Axon World Headquarters Mixed-Use Campus

REZONING, NON-MAJOR GENERAL PLAN AMENDMENTS, AMENDMENTS TO CROSSROADS EAST PCD, AND BONUS REQUEST

REPRESENTATIVE:

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APPLICANT:

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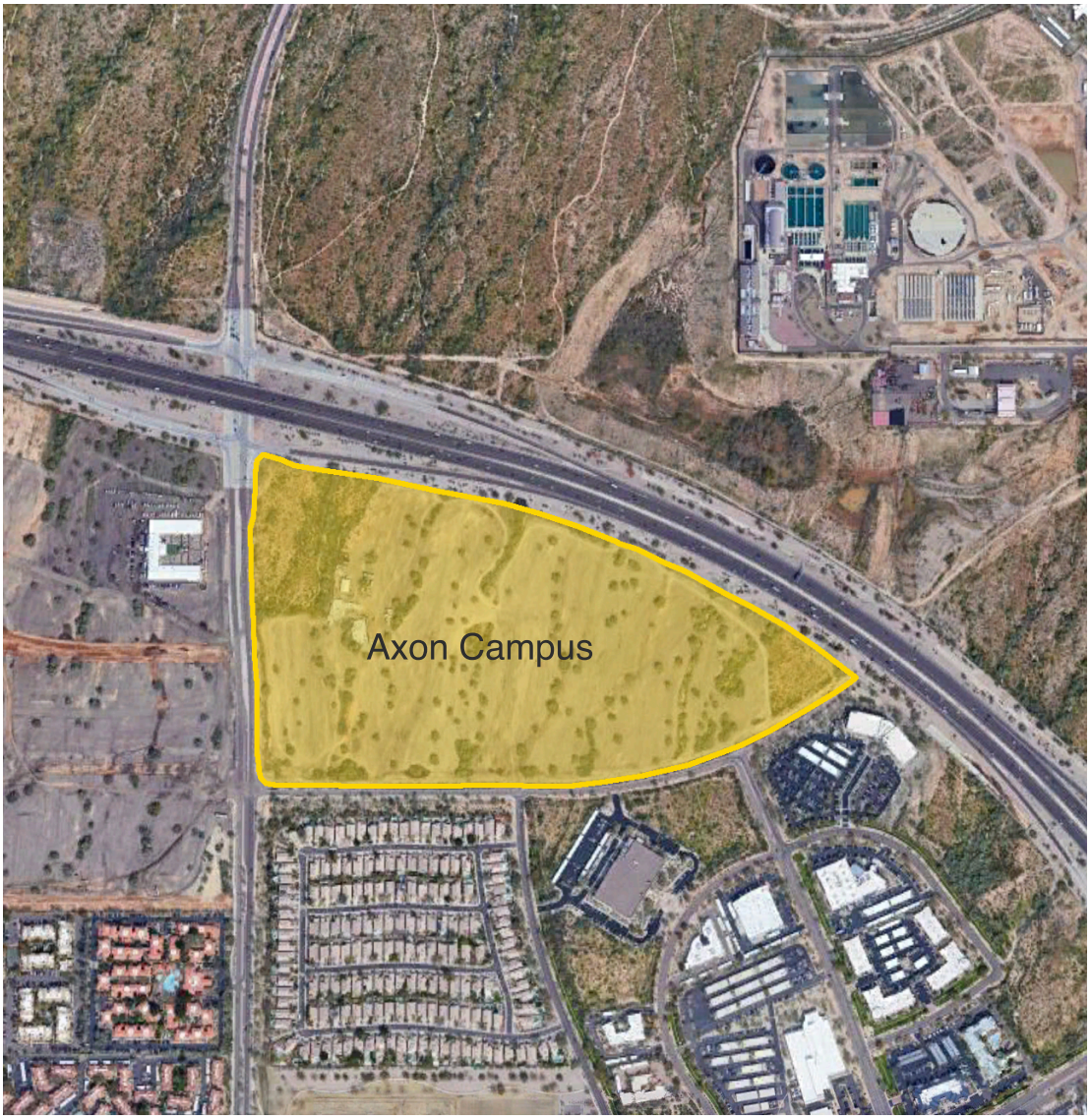
PROJECT OVERVIEW

In 2020, Axon Enterprise, Inc. ("Axon") acquired from the Arizona State Land Department (ASLD) approximately 73.57 acres on the south side of the Loop 101 freeway at Hayden Road to expand its campus within the area shown below:



On November 11, 2020, Scottsdale City Council approved the first phase of Axon's campus, requests for a Zoning District Map Amendment from Planned Community (P-C) to Planned Community District - Industrial Park (PCD I-1), amended development standards, and design review for the new Axon Campus office building. The site appears to be subject to the large-scale Crossroads East PCD consisting of approximately 1,000 acres of land that was at one point owned entirely by ASLD but has since been partially sold in pieces to private property owners.

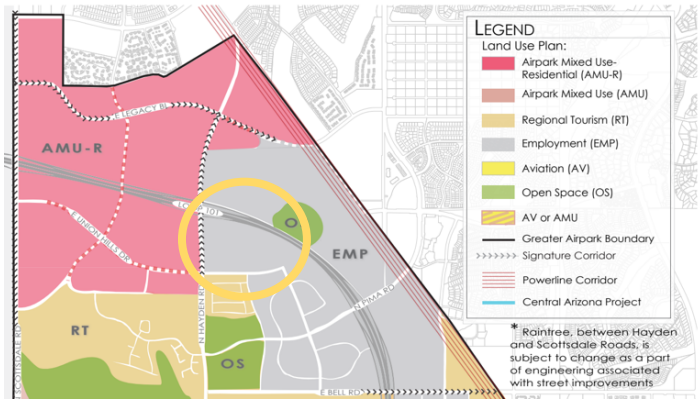
In keeping with the "Axon Campus" name, and in addition to the already approved headquarters, Axon is proposing to build a new mixed-use development with multi-family residential, hotel and commercial uses on the remaining portion of the site in conjunction with the adjacent municipal site's fire station and water treatment facility construction. The previously approved office building will be Phase I and the supporting housing and commercial uses will be Phase II of the campus build out.

In order to develop this campus vision, Axon is requesting the following:

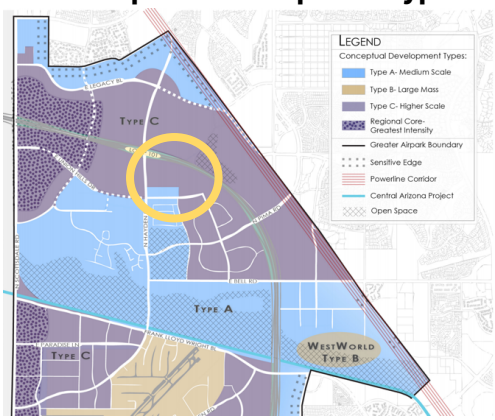
- a Non-Major General Plan Amendment to the Greater Airpark Character Area Plan from Employment to Airpark Mixed-Use Residential
- a Non-Major General Plan Amendment from Employment: Light Industrial/Office to Mixed-Use Neighborhoods
- a rezoning of a portion of the site from the Planned Community District – Industrial Park (PCD I-1) to Planned Community District – Planned Airpark Core Development/Airpark Mixed-Use Residential (PCD – PCP/AMU-R)
- Amended Development standards for the Crossroads East Land Use Budget, Zoning Allowance tables, and Hayden Area Transition Area

The site's overall 2035 General Plan designation is Employment: Light Industrial/Office with a Regional Use District overlay and the Greater Airpark Growth Area. The Axon campus is located within the Greater Airpark Area Plan with an Employment designation projected to be mostly Type C – Higher Scale Development type with a small portion of the site designed as Type A – Medium Scale as shown on the maps below:

Land Use Plan



Conceptual Development Types

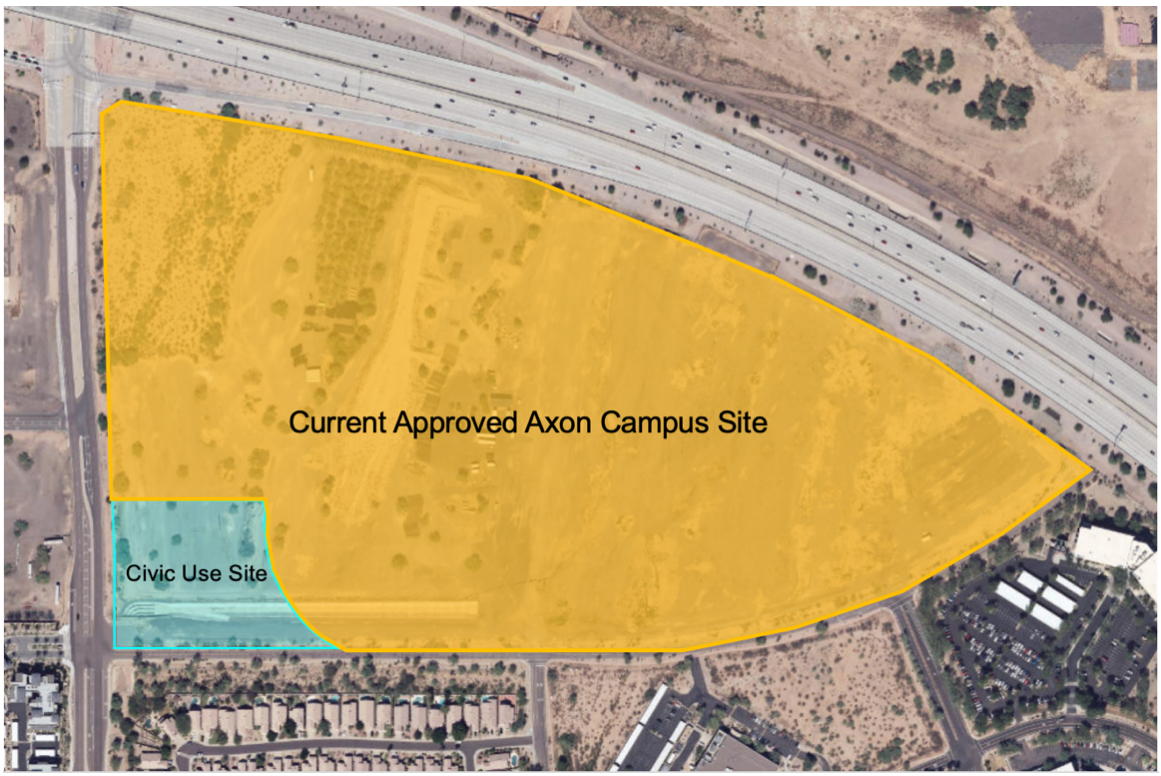


The approved Axon office/manufacturing building is an Industrial use at a scale designed to fit well with land use plans for this area. Rezoning the remaining portion of the site will allow this project to move forward as a true campus feel with the residential, hotel, commercial and industrial uses working cohesively with the adjacent municipal uses to create a genuinely mixed-use environment.

HISTORY

In 2020, Axon requested and received approval to rezone the approximately 74-acre site from PCD (Planned Community) to I-1 (Industrial Park) PCD, an amendment to the Development Standards for I-1 to accommodate an increased building height, and a Development Review (Major) for the proposed building design.

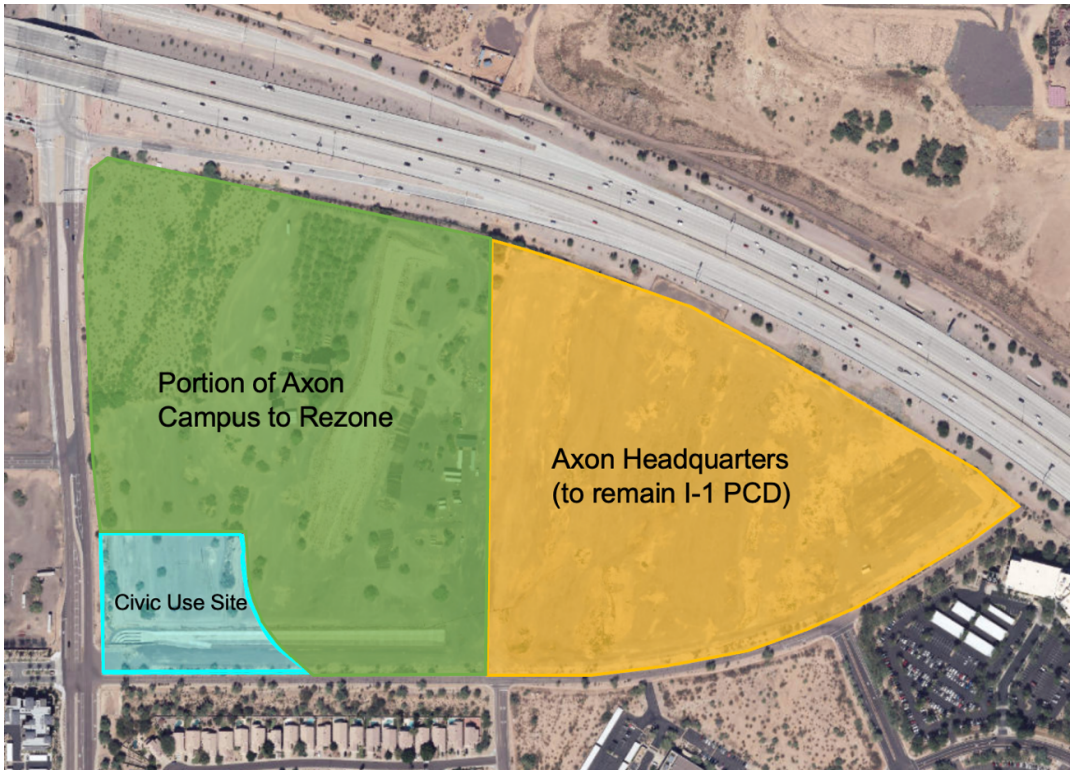
As part of an agreement between the City of Scottsdale, Axon dedicated an approximately 4.5-acre portion of the campus (the "Civic Use Site") highlighted in blue below. With the Civic Use Site dedicated to the City of Scottsdale and nearly 10 acres of land utilized for right-of-way improvements totaling nearly 15 acres (all of which has been dedicated to the City of Scottsdale), the remaining already approved Axon World Headquarters Mixed-Use Campus site is approximately 58.9 net acres, as shown highlighted in yellow below:



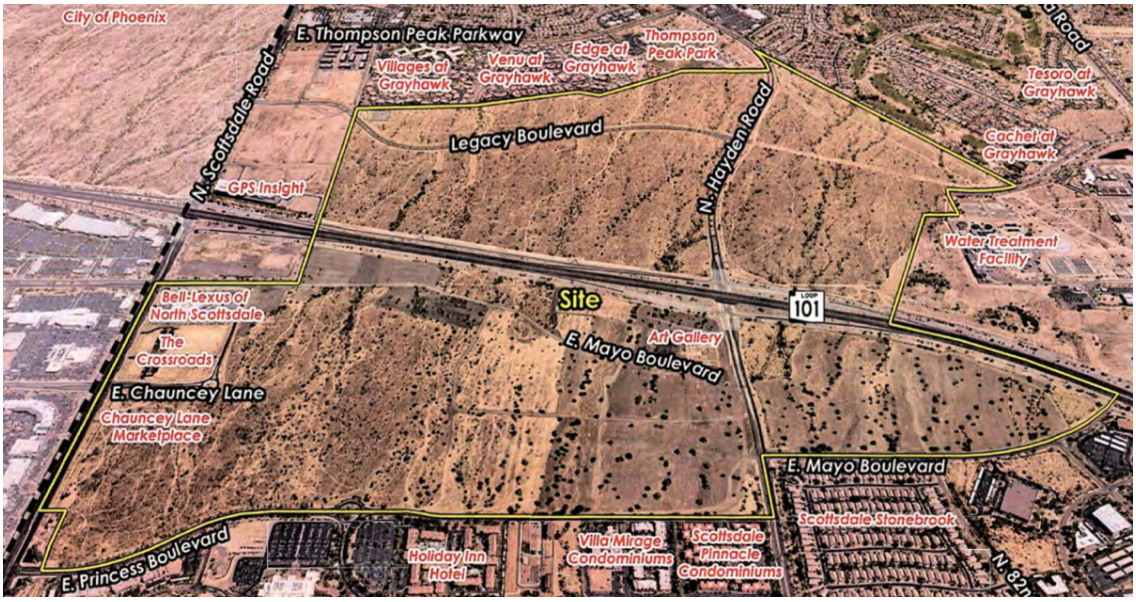
We have worked with the City for several years now to ensure adequate infrastructure in the area including moving Axon Way further away from the neighborhood to create a wide buffer from the Axon Campus and the nearby residential. Large amounts of open space and abundant landscape plantings are utilized to soften the transition from the nearby residential use in addition to a landscape berm which provides an additional physical barrier.

Axon's request to rezone approximately 32 acres of the site to PCP PCD with an amendment to the Greater Airpark Area Plan to AMU-R and will leave approximately 26.9 acres as I-1

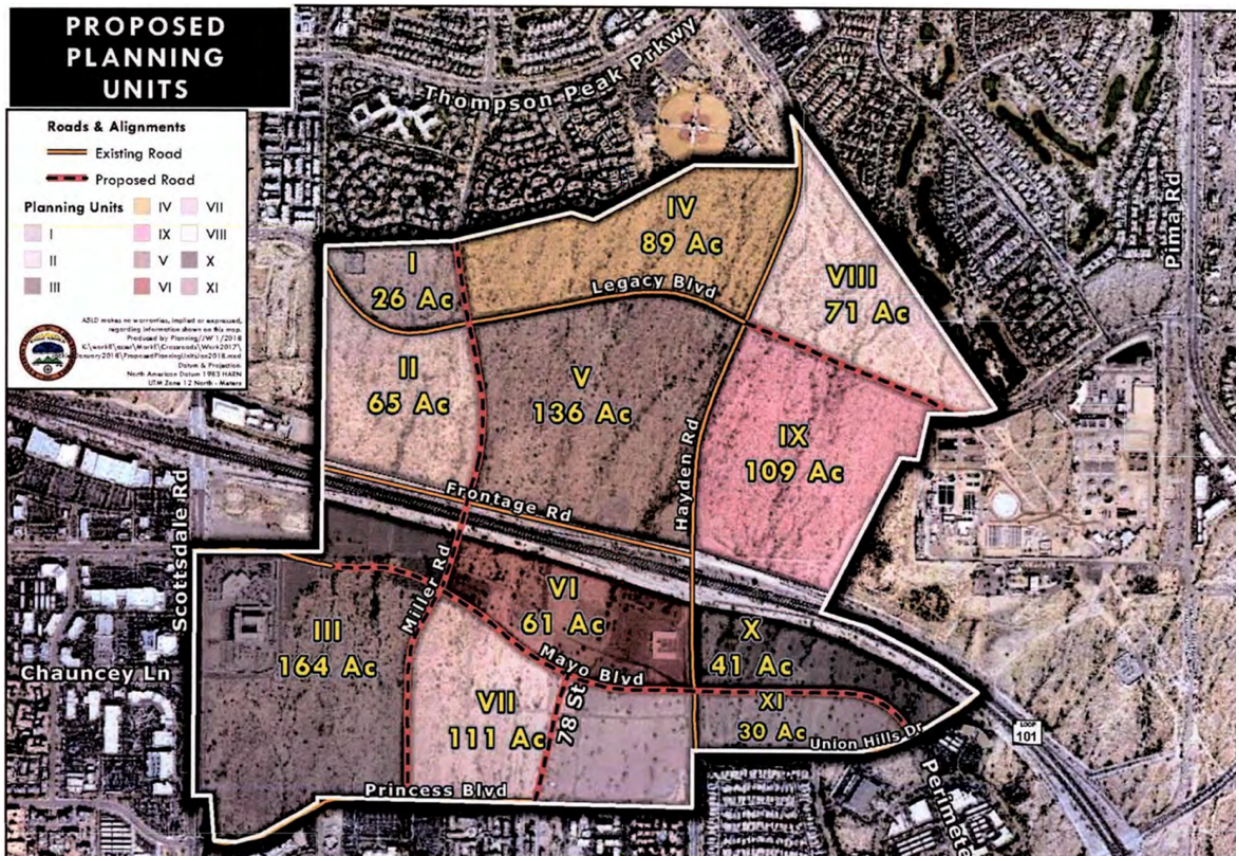
PCD. Below is an image that shows the City of Scottsdale's Civic Use Site (in blue), the Axon headquarters to remain I-1 PCD (in yellow), and the portion of the site that is included in this rezoning request (in green).



The site is located within a larger planning area within the City of Scottsdale known as Crossroads East that has been subject to various Development Agreements, rezonings, and other entitlement cases over many years. The Crossroads East area is depicted below in this City-created image:



Crossroads East is divided into Planning Units, which have been broken up over time. The future Axon Campus is located in Planning Units X and XI as shown in the map below created by rezoning case 19-ZN-2002#6:



All of the land contained within the Crossroads East area was previously rezoned by the City to Planned Community (PCD) with a zoning bank allowance for various zoning categories to be permitted in the Planning Units as well as dictating the amount of land that could utilize each zoning category and placing restrictions on the number of residential units permitted.

Part of our request includes a proposed modification to the Permitted Zoning Districts in Planning Units X and XI as well as a modification to the Land Use Budget to adjust the amount of acreage zoned I-1, PCP and to update the allowed dwelling units. Each of the various requests are detailed below in their respective sections.

The requested rezoning allows the Axon Campus and adjacent municipal fire station and water treatment facility to function in a true mixed-use environment with office, manufacturing, housing, hotels, and commercial on what was once a single vacant parcel.

REZONING NARRATIVE

Axon seeks to rezone a portion of the current I-1 (Industrial Park) PCD to PCP PCD to accommodate the mixed-use portion of the Axon Campus development. In conjunction with this rezoning request, an amendment to the Crossroads East PCD is necessary to update the Zoning Allowances and Land Use Budget.

These modifications allow Axon to proceed with creating a mixed-use campus that blends well with the adjacent municipal fire station and water treatment facility.

Crossroads East PCD

The subject site is located within Planning Units X and XI (created by 19-ZN-2002#6) with the following zoning allowances:

Current Crossroads East Permitted Zoning Districts

Category	Zoning	Permitted Zoning Districts										
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Employment	I-1		●	●	●	●	●	●	●	●	●	●
Employment	C-O	●	●	●	●	●	●	●	●	●	●	●
Mixed Use	PRC & PCP		●	●		●	●	●		●		
Commercial	C-2/C-3		●	●	●	●	●	●	●	●	●	●
Residential	R-5	●	●	●	●	●	●	●	●			

We are proposing to add PRC & PCP (Mixed Use Zoning Districts) to the Permitted Zoning Districts for Planning Units X & XI as shown in the proposed updated chart below:

Proposed Crossroads East Permitted Zoning Districts

Category	Zoning	Permitted Zoning Districts										
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Employment	I-1		•	•	•	•	•	•	•	•	•	•
Employment	C-O	•	•	•	•	•	•	•	•	•	•	•
Mixed Use	PRC & PCP		•	•		•	•	•		•	**•**	**•**
Commercial	C-2/C-3		•	•	•	•	•	•	•	•	•	•
Residential	R-5	•	•	•	•	•	•	•	•			

In addition to the Permitted Zoning District modification requested, we are also proposing a modification to various components of the Land Use Budget. The Land Use Budget provides for specific amounts of acreage to be zoned into a number of categories and also assigns a maximum number of dwelling units that is permitted in each zoning category.

The subject site is currently within the 210-acre allotment of I-1 zoning, which does not allow dwelling units, as shown in the chart below:

Current Crossroads East Land Use Budget approved with case 19-ZN-2002#11

Category	Zoning	Gross Acreage by Zoning	Maximum Dwelling Unit per Gross Acre (DU/AC)	Maximum Allowable Dwelling Units
Employment	I-1	210	NP	NP
Employment	C-O	81	NP	NP
Mixed Use	PRC & PCP	407	See Schedule C	4,163
Commercial	C-2/C-3	170	NP	NP
Residential	R-5	132	23	2,806
Total		1,000		6,969

We are proposing to remove +/- 40 acres from the I-1 allocation in the Land Use Budget for Phase II of the Axon Campus and add those +/- 40 acres to the PRC & PCP allocation.

Proposed Crossroads East Land Use Budget

Category	Zoning	Gross Acreage by Zoning	Maximum Dwelling Unit per Gross Acre (DU/AC)	Maximum Allowable Dwelling Units
Employment	I-1	**170**~~210~~	NP	NP
Employment	C-O	81	NP	NP
Mixed Use	PRC & PCP	40**4**7	See Schedule C	~~4,163~~**6,715**
Commercial	C-2/C-3	170	NP	NP
Residential	R-5	132	23	2,806
Total		1,000		~~6,969~~**9,521**

Axon will continue to utilize approximately 26.9 net acres of the I-1 allotment in the Land Use Budget for the rezoning of Planning Units X and XI in Crossroads East.

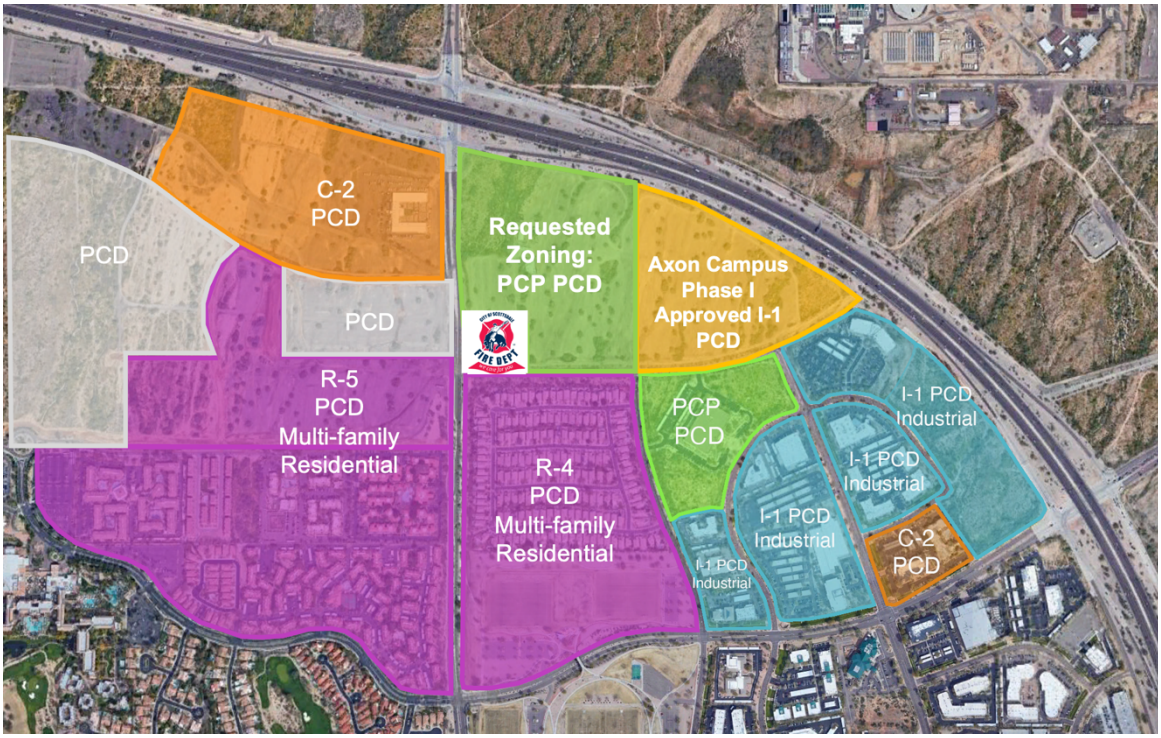
Compliance with Goals and Policies of the General Plan

The proposed Axon Campus expansion is consistent with various goals and policies of the General Plan 2035 set forth below.

Character and Design Element

Goal CD1. Determine the appropriateness of all development in terms of community goals, surrounding area character, and context.

> *CD1.1: New and revitalized developments should respond to the regional, citywide, and neighborhood contexts.*
> Axon's proposed mixed-use campus expansion is located on a vacant parcel within the Crossroads East PCD, an area geared at attracting regional headquarters for businesses as well as providing the multi-family residential base for new residents to live.
>
> Axon's World Headquarters Mixed-Use Campus Expansion integrates well into the plans for this area including expansion of employment and industrial opportunities adjacent to the Loop 101 freeway. The uses and densities in the surrounding area tend to be more intense due to the regional focus of Crossroads East. The addition of a mixed-use campus component to support the employment component is critical and consistent with much of the surrounding development that is a combination of high-density multi-family, commercial, Planned Airpark Core (mixed-use) and industrial.
>
> The map below demonstrates the zoning categories of the surrounding land:



The site is located within the Greater Airpark Character Area, which is designated as a growth area in the 2035 General Plan. The intent is to grow the City's crucial employment base and ensure attractive development occurs in the area. Part of growing employment cores includes a mixed-use campus environment like those found on the north side of the Loop 101. The addition of the City's fire station and water treatment facility further contribute to the variety of compatible uses present on the campus.

CD 1.2: Consider the effects of building height, overall development density, and building orientation on adjacent neighborhood character, privacy, and viewsheds.

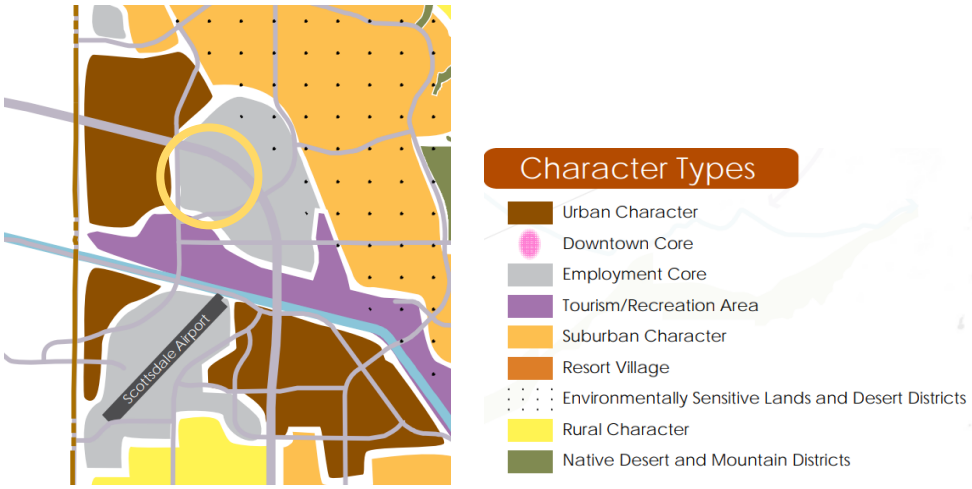
This area is bounded on two sides by the curve of the Loop 101 freeway, with the other portions of the site oriented towards a Major Arterial – Urban Street (Hayden Road) and a Major Collector – Urban Street (Axon Way, formerly Mayo Boulevard).

The parcel has been planned as an employment center of larger scale with associated intensity in relationship to its proximity to the Scottsdale Airpark and freeway. Accordingly, Axon designed and was approved for an appropriately scaled industrial building with a unique design that is oriented closer to the Loop 101. The remaining portion of the site that is the subject of this request will create an attractive and compatible development by building a site with a campus feel.

The proposed mixed-use development consists of a residential density consistent with the adjacent developments on the west side of Hayden Road. All of the Phase II buildings are proposed as 5-stories tall. The new buildings are proposed to be consistent with the approved height for the Axon building that will occupy the eastern portion of the site.

CD 1.3: Ensure that all development is part of and contributes to established Character Types.

As depicted in the image below from the 2035 General Plan, Axon is located within the Employment Core Character Type and much of the surrounding land is Urban Character.



Employment Core areas are planned as "primary employment centers for the city" and are "predominately concentrated in the Greater Airpark Character Area, a mixed-use employment core with primary freeway access, as well as around other major employment campuses . . ." and "support a wide range of activities, such as aviation, light-industrial, and regional- and community-level employment uses. These areas consist of multi-functional buildings with an emphasis on technology and corporate character."

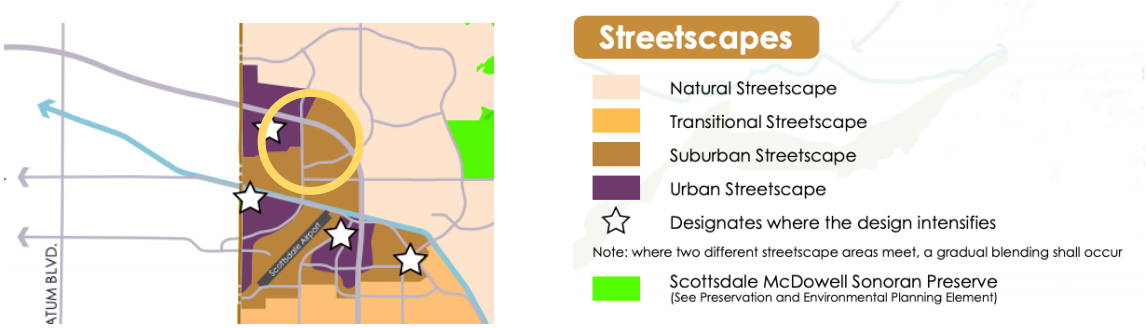
Consistent with the vision the City has for this area, Axon is proposing an expansion of its facilities into a true corporate campus including the approved world-class employment center and requested mixed-use component. Its location off of the Hayden Road exit for the Loop 101 freeway creates a regional presence with easy access throughout the Valley that will be home to highly sought-after technology jobs.

Attracting quality candidates for employment includes providing conveniently located housing and commercial amenities like restaurants and retail. By adding the additional uses to the already approved light industrial component, Axon will be

contributing to the Employment Core Character Type by supporting a wide range of activities with multi-functional buildings that support the headquarters and its emphasis on technology. Axon's goal to create a campus that supports different types of uses and allows for a cohesive environment of office, retail, residential, and hotel in addition to the municipal development consisting of a fire station and water treatment facility on the southwest corner.

Goal CD 4. Enhance the design of streets and public spaces to improve Scottsdale's visual quality, experience, Sonoran Desert context, and social life.

CD 4.1: Promote contextually compatible streetscapes that correspond with the following classifications: Suburban Streetscapes strive to achieve compatibility and safety between automobile traffic, neighborhood amenities (schools and parks), pedestrians, bicyclists, and recreational activities through the use of landscape areas, consideration of sidewalk alignment, and incorporation of a broad tree canopy.



The streetscapes have been designed and previously approved by the City consistent with the guidelines for Suburban Streetscapes including large landscape buffers and berms, roundabouts to control speed and make the streets safer for pedestrians and cyclists, as well as native landscaping. The approved and proposed landscape palettes feature Palo Brea, Blue Palo Verde, Cooperi Mesquite and Ironwood trees as well as native groundcover including – but not limited to – creosote, jojoba, various species of agave, desert milkweed, ocotillo and various species of yucca.

A landscape berm is proposed to buffer the streets from the adjacent residential as depicted below:

Goal CD 5. Promote the value and visual significance landscaping has on the character of the community.

CD 5.1: Employ appropriate heat island reduction techniques to reduce the effects of reflective heat and glare on buildings and paved surfaces.

The proposed Axon Campus Expansion mixed-use component proposes most the parking to be located in garages to reduce the impact of the heat island effect.

Land Use Element

Goal LU 1. Enhance Scottsdale's economic viability by encouraging land uses that reinforce the city's reputation as the premier international tourist destination in the Southwest and sustain the city's role as a regional cultural center and economic hub. Land uses should be compatible with Scottsdale's character and physical appearance.

LU1.1: Encourage land uses that preserve a high quality of life and further define Scottsdale's sense of place within the region.

Axon's campus expansion will further the City's goal to increase its economic base beyond tourism and recreation. The approved Axon Campus office brings high quality technology jobs including those in programing and research and development which significantly contribute to the City's desire for economic diversity. The proposed Campus Expansion supports the Axon office and industrial building with the addition of retail, residential, and hotel uses on the same site.

The Axon Campus Expansion is located with the Greater Airpark Character Area, which seeks to attract and retain desirable regional corporate headquarters within this part of the City. Keeping Axon in Scottsdale and providing a campus environment further cements this area's growing reputation as a corporate hub with regional economic significance.

Goal LU 2: Sensitively transition and integrate land uses with the surrounding natural and built environments.

LU 2.3: Locate employment and major non-residential uses along major transportation networks to limit impacts on residential areas and provide citywide and regional access.

The subject site is located along the contours of the Loop 101 freeway with easy access from the Hayden Road exist. This configuration is purposeful and allows for mitigation of the impact of traffic on adjacent residential areas.

Goal LU 3: Maintain a balance of land uses to support a high quality of life.

LU3.1: Allow for the diversity and innovative development patterns of residential uses and supporting services to provide for the needs of the community.

The proposed Axon Campus Expansion proposes a diverse patters of development by incorporating residential uses along with retail, hotel, and office/industrial uses as well as the adjacent municipal uses with a fire station and water treatment facility. This diversity of land use serves the needs of the community in several ways. The retail components of the site will be able to provide supporting services for not just Axon employees and residents of the multi-family on site but also for the surrounding residential. And the multi-family itself provides critical support for the Axon Campus office building that will serve as the anchor to the Campus. Contributing to the diversity of land use is the adjacent municipal site consisting of a fire station and water treatment facility.

LU 3.2: Integrate housing, employment, and supporting infrastructure, primarily in mixed-use neighborhoods and Growth and Activity Areas, to support a jobs/housing balance.

Axon is proposing a mixed-use campus that includes a residential component to support the approved office/industrial phase. The residential buildings provide a crucial piece of the overall Campus Expansion that promotes a balance between jobs and housing. Because the Greater Airpark Character Area emphasizes employment in this area, nearby housing is needed to provide an increased harmony between these important needs.

LU 3.3: Maintain a citywide balance of land uses, and consider modifications to the land use mix to accommodate changes in community vision, demographic needs, and economic sustainability.

Crossroads East demonstrates a clear change in community vision for this part of Scottsdale, which is rapidly growing and attracting highly sought after major employers and luxury multi-family. Consistent with the Policy LU 3.2, the balance between attracting employers and providing housing for their workforce furthers the City's overall goal for this area as a regional hub.

Axon's proposed Campus Expansion furthers this goal and is requesting a modification to several land use classifications to respond to this changing demand.

Goal LU 6: Attract and retain diverse employment, business, and retail land uses to improve the economic well-being of Scottsdale's residents.

LU 6.1: Promote opportunities for the expansion and revitalization of employment and commercial uses within the city.

Axon is a homegrown success story whose existing global headquarters is located just across Axon Way from the proposed Campus Expansion. While a larger office and manufacturing facility are approved on the easternmost portion of the site, the current proposal is to develop the remaining +/- 32 acres to serve as a campus for the business operations expansion.

The Axon Campus Expansion proposal allows this locally-based global company to continue to grow within the City of Scottsdale.

Conservation Element

Goal CONSV 2: Protect and manage Sonoran Desert biodiversity and native ecosystems.

CONSV 2.2: Encourage landscaping that limits the amount of grass and makes optimal use of native desert plants.

Axon is proposing a varied palette of native plantings which were discussed in detail above. However, in addition to those plantings, the Axon Campus Expansion will utilize several iconic Sonoran Desert plant species – some of which are protected by statute due to their importance to the Sonoran Desert – including Saguaro cactus and Golden Barrel cactus. Other native plants include cholla, prickly pear and desert spoon.

Community Involvement Element

Goal CI 1: Seek early and ongoing community involvement through broad public input in project and policy-making discussions.

CI 1.1: Maximize opportunities for early notification of proposed projects using a variety of methods.

Axon began early outreach with various stakeholders in the community that included phone calls and meetings. This outreach has continued, and we have spoken with several nearby property owners and/or their representatives to notify them of Axon's plans prior to formal notification of the Open House.

In addition to this early outreach, we hosted a Neighborhood Open House for property owners and interested parties the opportunity to provide feedback on the draft plans.

CI 1.2: Use public involvement plans to identify and engage interested parties, and provide opportunities for information exchange.

When notifying for the Neighborhood Open House, we included an expanded notification area and notified neighbors within 1,250'. In addition to the neighbors, we also notified all interested parties in the list provided by the City. As detailed above, we also engaged in early outreach with interested parties from the Axon Campus original case in 2020.

Housing Element

Goal H1: Support diverse, safe, resource-efficient, and high-quality housing options.

H1.3: Ensure community dialogue during zoning and the development review processes to encourage context-appropriate development designs.

We hosted an early Neighborhood Open House on June 21, 2023, to provide surrounding property owners and interested parties the opportunity to provide feedback on the draft site plan, listen to concerns and feedback, and answers questions they had. As a result, some portions of the project have been modified prior to formal submittal to address those comments.

H1.4: Support the creation of mixed-use projects, primarily in Growth and Activity Areas, to increase housing supply within walking distance of employment, transportation options, and services.

This proposal is for a mixed-use project within the Greater Airpark Growth Area that provides multi-family residential housing within walking distance to various employment opportunities – mainly, the Axon Campus. In addition to housing and employment, this project will provide retail opportunities for the residents that live on site, as well as the residents that live in the surrounding area.

H1.5: Encourage a variety of housing densities in context-appropriate locations throughout Scottsdale to accommodate projected population growth.

Much of the surrounding residential density is zoned for multi-family and is in densities similar to the proposed Axon Campus expansion residential portion. In several instances, the surrounding residential density is nearly double what is proposed at the Axon Campus. Scottsdale is continuing to grow and with the current housing shortage, this site provides a context-appropriate location for a denser mixed-use development.

Goal H4: Abide by regulations that prevent housing discrimination practices towards any person, as required by local, State, and Federal laws.

H4.1: Comply with local, State, and Federal laws prohibiting discrimination in housing and support fair and equal access to housing regardless of race, color, sex, creed, familial status, economic level, or ability.

Axon is an equal opportunity employer and values diversity at their company. Axon does not discriminate on the basis of race, religion, color, national origin, gender, sexual orientation, age, marital status, veteran status, or disability status.

Axon is looking forward to providing individuals the same level of equal opportunity to the future residents of this site. All housing within the Axon Campus Expansion will comply with all local, State, and Federal laws to prohibit discrimination in housing.

Circulation Element

Goal C1: Design and improve transportation corridors to safely and efficiently move people and goods.

C1.3: Reduce conflict points between various modes of travel, for example, where the paths of vehicles and bicycles, pedestrians, or equestrians, cross, diverge, or merge.

As shown in the Pedestrian Circulation Plan and Vehicular Circulation Plan, Axon will be providing sidewalks that will assist pedestrians in getting around the site with reduced conflict with vehicles and bicycles. This includes detached sidewalks to buffer residents from the street as well as roundabouts to reduce vehicular speeds at intersections.

Goal C2: Reduce the number, length, and frequency of automobile trips to improve air quality, reduce traffic congestion, and enhance quality of life and the environment.

C2.1: Encourage a mix of land uses that will reduce the distance and frequency of automobile trips and support mobility choices.

Axon is proposing a mixed-use development that will complement the approved Axon Campus office. The purpose of the Campus Expansion is to provide an environment that promotes walkability and reduces reliance on the automobile for Axon employees.

Growth Area Element

Goal GA1: Direct growth in areas of the city that can support a concentration of development density and intensity, as well as a broad mix of uses.

> *GA1.5: Identify Growth and Activity Area "edges," and incorporate context-appropriate transitions between these "edges" and adjacent neighborhoods to maximize the impacts of higher-intensity development.*
>
> The proposed Axon Campus Expansion is located within the Greater Airpark Growth Area. According to the General Plan, in the Greater Airpark Growth Area, "[b]uilding heights generally range between three and six stories and may exceed six stories in certain areas identified in the Greater Airpark Character Area Plan."
>
> The Axon Campus Expansion is proposed to be in this height range with buildings proposed at five stories.

Goal GA5: Recognize and build on the character and diversity of Scottsdale's various Growth and Activity Areas.

> *GA5.4: Promote new development, revitalization, and redevelopment within Growth and Activity Areas that maintains fiscal sustainability, promotes long-term economic development goals, and enhances quality of life.*
>
> Axon is a leader in technology and innovation with its existing global headquarters located in Scottsdale. Providing Axon the opportunity to expand and increase its operations in Scottsdale with this Campus Expansion promotes long-term economic growth within the City and the addition of housing brings new Scottsdale residents to an area experience significant growth.

<u>Economic Vitality Element</u>

Goal EV 1: Foster Scottsdale's resiliency to economic change through support of our core industries (e.g., tourism, healthcare, bio/life sciences, advanced business services), assets, regional competitiveness, and economic diversity.

> *EV1.3: Diversify Scottsdale's businesses, focusing on industries that add value to the existing economic environment.*
>
> Axon (formerly Taser International), has been based in Scottsdale for many years and provides diversity of employment in the desirable technology sector. Providing Axon the opportunity to grow its operations in Scottsdale through approval of the Campus expansion furthers the goal of supporting a diverse economic environment within the City.

Goal EV3: Sensitively manage land uses to provide and enhance economic development, fiscal health and job growth, while simultaneously protecting the integrity and lifestyle of neighborhoods.

EV3.5: Ensure neighborhoods are adequately protected from major development through design sensitivity, buffering, and traffic management.

Axon's proposed Campus expansion provides a number of buffers to reduce the impact of the Campus expansion on the nearby residential. These include the realignment of Axon Way away from the neighborhood as well as a generous landscape buffer and berm to separate vehicles from the pedestrian circulation.

GREATER AIRPARK CHARACTER AREA PLAN AMENDMENT NARRATIVE

The Axon Campus Expansion is located within the Employment Land Use in the Greater Airpark Character Area Plan. While the portion of the Campus that was approved for the office/industrial building in 2020 will remain Employment, the Campus Expansion requires an amendment to the Greater Airpark, Character Area Plan Land Use from Employment to Airpark Mixed Use – Residential to accommodate the mix of multi-family residential, commercial and hotel proposed.

Land Use

Goal LU1: Maintain and expand the Greater Airpark's role as a national and international economic destination through appropriate land uses, development, and revitalization.

Policy LU 1.1: Maintain and expand the diversity of land uses in the Greater Airpark.

When Axon purchased the subject site from ASLD in 2020, the entire 70+ acre parcel was required to be rezoned to I-1 PCD consistent with the Employment designation in the Greater Airpark Character Area Plan. Since that time, the first phase of the Axon Campus consisting of the office/manufacturing building was approved, Axon dedicated a Civic Use Site and significant Right-of-Way, leaving approximately 32 acres remaining. In keeping with Axon's employment growth goals, we seek this Campus expansion to accommodate supporting uses such as commercial, residential, and hotel. In addition to the Axon Campus, the southwest corner of the original parcel will consist of municipal uses including a fire station and water treatment facility.

These supporting uses are necessary for the success of Axon's Campus and to promote the City's goal for employment in this area. However, although these uses support the Employment Land Use Designation, they require an amendment to the Greater Airpark Character Area Plan Land Use Designation.

Policy LU 1.2: Support a mix of uses within the Greater Airpark that promote a sense of community and economic efficiency, such as clustering similar/supportive uses and incorporating residential intended for the area's workforce, where appropriate.

Axon's proposed Campus seeks to balance the City's desire for additional economic growth in this area with the need for additional housing and supportive commercial. The residential component of this proposal intends to serve Axon's employees, while the hotel provides opportunities for Axon to host events in close proximately to its office and manufacturing facility.

Policy LU1.4: Encourage the redevelopment of underutilized land to more productive uses.

This site is a prominent vacant piece of land in a critical growth area. Axon plans to develop this parcel into its Campus with a variety of uses that will put this land to a more productive use, including the public benefits associated with the new fire station and water treatment facility.

Policy LU1.5: Maintain and continue to foster dialogue between the City of Scottsdale and Arizona State Land Department to facilitate innovative use and development of State-owned land.

The Axon site is part of the Crossroads East PCD, which originally consisted of approximately 1,000 acres of ASLD owned land. Over time portions of Crossroads East have been purchased by private property owners, including the subject Axon Campus Expansion parcel. We continue to have conversations with the City and ASLD regarding the Axon Campus Expansion.

Goal LU4: Utilize development types to guide the physical and built form of the Greater Airpark

Policy LU 4.3: Encourage higher-scale Type C development in areas with access to major transportation corridors and where lower-scale residential areas will be buffered from higher-scale development.

A majority of the Axon site falls within the Type C development designation and accordingly, both the approved office and proposed Expansion place higher intensity development in these areas adjacent to the Loop 101 and along Hayden Road. A small portion of the site is within the Type A development type. The Type A portion of the site will feature shorter buildings that buffer the neighborhood from the higher scale of the Type C portion of the site.

Goal LU5: Encourage Greater Airpark development flexibility.

Policy LU 5.1: Update and provide greater flexibility in development regulations to achieve the goals of the Greater Airpark Character Area Plan and encourage revitalization in the area.

Axon is requesting a number of development regulation modifications to allow the proposed Campus Expansion in furtherance of the City's goal for growth in this area, This flexibility achieves various City goals including economic development and appropriate residential expansion near employment hubs and allows Axon the opportunity to remain in Scottsdale and grow its World Headquarters.

Policy LU 5.5: Promote flexibility of land uses when it can be demonstrated that new land uses are viable in serving a regional market, such as corporate headquarters, tourism, and educational campuses.
Axon's Campus Expansion proposes a variety of land uses, including the approved office. The proposed land uses aim to promote flexibility on this site by providing a variety of uses that support the office building and create more of a campus environment.

Neighborhoods and Housing

Goal NH2: Create complete neighborhoods within the Greater Airpark, through the development of urban dwelling types and mixed- use developments, while being respectful of the Greater Airpark as an aviation-based employment center.

Policy NH 2.2: Encourage a variety of urban dwelling types and mixed-use development in areas designated Airpark Mixed Use-Residential in the Greater Airpark Character Area Future Land Use Plan that are compatible with and support the aviation and employment uses of the Greater Airpark.

Axon is requesting to modify its Land Use Designation from Employment to Airpark Mixed Use-Residential in order to offer a mixed-use campus with a residential component. The Airpark Mixed-Use Residential designation is appropriate on this site as it supports the approved office/manufacturing building.

Economic Vitality

Goal EV3: Preserve and enhance tourism and visitor experiences of the Greater Airpark.

Policy EV 3.2: Encourage complementary uses, such as specialty retail and hotels, to locate in the Greater Airpark in order to support tourist attractions.

Axon's Campus Expansion includes a hotel component within the mixed-use portion of the site. Part of Axon's growth plans is to host conferences and events for its customers within close proximity to the approved office building. While Axon does not plan to host events year round, there are many high-profile events that occur close to the site that are well served by the addition of more hotel rooms. Additional hotel rooms also prevent proliferation of short term rentals in nearby single-family neighborhoods.

Environmental Planning

Goal EP1: Reduce energy consumption through environmentally sensitive land use practices and design policies.

Policy EP 1.3: Promote landscape design and irrigation methods that contribute to water and energy conservation.

All of the landscaping proposed for the Axon Campus Expansion are low-water, drought tolerant species, many of which are native Sonoran Desert plants. Using appropriate landscaping will reduce water usage in the large open spaces provided on the site.

BONUS PROVISION

The Planned Airpark Core (PCP) zoning category permits bonuses for Floor Area Ratio (FAR) and building height. While the proposed Axon Campus Expansion is within the permitted height, we are requesting an increase in the FAR from 0.8 to 1.1 pursuant to the bonus provisions in Section 5.4008.

Because the proposed Axon Campus Expansion is greater than 4 acres and is not limited due to its proximity to residential or within Airport Influence Area AC-3, Axon may request this modest bonus increase in the allowed FAR.

The subject site is already part of a Development Agreement with the City that includes several significant public benefits that justify the granting of this bonus request. Axon recently dedicated a nearly 4.5-acre site to the City for use as a Civic Use Site and agreed to sell this important property for the price paid per square foot by Axon at the public auction and is not subject to any increases in the value. It's worth noting that the land dedicated to the City had a higher value at the time it was dedicated than the purchase price agreed to and that the City does not need to pay for the land until Axon completes certain achievements in development. Furthermore, that land even at the time of the auction had a greater value than some of the other portions of the parcel because of its location along Hayden Road at the intersection with Axon Way. Axon allowed the City to process a plat in order to divide the property so that the City could take ownership quickly to take advantage of a grant for a fire station and water treatment facility.

Additional public benefits include Axon's dedication of nearly 10 acres of right-of-way for major infrastructure improvements that include construct new or enhanced roads in the area that feature substantial landscape buffers and significantly enhanced pedestrian amenities. These Special Public Improvements are set forth in Section 7.1200 as justifications for bonus provision requests and because Axon is providing many of these qualifying improvements, we believe the modest request to increase the FAR from 0.8 to 1.1 is well justified.

GREATER PHOENIX METRO GREEN INFRASTRUCTURE HANDBOOK COMPLIANCE

Axon shares in the desire to incorporate low impact development into its Campus Expansion and has incorporated the principles set forth in the Greater Phoenix Metro Green Infrastructure Handbook.

Specifically, the Axon Campus utilizes materials from the recommended plant palette which are native to the Sonoran Desert and low water use. Additional provisions from the handbook may be incorporated during the design review phase of the project.

7/13/2023 4:23:16 PM

SITE LEGEND

- Proposed Commercial (Ground floor Only)
- Proposed Building (Residential)
- Courtyard/Open Space
- Garage
- Site Entry
- Traffic Flow
- Fire Apparatus Turn Radius (55', 49', 25')
- PROPERTY LINE
- SITE R.O.W. LINE
- EASEMENT LINE
- BUILDING STEPBACK LIMITS
- INTERNAL LOT LINE

DEVELOPMENT DATA

PROJECT DESCRIPTION:

MASTER PLAN FOR AXON CAMPUS TO INCLUDE NEW MULTI-FAMILY RESIDENTIAL, HOTEL, RETAIL, IN ADDITION TO LIGHT INDUSTRIAL ON THE NORTHEAST CORNER OF HAYDEN ROAD AND AXON WAY.

ZONING:

CURRENT: I-1
PROPOSED: PCD-PCP/AMU-R

APN:

ASSESSOR PARCEL NUMBER
215-07-407 AND 215-07-408

CONSTRUCTION TYPE:

BUILDING A-F : 1A & IIIA

BUILDING HEIGHT:

PROPOSED: .
AXON CAMPUS 96'-0" MAX.
BUILDINGS A-F 67'-0" MAX.

LOT COVERAGE:

BUILDING FOOTPRINT TOTAL:
746,395 S.F.

Proposed Gross Areas:
Buildings A-F = 2,025,900 S.F.

FLOOR AREA RATIO (FAR) = 1.1

SITE DATA

SITE AREA:

TOTAL GROSS AREA: 1,819,045 SQ. FT. / 41.76 ACRES
TOTAL NET AREA: 1,500,759 SQ. FT. / 34.45 ACRES

SITE AREAS

APN	Area (NET)	Acres (NET)
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APN: 215-07-407	1,424,132 SF	32.69 acres
APN: 215-07-408	76,627 SF	1.76 acres
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	1,819,045 SF	41.76 acres
Axon Site (not included):		
APN: 215-07-407	1,066,193 SF	24.48 acres
ROAD R.O.W.	118,746 SF	2.73 acres
	1,184,939 SF	27.20 acres

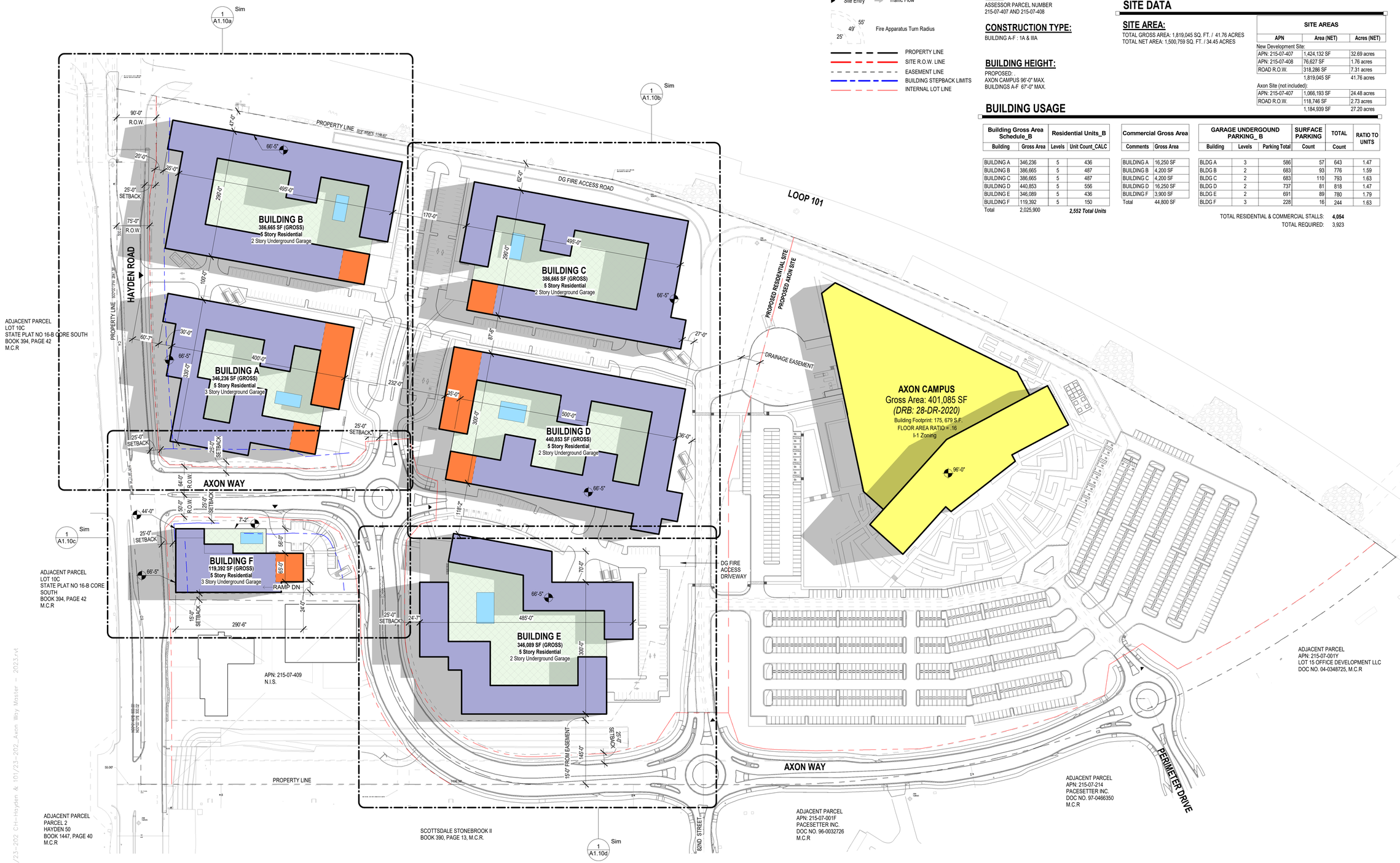
BUILDING USAGE

Building Gross Area Schedule_B		Residential Units_B	
Building	Gross Area	Levels	Unit Count_CALC
BUILDING A	346,236	5	436
BUILDING B	386,665	5	487
BUILDING C	386,665	5	487
BUILDING D	440,853	5	556
BUILDING E	346,089	5	436
BUILDING F	119,392	5	150
Total	2,025,900		***2,552 Total Units***

Commercial Gross Area	
Comments	Gross Area
BUILDING A	16,250 SF
BUILDING B	4,200 SF
BUILDING C	4,200 SF
BUILDING D	16,250 SF
BUILDING F	3,900 SF
Total	44,800 SF

GARAGE UNDERGOUND PARKING_ B			SURFACE PARKING	TOTAL	RATIO TO UNITS
Building	Levels	Parking Total	Count	Count	
BLDG A	3	586	57	643	1.47
BLDG B	2	683	93	776	1.59
BLDG C	2	683	110	793	1.63
BLDG D	2	737	81	818	1.47
BLDG E	2	691	89	780	1.79
BLDG F	3	228	16	244	1.63

TOTAL RESIDENTIAL & COMMERCIAL STALLS: **4,054**
TOTAL REQUIRED: 3,923

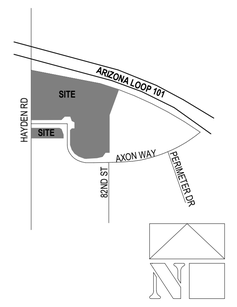


1 SITE PLAN OVERALL

0' 50' 100' 200'

SCALE: 1" = 100'-0"

VICINITY MAP



AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYDEN RD AND AXON WAY
SCOTTSDALE, ARIZONA 85255

Office of Rich Barber Architecture, LLC
ORB
WorldHQ@ORBArch.com

PRELIMINARY NOT FOR CONSTRUCTION

REGISTERED ARCHITECT 15213 Rich Barber ARIZONA U.S.A. Expires 3/31/2026

AXON

DATE: 07.13.2023 ORB #: 23-202

A1.10

SITE PLAN

DEVELOPMENT DATA

PROJECT DESCRIPTION:

MASTER PLAN FOR AXON CAMPUS TO INCLUDE NEW MULTI-FAMILY RESIDENTIAL, HOTEL, RETAIL IN ADDITION TO LIGHT INDUSTRIAL ON THE NORTHEAST CORNER OF HAYDEN ROAD AND AXON WAY.

ZONING:

CURRENT: I-1
PROPOSED: PCD-PCP/AMU-R

APN:

ASSESSOR PARCEL NUMBER
215-07-407 AND 215-07-408

CONSTRUCTION TYPE:

BUILDING A-F : 1A & 3A

BUILDING HEIGHT:

AXON CAMPUS 98'-0" MAX.
BUILDINGS A-F 67'-0" MAX.

LOT COVERAGE:

BUILDING FOOTPRINT TOTAL:
746,395 S.F.

Proposed Gross Areas:
Buildings A-F = 2,032,995 S.F.

FLOOR AREA RATIO (FAR) = 1.1

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BUILDING USAGE

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Total	2,025,900	Total	746,395 SF		***2,552 Total Units***

Commercial Gross Area	
Comments	Gross Area
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BUILDING B	4,200 SF
BUILDING C	4,200 SF
BUILDING D	16,250 SF
BUILDING F	3,900 SF
Total	44,800 SF

VEHICLE PARKING ANALYSIS

REQUIRED RESIDENTIAL:
(2552) 1 BED @ 1.3
TOTAL = 3,318 STALLS

REQUIRED GUEST:
1 PER 6 UNITS = 425 STALLS
REQUIRED RETAIL:
1 PER 250 GSF = 180 STALLS

TOTAL REQUIRED: 3,923 STALLS

GARAGE PARKING_ All			SURFACE PARKING	TOTAL	RATIO TO UNITS	ADA (4% OF TOTAL)	BIKE (1 PER 10 STALLS)
Building	Levels	Parking Total	Count	Count			
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BLDG C	2	683	110	793	1.63	31	79
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BLDG E	2	691	89	780	1.79	31	78
BLDG F	3	228	16	244	1.63	10	25

TOTAL RESIDENTIAL & COMMERCIAL STALLS: **4,054**

ACCESSIBILITY NOTES

1. CONTRACTOR SHALL OBTAIN A COPY OF THE FAIR HOUSING ACT DESIGN MANUAL AND ICC/A.N.S.I. A117.1-2009 FOR ON SITE REFERENCE.
2. ALL SIDEWALKS PART OF THE ACCESSIBLE ROUTE SHALL BE ACCESSIBLE PER A.N.S.I. SECTION CHAPTER 4. THE RUNNING SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:20 (5%). THE CROSS SLOPE OF A WALKING SURFACE SHALL NOT BE STEEPER THAN 1:48 (2%). THE CLEAR WIDTH OF ALL SIDEWALKS SHALL BE NO LESS THAN 36". COORDINATE ALL GRADES TO COMPLY WITH SLOPE AND CROSS SLOPE REQUIREMENTS.
3. ALL GROUND FLOOR UNITS TO BE ANSI TYPE 'B' UNITS U.N.O.

SITE LEGEND

- Proposed Commercial (Ground floor Only)
- Proposed Building (Residential)
- Courtyard/Open Space
- Garage
- Site Entry
- Traffic Flow
- Fire Apparatus Turn Radius (55', 49', 25')
- PROPERTY LINE
- SITE R.O.W. LINE
- EASEMENT LINE
- BUILDING STEPBACK LIMITS
- INTERNAL LOT LINE

KEYNOTES

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1102	EASEMENT
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1105	CONCRETE SIDEWALK
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1121	CONNECT PATH
1207	LANDSCAPE AREA
1208	GROUND PAVERS
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1310	FIRE TRUCK TURNING RADIUS

AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYDEN RD AND AXON WAY
SCOTTSDALE, ARIZONA 85255

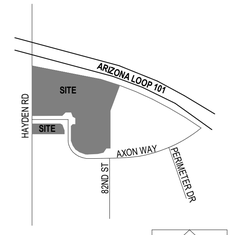
Office of Rich Barber Architecture, LLC
ORB
WorldHQ@ORBArch.com

PRELIMINARY NOT FOR CONSTRUCTION

REGISTERED ARCHITECT
15213
Rich Barber
ARIZONA U.S.A.
Expires 3/31/2026

AXON

VICINITY MAP



DATE: 07.13.2023 ORB #: 23-202

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SITE PLAN AREA A

1 SITE PLAN AREA B

0' 20' 40' 80'

SCALE: 1" = 40'-0"

DEVELOPMENT DATA

PROJECT DESCRIPTION:

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ASSESSOR PARCEL NUMBER
215-07-407 AND 215-07-408

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BUILDINGS A-F 67'-0" MAX.

LOT COVERAGE:

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FLOOR AREA RATIO (FAR) = 1.1

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Comments	**Gross Area**
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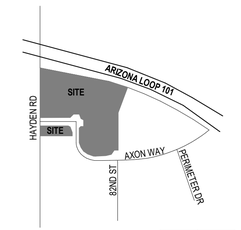
AXON

VICINITY MAP



DATE: 07.13.2023 ORB #: 23-202

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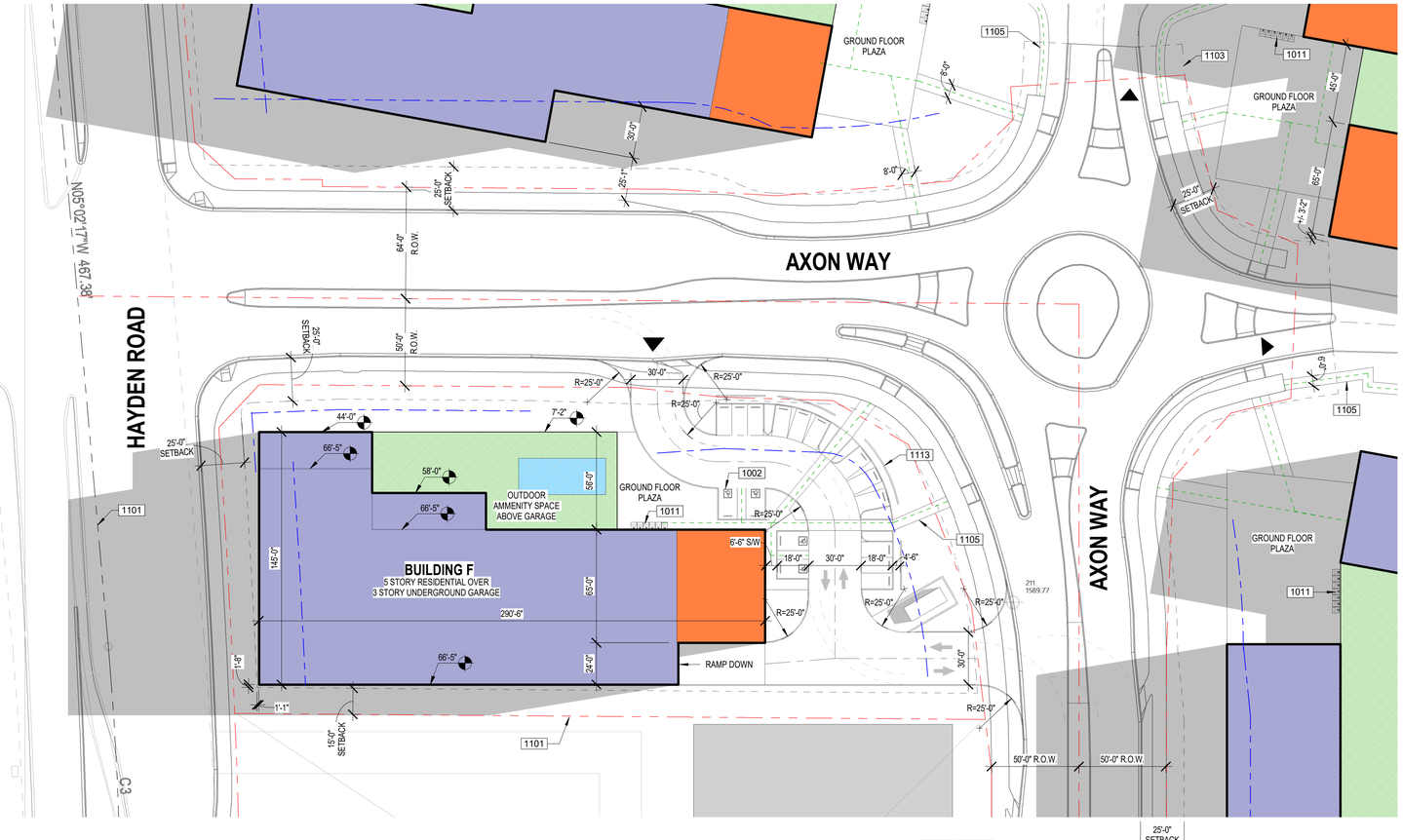
SITE PLAN AREA B



1 SITE PLAN AREA C

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REQUIRED GUEST:
1 PER 6 UNITS = 425 STALLS
REQUIRED RETAIL:
1 PER 250 GSF = 180 STALLS

TOTAL REQUIRED: 3,923 STALLS

GARAGE PARKING_ All			SURFACE PARKING	TOTAL	RATIO TO UNITS	ADA (4% OF TOTAL)	BIKE (1 PER 10 STALLS)
Building	**Levels**	**Parking Total**	**Count**	**Count**			
BLDG A	3	586	57	643	1.47	26	64
BLDG B	2	683	93	776	1.59	31	78
BLDG C	2	683	110	793	1.63	31	79
BLDG D	2	737	81	818	1.47	33	83
BLDG E	2	691	89	780	1.79	31	78
BLDG F	3	228	16	244	1.63	10	25

TOTAL RESIDENTIAL & COMMERCIAL STALLS: **4,054**

ACCESSIBILITY NOTES

1. CONTRACTOR SHALL OBTAIN A COPY OF THE FAIR HOUSING ACT DESIGN MANUAL AND ICC/A.N.S.I. A117.1-2009 FOR ON SITE REFERENCE.
2. ALL SIDEWALKS PART OF THE ACCESSIBLE ROUTE SHALL BE ACCESSIBLE PER A.N.S.I. SECTION CHAPTER 4. THE RUNNING SLOPE OF WALKING SURFACES SHALL NOT BE STEEPER THAN 1:20 (5%). THE CROSS SLOPE OF A WALKING SURFACE SHALL NOT BE STEEPER THAN 1:48 (2%). THE CLEAR WIDTH OF ALL SIDEWALKS SHALL BE NO LESS THAN 36". COORDINATE ALL GRADES TO COMPLY WITH SLOPE AND CROSS SLOPE REQUIREMENTS.
3. ALL GROUND FLOOR UNITS TO BE ANSI TYPE 'B' UNITS U.N.O.

SITE LEGEND

- Proposed Commercial (Ground floor Only)
- Proposed Building (Residential)
- Courtyard/Open Space
- Garage
- Site Entry
- Traffic Flow
- 55' / 49' / 25' Fire Apparatus Turn Radius
- PROPERTY LINE
- SITE R.O.W. LINE
- EASEMENT LINE
- BUILDING STEPBACK LIMITS
- INTERNAL LOT LINE

KEYNOTES

1001	TYPICAL PARKING STALL, 9' x 18'
1002	ACCESSIBLE PARKING STALL, MIN. 11' x 18'
1011	BICYCLE PARKING
1101	PROPERTY LINE
1102	EASEMENT
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1108	PERIMETER WALL
1113	MASONRY WALL
1120	DECOMPOSED GRANITE FIRE ACCESS PATH
1121	CONNECT PATH
1207	LANDSCAPE AREA
1208	GROUND PAVERS
1301	TRASH COMPACTOR ENCLOSURE
1310	FIRE TRUCK TURNING RADIUS

AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYDEN RD AND AXON WAY
SCOTTSDALE, ARIZONA 85255

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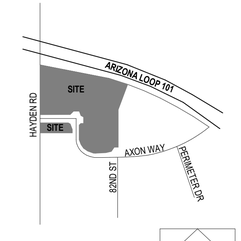
PRELIMINARY NOT FOR CONSTRUCTION

AXON

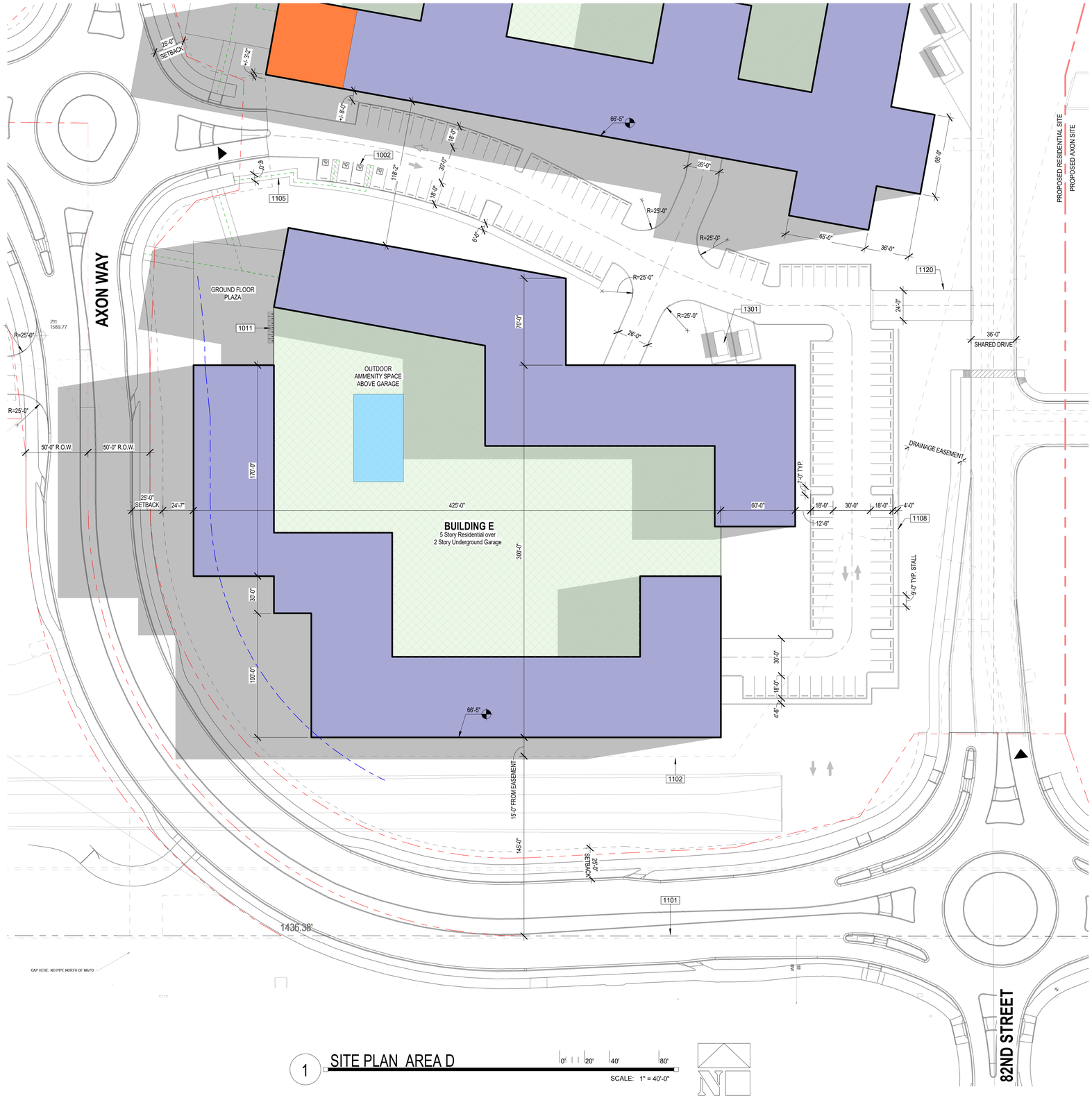
VICINITY MAP



DATE: 07.13.2023 ORB #: 23-202

A1.10c

SITE PLAN AREA C



1 SITE PLAN AREA D

0' 20' 40' 80'

SCALE: 1" = 40'-0"

DEVELOPMENT DATA

PROJECT DESCRIPTION:

MASTER PLAN FOR AXON CAMPUS TO INCLUDE NEW MULTI-FAMILY RESIDENTIAL, HOTEL, RETAIL IN ADDITION TO LIGHT INDUSTRIAL ON THE NORTHEAST CORNER OF HAYDEN ROAD AND AXON WAY.

ZONING:

CURRENT: I-1
PROPOSED: PCD-PCP/AMU-R

APN:

ASSESSOR PARCEL NUMBER
215-07-407 AND 215-07-408

CONSTRUCTION TYPE:

BUILDING A-F : 1A & 3A

BUILDING HEIGHT:

AXON CAMPUS 98'-0" MAX.
BUILDINGS A-F 67'-0" MAX.

LOT COVERAGE:

BUILDING FOOTPRINT TOTAL:
746,395 S.F.

Proposed Gross Areas:
Buildings A-F = 2,025,900 S.F.

FLOOR AREA RATIO (FAR) = 1.1

SITE DATA

SITE AREA:

TOTAL GROSS AREA: 1,819,045 SQ. FT. / 41.76 ACRES
TOTAL NET AREA: 1,500,759 SQ. FT. / 34.45 ACRES

SITE AREAS

APN	Area (NET)	Acres (NET)
New Development Site:		
APN: 215-07-407	1,424,132 SF	32.69 acres
APN: 215-07-408	76,627 SF	1.76 acres
ROAD R.O.W.	318,286 SF	7.31 acres
	1,819,045 SF	41.76 acres
Axon Site (not included):		
APN: 215-07-407	1,066,193 SF	24.48 acres
ROAD R.O.W.	118,746 SF	2.73 acres
	1,184,939 SF	27.20 acres

BUILDING USAGE

Building Gross Area Schedule_B		Building Footprint Area_ B		Residential Units_B	
Building	Gross Area	Building	Floor Area	Levels	Unit Count_CALC
BUILDING A	346,236	BLDG A	119,475 SF	5	436
BUILDING B	386,665	BLDG B	142,220 SF	5	487
BUILDING C	386,665	BLDG C	142,220 SF	5	487
BUILDING D	440,853	BLDG D	161,330 SF	5	556
BUILDING E	346,089	BLDG E	144,956 SF	5	436
BUILDING F	119,392	BLDG F	36,194 SF	5	150
Total	2,025,900	Total	746,395 SF		

2,552 Total Units

Commercial Gross Area	
Comments	Gross Area
BUILDING A	16,250 SF
BUILDING B	4,200 SF
BUILDING C	4,200 SF
BUILDING D	16,250 SF
BUILDING F	3,900 SF
Total	44,800 SF

VEHICLE PARKING ANALYSIS

REQUIRED RESIDENTIAL:
(2552) 1 BED @ 1.3
TOTAL = 3,318 STALLS

REQUIRED GUEST:
1 PER 6 UNITS = 425 STALLS
REQUIRED RETAIL:
1 PER 250 GSF = 180 STALLS

TOTAL REQUIRED: 3,923 STALLS

GARAGE PARKING_ All			SURFACE PARKING	TOTAL	RATIO TO UNITS	ADA (4% OF TOTAL)	BIKE (1 PER 10 STALLS)
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SITE LEGEND

- Proposed Commercial (Ground floor Only)
- Proposed Building (Residential)
- Courtyard/Open Space
- Garage
- Site Entry
- Traffic Flow
- Fire Apparatus Turn Radius (55' / 49' / 25')
- PROPERTY LINE
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KEYNOTES

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AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYDEN RD AND AXON WAY
SCOTTSDALE, ARIZONA 85255

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REGISTERED ARCHITECT
15213
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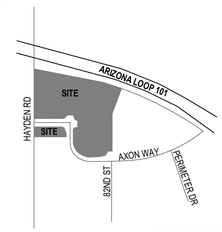
Expires 3/31/2026

AXON

VICINITY MAP



DATE: 07.13.2023 ORB #: 23-202

A1.10d

SITE PLAN AREA D

1 CONTEXT SITE PLAN

0' 100' 200' 400'

SCALE: 1" = 200'-0"

AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYDEN RD AND AXON WAY

SCOTTSDALE, ARIZONA 85255

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AXON

DATE: 07.13.2023 ORB #: 23-202

A1.00

CONTEXT PLAN

AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYDEN RD AND AXON WAY
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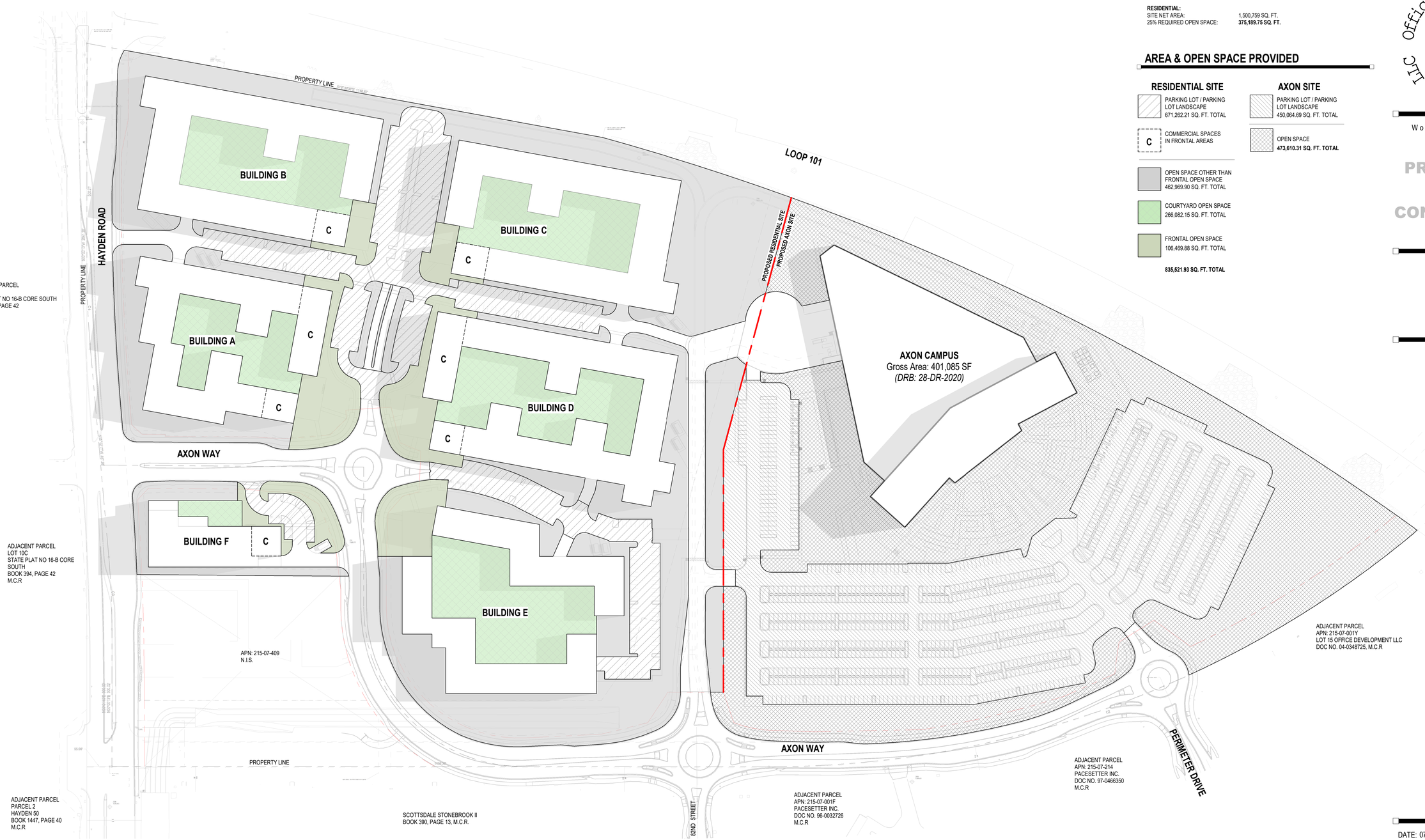
AXON

DATE: 07.13.2023 ORB #: 23-202

A1.00
CONTEXT PLAN

1 CONTEXT SITE PLAN
SCALE: 1" = 200'-0"



OPEN SPACE CALCULATIONS

REQUIRED OPEN SPACE:

AXON CAMPUS:
LIGHT INDUSTRIAL REQUIRED OPEN SPACE:
SITE NET AREA: 1,066,193 SQ. FT.
FIRST FLOOR (16 FT.)
10% OF NET AREA: 106,619 SQ. FT.

EVERY ADDITIONAL 10' AFTER
94' - 16' = 78' (ROUNDED UP TO 80')
NET AREA 4%: 341,181 SQ. FT.

TOTAL REQUIRED OPEN SPACE: **447,800 SQ. FT.**

RESIDENTIAL:
SITE NET AREA: 1,500,759 SQ. FT.
25% REQUIRED OPEN SPACE: **375,189.75 SQ. FT.**

AREA & OPEN SPACE PROVIDED

RESIDENTIAL SITE

PARKING LOT / PARKING LOT LANDSCAPE
671,262.21 SQ. FT. TOTAL

C — COMMERCIAL SPACES IN FRONTAL AREAS

OPEN SPACE OTHER THAN FRONTAL OPEN SPACE
462,969.90 SQ. FT. TOTAL

COURTYARD OPEN SPACE
266,082.15 SQ. FT. TOTAL

FRONTAL OPEN SPACE
106,469.88 SQ. FT. TOTAL

835,521.93 SQ. FT. TOTAL

AXON SITE

PARKING LOT / PARKING LOT LANDSCAPE
450,064.69 SQ. FT. TOTAL

OPEN SPACE
473,610.31 SQ. FT. TOTAL

AXON WAY & HAYDEN ROAD

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AXON

1 SITE PLAN OPEN SPACE PLAN
0' 50' 100' 200'
SCALE: 1" = 100'-0"

DATE: 07.13.2023 ORB #: 23-202

A1.15
OPEN SPACE PLAN

AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYDEN RD AND AXON WAY
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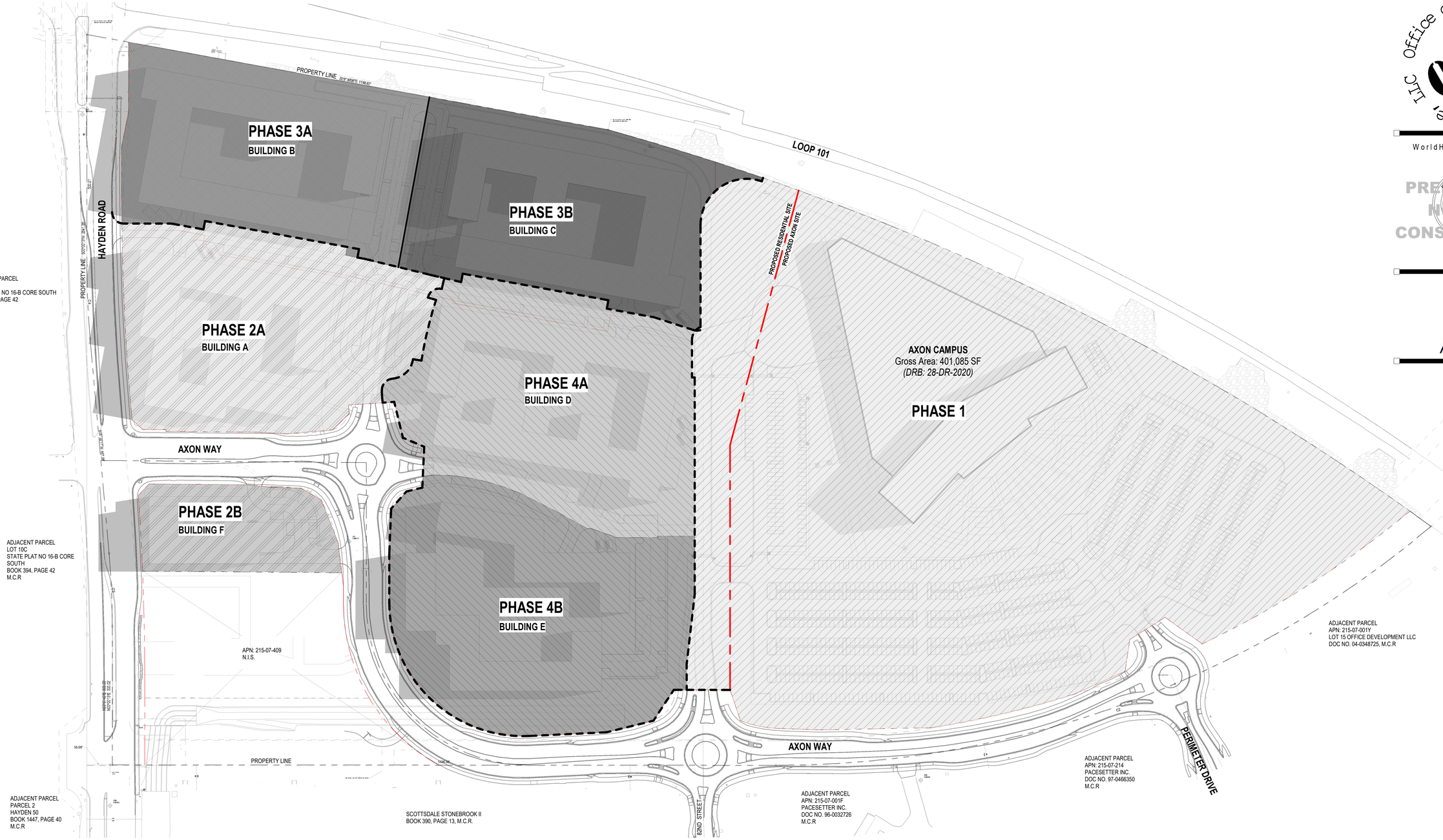
AXON



1 PHASING PLAN

0' 50' 100' 200'

SCALE: 1" = 100'-0"

N

DATE: 07.13.2023 ORB #: 23-202

A1.16

PHASING PLAN

ACCESSIBILITY NOTES

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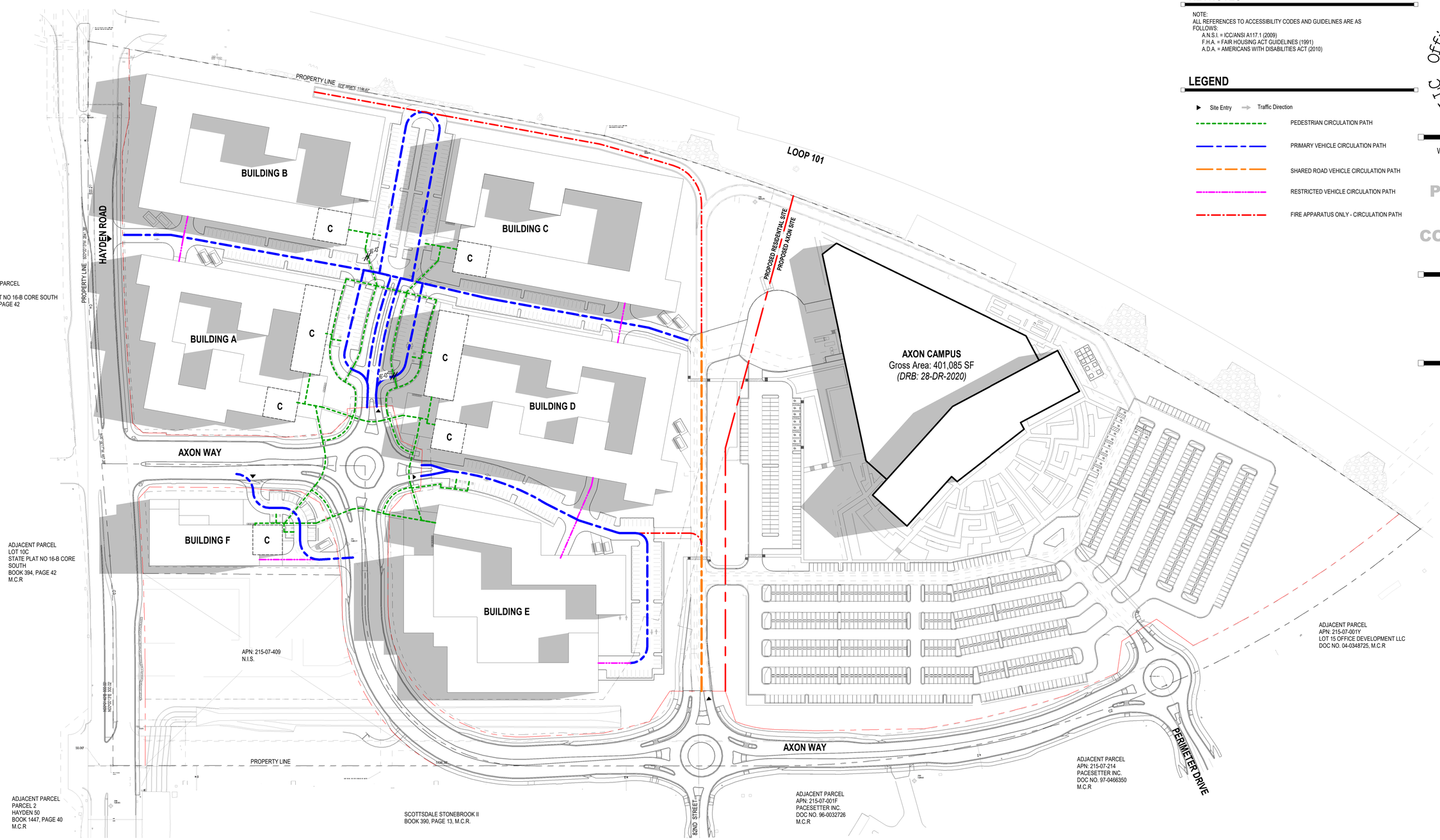
KEYNOTES

NOTE:
ALL REFERENCES TO ACCESSIBILITY CODES AND GUIDELINES ARE AS FOLLOWS:
A.N.S.I. = ICC/ANSI A117.1 (2009)
F.H.A. = FAIR HOUSING ACT GUIDELINES (1991)
A.D.A. = AMERICANS WITH DISABILITIES ACT (2010)

LEGEND

- Site Entry
- Traffic Direction
- PEDESTRIAN CIRCULATION PATH
- PRIMARY VEHICLE CIRCULATION PATH
- SHARED ROAD VEHICLE CIRCULATION PATH
- RESTRICTED VEHICLE CIRCULATION PATH
- FIRE APPARATUS ONLY - CIRCULATION PATH



AXON WAY & HAYDEN ROAD

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ARIZONA U.S.A.
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AXON

1 PEDESTRIAN & VEHICULAR PLAN
SCALE: 1" = 100'-0"

DATE: 07.13.2023 ORB #: 23-202

A1.18
PEDESTRIAN AND VEHICULAR PLAN

August 4, 2023

Charles Huellmantel
Huellmantel & Affiliates
605 South Ash Avenue
Tempe, Arizona 85281

RE: EXECUTIVE SUMMARY FOR AXON CAMPUS – SCOTTSDALE, ARIZONA

Dear Mr. Huellmantel:

Thank you for engaging CivTech to prepare this Executive Summary in advance of the preparation of a Category 2 Traffic Impact and Mitigation Analysis (TIMA) required by the City of Scottsdale. Axon Enterprise, Inc. is proposing to build a new multi-use campus consisting of a 401,085-square foot (sf) office building and a 6-building, 2,552-dwelling unit (DU) five-story (i.e., mid-rise) multifamily residential community with a total of 44,800 sf of ground-floor commercial uses on a site designated as "Parcel P-13" of the Crossroads East development.

SUMMARY

Based on the information available, CivTech has drawn the following conclusions:

- As currently proposed, the Axon campus is anticipated to generate 16,282 trips on a typical weekday with 2,154 trips (1,244 in/910 out) generated during the AM peak hour and 2,408 trips (1,080 in/1,328 out) generated during the PM peak hour. Up to 404 hotel rooms could be developed (offsetting an equal number of DUs) before more peak hour trips than these would be generated.

- The proposed Axon campus is expected to generate 10,272 trips more on a typical weekday than anticipated in 2011 from Crossroads East Parcel P-13 with 1,419 additional trips (660 in/759 out) generated during the AM peak hour and 1,551 additional trips (839 in/712 out) generated during the PM peak hour.

- The proposed Axon campus is expected to generate 8,250 trips more on a typical weekday than anticipated in 2022 from Crossroads East Parcel P-13 with 1,353 additional trips (558 in/795 out) generated during the AM peak hour and 1,564 additional trips (940 in/624 out) generated during the PM peak hour.

- With 15,000 vpd on Hayden Road, a posted speed limit of 45 mph, and up to 128 northbound right turns during the PM peak hour expected into Access A, CivTech recommends a northbound right turn lane with a minimal queue storage capacity of 100 feet be provided on Hayden Road approaching Access A.

- Minimum sight distances will be provided on the Development Plans at each of the proposed access points per the City of Scottsdale Design Standards & Policies Manual.

Background and Purpose

CivTech originally studied Crossroads East for the Arizona State Land Department in 2011. In 2022, CivTech prepared a follow-up Enhanced Traffic Statement for an Axon campus on Parcel P-13. In late June 2023 CivTech Inc. was retained by Axon Enterprise, Inc. to begin a Category 2 Traffic Impact and Mitigation Analysis (TIMA) for its proposed campus, the level of study requested by the City of Scottsdale. With seasonal traffic volumes typically lower in the summer months due to vacationing and schools not being in session, CivTech elected to wait until school was back in session to record turning movement counts. The primary purpose of this Executive Summary is, therefore, to provide the latest expected trip generation information for the proposed Axon campus based on the land uses now anticipated. A secondary purpose is to allow the City to comment on CivTech's proposed study area and on factors for several of the items of a TIMA (e.g., growth rates, trip distribution percentages, etc.) that, if not addressed in advance, often draw City comments, necessitating additional rework and subsequent submissions later. No capacity analyses or other analyses that required existing and future projected background and total traffic volumes are provided, with the exception of a right turn lane warrant analysis for a new, proposed site access to Hayden Road. Most items are addressed in brief; they will be fully documented subsequently in the requested TIMA.

Proposed Development

Site Location

Axon Enterprise, Inc. is proposing to build, a 401,085-square foot (sf) general office building as a new company headquarters and 6-building, a 2,552-dwelling unit (DU) five-story (i.e., mid-rise) multifamily residential community with a total of 44,800 sf of ground-floor commercial uses on a site designated as "Parcel P-13" of the Crossroads East development, which CivTech studied in 2011 for the Arizona State Land Department and for which CivTech finalized a follow-up Enhanced Traffic Statement in February 2022. Parcel P-13 consists of three individual Maricopa County Assessor numbered parcels and 10.03 acres of City roadway right of way that total 73.57 acres. **Attachment A** is a preliminary site plan.

Site Access

As shown in **Attachment A**, Mayo Boulevard east of Hayden Road has already been renamed Axon Way. Axon Way will be realigned west of 82nd Street (within public right or way already dedicated/acquired for the purpose) to intersect Mayo Boulevard.

Primary access to the site will be via the (future) signalized intersection of Hayden Road and Mayo Boulevard/Axon Way and three modern roundabouts along Axon Way that were studied by CivTech in the 2022 Enhanced Traffic Statement. The first of these roundabouts will be located just east of Hayden Road, where Axon Way begins to curve to the south; it will also serve two driveways, one to/from the north and one to/from the east. The second roundabout will be at 82nd Street and the third at Perimeter Drive. Additional access will be provided by three driveways:

Access A will serve the main parcel along Hayden Road and will be located approximately 465 feet (on-center) north of Axon Way. Its movements will be restricted by location and an existing media to right-in/right-out only.

Accesses B and C along Axon Way will serve Building F on a site "orphaned" (separated) from the rest of the site. **Access B** will be located approximately 330 feet east of Hayden Road and be restricted to right-in/right-out movements only, serving primarily as the entrance to Building F, which may potentially become a 150-room hotel. **Access C** will be located east/south of the first roundabout approximately 660 feet east of Hayden Road and approximately 330 feet east of **Access B**; serving primarily as an exit from a parking garage provided beneath Building F, all movements will be allowed at **Access C**.

TRIP GENERATION AND COMPARISONS

The potential trip generation for the proposed development was estimated utilizing the latest (11th) edition of Institute of Transportation Engineers' (ITE) *Trip Generation Manual* (TripGen11) and the 3rd Edition of its *Trip Generation Handbook*. ITE's Land Use Code (LUC) 231, Mid-Rise Residential with Ground-Floor Commercial GFA (25-65k) in a Dense, Multi-Use Urban setting[1], was selected by CivTech as the appropriate land use for the residential use. The Axon building is LUC 715, a Single-Tenant Office Building. More detail on the information the two ITE reference manuals provide, the rationale for the selection of these land uses, an explanation of how CivTech estimated a trip generation rate not provided in TripGen11, other detailed trip generation calculations, and CivTech's reasoning for why reductions were (or were not) taken for internal capture/interaction, pass-by trips, and/or the use of alternative modes of transportation will be addressed in the full TIMA. Also to be documented in the TIMA is a CivTech observation/conclusion that up to 404 hotel rooms could be developed (offsetting an equal number of DUs) before more peak hour trips than are estimated here would be generated. Please note that, for this summary and the comparisons in **Table 1**, CivTech elected to compare base trips before any reductions.

TABLE 1 – TRIP GENERATION SUMMARY AND COMPARISONS

Proposed Use	ITE LUC	Setting*	Quantity Units†	Weekday Trips						
				Daily	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out	Total
Mid-Rise Residential with Ground-Floor Commercial GFA (1-25k)	231	D	2,402 DUs	11,770	542	779	1,321	917	692	1,609
Building F: Mid-Rise Res. w/ Ground-Floor Commercial GFA (1-25k)	231	D	150 DUs	736	34	49	83	58	43	101
Single-Tenant Office Building	715	G	401.085 ksf	3,776	688	82	750	105	593	698
2023 Totals				**16,282**	**1,244**	**910**	**2,154**	**1,080**	**1,328**	**2,408**
Crossroads East *(2011)*	Various	n/a	1,472.328 ksf	**6,010**	**584**	**151**	**735**	**241**	**616**	**857**
Differences (2023-2011)				**+10,272**	**+660**	**+759**	**+1,419**	**+839**	**+712**	**+1,551**
Crossroads East *(2022)*	Various	n/a	910.000 ksf	**8,032**	**686**	**115**	**801**	**140**	**704**	**844**
Differences (2023-2022)				**+8,250**	**+558**	**+795**	**+1,353**	**+940**	**+624**	**+1,564**

* Settings: (G)eneral/Suburban; (D)ense, Multi-Use Urban; n/a = not indicated in *Trip General Manual* version in effect at time of report.

A review of the trips generation and comparisons summarized in **Table 1** reveals the following:

- As currently proposed, the Axon campus is anticipated to generate 16,282 trips on a typical weekday with 2,154 trips (1,244 in/910 out) generated during the AM peak hour and 2,408 trips (1,080

[1] TripGen11 does not provide data for this use in a General/Suburban setting. CivTech understands, however, that the proposed zoning for the Axon campus is Planned Airpark Core Development (PCP) and the Airpark Character Area Plan calls for most of this area to be Type C – Higher Scale, which is intended to foster urban development types (mixed-use, higher density) to support the surrounding employment in the Airpark area. Thus, use of the "D" setting should be appropriate.

in/1,328 out) generated during the PM peak hour. Up to 404 hotel rooms could be developed (offsetting an equal number of DUs) before more peak hour trips than these would be generated.

- The proposed Axon campus is expected to generate 10,272 trips more on a typical weekday than anticipated in 2011 from Crossroads East Parcel P-13 with 1,419 additional trips (660 in/759 out) generated during the AM peak hour and 1,551 additional trips (839 in/712 out) generated during the PM peak hour.

- The proposed Axon campus is expected to generate 8,250 trips more on a typical weekday than anticipated in 2022 from Crossroads East Parcel P-13 with 1,353 additional trips (558 in/795 out) generated during the AM peak hour and 1,564 additional trips (940 in/624 out) generated during the PM peak hour.

Site Trip Distribution and Assignment

Two trip distributions were assumed for the proposed development one for residential trips (to and from their places of employment) and one to/from the Axon building to/from employees' homes). It is expected that the proposed Axon campus will generate trips based on future employment opportunities and population living within a 12-mile radius of the site. Future total employment and population within a 12-mile radius of the site, as projected by the 2030 compiled by the Maricopa Association of Governments (MAG), were used as the bases to estimate trip distribution. **Attachment B** is a summary page of the socio-economic data used by CivTech. The resulting trip distribution percentages for the study area are listed in **Table 2**. CivTech applied these percentages to the site trips generated by each land use and assigned them through the study intersections to the area roadway network. The site trip assigned through CivTech's intended study intersections is illustrated in **Attachment C**.

Table 2 – Site Trip Distribution Percentages

Direction (To/From)	Residential Trips (to/from Work)	Employment Trips (to/from Home)
East on Loop 101	30%	35%
West on Loop 101	40%	40%
South on Hayden Road	20%	15%
North on Hayden Road	5%	5%
North on Pima Road	5%	5%
Total	**100%**	**100%**

Future Background Traffic

CivTech reviewed historical daily traffic volumes from the City of Scottsdale website Traffic Volume Map to estimate an average annual growth rate. Reported average daily traffic volumes on Hayden Road south of Loop 101 were 15,700 vehicles per day (vpd) in 2016, decreased to 12,600 vpd in 2018, and 15,100 vpd in 2020, an increase from 2018, but still not at 2016 levels. Thus, Hayden Road experienced a net average annual decrease from 2016 to 2020. Since a negative growth rate is not realistic, CivTech proposes to apply in the full TIMA a modest 1% annual growth rate from 2023 to project 2025 and 2030 non-site or background traffic volumes. The factors to be applied are 1.02 (= 1.010^2) to 2025 and 1.072 (= 1.010^7) to 2030.

RIGHT TURN LANE WARRANT AND QUEUE STORAGE

Based on City criteria, with 15,000 vpd on Hayden Road, a posted speed limit of 45 mph, and up to 128 northbound right turns expected into Access A during the PM peak hour, CivTech recommends that a northbound right turn lane be provided on Hayden Road approaching Access A. Based on the traditional industry method of providing right-turn queue storage at twice the average arrival rate (just over two right turns into Access A per minute or five right turns in a two-minute period), a minimum queue storage capacity of 125 feet is required, which is sufficient to accommodate five (5) typical passenger vehicles at an average length of 25 feet per vehicle.

SIGHT DISTANCE ANALYSIS

Adequate sight distance shall be provided at intersections and site access driveways to allow safe turning movements. There shall be sufficient unobstructed sight distance along both approaches of a street/driveway intersection and across their included corners to allow operators of vehicles to see each other in time to prevent a collision. The City of Scottsdale provides minimum sight distance requirements based on the posted roadway speed and the number of through lanes in each direction of travel. These minimum sight distances will be provided on the Development Plans at each of the proposed access points per the City of Scottsdale *Design Standards & Policies Manual* (DS&PM). Excerpts from the DS&PM are included as **Attachment D**.

CONCLUSIONS

From the above, CivTech has drawn the following conclusions:

- As currently proposed, the Axon campus is anticipated to generate 16,282 trips on a typical weekday with 2,154 trips (1,244 in/910 out) generated during the AM peak hour and 2,408 trips (1,080 in/1,328 out) generated during the PM peak hour. Up to 404 hotel rooms could be developed (offsetting an equal number of DUs) before more peak hour trips would be generated than these.

- The proposed Axon campus is expected to generate 10,272 trips more on a typical weekday than anticipated in 2011 from Crossroads East Parcel P-13 with 1,419 additional trips (660 in/759 out) generated during the AM peak hour and 1,551 additional trips (839 in/712 out) generated during the PM peak hour.

- The proposed Axon campus is expected to generate 8,250 trips more on a typical weekday than anticipated in 2022 from Crossroads East Parcel P-13 with 1,353 additional trips (558 in/795 out) generated during the AM peak hour and 1,564 additional trips (940 in/624 out) generated during the PM peak hour.

- With 15,000 vpd on Hayden Road, a posted speed limit of 45 mph, and up to 128 northbound right turns during the PM peak hour expected into Access A, CivTech recommends a northbound right turn lane with a minimal queue storage capacity of 100 feet be provided on Hayden Road approaching Access A.

- Minimum sight distances will be provided on the Development Plans at each of the proposed access points per the City of Scottsdale Design Standards & Policies Manual.

Thank you for allowing CivTech to assist you on this project. If you have any questions about this summary and/or if CivTech can be of further assistance, please contact me.

Sincerely,

CivTech

Joseph F. Spadafino, PE, PTOE, PTP
Senior Project Manager/Traffic Engineer

Attachments (4)

7/6/2023 1:19:11 PM

SITE LEGEND

- Proposed Commercial (Ground floor Only)
- Proposed Building
- Courtyard/Open Space
- Garage
- Site Entry
- Traffic Flow
- Fire Apparatus Turn Radius (49', 55', 25')
- PROPERTY LINE
- SITE R.O.W. LINE
- EASEMENT LINE
- BUILDING STEPBACK LIMITS

DEVELOPMENT DATA

PROJECT DESCRIPTION:

MASTER PLAN FOR AXON CAMPUS TO INCLUDE NEW MULTI-FAMILY RESIDENTIAL, HOTEL, RETAIL, IN ADDITION TO LIGHT INDUSTRIAL ON THE NORTHEAST CORNER OF HAYDEN ROAD AND AXON WAY.

ZONING:

CURRENT: I-1
PROPOSED: PCD-PCP/AMU-R

APN:

ASSESSOR PARCEL NUMBER
215-07-407 AND 215-07-408

CONSTRUCTION TYPE:

BUILDING A,D,E,F : 1A & IIIA
BUILDING B,C : IB & VA

BUILDING HEIGHT:

PROPOSED:
AXON CAMPUS 96'-0" MAX.
BUILDINGS A-F 76'-0" MAX.

LOT COVERAGE:

SITE NET AREA: 2,566,951 SQ. FT.
BUILDING FOOTPRINT TOTAL:
669,177 S.F. +
175,895 S.F.(per 28-DR-2020)
= 845,741 S.F.

Proposed Gross Areas:
Buildings A-F = 3,490,472 S.F.
Axon Campus = 401,085 S.F.
Total 3,891,557 S.F.

FLOOR AREA RATIO (FAR) = 1.52

SITE DATA

SITE AREA:

TOTAL GROSS AREA: 3,003,984 SQ. FT. / 68.96 ACRES
TOTAL NET AREA: 2,566,951 SQ. FT. / 58.93 ACRES

SITE NET AREAS

APN	Area	Acres
APN: 215-07-407	2,490,325 SF	57.17 acres
APN: 215-07-408	76,627 SF	1.76 acres
ROAD R.O.W.	437,033 SF	10.03 acres
	3,003,984 SF	68.96 acres

BUILDING USAGE

BUILDING AREA		Residential Units	
Building	Floor Area	Levels	Unit Count_Calc
BLDG A	119,475 SF	5	436
BLDG B	108,650 SF	5	414
BLDG C	108,650 SF	5	414
BLDG D	161,330 SF	5	556
BLDG E	144,956 SF	5	436
BLDG F	26,116 SF	5	103
Total	669,177 SF		

2359 Total Units / 68.96 Acres
= 34 Units per Acre

Commercial Gross Area	
Comments	Gross Area
BUILDING A	16,250 SF
BUILDING B	4,200 SF
BUILDING C	4,200 SF
BUILDING D	16,250 SF
BUILDING F	3,900 SF
Total	44,800 SF

GARAGE PARKING_ All			SURFACE PARKING	TOTAL	RATIO TO UNITS
Building	Levels	Parking Total	Count	Count	
BLDG A	3	588	57	645	1.48
BLDG B	7	542	16	635	1.53
BLDG C	7	542	93	652	1.57
BLDG D	2	739	110	820	1.47
BLDG E	2	691	81	780	1.79
BLDG F	2	136	89	152	1.42

TOTAL RESIDENTIAL & COMMERCIAL STALLS: **3,684**
+AXON CAMPUS STALLS: 1,083
TOTAL STALLS ACROSS SITE: 4,767
TOTAL REQUIRED: 4,689

AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYDEN RD AND AXON WAY
SCOTTSDALE, ARIZONA 85255

Office of Rich Barber Architecture, LLC
ORB
WorldHQ@ORBArch.com

REGISTERED ARCHITECT
CERTIFICATE NO.
15213
Rich Barber
STATE OF ARIZONA, U.S.A.
Expires 3/31/2026

PRELIMINARY
NOT FOR
CONSTRUCTION

AXON

ADJACENT PARCEL
LOT 10C
STATE PLAT NO 16-B CORE SOUTH
BOOK 394, PAGE 42
M.C.R

ADJACENT PARCEL
LOT 10C
STATE PLAT NO 16-B CORE SOUTH
BOOK 394, PAGE 42
M.C.R

ADJACENT PARCEL
PARCEL 2
HAYDEN 50
BOOK 1447, PAGE 40
M.C.R

APN: 215-07-409
N.I.S.

SCOTTSDALE STONEBROOK II
BOOK 390, PAGE 13, M.C.R.

ADJACENT PARCEL
APN: 215-07-001F
PACESETTER INC.
DOC NO. 96-0032726
M.C.R

ADJACENT PARCEL
APN: 215-07-214
PACESETTER INC.
DOC NO. 97-0466350
M.C.R

ADJACENT PARCEL
APN: 215-07-001Y
LOT 15 OFFICE DEVELOPMENT LLC
DOC NO. 04-0348725, M.C.R

LOOP 101

HAYDEN ROAD

AXON WAY

PERIMETER DRIVE

BOND STREET

DG FIRE ACCESS ROAD

DG FIRE ACCESS DRIVEWAY

DRAINAGE EASEMENT

PROPERTY LINE

15'-0" FROM EASEMENT

AXON CAMPUS
Gross Area: 401,085 SF
(DRB: 28-DR-2020)
Building Footprint: 175, 679 S.F.
FLOOR AREA RATIO = .16

BUILDING A
5 Story Residential over 2 Story Garage
+1 Story Underground Garage

BUILDING B
5 Story Residential
7 Story Parking Garage

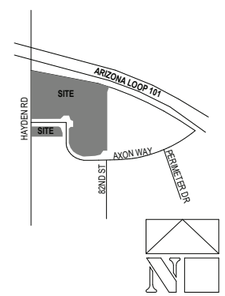
BUILDING C
5 Story Residential
7 Story Parking Garage

BUILDING D
5 Story Residential over 2 Story Garage

BUILDING E
5 Story Residential over 2 Story Garage

BUILDING F
5 Story Residential over 2 Story Garage
RAMP DN

VICINITY MAP



1 SITE PLAN OVERALL
SCALE: 1" = 100'-0"

C = Access Designation
(added by CivTech)

DATE: 07.06.2023 ORB #: 23-202

A1.10

Attachment A
Sheet 1 of 1

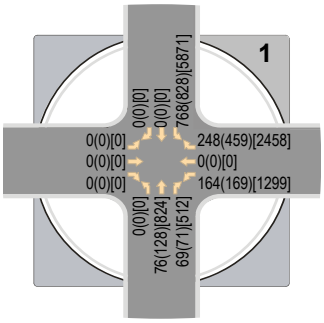
Autodesk Docs://23-202 CH-Hayden & 101/23-202_Axon Way Master - 2023.rvt

Quadrant	2030 Population	2030 Percent	2030 Employment	2030 Percent	2040 Population	2040 Percent	2040 Employment	2040 Percent
North Northwest	65,664	7.9%	33,343	6.2%	82,244	9.2%	37,813	6.6%
North Northeast	32,920	3.9%	15,715	2.9%	36,581	4.1%	17,242	3.0%
North	98,584	11.8%	49,058	9.1%	118,825	**13.3%**	55,055	**9.6%**
East Northeast	27,920	3.3%	18,788	3.5%	30,611	3.4%	21,461	3.7%
East Southeast	59,560	7.1%	32,251	6.0%	61,219	6.9%	35,285	6.1%
East	87,480	10.4%	51,039	9.5%	91,830	**10.3%**	56,746	**9.8%**
South Southeast	51,477	6.2%	57,153	10.7%	52,560	5.9%	61,300	10.6%
South Southwest	190,967	22.9%	173,280	32.5%	198,939	22.4%	185,072	32.1%
South	242,444	29.1%	230,433	43.2%	251,499	**28.3%**	246,372	**42.7%**
West Southwest	231,712	27.8%	113,378	21.2%	236,245	26.6%	119,965	20.8%
West Northwest	173,673	20.8%	89,904	16.8%	191,158	21.5%	98,785	17.1%
West	405,385	48.6%	203,282	38.0%	427,403	**48.1%**	218,750	**37.9%**
Totals	833,893	99.9%	533,812	99.8%	889,557	100.0%	576,923	100.0%

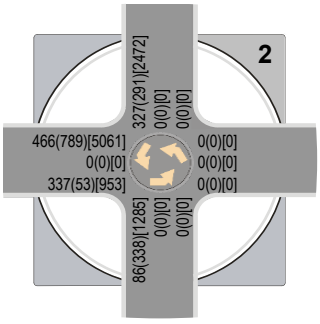
Radii

Population radius: 12 miles
Employment radius: 12 miles

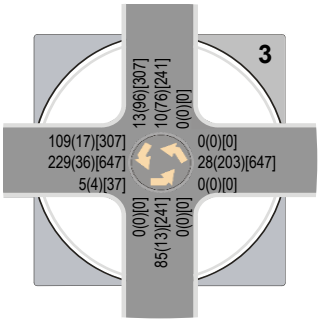
Select Analysis Year (2030, 2040, 2050)
2030



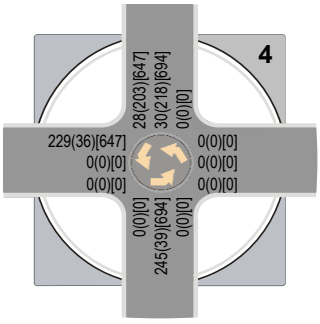
Hayden Rd & Mayo Blvd/Axon Wy



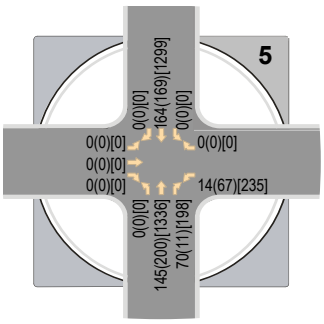
Axon Wy & Axon Wy



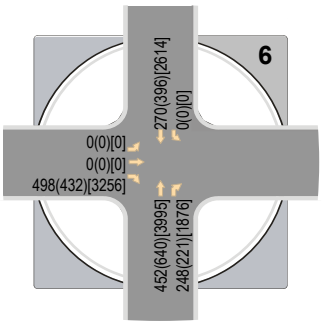
82nd St & Axon Wy



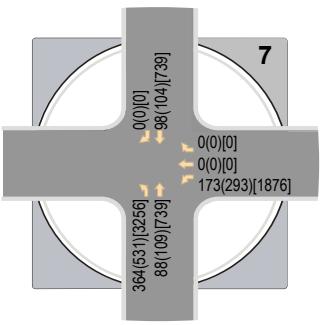
Perimeter Dr & Axon Wy



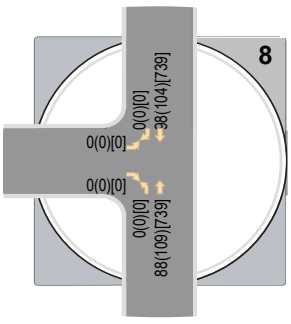
Hayden Rd & Princess Dr



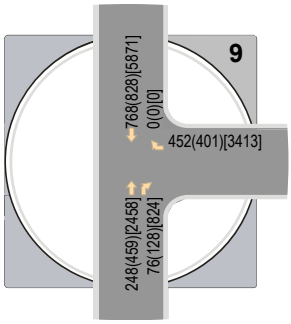
Hayden Rd & Loop 101 EB Ramps



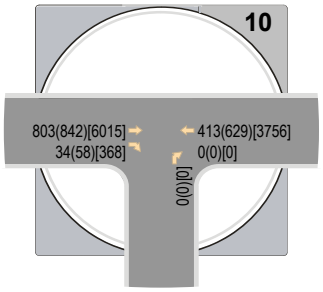
Hayden Rd & Loop 101 WB Ramps



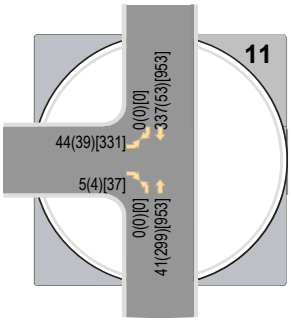
Hayden Rd & Legacy Blvd



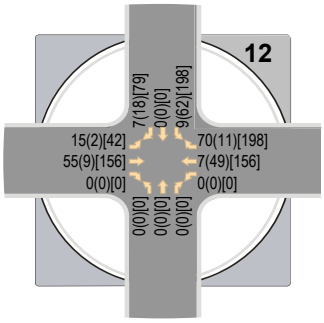
Hayden Rd & Access A



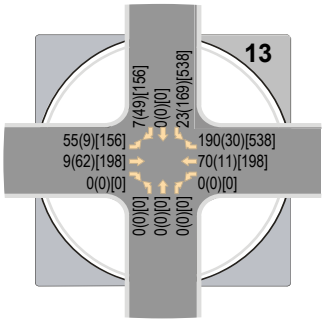
Access B & Axon Way



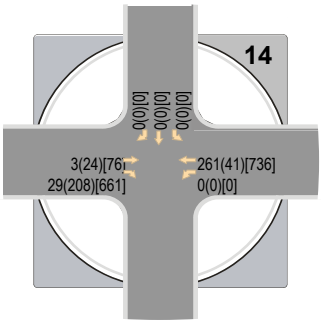
Axon Way & Access C



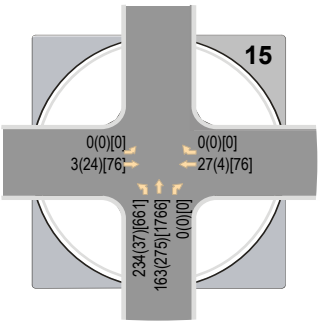
82nd St & Princess Dr



Princess Dr & Axon Wy



Loop 101 SB Ramps @ Princess Dr/Pima Rd



Loop 101 NB Ramps @ Princess Dr/Pima Rd

LEGEND

XX(XX)[XXX] - AM(PM)[Daily] Traffic Volumes

Attachment C: Site-Generated Trips

CITY OF SCOTTSDALE

DESIGN STANDARDS & POLICIES MANUAL

B. **Superelevation Rate Greater than 0.02 ft/ft**
A superelevation rate greater than 0.02 ft/ft may not be used except when approved by the Transportation Department. In no case shall a superelevation exceed 0.06 ft/ft

C. **Transition for Superelevation**
The length of superelevation transition is based on the superelevation rate and the width of rotation. The axis of rotation is generally the pavement centerline. The transition lengths for a superelevation rate of 0.02 ft/ft are provided in Appendix 5-3A. For other superelevation rates, refer to the AASHTO's Policy on Geometric Design.
In designing the beginning or ending of a horizontal curve, 1/3 of the transition is on the curve and 2/3 of the transition is on the tangent pavement section.

D. **Drainage on Superelevated Curves**
Whenever superelevation is allowed on a divided street, a storm drainage system must be provided to collect the runoff along the median curb. Nuisance water from the higher traveled area is not allowed to cross the lower traveled area.

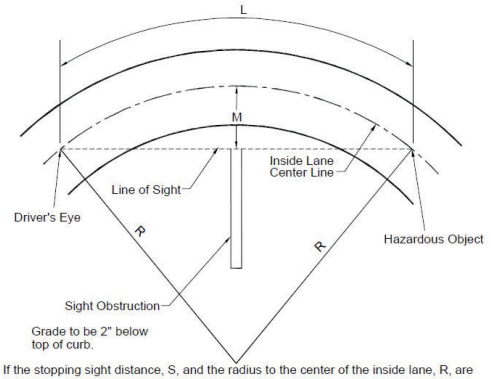
HORIZONTAL CURVES

5-3.120

Horizontal alignments need to provide safe and continuous operation of motor vehicles at a uniform design speed for substantial lengths of street. At a minimum, a horizontal curve is typically required when the angle of change in horizontal alignment is equal to or greater than two degrees. The nature of the surrounding development and topography, and the street classification will establish the factors that determine the radius of a curve.

A. **Minimum Radii of Curvature**
The minimum radius of curvature is determined by the design speed or by the stopping sight distance.

1. Minimum Radii Based on Design Speed
Appendix 5-3A contains the minimum radius of curvature depending on design speed with and without a superelevation rate of 0.02 ft/ft. Wherever possible, the radii used in design needs to be larger. If stopping sight distance conditions require a larger radius than that shown in these appendices, then that larger radius becomes the minimum radius for the curve.
2. Consideration of Stopping Sight Distance
When walls, buildings, bridge piers, cut slopes, vegetation, or other obstructions are near the roadway on the inside of a curve, they can block a driver's view of the road ahead. If they are too near, the driver will not have sufficient distance along the curved roadway to stop when a hazardous condition comes into view. For design, the driver's eye is 3.5 feet above the center of the inside lane (the driving lane nearest to the inside of the curve) and a hazardous condition is an object 2.0 feet high in the center of the inside lane, or per currently accepted AASHTO standards. The clear distance, "M" is measured from the center of the inside lane to the view obstruction. Figure 5-3.27 depicts these relationships.
Refer to AASHTO "A Policy on Geometric Design of Highways and Streets" Section 3-3.12 for Stopping Sight Distance calculations.



If the stopping sight distance, S, and the radius to the center of the inside lane, R, are known, the distance, M, is found by the following equation:

M = R[1-COS(28.65 S/R)]

If the radius, R, and the distance, M, are tentatively selected, then the length, L, of the arc in the middle of the inside lane may be found by the following equation:

L = (R/28.65)ARRCCOS[(R-M)/R]

If the length, L, is less than the stopping sight distance for the desired speed, either the radius, R, or the distance, M, must be increased.

FIGURE 5-3.24 VIEW OBSTRUCTIONS AND HORIZONTAL CURVES

B. **Reduced Design Speeds on Curves**
The reduction of a street design speed on a curve should be avoided; however, where physical restrictions prohibit increasing the radius of the curve or the clear distance, "M" and/or provide superelevation; the design speed for the curved section may be reduced. In such circumstances, appropriate signage in accordance with the MUTCD is required. The difference between the design speed for the roadway approaching the curve and the design speed for the curve cannot be greater than 10 miles per hour. The design speed for a curved roadway section must not be reduced if the reduction occurs at the end of a long tangent or at any location where high approach speeds may be expected.

C. **Compound Curves**
Compound curves should be avoided; however, if site conditions make the use of compound curves unavoidable, the shorter radius needs to be at least 2/3 the length of the longer radius. Compound curves are not permitted when design speeds require the shorter radius to be greater than 1,000 feet.

D. **Tangent Sections Between Curves in the Same Direction**
On two-lane roads, tangent sections are needed between two curves in the same direction. If the pavement cross-sections throughout the curves do not have

superelevation then the minimum lengths for tangent sections are listed in Appendix 5-3A.
If superelevation is provided in the curved portions of the roadway, then the superelevation transition lengths indicated will determine the tangent lengths.

E. **Tangent Sections Between Reverse Curves**
Generally, a tangent section must be provided between two curves that curve in the opposite direction. Minimum lengths for tangent sections between reverse curves without superelevation are provided in Appendix 5-3A. If the curve radii are at least 50 percent greater than the radii required by the design speed, a tangent section may not be required depending on grades, topography and vegetation. If superelevation is provided for the curves, then the superelevation transition lengths indicated will determine the minimum length of tangent sections between reverse curves.

F. **Tangent Sections Approaching Intersections**
A tangent section must be provided between a street intersection and a curve unless otherwise approved by the Transportation Department. The minimum tangent length is shown in Appendix 5-3A and shall be measured from the end of the curve to the edge of the intersecting roadway.

VERTICAL ALIGNMENT 5-3.121

A vertical curve is required when grade changes are equal to or greater than 1.5 percent. All sections of a street's vertical alignment must meet passing and stopping sight distance requirements for the design speed established for the street. For specific details, refer to the AASHTO's Policy on Geometric Design.

A. **Longitudinal Street Grades**
For arterial streets, the maximum longitudinal grade is 6 percent. For non-ESL/Rural collector and local streets, the maximum grade is 9 percent. The minimum longitudinal street grade for all streets is 0.4 percent. Wherever possible, longitudinal street grades greater than the minimum grade are to be provided. Where necessary, grades less than 0.4 percent may be used with approval from the Public Works Department and/or Transportation Department. Grades that exceed the maximum longitudinal grades allowed may be used with approval from the Transportation, Public Works, and Fire Departments.

B. **Vertical Curves**
Properly designed vertical curves should provide adequate sight distance, safety and effective drainage.

1. Refer to AASHTO's Policy on Geometric Design of Highways and Streets for the equations that are to be used to determine the necessary parabolic vertical curve criteria.
2. Sight Distance Requirements
Sight distance is the continuous length of street ahead that is visible to the driver. For vertical alignment design, two sight distances are considered: passing sight distance and stopping sight distance. Stopping sight distance is the minimum sight distance to be provided at all points on multi-lane streets and on 2-lane streets when passing sight distance is not economically obtainable as approved by city staff. Stopping sight distance needs to be

provided near intersections. Appendix 5-3Alists the minimum stopping sight distances for the various design speeds.

a. Stopping Sight Distance
The minimum stopping sight distance is the distance required by the driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eyes, 3.5 feet above the pavement surface, to object 2.0 feet tall on the roadway, or per currently accepted AASHTO standards.

b. Passing Sight Distance
Passing sight is the minimum sight distance that must be available to enable the driver of one vehicle to pass another vehicle safely, without interfering with the speed of an oncoming vehicle. The sight distance available for passing at any one place is the distance at which a driver, whose eyes are 3.5 feet above the roadway surface, can see the top 0.8 feet of an object 4.35 feet tall on the road (corresponding to an object height of 3.5 feet tall), or per currently accepted AASHTO standards.

3. Minimum Vertical Curve Lengths
Minimum vertical curve lengths are determined by sight distance requirements for a given design speed.

a. Crest Vertical Curve Lengths
Minimum crest curve lengths are determined by either the stopping sight distance or the passing sight distance, whichever provides the greatest curve length. Refer to AASHTO's Policy on Geometric Design of Highways and Streets for the equations that are to be used to determine the minimum crest vertical curve lengths based upon stopping distance and passing sight distance requirements.

b. Sag Vertical Curve Lengths
Minimum sag vertical curve lengths are determined by either the stopping sight distance or comfort factors. The longer of the two possible minimum curve lengths will be used. Refer to AASHTO's Policy on Geometric Design of Highways and Streets for the equations that are to be used to determine the minimum sag vertical curve lengths based upon stopping distance and comfort factors requirements.

COMBINED CURVES 5-3.122

When horizontal and vertical curves are combined, the horizontal curve needs to lead and follow the vertical curve, and not be introduced near the top or bottom of a crest vertical curve or bottom of a sag vertical curve. For additional information on this topic, refer to the AASHTO's Policy on Geometric Design.

INTERSECTIONS 5-3.123

Although all intersections share certain common elements, they are not subject to generalized treatment. To minimize conflicts and provide for anticipated traffic movements, each intersection must be evaluated based on individual characteristics and designed based on the following factors:

A. Traffic factors such as capacities, turning movements, vehicle size and operating characteristics, vehicle speed, pedestrian and bicycle movements, transit operations and collision history.
B. Physical factors such as topography, existing conditions, channelization requirements and available sight distance.
C. Human factors such as driving habits, reaction to surprises, decision and reaction time, and natural paths of movement.

Unless otherwise noted, intersection and street design for major collectors and arterial streets shall assume a WB-62 design vehicle as defined in AASHTO's A Policy on Geometric Design of Highways and Streets. There may be locations within or adjacent to heavy commercial or industrial areas where a WB-67 design vehicle may be required by Transportation staff.

For this section, the term "intersection" shall refer to the location where a public street meets or overlaps another public street, a private street, or a private driveway unless specifically noted otherwise.

A. **Public and Private Street Intersection Spacing**
Street intersections along major streets should be kept to a minimum. Along arterial streets, the minimum intersection spacing should be 1/4 mile (1320 feet). Along collector streets (major collectors and minor collectors), the minimum spacing should be 1/8 mile (660 feet). Along local streets (local residential and local collectors), the minimum spacing should be 250 feet. New intersections on major streets should be located to align with planned median openings. New intersections on minor streets should be located to avoid creating conflicting turning movements with existing intersections or driveways.

B. **Angle of Intersection**
A right-angle intersection provides the shortest crossing distance for intersecting traffic streams. It also provides the most favorable condition for drivers to judge the relative position and speed of oncoming vehicles. Where special conditions exist, intersection angles may diverge from a right-angle by a maximum of 2 degrees (up to 4 degrees with approval of the Transportation Department) on arterial streets and major collector streets; and by a maximum of 4 degrees (up to 15 degrees with approval of the Transportation Department) on minor and local collector streets, couplets and local streets.

C. **Alignment and Profile**
Intersections occurring on horizontal or crest vertical curves are undesirable. When there is latitude in the selection of intersection locations, vertical or horizontal curvature should be avoided. A line or grade change is frequently warranted when major intersections are involved. If a curve is unavoidable, it should be as flat as site conditions permit. Where the grade of the through roadway is steep, flattening through the intersection is desirable as a safety measure.
The maximum profile grade through an intersection is 6 percent for arterials and collector streets and 8 percent for local streets. The profiles and cross slopes of the intersecting streets need to be coordinated with one another to ensure a safe and comfortable driving surface. Typically, this may mean extending grades through

AXON MIXED-USE

TRAFFIC IMPACT AND MITIGATION ANALYSIS

July 2023

CivTech Project No. 21-0551

East of Hayden Road and
South of SR 101 in
Scottsdale, Arizona

Prepared for:

Axon Enterprise, Inc.
c/o Huellmantel & Affiliates
605 South Ash Avenue
Tempe, AZ 85281

Submittal to:

City of Scottsdale

10605 North Hayden Road, Suite 140 • Scottsdale, Arizona 85260 • 480.659.4250

CivTech

AXON MIXED-USE
TRAFFIC IMPACT AND MITIGATION ANALYSIS

South of State Route Loop 101/Pima Freeway
East of Hayden Road
[Crossroads East Parcel P-13]

Prepared for:

Axon Enterprise, Inc.
c/o Huellmantel & Affiliates
605 South Ash Avenue
Tempe, Arizona 85281

For Submittal to:

City of Scottsdale

Prepared by:

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July 2023
CIVTECH PROJECT NO. 21-0551

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EXECUTIVE SUMMARY

Axon Enterprise, Inc. (the Client) is proposing to build, a 401,085-square foot (sf) general office building as a new company headquarters, a 100-key hotel, and a 2,099-dwelling unit (DU) five-story (i.e., mid-rise) multifamily residential community with ground-floor commercial uses on a site designated as "Parcel P-13" of the Crossroads East development, which CivTech studied in 2011 for the Arizona State Land Department. Parcel P-13 consists of three individual Maricopa County Assessor numbered parcels and 10.03 acres of City roadway right of way that total 73.57 acres.

As shown on the site plan provided, Mayo Boulevard (South) will be renamed Axon Way and realigned west of 82nd Street such that it intersects Scottsdale Road across from Mayo Boulevard (North). A review of Assessor maps shows that the right of way for this realignment has already been dedicated. Primary access to the site will be via the (future) signalized intersection of Hayden Road and Mayo Boulevard/Axon Way and three modern roundabouts along Axon Way: the first just east of Hayden Road (where Axon Way begins to curve to the south and it will also serve two driveways), the second at 82nd Street, and the third at Perimeter Drive. Additional access will be provided by two right-in/right-out driveways: one along Hayden Road serving the main parcel and one along Axon Way serving the small parcel on which the hotel will be developed.

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

- The proposed development is anticipated to generate 7,640 trips on a typical weekday with 977 trips (666 in/311 out) generated during the AM peak hour and 1,133 trips (327 in/806 out) generated during the PM peak hour.

- The proposed Axon Mixed-Use development is expected to generate 1,630 trips more on a typical weekday than anticipated in 2011 from Crossroads East Parcel P-13 with 735 additional trips (583 in/151 out) generated during the AM peak hour and 857 additional trips (241 in/616 out) generated during the PM peak hour.

- With 15,000 vpd on Hayden Road, a posted speed limit of 45 mph, and 36 northbound right turns during the PM peak hour expected into Access A, CivTech recommends a northbound right turn lane with a minimal queue storage capacity of 100 feet be provided on Hayden Road approaching Access A.

INTRODUCTION

Axon Enterprise, Inc. (the Client) is proposing to build, a 401,085-square foot (sf) general office building as a new company headquarters, a 100-key hotel, and a 2,099-dwelling unit (DU) five-story (i.e., mid-rise) multifamily residential community with ground-floor commercial uses on a site designated as "Parcel P-13" of the Crossroads East development, which CivTech studied in 2011 for the Arizona State Land Department. Parcel P-13 consists of three individual Maricopa County Assessor numbered parcels and 10.03 acres of City roadway right of way that total 73.57 acres. Parcel P-13 is roughly triangular in shape, bounded by Hayden Road on the west, the Loop 101/Pima Freeway on the north, and Union Hills Drive on the south. Axon has acquired the first two parcels, 57.17-acre APN 215-07-407 and 1.76-acre APN 215-07-408. The third, 4.61-acre 215-07-409, is presently owned by the City of Scottsdale and is not shown on the plans provided as part of the Axon development. As originally studied, the entire Crossroads East development, located in the northeast corner of Scottsdale Road and Princess Drive, was expected to provide 3,305,943 sf of retail uses, 2,557,669 sf of office space, 3,443 DUs, and 7,775,460 sf of industrial land uses on approximately 882 gross acres.

Primary access to the site will be via the (future) signalized intersection of Hayden Road and Mayo Boulevard/Axon Way and three modern roundabouts along Axon Way: the first just east of Hayden Road (where Axon Way begins to curve to the south and it will also serve two driveways), the second at 82nd Street, and the third at Perimeter Drive. Additional access will be provided by two right-in/right-out driveways: one along Hayden Road serving the main parcel and one along Axon Way serving the small parcel on which the hotel will be developed. A location map is provided in **Figure 1**.

PURPOSE OF REPORT AND STUDY OBJECTIVES

CivTech Inc. was retained in late June by Axon Enterprise, Inc. to perform a Category 2 Traffic Impact and Mitigation Analysis (TIMA) for the proposed Axon development, the level of study requested by the City of Scottsdale. *With the Independence Day holiday falling in the middle of the week, CivTech was unable to record turning movement counts in time to meet its Client's submission date. The purpose of this study is, therefore, to serve as a "placeholder" for a more-formal study, completing a submittal package and providing as much information as possible. CivTech expects that this document will allow City traffic engineers to see the direction that CivTech is taking the study and to make comments/suggestions as to the study area, annual growth rates to be applied, the seasonal factors that should be applied to the counts (which will be recorded during the summer vacation period), the directional distribution, interaction/internal capture rates, etc., item on which reviewers often have comments.*

Turning movement counts will be recorded and future submittals will address traffic and transportation impacts of the proposed development on the surrounding streets and intersections. The specific objectives of the study will then be as follows:

1. To evaluate lane requirements on all existing and proposed roadways and at all existing and future signalized intersections within the study area and recommend any capacity related improvements.

2. To determine ultimate build-out level of service for all existing and future signalized intersections within the study area and recommend any capacity related improvements.

3. To evaluate the need for future traffic control changes within the proposed study area.

CivTech will analyze all major arterial-to-arterial and major arterial-to-collector intersections within one-mile and adjacent to the proposed development and all site driveways.

STUDY REQUIREMENTS

This study analyzes the traffic impact due to the proposed Axon mixed-use development on the surrounding street network and has been prepared per the requirements of Section 5-1 (Transportation Impact Study) of the City of Scottsdale's 2018[1] *Design Standards and Polices Manual*.

STUDY AREA

The study area has been identified as the following arterial-to-arterial and arterial-to-collector intersections:

1. Hayden Road at Mayo Boulevard (North)
2. Hayden Road at Mayo Boulevard (South)
3. 82nd Street at Union Hills Drive
4. Perimeter Drive at Union Hills Drive
5. Hayden Road at Princess Drive
6. Hayden Road at Loop 101 Eastbound Ramps
7. Hayden Road at Loop 101 Westbound Ramps
8. Hayden Road at Legacy Boulevard

In addition, CivTech will analyze all proposed accesses to the development, which, as noted above, will include two right-in/right-out driveways.

HORIZON YEARS

The opening year 2025 and any other years thereafter identified by the City will be the years for which level of service analyses and documentation will be provided. For purposes of this analysis, it is assumed that the proposed development will be fully built-out by the horizon year 2025.

[1] In 2021, the City issued an update in draft form; it has not yet been adopted. A comparison of the 2018 and 2021 versions as this proposal us being prepared reveals that the primary difference applicable to a Level 3 TIMA would be a requirement to provide copies of the digital files used by CivTech for the analysis, e.g., the Synchro files used for the LOS analysis. Otherwise, there are no differences.

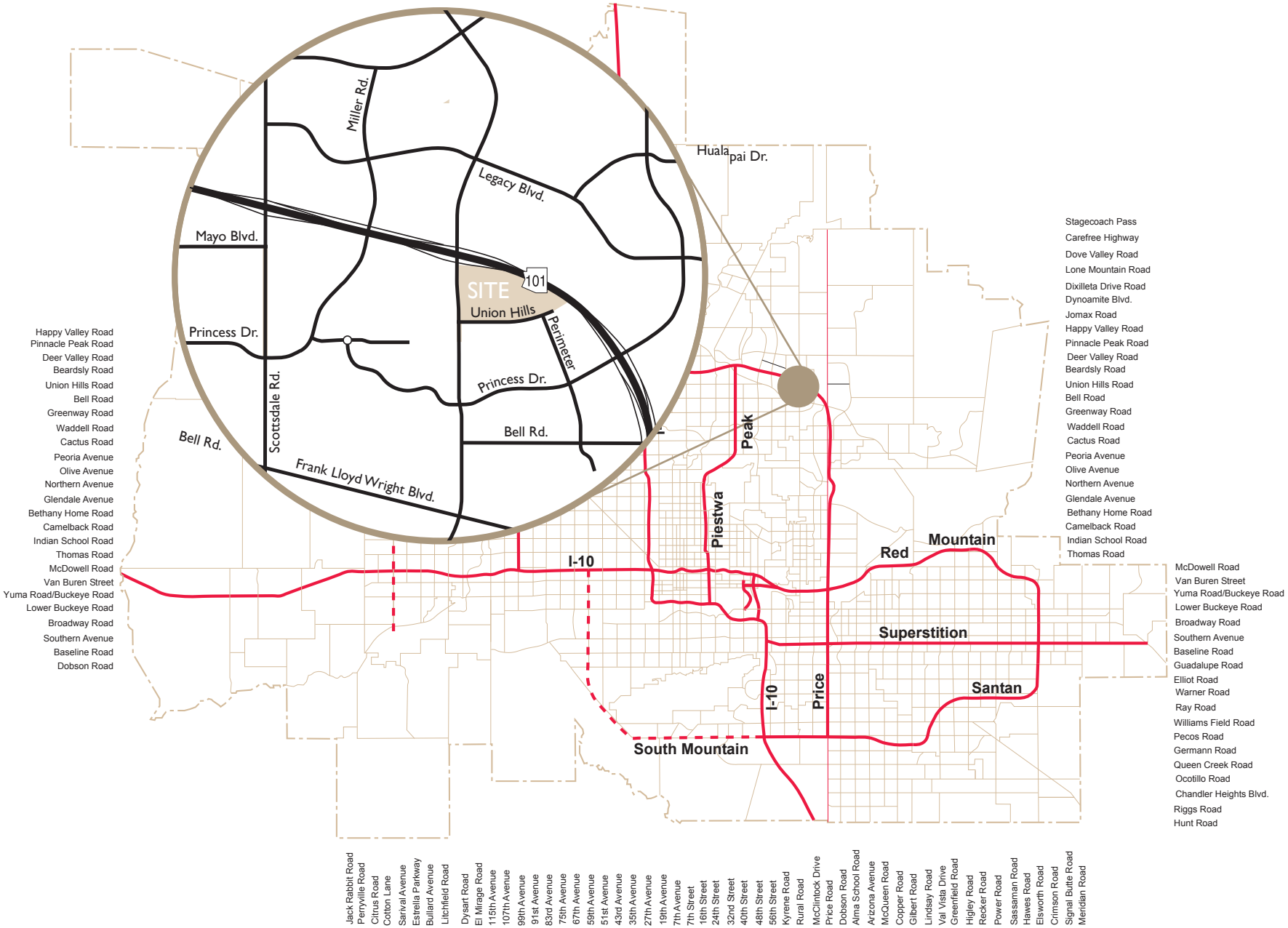


Figure 1: Vicinity Map

EXISTING CONDITIONS

SURROUNDING LAND USE

The Axon site is currently undeveloped land, located north of Mayo Boulevard, east of Hayden Road, and south of State Highway Loop 101 (SR 101 or Loop 101), the Pima Freeway.

South of the site (across Mayo Boulevard) from west to east are:

- The Scottsdale Stonebrook residential subdivision between Hayden Road and 82nd Street.
- Three parcels owned by Pacesetter, Inc. and used for the manufacture of medical devices. The largest of the parcels, in the southeast corner of the 82nd Street/Mayo Boulevard intersection is developed; the two others one to its east and the other to its south are undeveloped and will presumably be used for future expansion of the facility.
- Between Perimeter Drive and Loop 101 at 17851 North 85th Street is a three-story general office building.
- Across Hayden Road to the west are vacant parcels of the Crossroads East area, some of which have been sold and one that remains in the name of the Arizona State Land Department (ASLD).

EXISTING TRANSIT NETWORK

The closest existing transit route to the proposed development are Local Routes 72 (Scottsdale Road) and 170 (Bell Road) and Express Route 511. Route 72 begins just north of Loop 101, connecting Scottsdale Healthcare Drive on the north to the Chandler Fashion Center/Transit Station at its southern terminus. Routes 511 and 170 provide additional connectivity within the north Scottsdale area and require just a single transfer to reach alternate destinations. Route 511 is the Scottsdale/ Tempe Express which provides access from the Scottsdale Airpark to select locations such at 90th Street/Shea Boulevard, Scottsdale Community College, and Apache Boulevard/Price Road. Route 170 provides east-west connectivity along Bell Road and Frank Lloyd Wright Boulevard.

ROADWAY NETWORK

The existing roadway network within the study area includes the following:

Hayden Road is a north-south, four-lane major arterial with a center raised median per the Scottsdale Transportation Master Plan within the vicinity of the proposed site. Hayden Road begins north of Pinnacle Peak Road and travels southbound becoming the Greenway Hayden Loop south of Frank Lloyd Wright Boulevard. Hayden Road provides direct access to the Pima Freeway (Loop 101) and all major east-west arterials within the vicinity of the proposed site. The posted speed limit is 45 mph within the vicinity of the proposed site.

Perimeter Road is a north-south, four-lane major collector with a center raised median per the Scottsdale Transportation Master Plan within the vicinity of the proposed site. Perimeter Road begins to the north at Union Hills Drive and travels southbound terminating just south of Bell Road. Perimeter Road provides direct access to Union Hills Drive, Princess Drive and Bell Road. The posted speed limit is 35 mph within the vicinity of the proposed site.

Pima Freeway (Loop 101) is a six-lane freeway within the vicinity of the study area. The westbound/eastbound on and off ramps and freeway are under the direction and control of the Arizona Department of Transportation (ADOT). The Loop 101 within the vicinity of the study area provides regional access to the Piestewa Freeway (SR 51) to the west, north Phoenix, the City of Scottsdale to the east and the Cities of Tempe, Mesa, and Chandler to the south. The posted speed limit is 65 mph on the freeway. Currently construction is on-going to provide a high-occupancy vehicle (HOV) lane in each direction within the existing freeway median.

Legacy Boulevard is an east-west, four-lane minor arterial roadway providing access to Hayden Road from Scottsdale Road. Legacy Boulevard construction was recently completed and the roadway is open and functional for public use between Hayden Road and Scottsdale Road. Currently, Legacy Boulevard begins at Scottsdale Road and terminates at Hayden Road.

Mayo Boulevard (North) is an east-west arterial roadway that terminates as a parking lot to the east of Scottsdale Road. To the west of Hayden Road, Mayo Boulevard continues across Scottsdale Road and terminated at Tatum Boulevard. Mayo Boulevard provides the primary access to the Scottsdale 101 Shopping Area and is a six-lane arterial roadway adjacent to the shopping center. West of the Scottsdale 101 Shopping Area Mayo Boulevard reduces to one-lane per direction. The posted speed limit on Mayo Boulevard is 45 mph within the study area.

Mayo Boulevard (South) is an east-west four-lane major collector that intersects Hayden Road south of Mayo Boulevard (North). Mayo Boulevard (South) was constructed with a raised median per the Scottsdale Transportation Master Plan. Mayo Boulevard (South) begins to the west at Hayden Road and extends easterly, terminating at the Pima Freeway (Loop 101). The posted speed limit on Mayo Boulevard (South) is 35 mph within the study area.

82nd Street is a north-south three-lane collector roadway with a continuous two-way left turn lane. 82nd Street begins to the north at Mayo Boulevard (South) and extends southerly across Princess Drive and terminates just south of Bell Road, where it serves as the access for a gated condominium community and a gated apartment complex. The posted speed limit on 82nd Street south of Mayo Boulevard (South) is 30 mph.

INTERSECTIONS

1. The intersection of *Hayden Road and Mayo Boulevard (North)* operates as a T-intersection (with no westbound approach) under stop control on the eastbound approach. The northbound approach consists of one (1) exclusive left-turn lane and two (2) through lanes. The southbound approach consists of two (2) through lanes and one (1) dedicated right-turn lane. The westbound approach consists of separate left and right-turn lanes.

2. The intersection of *Hayden Road and Mayo Boulevard (South)* operates as a four-legged-intersection under stop control on the eastbound and westbound approaches. The northbound approach consists of one (1) exclusive left-turn lane, two (2) through lanes, and one (1) dedicated right-turn lane. The southbound approach consists of one (1) exclusive left-turn lane, two (2) through lanes, and one (1) dedicated right-turn lane. The westbound approach consists of one (1) shared left-

right-turn lane. The eastbound approach is a driveway to a gated apartment complex and consists of one (1) shared left-right-turn lane.

3. The intersection of ***82nd Street and Mayo Boulevard (South)*** operates as a T-intersection (with no southbound approach) under stop control on the northbound approach. The northbound approach consists of one (1) shared left-right-turn lane. The eastbound approach consists of one (1) shared through-right-turn lane. The westbound approach consists of one (1) shared through-left-turn lane.

4. The intersection of ***Perimeter Drive and Mayo Boulevard (South)*** operates as a T-intersection (with no southbound approach) under stop control on the northbound approach. The northbound approach consists of separate left and right-turn lanes. The eastbound approach consists of one (1) shared through-right-turn lane. The westbound approach consists of one (1) shared through-left-turn lane.

5. The intersection of ***Hayden Road and Princess Drive*** operates under signalized conditions. Both the northbound and southbound approaches consist of one (1) dedicated left-turn lane, two (2) through lanes and one (1) dedicated right-turn lane. The eastbound approach consists of one (1) shared left-through turn lane and one (1) dedicated right-turn lane. The westbound approach consists of two (2) left-turn lanes and one (1) dedicated right-turn lane.

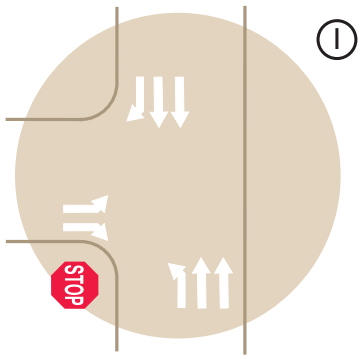
6. and 7. The intersections of ***Hayden Road and the Loop 101 Ramps*** operate as a signalized tight urban diamond traffic interchange (TUDI). The northbound approach consists of one (1) exclusive left-turn lane, two (2) through lanes and one (1) dedicated right-turn lane. The southbound approach consists of two (2) left-turn lanes, two (2) through lanes and one (1) dedicated right-turn lane. The eastbound approach consists of one (1) exclusive left-turn lane, one (1) shared left-right turn lane and one (1) dedicated right-turn turn lane. The westbound approach consists of one (1) exclusive left-turn lane, one (1) shared left-through turn lane, one (1) through lane and one (1) dedicated right-turn lane.

8. The intersection of ***Hayden Road and Legacy Boulevard*** is a T-intersection (with no westbound approach) operating under signalized conditions. The northbound approach consists of one (1) exclusive left-turn lane and two (2) through lanes. The southbound approach consists of two (2) through lanes and one (1) dedicated right-turn lane. The eastbound approach consists of one (1) exclusive left-turn lane and one (1) dedicated right-turn lane.

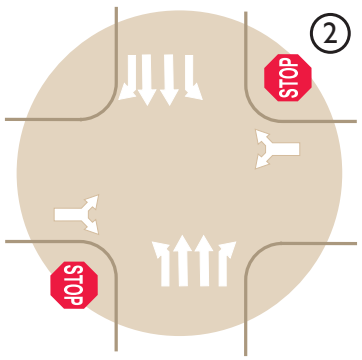
Figure 2 depicts the existing stop controls and lane geometries within the project area.

TRAFFIC VOLUMES

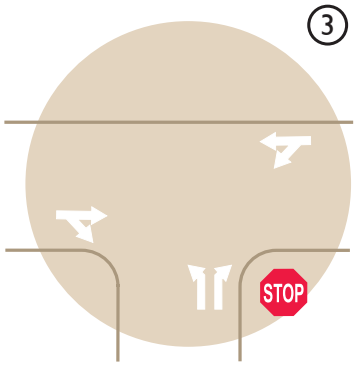
CivTech contracted Field Data Services of Arizona (FDS) Inc. to conduct turning movement counts at the above intersections. These turning movement counts were conducted on Tuesday July 11, 2023 from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM during an average weekday. Existing turning movement traffic count data was also taken from the Maricopa Association Government (MAG) website for the following intersections.



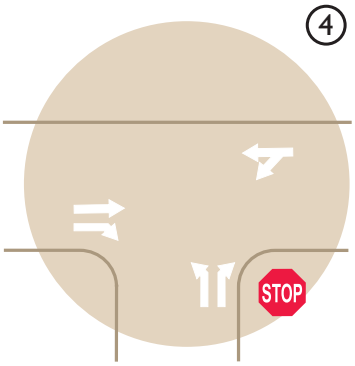
Hayden Rd. & Mayo Blvd. (North)



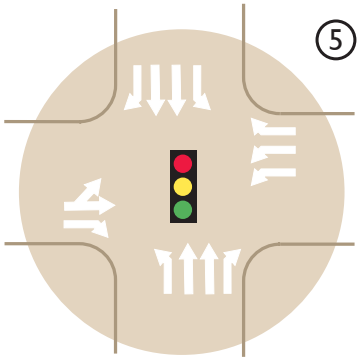
Hayden Rd. & Mayo Blvd. (South)



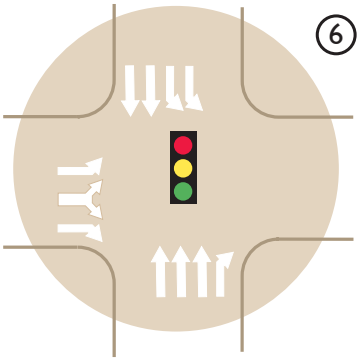
82nd St. & Mayo Blvd. (South)



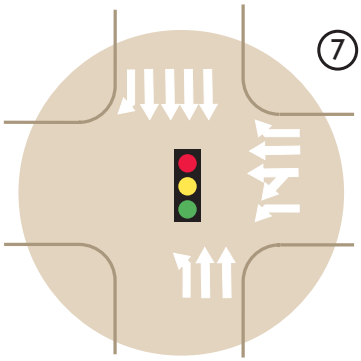
Perimeter Dr. & Mayo Blvd. (South)



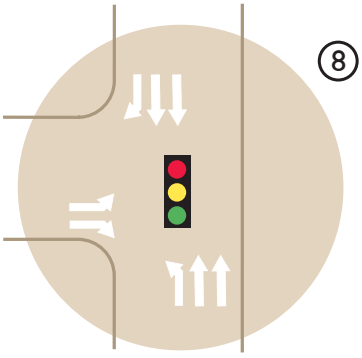
Hayden Rd. & Princess Dr.



Hayden Rd. & Loop 101 EB Ramp



Hayden Rd. & Loop 101 WB Ramp



Hayden Rd. & Legacy Blvd.

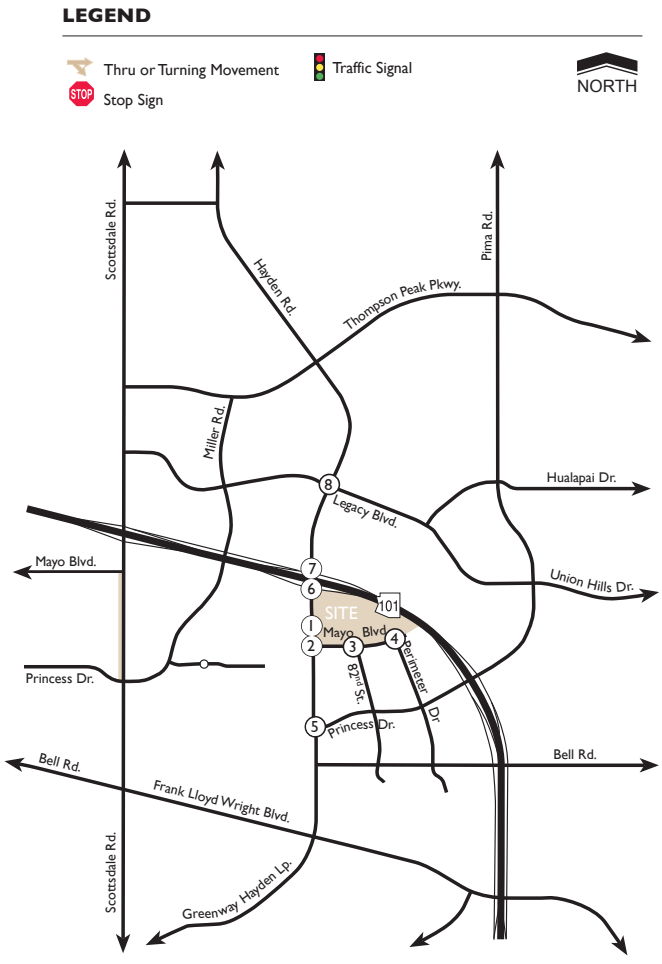


Figure 2: Existing Lane Configurations and Stop Controls

The existing traffic volume data for this study is presented in the **Appendix B** for the AM and PM peak hours. **Figure 3** illustrates the existing daily traffic volumes obtained from the websites of the Maricopa Association of Governments', City of Scottsdale, and City of Phoenix. **Figure 4** illustrates the peak hour turning movement volume counts conducted for this study.

CRASH ANALYSIS (RESERVED)

*CivTech will provide an analysis of crash data for the study intersections. The data will be summarized in tables and the detailed data will be provided in **Appendix C**.*

FIGURE 3 – EXISTING DAILY TRAFFIC VOLUMES (RESERVED)

FIGURE 4 – EXISTING PEAK HOUR TRAFFIC VOLUMES (RESERVED)

CAPACITY ANALYSIS

The concept of level of service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The individual levels of service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions. Levels of service for intersections are defined within ranges of average control delay per vehicle, the number of seconds a vehicle can expect to wait due to the presence of a traffic control device. lists the level of service criteria for signalized and unsignalized intersections. **Table 1** summarizes this information.

Synchro 11 software using the methodologies of the latest (6th) edition of the *Highway Capacity Manual* (HCM 2016) were used to calculate average per-vehicle control delays, from which movement, approach, and overall intersection levels of service are determined. The methods take into account lane geometry, traffic volumes, and traffic control (two-way stop, all-way stop, or signal). Synchro's analysis worksheets report individual movement delay/LOS and overall delay/LOS for signalized intersections and the worst-case delay/LOS and the average overall intersection delay for unsignalized intersections. Results of the existing, no build, and build scenarios level of service analyses conducted for the proposed development are summarized in **Table 3** for both peak hours. The output sheets for the existing conditions have been included in **Appendix D**.

TABLE 1 – INTERSECTION LEVEL OF SERVICE CRITERIA

Level of Service	Control Delay (sec/veh)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80 (or v/c>1)	> 50 (or v/c>1)

Source: Exhibits 19-8, 20-2, 21-8, and 22-8, Highway Capacity Manual, 6th Edition (2016)

TABLE 2 – EXISTING PEAK HOUR LEVELS OF SERVICE

ID	Intersection	Stop Control	Approach	AM	PM
1	Hayden Road at Mayo Boulevard (North)	One-way stop (EB)			
2	Hayden Road at Mayo Boulevard (South)	One-way stop (WB)			
3	82nd Street at Mayo Boulevard (South)	One-way stop (NB)			
4	Perimeter Drive at Mayo Boulevard (South)	One-way stop (NB)			
5	Hayden Road at Princess Drive	Signal			
6	Hayden Road at Loop 101 EB Ramps	Signal			
7	Hayden Road at Loop 101 WB Ramps	Signal			
8	Hayden Road at Legacy Boulevard	Signal			

FUTURE ROADWAY IMPROVEMENTS

REGIONAL IMPROVEMENTS

Regional improvements from Princess Drive west along Loop 101 anticipated in CivTech's 2011 Crossroads East traffic study have been implemented.

Mayo Boulevard will be connected between 78th Street and 73rd Place as other Crossroads East parcels are developed, providing a new minor arterial roadway between Hayden and Scottsdale Roads. In this study, CivTech has assumed that this connection will *not* be made before the study horizon year of 2030.

PROPOSED DEVELOPMENT

SITE LOCATION

Axon Enterprise, Inc. (the Client) is proposing to build, a 401,085-square foot (sf) general office building as a new company headquarters, a 100-key hotel, and a 2,099-dwelling unit (DU) five-story (i.e., mid-rise) multifamily residential community with ground-floor commercial uses on a site designated as "Parcel P-13" of the Crossroads East development, which CivTech studied in 2011 for the Arizona State Land Department. Parcel P-13 consists of three individual Maricopa County Assessor numbered parcels and 10.03 acres of City roadway right of way that total 73.57 acres.

SITE ACCESS

As shown in **Figure 5**, Mayo Boulevard (South) will be renamed Axon Way and realigned west of 82nd Street such that it intersects Scottsdale Road across from Mayo Boulevard (North). A review of Assessor maps shows that the right of way for this realignment has already been dedicated.

Primary access to the site will be via the (future) signalized intersection of Hayden Road and Mayo Boulevard/Axon Way and three modern roundabouts along Axon Way: the first just east of Hayden Road (where Axon Way begins to curve to the south and it will also serve two driveways), the second at 82nd Street, and the third at Perimeter Drive.

Additional access will be provided by three right-in/right-out driveways:

Access A will serve the main parcel along Hayden Road and will be located approximately 465 feet (on-center) north of Axon Way.
Accesses B and C will serve the hotel along Axon Way. **Access A** will be located approximately 330 feet east of Hayden Road. **Access B** will be located east/south of the first roundabout approximately 660 feet east of Hayden Road and approximately 330 feet east of **Access A**.

TRIP GENERATION AND COMPARISON

The potential trip generation for the proposed development was estimated utilizing the latest (11th) edition of Institute of Transportation Engineers' (ITE) *Trip Generation Manual* and the 3rd Edition of its *Trip Generation Handbook*. 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.

ITE's Land Use Code (LUC) 231, Mid-Rise Residential with Ground-Floor Commercial GFA (1-25k), was selected by CivTech as the appropriate land use for the residential use. Although the total commercial floor area is expected to exceed "25k" (i.e., 25,000 sf or 25 ksf), only average rates for the peak hours were published, that is, no regression equations have yet been developed. Mathematically, applying the average rate to the DUs in each individual building (none which would have commercial space exceeding 25 ksf) would yield the same number of trips as applying the rates to the total number of DUs. The Hotel is LUC 310. The Axon headquarters is LUC 714, a Corporate Headquarters Building, which the manual describes as possibly having a cafeteria or restaurant.

INTERNAL CAPTURE

According to data presented in the Trip Generation Handbook, 3rd Edition, trips attracted to certain land uses are often shared. This means that a single trip (vehicle) to the proposed development may visit additional attractions within the site during the same visit, an occurrence known as internal capture. This is especially true for large mixed-use developments. An example of this would be a business person, who generated a trip on their drive to and home from work, who walks to the restaurant in their building for lunch. This restaurant trip is not a new trip on the roadway.

Internal capture in a mixed-use development describes the attraction of trips from one of the development's lands use components by another and results in a trip that begins and ends onsite. The importance of internal capture in the qualification of traffic impact for a mixed-use development is that internally captured trips comprise a portion of the total development's trip generation without using the external road system. As a result, a mixed-use development will generally create less demand on the external road system (i.e., fewer external trips) than the sum of the trip generation potential of each of its use components when considered as single-use developments. The percentage of a mixed-use development's total trip generation that will be internally captured will depend on the strength of the attraction between its land use components.

The trips generated by the residential land use include trips to the commercial uses; thus, internal capture is, in effect, built in to the published rates. CivTech also notes that some of the residents will likely be employed at Axon and be able to walk to work; however, CivTech will also not consider this potential reduction in its analysis below.

ALTERNATIVE MODES

Alternate modes of travel affect the number of trips on the roadway. Since the site is more than one-half mile from the nearest bus stop, it is considered by ITE as not being close to transit. Therefore, CivTech did not take any reduction for the use of alternative modes of transportation.

PASS-BY AND DIVERTED LINK TRIPS

Based on the published ITE data, as found in *Trip Generation Handbook*, 3rd Edition, it could be estimated that some portion of the traffic entering and exiting a commercial development would come from traffic already on the external street system. The term 'pass-by' trips refers to traffic already traveling on a study roadway from an origin to a destination that stops into the commercial development on the way. The term 'diverted link trips' refers to traffic on major roadway corridors, such as Hayden Road, that are diverted into the development from their original destination.

Given that the natures of the ground floor commercial uses are not yet known, CivTech elected to not estimate or apply pass-by/diverted trip peak hour reductions rates.

The anticipated trip generation is detailed in **Table 3**. Please note that a weekday trip generation rate was not published; therefore, CivTech estimated a rate by applying the ratio (4.02) of the sum of the AM and PM peak hour rates (0.50=0.25+0.25) to the daily rate (2.01) of the mid-rise multifamily use *without* ground-floor commercial (LUC 221) to the sum of the AM and PM peak hour rates

(0.48 = 0.20+0.28) for the proposed use. These supplemental trip generation calculations are provided in **Appendix E**.

TABLE 3 – TRIP GENERATION

Land Use	Quantity	Units†	ITE Code	ITE Land Use Name	AM Distribution		PM Distribution	
					In	Out	In	Out
Multifamily	2,099	DUs	231	Mid-Rise Residential with Ground-Floor Commercial GFA (1-25k)	39%	61%	44%	56%
Hotel	100	Rooms	310	Hotel	56%	44%	51%	49%
Axon HQ	400.085	KSF	714	Corporate Headquarters Building	93%	7%	9%	91%

Land Use	ADT		AM Peak Hour				PM Peak Hour			
	Avg. Rate	Total	Avg. Rate*	In	Out	Total	Avg. Rate*	In	Out	Total
Multifamily	1.93‡	4,052	0.20	164	256	420	0.28	259	329	588
Hotel	6.60*	660	0.43*	24	19	43	0.46*	23	23	46
Axon HQ	7.32*	2,928	1.29*	478	36	514	1.25*	45	454	499
Totals Trips		7,640		666	311	977		327	806	1,133

Notes: † KSF = 1,000 square feet; DUs = Dwelling Units
‡ No rate published. Average rate estimated assuming ratio of AM+PM to Daily rate was similar to that of mid-rise *without* commercial.
* Average rate was calculated by dividing total trips generated using regression equation by the number of units. (See below.)

CALCULATIONS (Equations shown only where applicable)			
Land Use [Units]	*Daily*	*AM Peak Hour*	*PM Peak Hour*
Multifamily [X = 2,099]	(see footnote ‡ above)	n/a	n/a
Hotel [X = 100]	T_{Day} = 10.82X - 452.51 = 660	T_{AM} = 0.50X - 7.45 = 43	T_{PM} = 0.74X - 27.89 = 46
Axon HQ [X = 400.1]	T_{Day} = 6.16X + 462.5 = 2,928	Ln(T_{AM}) = Ln(X) × 0.89 + 0.91 = 514	Ln(T_{PM}) = Ln(X) × 0.94 + 0.58 = 499

The proposed development is anticipated to generate 7,640 trips on a typical weekday with 977 trips (666 in/311 out) generated during the AM peak hour and 1,133 trips (327 in/806 out) generated during the PM peak hour.

TRIP GENERATION COMPARISON

As noted, the Axon site was Parcel P-13 of the Crossroads East development, which was studied by CivTech previously. In that study, industrial park, manufacturing, and warehousing uses were assumed with the total expected floor area simply divided among the three uses. **Table 4** is an excerpt from the trip generation table in that study showing the trips expected from P-13. *Please note that the totals by parcel were not provided in the original study and that CivTech added them to this table for comparison purposes. CivTech also made some formatting changes to the table.*

TABLE 4 – CROSSROADS EAST TRIP GENERATION

Parcel	Land Use	ITE Code	Size	Weekday Generated Trips						
				Daily	AM Peak Hour			PM Peak Hour		
			Quantity Units	Total	Enter	Exit	Total	Enter	Exit	Total
P-13	Industrial Park	130	490,776 SF	2,576	196	43	239	81	305	386
	Manufacturing	140	490,776 SF	1,900	313	88	402	137	243	380
	Warehousing	150	490,776 SF	1,534	74	20	94	23	68	91
Totals			*1,472,328 SF*	*6,010*	*583*	*151*	*735*	*241*	*616*	*857*

Table 5 provides a comparison of the trips now expected to the overall trips (these being before any reductions were applied) documented in CivTech's original Crossroads East study in 2011. As can be seen in the bottom row, the proposed Axon Mixed-Use development is expected to generate 1,630

trips more on a typical weekday than anticipated in 2011 from Crossroads East Parcel P-13 with 735 additional trips (583 in/151 out) generated during the AM peak hour and 857 additional trips (241 in/616 out) generated during the PM peak hour.

TABLE 5 – TRIP GENERATION COMPARISON

Development	Size		Weekday Generated Trips						
			Daily	AM Peak Hour			PM Peak Hour		
	Quantity	Units	Total	Enter	Exit	Total	Enter	Exit	Total
Axon Mixed-Use	Various		7,640	666	311	977	327	806	1,133
Crossroads East Parcel P-13	1,472,328	SF	6,010	583	151	735	241	616	857
Differences			+1,630	+83	+160	+242	+86	+190	+276

TRIP DISTRIBUTION AND ASSIGNMENT

Two trip distributions were assumed for the proposed development one for employment to be applied to the residential trips and one for population to be applied to the trips generated by the Axon headquarters building. It is expected that the proposed development will generate trips based on future employment and population within a 12-mile radius of the site. Future total employment and population within a 12-mile radius of the site, as projected by the 2030 socio-economic data compiled by the Maricopa Association of Governments (MAG), were used as the bases to estimate trip distribution. The resulting trip distribution percentages for the study area are shown in **Figure 6**. The trip distribution calculations are included in **Appendix F**.

FUTURE BACKGROUND TRAFFIC

CivTech reviewed historical daily traffic volumes from the City of Scottsdale website Traffic Volume Map to estimate an average annual growth rate. Reported average daily traffic volumes on Hayden Road south of Loop 101 were 15,700 vehicles per day (vpd) in 2016, decreased to 12,600 vpd in 2018, and 15,100 vpd in 2020, an increase from 2018, but still not at 2016 levels. Thus, Hayden Road experienced a net average annual decrease from 2016 to 2020. Since a negative growth rate is not realistic, CivTech applied a modest 1% annual growth rate from 2023 to project 2025 and 2030 non-site or background traffic volumes. The factors applied were 1.02 (= 1.010^2) to 2025 and 1.072 (= 1.010^7) to 2030.

The background volumes for the opening year of 2025 are presented in **Figure 8**. The background volumes for the opening year of 2030 are presented in **Figure 9**.

TOTAL TRAFFIC

Total traffic was determined by adding the site generated traffic to the estimated projected background traffic. Total peak hour traffic volumes for the opening year of 2025 are shown in **Figure 10**. Total peak hour traffic volumes for the horizon year of 2030 are shown in **Figure 11**.

LEGAL DESCTRIPTION

LEGEND

- Proposed Commercial (Ground floor Only)
- Proposed Building
- Courtyard/Open Space
- Garage
- Site Entry
- Traffic Flow
- Fire Apparatus Turn Radius (55', 49', 25')
- PROPERTY LINE
- SITE R.O.W. LINE
- EASEMENT LINE

DEVELOPMENT DATA

PROJECT DESCRIPTION:

DEVELOP MIX-USE MASTER PLAN INCLUDING MULTI-FAMILY RESIDENTIAL, HOTEL, RETAIL, AND LIGHT INDUSTRIAL ON THE NORTHEAST CORNER OF HAYDEN ROAD AND AXON WAY.

ZONING:

APN: 215-07-407 & 215-07-408
EXISTING: I-1, PC

PROPOSED:
Planned Community District - Planned Airpark Core Development/Airpark Mixed-Use Residential (PCD-PCP/AMU-R)

SITE AREA:

GROSS: 3,003,984 S.F. / 68.96 ACS.

NET: 2,566,951 S.F. / 58.93 ACS.

PROPOSED BUILDING GROSS AREA:
Buildings A-F 3,462,104 S.F.
Axon Campus 401,085 S.F.
Total 3,863,189 S.F.

FLOOR AREA RATIO (FAR) = 1.50

BUILDING HEIGHT :

ALLOWED: 76'-0" FT. MAX.
PROVIDED: 75'-0" FT. FOR RESIDENTIAL

SUBDIVISION SITE NET AREA

Building Number	Area	Acres
APN: 215-07-407	2,490,325 SF	57.17 acres
APN: 215-07-408	76,627 SF	1.76 acres
ROAD R.O.W.	437,033 SF	10.03 acres
	3,003,984 SF	68.96 acres
Not included:		
APN: 215-07-409	200,816 SF	4.61 acres
	200,816 SF	4.61 acres

OPEN SPACE:

Required Open Space:

1. Axon Campus: 480,559 SF (per 28-DR-2020)
2. Residential: 40% of Site Net Lot Area = 1,026,780.4 S.F.

Provided Open Space: 1,257,073 S.F.
Frontage: Min. 20 S.F. per linear foot of public street frontage.
Common open space: 1,190,995 S.F.

Building Gross Area Schedule

Building	Building Gross Area
BUILDING A	646,286 SF
BUILDING B	573,850 SF
BUILDING C	573,850 SF
BUILDING D	841,310 SF
BUILDING E	674,976 SF
BUILDING F	151,832 SF
Total	3,462,104 SF

Lot Coverage (Site Gross Area/Floor...

Floor Area	Lot Coverage
119,475 SF	3.98%
108,650 SF	3.62%
108,650 SF	3.62%
161,330 SF	5.37%
137,156 SF	4.57%
26,116 SF	0.87%
661,377 SF	

Building Lot Coverage:
661,377 S.F. +
175,895 S.F.(per 28-DR-2020)
= 837,272 S.F.

Residential Units

Residential Gross Area	Levels	Unit Count (~900SF per Unit)
407,336 SF	5	407
386,050 SF	5	386
386,050 SF	5	386
518,650 SF	5	519
400,663 SF	5	401
99,600 SF	5	100 KEYS
2,198,350 SF		2198

2198 / 68.96 ACRES =
32 Units per Acre

Commercial Gross Area

Comments	Gross Area
BUILDING A	16,250 SF
BUILDING B	4,200 SF
BUILDING C	4,200 SF
BUILDING D	16,250 SF
BUILDING F	3,900 SF
Total	44,800 SF

REQUIRED RESIDENTIAL:
50% 1 BED @ 1.3 = 1,428.7
50% 2 BED @ 1.7 = 1,868.3
TOTAL = 3,297 STALLS
REQUIRED GUEST:
1 PER 6 UNITS = 366 STALLS
REQUIRED RETAIL:
1 PER 250 GSF = 180 STALLS
REQUIRED AXON CAMPUS:
1,083 STALLS
TOTAL REQUIRED: 4,926 STALLS

GARAGE PARKING

Building	Levels	Parking Count
BLDG A	2	712
BLDG B	6	592
BLDG C	6	592
BLDG D	1.9	876
BLDG E	1.5	664
BLDG F	2	132

SURFACE PARKING Count	TOTAL Count	RATIO TO UNITS
29	738	1.83
118	712	1.84
125	717	1.86
68	944	1.81
137	801	1.99
16	148	1.48

TOTAL RESIDENTIAL & COMMERCIAL STALLS: **4,060**
+AXON CAMPUS STALLS: 1,083
TOTAL STALLS ACROSS SITE: 5,143

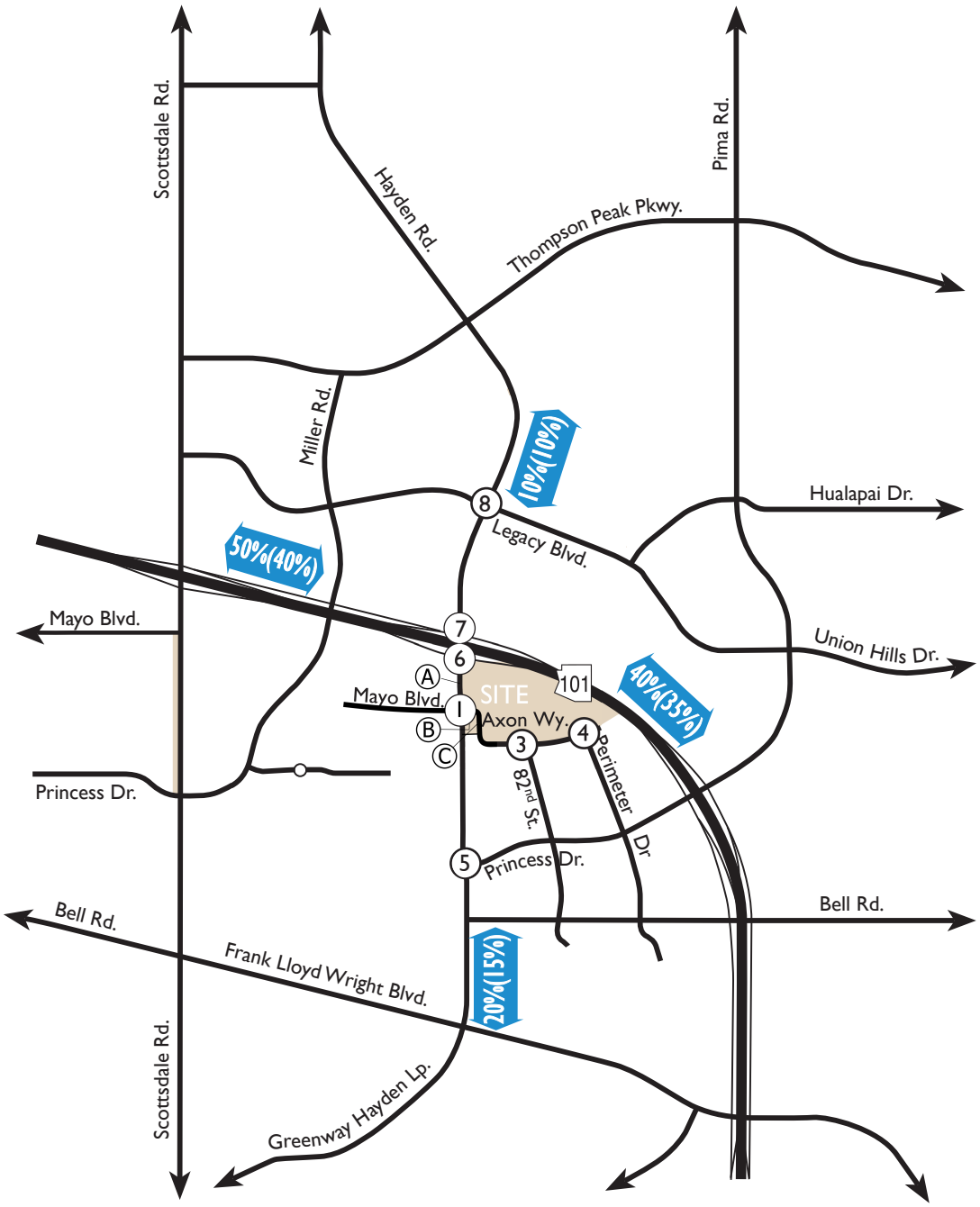
AXON WAY & HAYDEN ROAD

NE CORNER OF N. HAYEND RD AND AXON WAY
SCOTTSDALE, ARIZONA 85255

Office of Rich Barber Architecture, LLC
ORB
WorldHQ@ORBArch.com

AXON

Figure 5: Site Plan and Access



LEGEND

X%(X%) Population(Employment) Percentage Trip Distribution

NORTH
Not to Scale

Figure 6: Site Trip Distribution

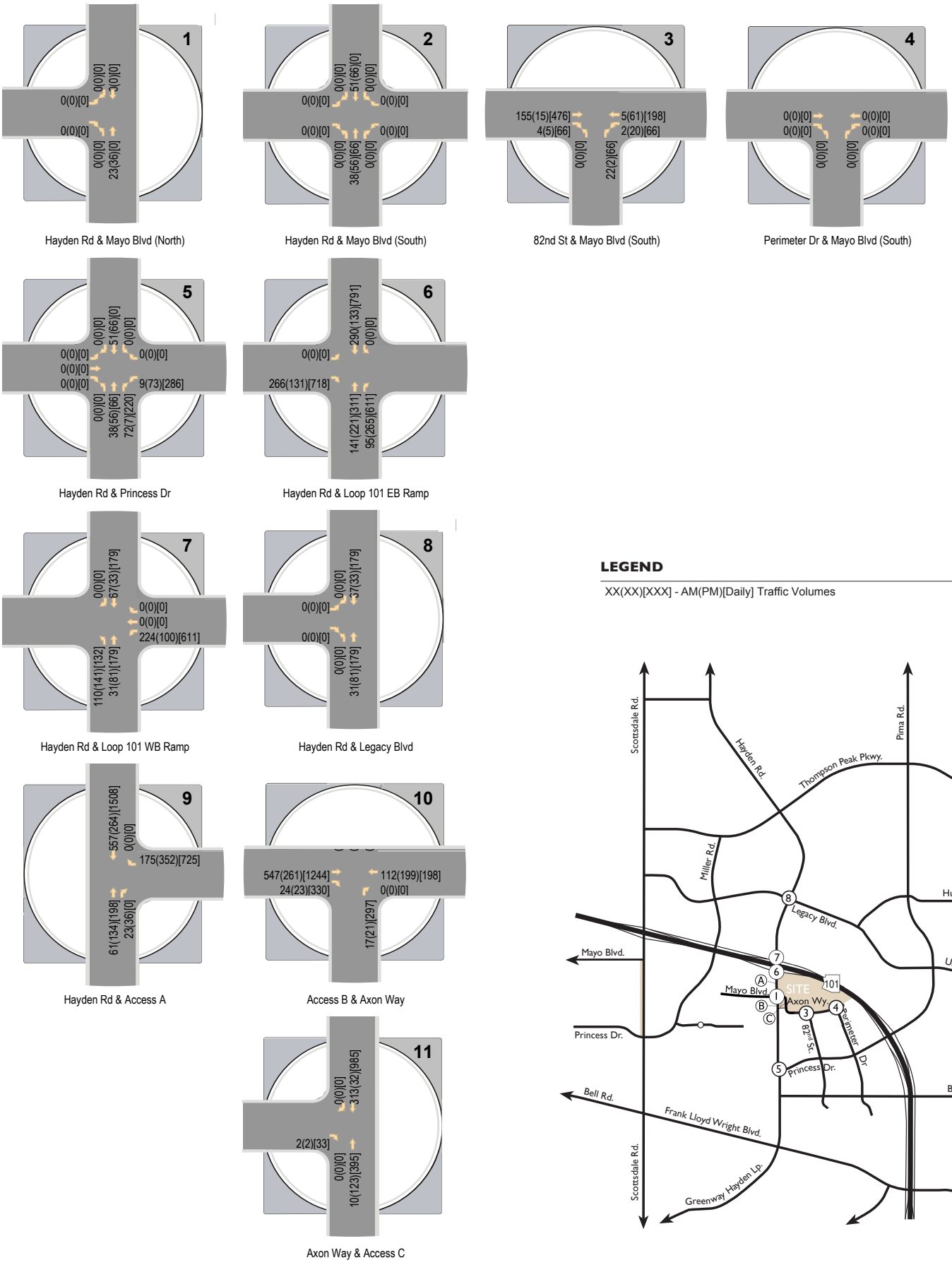


Figure 7: AM & PM Peak Hour Site-Generated Trips

FIGURE 8 – 2025 BACKGROUND TRAFFIC VOLUMES (RESERVED)

FIGURE 9 – 2030 BACKGROUND TRAFFIC VOLUMES (RESERVED)

FIGURE 10 – 2025 TOTAL TRAFFIC VOLUMES (RESERVED)

FIGURE 11 – 2030 TOTAL TRAFFIC VOLUMES (RESERVED)

TRAFFIC AND IMPROVEMENT ANALYSIS

INTERSECTION CAPACITY ANALYSIS (RESERVED)

The overall intersection and approach levels of service are summarized in **Table 6** for the 2025 and 2030 Background and Total conditions. Detailed analysis worksheets for the 2025 analysis can be found in **Appendix G** and in **Appendix H** for the 2030 analysis. Both appendices include worksheets for mitigated intersections, where applicable.

TABLE 6 – PEAK HOUR LEVELS OF SERVICE

ID	Intersection	Intersection Control	Approach/ Movement	2025		2030	
				No Build LOS	Build LOS	No Build LOS	Build LOS
				AM (PM)	AM (PM)	AM (PM)	AM (PM)
1	Hayden Road at Mayo Boulevard/Axon Way	Signal					
3	82nd Street at Mayo Boulevard (South)	Roundabout					
4	Perimeter Drive at Mayo Boulevard (South)	Roundabout					
5	Hayden Road at Princess Drive	Signal					
6	Hayden Road at Loop 101 EB Ramps	Signal					
7	Hayden Road at Loop 101 WB Ramps	Signal					
8	Hayden Road at Legacy Boulevard	Signal					
A	Hayden Road at Access A	One-way Stop (WB)					
B	Access B at Axon Way	One-way Stop (NB)					
C	Axon Way at Access C	One-way Stop (EB)					

The results of the Synchro analysis summarized in **Table 6** reveals…(*reserved*)

TURN LANE WARRANTING AND QUEUE LENGTH ANALYSIS

RIGHT-TURN DECELERATION LANES

The site plan does not currently show a dedicated northbound right turn lane on Hayden Road approaching Access A along Mayo Boulevard. To determine if a right turn lane is warranted approaching Access A, the City of Scottsdale provides the following criteria:

1. At least 5,000 vpd are expected to use the street;
2. The 85th percentile traffic speed on the street is at least 35 mph;

3. At least 30 vehicles will make right turns into the driveway during a 1-hour period.

Based on these criteria, with 15,000 vpd on Hayden Road, a posted speed limit of 45 mph, and 36 northbound right turns expected during the PM peak hour into Access A, CivTech recommends a northbound right turn lane be provided on Hayden Road approaching Access A. The storage capacity of this turn lane is assessed below.

LEFT-TURN DECELERATION LANES

Apart from the three minor accesses (Accesses A, B, and C), all access to the site will be through conventional intersections with left turn lanes or via modern roundabouts; therefore, a left turn lane warrant analysis is not required.

QUEUE STORAGE

Adequate turn storage should be provided 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 using the methodology documented on pages 9-96 through 9-99 of the latest (7th) edition of the American Association of Highway and Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets* (the AASHTO "Green Book"). The Green Book indicates that, "A deceleration lane should be sufficiently long to store the number of vehicles likely to accumulate in a queue during a critical period."

For a right turn lane at an unsignalized driveway or intersection, the critical period has typically been two minutes and the storage length estimated as the length required to hold the average number of arriving vehicles per a two-minute period, of which there are 30 per hour. Thus, for unsignalized driveways and intersections, the storage length for a right-turn lane can be calculated by use of the following formula:

Storage Length = $\left\{\frac{(veh/hr)}{(30\ periods/hr)}\right\} \times VL$, where *VL* is an assumed average Vehicle Length of 25 feet.

For unsignalized intersections, the storage length for a left-turn lane is determined by the use of Equations 9-3 and 9-4 of the Green Book.

Storage Length = $\left\{\frac{\ln[P(n>N)]}{\ln\frac{v}{c}} - 1\right\} \times VL$ [9-4], where $c = \frac{V_0 e^{-V_0 t_c/3600}}{1-e^{-V_0 t_c/3600}}$ [9-3] and *VL* is 25 feet.

Where signalized, the critical period per the Green Book is one-and-a-half to two signal cycles.[2] The equation used to calculate the queue storage for a right- *or* left-turn lane using AASHTO methodology is thus:

[2] AASHTO, under Section 9.7.2.2 (page 9-96) of the Green Book, indicates that storage length for a turn lane, exclusive of taper, "should usually be based on 1.5 to 2 times the average number of vehicles that would need to be stored per signal cycle" at a signalized intersection.

Storage Length = $\left\{\frac{1.5\ x\ (veh/hr)}{(cycles/hr)}\right\} \times VL$, where *VL* is, again, 25 feet.

The turn lane storage requirements for the study intersections are summarized in **Table 7**. Queue storage calculations are provided in **Appendix I**.

TABLE 7 – TURN LANE QUEUE STORAGE LENGTHS

ID	Intersection	Intersection Control	Movement	Queue Storage (feet)			
				Existing(1)	AASHTO	HCM(2)	Recommended
A	Access A & Hayden Rd	1-way stop (EB)	NB Right	---	50	n/a	[1]100

(1) Recommended minimum storage length.

SIGHT DISTANCE ANALYSIS

Adequate sight distance shall be provided at intersections and site access driveways to allow safe turning movements. There shall be sufficient unobstructed sight distance along both approaches of a street/driveway intersection and across their included corners to allow operators of vehicles to see each other in time to prevent a collision.

The City of Scottsdale provides minimum sight distance requirements based on the posted roadway speed and the number of through lanes in each direction of travel. Minimum sight distances should be provided on the Development Plans at each of the proposed access points per the City of Scottsdale *Design Standards & Policies Manual* (DS&PM).

Excerpts from the DS&PM are included in **Appendix J**.

CONCLUSIONS AND RECOMMENDATIONS

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

- The proposed development is anticipated to generate 7,640 trips on a typical weekday with 977 trips (666 in/311 out) generated during the AM peak hour and 1,133 trips (327 in/806 out) generated during the PM peak hour.

- The proposed Axon Mixed-Use development is expected to generate 1,630 trips more on a typical weekday than anticipated in 2011 from Crossroads East Parcel P-13 with 735 additional trips (583 in/151 out) generated during the AM peak hour and 857 additional trips (241 in/616 out) generated during the PM peak hour.

- With 15,000 vpd on Hayden Road, a posted speed limit of 45 mph, and 36 northbound right turns expected during the PM peak hour into Access A, CivTech recommends a northbound right turn lane with a minimal queue storage capacity of 100 feet be provided on Hayden Road approaching Access A.

LIST OF REFERENCES

Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis. Transportation Research Board, Washington, D.C., 2018.

*Manual on Uniform Traffic Control Devices. U.*S. Department of Transportation, Federal Highways Administration, Washington, D.C., 2009.

Roadway Design Manual, Maricopa County Department of Transportation, Phoenix, Arizona, Revised March 2023.

Trip Generation Manual, 11th Edition, Institute of Transportation Engineers, Washington, D.C., 2017.

Trip Generation Handbook, 3rd Edition, Institute of Transportation Engineers, Washington, D.C., 2014.

City of Phoenix Ordinance Section 31-13, City of Phoenix, Arizona, November 2010.

Street Planning and Design Guidelines, 12.1.2 Traffic Impact Studies, City of Phoenix, Arizona, December 2009.

Design Standards & Policies Manual, Geometrics, City of Scottsdale, Arizona, June 2014.

TECHNICAL APPENDICES

APPENDIX A

REVIEW COMMENTS AND RESPONSES (Reserved)

APPENDIX B

EXISTING TRAFFIC COUNTS (Reserved)

APPENDIX C

CRASH ANALYSIS WORKSHEETS (Reserved)

APPENDIX D

EXISTING PEAK HOUR ANALYSIS (Reserved)

APPENDIX E

TRIP GENERATION CALCULATIONS

Supplemental Multifamily Trip Generation Calculations

LUC	Land Use	Setting†	DUs	Wt. Avg.	Eq. Constants* (a)	(b)	(C)	Trips by Using Average	Trips by Using Equation	Percent Entering	Calc'd Trips	Average rate
Proposed Axon Crossroads East Development (2,099 DUs)												
Weekday												
220	Multifamily Housing (Low-Rise)	D	2,099									
221	Multifamily Housing (Mid-Rise)	D	2,099	**2.01**				4,220		50%		
222	Multifamily Housing (High-Rise)	D	2,099	2.14	0.86	1.61	L	4,492	3,599	50%		
230	Low-Rise Residential w/ GF Comm <25k	D	2,099									
231	Mid-Rise Residential w/ GF Comm <25k	D	**2,099**								**4,052**	**1.93**
232	High-Rise Residential w/ GF Comm <25k	D	2,099									
AM Peak Hour of Adjacent Street Traffic (7-9 AM)												
220	Multifamily Housing (Low-Rise)	D	2,099	0.32	0.87	-0.44	L	672	500	10%		
221	Multifamily Housing (Mid-Rise)	D	2,099	**0.25**				525		15%		
222	Multifamily Housing (High-Rise)	D	2,099	0.22	0.93	-1.17	L	462	381	34%		
230	Low-Rise Residential w/ GF Comm <25k	D	2,099	0.25				525		n/a		
231	Mid-Rise Residential w/ GF Comm <25k	D	2,099	**0.20**				420		39%		
232	High-Rise Residential w/ GF Comm <25k	D	2,099	0.31				651		n/a		
PM Peak Hour of Adjacent Street Traffic (4-6 PM)												
220	Multifamily Housing (Low-Rise)	D	2,099	0.31	0.88	-0.57	L	651	474	90%		
221	Multifamily Housing (Mid-Rise)	D	2,099	**0.25**	0.24	2.00		525	506	74%		
222	Multifamily Housing (High-Rise)	D	2,099	0.19	0.87	-0.96	L	399	297	56%		
230	Low-Rise Residential w/ GF Comm <25k	D	2,099	0.25				525		n/a		
231	Mid-Rise Residential w/ GF Comm <25k	D	2,099	**0.28**				588		44%		
232	High-Rise Residential w/ GF Comm <25k	D	2,099	0.21				441		n/a		

† Settings: G = General Urban/Suburban, D = Dense Multi-Use Urban (outside City Core)

* "L" in the (c) column indicates that the published regression equations is logarithmic, in the form of Ln(T) = aLn(X) + b.
Other equations are in the form of T = aX + b. In both, T = trips and X is the number of (dwelling) units.

APPENDIX F

TRIP DISTRIBUTION CALCULATIONS

Quadrant	2030 Population	2030 Percent	2030 Employment	2030 Percent	2040 Population	2040 Percent	2040 Employment	2040 Percent
North Northwest	65,664	7.9%	33,343	6.2%	82,244	9.2%	37,813	6.6%
North Northeast	32,920	3.9%	15,715	2.9%	36,581	4.1%	17,242	3.0%
North	98,584	11.8%	49,058	9.1%	118,825	**13.3%**	55,055	**9.6%**
East Northeast	27,920	3.3%	18,788	3.5%	30,611	3.4%	21,461	3.7%
East Southeast	59,560	7.1%	32,251	6.0%	61,219	6.9%	35,285	6.1%
East	87,480	10.4%	51,039	9.5%	91,830	**10.3%**	56,746	**9.8%**
South Southeast	51,477	6.2%	57,153	10.7%	52,560	5.9%	61,300	10.6%
South Southwest	190,967	22.9%	173,280	32.5%	198,939	22.4%	185,072	32.1%
South	242,444	29.1%	230,433	43.2%	251,499	**28.3%**	246,372	**42.7%**
West Southwest	231,712	27.8%	113,378	21.2%	236,245	26.6%	119,965	20.8%
West Northwest	173,673	20.8%	89,904	16.8%	191,158	21.5%	98,785	17.1%
West	405,385	48.6%	203,282	38.0%	427,403	**48.1%**	218,750	**37.9%**
Totals	833,893	99.9%	533,812	99.8%	889,557	100.0%	576,923	100.0%

Radii

Population radius: 12 miles
Employment radius: 12 miles

Select Analysis Year (2030, 2040, 2050)
2030

12-mile radius

RAZ	MPA	2030 Population	2040 Population	% of TAZ	2030 Adjusted	2040 Adjusted	RAZ	MPA	2030 Population	2040 Population	% of TAZ	2030 Adjusted	2040 Adjusted
ENE							ESE						
230	SC	38,882	43,580	50%	19,441	21,790	230	SC	38,882	43,580	20%	7,776	8,716
250	FH	26,173	26,649	10%	2,617	2,665	248	SC	38,468	38,807	15%	5,770	5,821
231	MC	2,852	2,872	85%	2,424	2,441	249	SC	22,543	22,768	95%	21,416	21,630
229	SC	25,221	27,864	10%	2,522	2,786	250	FH	26,173	26,649	90%	23,556	23,984
345	MC	6,032	6,120	15%	905	918	251	FM	1,055	1,055	3%	32	32
251	FM	1,055	1,055	1%	11	11	264	SR	5,708	5,820	15%	856	873
		-	-		-	-	247	SC	15,420	16,342	1%	154	163
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From ENE					27,920	30,611	From ESE					59,560	61,219
From East												87,480	91,830

Axon Mixed-Use, Scottsdale
Traffic Impact (and Mitigation) Analysis/Study

12-mile radius

RAZ	MPA	2030 Population	2040 Population	% of TAZ	2030 Adjusted	2040 Adjusted	RAZ	MPA	2030 Population	2040 Population	% of TAZ	2030 Adjusted	2040 Adjusted
NNW							NNE						
230	SC	38,882	43,580	10%	3,888	4,358	230	SC	38,882	43,580	15%	5,832	6,537
228	PH	27,844	41,054	60%	16,706	24,632	229	SC	25,221	27,864	80%	20,177	22,291
229	SC	25,221	27,864	10%	2,522	2,786	209	SC	13,961	14,512	15%	2,094	2,177
209	SC	13,961	14,512	80%	11,169	11,610	210	SC	10,463	12,339	40%	4,185	4,936
218	PH	18,080	19,394	95%	17,176	18,424	345	MC	6,032	6,120	10%	603	612
219	PH	13,803	21,652	70%	9,662	15,156	231	MC	2,852	2,872	1%	29	29
227	PH	62,395	68,782	5%	3,120	3,439			-	-		-	-
208	CF	4,128	4,208	5%	206	210			-	-		-	-
217	PH	24,287	32,553	5%	1,214	1,628			-	-		-	-
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From NNW					65,664	82,244	From NNE					32,920	36,581
From North												98,584	118,825

12-mile radius

RAZ	MPA	2030 Population	2040 Population	% of TAZ	2030 Adjusted	2040 Adjusted	RAZ	MPA	2030 Population	2040 Population	% of TAZ	2030 Adjusted	2040 Adjusted
WSW							WNW						
247	SC	15,420	16,342	10%	1,542	1,634	247	SC	15,420	16,342	1%	154	163
246	PH	62,638	63,884	85%	53,242	54,301	230	SC	38,882	43,580	5%	1,944	2,179
245	PH	59,810	60,177	95%	56,820	57,168	246	PH	62,638	63,884	10%	6,264	6,388
261	PH	37,490	39,383	80%	29,992	31,506	228	PH	27,844	41,054	40%	11,138	16,422
260	PH	65,550	69,005	5%	3,278	3,450	227	PH	62,395	68,782	95%	59,275	65,343
244	PH	58,707	59,498	95%	55,772	56,523	242	PH	31,046	31,677	10%	3,105	3,168
242	PH	31,046	31,677	90%	27,941	28,509	226	PH	75,841	76,004	90%	68,257	68,404
241	PH	47,345	47,840	5%	2,367	2,392	225	PH	28,641	32,206	55%	15,753	17,713
226	PH	75,841	76,004	1%	758	760	217	PH	24,287	32,553	15%	3,643	4,883
		-	-		-	-	219	PH	13,803	21,652	30%	4,141	6,496
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From WSW					231,712	236,245	From WNW					173,673	191,158
From West												405,385	427,403

12-mile radius

RAZ	MPA	2030 Population	2040 Population	% of TAZ	2030 Adjusted	2040 Adjusted	RAZ	MPA	2030 Population	2040 Population	% of TAZ	2030 Adjusted	2040 Adjusted
SSE							SSW						
247	SC	15,420	16,342	10%	1,542	1,634	247	SC	15,420	16,342	78%	12,028	12,747
263	SC	37,002	37,252	15%	5,550	5,588	246	PH	62,638	63,884	5%	3,132	3,194
248	SC	38,468	38,807	85%	32,698	32,986	263	SC	37,002	37,252	85%	31,452	31,664
264	SR	5,708	5,820	45%	2,569	2,619	262	PV	14,716	15,118	95%	13,980	14,362
272	SC	79,910	85,942	10%	7,991	8,594	349	MC	384	387	100%	384	387
249	SC	22,543	22,768	5%	1,127	1,138	261	PH	37,490	39,383	15%	5,624	5,907
		-	-		-	-	271	PH	72,039	73,678	80%	57,631	58,942
		-	-		-	-	276	PH	56,183	59,625	5%	2,809	2,981
		-	-		-	-	272	SC	79,910	85,942	80%	63,928	68,754
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From SSE					51,477	52,560	From SSW					190,967	198,939
From South												242,444	251,499

12-mile radius

RAZ	MPA	2030 Employment	2040 Employment	% of TAZ	2030 Adjusted	2040 Adjusted	RAZ	MPA	2030 Employment	2040 Employment	% of TAZ	2030 Adjusted	2040 Adjusted
NNW							NNE						
230	SC	32,112	36,968	10%	3,211	3,697	230	SC	32,112	36,968	15%	4,817	5,545
228	PH	29,254	32,792	60%	17,552	19,675	229	SC	11,231	11,962	80%	8,985	9,570
229	SC	11,231	11,962	10%	1,123	1,196	209	SC	4,851	5,174	15%	728	776
209	SC	4,851	5,174	80%	3,881	4,139	210	SC	2,759	3,091	40%	1,104	1,236
218	PH	3,920	4,271	95%	3,724	4,057	345	MC	757	1,075	10%	76	108
219	PH	3,399	4,719	70%	2,379	3,303	231	MC	654	720	1%	7	7
227	PH	18,618	21,380	5%	931	1,069			-	-		-	-
208	CF	2,102	2,395	5%	105	120			-	-		-	-
217	PH	8,720	11,114	5%	436	556			-	-		-	-
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From NNW					33,343	37,813	From NNE					15,715	17,242
From North												49,058	55,055

12-mile radius

RAZ	MPA	2030 Employment	2040 Employment	% of TAZ	2030 Adjusted	2040 Adjusted	RAZ	MPA	2030 Employment	2040 Employment	% of TAZ	2030 Adjusted	2040 Adjusted
ENE							ESE						
230	SC	32,112	36,968	50%	16,056	18,484	230	SC	32,112	36,968	20%	6,422	7,394
250	FH	9,148	9,819	10%	915	982	248	SC	33,285	34,001	15%	4,993	5,100
231	MC	654	720	85%	556	612	249	SC	8,179	8,684	95%	7,770	8,250
229	SC	11,231	11,962	10%	1,123	1,196	250	FH	9,148	9,819	90%	8,233	8,837
345	MC	757	1,075	15%	114	161	251	FM	2,449	2,530	3%	73	76
251	FM	2,449	2,530	1%	24	25	264	SR	28,215	33,871	15%	4,232	5,081
		-	-		-	-	247	SC	52,652	54,822	1%	527	548
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From ENE					18,788	21,461	From ESE					32,251	35,285
From East												51,039	56,746

12-mile radius

RAZ	MPA	2030 Employment	2040 Employment	% of TAZ	2030 Adjusted	2040 Adjusted	RAZ	MPA	2030 Employment	2040 Employment	% of TAZ	2030 Adjusted	2040 Adjusted
WSW							**WNW**						
247	SC	52,652	54,822	10%	5,265	5,482	247	SC	52,652	54,822	1%	527	548
246	PH	38,455	40,333	85%	32,687	34,283	230	SC	32,112	36,968	5%	1,606	1,848
245	PH	18,942	19,901	95%	17,995	18,906	246	PH	38,455	40,333	10%	3,846	4,033
261	PH	36,509	38,927	80%	29,207	31,142	228	PH	29,254	32,792	40%	11,702	13,117
260	PH	23,179	25,494	5%	1,159	1,275	227	PH	18,618	21,380	95%	17,687	20,311
244	PH	17,524	18,787	95%	16,648	17,848	242	PH	10,621	11,216	10%	1,062	1,122
242	PH	10,621	11,216	90%	9,559	10,094	226	PH	23,507	24,262	90%	21,156	21,836
241	PH	12,459	13,847	5%	623	692	225	PH	54,530	59,795	55%	29,992	32,887
226	PH	23,507	24,262	1%	235	243	217	PH	8,720	11,114	15%	1,308	1,667
		-	-		-	-	219	PH	3,399	4,719	30%	1,020	1,416
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From WSW					**113,378**	**119,965**	**From WNW**					**89,904**	**98,785**
From West												**203,282**	**218,750**

Axon Mixed-Use, Scottsdale
Traffic Impact (and Mitigation) Analysis/Study

12-mile radius

RAZ	MPA	2030 Employment	2040 Employment	% of TAZ	2030 Adjusted	2040 Adjusted	RAZ	MPA	2030 Employment	2040 Employment	% of TAZ	2030 Adjusted	2040 Adjusted
SSE							**SSW**						
247	SC	52,652	54,822	10%	5,265	5,482	247	SC	52,652	54,822	78%	41,069	42,761
263	SC	28,903	30,245	15%	4,335	4,537	246	PH	38,455	40,333	5%	1,923	2,017
248	SC	33,285	34,001	85%	28,292	28,901	263	SC	28,903	30,245	85%	24,568	25,708
264	SR	28,215	33,871	45%	12,697	15,242	262	PV	6,788	7,115	95%	6,449	6,759
272	SC	61,540	67,039	10%	6,154	6,704	349	MC	33	36	100%	33	36
249	SC	8,179	8,684	5%	409	434	261	PH	36,509	38,927	15%	5,476	5,839
		-	-		-	-	271	PH	54,144	58,703	80%	43,315	46,962
		-	-		-	-	276	PH	24,321	27,156	5%	1,216	1,358
		-	-		-	-	272	SC	61,540	67,039	80%	49,232	53,631
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From SSE					**57,153**	**61,300**	**From SSW**					**173,280**	**185,072**
From South												**230,433**	**246,372**

APPENDIX G

2025 PEAK HOUR ANALYSIS (Reserved)

APPENDIX H

2030 BUILD PEAK HOUR ANALYSIS (Reserved)

APPENDIX I

QUEUE STORAGE ANALYSIS (Reserved)

APPENDIX J

SIGHT DISTANCE ANALYSIS

B. **Superelevation Rate Greater than 0.02 ft/ft**
A superelevation rate greater than 0.02 ft/ft may not be used except when approved by the Transportation Department. In no case shall a superelevation exceed 0.06 ft/ft

C. **Transition for Superelevation**
The length of superelevation transition is based on the superelevation rate and the width of rotation. The axis of rotation is generally the pavement centerline. The transition lengths for a superelevation rate of 0.02 ft/ft are provided in Appendix 5-3A. For other superelevation rates, refer to the AASHTO's Policy on Geometric Design.
In designing the beginning or ending of a horizontal curve, 1/3 of the transition is on the curve and 2/3 of the transition is on the tangent pavement section.

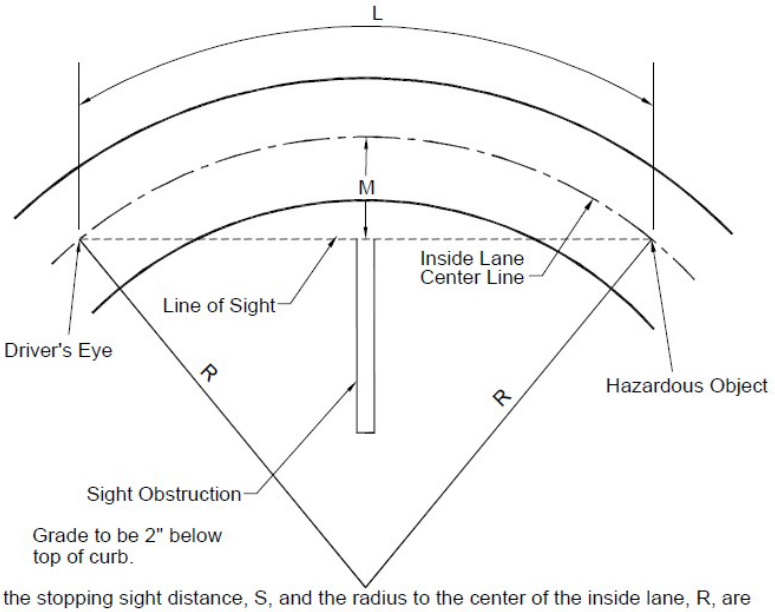
D. **Drainage on Superelevated Curves**
Whenever superelevation is allowed on a divided street, a storm drainage system must be provided to collect the runoff along the median curb. Nuisance water from the higher traveled area is not allowed to cross the lower traveled area.

HORIZONTAL CURVES 5-3.120

Horizontal alignments need to provide safe and continuous operation of motor vehicles at a uniform design speed for substantial lengths of street. At a minimum, a horizontal curve is typically required when the angle of change in horizontal alignment is equal to or greater than two degrees. The nature of the surrounding development and topography, and the street classification will establish the factors that determine the radius of a curve.

A. **Minimum Radii of Curvature**
The minimum radius of curvature is determined by the design speed or by the stopping sight distance.

1. Minimum Radii Based on Design Speed
Appendix 5-3A contains the minimum radius of curvature depending on design speed with and without a superelevation rate of 0.02 ft/ft. Wherever possible, the radii used in design needs to be larger. If stopping sight distance conditions require a larger radius than that shown in these appendices, then that larger radius becomes the minimum radius for the curve.
2. Consideration of Stopping Sight Distance
When walls, buildings, bridge piers, cut slopes, vegetation, or other obstructions are near the roadway on the inside of a curve, they can block a driver's view of the road ahead. If they are too near, the driver will not have sufficient distance along the curved roadway to stop when a hazardous condition comes into view. For design, the driver's eye is 3.5 feet above the center of the inside lane (the driving lane nearest to the inside of the curve) and a hazardous condition is an object 2.0 feet high in the center of the inside lane, or per currently accepted AASHTO standards. The clear distance, "M" is measured from the center of the inside lane to the view obstruction. Figure 5-3.27 depicts these relationships.
Refer to AASHTO "A Policy on Geometric Design of Highways and Streets" Section 3-3.12 for Stopping Sight Distance calculations.



If the stopping sight distance, S, and the radius to the center of the inside lane, R, are known, the distance, M, is found by the following equation:

$$M = R[1-COS(28.65\ S/R)]$$

If the radius, R, and the distance, M, are tentatively selected, then the length, L, of the arc in the middle of the inside lane may be found by the following equation:

$$L = (R/28.65)ARRCCOS[(R-M)/R]$$

If the length, L, is less than the stopping sight distance for the desired speed, either the radius, R, or the distance, M, must be increased.

FIGURE 5-3.24 VIEW OBSTRUCTIONS AND HORIZONTAL CURVES

B. **Reduced Design Speeds on Curves**
The reduction of a street design speed on a curve should be avoided; however, where physical restrictions prohibit increasing the radius of the curve or the clear distance, "M" and/or provide superelevation; the design speed for the curved section may be reduced. In such circumstances, appropriate signage in accordance with the MUTCD is required. The difference between the design speed for the roadway approaching the curve and the design speed for the curve cannot be greater than 10 miles per hour. The design speed for a curved roadway section must not be reduced if the reduction occurs at the end of a long tangent or at any location where high approach speeds may be expected.

C. **Compound Curves**
Compound curves should be avoided; however, if site conditions make the use of compound curves unavoidable, the shorter radius needs to be at least 2/3 the length of the longer radius. Compound curves are not permitted when design speeds require the shorter radius to be greater than 1,000 feet.

D. **Tangent Sections Between Curves in the Same Direction**
On two-lane roads, tangent sections are needed between two curves in the same direction. If the pavement cross-sections throughout the curves do not have

superelevation then the minimum lengths for tangent sections are listed in Appendix 5-3A.
If superelevation is provided in the curved portions of the roadway, then the superelevation transition lengths indicated will determine the tangent lengths.

E. **Tangent Sections Between Reverse Curves**
Generally, a tangent section must be provided between two curves that curve in the opposite direction. Minimum lengths for tangent sections between reverse curves without superelevation are provided in Appendix 5-3A. If the curve radii are at least 50 percent greater than the radii required by the design speed, a tangent section may not be required depending on grades, topography and vegetation. If superelevation is provided for the curves, then the superelevation transition lengths indicated will determine the minimum length of tangent sections between reverse curves.

F. **Tangent Sections Approaching Intersections**
A tangent section must be provided between a street intersection and a curve unless otherwise approved by the Transportation Department. The minimum tangent length is shown in Appendix 5-3A and shall be measured from the end of the curve to the edge of the intersecting roadway.

VERTICAL ALIGNMENT 5-3.121

A vertical curve is required when grade changes are equal to or greater than 1.5 percent. All sections of a street's vertical alignment must meet passing and stopping sight distance requirements for the design speed established for the street. For specific details, refer to the AASHTO's Policy on Geometric Design.

A. **Longitudinal Street Grades**
For arterial streets, the maximum longitudinal grade is 6 percent. For non-ESL/Rural collector and local streets, the maximum grade is 9 percent. The minimum longitudinal street grade for all streets is 0.4 percent. Wherever possible, longitudinal street grades greater than the minimum grade are to be provided. Where necessary, grades less than 0.4 percent may be used with approval from the Public Works Department and/or Transportation Department. Grades that exceed the maximum longitudinal grades allowed may be used with approval from the Transportation, Public Works, and Fire Departments.

B. **Vertical Curves**
Properly designed vertical curves should provide adequate sight distance, safety and effective drainage.

1. Refer to AASHTO's Policy on Geometric Design of Highways and Streets for the equations that are to be used to determine the necessary parabolic vertical curve criteria.
2. Sight Distance Requirements
Sight distance is the continuous length of street ahead that is visible to the driver. For vertical alignment design, two sight distances are considered: passing sight distance and stopping sight distance. Stopping sight distance is the minimum sight distance to be provided at all points on multi-lane streets and on 2-lane streets when passing sight distance is not economically obtainable as approved by city staff. Stopping sight distance needs to be

provided near intersections. Appendix 5-3Alists the minimum stopping sight distances for the various design speeds.

a. Stopping Sight Distance
The minimum stopping sight distance is the distance required by the driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eyes, 3.5 feet above the pavement surface, to object 2.0 feet tall on the roadway, or per currently accepted AASHTO standards.

b. Passing Sight Distance
Passing sight is the minimum sight distance that must be available to enable the driver of one vehicle to pass another vehicle safely, without interfering with the speed of an oncoming vehicle. The sight distance available for passing at any one place is the distance at which a driver, whose eyes are 3.5 feet above the roadway surface, can see the top 0.8 feet of an object 4.35 feet tall on the road (corresponding to an object height of 3.5 feet tall), or per currently accepted AASHTO standards.

3. Minimum Vertical Curve Lengths
Minimum vertical curve lengths are determined by sight distance requirements for a given design speed.

a. Crest Vertical Curve Lengths
Minimum crest curve lengths are determined by either the stopping sight distance or the passing sight distance, whichever provides the greatest curve length. Refer to AASHTO's Policy on Geometric Design of Highways and Streets for the equations that are to be used to determine the minimum crest vertical curve lengths based upon stopping distance and passing sight distance requirements.

b. Sag Vertical Curve Lengths
Minimum sag vertical curve lengths are determined by either the stopping sight distance or comfort factors. The longer of the two possible minimum curve lengths will be used. Refer to AASHTO's Policy on Geometric Design of Highways and Streets for the equations that are to be used to determine the minimum sag vertical curve lengths based upon stopping distance and comfort factors requirements.

COMBINED CURVES 5-3.122

When horizontal and vertical curves are combined, the horizontal curve needs to lead and follow the vertical curve, and not be introduced near the top or bottom of a crest vertical curve or bottom of a sag vertical curve. For additional information on this topic, refer to the AASHTO's Policy on Geometric Design.

INTERSECTIONS 5-3.123

Although all intersections share certain common elements, they are not subject to generalized treatment. To minimize conflicts and provide for anticipated traffic movements, each intersection must be evaluated based on individual characteristics and designed based on the following factors:

A. Traffic factors such as capacities, turning movements, vehicle size and operating characteristics, vehicle speed, pedestrian and bicycle movements, transit operations and collision history.
B. Physical factors such as topography, existing conditions, channelization requirements and available sight distance.
C. Human factors such as driving habits, reaction to surprises, decision and reaction time, and natural paths of movement.

Unless otherwise noted, intersection and street design for major collectors and arterial streets shall assume a WB-62 design vehicle as defined in AASHTO's A Policy on Geometric Design of Highways and Streets. There may be locations within or adjacent to heavy commercial or industrial areas where a WB-67 design vehicle may be required by Transportation staff.

For this section, the term "intersection" shall refer to the location where a public street meets or overlaps another public street, a private street, or a private driveway unless specifically noted otherwise.

A. **Public and Private Street Intersection Spacing**
Street intersections along major streets should be kept to a minimum. Along arterial streets, the minimum intersection spacing should be 1/4 mile (1320 feet). Along collector streets (major collectors and minor collectors), the minimum spacing should be 1/8 mile (660 feet). Along local streets (local residential and local collectors), the minimum spacing should be 250 feet. New intersections on major streets should be located to align with planned median openings. New intersections on minor streets should be located to avoid creating conflicting turning movements with existing intersections or driveways.

B. **Angle of Intersection**
A right-angle intersection provides the shortest crossing distance for intersecting traffic streams. It also provides the most favorable condition for drivers to judge the relative position and speed of oncoming vehicles. Where special conditions exist, intersection angles may diverge from a right-angle by a maximum of 2 degrees (up to 4 degrees with approval of the Transportation Department) on arterial streets and major collector streets; and by a maximum of 4 degrees (up to 15 degrees with approval of the Transportation Department) on minor and local collector streets, couplets and local streets.

C. **Alignment and Profile**
Intersections occurring on horizontal or crest vertical curves are undesirable. When there is latitude in the selection of intersection locations, vertical or horizontal curvature should be avoided. A line or grade change is frequently warranted when major intersections are involved. If a curve is unavoidable, it should be as flat as site conditions permit. Where the grade of the through roadway is steep, flattening through the intersection is desirable as a safety measure.
The maximum profile grade through an intersection is 6 percent for arterials and collector streets and 8 percent for local streets. The profiles and cross slopes of the intersecting streets need to be coordinated with one another to ensure a safe and comfortable driving surface. Typically, this may mean extending grades through

CONCEPTUAL WATER DISTRIBUTION SYSTEM
BASIS OF DESIGN REPORT
FOR
AXON WAY & HAYDEN ROAD
August 2, 2023
WP# 205133.04

WOOD PATEL

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August 2, 2023

Mr. Levi Dillon, PE
Sr. Water Resource Engineer
City of Scottsdale
9379 East San Salvador Drive
Scottsdale, Arizona 85258

480.312.5319
ldillon@scottsdaleaz.gov

Re: **Axon Way & Hayden Road Project**
Conceptual Water Distribution System Basis of Design Report
WP# 205133.04

Dear Mr. Dillon:

The proposed Axon Way & Hayden Road project (Site) is a 74.44-acre site, located in the northwest quarter of Section 36, Township 4 North, Range 4 East of the Gila and Salt River Meridian. More specifically, the Site is located at the northeast corner of Hayden Road and Axon Way. Refer to the Vicinity Map at the back of this report for project location. Phase 1 of this project included one (1) proposed mixed-used structure with associated parking, landscape, hardscape and utilities as well as realignment of the existing Mayo Boulevard to be renamed as Axon Way. This report, however, is concerned with the improvements as part of phase 2 including six (6) proposed mixed-used structures and associated parking, landscape, hardscape and utilities. All six (6) proposed structures are 5-story buildings containing residential units and garage parking. Buildings A, B, C, D, and F also have proposed commercial space on the ground floor. Building A consists of approximately 119,475 square-feet of residential units, 16,250 square-feet of commercial space and a parking garage spanning three (3) levels. Buildings B and C are comprised of approximately 108,650 square-feet of residential units, 4,200 square-feet of commercial space, and a parking garage spanning seven (7) levels. Building D contains approximately 161,330 square-feet of residential units, 16,250 square-feet of commercial space and a parking garage spanning two (2) levels. Building E does not contain any commercial space with approximately 144,956 square-feet of residential units and a parking garage spanning two (2) levels. Building F consists of approximately 26,116 square-feet of residential units, 3,900 square-feet of commercial space and a parking garage spanning two (2) levels.

Existing water infrastructure adjacent to the Site includes a public 16-inch waterline within Hayden Road and a public 12-inch waterline within the existing Mayo Boulevard. Two (2) existing water stubs extend from the 12-inch waterline to the Site. Refer to the attached Water Exhibit for a depiction of the existing water infrastructure surrounding the Site.

The design criteria used to estimate potable water demands and evaluate system hydraulics are based on Wood, Patel & Associates, Inc.'s (WOODPATEL) understanding of the published *City of Scottsdale Design Standards and Policies Manual*, 2018, *City of Phoenix Design Standards Manual for Water and Wastewater Systems*, 2017 and *International Fire Code,* 2015. The following is a summary of the primary design criteria utilized:

- Average Day Water Demand, Office:..... 8.34×10^{-4} gpm/ sq. ft*
- Average Day Water Demand, Industrial (Phoenix):..... 9.03×10^{-2} gpm/ 1,000 sq. ft
- Maximum Day Demand: .....2.0 x ADD
- Peak Hour Demand: .....3.5 x ADD
- Fire Flow Demand:..... 3,625 gpm (7,250 gpm * 50% reduction)
- Minimum Residual Pressure, Peak Hour: .....50 psi
- Minimum Residual Pressure, Maximum Day + Fire Flow:.....30 psi

- Maximum System Pressure ..... 120 psi
- Maximum Pipe Head Loss, Maximum day Demand ..... 8 ft / 1000 ft
- Maximum Pipe Head Loss, Peak Hour Demand ..... 10 ft / 1000 ft
- Minimum Pipe Diameter, Public Water Line ..... 8 inches

Abbreviations: gpd = gallons per day; sf = square feet; ADD = average day demand; psi = pounds per square inch
*Includes both inside and outside use per Figure 6-1.2, COS Design Standards & Policies Manual

Proposed water infrastructure includes two (2) 12-inch waterline loops. The first proposed loop will be located near the southwest corner of the site in proximity to proposed building E and connects to another 12-inch waterline that is a part of the improvements in phase 1 of this project. The second proposed loop is located on the northwest corner of the site. The loop will connect to the existing waterline in Hayden Road and will also connect into waterlines included in the phase 1 improvements. Fire protection for the project will be provided by a combination of a fire service for building fire sprinklers, a proposed remote fire department connection, and 15 proposed fire hydrants that have been located to meet City of Scottsdale coverage requirements.

The average day water demand for the Site is projected to be approximately 688 gallons per minute (gpm). Maximum day demands and peak hour demands are projected to be 1,372 gpm and 2,403 gpm, respectively (refer to the attached calculations).

WaterCAD V10i, by Haestad Methods, was utilized to analyze the existing water distribution system and proposed improvements. Results from a fire hydrant flow test, conducted on March 12, 2020, by Arizona Flow Testing LLC, were utilized to simulate the City of Scottsdale water supply for the project (refer to attached modeling results).

The hydraulic modeling results indicate the proposed system is capable of delivering peak hour demands, totaling 675.2 gpm, to the proposed Site, with pressures ranging from 51 to 66 pounds per square inch (psi).

The *Fire Flow + Max Day* results from the model indicate that while using the reduced flow test results, per City of Scottsdale requirements, the proposed fire flow system can deliver the modeled flow of 2,000 gpm while maintaining minimums pressures of 30 psi throughout the site.

Thank you for your review of the Conceptual Water Distribution System Basis of Design Report provided for the Axon Way & Hayden Road Project. Feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

Nicholas Brown, PE
Project Manager

EXPIRES 03-31-25

CALCULATIONS AND HYDRAULIC MODELING RESULTS

WOOD PATEL

TABLE 1
WATER DISTRIBUTION SYSTEM DESIGN CRITERIA

Project	Axon Way & Hayden Road
Location	Scottsdale Arizona
Project Number	205133.04
Project Engineer	Nicholas Brown, P.E.
References	City of Scottsdale Design Standards & Policies Manual (2018)

RESIDENTIAL WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
< 2 DU/ac	0.69	gpm/unit	Note 1
2-2.9 DU/ac	0.66	gpm/unit	Note 1
3-7.9 DU/ac	0.36	gpm/unit	Note 1
8-11.9 DU/ac	0.33	gpm/unit	Note 1
12-22 DU/ac	0.33	gpm/unit	Note 1
High Density Condominium	0.27	gpm/unit	Note 1
Resort Hotel (includes site amenities)	0.63	gpm/unit	Note 1

NON-RESIDENTIAL WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
Restaurant	0.00181	gpm/sf	Note 1
Commercial/Retail	0.00111	gpm/sf	Note 1
Commercial High Rise	0.000834	gpm/sf	Note 1
Office	0.000834	gpm/sf	Note 1
Institutional	1.88	gpm/acre	Note 1
Industrial	1.44	gpm/acre	Note 1
Research and Development	1.79	gpm/acre	Note 1

LANDSCAPE WATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**NOTES**
	VALUE	**UNITS**	
Natural Area Open Space	0.00	gpm/acre	Note 1
Developed Open Space - Parks	2.49	gpm/acre	Note 1
Developed Open Space - Golf Course	5.96	gpm/acre	Note 1

HYDRAULIC MODELING CRITERIA				
	DESCRIPTION	**VALUE**	**UNITS**	**NOTES**
MAX DAY FLOW				
	Max Day Flow = Peaking Factor (PF) x ADD	2 x ADD	gpm	Note 1
PEAK HOUR FLOW				
	Peak Hour Flow = Peaking Factor (PF) x ADD	3.5 x ADD	gpm	Note 1
MODELED FIRE HYDRANT FLOW (MINIMUM)				
☐	Residential, 0 - 3,600 sf fire-flow calculation area	1,000	gpm	Note 3
☐	Residential, 3,601 - 4,800 sf fire-flow calculation area	1,750	gpm	Note 4
☐	Residential, 4,801 - 6,200 sf fire-flow calculation area	2,000	gpm	Note 4
☐	Residential, 6,201 - 7,700 sf fire-flow calculation area	2,250	gpm	Note 4
☐	Residential, 7,701 - 9,400 sf fire-flow calculation area	2,500	gpm	Note 4
☐	Residential, 9,401 - 11,300 sf fire-flow calculation area	2,750	gpm	Note 4
☐	Multi-Family Residential	Varies	gpm	Note 2
☐	Commercial	Varies	gpm	Note 2
HYDRAULICS				
	Residual Pressure Range, Peak Hour	50-150	psi	Note 1
	Minimum Residual Pressure, Max Day + Fire Flow (Hydrant)	30	psi	Note 1
	Minimum Residual Pressure, Max Day + Fire Flow (Domestic Service)	15	psi	Note 1
	Minimum Pipe Diameter, Looped System	6	in	Note 1
	Hazen-Williams C-value	130	-	Note 1

Notes:
1. Per City of Scottsdale Design Standards & Policies Manual (2018)
2. Per 2015 International Fire Code as adopted by the City of Scottsdale with 50% reduction applied.
3. Residential limited to one- and two-family dwellings, assumes Type V-B construction, and has a 1-hour fire duration
4. Residential limited to one- and two-family dwellings, assumes Type V-B construction, and has a 2-hour fire duration

WOOD PATEL

TABLE 2
WATER DEMAND DESIGN FLOWS

Project Axon Way & Hayden Road
Location Scottsdale Arizona
Project Number 205133.04
Project Engineer Nicholas Brown, P.E.
References City of Scottsdale Design Standards & Policies Manual (2018)

BUILDING ID	CONSTRUCTION TYPE	BUILDING AREA	LAND USE	APPLICABLE UNIT	NUMBER OF UNITS	GPM/APPLICABLE UNIT[1]	AVERAGE DAILY DEMAND		MAX DAY DEMAND		PEAK HOUR DEMAND		Fire Flow[2]
							(gpm)	Total (gpm)	(gpm)	Total (gpm)	(gpm)	Total (gpm)	(gpm)
A	IA & IIIA	119,475	High Density Condominium	gpm/unit	436	0.27	117.7	**136**	235.4	**271**	412.0	**475**	**2,500**
			Commercial/Retail	gpm/sf	16,250	0.00111	18.0		36.0		63.0		
B	IB & VA	108,650	High Density Condominium	gpm/unit	414	0.27	111.8	**117**	223.6	**233**	391.3	**408**	**2,500**
			Commercial/Retail	gpm/sf	4,200	0.00111	4.7		9.4		16.5		
C	IB & VA	108,650	High Density Condominium	gpm/unit	414	0.27	111.8	**117**	223.6	**233**	391.3	**408**	**2,500**
			Commercial/Retail	gpm/sf	4,200	0.00111	4.7		9.4		16.5		
D	IA & IIIA	161,330	High Density Condominium	gpm/unit	556	0.27	150.1	**168**	300.2	**336**	525.4	**588**	**2,500**
			Commercial/Retail	gpm/sf	16,250	0.00111	18.0		36.0		63.0		
E	IA & IIIA	144,956	High Density Condominium	gpm/unit	436	0.27	117.7	**118**	235.4	**235**	412.0	**412**	**2,500**
F	IA & IIIA	26,116	High Density Condominium	gpm/unit	103	0.27	27.8	**32**	55.6	**64**	97.3	**112**	**1,250**
			Commercial/Retail	gpm/sf	3,900	0.00111	4.3		8.6		15.1		
								Total 688		**1,372**		**2,403**	

Notes
1. GPM values are based on a 12-hour active water used period per 24-hour day per the City of Scottsdale Design Standards and Policy Manual.
2. Fire Flows determined from IFC Section B105, applying a 50% reduction due to fire sprinkler systems.

Axon Way & Hayden Road
FlexTable: Junction Table
Active Scenario: Calibration Static

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
FH-FLOW A (EX)	1,586.00	0	1,764.75	77	True
FH-FLOW B (EX)	1,595.87	0	1,764.75	73	True
FH-TEST (EX)	1,590.98	0	1,764.75	75	True
J-3 (EX)	1,599.01	0	1,764.75	72	True
J-7 (PH 2)	1,591.24	0	1,764.75	75	True
J-15 (PH 1)	1,595.00	0	1,764.75	73	True
J-16 (PH 1)	1,584.45	0	1,764.75	78	True
J-17 (EX)	1,584.83	0	1,764.75	78	True

Axon Way & Hayden Road
FlexTable: Junction Table
Active Scenario: Calibration Residual

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
FH-FLOW A (EX)	1,586.00	1,550	1,698.87	49	True
FH-FLOW B (EX)	1,595.87	2,148	1,697.45	44	True
FH-TEST (EX)	1,590.98	0	1,702.38	48	True
J-3 (EX)	1,599.01	0	1,698.87	43	True
J-7 (PH 2)	1,591.24	0	1,698.87	47	True
J-15 (PH 1)	1,595.00	0	1,698.78	45	True
J-16 (PH 1)	1,584.45	0	1,698.87	50	True
J-17 (EX)	1,584.83	0	1,698.87	49	True

Axon Way & Hayden Road
FlexTable: Junction Table
Active Scenario: Calibration Max

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
FH-FLOW A (EX)	1,586.00	2,276	1,630.60	19	True
FH-FLOW B (EX)	1,595.87	3,154	1,627.69	14	True
FH-TEST (EX)	1,590.98	0	1,637.74	20	True
J-3 (EX)	1,599.01	0	1,630.60	14	True
J-7 (PH 2)	1,591.24	0	1,630.60	17	True
J-15 (PH 1)	1,595.00	0	1,630.41	15	True
J-16 (PH 1)	1,584.45	0	1,630.60	20	True
J-17 (EX)	1,584.83	0	1,630.60	20	True

Axon Way & Hayden Road
FlexTable: Junction Table
Active Scenario: Average Day Demand

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
BLDG A DOM	1,598.53	136	1,761.84	71	True
BLDG B DOM	1,598.35	117	1,761.84	71	True
BLDG C DOM	1,601.06	117	1,761.84	70	True
BLDG D DOM	1,601.09	168	1,761.84	70	True
BLDG E DOM	1,595.38	118	1,761.90	72	True
FH-1 (PH 2)	1,603.00	0	1,761.86	69	True
FH-2 (PH 2)	1,603.67	0	1,761.86	68	True
FH-3 (PH 2)	1,603.82	0	1,761.86	68	True
FH-4 (PH 2)	1,605.58	0	1,761.87	68	True
FH-5 (PH 2)	1,598.29	0	1,761.84	71	True
FH-6 (PH 2)	1,598.85	0	1,761.84	71	True
FH-7 (PH 2)	1,599.85	0	1,761.85	70	True
FH-8 (PH 2)	1,601.41	0	1,761.85	69	True
FH-9 (PH 2)	1,601.49	0	1,761.84	69	True
FH-10 (PH 2)	1,593.00	0	1,761.85	73	True
FH-11 (PH 1)	1,591.62	0	1,761.89	74	True
FH-12 (PH 2)	1,591.85	0	1,761.90	74	True
FH-13 (PH 2)	1,593.09	0	1,761.90	73	True
FH-14 (PH 2)	1,595.49	0	1,761.90	72	True
FH-15 (PH 2)	1,595.78	0	1,761.91	72	True
FH-16 (PH 2)	1,594.00	0	1,761.91	73	True
FH-17 (PH 1)	1,588.09	0	1,761.90	75	True
FH-18 (PH 1)	1,599.85	0	1,761.88	70	True
FH-19 (PH 1)	1,594.07	0	1,761.93	73	True
FH-20 (PH 2)	1,606.00	0	1,761.85	67	True
FH-FLOW A (EX)	1,586.00	0	1,761.99	76	True
FH-FLOW B (EX)	1,595.87	0	1,762.11	72	True
FH-TEST (EX)	1,590.98	0	1,762.21	74	True
J-1 (PH 2)	1,604.43	0	1,761.86	68	True
J-2 (PH 1)	1,605.24	0	1,761.88	68	True
J-3 (EX)	1,599.01	0	1,761.86	70	True
J-4 (PH 2)	1,602.03	0	1,761.85	69	True
J-5 (PH 2)	1,602.48	0	1,761.85	69	True
J-6 (PH 1)	1,600.67	0	1,761.87	70	True
J-7 (PH 2)	1,591.24	0	1,761.88	74	True
J-8 (PH 1)	1,590.86	0	1,761.89	74	True
J-10 (PH 1)	1,589.99	0	1,761.90	74	True
J-11 (PH 2)	1,595.20	0	1,761.91	72	True
J-12 (PH 1)	1,594.93	0	1,761.91	72	True
J-13 (PH 1)	1,593.22	0	1,761.94	73	True
J-14 (PH 1)	1,599.38	0	1,762.00	70	True
J-15 (PH 1)	1,595.00	0	1,762.11	72	True
J-16 (PH 1)	1,584.45	0	1,761.91	77	True
J-17 (EX)	1,584.83	0	1,761.88	77	True

Axon Way & Hayden Road

FlexTable: Pipe Table

Active Scenario: Average Day Demand

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-40 (EX)	614	FH-FLOW A (EX)	FH-TEST (EX)	12.0	130.0	-352	1.00	0.366	True
P-34 (PH 1)	57	FH-19 (PH 1)	J-13 (PH 1)	12.0	130.0	-313	0.89	0.296	True
P-35 (PH 1)	51	J-12 (PH 1)	FH-19 (PH 1)	12.0	130.0	-313	0.89	0.294	True
P-37 (PH 1)	412	J-15 (PH 1)	J-14 (PH 1)	12.0	130.0	304	0.86	0.280	True
P-39 (EX)	345	J-15 (PH 1)	FH-TEST (EX)	12.0	130.0	-304	0.86	0.280	True
P-19 (PH 2)	126	J-6 (PH 1)	BLDG C DOM	12.0	130.0	250	0.71	0.195	True
P-8 (PH 2)	122	J-3 (EX)	BLDG B DOM	12.0	130.0	199	0.56	0.127	True
P-41 (EX)	730	J-16 (PH 1)	FH-FLOW A (EX)	12.0	130.0	-182	0.52	0.108	True
P-30 (PH 1)	72	J-6 (PH 1)	FH-18 (PH 1)	12.0	130.0	-178	0.50	0.104	True
P-29 (PH 1)	349	FH-18 (PH 1)	J-12 (PH 1)	12.0	130.0	-178	0.50	0.103	True
P-36 (PH 1)	450	J-13 (PH 1)	FH-FLOW A (EX)	12.0	130.0	-170	0.48	0.095	True
P-32 (PH 1)	1,439	J-14 (PH 1)	J-2 (PH 1)	12.0	130.0	161	0.46	0.086	True
P-33 (PH 1)	801	J-14 (PH 1)	J-13 (PH 1)	12.0	130.0	143	0.41	0.069	True
P-28 (PH 2)	102	J-12 (PH 1)	FH-15 (PH 2)	12.0	130.0	135	0.38	0.062	True
P-25 (PH 2)	128	J-11 (PH 2)	BLDG E DOM	12.0	130.0	135	0.38	0.062	True
P-27 (PH 2)	10	FH-15 (PH 2)	J-11 (PH 2)	12.0	130.0	135	0.38	0.061	True
P-18 (PH 2)	9	BLDG C DOM	BLDG D DOM	12.0	130.0	133	0.38	0.053	True
P-41 (EX)	707	J-17 (EX)	J-16 (PH 1)	12.0	130.0	-104	0.30	0.039	True
P-45 (PH 1)	129	J-8 (PH 1)	FH-11 (PH 1)	12.0	130.0	-94	0.27	0.032	True
P-44 (PH 1)	385	J-7 (PH 2)	J-8 (PH 1)	12.0	130.0	-94	0.27	0.032	True
P-46 (PH 1)	124	FH-11 (PH 1)	J-10 (PH 1)	12.0	130.0	-94	0.27	0.031	True
P-43 (EX)	514	J-7 (PH 2)	J-3 (EX)	16.0	130.0	199	0.32	0.031	True
P-6 (PH 2)	174	J-1 (PH 2)	FH-20 (PH 2)	12.0	130.0	89	0.25	0.029	True
P-5 (PH 2)	166	J-2 (PH 1)	FH-4 (PH 2)	12.0	130.0	89	0.25	0.029	True
P-3 (PH 2)	200	FH-3 (PH 2)	J-1 (PH 2)	12.0	130.0	89	0.25	0.029	True
P-4 (PH 2)	273	FH-4 (PH 2)	FH-3 (PH 2)	12.0	130.0	89	0.25	0.029	True
P-7 (PH 2)	185	FH-20 (PH 2)	J-5 (PH 2)	12.0	130.0	89	0.25	0.028	True
P-10 (PH 2)	115	FH-5 (PH 2)	BLDG A DOM	12.0	130.0	82	0.23	0.024	True
P-47 (PH 1)	179	J-10 (PH 1)	FH-17 (PH 1)	12.0	130.0	-77	0.22	0.022	True
P-48 (PH 1)	368	FH-17 (PH 1)	J-16 (PH 1)	12.0	130.0	-77	0.22	0.022	True
P-9 (PH 2)	11	BLDG B DOM	FH-5 (PH 2)	12.0	130.0	82	0.23	0.022	True
P-31 (PH 1)	311	J-2 (PH 1)	J-6 (PH 1)	12.0	130.0	72	0.21	0.020	True
P-14 (PH 2)	26	J-5 (PH 2)	J-4 (PH 2)	12.0	130.0	54	0.15	0.014	True
P-11 (PH 2)	149	BLDG A DOM	FH-6 (PH 2)	12.0	130.0	-54	0.15	0.011	True

Axon Way & Hayden Road

FlexTable: Pipe Table

Active Scenario: Average Day Demand

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-13 (PH 2)	86	FH-7 (PH 2)	J-4 (PH 2)	12.0	130.0	-54	0.15	0.011	True
P-12 (PH 2)	216	FH-6 (PH 2)	FH-7 (PH 2)	12.0	130.0	-54	0.15	0.011	True
P-21 (PH 2)	87	J-10 (PH 1)	FH-12 (PH 2)	8.0	130.0	-17	0.11	0.010	True
P-42 (EX)	561	J-7 (PH 2)	J-17 (EX)	16.0	130.0	-104	0.17	0.010	True
P-16 (PH 2)	286	FH-9 (PH 2)	FH-8 (PH 2)	12.0	130.0	-35	0.10	0.005	True
P-15 (PH 2)	99	FH-8 (PH 2)	J-5 (PH 2)	12.0	130.0	-35	0.10	0.005	True
P-17 (PH 2)	127	BLDG D DOM	FH-9 (PH 2)	12.0	130.0	-35	0.10	0.005	True
P-22 (PH 2)	214	FH-12 (PH 2)	FH-13 (PH 2)	12.0	130.0	-17	0.05	0.002	True
P-24 (PH 2)	79	BLDG E DOM	FH-14 (PH 2)	12.0	130.0	17	0.05	0.002	True
P-23 (PH 2)	234	FH-14 (PH 2)	FH-13 (PH 2)	12.0	130.0	17	0.05	0.001	True
P-RESERVOIR	24	RESERVOIR	PUMP	48.0	130.0	656	0.12	0.000	True
P-PUMP	35	PUMP	FH-TEST (EX)	48.0	130.0	656	0.12	0.000	True
P-38 (EX)	127	J-15 (PH 1)	FH-FLOW B (EX)	12.0	130.0	0	0.00	0.000	True
P-26 (PH 2)	272	J-11 (PH 2)	FH-16 (PH 2)	12.0	130.0	0	0.00	0.000	True
P-20 (PH 2)	308	J-4 (PH 2)	FH-10 (PH 2)	12.0	130.0	0	0.00	0.000	True
P-2 (PH 2)	94	J-1 (PH 2)	FH-2 (PH 2)	12.0	130.0	0	0.00	0.000	True
P-1 (PH 2)	296	FH-2 (PH 2)	FH-1 (PH 2)	12.0	130.0	0	0.00	0.000	True

Axon Way & Hayden Road
FlexTable: Junction Table
Active Scenario: Peak Hour Demand

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?
BLDG A DOM	1,598.53	476	1,735.17	59	True
BLDG B DOM	1,598.35	410	1,735.20	59	True
BLDG C DOM	1,601.06	410	1,735.20	58	True
BLDG D DOM	1,601.09	588	1,735.20	58	True
BLDG E DOM	1,595.38	413	1,735.75	61	True
FH-1 (PH 2)	1,603.00	0	1,735.33	57	True
FH-2 (PH 2)	1,603.67	0	1,735.33	57	True
FH-3 (PH 2)	1,603.82	0	1,735.39	57	True
FH-4 (PH 2)	1,605.58	0	1,735.47	56	True
FH-5 (PH 2)	1,598.29	0	1,735.20	59	True
FH-6 (PH 2)	1,598.85	0	1,735.19	59	True
FH-7 (PH 2)	1,599.85	0	1,735.21	59	True
FH-8 (PH 2)	1,601.41	0	1,735.22	58	True
FH-9 (PH 2)	1,601.49	0	1,735.20	58	True
FH-10 (PH 2)	1,593.00	0	1,735.22	62	True
FH-11 (PH 1)	1,591.62	0	1,735.69	62	True
FH-12 (PH 2)	1,591.85	0	1,735.74	62	True
FH-13 (PH 2)	1,593.09	0	1,735.74	62	True
FH-14 (PH 2)	1,595.49	0	1,735.74	61	True
FH-15 (PH 2)	1,595.78	0	1,735.83	61	True
FH-16 (PH 2)	1,594.00	0	1,735.83	61	True
FH-17 (PH 1)	1,588.09	0	1,735.77	64	True
FH-18 (PH 1)	1,599.85	0	1,735.53	59	True
FH-19 (PH 1)	1,594.07	0	1,736.05	61	True
FH-20 (PH 2)	1,606.00	0	1,735.28	56	True
FH-FLOW A (EX)	1,586.00	0	1,736.65	65	True
FH-FLOW B (EX)	1,595.87	0	1,737.96	61	True
FH-TEST (EX)	1,590.98	0	1,738.94	64	True
J-1 (PH 2)	1,604.43	0	1,735.33	57	True
J-2 (PH 1)	1,605.24	0	1,735.52	56	True
J-3 (EX)	1,599.01	0	1,735.36	59	True
J-4 (PH 2)	1,602.03	0	1,735.22	58	True
J-5 (PH 2)	1,602.48	0	1,735.22	57	True
J-6 (PH 1)	1,600.67	0	1,735.45	58	True
J-7 (PH 2)	1,591.24	0	1,735.52	62	True
J-8 (PH 1)	1,590.86	0	1,735.65	63	True
J-10 (PH 1)	1,589.99	0	1,735.73	63	True
J-11 (PH 2)	1,595.20	0	1,735.83	61	True
J-12 (PH 1)	1,594.93	0	1,735.90	61	True
J-13 (PH 1)	1,593.22	0	1,736.22	62	True
J-14 (PH 1)	1,599.38	0	1,736.78	59	True
J-15 (PH 1)	1,595.00	0	1,737.96	62	True
J-16 (PH 1)	1,584.45	0	1,735.85	66	True
J-17 (EX)	1,584.83	0	1,735.58	65	True

Axon Way & Hayden Road

FlexTable: Pipe Table

Active Scenario: Peak Hour Demand

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-40 (EX)	614	FH-FLOW A (EX)	FH-TEST (EX)	12.0	130.0	-1,230	3.49	3.721	True
P-34 (PH 1)	57	FH-19 (PH 1)	J-13 (PH 1)	12.0	130.0	-1,095	3.11	2.998	True
P-35 (PH 1)	51	J-12 (PH 1)	FH-19 (PH 1)	12.0	130.0	-1,095	3.11	2.998	True
P-37 (PH 1)	412	J-15 (PH 1)	J-14 (PH 1)	12.0	130.0	1,066	3.02	2.851	True
P-39 (EX)	345	J-15 (PH 1)	FH-TEST (EX)	12.0	130.0	-1,066	3.02	2.851	True
P-19 (PH 2)	126	J-6 (PH 1)	BLDG C DOM	12.0	130.0	876	2.49	1.984	True
P-8 (PH 2)	122	J-3 (EX)	BLDG B DOM	12.0	130.0	696	1.97	1.293	True
P-41 (EX)	730	J-16 (PH 1)	FH-FLOW A (EX)	12.0	130.0	-636	1.80	1.097	True
P-30 (PH 1)	72	J-6 (PH 1)	FH-18 (PH 1)	12.0	130.0	-623	1.77	1.054	True
P-29 (PH 1)	349	FH-18 (PH 1)	J-12 (PH 1)	12.0	130.0	-623	1.77	1.054	True
P-36 (PH 1)	450	J-13 (PH 1)	FH-FLOW A (EX)	12.0	130.0	-594	1.69	0.967	True
P-32 (PH 1)	1,439	J-14 (PH 1)	J-2 (PH 1)	12.0	130.0	565	1.60	0.880	True
P-33 (PH 1)	801	J-14 (PH 1)	J-13 (PH 1)	12.0	130.0	501	1.42	0.704	True
P-28 (PH 2)	102	J-12 (PH 1)	FH-15 (PH 2)	12.0	130.0	472	1.34	0.632	True
P-25 (PH 2)	128	J-11 (PH 2)	BLDG E DOM	12.0	130.0	472	1.34	0.632	True
P-27 (PH 2)	10	FH-15 (PH 2)	J-11 (PH 2)	12.0	130.0	472	1.34	0.633	True
P-18 (PH 2)	9	BLDG C DOM	BLDG D DOM	12.0	130.0	467	1.32	0.614	True
P-41 (EX)	707	J-17 (EX)	J-16 (PH 1)	12.0	130.0	-365	1.04	0.392	True
P-45 (PH 1)	129	J-8 (PH 1)	FH-11 (PH 1)	12.0	130.0	-330	0.94	0.327	True
P-44 (PH 1)	385	J-7 (PH 2)	J-8 (PH 1)	12.0	130.0	-330	0.94	0.326	True
P-46 (PH 1)	124	FH-11 (PH 1)	J-10 (PH 1)	12.0	130.0	-330	0.94	0.326	True
P-43 (EX)	514	J-7 (PH 2)	J-3 (EX)	16.0	130.0	696	1.11	0.319	True
P-6 (PH 2)	174	J-1 (PH 2)	FH-20 (PH 2)	12.0	130.0	311	0.88	0.291	True
P-5 (PH 2)	166	J-2 (PH 1)	FH-4 (PH 2)	12.0	130.0	311	0.88	0.292	True
P-3 (PH 2)	200	FH-3 (PH 2)	J-1 (PH 2)	12.0	130.0	311	0.88	0.292	True
P-4 (PH 2)	273	FH-4 (PH 2)	FH-3 (PH 2)	12.0	130.0	311	0.88	0.292	True
P-7 (PH 2)	185	FH-20 (PH 2)	J-5 (PH 2)	12.0	130.0	311	0.88	0.292	True
P-10 (PH 2)	115	FH-5 (PH 2)	BLDG A DOM	12.0	130.0	286	0.81	0.250	True
P-47 (PH 1)	179	J-10 (PH 1)	FH-17 (PH 1)	12.0	130.0	-271	0.77	0.226	True
P-48 (PH 1)	368	FH-17 (PH 1)	J-16 (PH 1)	12.0	130.0	-271	0.77	0.226	True
P-9 (PH 2)	11	BLDG B DOM	FH-5 (PH 2)	12.0	130.0	286	0.81	0.252	True
P-31 (PH 1)	311	J-2 (PH 1)	J-6 (PH 1)	12.0	130.0	254	0.72	0.200	True
P-14 (PH 2)	26	J-5 (PH 2)	J-4 (PH 2)	12.0	130.0	190	0.54	0.115	True

Axon Way & Hayden Road

FlexTable: Pipe Table

Active Scenario: Peak Hour Demand

Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/1000ft)	Is Active?
P-11 (PH 2)	149	BLDG A DOM	FH-6 (PH 2)	12.0	130.0	-190	0.54	0.116	True
P-13 (PH 2)	86	FH-7 (PH 2)	J-4 (PH 2)	12.0	130.0	-190	0.54	0.118	True
P-12 (PH 2)	216	FH-6 (PH 2)	FH-7 (PH 2)	12.0	130.0	-190	0.54	0.117	True
P-21 (PH 2)	87	J-10 (PH 1)	FH-12 (PH 2)	8.0	130.0	-59	0.38	0.098	True
P-42 (EX)	561	J-7 (PH 2)	J-17 (EX)	16.0	130.0	-365	0.58	0.097	True
P-16 (PH 2)	286	FH-9 (PH 2)	FH-8 (PH 2)	12.0	130.0	-121	0.34	0.051	True
P-15 (PH 2)	99	FH-8 (PH 2)	J-5 (PH 2)	12.0	130.0	-121	0.34	0.051	True
P-17 (PH 2)	127	BLDG D DOM	FH-9 (PH 2)	12.0	130.0	-121	0.34	0.051	True
P-22 (PH 2)	214	FH-12 (PH 2)	FH-13 (PH 2)	12.0	130.0	-59	0.17	0.014	True
P-24 (PH 2)	79	BLDG E DOM	FH-14 (PH 2)	12.0	130.0	59	0.17	0.014	True
P-23 (PH 2)	234	FH-14 (PH 2)	FH-13 (PH 2)	12.0	130.0	59	0.17	0.014	True
P-RESERVOIR	24	RESERVOIR	PUMP	48.0	130.0	2,296	0.41	0.000	True
P-PUMP	35	PUMP	FH-TEST (EX)	48.0	130.0	2,296	0.41	0.000	True
P-38 (EX)	127	J-15 (PH 1)	FH-FLOW B (EX)	12.0	130.0	0	0.00	0.000	True
P-26 (PH 2)	272	J-11 (PH 2)	FH-16 (PH 2)	12.0	130.0	0	0.00	0.000	True
P-20 (PH 2)	308	J-4 (PH 2)	FH-10 (PH 2)	12.0	130.0	0	0.00	0.000	True
P-2 (PH 2)	94	J-1 (PH 2)	FH-2 (PH 2)	12.0	130.0	0	0.00	0.000	True
P-1 (PH 2)	296	FH-2 (PH 2)	FH-1 (PH 2)	12.0	130.0	0	0.00	0.000	True

Axon Way & Hayden Road

Fire Flow Node FlexTable: Fire Flow Results Table

Active Scenario: Max Day + Fire Flow (Fire Flow Analysis)

Label	Elevation (ft)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Calculated System Lower Limit) (psi)	Satisfies Fire Flow Constraints?	Pressure (Calculated Residual @ Total Flow Needed) (psi)
BLDG A DOM	1,598.53	2,340	2,875	30	32	30	True	41
BLDG B DOM	1,598.35	2,293	2,834	30	32	30	True	41
BLDG C DOM	1,601.06	2,293	2,823	30	32	30	True	40
BLDG D DOM	1,601.09	2,420	2,950	30	31	30	True	40
BLDG E DOM	1,595.38	2,295	2,871	30	34	30	True	43
FH-1 (PH 2)	1,603.00	2,000	2,428	30	30	31	True	38
FH-2 (PH 2)	1,603.67	2,000	2,496	30	30	30	True	39
FH-3 (PH 2)	1,603.82	2,000	2,508	30	30	30	True	39
FH-4 (PH 2)	1,605.58	2,000	2,510	30	30	30	True	38
FH-5 (PH 2)	1,598.29	2,000	2,541	30	32	30	True	41
FH-6 (PH 2)	1,598.85	2,000	2,527	30	32	30	True	41
FH-7 (PH 2)	1,599.85	2,000	2,515	30	32	30	True	41
FH-8 (PH 2)	1,601.41	2,000	2,513	30	32	30	True	40
FH-9 (PH 2)	1,601.49	2,000	2,525	30	31	30	True	40
FH-10 (PH 2)	1,593.00	2,000	2,509	30	34	30	True	43
FH-11 (PH 1)	1,591.62	2,000	2,568	30	35	30	True	45
FH-12 (PH 2)	1,591.85	2,000	2,575	30	35	30	True	44
FH-13 (PH 2)	1,593.09	2,000	2,576	30	34	30	True	44
FH-14 (PH 2)	1,595.49	2,000	2,576	30	33	30	True	43
FH-15 (PH 2)	1,595.78	2,000	2,576	30	34	30	True	43
FH-16 (PH 2)	1,594.00	2,000	2,576	30	33	30	True	43
FH-17 (PH 1)	1,588.09	2,000	2,572	30	37	30	True	46
FH-18 (PH 1)	1,599.85	2,000	2,544	30	32	30	True	41
FH-19 (PH 1)	1,594.07	2,000	2,585	30	35	30	True	44
FH-20 (PH 2)	1,606.00	2,000	2,485	30	30	31	True	38
FH-FLOW A (EX)	1,586.00	2,000	2,623	30	39	30	True	49
FH-FLOW B (EX)	1,595.87	2,000	2,696	30	34	30	True	45
FH-TEST (EX)	1,590.98	2,000	2,799	30	37	30	True	49
J-1 (PH 2)	1,604.43	2,000	2,496	30	30	30	True	39
J-2 (PH 1)	1,605.24	2,000	2,533	30	30	30	True	39
J-3 (EX)	1,599.01	2,000	2,548	30	32	30	True	41
J-4 (PH 2)	1,602.03	2,000	2,509	30	31	30	True	40
J-5 (PH 2)	1,602.48	2,000	2,507	30	31	30	True	40
J-6 (PH 1)	1,600.67	2,000	2,539	30	32	30	True	41
J-7 (PH 2)	1,591.24	2,000	2,557	30	35	30	True	45
J-8 (PH 1)	1,590.86	2,000	2,565	30	35	30	True	45
J-10 (PH 1)	1,589.99	2,000	2,571	30	36	30	True	45
J-11 (PH 2)	1,595.20	2,000	2,576	30	34	30	True	44
J-12 (PH 1)	1,594.93	2,000	2,577	30	35	30	True	44
J-13 (PH 1)	1,593.22	2,000	2,595	30	36	30	True	45
J-14 (PH 1)	1,599.38	2,000	2,623	30	33	30	True	43
J-15 (PH 1)	1,595.00	2,000	2,696	30	35	30	True	46
J-16 (PH 1)	1,584.45	2,000	2,575	30	39	30	True	48
J-17 (EX)	1,584.83	2,000	2,560	30	38	30	True	47

FIRE HYDRANT FLOW TEST

Arizona Flow Testing LLC

HYDRANT FLOW TEST REPORT

Project Name:	Hayden/ Union Hills
Project Address:	Union Hills & 82nd Street, Scottsdale, Arizona, 85255
Client Project No.:	Not Provided
Arizona Flow Testing Project No.:	21181
Flow Test Permit No.:	C64955
Date and time flow test conducted:	April 14, 2021 at 6:50 AM
Data is current and reliable until:	October 14, 2021
Conducted by:	F. Vaughan & S. Ballard – Az. Flow Testing, LLC (480-250-8154)
Coordinated by:	Jared Berry – City of Scottsdale-Inspector (602-541-4942)

Raw Test Data

Static Pressure: **75.0 PSI**
(Measured in pounds per square inch)

Residual Pressure: **48.0 PSI**
(Measured in pounds per square inch)

Pitot Pressure: **17.0 PSI Hyd A**
25.0 PSI Hyd B
(Measured in pounds per square inch)

Diffuser Orifice Diameter: One 4-inch Hose Monster (B)
(Measured in inches) One 4 inch Pollard Diffuser (A)

Coefficient of Diffuser: 0.7875/(B) and 0.9/(A)

Flowing GPM: **3,698 GPM**
(Measured in gallons per minute)
1,550 GPM + 2,148 GPM = 3,698 GPM

GPM @ 20 PSI: **5,431 GPM**

Data with 10% Safety Factor

Static Pressure: **67.5 PSI**
(Measured in pounds per square inch)

Residual Pressure: **40.5 PSI**
(Measured in pounds per square inch)

Distance between hydrants: See Below

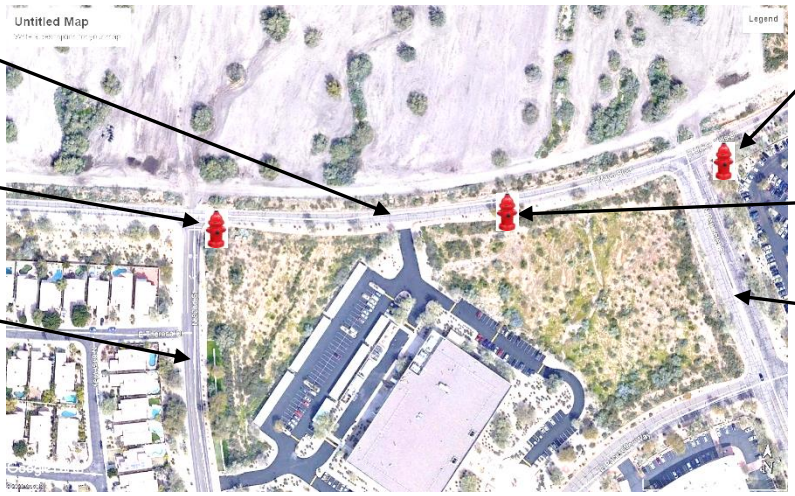
Main size: Not Provided

Flowing GPM: **3,698 GPM**

GPM @ 20 PSI**:** **5,018 GPM**

Flow Test Location

North



East Mayo Blvd.

Flow Fire Hydrant A
(630 Feet from Pressure Hydrant)

North 82nd Street

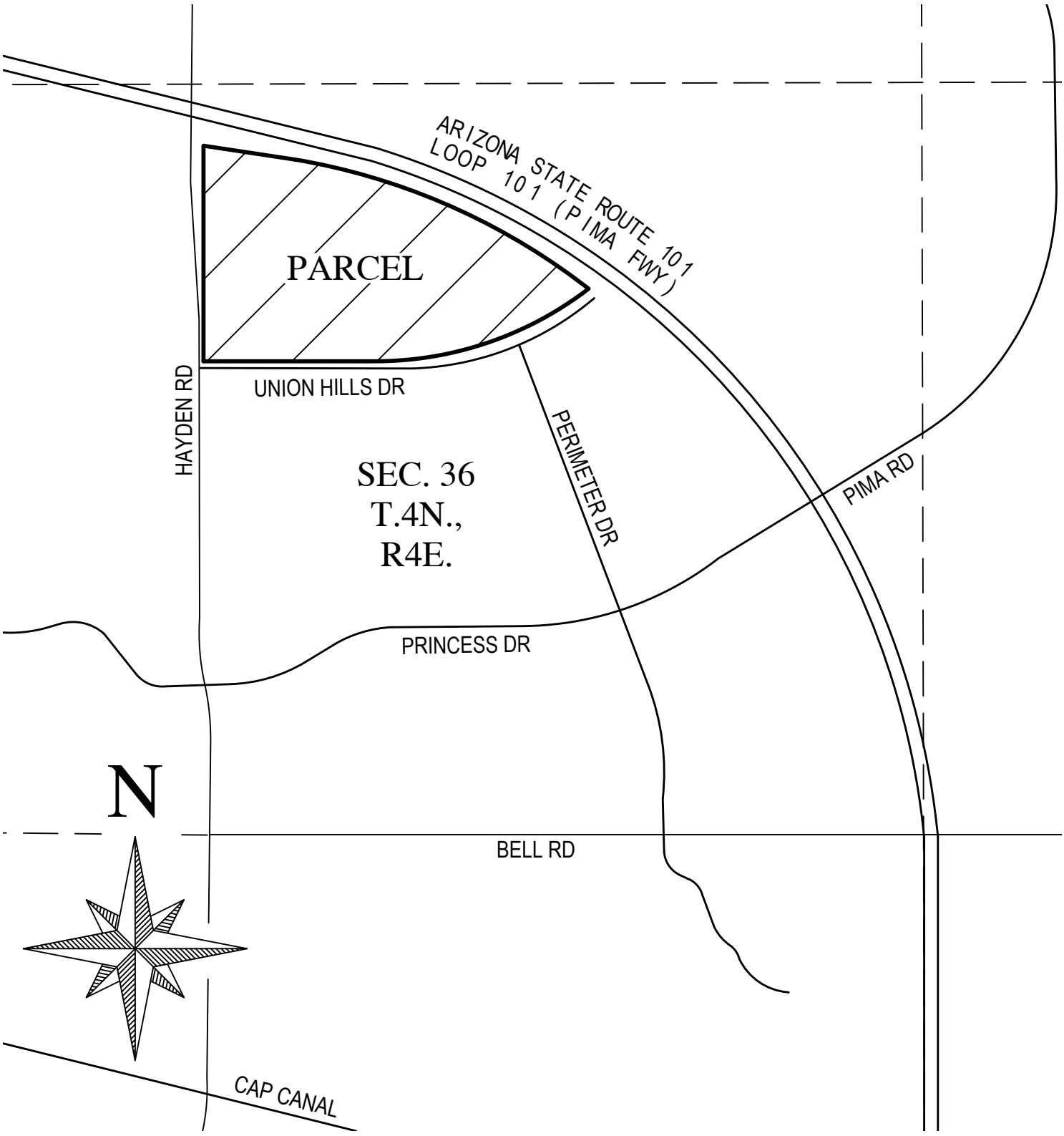
Flow Fire Hydrant B
(450 Feet from Pressure Hydrant)

Pressure Fire Hydrant

North Perimeter Drive

Project Site
Union Hills & 82nd Street

VICINITY MAP



WOOD PATEL

AXON WAY & HAYDEN ROAD

VICINITY MAP

DATE	08-02-23	SCALE	1" = 1000'	SHEET	1 OF 1
JOB NO.	205133.04	DESIGN	BLJ	CHECK	NEB
		DRAWN	BLJ		

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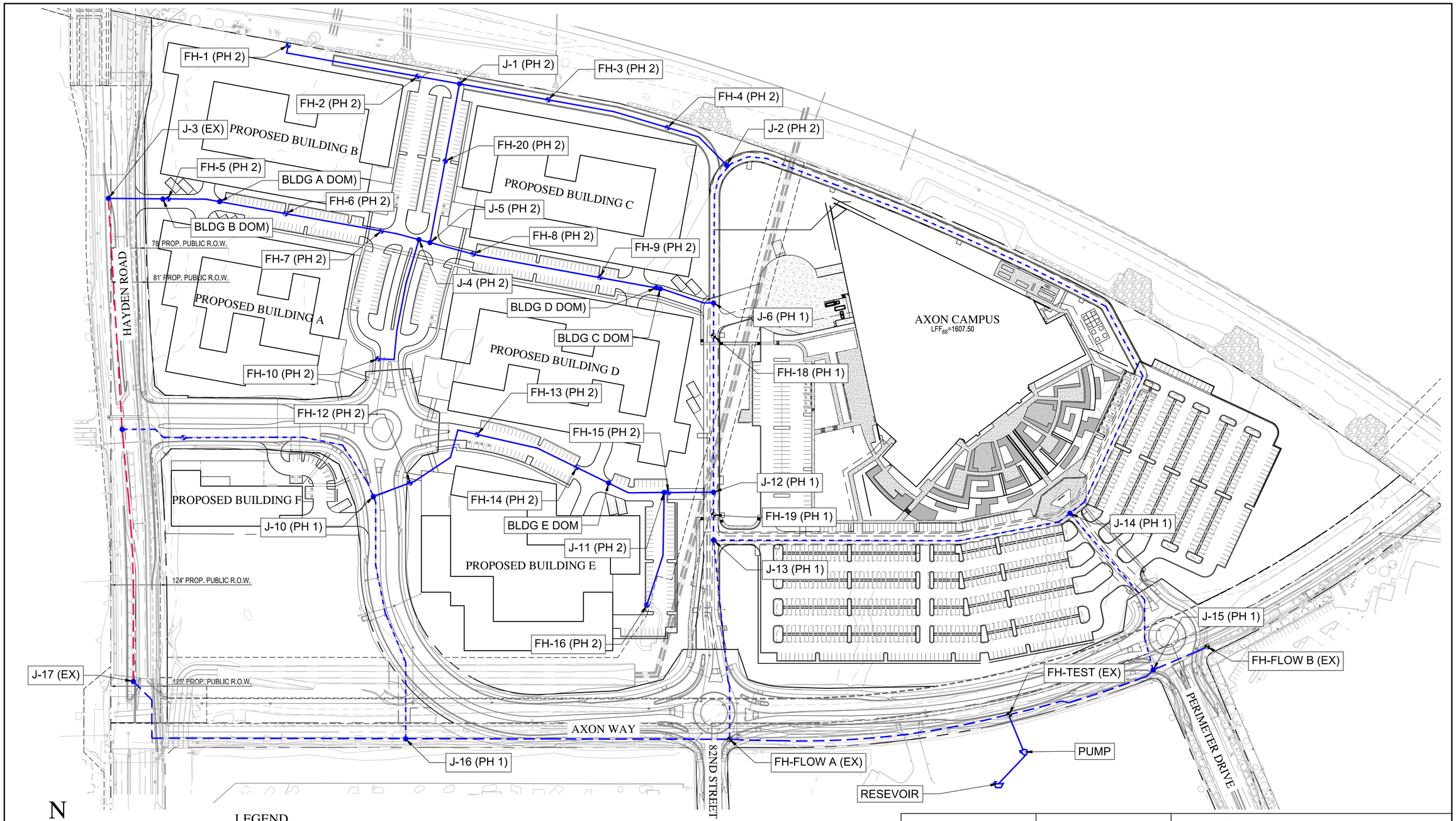
WATER EXHIBIT



NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

AXON WAY & HAYDEN ROAD

WATER SYSTEM MAP

DATE	08-02-2023	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	205133.04	DESIGN	AF	DRAWN	BP

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WOOD PATEL

CONCEPTUAL WASTEWATER COLLECTION SYSTEM
BASIS OF DESIGN REPORT
FOR
AXON WAY & HAYDEN ROAD PROJECT

August 2, 2023
WP# 205133.04

WOOD PATEL

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EMERITUS
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August 2, 2023

Mr. Levi Dillon, PE
Sr. Water Resource Engineer
City of Scottsdale
9379 East San Salvador Drive
Scottsdale, Arizona 85258

480.312.5319
ldillon@scottsdaleaz.gov

Re: **Axon Way & Hayden Road Project**
Conceptual Wastewater Collection System Basis of Design Report
WP# 205133.04

Dear Mr. Dillon:

The proposed Axon Way & Hayden Road Project (Site) is a 74.44-acre site, located in the northwest quarter of Section 36, Township 4 North, Range 4 East of the Gila and Salt River Meridian. More specifically, the Site is located at the northeast corner of Hayden Road and Mayo Boulevard. Refer to the Vicinity Map at the back of this report for project location. Phase 1 of this project includes one (1) proposed mixed-used structure, associated parking, landscape, hardscape and utilities as well as realignment of the existing Mayo Boulevard to be renamed as Axon Way. This report, however, is concerned with the improvements as part of phase 2 including six (6) proposed mixed-used structures and associated parking, landscape, hardscape and utilities. The proposed structures are comprised of six (6) buildings. All six (6) proposed structures are 5-story buildings containing residential units and garage parking. Buildings A, B, C, D, and F also have proposed commercial space on the ground floor. Building A consists of approximately 119,475 square-feet of residential units, 16,250 square-feet of commercial space and a parking garage spanning three (3) levels. Buildings B and C are comprised of approximately 108,650 square-feet of residential units, 4,200 square-feet of commercial space, and a parking garage spanning seven (7) levels. Building D contains approximately 161,330 square-feet of residential units, 16,250 square-feet of commercial space and a parking garage spanning two (2) levels. Building E does not contain any commercial space with approximately 144,956 square-feet of residential units and a parking garage spanning two (2) levels. Building F consists of approximately 26,116 square-feet of residential units, 3,900 square-feet of commercial space and a parking garage spanning two (2) levels.

Wastewater flows from the proposed buildings will discharge to 3 proposed 8-inch onsite sewer lines. Each of these proposed 8-inch onsite sewer lines will connect to 8-inch offsite/public sewer lines as part of phase 1 improvements. Wastewater flows from proposed building E are to discharge into an existing stub as part of the 8-inch offsite/public sewer lines included in phase 1 improvements. This 8-inch offsite/public sewer line (south collection system) will outfall to the existing 12-inch sewer line in Hayden Road.

The 8-inch offsite/public sewer line (north collection system) to be be constructed in the realigned Mayo Boulevard is intended to also serve Wastewater flows from buildings A, B, C, D, and E. There are 2 8-inch stubs as part of this north collection system allowing for the proposed 8-inch onsite sewer lines to connect to this system. Wastewater flows from the proposed onsite sewer line will then outfall to the existing 12-inch sewer line in Hayden Road.

The design criteria used to estimate wastewater flows and evaluate system hydraulics are based on Wood, Patel & Associates, Inc.'s (WOODPATEL) understanding of the published *City of Scottsdale Design Standards and Policies Manual*, 2018 and City of *Phoenix Design Standards Manual for Water and Wastewater Systems*, 2017. The following is a summary of the primary design criteria utilized:

- Average Day Wastewater Demand, Office: ..... 0.4 gpd / sq. ft
- Average Day Wastewater Demand, Industrial (Phoenix): ..... 50 gpd / 1,000 sq. ft
- Peak Factor, Office: 3
- Peak Factor, Industrial: ..... $1+14/(4+P^{1/2})$
- Minimum Mean Full Flow Velocity: ..... 2.50 fps
- Minimum Peak Full Flow Velocity: ..... 10.0 fps
- Minimum Peak Flow d/D Ratio (12" dia. or less sewers): ..... d/D = 0.65

Abbreviations: gpd = gallons per day; fps = feet per second; P=population/1,000

Based on the above design criteria, the projected average day flow for the proposed Site is calculated to be 541,380 gallons per day (gpd), or 376 gallons per minute (gpm). The peak flow is projected to be 1,739,359 gpd, or 1,208 gpm. The proposed sewer slopes, projected flow velocities, and pipe flow capacities are summarized on the attached spreadsheets. It is assumed the infiltration and inflow from wet weather has been accounted for in the published design flow rates for the development and the maximum d/D. Therefore, those flows have not been added into the calculations.

Thank you for your review of the Conceptual Wastewater Collection System Basis of Design Report provided for the Axon Way & Hayden Road Project. Feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

Nicholas Brown, PE
Project Manager

EXPIRES 03-31-25

CALCULATIONS AND MODELING RESULTS

WOOD PATEL

TABLE 1
WASTEWATER DESIGN CRITERIA

Project	Axon - Phase 2
Location	Scottsdale AZ
Project Number	205133
Project Engineer	Nicholas Brown, PE
References	City of Scottsdale Design Standards and Policy Manual (2018)

RESIDENTIAL WASTEWATER DEMANDS			
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**POPULATION[1]**
	VALUE	**UNITS**	
Single Family Residential	250	gpd/DU	2.5 Persons per DU
Multi-Family Residential	220	gpd/DU	2.2 Persons per DU

NON-RESIDENTIAL WASTEWATER DEMANDS				
LAND USE	**AVERAGE DAILY DEMAND (ADD)**		**POPULATION[1]**	**Peaking Factor (PF)**
	VALUE	**UNITS**		
Commercial/Retail	0.5	gpd/sf	0.005 Persons per sf	3
Office	0	gpd/sf	0.004 Persons per sf	3
Restaurant	1	gpd/sf	0.012 Persons per sf	6
High Density Condominium	140	gpd/unit	1.4 Persons per unit	4.5
Resort Hotel	380	gpd/room	3.8 Persons per room	4.5
School: without cafeteria	30	gpd/student	0.3 Persons per Student	6
School: with cafeteria	50	gpd/student	0.5 Persons per Student	6
Cultural	0.1	gpd/sf	0.001 Persons per sf	3
Clubhouse for Subdivision Golf Course	200	gpd/DU	2 Persons per patron x2 patrons per du per day	4.5
Fitness Center/ Spa/ Health Club	0.8	gpd/sf	0	3.5
Industrial	50	gpd/1,000 sf	0.5 Persons per 1,000 sf	-

HYDRAULIC MODELING CRITERIA		
DESCRIPTION		**VALUE[2]**
PEAK FLOW		
	Peak Flow = Peaking Factor (PF) x ADD	$[1+14/(4+P^{1/2})]$ x ADD
	(PF is based on upstream population, P = Population/1,000)	
HYDRAULICS		
	Minimum Pipe Diameter (in)	8
	Manning's "n" value	0.013
	Maximum d/D ratio at peak flow (D ≤ 12")	0.65
	Maximum d/D ratio at peak flow (D > 12")	0.7

PIPE SIZE	MEAN VELOCITY[2]		DESIGN SLOPE[2]	
(in)	Minimum (ft/sec)	Maximum (ft/sec)	Minimum (%)	Maximum (%)
6	2.5	10.0	0.520	6.980
8	2.5	10.0	0.520	6.980
10	2.5	10.0	0.390	5.121
12	2.5	10.0	0.310	3.919

Notes

1. Based on Arizona Administrative Code, Title 18, Chapter 9 value of 100 gallons per capita per day.
2. Per City of Scottsdale Design Standards and Policy Manual (2018)

TABLE 2
WASTEWATER MODEL, FULL BUILD-OUT CONDITION

Project	Axon - Phase 2
Location	Scottsdale AZ
Project Number	205133
Project Engineer	Nicholas Brown, PE
References	City of Scottsdale Design Standards and Policy Manual (2018)
	Arizona Administrative Code, Title 18, Chapter 9

LAND USE

FROM NODE	TO NODE	Multi-Family Residential (DU)	Commercial/Retail (1,000 sf)	SEWER NODE ADD (gpd)	TOTAL ADD (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (gpm)
Outfall 1 SSMH #1 TO EX. SSMH #15								
Building B & Building C	MH #1	828	8,400	186,360	186,360	4.0	745,440	518
MH #1	MH #2			0	186,360	4.0	745,440	518
MH #2	MH #3			0	186,360	4.0	745,440	518
MH #3	MH #4			0	186,360	4.0	745,440	518
MH #4	EX. MH #15	992	32,500	234,490	420,850	4.0	1,683,400	1,169
Total Outfall 1		**1,820**	**40,900**	**420,850**	**420,850**	**4.0**	**1,683,400**	**1,169**

TABLE 2
WASTEWATER MODEL, FULL BUILD-OUT CONDITION

Project	Axon - Phase 2
Location	Scottsdale AZ
Project Number	205133
Project Engineer	Nicholas Brown, PE
References	City of Scottsdale Design Standards and Policy Manual (2018)
	Arizona Administrative Code, Title 18, Chapter 9

LAND USE

FROM NODE	TO NODE	Multi-Family Residential (DU)	Commercial/Retail (1,000 sf)	SEWER NODE ADD (gpd)	TOTAL ADD (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (gpm)
Outfall 2 BLDG E TO EX. SSMH #11								
Building E	EX. MH #11	436		95,920	95,920	4.0	383,680	266
Total Outfall 2		**436**	**0**	**95,920**	**95,920**	**4.0**	**383,680**	**266**
Outfall 3 BLDG F TO EX. SSMH #17								
Building F	EX. MH #17	103	3,900	24,610	24,610	4.0	98,440	68
Total Outfall 3		**103**	**3,900**	**24,610**	**24,610**	**4.0**	**98,440**	**68**

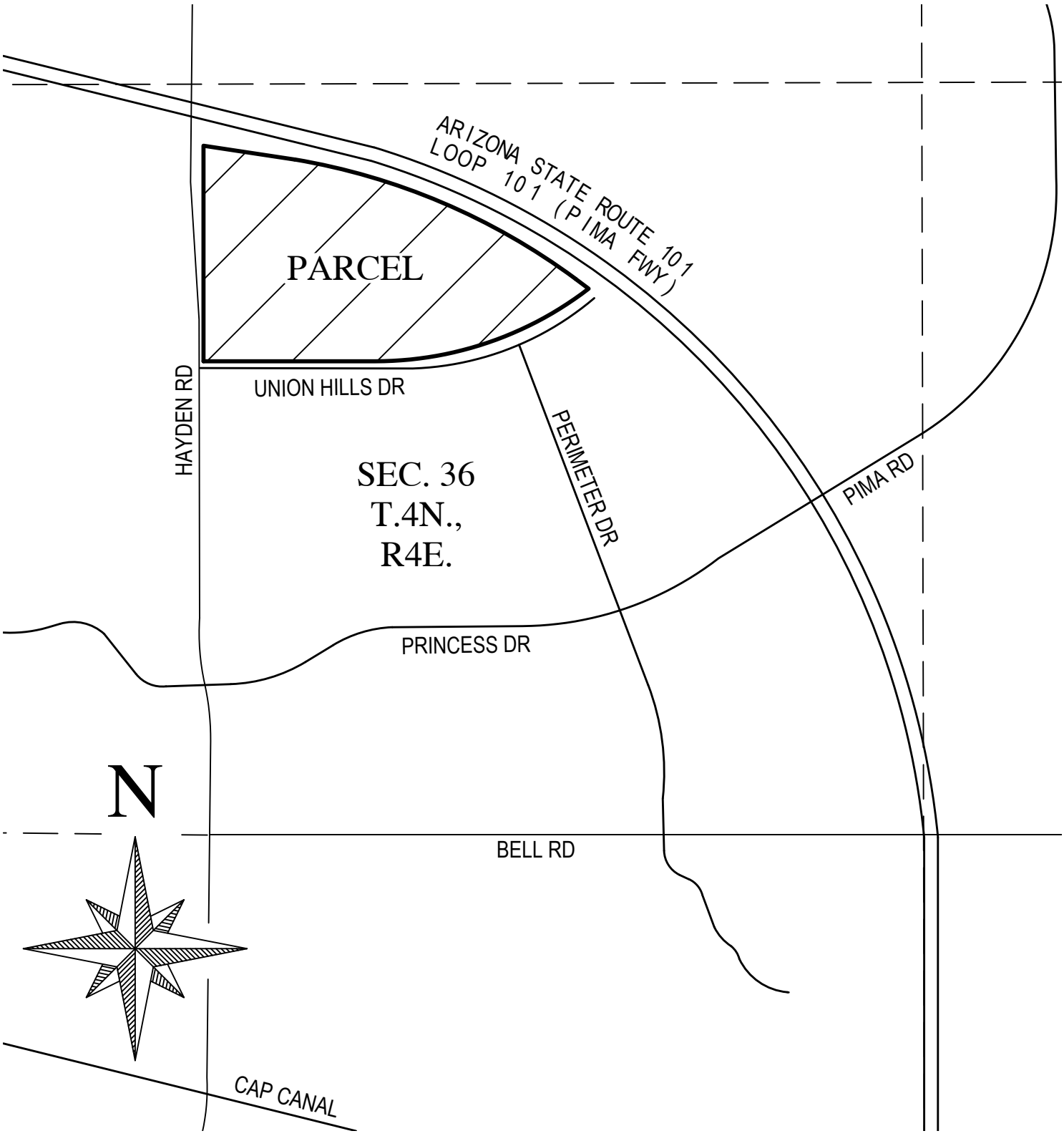
WOOD PATEL

TABLE 3
CALCULATED PIPE CAPACITIES, FULL BUILD-OUT CONDITION

Project	Axon - Phase 2
Location	Scottsdale AZ
Project Number	205133.04
Project Engineer	Nicholas Brown, PE
References	City of Scottsdale Design Standards and Policy Manual (2018)
	ADEQ Bulletin No. 11

						PEAK FLOW RESULTS					
FROM NODE	**TO NODE**	**PIPE SIZE**	**MODELED PIPE SLOPE**	**PIPE CAPACITY (FULL)**		**PEAK FLOW**	**PEAK FLOW**	**d/D**	**MEAN VELOCITY (at d/D=0.65)**	**SURPLUS CAPACITY**	**PERCENT OF CAPACITY**
		(in)	**(ft/ft)**	**(gpd)**	**(gpm)**	**(gpd)**	**(gpm)**		**(ft/sec)**	**(gpd)**	**(%)**
Outfall 1 SSMH #1 TO EX. SSMH #15											
Building B & Building C	MH #1	8	0.0100	783,170	544	745,440	518	0.78	3.8	37,730	95.2%
MH #1	MH #2	8	0.0100	783,170	544	745,440	518	0.78	3.8	37,730	95.2%
MH #2	MH #3	8	0.0100	783,170	544	745,440	518	0.78	3.8	37,730	95.2%
MH #3	MH #4	8	0.0100	783,170	544	745,440	518	0.78	3.8	37,730	95.2%
MH #4	EX. MH #15	8	0.0100	783,170	544	1,683,400	1,169	0.96	3.8	-900,230	214.9%
Outfall 2 BLDG E TO EX. SSMH #11											
Building E	EX. MH #11	8	0.0100	783,170	544	383,680	266	0.49	3.8	399,490	49.0%
Outfall 3 BLDG F TO EX. SSMH #17											
Building F	EX. MH #17	8	0.0100	783,170	544	98,440	68	0.24	3.9	684,730	12.6%

VICINITY MAP



WOOD PATEL

AXON WAY & HAYDEN ROAD

VICINITY MAP

DATE	08-02-23	SCALE	1" = 1000'	SHEET	1 OF 1
JOB NO.	205133.04	DESIGN	BLJ	CHECK	NEB
		DRAWN	BLJ		

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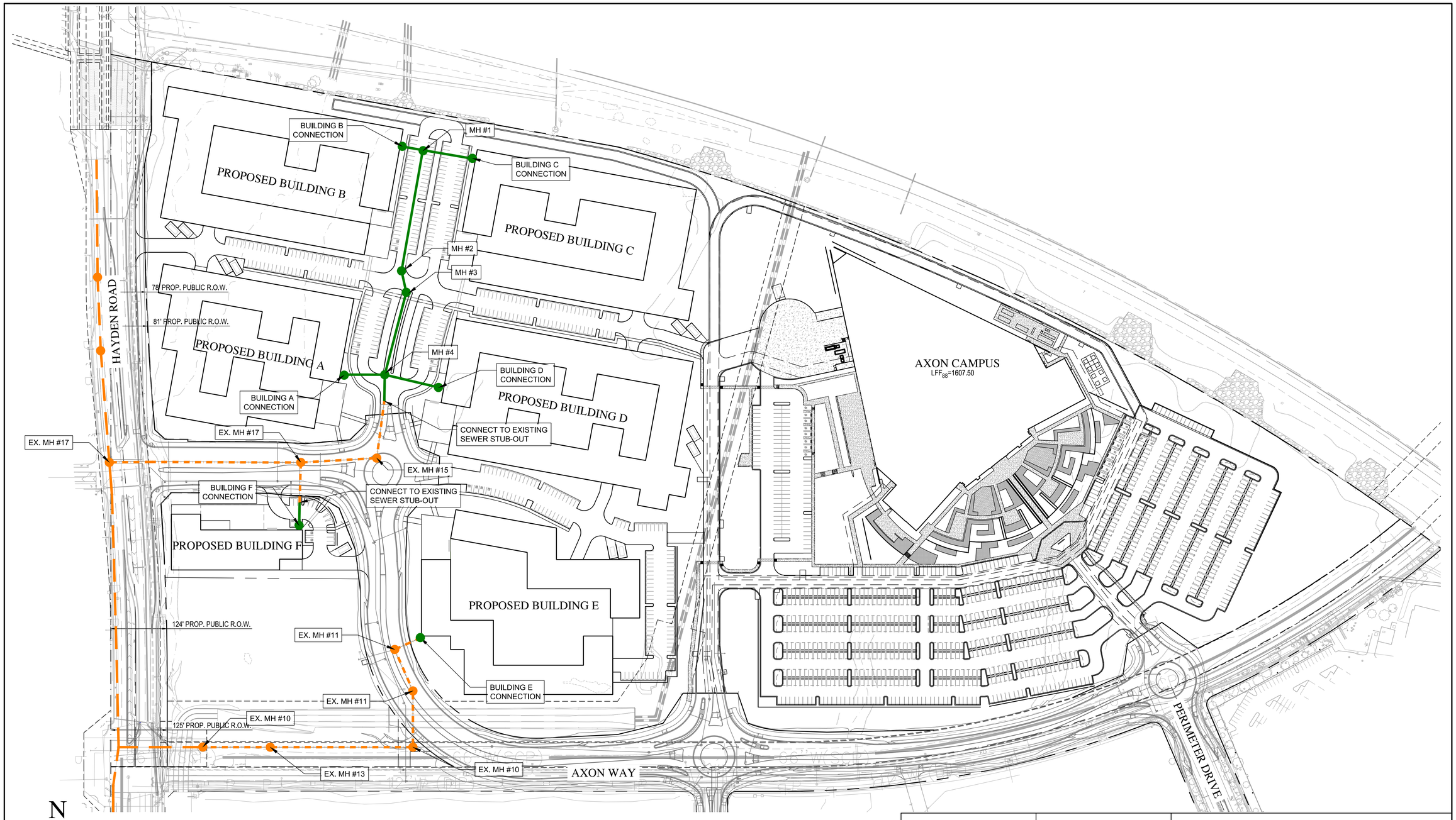
WASTEWATER EXHIBIT



N

0 50 100

Horz. 1 in. = 100 ft.

LEGEND

- EXISTING SEWER PIPE
- EXISTING PHASE 1 SEWER PIPE
- PROPOSED SEWER PIPE
- PROPERTY BOUNDARY
- EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

AXON WAY & HAYDEN ROAD

WASTEWATER SYSTEM MAP

DATE	08-02-2023	SCALE	1" = 100'	SHEET	1 OF 1
JOB NO.	205133.04	DESIGN	AF	DRAWN	BP

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WOOD PATEL

CONCEPTUAL DRAINAGE REPORT
FOR
AXON WAY & HAYDEN ROAD PROJECT

August 2, 2023
WP# 205133.04

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August 2, 2023

City of Scottsdale
9379 East San Salvador Drive
Scottsdale, Arizona 85258

Re: **Axon Way & Hayden Road Project**
Conceptual Drainage Report
WP# 205133.04

To Whom it May Concern:

The Axon Campus (Site) is currently on an undeveloped parcel. The parcel, Tract 14A of State Plat No. 16-B Core South, consists of a portion of the northern half of Section 36, Township 4 North, Range 4 East, in the City of Scottsdale, Arizona. The parcel is approximately 74.44 acres in size and is located northeast of the intersection of Hayden Road and Union Hills Drive in the City of Scottsdale, Arizona. The parcel's western boundary has frontage along the east side of Hayden Road, and the parcel's southern boundary has frontage along the north side of Union Hills Drive. Additionally, the north side of the parcel parallels a portion of Arizona Department of Transportation (ADOT) State Route 101.

The first phase of the site, located on the east side, is already in design and will include an office building with associated parking, hardscape, and landscape. In addition, Axon Way, a new roadway with associated utilities will be constructed. This report and related plan set are to support the development of the remaining west area of the parcel, currently planned for residential/commercial mixed use. A fire station is being designed by others.

The Site is vacant of surface structures, with the exception of the improvements covered in Section 2.4, and significant portions of the parcel have been cleared and covered with recycled asphalt millings to provide dust control. Reportedly, the parcel has previously served as overflow parking. Portions of the parcel that have not been cleared or disturbed display native desert terrain, common to the area. The parcel slopes to the southwest at an average slope of 1.5%. As displayed in Exhibit 3 – Existing Drainage Map, contour elevations range from approximately 1,605 feet to 1,583 feet. The Site is located downstream of Crossroads East Basin 53R, which is a regional flood control basin. This basin stops the majority of the historic off-site runoff from impacting the Site. However, there are several existing ADOT culverts along the north frontage of the right-of-way to collect storm water runoff from the AZ Loop 101, and carry the water south through the parcel.

ASLD Parcel Tract 14A is located within a Federal Emergency Management Agency (FEMA) floodplain designation, Zone "AO-Depth 1 Foot, Velocity 3 FPS". The proposed buildings will have finished floor elevations at least 2 feet above their respective historical adjacent grade elevations. Refer to conceptual grading & drainage plan for specific finished floor elevations.

The proposed on-site grading for the project is designed to direct storm water runoff away from the proposed building and into proposed retention basins. Proposed roof drains, catch basins, and storm drains will collect the majority of the runoff to store in retention systems. These retention systems have been designed to handle the on-site and adjacent Axon Way half street runoff first flush volume. Off-site runoff entering the site from the north will be collected in storm conveyance systems and routed around the site towards the ultimate discharge location at the southwest corner.

Thank you for your review of the Conceptual Drainage Report provided for the Axon Way & Hayden Road Project. Feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

Nicholas Brown, PE
Project Manager

EXPIRES 03-31-25

WOOD PATEL

SITE I-D-F CURVE

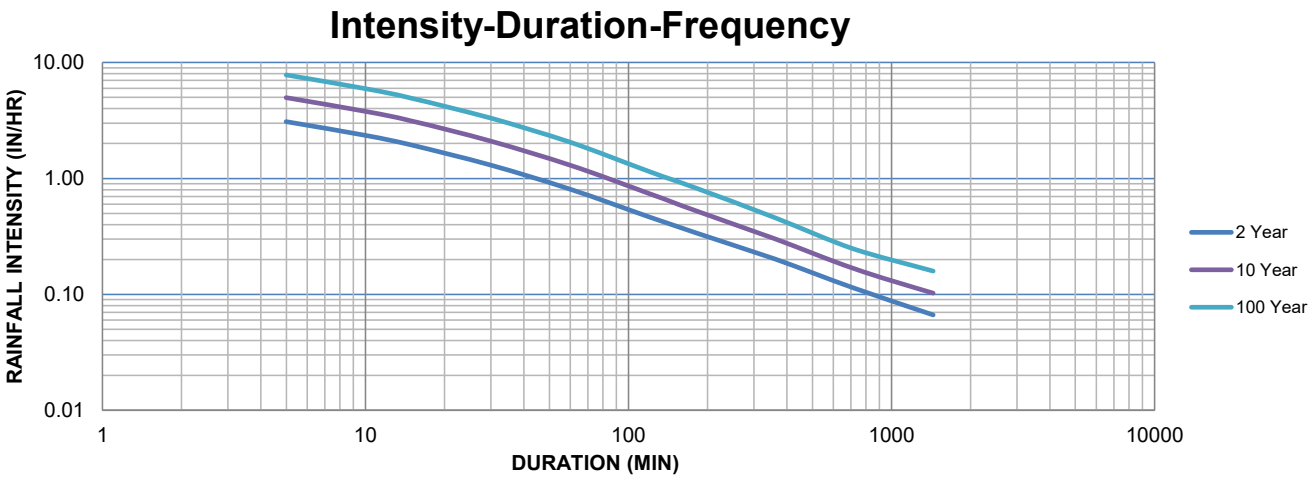
Project	Axon Way & Hayden Road
Location	Scottsdale AZ
Project Number	205133.04
Project Engineer	Aaron Feldberg

RAINFALL DEPTHS, INCHES

Duration	Average Reccurence Interval (years)					
	2	5	10	25	50	100
5-min	0.257	0.346	0.415	0.507	0.578	0.651
10-min	0.391	0.526	0.631	0.772	0.880	0.990
15-min	0.484	0.652	0.782	0.957	1.090	1.230
30-min	0.651	0.879	1.050	1.290	1.470	1.650
60-min	0.806	1.090	1.300	1.600	1.820	2.050
2-hr	0.931	1.240	1.480	1.800	2.040	2.290
3-hr	1.020	1.330	1.580	1.920	2.200	2.480
6-hr	1.210	1.540	1.810	2.170	2.450	2.750
12-hr	1.360	1.720	2.000	2.380	2.660	2.960
24-hr	1.600	2.070	2.450	2.970	3.380	3.810

RAINFALL INTENSITY, INCHES/HOUR

Duration minutes	Frequency, years					
	2	5	10	25	50	100
5	3.08	4.15	4.98	6.08	6.94	7.81
10	2.35	3.16	3.79	4.63	5.28	5.94
15	1.94	2.61	3.13	3.83	4.36	4.92
30	1.30	1.76	2.10	2.58	2.94	3.30
60	0.81	1.09	1.30	1.60	1.82	2.05
120	0.47	0.62	0.74	0.90	1.02	1.15
180	0.34	0.44	0.53	0.64	0.73	0.83
360	0.20	0.26	0.30	0.36	0.41	0.46
720	0.11	0.14	0.17	0.20	0.22	0.25
1440	0.07	0.09	0.10	0.12	0.14	0.16



WOOD PATEL

RATIONAL METHOD SUMMARY
100 YEAR, 10 YEAR, 2 YEAR

Project Axon Way & Hayden Road
Location Scottsdale AZ
Project Number 205133.04
Project Engineer Aaron Feldberg

ON SITE

										100 YEAR				10 YEAR				2 YEAR			
Drainage Subbasin ID	Longest Watercourse 'L' (ft)	Longest Watercourse 'L' (mi)	Drainage Area 'A' (sf)	Drainage Area 'A' (Acres)	$'K_b'$ Type[1]	Watershed Resistance Coefficient $'K_b'$	Top Elevation	Bottom Elevation	Basin Slope 'S' (ft/mi)	Calculated Q100 'Tc' (See Note 2) (min)	100 YEAR Intensity 'i' (in/hr)	100 YR Runoff Coefficient 'C'	Q100 Flow (cfs)	Calculated Q10 'Tc' (See Note 2) (min)	10 YEAR Intensity 'i' (in/hr)	10 YR Runoff Coefficient 'C'	Q10 Flow (cfs)	Calculated Q2 'Tc' (See Note 2) (min)	2 YEAR Intensity 'i' (in/hr)	2 YR Runoff Coefficient 'C'	Q2 Flow (cfs)
A1	50	0.009	45,865	1.05	A	0.0399	100.0	90.0	1056.0	0.7	7.81	0.90	**7.4**	0.8	4.98	0.78	**4.1**	0.9	3.08	0.72	**2.3**
A2	50	0.009	12,540	0.29	A	0.0434	100.0	90.0	1056.0	0.7	7.81	0.90	**2.0**	0.8	4.98	0.78	**1.1**	1.0	3.08	0.72	**0.6**
A3	50	0.009	10,540	0.24	A	0.0439	100.0	90.0	1056.0	0.7	7.81	0.90	**1.7**	0.8	4.98	0.78	**0.9**	1.0	3.08	0.72	**0.5**
A4	50	0.009	44,575	1.02	A	0.0399	100.0	90.0	1056.0	0.7	7.81	0.90	**7.2**	0.8	4.98	0.78	**4.0**	0.9	3.08	0.72	**2.3**
A5	50	0.009	14,245	0.33	A	0.0430	100.0	90.0	1056.0	0.7	7.81	0.90	**2.3**	0.8	4.98	0.78	**1.3**	1.0	3.08	0.72	**0.7**
A6	50	0.009	11,950	0.27	A	0.0435	100.0	90.0	1056.0	0.7	7.81	0.90	**1.9**	0.8	4.98	0.78	**1.1**	1.0	3.08	0.72	**0.6**
A7	50	0.009	44,720	1.03	A	0.0399	100.0	90.0	1056.0	0.7	7.81	0.90	**7.2**	0.8	4.98	0.78	**4.0**	0.9	3.08	0.72	**2.3**
A8	50	0.009	10,720	0.25	A	0.0438	100.0	90.0	1056.0	0.7	7.81	0.90	**1.7**	0.8	4.98	0.78	**1.0**	1.0	3.08	0.72	**0.5**
A9	50	0.009	20,870	0.48	A	0.0420	100.0	90.0	1056.0	0.7	7.81	0.90	**3.4**	0.8	4.98	0.78	**1.9**	1.0	3.08	0.72	**1.1**
A10	50	0.009	16,610	0.38	A	0.0426	100.0	90.0	1056.0	0.7	7.81	0.90	**2.7**	0.8	4.98	0.78	**1.5**	1.0	3.08	0.72	**0.8**
A11	50	0.009	48,835	1.12	A	0.0397	100.0	90.0	1056.0	0.7	7.81	0.90	**7.9**	0.8	4.98	0.78	**4.4**	0.9	3.08	0.72	**2.5**
A12	50	0.009	20,290	0.47	A	0.0421	100.0	90.0	1056.0	0.7	7.81	0.90	**3.3**	0.8	4.98	0.78	**1.8**	1.0	3.08	0.72	**1.0**
A13	50	0.009	16,380	0.38	A	0.0427	100.0	90.0	1056.0	0.7	7.81	0.90	**2.6**	0.8	4.98	0.78	**1.5**	1.0	3.08	0.72	**0.8**
A14	50	0.009	17,495	0.40	A	0.0425	100.0	90.0	1056.0	0.7	7.81	0.90	**2.8**	0.8	4.98	0.78	**1.6**	1.0	3.08	0.72	**0.9**
A15	50	0.009	22,090	0.51	A	0.0418	100.0	90.0	1056.0	0.7	7.81	0.90	**3.6**	0.8	4.98	0.78	**2.0**	1.0	3.08	0.72	**1.1**
A16	50	0.009	7,990	0.18	A	0.0446	100.0	90.0	1056.0	0.7	7.81	0.90	**1.3**	0.8	4.98	0.78	**0.7**	1.0	3.08	0.72	**0.4**
A17	50	0.009	46,330	1.06	A	0.0398	100.0	90.0	1056.0	0.7	7.81	0.90	**7.5**	0.8	4.98	0.78	**4.1**	0.9	3.08	0.72	**2.4**
A18	50	0.009	51,655	1.19	A	0.0395	100.0	90.0	1056.0	0.7	7.81	0.90	**8.3**	0.8	4.98	0.78	**4.6**	0.9	3.08	0.72	**2.6**
B1	50	0.009	61,410	1.41	A	0.0391	100.0	90.0	1056.0	0.7	7.81	0.90	**9.9**	0.8	4.98	0.78	**5.5**	0.9	3.08	0.72	**3.1**
B2	50	0.009	9,930	0.23	A	0.0440	100.0	90.0	1056.0	0.7	7.81	0.90	**1.6**	0.8	4.98	0.78	**0.9**	1.0	3.08	0.72	**0.5**
B3	50	0.009	32,830	0.75	A	0.0408	100.0	90.0	1056.0	0.7	7.81	0.90	**5.3**	0.8	4.98	0.78	**2.9**	0.9	3.08	0.72	**1.7**
B4	50	0.009	13,850	0.32	A	0.0431	100.0	90.0	1056.0	0.7	7.81	0.90	**2.2**	0.8	4.98	0.78	**1.2**	1.0	3.08	0.72	**0.7**
C1	50	0.009	33,270	0.76	A	0.0407	100.0	90.0	1056.0	0.7	7.81	0.90	**5.4**	0.8	4.98	0.78	**3.0**	0.9	3.08	0.72	**1.7**
C2	50	0.009	50,835	1.17	A	0.0396	100.0	90.0	1056.0	0.7	7.81	0.90	**8.2**	0.8	4.98	0.78	**4.5**	0.9	3.08	0.72	**2.6**
C3	50	0.009	36,190	0.83	A	0.0405	100.0	90.0	1056.0	0.7	7.81	0.90	**5.8**	0.8	4.98	0.78	**3.2**	0.9	3.08	0.72	**1.8**
C4	50	0.009	27,930	0.64	A	0.0412	100.0	90.0	1056.0	0.7	7.81	0.90	**4.5**	0.8	4.98	0.78	**2.5**	1.0	3.08	0.72	**1.4**
C5	50	0.009	33,510	0.77	A	0.0407	100.0	90.0	1056.0	0.7	7.81	0.90	**5.4**	0.8	4.98	0.78	**3.0**	0.9	3.08	0.72	**1.7**
D1	50	0.009	63,030	1.45	A	0.0390	100.0	90.0	1056.0	0.7	7.81	0.90	**10.2**	0.8	4.98	0.78	**5.6**	0.9	3.08	0.72	**3.2**
D2	50	0.009	44,900	1.03	A	0.0399	100.0	90.0	1056.0	0.7	7.81	0.90	**7.2**	0.8	4.98	0.78	**4.0**	0.9	3.08	0.72	**2.3**
D3	50	0.009	11,380	0.26	A	0.0436	100.0	90.0	1056.0	0.7	7.81	0.90	**1.8**	0.8	4.98	0.78	**1.0**	1.0	3.08	0.72	**0.6**
E1	50	0.009	24,340	0.56	A	0.0416	100.0	90.0	1056.0	0.7	7.81	0.90	**3.9**	0.8	4.98	0.78	**2.2**	1.0	3.08	0.72	**1.2**
E2	50	0.009	27,760	0.64	A	0.0412	100.0	90.0	1056.0	0.7	7.81	0.90	**4.5**	0.8	4.98	0.78	**2.5**	1.0	3.08	0.72	**1.4**
E3	50	0.009	20,735	0.48	A	0.0420	100.0	90.0	1056.0	0.7	7.81	0.90	**3.3**	0.8	4.98	0.78	**1.9**	1.0	3.08	0.72	**1.1**
E4	50	0.009	18,040	0.41	A	0.0424	100.0	90.0	1056.0	0.7	7.81	0.90	**2.9**	0.8	4.98	0.78	**1.6**	1.0	3.08	0.72	**0.9**
E5	50	0.009	10,025	0.23	A	0.0440	100.0	90.0	1056.0	0.7	7.81	0.90	**1.6**	0.8	4.98	0.78	**0.9**	1.0	3.08	0.72	**0.5**
F1	50	0.009	55,935	1.28	A	0.0393	100.0	90.0	1056.0	0.7	7.81	0.90	**9.0**	0.8	4.98	0.78	**5.0**	0.9	3.08	0.72	**2.8**
G1	50	0.009	25,640	0.59	A	0.0414	100.0	90.0	1056.0	0.7	7.81	0.90	**4.1**	0.8	4.98	0.78	**2.3**	1.0	3.08	0.72	**1.3**
H1	50	0.009	38,240	0.88	A	0.0404	100.0	90.0	1056.0	0.7	7.81	0.90	**6.2**	0.8	4.98	0.78	**3.4**	0.9	3.08	0.72	**1.9**
I1	50	0.009	91,310	2.10	A	0.0380	100.0	90.0	1056.0	0.6	7.81	0.90	**14.7**	0.8	4.98	0.78	**8.2**	0.9	3.08	0.72	**4.6**
J1	50	0.009	59,970	1.38	A	0.0391	100.0	90.0	1056.0	0.7	7.81	0.90	**9.7**	0.8	4.98	0.78	**5.4**	0.9	3.08	0.72	**3.1**
		SUBTOTAL	**1,254,760**	**28.81**																	

BUILDING INTERNAL (ROUTED TO SANITARY SEWER SYSTEM)

BLDG A	38,000	0.87
BLDG B	50,190	1.15
BLDG C	54,780	1.26
BLDG D	57,560	1.32
BLDG E	63,330	1.45
SUBTOTAL	**263,860**	**6.06**

TOTAL 1,518,620 34.86

WOOD PATEL

RETENTION VOLUMES REQUIRED
FIRST FLUSH VOLUME

Project Axon Way & Hayden Road
Location Scottsdale AZ
Project Number 205133.04
Project Engineer Aaron Feldberg

Rainfall Depth "P" = 0.50 inches

Drainage Subbasin ID	Retention Basin ID	Drainage Area "A" (Acres)	100 YR Runoff Coefficient "C"	A*C	Required Retention (AF)	Required Retention (CF)	Cumulative Required Retention (CF)
A1	A	1.05	1.00	1.05	0.04	1,911	19,321
A2		0.29	1.00	0.29	0.01	523	
A3		0.24	1.00	0.24	0.01	439	
A4		1.02	1.00	1.02	0.04	1,857	
A5		0.33	1.00	0.33	0.01	594	
A6		0.27	1.00	0.27	0.01	498	
A7		1.03	1.00	1.03	0.04	1,863	
A8		0.25	1.00	0.25	0.01	447	
A9		0.48	1.00	0.48	0.02	870	
A10		0.38	1.00	0.38	0.02	692	
A11		1.12	1.00	1.12	0.05	2,035	
A12		0.47	1.00	0.47	0.02	845	
A13		0.38	1.00	0.38	0.02	683	
A14		0.40	1.00	0.40	0.02	729	
A15		0.51	1.00	0.51	0.02	920	
A16		0.18	1.00	0.18	0.01	333	
A17		1.06	1.00	1.06	0.04	1,930	
A18		1.19	1.00	1.19	0.05	2,152	
B1	B	1.41	1.00	1.41	0.06	2,559	4,918
B2		0.23	1.00	0.23	0.01	414	
B3		0.75	1.00	0.75	0.03	1,368	
B4		0.32	1.00	0.32	0.01	577	
C1	C	0.76	1.00	0.76	0.03	1,386	7,572
C2		1.17	1.00	1.17	0.05	2,118	
C3		0.83	1.00	0.83	0.03	1,508	
C4		0.64	1.00	0.64	0.03	1,164	
C5		0.77	1.00	0.77	0.03	1,396	
D1	D	1.45	1.00	1.45	0.06	2,626	4,971
D2		1.03	1.00	1.03	0.04	1,871	
D3		0.26	1.00	0.26	0.01	474	
E1	1E	0.56	1.00	0.56	0.02	1,014	3,035
E2		0.64	1.00	0.64	0.03	1,157	
E3		0.48	1.00	0.48	0.02	864	
E4	2E	0.41	1.00	0.41	0.02	752	1,169
E5		0.23	1.00	0.23	0.01	418	
F1	F	1.28	1.00	1.28	0.05	2,331	2,331
G1	G	0.59	1.00	0.59	0.02	1,068	1,068
H1	H	0.88	1.00	0.88	0.04	1,593	1,593
I1	I	2.10	1.00	2.10	0.09	3,805	3,805
J1	J	1.38	1.00	1.38	0.06	2,499	2,499
TOTAL		**28.81**			**1.20**		**52,282**

Calculated Values

Required Retention = Vrequired = (P/12)*C*A
Weighted "C" = ((A1*C1)+(A2*C2))/(A1+A2)

WOOD PATEL

RETENTION VOLUME SUMMARY

Project Axon Way & Hayden Road
Location Scottsdale AZ
Project Number 205133.04
Project Engineer Aaron Feldberg

Volume Method Used **Average End Area**

Retention Basin ID	Bottom Elevation	Top Elevation	Bottom Area (sf)	Top Area (sf)	Volume (cf)	Total Volume Provided (cf)	Volume Required (cf)	Excess Storage Volume (cf)	NOTES
A	260 LF OF 10' DIA. STORAGE PIPE				20,420	20,420	19,321	1,100	
B	1,590.0	1,591.0	4,985	7,510	6,248	6,248	4,918	1,330	
C	100 LF OF 10' DIA. STORAGE PIPE				7,854	7,854	7,572	282	
D	1,585.0	1,586.0	6,110	7,445	6,778	6,778	4,971	1,806	
1E	40 LF OF 10' DIA. STORAGE PIPE				3,142	3,142	3,035	107	
2E	1,589.0	1,590.0	1,250	2,560	1,905	1,905	1,169	736	
TOTAL						**44,441**	**39,817**	**4,624**	

WOOD PATEL

DRYWELL BASIN DRAIN TIME

Project	Axon Way & Hayden Road
Location	Scottsdale AZ
Project Number	205133.04
Project Engineer	Aaron Feldberg

Retention Basin ID	Volume Required (AF)	Volume Required (cf)	Drywell Percolation Rate (cfs / drywell)	Number of Drywells Required	Number of Drywells Provided	Drain Time (Minutes)	(Hours)
A	0.44	19,321	0.10	2	2	1,610	26.83
C	0.17	7,572	0.10	1	1	1,262	21.03
1E	0.07	3,035	0.10	1	1	506	8.43

ARIZONA STATE ROUTE 101

ARIZONA STATE ROUTE 101

HAYDEN ROAD

AXON WAY

LEGEND

- A1 — DRAINAGE SUBBASIN
- DRAINAGE SUBBASIN BOUNDARY
- STORM DRAIN
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR

N

0 40 80

Horz. 1 in. = 80 ft.

F1 A1 J1 BLDG B A2 A3 G1 A4 A7 A5 A6 BLDG C A8 A9 A10 A17 A11 A14 A12 A13 A15 A16 BLDG A A18 B3 BLDG D B1 B4 B2 C2 E5 E2 C1 C4 H1 E4 E1 D1 E3 C3 BLDG E C5 D2 D3 I1

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

AXON WAY & HAYDEN ROAD

PROPOSED DRAINAGE MAP

DATE	08-02-2023	SCALE	1" = 80'	SHEET	1 OF 1
JOB NO	205133.04	DESIGN	AF	DRAWN	AF

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