



# Report of Findings

## Woodland Park Homeowners Association

Prepared by  
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Frank Civil Consulting

The Pavement, Drainage and Infrastructure Specialists

February 29, 2016

## INTRODUCTION



*Frank Civil Consulting* has been retained to complete an investigation of the existing asphalt conditions present at the Woodland Park located at the intersection of 32nd Street and Hazelwood Street in Phoenix, Arizona. The purpose of this investigation was to evaluate existing pavement, drainage and related components and recommend remediation options. Visual examination of the site took place on Wednesday, February 10, 2016. During this examination, the existing pavement surfaces were reviewed and existing drainage and conveyance systems evaluated. Use of this report and subsequent reports is for the expressed and intended purpose of the Woodland Park Community and the information contained herein for streets or other ancillary components outside of this community are expressly prohibited. **This report is not provided for the intended use of bid specifications.** If not included under the terms of this agreement; bid specifications can be provided under separate agreement with application rates, means and methods of construction/application, design standards, along with other information designed specifically for the bidding process. With this in mind, the following observations have been made.

## GENERAL OBSERVATIONS

Woodland Park Community is an attached townhome community. The Community is approximately 40 years of age. They have received numerous surface applications over its life including isolated asphalt overlays and a slurry seal.

The Community expressed concern related to storm water storage within the pavement surface, more specifically at the cul-de-sac at the west end of Hazelwood Street. On February 11, 2016, a field survey was completed (see attachment) by Frank Civil Consulting utilizing existing elevations on the curb line to define original design intent (considering ongoing pavement surface applications may have an impact on drainage performance). This coupled with our field evaluation and understanding of storm drain requirements in the 1970's provided insight into the conditions impacting storm water release. Per the elevations and site inspection, the Community was designed to have two storm water release points within the property.

The first location identified was a "wet well" located at approximately the mid-point of the property at the north end of the Community in a common element just north of the Hazelwood Street cul-de-sac (Exhibit 1). This drainage component is made of brick and mortar and appears to receive a portion of the storm water generated at the east end of Hazelwood Street and all storm water within the cul-de-sac. The well grate was grouted in place; therefore, we were unable to determine its performance ability (Exhibit 2). We are not sure if this was truly a part of the original design and construction; however, "wet wells" of this nature will fill with sediment and eventually lose the ability to percolate storm water.



Exhibit 1



Exhibit 2

## GENERAL OBSERVATIONS CONTINUED

The second location is at the southwest corner of the cul-de-sac at the west end of the property. The pavement is bordered by ribbon curb, originally providing the free and open release of storm water off the pavement into the adjacent common elements. However, over the years, sod adjacent to the curb has filled with sediment and subsequently more sod growth where now existing elevations well exceed storm water ability to release (Exhibit 3). It is our opinion that this storm water conveyance may not have terminated at the common area to the west. It is our belief that this water was either designed to convey further to the south and west through a wall opening at the southwest corner of the property or may have been designed to store in the southwest corner of the property or release into a drywell or storm water component in the general area of the storage parking lot. The adjacent property to the south exhibits what may have been at one time a detention or drainage swale which may have accepted storm water from the Woodland Park Property and possibly conveyed it further to the south. Unfortunately, historical maintenance and lack of understanding of this drainage design has dramatically altered current drainage patterns. It is not our opinion that these previous drainage patterns can be re-established without considerable design and cooperation with adjacent properties to complete.

Given the establishment of this opinion, we recommend that a minor hydraulic study be completed to determine the amount of storm water that impacts this Community in a 100 year event and design retention at the southwest corner of the property to capture this water off of the cul-de-sac. The assistance of a drywell may be necessary to address percolation issues that may result. Most certainly, the common area adjacent to the southwest corner of the cul-de-sac must be lowered to allow for storm water release off of the cul-de-sac. Failure to do so will dramatically impact pavement performance moving forward.

The above addresses the common issues facing the Community's streets. For the purposes of the remainder of this report each street has been identified independently of each other.



Exhibit 3

## HAZELWOOD STREET OBSERVATIONS

Hazelwood Street is the arterial collector street that runs east and west throughout the community connecting 32nd Street to the east and terminates at a cul-de-sac to the west.

The surface condition of Hazelwood Street is extremely dry and brittle and instability of the original pavement is reflecting through the surface of the slurry seal (Exhibit 4). There is considerable structural and finite cracking occurring throughout the pavement surface (Exhibit 5). Thermal shrinkage and pavement structural failure cracks exist from approximately hairline to ½” in width (Exhibit 6). Some of this cracking is the result of moisture intrusion into the sub terrain creating instability that impacts the structural stability of the pavement above while other cracking is related to the age and brittle nature of the pavement section. Asphalt failure was exhibited throughout this street.

Irrigation overspray has dramatically impacted the amount of asphalt deterioration adjacent to sod locations (Exhibit 7). Oils and surface fines have been washed out of the pavement surface at these locations exposing the coarse structural aggregates beneath. The pavement is now displacing even the coarse aggregates at the time of this investigation. Consideration should be given for the installation of a riparian barrier between grass and pavement or installation of “stream head” sprinklers once reclamation is completed to minimize water contact with the new pavement surface maximizing its life expectancy (Exhibit 8).



Exhibit 4



Exhibit 5



Exhibit 6



Exhibit 7



Exhibit 8

## HAZELWOOD STREET OBSERVATIONS CONTINUED

Undulation (ground movement that is creating both heaving and settlement) of the pavement and concrete is occurring at multiple locations where asphalt along the ribbon curb has settled up to 2" (Exhibits 9 & 10). Ground movement of this nature was also identified at isolated locations between the curb and the resident's driveways (Exhibit 11). This geographic region historically has exhibited highly expansive clay soils which promotes earth movement when moisture intrusion occurs. Storm and irrigation water permeation into the pavement surface where water stores, thermal cracks and the void between concrete and pavement has created this condition throughout the property.

Hazelwood appears to have been at one time a crowned street; however, it is unclear the exact original design intent as asphalt overlays and slurry seal applications have changed pavement surface elevations. There is predominately one tenth of a foot (.10) of elevation difference between the north side pavement's ribbon curb and the south side of the pavement's ribbon curb (being lower) creating fall to the south for water release toward the residents yards.

During previous asphalt renovation projects, public utilities were not adjusted to the new finish elevation of the pavement surface (Exhibits 12, 13 & 14). This practice is frowned upon by the public agencies that are required to maintain them. During reconstruction, all utilities will be lowered to avoid damage during grading and paving operations. Once completed, all utilities will be readjusted to finished pavement elevation utilizing a concrete adjustment/subsidence collar.



Exhibit 9



Exhibit 10



Exhibit 11



Exhibit 12



Exhibit 13



Exhibit 14

## HAZELWOOD STREET OBSERVATIONS CONTINUED

Water storage in the west cul-de-sac as defined in the “General Observations” of this report has resulted in moisture intrusion into the sub terrain and subsequent severe pavement failure (Exhibits 15 & 16). Removal and replacement of the asphalt is recommended for this property as a whole; however, as stated previously in this report, storm and nuisance water release off of the asphalt is extremely important to prevent pre-mature degradation of the pavement and sub terrain.

Ribbon curb throughout the street was exhibiting structural failure at isolated locations as a result of unstable sub terrain and the load of the concrete or traffic above (Exhibits 17, 18 & 19). These structurally failed curb locations warrant removal and replacement as a part of the asphalt reclamation project.



Exhibit 15



Exhibit 16



Exhibit 17

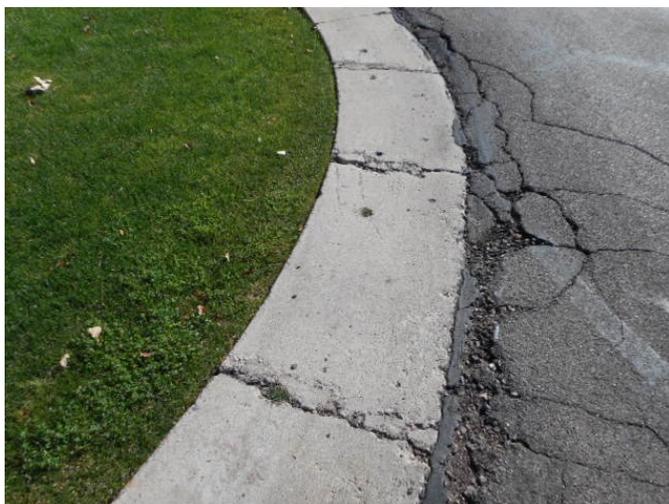


Exhibit 18



Exhibit 19

## HAZELWOOD STREET OBSERVATIONS CONTINUED

It is our understanding that the association owns and maintains the driveways throughout this community. At multiple isolated locations structural cracking and concrete failure was identified (Exhibits 20 & 21). Several minor previous repairs have been completed throughout that were performing acceptably at the time of this investigation (Exhibits 22 & 23). All locations exhibiting excessive structural fatigue (ground movement, severe concrete damage) are recommended for reconstruction. The degree that these area are corrected should be evaluated by the Board.



Exhibit 20



Exhibit 21



Exhibit 22



Exhibit 23

## 31ST PLACE OBSERVATIONS

31st Place connects Coolidge Street and Hazelwood Street. It is a crowned street with storm and nuisance water draining along the ribbon curb edges to the south for release onto Hazelwood Street for further conveyance to the west (Exhibit 24).

The surface condition of the pavement is commensurate with Hazelwood Street. The condition of the slurry is very fatigued and brittle (Exhibit 25). Irrigation overspray has increased pavement failure along the curbside edge which should be corrected prior to reconstruction (Exhibit 26). Instability of the sub terrain has reflected through the surface of the pavement and slurry seal throughout this drive.

As identified on Hazelwood, utilities were never adjusted to the finish surface elevation of the pavement after the prior asphalt overlay and slurry application (Exhibit 27). Some of these utilities were over an inch below the surface elevation of the pavement.

Concrete curb and resident driveway cracking and structural failure were identified at multiple locations throughout this street (Exhibits 28 & 29). Removal and replacement during asphalt reclamation is warranted and recommended. Specifically regarding the resident's driveways, the Community's Board of Directors should discuss the limits of repair for cost versus the aesthetic appeal of those limits.

At the southern end of the street where intersecting with Hazelwood, consideration should be given for installation of a concrete valley gutter to assist in the conveyance of storm and nuisance water through this intersection to the west (Exhibit 30).



Exhibit 24



Exhibit 25



Exhibit 26



Exhibit 27



Exhibit 28



Exhibit 29

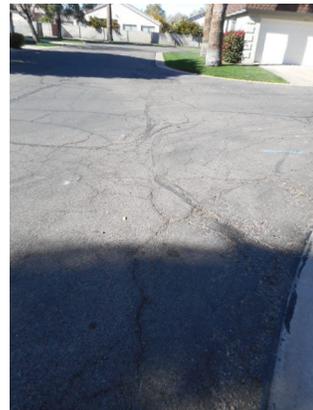


Exhibit 30

## 31ST WAY OBSERVATIONS

31st Way connects Coolidge Street with Hazelwood Street at the east side of the community (Exhibit 31). 31st Way exhibits the same asphalt conditions structurally and from a subterranean perspective with regard to instability and pavement failure (Exhibit 32).

The structurally failed concrete driveway entrance at the north end of this street is maintained by the City of Phoenix and cannot be replaced by the Community without a permit (Exhibit 33). When reclamation is planned a meeting with the City should be arranged to discuss potential municipal repairs at this location.

Storm and nuisance water on this street drains back to the south for release onto Hazelwood Street for further conveyance to the west.

As was identified throughout the community, public utilities were never adjusted up to the finish elevation of the pavement surface and should be during the planned reclamation project (Exhibits 34 & 35).



Exhibit 31



Exhibit 32



Exhibit 33



Exhibit 34



Exhibit 35

## 31ST WAY OBSERVATIONS CONTINUED

Irrigation water has negatively impacted the structural condition of the pavement adjacent to sod areas on this street as it has on all other streets within the Community (Exhibits 36 & 37).

Concrete cracking and structural failure of the ribbon curb and resident's driveways were identified at multiple locations throughout this street (Exhibit 38). Ribbon curb at one location of this street has settled up to 4" in depth as a result of moisture permeation and subsequent ground movement. Removal and replacement of these severely fatigued concrete areas are recommended and warranted during the reclamation of the streets. Again, the Community's Board of Directors should discuss the limits of repair for cost versus the aesthetic appeal of those limits.



Exhibit 36



Exhibit 37



Exhibit 38

## CONCLUSIONS AND RECOMMENDATIONS

The asphaltic concrete pavement within this community has exhausted its useful life at 40 years. No surface applications exist that will address the level of instability and asphalt failure that the community is experiencing. It is warranted and recommended to remove and replace all existing asphalt within the property's streets. The asphalt structural section should be compliant with the recommendations provided in the Speedie and Associates report (April 14th, 2014) of 2 ½" Asphalt on 5" Aggregate Base Course (ABC) on compacted sub grade. Cores from this report define existing aggregate base course depth to exceed 5". Therefore, provided that no contamination of the existing ABC is evident, reuse of this product would be anticipated. Our recommendation would be to remove the existing asphalt, complete load testing of the existing ABC and sub terrain to identify any unstable subterranean locations and then correct prior to placement of the new 2 ½" asphalt surface. Until the extent of instability can be determined, the means and methods of stabilization will be unknown. The Frank Civil Consulting budget will reflect an allowance for repairs of these unforeseeable conditions.

All concrete curb and drives should also be removed, sub terrain stabilized and then replaced prior to asphalt reconstruction.

Finally, prior to asphalt reconstruction, all storm water and irrigation components should be addressed per the recommendations provided in the body of this report. Failure to do so will dramatically reduce the life expectancy of the new asphalt.

## END OF REPORT

Based on the recommendations provided within this report, should the board choose to pursue the work as identified, it can be expected that the remediation completed therein will provide the community a good wearing surface for 3-4 years before further preventative is needed (excepting crack filling which should be evaluated every 12-18 months) or other unidentifiable structural repairs not evident at the time of this investigation. In addition, a reserve analysis of ongoing pavement maintenance should be part of a long range plan where corrective work is conducted annually over a predetermined period of time to ultimately provide the longest range resolution of the overall pavement issue of asphalt aging. This long range plan should incorporate the eventual and ultimate need to address complete removal and replacement of existing asphalt.

This concludes my report of investigation. Recommendations made within this report are strictly that; recommendations. It is anticipated that the client will proceed utilizing his best judgment applying this information and any other information received from his civil engineer and other consultants. A pavement reserve study is a proposed part of the overall services agreement between Woodland Park Community Association and Frank Civil Consulting, and if accepted will be presented under separate report cover once the board has met with me to discuss this report and a plan relative to its content is created. Should you require further information, please don't hesitate to contact me.

Sincerely,

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Principal  
Frank Civil Consulting



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