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Case #: 39-DR-2024
Review Cycle: 1
Date: 02/19/2025
Status: Corrections Required

Address all drainage review comments provided on the report and/or plans, as applicable, and provide a written response to each comment.

It is preferred that responses are provided on a copy of said documents.

Next submittal may be considered incomplete otherwise.

NOVEMBER 15 2024

DRAINAGE DESIGN REPORT MAIN & MARSHALL REMODEL

PROJ NO. 644-PA-2024 KEY CODE 24029

7107 E Main St Scottsdale, Arizona 85251

UPDATED

XX-DR-2024



Owner:

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UPDATED

Civil Engineer !

Consultant:

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The information below include elements not part of the drainage report. No proper QA/QC conducted. Revise as applicable

UPDATED

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Appendices

- Appendix A – Water Layout Exhibit
- Appendix B – Fire Flow Results
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UPDATED



MAIN & MARSHALL REMODEL

7107 E MAIN ST SCOTTSDALE, AZ 85251

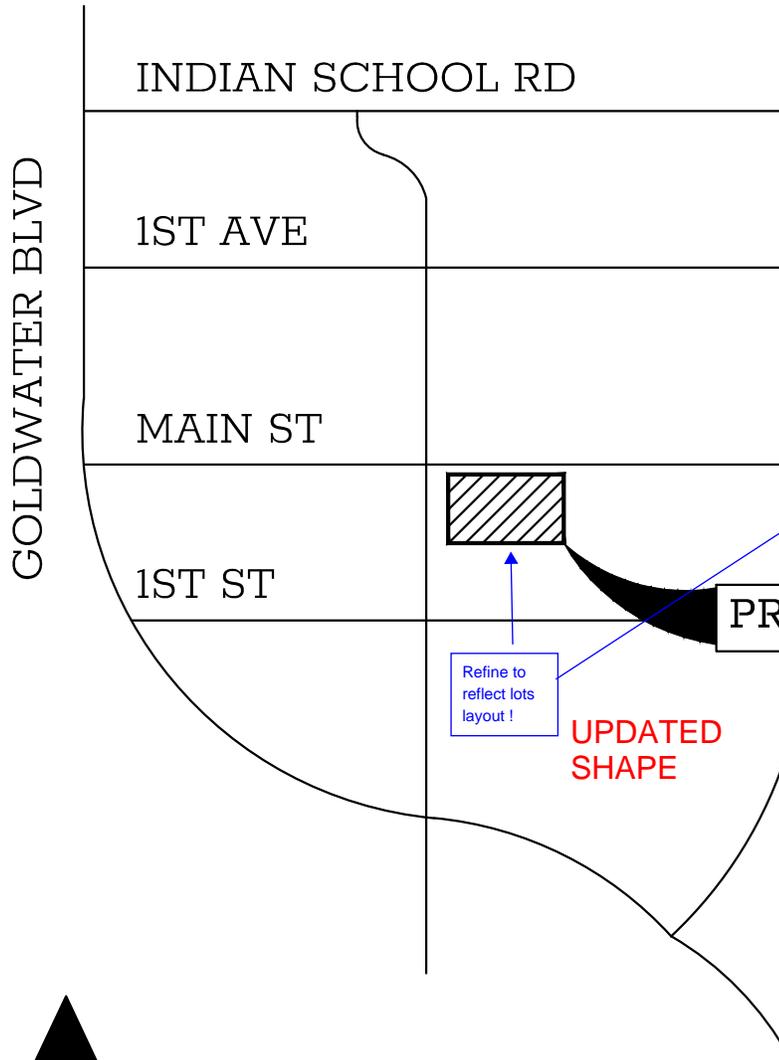


image from the city database, which not guaranteed to be 100% accurate

Refine to reflect lots layout!

UPDATED SHAPE

PROJECT SITE

UPDATED



VICINITY MAP

NTS



Drainage Design Report

Main & Marshall Remodel - 7107 E Main St Scottsdale, Arizona 85251

1.0 Introduction

1.1 Project Description

The site is located in a portion of the northeast quarter of Section 27, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. See **Figure 1: Vicinity Map** on the previous page for project location.

This project consists of the renovation of three existing, single story, commercial/retail (occupancy type 'M') buildings in Scottsdale, Arizona. Interior walls between the buildings will be removed/remodeled, but the external walls will remain. The proposed use for the renovated/new building is A-2 (Restaurant). A new clerestory roof structure and updates to the exterior façade are also proposed with this project. The proposed building is approximately 7,545 square feet and includes covered and uncovered patio spaces for a total of approximately 9,177 square feet under roof.

Clarify the term

REMOVED HERE AND EXPLAINED BELOW

The project is an infill project and will connect to existing site parking along Main St (north) and an existing alley (south), with limited disturbance to existing improvements except for within the alley. Five (5) additional stalls are proposed south of the parcel in the existing alley in addition to refuse containment, and architectural/landscape improvements. Existing onsite utilities will be removed and replaced with this project.

1.2 Project Location & Topography

EXPLAINED INFILL

This site is an infill project bounded to the north by Main St and existing parking, to the east by Malee's Thai Bistro (zoned C-2 DO), to the west by Marshall Way, and to the south by Canopy by Hilton Hotel separated by an existing alley/access road. See **Figure 1: Vicinity Map** on the previous page for project location.

check per the attached image from the city database, which not guaranteed to be 100% accurate

REMOVED LOT 10

The project consists of Lots 10, 11 and 12 of the West Scottsdale Subdivision (platted 1913), located just Southwest of the intersection of Indian School Rd (Paradise Ave) and Scottsdale Rd (2nd Ave). The project will require a Lot Combination of existing parcels APN 130-12-112, -113 and -114 for the development. All three parcels are currently zoned D/DC-1 DO. The project will not need to be rezoned.

Existing topography immediately adjacent to the site (within the alley) slopes east to west at approximately 0.35%. The parking area south of the building slopes south toward the alley and away from the building. The benchmark for this site is the northeast ¼ of section 27, T2N, R4E, NAVD 88 Datum, Elevation 1274.52. See **Figures 2a & 2B – Project Area Map** for an aerial of the surrounding project area.

1.3 Purpose

per the !

ADDED

information !

UPDATED

The purpose of this report is to ensure that the assumptions and methodologies used to develop the site hydrologic and hydraulic design of this project are in conformance with the requirements of City of Scottsdale. The 2018 City of Scottsdale Design Policy and Standards Manual (DSPM), and the Flood Control District of Maricopa County (FCDMC) Hydraulics and Hydrology Manuals.

ADDED

, as a supplement

1.4 Site Location Relative to Known FEMA Flood Hazard Zones

The project lies within Zone "X" No Screen, as shown on FIRM map number 04013C2235M, dated September 18, 2020. See Figure 3: FIRM Map. Zone "X" No Screen is defined by FEMA as:

"Areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood."

1.5 Existing Studies and Special Conditions

located within the southern watershed of

(LIBW) Area Drainage Master Study (ADMA), based on FLO-2D program modeling

UPDATED

The site is a part of the Lower Indian Bend Wash, South 100-yr 6-hr Maricopa County Area Drainage Master plan. Flow 2D information from the study can be found in Appendix A. The study results are discussed in Section 2.1.

UPDATED

The 100-yr, 6-hour FLO-2D modeling results

UPDATED

2.0 Existing Drainage Conditions

2.1 Street Capacity and Off-Site Flow Determination

LIBW study

UPDATED

north !

UPDATED

The site is bounded by existing E Main St to the west, which is crowned and slopes from west to east at approximately 0.35%. Flow 2D data from the Lower Indian Bend Wash Maricopa County Area Drainage Master Plan shows roughly 16.54cfs of flowing within E Main St during the 100-year 6-hour storm event at a maximum depth of approximately 0.47ft (average depth of 0.2ft) adjacent to the Site.

UPDATED

west !

The site is bounded by existing N Marshall Way to the north, which is crowned and slopes from north to south at approximately 0.36%. Flow 2D data from the Lower Indian Bend Wash Maricopa County Area Drainage Master Plan shows roughly 28 cfs of flowing within N Marshall Way during the 100-year 6-hour storm event at a maximum depth of approximately 0.57ft (average depth of 0.4ft) adjacent to the Site.

The existing storm drain inlets along Main St and Marshall Way should have been designed to intercept the 10-year flow and to allow flow-by during larger storms. The site should be protected by the existing storm drain infrastructure for the 10-year storm and should see no impact from off-site flows. However, the Flo2D analysis of the 100-year storm shows that the off-site infrastructure, in conjunction with the full capacity of the street, may not provide full protection of the existing site from larger storm events. The building is in an existing state and does not have any grading and drainage improvements proposed.

see comments on page 4 and recheck content of this section as applicable

UPDATED

Flow from north of the building/site sheet flows into E Main St. Flow from south of the building sheet flows into the alley and generally travels southeast. The alley slopes from west to east at approximately 0.2%. Flow from the alley is directed east to where it intersects 1st Street and continues east and into existing drainage infrastructure. Flow from E main street is captured via a 15" RCP storm drain at the

intersection of Main St and Scottsdale Rd. From there, flow continues south within Scottsdale Rd storm infrastructure. Flow from Marshall Way is captured via an 18” concrete pipe at the intersection of Marshall Way and 2nd St. From there, flow is conveyed east and away from the site. These inlets should be designed to capture the 10-year storm event flow and provide a flow-by condition for larger events. Minimal topographic changes are being made to the existing condition of the site. The project has little to no effect on existing drainage characteristics including concentration. The existing ultimate outfall for the site is at the southeast corner of the lot at an elevation of 1258.33. For the portion of the site that outfalls to the north, the outfall is the back of curb at the northeast corner of the lot at an elevation of 1258.35. For the portion of the site that outfalls to the west, the outfall elevation is 1258.46.

The Green Ampt soil characteristics for the site including USDA NRCS soil survey maps are included in **Appendix B – Soil Map**. The site soil is composed of LaA Laveen loam which is characterized as being well drained, with slow to medium runoff and moderate permeability.

The ultimate outfalls are related to where the flow leave the site. Why this value is entered?

UPDATED TO DISCUSS WHERE EACH OUTFALL IS LOCATED AND, UPDATED TO NEW SURVEY INFO

3.0 Proposed Drainage Conditions

3.1 Conveyance of Runoff Through Site

UPDATED outfalls!

On-site flows surface drain, as in the historic condition, via sheet flow to the site outfall. See **Appendix C – Grading and Drainage Plan** for the site layout. The Rational method per the FCDMC Hydrology Manual is typically used to calculate peak discharge from the site to ensure there is no change in pre-vs-post development discharge rates for the 2, 10, and 100-year storm events. The peak discharge can be calculated as follows:

Rational Method Equation: for Calculating Peak Discharge
Variables per Section 4-1.504.E of the COS DSPM
Q = CIA

Q =	cfs	Peak discharge
C =		Runoff Coefficient based on Land Use (Note: arithmetically area weighted value of contributing subbasins for a given concentration point)
I =	In/hr	Rainfall Intensity, lasting for Tc (Scottsdale Minimum Tc = 5 min)
A =	acres	Drainage area (addition of subbasin area for a given concentration point)

The existing development on-site is predominantly covered by pavement, building roof area, and covered patio. Only a small portion of the existing site is desert landscaping. The proposed development has greater landscape area than in the existing condition, which reduces the overall peak discharge from the site. See **Figure 4** and **Figure 5: Drainage Area Exhibit – Existing “C” Factors and Proposed “C” Factors**. The weighted runoff coefficient for the existing site is calculated to be 0.94. The weighted runoff coefficient for the proposed site is calculated to be 0.93. See **Figure 5** for calculations. All proposed roof slopes and grades adjacent to the building match that of the existing condition. Therefore, the I and A variables are the same in the predeveloped and post developed conditions and the runoff coefficient (C variable) decreases by 0.01 with the new development. This creates a slight decrease from the historic

RAISED FINISHED FLOOR ABOVE 100-YEAR HWE, MODELED EXISTING STREETS WITH FLO-2D DATA TO FINE TRUE HWE. ADDED DISCUSSION ABOUT FINISHED FLOOR UPDATE

Orangewood Engineerin

Lowest floor elevation (LF) requirements:
-If the plan is signed by a civil engineer, the engineer can set a LF considered safe from flooding, for up to the 100-year storm, and add the standard elevation certification statement (from DSPM, Chapter 1, Figure 1-3.12).
-If the plan is not sealed by an engineer, LF must be set a minimum of 14" above the highest adjacent grade.
-The LF for a garage is the elevation at the lower end/lip.
Additionally, when a structure is adjacent to any flow in a natural wash or channel, the LF of the structure should be set a minimum of 1.0 ft above the 100-year water surface elevation (WSEL) in the conveyance element, assessed at the upstream end of the structure.
-Structures that are impacted by a special FEMA flood hazard zone, such as AO, AE and AH, will be subject to additional FEMA and local requirements per the applicable flood zone.
-For lowest floor requirements in regard to adjacent street flows, see DSPM-Figure4-1.2

peak discharge from the site. The development of the property will not adversely change resulting flows affecting adjacent properties.

ADDED

3.2 Finished Floor Analysis

There are some discussion in this section not consistent with city policy (summarized above). review this section and revise accordingly

Note that the FLO-2D studies in Scottsdale are typically based on large 20'x20' topographic cells and, accordingly, the WSEL along the streets used to compare with ultimate outfall and lowest floor may not be completely relevant. If such elevations are needed for the design, the flow can be derived from the study but a separate street section hydraulics may need to be conducted

This existing finished floor of the building will not be modified with the scope of these improvements. The following analysis was performed for informational purposes.

In its existing condition, the finished floor for this project is 6.36" (0.53ft) above the low curb within E Main St. and 4.2" (0.35ft) above the highwater elevation in E Main St at the outfall.

In its existing condition, the finished floor for this project is 2.52" (0.21ft) above the low curb within Marshall Way and 1.3" (0.11ft) above the highwater elevation in E Main St at the outfall.

In its existing condition, the finished floor is below the high curb where E Main St intersects Marshall Way and is below the highwater elevation in the intersection at the northwest corner of the lot (the highest highwater elevation in the public street which is adjacent to the site). The existing finished floor elevation of 58.88 is below the highest adjacent highwater elevation (59.24') in the street by 4.3" (0.36ft). However, the 100-year 6-hour storm event is no more than 0.2 ft above the back of curb at any location adjacent the site.

The Flo2D Analysis provided by the Lower Indian Bend Wash Area Drainage Master Plan does not show the off-site flow in Main St or Marshall Way impacting the existing building. However, the elevations provided for the high waters within the streets, particularly at the intersection, are showing at a higher elevation than the existing finished floor. The existing hardscape in the right of way and the 20' of separation from the building to the back of curb is providing additional capacity within the site's frontage and is likely why the model does not show flow affecting the existing building. Additional topographic data will be required to determine the true capacity of the frontage on Marshall Way and Main St to determine if the Flo2D model is accurate in showing that the building is protected from the off-site flow.

Per Table 6.7 - *Minimum Drainage Design Criteria* of the Maricopa County Design manual, the lowest Finished Floor shall be located 14 inches above the lowest drainage outfall of the site (Ultimate Outfall) and 12 inches above the low curb.

Therefore, in reference to the standards mentioned above:

1. The finished floor is below the highest adjacent 100-year high water elevation at the intersection of Main St and Marshall Way by 4.8 inches. Therefore, the site does not comply with this standard.
2. The site outfall is at the southeast corner of the lot and is at an elevation of 1258.33 ft. The finished floor is less than 14-inches above the lowest drainage outfall for the lot (only 6.1"). Therefore, the site does not comply with this standard.
3. The finished floor is not 12 inches above low curb elevation of 1258.35 (only 6"). The site does not comply. Therefore, the site does not comply with this standard.

The existing finished floor elevation (elevation 1258.84) does not meet the minimum drainage design criteria for Maricopa County and the finished floor condition is not proposed to be altered with this renovation.

RAISED FINISHED FLOOR

Elevating the existing finished floor with the proposed renovations was considered, however, the scope of this project is limited primarily to interior renovations. No external changes are proposed adjacent to Marshall Way or Main St, therefore there is no impact to existing offsite flow conditions positively, or negatively. The 100-year 6-hour Flow 2D Model shows that the flow is contained within street ROW where the highwater elevation is above the finished floor elevation, meaning that this site is plausibly safe from inundation during the base flood event. However, there is still some concern for flooding in the base flood event due to model limitations and the proximity of the highwater in adjacent streets to the breakout elevation at back of sidewalk. It is recommended that additional floodproofing measures are taken to further protect this site from offsite flow.

If after revisiting the finished floor section per the comments provided, the existing lowest floor elevation is still inadequate, there may be a need to reconsider raising the floor !

3.3 Retention Requirements

The existing lot is a fully developed commercial site which does not appear to provide any retention volume for on-site runoff in the existing condition.

Proposed redeveloped sites are typically required to provide retention for the greater of the pre-vs-post or the first flush as follows:

Per the City of Scottsdale Design Standards and Policies Manual section 4-1201.C the applicant must illustrate no increase in outflows from the site or applicable portions of the site from pre-development conditions for sites which were graded and developed prior to 1987. This site was platted in 1913 and constructed in 1956. This site is fully developed with building and pavement and minimal desert landscaping. In the proposed condition, the amount of landscaping increases and pavement area decreases. See **Figure 4** and **Figure 5: Drainage Area Exhibit – Existing “C” Factors and Proposed “C” Factors**. Additionally, see **Figure 6** for the calculated required retention. Negative 22 cubic feet of retention is calculated; therefore, the pre vs post analysis produces no required retention volume.

Per section 4-1201.C.2D, sites that are less than one acre in size and are not likely to contribute stormwater contaminants to the city’s municipal separate storm sewer system or waters of the U.S., the first flush requirements are not applicable.

4.0 Conclusion

Revise after addressing comments
Conclusion is more relevant to large reports. For small reports, the conclusion section can be brief

REVISED

The study supports that the Main and Marshall redevelopment meets most of the criteria set forth by Section 4 of the City of Scottsdale 2018 Design Standards and Policies Manual. The exception to this is that the building finished floor in the existing condition is lower than requirements allow. The findings of the report are stated below:

- The development was designed to meet or exceed the drainage requirements set by City of Scottsdale, Maricopa County and Flood Control District (with the exception of the existing finished floor – see section 3.2 in this report).

see comments on
the report text for
proper reference

REVISED

Appendix A -

Lower Indian Bend Wash Maricopa County Area Drainage Master plan. Flow 2D