existing 4" Skip Stripe with Raised Pavement Markers	LF	585
2	Remove Existing 4" Solid Stripe	LF	513
5	Remove Existing 8" Stripe	LF	140
7	Remove Existing Pvmt Marking Legend	EA	1
8	Remove Sign, Post, & Post Base	EA	1
9	Remove & Relocate Existing Sign Remove Post & Post Base	EA	4

CONSTRUCTION NOTES

	DESCRIPTION	UNIT	QUAN
1	4" White Skip Stripe with Type G Markers per COS Std Dtl 2132	LF	622
3	8" Solid White Line	LF	455
4	8" Solid White Line with Type G Markers per COS Std Dtl 2132	LF	70
5	12" Solid White Line	LF	217
6	18" Solid White Line	LF	116
9	8" White Skip Stripe 2' Stripe with 6' Gap	LF	290
13	New Bicycle Pvmt Symbol & Arrow per Detail TA	EA	2
14	New Pavement Legend per ADOT Std M-6, M-7 & M-8	EA	1
15	New Pavement Symbol per ADOT Std M-10	EA	3
17	New Median Nose Signing, Type A per COS Std Dtl 2133-1	EA	2
19	New Median Nose Paint & Markers per COS Std Dtl 2226 or Dtl TE	LF	50
20	New Sign, Post & Foundation per COS Std Dtl 2131	EA	1
23	Relocate Existing Sign New Sign Post and Foundation per COS Std Dtl 2131	EA	2
27	New 24" Internally Illuminated Street Name Sign (IISNS) on New Traffic Signal Pole per COS Std Dtl 2134-4	EA	4

GENERAL NOTES

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DATE	REVISION	BY

ENGINEER
41977 KAREN C. HOBBS
Registered Professional Engineer
Date Signed 07/20/22
Expires 3/31/23

PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

SHEET TITLE
SIGNING AND PAVEMENT MARKING

PROJECT TITLE
AXON WAY
HAYDEN RD TO PERIMETER DR

SCALE	DESIGNED	DATE	BID NO.	SHT.
HORIZ. 1"=20'	DK/KH	07/2022		SM2
VERT. N/A	DRAWN TML	AS-BUILT	PROJECT NO. 4474-21-6	69 OF 148

SM2
69

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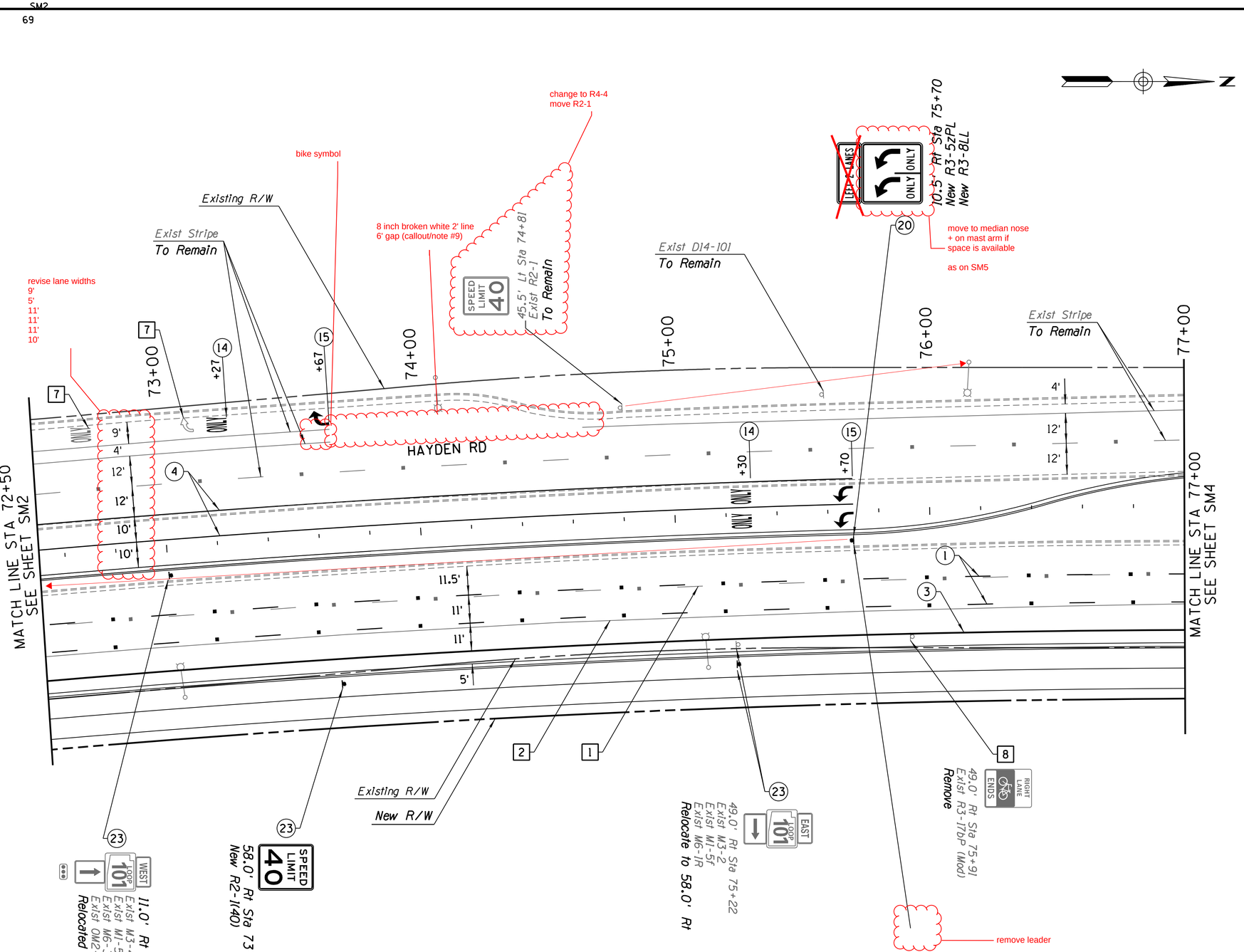

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REMOVAL & RELOCATION NOTES

	DESCRIPTION	UNIT	QUAN
1	Remove Existing 4" Skip Stripe with Raised Pavement Markers	LF	450
2	Remove Existing 4" Solid Stripe	LF	450
7	Remove Existing Pvmt Marking Legend	EA	2
8	Remove Sign, Post, & Post Base	EA	1

CONSTRUCTION NOTES

	DESCRIPTION	UNIT	QUAN
1	4" White Skip Stripe with Type G Markers per COS Std Dtl 2132	LF	900
3	8" Solid White Line	LF	450
4	8" Solid White Line with Type G Markers per COS Std Dtl 2132	LF	640
14	New Pavement Legend per ADOT Std M-6, M-7 & M-8	EA	3
15	New Pavement Symbol per ADOT Std M-10	EA	3
20	New Sign, Post & Foundation per COS Std Dtl 2131	EA	1
23	Relocate Existing Sign New Sign Post and Foundation per COS Std Dtl 2131	EA	3

GENERAL NOTES

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DATE	REVISION	BY

ENGINEER
Registered Professional Engineer
CERTIFICATE NO.
41977
KAREN C. HOBBS
Date Signed 07/20/2022
ARIZONA, U.S.A.
Expires 3/31/23

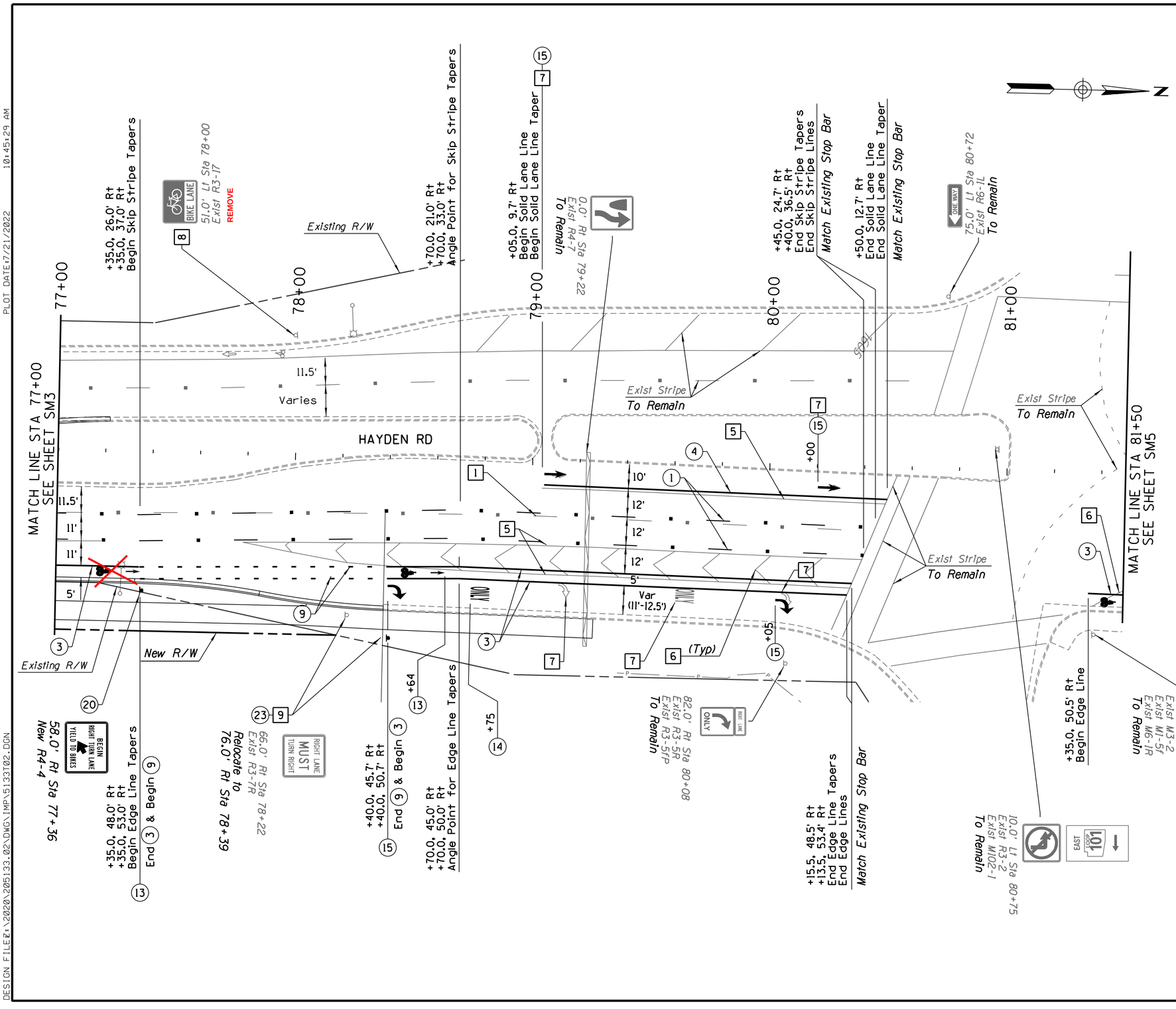
CITY OF SCOTTSDALE
ARIZONA

PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

SHEET TITLE
SIGNING AND PAVEMENT MARKING

PROJECT TITLE
AXON WAY
HAYDEN RD TO PERIMETER DR

SCALE	DESIGNED	DATE	BID NO.	SHT.
HORIZ. 1"=20'	DK/KH	07/2022		SM3
VERT. N/A	DRAWN TML	AS-BUILT	PROJECT NO. 4474-21-6	70 OF 148



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REMOVAL & RELOCATION NOTES

	DESCRIPTION	UNIT	QUAN
1	Remove Existing 4" Skip Stripe with Raised Pavement Markers	LF	343
5	Remove Existing 8" Stripe	LF	595
6	Remove Existing 12" Stripe	LF	185
7	Remove Existing Pvmt Marking Arrow or Legend	EA	5
8	Remove Sign, Post, & Post Base	EA	1
9	Remove & Relocate Existing Sign Remove Post & Post Base	EA	1

CONSTRUCTION NOTES

	DESCRIPTION	UNIT	QUAN
1	4" White Skip Stripe with Type G Markers per COS Std Dtl 2132	LF	690
3	8" Solid White Line	LF	450
4	8" Solid White Line with Type G Markers per COS Std Dtl 2132	LF	145
9	8" White Skip Stripe 2' Stripe with 6' Gap	LF	210
13	New Bicycle Pvmt Symbol & Arrow per Detail TA	EA	2
14	New Pavement Legend per ADOT Std M-6, M-7 & M-8	EA	1
15	New Pavement Symbol per ADOT Std M-10	EA	4
20	New Sign, Post & Foundation per COS Std Dtl 2131	EA	1
23	Relocate Existing Sign New Sign Post and Foundation per COS Std Dtl 2131	EA	1

GENERAL NOTES

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41977
KAREN C. HOBBS
Date Signed 07/21/2022
Expires 9/30/23
ARIZONA, U.S.A.

CITY OF SCOTTSDALE
ARIZONA

PUBLIC WORKS
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7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

SHEET TITLE
SIGNING AND PAVEMENT MARKING

PROJECT TITLE
AXON WAY
HAYDEN RD TO PERIMETER DR

SCALE	DESIGNED	DATE	BID NO.	SHT.
HORIZ. 1"=20'	DK/KH	07/2022		SM4
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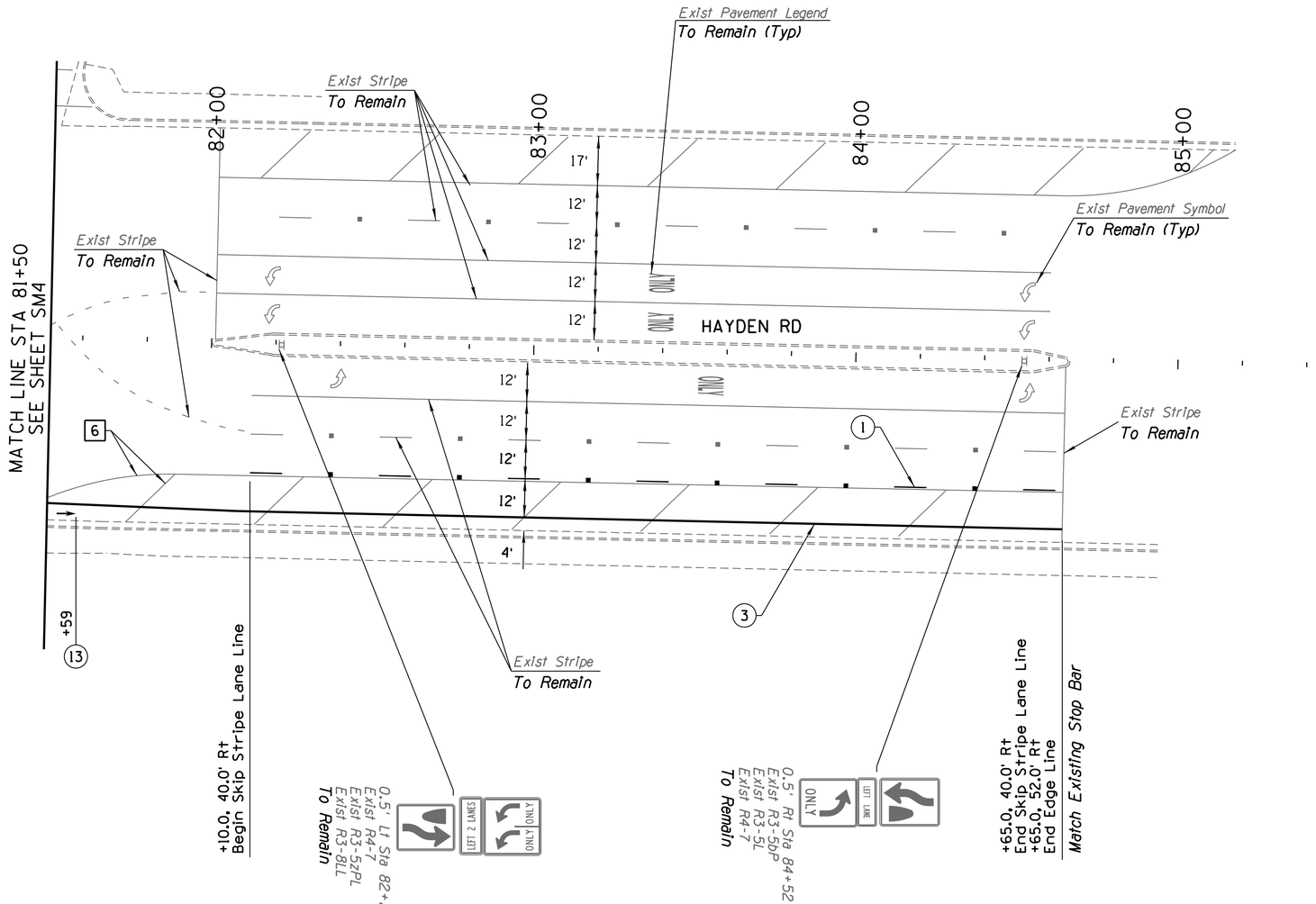

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REMOVAL & RELOCATION NOTES

DESCRIPTION	UNIT	QUAN
6 Remove Existing 12" Stripe	LF	465

CONSTRUCTION NOTES

DESCRIPTION	UNIT	QUAN
(1) 4" White Skip Stripe with Type G Markers per COS Std Dtl 2132	LF	255
(3) 8" Solid White Line	LF	315
(13) New Bicycle Pvmt Symbol & Arrow per Detail TA	EA	1

GENERAL NOTES

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DATE	REVISION	BY

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41977
KAREN C. HOBBS
Date Signed 07/20/2022
ARIZONA, U.S.A.
Expires 9/30/23

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ARIZONA

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7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

SHEET TITLE
SIGNING AND PAVEMENT MARKING

PROJECT TITLE
AXON WAY
HAYDEN RD TO PERIMETER DR

SCALE	DESIGNED	DATE	BID NO.	SHT.
HORIZ. 1"=20'	DK/KH	07/2022		SM5
VERT. N/A	DRAWN TML	AS-BUILT	PROJECT NO. 4474-21-6	72 OF 148

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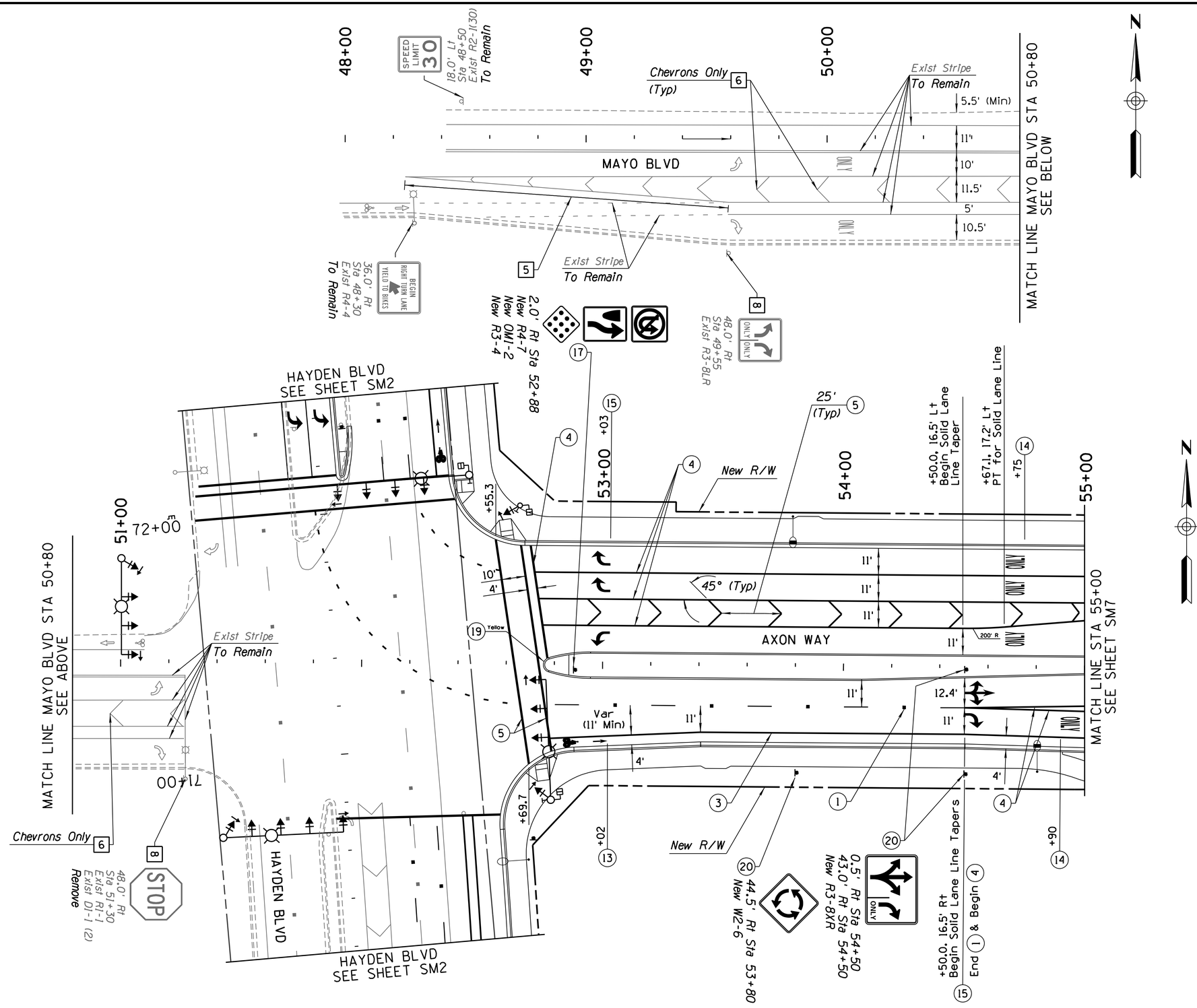

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REMOVAL & RELOCATION NOTES

	DESCRIPTION		QUAN
5	Remove Existing 8" Stripe	LF	152
6	Remove Existing 12" Stripe	LF	1
8	Remove Sign, Post, & Post Base	EA	1

CONSTRUCTION NOTES

	DESCRIPTION	UNIT	QUAN
1	4" White Skip Stripe with Type G Markers per COS Std Dtl 2132	LF	175
3	8" Solid White Line	LF	222
4	8" Solid White Line with Type G Markers per COS Std Dtl 2132	LF	780
5	12" Solid White Line	LF	123
6	18" Solid White Line	LF	48
13	New Bicycle Pvmt Symbol & Arrow per Detail TA	EA	1
14	New Pavement Legend per ADOT Std M-6, M-7 & M-8	EA	4
15	New Pavement Symbol per ADOT Std M-10	EA	5
17	New Median Nose Signing, Type A per COS Std Dtl 2133-1	EA	1
19	New Median Nose Paint & Markers per COS Std Dtl 2226 or Dtl TE	LF	33
20	New Sign, Post & Foundation per COS Std Dtl 2131	EA	2

GENERAL NOTES

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DATE	REVISION	BY

ENGINEER
Registered Professional Engineer — ARIZONA, U.S.A. — 41977 KAREN C. HOBBS — Date Signed 07/20/2022 — Expires 3/31/23

PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

SHEET TITLE
SIGNING AND PAVEMENT MARKING

PROJECT TITLE
AXON WAY
HAYDEN RD TO PERIMETER DR

SCALE	DESIGNED	DATE	BID NO.	SHT.
HORIZ. 1"=20'	DK/KH	07/2022		SM6
VERT. 1"=2'	DRAWN TML	AS-BUILT	PROJECT NO. 4474-21-6	73 OF 148

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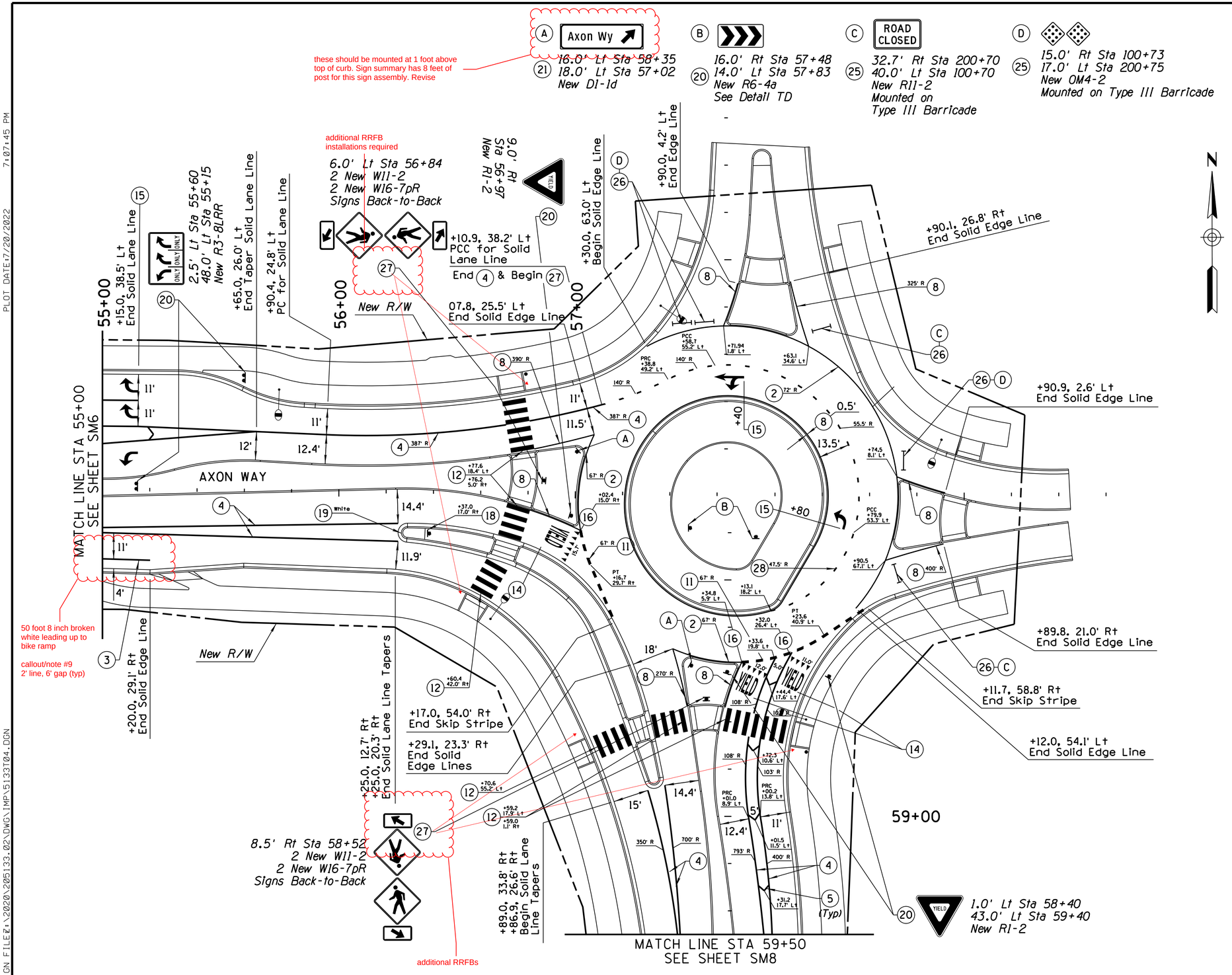
these should be mounted at 1 foot above top of curb. Sign summary has 8 feet of post for this sign assembly. Revise

additional RRFB installations required

50 foot 8 inch broken white leading up to bike ramp

callout/note #9
2' line, 6' gap (typ)

additional RRFBs



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CONSTRUCTION NOTES

	DESCRIPTION	UNIT	QUAN
2	4" Solid White Line	LF	279
3	8" Solid White Line	LF	20
4	8" Solid White Line with Type G Markers per COS Std Dtl 2132	LF	604
5	12" Solid White Line	LF	15
8	4" Solid Yellow Line	LF	467
11	24" White Skip Stripe 2' Stripe with 1' Gap	LF	104
12	High Resolution Crosswalk 10' x 24" Transverse Lines per Detail TB	EA	29
14	New Pavement Legend per ADOT Std M-6, M-7 & M-8	EA	3
15	New Pavement Symbol per ADOT Std M-10	EA	5
16	New Yield Line per Detail TC	EA	3
18	New Median Nose Signing, Type B per COS Std Dtl 2133-1	EA	1
19	New Median Nose Paint & Markers per COS Std Dtl 2226 or Dtl TE	LF	38
20	New Sign, Post & Foundation per COS Std Dtl 2131	EA	7
21	New Directional Street Name Sign, Post and Foundation per COS Std Dtl 2134-5	EA	2
25	New Sign Panel on New Barricade	EA	6
26	New Type III Barricade	EA	5
27	New Sign Panel on RRFB Assembly per Detail TG	LS	1
28	8" White Skip Stripe 6' Stripe with 3' Gap	LF	210

GENERAL NOTES

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ARIZONA811 BLUE STAKE, INC.
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DATE	REVISION	BY

ENGINEER
Registered Professional Engineer
41977
KAREN C. HOBBS
Date Signed 07/20/2022
ARIZONA, U.S.A.
Expires 9/30/23

CITY OF SCOTTSDALE
ARIZONA

PUBLIC WORKS
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

SHEET TITLE
SIGNING AND PAVEMENT MARKING

PROJECT TITLE
AXON WAY
HAYDEN RD TO PERIMETER DR

SCALE	DESIGNED	DATE	BID NO.	SHT.
HORIZ. 1"=20'	DK/KH	07/2022		SM7
VERT. N/A	DRAWN TML	AS-BUILT	PROJECT NO. 4474-21-6	74 OF 148

Optima McDowell Mountain Village

Traffic Impact and Mitigation Analysis

South of Loop 101 Pima Freeway
and East of Scottsdale Road
in Scottsdale, Arizona

August 2022
Project No. 21-1830

ACCEPTED WITH COMMENTS

Figure 14 in study shows incorrect future lane configuration at the intersections of Scottsdale Rd/Mayo Blvd (no 4th eastbound through lane) and the Loop 101 Ramps/Hayden Road intersections (additional northbound and southbound through lanes expected, currently hatched out).

Prepared For:
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Scottsdale, Arizona 85251

For Submittal to:
City of Scottsdale

Prepared By:

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INTRODUCTION

The Optima McDowell Mountain Village is a proposed mixed-use development located north of Mayo Boulevard and east of Scottsdale Road in the City of Scottsdale, Arizona. The development plans to consist of up to 1,390 dwelling units of luxury multi-family residences in six individual buildings with some retail on the ground floor and a lower courtyard area. The development will also provide an underground parking lot for residences that can be accessed from Mayo Boulevard. Alternatively, a right in only access will be provided along Scottsdale Road to assist with the inflow of traffic to the development. The vicinity of the site is provided in **Figure 1**.

CivTech, Inc. has been retained by DCH Development, Inc. to prepare the Traffic Impact and Mitigation Analysis Report (TIMA) for the proposed development. The purpose of this TIMA is to address the traffic and transportation impacts of the proposed development on the surrounding streets and intersections.

STUDY REQUIREMENTS

This TIMA analyzes the traffic impact due to the proposed development on the surrounding street network. The TIMA has been prepared in conformance with the *City of Scottsdale Design Standards and Policy Manual* Section 5-1 *Transportation Impact Study* dated 2018. The specific objectives of the TIMA are:

- To determine whether the planned street system in the vicinity of the site is adequate to accommodate the increased traffic that results from the proposed development.
- To recommend additional street improvements or traffic control devices, where necessary, to mitigate the additional site-generated traffic.

STUDY AREA

The Study Area has been defined as including the following Study Intersections:

1. Scottsdale Rd & Thompson Peak Pkwy
2. Scottsdale Rd & Legacy Blvd
3. Scottsdale Rd & Loop 101 WB Ramps
4. Scottsdale Rd & Loop 101 EB Ramps
5. 68th St & Mayo Blvd
6. Allied Way & Mayo Blvd
7. Scottsdale Rd & Mayo Blvd
8. Lexus Drwy & Mayo Blvd
9. Hayden Rd & Loop 101 WB Ramps
10. Hayden Rd & Loop 101 EB Ramps
11. Scottsdale Rd & Chauncey Ln
12. 73rd Pl & Chauncey Ln
13. Hayden Rd & Mayo Blvd
14. Scottsdale Rd & Princess Dr

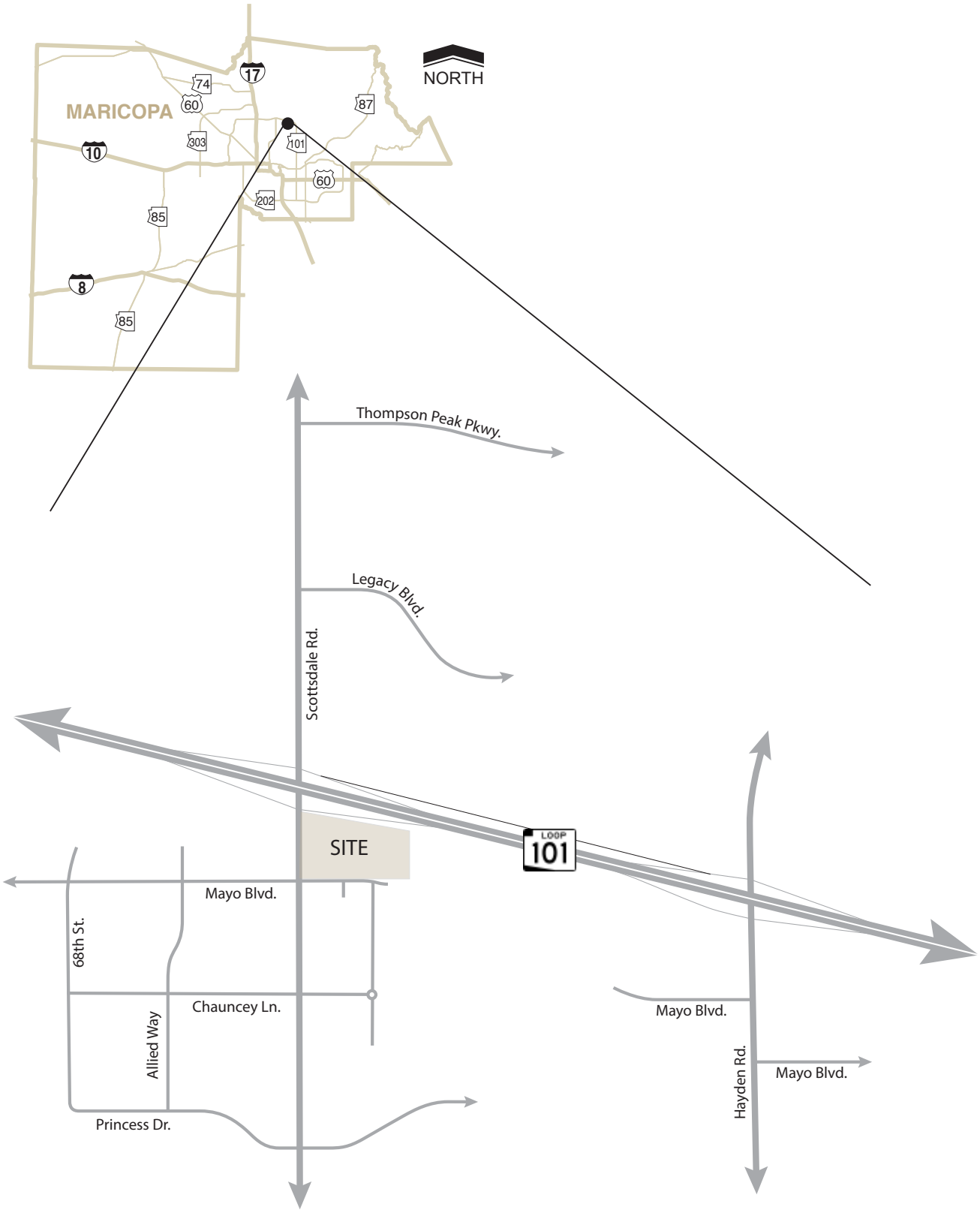


Figure 1: Vicinity Map

TRIP GENERATION

The potential trip generation for the proposed development was estimated utilizing the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* and *Trip Generation Handbook, 3rd Edition*. The ITE *Trip Generation Manual* contains data collected by various transportation professionals for a wide range of different land uses. The data are summarized in the report and average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized land use. The report provides information for daily and Peak Hour trips.

The project site will consist of 6 buildings in total with some retail on the ground floor. Three of the buildings will contain 9 stories of residential dwelling units, which is considered a mid-rise building (LUC 221); the other three buildings will be 10-story buildings which are considered high rise (LUC 222). Additionally, around 36,000 square feet of retail will be provided on-site at the ground level of a few of the buildings. Since less than 40,000 sf of retail will be provided the ITE LUC 822 for a strip retail plaza may be used. The retail component of the site is aimed more towards resident use; however, non-residents are also permitted to use this retail so an internal capture reduction has been applied to account for the internal use of the retail. A 30% reduction has been applied, although this internal capture will likely be much higher due to the nature of the site, 30% has been used in order to be conservative.

The anticipated trip generation is summarized in **Table 4**. Detailed trip generation calculations are provided in **Appendix E**.

Table 4 – Trip Generation

				Weekday Trips						
				Daily	AM Peak Hour			PM Peak Hour		
Proposed Use	ITE LUC	Size	Units	Total	In	Out	Total	In	Out	Total
Building 1	222	278	DU	1,262	26	49	75	50	39	89
Building 2	222	238	DU	1,080	22	42	64	43	33	76
Building 3	221	209	DU	948	18	59	77	50	32	82
Building 4	221	211	DU	958	18	60	78	50	32	82
Building 5	221	209	DU	948	18	59	77	50	32	82
Building 6	222	245	DU	1,112	22	44	66	44	34	78
Retail Plaza	822	36,000	SF	1,748	40	27	67	97	96	193
Subtotals				**8,056**	**164**	**340**	**504**	**384**	**298**	**682**
Internal Capture Reduction (Retail)				*(524)*	*(10)*	*(10)*	*(20)*	*(29)*	*(29)*	*(58)*
Total External Trips				**7,532**	**154**	**330**	**484**	**355**	**269**	**624**

The proposed development it anticipated to generate up to 7,532 external weekday daily trips with 484 trips occurring during the AM Peak Hour (154 in/330 out) and 624 trips occurring during the PM Peak Hour (355 in/269 out).

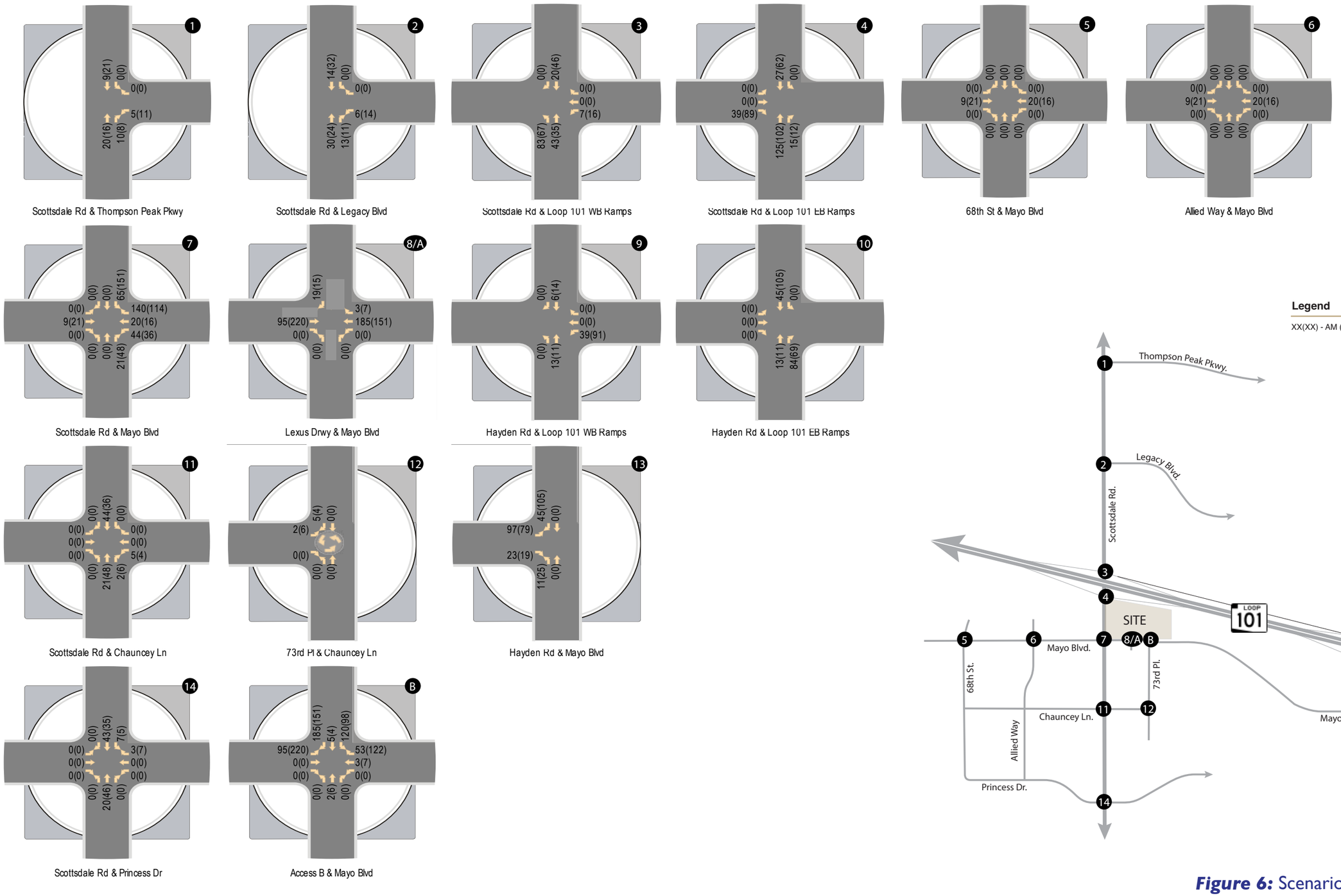


Figure 6: Scenario 1 Site Traffic Volumes

Table 7 – Queue Storage Lengths

ID	Intersection	Intersection Control	Movement	Queue Storage			
				Existing[1]	AASHTO	HCM[2]	Recommended
1	Scottsdale Rd & Thompson Peak Pkwy	Signal	NB Left	-	125’	<25’	[4] 150’
			SB Left	200’	250’	135’	No Change
			EB Left	-	0’	<25’	[4] 2@320’
			WB Left	2@135’	975’	345’	[6] 2@175’
			NB Right	520’	650’	225’	No Change
			SB Right	-	0’	<25’	[4] 150’
			EB Right	-	75’	<25’	[4] 150’
			WB Right	225’	300’	40’	No Change
2	Scottsdale Rd & Legacy Blvd	Signal	NB Left	-	75’	<25’	[4] 150’
			SB Left	195’	175’	60’	No Change
			EB Left	-	0’	<25’	[4] 2@185’
			WB Left	2@225’	550’	175’	No Change
			NB Right	145’	475’	<25’	No Change
			SB Right	-	0’	<25’	[4] 150’
			EB Right	-	0’	<25’	[4] 150’
			WB Right	330’	225’	45’	No Change
3	Scottsdale Rd & Loop 101 WB Ramps	Signal	NB Left	2@245’	1,025’	435’	No Change
			WB Left	2@315’	1,525’	725’	No Change
			SB Right	400’	1,125’	620’	[6][7] No Change
			WB Right	2x315’	1,575’	200’	No Change
4	Scottsdale Rd & Loop 101 EB Ramps	Signal	SB Left	2@265’	1,650’	615’	[6][7] No Change
			EB Left	2@205’	975’	525’	[6][7] No Change
			NB Right	605’	1,500’	485’	No Change
			EB Right	2@215’	1,250’	105’	No Change
5	68th St & Mayo Blvd	Signal	NB Left	140’	800’	450’	[3][6] 350’
			SB Left	160’	175’	45’	No Change
			EB Left	240’	150’	60’	No Change
			WB Left	255’	150’	50’	No Change
			NB Right	140’	150’	40’	No Change
			EB Right	105’	600’	60’	No Change
			WB Right	170’	75’	<25’	No Change
6	Allied Way & Mayo Blvd	Signal	NB Left	190’	375’	200’	No Change
			SB Left	145’	225’	450’	[6][7] No Change
			EB Left	150’	225’	65’	No Change
			WB Left	185’	250’	50’	No Change
			NB Right	195’	375’	40’	No Change
			EB Right	170’	250’	30’	No Change
			WB Right	200’	500’	55’	No Change
7	Scottsdale Rd & Mayo Blvd	Signal	NB Left	2@240’	750’	315’	No Change
			SB Left	2@165’	425’	95’	No Change
			EB Left	2@325’	1,225’	435’	No Change
			WB Left	2@165’	125’	35’	No Change
			NB Right	160’	125’	<25’	No Change
			SB Right	240’	1,600’	175’	No Change
			EB Right	335’	650’	95’	No Change

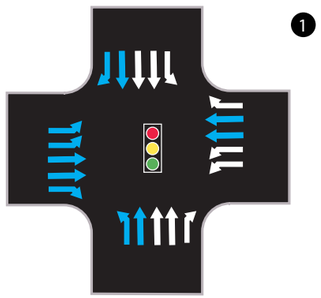
ID	Intersection	Intersection Control	Movement	Queue Storage			
				Existing[1]	AASHTO	HCM[2]	Recommended
8/A	Lexus Drwy/Access A & Mayo Blvd	2-way stop (NB/SB)	NB Left	-	50’	<25’	[3] 100’
			SB Left	-	50’	<25’	[3] 100’
			EB Left	95’	25’	<25’	No Change
			WB Left	75’	25’	<25’	No Change
			EB Right	75’	50’	<25’	No Change
9	Hayden Rd & Loop 101 WB Ramps	Signal	NB Left	240’	1,350’	1,085’	[6][7] No Change
			WB Left	2@485’	475’	120’	No Change
			SB Right	235’	825’	175’	No Change
			WB Right	2@500’	1,300’	105’	No Change
10	Hayden Rd & Loop 101 EB Ramps	Signal	SB Left	2@250’	1,300’	440’	No Change
			EB Left	2@425’	1,425’	770’	No Change
			NB Right	255’	475’	200’	No Change
			EB Right	2@430’	1,250’	185’	No Change
11	Scottsdale Rd & Chauncey Ln	Signal	NB Left	195’	225’	190’	No Change
			SB Left	175’	150’	65’	No Change
			EB Left	165’	300’	205’	[6][7] No Change
			WB Left	170’	225’	150’	No Change
			NB Right	130’	125’	<25’	No Change
			SB Right	165’	250’	35’	No Change
			EB Right	110’	250’	145’	[6][7] No Change
			WB Right	180’	150’	80’	No Change
13	Hayden Rd & Mayo Blvd	Signal	NB Left	-	100’	40’	[5] 250’
			SB Left	370’	500’	145’	[5] 2@370’
			EB Left	-	275’	90’	[5] 2@265’
			WB Left	-	250’	175’	[5] 295’
			NB Right	-	250’	<25’	[5] 150’
			SB Right	185’	325’	<25’	No Change
			EB Right	165’	125’	<25’	No Change
			WB Right	-	525’	260’	[5] 200’
14	Scottsdale Rd & Princess Dr	Signal	NB Left	255’	550’	175’	2@255’
			SB Left	240’	375’	110’	2@240’
			EB Left	210’-	125’	80’	No Change
			WB Left	175’	350’	270’	[6]270’
			NB Right	250’	400’	85’	No Change
			SB Right	255’	175’	45’	No Change
			WB Right	85’	300’	70’	No Change
B	Access B & Mayo Blvd	2-way stop (NB/SB)	NB Left	105’	25’	<25’	No Change
			SB Left	-	25’	<25’	[3] 100’
			EB Left	285’	25’	<25’	No Change
			WB Left	-	0’	<25’	[3] 100’
			EB Right	190’	25’	<25’	No Change
			WB Right	-	75’	<25’	[3] 100’
C	Scottsdale Rd & Access C	Free	NB Right	115’	25’	<25’	No Change

(1) Measured from beginning of stop bar
(2) HCM 95th percentile queue reported in vehicles/lane, assuming 1 vehicle ~ 25 feet.
(3) Per City of Scottsdale DS&PM, a minimum turn lane length of 150 feet is recommended for all new turn lanes with a minimum recommendation of 100 feet. Maximum recommended turn lane length is 350 feet.
(4) Turn lane recommendation from Cavasson TIMA.
(5) Turn lane recommendation from AXON TIA.
(6) Optima site contributes little or no traffic to this movement.
(7) Existing ROW restrictions prevent extension of turn lane.

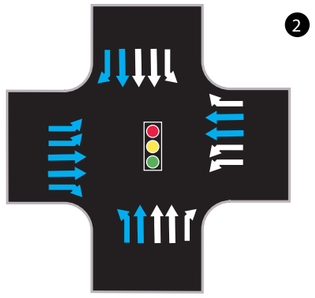
Many of the recommendations for this Study Area are based on the HCM 95th percentile queue lengths. Synchro 11 software takes into account peak hour factors, number of approach lanes, signal timing etc. in order to calculate 95th percentile queue lengths. Since more data is taken into consideration when completing these calculations, they provide a better idea of what storage lengths will actually be needed once the development is constructed and the extra vehicles are added to the roadway network. The values presented in the "recommended" column of Table 7 are based on the HCM 95th percentile calculations instead of the AASHTO calculations.

For dual left turn lanes, the values presented in the AASHTO and HCM columns represent the total recommended length of both lanes; divide value by 2 to achieve a per-lane length. Both the Cavasson TIMA and the Axon TIA provide recommended storage lengths for the new lanes provided by each of the respective developers. These recommendations have been included here as well and noted in the table.

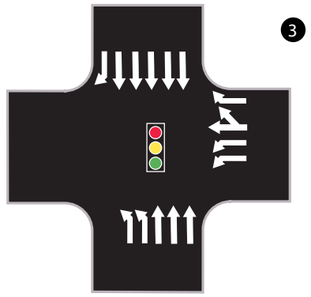
The recommended storage lengths in **Table 7** are provided for Study Horizon Year 2030 using the Total Traffic volumes. Proposed lane configurations are shown in **Figure 14**.



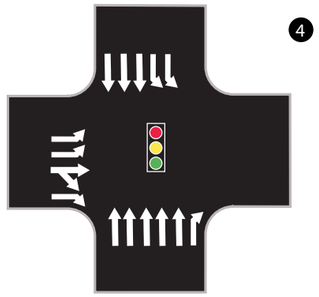
Scottsdale Rd & Thompson Peak Pkwy



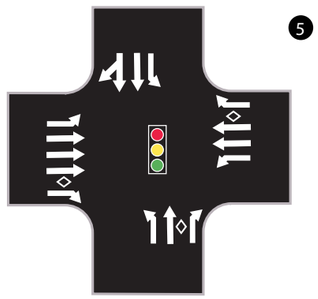
Scottsdale Rd & Legacy Blvd



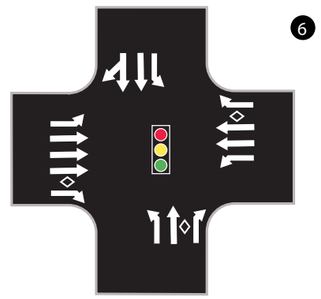
Scottsdale Rd & Loop 101 WB Ramps



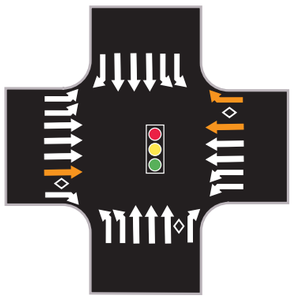
Scottsdale Rd & Loop 101 EB Ramps



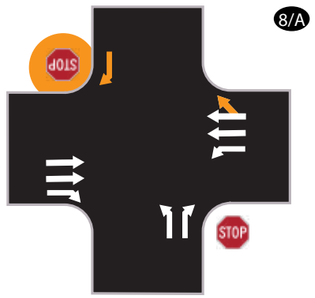
68th St & Mayo Blvd



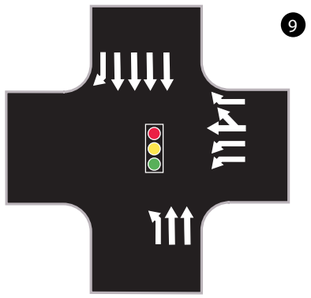
Allied Way & Mayo Blvd



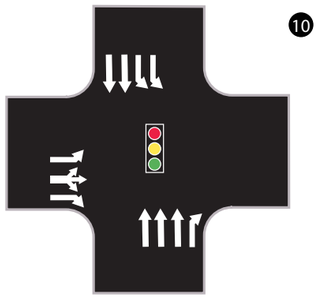
Scottsdale Rd & Mayo Blvd



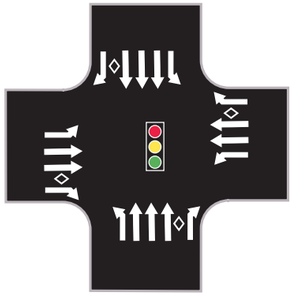
Lexus Drwy & Mayo Blvd



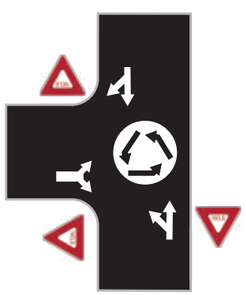
Hayden Rd & Loop 101 WB Ramps



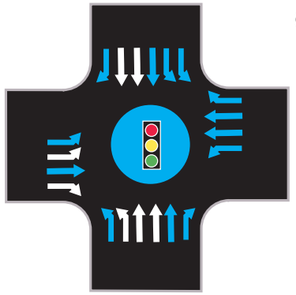
Hayden Rd & Loop 101 EB Ramps



Scottsdale Rd & Chauncey Ln



73rd Pl & Chauncey Ln



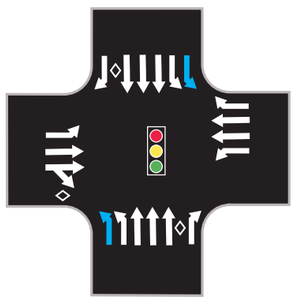
Hayden Rd & Mayo Blvd

LEGEND

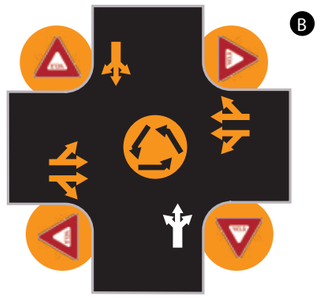
NORTH

- Thru or Turning Movement
- Two-Way Left Turn-Lane
- Raised Median
- Bike Lane
- Traffic Signal
- Stop Sign
- Speed Limit

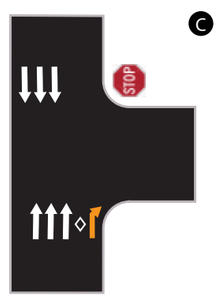
- Recommended Improvements by 2025
- Recommended improvements by 2030



Scottsdale Rd & Princess Dr



Access B & Mayo Blvd



Scottsdale Rd & Access C

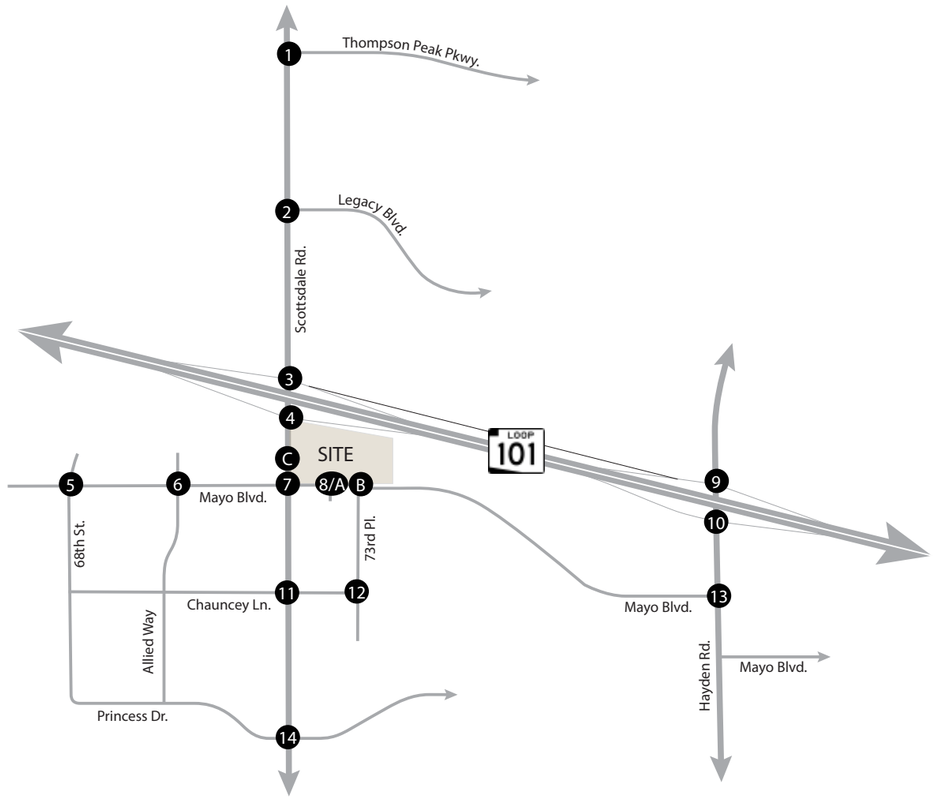


Figure 14: Proposed Lane Configurations and Traffic Controls

CONCLUSIONS

In conclusion, the proposed mixed-use development can be developed with the following recommendations documented in this TIMA.

GENERAL

- Of all of the crashes listed that have been recorded within the Study Area, none have involved fatalities or pedestrians. A majority of the crashes within the Study Area have been rear end crashes, which cannot be mitigated, which is basically driver inattention and speed. The next highest incident being left turn crashes and angle crashes.
- The project site will consist of 6 buildings in total with some retail on the ground floor. Three of the buildings will contain 9 stories of residential dwelling units, which is considered a mid-rise building (LUC 221); the other three buildings will be 10-story buildings which are considered high rise (LUC 222). Additionally, around 36,000 square feet of retail will be provided on-site at the ground level of a few of the buildings.
- The proposed development it anticipated to generate up to 7,532 external weekday daily trips with 484 trips occurring during the AM Peak Hour (154 in/330 out) and 624 trips occurring during the PM Peak Hour (355 in/269 out).
- No new streets and thoroughfares are proposed as part of this development. The existing streets are suitable and adequate to serve the proposed development and the anticipated traffic it will generate.
- The site is ideally located for higher density development given it is located adjacent to the 101 freeway which will allow the residents to conveniently transit to local and regional destinations without impacting the Scottsdale Road network.
- A new bus bay and bus stop will be constructed on Scottsdale Road just north of the Mayo Boulevard intersection to allow convenient access to mass transportation. Bus Route 72 has one of the highest frequencies and has the highest ridership of all the north-south routes in the City of Scottsdale. This helps support its use in an area that really has not been transit minded.

RESULTS – EXISTING CONDITIONS

- The results of the 2021 existing conditions analysis indicate that most Study Intersections operate with acceptable Levels of Service (LOS D or better), with the exception of the following intersections. The poor Levels of Service are a direct result of the existing development within the Study Area of this TIMA.
    - The signalized intersection of **Scottsdale Road and Legacy Boulevard** currently operates at LOS E for the WB approach during the AM Peak Hour. The current delay is 55 seconds per vehicle (sec/veh) which is the minimum threshold value for LOS E.
    - The signalized intersection of **Scottsdale Road and Loop 101 WB Ramps** currently operates at LOS F for the WB approach during both the AM and PM Peak Hours. This delay is due to the high volume of vehicles utilizing this approach during both Peak

Hours, 1,200 vehicles in the AM peak and 1,127 vehicles in the PM peak. The existing delays are 463.7 sec/veh in the AM and 221.8 sec/veh in the PM.

- The signalized intersection of **Scottsdale Road and Loop 101 EB Ramps** currently operates at LOS E/F for the SB approach during the AM and PM Peak Hours respectively. This delay is due to the high volume of SB approach vehicles during both Peak Hours, 1,902 SB through vehicles in the AM and 735 SB left turning vehicles in the PM. The existing delays are 73.3 sec/veh in the AM and 107.6 sec/veh in the PM.
- The signalized intersection of **68th Street and Mayo Boulevard** currently operates at LOS E for the NB approach during the PM Peak Hour only. This delay is due to the high volume of NB left turning vehicles and only a single left turn lane, 370 vehicles. The existing delay is 70.9 sec/veh.
- The signalized intersection of **Scottsdale Road and Mayo Boulevard** currently operates at LOS E for the WB approach during the AM Peak Hour and on the SB and EB approaches during the PM Peak Hour. The AM Peak Hour delay is caused by the split phasing of the EB/WB approaches and very few vehicles approaching on the WB. During the PM Peak Hour, the volume of SB right turn volume is very high, 738 vehicles, with only a single turn lane and no overlap phasing and the EB left turn volume is also very high, 574 vehicles, with split phasing. The existing delays during the AM are 55.9 sec/veh on the WB, during the PM there is 72.0 sec/veh on the SB during and 62.6 sec/veh on the EB.
- The signalized intersection of **Hayden Road and Loop 101 WB Ramps** currently operates with LOS E on the NB approach during the PM Peak Hour only. The delay is caused by the high volume of NB left turning vehicles, 491 vehicles, and only a single left turn lane. The existing delay is 73.7 sec/veh.
- The signalized intersection of **Hayden Road and Loop 101 EB Ramps** currently operates with LOS E on the EB approach during the AM and on the SB approach during the PM. The AM delay is due to the high volume of vehicles exiting the Loop 101 on the EB Ramps, 1,035 vehicles, and not enough green time allocated to the approach. During the PM peak, the delay is caused by the SB left turn approach not having enough green time allocated. The existing delay during the AM is 55.9 sec/veh on the EB and during the PM it is 74.6 sec/veh on the SB approach.
- The unsignalized intersection of **Hayden Road and Mayo Boulevard** currently operates with LOS E on the EB left turn approach during the PM Peak Hour. This delay is due to the high volume of NB and SB through traffic on Hayden Road and the intersection being unsignalized. This intersection will be signalized in the future and should reduce the existing delays. The delay is currently 37.5 sec/veh on the EB left turn approach.
- The signalized intersection of **Scottsdale Road and Princess Drive** currently operates with LOS E on the EB approach during the AM peak and on the EB and WB approaches during the PM peak. The AM peak delay is due to the high volume of EB right turns, 229 vehicles, and no dedicated right turn lane on the approach. During the

PM peak, the EB approach delay is caused by the high volume of right turns, 230 vehicles, and no dedicated right turn lane/not enough green time allocated to the approach and the WB approach delay is also due to not enough green time being allocated to the approach. During the AM, the existing delay is 77.2 sec/veh; during the PM, the existing EB delay is 381.1 sec/veh and the WB delay is 68.0 sec/veh.

RESULTS – STUDY HORIZON YEAR 2025 – OPENING YEAR

- The signalized intersection of **Scottsdale Road and Legacy Boulevard** is expected to operate with 55.4 sec/veh and 95.5 sec/veh of delay during the AM and PM Peak Hours, respectively. The AM Peak Hour delay in the EB and WB approaches cannot be mitigated at this time since it is due to not enough vehicles approaching the EB and WB approaches during the AM Peak Hour and the signal being actuated. An actuated signal prioritizes the movement along the primary corridor and in this case the priority is given to Scottsdale Road. If there is a period of a few seconds after the minimum allotted green time where no vehicle passes through the intersection in the NB and SB directions, then the signal could cut the green phase short and allow the next phase to proceed earlier. If there are not enough vehicles on the EB and WB approaches in this initial green phase, higher delays can occur, which is likely what is happening at this intersection during the 2025 opening year of the site.
    - During the PM Peak Hour, it is recommended that the WB green phase be extended from 14 seconds to 31 seconds to reduce the delay from 96.6 sec/veh to 55.4 sec/veh.
- The signalized intersection of **Scottsdale Road and Loop 101 Interchange** is expected to operate with delay on most of the approaches by the 2025 opening year due to the high volume of vehicles utilizing the interchange. There are existing delays at this interchange already, so little can be done in terms of mitigation to improve the delays. Green times were adjusted to try and minimize the delays, however, without providing alternate routes or adding lanes to the intersection, the overall intersection delays can only be reduced slightly.
    - WB Ramps from 200.7 sec/veh to 89.4 sec/veh in the AM Peak Hour and 120.4 sec/veh to 116.0 sec/veh in the PM Peak Hour
    - EB Ramps from 103.1 sec/veh to 82.3 sec/veh in the AM Peak Hour and 134.4 sec/veh to 77.2 sec/veh in the PM Peak Hour
- The signalized intersection of **68th Street and Mayo Boulevard** is expected to operate with 97.1 sec/veh of delay during the PM Peak Hour on the NB approach. This delay is due to the high volume of NB left turning vehicles during the Peak Hour and only one NB left turn lane. The current right-of-way at this intersection is not sufficient to provide dual NB left turn lanes, so instead it is recommended that the NB phasing be changed from permissive-only phasing to protected-permissive phasing to allow more green time for the NB left turning movement, and therefore, more time for vehicles to clear the intersection. This mitigation is anticipated to reduce the NB approach delay from 97.1 sec/veh to 46.8 sec/veh.
- The signalized intersection of **Scottsdale Road and Mayo Boulevard** is expected to operate with 57.2 sec/veh of delay on the SB approach and 85.9sec/veh of delay on the EB approach

TRAFFIC MASTER PLAN

Crossroads East
Planning Unit VII
Scottsdale, Arizona

Kimley»Horn

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

This report documents a traffic master plan analysis performed for Arizona State Land Department (ASLD) Crossroads East Planning Unit VII located near the northwest corner of Hayden Road and the Princess Boulevard alignment in Scottsdale, Arizona. Planning Unit VII is anticipated to include residential, office, and retail land uses.

1.2 SITE LOCATION

Planning Unit VII encompasses approximately 111 acres in north Scottsdale, near the northwest corner of Hayden Road and the Princess Boulevard alignment. More specifically, Planning Unit VII is bounded by the future Mayo Boulevard alignment and vacant undeveloped parcels to the north, Hayden Road to the east, Princess Boulevard and existing multi-family and hotel developments to the south, and the future Miller Road alignment and vacant undeveloped parcels to the west. The planning unit location is depicted in the Proposed Planning Units exhibit and Land Use Map, which are included in the **Appendix**.

Approximately 47 acres of Planning Unit VII (hereinafter known as the Sale Parcel) were purchased from ASLD by Princess-Hayden LLC at public auction on February 13, 2018. The Sale Parcel is located in a portion of the Northeast Quarter of Section 35, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian in Maricopa County, Arizona. The Sale Parcel is bounded by the future Mayo Boulevard alignment and vacant undeveloped parcels to the north, Hayden Road to the east, Princess Boulevard and existing multi-family and hotel developments to the south, and vacant undeveloped parcels to the west. The Land Use Map is included in the **Appendix**.

Approximately 64 acres of Planning Unit VII (hereinafter known as the Remainder Parcel) currently remains with the ASLD.

1.3 REPORT PURPOSE AND OBJECTIVES

The Traffic Master Plan for Crossroads East Planning Unit VII is intended to satisfy the City of Scottsdale traffic master plan requirement of the Development Agreement recorded against the property (19-ZN-2002#2) for Planning Unit VII. It provides a description of the transportation requirements, access locations, street cross-sections and intersection control at buildout of study area roadways for Planning Unit VII.

2.0 LAND USE AND ACCESSIBILITY

2.1 LAND USE

Planning Unit VII is anticipated to include residential, office, and retail land uses. **Table 1** illustrates the land use, size, and anticipated development density of Planning Unit VII.

Table 1. Land Use

Parcel	General Description	ITE Land Use	Area (Acres)	Assumed Density	No. of Units	Building Area	Independent Variable
Sale	Multifamily Housing	220	37	23 DU / Acre	851	-	DU
Sale	Senior Living	252	10	23 DU / Acre	230	-	DU
Remainder	Multifamily Housing	220	8.6	23 DU / Acre	198	-	DU
Remainder	Office Park	750	39.4	0.35 FAR	-	600	1,000 SF
Remainder	Retail	820	16	0.25 FAR	-	174	1,000 SF

DU = Dwelling Units
FAR = Floor Area Ratio
SF = Square Feet

The layout of Planning Unit VII is illustrated in the Land Use Map included in the **Appendix**.

2.2 ACCESSIBILITY

Planning Unit VII is accessed locally via Hayden Road, Princess Boulevard, and the future Miller Road and Mayo Boulevard alignments. Regional access is expected to be provided by SR 101L, a major freeway in the vicinity of the planning unit with traffic interchanges at Hayden Road, Scottsdale Road, Princess Drive, Bell Road, and Frank Lloyd Wright Boulevard. Regional access is also expected to be provided by the other arterial streets in the vicinity such as Scottsdale Road and Frank Lloyd Wright Boulevard.

2.3 SITE CIRCULATION

Planning Unit VII's potential access points and the surrounding street system are illustrated in the Traffic Master Plan exhibit, which is included in the **Appendix**. The access points identified are generally compliant with the City of Scottsdale Design Standards and Policy Manual (DSPM).

The future Miller Road alignment serves as the west boundary of the planning unit, and the future Mayo Boulevard alignment is the north boundary of the planning unit. The future 78th Street alignment, located midway between the future Miller Road alignment and Hayden Road, connects Princess Boulevard to the future Mayo Boulevard alignment.

3.0 STUDY AREA ANALYSIS

3.1 STREET CLASSIFICATIONS

The Miller Road and Mayo Boulevard alignments are classified as a major collector with urban character in the City of Scottsdale's Transportation Master Plan, which was adopted by City Council on July 5, 2016. Princess Boulevard is also classified as a major collector with urban character, west of 78th Street. 78th Street is classified as a minor collector with urban character. Princess Boulevard, between 78th Street and Hayden Road, is proposed to have a modified local collector cross-section.

3.2 TYPICAL STREET SECTIONS

The typical sections for Miller Road, Mayo Boulevard, Princess Boulevard, and 78th Street are shown in the Roadway Sections exhibit in the **Appendix**.

3.3 ADJACENT LAND USE

Access to the existing developments south of the Princess Boulevard alignment should be maintained when the Princess Boulevard connection is made between Miller Road and Hayden Road. Modification of the existing access is recommended for the Scottsdale Villa Mirage Resort Condominiums access to Princess Boulevard and the Scottsdale Pinnacle Condominiums access to Hayden Road when the Princess Boulevard connection is made.

The Scottsdale Villa Mirage Resort Condominiums has an existing site access driveway at the northwest corner of the parcel. Modification of the existing driveway is recommended to provide full access to Princess Boulevard. The recommended full access location is shown in the Traffic Master Plan exhibit in the **Appendix**. If the property owner does not want to modify existing access, right turns out of the development should be restricted due the geometric constraint of the existing Princess Boulevard connection.

The existing Scottsdale Pinnacle condominium driveway access on Hayden Road, south of the Princess Boulevard right in/right out access, does not satisfy spacing requirements when the Princess Boulevard connection is constructed. Additionally, turning movement counts were collected at the Scottsdale Pinnacle Condominium driveway on Hayden Road on Thursday, March 15, 2018. The counts were performed between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM. During the AM peak hour there were four southbound right turns into the development and one eastbound right turn out of the development. During the PM peak hour there were three southbound right turns into the development and six eastbound right turns out of the development. A copy of the counts is attached in the **Appendix**. The counts show that the existing driveway is not used by a large percentage of traffic to the condominiums. The existing Scottsdale Pinnacle Condominium driveway access on Hayden Road could be relocated to a new full access driveway on Princess Boulevard, west of Hayden Road. The alternative access is illustrated in the Traffic Master Plan exhibit, which is included in the **Appendix**.

4.0 PROJECTED TRAFFIC

4.1 TRAFFIC FORECASTS

4.1.1 TRIP GENERATION

The Institute of Transportation Engineers' (ITE) *Trip Generation, 10th Edition,* was used to obtain daily and peak-hour trip generation rates and inbound-outbound percentages, which were then used to estimate the number of daily and peak hour trips that can be attributed to Planning Unit VII. The trip generation characteristics are summarized in **Table 2**.

Table 2. Planning Unit VII Trip Generation

Land Use	ITE Code	Quantity	Units	Daily Total	AM Peak			PM Peak		
					In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise)	220	1,049	DUs	7,680	111	372	483	370	217	587
Senior Adult Housing-Attached	252	230	DUs	852	16	30	46	33	27	60
Office Park	750	600,000	SF	6,650	797	98	895	120	679	799
Shopping Center	820	174,000	SF	6,578	102	62	164	319	345	664
Total Trips				21,760	1,026	562	1,588	842	1,268	2,110

Planning Unit VII is expected to generate 21,760 daily trips, with 1,588 trips occurring in the AM peak hour and 2,110 trips occurring in the PM peak hour. Owing to the mix of uses, trip reductions are anticipated and justified below.

4.1.2 TRIP REDUCTIONS

It is reasonable to expect that trip interaction will result considering the mix of residential, office, and retail land uses. To account for this interaction, the methodology for estimating internally captured trips in the *ITE Trip Generation Handbook, 10th Edition* was used. The worksheet calculating internal capture using the ITE method and the resulting internal trip generation is located in the **Appendix**.

As documented in the ITE publication, *Trip Generation*, 10*th Edition*, shopping centers do not typically generate all new traffic on a roadway system. The total traffic generation is a combination of pass-by trips, or traffic drawn directly from the passing traffic flow on the adjacent streets, and primary trips, which represent new traffic drawn to the facility. In order to assess the pass-by trips, the data published in the ITE *Trip Generation Handbook* was used to estimate the pass-by percentages for the commercial parcels. It should be noted that pass-by trip reductions do not reduce driveway traffic volumes. Pass-by reductions are shown in the **Appendix**.

Taking into consideration internal capture and pass-by trips, Planning Unit VII is expected to add 18,434 new daily trips, 1,468 new AM peak hour trips, and 1,579 new PM peak hour trips to the roadway network.

4.2 PROJECTED TRAFFIC VOLUME INFORMATION

The City of Scottsdale provided 2035 traffic volume projections based on traffic analysis zone (TAZ) information. The average daily traffic (ADT) volume projections are shown in the Traffic Master Plan exhibit in the **Appendix**. Princess Boulevard west of Hayden is expected to carry less than 5,000 vehicles per day. The projected volumes are consistent with the average daily traffic ranges for the various street classifications.

4.2.1 TRAFFIC ANALYSIS ZONE INFORMATION

The TAZ information, provided by the City of Scottsdale, is included in the **Appendix**. Planning Unit VII includes TAZ 3208 and a portion of TAZ 3207. All boundaries between TAZ 3207 and TAZ 3208 with

Planning Unit VII are consistent, with the exception of the western boundary of TAZ 3207 and Planning Unit VII. TAZ 3207 is bounded by the future Miller Road alignment to the west. The future Miller Road alignment was revised to connect to the northern extension of Princess Drive at the north leg of the existing roundabout. This alignment revision created a difference in the western boundary of TAZ 3207 and Planning Unit VII. For this reason, TAZ 3207 is split between Planning Unit VII and Planning Unit III. The TAZ 3207 variation with the current Planning Unit VII boundary is not expected to significantly impact the 2035 traffic volume projections that were provided by the City of Scottsdale.

TAZ 3207 is approximately 70 acres. Approximately 44 acres of TAZ 3207 is within Planning Unit VII and approximately 26 acres is within Planning Unit III. TAZ 3208 is approximately 90 acres.

Key socioeconomic data for TAZ 3207 and TAZ 3208 is summarized in **Table 3** and **Table 4**, respectively. The full socioeconomic TAZ data spreadsheet, provided by the City of Scottsdale, is included in the **Appendix**. The TAZ data is based on 2035 socioeconomic projections.

Table 3. TAZ 3207 Socioeconomic Data

Portion of TAZ 3207	Retail Employees	Office Employees	Industrial Employees	Multifamily Households
Full (70 Acres)	378	135	0	189
Planning Unit III (26 Acres)	140	50	0	70
Planning Unit VII (44 Acres)	238	85	0	119

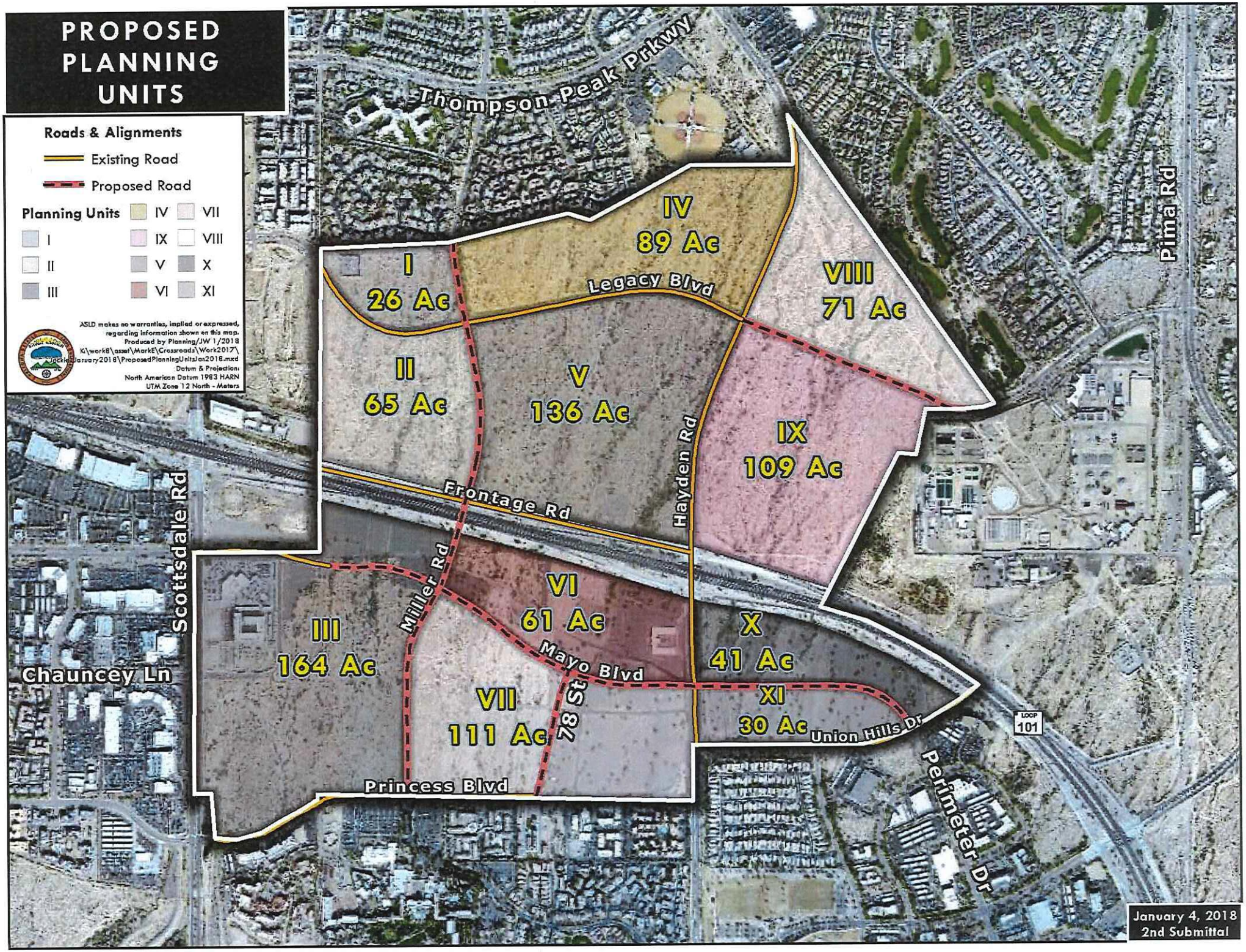
Table 4. TAZ 3208 Socioeconomic Data

Total Area	Retail Employees	Office Employees	Industrial Employees	Multifamily Households
90 Acres (All in Planning Unit VII)	346	106	101	244

Based on the TAZ data, Planning Unit VII is expected to have 584 retail employees, 191 office employees, 101 industrial employees, and 363 multifamily households in 2035.

5.0 CONCLUSIONS

While the specific number of Planning Unit VII employees and residential units may not precisely match the socioeconomic data from the 2035 TAZ projections, the proposed land uses are consistent. The proposed street sections have capacities in excess of the 2035 projected volumes.


PROPOSED PLANNING UNITS
Roads & Alignments
Existing Road
Proposed Road
Planning Units
I
II
III
IV
V
VI
VII
VIII
IX
X
XI
ASLD makes no warranties, implied or expressed, regarding information shown on this map.
Produced by Planning/JW 1/2018
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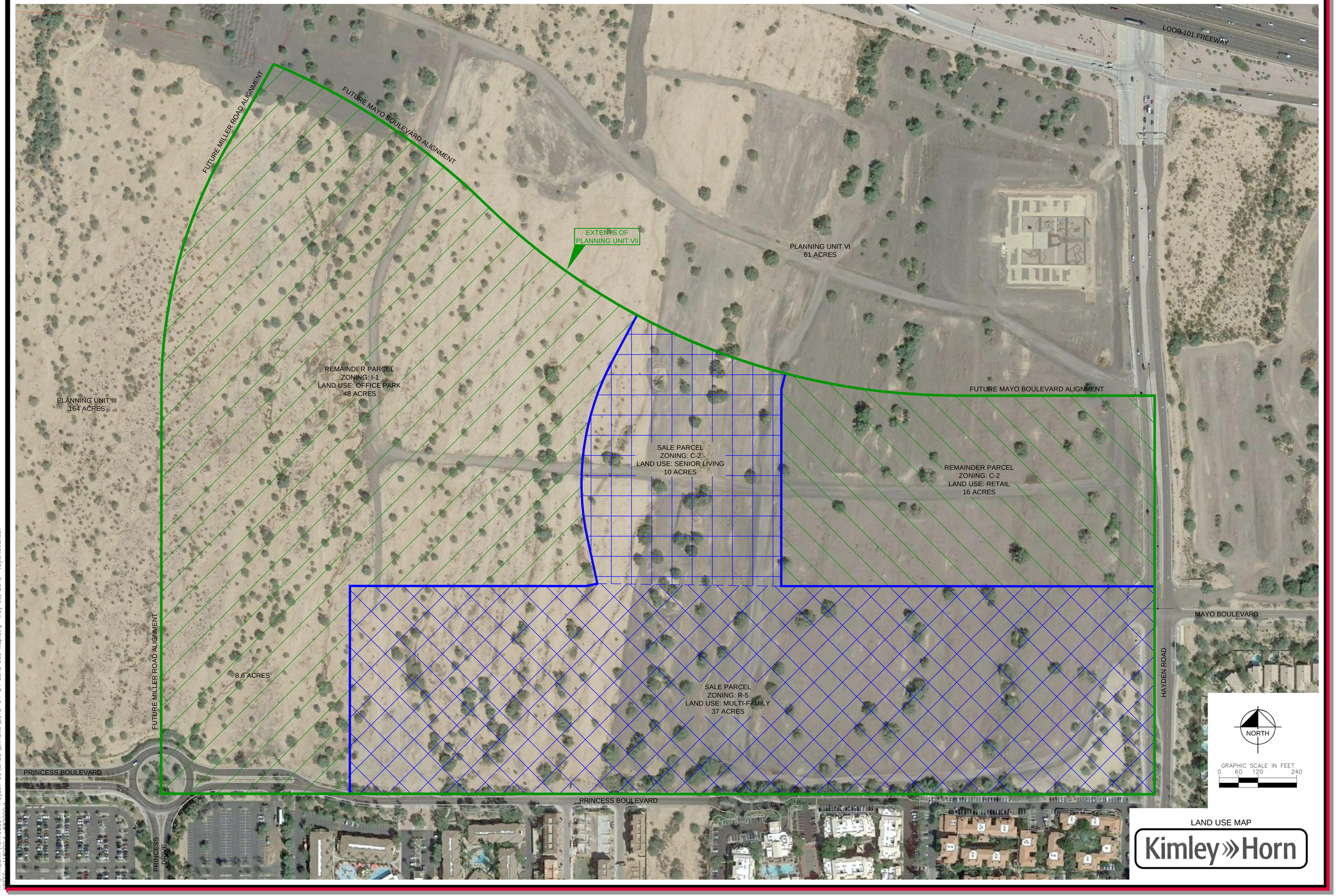
Datum & Projection:
North American Datum 1983 HARN
UTM Zone 12 North - Meters
Thompson Peak Prkwy
Pima Rd
IV
89 Ac
I
26 Ac
Legacy Blvd
VIII
71 Ac
II
65 Ac
V
136 Ac
IX
109 Ac
Hayden Rd
Frontage Rd
Scottsdale Rd
Miller Rd
VI
61 Ac
III
164 Ac
X
41 Ac
Mayo Blvd
Chauncey Ln
VII
111 Ac
78 St
XI
30 Ac
Union Hills Dr
LOOP 101
Perimeter Dr
Princess Blvd
January 4, 2018
2nd Submittal



LAND USE MAP

Kimley»Horn

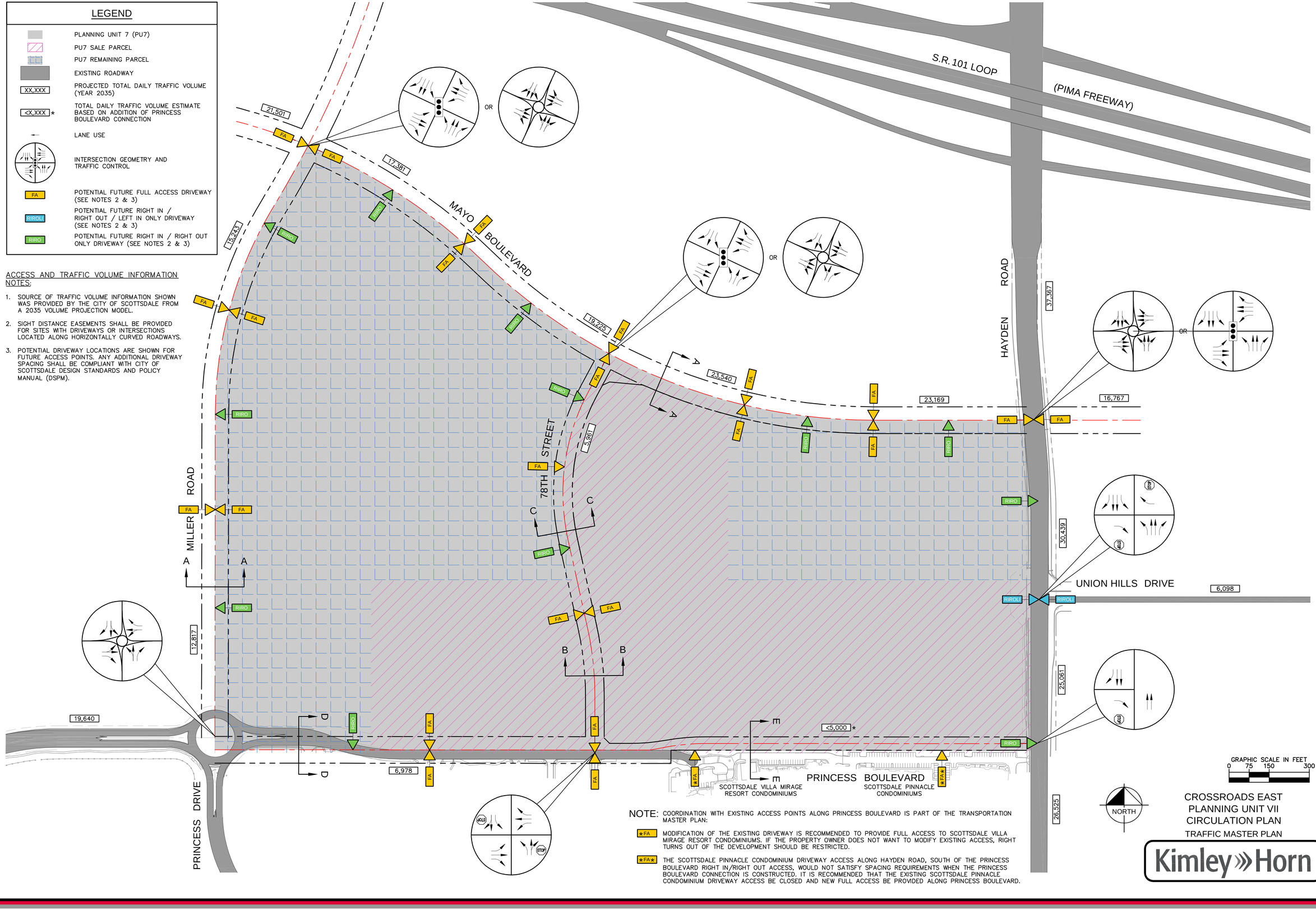
K:\PHX_Civil\191769004 - Hayden 50\CADD\Exhibits\2018-04-24 Land Use Map.dwg May 08, 2018 taylor.swanson

LEGEND

- PLANNING UNIT 7 (PU7)
- PU7 SALE PARCEL
- PU7 REMAINING PARCEL
- EXISTING ROADWAY
- XX,XXX — PROJECTED TOTAL DAILY TRAFFIC VOLUME (YEAR 2035)
- <X,XXX * — TOTAL DAILY TRAFFIC VOLUME ESTIMATE BASED ON ADDITION OF PRprincess BOULEVARD CONNECTION
- LANE USE
- INTERSECTION GEOMETRY AND TRAFFIC CONTROL
- FA — POTENTIAL FUTURE FULL ACCESS DRIVEWAY (SEE NOTES 2 & 3)
- RIROLI — POTENTIAL FUTURE RIGHT IN / RIGHT OUT / LEFT IN ONLY DRIVEWAY (SEE NOTES 2 & 3)
- RIRO — POTENTIAL FUTURE RIGHT IN / RIGHT OUT ONLY DRIVEWAY (SEE NOTES 2 & 3)

ACCESS AND TRAFFIC VOLUME INFORMATION NOTES:

1. SOURCE OF TRAFFIC VOLUME INFORMATION SHOWN WAS PROVIDED BY THE CITY OF SCOTTSDALE FROM A 2035 VOLUME PROJECTION MODEL.
2. SIGHT DISTANCE EASEMENTS SHALL BE PROVIDED FOR SITES WITH DRIVEWAYS OR INTERSECTIONS LOCATED ALONG HORIZONTALLY CURVED ROADWAYS.
3. POTENTIAL DRIVEWAY LOCATIONS ARE SHOWN FOR FUTURE ACCESS POINTS. ANY ADDITIONAL DRIVEWAY SPACING SHALL BE COMPLIANT WITH CITY OF SCOTTSDALE DESIGN STANDARDS AND POLICY MANUAL (DSPM).



NOTE: COORDINATION WITH EXISTING ACCESS POINTS ALONG PRINCESS BOULEVARD IS PART OF THE TRANSPORTATION MASTER PLAN:

- *FA — MODIFICATION OF THE EXISTING DRIVEWAY IS RECOMMENDED TO PROVIDE FULL ACCESS TO SCOTTSDALE VILLA MIRAGE RESORT CONDOMINIUMS. IF THE PROPERTY OWNER DOES NOT WANT TO MODIFY EXISTING ACCESS, RIGHT TURNS OUT OF THE DEVELOPMENT SHOULD BE RESTRICTED.
- *FA* — THE SCOTTSDALE PINNACLE CONDOMINIUM DRIVEWAY ACCESS ALONG HAYDEN ROAD, SOUTH OF THE PRINCESS BOULEVARD RIGHT IN/RIGHT OUT ACCESS, WOULD NOT SATISFY SPACING REQUIREMENTS WHEN THE PRINCESS BOULEVARD CONNECTION IS CONSTRUCTED. IT IS RECOMMENDED THAT THE EXISTING SCOTTSDALE PINNACLE CONDOMINIUM DRIVEWAY ACCESS BE CLOSED AND NEW FULL ACCESS BE PROVIDED ALONG PRINCESS BOULEVARD.

CROSSROADS EAST
PLANNING UNIT VII
CIRCULATION PLAN
TRAFFIC MASTER PLAN

Kimley»Horn

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3208
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3204
2982
1750

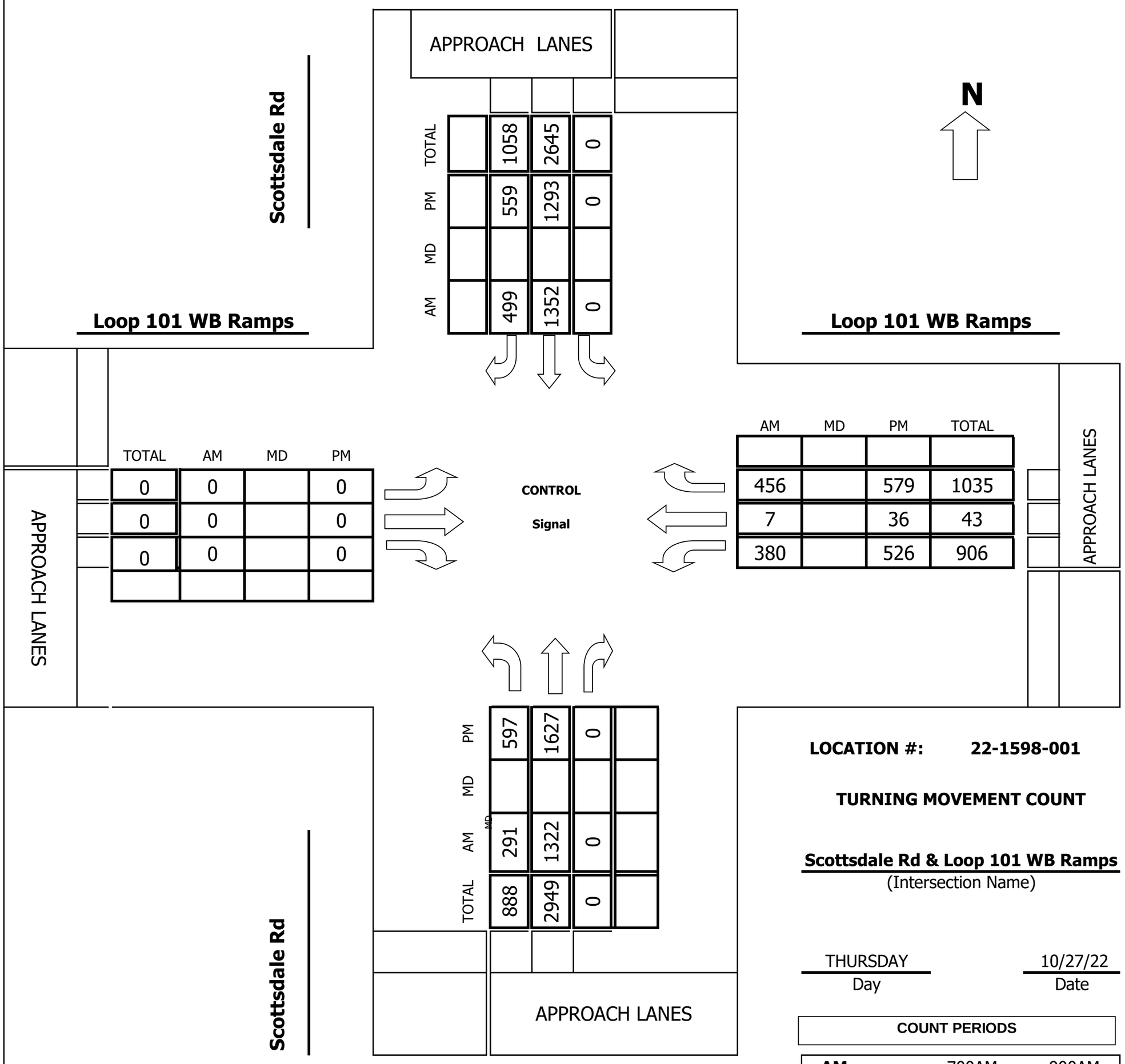
Traffic Counts

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-001

TMC SUMMARY OF Scottsdale Rd & Loop 101 WB Ramps



LOCATION #: 22-1598-001

TURNING MOVEMENT COUNT

Scottsdale Rd & Loop 101 WB Ramps
(Intersection Name)

THURSDAY — Day
10/27/22 — Date

COUNT PERIODS

AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 800 AM

NOON PEAK HOUR

PM PEAK HOUR 430 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Scottsdale Rd	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Loop 101 WB Ramps	DAY:	THURSDAY	PROJECT#	22-1598-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	3	0	0	5	1	0	0	0	2	0.5	1.5	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	54	255	0	0	243	115	0	0	0	51	1	85	804
7:15 AM	68	304	0	0	340	119	0	0	0	59	0	86	976
7:30 AM	79	321	0	0	385	150	0	0	0	60	1	113	1109
7:45 AM	78	397	0	0	349	114	0	0	0	97	0	119	1154
8:00 AM	83	292	0	0	323	128	0	0	0	89	3	116	1034
8:15 AM	91	315	0	0	305	113	0	0	0	87	0	96	1007
8:30 AM	56	313	0	0	360	117	0	0	0	110	3	121	1080
8:45 AM	61	402	0	0	364	141	0	0	0	94	1	123	1186
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	570	2599	0	0	2669	997	0	0	0	647	9	859	8350
Approach %	17.99	82.01	0.00	0.00	72.80	27.20	####	####	####	42.71	0.59	56.70	
App/Depart	3169	/	3458	3666	/	3316	0	/	0	1515	/	1576	

AM Peak Hr Begins at: 800 AM

PEAK													
Volumes	291	1322	0	0	1352	499	0	0	0	380	7	456	4307
Approach %	18.04	81.96	0.00	0.00	73.04	26.96	####	####	####	45.08	0.83	54.09	

PEAK HR. FACTOR:	0.871	0.916	0.000	0.901	0.908

CONTROL: Signal
COMMENT 1:
GPS: 33.658758, -111.925339

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Scottsdale Rd 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Loop 101 WB Ramps	DAY:	THURSDAY	PROJECT#	22-1598-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	3	0	0	5	1	0	0	0	2	0.5	1.5	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	187	353	0	0	303	152	0	0	0	95	9	122	1221
4:15 PM	172	389	0	0	286	151	0	0	0	109	11	119	1237
4:30 PM	149	433	0	0	333	131	0	0	0	119	9	128	1302
4:45 PM	134	381	0	0	294	150	0	0	0	137	9	140	1245
5:00 PM	163	378	0	0	321	153	0	0	0	114	10	140	1279
5:15 PM	151	435	0	0	345	125	0	0	0	156	8	171	1391
5:30 PM	140	439	0	0	312	100	0	0	0	95	6	157	1249
5:45 PM	149	357	0	0	274	110	0	0	0	122	1	112	1125
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	1245	3165	0	0	2468	1072	0	0	0	947	63	1089	10049
Approach %	28.23	71.77	0.00	0.00	69.72	30.28	####	####	####	45.12	3.00	51.88	
App/Depart	4410	/	4254	3540	/	3415	0	/	0	2099	/	2380	

PM Peak Hr Begins at: 430 PM

PEAK													
Volumes	597	1627	0	0	1293	559	0	0	0	526	36	579	5217
Approach %	26.84	73.16	0.00	0.00	69.82	30.18	####	####	####	46.10	3.16	50.74	
PEAK HR. FACTOR:		0.949			0.977			0.000			0.851		0.938

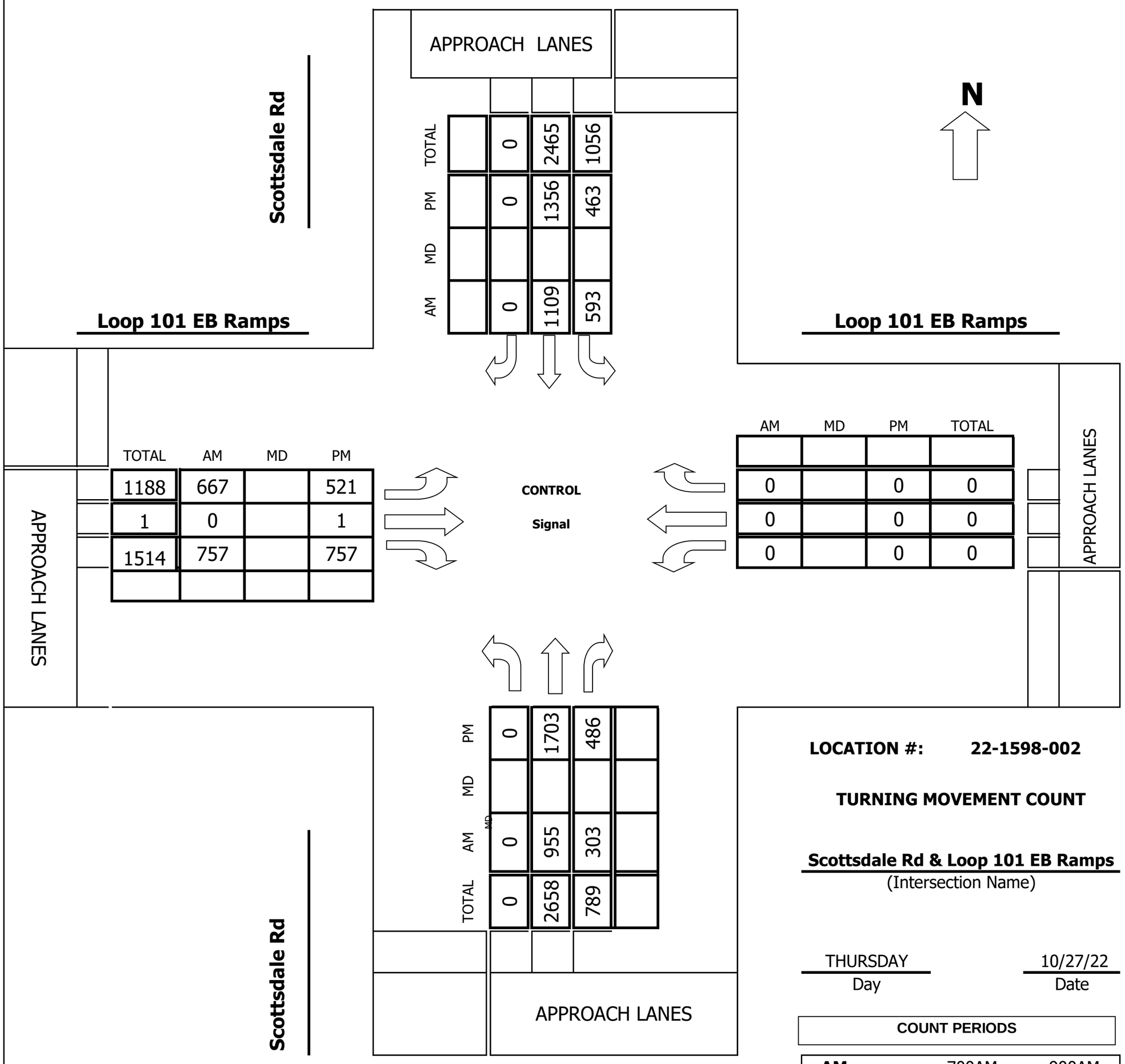
CONTROL:	Signal
COMMENT 1:	0
GPS:	33.658758, -111.925339

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-002

TMC SUMMARY OF Scottsdale Rd & Loop 101 EB Ramps



LOCATION #: 22-1598-002

TURNING MOVEMENT COUNT

Scottsdale Rd & Loop 101 EB Ramps
(Intersection Name)

THURSDAY — Day
10/27/22 — Date

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

PM PEAK HOUR 430 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Scottsdale Rd	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Loop 101 EB Ramps	DAY:	THURSDAY	PROJECT#	22-1598-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	5	1	2	3	0	2	0.5	1.5	0	0	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	147	54	148	146	0	162	0	189	0	0	0	846
7:15 AM	0	211	73	144	255	0	161	0	203	0	0	0	1047
7:30 AM	0	207	74	179	266	0	193	0	205	0	0	0	1124
7:45 AM	0	288	70	122	324	0	187	0	207	0	0	0	1198
8:00 AM	0	249	86	148	264	0	126	0	142	0	0	0	1015
8:15 AM	0	312	71	116	276	0	94	0	125	0	0	0	994
8:30 AM	0	194	80	151	319	0	175	0	200	0	0	0	1119
8:45 AM	0	279	74	126	332	0	184	2	251	0	0	0	1248
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	1887	582	1134	2182	0	1282	2	1522	0	0	0	8591
Approach %	0.00	76.43	23.57	34.20	65.80	0.00	45.69	0.07	54.24	####	####	####	
App/Depart	2469	/	3169	3316	/	3704	2806	/	1718	0	/	0	

AM Peak Hr Begins at: 715 AM

PEAK													
Volumes	0	955	303	593	1109	0	667	0	757	0	0	0	4384
Approach %	0.00	75.91	24.09	34.84	65.16	0.00	46.84	0.00	53.16	####	####	####	

PEAK HR. FACTOR:	0.878	0.954	0.894	0.000	0.915

CONTROL: Signal
COMMENT 1:
GPS: 33.657620, -111.925365

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Scottsdale Rd 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Loop 101 EB Ramps	DAY:	THURSDAY	PROJECT#	22-1598-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	5	1	2	3	0	2	0.5	1.5	0	0	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	422	121	118	280	0	118	0	150	0	0	0	1209
4:15 PM	0	441	111	115	280	0	120	2	183	0	0	0	1252
4:30 PM	0	451	118	127	325	0	131	1	206	0	0	0	1359
4:45 PM	0	383	116	108	323	0	132	0	185	0	0	0	1247
5:00 PM	0	426	132	120	315	0	115	0	161	0	0	0	1269
5:15 PM	0	443	120	108	393	0	143	0	205	0	0	0	1412
5:30 PM	0	470	122	108	299	0	109	2	159	0	0	0	1269
5:45 PM	0	391	100	82	314	0	115	0	167	0	0	0	1169
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	3427	940	886	2529	0	983	5	1416	0	0	0	10186
Approach %	0.00	78.47	21.53	25.94	74.06	0.00	40.89	0.21	58.90	####	####	####	
App/Depart	4367	/	4410	3415	/	3945	2404	/	1831	0	/	0	

PM Peak Hr Begins at: 430 PM

PEAK													
Volumes	0	1703	486	463	1356	0	521	1	757	0	0	0	5287
Approach %	0.00	77.80	22.20	25.45	74.55	0.00	40.73	0.08	59.19	####	####	####	
PEAK HR. FACTOR:		0.962			0.908			0.919			0.000		0.936

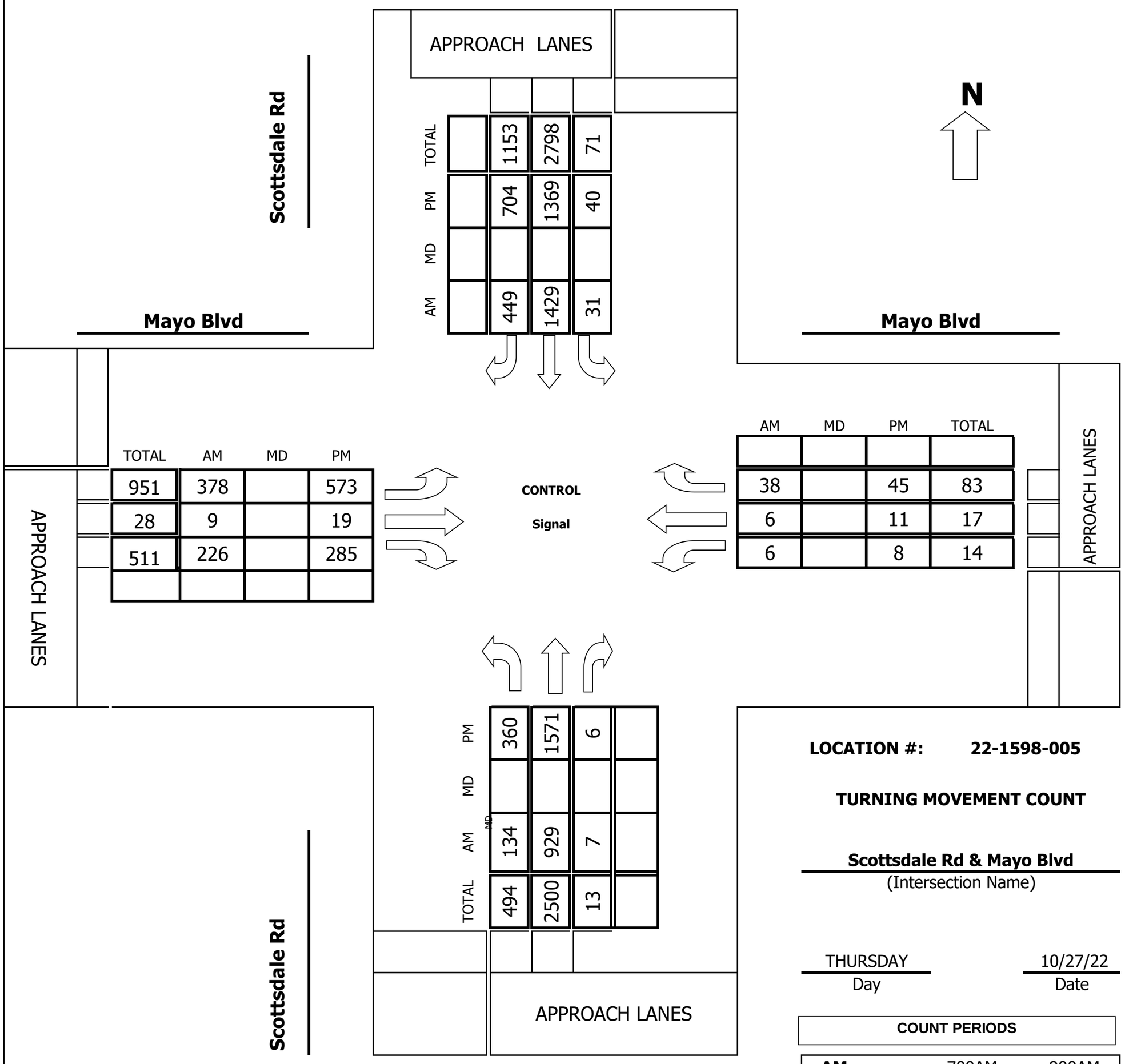
CONTROL:	Signal
COMMENT 1:	0
GPS:	33.657620, -111.925365

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-005

TMC SUMMARY OF Scottsdale Rd & Mayo Blvd



LOCATION #: 22-1598-005

TURNING MOVEMENT COUNT

Scottsdale Rd & Mayo Blvd
(Intersection Name)

THURSDAY — Day
10/27/22 — Date

COUNT PERIODS

AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 800 AM

NOON PEAK HOUR

PM PEAK HOUR 430 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Scottsdale Rd	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Mayo Blvd	DAY:	THURSDAY	PROJECT#	22-1598-005

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	3	1	2	3	1	2	3	1	2	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	11	137	0	4	257	74	60	1	24	1	2	4	575
7:15 AM	27	195	2	8	368	82	80	2	37	3	2	9	815
7:30 AM	33	185	1	8	395	68	85	4	45	1	2	11	838
7:45 AM	49	283	2	9	421	101	63	7	42	1	2	12	992
8:00 AM	41	228	3	9	287	110	92	0	58	1	3	15	847
8:15 AM	30	273	0	5	289	107	99	2	53	1	0	11	870
8:30 AM	36	165	1	8	402	109	101	5	63	1	2	8	901
8:45 AM	27	263	3	9	451	123	86	2	52	3	1	4	1024
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	254	1729	12	60	2870	774	666	23	374	12	14	74	6862
Approach %	12.73	86.67	0.60	1.62	77.48	20.90	62.65	2.16	35.18	12.00	14.00	74.00	
App/Depart	1995	/	2469	3704	/	3256	1063	/	95	100	/	1042	

AM Peak Hr Begins at: 800 AM

PEAK													
Volumes	134	929	7	31	1429	449	378	9	226	6	6	38	3642
Approach %	12.52	86.82	0.65	1.62	74.86	23.52	61.66	1.47	36.87	12.00	12.00	76.00	
PEAK HR. FACTOR:		0.883			0.819			0.907			0.658		0.889

CONTROL: Signal
COMMENT 1:
GPS: 33.655158, -111.925364

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Scottsdale Rd 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Mayo Blvd	DAY:	THURSDAY	PROJECT#	22-1598-005

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	2	3	1	2	3	1	2	3	1	2	2	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	65	389	5	12	271	147	135	3	77	8	5	19	1136
4:15 PM	81	386	1	8	288	167	152	2	72	7	3	14	1181
4:30 PM	80	432	3	10	350	171	121	3	70	3	2	16	1261
4:45 PM	86	334	1	11	322	175	155	4	69	1	4	10	1172
5:00 PM	66	392	0	11	299	166	151	6	75	2	1	15	1184
5:15 PM	128	413	2	8	398	192	146	6	71	2	4	4	1374
5:30 PM	64	438	2	5	258	195	148	5	75	0	4	6	1200
5:45 PM	95	325	1	11	287	183	161	6	62	4	3	5	1143
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	665	3109	15	76	2473	1396	1169	35	571	27	26	89	9651
Approach %	17.55	82.05	0.40	1.93	62.69	35.39	65.86	1.97	32.17	19.01	18.31	62.68	
App/Depart	3789	/	4367	3945	/	3071	1775	/	126	142	/	2087	

PM Peak Hr Begins at: 430 PM

PEAK													
Volumes	360	1571	6	40	1369	704	573	19	285	8	11	45	4991
Approach %	18.59	81.10	0.31	1.89	64.79	33.32	65.34	2.17	32.50	12.50	17.19	70.31	

PEAK HR. FACTOR:	0.892	0.883	0.945	0.762	0.908

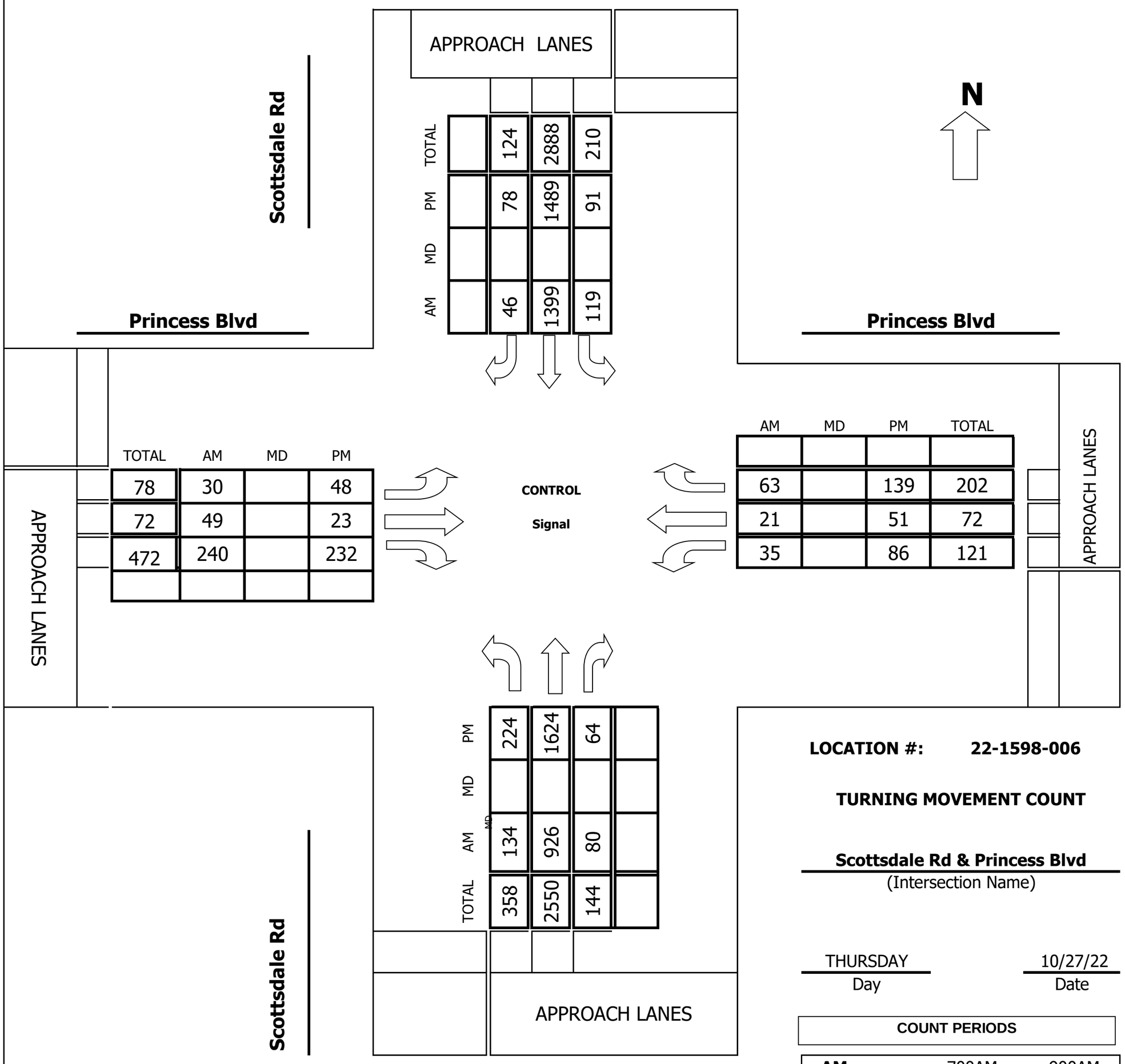
CONTROL:	Signal
COMMENT 1:	0
GPS:	33.655158, -111.925364

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-006

TMC SUMMARY OF Scottsdale Rd & Princess Blvd



LOCATION #: 22-1598-006

TURNING MOVEMENT COUNT

Scottsdale Rd & Princess Blvd
(Intersection Name)

THURSDAY — Day
10/27/22 — Date

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 730 AM

NOON PEAK HOUR

PM PEAK HOUR 430 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Scottsdale Rd	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Princess Blvd	DAY:	THURSDAY	PROJECT#	22-1598-006

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	3	1	1	3	1	1	2	0	1	2	1	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	23	136	20	21	250	14	4	4	45	13	4	10	544
7:15 AM	26	162	19	25	354	10	5	5	54	8	3	13	684
7:30 AM	34	211	22	36	365	12	12	11	70	7	8	15	803
7:45 AM	37	268	24	35	411	11	3	15	57	6	4	19	890
8:00 AM	35	220	19	29	315	12	6	9	52	14	3	16	730
8:15 AM	28	227	15	19	308	11	9	14	61	8	6	13	719
8:30 AM	31	204	20	40	371	21	11	9	53	13	3	18	794
8:45 AM	45	260	29	42	391	17	8	10	50	11	5	18	886
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	259	1688	168	247	2765	108	58	77	442	80	36	122	6050
Approach %	12.25	79.81	7.94	7.92	88.62	3.46	10.05	13.34	76.60	33.61	15.13	51.26	
App/Depart	2115	/	1868	3120	/	3287	577	/	492	238	/	403	

AM Peak Hr Begins at: 730 AM

PEAK													
Volumes	134	926	80	119	1399	46	30	49	240	35	21	63	3142
Approach %	11.75	81.23	7.02	7.61	89.45	2.94	9.40	15.36	75.24	29.41	17.65	52.94	
PEAK HR. FACTOR:		0.866			0.856			0.858			0.902		0.883

CONTROL: Signal
COMMENT 1:
GPS: 33.646692, -111.925376

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Scottsdale Rd 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Princess Blvd	DAY:	THURSDAY	PROJECT#	22-1598-006

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	3	1	1	3	1	1	2	0	1	2	1	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	46	410	10	22	343	16	17	8	43	20	7	38	980
4:15 PM	56	440	18	24	352	14	3	5	54	21	11	32	1030
4:30 PM	51	368	19	28	375	19	8	9	54	30	22	28	1011
4:45 PM	51	401	14	19	369	18	9	3	58	13	6	31	992
5:00 PM	54	420	15	24	349	18	17	5	59	25	12	39	1037
5:15 PM	68	435	16	20	396	23	14	6	61	18	11	41	1109
5:30 PM	75	344	16	21	318	10	13	4	62	15	13	44	935
5:45 PM	45	380	20	23	326	8	6	8	59	19	17	29	940
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	446	3198	128	181	2828	126	87	48	450	161	99	282	8034
Approach %	11.82	84.78	3.39	5.77	90.21	4.02	14.87	8.21	76.92	29.70	18.27	52.03	
App/Depart	3772	/	3567	3135	/	3439	585	/	357	542	/	671	

PM Peak Hr Begins at: 430 PM

PEAK													
Volumes	224	1624	64	91	1489	78	48	23	232	86	51	139	4149
Approach %	11.72	84.94	3.35	5.49	89.81	4.70	15.84	7.59	76.57	31.16	18.48	50.36	
PEAK HR. FACTOR:		0.921			0.944			0.935			0.863		0.935

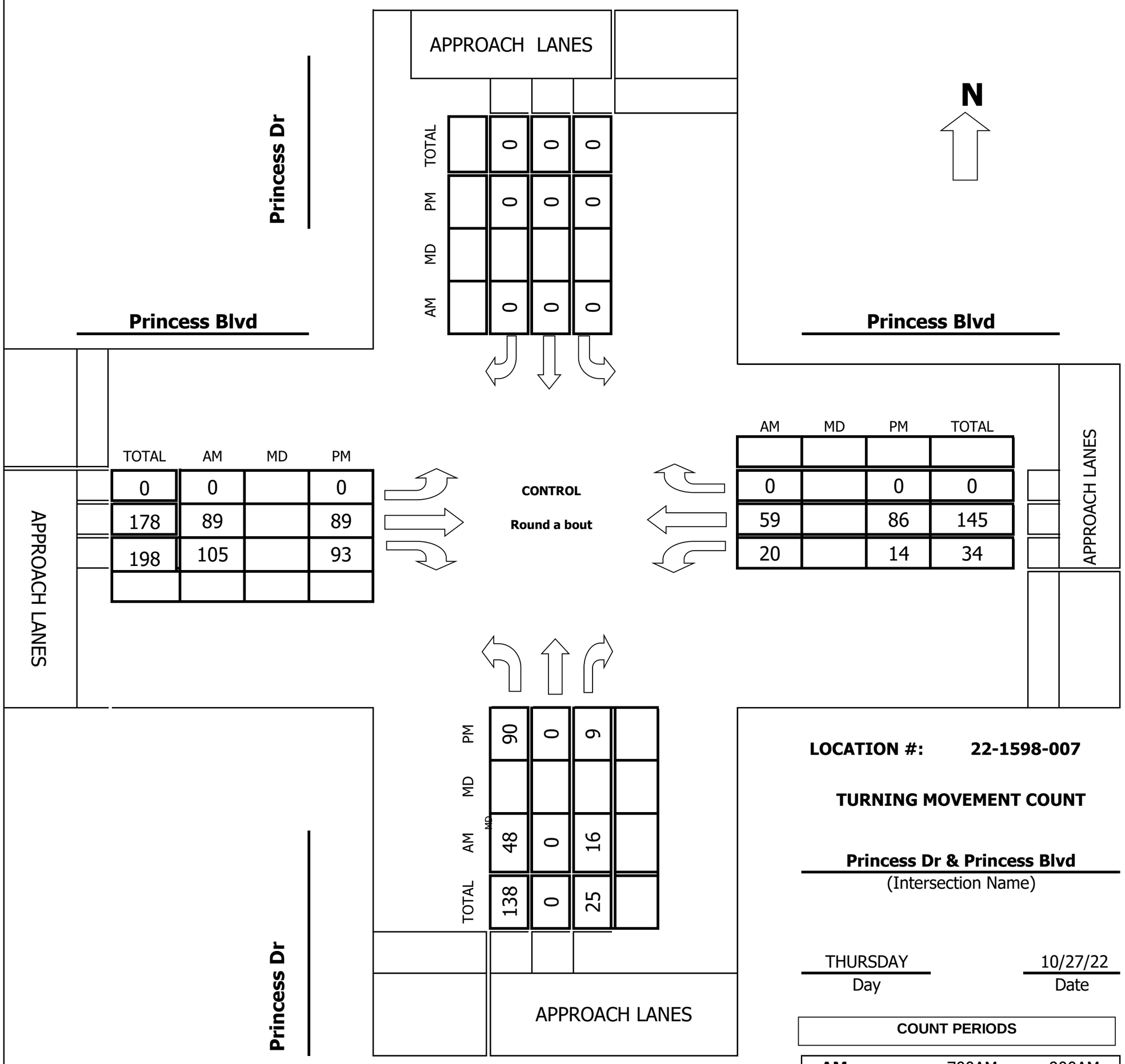
CONTROL:	Signal
COMMENT 1:	0
GPS:	33.646692, -111.925376

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-007

TMC SUMMARY OF Princess Dr & Princess Blvd



LOCATION #: 22-1598-007

TURNING MOVEMENT COUNT

Princess Dr & Princess Blvd
(Intersection Name)

THURSDAY (Day) 10/27/22 (Date)

COUNT PERIODS

AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 700 AM

NOON PEAK HOUR

PM PEAK HOUR 445 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Princess Dr	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Princess Blvd	DAY:	THURSDAY	PROJECT#	22-1598-007

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1.5	0	0.5	0	0	0	0	1	1	0	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	10	0	5	0	0	0	0	23	25	8	19	0	90
7:15 AM	14	0	3	0	0	0	0	26	23	7	10	0	83
7:30 AM	13	0	5	0	0	0	0	16	28	4	16	0	82
7:45 AM	11	0	3	0	0	0	0	24	29	1	14	0	82
8:00 AM	7	0	1	0	0	0	0	16	11	2	12	0	49
8:15 AM	14	0	1	0	0	0	0	17	26	2	17	0	77
8:30 AM	16	0	2	0	0	0	0	20	27	5	29	0	99
8:45 AM	11	0	1	0	0	0	0	13	28	3	37	0	93
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	96	0	21	0	0	0	0	155	197	32	154	0	655
Approach %	82.05	0.00	17.95	####	####	####	0.00	44.03	55.97	17.20	82.80	0.00	
App/Depart	117	/	0	0	/	229	352	/	176	186	/	250	

AM Peak Hr Begins at: 700 AM

PEAK													
Volumes	48	0	16	0	0	0	0	89	105	20	59	0	337
Approach %	75.00	0.00	25.00	####	####	####	0.00	45.88	54.12	25.32	74.68	0.00	
PEAK HR. FACTOR:	0.889			0.000			0.915			0.731			0.936

CONTROL:	Round a bout
COMMENT 1:	
GPS:	33.648033, -111.917939

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Princess Dr 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Princess Blvd	DAY:	THURSDAY	PROJECT#	22-1598-007

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1.5	0	0.5	0	0	0	0	1	1	0	1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	23	0	5	0	0	0	0	10	22	3	20	0	83
4:15 PM	23	0	3	0	0	0	0	23	32	4	23	0	108
4:30 PM	14	0	2	0	0	0	0	18	25	5	15	0	79
4:45 PM	30	0	1	0	0	0	0	9	28	4	13	0	85
5:00 PM	17	0	5	0	0	0	0	27	19	6	31	0	105
5:15 PM	20	0	0	0	0	0	0	27	18	2	18	0	85
5:30 PM	23	0	3	0	0	0	0	26	28	2	24	0	106
5:45 PM	20	0	3	0	0	0	0	11	19	4	19	0	76
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	170	0	22	0	0	0	0	151	191	30	163	0	727
Approach %	88.54	0.00	11.46	####	####	####	0.00	44.15	55.85	15.54	84.46	0.00	
App/Depart	192	/	0	0	/	221	342	/	173	193	/	333	

PM Peak Hr Begins at: 445 PM

PEAK													
Volumes	90	0	9	0	0	0	0	89	93	14	86	0	381
Approach %	90.91	0.00	9.09	####	####	####	0.00	48.90	51.10	14.00	86.00	0.00	
PEAK HR. FACTOR:		0.798			0.000			0.843			0.676		0.899

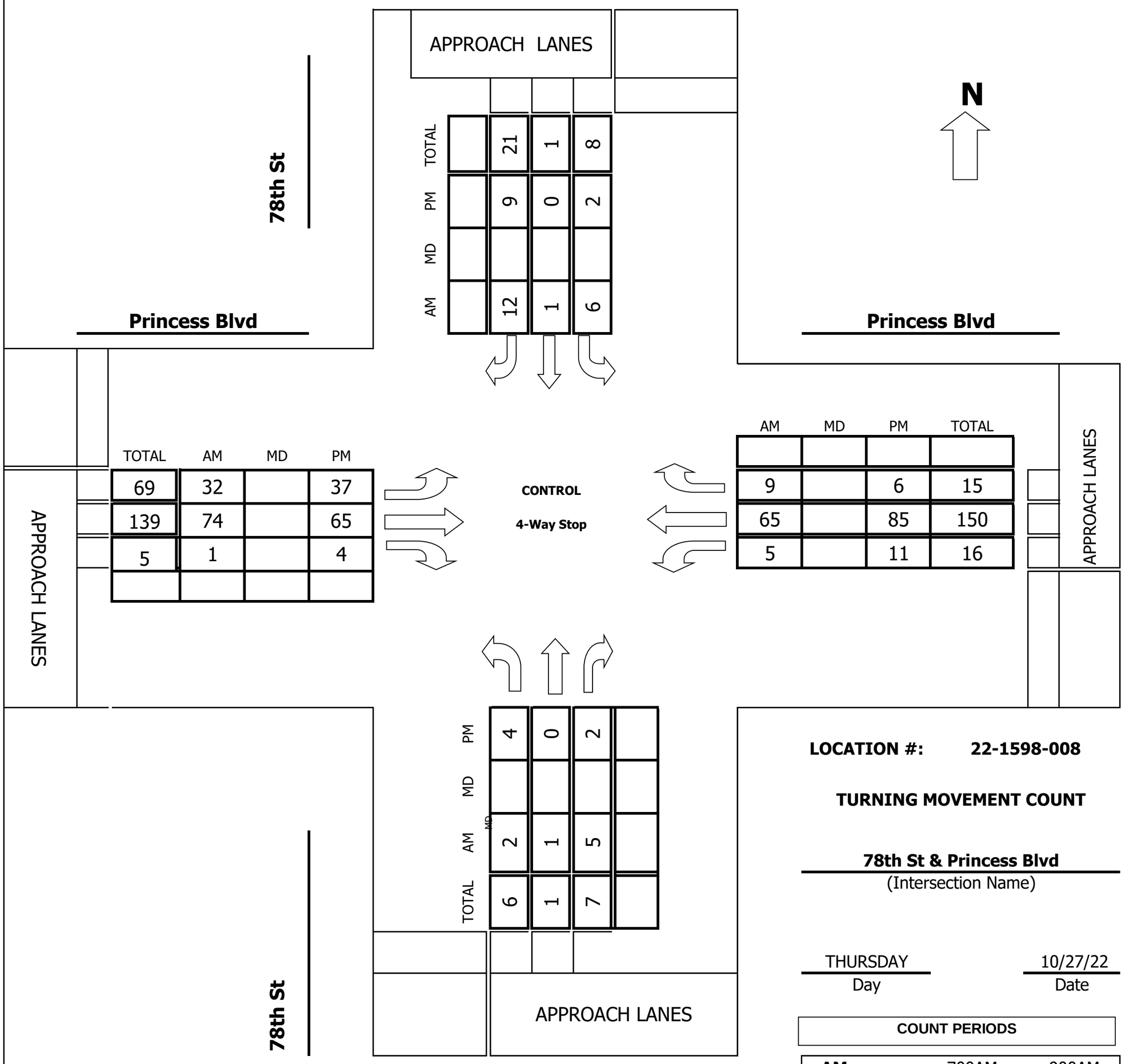
CONTROL:	Round a bout
COMMENT 1:	0
GPS:	33.648033, -111.917939

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-008

TMC SUMMARY OF 78th St & Princess Blvd



LOCATION #: 22-1598-008

TURNING MOVEMENT COUNT

78th St & Princess Blvd
(Intersection Name)

THURSDAY — Day
10/27/22 — Date

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

PM PEAK HOUR 500 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	78th St	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Princess Blvd	DAY:	THURSDAY	PROJECT#	22-1598-008

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	1	1	0	1	1	0	1	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	2	1	1	0	1	9	6	0	0	13	0	33
7:15 AM	0	1	1	1	0	5	10	18	0	1	19	2	58
7:30 AM	1	0	1	2	1	4	6	21	0	1	15	2	54
7:45 AM	0	0	2	1	0	3	9	12	0	2	17	2	48
8:00 AM	1	0	1	2	0	0	7	23	1	1	14	3	53
8:15 AM	0	3	2	2	1	2	3	15	0	3	11	3	45
8:30 AM	1	1	0	1	1	2	6	12	1	2	20	0	47
8:45 AM	0	1	1	0	0	1	3	18	0	2	34	3	63
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	3	8	9	10	3	18	53	125	2	12	143	15	401
Approach %	15.00	40.00	45.00	32.26	9.68	58.06	29.44	69.44	1.11	7.06	84.12	8.82	
App/Depart	20	/	76	31	/	17	180	/	144	170	/	164	

AM Peak Hr Begins at: 715 AM

PEAK													
Volumes	2	1	5	6	1	12	32	74	1	5	65	9	213
Approach %	25.00	12.50	62.50	31.58	5.26	63.16	29.91	69.16	0.93	6.33	82.28	11.39	
PEAK HR. FACTOR:		1.000			0.679			0.863			0.898		0.918

CONTROL: 4-Way Stop
COMMENT 1:
GPS: 33.647857, -111.913295

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	78th St 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Princess Blvd	DAY:	THURSDAY	PROJECT#	22-1598-008

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	1	1	0	1	1	0	1	1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	1	0	1	1	0	2	5	20	1	2	19	1	53
4:15 PM	0	0	2	1	0	2	2	13	0	1	17	2	40
4:30 PM	1	0	3	4	0	1	6	15	3	4	26	0	63
4:45 PM	0	2	2	3	0	2	5	13	0	1	15	2	45
5:00 PM	1	0	0	1	0	2	11	11	1	3	18	1	49
5:15 PM	1	0	1	0	0	3	5	20	2	2	27	1	62
5:30 PM	1	0	1	0	0	2	5	15	0	4	20	2	50
5:45 PM	1	0	0	1	0	2	16	19	1	2	20	2	64
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	6	2	10	11	0	16	55	126	8	19	162	11	426
Approach %	33.33	11.11	55.56	40.74	0.00	59.26	29.10	66.67	4.23	9.90	84.38	5.73	
App/Depart	18	/	68	27	/	27	189	/	147	192	/	184	

PM Peak Hr Begins at: 500 PM

PEAK													
Volumes	4	0	2	2	0	9	37	65	4	11	85	6	225
Approach %	66.67	0.00	33.33	18.18	0.00	81.82	34.91	61.32	3.77	10.78	83.33	5.88	
PEAK HR. FACTOR:		0.750			0.917			0.736			0.850		0.879

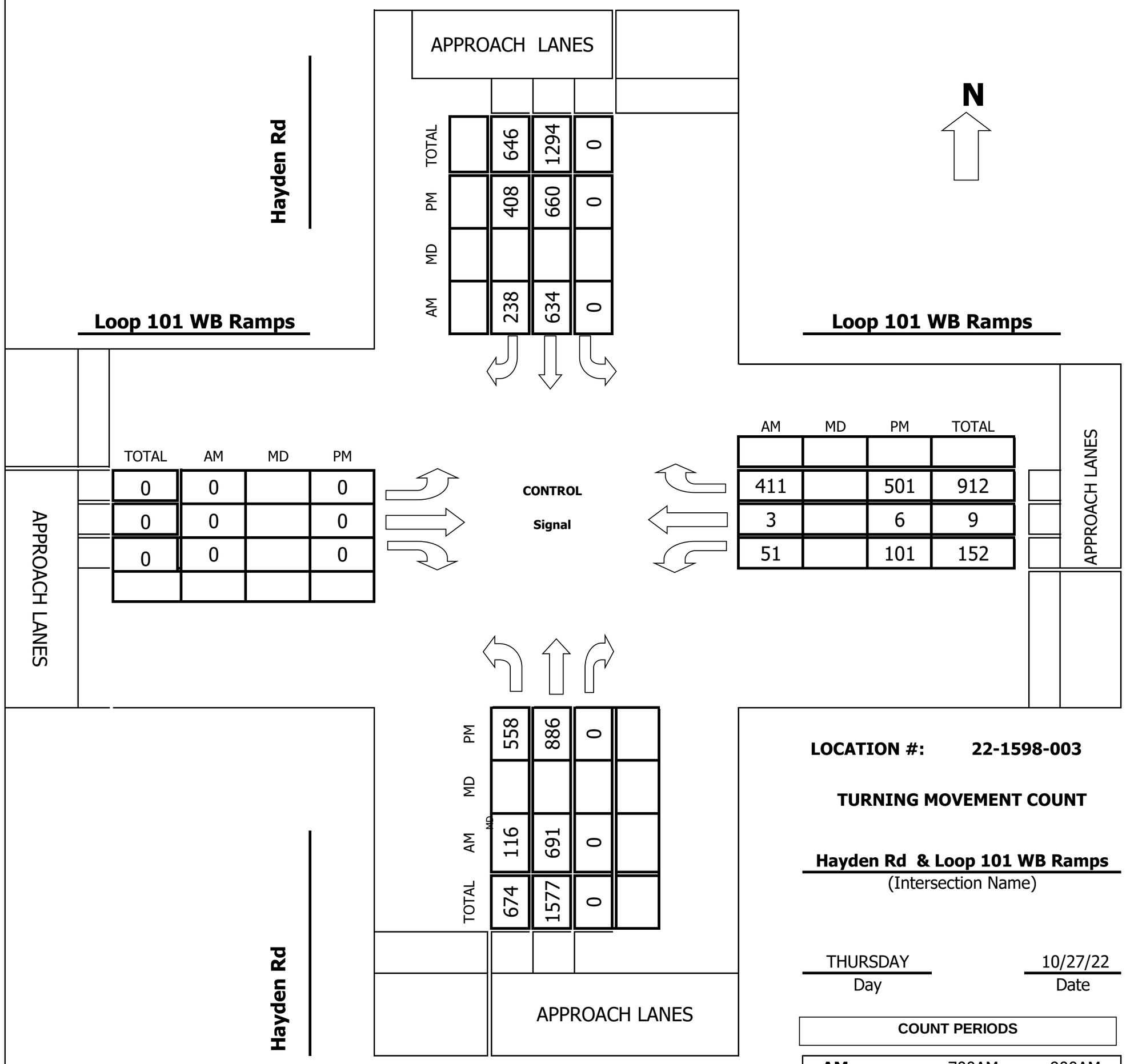
CONTROL: 4-Way Stop
COMMENT 1: 0
GPS: 33.647857, -111.913295

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-003

TMC SUMMARY OF Hayden Rd & Loop 101 WB Ramps



LOCATION #: 22-1598-003

TURNING MOVEMENT COUNT

Hayden Rd & Loop 101 WB Ramps
(Intersection Name)

THURSDAY — Day
10/27/22 — Date

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

PM PEAK HOUR 415 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Hayden Rd	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Loop 101 WB Ramps	DAY:	THURSDAY	PROJECT#	22-1598-003

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	4	1	0	0	0	2	0.5	1.5	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	25	120	0	0	163	58	0	0	0	8	0	63	437
7:15 AM	24	154	0	0	166	74	0	0	0	11	0	99	528
7:30 AM	29	183	0	0	174	54	0	0	0	10	0	103	553
7:45 AM	33	167	0	0	140	52	0	0	0	14	1	101	508
8:00 AM	30	187	0	0	154	58	0	0	0	16	2	108	555
8:15 AM	32	159	0	0	140	65	0	0	0	13	1	85	495
8:30 AM	28	151	0	0	181	60	0	0	0	19	0	89	528
8:45 AM	24	144	0	0	154	66	0	0	0	21	1	99	509
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	225	1265	0	0	1272	487	0	0	0	112	5	747	4113
Approach %	15.10	84.90	0.00	0.00	72.31	27.69	####	####	####	12.96	0.58	86.46	
App/Depart	1490	/	2012	1759	/	1384	0	/	0	864	/	717	

AM Peak Hr Begins at: 715 AM

PEAK													
Volumes	116	691	0	0	634	238	0	0	0	51	3	411	2144
Approach %	14.37	85.63	0.00	0.00	72.71	27.29	####	####	####	10.97	0.65	88.39	
PEAK HR. FACTOR:		0.930			0.908			0.000			0.923		0.966

CONTROL:	Signal
COMMENT 1:	
GPS:	33.655160, -111.907976

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Hayden Rd	DATE:	10/27/22	LOCATION:	Scottsdale
	0				
E-W STREET:	Loop 101 WB Ramps	DAY:	THURSDAY	PROJECT#	22-1598-003

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	4	1	0	0	0	2	0.5	1.5	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	114	200	0	0	154	103	0	0	0	24	1	110	706
4:15 PM	122	238	0	0	152	111	0	0	0	25	2	124	774
4:30 PM	152	224	0	0	162	104	0	0	0	24	1	125	792
4:45 PM	141	212	0	0	183	108	0	0	0	28	2	141	815
5:00 PM	143	212	0	0	163	85	0	0	0	24	1	111	739
5:15 PM	133	227	0	0	151	103	0	0	0	20	0	133	767
5:30 PM	104	226	0	0	185	101	0	0	0	16	0	136	768
5:45 PM	85	161	0	0	154	105	0	0	0	19	1	111	636
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	994	1700	0	0	1304	820	0	0	0	180	8	991	5997
Approach %	36.90	63.10	0.00	0.00	61.39	38.61	####	####	####	15.27	0.68	84.05	
App/Depart	2694	/	2691	2124	/	1484	0	/	0	1179	/	1822	

PM Peak Hr Begins at: 415 PM

PEAK													
Volumes	558	886	0	0	660	408	0	0	0	101	6	501	3120
Approach %	38.64	61.36	0.00	0.00	61.80	38.20	####	####	####	16.61	0.99	82.40	
PEAK HR. FACTOR:		0.960			0.918			0.000			0.889		0.957

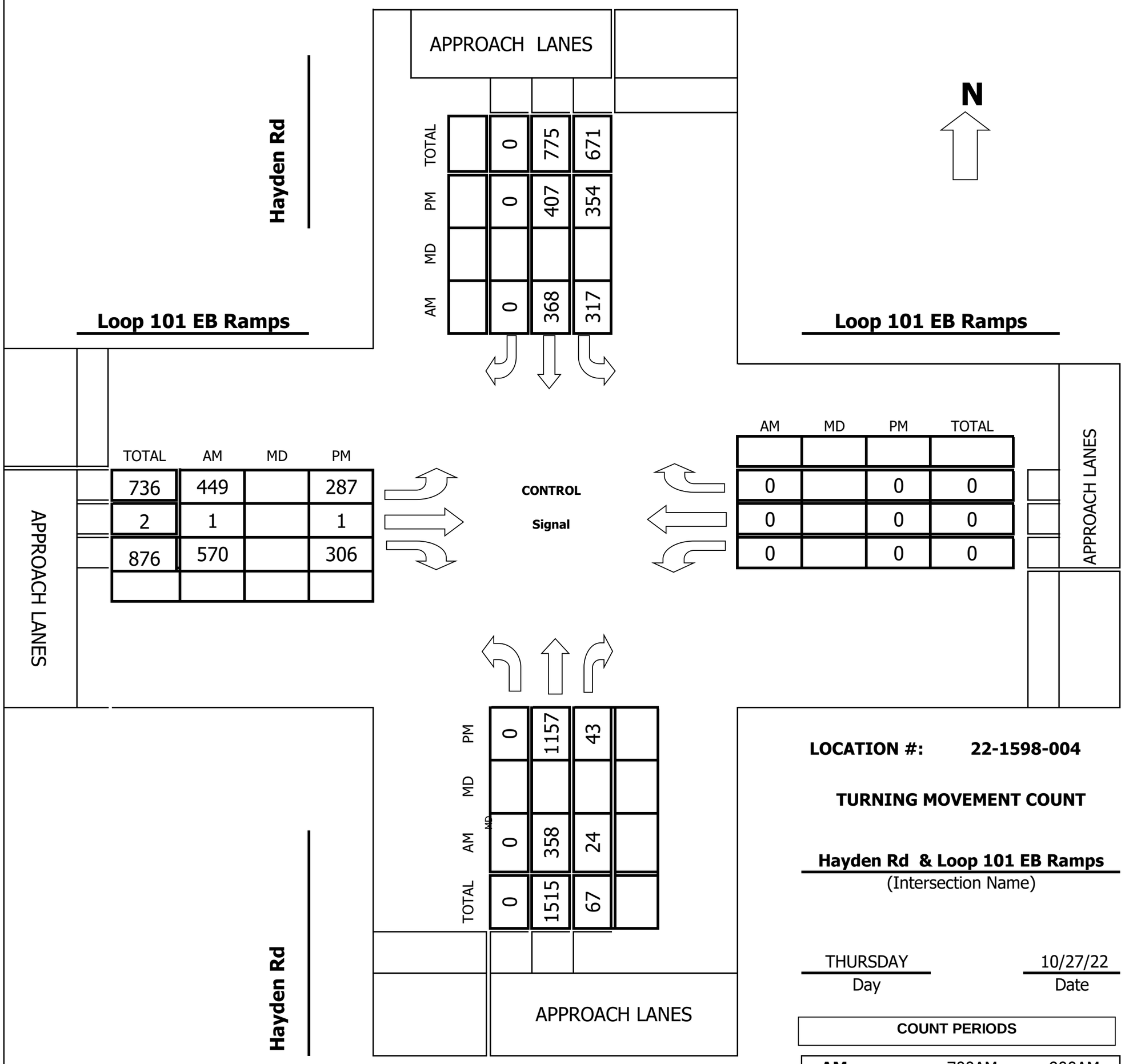
CONTROL:	Signal
COMMENT 1:	0
GPS:	33.655160, -111.907976

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-004

TMC SUMMARY OF Hayden Rd & Loop 101 EB Ramps



LOCATION #: 22-1598-004

TURNING MOVEMENT COUNT

Hayden Rd & Loop 101 EB Ramps
(Intersection Name)

THURSDAY (Day) 10/27/22 (Date)

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

PM PEAK HOUR 415 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Hayden Rd	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Loop 101 EB Ramps	DAY:	THURSDAY	PROJECT#	22-1598-004

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	3	1	2	2	0	1.3	0.3	1.3	0	0	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	76	5	85	86	0	69	0	67	0	0	0	388
7:15 AM	0	76	3	74	103	0	102	1	104	0	0	0	463
7:30 AM	0	90	6	78	106	0	122	0	117	0	0	0	519
7:45 AM	0	79	9	80	74	0	121	0	208	0	0	0	571
8:00 AM	0	113	6	85	85	0	104	0	141	0	0	0	534
8:15 AM	0	106	9	89	64	0	85	1	100	0	0	0	454
8:30 AM	0	105	8	99	101	0	74	0	120	0	0	0	507
8:45 AM	0	93	5	90	85	0	75	0	136	0	0	0	484
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	738	51	680	704	0	752	2	993	0	0	0	3920
Approach %	0.00	93.54	6.46	49.13	50.87	0.00	43.05	0.11	56.84	####	####	####	
App/Depart	789	/	1490	1384	/	1697	1747	/	733	0	/	0	

AM Peak Hr Begins at: 715 AM

PEAK													
Volumes	0	358	24	317	368	0	449	1	570	0	0	0	2087
Approach %	0.00	93.72	6.28	46.28	53.72	0.00	44.02	0.10	55.88	####	####	####	

PEAK HR. FACTOR:	0.803	0.931	0.775	0.000	0.914

CONTROL: Signal
COMMENT 1:
GPS: 33.653965, -111.908026

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Hayden Rd 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Loop 101 EB Ramps	DAY:	THURSDAY	PROJECT#	22-1598-004

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	3	1	2	2	0	1.3	0.3	1.3	0	0	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	248	14	78	100	0	66	0	41	0	0	0	547
4:15 PM	0	300	10	80	97	0	60	0	75	0	0	0	622
4:30 PM	0	302	11	86	100	0	74	0	85	0	0	0	658
4:45 PM	0	278	8	89	122	0	75	1	86	0	0	0	659
5:00 PM	0	277	14	99	88	0	78	0	60	0	0	0	616
5:15 PM	0	280	10	90	81	0	80	1	54	0	0	0	596
5:30 PM	0	245	11	98	103	0	85	0	41	0	0	0	583
5:45 PM	0	172	8	87	86	0	74	0	43	0	0	0	470
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	2102	86	707	777	0	592	2	485	0	0	0	4751
Approach %	0.00	96.07	3.93	47.64	52.36	0.00	54.87	0.19	44.95	####	####	####	
App/Depart	2188	/	2694	1484	/	1262	1079	/	795	0	/	0	

PM Peak Hr Begins at: 415 PM

PEAK													
Volumes	0	1157	43	354	407	0	287	1	306	0	0	0	2555
Approach %	0.00	96.42	3.58	46.52	53.48	0.00	48.32	0.17	51.52	####	####	####	
PEAK HR. FACTOR:		0.958			0.902			0.917			0.000		0.969

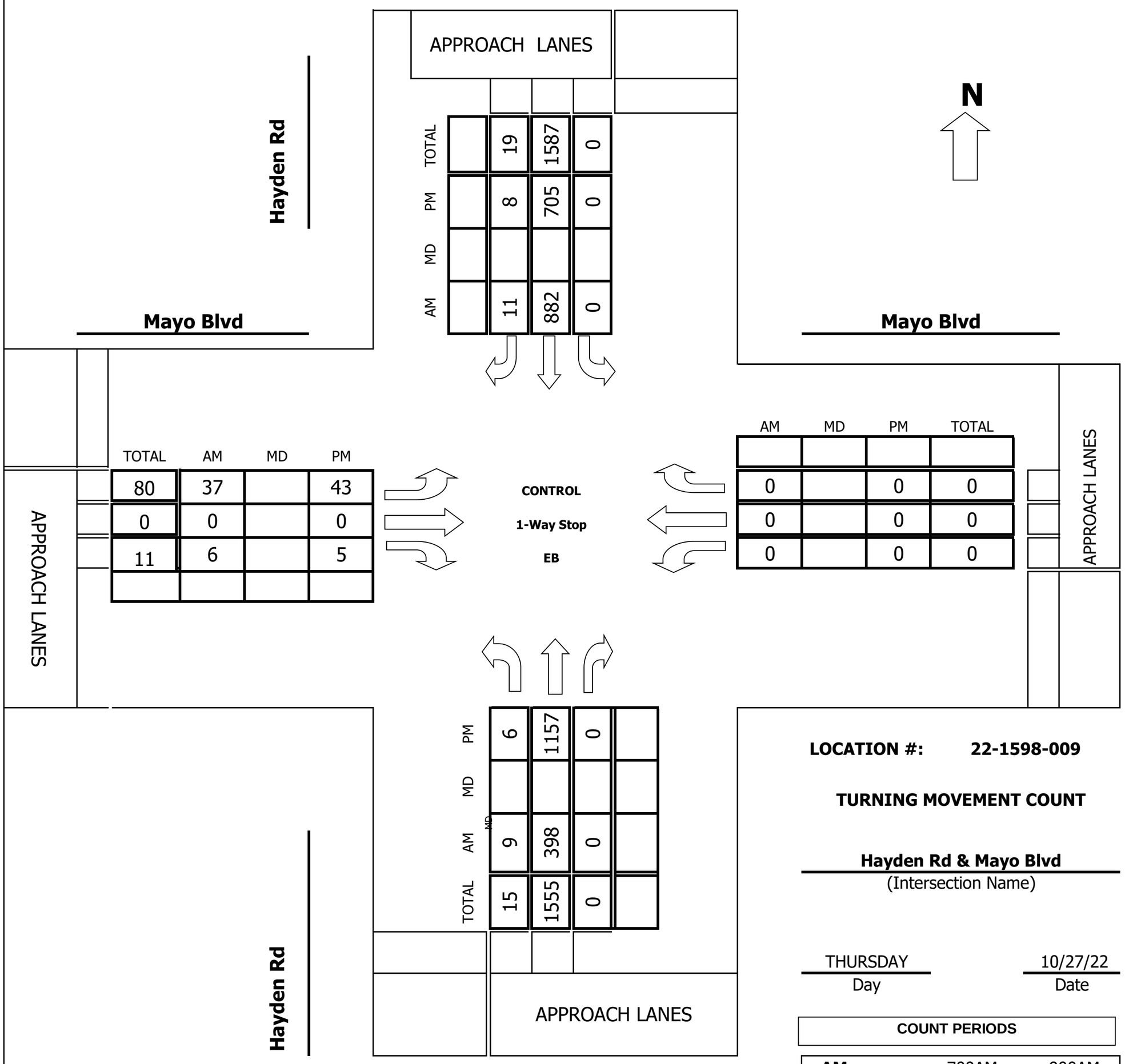
CONTROL:	Signal
COMMENT 1:	0
GPS:	33.653965, -111.908026

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-009

TMC SUMMARY OF Hayden Rd & Mayo Blvd



N

LOCATION #: 22-1598-009

TURNING MOVEMENT COUNT

Hayden Rd & Mayo Blvd
(Intersection Name)

THURSDAY — Day

10/27/22 — Date

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 745 AM

NOON PEAK HOUR

PM PEAK HOUR 415 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Hayden Rd	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Mayo Blvd	DAY:	THURSDAY	PROJECT#	22-1598-009

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	1	1	0	1	0	0	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	1	72	0	0	138	15	9	0	1	0	0	0	236
7:15 AM	3	70	0	0	202	5	9	0	3	0	0	0	292
7:30 AM	3	89	0	0	220	3	7	0	2	0	0	0	324
7:45 AM	1	80	0	0	280	2	8	0	2	0	0	0	373
8:00 AM	1	109	0	0	224	2	10	0	0	0	0	0	346
8:15 AM	5	106	0	0	160	4	9	0	1	0	0	0	285
8:30 AM	2	103	0	0	218	3	10	0	3	0	0	0	339
8:45 AM	3	89	0	0	215	6	9	0	1	0	0	0	323
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	19	718	0	0	1657	40	71	0	13	0	0	0	2518
Approach %	2.58	97.42	0.00	0.00	97.64	2.36	84.52	0.00	15.48	####	####	####	
App/Depart	737	/	789	1697	/	1670	84	/	0	0	/	59	

AM Peak Hr Begins at: 745 AM

PEAK													
Volumes	9	398	0	0	882	11	37	0	6	0	0	0	1343
Approach %	2.21	97.79	0.00	0.00	98.77	1.23	86.05	0.00	13.95	####	####	####	
PEAK HR. FACTOR:	0.917			0.792			0.827			0.000			0.900

CONTROL:	1-Way Stop (EB)
COMMENT 1:	
GPS:	33.651278, -111.907900

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Hayden Rd 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Mayo Blvd	DAY:	THURSDAY	PROJECT#	22-1598-009

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	1	1	0	1	0	0	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	3	255	0	0	141	0	7	0	1	0	0	0	407
4:15 PM	2	302	0	0	170	2	8	0	1	0	0	0	485
4:30 PM	1	307	0	0	182	3	6	0	0	0	0	0	499
4:45 PM	1	265	0	0	207	1	21	0	2	0	0	0	497
5:00 PM	2	283	0	0	146	2	8	0	2	0	0	0	443
5:15 PM	1	286	0	0	135	0	4	0	2	0	0	0	428
5:30 PM	2	250	0	0	144	0	6	0	4	0	0	0	406
5:45 PM	1	166	0	0	125	4	14	0	5	0	0	0	315
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	13	2114	0	0	1250	12	74	0	17	0	0	0	3480
Approach %	0.61	99.39	0.00	0.00	99.05	0.95	81.32	0.00	18.68	####	####	####	
App/Depart	2127	/	2188	1262	/	1267	91	/	0	0	/	25	

PM Peak Hr Begins at: 415 PM

PEAK													
Volumes	6	1157	0	0	705	8	43	0	5	0	0	0	1924
Approach %	0.52	99.48	0.00	0.00	98.88	1.12	89.58	0.00	10.42	####	####	####	
PEAK HR. FACTOR:		0.944			0.857			0.522			0.000		0.964

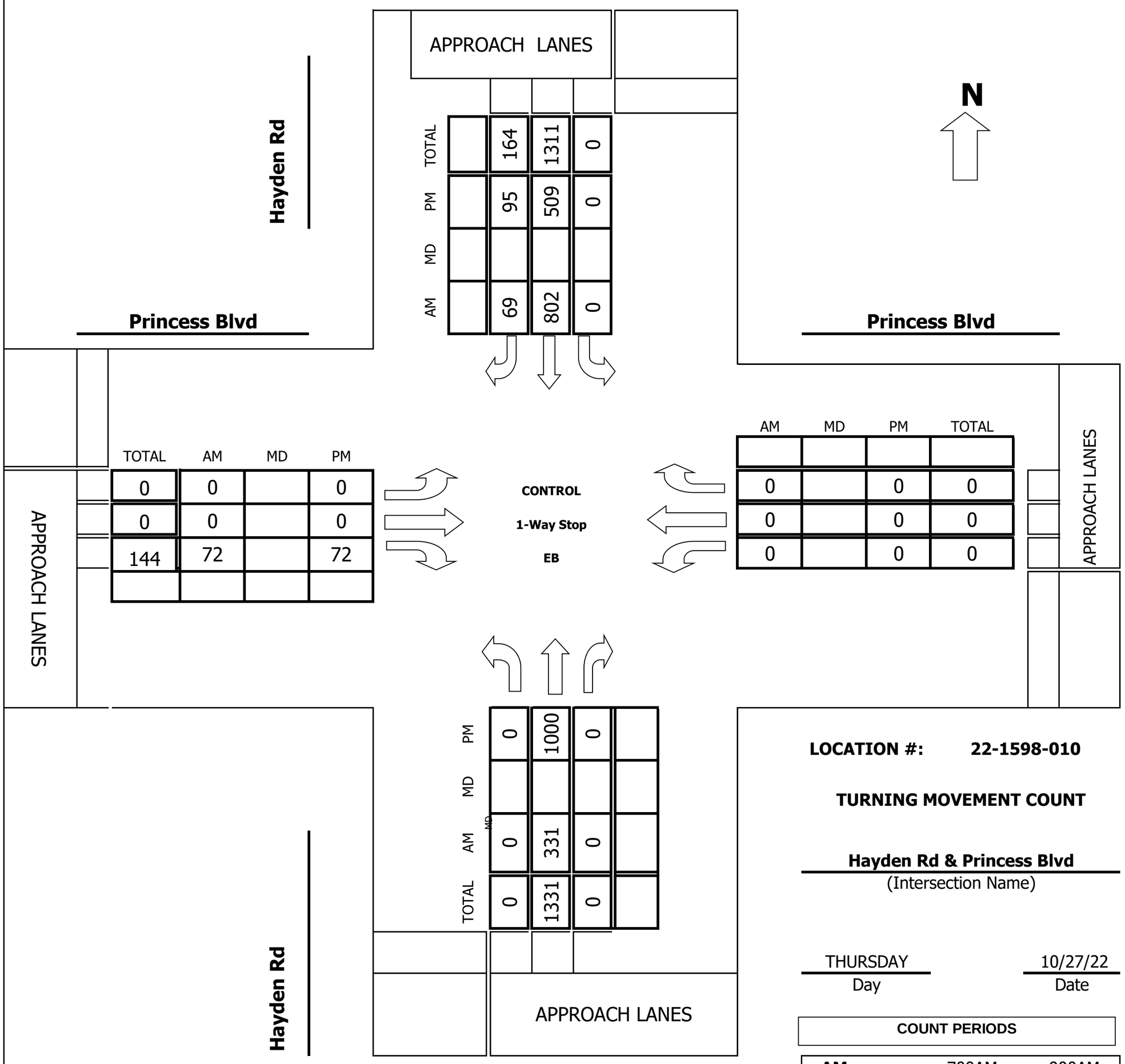
CONTROL:	1-Way Stop (EB)
COMMENT 1:	0
GPS:	33.651278, -111.907900

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

Project #: 22-1598-010

TMC SUMMARY OF Hayden Rd & Princess Blvd



LOCATION #: 22-1598-010

TURNING MOVEMENT COUNT

Hayden Rd & Princess Blvd
(Intersection Name)

THURSDAY — Day

10/27/22 — Date

COUNT PERIODS			
AM	700AM	-	900AM
NOON		-	
PM	400PM	-	600PM

AM PEAK HOUR 715 AM

NOON PEAK HOUR

PM PEAK HOUR 415 PM

Intersection Turning Movement
Prepared by:

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Hayden Rd	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Princess Blvd	DAY:	THURSDAY	PROJECT#	22-1598-010

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	1	0	0	1	0	0	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	0	72	0	0	113	16	0	0	12	0	0	0	213
7:15 AM	0	58	0	0	175	15	0	0	14	0	0	0	262
7:30 AM	0	92	0	0	212	27	0	0	19	0	0	0	350
7:45 AM	0	71	0	0	244	13	0	0	18	0	0	0	346
8:00 AM	0	110	0	0	171	14	0	0	21	0	0	0	316
8:15 AM	0	81	0	0	127	14	0	0	16	0	0	0	238
8:30 AM	0	102	0	0	181	29	0	0	17	0	0	0	329
8:45 AM	0	72	0	0	202	33	0	0	14	0	0	0	321
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	658	0	0	1425	161	0	0	131	0	0	0	2375
Approach %	0.00	100.00	0.00	0.00	89.85	10.15	0.00	0.00	100.00	####	####	####	
App/Depart	658	/	658	1586	/	1556	131	/	0	0	/	161	

AM Peak Hr Begins at: 715 AM

PEAK													
Volumes	0	331	0	0	802	69	0	0	72	0	0	0	1274
Approach %	0.00	100.00	0.00	0.00	92.08	7.92	0.00	0.00	100.00	####	####	####	

PEAK HR. FACTOR:	0.752	0.847	0.857	0.000	0.910

CONTROL: 1-Way Stop (EB)
COMMENT 1:
GPS: 33.647968, -111.907826

Intersection Turning Movement

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	Hayden Rd 0	DATE:	10/27/22	LOCATION:	Scottsdale
E-W STREET:	Princess Blvd	DAY:	THURSDAY	PROJECT#	22-1598-010

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	0	2	1	0	0	1	0	0	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	248	0	0	128	26	0	0	20	0	0	0	422
4:15 PM	0	253	0	0	124	21	0	0	19	0	0	0	417
4:30 PM	0	236	0	0	111	24	0	0	21	0	0	0	392
4:45 PM	0	221	0	0	146	22	0	0	16	0	0	0	405
5:00 PM	0	290	0	0	128	28	0	0	16	0	0	0	462
5:15 PM	0	244	0	0	108	22	0	0	19	0	0	0	393
5:30 PM	0	213	0	0	127	23	0	0	19	0	0	0	382
5:45 PM	0	161	0	0	112	19	0	0	21	0	0	0	313
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	1866	0	0	984	185	0	0	151	0	0	0	3186
Approach %	0.00	100.00	0.00	0.00	84.17	15.83	0.00	0.00	100.00	####	####	####	
App/Depart	1866	/	1866	1169	/	1135	151	/	0	0	/	185	

PM Peak Hr Begins at: 415 PM

PEAK													
Volumes	0	1000	0	0	509	95	0	0	72	0	0	0	1676
Approach %	0.00	100.00	0.00	0.00	84.27	15.73	0.00	0.00	100.00	####	####	####	
PEAK HR. FACTOR:		0.862			0.899			0.857			0.000		0.907

CONTROL:	1-Way Stop (EB)
COMMENT 1:	0
GPS:	33.647968, -111.907826

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, October 27, 2022 City: Scottsdale Project #: 22-1598-011

Location: Scottsdale Rd north of Mayo Blvd

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	19		16					12:00	459		518				
00:15	29		21					12:15	456		552				
00:30	26		9					12:30	451		490				
00:45	26	100	15	61			161	12:45	492	1858	534	2094			3952
01:00	26		25					13:00	465		502				
01:15	6		11					13:15	505		466				
01:30	12		9					13:30	483		416				
01:45	10	54	15	60			114	13:45	437	1890	479	1863			3753
02:00	18		7					14:00	580		439				
02:15	10		7					14:15	559		414				
02:30	8		3					14:30	535		472				
02:45	6	42	9	26			68	14:45	500	2174	427	1752			3926
03:00	3		9					15:00	496		392				
03:15	10		14					15:15	557		428				
03:30	7		23					15:30	572		479				
03:45	13	33	33	79			112	15:45	518	2143	476	1775			3918
04:00	20		37					16:00	543		430				
04:15	18		26					16:15	552		463				
04:30	20		68					16:30	569		531				
04:45	20	78	100	231			309	16:45	499	2163	508	1932			4095
05:00	41		88					17:00	558		476				
05:15	47		123					17:15	563		598				
05:30	47		158					17:30	592		458				
05:45	62	197	217	586			783	17:45	491	2204	481	2013			4217
06:00	69		215					18:00	511		385				
06:15	129		236					18:15	424		381				
06:30	161		287					18:30	349		363				
06:45	164	523	375	1113			1636	18:45	377	1661	346	1475			3136
07:00	201		335					19:00	457		255				
07:15	284		458					19:15	340		196				
07:30	281		471					19:30	308		224				
07:45	358	1124	531	1795			2919	19:45	297	1402	170	845			2247
08:00	335		406					20:00	275		153				
08:15	383		401					20:15	249		148				
08:30	274		519					20:30	222		121				
08:45	353	1345	583	1909			3254	20:45	256	1002	123	545			1547
09:00	279		565					21:00	211		129				
09:15	294		442					21:15	190		104				
09:30	312		472					21:30	163		98				
09:45	327	1212	510	1989			3201	21:45	145	709	83	414			1123
10:00	338		508					22:00	158		77				
10:15	346		452					22:15	113		70				
10:30	376		504					22:30	103		63				
10:45	380	1440	519	1983			3423	22:45	82	456	43	253			709
11:00	343		462					23:00	83		46				
11:15	391		487					23:15	68		36				
11:30	389		561					23:30	50		30				
11:45	447	1570	574	2084			3654	23:45	35	236	28	140			376
Total Vol.		7718		11916			**19634**			17898		15101			**32999**

GPS Coordinates: 33.656283, -111.925388

Daily Totals

NB	SB	EB	WB	**Combined**
25616	27017			**52633**

	AM			**PM**		
Split %	39.3%	60.7%	**37.3%**	54.2%	45.8%	**62.7%**
Peak Hour	11:45	11:30	**11:30**	16:45	16:30	**16:30**
Volume	1813	2205	**3956**	2212	2113	**4302**
P.H.F.	0.99	0.96	**0.97**	0.93	0.88	**0.93**

Prepared by: Field Data Services of Arizona/Veracity Traffic Group (520) 316-6745

Volumes for: Thursday, October 27, 2022 City: Scottsdale Project #: 22-1598-012

Location: Hayden Rd north of Mayo Blvd

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	5		14					12:00	122		152				
00:15	7		11					12:15	131		141				
00:30	10		8					12:30	124		143				
00:45	11	33	9	42			75	12:45	145	522	139	575			1097
01:00	3		9					13:00	185		166				
01:15	6		8					13:15	189		161				
01:30	9		5					13:30	196		154				
01:45	5	23	7	29			52	13:45	199	769	174	655			1424
02:00	8		5					14:00	204		175				
02:15	4		8					14:15	245		185				
02:30	7		6					14:30	258		181				
02:45	5	24	9	28			52	14:45	252	959	187	728			1687
03:00	8		13					15:00	286		174				
03:15	6		16					15:15	296		176				
03:30	9		16					15:30	301		163				
03:45	13	36	14	59			95	15:45	325	1208	155	668			1876
04:00	16		21					16:00	262		141				
04:15	18		42					16:15	310		172				
04:30	14		41					16:30	313		185				
04:45	14	62	54	158			220	16:45	286	1171	208	706			1877
05:00	21		65					17:00	291		148				
05:15	42		60					17:15	290		135				
05:30	41		76					17:30	256		144				
05:45	54	158	74	275			433	17:45	180	1017	129	556			1573
06:00	65		85					18:00	174		110				
06:15	60		104					18:15	145		107				
06:30	76		122					18:30	128		108				
06:45	74	275	128	439			714	18:45	133	580	85	410			990
07:00	81		153					19:00	130		86				
07:15	79		207					19:15	128		103				
07:30	96		223					19:30	124		96				
07:45	88	344	282	865			1209	19:45	141	523	99	384			907
08:00	119		226					20:00	111		90				
08:15	115		164					20:15	104		85				
08:30	113		221					20:30	85		76				
08:45	98	445	221	832			1277	20:45	76	376	60	311			687
09:00	99		204					21:00	60		65				
09:15	90		214					21:15	65		52				
09:30	87		196					21:30	54		55				
09:45	74	350	199	813			1163	21:45	41	220	50	222			442
10:00	78		161					22:00	42		54				
10:15	80		154					22:15	28		41				
10:30	85		174					22:30	24		47				
10:45	74	317	175	664			981	22:45	21	115	45	187			302
11:00	78		185					23:00	14		50				
11:15	80		189					23:15	16		43				
11:30	96		196					23:30	13		30				
11:45	103	357	144	714			1071	23:45	9	52	21	144			196
Total Vol.		2424		4918			**7342**			7512		5546			**13058**

GPS Coordinates: 33.652388, -111.907992

Daily Totals

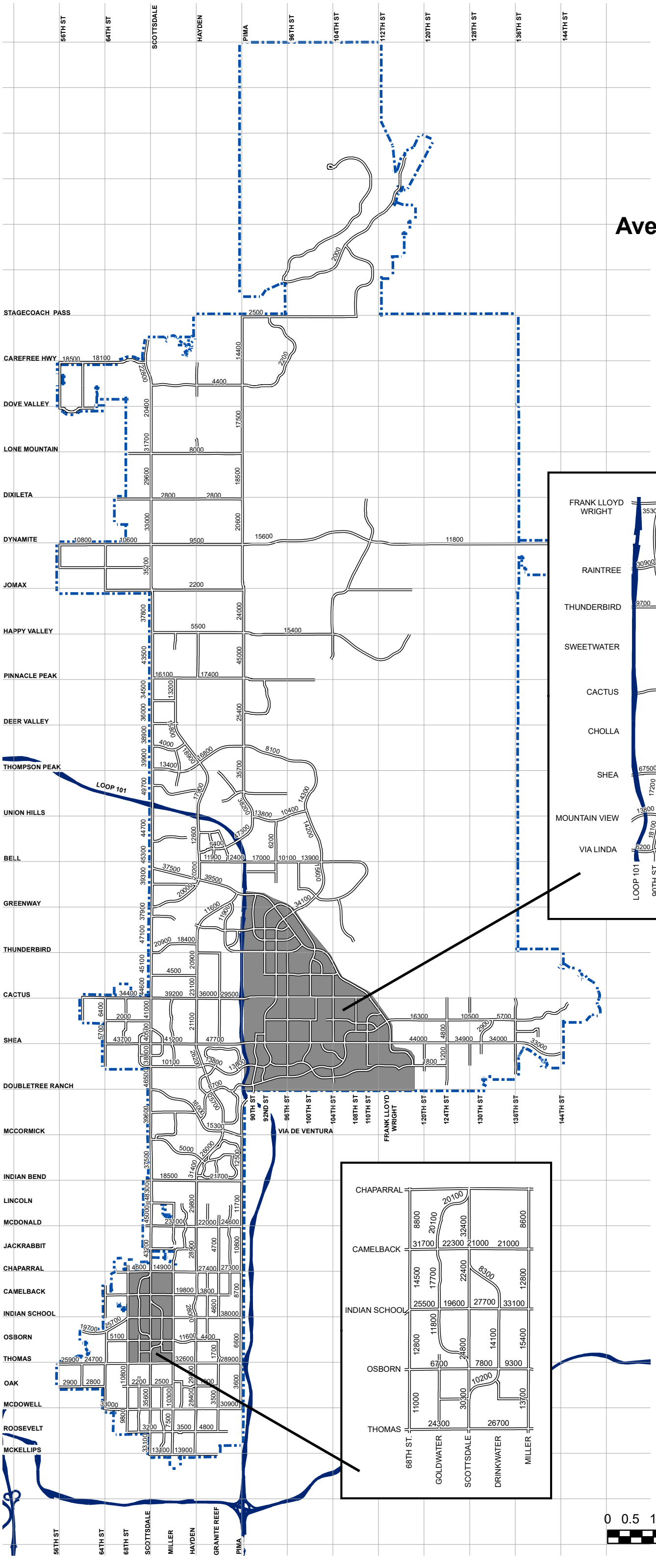
NB	SB	EB	WB	**Combined**
9936	10464			**20400**

	AM			**PM**		
Split %	33.0%	67.0%	**36.0%**	57.5%	42.5%	**64.0%**
Peak Hour	11:45	07:15	**07:45**	15:45	14:00	**16:15**
Volume	480	938	**1328**	1210	728	**1913**
P.H.F.	0.92	0.83	**0.90**	0.93	0.97	**0.96**

City of Scottsdale
Average Daily Segment Volume Maps

CITY OF SCOTTSDALE

2018
Average Daily Traffic Volumes
SEGMENT



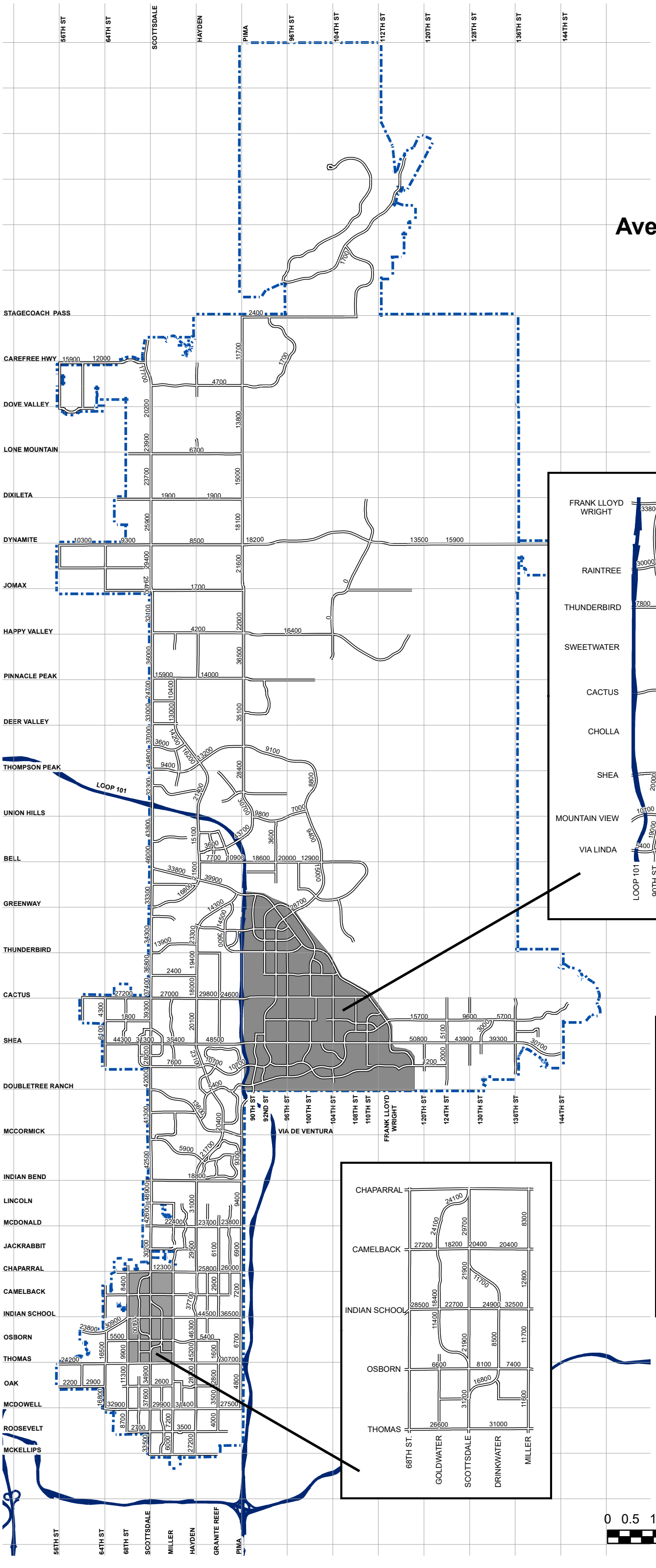
CITYWIDE MONTHLY ADJUSTMENT FACTORS	
MONTH	**FACTOR**
JANUARY	1.00
FEBRUARY	0.95
MARCH	0.93
APRIL	0.96
MAY	1.01
JUNE	1.03
JULY	1.05
AUGUST	1.05
SEPTEMBER	1.02
OCTOBER	1.00
NOVEMBER	1.00
DECEMBER	0.99

0 0.5 1 2 3 4 Miles

N

CITY OF SCOTTSDALE

2020
Average Daily Traffic Volumes
SEGMENT



CITYWIDE MONTHLY ADJUSTMENT FACTORS	
MONTH	FACTOR
JANUARY	1.003
FEBRUARY	1.045
MARCH	1.040
APRIL	1.044
MAY	1.022
JUNE	0.972
JULY	0.930
AUGUST	0.975
SEPTEMBER	0.995
OCTOBER	0.994
NOVEMBER	1.008
DECEMBER	0.974

NORTH SCOTTSDALE MONTHLY ADJUSTMENT FACTORS	
MONTH	FACTOR
JANUARY	0.953
FEBRUARY	0.921
MARCH	0.901
APRIL	0.884
MAY	0.950
JUNE	1.152
JULY	1.174
AUGUST	1.216
SEPTEMBER	1.049
OCTOBER	0.923
NOVEMBER	0.967
DECEMBER	0.862

City of Scottsdale Signal Timing Data

SCOTTSDALE RD & LOOP 101

System # 254

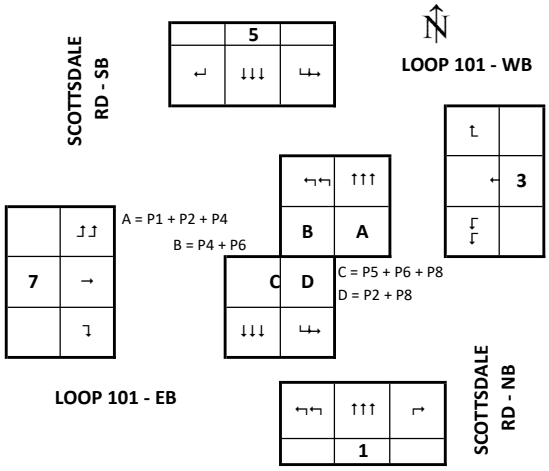
BASIC TIMING PLAN

Section #	I.P. Address	Date Designed
	MM1-5-1	
	172.27.12.54	6/18/2020

	Phase	1	2	3	4	5	6	7	8
	Movement	NBT		WBT		SBT		EBT	
	NOTES								
	MIN GRN	10	5	7	2	10	5	7	2
	BK MGRN								
	CS MGRN								
	DLY GRN								
	WALK	4		4		4		4	
	WALK2								
	WLK MAX								
	PED CLR/FDW	18		46		20		44	
	PD CLR2								
	PC MAX								
	PED CO								
	VEH EXT	2	2	2	2	2	2	2	2
	VH EXT2								
	MAX 1	50	30	40	12	50	30	40	4
	MAX 2	70	50	60	35	70	50	60	4
	MAX 3								
	DYM MAX	70	50	60	35	70	50	60	4
	DYM STP	5	5	5	5	5	5	5	5
	YELLOW	4.7	4.0	4.7	4	4.7	4	4.7	4
	RED CLR	1	2.0	2	2.0	1	2.0	2	2.0
	RED MAX								
	RED RVT	2	2	2	2	2	2	2	2
	ACT B4								
	SEC/ACT								
	MAX INT								
	TIME B4								
	CARS WT								
	STPTDUC								
	TTREDUC								
	MIN GAP								
	LOCK DET								
	VEH RECALL	X				X			
	PED RECALL								
	MAX RECALL				X				X
	SOFT RECALL								
	NO REST								
	ADD INIT CAL								

TIMING PLAN - MM-2-1

RECALLS - MM-2-8



PHASING SEQUENCES

TOD: MORNING

R1	1	2	3	4	
R2	6	5	8	7	
		B		B	

Use Timing plan:

TOD: MIDDAY

R1	1	2	3	4	
R2	6	5	8	7	
		B		B	

Use Timing plan:

TOD: EVENING

R1	1	2	3	4	
R2	6	5	8	7	
		B		B	

Use Timing plan:

TOD: NIGHT

R1	1	2	3	4	
R2	6	5	8	7	
		B		B	

Use Timing plan:

FREE

R1	1	2	3	4	
R2	6	5	8	7	
		B		B	

Use Timing plan: 254

NOTES

OVLP A = Ph1 + Ph2 + Ph4;
OVLP B = Ph4 + Ph6;
OVLP C = Ph5 + Ph6 + Ph8;
OVLP D = Ph2 + Ph8;

Approved By

Effective Date

SCOTTSDALE RD & LOOP 101

System #	254

COORDINATOR	Section #	Date Updated
	0	6/18/2020

PHASE	1	2	3	4	5	6	7	8
FDW	18		46	0	20		44	
YELLOW	4.7	4	4.7	4	4.7	4	4.7	4
ALL RED	1	2	2	2	1	2	2	2
WALK				0				

PLAN 1 AM PLAN OPERATIVE TIMES **6:00**

										COORD PATTERN	OFFSET
R1	1	↰	2	→	3	↰	4	↓			
R2	6	←	5	↳	8	↑	7	↳		Balanced	85
	RING 1				RING 2						
PHASE	1	2	3	4	5	6	7	8			
SPLIT	38	42	30	10	48	32	36	4		Target Cycle Length	
COORD	X				X					120	
RECALLS	V				V					Actual Cycle Length	
GREEN	32.3	36.0	23.3	4.0	###	26.0	29.3	-2.0		120	

PLAN 2 MIDDAY PLAN OPERATIVE TIMES **9:00**

										COORD PATTERN	OFFSET
R1	1	↰	2	→	3	↰	4	↓			
R2	6	←	5	↳	8	↑	7	↳		Balanced	14
	RING 1				RING 2						
PHASE	1	2	3	4	5	6	7	8			
SPLIT	40	29	29	10	32	37	35	4		Target Cycle Length	
COORD	X				X					108	
RECALLS	V				V					Actual Cycle Length	
GREEN	34.3	23.0	22.3	4.0	###	31.0	28.3	-2.0		108	

PLAN 3 PM PLAN OPERATIVE TIMES **15:00**

										COORD PATTERN	OFFSET
R1	1	↰	2	→	3	↰	4	↓			
R2	6	←	5	↳	8	↑	7	↳		Balanced	9
	RING 1				RING 2						
PHASE	1	2	3	4	5	6	7	8			
SPLIT	48	30	32	10	35	43	38	4		Target Cycle Length	
COORD	X				X					120	
RECALLS	V				V					Actual Cycle Length	
GREEN	42.3	24.0	25.3	4.0	###	37.0	31.3	-2.0		120	

PLAN 4 MIDNIGHT PLAN OPERATIVE TIMES

										COORD PATTERN	OFFSET
R1	1	↰	2	→	3	↰	4	↓			
R2	6	←	5	↳	8	↑	7	↳		Balanced	83
	RING 1				RING 2						
PHASE	1	2	3	4	5	6	7	8			
SPLIT	33	25	22	10	33	25	30	2		Target Cycle Length	
COORD	X				X					90	
RECALLS	V				V					Actual Cycle Length	
GREEN	27.3	19.0	15.3	4.0	###	19.0	23.3	-4.0		90	

PLAN 254 **FREE** PLAN OPERATIVE TIMES **22:00**

										COORD PATTERN	OFFSET
R1	1	↰	2	→	3	↰	4	↓			
R2	6	←	5	↳	8	↑	7	↳		Balanced	
	RING 1				RING 2						
PHASE	1	2	3	4	5	6	7	8			
SPLIT										Target Cycle Length	
COORD										XXX	
RECALLS										Actual Cycle Length	
GREEN	-5.7	-6.0	-6.7	-6.0	-5.7	-6.0	-6.7	-6.0		0	

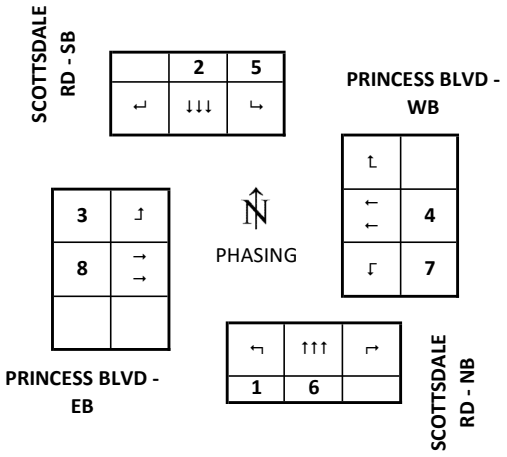
SCOTTSDALE RD & PRINCESS BLVD

System # 163

BASIC TIMING PLAN

Section #	I.P. Address	Date Designed
	MM1-5-1	
	172.27.11.63	1/15/2021

	Phase	1	2	3	4	5	6	7	8
TIMING PLAN - MM-2-1	Movement	NBL	SBT	EBL	WBT	SBL	NBT	WBL	EBT
	NOTES	p&P	COORD	p&P		p&P	COORD	p&P	
	MIN GRN	5	10	5	7	5	10	5	7
	BK MGRN								
	CS MGRN								
	DLY GRN								
	WALK		7		9		7		9
	WALK2								
	WLK MAX								
	PED CLR/FDW		19		31		19		31
	PD CLR2								
	PC MAX								
	PED CO								
	VEH EXT	2	1	2	2	2	1	2	2
	VH EXT2								
	MAX 1	20	65	15	50	20	65	15	50
	MAX 2	35	80	35	60	35	80	35	60
	MAX 3								
	DYM MAX								
	DYM STP								
	YELLOW	4	4.7	3.3	4	4	4.7	3.3	4
	RED CLR	2	1.2	2	2.1	2	1.2	2	2.1
	RED MAX								
	RED RVT	2	2	2	2	2	2	2	2
	ACT B4								
	SEC/ACT								
	MAX INT								
	TIME B4								
	CARS WT								
	STPTDUC								
	TTREDUC								
	MIN GAP								
RECALLS - MM-2-8	LOCK DET								
	VEH RECALL		X				X		
	PED RECALL								
	MAX RECALL								
	SOFT RECALL								
	NO REST								
	ADD INIT CAL								



PHASING SEQUENCES					
TOD: MORNING					
R1	2	1	4	3	
R2	6	5	8	7	
	B	B	B	B	
Use Timing plan:					
TOD: MIDDAY					
R1	2	1	4	3	
R2	6	5	8	7	
	B	B	B	B	
Use Timing plan:					
TOD: EVENING					
R1	2	1	4	3	
R2	6	5	8	7	
	B	B	B	B	
Use Timing plan:					
TOD: NIGHT					
R1	2	1	4	3	
R2	6	5	8	7	
	B	B	B	B	
Use Timing plan:					
FREE					
R1	2	1	4	3	
R2	6	5	8	7	
	B	B	B	B	
Use Timing plan: 254					

NOTES

Approved By
Effective Date

SCOTTSDALE RD & PRINCESS BLVD

System #	163

COORDINATOR	Section #	Date Updated
	0	1/15/2021

	PHASE	1	2	3	4	5	6	7	8	
	FDW		19		31		19		31	
	YELLOW	4	4.7	3.3	4	4	4.7	3.3	4	
	ALL RED	2	1.2	2	2.1	2	1.2	2	2.1	
	WALK		19		31		19		31	

										COORD PATTERN	OFFSET
PLAN 1 AM PLAN OPERATIVE TIMES 6:00	R1	2	↓	1	↰	4	←	3	↥		
	R2	6	↑	5	↳	8	→	7	↧	Balanced	65
		RING 1				RING 2					
	PHASE	1	2	3	4	5	6	7	8		
	SPLIT	12	71	11	26	12	71	11	26	Target Cycle Length	
	COORD		X				X			120	
	RECALLS		V				V			Actual Cycle Length	
	GREEN	6.0	65.1	5.7	19.9	6.0	65.1	5.7	19.9	120	

										COORD PATTERN	OFFSET
PLAN 2 MIDDAY PLAN OPERATIVE TIMES 9:00	R1	2	↓	1	↰	4	←	3	↥		
	R2	6	↑	5	↳	8	→	7	↧	Balanced	87
		RING 1				RING 2					
	PHASE	1	2	3	4	5	6	7	8		
	SPLIT	12	68	12	16	12	68	12	16	Target Cycle Length	
	COORD		X				X			108	
	RECALLS		V				V			Actual Cycle Length	
	GREEN	6.0	62.1	6.7	9.9	6.0	62.1	6.7	9.9	108	

										COORD PATTERN	OFFSET
PLAN 3 PM PLAN OPERATIVE TIMES 15:00	R1	2	↓	1	↰	4	←	3	↥		
	R2	6	↑	5	↳	8	→	7	↧	Balanced	67
		RING 1				RING 2					
	PHASE	1	2	3	4	5	6	7	8		
	SPLIT	19	74	11	16	19	74	11	16	Target Cycle Length	
	COORD		X				X			120	
	RECALLS		V				V			Actual Cycle Length	
	GREEN	13.0	68.1	5.7	9.9	###	68.1	5.7	9.9	120	

										COORD PATTERN	OFFSET
PLAN 4 MIDNIGHT PLAN OPERATIVE TIMES 22:00	R1	2	↓	1	↰	4	←	3	↥		
	R2	6	↑	5	↳	8	→	7	↧	Balanced	49
		RING 1				RING 2					
	PHASE	1	2	3	4	5	6	7	8		
	SPLIT	13	41	11	25	13	41	11	25	Target Cycle Length	
	COORD		X				X			90	
	RECALLS		P				P			Actual Cycle Length	
	GREEN	7.0	35.2	5.7	18.9	7.0	35.2	5.7	18.9	90	

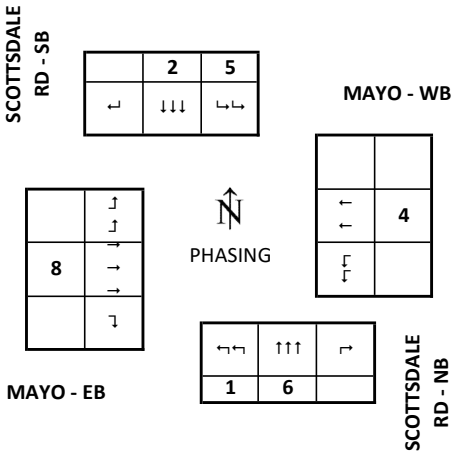
SCOTTSDALE RD & MAYO

System # 215

BASIC TIMING PLAN

Section #	I.P. Address	Date Designed
	MM1-5-1	1/15/2021
	172.27.12.15	

	Phase	1	2		4	5	6		8
	Movement	NBL	SBT		WBT	SBL	NBT		EBT
	NOTES	PROT	COORD		SPLIT	L-P	COORD		SPLIT
TIMING PLAN - MM-2-1	MIN GRN	5	10		7	5	10		7
	BK MGRN								
	CS MGRN								
	DLY GRN								
	WALK		4		4		4		4
	WALK2								
	WLK MAX								
	PED CLR/FDW		35		31		28		33
	PD CLR2								
	PC MAX								
	PED CO								
	VEH EXT	2	1		2	2	1		3
	VH EXT2								
	MAX 1	25	60		50	25	60		25
	MAX 2	35	70		60	35	70		60
	MAX 3								
	DYM MAX								
	DYM STP								
	YELLOW	4.7	4.7		3.4	4	4.7		4
	RED CLR	1.5	1.7		2.6	2	1.7		2.6
	RED MAX								
	RED RVT	2	2		2	2	2		2
	ACT B4								
	SEC/ACT								
	MAX INT								
	TIME B4								
	CARS WT								
	STPTDUC								
	TTREDUC								
	MIN GAP								
RECALLS - MM-2-8	LOCK DET								
	VEH RECALL		X				X		
	PED RECALL								
	MAX RECALL								
	SOFT RECALL								
	NO REST								
	ADD INIT CAL								



PHASING SEQUENCES

TOD: MORNING
R1 2 1 8 4
R2 5 6
B B
Use Timing plan:

TOD: MIDDAY
R1 2 1 8 4
R2 5 6
B B
Use Timing plan:

TOD: EVENING
R1 2 1 8 4
R2 5 6
B B
Use Timing plan:

TOD: NIGHT
R1 2 1 8 4
R2 5 6
B B
Use Timing plan:

FREE
R1 2 1 8 4
R2 5 6
B B
Use Timing plan: 254

NOTES

Approved By
Effective Date

SCOTTSDALE RD & MAYO

System #	215

COORDINATOR

Section #	Date Updated
0	1/15/2021

PHASE	1	2	3	4	5	6	7	8
FDW		35		31		28		33
YELLOW	4.7	4.7		3.4	4	4.7		4
ALL RED	1.5	1.7		2.6	2	1.7		2.6
WALK		35		31		28		33

PLAN 1 — AM PLAN OPERATIVE TIMES 6:30

										COORD PATTERN	OFFSET
R1	2	↓	1	↰	8	→	4	←			
R2	5	↳	6	↑						Balanced	33
	RING 1				RING 2						
PHASE	1	2		4	5	6		8			
SPLIT	17	54		13	25	46		36		Target Cycle Length	
COORD		X				X				120	
RECALLS		V				V				Actual Cycle Length	
GREEN	10.8	47.6		7.0	19.0	39.6		29.4		120	

PLAN 2 — MIDDAY PLAN OPERATIVE TIMES 9:00

										COORD PATTERN	OFFSET
R1	2	↓	1	↰	8	→	4	←			
R2	5	↳	6	↑						Balanced	65
	RING 1				RING 2						
PHASE	1	2		4	5	6		8			
SPLIT	20	42		14	15	47		32		Target Cycle Length	
COORD		X				X				108	
RECALLS		V				V				Actual Cycle Length	
GREEN	13.8	35.6		8.0	9.0	40.6		25.4		108	

PLAN 3 — PM PLAN OPERATIVE TIMES 15:00

										COORD PATTERN	OFFSET
R1	2	↓	1	↰	8	→	4	←			
R2	5	↳	6	↑						Balanced	43
	RING 1				RING 2						
PHASE	1	2		4	5	6		8			
SPLIT	25	43		22	12	56		30		Target Cycle Length	
COORD		X				X				120	
RECALLS		V				V				Actual Cycle Length	
GREEN	18.8	36.6		16.0	6.0	49.6		23.4		120	

PLAN 4 — MIDNIGHT PLAN OPERATIVE TIMES 22:00

										COORD PATTERN	OFFSET
R1	2	↓	1	↰	8	→	4	←			
R2	5	↳	6	↑						Balanced	41
	RING 1				RING 2						
PHASE	1	2		4	5	6		8			
SPLIT	15	39		12	11	43		24		Target Cycle Length	
COORD		X				X				90	
RECALLS		V				V				Actual Cycle Length	
GREEN	8.8	32.6		6.0	5.0	36.6		17.4		90	

HAYDEN & LOOP 101

System # 255

BASIC TIMING PLAN

Section #	I.P. Address	Date Designed
	MM1-5-1	
	172.27.12.55	4/8/2019

	Phase	1	2	3		5	6	7	
	Movement	NBL	SBT	WBT		SBL	NBT	EBT	
	NOTES	PROT		PERM		PROT		PERM	
TIMING PLAN - MM-2-1	MIN GRN	12	16	7		12	5	7	
	BK MGRN								
	CS MGRN								
	DLY GRN								
	WALK	5		7			5	7	
	WALK2								
	WLK MAX								
	PED CLR/FDW	20	45	33		30	35	33	
	PD CLR2								
	PC MAX								
	PED CO								
	VEH EXT	5	2	2		2	5	2	
	VH EXT2								
	MAX 1	45	35	30		45	35	45	
	MAX 2	60	55	55		60	55	55	
	MAX 3								
	DYM MAX	1	2	55		5	6	55	
	DYM STP	20	36			5	5	5	
	YELLOW	4.4	4.4	4.3		4.4	4.4	4.3	
	RED CLR	1.6	1.6	2.7		1.6	1.6	2.7	
	RED MAX								
	RED RVT	2		2		2		2	
	ACT B4								
	SEC/ACT								
	MAX INT								
	TIME B4								
	CARS WT								
	STPTDUC								
	TTREDUC								
	MIN GAP		V				V		
RECALLS - MM-2-8	LOCK DET								
	VEH RECALL		X				X		
	PED RECALL								
	MAX RECALL								
	SOFT RECALL								
	NO REST								
	ADD INIT CAL								

HAYDEN - SB

	2	5
↵	↓↓↓	↳↳

LOOP 101 - WB

↰	
←	3
↲↲	

	↴↴
7	
	↴

PHASING

↰↰	↑↑↑	↦
1	6	

LOOP 101 - EB

HAYDEN - NB

PHASING SEQUENCES

TOD: MORNING

R1	1	2	3	7
R2	6	5		
		B		B

Use Timing plan:

TOD: MIDDAY

R1	1	2	3	7
R2	6	5		
		B	7	B

Use Timing plan:

TOD: EVENING

R1	1	2	3	7
R2	6	5		
		B		B

Use Timing plan:

TOD: WEEKEND

R1	1	2	3	7
R2	6	5		
		B		B

Use Timing plan:

FREE

R1	1	2	3	7
R2	6	5		
		B		B

Use Timing plan: 254

NOTES

PHS 3&7 EXCL, OVERLAPS: OL-A=1+5+6+7, OL-B=6+7,OL-C=1+2+3+5, OL-D=2+3
REASSIGN SP: SP-2=4(D), O SP-4=1(A), O SP-6=2(B), O SP-8=3(C), O

EXPIRES XX/XX/XXXX

HAYDEN & LOOP 101

System # 255

COORDINATOR

Section #	Date Updated
0	4/8/2019

PHASE	1	2	3	4	5	6	7	8
FDW	20	45	33	0	30	35	33	0
YELLOW	4.4	4.4	4.3	0	4.4	4.4	4.3	0
ALL RED	1.6	1.6	2.7	0	1.6	1.6	2.7	0
WALK	12	16		0	12	5		0

PLAN 1 — 6:00 AM PLAN OPERATIVE TIMES

									COORD PATTERN	OFFSET
R1	1	↰	2	↓	3	↰	7	↳		
R2	6	↑	5	↳	0	↑↑	0	↑↑	Balanced	98
	RING 1				RING 2					
PHASE	1	2	3		5	6	7			
SPLIT	20	45	25		30	35	30		Target Cycle Length	
COORD		X				X			120	
RECALLS		V				V			Actual Cycle Length	
GREEN	14.0	39.0	18.0	0.0	24.0	29.0	23.0	0.0	120	

PLAN 2 — 9:00 AM MIDDAY PLAN OPERATIVE TIMES

									COORD PATTERN	OFFSET
R1	1	↰	2	↓	3	↰	7	↳		
R2	45	⇠↑	30	↑↑	45	⇠↑	0	↑↑	Balanced	25
	RING 1				RING 2					
PHASE	1	2	3		5	6	7			
SPLIT	20	36	26		23	33	26		Target Cycle Length	
COORD		X				X			108	
RECALLS		V				V			Actual Cycle Length	
GREEN	14.0	30.0	19.0	0.0	17.0	27.0	19.0	0.0	108	

PLAN 3 — 15:00PM PLAN OPERATIVE TIMES

									COORD PATTERN	OFFSET
R1	1	↰	2	↓	3	↰	7	↳		
R2	6	↑	5	↳	0	↑↑	0	↑↑	Balanced	26
	RING 1				RING 2					
PHASE	1	2	3		5	6	7			
SPLIT	32	33	35		18	47	20		Target Cycle Length	
COORD		X				X			120	
RECALLS		V				V			Actual Cycle Length	
GREEN	26.0	27.0	28.0	0.0	12.0	41.0	13.0	0.0	120	

PLAN 4 — 22:00 MIDNIGHT PLAN OPERATIVE TIMES

									COORD PATTERN	OFFSET
R1	1	↰	2	↓	3	↰	7	↳		
R2	6	↑	5	↳	0	↑↑	0	↑↑	Balanced	83
	RING 1				RING 2					
PHASE	1	2	3		5	6	7			
SPLIT	18	34	22		18	34	16		Target Cycle Length	
COORD		X				X			90	
RECALLS		V				V			Actual Cycle Length	
GREEN	12.0	28.0	15.0	0.0	12.0	28.0	9.0	0.0	90	

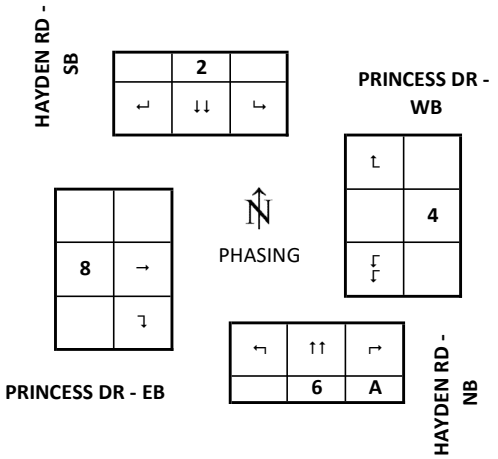
HAYDEN RD & PRINCESS DR

System # 265

BASIC TIMING PLAN

Section #	I.P. Address	Date Designed
	MM1-5-1	
	172.27.12.65	8/31/2020

	Phase		2		4		6		8
TIMING PLAN - MM-2-1	Movement		SBT		WBT		NBT		EBT
	NOTES		COORD		SPLIT		COORD		SPLIT
	MIN GRN		10		7		10		7
	BK MGRN								
	CS MGRN								
	DLY GRN								
	WALK		4		4		4		4
	WALK2								
	WLK MAX								
	PED CLR/FDW		25		17		25		22
	PD CLR2								
	PC MAX								
	PED CO								
	VEH EXT		1		2		1		2
	VH EXT2								
	MAX 1		65		35		65		25
	MAX 2		90		40		90		30
	MAX 3								
	DYM MAX		90		40		90		30
	DYM STP		5		5		5		5
	YELLOW		4.0		4.4		4		4.4
	RED CLR		2.0		1.0		2.0		1.0
	RED MAX								
	RED RVT		2		2		2		2
	ACT B4								
	SEC/ACT								
	MAX INT								
	TIME B4								
	CARS WT								
	STPTDUC								
	TTREDUC								
	MIN GAP								
RECALLS - MM-2-8	LOCK DET								
	VEH RECALL								
	PED RECALL								
	MAX RECALL		X				X		
	SOFT RECALL								
	NO REST								
	ADD INIT CAL								



PHASING SEQUENCES

TOD: MORNING
R1: 2 4 8
R2: 6
B B
Use Timing plan:

TOD: MIDDAY
R1: 2 4 8
R2: 6
B B
Use Timing plan:

TOD: EVENING
R1: 2 4 8
R2: 6
B B
Use Timing plan:

TOD: NIGHT
R1: 2 4 8
R2: 6
B B
Use Timing plan:

FREE
R1: 2 4 8
R2: 6
B B
Use Timing plan: 254

NOTES

Approved By
Effective Date

HAYDEN RD & PRINCESS DR

System #	265

COORDINATOR	Section #	Date Updated
	0	8/31/2020

PHASE	1	2	3	4	5	6	7	8
FDW		25		17		25		22
YELLOW		4		4.4		4		4.4
ALL RED		2		1		2		1
WALK		25		17		25		22

PLAN 1
6:00 AM PLAN OPERATIVE TIMES
6:00

									COORD PATTERN	OFFSET
R1	2	↓			4	←	8	→		
R2	6	↑							Balanced	7
	RING 1				RING 2					
PHASE		2		4		6		8		
SPLIT		75		27		75		18	Target Cycle Length	
COORD		X				X			120	
RECALLS		M				M			Actual Cycle Length	
GREEN		69.0		21.6		69.0		12.6	120	

PLAN 2
9:00 MIDDAY PLAN OPERATIVE TIMES
9:00

									COORD PATTERN	OFFSET
R1	2	↓			4	←	8	→		
R2	6	↑							Balanced	68
	RING 1				RING 2					
PHASE		2		4		6		8		
SPLIT		55		28		55		25	Target Cycle Length	
COORD		X				X			108	
RECALLS		M				M			Actual Cycle Length	
GREEN		49.0		22.6		49.0		19.6	108	

PLAN 3
15:00 PM PLAN OPERATIVE TIMES
15:00

									COORD PATTERN	OFFSET
R1	2	↓			4	←	8	→		
R2	6	↑							Balanced	57
	RING 1				RING 2					
PHASE		2		4		6		8		
SPLIT		75		25		75		20	Target Cycle Length	
COORD		X				X			120	
RECALLS		M				M			Actual Cycle Length	
GREEN		69.0		19.6		69.0		14.6	120	

PLAN 4
22:00 MIDNIGHT PLAN OPERATIVE TIMES

									COORD PATTERN	OFFSET
R1	2	↓			4	←	8	→		
R2	6	⇧				⇧			Balanced	7
	RING 1				RING 2					
PHASE		2		4		6		8		
SPLIT		50		22		50		18	Target Cycle Length	
COORD		X				X			90	
RECALLS		M				M			Actual Cycle Length	
GREEN		44.0		16.6		44.0		12.6	90	

Appendix F MOB+ TIMA Report

BANNER HEALTH CENTER PLUS SCOTTSDALE

Traffic Impact and Mitigation Analysis

Prepared For: Banner Health

Seth Chalmers, PE

Project No.: 1121151

June 19, 2024



DIBBLE

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I. EXECUTIVE SUMMARY AND INTRODUCTION

A. Purpose of Report

The purpose of this Traffic Impact and Mitigation Analysis ("Report") is to evaluate the traffic impacts of a proposed joint Banner Health and NexCore Medical Office Building, Banner Health Center Plus ("MOB+") proposed on approximately 14.8 acres located just west of the northwest corner of Mayo Boulevard and Hayden Road (the "MOB+ Site"). The MOB+ Site constitutes a portion of a larger scale development planned for approximately 73.2 acres located at the northwest corner of Mayo Boulevard & Hayden Road in Scottsdale, Arizona ("Overall Site"). The MOB+ is designated as a critical care facility and is allowed by right within the existing Crossroads East C-2 PAD zoning. The opening year was assumed to be 2026 for the purposes of this Report. The City of Scottsdale has requested a Category II Traffic Impact and Mitigation Analysis for the MOB+ development to determine the offsite infrastructure needs for the MOB+ Site and to determine if and when traffic signals will be warranted for the MOB+ Site and during the development of the larger medical campus planned but not yet approved for the Overall Site. A Traffic Impact & Mitigation Analysis for the Overall Site was prepared by Kimley Horn & Associates and accepted by the City on June 14, 2023, and is included in **Appendix E** of this Report ("Kimley-Horn TIMA"). In the Kimley-Horn study, approximately 48 acres of the Overall Site were assumed to be developed for medical uses. The 14.2 acre MOB+ facility is a portion of the larger planned medical uses. Although this Report focuses on the MOB+, the future plans for the Overall Site are accounted for in the background traffic for a future horizon year (2040). This was done to evaluate the full buildout offsite transportation infrastructure needs, which will allow the improvements to efficiently be built with the construction of Mayo Boulevard and Miller Road along the frontage of the Overall Site.

B. Executive Summary

Site Location and Study Area

The MOB+ Site is located within the City of Scottsdale, west of Hayden Road between Loop 101 and Mayo Boulevard. This Report includes the analysis of the following intersections:

- Mayo Boulevard & 78th Street
- Hayden Road & Mayo Boulevard
- Mayo Boulevard & Miller Road
- Five access points to the medical campus

Development Description

The proposed 119,500 SF MOB+ will be developed in one phase. There is potential for a larger medical campus in the future as a part of development planned for the Overall Site. The planning level numbers from the Kimley Horn TIMA were used for the Overall Site and included as a part of the background traffic for the purposes of this Report.

Principal Findings

At full buildout of the MOB+, it is anticipated that multiple off-site improvements will be completed by the master developer of the Overall Site, including installing a traffic signal at Mayo Boulevard & Hayden Road, and at Mayo Boulevard & Miller Road. The signal at Mayo Boulevard & Hayden Road may not be installed prior to the completion of the MOB+ or, potentially, the remainder of the Overall Site. The peak hour (warrant 3) signal warrant was therefore analyzed for two scenarios.

- Scenario 1: Full buildout of the MOB+ only by 2026
- Scenario 2: Full buildout of the Overall Site by 2040 **without** the Axon development (as discussed further below)

The results of the signal warrant analysis are summarized in **Table 1**.

Table 1 –Signal Warrant Results

Intersection	Scenario	
	MOB+ Only 2026	NWC Development 2040 w/o Axon
Mayo Blvd & Miller Rd	No	Yes (Both Peaks)
Mayo Blvd & 78th St	No	Yes (Both Peaks)
Mayo Blvd & Hayden Road	Yes (PM Peak)	Yes (Both Peaks)

Development of the MOB+ Site is not anticipated to create excessive delays at the surrounding intersections. With the current site plan and recommended site access, the adjacent intersections and site driveways are anticipated to operate acceptably for the opening day of the MOB+ as well as the full buildout of the Overall Site with full access provided at driveways B, C and D as well as 78th Street and Mayo.

Recommendations

Based on the analysis of this Report there are several recommendations for the Overall Site driveways and adjacent intersections by opening day of the MOB+ that also take into consideration the additional future development surrounding the Overall Site. The recommendations are in alignment with the approved Kimley Horn TIMA.

Overall, it is recommended to provide a right turn lane for driveways A, B, C, D, E, and at 78th Street into the Overall Site. Per City of Scottsdale Design Standards & Policies Manual, the standard storage length for a right-turn lane is 150 feet as indicated in **Table 13**.

Additional recommendations for specific driveways and adjacent intersections are as follows:

Hayden Road & Driveway E

With a dedicated southbound right turn lane at Hayden Road & Driveway E, the queue length is not anticipated to extend beyond the boundary of the right turn lane. Therefore, the queue is not anticipated to have a negative impact on the operation of the Loop 101 and Hayden interchange.

Mayo Boulevard & 78th Street

A signal is not warranted from both a vehicle capacity and delay perspective for opening day of the MOB+. A signal is warranted in the future as the Overall Site is developed. It is recommended to install signal pull boxes on all four corners of Mayo Boulevard and 78th Street as well as signal conduit connections between the pull boxes for a future traffic signal for opening day of the MOB+. With the construction of the MOB+, the intersection operates at an acceptable level of service with two-way stop control and Mayo Boulevard traffic free flowing.

Mayo Boulevard & Hayden Road

Provide a southbound right turn lane at the intersection, which is already planned. Additionally, if the Axon development is delayed and the signal is not installed by the completion of the MOB+, a signal will be warranted at the intersection by opening day of the MOB+.

Mayo Boulevard & Miller Road

A signal is not warranted at this intersection from both a vehicle capacity and delay perspective for opening day of the MOB+. A roundabout is planned for this intersection with future development as the right-of-

way becomes available. If a round-about is ruled out in the future, a signal will be warranted in the future scenarios with the further development of the Overall Site. With the construction of the MOB+, the intersection operates at an acceptable level of service with two-way stop control and Mayo Boulevard traffic free flowing.

Recommended turn lane storage lengths for all new intersections and turn lanes are given in **Table 13** – **Table 14**.

II. PROPOSED DEVELOPMENT

A. Off-Site Development

In addition to the development planned for the Overall Site, there are several other off-site developments planned in the area. The Kimley Horn TIMA for the Overall Site includes planning level traffic assumptions for the Overall Site that included a planned medical campus as well as other proposed land uses such as office, retail and hotels. The Kimley Horn TIMA can be found in **Appendix E**. The Kimley-Horn TIMA also incorporates additional planned developments within the area such as Cavasson, HonorHealth Medical Campus, Axon Campus and Optima McDowell Mountain Village into the background traffic. The independent traffic studies for each of those developments was used to generate the background traffic numbers. Those same assumptions were utilized in this Report. At the time of this Report, it is unknown if or when the Axon development will be constructed. A traffic signal at Mayo Boulevard and Hayden Road was planned as a part of the Axon development. If the Axon development is delayed or is no longer built on the east side of the intersection of Mayo Boulevard and Hayden Road, the traffic signal will still be needed for the MOB+, the Overall Site and other developments in the area. This Report therefore, evaluates the need for a traffic signal at this intersection with the completion of the MOB+. Kimley Horn also provided Dibble with their total 2040 traffic numbers for the surrounding intersections that excluded the Banner Health traffic. The traffic numbers also included all the previously mentioned proposed developments in the area. These traffic numbers can be found in **Appendix D**.

B. Description of on-site Development

Land Use and Intensity

This MOB+ Site is planned to be developed with a medical office building comprised of 119,500 SF of building space. For the purposes of this Report, a future (not currently planned) 48,700 SF expansion of the MOB+ was assumed for a total of 168,200 SF on the MOB+ Site.

Location

The proposed MOB+ development is located within the City of Scottsdale, west of Hayden Road between Loop 101 and Mayo Boulevard. This location is shown in **Figure 1**.

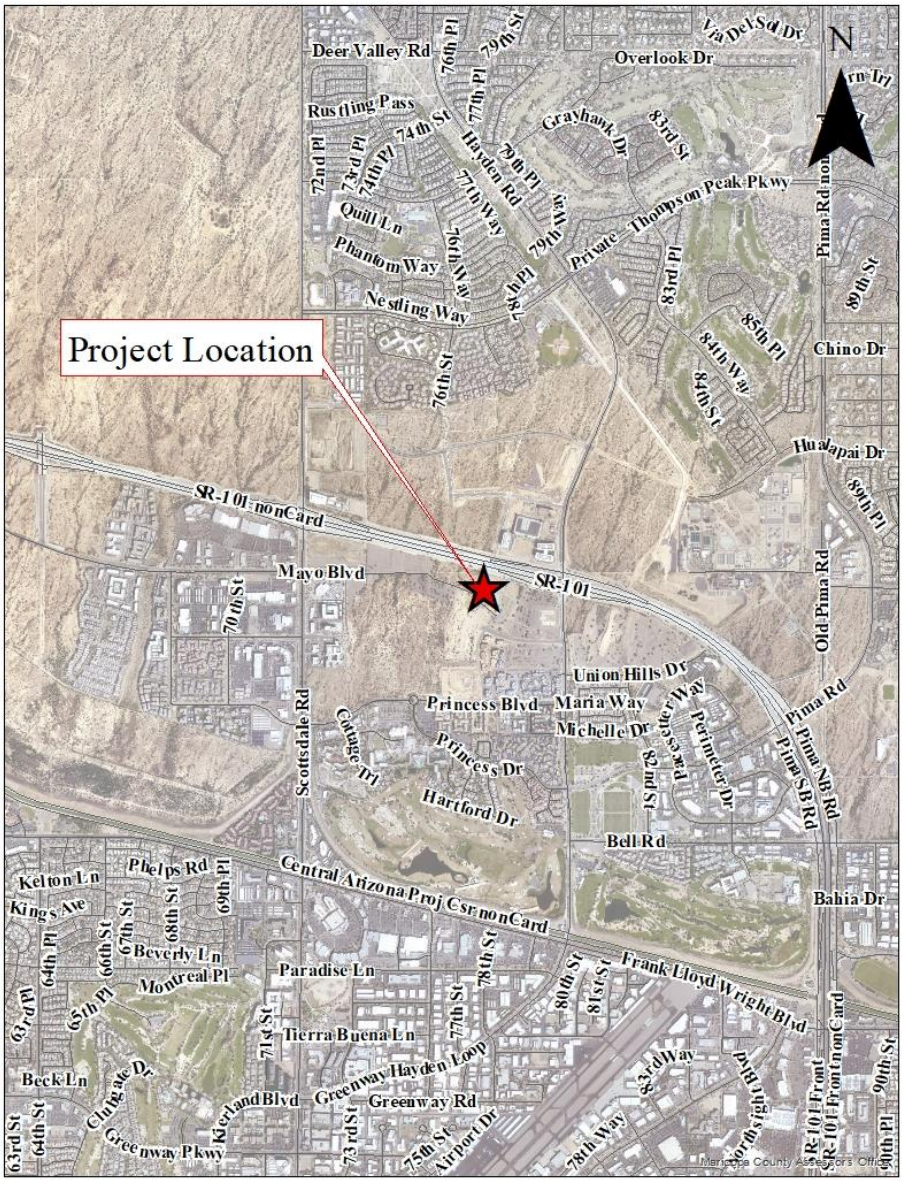


Figure 1 – Vicinity Map

Site Plan

The Overall Site is planned to have seven driveways to access the Overall Site. One driveway is planned to provide full access on Miller Road (Driveway A). Four access points are initially modeled to provide full access on Mayo Boulevard (Driveways B-D and 78th Street). The sixth proposed access point (Driveway E) is on Hayden Road to provide more direct access from the freeway. Driveway E will be a right-in only access point due to the proximity to the Loop 101 ramps as well as the Mayo Boulevard and Hayden Road intersection to prevent unsafe weaving traffic exiting the site. The proposed driveways are shown in **Figure 2** followed by the current site plan in **Figure 3**.

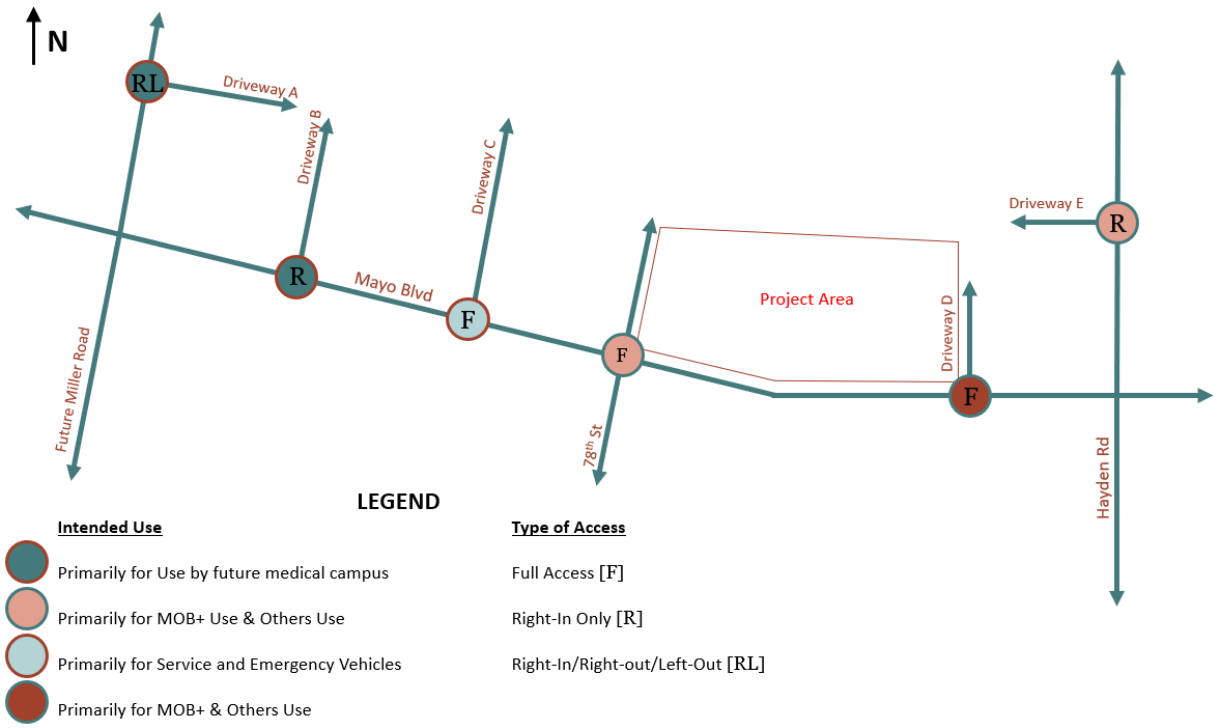


Figure 2 – Overall Site Access



Figure 3 – MOB+ Site Plan

Phasing and Timing

The MOB+ will be developed in one phase. The remainder of the medical campus development on the Overall Site will be developed at a later date. Conservative planning level numbers from the Kimley Horn TIMA are used for the future medical campus development and included as a part of the background traffic for the purposes of this Report.

III. AREA CONDITIONS

A. Study Area

Area of Influence

The MOB+ Site is located within the City of Scottsdale, west of Hayden Road between Loop 101 and Mayo Boulevard. This MOB+ Site and the larger medical campus planned for a portion of the Overall Site are anticipated to serve the surrounding population. There are several smaller clinics as well as other hospitals within a 5-mile radius of this site. This was considered for the trip distribution for the MOB+ Site as well as the medical services provided at other locations.

Area of Significant Traffic Impact

The area with the most traffic impact due to the addition of the MOB+ and the larger medical campus planned for a portion of the Overall Site will occur along Loop 101, Hayden Road, Scottsdale Road, and Mayo Boulevard roadways. These are the major travel routes that vehicles will likely take to reach and leave the site.

This study focuses on the capacity analysis for the Overall Site driveways and the following surrounding intersections:

- Mayo Boulevard & 78th Street
- Hayden Road & Mayo Boulevard
- Mayo Boulevard & Miller Road
- Five additional access points to the Overall Site

B. Study Area Land Use

Existing Land Uses and Zoning

The MOB+ Site is currently zoned as Planned Community District-Central Business District (P-C C-2).

Anticipated Future Development

As previously mentioned, the Kimley Horn TIMA included development plans for a larger medical campus on the Overall Site. The planned developments analyzed in Kimley Horn TIMA include retail, senior living, office, hotel, and restaurant land uses. The trips generated by these developments in the Kimley Horn TIMA were used in this Report as background traffic. Surrounding offsite developments include the Axon development and the Optima McDowell Mountain development. The background traffic provided from the Kimley Horn TIMA can be found in **Appendix D**. It should be noted that the Axon development may be delayed or it may not be built. At the request of the City,his Report therefore reflects scenarios that include this development and as exclude this development.

C. Site Accessibility

Existing Roadway System

Roadway Segments

Hayden Road is currently a divided, four-lane, north-south minor arterial roadway. There are two northbound and two southbound lanes with a 40-mph posted speed limit in each direction and a raised median down the middle. There is curb and gutter on both sides of the road. There is a sidewalk with large gaps and a bike lane on the west side of the road with little sidewalk and no bike lane on the east side of the road. The east side of the road has a 5-foot-wide shoulder that tapers out as it nears the intersection with Loop 101.

Miller Road is not currently built but is anticipated to be a major collector. The future Miller Road alignment is expected to connect as the north leg of the Princess Boulevard & Princess Drive intersection then extend north under Loop 101 providing a grade separation. Miller Road is anticipated to be constructed as a 4-lane roadway with a two-way left-turn lane down the middle and a bike lane in each direction. It is assumed Miller Road will have a posted speed limit of 40 mph.

78th Street is currently a 2-lane divided road with a two-way left-turn lane down the middle classified by the City of Scottsdale as a minor collector. The road is built between Princess Boulevard and Mayo Boulevard. There is curb, gutter, and sidewalk on both sides of the road. There is also a bike lane and a posted speed limit of 30 mph in each direction.

Mayo Boulevard is currently a 2-lane divided road with a two-way left-turn lane down the middle classified by the City of Scottsdale as a major collector. The road is built between Hayden Road & 78th Street. There is currently curb and gutter on the south side of the road and bike lanes on both sides of the road. This road is expected to be extended to the west to connect with the Mayo Boulevard & Scottsdale Road intersection. There is a posted speed limit of 30 mph east of Scottsdale Road.

Intersections

Mayo Boulevard & 78th Street is currently a 2-way free-flowing intersection. This results in a curved roadway with a name transition between the two directions. This intersection is anticipated to be built out with the west leg being an extension of Mayo Boulevard and the south leg being stop-controlled.

Hayden Road & Mayo Boulevard is a 3-leg stop-controlled intersection with the west leg being stop controlled and the north and south legs being free-flow. There is one dedicated left turn lane (300' storage length) and one dedicated right turn lane (170' storage length) on the eastbound approach. There is one dedicated left turn lane (150' storage length) and two through lanes on the northbound approach. There are two through lanes on the southbound approach with a dedicated right turn lane (185' storage length).

Future Roadway System

There are a few improvements already planned for this area. It is anticipated that a third southbound through lane will extend south of the Loop 101 to the Mayo Boulevard intersection where the third through lane is anticipated to transition to a right-turn only lane. Mayo Boulevard is anticipated to be constructed with two travel lanes, a bike lane in each direction and a center two-way left turn lane between 73rd Place and Hayden Road. Miller Road is anticipated to be constructed with two travel lanes and a bike lane in each direction with a two-way left-turn lane.

There are also multiple proposed developments planned in the surrounding area that are anticipated to make improvements to the surrounding roadway network. The anticipated developments and the associated improvements with each one are listed below.

General Recommendations made in the Kimley Horn TIMA: The northbound approach at Hayden Road & Mayo Boulevard is to be remarked to provide dual northbound left lanes when this intersection becomes signalized. At Miller Road & Mayo Boulevard, the eastbound approach is to have dual left turn lanes with 400 feet of storage. The Miller Road & Mayo Boulevard intersection is recommended to have dedicated right and turn lanes with 250 feet for all approaches.

Axon Development: At Hayden Road & Mayo Boulevard, there should be a third northbound through lane that is expected to continue north to the Loop 101 WB Ramp & Scottsdale Road intersection. There should also be dual westbound right turn lanes at this intersection. Additionally, this development is anticipated to construct Mayo Boulevard east of Hayden Road with two travel lanes in each direction. It is also anticipated this development will construct a traffic signal at Mayo Boulevard and Hayden Road. If this development is delayed or it is not constructed, the traffic signal will still likely be warranted due to the other developments planned in the area.

Optima McDowell Mountain: A dedicated westbound right turn lane is anticipated to be built at Scottsdale Road & Mayo Boulevard. A third westbound lane along Mayo Boulevard is anticipated to be built along Optima McDowell Mountain's frontage. This will become a dedicated westbound right turn lane at Scottsdale Road & Mayo Boulevard.

It is assumed these roadway improvements are constructed and open for public use by 2040 since the City of Scottsdale Transportation Master Plan, 2016 mentions a few of these improvements are anticipated to be completed by 2030. This includes widening Hayden to a six-lane road in this area and constructing Mayo

Boulevard as a four-lane road in this area. For the purposes of this Report, the driveways are assumed to have a speed limit of 25 mph with two-lane roads at the driveway entrances.

Traffic Volumes and Conditions

The anticipated 2040 traffic volumes for this area were obtained and adjusted by Kimley Horn from the 2035 MAG model as described in the Kimley Horn TIMA (see **Appendix E**). These volumes were combined with the trips generated by the surrounding developments and were provided to Dibble. The combined volumes are used as the background traffic in this Report.

Transit Service

There are existing bus services along Mayo Boulevard to the west of this site, along Scottsdale Road, and along Bell Road south of this site. The closest bus stop is located at Scottsdale Road & Mayo Boulevard about 2/3 of a mile away from this site. There are no plans at this time to extend the bus route along Mayo Boulevard according to the City of Scottsdale Transportation Master Plan, 2008.

IV. PROJECTED TRAFFIC

A. Site Traffic

Trip Generation

The trip generation for this project was calculated using the ITE Trip Generation Manual, 11th edition. These values are for the typical peak hour times of the adjacent street (between 7:00 and 9:00 for the morning peak hour and between 4:00 and 6:00 for the afternoon peak hour). The medical-dental office building land use code was used for the trip generation calculations since it seems to best align with the proposed development. This corresponds with land use 720.

The trips generated by the MOB+ development is shown in **Table 2**. The total trips generated are slightly less than the trips generated in the Kimley Horn TIMA. Kimley Horn used planning level numbers prior to having a developed site plan for the development to calculate the trip generation numbers.

Table 2 –Trip Generation

General Suburban - Fitted Curve												
LUC	Description	Units	Quant	Weekday			AM Peak			PM Peak		
				Total	Ingress	Egress	Total	Ingress	Egress	Total	Ingress	Egress
720	Medical-Dental Office Building	1000 Sq. Ft. GFA	168.2	7120	3560	3560	521	412	109	681	204	477

Trip Distribution

The trip distribution was assessed based on the surrounding population within a 5-10 mile radius. It is assumed that most people will attempt to exit the same way they had entered with minor changes due to limited access driveways. When reviewing the surrounding street network, the main freeway used to access the study area is the Loop 101 with the closest exit ramps located both east and west of the site at Hayden Road and Scottsdale Road. The main arterials and collectors are Scottsdale Road, Hayden Road, and Mayo Boulevard. To access the site, the traffic will either enter from Miller Road, Mayo Boulevard, or Hayden Road. The trip distribution is summarized in **Figure 4**.

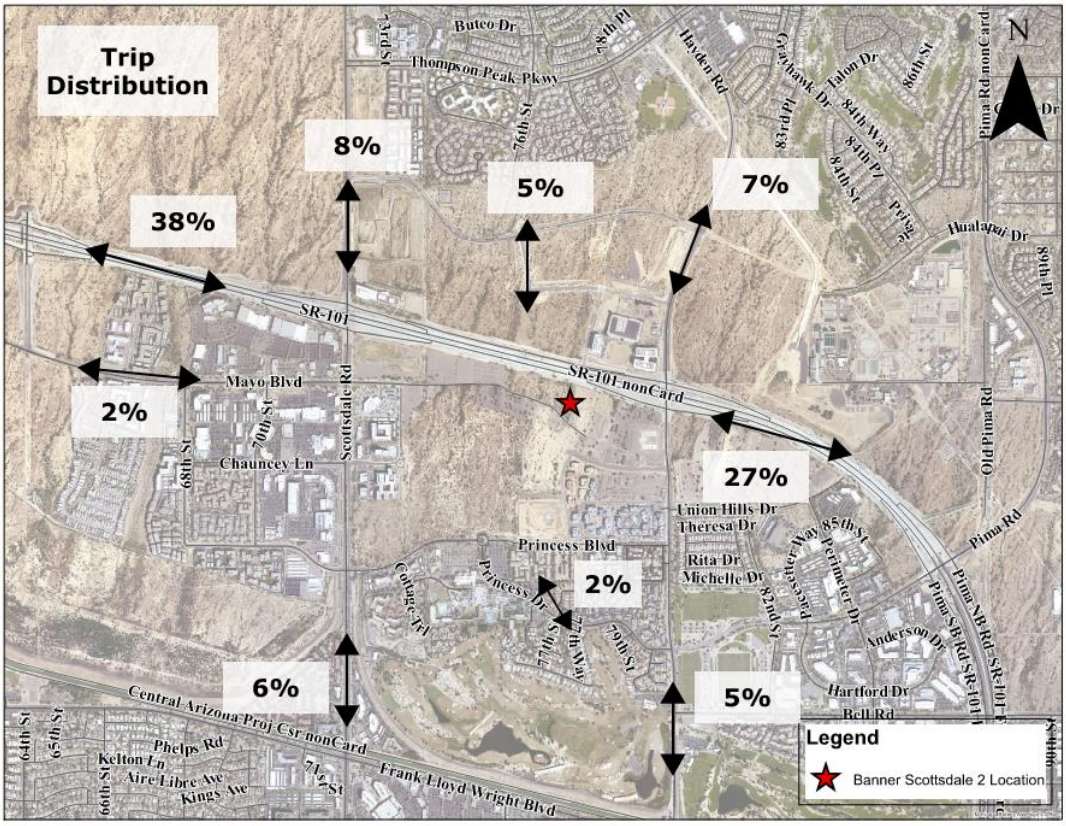


Figure 4 – Trip Distribution

Modal Split

Most traffic will likely travel to and from the site via passenger car since the surrounding area does not have heavy residential areas. If a bus route is added or extended to provide a stop near the hospital, some trips may arrive via public transportation. It is assumed in this report that all trips will be made via passenger vehicle in order to analyze the worst-case scenario.

Trip Assignment

The trip assignment is shown in **Figure 5**. The MOB+ trips will likely primarily use the 78th Street & Mayo Boulevard entrance as well as Driveway D to access the site due to the proximity of the building and it's parking lot to the two access points. It is also likely that some vehicles will use Driveway E to access the site to the MOB+ parking lot.

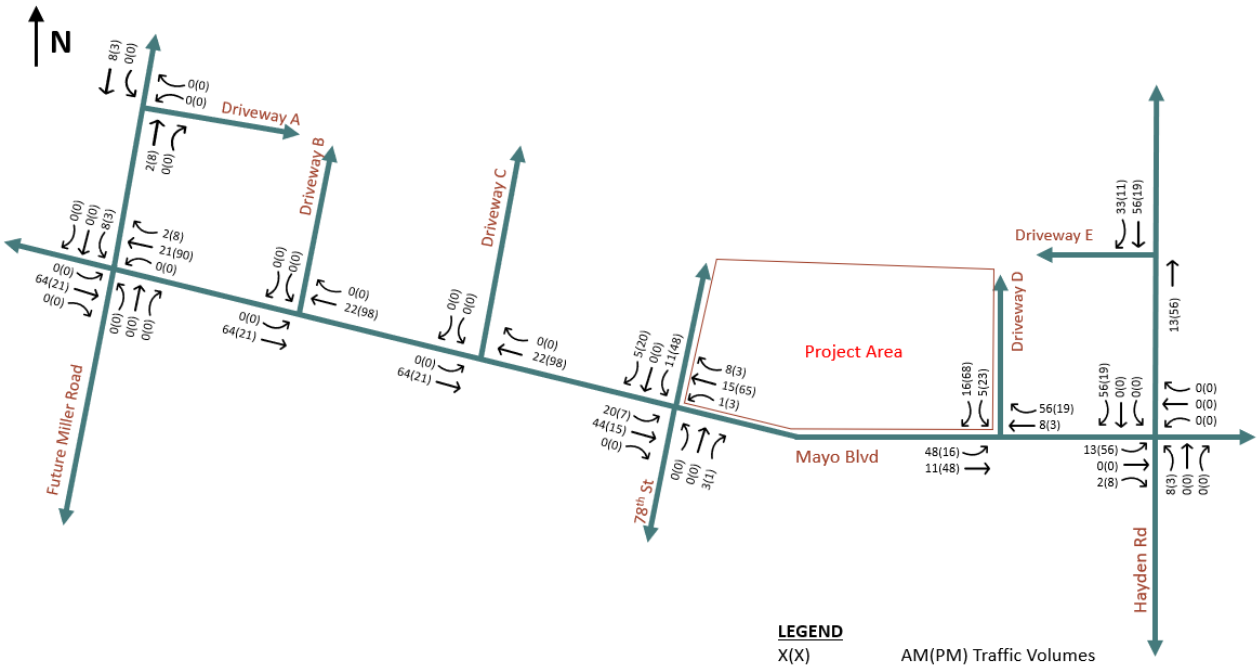


Figure 5 – Trip Assignment

B. Background Traffic

Method of Projections

There are two horizon years projected for the purposes of this Report. The first is the anticipated opening year of 2026 for the MOB+. The traffic studies for the surrounding developments from the Kimley Horn TIMA indicate that the surrounding developments are anticipated to be completed after the 2026 opening year. To account for other potential growth in the area, a 0.5% growth rate was applied to the 2022 collected counts for 4 years to determine the background traffic for 2026.

The second horizon year is for 2040 with the full build out of the Overall Site. The anticipated 2040 traffic volumes for this area were obtained and adjusted by Kimley Horn from the 2035 MAG model as described in Kimley Horn TIMA. These volumes were combined with the trips generated by the surrounding developments. These combined volumes are used as the background traffic in this Report. Note that the trips generated by the parcels to the east of this site along Hayden Road were assigned to use two of the driveways studied in this Report as well as a driveway not studied in this Report.

Estimated Volumes

Figure 6, **Figure 7** and **Figure 8** show the calculated background traffic volumes used for the anticipated Opening Day and for the Future (2040) analysis with and without the Axon development. This is when all four phases of the Overall Site are anticipated to be completed.

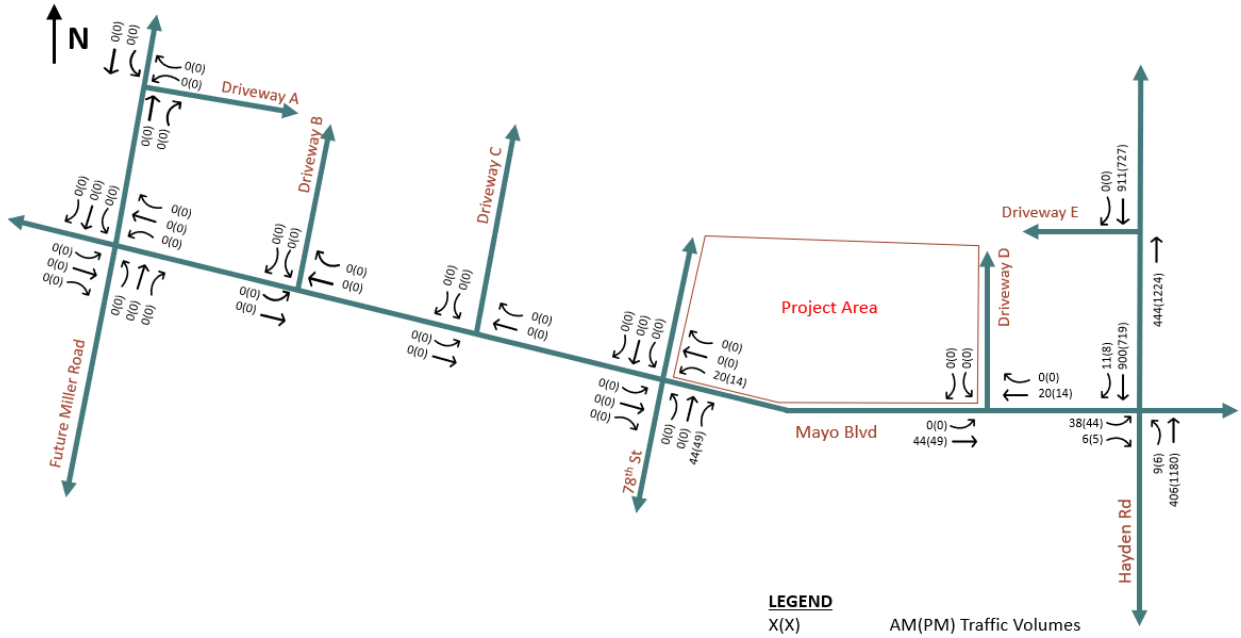


Figure 6 – Opening Day Background Traffic (2026)

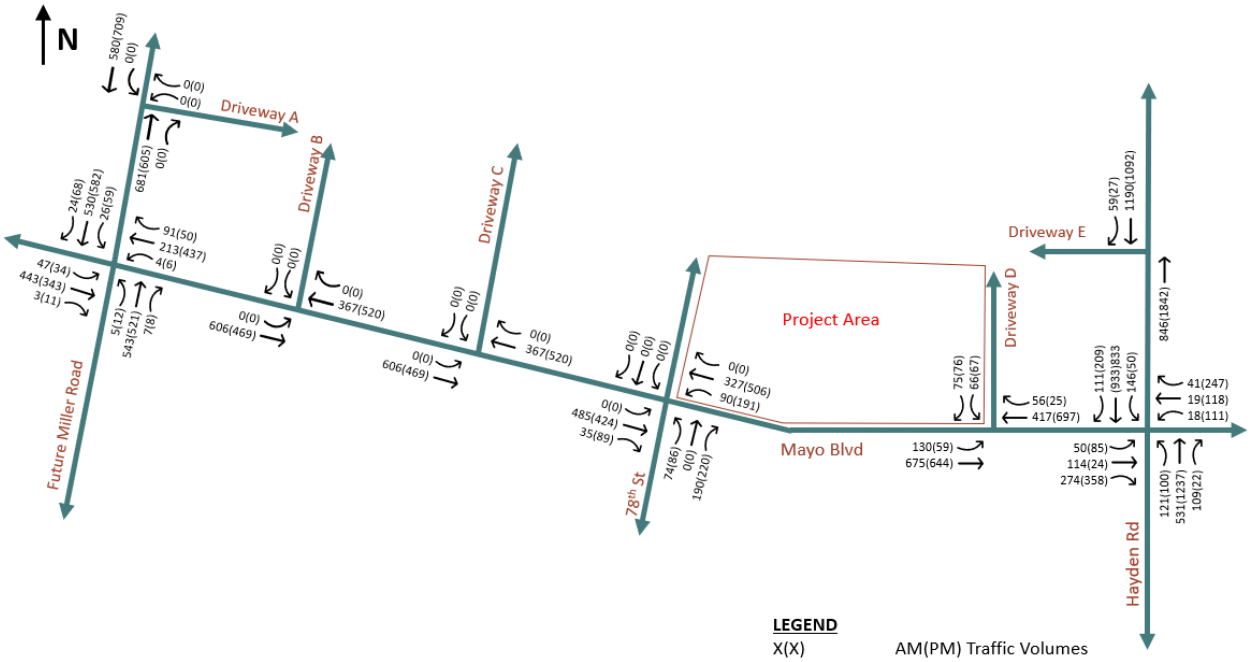


Figure 7 – Future Background Traffic w/Axon (2040)

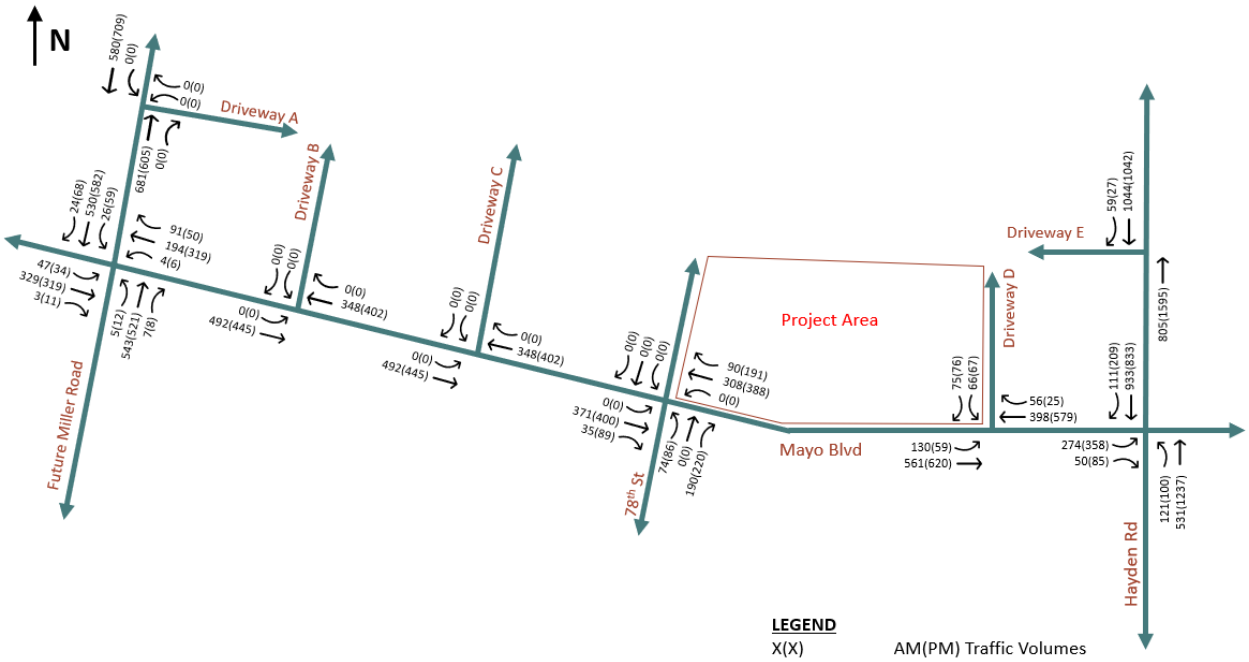


Figure 8 – Future Background Traffic w/o Axon (2040)

C. Total Traffic

The background traffic and anticipated site traffic were combined to calculate the total anticipated traffic for both horizon years. **Figure 9** and **Figure 10** show the anticipated total traffic for the two horizon years.

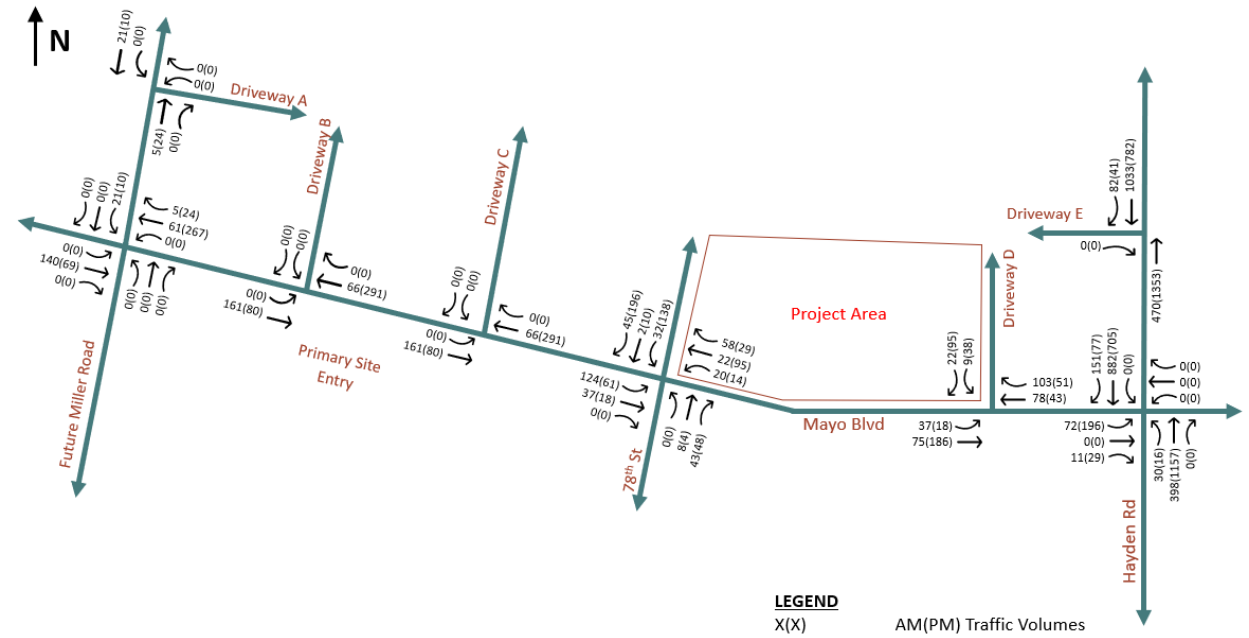


Figure 9 – Opening Day Total Traffic (2026)

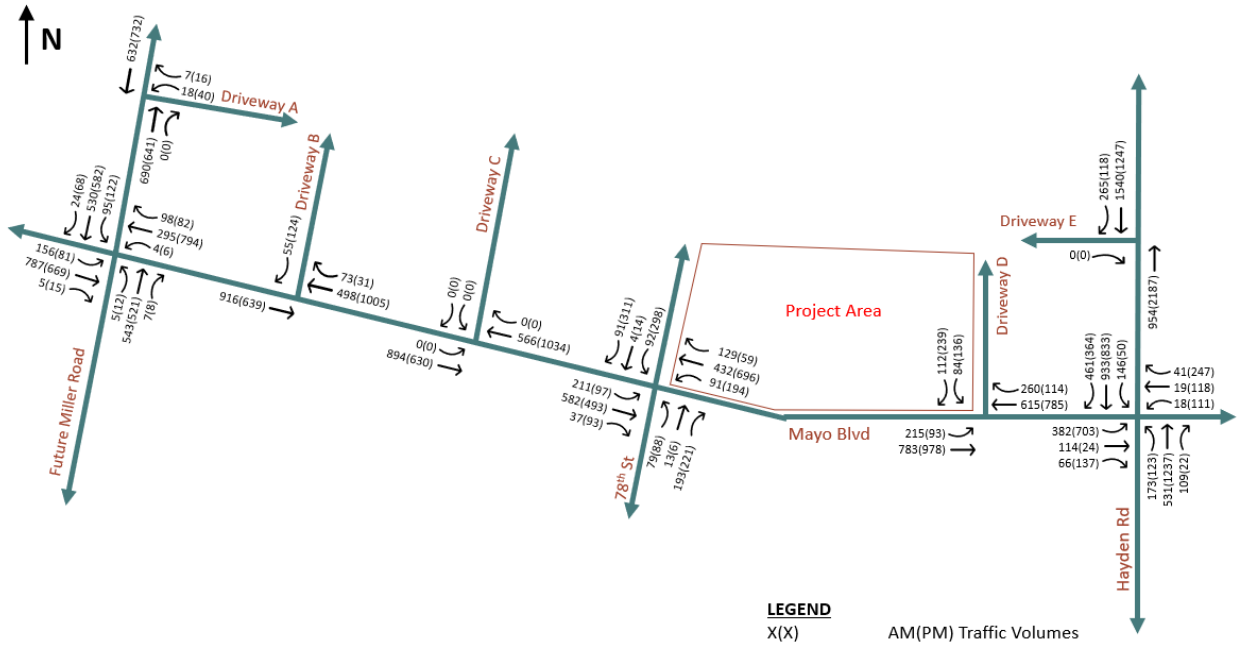


Figure 10 – Future Total Traffic (2040)

An additional 2040 scenario was also analyzed that excluded the Axon development. The total traffic anticipated for that scenario is shown in **Figure 11**.

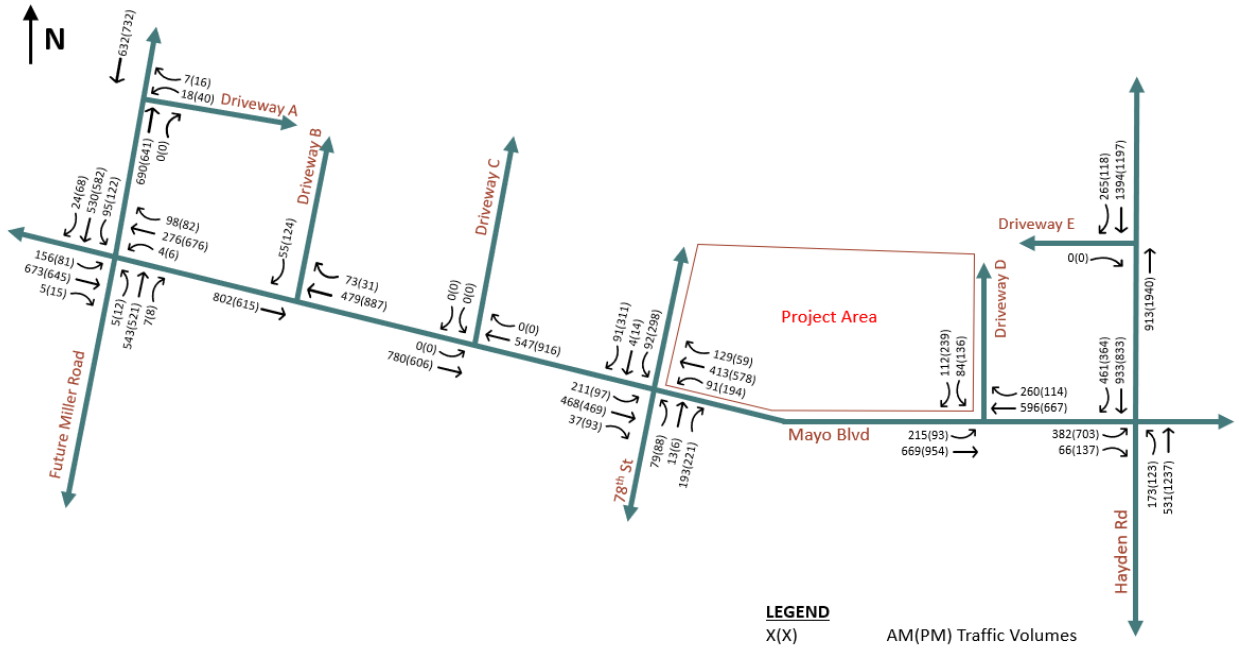


Figure 11 – Future Total Traffic w/o Axon (2040)

V. TRAFFIC ANALYSIS

A. Site Access

The Overall Site is planned to have six access points for the portion of the development bound by Miller Road, Hayden Road, Loop 101, and Mayo Boulevard. One of these is planned to provide full access from Miller Road (Driveway A). Four of these access points are planned to provide direct access from Mayo Boulevard (Driveway B, C, D and 78th Street). The Mayo Boulevard and 78th Street access is expected to primarily provide access to patients entering or exiting the site for the MOB+ in addition to Driveway D and Driveway E. Mayo Boulevard & Driveway D is a proposed full access driveway and will be shared with the future retail, office and hotel uses directly adjacent to Hayden Road. Driveway E will provide the most direct access to the future planned emergency room for hospital patients. The close proximity to the Loop 101 interchange is vital in providing quick access to the planned hospital when needed. **Figure 12** provides a schematic layout of the proposed site driveways.

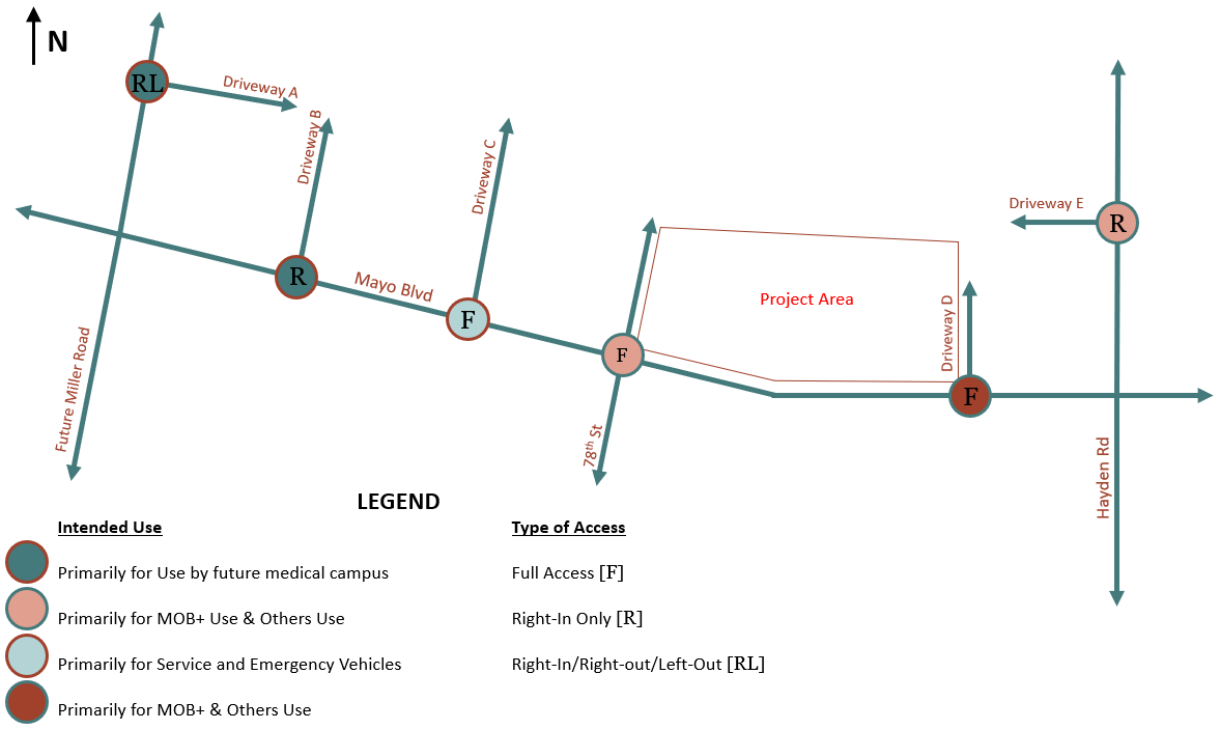


Figure 12 – Site Access

B. Turn Lane Warrants

The following turn lane warrants were completed in accordance with the City of Scottsdale 2018 Design Standards and Policies Manual Chapter 5 Section 3. The manual states that dedicated right turn lanes are required at all street intersections on major arterials while dedicated left turn lanes are required at all street intersections on major collectors and arterials. The results are summarized in **Table 3** for right turn lanes and in **Table 4** for left turn lanes. Turning movements that have an existing dedicated turn lane are not included in these tables. Dedicated turn lanes planned or warranted in the following tables were assumed to be built in the capacity analysis included in this Report. Additionally, the Kimley Horn TIMA was approved by the City of Scottsdale with comments and stipulations. One of the comments requires right turn lanes at all driveways along Mayo Boulevard and Miller Road.

Table 3 –Right Turn Lane Warrants

Intersection	Access	Turning Movement	Lane Warranted Due to City Prescriptive Requirements?
Miller Rd & Driveway A	Full	NBR	No
		SBR	No
Mayo Blvd & Driveway B	Full	EBR	No
		WBR	No
Mayo Blvd & 78th St	Full	EBR	No
		WBR	No
		NBR	No
		SBR	No
Mayo Blvd & Driveway C	Full	EBR	No
		WBR	No
Mayo Blvd & Driveway D	Full	EBR	No
		WBR	No
Hayden Rd & Driveway E	RI	EBR	No
		SBR	No
Hayden Rd & Mayo Blvd	Full	WBR	Planned*
		NBR	No
Mayo Blvd & Miller Rd	Full	EBR	Planned
		WBR	Planned
		NBR	Planned
		SBR	Planned

City Prescriptive Requirements includes a right turn lane on all major arterials and a left turn lane on all major collectors or arterials in accordance with the City of Scottsdale Design Standards and Policies Manual, 2018 Chapter 5

RI = Right-In Only

Planned = already planned by other developments, does not yet exist

**Planned to be a dual*

Table 4 –Left Turn Lane Warrants

Intersection	Access	Turning Movement	Lane Warranted Due to City Prescriptive Requirements?
Miller Rd & Driveway A	Full	NBL	Yes
		SBL	Yes
Mayo Blvd & Driveway B	Full	EBL	Yes
		WBL	Yes
Mayo Blvd & 78th St	Full	EBL	Yes
		WBL	Yes
		NBL	Yes
		SBL	Yes
Mayo Blvd & Driveway C	Full	EBL	Yes
		WBL	Yes
Mayo Blvd & Driveway D	Full	EBL	Yes
		WBL	Yes
Hayden Rd & Mayo Blvd	Full	EBL	Exists*
		WBL	Yes
		NBL	Exists*
		SBL	Planned*
Mayo Blvd & Miller Rd	Full	EBL	Planned
		WBL	Planned
		NBL	Planned
		SBL	Planned

City Prescriptive Requirements includes a left turn lane on all major arterials and a left turn lane on all major collectors or arterials in accordance with the City of Scottsdale Design Standards and Policies Manual, 2018 Chapter 5

Planned = already planned by other developments, does not yet exist

**Planned to be a dual*

Although the driveways along Mayo Boulevard and Miller Road do not warrant right turn lanes based on City guidelines, Banner Health would still like to provide right turn lanes at the heavily used driveways and the driveway closest to the Mayo Boulevard and Hayden intersection to improve traffic operations and help reduce the rear end crash potential. **Table 5** provides a summary of the driveways where right turn lanes are planned and an explanation of why providing these right turn lanes is desirable.

Table 5 – Traffic Operations Issues & Considerations

Intersection	Turning Movement	Issues & Consideration
Mayo Blvd & Driveway B	WBR	Warranted due to the high volume anticipated to be using this intersection. This dedicated right turn lane will allow space for right-turning vehicles to slow down outside of the main travel way. This will reduce the chance of a queue forming behind a right-turning vehicle. It also reduces the risk of rear-end crashes at this intersection.
Mayo Blvd & Driveway C	WBR	Warranted due to the types of vehicles anticipated to use this intersection. This dedicated right turn would allow a place for emergency vehicles to slow down in order to turn the corner gently outside of the main travel way. Additionally, large delivery trucks that are anticipated to use this driveway require more room to slow down. This would also decrease the risk of rear-end crashes at this intersection.
Mayo Blvd & Driveway D	WBR	Warranted due to the close proximity to the Hayden Road & Mayo Boulevard intersection. This dedicated right turn lane will allow space for right-turning vehicles to slow down outside of the main travel way. This will reduce the chance of a queue forming behind a right-turning vehicle which would have the potential to back up to the Hayden Road & Mayo Boulevard intersection. It also reduces the risk of rear-end crashes at this intersection.
Mayo Blvd & Driveway E	SBR	Warranted due to the close proximity to the Hayden Road & Loop 101 interchange. This dedicated right turn lane will allow space for right-turning vehicles to slow down outside of the main travel way. This will reduce the chance of a queue forming behind a right-turning vehicle which would have the potential to back up near the interchange. It also reduces the risk of rear-end crashes at this intersection.

A. Traffic Signals

It is already planned for Hayden Road & Mayo Boulevard to be signalized in the near future. It is also already anticipated that Mayo Boulevard & Miller Road will be a roundabout or signalized intersection for future developments. Based on City of Scottsdale comments for the approved Master Plan TIMA, a roundabout is to be built at the intersection once the right-of-way is available unless it is ruled out, in which case, a traffic signal would be considered.

All other intersections studied in this Report are anticipated to operate acceptably given the conditions and mitigations mentioned in this report. As previously mentioned, the Axon development may be delayed or the project may not be built. The Axon development is currently responsible for the signal at Mayo Boulevard and Hayden Road, however if the MOB+ and/or the remainder of the Overall Site is built before Axon, the signal would not exist. A signal warrant analysis was therefore conducted to determine if the MOB+ development warrants the signal at the intersection as well as the remainder of the Overall Site without the Axon development per the peak hour warrant from the Manual on Uniform Traffic Control Devices. The analysis was also conducted for both scenarios for the Miller Road and 78th Street intersections with Mayo Boulevard. The results are summarized in **Table 6**. The warrant analysis is also included in **Appendix F.**

Table 6 –Signal Warrant Results

Intersection	Scenario	
	MOB+ Only 2026	NWC Development 2040 w/o Axon
Mayo Blvd & Miller Rd	No	Yes (Both Peaks)
Mayo Blvd & 78th St	No	Yes (Both Peaks)
Mayo Blvd & Hayden Road	Yes (PM Peak)	Yes (Both Peaks)

Per City of Scottsdale's direction during a comment resolution meeting on May 22, 2024 and as outlined in the comment response form in **Appendix H**, the intersection at Mayo Boulevard and Miller Road will operate as an all-way stop control intersection until the right-of-way is obtained to construct a roundabout at the intersection.

B. Capacity and Level of Service

The capacity analysis was conducted using Synchro 11 software. **Table 7, Table 8, Table 9,** and **Table 10** summarize the level of service (LOS) results for the analyzed turning movements for opening day in 2040 both without site traffic (background traffic) and with site traffic (total traffic), respectively. Note that a level of service "E" or "F" is typically considered a "failing" level of service during peak traffic times and will sometimes require some sort of mitigation to bring the level of service back to a "D" or better, if possible. However, sometimes it is not feasible nor warranted to mitigate due to a number of considerations including the current traffic demand. Additionally, sometimes it is simply not feasible to invest in a lot of additional capacity improvements to support one or both peak hour traffic times at one or two locations. Especially, when it is put into the context of all the other capacity or capacity utilization improvements that will be provided for this proposed development.

As stated in the previous section, the intersection of Mayo Boulevard and Miller Road is to operate as an stop controlled intersection until such time that the right-of-way is obtained to construct a roundabout at the intersection or a traffic signal if the roundabout is ruled out in the future. **Table 9,** and **Table 10** assume the intersection will still be stop controlled to show how that scenario is anticipated to operate by 2040. A roundabout should be constructed by 2040, however, or a signal should be installed if the roundabout is ruled out in the future. **Table 11** and **Table 12** summarize the LOS and Delay results for both a roundabout and a signal for 2040 (with and without the Axon development).

The southbound left turning movement at Driveway D experiences what would be considered an undesirable level of service for the 2040 horizon year both with and without the Axon development. It is important to note that this delay is experienced on site and the vehicle queues do not exceed more than 2-5 vehicles (roughly 40-100 feet) depending on the peak hours.

Additionally, the

Table 7 –Opening Day Background (2040) LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Mayo Blvd & 78th St	AM	6.5	A	0.0	A	7.0	A	7.0	A	9.0	A	6.3	A	0.0	A	9.9	A	0.0	A	3.2	A	0.0	A	0.0	A	0.0	A
	PM	7.4	A	0.0	A	6.3	A	6.3	A	14.5	B	7.0	A	0.0	A	13.5	B	0.0	A	2.5	A	0.0	A	0.0	A	0.0	A
Mayo Blvd & Driveway D	AM	-	-	9.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	20.1	C	-	-	10.2	B
	PM	-	-	9.7	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	22.2	C	-	-	11.7	B
Hayden Rd & Mayo Blvd	AM	17.5	B	30.5	C	16.5	B	2.5	A	26.6	C	25.6	C	0.4	A	31.1	C	12.5	B	12.5	B	28.6	C	16.8	B	2.3	A
	PM	23.9	C	33.9	C	12.9	B	3.6	A	39.3	D	29.2	C	5.9	A	42.4	D	23.7	C	23.7	C	38.8	D	26.3	C	4.7	A
Mayo Blvd & Miller Rd	AM	8.8	A	9.1	A	9.6	A	0.0	A	8.2	A	8.4	A	3.4	A	7.4	A	9.2	A	0.6	A	8.2	A	9.1	A	3.1	A
	PM	8.9	A	9.6	A	9.3	A	1.5	A	8.3	A	9.9	A	3.8	A	7.8	A	8.9	A	0.9	A	9.6	A	9.3	A	3.2	A

Table 8 –Opening Day (2026) Total Traffic LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Miller & Driveway A	AM	-	-	-	-	-	-	-	-	-	-	-	-	0.0	A	-	-	0.0	A	0.0	A	-	-	0.0	A	-	-
	PM	-	-	-	-	-	-	-	-	-	-	-	-	0.0	A	-	-	0.0	A	0.0	A	-	-	0.0	A	-	-
Mayo Blvd & Driveway B	AM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	0.0	A	-	-	0.0	A
	PM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	0.0	A	-	-	0.0	A
Mayo Blvd & Driveway C	AM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	0.0	A	-	-	0.0	A
	PM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Mayo Blvd & 78th St	AM	-	-	7.6	A	0.0	A	0.0	A	7.3	A	0.0	A	0.0	A	0.0	A	-	-	9.4	A	13.3	B	-	-	8.9	A
	PM	-	-	7.6	A	0.0	A	0.0	A	7.3	A	0.0	A	0.0	A	0.0	A	-	-	8.8	A	13.4	B	-	-	10.0	A
Mayo Blvd & Driveway D	AM	-	-	7.7	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	9.9	A	-	-	8.6	A
	PM	-	-	7.5	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	10.0	A	-	-	8.8	A
Mayo Blvd & Driveway E	AM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Hayden Rd & Mayo Blvd	AM	6.2	A	43.2	D	-	-	0.3	A	-	-	-	-	-	-	42.6	D	1.6	A	-	-	-	-	4.9	A	1.1	A
	PM	7.1	A	38.1	D	-	-	0.4	A	-	-	-	-	-	-	37.9	D	3.4	A	-	-	-	-	4.6	A	1.2	A
Mayo Blvd & Miller Rd	AM	-	-	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	9.6	A	0.0	A	0.0	A
	PM	-	-	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	11.2	B	0.0	A	0.0	A

Table 9 – Future (2040) Total Traffic LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Miller & Driveway A	AM	-	-	-	-	-	-	-	-	16.7	C	-	-	10.9	B	-	-	0.0	A	0.0	A	-	-	0.0	A	-	-
	PM	-	-	-	-	-	-	-	-	17.4	C	-	-	10.7	B	-	-	0.0	A	0.0	A	-	-	0.0	A	-	-
Mayo Blvd & Driveway B	AM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	0.0	A	-	-	10.4	B
	PM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	0.0	A	-	-	15.3	C
Mayo Blvd & Driveway C	AM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Mayo Blvd & 78th St	AM	7.8	A	12.0	B	7.0	A	7.0	A	8.6	A	6.4	A	1.9	A	16.4	B	5.7	A	5.7	A	17.8	B	5.7	A	5.7	A
	PM	18.9	B	24.5	C	15.8	B	15.8	B	36.3	D	17.3	B	4.4	A	21.5	C	4.1	A	4.1	A	35.2	D	13.5	B	13.5	B
Mayo Blvd & Driveway D	AM	-	-	12.4	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	42.1	E	-	-	11.7	B
	PM	-	-	11.0	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	56.7	F	-	-	16.3	C
Mayo Blvd & Driveway E	AM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Hayden Rd & Mayo Blvd	AM	23.7	C	47.4	D	27.8	C	7.3	A	52.9	D	47.1	D	1.1	A	50.0	D	14.9	B	14.9	B	51.2	D	21.4	C	3.4	A
	PM	33.7	C	40.0	D	13.2	B	2.8	A	56.0	E	40.1	D	7.6	A	48.5	D	35.2	D	35.2	D	48.9	D	43.6	D	8.4	A
Mayo Blvd & Miller Rd	AM	168.9	F	31.4	D	424.8	F	75.7	F	16.7	C	47.7	E	44.3	E	16.6	C	214.2	F	41.6	E	24.0	C	191.9	F	191.9	F
	PM	256.6	F	24.5	C	381.1	F	79.0	F	16.9	C	513.8	F	204.4	F	17.2	C	225.4	F	43.8	E	33.2	D	281.2	F	281.2	F

Table 10 – Future (2040) Total Traffic w/o Axon LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Miller & Driveway A	AM	-	-	-	-	-	-	-	-	16.7	C	-	-	10.9	B	-	-	0.0	A	0.0	A	0.0	A	0.0	A	-	-
	PM	-	-	-	-	-	-	-	-	17.4	C	-	-	10.7	B	-	-	0.0	A	0.0	A	0.0	A	0.0	A	-	-
Mayo Blvd & Driveway B	AM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	0.0	A	-	-	10.3	B
	PM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	0.0	A	-	-	14.1	B
Mayo Blvd & Driveway C	AM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	0.0	A	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Mayo Blvd & 78th St	AM	7.7	A	12.3	B	6.7	A	6.7	A	8.0	A	6.5	A	2.0	A	15.2	B	5.5	A	5.5	A	16.6	B	5.4	A	5.4	A
	PM	17.6	B	20.7	C	15.4	B	15.4	B	34.7	C	16.2	B	4.3	A	20.8	C	4.1	A	4.1	A	33.5	C	9.6	A	9.6	A
Mayo Blvd & Driveway D	AM	-	-	12.2	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	37.9	E	-	-	11.5	B
	PM	-	-	10.3	B	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	42.8	E	-	-	14.6	B
Mayo Blvd & Driveway E	AM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
	PM	-	-	-	-	0.0	A	-	-	-	-	0.0	A	0.0	A	-	-	-	-	-	-	-	-	-	-	0.0	A
Hayden Rd & Mayo Blvd	AM	15.5	B	40.0	D	-	-	0.8	A	-	-	-	-	-	-	41.6	D	4.3	A	4.3	A	-	-	14.3	B	2.6	A
	PM	17.7	B	35.2	D	-	-	5.6	A	-	-	-	-	-	-	42.5	D	10.0	A	10.0	A	-	-	19.1	B	3.3	A
Mayo Blvd & Miller Rd	AM	133.0	F	30.7	D	299.9	F	49.7	E	16.5	C	41.3	E	40.7	E	16.2	C	203.3	F	39.5	E	23.0	C	179.7	F	179.7	F
	PM	215.7	F	24.0	C	352.5	F	71.2	F	16.9	C	378.4	F	145.7	F	17.3	C	224.5	F	43.9	E	31.5	D	276.4	F	276.4	F

Table 11 – Future (2040) Total Traffic Miller & Mayo Roundabout LOS

Intersection	Peak Hour	Intersection		EBL/EBT		EBT/EBR		WBL/WBT		WBT/WBR		NBL/NBT		NBT/NBR		SBL/SBT		SBT/SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
With Axon																			
Mayo Blvd & Miller Rd	AM	18.1	C	23.0	27	27.1	D	10.3	B	10.4	B	21.9	C	22.8	C	8.7	A	9.3	A
	PM	20.9	C	18.8	C	20.7	C	19.4	C	22.2	C	16.2	C	16.7	C	23.5	C	26.2	D
Without Axon																			
Mayo Blvd & Miller Rd	AM	14.9	B	18.3	B	20.5	C	10.0	A	10.2	B	18.0	B	18.8	B	8.5	A	9.1	A
	PM	17.8	B	18.0	B	19.6	B	15.8	B	17.2	B	15.7	B	16.1	B	18.5	B	20.4	C

Table 12 – Future (2040) Total Traffic Miller & Mayo Signal LOS

Intersection	Peak Hour	Intersection		EBL		EBT		EBR		WBL		WBT		WBR		NBL		NBT		NBR		SBL		SBT		SBR	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Roundabout																											
Mayo Blvd & Miller Rd	AM	29.6	C	52.2	D	53.7	D	17.8	B	25.2	C	29.3	C	5.1	A	12.8	B	13.1	B	4.3	A	15.0	B	13.1	B	4.9	A
	PM	23.9	C	53.1	D	27.0	C	8.4	A	23.8	C	37.8	D	5.1	A	13.8	B	13.7	B	5.1	A	16.8	B	14.1	B	3.5	A
Signal																											
Mayo Blvd & Miller Rd	AM	25.8	C	50.2	D	47.2	D	15.6	B	28.0	C	32.8	C	5.9	A	10.6	B	10.8	B	3.6	A	12.3	B	10.7	B	4.1	A
	PM	23.3	C	54.5	D	28.3	C	9.1	A	28.8	C	41.8	D	6.1	A	10.8	B	10.7	B	4.0	A	13.0	B	11.0	B	2.8	A

C. Site Circulation and Parking

The traffic accessing the MOB+ will generally be split between 78th Street and Driveway D to access the site with a small amount of the traffic anticipated to access the site using Driveway E from Hayden Road. The remaining driveways will provide access to the potential future expansion of the medical campus and for other commercial uses on the Overall Site. See **Appendix G** for the conceptual Future Development Circulation Plan.

VI. IMPROVEMENT ANALYSIS

A. Queueing Analysis

The following queueing analysis is completed with the assumption that the recommendations made throughout this Report are completed. This analysis is also completed using the City of Scottsdale's minimum storage length requirements as outlined in the City of Scottsdale's 2018 Design Standards and Policies Manual Section Chapter 5 Section 3. The 95th percentile from Synchro 11 was used to obtain each anticipated queue length. **Table 13** provides the recommended right turn lane storage lengths and **Table 14** provides the recommended left turn lane storage lengths based on the total traffic anticipated by 2040. The intent of focusing on the 2040 vehicle queues is to determine what storage lengths will be needed for all access points to the Overall Site in the future to avoid adding additional storage at a later date after the roadways and driveways are already constructed.

Table 13 –Right Turn Lane Queues

Intersection	Turning Movement	Current Length (ft)	2040 Queue Length (ft)	City of Scottsdale Preferred Length (ft)	City of Scottsdale Minimum Length (ft)	Recommended 2040 Storage Length (ft)
Miller Road & Driveway A	NBR	-	0	150	100	150
Mayo Blvd & Driveway B	WBR	-	0	150	100	150
Mayo Blvd & Driveway C	WBR	-	0	150	100	150
Mayo Blvd & Driveway D	WBR	-	0	150	100	150
Hayden Road & Driveway E	WBR	-	0	150	100	150
Mayo Blvd & 78th St	WBR	-	23	150	100	150
Hayden Rd & Mayo Blvd	EBR	170	32	150	100	170
	WBR	-	41	150	100	150
	SBR	185	110	150	100	185
Mayo Blvd & Miller Rd	EBR	-	5	150	100	150
	WBR	-	20	150	100	150
	NBR	-	2	150	100	150
	SBR	-	17	150	100	150

Table 14 –Left Turn Lane Queues

Intersection	Turning Movement	Current Length (ft)	2040 95th Percentile Queue Length (ft)	City of Scottsdale Minimum Length (ft)	Minimum Recommended 2040 Storage Length (ft)
Mayo Blvd & Driveway B	EBL	-	20	100	100
Mayo Blvd & 78th St	EBL	-	20	100	100
	WBL	-	20	100	100
Mayo Blvd & Driveway C	EBL	-	20	100	100
Mayo Blvd & Driveway D	EBL	-	40	100	100
Mayo Blvd & Driveway E	EBL	-	20	100	100
Hayden Rd & Mayo Blvd	EBL	300	316	100	380
	WBL	-	146	100	150
	NBL	150	103	100	150
	SBL	-	91	100	100
Mayo Blvd & Miller Rd*	EBL	-	181	100	200
	WBL	-	13	100	100
	NBL	-	16	100	100
	SBL	-	111	100	150

**Queues and Recommendations if signalized*

VII. FINDINGS

A. Site Accessibility

The proposed site accesses are anticipated to operate acceptably with the given conditions and the construction of the turn lanes and traffic signals, and roundabout mentioned in the Report.

B. Traffic Impacts

The addition of this MOB+ Site is anticipated to have a minimal impact along Mayo Boulevard and Hayden Road.

C. Need for Improvements

Mayo Boulevard & 78th Street

This intersection operates with an acceptable level of service as a two-way stop-controlled intersection with Mayo Boulevard traffic free flowing for opening day of the MOB+, however, a signal will eventually be warranted as the Overall Site is developed. This intersection should maintain two egress southbound lanes for a dedicated left turn lane and a dedicated right turn lane to minimize the vehicle queue. A westbound right turn lane should be provided at this driveway.

Mayo Boulevard & Miller Road

This intersection operates with an acceptable level of service as a two-way stop controlled intersection for opening day of the MOB+, however, a roundabout will eventually be needed to mitigate traffic delays as the Overall Site is developed. If a roundabout is ruled out in the future, a signal would be warranted in its place.

Miller Road & Driveway A

This driveway operates with an acceptable level of service as a right-in/right-out and left-in only driveway. A preliminary assessment was conducted for sight visibility for a left-out at the driveway. Based on the preliminary design plans for Miller Road under Loop 101, there will be adequate visibility for a driver to

turn left from Driveway A onto Miller Road. A southbound left from Miller Road to Driveway A, is not likely to be feasible with the available width for the roadway passing under Loop 101.

In general, it is recommended to provide a dedicated right turn lane for driveways along Mayo Boulevard and Miller Road. The City of Scottsdale also approved the NWC Hayden Road and Mayo Boulevard TIMA with a comment requiring all site driveways along Mayo Boulevard and Miller Road. Therefore, a westbound right turn lane should be provided at this driveway.

Mayo Boulevard & Driveway B

This driveway operates with an acceptable level of service as a right-in/right-out only driveway. In general, it is recommended to provide a dedicated right turn lane for driveways along Mayo Boulevard and Miller Road. The City of Scottsdale also approved the NWC Hayden Road and Mayo Boulevard TIMA with a comment requiring all site driveways along Mayo Boulevard and Miller Road. Therefore, a westbound right turn lane should be provided at this driveway.

Mayo Boulevard & Driveway D

This driveway should also maintain two egress southbound lanes for a dedicated left turn lane and a dedicated right turn lane to minimize the vehicle queue. The City of Scottsdale also approved the NWC Hayden Road and Mayo Boulevard TIMA with a comment requiring all site driveways along Mayo Boulevard and Miller Road. Therefore, a westbound right turn lane should be provided at this driveway.

Hayden Road & Driveway E

This driveway shall include a southbound right turn lane to account for any potential queue for the southbound right turn lane and to avoid conflicts with the Loop 101 egress ramp traffic.

D. Compliance with Applicable City Codes

The City of Scottsdale Design Standards and Policies Manual, 2018 was referenced throughout this analysis as mentioned throughout this Report.

VIII. RECOMMENDATIONS

A. Roadway Improvements

Based on the analysis of this Report there are several recommendations for the Overall Site driveways and adjacent intersections by opening day of the MOB+ that also take into consideration the additional future development surrounding the Overall Site. The recommendations are in alignment with the approved Kimley Horn TIMA.

Overall, it is recommended to provide a right turn lane for driveways A, B, C, D, E, and at 78th Street into the Overall Site. Per City of Scottsdale Design Standards & Policies Manual, the standard storage length for a right-turn lane is 150 feet as indicated in **Table 13**.

Additional recommendations for specific driveways and adjacent intersections are as follows:

Hayden Road & Driveway E

With a dedicated southbound right turn lane at Hayden Road & Driveway E, the queue length is not anticipated to extend beyond the boundary of the right turn lane. Therefore, the queue is not anticipated to have a negative impact on the operation of the Loop 101 and Hayden interchange.

Mayo Boulevard & 78th Street

A signal is not warranted from both a vehicle capacity and delay perspective for opening day of the MOB+. A signal is warranted in the future as the Overall Site is developed. It is recommended to install signal pull

boxes on all four corners of Mayo Boulevard and 78th Street as well as signal conduit connections between the pull boxes for a future traffic signal for opening day of the MOB+. With the construction of the MOB+, the intersection operates at an acceptable level of service with two-way stop control and Mayo Boulevard traffic free flowing.

Mayo Boulevard & Hayden Road
Provide a southbound right turn lane at the intersection, which is already planned. Additionally, if the Axon development is delayed and the signal is not installed by the completion of the MOB+, a signal will be warranted at the intersection by opening day of the MOB+.

Mayo Boulevard & Miller Road
A signal is not warranted at this intersection from both a vehicle capacity and delay perspective for opening day of the MOB+. A roundabout is planned for this intersection with future development as the right-of-way becomes available. If a round-about is ruled out in the future, a signal will be warranted in the future scenarios with the further development of the Overall Site. With the construction of the MOB+, the intersection operates at an acceptable level of service with two-way stop control and Mayo Boulevard traffic free flowing.

Recommended turn lane storage lengths for all new intersections and turn lanes are given in **Table 13** – **Table 14**.

Appendix G Signal Warrant Analysis

2030 Background Mayo & 78th w/o Axon

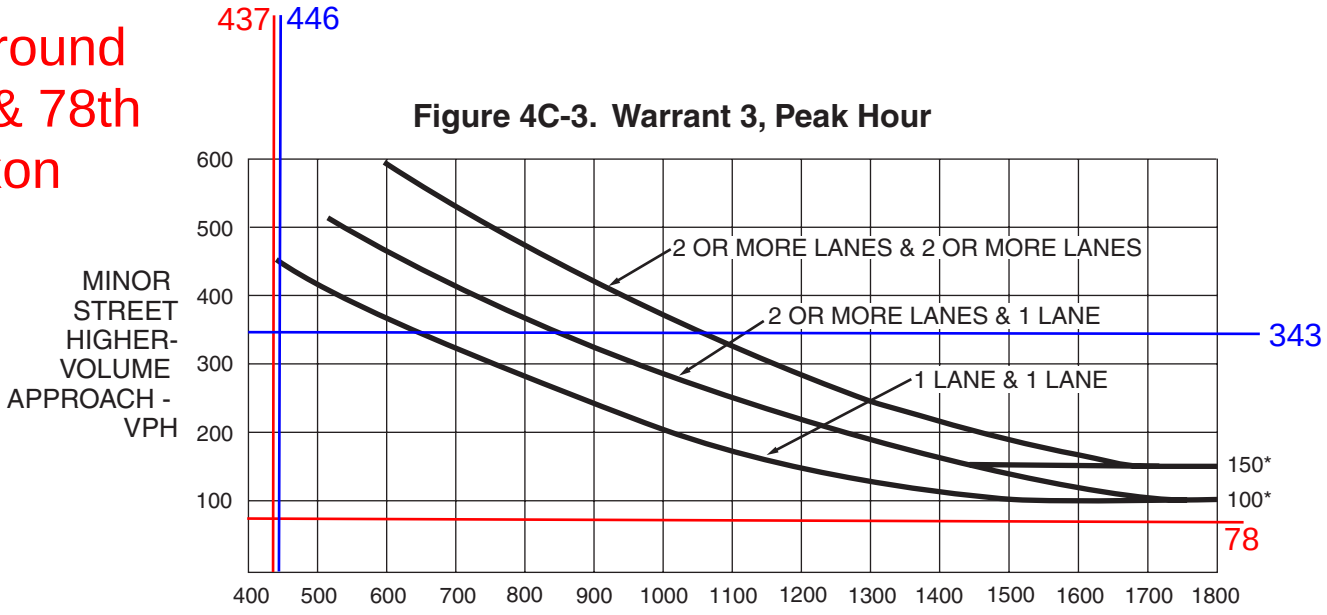


Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

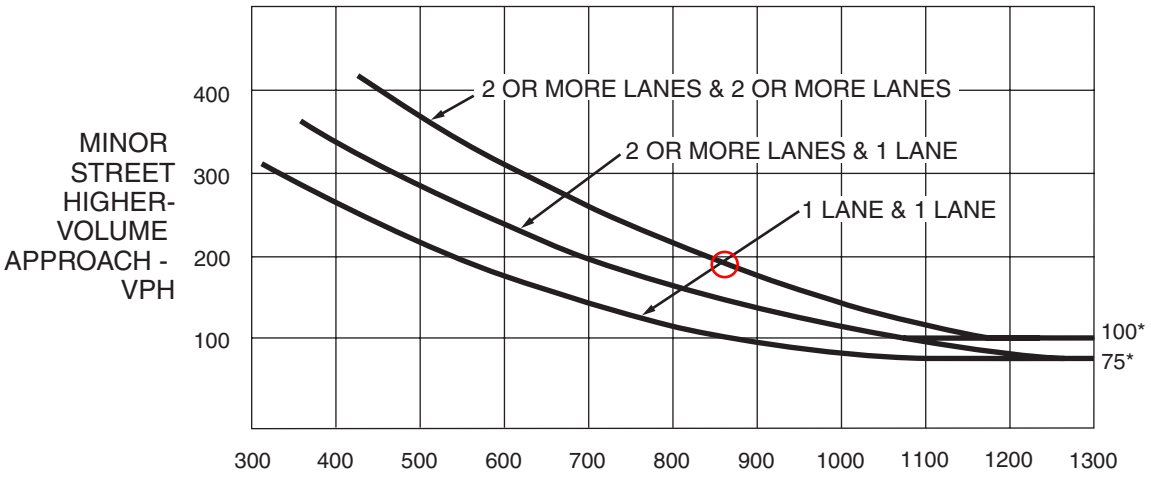
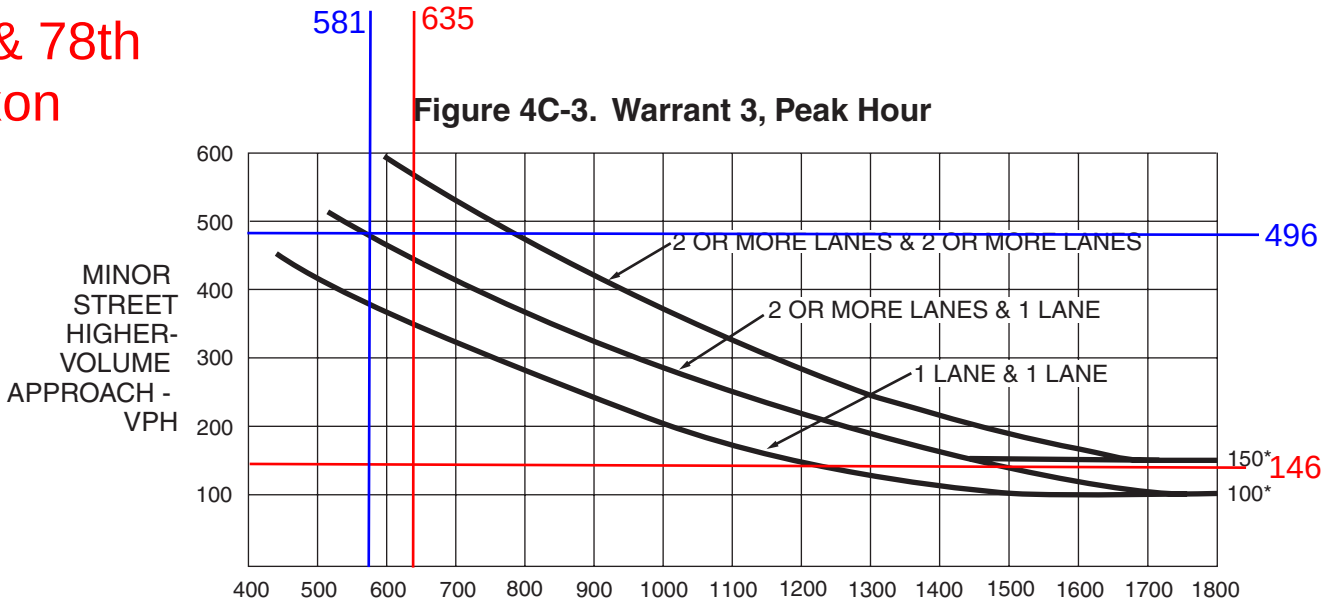


Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

2030 Total
Mayo & 78th
w/o Axon



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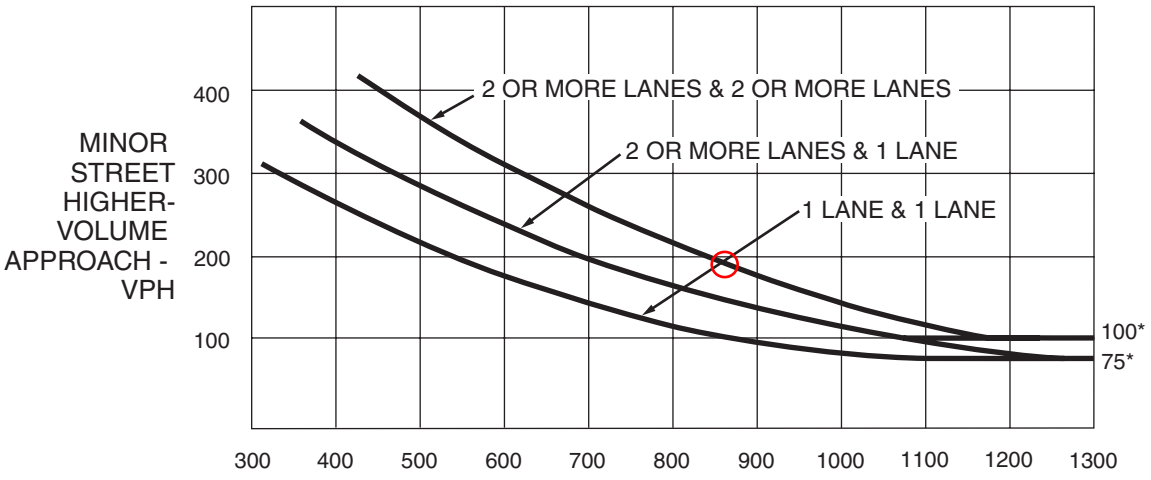

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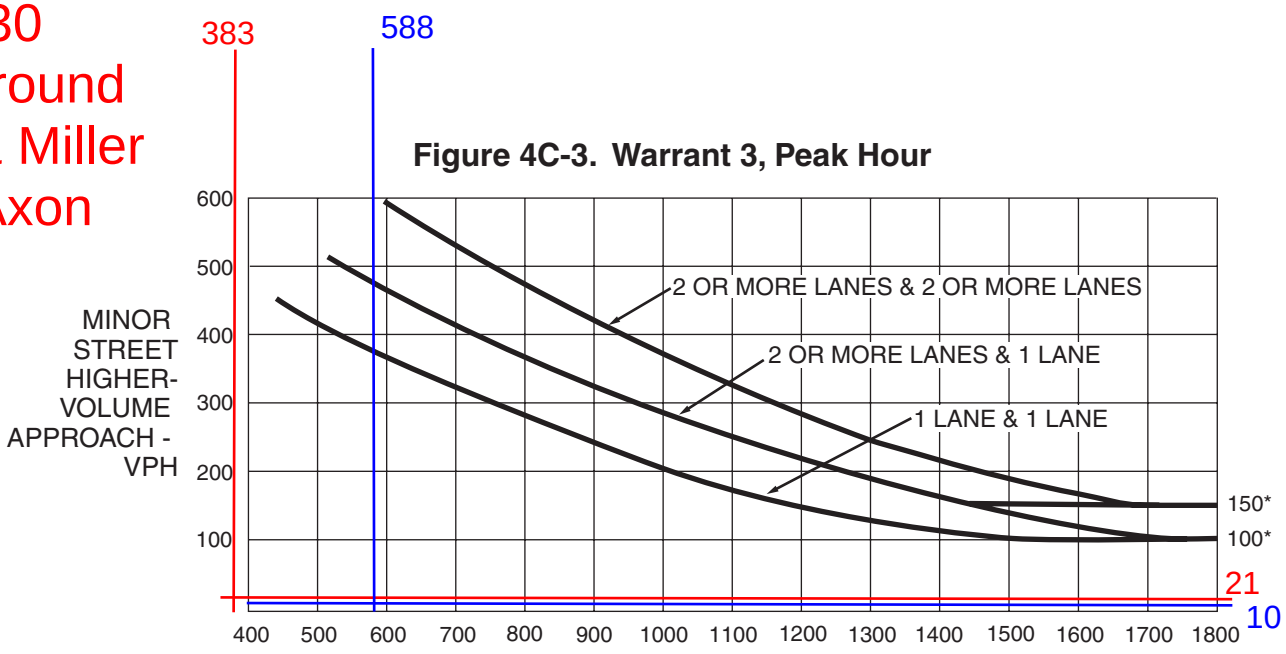
2030 Background Mayo & Miller w/o Axon



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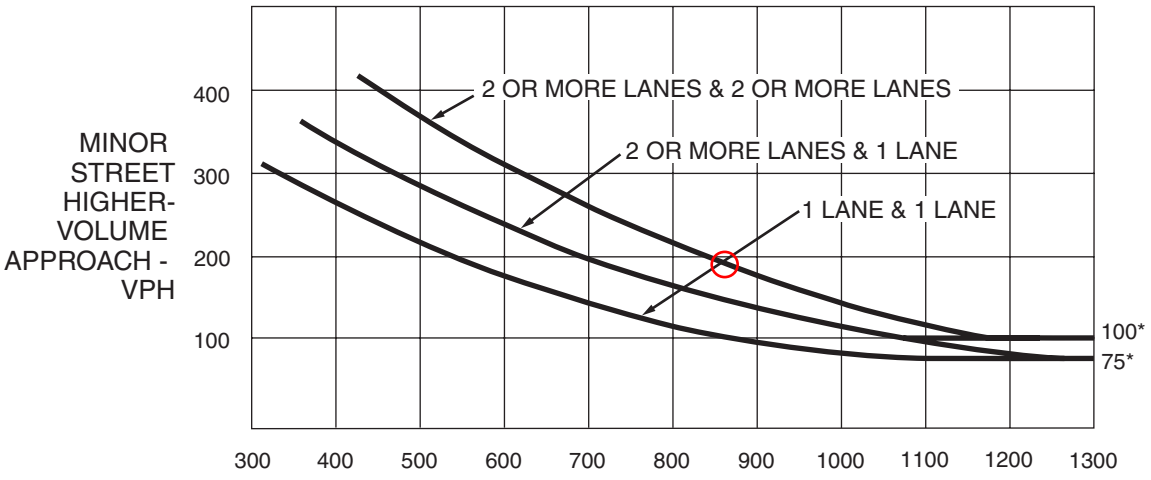

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(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

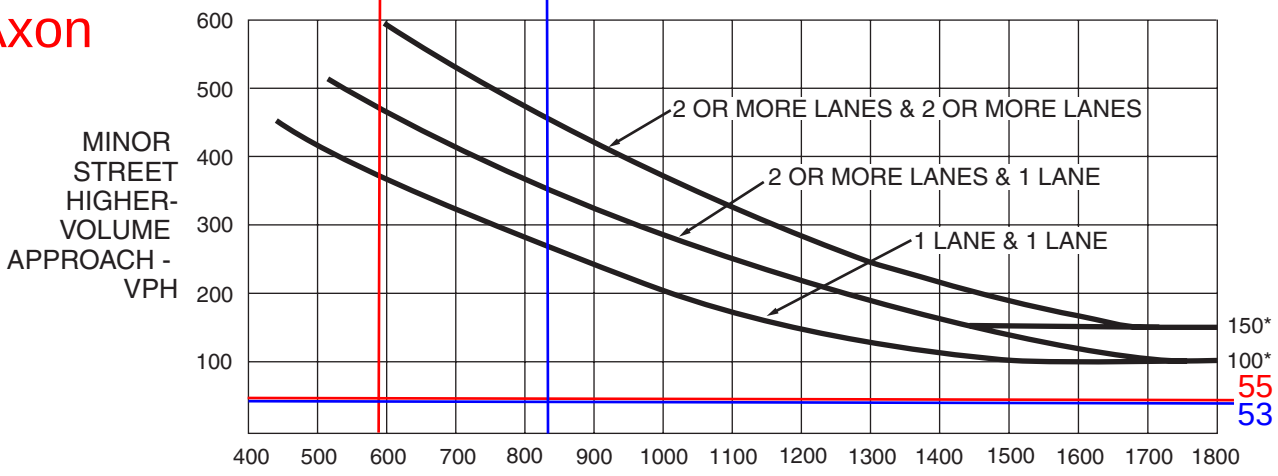
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

2030 Total Mayo & Miller w/o Axon

597

832

Figure 4C-3. Warrant 3, Peak Hour



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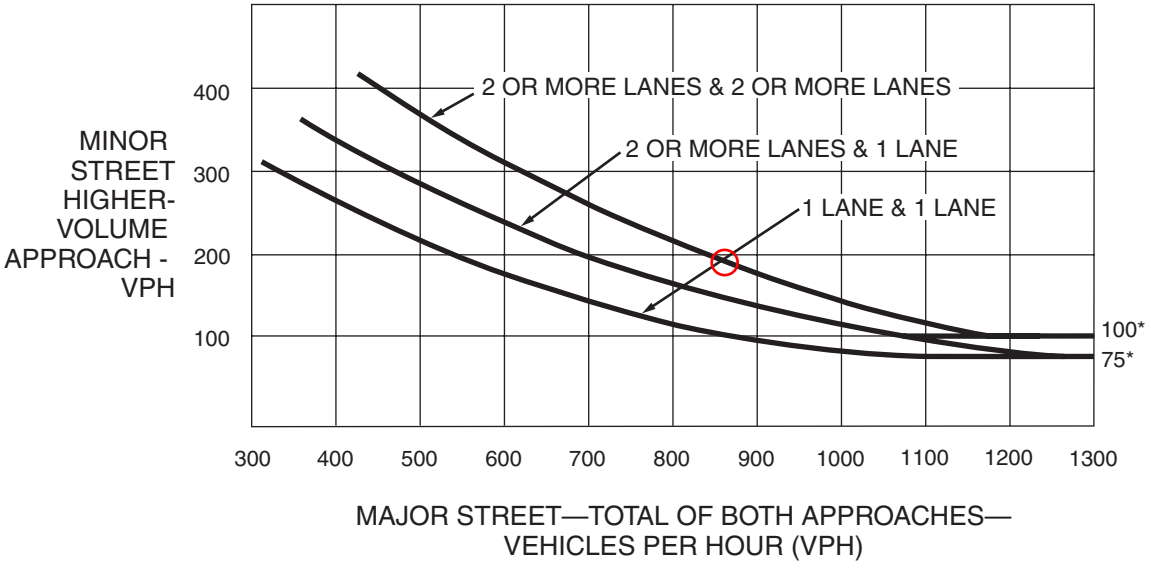

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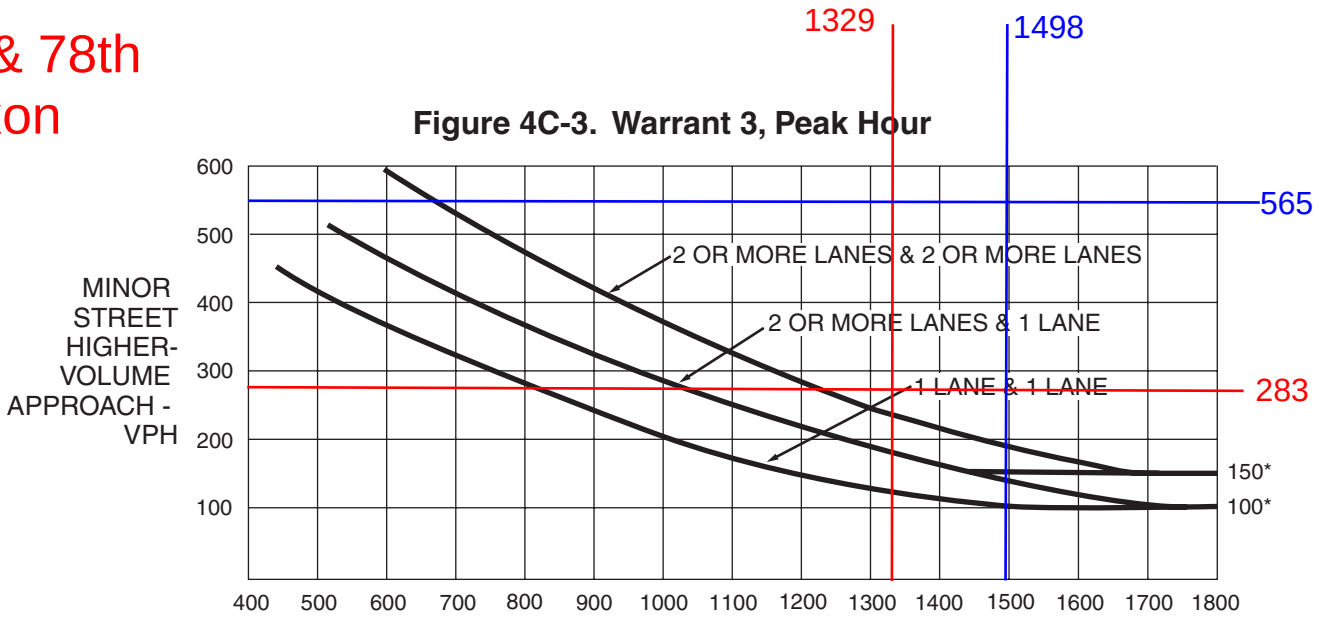
2040
Mayo & 78th
w/o Axon

Figure 4C-3. Warrant 3, Peak Hour



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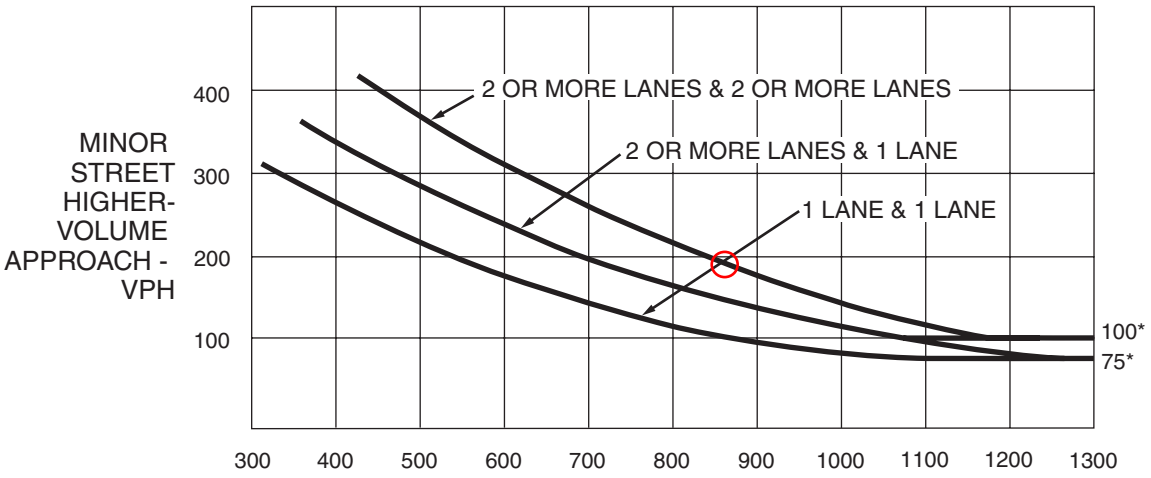

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2040
Mayo & Miller
w/o Axon

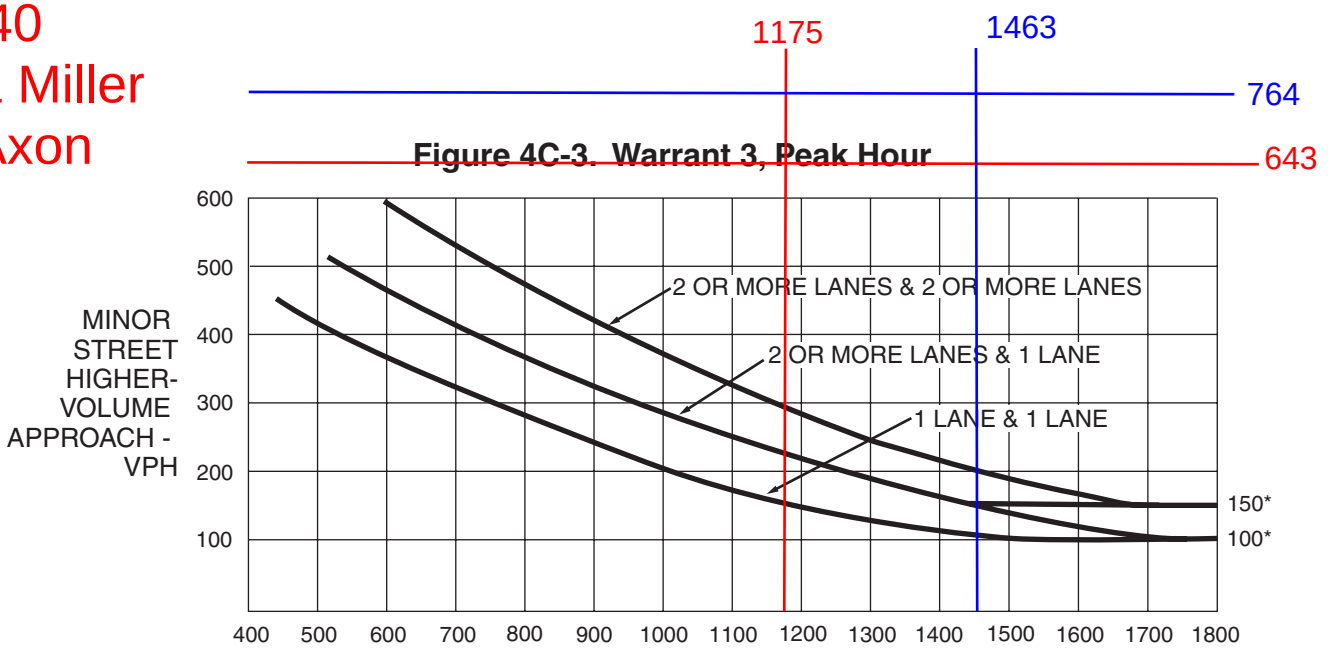

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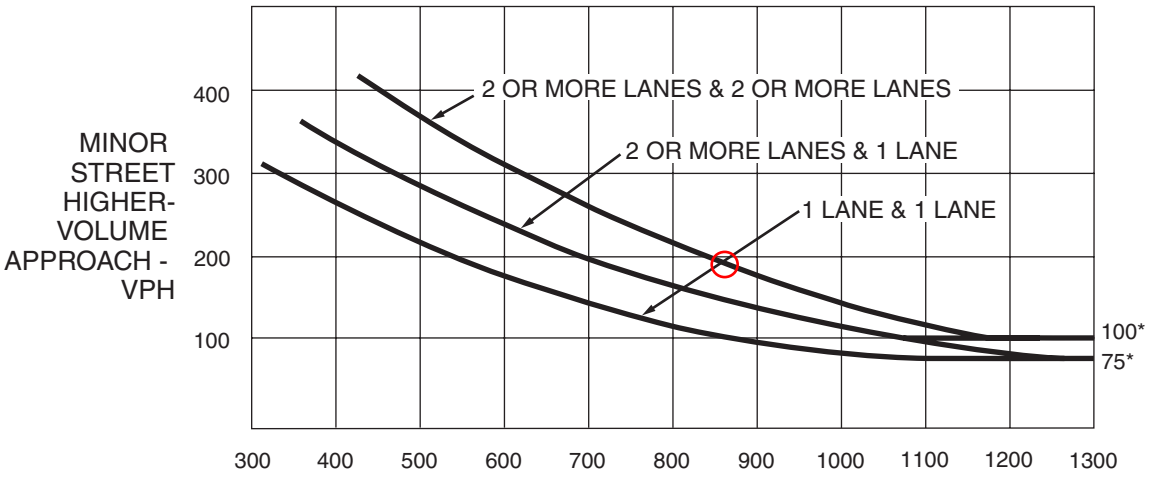
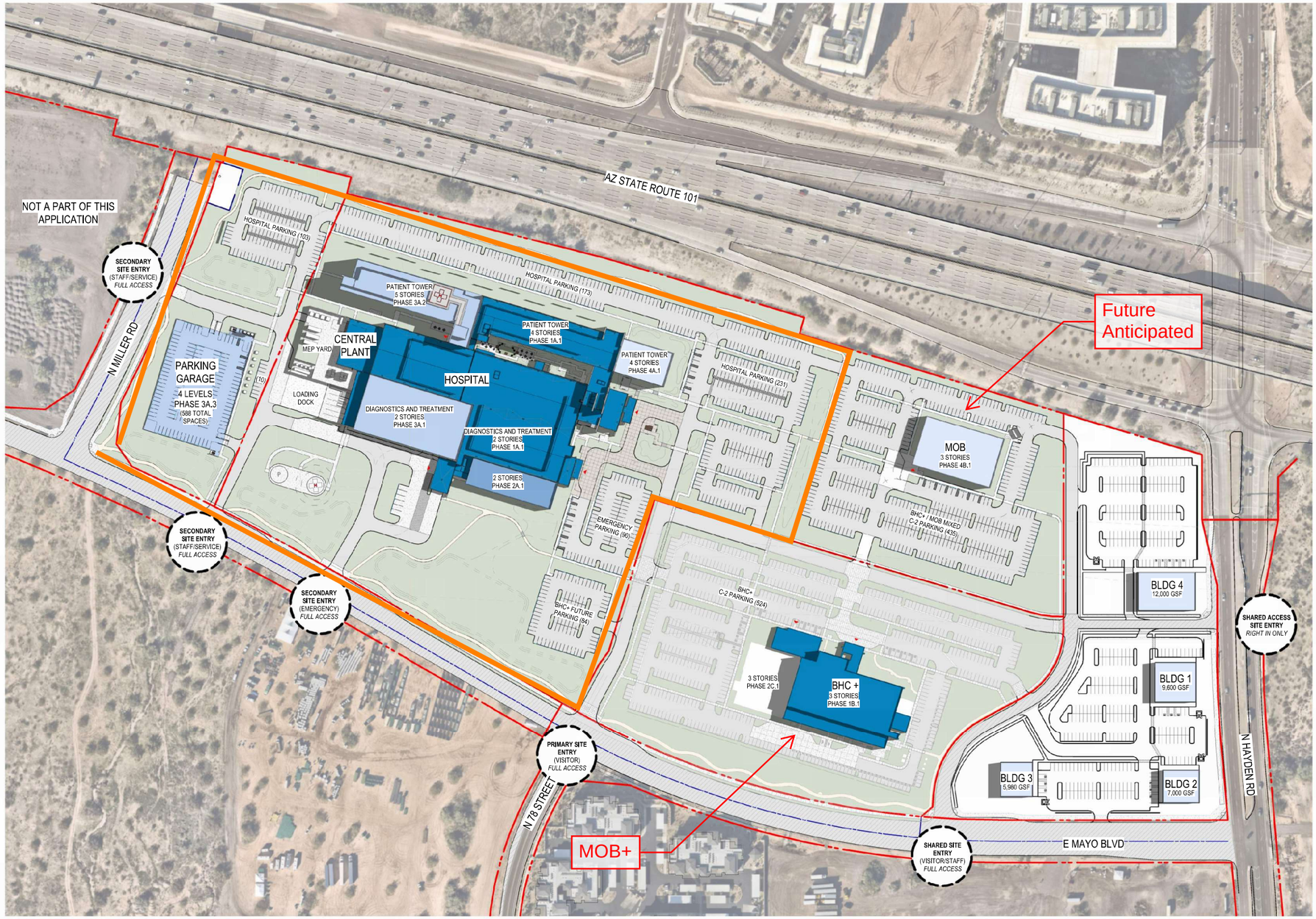
Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Appendix H Conceptual Future Development Circulation Plan



OVERALL DEVELOPMENT SITE PLAN
SCALE: 1" = 120'-0"

NORTH

0 120' 240' 360'
GRAPHIC SCALE: 1" = 120' - 0"

Plot Date: 8/26/2024 10:30:07 AM Author

SITE DATA

PARKING DATA

Banner Scottsdale Medical Center

SCOTTSDALE CAMPUS HOSPITAL
NW Corner of Hayden Rd. and Mayo Blvd.
Scottsdale, Arizona 85255

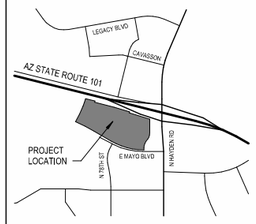
SMITHGROUP
455 NORTH THIRD STREET
SUITE 250
PHOENIX, AZ 85004
602.265.2200
smithgroup.com

ISSUED FOR	REV	DATE
ENTITLEMENT REVIEW		09MAY23

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

VICINITY MAP



SHEET TITLE
OVERALL DEVELOPMENT SITE PLAN

PROJECT NUMBER
CUP_A1.1.1
SHEET NUMBER

PROJECT SHEET INDEX

SHEET NUMBER	SHEET NAME
ARCHITECTURAL	
ENT_G0.1	COVER SHEET
CIVIL	
ENT_C2.0	PRELIMINARY GRADING & DRAINAGE PLAN
LANDSCAPE	
ENT_LP100	LANDSCAPE PLAN
ENT_LP101	HARDSCAPE PLAN
ARCHITECTURAL	
ENT_A1.0.0	CONTEXT AERIAL SITE PLAN
ENT_A1.0.1	CONTEXT PHOTOGRAPHS
ENT_A1.0.2	CONTEXT PHOTOGRAPHS
ENT_A1.0.3	CONTEXT PHOTOGRAPHS
ENT_A1.0.4	CONTEXT PHOTOGRAPHS
ENT_A1.0.5	CONTEXT PHOTOGRAPHS
ENT_A1.1.0	ARCHITECTURAL SITE PLAN - OVERALL
ENT_A1.1.1	ENLARGED SITE PLAN AND PARKING PLAN - AREA A
ENT_A1.1.2	ENLARGED SITE PLAN AND PARKING PLAN - AREA B
ENT_A1.1.3	ENLARGED SITE PLAN AND PARKING PLAN - AREA C
ENT_A1.1.4	ENLARGED SITE PLAN AND PARKING PLAN - AREA D
ENT_A1.1.5	ENLARGED SITE PLAN AND PARKING PLAN - AREA E
ENT_A1.1.6	ENLARGED SITE PLAN AND PARKING PLAN - AREA F
ENT_A1.2.1	REFUSE PLAN
ENT_A1.3.1	OPEN SPACE PLAN
ENT_A1.4.1	PHASING PLAN
ENT_A1.5.1	PEDESTRIAN AND VEHICULAR CIRCULATION PLAN
ENT_A1.6.1	PARKING PLAN
ENT_A1.7.1	INTERNATIONAL GREEN CONSTRUCTION CODE
ENT_A2.1.0	LEVEL 1 FLOOR PLAN - OVERALL PHASE 1
ENT_A2.2.0	LEVEL 2 FLOOR PLAN - OVERALL PHASE 1
ENT_A2.3.0	LEVEL 3 FLOOR PLAN - OVERALL PHASE 1
ENT_A2.4.0	LEVEL 4 FLOOR PLAN - OVERALL PHASE 1
ENT_A2.5.0	ROOF PLAN - OVERALL PHASE 1
ENT_A4.0.0	BANNER HEALTH DESIGN PRECEDENTS
ENT_A4.1.1	EXTERIOR ELEVATIONS
ENT_A4.1.2	EXTERIOR ELEVATIONS
ENT_A4.1.4	EXTERIOR CONCEPT RENDERINGS
ENT_A4.1.5	EXTERIOR CONCEPT RENDERINGS
ELECTRICAL	
ENT_E1	ELECTRICAL SITE PHOTOMETRY PLAN
ENT_E2	ELECTRICAL SITE PHOTOMETRY PLAN
ENT_E3	ELECTRICAL LIGHTING SPECIFICATION SHEETS
ENT_E4	ELECTRICAL LIGHTING SPECIFICATION SHEETS
ENT_E5	ELECTRICAL LIGHTING SPECIFICATION SHEETS
ENT_E6	ELECTRICAL LIGHTING SPECIFICATION SHEETS
ENT_E7	ELECTRICAL LIGHTING SPECIFICATION SHEETS
ENT_E8	ELECTRICAL LIGHTING SPECIFICATION SHEETS

PROJECT TEAM

OWNER / CLIENT:

BANNER HEALTH
2901 NORTH CENTRAL AVENUE, SUITE 160
PHOENIX, AZ 85012
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F: 602-747-4185
WEBSITE: www.bannerhealth.com

ARCHITECT:

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PHOENIX, AZ 85004
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F: 602-265-2244
WEBSITE: www.smithgroup.com

CIVIL ENGINEER:

DIBBLE ENGINEERING
177 NORTH CHURCH AVENUE, SUITE 711
TUCSON, AZ 85701
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WEBSITE: www.dibblecorp.com

LANDSCAPE ARCHITECT:

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F: 602-265-2244
WEBSITE: www.smithgroup.com

ELECTRICAL ENGINEER:

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455 NORTH THIRD STREET, SUITE 250
PHOENIX, AZ 85004
T: 602-265-2200
F: 602-265-2244
WEBSITE: www.smithgroup.com

CITY OF SCOTTSDALE

INTERNATIONAL BUILDING CODES

(IBC)	INTERNATIONAL BUILDING CODE	2021
(IEBC)	INTERNATIONAL REHABILITATION CODE	2021
(IECC)	INTERNATIONAL ENERGY CONSERVATION CODE	2021
(IFC)	INTERNATIONAL FIRE CODE	2021
(IMC)	INTERNATIONAL MECHANICAL CODE	2021
(IPC)	INTERNATIONAL PLUMBING CODE	2021

SITE DATA

PROPERTY DESCRIPTION:

NW CORNER OF HAYDEN ROAD AND MAYO BOULEVARD
SCOTTSDALE, AZ 85255
LOCATED IN SEC 36, 4N, 4E, MARICOPA COUNTY, ARIZONA

EXISTING ZONING DESIGNATION:	C2-PCD AND I-1 PCD
EXISTING USE:	VACANT
ZONING:	PCD
LAND USE DESIGNATION:	CO

SITE SIZE - GROSS / NET:

1,372,138 SQ. FT. GROSS / 1,257,577 SQ. FT. NET

PROPOSED SCREENING:

SITE WALLS, BERMS, PLANTS/TREES

OPEN SPACE: *SECTION 6.806.A, SECTION 6.804.C.3*

REQUIRED: 301,818 SQ.FT.
PROVIDED: 545,850 SQ. FT.
(SEE SHEET ENT_A1.3.1 FOR BREAKDOWN)

PROPOSED USES:

HOSPITAL / CENTRAL UTILITY PLANT

HOSPITAL BUILDING AREA - GROSS:

LEVEL 1: 237,500 SQ. FT.
LEVEL 2: 227,500 SQ. FT.
LEVEL 3: 73,500 SQ.FT.
LEVEL 4: 73,500 SQ.FT.
LEVEL 5: 28,000 SQ.FT.
TOTAL: 640,000 SQ.FT.
MAX BUILDING HEIGHT: 85'-0"

CENTRAL UTILITY PLANT BUILDING AREA - GROSS:

LEVEL 1: 10,000 SQ. FT.
TOTAL: 10,000 SQ.FT.
MAX BUILDING HEIGHT: 20'-0"

FLOOR AREA RATIO (FAR): *SECTION 6.804.D*

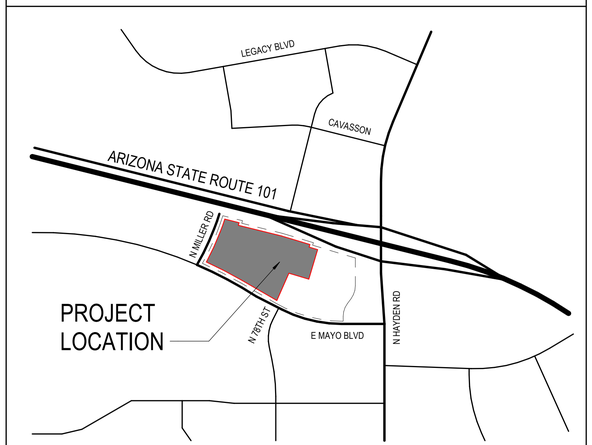
MAXIMUM: 0.60
PROVIDED: 0.52

FAR = TOTAL USABLE BUILDING AREA / NET SITE AREA
(640,000 + 10,000) SQ. FT. / 1,257,577 SQ. FT. = 0.52

PARKING STRUCTURE - GROSS:

LEVELS 1-4: 52,900 SQ. FT.
TOTAL: 211,600 SQ.FT.
MAX BUILDING HEIGHT: 75'-0"

VICINITY MAP



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ISSUED FOR	REV	DATE
ENTITLEMENT REVIEW		14JUL25

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

SHEET TITLE

COVER SHEET

PROJECT NUMBER

ENT_G0.1

SHEET NUMBER

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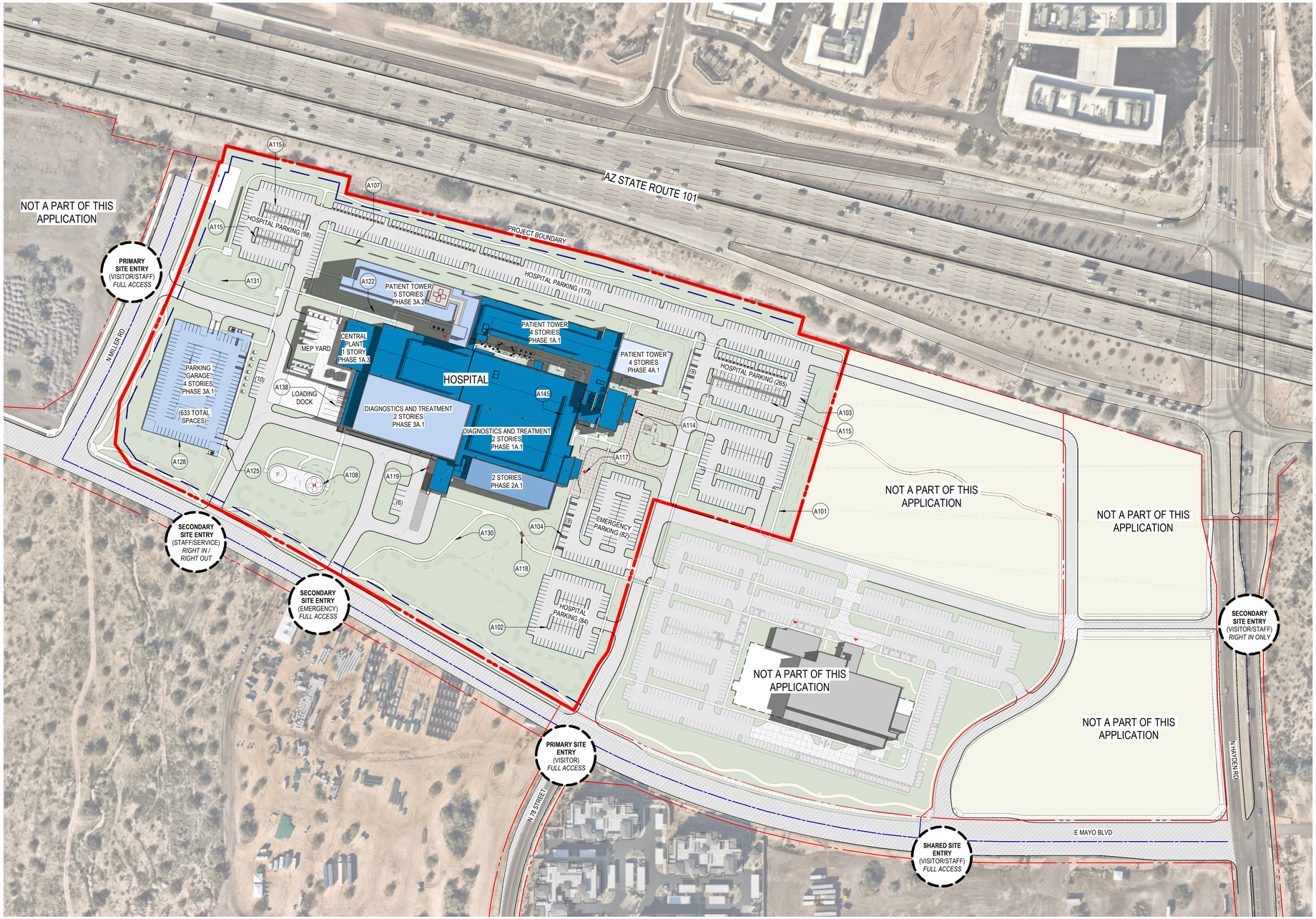

OVERALL SITE PLAN
SCALE: 1" = 120'-0"

NORTH

0 120' 240' 360'
GRAPHIC SCALE: 1" = 120' - 0"

SITE PLAN NOTES

A. ALL PARKING SPACES ARE 9'-0" WIDE X 18'-0" LONG W/ A MINIMUM DRIVE AISLE OF 24'-0". DRIVE AISLES ARE WIDER FOR FIRE LANES AND ARE NOTED ON THE PLANS.

B. ALL SIDEWALKS ARE A MINIMUM OF 6'-0".

C. ACCESSIBLE PARKING SPACES MEET DSPM, ZONING, AND ADA STANDARDS. THEY ARE SIZED TO BE 11'-0" WIDE X 18'-0" LONG WITH A 5'-0" ACCESS AISLES BETWEEN A MAXIMUM OF (2) ACCESSIBLE SPACES.

D. REFER TO AND COORDINATE WITH CIVIL, LANDSCAPE, STRUCTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL SITE INFORMATION NOT SHOWN ON THIS DRAWING.

SITE DATA

PROPERTY DESCRIPTION:

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SCOTTSDALE, AZ 85255
LOCATED IN SEC 36, 4N, 4E, MARICOPA COUNTY, ARIZONA

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TOTAL: 640,000 SQ.FT.
MAX BUILDING HEIGHT: 85'-0"

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TOTAL: 10,000 SQ.FT.
MAX BUILDING HEIGHT: 20'-0"

FLOOR AREA RATIO (FAR): *SECTION 6.804.D*

MAXIMUM: 0.60
PROVIDED: 0.52

FAR = TOTAL USABLE BUILDING AREA / NET SITE AREA
(640,000 + 10,000) SQ. FT. / 1,257,577 SQ. FT. = 0.52

PARKING STRUCTURE - GROSS:

LEVELS 1-4: 52,900 SQ. FT.
TOTAL: 211,600 SQ.FT.
MAX BUILDING HEIGHT: 75'-0"

SHEET KEYNOTES

A101	SIDEWALK
A102	LANDSCAPE PARKING ISLAND
A103	PARKING STALL: 9'-0" X 18'-0", TYP.
A104	ADA PARKING STALL: 11'-0" X 18'-0" WITH 5'-0" ACCESS AISLE
A107	CMU SITE WALL
A108	HELICOPTER PAD
A114	BUILDING ENTRY
A115	PV PARKING CANOPY
A117	EMERGENCY DEPARTMENT ENTRY
A118	LANDSCAPE FEATURE (BRIDGE)
A119	AMBULANCE ENTRY
A122	BICYCLE PARKING
A125	TRAFFIC BARRIER ARM
A128	PARKING BUILDING STRUCTURE
A130	DG WALKING PATH
A131	PHASE 1 RETENTION BASIN - REFER TO CIVIL
A138	TRASH COMPACTOR
A145	MECHANICAL SCREENWALL - TOP OF HIGHEST UNIT WILL BE SCREENED

Banner Scottsdale Medical Center

SCOTTSDALE CAMPUS HOSPITAL
NW Corner of Hayden Rd. and Mayo Blvd.
Scottsdale, Arizona 85255

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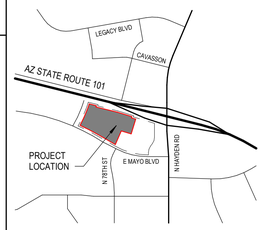
ISSUED FOR	REV	DATE
ENTITLEMENT REVIEW		*14JUL25*

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

VICINITY MAP



SHEET TITLE

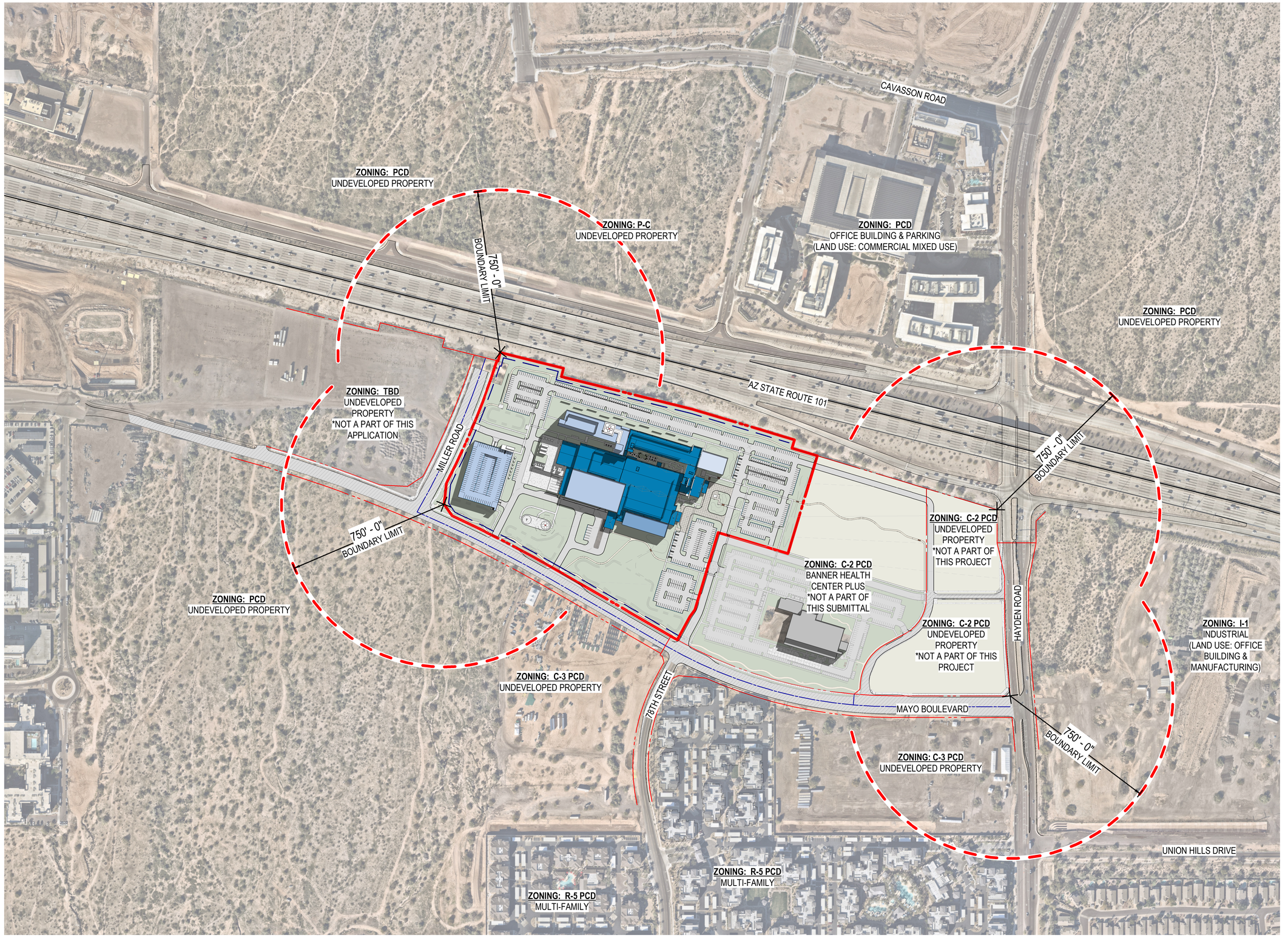
ARCHITECTURAL SITE PLAN - OVERALL

PROJECT NUMBER

ENT_A1.1.0

SHEET NUMBER

Author
7/11/2025 1:06:36 PM
Plot Date:



CONTEXT AERIAL SITE PLAN
SCALE: 1" = 200'-0"

NORTH

0 200' 400' 600'
GRAPHIC SCALE: 1" = 200' - 0"

Plot Date: 7/11/2025 1:06:24 PM Author

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ENTITLEMENT REVIEW		*14JUL25*

SEALS AND SIGNATURES

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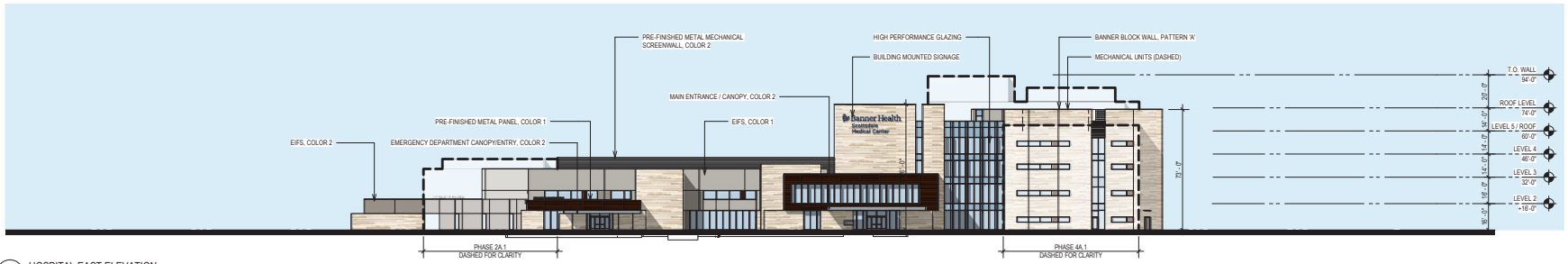
SHEET TITLE

CONTEXT AERIAL SITE PLAN

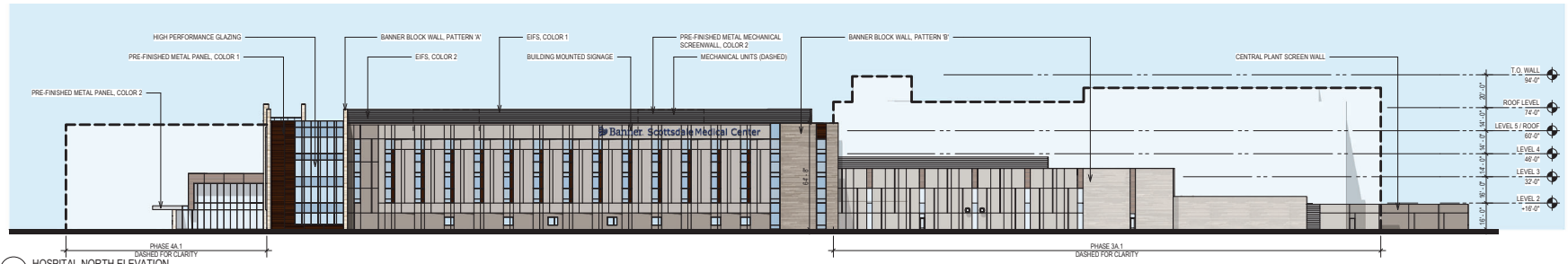
PROJECT NUMBER

ENT_A1.0.0

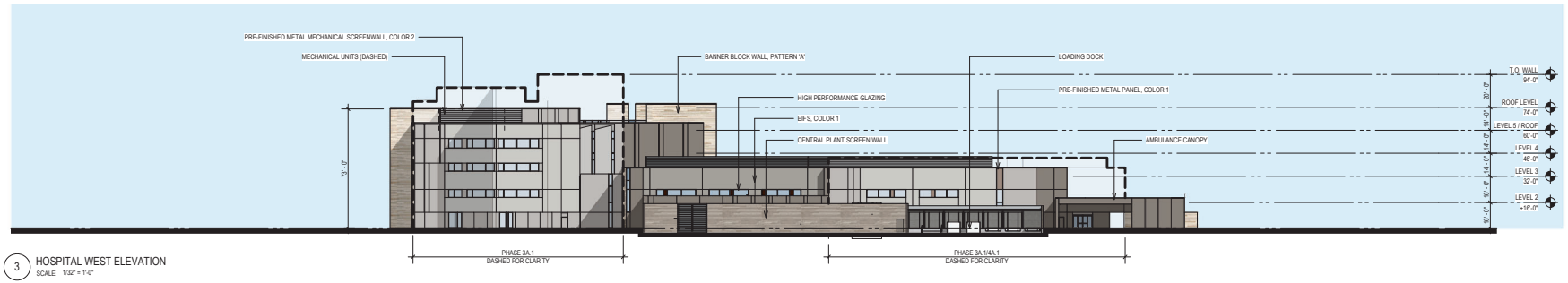
SHEET NUMBER



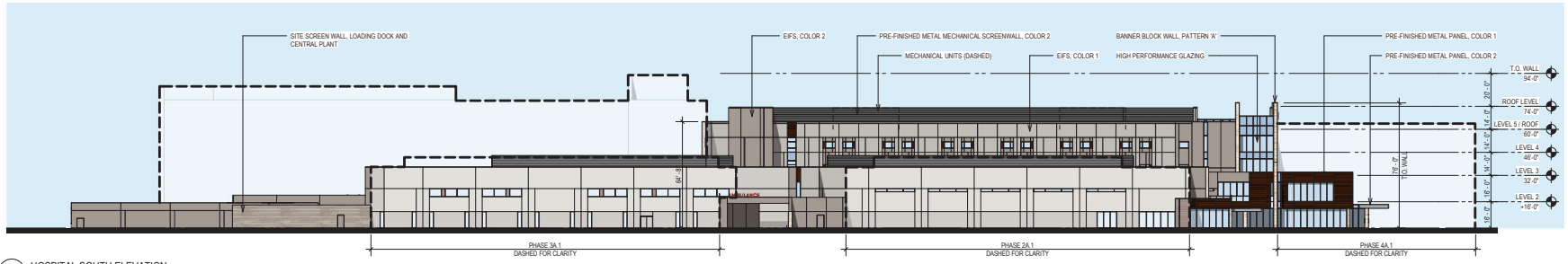
1 HOSPITAL EAST ELEVATION
SCALE: 1/32" = 1'-0"



2 HOSPITAL NORTH ELEVATION
SCALE: 1/32" = 1'-0"



3 HOSPITAL WEST ELEVATION
SCALE: 1/32" = 1'-0"



4 HOSPITAL SOUTH ELEVATION
SCALE: 1/32" = 1'-0"

Plot Date: 7/11/2025 1:08:46 PM Author

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SEALS AND SIGNATURES

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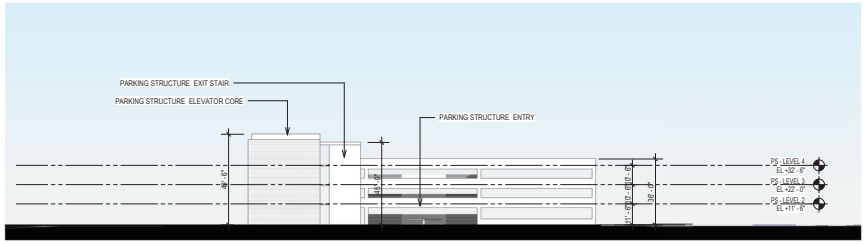
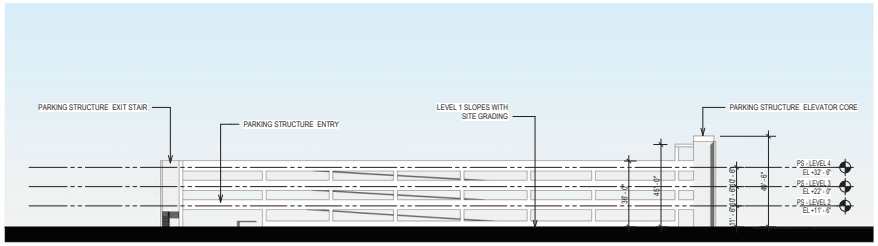
SHEET TITLE
EXTERIOR ELEVATIONS

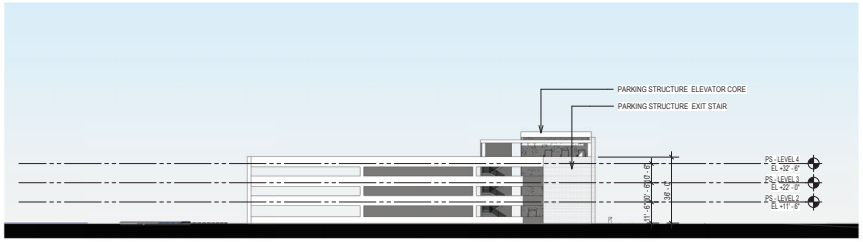
PROJECT NUMBER
ENT_A4.1.1
SHEET NUMBER



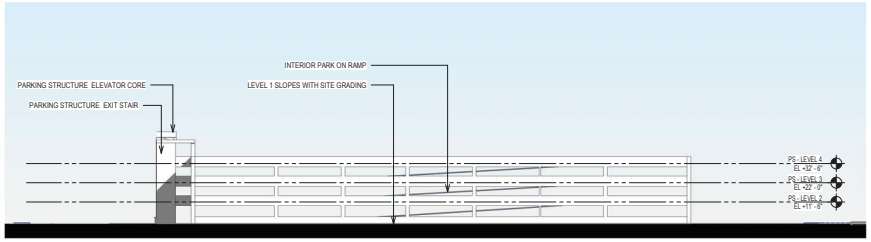
1 PARKING STRUCTURE - NORTH ELEVATION
SCALE: 1/32" = 1'-0"



2 PARKING STRUCTURE - EAST ELEVATION
SCALE: 1/32" = 1'-0"



3 PARKING STRUCTURE - SOUTH ELEVATION
SCALE: 1/32" = 1'-0"



4 PARKING STRUCTURE - WEST ELEVATION
SCALE: 1/32" = 1'-0"

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SEALS AND SIGNATURES

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SHEET TITLE
EXTERIOR ELEVATIONS

PROJECT NUMBER
ENT_A4.1.2
SHEET NUMBER



1 HOSPITAL ENTRY_PHASE 1
SCALE: NOT TO SCALE



2 HOSPITAL SOUTH EAST PERSPECTIVE_PHASE 1
SCALE: NOT TO SCALE



3 HOSPITAL ENTRY PERSPECTIVE_PHASE 1
SCALE: NOT TO SCALE



4 HOSPITAL SOUTH PERSPECTIVE_PHASE 1
SCALE: NOT TO SCALE

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SHEET TITLE
EXTERIOR CONCEPT RENDERINGS

PROJECT NUMBER
ENT_A4.1.4
SHEET NUMBER



LEVEL 1 FLOOR PLAN - OVERALL

SCALE: 1" = 30'-0"

GRAPHIC LEGEND

- PUBLIC / ADMINISTRATION
- GENERAL SERVICES / BUILDING SUPPORT
- DIAGNOSTICS & TREATMENT
- CLINICAL SUPPORT
- NURSING / PATIENT UNITS
- SHELL SPACE
- VERTICAL CIRCULATION
- PRIMARY BUILDING ENTRY / EXIT
- BUILDING EXIT

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SHEET TITLE

LEVEL 1 FLOOR PLAN - OVERALL PHASE 1

PROJECT NUMBER

ENT_A2.1.0

SHEET NUMBER

Plot Date: 7/11/2025 1:07:47 PM Author



LEVEL 2 FLOOR PLAN - OVERALL

SCALE: 1" = 30'-0"

NORTH

GRAPHIC LEGEND

- PUBLIC / ADMINISTRATION
- GENERAL SERVICES / BUILDING SUPPORT
- DIAGNOSTICS & TREATMENT
- CLINICAL SUPPORT
- NURSING / PATIENT UNITS
- SHELL SPACE
- VERTICAL CIRCULATION
- PRIMARY BUILDING ENTRY / EXIT
- BUILDING EXIT

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SEALS AND SIGNATURES

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SHEET TITLE

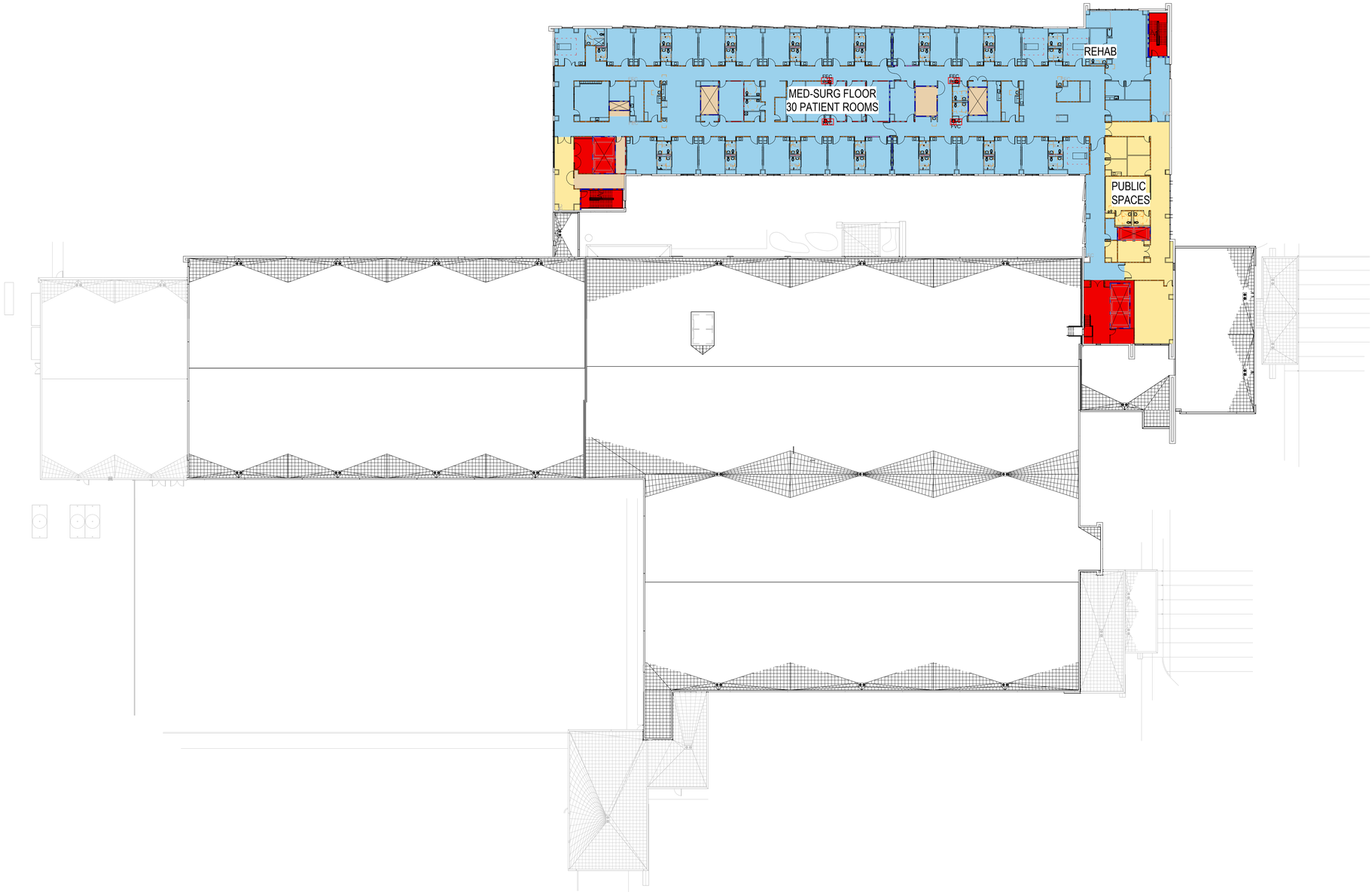
LEVEL 2 FLOOR PLAN - OVERALL PHASE 1

PROJECT NUMBER

ENT_A2.2.0

SHEET NUMBER

Plot Date: 7/11/2025 1:07:56 PM Author



GRAPHIC LEGEND

- PUBLIC / ADMINISTRATION
- GENERAL SERVICES / BUILDING SUPPORT
- DIAGNOSTICS & TREATMENT
- CLINICAL SUPPORT
- NURSING / PATIENT UNITS
- SHELL SPACE
- VERTICAL CIRCULATION
- PRIMARY BUILDING ENTRY / EXIT
- BUILDING EXIT

LEVEL 3 FLOOR PLAN - OVERALL

SCALE: 1" = 30'-0"

NORTH

Plot Date: 7/11/2025 1:08:02 PM Author

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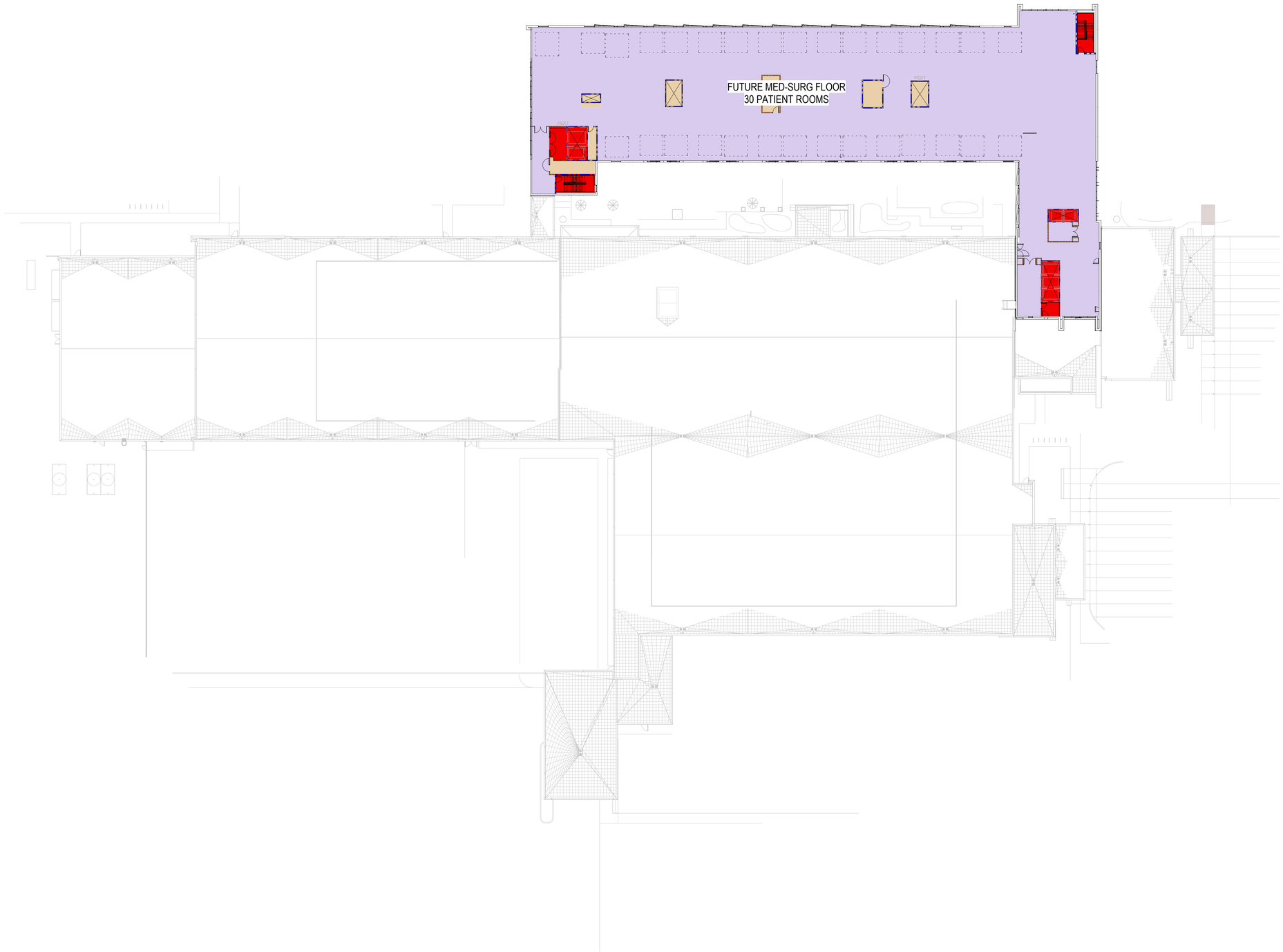
SHEET TITLE

LEVEL 3 FLOOR PLAN - OVERALL PHASE 1

PROJECT NUMBER

ENT_A2.3.0

SHEET NUMBER



LEVEL 4 FLOOR PLAN - OVERALL

SCALE: 1" = 30'-0"

NORTH

GRAPHIC LEGEND

- PUBLIC / ADMINISTRATION
- GENERAL SERVICES / BUILDING SUPPORT
- DIAGNOSTICS & TREATMENT
- CLINICAL SUPPORT
- NURSING / PATIENT UNITS
- SHELL SPACE
- VERTICAL CIRCULATION
- PRIMARY BUILDING ENTRY / EXIT
- BUILDING EXIT

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SHEET TITLE

LEVEL 4 FLOOR PLAN - OVERALL PHASE 1

PROJECT NUMBER

ENT_A2.4.0

SHEET NUMBER

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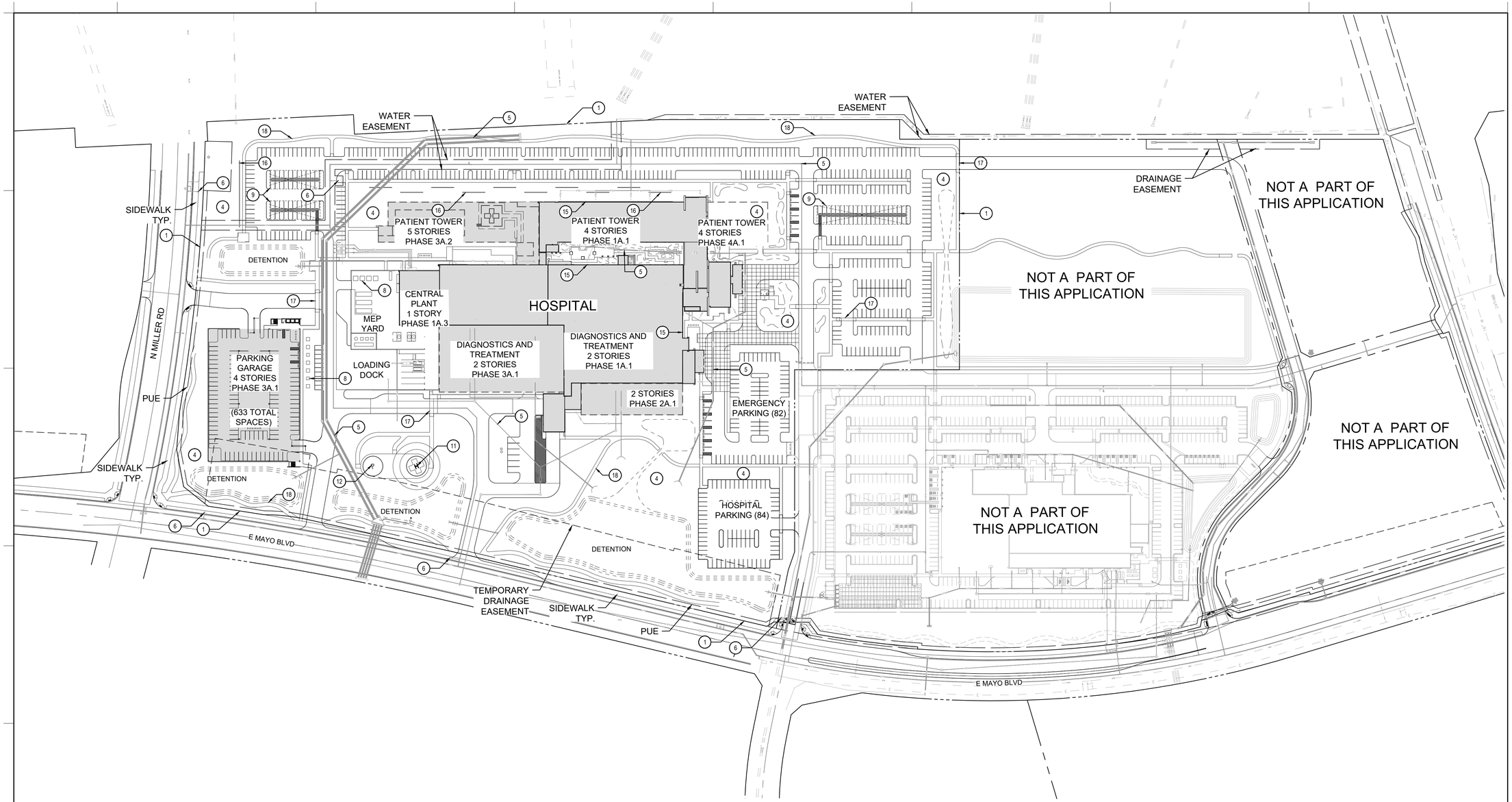

KEYNOTES

1. PROPERTY LINE
2. SIGHT VISIBILITY LINE
3. LIMIT OF CONSTRUCTION / DISTURBANCE
4. LANDSCAPE AREA - SEE LAND.
5. UNDERGROUND UTILITY - SEE CIVIL
6. FIRE HYDRANT - MAINTAIN 5' CLEAR
7. DOMESTIC WATER METER / BACKFLOW PREVENTER
8. TRANSFORMER - SEE ELEC.
9. PARKING CANOPY - SEE ARCH.
10. TRASH ENCLOSURE - SEE ARCH.
11. HELIPAD
12. HELIPAD PARKING
13. SIGNAGE - SEE ARCH.
14. BUILDING CANOPY - SEE ARCH.
15. BUILDING WALL - SEE ARCH.
16. CMU SCREEN WALL
17. PEDESTRIAN CROSSING
18. 6'-8' WIDE 1/4" MINUS STABILIZED D.G. WELLNESS PATH W/ STEEL HEADER ON BOTH SIDES
19. LANDSCAPE ACCENT LIGHTING (NOT SHOWN) - SEE ELECTRICAL PLANS
20. SITE LIGHTING - SEE ELEC.

NORTH

SCALE: 100 200 1:100

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SEALS AND SIGNATURES

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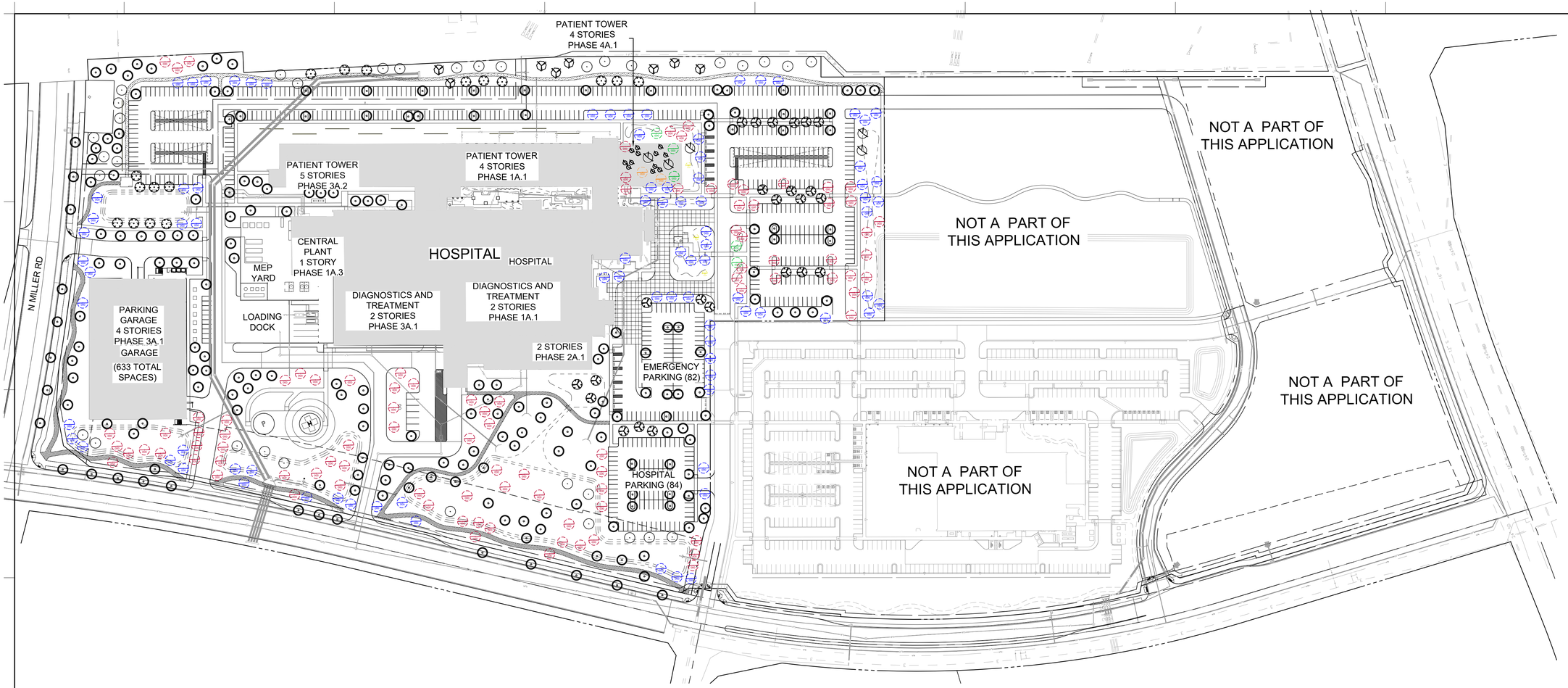
SHEET TITLE

OVERALL HARDSCAPE PLAN

PROJECT NUMBER

LS100

SHEET NUMBER



NOTES:

- LANDSCAPE DESIGN TO CONSIST OF NATIVE AND REGIONALLY ADAPTED TREE/SHRUB/CACTI SPECIES THAT ARE LOW WATER USE BY NATURE. NO TURF/LAWN AREAS PROPOSED FOR THE PROJECT LANDSCAPE DESIGN.
- LANDSCAPE AREAS CAPTURE AND FILTER WATER WHERE POSSIBLE.
- FINAL TREE/PLANT QUANTITY AND TREE/PLANT SPECIES TO BE DETERMINED. TREE/PLANT SPECIES TO MEET CODE REQUIREMENTS.
- SALVAGE PLANT MATERIALS TO BE USED TO BE DETERMINED BASED ON APPROVED NATIVE INVENTORY AND SALVAGE PLANS AND AVAILABLE PLANTS REMAINING - COORDINATION OF THIS IS PENDING.
- ALL TREES AND PLANTS TO BE FED BY AUTOMATIC UNDERGROUND IRRIGATION SYSTEM DELIVERING WATER DIRECTLY TO EACH TREE AND SHRUB IN TIMED INTERVALS THROUGH DRIP EMITTERS.
- TREES, SHRUBS AND CACTI TO BE VALVED SEPARATELY TO CONTROL AMOUNT AND DURATION OF WATERING TO MEET INDIVIDUAL SPECIES NEEDS AND AVOID OVER-WATERING.
- IRRIGATION SYSTEM TO UTILIZE MASTER VALVE THAT WILL AUTOMATICALLY SHUT DOWN SYSTEM IN EVENT OF DETECTED WATER LEAK WITHIN OVERALL SYSTEM AND RAIN SENSORS TO MONITOR LOCAL WEATHER CONDITIONS AND ADJUST WATER SCHEDULE ACCORDINGLY.
- ALL PLANTING AREAS THROUGHOUT PROJECT TO BE TOP-DRESSED WITH 2" DEPTH GRANITE MULCH TO RETAIN MOISTURE AT TREE AND SHRUB LOCATIONS.
- HARDSCAPE/PAVING AREAS ON SITE TO DIRECT STORMWATER RUNOFF INTO LANDSCAPE PLANTING AREAS THAT COLLECT AND CONVEY STORMWATER RUNOFF TO LARGER RETENTION AREAS. THESE MICRO BASINS WILL DELIVER WATER TO PLANTS PRIOR TO ENTRY INTO STORMWATER STRUCTURES THEREBY REDUCING NET IRRIGATION DEMAND AND LOWERING STORMWATER VOLUME ENTERING DRAINAGE SYSTEM.



PLANT LEGEND

SYMBOL	BOTANICAL / COMMON NAME	SIZE	MATURE	INSTALL	QTY	REMARKS
TREES						
	BAUHINIA LUNARIOIDES ANACACHO ORCHID TREE	1" CAL.	12'X8'	5'X4'	12	MULTI
	OLNEYA TESOTA DESERT IRONWOOD	1" CAL.	30'X20'	8'X6'	5	MULTI
	PARKINSONIA FLORIDA BLUE PALO VERDE	2" CAL.	30'X30'	10'X8'	28	MULTI
	PARKINSONIA MICROPHYLLA FOOTHILLS PALO VERDE	1.5" CAL.	25'X25'	8'X5'	8	MULTI
	PARKINSONIA X `DESERT MUSEUM' DESERT MUSEUM PALO VERDE	2" CAL.	30'X30'	10'X7'	21	MULTI
	PROSOPIS VELUTINA VELVET MESQUITE	2.5" CAL.	30'X30'	10'X8'	40	MULTI
	PROSOPIS X COOPERI COOPERI MESQUITE	2.5" CAL.	25'X25'	10' X 8'	191	MULTI
	QUERCUS VIRGINIANA SOUTHERN LIVE OAK	2" CAL.	40'X40'	12'X7'	15	HIGH BREAK

SALVAGE PLANT LEGEND

SYM.	BOTANICAL NAME (COMMON NAME)	QTY.
	TREES	
	PARKINSONIA FLORIDA BLUE PALO VERDE	+/- 93
	PARKINSONIA MICROPHYLLA FOOTHILLS PALO VERDE	+/- 3
	PROSOPIS VELUTINA MESQUITE	+/- 91
	OLNEYA TESOTA IRONWOOD	+/- 5
	ZIZIPHUS OBTUSIFOLIA GRAYTHORN	+/- 2

TOPDRESS/DUST CONTROL LEGEND

- DECOMPOSED GRANITE, 2" MIN. DEPTH.
  SIZE: **3/4" SCREENED** COLOR: **MADISON GOLD OR EQUAL TO MATCH NATURAL DESERT. ALL PLANTING AREAS U.O.N.**
- STONE COBBLE, 3" MIN. DEPTH.
  SIZE: **SIZE PER CIVIL DRAWINGS** COLOR: **DESERT BROWN**
- STONE COBBLE, 3" MIN. DEPTH.
  SIZE: **1"-3"** COLOR: **ARIZONA BROWN**
- STABILIZED DECOMPOSED GRANITE, 3" MIN. DEPTH.
  SIZE: **1/4" MINUS** COLOR: **ARIZONA BROWN**
- NATIVE RESTORATIVE SEED MIX BY HYDROSEED
  SEE NATIVE SEED MIX LEGEND
- A +/-(30) SURFACE SELECT GRANITE BOULDERS - 1 TON - 3'X 5'X 3'
- B +/-(45) SURFACE SELECT GRANITE BOULDERS - 3/4 TON - 3'X 3'X 3'
- C +/-(45) SURFACE SELECT GRANITE BOULDERS - 3/4 TON - 2'X 2'X 2'

NOTE: ALL BOULDERS TO BE ARIZONA BROWN COLOR. NOT ALL BOULDERS SHOWN ON PLAN.

NORTH
SCALE: 100 200
1:100

Author
5/22/2025 11:46:06 AM
Plot Date:

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ENTITLEMENT REVIEW		14JUL25

SEALS AND SIGNATURES

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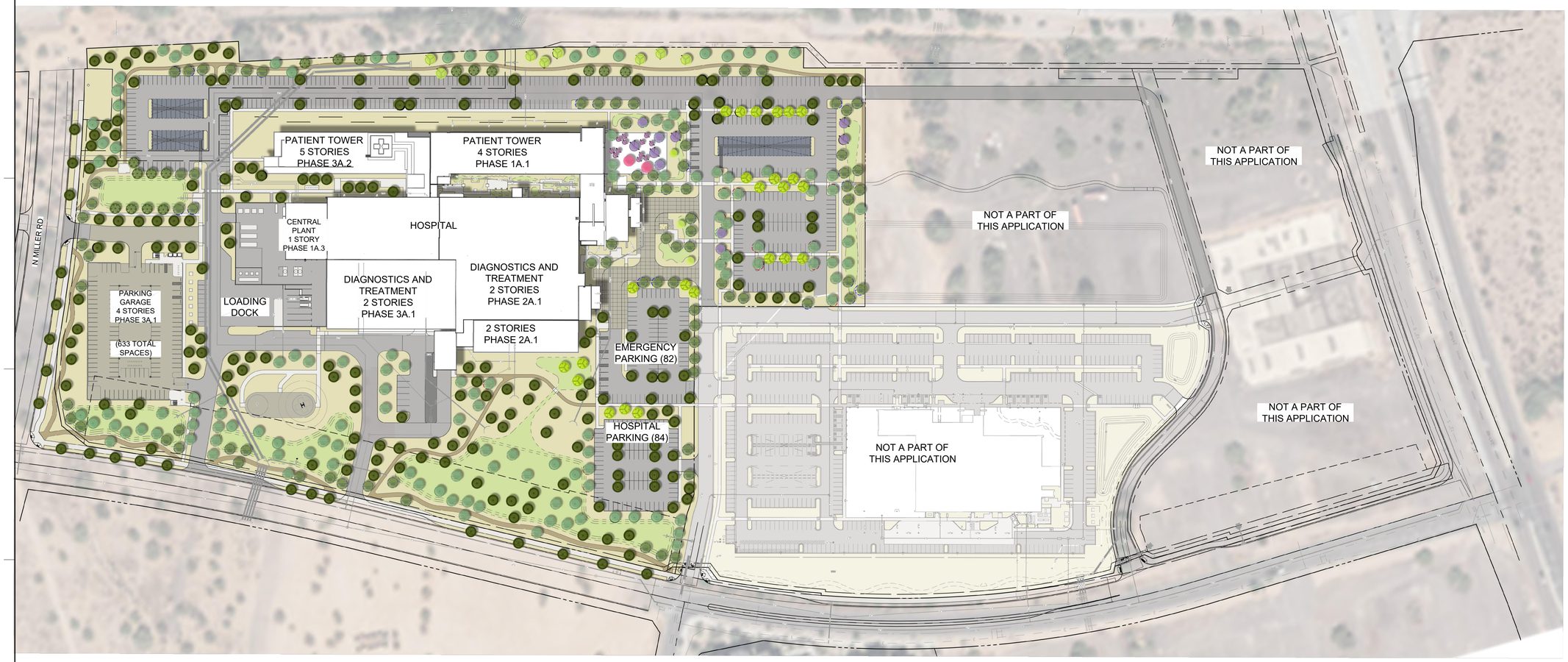
SHEET TITLE
OVERALL TREE PLAN

PROJECT NUMBER
LS100

SHEET NUMBER



NOTES:

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PLANT LEGEND

SYMBOL	BOTANICAL / COMMON NAME	SIZE	MATURE	INSTALL	QTY	REMARKS
TREES						
	BAUHINIA LUNARIOIDES ANACACHO ORCHID TREE	1" CAL.	12'X8'	5'X4'	12	MULTI
	OLNEYA TESOTA DESERT IRONWOOD	1" CAL.	30'X20'	8'X6'	5	MULTI
	PARKINSONIA FLORIDA BLUE PALO VERDE	2" CAL.	30'X30'	10'X8'	28	MULTI
	PARKINSONIA MICROPHYLLA FOOTHILLS PALO VERDE	1.5" CAL.	25'X25'	8'X5'	8	MULTI
	PARKINSONIA X 'DESERT MUSEUM' DESERT MUSEUM PALO VERDE	2" CAL.	30'X30'	10'X7'	21	MULTI
	PROSOPIS VELUTINA VELVET MESQUITE	2.5" CAL.	30'X30'	10'X8'	40	MULTI
	PROSOPIS X COOPERI COOPERI MESQUITE	2.5" CAL.	25'X25'	10' X 8'	191	MULTI
	QUERCUS VIRGINIANA SOUTHERN LIVE OAK	2" CAL.	40'X40'	12'X7'	15	HIGH BREAK

SALVAGE PLANT LEGEND

SYM.	BOTANICAL NAME (COMMON NAME)	QTY.
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	PARKINSONIA FLORIDA BLUE PALO VERDE	+/- 93
	PARKINSONIA MICROPHYLLA FOOTHILLS PALO VERDE	+/- 3
	PROSOPIS VELUTINA MESQUITE	+/- 91
	OLNEYA TESOTA IRONWOOD	+/- 5
	ZIZIPHUS OBTUSIFOLIA GRAYTHORN	+/- 2

TOPDRESS/DUST CONTROL LEGEND

- DECOMPOSED GRANITE, 2" MIN. DEPTH.
  SIZE: **3/4" SCREENED** COLOR: **MADISON GOLD OR EQUAL TO MATCH NATURAL DESERT. ALL PLANTING AREAS U.O.N.**
- STONE COBBLE, 3" MIN. DEPTH.
  SIZE: **SIZE PER CIVIL DRAWINGS** COLOR: **DESERT BROWN**
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  SIZE: **1"-3"** COLOR: **ARIZONA BROWN**
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  SIZE: **1/4" MINUS** COLOR: **ARIZONA BROWN**
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  SEE NATIVE SEED MIX LEGEND
- A +/-(30) SURFACE SELECT GRANITE BOULDERS - 1 TON - 3'X 5'X 3'
- B +/-(45) SURFACE SELECT GRANITE BOULDERS - 3/4 TON - 3'X 3'X 3'
- C +/-(45) SURFACE SELECT GRANITE BOULDERS - 3/4 TON - 2'X 2'X 2'

NOTE: ALL BOULDERS TO BE ARIZONA BROWN COLOR, NOT ALL BOULDERS SHOWN ON PLAN.

NORTH

SCALE: 100 200 1:100

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SEALS AND SIGNATURES

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SHEET TITLE
OVERALL RENDERED TREE PLAN

PROJECT NUMBER
LP101

SHEET NUMBER

COMMUNITY HOSPITAL



BANNER OCOTILLO MEDICAL CENTER



BANNER OCOTILLO MEDICAL CENTER





BANNER GATEWAY MEDICAL CENTER




BANNER IRONWOOD MEDICAL CENTER


BANNER UNIVERSITY MEDICAL CENTER - TUCSON

BANNER HEALTH CENTER PLUS – SCOTTSDALE (NOT A PART OF THIS APPLICATION, FOR REFERENCE ONLY)


NE VIEW



ENTRY FROM WEST


ENTRY FROM EAST


RESPITE PATH


ENTRY DETAIL

MATERIAL PALETTE


BANNER BLOCK WALL - PATTERN 'A'


BANNER BLOCK WALL - PATTERN 'B'



MALIBU SAND - MESASTONE



MISSION WHITE - MESASTONE



PEARL WHITE - MESASTONE



WALNUT CREEK - MESASTONE



MALIBU SAND - TRENDSTONE



MISSION WHITE - TRENDSTONE



PEARL WHITE - TRENDSTONE

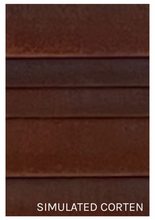


WALNUT CREEK - TRENDSTONE


HP GLAZING - VIRACON VNE 35-53


EFIS - COLOR 1


EFIS - COLOR 2



METAL PANEL - COLOR 1



METAL PANEL - COLOR 2

Author

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Plot Date:

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Scottsdale, Arizona 85255

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ENTITLEMENT REVIEW		*14JUL25*

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

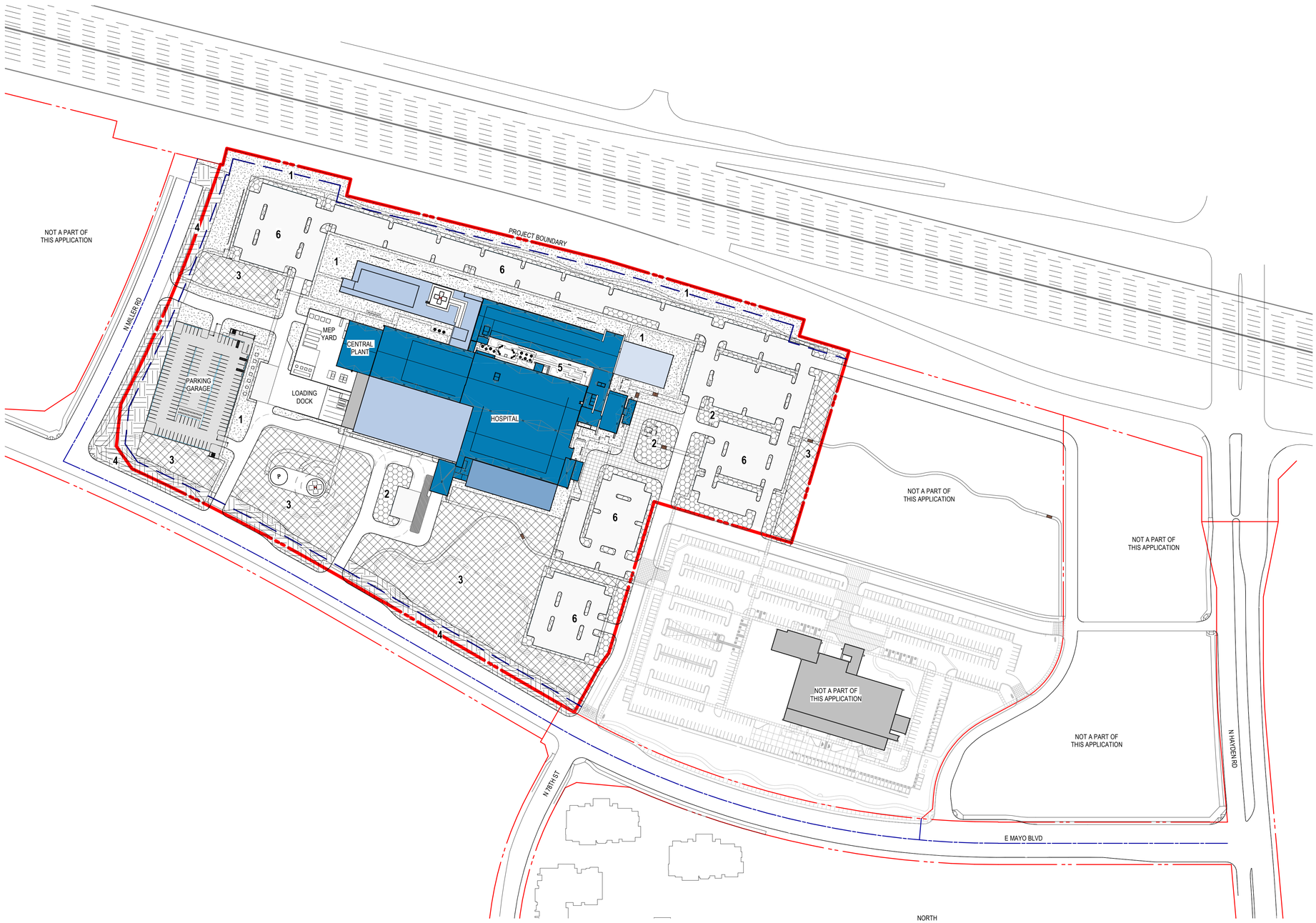
SHEET TITLE

BANNER HEALTH DESIGN PRECEDENTS

PROJECT NUMBER

ENT_A4.0.0

SHEET NUMBER



SITE PLAN - OPEN SPACE PLAN

SCALE: 1" = 120'-0"

0 120' 240' 360'

GRAPHIC SCALE: 1" = 120' - 0"

GRAPHIC LEGEND

1 GENERAL SITE OPEN SPACE: 202,687 SQ. FT. *(LANDSCAPE + HARDSCAPE)*

2 PARKING LOT LANDSCAPE: 108,185 SQ. FT. *(LANDSCAPE + HARDSCAPE)*

3 RETENTION OPEN SPACE: 225,385 SQ. FT. *(LANDSCAPE)*

4 FRONTAGE OPEN SPACE: 106,335 SQ. FT. *(LANDSCAPE + HARDSCAPE)*

5 COURTYARD: 11,443 SQ. FT. *(LANDSCAPE + HARDSCAPE)*

6 PARKING AREA: 236,423 SQ. FT.

BUILDING FOOTPRINT

PROPERTY BOUNDARY

UTILITY EASEMENT

OPEN SPACE CALCULATION

SITE AREA (GROSS):	1,372,138 SQ. FT. GROSS
SITE AREA (NET):	1,257,577 SQ. FT. NET
REQUIRED OPEN SPACE: *SECTION 1.403.J*	
NET SITE AREA X 0.24 *(excluding parking lot landscaping)*	301,818 SQ. FT.
TOTAL REQUIRED OPEN SPACE:	**301,818 SQ. FT.**
GENERAL SITE OPEN SPACE	202,687 SQ. FT.
RETENTION OPEN SPACE	+225,385 SQ. FT.
FRONTAGE OPEN SPACE	+106,335 SQ. FT.
COURTYARD OPEN SPACE	+ 11,443 SQ. FT.
TOTAL PROVIDED OPEN SPACE:	**545,850 SQ. FT.**
REQUIRED FRONTAGE OPEN SPACE: *SECTION 1.403.J*	
30 SQ. FT. PER 1 LINEAR FT. OF PUBLIC STREET	
MAYO BLVD. LINEAR FT.	1,299 LINEAR FT.
MILLER RD. LINEAR FT.	681 LINEAR FT.
30 X (1,299 + 681)	59,490 SQ. FT.
TOTAL PROVIDED FRONTAGE OPEN SPACE:	**106,335 SQ. FT.**
REQUIRED PARKING LOT LANDSCAPING: *SECTION 10.501.H.2*	
(PARKING LOT AREA x 15%) (236,423 x 0.15)	
TOTAL REQUIRED PARKING LOT LANDSCAPING:	35,463 SQ. FT.
TOTAL PROVIDED PARKING LOT LANDSCAPING: (INCLUDES HARDSCAPE)	**108,185 SQ. FT.**

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SEALS AND SIGNATURES

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SHEET TITLE

OPEN SPACE PLAN

PROJECT NUMBER

ENT_A1.3.1

SHEET NUMBER

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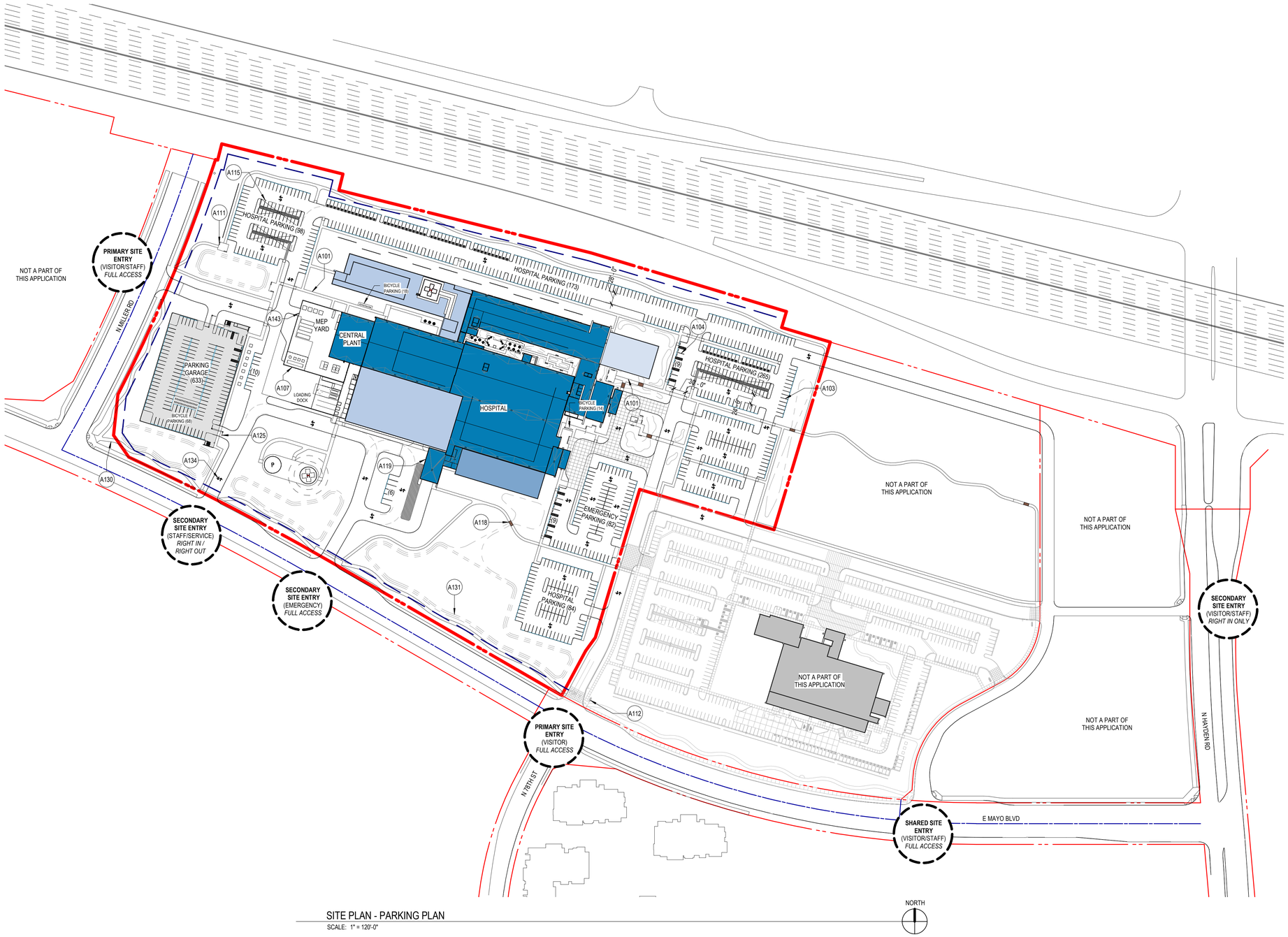

SITE PLAN - PARKING PLAN
SCALE: 1" = 120'-0"

PARKING NOTES

A. ALL PARKING SPACES ARE 9'-0" WIDE X 18'-0" LONG W/ A MINIMUM DRIVE AISLE OF 24'-0". DRIVE AISLES ARE WIDER FOR FIRE LANES AND ARE NOTED ON THE PLANS.

B. ALL SIDEWALKS ARE A MINIMUM OF 6'-0".

C. ACCESSIBLE PARKING SPACES MEET DSPM, ZONING, AND ADA STANDARDS. THEY ARE SIZED TO BE 11'-0" WIDE X 18'-0" LONG WITH A 5'-0" ACCESS AISLES BETWEEN A MAXIMUM OF (2) ACCESSIBLE SPACES.

D. REFER TO AND COORDINATE WITH CIVIL, LANDSCAPE, STRUCTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL SITE INFORMATION NOT SHOWN ON THIS DRAWING.

PARKING DATA

OVERALL *TABLE 9.103.A* **PROVIDED TOTALS REPRESENT BANNER HEALTH DESIGN STANDARDS*		
	REQUIRED	**PROVIDED**
HOSPITAL (300 BEDS @1.5 PER BED)	450	1,190 (3.97/BED)*
AMBULATORY (PHASE 4)	-	84
TOTAL	**450**	**1,274***
BREAKDOWN OF OVERALL		
	REQUIRED	**PROVIDED**
ACCESSIBLE (4% OF REQ'D PARKING)	18	*SECTION 9.105.B.4* 43 17 (UNCOVERED) 26 (COVERED)
STANDARD (UNCOVERED)	-	815
STANDAR (SOLAR COVERED)	-	82
EV STATIONS (READY)**	18	18 *IGCC 501.3.7.3*
EV STATIONS (CAPABLE)**	45	46 *IGCC 501.3.7.3*
PARKING GARAGE		**588**
STANDARD (COVERED)	-	427
STANDARD (UNCOVERED)	-	161
BICYCLE (2 PER 10 REQ'D PARKING SPACES) OR (100 MAX.)	100	*SECTION 9.103.C* 100 32 (UNCOVERED) 68 (COVERED)

*PROVIDED TOTALS REPRESENT BANNER HEALTH DESIGN STANDARDS.

**NOTE: AS REQUIRED BY THE 2021 SCOTTSDALE IGCC, 4% OF THE REQUIRED PARKING READY, AND 10% OF THE REQUIRED PARKING CAPABLE.

SHEET KEYNOTES

A101	SIDEWALK
A103	PARKING STALL: 9'-0" X 18'-0", TYP.
A104	ADA PARKING STALL: 11'-0" X 18'-0" WITH 5'-0" ACCESS AISLE
A107	CMU SITE WALL
A111	SITE RESPITE / GATHERING
A112	MONUMENT AND DIRECTIONAL SITE SIGNAGE - BY OTHERS
A115	PV PARKING CANOPY
A118	LANDSCAPE FEATURE (BRIDGE)
A119	AMBULANCE ENTRY
A125	TRAFFIC BARRIER ARM
A130	DG WALKING PATH
A131	PHASE 1 RETENTION BASIN - REFER TO CIVIL
A134	PAINTED DIRECTIONAL ARROWS
A143	CENTRAL PLANT YARD AUTO OPERATOR SLIDING GATE

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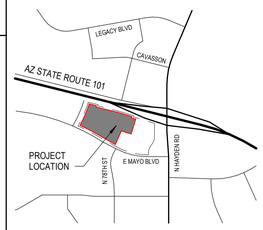
VICINITY MAP



SHEET TITLE

PARKING PLAN

PROJECT NUMBER

ENT_A1.6.1

SHEET NUMBER

Author

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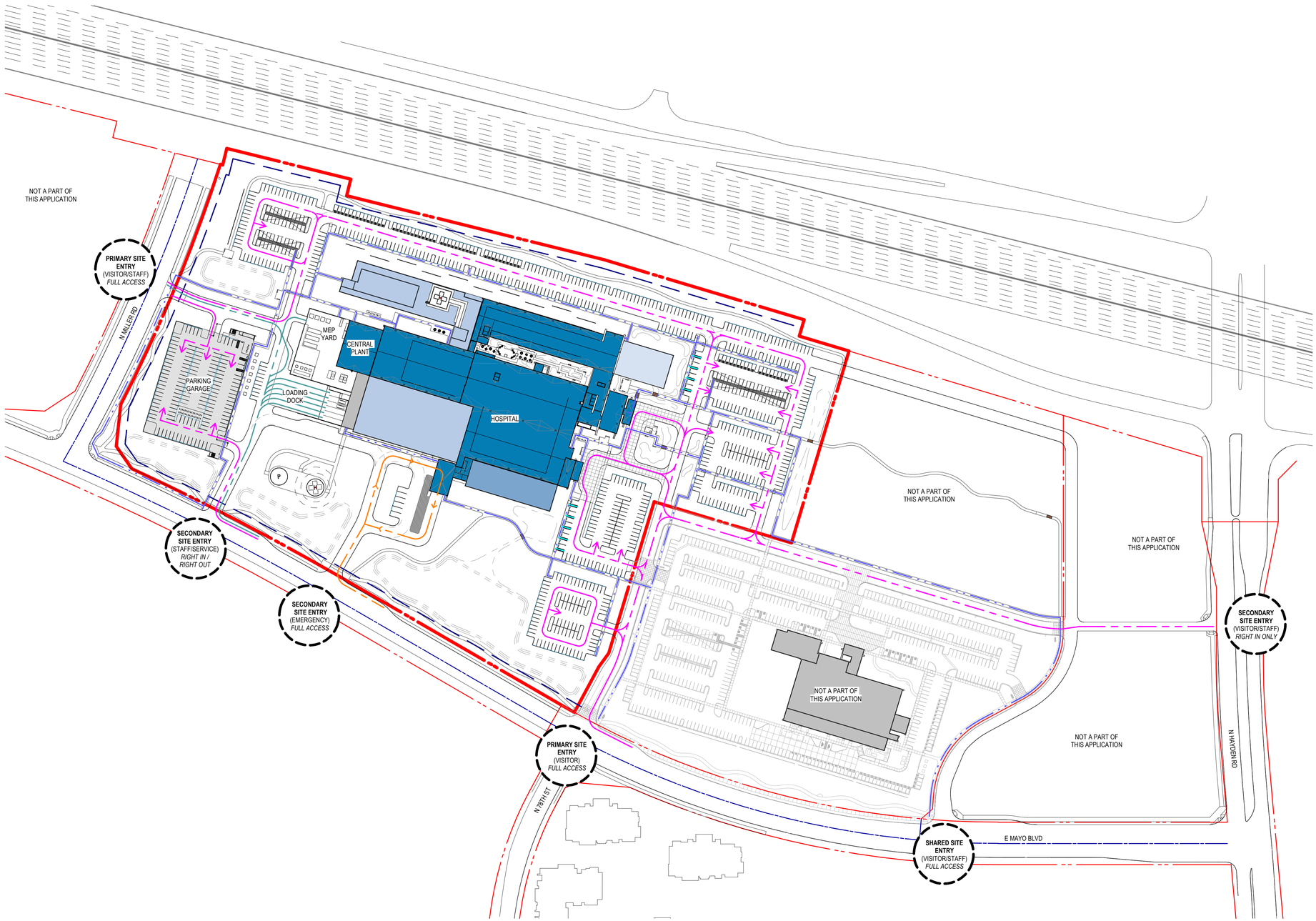
Plot Date:



SITE PLAN - PEDESTRIAN AND VEHICULAR CIRCULATION PLAN

SCALE: 1" = 120'-0"

GRAPHIC SCALE: 1" = 120' - 0"

GRAPHIC LEGEND

- PROPERTY BOUNDARY
- PEDESTRIAN CIRCULATION
- SERVICE VEHICLE CIRCULATION
- EMPLOYEE/VISITOR VEHICLE CIRCULATION
- EMERGENCY VEHICLE CIRCULATION
- ACCESSIBLE CIRCULATION

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SEALS AND SIGNATURES

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SHEET TITLE

PEDESTRIAN AND VEHICULAR CIRCULATION PLAN

PROJECT NUMBER

ENT_A1.5.1

SHEET NUMBER

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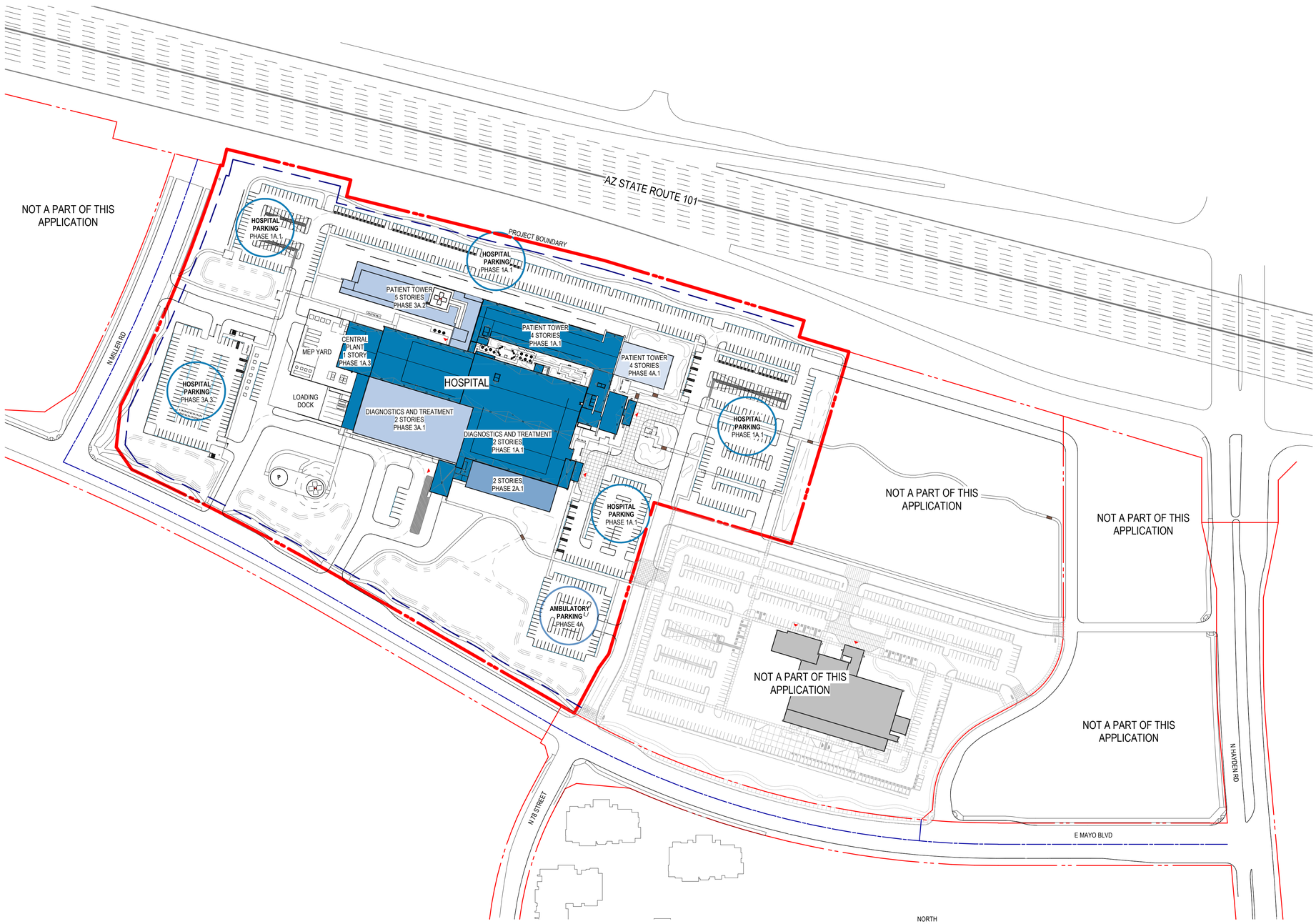

SITE PLAN - PHASING PLAN
SCALE: 1" = 120'-0"

NORTH

0 120' 240' 360'
GRAPHIC SCALE: 1" = 120' - 0"

PHASE 1

1A (CURRENT DRB REPRESENTED SCOPE):

1A.1 - DIAGNOSTICS AND TREATMENT (2 STORIES):	= 204,000 SF
1A.2 - PATIENT TOWER AND CONNECTION (4 STORIES):	= 170,000 SF
1A.3 - CENTRAL PLANT (1 STORIES):	= 10,000 SF
SUBTOTAL:	**= 384,000 SF**

PHASE 2

2A :

2A.1 - DIAGNOSTICS AND TREATMENT (2 STORIES):	= 32,000 SF
SUBTOTAL:	**= 32,000 SF**

PHASE 3

3A:

3A.1 - DIAGNOSTICS AND TREATMENT (2 STORIES):	= 72,000 SF
3A.2 - PATIENT TOWER & CONNECTION (5 STORIES):	= 145,000 SF
3A.3 - PARKING STRUCTURE (4 STORIES):	= 211,600 SF
SUBTOTAL:	**= 428,600 SF**

PHASE 4

4A:

4A.1 - NICU / PATIENT TOWER (4 STORIES:	= 52,500 SF
SUBTOTAL:	**= 52,500 SF**

OVERALL CAMPUS TOTAL: = 897,100 SF

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SEALS AND SIGNATURES

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SHEET TITLE
PHASING PLAN

PROJECT NUMBER
ENT_A1.4.1
SHEET NUMBER

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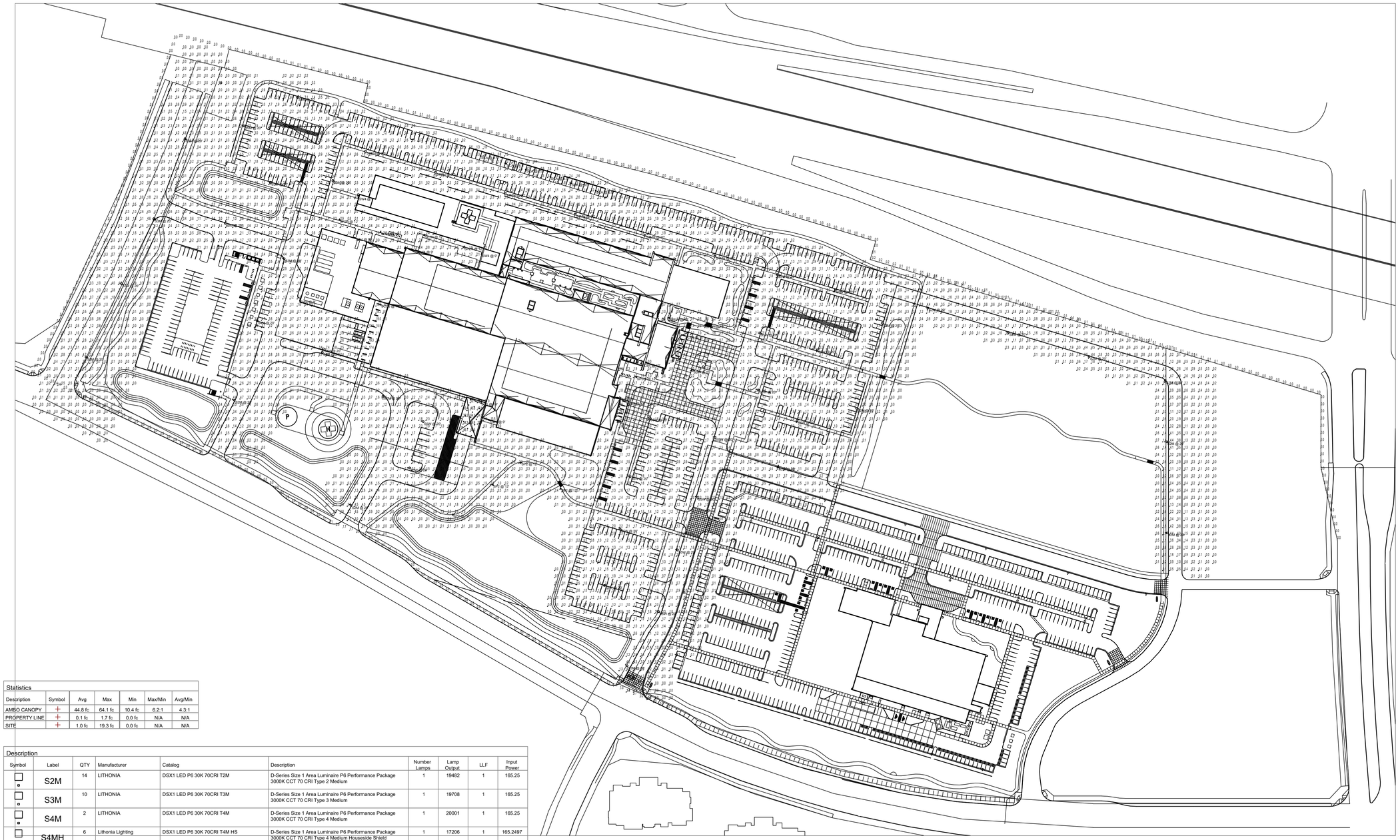

Statistics						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
AMBO CANOPY	+	44.8 fc	64.1 fc	10.4 fc	6.2:1	4.3:1
PROPERTY LINE	+	0.1 fc	1.7 fc	0.0 fc	N/A	N/A
SITE	+	1.0 fc	19.3 fc	0.0 fc	N/A	N/A

Description

Symbol	Label	QTY	Manufacturer	Catalog	Description	Number Lamps	Lamp Output	LLF	Input Power
	S2M	14	LITHONIA	DSX1 LED P6 30K 70CRI T2M	D-Series Size 1 Area Luminaire P6 Performance Package 3000K CCT 70 CRI Type 2 Medium	1	19482	1	165.25
	S3M	10	LITHONIA	DSX1 LED P6 30K 70CRI T3M	D-Series Size 1 Area Luminaire P6 Performance Package 3000K CCT 70 CRI Type 3 Medium	1	19708	1	165.25
	S4M	2	LITHONIA	DSX1 LED P6 30K 70CRI T4M	D-Series Size 1 Area Luminaire P6 Performance Package 3000K CCT 70 CRI Type 4 Medium	1	20001	1	165.25
	S4MH	6	Lithonia Lighting	DSX1 LED P6 30K 70CRI T4M HS	D-Series Size 1 Area Luminaire P6 Performance Package 3000K CCT 70 CRI Type 4 Medium Houseside Shield	1	17206	1	165.2497
	S5W	17	LITHONIA	DSX1 LED P6 30K 70CRI T5W	D-Series Size 1 Area Luminaire P6 Performance Package 3000K CCT 70 CRI Type 5 Wide	1	20912	1	165.25
	SCA	10	Lithonia Lighting	VCVL LED P1 30K T5W MVOLT	VCVL LED WITH P1 - PERFORMANCE PACKAGE, 3000K, T5W OPTIC TYPE	1	3592	1	26.57
	SCB8	12	PINNACLE	EV3-WET-830-4	3-11/16 " WIDE X 8' LONG WET LOCATION LINEAR SLOT LIGHT, UNDER CANOPY	144	12	1	37.6
	SCC8	11	LITHONIA	CSVT L96 10000LM MVOLT 3500K 80CRI	SEALED INDUSTRICAL STRIP, LED Vapor Tite, 96", 10000LM, 120-277V,3500K, 80 CRI	1	9658	1	83.9754
	SD1	21	INDY	L8 90LM 35K 120 G4 80CRI ZT HM CD	INDY 8" DIA. 1-LED 9000LM, 35K 80 CRI, GEN4 RECESSED DOWNLIGHT W/ CLEAR SATIN ALZAK (CD) MEDIUM FLOOD HYPERBOLIC REFLECTOR (BEAM SPREAD: 65 DEGREES)	1	7801	1	85.03
	SP2	4	LITHONIA	DSX0 LED P1 30K 70CRI T2M	D-Series Size 0 Area Luminaire P1 Performance Package 3000K CCT 70 CRI Type 2 Medium	1	4545	1	33.21
	SP5W	2	LITHONIA	DSX0 LED P1 30K 70CRI T5W	D-Series Size 0 Area Luminaire P1 Performance Package 3000K CCT 70 CRI Type 5 Wide	1	4878	1	33.21
	SW4	7	PINNACLE	EX3-WET-N-830HO-4	FABRICATED METAL HOUSING WITH WHITE PAINTED GENERAL INTERIOR FINISH, FORMED WHITE PAINTED METAL REFLECTOR, WHITE CIRCUIT BOARDS EACH WITH 36 LEDS, EXTRUDED FROSTED HOLOGRAPHIC PLASTIC DROP LENS. LENS FROSTED BOTH SIDES.	144	22	1	34.6
	SP2H	5	LITHONIA	DSX0 LED P1 30K 70CRI T2M HS	D-Series Size 0 Area Luminaire P1 Performance Package 3000K CCT 70 CRI Type 2 Medium Houseside Shield	1	3943	1	33.21
	SCB4	6	PINNACLE	EV3-WET-830-4	3-11/16 " WIDE X 8' LONG WET LOCATION LINEAR SLOT LIGHT, UNDER CANOPY	144	12	1	18.8

SITE PLAN - OVERALL

SCALE: 1" = 100'-0"

NORTH

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SEALS AND SIGNATURES

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SHEET TITLE

ELECTRICAL SITE PHOTOMETRY PLAN

PROJECT NUMBER

ENT_E1.1.1

SHEET NUMBER

LITHONIA LIGHTING

Catalog Number	
Notes:	
Type:	

Vapor Tight LED Strip Light

CSVT



FEATURES & SPECIFICATIONS

INTENDED USE — Ideal for damp/wet locations such as outdoor venues, canopies and locker rooms. Not for use or installation in direct outdoor sunlight. Must be installed under canopy or covered ceiling. For direct sunlight installations, please refer to the P5 product family. **Certain airborne contaminants can diminish the performance of LED and/or polycarbonate. Click here for Acrylic Polycarbonate Compatibility Guide for installation needs.**

Certain airborne contaminants may adversely affect the functioning of LEDs and other electronic components, depending on various factors such as concentrations of the contaminants, ventilation, and temperature at the end-user location. **Click here for a list of substances that may not be suitable for interactive with LEDs and other electronic components.**

CONSTRUCTION
- Light Gray Polycarbonate housing
- Frosted Polycarbonate lens
- Poured in place polyurethane gasket
- Polycarbonate Latches, optional stainless steel latches available.
- Standard 1/2" wet location fitting

ELECTRICAL
- High Efficiency LEDs mixed CRI Standard
- MVOLT (120-277V) & 347V
- 0-10V Dimming standard

Luminaire Surge Protection Level: Designed to withstand up to 2.5kV/0.75kA per ANSI C62.41.2-2015. For up-stream surge protection, a higher level of protection additional surge protection must be provided.

INSTALLATION
- Surface (wall, ceiling) using standard brackets (brackets built for chain-hanging
- Suspended (chain, cable) using standard brackets

LISTINGS
- CSA Certified to UL & cUL Standards for wet location
- IP65, IP66 rated per IEC60529
- IK07 Splash zone rated
- ICC 700 ref, Part 15 Subpart B compliant
- 2.5kV/0.75kA Surge Rated per ANSI C62.11-5-2015
- CSA Ambient Listings are Page 3
- Lumen Maintenance Listed on Page 3

Design Light Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

WARRANTY — 5-year limited warranty. This is the only warranty provided and no other statements in this specification sheet create any warranty of any kind. All other express and implied warranties are disclaimed. Complete warranty terms located at www.acuitybrands.com/support/warranty/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.
All values are design or typical values, measured under laboratory conditions at 25 °C.
Specifications subject to change without notice.

Capable Luminaire
This item is an A + capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.
- All configurations of this luminaire meet the Acuity Brands' specification for chromaticity consistency.
- This luminaire is part of an A + Certified solution for nLight® or Distech™ Wireless control networks, marked by a shaded background.

To learn more about A +, visit www.acuitybrands.com/aplus.
*See ordering tree for details

CSVT Vapor Tight LED Strip Light

CS Looking for Contractor Select quality available configurations? Click here to see Contractor Select® and check out our inventory offerings and product cuts!

A + Capable options indicated by this color background.

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative. **Example:** CSVT L48 4LED MVOLT SWB1 80CRI

Series	Length	Lumen Output	Voltage	Color temperature	Color rendering index
CSVT Linear LED Vapor Tight	L48 48"	3000LM 3,000 lumens 4000LM 4,000 lumens 5000LM 5,000 lumens 6000LM 6,000 lumens ALO1 Switchable lumens, 3000LM / 4000LM / 5000LM ‡	MVOLT 120-277V 347 347V	35K 3500K ‡ 40K 4000K ‡ 50K 5000K ‡	80CRI 80 CRI
	L96 96"	6000LM 6,000 lumens ‡ 8000LM 8,000 lumens ‡ 10000LM 10,000 lumens ‡ 12000LM 12,000 lumens ‡ ALO4 Switchable lumens, 6000LM, 8000LM, and 10000LM ‡			

Options		
STSL	Stainless steel latches	Individual Controls ‡
ICTMCP	Emergency battery pack, CSA Certified to CA Title 20 MAEDBS ‡	SWB1FB 360° integral low mount motion sensor (standard on/off operation)
ICTMCPNC	Emergency battery pack, CSA Certified to CA Title 20 MAEDBS ‡	SWB1DCB SV 360° integral low mount motion sensor with dimming (low trim set at 30%)
NLSYNC2	NLC nLight Wireless Mesh Timing (must be both node) ‡	SWB1FB1P 360° integral low mount motion sensor with photocell
NCNB	NEMA certified	nLight Wireless Controls ‡
		NLTAIR2 P3BXFB nLight (wireless) gen 2 high mount occupancy & daylight sensor

NOTE: ‡ indicates option chosen has ordering restrictions. Please reference ordering restrictions chart.

If Option Below Is Being Backordered	Restrictions
Option value	Not available with ALO lumen packages.
ALO1, ALO4, 3000LM, 5000LM, 6000LM, 8000LM, 10000LM, 12000LM	Not available with SWB1.
ALO1, ALO4	Not available with battery pack options.
CSVT STSL LATCH	Requires two for L96
ICTMCP, ICTMCPNC	Not available with NLTAIR2 nLight.
Individual Controls	Not available with NLSYNC2 option.
nLight Wireless Controls	Not available with NLSYNC2 option.
NLSYNC2	Not available with cord set or sensor options.

Accessories Order as separate catalog number.

CSVT STSL LATCH	Stainless steel latch (Set of 10) ‡
CSVTBKBA	Angle-mount bracket (QTY of 2) (316 stainless steel)
CSVTBKBB	Rigid-mount S-bolt bracket (QTY of 2) (316 stainless steel)
CSVTBKBA	Rigid-mount bracket (QTY of 2) (316 stainless steel)
CSVTSWC	Replacement snaked-mounting brackets (QTY of 2) (301 stainless steel)
MHCHCSUS	36" stainless steel chain (QTY of 2)

How to Estimate Delivered Luminous in Emergency Mode
Use the formula below to estimate the delivered lumens in emergency mode:
Delivered Lumens = 1.25 x # x LPW
1 = Output power of emergency driver; # = 100 for ECOSYNC
LPW = Lumens per watt rating of the luminaire. This information is available on the IES luminaire spec sheet. The LPW rating is also available in Energy Information.

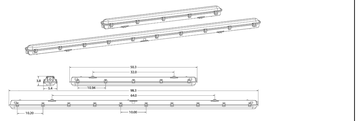
CSVT Vapor Tight LED Strip Light

DIMENSIONS

All dimensions are shown in inches unless otherwise noted.

Length	Width	Height	Length	Approximate weight	Fixtures per pallet
L48	5.4	3.8	50.2	9 lbs	70
L96	5.4	3.8	98.2	18 lbs	70

*Weights will vary slightly with added options.



CSVT Vapor Tight LED Strip Light

OPERATIONAL DATA

Length	Package	Voltage	Watts	3500 K		4000 K		5000 K		Comparable Lightwave
				Lumens	LPW	Lumens	LPW	Lumens	LPW	
L48	3000LM	MVOLT	24	3033	125	3106	128	2724	112	1 lamp 12'HE, 1 lamp 4'AW T5HO, 5LMH 40Q
		347	25		122		124		109	
	4000LM	MVOLT	34	4065	119	4163	122	4200	123	2 lamp 12'HE, 1 lamp 4'AW T5HO, 5LMH 40Q
		347	40		102		104		106	
	5000LM	MVOLT	42	4829	115	4946	118	4989	119	2 lamp 12'HE, 1 lamp 4'AW T5HO, 7LMH 40Q
		347	49		98		101		102	
	6000LM	MVOLT	49	6066	123	6213	126	6268	128	2 lamp 12'HE,1 lamp 4'AW T5HO, 10LMH 40Q
		347	56		42		105		106	
	ALO1 (3000LM)	MVOLT	24	3039	124	3106	128	3141	129	1 lamp 12'HE, 1 lamp 4'AW T5HO, 5LMH 40Q
		347	25		107		110		113	
	ALO1 (4000LM)	MVOLT	34	4046	118	4163	122	4210	123	2 lamp 12'HE, 1 lamp 4'AW T5HO, 5LMH 40Q
		347	40		102		104		106	
	ALO1 (5000LM)	MVOLT	42	4806	114	4946	118	5001	119	2 lamp 12'HE, 1 lamp 4'AW T5HO, 7LMH 40Q
		347	49		98		101		102	
L96	6000LM	MVOLT	49	6066	123	6213	126	6268	128	2 lamp 12'HE,2 lamp 4'AW T5HO, 10LMH 40Q
		347	56		108		110		113	
	8000LM	MVOLT	68	8130	119	8336	122	8400	123	3 lamp 12'HE,3 lamp 4'AW T5HO, 10LMH 40Q
		347	80		102		104		106	
	10000LM	MVOLT	84	9638	115	9891	118	9979	119	4 lamp 12'HE,3 lamp 4'AW T5HO, 15LMH 40Q
		347	98		99		101		102	
	12000LM	MVOLT	103	12133	118	12425	121	12535	122	4 lamp 12'HE,4 lamp 4'AW T5HO, 15LMH 40Q
		347	120		103		104		105	
	ALO4 (6000LM)	MVOLT	49	6038	124	6213	128	6283	129	2 lamp 12'HE,2 lamp 4'AW T5HO, 10LMH 40Q
		347	56		107		110		113	
	ALO4 (8000LM)	MVOLT	68	8082	118	8336	122	8420	123	3 lamp 12'HE,3 lamp 4'AW T5HO, 10LMH 40Q
		347	80		102		104		106	
	ALO4 (10000LM)	MVOLT	84	9613	114	9891	118	10003	119	4 lamp 12'HE,3 lamp 4'AW T5HO, 15LMH 40Q
		347	98		99		101		102	

*All values are typical and are at 25C. Actual performance may vary and is dependent on operating environment.

PROJECTED LUMEN MAINTENANCE			
Lumen Maintenance Factor	0.91	0.81	0.75
Operating Hours	40,000	90,000	120,000

*Actual performance may vary based on ambient temperature of installed location.

Ambient Temperature Ratings

Fixture Length	Lumen Package	Temperature rating	Temperature rating with ALO1
L48	3000LM	-40°C - 45°C	0°C to 50°C
	4000LM	-40°C - 45°C	0°C to 50°C
	5000LM	-40°C - 45°C	0°C to 50°C
	6000LM	-40°C - 45°C	0°C to 50°C
L96	6000LM	-40°C - 45°C	0°C to 50°C
	8000LM	-40°C - 30°C	0°C to 50°C
	10000LM	-40°C - 30°C	0°C to 50°C
	12000LM	-40°C - 30°C	0°C to 50°C

Number of Boards and Drivers

Fixture length	Lumen package	Driver QTY	Board QTY
L48	3000LM	1	1
	4000LM	1	1
	5000LM	1	1
	6000LM	1	1
	ALO1	1	1
L96	6000LM	1	2
	8000LM	1	2
	10000LM	1	2
	12000LM	1	2
	ALO4	1	2

Banner Scottsdale Medical Center

SCOTTSDALE CAMPUS HOSPITAL

NW Corner of Hayden Rd. and Mayo Blvd.
Scottsdale, Arizona 85255

SMITHGROUP

455 NORTH THIRD STREET
SUITE 250
PHOENIX, AZ 85004
602.265.2200
smithgroup.com

ISSUED FOR	REV	DATE
ENTITLEMENT REVIEW		*14JUL25*

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

SHEET TITLE

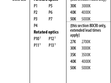
ELECTRICAL SITE LIGHTING SPECIFICATION SHEETS

PROJECT NUMBER

ENT_E1.1.2

SHEET NUMBER

Plot Date: 5/22/2025 11:46:06 AM Author



D-Series Size 0

LED Area Luminaire

d-series

Specifications

EPA:	0.44 ft² (0.04 m²)
Length:	26.18" (66.5 cm)
Width:	14.06" (35.7 cm)
Height H1:	2.26" (5.7 cm)
Height H2:	7.62" (19.4 cm)
Weight:	23 lbs (10.4 kgs)



Ordering Information

EXAMPLE: DSX0 LED P6 40K 70CRI T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX0 LED											
Series	LEDs	Drive Type (Ordered Separately)		Color Rendering Index	Distribution			Voltage		Mounting	
DSX0 LED	**Forward optics** P1 P5 P7 P4 **Rotated optics** P10¹ P12¹	P5 P6 P7	(Only with these XICOR only) specified in lead times 30K 3000K 40K 4000K 50K 5000K (Only with these XICOR only, extended lead times apply) 27K 2700K 30K 3000K 35K 3500K 40K 4000K 50K 5000K	70CRI	AFR Automotive front row T1S Type I short T2M Type II medium T2S Type II short T3M Type III medium T3S Type III short T4M Type IV medium TFTM Forward throw medium	T5M Type V medium T5S Type V short T5W Type V wide BLC Type III backlight control² BLCA Type III backlight control² LCCO Left corner cutoff² RCCO Right corner cutoff²	MVOLT (120V-277V)² HVOLT (347V-480V)² XVOLT (277V-480V)²	**Shipped included** SPA Square pole mounting (DSX0SPA) 3" min. OD pole² RPA Round pole mounting (DSX0RPA) 3" min. OD pole² SPA2 Square pole mounting (DSX0SPA2) 3" min. OD pole² RPA2 Round pole mounting (DSX0RPA2) 3" min. OD pole² TBRSPA Square narrow pole mounting (DSX0TBRSPA) 3" min. OD pole² WBA Wall bracket WBA2 Wall bracket adapter (mounts on 2-3/8" OD horizontal tenon)

Options (Add to end of nomenclature)			Field Installed
Shipped installed			
NLTAIR2 P3BXFB	nLight AIR gen 2 enabled with bi-level motion / ambient sensor, 15' mounting height, ambient sensor enabled at 25 fc²,³,⁴,⁵	PUSP Seven-pin receptacle only (controls ordered separately)⁶,⁷	
P3B	Nightview, motion/ambient sensor, 8-40' mounting height, ambient sensor enabled at 3 fc²,³,⁴	FAO Field adjustable output⁸,⁹,¹⁰	
	NEMA® twist-lock receptacle only (controls ordered separately)⁶,⁷	BLCB Bi-level switched dimming, 50%⁹,¹⁰	
P3D	Five-pin receptacle only (controls ordered separately)⁶,⁷	BLTB Bi-level switched dimming, 30%⁹,¹⁰	
		DMG 0-10v dimming wires pulled outside fixture for use with an external dimming control (ordered separately)⁷	

Finish (required)
DDBXD Dark Bronze
DBLXD Black
DNAXD Natural Aluminum
DWHXD White
DSSTXD Textured sleek bronze
DSLBXD Textured black
DNATXD Textured natural aluminum
DWHGXD Textured white

Introduction

The modern styling of the D-Series features a highly refined aesthetic that blends seamlessly with its environment. The D-Series offers the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. D-Series outstanding photometry aids in reducing the number of poles required in area lighting applications, with typical energy savings of 70% and expected service life of over 100,000 hours.

Ordering Information

Accessories

Ordered and shipped separately.

DLL127 1.5 CID Photocell - SSL twist-lock (120-277V)⁷
DLL347 1.5 CID Photocell - SSL twist-lock (347V)⁷
DLL480 1.5 CID Photocell - SSL twist-lock (480V)⁷
DSHORT SBK U Shorting cap
DSX0HS House-side shield (one required per unit). Not to be ordered with BLC, LCCO or RCCO options.
DSX0SCWG Single pole mount bracket adapter (specify finish)
DSX0DM2 Square pole universal drilling pattern
DSX0DM2HS Square pole mount bracket with house-side shield (one required per unit)
DSX0DMXHS Non-pole-mounted bracket (specify finish)

NOTES
1 Rotated optics available with packages P10, P11, P12 and P13. Must be combined with option LCCO or RCCO.
2 CSA, FM, cULus, IP65, IK10, 5 year limited warranty. Not available with NEMA, Contact Technical Support for other possible combinations.
3 MVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
4 HVOLT driver operates on any line voltage from 347-480V (50/60 Hz).
5 HVOLT not available with packages P1, P7, and P10 when combined with option NLTAIR2 PIRHN or option PIR.
6 Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See Accessories.
7 PUSP, DMG, PIR, PIRH, PER, PERH, PIR1FC3V, PIRH1FC3V, NLTAIR2 PIR, NLTAIR2 PIRH, PIRT, PERT, PIRTH, PIR1FC3VT, PIRH1FC3VT, PER5, PER5H, PER7, PER7H, PER5T, PER5TH, PER7T, PER7TH, PIR1FC3V5, PIR1FC3V5T, PIR1FC3V7, PIR1FC3V7T, PIR1FC3V5TH, PIR1FC3V7TH, PIR1FC3V5TH, PIR1FC3V7TH, PIRH1FC3V5T, PIRH1FC3V7T, PIRH1FC3V5TH, PIRH1FC3V7TH, PIRH1FC3V5TH, PIRH1FC3V7TH, PIRH1FC3V5TH, PIRH1FC3V7TH



D-Series Size 1

LED Area Luminaire

d-series

Specifications

EPA: 0.69 ft²
(0.064 m²)

Length: 22.71"
(577 mm)

Width: 14.26"
(362 mm)

Height H1: 7.00"
(203 mm)

Height H2: 4.74"
(120 mm)

Weight: 34 lbs
(15 kg)



Ordering Information

EXAMPLE: DSX1 LED P7 40K 70CRI T3M MVOLT SPA NLTAIR2 PIRHN DDBXD

DSX1 LED

Series	LEDs	Driver Type (required)	Color Rendering Index*	Distribution	Voltage*	Mounting*
DSX1 LED	**Forward optics** P1 P6 P2 P7 P3 P8 P4 P9 P5 **Rotated optics** P10¹ P12¹ P11¹ P13¹	(blank) Non-dimming DS 1000A DSR 1000A DSW 1000A (blank) Non-dimming DS 1000A DSR 1000A DSW 1000A (blank) Non-dimming DS 1000A DSR 1000A DSW 1000A	(blank) 70CRI 70CRI 70CRI (blank) 70CRI 70CRI 70CRI (blank) 70CRI 70CRI 70CRI	AFR Automotive front row T1S Type I short T2M Type II medium T3M Type III medium T3S Type III short² T4M Type IV medium T4VS Type IV Very Short² T5VW Forward throw medium	T5W Type V medium T5VS Type V very short T5VW Type V wide BLC3 Type III backlight control BLC4 Type IV backlight control BLCX Type IV backlight control LCCO Left corner cutoff³ RCCO Right corner cutoff³	MVOLT (120-277V)⁴ HVOLT (347V-480V)⁴⁵ XVOLT (277V - 480V)⁴⁵

Mounting*	Shipped included
SPA Square pole mounting (#8 drilling)	
RPA Round pole mounting (#8 drilling)	
SPUG Square pole universal mounting adaptor⁶	
RPUG Round pole universal mounting adaptor⁶	
WBA Wall bracket⁶	
AA Mast arm adapter (mounts on 2 3/8" OD horizontal tenon)	

Control Options	Other Options	Finish (required)
Shipped installed NLTAIR2 PIRHN nLight AIR gen 2 enabled with bi-level motion / ambient sensor, 8'-15' mounting height, ambient sensor enabled at 25 fc⁷⁸⁹¹⁰ PIR High/low, motion/ambient sensor, 8'-15' mounting height, ambient sensor enabled at 25 fc⁷⁸⁹¹⁰ PER NEMA twist-lock receptacle only (controls ordered separate)¹¹ PERS Two photocells only (controls ordered separate)¹¹	PIRH Sensor offers programmable high/low settings per zone⁷⁸⁹¹⁰ DMG 0-10V dimming wires pulled outside fixture (for use with an external control, ordered separately)⁹ DS Dual switching⁹ ¹² **Shipped separately** SPD20KV 20kV surge protection HS Houseside shield (black finish standard)¹³ SF Single fuse (120V)¹⁴ DF Double fuse (208-277V)¹⁴ WG Wire guard accessory¹⁵ CCE Coastal Construction¹⁶ WH Single Universal Mast Arm Adapter (fits 2 3/8" OD horizontal tenon)¹⁷ FA 50°C ambient operation¹⁸ **Shipped separately** EGSR External Glare Shield (reversible, field install required, matches housing finish) BUGR Bird spikes (field install required)	DDBXD Dark Bronze DBLXD Black DNAXD Natural Aluminum DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DMAGXD Textured white

COMMERCIAL OUTDOOR

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DSX1-LED
Rev. 08/17/23
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Introduction

The modern styling of the D-Series features a highly refined aesthetic that blends seamlessly with its environment. The D-Series offers the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. D-Series outstanding photometry aids in reducing the number of poles required in area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

Ordering Information

DSX1 LED

Series	LEDs	Driver Type (required)	Color Rendering Index*	Distribution	Voltage*	Mounting*	Shipped included
DSX1 LED	**Forward optics** P1 P6 P2 P7 P3 P8 P4 P9 P5 **Rotated optics** P10¹ P12¹ P11¹ P13¹	(blank) Non-dimming DS 1000A DSR 1000A DSW 1000A (blank) Non-dimming DS 1000A DSR 1000A DSW 1000A (blank) Non-dimming DS 1000A DSR 1000A DSW 1000A	(blank) 70CRI 70CRI 70CRI (blank) 70CRI 70CRI 70CRI (blank) 70CRI 70CRI 70CRI	AFR Automotive front row T1S Type I short T2M Type II medium T3M Type III medium T3S Type III short² T4M Type IV medium T4VS Type IV Very Short² T5VW Forward throw medium	T5W Type V medium T5VS Type V very short T5VW Type V wide BLC3 Type III backlight control BLC4 Type IV backlight control BLCX Type IV backlight control LCCO Left corner cutoff³ RCCO Right corner cutoff³	MVOLT (120-277V)⁴ HVOLT (347V-480V)⁴⁵ XVOLT (277V - 480V)⁴⁵	**Shipped included** SPA Square pole mounting (#8 drilling) RPA Round pole mounting (#8 drilling) SPUG Square pole universal mounting adaptor⁶ RPUG Round pole universal mounting adaptor⁶ WBA Wall bracket⁶ AA Mast arm adapter (mounts on 2 3/8" OD horizontal tenon)

Control Options	Other Options	Finish (required)
Shipped installed NLTAIR2 PIRHN nLight AIR gen 2 enabled with bi-level motion / ambient sensor, 8'-15' mounting height, ambient sensor enabled at 25 fc⁷⁸⁹¹⁰ PIR High/low, motion/ambient sensor, 8'-15' mounting height, ambient sensor enabled at 25 fc⁷⁸⁹¹⁰ PER NEMA twist-lock receptacle only (controls ordered separate)¹¹ PERS Two photocells only (controls ordered separate)¹¹	**Shipped installed** SPD20KV 20kV surge protection HS Houseside shield (black finish standard)¹³ SF Single fuse (120V)¹⁴ DF Double fuse (208-277V)¹⁴ WG Wire guard accessory¹⁵ CCE Coastal Construction¹⁶ WH Single Universal Mast Arm Adapter (fits 2 3/8" OD horizontal tenon)¹⁷ FA 50°C ambient operation¹⁸ **Shipped separately** EGSR External Glare Shield (reversible, field install required, matches housing finish) BUGR Bird spikes (field install required)	DDBXD Dark Bronze DBLXD Black DNAXD Natural Aluminum DWHXD White DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DMAGXD Textured white

*When specifying OUTPUT the first _ to be specifying either 4 - 8K/5K/7K or 6 - 4K/5K. The ending ___ are for specifying output, example 5K7 - High Output. See output charts for more information. ¹Individual fixtures come in nominal 2', 3.5', 5', 6', 7', 8' lengths; see pg. 2 for actual lengths. ²Specify position of fixture. Use 180 for an individual fixture, see BUBL BUGR, or CUR for building mounted cut sheets. ³Order quantity for Battery and Emergency Example 2A.

Specifications and dimension subject to change without notice. Specification sheets that appear on pinnacle-ltg.com are the most recent version and supersede all other previously printed or electronic versions.

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EVS_WET_LED_SPEC_APR0.2023

A brand of legrand

pg. 2

Ordering Information

Accessories

Ordered and shipped separately.

BLC3/T 3 LC Photocell - SSL twist-lock (120-277V)⁴
BLC4/T 4 LC Photocell - SSL twist-lock (120-277V)⁴
DSHORT SBK Shorting cap⁴
DSX1HS HS Houseside shield for use with #8 drilling
DSHR Square pole universal mount adaptor
DSHRC Round pole universal mount adaptor
DSX1WG WG Wire guard accessory
DSX1EGSR EGSR Field install external glare shield

NOTES
1 Rotated optics available with packages P10, P11, P12 and P13. Must be combined with option LPO or RPO.
2 Type III short and Type IV Very Short distributions are not to be used in conjunction with MVOLT. Contact Technical Support for other possible combinations.
3 T5LCO, T5LCO, BLC3, BLC4, LCCO, RCCO not available with option SF.
4 HVOLT driver operates on any line voltage from 120-277V (50/60 Hz).
5 Not available with P1, P2, P3, P4, P5, P10 and P11. Must be ordered with DS.
6 HVOLT not available with packages P1 and P10 when combined with option NLTAIR2 PIRHN or option PIR.
7 Reference Controls Options table on page 4 for more information.
8 XVOLT not available in packages P1 or P10.
9 Not available with NLTAIR2 PIRHN. Not available for use with #8 drilling.
10 DSHRC cannot be combined with Type 5 distributions (use universal (SPA)).
11 PER, PERS and PIRHN must be ordered together. For more information on nLight AIR visit this link.
12 DS not available with P1, P2, P3, P4, P5, P10 and P11. Not available with PIR, PIRH, PER, PERS, DMG and DS. NLTAIR2 PIRHN not available with P1 and P10. Not available with BLC3, BLC4, LCCO, RCCO, T5LCO, T5LCO, T5W, T5VS, T5VW, BLC3, BLC4, LCCO and RCCO.
13 HS not available with T5LCO, T5LCO, T5W, T5VS, T5VW, BLC3, BLC4, LCCO and RCCO. HS not available with P1 and P10 using MVOLT. P10 not available with P1 and P2 using XVOLT.
14 Not available with P1, P2, P3, P4, P5, P10, P11, P12, P13, BLC3, BLC4, LCCO, RCCO, T5LCO, T5LCO, T5W, T5VS, T5VW, BLC3, BLC4, LCCO and RCCO. Must be ordered with DS.
15 Not available with P1, P2, P3, P4, P5, P10, P11, P12, P13, BLC3, BLC4, LCCO, RCCO, T5LCO, T5LCO, T5W, T5VS, T5VW, BLC3, BLC4, LCCO and RCCO.
16 Not available with T5LCO, T5LCO, T5W, T5VS, T5VW, BLC3, BLC4, LCCO and RCCO. Not to be used in conjunction with SF or DF. Not to be used in conjunction with any DS different suite of loads using (2) drivers. DS only available with packages P2, P3, P4, P7, P8, P9, P12, P13, P14 and P15.
17 Universal Mast Arm Adapter fits 2 3/8" OD tenon. Ordering single unit or package of 4 (see ordering information on page 4 for more information).
18 Reference Controls Options table on page 4.
19 PIR not available with T5LCO, T5LCO, BLC3, BLC4, LCCO and RCCO distribution. Also available as a separate accessory; see Accessories information.
20 Not available with P1, P2, P3, P4, P5, P10, P11, P12, P13, T5LCO, T5LCO, T5W, T5VS, T5VW, BLC3, BLC4, LCCO and RCCO.
21 Reference Controls Options table on page 4. Not available with P1, P2, P3, P4, P5, P10, P11, P12, P13, T5LCO, T5LCO, T5W, T5VS, T5VW, BLC3, BLC4, LCCO and RCCO. Not available with DS or DSR.
22 Reference Controls Options table on page 4. Not available with P1, P2, P3, P4, P5, P10, P11, P12, P13, T5LCO, T5LCO, T5W, T5VS, T5VW, BLC3, BLC4, LCCO and RCCO. Not available with DS or DSR.

Shield Accessories



External Glare Shield (EGSR)



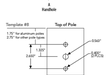
House Side Shield (HS)

Drilling

HANDHOLE ORIENTATION



Handhole



Template #3

Top of Pole

Tenon Mounting Slipfitter

Tenon O.D.	Single	2 @ 180°	2 @ 90°	3 @ 90°	3 @ 120°	4 @ 90°
2 3/8"	EPA	4.5 x 7.98	4.5 x 3.86	4.5 x 3.86	4.5 x 3.86	4.5 x 3.86
2 7/8"	EPA	4.5 x 7.98	4.5 x 3.86	4.5 x 3.86	4.5 x 3.86	4.5 x 3.86
4"	EPA	4.5 x 7.98	4.5 x 3.86	4.5 x 3.86	4.5 x 3.86	4.5 x 3.86

Mounting Option	Drilling	Tenon O.D.	Shielding
Wall Location	Side B	Side B & D	Side B & C	Side B, C & D	Beyond Rear Vertical	Side A, B, C & D
Left Round Arm	RA	2@180°	2@180°	2@180°	2@180°	2@180°	2@180°
Right Round Arm	RA	2@180°	2@180°	2@180°	2@180°	2@180°	2@180°
EPA	PA	2"	2"	2"	2"	2"	2"
RPA	AD	2"	2"	2"	2"	2"	2"
SPA	PA	2"	2"	2"	2"	2"	2"
RPA5	AD	2"	2"	2"	2"	2"	2"

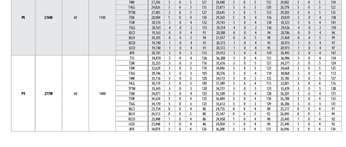
DSX1 Area Luminaire - EPA

*Includes mounting hardware, arms, brackets or other accessories are not included in the EPA data.

Pattern Quantity & Mounting Configuration	Single @0°A	2 @ 180° A180°	2 @ 90° A90°	3 @ 90° A90°A180°	3 @ 120° A120°	4 @ 90° A90°A180°
Mounting Type						
DSX1 with SPA	0.69	1.38	1.38	1.38	1.38	1.38
DSX1 with SPA2, SPA3N	0.77	1.45	1.53	1.66	—	1.66
DSX1 with RPA, RPA5	0.75	1.42	1.50	1.64	1.60	1.64
DSX1 with WBA	0.65	1.44	1.31	2.09	2.09	2.09

Length

1	2	3	4	5	6	7	8
Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture



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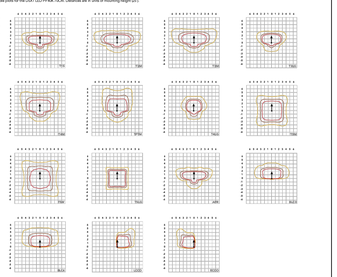
pg. 3

Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's homepage.

LEGEND
10 ft ø
20 ft ø
1 ft ø



Performance Data

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for ambient temperatures between 0°C and 50°C (32°F and 122°F).

Ambient	LAT Multiplier
0°C	1.04
5°C	1.03
10°C	1.02
15°C	1.01
20°C	1.01
25°C	1.00
30°C	0.99
35°C	0.98
40°C	0.97
45°C	0.96
50°C	0.97

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a 25°C ambient, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21).

To calculate L72, use the lumen maintenance factor that corresponds to the desired number of hours from the Values table below and multiply the reported results by that factor.

Operating Hours	Lumen Maintenance Factor
0	1.00
25,000	0.95
50,000	0.90
100,000	0.81

FAO Dimming Settings

100 Hours	50 Hours	10 Hours/Start
1	57%	43%
2	57%	43%
3	43%	77%
4	28%	67%
5	28%	67%
6	15%	33%
7	15%	33%

*Note: Calculated values are based on original performance package data. When calculating new values for given VAC position, use the corresponding percentage of the original specification sheet input watts and lumens by optic type.

Electrical Load

Rotated Optics (Requires LPO or RPO)	Distribution	120V	208V	240V	277V	347V	480V
Forward Optics (Non-Rotated)	P1	30	128	111	0.42	0.34	0.31	0.15	0.13
	P2	30	192	168	0.56	0.53	0.38	0.24	0.20
	P3	30	193	164	0.63	0.49	0.43	0.27	0.23
	P4	30	129	125	1.01	0.60	0.52	0.45	0.26
	P5	30	1400	142	1.15	0.66	0.58	0.50	0.29
	P6	40	1200	167	1.38	0.79	0.68	0.60	0.34
	P7	40	1400	188	1.54	0.88	0.77	0.67	0.33
	P8	60	1100	276	2.26	1.34	0.78	0.52	0.45
	P9	60	1400	279	2.31	1.33	1.15	1.00	0.60
	P10	60	500	0.84	0.48	0.27	0.23	0.19	0.10
Rotated Optics (Requires LPO or RPO)	P11	60	700	115	1.12	0.63	0.55	0.49	0.29
	P12	60	1000	286	2.35	0.99	0.86	0.74	0.43
	P13	60	1400	279	2.30	1.33	1.15	1.00	0.70

LED Color Temperature / Color Rendering Multipliers

	3000K		5000K	
	Lumen Multiplier	Availability	Lumen Multiplier	Availability
5000K	107%	Standard	100%	Standard
4000K	108%	Standard	92%	Extended lead time
3500K	108%	Standard	89%	Extended lead time
3000K	96%	Standard	87%	Extended lead time
2700K	94%	(see note)	85%	Extended lead time

Motion Sensor Default Settings

	Mounting Height	Ambient Sensitivity	Dwell Time	Ramp-up Time	Ramped Level (%)
PIR	20ft	100%	Enabled at 2fc	3 sec	5 min
NLTAIR2 PIRHN	20ft	100%	Enabled at 2fc	3 sec	5 min

Controls Options

Option	Description	Input Leads	Factory Lead Wiring	Notes
PIR	Field adjustable output/motion sensor, factory mounted and integrated	Allows the luminaire to be manually dimmed, effectively trimming the light output.	10A device	Cannot be used with other controls options that need the 0-10V leads.
DS (not available on DSR)	Drivers wired independently for 50/50 luminaire operation	The luminaire is wired to two separate circuits, allowing for 50/50 operation.	Independently wired drivers	Requires two separately switched circuits. Consider nLight AIR as a more cost-effective alternative.
PERS or PERS7	Twist-lock photocell receptacle	Compatible with standard twist-lock photocells for dusk to dawn operation, or advanced control nodes such as NSPD.	Twist-lock photocells sold as (5) 20ea or advanced control nodes such as NSPD.	Pins 4 & 5 to dimming leads on drivers. Pins 6 & 7 are unpowered auxiliary contacts. Control must wire to pins 4 & 5 to dim luminaire.
PIR	Motion sensor with integral photocell. Sensor suitable for 8' to 15' mounting height.	Luminaire dims when no occupancy is detected.	Acuity Controls ISSL	Luminaire can be used with other controls options that need the 0-10V leads.
NLTAIR2 PIRHN	nLight AIR enabled luminaire for motion sensing, photocell and wireless communication.	Wireless and ambient light sensing with group response. Scheduled dimming with built-in timer. Multiple wireless luminaires in the nLight zone.	nLight Air ISSL	nLight AIR sensors can be programmed and commissioned from the ground using the AIRGRA Pro app. Cannot be used with other controls options that need the 0-10V leads.
BLE or BLE2E	Integrated bi-level sensor that allows a second control circuit to switch at full night output (either 50% or 30% light output).	ALL sensor provides input to (2) 10V dimming leads as set of drivers providing either 100% or dimmed (30% or 50%) power to a secondary circuit	BLE SPECT	BLE2 is powered off the 2 10V dimming leads, thus can be used with any input voltage from 120 to 480V

Motion Sensor Default Settings

	Mounting Height	Ambient Sensitivity	Dwell Time	Ramp-up Time	Ramped Level (%)
PIR	20ft	100%	Enabled at 2fc	3 sec	5 min
NLTAIR2 PIRHN	20ft	100%	Enabled at 2fc	3 sec	5 min

Controls Options

Option	Description	Input Leads	Factory Lead Wiring	Notes
PIR	Field adjustable output/motion sensor, factory mounted and integrated	Allows the luminaire to be manually dimmed, effectively trimming the light output.	10A device	Cannot be used with other controls options that need the 0-10V leads.
DS (not available on DSR)	Drivers wired independently for 50/50 luminaire operation	The luminaire is wired to two separate circuits, allowing for 50/50 operation.	Independently wired drivers	Requires two separately switched circuits. Consider nLight AIR as a more cost-effective alternative.
PERS or PERS7	Twist-lock photocell receptacle	Compatible with standard twist-lock photocells for dusk to dawn operation, or advanced control nodes such as NSPD.	Twist-lock photocells sold as (5) 20ea or advanced control nodes such as NSPD.	Pins 4 & 5 to dimming leads on drivers. Pins 6 & 7 are unpowered auxiliary contacts. Control must wire to pins 4 & 5 to dim luminaire.
PIR	Motion sensor with integral photocell. Sensor suitable for 8' to 15' mounting height.	Luminaire dims when no occupancy is detected.	Acuity Controls ISSL	Luminaire can be used with other controls options that need the 0-10V leads.
NLTAIR2 PIRHN	nLight AIR enabled luminaire for motion sensing, photocell and wireless communication.	Wireless and ambient light sensing with group response. Scheduled dimming with built-in timer. Multiple wireless luminaires in the nLight zone.	nLight Air ISSL	nLight AIR sensors can be programmed and commissioned from the ground using the AIRGRA Pro app. Cannot be used with other controls options that need the 0-10V leads.
BLE or BLE2E	Integrated bi-level sensor that allows a second control circuit to switch at full night output (either 50% or 30% light output).	ALL sensor provides input to (2) 10V dimming leads as set of drivers providing either 100% or dimmed (30% or 50%) power to a secondary circuit	BLE SPECT	BLE2 is powered off the 2 10V dimming leads, thus can be used with any input voltage from 120 to 480V

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of configurations shown within the tolerances described within LM-79.
Contact factory for performance data on any configurations not shown here.

Forward Optics

Performance Package	System Watts	LED Count	Drive Current (mA)	Wattage Type	25C				40C				50C			
					Lumens	B	U	G	Lumens	B	U	G	Lumens	B	U	G
P1	124W	30	1200	5C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				6C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				7C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				8C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				5K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				6K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				7K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				8K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				4K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
P5	124W	30	1200	5C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				6C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				7C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				8C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				5K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				6K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				7K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				8K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				4K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
P9	279W	60	1400	5C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				6C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				7C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				8C	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				5K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				6K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				7K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				8K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2
				4K	15,475	2	0	2	14,705	2	0	2	14,241	2	0	2

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of configurations shown within the tolerances described within LM-79.
Contact factory for performance data on any configurations not shown here.

Forward Optics

Performance Package	System Watts	LED Count	Drive Current (mA)	Wattage Type	25C				40C				50C			
					Lumens	B	U	G	Lumens	B	U	G	Lumens	B	U	G
P7	186W	40	1200	5C	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
				6C	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
				7C	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
				8C	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
				5K	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
				6K	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
				7K	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
				8K	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
				4K	23,213	3	0	3	22,058	3	0	3	21,361	3	0	3
P8	240W	60	1100	5C	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				6C	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				7C	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				8C	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				5K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				6K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				7K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				8K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				4K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
P9	279W	60	1400	5C	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				6C	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				7C	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				8C	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				5K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				6K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				7K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				8K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3
				4K	29,844	3	0	3	28,364	3	0	3	27,466	3	0	3

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of configurations shown within the tolerances described within LM-79.
Contact factory for performance data on any configurations not shown here.

Rotated Optics

Performance Package	System Watts	LED Count	Drive Current (mA)	Wattage Type	25C				40C				50C			
					Lumens	B	U	G	Lumens	B	U	G	Lumens	B	U	G
P10	181W	60	530	5C	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
				6C	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
				7C	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
				8C	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
				5K	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
				6K	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
				7K	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
				8K	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
				4K	22,594	3	0	3	21,463	3	0	3	20,794	3	0	3
P11	115W	60	700	5C	15,344	3	0	3	14,580	3	0	3	14,126	3	0	3
				6C	15,344	3	0	3	14,580	3	0	3	14,126	3	0	3
				7C	15,344	3	0	3	14,580	3	0	3	14,126	3	0	3
				8C	15,344	3	0	3	14,580	3	0	3	14,126	3	0	3
				5K	15,344	3	0	3	14,580	3	0	3	14,126	3	0	3
				6K	15,344	3	0	3	14,580	3	0	3	14

PINNACLE ARCHITECTURAL LIGHTING

Project Name

Date Type SW4

EDGE EX3WET
3" Suspended Direct Linear WET





LED

Example Part #: EX3-WET-N-830HO-E1-IND-ACASD-U-CL2-1-SR

EX3 - WET - N

SERIES | SHIELDING | ELEMENT SHIELDING | CRI, CCT & OUTPUT | LENGTH | MOUNTING | VOLTAGE | DRIVER | CIRCUITING | BATTERY & EMERGENCY | FINISH | FIXTURE OPTIONS

WET	N
DIRECT SHIELDING	INDIRECT SHIELDING
WET – Satine Wet Lens *Shielding pg. 2*	**N** – None *Shielding pg. 2*

CRI, CCT & OUTPUT	LENGTH
27 ___ 2700K **30** ___ 3000K **35** ___ 3500K **40** ___ 4000K **50** ___ 5000K **CL** ___ Custom Lumens **CW** ___ Custom Watts *Lumen Output pg. 2*	___ – Individual Fixture *Length pg. 2*

POSITION*	MOUNTING*	VOLTAGE	DRIVER
IND – Individual Fixture **M** – Multi Circuit **E** – Emergency (entire fixture) **N** – Night Light (entire fixture) *Circuiting pg. 4*	**PP** ___ JB – Pendant to J-Box **PP** ___ ST – Pendant to Structure **WA** – Wall Mount **SM** – Surface Mount *Mounting pg. 3*	**U** – Universal (120 thru 277V) **1** – 120V **2** – 277V **3** – 347V *Voltage pg. 3*	**FSD** – Factory Select Driver (1%, 0-10v) **FLZ** – Fadeless Aluminum (1%, 0-10v) **ELD** – Dynalite (1%, 0-10v) **ELC** – eldoLED DCI (1%, 0-10v) **ES1** – eldoLED SOLOdrive (0.5%, 0-10v) **ES2** – eldoLED SOLOdrive (0.5%, 0-10v) **TEL** – Fadeless Aluminum (0.1%, 0-10v) *Driver pg. 3*

CIRCUITING	BATTERY & EMERGENCY*	FINISH	FIXTURE OPTIONS*	CONTROLS
1 – Single Circuit **M** – Multi Circuit **E** – Emergency (entire fixture) **N** – Night Light (entire fixture) *Circuiting pg. 4*	**0** – None **FSB** – Factory Select Battery **FSCA** – Factory Select AC/DC **ELI** – Iota ELI 0.5 **ELB** – Bodine GTD **ELC** – eldoLED Connect (CES listed) **P** – Bodine Size Integral **E** – Emergency Section **N** – Night Light Section **L** – Life Safety Section *Battery and Emergency pg. 4*	**W** – White **S** – Metallic Silver **BL** – Textured Black **BR** – Bronze **GR** – Graphite **CC** – Custom Color *Finish pg. 4*	**ELB** – Internal Fast Blow Fuse **EFF** – End Power Feed **DBP** – Customer Supplied Battery/ Driver/Sensor **N** – Natorium (corrosion resistant hardware) *Fixture Options pg. 5*	Fixtures visible in accommodate different control solutions from different manufacturers. Consult factory for more information.

**When specifying CIRCUITING the first, 1st or Non-specifying either E - EMERGENCY, N - NIGHT LIGHT, or L - LIFE SAFETY, available only in Single circuit (1) and Multi circuit (M) configurations. *Individual fixtures cannot be mixed E & E, N & N, P & P lengths, nor can they be mixed with a multi-fixture run. Specify one individual fixture, and NOT, or ADD to a multi-fixture run. Specify one length of either 12" or 18" or 36" Product notes not available with Natorium. *Order quantity for Battery and Emergency, Example 2P "Natorium not available with pendant options.*

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PINNACLE ARCHITECTURAL LIGHTING

EDGE EX3 Suspended Linear WET

Direct Shielding

WET
Satine Wet Lens



Indirect Shielding

N
None

Output

- Specify either 80 or 90 CRI
- Specify Lumens, may vary by 90 CRI. Consult factory
- 90 CRI = 1Rb360

Custom Output- Lumens OR Wattage

CL _____	Specify CRI, CCT and desired lumens (i.e. CL835000)
CW _____	Specify CRI, CCT and desired wattage (i.e. CW940T)

Specify lumens between absolute0 offering listed below. Lumens are specified per color temp.

Specify watts between standard offering listed below

80 CRI

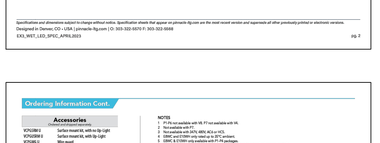
	Color	Output	Watts per foot	Shielding WET Satine Wet Lumens/ft	LPW
830	3000K	Standard	4.7	436	92.8
830HO	3000K	High	8.7	788	91.1
835	3500K	Standard	4.7	456	97.0
835HO	3500K	High	8.7	804	94.9
840	4000K	Standard	4.7	457	97.2
840HO	4000K	High	8.7	827	95.6
850	5000K	Standard	4.7	456	97.0
850HO	5000K	High	8.7	825	95.4

90 CRI

927	2700K	Standard	4.7	344	73.2
927HO	2700K	High	8.7	623	72.0
930	3000K	Standard	4.7	370	78.7
930HO	3000K	High	8.7	688	77.2
935	3500K	Standard	4.7	391	83.2
935HO	3500K	High	8.7	708	81.6
940	4000K	Standard	4.7	391	83.2
940HO	4000K	High	8.7	726	81.8

Length

2	3	4	5	6	7	8
Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture	Individual Fixture



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PINNACLE ARCHITECTURAL LIGHTING

EDGE EX3 Suspended Linear WET

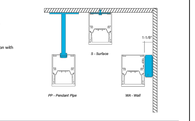
Position

- When making rows with EDGE Wet, the rows must be ordered as individual units with a position specified
- Positions can either be "BOR" – Beginning of Row, "MOR" – Middle of Row, or "EOR" – End of Row
- The connection between fixtures is less than 0.5"
- For single, non-connected units, specify as "IND" for individual

IND	BOR	MOR	EOR
Individual Fixture	Beginning of Row	Middle of Row	End of Row

Mounting

- 1/2" diameter rigid stem pendant and wall mount available
- Specify overall pendant length of 12", 18" or 24"
- Pendant Mount to J-Box (PP_JB) or Structure (PP_ST)
- Utilize Surface Mount for in-wall application. Building surface waterproofing by others
- End trims and power cord attached at factory
- Surface Mount Accessory Kit (SMK) is a Field Install Kit for additional details
- Approved for wet locations unless otherwise noted
- Refer to installation instructions during installation at the jobsite
- Wall Mount (WA) is designed for 1 fixture per wall. Multiple fixtures per run in wall application with the lens facing outward, please see the EDGE Wet Recessed Spec Sheet



Voltage

- Some EDGE Wet configurations will not accommodate all voltage options; consult with factory

U	Universal
1	120 volt
2	277 volt
3	347 volt

Driver

- Standard Driver Option = FSD
- Driver Lifetime: 50,000 hours at 25°C ambient operating conditions
- For more driver options see Pinnacle Resource Guide
- Some EDGE Wet configurations will not accommodate all driver options; consult with factory

0-10V Drivers	
FSD	Factory Select Driver (1%, 0-10v
FLZ	Supply Advance Aluminum 1%, 0-10v
FLX	Advance Aluminum 347V 1%, 0-10v, requires 347v
ELC	Osram Optotronic 1%, 0-10v
ELD	Osram Optotronic 1%, 0-10v, requires 347v option
ES1	eldoLED ECOdrive 1%, 0-10v Logarithmic
ES2	eldoLED ECOdrive 1%, 0-10v Linear
ES1	eldoLED SOLOdrive 0.5%, 0.1% Logarithmic
ES2	eldoLED SOLOdrive 0.5%, 0% Linear
DALI Drivers	
EE3	eldoLED ECOdrive 3%, DALI (Logarithmic)
EE3	eldoLED SOLOdrive 3%, DALI (Logarithmic)
OD1	Osram Optotronic 1%, DEXAL
OD2	Osram Optotronic 1%, DALI 2 Channel
LiFe Drivers	
LN1	Lutron Hi-lume Soft-on, Fade-to-black 1%, EcoSystem, LDE1
LN2	Lutron Hi-Lume 1%, 2 wire, Lutron LTEA2RL 120v only
Ultimate Drivers	
FSLL	Signify Advance Xitanium Step Dimming 50%/100%
OD1	Osram Optotronic 1%, DEXAL
ER1	ELV 120v only, 0-10v universal

Emergency

- Select emergency section type if required, indicate total QTY, example 2E
- Combine battery and emergency section ordering codes if both options are desired
- Entire direct fixture housing is on battery for lengths up to 9'
- For 10' and 12' lengths, emergency ballast is integral to fixture
- For more battery options available, see Pinnacle Resource Guide

0	No Battery
FSB	Factory Select Battery (Low option)
FSBSTS	Factory Select Battery (Low, Self Testing)
ILL	Iota 1.0w Integral Lithium, Self Testing
IBH	Iota 20w Remote
PBH	Bodine 20w Remote
ILL	Bodine Low Integral Lithium, Self Testing

For Approximate Battery Lumen Output
• Multiply battery wattage in Note 2 (Fifth Sheet) on Lumen Table
• 22.3 (LP90) x 10 (watts) = 223 battery lumen output

Finish

- Standard powder-coat textured white, metallic silver, textured black, graphite or bronze painted finish; consult factory for chip of standard paint finishes
- Selecting a Natura finish other than white may impact lumen output; consult factory for more information

W	White (extra pendant & canopy)
S	Metallic Silver (extra pendant & canopy)
BL	Textured Black (black pendant & canopy)
BR	Bronze (extra pendant & canopy)
GR	Graphite (graphite pendant & canopy)
CC	Custom Color (extra charge, please match powdercoat & canopy)

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PINNACLE ARCHITECTURAL LIGHTING

EDGE EX3 Suspended Linear WET

How to specify Circuiting, Battery and Emergency

1 Select fixture circuiting from options below
- Some EDGE Wet configurations will not accommodate all circuiting options, consult with factory

Circuiting

1	Single Circuit
M	Multi Circuit
E	Emergency Circuit only
N	Night Light Circuit only

2 + **3** Battery and emergency section options are available in addition to fixture circuit

- Some EDGE Wet configurations will not accommodate all battery options, consult with factory
- Some EDGE Wet configurations will not accommodate all circuiting options, consult with factory

Battery and/or Emergency (if Required)

0	No battery or specific emergency section required

Battery

- Select battery section type if required, indicate total QTY, example 2P
- Select battery section type if required, indicate total QTY, example 2P
- No battery option available for 3' lengths

0	No Battery
FSB	Factory Select Battery (Low option)
FSBSTS	Factory Select Battery (Low, Self Testing)
ILL	Iota 1.0w Integral Lithium, Self Testing
IBH	Iota 20w Remote
PBH	Bodine 20w Remote
ILL	Bodine Low Integral Lithium, Self Testing

Emergency

- Select emergency section type if required, indicate total QTY, example 2E
- Combine battery and emergency section ordering codes if both options are desired

E	Emergency section
N	Night Light section
L	Life Safety circuit section NO THROUGH WIRE

Combination On Circuiting Examples
- Single circuit (1) low battery (1) emergency section — Ordering Code: 1-1PBE
- Multi circuit (M) low battery (2) emergency sections — Ordering Code: M-2PBEE
- Single circuit (1) night light section — Ordering Code: 1-N

Battery OR Emergency Ordering Examples
- Single circuit, low integral Battery — Ordering Code: 1-IP
- Emergency only, Iota 4 Hazard Battery — Ordering Code: E-IH
- Single circuit- QTO required — Ordering Code: 1-1Q

Specifications and dimensions subject to change without notice. Specification sheets that appear on pinnacle-ltg.com are the most recent version and supersede all other previously printed or electronic versions.

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PINNACLE ARCHITECTURAL LIGHTING

EDGE EX3 Suspended Linear WET

Fixture Options

- Additional options to enhance the fixture and finish of the product

ELB	Internal Fast Blow Fuse
DBP	Customer Supplied Battery/Driver/Sensor
EFF	End Power Feed
N	Natorium (corrosion resistant hardware)

Controls

- Pinnacle is able to accommodate different control solutions from different manufacturers. Consult Factory for more information.

Photometrics

Satine Wet Lens

Tests # Scales from T-24000
Catalog # EDI-WET-N-840HO-4
Notes 3rd
Efficacy 98 LPW



Candela Distribution

Vert Angles	Horizontal Angle 0	22.5	45	67.5	90
0	1327	1327	1327	1327	1327
5	1364	1367	1364	1360	1356
15	1344	1346	1344	1340	1336
25	1298	1298	1278	1270	1268
35	1218	1218	1208	1198	1177
45	1106	1106	1096	1086	1065
55	958	958	958	874	874
65	802	800	802	800	800
75	643	643	643	643	643
85	472	470	356	472	487
90	356	356	356	356	356
95	503	503	503	503	503
105	643	643	643	643	643
115	787	785	774	784	784
125	926	926	926	926	926
135	1062	1056	1062	1062	1062
145	1192	1192	1192	1192	1192
155	1312	1312	1312	1312	1312
165	1418	1418	1418	1418	1418
175	1506	1506	1506	1506	1506
180	1538	1538	1538	1538	1538

Luminance Data (cd/sq.m)

Angles in Degrees	Average 0 Deg.	Average 45 Deg.	Average 90 Deg.
45	4611	4611	4611
55	7827	7875	7875
65	9511	9555	9727
75	10,000	9,900	10,000
85	7,888	7,979	7,727

For all available IES files, please visit our website at pinnacle-ltg.com. Photometry testing in accordance to IESNA LM-79-08 at an NVLAP accredited testing laboratory. Testing conducted at 25°C ambient conditions

Applications & Certificates

Construction 6063-T5 extruded aluminum housing with welded ends. Internal lens gaskets seal housing to prevent moisture and debris from entering the fixture. Fixtures equalizing vent allows fixture to "breathe" preventing condensation.

Shielding Solid acrylic diffuse lens with matte finish with an EPDM gasketed for complete wet seal.

Mounting Fixtures can be installed individually or connected for a continuous run appearance. All fixtures are individual fixtures and have no joining holes. All fixtures cannot be "T" fed. Fixtures are designed to be mounted to a flat surface, such as a wall, ceiling and soffit box. Mount light circuits and fixtures with joining holes on soffit ends of fixture. EDR fixtures are used for the end of a row and have no joining holes on power feed end. Mount EDR fixtures on the opposite end of power feed.

LED 25°C test environment. Lumen output/wattage has a margin of +/- 5%. 2" or 3" lengths may have a greater wattage deviation. Luminaire configurations tested in accordance with IESNA LM-79-08 and LM-80-08. Projected LED lumen maintenance data calculated using IES TM-21. Minimum lifetime greater than 60,000 hours. Lifetime Projection L70 = 136,000 hours and L90 = 41,000 hours. MacAdam 3-Step Ellipses. Not all products are Lighting Facts listed. For all available IES files, please visit our website at pinnacle-ltg.com.

CRI, CCT & Lumen Output Two lumen packages available. Standard and High (HO). Standard CRI is 80 and High Output CRI is 90. Standard color temperature is 3000K. Tested based on CIE, CCT & Output page. All CRI is available for 3000K, 3500K, and 4000K. 90 CRI is available for 2700K, 3000K, 3500K, and 4000K. 90 CRI = R9360.

Warranty EDGE Wet LED offered with a 5-year limited warranty. Covers LED, driver and finish.

Labels cUL and cUL Listed. IP65 and IK10 rated.

Buy American Act Compliant

Driver Standard Driver Option is Advance Xitanium 0-10V, 1% = PLZ. Electronic driver, Power factor is >0.9 with a THD <20%. Driver Lifetime: 60,000 hrs at 50°C ambient operating conditions. Ambient operating range: -20°F/-30°C to 122°F/50°C. For more driver options see Pinnacle Resource Guide. Some EDGE Wet configurations will not accommodate all driver options.

Circuiting Select from single circuit (1), Multi circuit - For multiple circuiting and zone control, requires factory shop drawing. (M), Emergency circuit (E) or Night Light circuit (N). For emergency circuiting situations that require on through wire or circuit separation, Life Safety Circuit is available (L). Note: Night Light circuit and emergency circuit are not a Life Safety Circuit in that section. Some EDGE Wet configurations will not accommodate all circuiting options; consult with factory

Battery & Emergency Select battery or emergency options if required. If battery or emergency option is not required, enter 0. Battery duration is 90 minutes as standard. Test switch is remote. Refer to Battery & Emergency Ordering Information for more details.

Finish Standard powder-coat textured white, metallic silver, textured black, graphite or bronze painted finish; consult factory for chip of standard paint finishes or for additional custom color and finish options.

Controls Consult Factory

Labels cUL and cUL Listed. IP65 and IK10 rated.

Buy American Act Compliant

Warranty EDGE Wet LED offered with a 5-year limited warranty. Covers LED, driver and finish.

Labels cUL and cUL Listed. IP65 and IK10 rated.

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VCVL LED
Architectural Luminaire

Catalog Number

Notes

Type SCA

Not factory to scale and images may or may not be accurate.

Specifications

Diameter: 19"
Height: 3.75" (with 48" field cut cable)
Weight (max, with no options): 18 lbs

A-1 guide system rods and hi-hiz color background

Introduction

The VCVL LED, Visually Comfortable Versatile Luminaire, is designed to bring glare control, optical performance and visual comfort to the ceiling plane. The low profile lens design of VCVL LED minimizes high angle glare, while its precision molded acrylic lens eliminates LED pixelation and delivers uniform distribution. The dedicated up-light module option reduces the contrast between the luminaire and the ceiling creating a more visually comfortable environment.

Ordering Information

EXAMPLE: VCVL LED V4 P4 40K 70CRI TSM MVOLT ACA DNAXD

VCVL LED													
Series	Size	Light Engine	Position	Color Temperature	CRI	Finish	Voltage	Mounting	Shipped Included
VCVL LED	36"	4 Light Engines	P1*	30K 3000K	70CRI	TSR Recessed	MVOLT	For ordering with Row	PIR Pendant mount standard (24 inch length supply lead)
	18"	2 Light Engines	P2*	35K 3500K	80CRI	TSM Medium	347	120	SRM Surface mount (24 inch length supply lead)
			P3*	40K 4000K		TSW Wide	480	208	ARM Arm mount (use KCWBA accessory to mount to a wall)
			P4*	50K 5000K		TSRP Rectangular		240	
			P5*					277	
			P6*					347	Shipped separately
			P7*					480	ACA Aircraft cable with white 6' cord (adjustable, mast 5')
									HCS Wide cast hook with black 5' cord (mainly on drop)

Options	Finish (required)
Shipped included UPL1 Up-light 100 lumens UPL2 Up-light 700 lumens EMAC Emergency battery backup, Certified to CA Title 20 MAEDBS (20W, 120°C max)(2)(3) EWMR Emergency battery backup, Certified to CA Title 20 MAEDBS (11W, 2°C min)(4)(5) HA High ambient (50°C max)(1)(4) SF Single fuse (120V, 277V, MVOLT) DF Double fuse (208, 240, 480, 480V) SPD10KV 10kV surge U20K 20kV CWA surge U20C2 2 Dr. (DR) lead length U20SB 18Rm (RB) lead length DWL External 0-10V leads (no controls)(1) **Shipped Separately** WG Wire Guard **Standalone Sensors/Controls**[1] PIR Motion/ambient sensor for 8-15' mounting heights PIRH Motion/ambient sensor for 15-30' mounting heights PIR1FC3V Motion/ambient sensor for 8-15' mounting heights, pre-programmed to 3fc and 25% light output PIRHFC3V Motion/ambient sensor for 15-30' mounting heights, pre-programmed to 3fc and 25% light output **Networked Sensors/Controls**[2] NLTAIR2 PIR eGGFI AIR Wireless enabled motion/ambient sensor for 8-15' mounting heights NLTAIR2 PIRH eGGFI AIR Wireless enabled motion/ambient sensor for 15'-30' mounting heights NLTAIR2 PIR1FC3V eGGFI AIR Wireless enabled, (3, 5) fc (Lens) motion/ambient sensor for emergency circuits for 8-15' mounting heights[3] NLTAIR2 PIRHFC3V eGGFI AIR Wireless enabled, (3, 5) fc (Lens) motion/ambient sensor for emergency circuits for 15-30' mounting heights[3]	DWHXD White DNAXD Natural aluminum DBXD Dark bronze DBLXD Black

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Ordering Information Cont.

Accessories

Ordered separately or with fixture

VCVLSRM12	Surface mount kit, white for Up-Light
VCVLSRM12B	Surface mount kit, black for Up-Light
VCVLWG12	Wire guard
SLYSQ	Quick mount pendant swivel kit, square
SLYRD	Quick mount pendant swivel kit, round
RSXWBA DWXD U	RSX WBA wall bracket (specify finish)
WSKSCSB	Safety cable SSP
WSKSCAW	Safety cable JIAP

NOTES
1. TSC is not available with VR, FT not available with VR.
2. Not available with FT.
3. Not available with 347V, 480V, ACA or HCS.
4. Not available with 347V, 480V, ACA or HCS.
5. EMAC & NLTAIR2 units available with FT-PR packages.
6. DWG option not available with ACA, HCS and Additional or networked sensors/controls.
7. Needs an 4-Light Air Framed Power Sensing (APS) device in the group. ACA, NLTAIR2 PIR and PIRH devices cannot act as APS devices.

Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, and values may change due to variation in manufacturing tolerances. Consult factory for performance data on any configurations not shown here.

Performance Group	Line	Drive Current	Power (W)	Input Watts	Delivered Lumens	Efficacy (LPW)	Color Rendering Index (CRI)
P1	27M	702	5.00	5.25	539	107.5	94
		750	5.40	5.66	580	107.4	94
		1,000	7.30	7.67	780	106.9	94
P2	35M	702	6.27	6.58	698	111.3	94
		750	6.82	7.16	757	111.0	94
		1,000	9.39	9.86	1,008	107.3	94
P3	40M	702	6.27	6.58	718	114.5	94
		750	6.82	7.16	779	114.2	94
		1,000	9.39	9.86	1,037	110.4	94
P4	50M	702	6.27	6.58	718	114.5	94
		750	6.82	7.16	779	114.2	94
		1,000	9.39	9.86	1,037	110.4	94
P5	27M	702	7.81	8.20	843	107.5	94
		750	8.49	8.91	907	106.9	94
		1,000	11.70	12.28	1,210	103.4	94
P6	35M	702	9.80	10.29	1,092	111.3	94
		750	10.65	11.18	1,184	111.0	94
		1,000	14.68	15.41	1,577	107.4	94
P7	40M	702	9.80	10.29	1,123	114.5	94
		750	10.65	11.18	1,218	114.2	94
		1,000	14.68	15.41	1,621	110.4	94
P8	50M	702	9.80	10.29	1,123	114.5	94
		750	10.65	11.18	1,218	114.2	94
		1,000	14.68	15.41	1,621	110.4	94
P9	27M	702	11.71	12.29	1,264	107.5	94
		750	12.73	13.36	1,361	106.9	94
		1,000	17.55	18.42	1,815	103.4	94
P10	35M	702	14.70	15.43	1,638	111.3	94
		750	15.98	16.77	1,776	111.0	94
		1,000	22.02	23.12	2,366	107.4	94
P11	40M	702	14.70	15.43	1,685	114.5	94
		750	15.98	16.77	1,827	114.2	94
		1,000	22.02	23.12	2,431	110.4	94
P12	50M	702	14.70	15.43	1,685	114.5	94
		750	15.98	16.77	1,827	114.2	94
		1,000	22.02	23.12	2,431	110.4	94

Up-light Lumen Output

Up-light Option	Lumens
UPL1	4,138
UPL2	8,138

Lumen Multiplier for 80CRI

CCT	Multiplier
3K	0.926
35K	0.946
4K	0.967
5K	0.965

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for operation at ambient temperatures of 0°C to 50°C (32°F to 122°F).

0°C	10°C	20°C	25°C	30°C	40°C	50°C
1.03	1.02	1.01	1.00	0.99	0.98	0.96

Projected LED Lumen Maintenance

Data is calculated according to IESNA TM-21 methods and calculations based on 25,000 hours of LED testing (per IESNA LM-80-08) and projected per IESNA TM-21-11.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.0	0.97	0.94	0.89

Electrical Load

Drive Current	Line Power	Input Watts	Input Current @ 120	@ 208	@ 240	@ 277
3K	27M	9.22	0.13	0.12	0.10	0.09
	35M	11.58	0.16	0.14	0.13	0.10
	40M	11.58	0.16	0.14	0.13	0.10
	50M	11.58	0.16	0.14	0.13	0.10
4K	27M	9.22	0.13	0.12	0.10	0.09
	35M	11.58	0.16	0.14	0.13	0.10
	40M	11.58	0.16	0.14	0.13	0.10
	50M	11.58	0.16	0.14	0.13	0.10
5K	27M	9.22	0.13	0.12	0.10	0.09
	35M	11.58	0.16	0.14	0.13	0.10
	40M	11.58	0.16	0.14	0.13	0.10
	50M	11.58	0.16	0.14	0.13	0.10

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Photometric Diagrams

To see complete photometric reports (or download) .ies files for this product, visit the Lithonia Lighting VCVL LED homepage, select configure and choose the "Documents" tab.



Control/Sensor Options

Motion/Ambient Sensor (PIR _ PIRH)

Motion/Ambient sensor (Sensor Switch MSOD) is integrated into the luminaire. The sensor provides both Motion and Daylight based dimming of the luminaire. For motion detection, the sensor utilizes 120% Digital Passive Infrared (PIR) technology that is tuned for walking size motion while preventing false tripping from the environment. The integrated photocell enables additional energy savings during daytime periods when there is sufficient daylight. Optimize sensor coverage by either selecting PIR or PIRH option. PIR option comes with standard lens and is optimized to provide maximum coverage for mounting heights between 8'-15ft, while PIRH is optimized for 15-40ft mounting height.

Networked Control (NLTAIR2)

nLight® AIR is a wireless lighting controls platform that allows for seamless integration of both indoor and outdoor luminaires. Five-tier security architecture, 900 MHz wireless communication and app (CLARITY™ Pro) based configurability combined together make nLight® AIR a secure, reliable and easy to use platform.

Motion/Ambient Sensor Default Settings

Sensor	Dimming Range	Photocell Operation	Ramp-up Time*	Hold Time*	Ramp-down Time*	Time to Step
PIR or PIRH	Motion - 3V (1%) Full On Ambient - 3V (Lens) off	1.5fc (adjustable)	100 (100% output)	15sec (adjustable)	1 min	5 min	Motion - 3 sec Photocell - 10 min
PIR1FC3V or PIRHFC3V	Motion - 3V (1%) Full On Ambient - 3V (Lens) off	3fc (adjustable)	100 (100% output)	15sec (adjustable)	1 min	5 min	Motion - 3 sec Photocell - 10 min

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Mounting, Options & Accessories

ACA – Aircraft Cable
D = 19"
H = 11" - 72"

HCS – Hook & Cord
D = 19"
H = 4.5" (up-light) or 5.2" (with up-light)

PM – Pendant Mount
(compatible with 5/8" threaded stem provided by others)
D = 19"
H = 4.5" (no up-light) or 5.2" (with up

ENVIRONMENTALLY FRIENDLY, ENERGY EFFICIENT

- Lumen packages suitable for ceiling heights ranging from 8' to in excess of 100'
- Efficacies up to 123 lm/w
- Superior-quality white LED light output using Chip on Board technology
- Patented Hyperbolic Reflector (U.S. Patent No. US,610,257 B2)
- Low Watt: LEDs of are for fixtures aimed at wall with a cut-off equal to or less than 4deg per CIE 117:1995 Discomfort Glare in Interior Lighting.

PRODUCT SPECIFICATIONS

Atrius™ - Ready Product: Select models of the Lumrite product line deliver valuable data when connected to the Atrius™ platform services. For more information, please refer to www.acuitybrands.com/Atrius.

OPTICS

Hyperbolic: Patented hyperbolic shape (U.S. Patent No. 10,670,227 B2) optimized for single-directional LED source, maximizes fixture efficiency while creating the "Giant Ceiling" appearance by reducing lamp image and aperture brightness • Geometry of hyperbolic reflector is designed to maximize spacing and uniformity of light output

Parabolic/Cone: Computer-optimized parabolic reflector with frosted narrowed lens engineered into cone provides uniform distribution with no striations

Wall Wash: Also available in Hyperbolic and Parabolic. Both provide uniform distribution with no striations

ELECTRICAL

LED Light Engine: Compact light source delivers uniform illumination without pixilation, exhibiting excellent beam control • 2000K (3000K within 350CW) • 80, 90 & 97 CRI

LED Driver: Driver is integral with push in wire connections mounts directly to heat sink and is easily replaceable

Passive Cooling: Aluminum heat sink integrated directly with housing provides superior thermal performance to ensure long life of the LEDs

LED Drivers: Power factor >0.9 • Easily replaceable from above/below the ceiling

Dimming: Dimmable via 0-10V protocol standard • Optional drivers available for use with Lutron® Hi-lume® Eco-Systems, 2-wire dimmers, DALI, or DALI • For a list of compatible dimmers, see WEBSITE

Life: Rated for 60,000 hours at 70% lumen maintenance

Emergency: Battery backup (Optional) **output:** Provides a minimum of 600 (lm &. Nominal 1,400 (lm) lumens for a minimum duration of 90 minutes • BATTERY option is CEC Title 20 compliant

BUY AMERICAN ACT: This product is assembled in the USA and meets the Buy American requirements of the applicable procurement requirements under FAR, DFARS and DOT regulations. Please refer to www.acuitybrands.com/buyamerican for additional information.

Warranty: 5 years when used in accordance with manufacturer's recommended environmental and operating conditions. This is the only warranty provided and no other statements in this specification sheet create warranty of any kind. All other express and implied warranties are disclaimed. **Note:** Actual performance may differ as a result of end-user environment and application. Specifications subject to change without notice.



NEW CONSTRUCTION



REMODEL

Air Capable options are available for use with Darkplane

ORDERING INFORMATION

Complete Catalog# Example: LR 2B3M ZT4 MVOLT G4 80CRI ZT (WH CS IP HBS)

RSX04-09

Series	Light Engine	Color Temperature	Voltage	Generation	CRI	Driver	Ready for Options	
LR 6" Lumrite Recessed Downlight	1XLM 1 Lumen Package	27K 2700K 30K 3000K 35K 3500K 40K 4000K 50K 5000K	120 120V 277 277V MVOLT (120-277)	G4	80CRI 90CRI 97CRI	DALI DALI Control Dimming (NOT for use with Emergency Battery Pack or Fuse Holder) ELDV0 ELDV0 Hi-lume® Eco-Systems, 0-10V Dimming, Sink Source, CEC Title 20 Compliant ELDV2* ELDV2 Hi-lume® Eco-Systems, 0-10V Dimming, Sink Source, CEC Title 20 Compliant ELDV* ELDV0 or ELDV2 Hi-lume® Eco-Systems, 0-10V Dimming, Sink Source, CEC Title 20 Compliant	Fuse and Fuse Holder (Not Available with Emergency Battery Pack or Fuse Holder) EMT** Emergency Battery Pack (Not Available with Fuse Holder) HBS** Hybrid Battery Pack (Not Available with Fuse Holder) IC** Insulation Contact Rated NLTR** nLight® dimming and daylight harvesting Eco-Systems via emergency driver NLTAIR2** nLight® AIR Dimming, Multi Window Controls NLTAIRGEN2** nLight® AIR Generation 2 Dimming, Multi Window Controls, Integrated emergency driver ACEM** Atrius™ Ready, ACC Emergency Battery Backup (BT Positioning)
6" Lumrite Remodel Downlight								

*For Hyperbolic, "FSK" option must be included in both trim/fit and Reflector. Order is one at the end of the nomenclature.

REFLECTOR To order reflector separately, use "LR" prefix before reflector option values. Ex: LR HBR CS PF

Trim Style		Finish		Trim Options	Mounting
HBR* Hyperbolic Medium HBW* Hyperbolic Wide HBWD* Hyperbolic Single Wall Wash	P Parabolic WWD** Parabolic Wide WC* Corner Wall Wash WS* Single Wall Wash WD* Double Wall Wash	BB Black Diffuse BS Black Specular CD Clear Diffuse CS Clear Specular CSB Clear Semi-Specular	GD Gold Diffuse GS Gold Specular PD Pewter Diffuse PS Pewter Specular WH White, White Flange WPD Wheat Diffuse WPS Wheat Specular	BT* White Flange WG Wet Location	Blank Flanged

Accessories**	
EMAST** 9" Flangeless Adapter for Drywall Ceilings Only	HBAILT80*** 9" Sloped Ceiling Adapter, 3° Angle
HBAIR* 26° CV Channel Bar Hangers, Pair	HBAILT85*** 9" Sloped Ceiling Adapter, 110° Angle
HBAIT* 33° CV Channel Bar Hangers, Pair	HBAILT90*** 9" Sloped Ceiling Adapter, 20° Angle
HBTC* 33° Trimless Channel Bar Hangers, Pair	HBAILT95*** 9" Sloped Ceiling Adapter, 30° Angle
SBQP** 37° Linear Bar Hangers, Pair	HBAILT100*** 9" Sloped Ceiling Adapter, 37° Angle
	HBAILT105*** 9" Sloped Ceiling Adapter, 45° Angle

Ordering Notes

1 MVOLT not available for RSX04 and up.
2 347V or 480V not available.
3 Not available with SCR75.
4 Not available for RSX04 and up.
5 Not available for RSX04 and SCR04 and up.
6 120V only.
7 Not available for SCR04 and up.
8 Not available.
9 See CR notes 1 for following table for compatibility with other options.
10 Only compatible with the following driver options: EZ1, EZB, EZ10, EZ1_IT (for 6CCM - 9CCM only).
11 Not compatible with WET.
12 Not available with WET.
13 FRAME required for HA.
14 PF not available with WH finish. When specifying WH finish, PWH must be ordered as well.
15 Not compatible with SBT, SBTDD, or HBB.
16 Not available with GWAR.
17 See RSX02 notes 1 for following table for compatibility with other options.
18 NEMA82, NEMA892, AEZ4CD not recommended for metal ceiling applications.
19 *HBL, WHB available with CS, CSS, CSS. With finishes only.
20 Not available for RSX04 and up.
21 SCCSS with MVOLT only available for 5000K - 57mA.

CP Notes

CP with MVOLT only available for 5000K - 57mA.
CP with MVOLT, HBB, 5000K, HL, NLDS, NEMA892, NEMA892, AEZ4CD not compatible with CP.
DALI, DMRR, ZT not available for CP with 9W or RSX04 and up.

AEZ4CD Notes:

Not compatible with SAT for 5MAR wattage.
Only compatible with EZ1 driver for RSX04 and below.
EZ1, EZ1_IT, EZ10, EZ10_IT, EZB, ELDV0, ELDV2, NLTAIR2 not compatible with AEZ4CD.
Recommended ceiling height of 20' and under, not recommended for mounting heights greater than 40' as need ceiling installations.

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PRODUCT SPECIFICATIONS (cont.)

MECHANICAL

New Construction Housing: Low profile, universal housing design installs in suspended grid, plaster or drywall • Integral heat sink conducts heat away from LED light engine • Driver is accessible from above and below ceiling and can be upgraded to accommodate future technology improvements • Knockouts facilitate quick wiring

Mounting Bracket: New construction mounting brackets have 3" vertical adjustment and support commercial bar hangers, including our proprietary Trunkslot bar hangers • Our non-proprietary Trunkslot bar hangers have integral clear locking screws and alignment notches for locating and locking fixture in the center or 1/4" tile increments

Junction Box: Die-cast 4" x 67" galvanized steel junction box with (8) ½" (21 °C) knockouts facilitate quick wiring • New Construction junction box has (4) ½" and (4) ¾" knockouts (RSX04 and up)

Plenum Rated: Suitable for installation in air handling spaces (plenums)

Plangeless Adapter: Must specify PAAX if flangeless, "FSK" option, is specified. Suitable for drywall installations only.

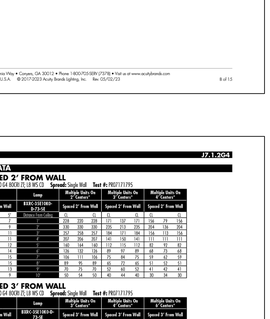
Remodel Housing: Housing installs from below ceiling in applications where above ceiling access is not available • Secured in place by factory installed remodel springs • Remodel springs accommodate ceilings from 1/2" to 1-1/8" thick • Integral heat sink conducts heat away from LED light engine • Driver is accessible from below the ceiling and can be upgraded to accommodate future technology improvements.

TRIMS:

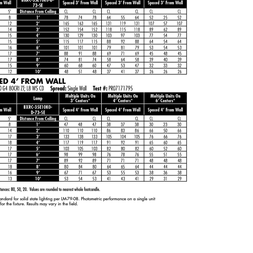


APERTURE: 7-3/8" Dia.
CEILING CUTOUT: 8" Dia.
OVERLAP TRIM: 9-5/8" Dia.

NEW CONSTRUCTION



REMODEL



ENERGY STAR® certified

PRODUCT	FIXTURE CONFIGURATIONS = ENERGY STAR
(5) DMVOA (CCSX SW) (V) (xx) (PE)(DR) (GD) (ZT) (CC)	Series: 5 = LR, LMAR Lumen Package: MW = LM, 1S, 1S, 1T, 2S, 2B, 3S, 4S, 4L, 5S, 6S, 7S, 8S, 9S, 9S (CC): XX = 2T, 3S, 3S, 4L, 5S Voltage: For MVOLT, Refer to Table 1, Pg 2 Driver: 1S = 1S, 1T, 2S, 2B, 3S, 4S, 4L, 5S, 6S, 7S, 8S, 9S, 9S Trim Color: WH, BK, BNZ, BSS, GTH, GSB, ZT, CC1 Trim Style/Flanges: ZT = HB, HW, HBL, HBW, WPD, WPS Trim Color/Finish: CC = 1S, CS, GS

LABELS AND LISTINGS

• Tested to UL1598 and CSA C22.2 250 and listed for lead through and damp locations • Spacing requirement for 4GAA and above: minimum of 4' between fixture centers, 3" overhead clearance, 3" from fixture center to side wall • RoHS compliant • ENF complies with FCC 47, Part 15, Class A • ENERGY STAR® certified, see table for designated products • U.E.W. Union made • ARRA Compliant

PERFORMANCE

LIGHT ENGINE	1XLM	1SLM	1TLM	2TLM	2SLM	2BLM	3SLM	4SLM	4LLM	5SLM	6SLM	7SLM	8SLM	9SLM	9XLM
	120V (50/60HZ)														
INPUT CURRENT	0.063	0.098	0.115	0.133	0.197	0.258	0.295	0.351	0.444	0.507	0.629	0.683	0.741	0.923	0.918
INPUT WATTAGE	7.50	11.74	13.66	15.82	23.33	29.46	33.63	42.19	51.98	58.57	68.14	77.85	85.07	105.00	104.00
THD%	4.43	5.19	4.61	3.86	3.09	3.46	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05
POWER FACTOR	0.993	0.993	0.992	0.994	0.994	0.995	0.997	0.998	0.998	0.998	0.998	0.998	0.995	0.995	0.996
	277V (50/60HZ)														
INPUT CURRENT	0.031	0.048	0.056	0.063	0.093	0.108	0.117	0.145	0.175	0.202	0.231	0.263	0.265	0.368	0.390
INPUT WATTAGE	7.89	11.86	13.89	15.83	23.15	28.19	29.84	41.68	45.74	49.80	57.02	62.26	67.48	89.70	89.16
THD%	13.00	11.42	11.31	11.34	9.93	9.94	10.48	8.79	9.15	8.07	9.95	11.12	10.97	13.02	13.16
POWER FACTOR	0.964	0.985	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987	0.987

	HYPERBOLIC REFLECTOR, LR HYP CS LOOK BACKS														
DELIVERED LUMENS (LL*1.0)	800	1,299	1,494	1,698	2,564	3,264	3,694	4,679	5,698	6,505	7,594	8,533	9,357	11,647	11,548
EFFICACY (LPW)	111	118	118	116	105	104	103	100	111	110	109	107	105	106	108
	PARABOLIC REFLECTOR, LR PCS CLEAR BOWL														
DELIVERED LUMENS (LL*1.0)	659	1,099	1,259	1,432	1,939	2,466	2,791	3,536	4,306	4,916	5,737	6,446	7,072	8,801	8,728
EFFICACY (LPW)	82	93	92	91	82	82	77	78	89	88	87	86	84	85	84

OPTICAL DISTRIBUTIONS

HYPERBOLIC BEAM SPREAD		
Trims	1BLM - 4LLM	5SLM - 9XLM
LR HB CS	72°	70°
LR HB CSS	74°	70°
LR HB CSS	52°	62°
LR HB CSS	52°	62°
LR HB CSB	63°	65°
LR HB CS	77°	74°
LR HB CSS	77°	74°

PARABOLIC BEAM SPREAD		
Trims	1BLM - 4LLM	5SLM - 9XLM
LR WB CS	80°	80°
LR WPS CS	56°	44°
LR WB CSS	56°	44°
LR P CSS	58°	53°
LR P CSS	58°	41°
LR P CSS	69°	73°
LR WPS CS	84°	83°
LR WPS CSS	83°	83°
LR WPS CS	83°	84°

LUMEN MULTIPLIERS

CCT	MULTIPLIER
2700K	0.98
3000K	0.96
3500K	1.00
4000K	1.01
5000K	1.04

CRI	MULTIPLIER
80CRI	1.00
90CRI	0.83
97CRI	0.77

HYPERBOLIC TRIM	MULTIPLIER
LR HB CS	0.96
LR HB CSS	0.97
LR HB CS	0.91
LR HB CSS	0.99
LR HB CSS	0.96
LR HB CS	0.89
LR HB CS	1.00
LR HBW CSS	0.98
LR HBW CS	0.97

PARABOLIC TRIM	MULTIPLIER
LR WB CS	0.96
LR WPS CS	1.00
LR WB CSS	0.94
LR P CS	1.00
LR P CSS	0.94
LR WPS CS	0.96
LR WPS CS	0.91

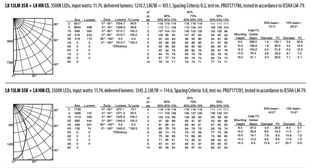
Applying Lumen Multipliers to Calculate Delivered Lumens

Base Fixture Delivered Lumens from Performance Table	x	CCT Multiplier	x	CRI Multiplier	=	Total Multiplier	=	Delivered Lumens for Desired Fixture and Reflector
Hyperbolic Reflector Example: LR 2TLM 30K 80CRI HBWDZ 90CRI 64 ZT HBR CD								
1761 Lumens	x	0.96	x	0.83	x	0.89	=	1743 Lumens
Parabolic Reflector Example: LR 2TLM 30K 80CRI WPS CS 90CRI 64 ZT WPS CD								
1929 Lumens	x	0.96	x	0.83	x	0.94	=	1643 Lumens

HYPERBOLIC PHOTOMETRICS

Distribution Curve **Distribution Data** **Output Data** **Coefficient of Utilization** **Illuminance Data at 30" Above Floor for a Single Luminaire**

LR 1XLM 35K • LR HB CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1290.7, LM/W = 109.9, Spacing Criteria: 0.2, test no. PR07175786, tested in accordance to IESNA LM-79.



LR 1XLM 35K • LR HW CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1345.2, LM/W = 114.6, Spacing Criteria: 0.8, test no. PR07175781, tested in accordance to IESNA LM-79.

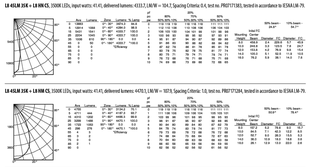


LR 1XLM 35K • LR HW CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1338.2, LM/W = 114.0, Spacing Criteria: 1.5, test no. PR07175804, tested in accordance to IESNA LM-79.

HYPERBOLIC PHOTOMETRICS

Distribution Curve **Distribution Data** **Output Data** **Coefficient of Utilization** **Illuminance Data at 30" Above Floor for a Single Luminaire**

LR 4XLM 35K • LR HB CS, 3500K LEDs, input watts: 41.41, delivered lumens: 4333.7, LM/W = 104.7, Spacing Criteria: 0.4, test no. PR07175383, tested in accordance to IESNA LM-79.



LR 4XLM 35K • LR HB CS, 3500K LEDs, input watts: 41.41, delivered lumens: 4470.1, LM/W = 107.9, Spacing Criteria: 1.0, test no. PR07175384, tested in accordance to IESNA LM-79.

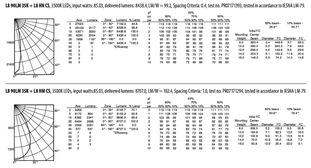


LR 4XLM 35K • LR HW CS, 3500K LEDs, input watts: 41.41, delivered lumens: 4310.0, LM/W = 104.1, Spacing Criteria: 1.2, test no. PR07175385, tested in accordance to IESNA LM-79.

HYPERBOLIC PHOTOMETRICS

Distribution Curve **Distribution Data** **Output Data** **Coefficient of Utilization** **Illuminance Data at 30" Above Floor for a Single Luminaire**

LR 9XLM 35K • LR HB CS, 3500K LEDs, input watts: 85.03, delivered lumens: 8458.4, LM/W = 99.5, Spacing Criteria: 0.4, test no. PR07172785, tested in accordance to IESNA LM-79.



LR 9XLM 35K • LR HW CS, 3500K LEDs, input watts:85.03, delivered lumens: 8703.8, LM/W = 102.4, Spacing Criteria: 1.0, test no. PR07172784, tested in accordance to IESNA LM-79.

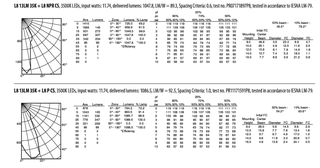


LR 9XLM 35K • LR HW CS, 3500K LEDs, input watts: 85.03, delivered lumens: 8779.2, LM/W = 103.3, Spacing Criteria: 1.2, test no. PR07172791, tested in accordance to IESNA LM-79.

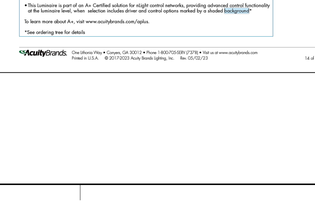
PARABOLIC PHOTOMETRICS

Distribution Curve **Distribution Data** **Output Data** **Coefficient of Utilization** **Illuminance Data at 30" Above Floor for a Single Luminaire**

LR 1XLM 35K • LR WPS CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1047.8, LM/W = 89.2, Spacing Criteria: 0.2, test no. PR07175789, tested in accordance to IESNA LM-79.



LR 1XLM 35K • LR P CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1086.5, LM/W = 92.5, Spacing Criteria: 1.0, test no. PR07175599, tested in accordance to IESNA LM-79.

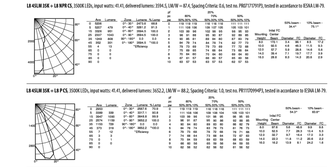


LR 1XLM 35K • LR WPS CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1068.5, LM/W = 91, Spacing Criteria: 1.5, test no. PR07175909, tested in accordance to IESNA LM-79.

PARABOLIC PHOTOMETRICS

Distribution Curve **Distribution Data** **Output Data** **Coefficient of Utilization** **Illuminance Data at 30" Above Floor for a Single Luminaire**

LR 4XLM 35K • LR WPS CS, 3500K LEDs, input watts: 41.45, delivered lumens: 3594.3, LM/W = 87.4, Spacing Criteria: 0.6, test no. PR07175975, tested in accordance to IESNA LM-79.



LR 4XLM 35K • LR P CS, 3500K LEDs, input watts: 41.41, delivered lumens: 3652.2, LM/W = 88.2, Spacing Criteria: 1.0, test no. PR07175994PS, tested in accordance to IESNA LM-79.

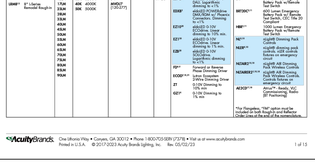


LR 4XLM 35K • LR WPS CS, 3500K LEDs, input watts: 41.45, delivered lumens: 3602.4, LM/W = 87, Spacing Criteria: 1.5, test no. PR07175982PS, tested in accordance to IESNA LM-79.

PARABOLIC PHOTOMETRICS

Distribution Curve **Distribution Data** **Output Data** **Coefficient of Utilization** **Illuminance Data at 30" Above Floor for a Single Luminaire**

LR 1XLM 35K • LR WPS CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1047.8, LM/W = 89.2, Spacing Criteria: 0.2, test no. PR07175789, tested in accordance to IESNA LM-79.



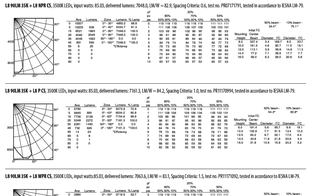
LR 1XLM 35K • LR P CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1086.5, LM/W = 92.5, Spacing Criteria: 1.0, test no. PR07175599, tested in accordance to IESNA LM-79.

LR 1XLM 35K • LR WPS CS, 3500K LEDs, input watts: 11.74, delivered lumens: 1068.5, LM/W = 91, Spacing Criteria: 1.5, test no. PR07175909, tested in accordance to IESNA LM-79.

PARABOLIC PHOTOMETRICS

Distribution Curve **Distribution Data** **Output Data** **Coefficient of Utilization** **Illuminance Data at 30" Above Floor for a Single Luminaire**

LR 9XLM 35K • LR WPS CS, 3500K LEDs, input watts:85.03, delivered lumens: 7161.3, LM/W = 84.2, Spacing Criteria: 1.0, test no. PR10170994, tested in accordance to IESNA LM-79.



LR 9XLM 35K • LR WPS CS, 3500K LEDs, input watts:85.03, delivered lumens: 7063.6, LM/W = 83.1, Spacing Criteria: 1.5, test no. PR10170992, tested in accordance to IESNA LM-79.

PERFORMANCE DATA

LUMINAIRES SPACED 2' FROM WALL

Catalog Numbers: LR 9XLM 35K 120 G4 80CRI ZT, LR HBR CSS **Spread:** Single Wall **Test #:** PR07171991

Single Unit	Lamp	Multiple Units On 2' Centers*		Multiple Units On 4' Centers*		Multiple Units On 6' Centers*	
Lateral Distance From Fixture 2' From Wall	RSX-SSE1HBD-B-2-9-35	Spread 2' From Wall		Spread 2' From Wall		Spread 2' From Wall	
	Distance From Ceiling	0	2	0	2	0	2
0'	2'	195	189	195	166	117	106
1'	4'	195	189	195	166	117	106
2'	6'	195	189	195	166	117	106
3'	8'	195	189	195	166	117	106
4'	10'	195	189	195	166	117	106
5'	12'	195	189	195	166	117	106
6'	14'	195	189	195	166	117	106
7'	16'	195	189	195	166	117	106
8'	18'	195	189	195	166	117	106
9'	20'	195	189	195	166	117	106
10'	22'	195	189	195	166	117	106

LUMINAIRES SPACED 3' FROM WALL

Catalog Numbers: LR 9XLM 35K 120 G4 80CRI ZT, LR HBR CSS **Spread:** Single Wall **Test #:** PR07171991

Single Unit	Lamp	Multiple Units On 2' Centers*		Multiple Units On 4' Centers*		Multiple Units On 6' Centers*	
Lateral Distance From Fixture 3' From Wall	RSX-SSE1HBD-B-2-9-35	Spread 2' From Wall		Spread 2' From Wall		Spread 2' From Wall	
	Distance From Ceiling	0	2	0	2	0	2
0'	2'	111	110	111	89	67	59
1'	4'	111	110	111	89	67	59
2'	6'	111	110	111	89	67	59
3'	8'	111	110	111	89	67	59
4'	10'	111	110	111	89	67	59
5'	12'	111	110	111	89	67	59
6'	14'	111	110	111	89	67	59
7'	16'	111	110	111	89	67	59
8'	18'	111	110	111	89	67	59
9'	20'	111	110	111	89	67	59
10'	22'	111	110	111	89	67	59

LUMINAIRES SPACED 4' FROM WALL

Catalog Numbers: LR 9XLM 35K 120 G4 80CRI ZT, LR HBR CSS **Spread:** Single Wall **Test #:** PR07171991

Single Unit	Lamp	Multiple Units On 2' Centers*		Multiple Units On 4' Centers*		Multiple Units On 6' Centers*	
Lateral Distance From Fixture 4' From Wall	RSX-SSE1HBD-B-2-9-35	Spread 4' From Wall		Spread 4' From Wall		Spread 4' From Wall	
	Distance From Ceiling	0	2	0	2	0	2
0'	2'	56	55	56	43	33	29
1'	4'	56	55	56	43	33	29
2'	6'	56	55	56	43	33	29
3'	8'	56	55	56	43	33	29
4'	10'	56	55	56	43	33	29
5'	12'	56	55	56	43	33	29
6'	14'	56	55	56	43	33	29
7'	16'	56	55	56	43	33	29
8'	18'	56	55	56	43	33	29
9'	20'	56	55	56	43	33	29
10'	22'	56	55	56	43	33	29

*Based on minimum of five luminaires. Reflectances: 80, 50, 20. Values are rounded to nearest whole footcandle.

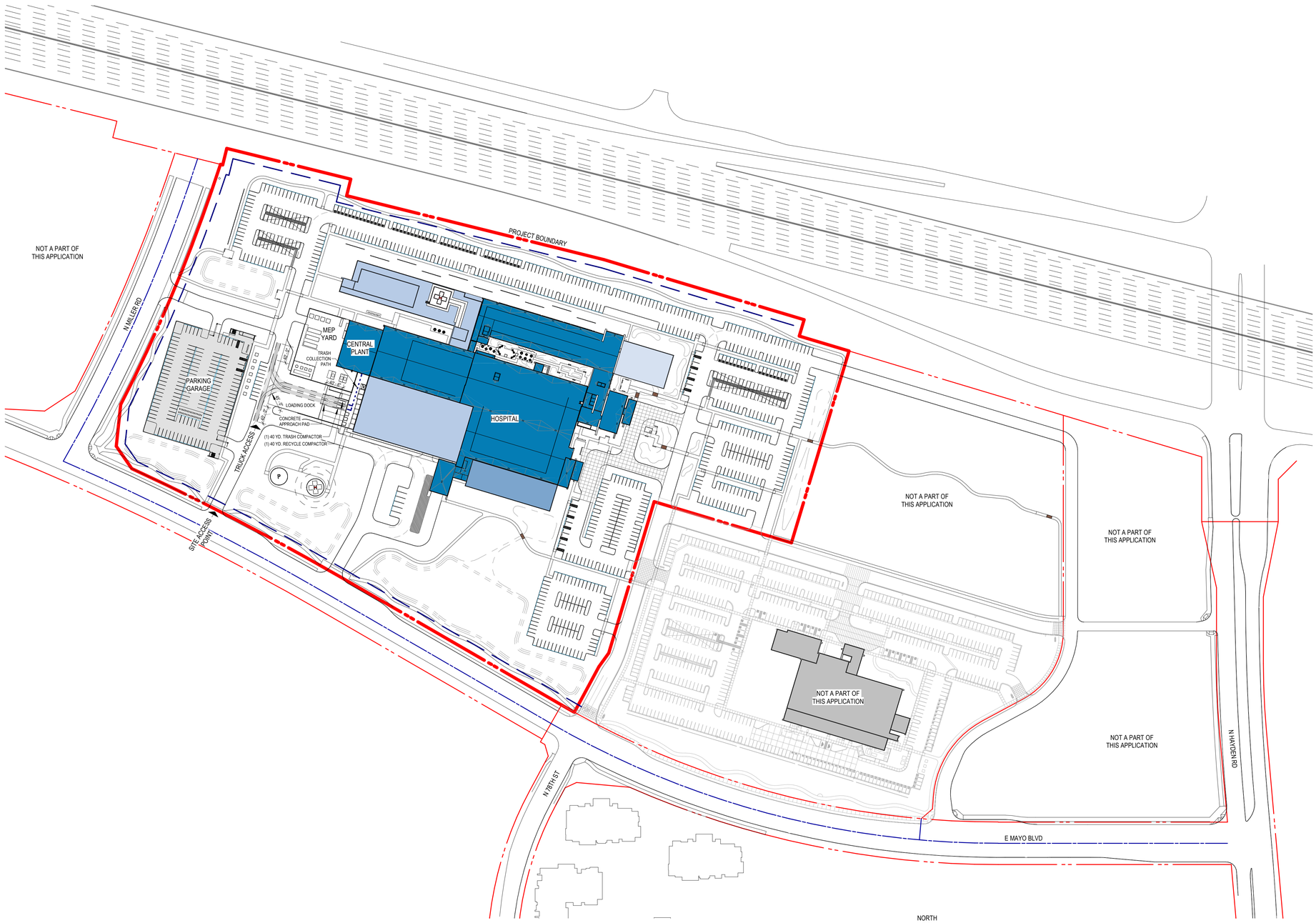
Fixtures tested to IES recommended standard for solid state lighting per LM-79-08. Photometric performance on a single unit represents a baseline of performance for the fixture. Results may vary in the field.

PERFORMANCE DATA

LUMINAIRES SPACED 2' FROM WALL

Catalog Number: LR 9XLM 35K 120 G4 80CRI ZT, LR WS CS **Spread:** Single Wall **Test #:** PR07171795

Single Unit	Lamp	Multiple Units On 2' Centers*		Multiple Units On 4' Centers*		Multiple Units On 6' Centers*	
Lateral Distance From Fixture 2' From Wall	RSX-SSE1HBD-B-2-9-35	Spread 2' From Wall		Spread 2' From Wall		Spread 2' From Wall	
	Distance From Ceiling	0	2	0	2	0	2
0'	2'	196	191	196	167	117	106
1'	4'	196	191	196	167	117	106
2'	6'	196	191	196	167	117	106
3'	8'	196	191	196	167	117	106
4'	10'	196	191	196	167	117	106
5'	12'	196	191	196	167	117	106
6'	14'	196	191	196	167	117	106
7'	16'	196	191	196	167	117	106
8'	18'	196	191	196	167	117	106
9'	20'	196	191



SITE PLAN - REFUSE PLAN

SCALE: 1" = 120'-0"

0 120' 240' 360'

GRAPHIC SCALE: 1" = 120' - 0"

REFUSE NOTES

A. REFUSE SIZE, LOCATION, AND ACCESS DESIGNED IN ACCORDANCE TO CITY OF SCOTTSDALE DSPM SECTION 2-1.309 AND CITY OF SCOTTSDALE SUPPLEMENT TO MAG STANDARD DETAILS.

B. TOTAL REFUSE SIZE AS BROKEN DOWN BELOW:

TOTAL GROSS SF (COMMERCIAL):
685,500 GSF (PROJECT AREA)

TOTAL REFUSE CONTAINERS:
(685,500/30,000) X 2 = 46 CONTAINERS
23 TRASH AND 23 RECYCLING

23 CONTAINERS * 4 CY = 92 CY OF WASTE AND
92 CY OF RECYCLING

WASTE COMPATION RATIO:
92 CY / 4 =
23 CY TRASH COMPACTOR REQUIRED
40 CU TRASJ COMPACTOR PROVIDED

RECYCLE COMPATION RATIO:
92 CY / 4 =
23 CY TRASH COMPACTOR REQUIRED
40 CU TRASJ COMPACTOR PROVIDED

Banner Scottsdale Medical Center

SCOTTSDALE CAMPUS HOSPITAL

NW Corner of Hayden Rd. and Mayo Blvd.
Scottsdale, Arizona 85255

SMITHGROUP

455 NORTH THIRD STREET
SUITE 250
PHOENIX, AZ 85004
602.265.2200
smithgroup.com

ISSUED FOR	REV	DATE
ENTITLEMENT REVIEW		*14JUL25*

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

SHEET TITLE

REFUSE PLAN

PROJECT NUMBER

ENT_A1.2.1

SHEET NUMBER

Plot Date: 7/11/2025 1:06:46 PM Author