

HOUGHTON ROAD CORRIDOR TUCSON, ARIZONA

EXISTING CONDITIONS DRAINAGE ANALYSIS AND REPORT

Prepared for

Arizona State Land Department

Task I-B-5 Deliverable

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EXECUTIVE SUMMARY

The Houghton Road Corridor (HRC) is a 12,000 acre parcel of land located in southeast Tucson, Arizona in Pima County. The property is primarily divided into two parcels, with the northern parcel being the larger of the two (~ 8250 ac) and both being non-uniform in shape. For the northern parcel, the property's most northern boundary is Irvington Road, the southern boundary being the Southern Pacific Railroad, the eastern most boundary south is Varner Drive and the Pantano Wash, and the western most boundary is the Harrison Road Corridor. For the southern parcel, the property is bounded on the north by the Southern Pacific Railroad, the southern most boundary is along E Brekke Road, the eastern most boundary is approximately 1300 feet east of S. Freeman Road, and the western most boundary is approximately 1300 feet west of Rita Road. This drainage study provides an assessment of the existing drainage conditions for this parcel.

The purpose of this report is analyze both the hydrologic and hydraulic characteristics of significant and minor watercourses that traverse the project site for the existing conditions for a 100-year storm event.

Data from previous drainage studies was collected, compiled and evaluated to establish the parameters and methodologies for this study. From the previous studies, updating the *Tucson Stormwater Management Study, (TSMS)*, was selected for the preferred methodology.

The HRC project site falls within the Airport/Julian and Atterbury/Rose hydrologic units per the designation in the TSMS. The two hydrologic units are further subdivided into watersheds with a total of five (5) watersheds being located within the project site. The names of the watersheds, from North to south, are:

- Mesquite Ranch Wash,
- Civano Wash,
- Atterbury Wash,
- Julian Wash,
- Airport Wash

Three (3) components of the TSMS HEC-1 models were updated for this analysis. The first revision was to add JD cards to the HEC-1 model to incorporate depth/area relationship for aerial reduction of the watershed, as the total contributing area increases as flows are routed down stream. The second change to the models was to update the percent imperviousness for changes in land uses where development has

occurred since the original TSMS hydrology was prepared. The 3rd update made to the HEC-1 models was to measure, verify and adjust the subbasin areas where appropriate

The five watersheds, discussed above, are tributary to significant water courses that traverse the project site washes which have the same names, respectively. Significant washes are identified as a well-defined channel with substantial conveyance capacity, linear extent and continuity of the channel through a major portion of the site with a majority of the reach exhibiting high value existing habitat and vegetation. Minor watercourses that collect and convey 100 cfs or more were identified by finding the point along watercourses where approximately 40 acres of drainage area becomes tributary to the stream. The 40 acres of tributary area is based on 2.5 cfs per acre.

A Floodplain Analysis was performed on both the significant and minor watercourses. For the significant washes, HEC-RAS was used to delineate the floodplains. The HEC-RAS delineated floodplains illustrate the 100-year peak flows and establish base flood elevations. For the minor washes and tributaries of 100 cfs or more, the normal depth method was used to approximate the floodplain widths. Floodplain delineations are present on 400 scale work maps that are located in Appendix B.5 of this report.

Future development for this parcel must consider the Guidelines and ordinances found in the City of Tucson's Municipal Code Chapter 26, Floodplain, Stormwater, and Erosion Hazard Management.

CONCLUSIONS AND RECOMMENDATIONS

This report analyzes both the hydrologic and hydraulic characteristics of significant and minor watercourses that traverse the Houghton Road Corridor (HRC) project site for the existing conditions for a 100-year storm event. The development of the HRC study is based on the Tucson Stormwater Management Study (TSMS) and it follows the guidelines and criteria found in the City of Tucson Department of Transportation Engineering Division's Standards Manual For Drainage Design and Floodplain Management In Tucson Arizona.

The HRC project site falls within two hydrologic units as identified in the TSMS study (Airport/Julian and Atterbury/Rose). These two hydrologic units are further subdivided into five (5) watersheds being located within the project site. The names of the watersheds, from North to South, are:

- Mesquite Ranch Wash,
- Civano Wash,
- Atterbury Wash,
- Julian Wash,
- Airport Wash

The five watersheds, listed above, are tributary to significant water courses that traverse the project site which have the same names, respectively. Significant washes are identified as a well-defined channel with substantial conveyance capacity, linear extent and continuity of the channel through a major portion of the site with a majority of the reach exhibiting high value existing habitat and vegetation. Minor watercourses that collect and convey 100 cfs or more were identified by finding the point along watercourses where approximately 40 acres of drainage area becomes tributary to the stream. A Floodplain Analysis was performed on both the significant and minor watercourses that traverse the HRC project site.

The HRC study is to be used as the basis for comparing existing conditions versus future developed conditions. Future development will require an updated hydrologic analyses reflecting the changes in subbasin boundaries and land uses per the proposed development plans as well as incorporating the mandatory detention requirements. In addition, more detailed floodplain analyses will be necessary for the major and minor water courses as the proposed developed conditions alters the existing drainage patterns and updated topographic mapping becomes available.

When developing the parcel consideration should be given for the preservation of the natural washes, undisturbed washes and "natural" riparian habitat corridors.

Future development for this parcel must consider the guidelines and ordinances found in the City of Tucson's Municipal Code Chapter 26, Floodplain, Stormwater, and Erosion Hazard Management. Policies, procedures and design criteria can be found in City of Tucson Department of Transportation Engineering Division's *Standards Manual For Drainage Design and Floodplain Management In Tucson Arizona*, and Pima County Department of Transportation & Flood Control District City of Tucson's *Stormwater Detention/Retention Manual*.