VILLAGES AT WOLF RANCH PHASE 5
MASTER DEVELOPMENT DRAINAGE REPORT
&
FINAL DRAINAGE REPORT
For
VILLAGES AT WOLF RANCH FILING NO. 20

February, 2013

Prepared for:

Villages at Wolf Ranch, LLC (Nor`wood)
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Project #12-019

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DRAINAGE PLAN STATEMENTS

ENGINEER'S STATEMENT

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City of Colorado Springs for drainage reports, and said drainage report is in conformity with the Master Plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

K.D. Rockwell, P.E.

Kent D. Rockwell, P.E.

COLORADO REGISTERED KENT D. ROCKWELL 25086 3/13/13 PROFESSIONAL ENGINEER

DEVELOPER'S STATEMENT

I, the developer, have read and will comply with all the requirements specified in this drainage report and plan.

Villages at Wolf Ranch, LLC

BY: _____ 2/25/13

Ralph A. Braden DATE

TITLE: Vice President, Norwood Limited, Inc.

ADDRESS: 111 S. Tejon Street, Suite 222
Colorado Springs, CO 80903

CITY OF COLORADO SPRINGS

Filed in accordance with Section 7-7-906 of the code of the City of Colorado Springs, 2001, as amended.

FOR THE CITY ENGINEER _____ 3/19/13 DATE

VILLAGES AT WOLF RANCH PHASE 5
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PURPOSE

The purpose of this report is to identify the existing and proposed runoff patterns and drainage facilities required for the proposed Villages at Wolf Ranch Phase 5 Development consisting of Villages at Wolf Ranch Filing No. 20 and future Villages filings. Villages at Wolf Ranch Phase 5 contains 46.363 acres with 189 single family lots. Filing No. 20 contains 13.615 acres with 49 single family lots. This development is located northeast of the Research Boulevard and Wolf Center Drive intersection. (See Figure 1).

SUMMARY OF DATA

The sources of information used in the development of this study are listed below:

1. City of Colorado Springs and El Paso County "Drainage Criteria Manual", October 1987, rev November 1991.

2. Soil Survey for El Paso County, Colorado, U.S. Department of Agriculture, Soil Conservation Service, June 1980.

3. "Flood Insurance Studies for Colorado Springs and El Paso County, Colorado", prepared by the Federal Emergency Management Agency (FEMA), 1985.

4. "Cottonwood Creek Drainage Basin Planning Study" by URS Consultants, Inc., August 1995.

5. "Cottonwood Creek Prudent Line Study" by Ayres & Associates, 1996.

6. "Preliminary/Final Drainage Report for Power Boulevard (Research Parkway to Woodmen Road" by JR Engineering, July, 2000.

7. "Preliminary/Final Drainage Report for Research Parkway (Scarborough Drive to Powers Blvd.) including Research Parkway Subdivision Filing No. 6, by JR Engineering, April, 2000.

8. "Master Development Drainage Plan for Wolf Ranch, Colorado Springs, Colorado," prepared by Ayres Associates, March, 2001.

9. "Westcreek at Wolf Ranch Subdivision Master Development Drainage Report & Final Drainage Report for Westcreek at Wolf Ranch Subdivision Filings 1, 2, 3, 4 and 5, prepared by Rockwell Minchow Consultants, Inc., dated July, 2004.

10. "Final Drainage Report for By the Creek at Wolf Ranch Subdivision Filing No. 1, by Rockwell Consulting, Inc. **(re-submittal to City Engineering for final approval pending).**

11. "Master Development Drainage Plan Wolf Ranch Development," prepared by Kiowa Engineering Corporation, Nov, 2004 **(not approved/accepted by City Engineering-approval pending).**

GENERAL LOCATION AND DESCRIPTION

The Villages at Wolf Ranch Phase 5 Development is located within the northeastern portion of the City of Colorado Springs, El Paso County, Colorado. (see Vicinity Map - Figure 1). The site is within the east half of Section 36, Township 12 South, Range 66 West and in the west half of Section 31, Township 13 South, Range 65 West of the 6th P.M. The site is bound on the west by Villages at Wolf Ranch Filing Nos. 1, 3 and 4 residential developments, on the south by Research Parkway (Filing No. 3) and Westcreek at Wolf Ranch Filing No. 11 residential development; on the north by Villages at Wolf Ranch Filing Nos. 9, 10 and 11 residential developments, and on the east by future By the Creek at Wolf Ranch Filing No. 1 residential development.

Well-established native grasses exist throughout the proposed development. The topography generally slopes from northeast to southwest.

SOILS

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the soils underlying the Villages Development fall under the Blakeland Series (Soil 8), the Stapleton (Soil 83), and the Truckton Series (Soil 97). All these soils are classified as Hydrologic Group "A" soils. However, since bedrock is known to exist just below the surface Hydrologic Group "D" soils were used to determine runoff coefficients (see Soils Map – Figure 2).

CLIMATE

This area of El Paso County can be described as the foothills, with total precipitation amounts typical of a semi-arid region. Winters are generally cold and dry, and summers relatively warm and dry. Precipitation ranges from 12 to 14 inches per year, with the majority of this moisture occurring in the spring and summer in the form of rainfall. Thunderstorms are common during the summer months.

FLOODPLAIN STATEMENT

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) #08041C0528 F and #08041c0529 F, dated March 17, 1997, no portion of the Villages at Wolf Ranch Phase 5 Development lies within a designated 100-year floodplain.

DRAINAGE CRITERIA

The current City of Colorado Springs/El Paso County Drainage Criteria was utilized in this report. Peak runoff quantities were determined using the Rational Method for both the 5 year and 100 year storms, as required for drainage basins less than 100 acres.

HISTORIC DRAINAGE BASIN DESCRIPTIONS

The Historic Drainage Basins within this portion of Wolf Ranch have been analyzed under the Wolf Ranch Master Development Drainage Plan (MDDP) and previous Villages at Wolf Range Final Drainage Reports. Previous grading and development of surrounding areas have altered the historic drainage patterns, therefore, an analysis of the historic drainage is not included in this report.

Detention of flows along the south and western boundary lines of Wolf Ranch has been provided in accordance with the Wolf Ranch MDDP prepared by Kiowa Engineering in 2004. The drainage for this parcel is consistent with that MDDP.

DEVELOPED DRAINAGE BASIN DESCRIPTIONS

A brief description of each developed drainage basin for the site is provided in this section of the report. A summary of peak developed runoff for the basins is depicted on the Developed Drainage Plan (Exhibit 1) provided in the appendix. All proposed drainage facilities are approximate in size and may vary with actual layout and design.

Within the single-family residential development, side lot line swales will be created on the downstream lots to convey flows from the upstream lots and into the street. Swales will be constructed by the homebuilders and maintained by the homeowner to limit concentrated flows and to disperse the flows as much as possible. Lot Drainage Plans will be prepared for the residential lots as they are developed and platted per filing.

Individual lot drainage is the responsibility of the lot owner / builder.

According to the Master Development Drainage Plan for Villages II at Wolf Ranch and Final Drainage Report for Villages at Wolf Ranch Subdivision Filings 5, 6, 7, 8 and 9 the total flows from Basins 1 through 12 and 21 through 26, inclusive which reach Design Point #A (located at the Wolf Village Drive and Valemount Drive intersection) are $Q_5 = 77.0$ cfs and $Q_{100} = 162$ cfs. An existing 42" pipe conveys these flows southerly into the Villages at Wolf Ranch Phase 5 Development through an earthen swale that reaches the existing 42" RCP stub-outs along the north side of Research Parkway just east of Wolf Center Drive. The Phase 5 development will pipe these flows though the public streets to the outfall in Research Parkway.

The Valemount and Wolf Village Drive intersection currently exists as a tee intersection. An existing 6' sump inlet is located along the south side of Wolf Village Drive and will need to be replaced. A 6' D-11 sump inlet will be constructed at the southwest corner of this intersection to replace the existing 6' sump inlet.

Developed Basin 1 consists of 0.95 acres of future residential lots along the south side of Wolf Village Drive together with the south ½ of Wolf Village Drive. This 0.95 acre basin generates runoff rates of 3.3 cubic feet per second (cfs) during the 5 year storm and 6.8 cfs during the 100 year storm. These runoff rates flow westerly within the south side of Wolf Village Drive toward the Valemount and Wolf Village Drive intersection. Wolf Village Drive at a slope of 2.6% has a 5 year street capacity of 18.2 cfs which is adequate to convey these flows. A 6' sump inlet will be installed at the southeast corner of this intersection to collect the flows generated from Basin 1. An 18" RCP will convey the collected flows westerly to the existing 42" RCP.

Additional flow rates of $Q_5 = 0.7$ cfs and $Q_{100} = 1.3$ cfs are generated from the 0.18 acre Basin 2 which is located along the south side of Wolf Village Drive just west of Valemount. A 4' sump D-11 inlet will be installed at the southwest corner of Wolf Village Drive and Valemount to collect the flows generated from Basin 2.

Basin 3, located along the south portion of Wolf Village Drive, extends from a point approximately 150 feet west of Valemount to the Wolf Center Drive and Wolf Village Drive intersection. This 1.14 acre basin generates runoff rates of 3.5 cfs during the 5 year storm and 7.7 cfs during the 100 year storm. These flows are conveyed westerly within Wolf Village Drive as street flows and turn southerly into Basin 7 located along the east side of Wolf Center Drive.

Approximately 3.64 acres along the north and west sides of Traditions Drive comprises Basin 4. The runoff rates of 9.4 cfs during the 5 year storm and 20.7 cfs during the 100 year storm generated from this basin are also conveyed westerly and then southerly within Traditions Drive. A 15' on-grade inlet will be placed along the west side of Traditions Drive just north of Rowdy Drive to collect flow rates of 5.8 cfs and 9.4 cfs during the 5 and 100 year storms, respectively. The remaining flows of $Q_5 = 3.6$ cfs and $Q_{100} = 11.3$ cfs will enter Basin 5 as street flows.

Basin 5 comprises approximately 1.97 acres south and east of Traditions Drive. Runoff rates of $Q_5 = 7.0$ cfs and $Q_{100} = 14.2$ cfs generated from this basin also flow westerly and southerly within Traditions Drive to the Traditions Drive and Rowdy Drive intersection. A 12' sump D-11 inlet will be placed along the east side of Traditions Drive just north of Rowdy Drive to collect these flows plus the bypass flows from Basin 4.

Traditions Drive at a minimum slope of 3% has a 5 year street capacity of 13.1 cfs which is adequate to convey the respective flows from Basin 4 and 5 to the proposed sump inlet.

Basin 6 consists of 0.44 acres along the south side of Rowdy Drive. The runoff rates of $Q_5 = 1.6$ cfs and $Q_{100} = 3.2$ cfs generated from this basin will reach a 4' sump inlet toward the west end of this basin.

A 30" RCP will convey the collected flow rates of $Q_5 = 15.7$ cfs and $Q_{100} = 31.0$ cfs reaching Design Point #1 from Basins 4, 5 and 6 easterly to the Rowdy Drive and Valemount Drive intersection.

Approximately 2.10 acres along the east side of Wolf Center Drive comprises Basin 7. Runoff rates of 5.7 cfs and 12.6 cfs are generated from this basin during the 5 and 100 year storms respectively. As stated above, additional flows enter Basin 7 from the upstream Basin 3 for a total street flows of $Q_5 = 9.2$ cfs and $Q_{100} = 20.3$ cfs reaching the south end of Basin 7. Wolf Center Drive at a minimum slope of 3 % has a 5 year street capacity of 18.3 cfs which is adequate to convey these flows.

A 20' inlet will be installed along the east side of Wolf Center Drive at the south end of Basin 7 to collect 6.4 cfs during the 5 year storm and 12.3 cfs during the 100 year storm. The bypass flows of 2.8 cfs and 8.0 cfs during the 5 and 100 year storms, respectively will enter Basin 8 as street flows. The collected flows will be conveyed easterly along Brave Eagle Drive within an 18" RCP.

Basin 8 is also located along the east side of Wolf Center Drive. Basin 8, consisting of 1.48 acres generates runoff rates of $Q_5 = 4.0$ cfs and $Q_{100} = 8.9$ cfs. Including the flows entering Basin 8 from the upstream basins, total street flows of 6.8 cfs and 16.9 cfs will reach the south end of Basin 8. These flows enter Basin 31 as street flows.

Basin 9 is located southwest of the Valemount Drive and Wolf Village Drive intersection. This 2.13 acre basin generates runoff rates of 7.2 cfs during the 5 year storm and 15.2 cfs during the 100 year storm. Valemount at a minimum slope of 4.5% and a 5 year street capacity of 15.4 cfs has the capacity to convey these flows.

A 15' on grade inlet will be constructed just south of the Traditions Drive and Valemount Drive intersection to collect a portion of these flows. The flow rates collected at this inlet are 4.5 cfs during the 5 year storm and 7.1 cfs during the 100 year storm. The bypass flows of 2.7 cfs and 8.1 cfs during the 5 and 100 year storms, respectively, will enter Basin 10 as street flows.

Basin 10 consists of an additional 0.64 acres along Valemount Drive. The runoff rates of Q_5 = 2.3 cfs and Q_{100} = 4.6 cfs generated from this basin combine with the bypass flows from Basin 9 for total street flows of 5.0 cfs and 12.7 cfs during the 5 and 100 year storms, respectively, reaching the south end of Basin 10. An additional 15' on-grade inlet will be constructed at the south end of Basin 10 to collect a portion of these flows. This inlet will collect runoff rates of Q_5 = 3.3 cfs and Q_{100} = 6.4 cfs with flows of 1.7 cfs and 6.3 cfs bypassing this inlet. These bypass flows will combine with flows generated from Basin 18.

Approximately 0.87 acres along the east side of Valemount comprises Basin 11 which generates runoff rates of 2.8 cfs during the 5 year storm and 6.1 cfs during the 100 year storm. A proposed 15' on-grade inlet at the south end of Basin 11 will collect runoff rates of 2.1 cfs and 3.9 cfs during the 5 and 100 year storms, respectively. The flow rates of Q_5 = 0.7 cfs and Q_{100} = 2.2 cfs bypassing this inlet will enter Basin 17 as street flows.

Design Point #2 is located just downstream of Basin 11. Total runoff rates of Q_5 = 84.9 cfs and Q_{100} = 169.8 cfs reach this point.

Basin 12 is located in the northeast corner of the proposed development. This 5.09 acre basin generates flow rates of 13.5 cfs during the 5 year storm and 28.9 cfs during the 100 year storm. A 15' on-grade inlet will be placed at the south end of Basin 12 to collect a portion of the flows generated from Basin 12. This inlet will collect runoff rates of Q_5 = 7.8 cfs and Q_{100} = 11.9 cfs. The bypass flows of 5.7 cfs and 17.0 cfs during the 5 and 100 year storms will enter Basin 16A as street flows.

Basin 13 is located along the south side of Kathi Drive and comprises 2.65 acres. Runoff rates of Q_5 = 8.9 cfs and Q_{100} = 18.4 cfs generated from this basin reach a proposed 15' on-grade inlet at the south end of this basin. The inlet collects 5.7 cfs during the 5 year storm and 9.2 cfs during the 100 year storm. The bypass flow rates of Q_5 = 3.2 cfs and Q_{100} = 9.2 cfs from this inlet will enter Basin 16A as street flows.

Approximately 2.02 acres along the Selkirk Place cul-de-sac and the area above the cul-de-sac comprise Basin 14. The runoff rates of 5.1 cfs during the 5 year storm and 11.2 cfs during the 100 year storm will flow southerly within Selkirk Place and enter Basin 15 as street flows.

Basin 15 consists of 1.17 acres at the northeast corner of the Rowdy Dive and Kathi Drive intersection. This basin generates runoff rates of 5.5 cfs during the 5 year storm and 10.0 cfs during the 100 year storm. Including the bypass flows from Basin 14 total flow rates of Q_5 = 10.6 cfs and Q_{100} = 21.2 cfs reach a proposed 15' on-grade inlet at the west end of this Basin 15. This inlet will collect runoff rates of 6.6 cfs during the 5 year storm and 10.3 cfs during the 100 year storm. Bypass flows of Q_5 = 4.0 cfs and Q_{100} = 10.9 cfs will enter Basin 16A as street flows.

Basin 16A, located along the west side of Kathi Drive comprises an additional 1.02 acres of residential development. Runoff rates of 3.1 cfs and 6.8 cfs are generated from this basin during the 5 and 100 year storms, respectively. These flows combine with the bypass flows from Basins 12, 13, 14 and 15 along the north side of Rowdy Drive.

A 15' on-grade inlet will be installed just west of the Kathi Drive and Rowdy Drive intersection to collect some of the bypass flows from above this intersection. Flow rates of Q_5 = 16.0 cfs and Q_{100} = 43.9 cfs approach this inlet as street flows. The inlet will collect flow rates of 8.6 cfs during the 5 year storm and 15.1 cfs during the 100 year storm. The bypass flows of Q_5 = 7.4 cfs and Q_{100} = 28.8 cfs will enter Basin 16B as street flows.

The 1.83 acre Basin 16B, located north of Rowdy Drive, generates runoff rates of 6.1 cfs during the 5 year storm and 13.0 cfs during the 100 year storm. This results in total flow rates of 13.5 cfs during the 5 year storm and 41.8 cfs during the 100 year storm reaching the west end of Basin 16B. A second 15' on-grade inlet will be installed at the west end of Basin 16B to collect flows of 7.9 cfs and 14.7 cfs during the 5 and 100 year storms, respectively. The bypass flows will enter Basin 17 as street flows.

Combined flows of Q_5 = 34.7cfs and Q_{100} = 68.3 cfs reach Design Point #3 from Basin 12 through 16A and 16B.

Total flows rates from Design Points 1, 2 and 3 reach Design Point #4A where the combined flow rates are 131.1 cfs during the 5 year storm and 256.9 cfs during the 100 year storm.

Basin 17 is located along the east side of Valemount Drive south of Rowdy Drive. This 0.64 acre basin generates runoff rates of 2.1 cfs during the 5 year storm and 4.4 cfs during the 100 year storm. Including flows bypassing upstream inlets, the total runoff rates reaching the south end of Basin 17 are 8.4 cfs during the 5 year storm and 33.7 cfs during the 100 year storm. The proposed 15' inlet at the south end of this basin will collect runoff rates of 5.7 cfs during the 5 year storm and 14.9 cfs during the 100 year storm. The bypass flows from this inlet will enter Basin 21 as street flows.

Approximately 1.11 acres located just northwest of the Valemount and Rowdy Drive intersection comprises Basin 18. Runoff rates of 3.6 cfs and 7.8 cfs are generated from this basin during the 5 and 100 year storms, respectively. Including the bypass flows from Basin 10 results in total flow rates of 5.3 cfs and 14.1 cfs reaching a proposed inlet at the southeast corner of Basin 18. This 15' on-grade inlet will be constructed along the west side of Valemount to collect flow rates of Q_5 = 3.9 cfs and Q_{100} = 8.6 cfs leaving bypass flows of 1.4 cfs during the 5 year storm and 5.5 cfs during the 100 year storm. These bypass flows will enter Basin 21 as street flows.

Design Point # 4B is located just downstream of Basin 18. Total flow rates of 131.6 cfs during the 5 year storm and 260.9 cfs during the 100 year storm reach this point.

Basin 19 is located just north of Brave Eagle Drive and east of Valemount Drive. This 2.94 acre basin generates runoff rates of 8.4 cfs during the 5 year storm and 17.9 cfs during the 100 year storm. The runoff from this basin reaches Brave Eagle Drive and continues westerly along the north side of Brave Eagle Drive to a proposed 15' on-grade inlet just east of Valemount Drive. This inlet will collect runoff rates of Q_5 = 5.7 cfs and Q_{100} = 10.5 cfs. Bypass flows of 2.7 cfs during the 5 year storm and 7.4 cfs during the 100 year storm will enter Basin 21 as street flows.

Basin 20 is located along the south side of Brave Eagle Drive consisting of 1.69 acres. Runoff rates of 5.9 cfs and 12.4 cfs generated from this basin during the 5 and 100 year storms, respectively, reach a 15' sump inlet just west of the Trek and Brave Eagle intersection. This inlet will collect 5.9 cfs during the 5 year storm and 12.4 cfs during the 100 year storm.

The 1.72 acre Basin 21 is located just northwest of the Valemount and Brave Eagle Drive intersection. The runoff rates of 3.3 cfs and 7.2 cfs generated from this basin during the 5 and 100 year storms, respectively, flow toward the Brave Eagle Drive and Monashee Court intersection. Including bypass flows from Basins 17, 18 and 19 total street flows of Q_5 = 10.1 cfs and Q_{100} = 38.9 cfs approach that intersection from the east within Brave Eagle Drive.

An additional 4.3 cfs and 9.9 cfs generated from Basin 22 during the 5 and 100 year storms, respectively, reach this same intersection from the west. A 15' sump inlet will collect the combined flows of 16.4 cfs during the 5 year storm and 53.7 cfs during the 100 year storm reaching the north side of the Brave Eagle Drive and Monashee Court intersection.

Total runoff rates of Q_5 = 131.0 cfs and Q_{100} = 254.6 cfs reach Design Point #5.

Basin 23 is located north of the eastern cul-de-sac of Monashee Court. The runoff rates of Q_5 = 6.4 cfs and Q_{100} = 13.8 cfs generated from this basin reach a proposed 15' on-grade inlet at the west end of this basin. This inlet will collect flows of 4.6 cfs during the 5 year storm and 8.6 cfs during the 100 year storm. The bypass flows of Q_5 = 1.8 cfs and Q_{100} = 5.2 cfs will enter Basin 24 as street flows.

The outfall pipe at Design Point # 6 conveys flows of Q_5 = 130.0 cfs and Q_{100} = 248.4 cfs.

The 2.13 acres located just southwest of the Brave Eagle Drive and Monashee Court intersection comprises Basin 24. The runoff rates of 6.6 cfs and 15.0 cfs generated from this basin during the 5 and 100 year storms, respectively, reach the west cul-de-sac of Monashee Court along with the bypass flows from Basin 23. This results in total flow rates of 8.4 cfs and 20.2 cfs during the 5 and 100 year storms, respectively, approaching a proposed 15' sump inlet from the east to be constructed within the west Monashee Court cul-de-sac.

Runoff rates of Q_5 = 1.8 cfs and Q_{100} = 3.6 cfs reach this same inlet from the west from the 0.50 acre Basin 25. A 24" RCP will convey these flows southeasterly to the existing inlet along the north side of Research Parkway.

Basin 26 is located along the south side of Wolf Village Drive and Wolf Lake Drive. This 1.60 acre basin including existing lots north of Wolf Village Drive generates runoff rates of 4.6 cfs during the 5 year storm and 9.5 cfs during the 100 year storms.

Additional bypass flows of 2.1 cfs and 12.5 cfs from upstream Basin V2-18 enter Basin 26 as street flows. Basin V2-18 was studied as part of the upstream drainage report.

The runoff rates from Basin 26 and the bypass flows from Basin V2-18 continue southerly within the west side of Wolf Lake Drive as street flows to a proposed 15' inlet just north of Kathi Drive. This inlet will collect runoff rates of 4.6 cfs and 10.8 cfs during the 5 and 100 year storms, respectively. The bypass flows of Q_5 = 2.1 cfs and Q_{100} = 11.2 cfs enter Basin 27 as street flow.

An additional 2.68 acres along the west side of Wolf Lake Drive comprises Basin 27. Runoff rates of Q_5 = 8.1 cfs and Q_{100} = 17.6 cfs generated from this basin combine with the flows from Basin 26 for total street flows of 10.2 cfs and 28.8 cfs reaching the south end of Basin 27 during the 5 and 100 year storms, respectively. A 15' on-grade inlet will be constructed at the south end of this basin to collect runoff rates of Q_5 = 6.5 cfs and Q_{100} = 12.6 cfs. Bypass flows of 3.7 cfs and 16.2 cfs will bypass this inlet and enter Basin 28 as street flows.

Basin 28 comprises 0.73 acres at the northwest corner of the Rowdy Drive and Wolf Lake Drive intersection. The runoff rates of 2.6 cfs and 5.3 cfs generated from this basin reach this intersection from the west. Combined flows of Q_5 = 6.3 cfs and Q_{100} = 21.5 cfs reach the south end of this basin. A 15' on-grade inlet will be constructed just south of this intersection to collect flows of 4.4 cfs during the 5 year storm and 10.7 cfs during the 100 year storm. These collected flows will be piped easterly into the By the Creek subdivision located on the east side of Wolf Lake Drive. These flows were anticipated in The By the Creek drainage report. The bypass flows of 1.9 cfs and 10.8 cfs during the 5 and 100 year storms, respectively, will enter Basin 29 as street flows.

Basin 29 is located at the northwest corner of the Research Parkway and Wolf Lake Drive intersection and generates runoff rates of 3.7 cfs during the 5 year storm and 7.6 cfs during the 100 year storm. These flows along with the flows bypassing the inlet within Basin 28 will enter Basin 30 as street flows. Total street flows of 5.6 cfs during the 5 year storm and 18.4 cfs during the 100 year storm will enter Bain 30.

The 2.56 acre Basin 30 consists of the north side of Research Parkway from Wolf Lake Drive to a point approximately 800 feet to the west. Runoff rates of Q_5 = 5.4 cfs and Q_{100} = 12.2 cfs generated from this basin flow westerly within the north side of Research Parkway. Total flow rates of 11.0 cfs and 30.6 cfs during the 5 and 100 year storms will reach the existing 20' sump inlet at the west end of Basin 30.

Basin 31 is also located along the north side of Research Parkway just east of Wolf Center Drive. Runoff rates of 1.7 cfs during the 5 year storm and 3.7 cfs during the 100 year storm generated from this basin along with the bypass flows from Basin 8 reach the same existing 20' sump inlet along the north side of Research Parkway.

Total flow rates of 10.6 cfs during the 5 year storm and 21.8 cfs during the 100 year storm reach Design Point #7 from Basins 3, 7, 8 and 31.

Total flows rates of Q_5 = 136.9 cfs and Q_{100} = 267.3 cfs reach Design Point #8. This compares to runoff rates of 133.6 cfs and 272.2 cfs anticipated at this location in the "Westcreek at Wolf Ranch Subdivision MDDP and Final Drainage Report for Westcreek at Wolf Ranch Subdivision Filings 6, 7, 8, 9, 10, 11 and 12 ." The Overall Wolf Ranch MDDP anticipated a 100 year flow rate of 241 cfs at this point.

A proposed development along the east side of Wolf Lake Drive, called "By the Creek Subdivision," was previously approved through the City of Colorado Springs review process. Several drainage basins along the east side of Wolf Lake Drive were described in the drainage report for that subdivision. Those basin are described below to provide an understanding of the required drainage facilities along Wolf Lake Drive. These basins are depicted on Exhibit 3 as a fold-out map in the Appendix of this drainage report and on Exhibit 1 (Ref 10).

By the Creek Basin B10 consists of 1.64 acres along the east side of Wolf Lake Drive. This basin generates flows of 3.2 cfs and 7.0 cfs during the 5 year and 100 year storms, respectively. A 15' inlet at the south end of Basin B10 will collect flows of 5.0 cfs and 10.4 cfs during the 5 and 100 year storms, respectively. The remaining flows of 2.7 cfs and 13.3 cfs bypassing this inlet will enter Basin B13 as street flows.

Basin B13 comprises an additional 1.66 acres along the east side of Wolf Lake Drive south of Wolf Village Drive. The flows of 3.2 cfs and 7.1 cfs generated from this basin during the 5 and 100 year storms, respectively, will enter Wolf Lake Drive and continue southerly as street flow within the east side of Wolf Lake Drive. Total flows of Q_5 = 5.9 cfs and Q_{100} = 20.4 cfs will approach a 15' inlet at the south end of Basin 13. This inlet will collect flows of Q_5 = 4.1 cfs and Q_{100} = 10.1 cfs. Flows of 1.8 cfs and 10.3 cfs will bypass this inlet during the 5 and 100 year storms and enter Basin B14 as street flows.

Basins B14 is located along the east side of Wolf Lake Drive. This 1.27 acre basin generates flows of 2.5 cfs during the 5 year storm and 5.4 cfs during the 100 year storm. These flows continue southerly along the east side of Wolf Lake Drive and enter Basin B15 as street flows.

Basin B5 generates an additional 2.5 cfs during the 5 year storm and 5.5 cfs during the 100 year storm. These flows also reach Wolf Lake Drive as street flows.

Basin B16, comprises 1.56 acre and generates flows of 3.1 cfs during the 5 year storm and 6.7 cfs during the 100 year storm. These flows along with the flows bypassing the inlet within Basin B13, plus the flows from Basins B14 and B15 will reach the south end of Basin B16.

Total flows of Q_5 = 9.9 cfs and Q_{100} = 27.9 cfs will reach a proposed 15' inlet at the south end of Basin B16 along the east side of Wolf Lake Drive. This inlet will collect flows of 6.3 cfs during the 5 year storm and 12.4 cfs during the 100 year storm. Flows of Q_5 = 3.6 cfs and Q_{100} = 15.5 cfs will bypass this inlet and enter Basin B17 as street flows.

Basin B17 is located just south of Basin 16 and just north of Research Parkway. This 0.89 acre basin generates flows of 1.9 cfs during the 5 year storm and 4.2 cfs during the 100 year storm. Flows of Q_5 = 5.5 cfs and Q_{100} = 19.7 cfs will enter Research Parkway as street flows.

Storm sewer pipes were sized based on Manning' equation normal flow to convey the 100 year collected flow rates.

EROSION CONTROL

Erosion control measures will be installed per the approved grading/erosion control plans to be submitted separately.

WATER QUALITY

The proposed development is single family residential development therefore, water quality is not required.

DRAINAGE, BRIDGE AND POND FEES

The Villages at Wolf Ranch Phase 5 Development is within the Cottonwood Creek Drainage Basin. The 2012 Drainage, Bridge and Pond Fees for proposed Villages at Wolf Ranch Subdivision Filing No. 20 are listed below. Drainage facilities within this filing are all part of the overall Wolf Ranch Drainage system presented in the Wolf Ranch Master Development Drainage Plan. Therefore, public drainage facilities will be constructed in lieu of paying fees.

Villages at Wolf Ranch Subdivision Filing No. 20 Drainage Fee ($11,821/Acre Total)

	Area	$/Acre	Total Fee
Capital Improvements Portion	13.165	$8,312.00	$109,427.48
Land Portion	13.165	$ 2,942.00	$ 38,731.43
Cash Portion	13.165	$ 567.00	$ 7,464.55
BRIDGE FEES	13.165	$ 886.00	$ 11,664.19
			$167,287.65

Remaining Portion of Villages at Wolf Ranch Phase 5 ($11,821/Acre Total)

	Area	$/Acre	Total Fee
Capital Improvements Portion	32.748	$8,312.00	$272,201.38
Land Portion	32.748	$ 2,942.00	$96,344.62
Cash Portion	32.748	$ 567.00	$18,568.12
BRIDGE FEES	32.748	$ 886.00	$29,014.73
			$416,128.85

DRAINAGE FACILTIES (Private and Public, Non Reimbursable)

The following drainage facilities will be required for the various Villages at Wolf Ranch Subdivisions. All these facilities are public drainage facilities. Any pipe 48" and larger qualifies as a reimbursable item contingent on City/County Drainage Board approval.

Villages at Wolf Ranch Subdivision Filing No. 20 (Public Non-Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
15' D-10-R Inlets	6	Ea.	$5,400.00	$ 32,400.00
18" RCP	201	L.F.	$34.00	$ 6,834.00
24" RCP	541	L.F.	$42.00	$ 22,722.00
30" RCP	31	L.F.	$60.00	$ 1,860.00
			Sub-Total	$ 63,816.00
10% Engineering and Contingency				$ 6,381.60
			Grand Total	$ 70,197.60

Villages at Wolf Ranch Subdivision Filing No. 20 (Public Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
Type I Manhole	2	Ea.	$5,300.00	$ 10,600.00
54" RCP	976	L.F.	$150.00	$ 146,400.00
60" RCP	0	L.F.	$190.00	$ 00.00
			Sub-Total	$ 157,000.00
10% Engineering and Contingency				$ 15,700.00
			Grand Total	$ 172,700.00

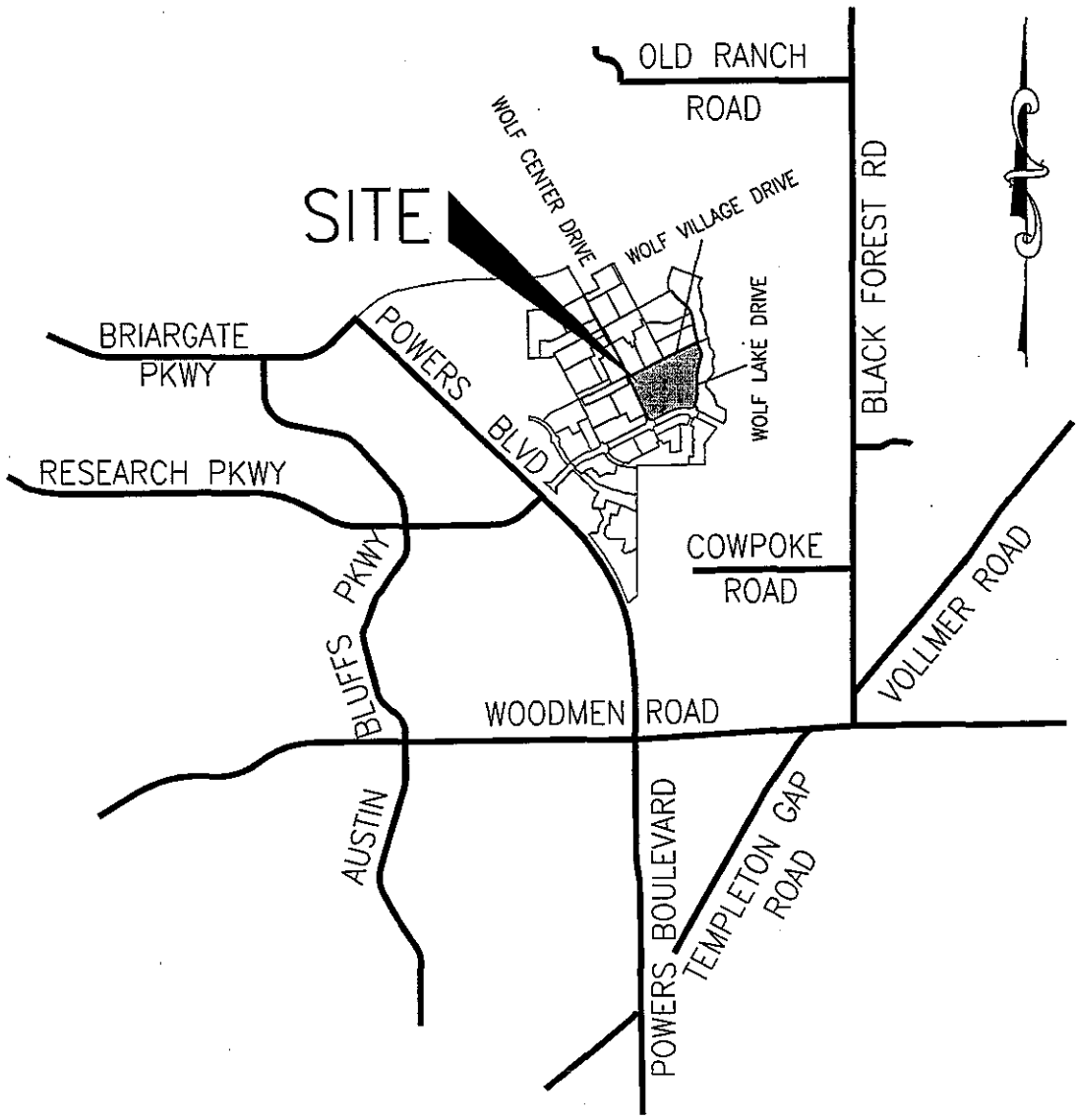
Remaining Area of Villages at Wolf Ranch Phase 5 (Public Non-Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
15' D-11-R Inlets	1	Ea.	$5,400.00	$ 5,400.00
12' D-11-R Inlets	1	Ea.	$5,000.00	$ 5,000.00
4' D-10-R Inlets	1	Ea.	$4,000.00	$ 4,000.00
15' D-10-R Inlets	11	Ea.	$5,400.00	$ 59,400.00
20' D-10-R Inlets	1	Ea.	$6,300.00	$ 6,300.00
Type I Manhole	2	Ea.	$5,300.00	$ 10,600.00
Type II Manhole	2	Ea.	$2,200.00	$ 4,400.00
18" RCP	437	L.F.	$34.00	$ 14,858.00
24" RCP	1490	L.F.	$42.00	$ 62,580.00
30" RCP	830	L.F.	$60.00	$ 49,800.00
42" RCP	335	L.F.	$95.00	$ 31,825.00
48" RCP	320	L.F.	$110.00	$ 35,200.00
			Sub-Total	$ 254,163.00
10% Engineering and Contingency				$ 25,416.30
			Grand Total	$ 279,579.30

Remaining Area of Villages at Wolf Ranch Phase 5 (Public Reimbursable)

ITEM	QUANTITY		UNIT PRICE	EXTENDED COST
48" RCP	120	L.F.	$110.00	$ 35,200.00
			Sub-Total	$ 35,200.00
10% Engineering and Contingency				$ 3,520.00
			Grand Total	$ 38,720.00

APPENDIX



Vicinity Map

NOT TO SCALE

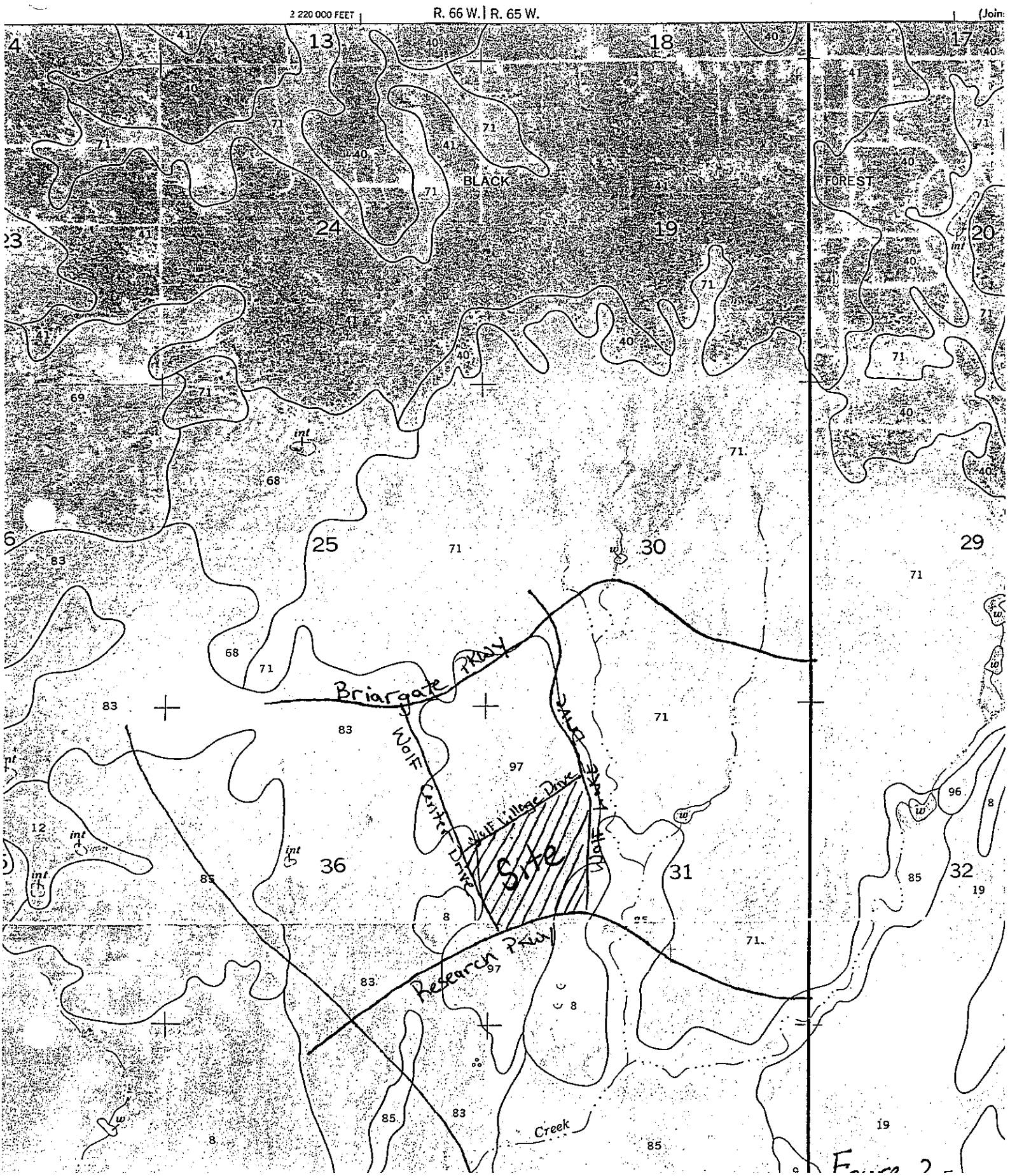
FIGURE 1

FILE: Vicinity.DWG
DATE: 12/18/12

JOB NO. 12-019

ROCKWELL CONSULTING, Inc.
ENGINEERING • SURVEYING
1955 N. UNION BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2575 • FAX (719) 475-9223

EPARTMENT OF AGRICULTURE
IL CONSERVATION SERVICE



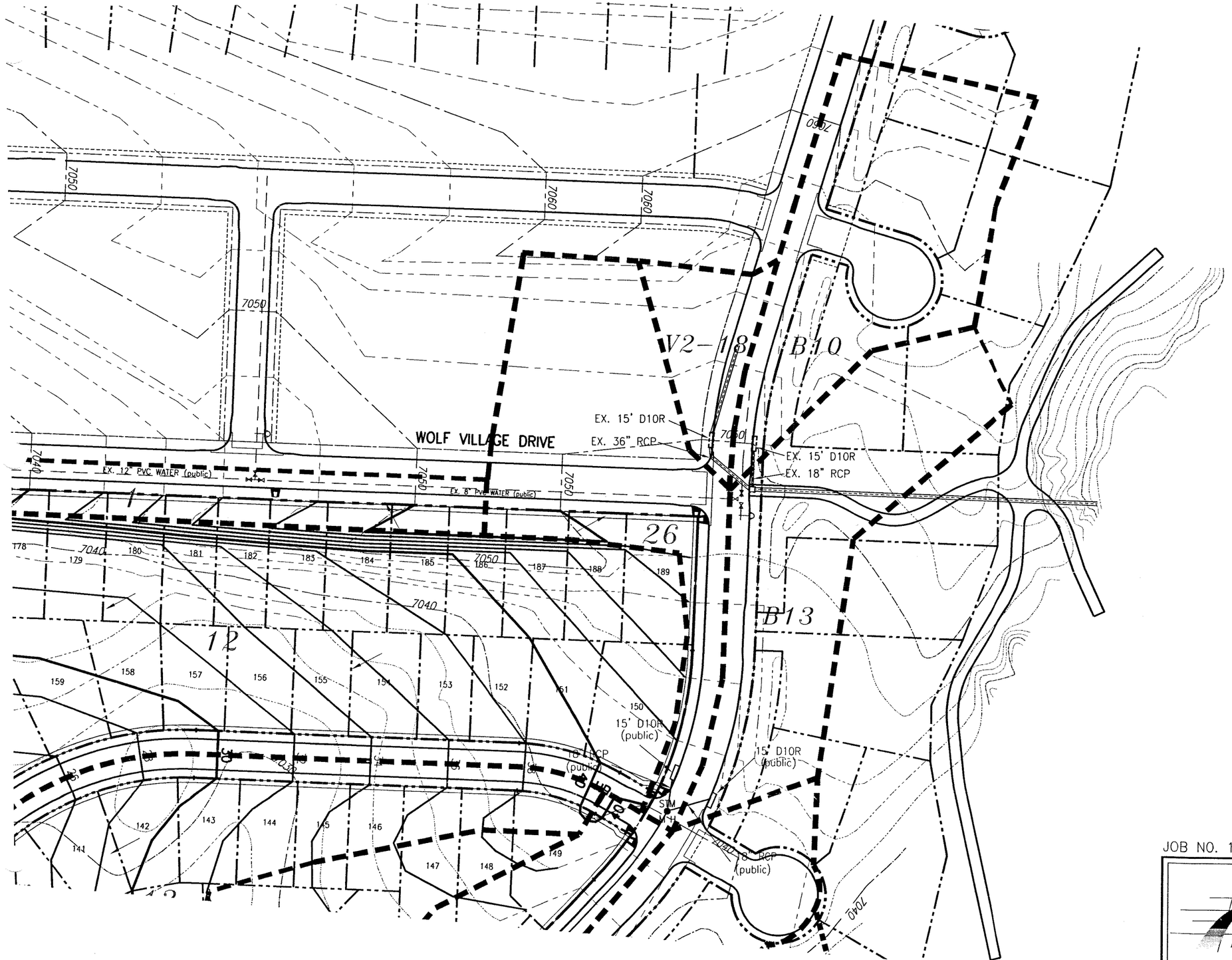


FIGURE 3

JOB NO. 12-019

FILE: 12019dev12.DWG
DATE: 12/18/12

ROCKWELL CONSULTING, Inc.
ENGINEERING • SURVEYING
1955 N. UNION BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2575 • FAX (719) 475-9223

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 1
AREA: 0.95
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.95	0.70	0.80	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.95			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3.0		2.85		2.14
Street	600	2.3	3	3.33	3.2	3.13
Tc Total:				6.18		5.26

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.0 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.3 cfs	6.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 2
AREA: 0.18
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.18	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.18			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3.0		2.85		2.14
Street	100	2.0	2.8	0.60	3	0.56
Tc Total:				3.45		2.69

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
0.7 cfs	1.3 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 3
AREA: 1.14
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.14	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.14			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3.0		2.85		2.14
Street	800	1.6	2.6	5.13	2.8	4.76
Tc Total:				7.98		6.90

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.4 in/hr	8.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.5 cfs	7.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 4
AREA: 3.64
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	3.64	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	3.64			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	230	2.0		9.02		6.77
Street	590	2.5	3	3.28	3.2	3.07
Tc Total:				12.30		9.84

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.7 in/hr	7.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
9.4 cfs	20.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 5
AREA: 1.97
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.97	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.97			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	80	2.0		5.32		3.99
Street	50	2.5	3	0.28	3.2	0.26
Tc Total:				5.60		4.25

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.1 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
7.0 cfs	14.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 6
AREA: 0.44
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.44	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.44			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3.0		2.85		2.14
Street	250	1.5	2.5	1.67	2.7	1.54
Tc Total:				4.52		3.68

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
1.6 cfs	3.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 7
AREA: 2.10
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.10	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.10			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	140	2.0		7.04		5.28
Street	700	2.9	3.4	3.43	3.6	3.24
Tc Total:				10.47		8.52

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.9 in/hr	7.5 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
5.7 cfs	12.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 8
AREA: 1.48
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.48	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.48			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	140	2.0		7.04		5.28
Street	500	1.5	2.5	3.33	2.7	3.09
Tc Total:				10.37		8.37

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.9 in/hr	7.5 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
4.0 cfs	8.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 9
AREA: 2.13
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.13	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.13			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	240	5		6.81		5.11
Street	0	2.7	3.3	0.00	3.5	0.00
Tc Total:				6.81		5.11

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.8 in/hr	8.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
7.2 cfs	15.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 10
AREA: 0.64
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.64	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.64			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3.0		2.85		2.14
Street	400	3.8	3.8	1.75	4.0	1.67
Tc Total:				4.61		3.80

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.3 cfs	4.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 11
AREA: 0.87
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.00	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.00			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3.0		2.85		2.14
Street	550	4.4	4.3	4.50	2.7	3.40
Tc Total:				7.35		5.53

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.6 in/hr	8.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.8 cfs	6.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 12
AREA: 5.09
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	5.09	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	5.09			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	230	3.5		7.50		5.63
Street	850	2.6	3.2	4.43	3.4	4.17
Tc Total:				11.93		9.79

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.8 in/hr	7.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
13.5 cfs	28.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 13
AREA: 2.65
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.65	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.65			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3.0		2.85		2.14
Street	800	2.6	3.2	4.17	3.4	3.92
Tc Total:				7.02		6.06

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.8 in/hr	8.7 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
8.9 cfs	18.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 14
AREA: 2.02
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.02	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.02			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	300	2.0		10.31		7.73
Street	400	1.8	2.1	3.17	2.3	2.90
Tc Total:				13.48		10.63

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.6 in/hr	6.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
5.1 cfs	11.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 15
AREA: 1.17
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.00	0.70	0.80	0.00%
Street	0.09	0.90	0.95	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.09			100%

COMPOSITE: C5= 0.90 C100= 0.95

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	300	4.0		4.10		3.07
Street	0	3.0	3.5	0.00	3.7	0.00
Tc Total:				4.10		3.07

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.2 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
5.5 cfs	10.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 16A
AREA: 1.02
SOIL TYPE: C & D
0.88

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.02	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.02			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	300	5.3		7.47		5.60
Street	150	1.5	2.5	1.00	2.7	0.93
Tc Total:				8.47		6.53

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.3 in/hr	8.3 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.1 cfs	6.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 16B
AREA: 1.83
SOIL TYPE: C & D
0.88

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.85	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.85			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	2.0		3.26		2.44
Street	500	2.0	2.8	2.98	3.0	2.78
Tc Total:				6.24		5.22

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.8 in/hr	8.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
6.1 cfs	13.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 17
AREA: 0.64
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.64	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.64			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3		2.85		2.14
Street	800	2.2	3	4.44	3.2	4.17
Tc Total:				7.30		6.30

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.6 in/hr	8.6 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.1 cfs	4.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 18
AREA: 1.11
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.11	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.11			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	230	6.0		6.28		4.71
Street	170	1.5	2.5	1.13	2.7	1.05
Tc Total:				7.41		5.76

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.6 in/hr	8.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.6 cfs	7.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 19
AREA: 2.94
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.94	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.94			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	200	4.0		6.69		5.02
Street	450	1.5	2.5	3.00	2.7	2.78
Tc Total:				9.69		7.80

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.1 in/hr	7.6 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
8.4 cfs	17.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 20
AREA: 1.69
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.69	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.69			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	30	3.0		2.85		2.14
Street	450	1.5	2.5	3.00	2.7	2.78
Tc Total:				5.85		4.92

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.0 in/hr	9.2 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
5.9 cfs	12.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 21
AREA: 1.72
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.44	0.70	0.80	83.72%
Park	0.28	0.30	0.45	16.28%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.72			100%

COMPOSITE: C5= 0.63 C100= 0.74

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	240	2.0		18.44		14.98
Street	200	1.5	2.6	1.28	2.8	1.19
Tc Total:				19.72		16.17

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.0 in/hr	5.6 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.3 cfs	7.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 22
AREA: 1.40
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.40	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.40			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	225	3.5		7.42		5.57
Street	0	4.0	4	0.00	4.2	0.00
Tc Total:				7.42		5.57

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.4 in/hr	8.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
4.3 cfs	9.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 23
AREA: 2.11
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.11	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.11			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	200	4.0		6.69		5.02
Street	270	1.5	2.5	1.80	2.7	1.67
Tc Total:				8.49		6.69

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.3 in/hr	8.2 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
6.4 cfs	13.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 24
AREA: 2.13
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.13	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.13			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	225	3.5		7.42		5.57
Street	0	1.5	2.5	0.00	2.7	0.00
Tc Total:				7.42		5.57

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.4 in/hr	8.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
6.6 cfs	15.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 25
AREA: 0.50
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.50	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.50			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	200	7		5.57		4.17
Street	0	0	2.8	0.00	3	0.00
Tc Total:				5.57		4.17

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.0 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
1.8 cfs	3.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 26
AREA: 1.60
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.60	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.60			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	200	4.0		6.69		5.02
Street	500	1.8	2.6	3.21	2.8	2.98
Tc Total:				9.90		8.00

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.1 in/hr	7.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
4.6 cfs	9.5 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 27
AREA: 2.68
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	2.68	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.68			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	65	3.0		4.20		3.15
Street	760	2.5	3.0	4.22	3.2	3.96
Tc Total:				8.42		7.11

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.3 in/hr	8.2 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
8.1 cfs	17.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 28
AREA: 0.73
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	0.73	0.70	0.80	100.00%
Street	0	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.73			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	3.0		5.21		3.90
Street	150	2.7	3.3	0.76	3.5	0.71
Tc Total:				5.96		4.62

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.0 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.6 cfs	5.3 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 29
AREA: 1.05
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.05	0.70	0.80	100.00%
Street	0.00	0.90	0.95	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.05			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	6.0		4.14		3.11
Street	275	2	2.8	1.64	3	1.53
Tc Total:				5.78		4.63

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
5.0 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.7 cfs	7.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 30
AREA: 2.56
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	1.28	0.30	0.45	50.00%
Street	1.28	0.90	0.95	50.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	2.56			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	90	3		9.88		8.02
Street	750	2.4	3	4.17	3.2	3.91
Tc Total:				14.04		11.93

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.5 in/hr	6.8 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
5.4 cfs	12.2 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: 31
AREA: 0.71
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Open Space	0.35	0.30	0.45	49.30%
Street	0.36	0.90	0.95	50.70%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.71			100%

COMPOSITE: C5= 0.60 C100= 0.70

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	90	4		8.98		7.30
Street	160	1.5	2.5	1.07	2.7	0.99
Tc Total:				10.05		8.29

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.0 in/hr	7.5 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
1.7 cfs	3.7 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: VILLAGES AT WOLF RANCH PHASE 2

BASIN: V2-18
AREA: 0.42
OIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DE\	AREA	C5	C100	% AREA
1/8 Acre R	0.42	0.70	0.80	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.42			100%

COMPOSI' C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Typ	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	200	4.5		6.44		4.83
Tc Total:				6.44		4.83

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.8 in/hr	9.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
1.4 cfs	3.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: By the Creek at Wolf Ranch

BASIN: B 10
AREA: 1.64
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Acre Residential	1.64	0.50	0.60	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.64			100%

COMPOSITE: C5= 0.50 C100= 0.60

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	180	3.33		10.12		8.43
Street	300	3.3	3.7	1.35	3.8	1.32
Tc Total:				11.47		9.75

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.9 in/hr	7.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.2 cfs	7.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: By the Creek at Wolf Ranch

BASIN: B13
AREA: 1.66
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Acre Residential	1.66	0.50	0.60	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.66			100%

COMPOSITE: C5= 0.50 C100= 0.60

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	200	4		10.04		8.37
Street	250	2.4	3.1	1.34	3.3	1.26
Tc Total:				11.39		9.63

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.9 in/hr	7.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.2 cfs	7.1 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: By the Creek at Wolf Ranch

BASIN: B 14
AREA: 1.27
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Acre Residential	1.27	0.50	0.60	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.27			100%

COMPOSITE: C5= 0.50 C100= 0.60

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	2		8.93		7.44
Street	350	2.9	3.3	1.77	3.5	1.67
Tc Total:				10.69		9.10

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.9 in/hr	7.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.5 cfs	5.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: By the Creek at Wolf Ranch

BASIN: B15
AREA: 1.30
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Acre Residential	1.30	0.50	0.60	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.30			100%

COMPOSITE: C5= 0.50 C100= 0.60

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	220	3.6		10.90		9.09
Street	150	2	2.8	0.89	3	0.83
Tc Total:				11.80		9.92

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.8 in/hr	7.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
2.5 cfs	5.5 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: By the Creek at Wolf Ranch

BASIN: B 16
AREA: 0.85
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Acre Residential	0.85	0.50	0.60	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0.85			100%

COMPOSITE: C5= 0.50 C100= 0.60

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	200	6		8.78		7.32
Street	50	2	2.8	0.30	3.0	0.28
Tc Total:				9.08		7.60

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.2 in/hr	7.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
1.8 cfs	4.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: By the Creek at Wolf Ranch

BASIN: B17
AREA: 1.58
SOIL TYPE: A & B

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/4 Acre Residential	1.58	0.50	0.60	100.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
	1.58			100%

COMPOSITE: C5= 0.50 C100= 0.60

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	3		7.81		6.51
Street	500	2.4	3.1	2.69	3.3	2.53
Tc Total:				10.50		9.03

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
4.0 in/hr	7.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
3.2 cfs	7.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#1
AREA: 6.05
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
	0.00	0.00	0.00	0.00%
Basin 4	1.97	0.70	0.80	32.56%
Basin 5	3.64	0.70	0.80	60.17%
Basin 6	0.44	0.70	0.80	7.27%
	6.05			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	230	2.0		9.02		
Street	590	2.5	3	3.28		
Pipe Flow	300	0.5	14	0.36		
Tc Total:				12.66		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.7 in/hr	6.4 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
15.7 cfs	31.0 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#2
AREA: 33.70
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Villages 2DP#1	28.93	0.7	0.8	85.85%
Basin 1	0.95	0.70	0.80	2.82%
Basin 2	0.18	0.70	0.80	0.53%
Basin 9	2.13	0.70	0.80	6.32%
Basin 10	0.64	0.70	0.80	1.90%
Basin 11	0.87	0.70	0.80	2.58%
	33.70			14%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	2.0		5.95		
Street	750	1.5	2.6	4.81		
Pipe Flow	1900	3.0	14	2.26		
Tc Total:				13.02		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.6 in/hr	6.3 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
84.9 cfs	169.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#3
AREA: 13.78
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin 12	5.09	0.70	0.80	36.94%
Basin 13	2.65	0.70	0.80	19.23%
Basin 14	2.02	0.70	0.80	14.66%
Basin 15	1.17	0.70	0.80	8.49%
Basin 16A	1.02	0.70	0.80	7.40%
Basin 16B	1.83	0.70	0.80	13.28%
	13.78			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	300	2.0		10.31		
Street	400	1.8	2.1	3.17		
Pipe Flow	0	1.5	14	0.00		
Tc Total:				13.48		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.6 in/hr	6.2 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
34.7 cfs	68.3 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#4A
AREA: 53.53
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#1	6.05	0.70	0.80	11.30%
DP#2	33.7	0.70	0.80	62.96%
DP#3	13.78	0.70	0.80	25.74%
	0	0.00	0.00	0.00%
	0	0.00	0.00	0.00%
		0.70	0.80	0.00%
	53.53			100%

COMPOSITE: C5= 0.70 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	2.0		5.95		
Street	750	1.5	2.6	4.81		
Pipe Flow	2100	3.0	11	3.18		
Tc Total:				13.94		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.5 in/hr	6.0 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
131.1 cfs	256.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#4B
AREA: 55.28
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#4A	53.53	0.70	0.80	96.83%
	0	0.00	0.00	0.00%
	0	0.70	0.80	0.00%
	0	0.70	0.80	0.00%
Basin 17	0.64	0.70	0.80	1.16%
Basin 18	1.11	0.70	0.80	2.01%
	55.28			100%

COMPOSITE: C5= 0.68 C100= 0.80

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	100	2.0		5.95		
Street	750	1.5	2.6	4.81		
Pipe Flow	2300	1.5	11	3.48		
Tc Total:				14.24		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.5 in/hr	5.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
131.6 cfs	260.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#5
AREA: 62.55
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#4B	55.28	0.70	0.80	88.38%
Basin 19	2.94	0.70	0.80	4.70%
Basin 20	1.21	0.70	0.80	1.93%
Basin 21	1.72	0.63	0.74	2.75%
Basin 22	1.4	0.70	0.80	2.24%
	0	0.70	0.80	0.00%
	62.55			100%

COMPOSITE: C5= 0.70 C100= 0.78

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	240	2.0		18.44		
Street	200	1.5	2.6	1.28		
Pipe Flow	0	1.5	8	0.00		
Tc Total:				19.72		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
3.0 in/hr	5.2 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
131.0 cfs	254.6 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#6
AREA: 64.94
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#5	62.55	0.69	0.78	96.32%
Basin 23	2.39	0.70	0.80	3.68%
	0	0.70	0.80	0.00%
	0	0.70	0.80	0.00%
	0	0.70	0.80	0.00%
	0	0.70	0.80	0.00%
	64.94			100%

COMPOSITE: C5= 0.69 C100= 0.78

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	240	2.0		18.44		
Street	600	1.5	2.6	3.85		
Pipe Flow	0	1.5	15	0.00		
Tc Total:				22.28		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.9 in/hr	4.9 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
130.0 cfs	248.4 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#7
AREA: 5.43
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
Basin 3	1.14	0.70	0.80	20.99%
Basin 7	2.1	0.70	0.80	38.67%
Basin 8	1.48	0.70	0.80	27.26%
Basin 31	0.71	0.60	0.70	13.08%
	0	0.70	0.80	0.00%
	0	0.70	0.80	0.00%
	5.43			100%

COMPOSITE: C5= 0.69 C100= 0.79

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Street	90	3.0		9.88		
Street	1360	1.8	2.1	10.79		
Tc Total:				20.67		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.9 in/hr	5.1 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
10.8 cfs	21.8 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: Villages at Wolf Ranch Phase 5

BASIN: DP#8
AREA: 76.59
SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
DP#6	64.94	0.69	0.78	84.79%
DP#7	5.43	0.69	0.79	7.09%
	0	0.00	0.00	0.00%
Basin 29	1.05	0.70	0.80	1.37%
Basin 30	2.56	0.60	0.70	3.34%
Basin 24	2.61	0.70	0.80	3.41%
	76.59			100%

COMPOSITE: C5= 0.69 C100= 0.78

TIME OF CONCENTRATION: Tc In Minutes:

Travel Type	L	s %	v5 (fps)	Tc (5 year)	v100 (fps)	Tc (100 year)
Overland	240	2.0		18.44		
Street	1100	1.5	2.6	7.05		
Pipe Flow	0	1.5	15	0.00		
Tc Total:				25.49		

Intensity, I (inches/hr) from Fig 5-1

I5	**I100**
2.6 in/hr	4.5 in/hr

PEAK FLOW: Q-CIA in cfs

Q5	**Q100**
136.9 cfs	267.3 cfs

Villages at Wolf Ranch Phase 5

INLET BASIN 4

	Q5 =	9.4	Q100 =	20.7
	SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	13.59	T	18.28
FW	2.23	FW	2.36
L1	23.3	L1	33.2
L2	14.0	L2	19.9
L3	49.9	L3	71.0

	Li =	15.00		
	5 YR Q =	9.4	100 YR Q	20.7
	5 YR Qi =	5.8	100 YR Qi	9.4
	5 YR Qfb =	3.6	100 YR Qfb	11.3

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN5

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		10.6	25.5	s(x)=	0.02
	d =	0.47	0.66	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		10.6	25.5	L=	12
	d(max)=	0.29	0.67		

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN 1

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		3.3	6.8	s(x)=	0.02
	d =	0.31	0.40	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		3.3	6.8		
				L=	6
	d(max)=	0.08	0.27		

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN 2

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		0.7	1.3	s(x)=	0.02
	d =	0.17	0.22	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		0.7	1.3		
				L=	4
	d(max)=	-0.14	-0.06		

Villages at Wolf Ranch Phase 5

INLET BASIN 4

Q5 =	9.4	Q100 =	20.7
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	13.59	T	18.28
FW	2.23	FW	2.36
L1	23.3	L1	33.2
L2	14.0	L2	19.9
L3	49.9	L3	71.0

Li =	15.00		
5 YR Q =	9.4	100 YR Q	20.7
5 YR Qi =	5.8	100 YR Qi	9.4
5 YR Qfb =	3.6	100 YR Qfb	11.3

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN 5

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		10.6	25.5	s(x)=	0.02
	d =	0.47	0.66	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		10.6	25.5		
				L=	12
	d(max)=	0.29	0.67		

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN 6

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		1.6	3.2	s(x)=	0.02
	d =	0.23	0.30	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		1.6	3.2		
				L=	4
	d(max)=	-0.03	0.11		

Villages at Wolf Ranch Phase 5

INLET BASIN 7

Q5 =	9.2	Q100 =	20.3
SL =	0.03	SO =	0.02

5 YEAR		100 YEAR	
T	13.48	T	18.14
FW	2.22	FW	2.35
L1	23.1	LI	32.9
L2	13.9	L2	19.7
L3	49.5	L3	70.4

Li =	20.00		
5 YR Q =	9.2	100 YR Q	20.3
5 YR Qi =	6.4	100 YR Qi	12.3
5 YR Qfb =	2.8	100 YR Qfb	8.0

Villages at Wolf Ranch Phase 5

INLET BASIN 9

	Q5 =	7.2	Q100 =	15.2
	SL =	0.045	SO =	0.02

5 YEAR		100 YEAR	
T	11.40	T	15.09
FW	2.63	FW	2.78
L1	23.1	L1	32.3
L2	13.9	L2	19.4
L3	49.5	L3	69.3

	Li =	15.00		
	5 YR Q =	7.2	100 YR Q	15.2
	5 YR Qi =	4.5	100 YR Qi	7.1
	5 YR Qfb =	2.7	100 YR Qfb	8.1

Villages at Wolf Ranch Phase 5

INLET BASIN 10

Q5 =	5.0	Q100 =	12.7
SL =	0.044	SO =	0.02

5 YEAR		100 YEAR	
T	9.98	T	14.16
FW	2.53	FW	2.72
L1	19.5	L1	29.6
L2	11.7	L2	17.8
L3	41.7	L3	63.5

Li =	15.00		
5 YR Q =	5	100 YR Q	12.7
5 YR Qi =	3.3	100 YR Qi	6.4
5 YR Qfb =	1.7	100 YR Qfb	6.3

Villages at Wolf Ranch Phase 5

INLET BASIN 11

Q5 =	2.8	Q100 =	6.1
SL =	0.044	SO =	0.02

5 YEAR		100 YEAR	
T	8.03	T	10.76
FW	2.42	FW	2.57
L1	15.0	L1	21.3
L2	9.0	L2	12.8
L3	32.1	L3	45.7

Li =	15.00		
5 YR Q =	2.8	100 YR Q	6.1
5 YR Qi =	2.1	100 YR Qi	3.9
5 YR Qfb =	0.7	100 YR Qfb	2.2

Villages at Wolf Ranch Phase 5

INLET BASIN 12

Q5 =	13.5	Q100 =	28.9
SL =	0.025	SO =	0.02

5 YEAR		100 YEAR	
T	16.11	T	21.43
FW	2.10	FW	2.22
L1	26.1	L1	36.6
L2	15.6	L2	22.0
L3	55.8	L3	78.3

Li =	15.00		
5 YR Q =	13.5	100 YR Q	28.9
5 YR Qi =	7.8	100 YR Qi	11.9
5 YR Qfb =	5.7	100 YR Qfb	17.0

Villages at Wolf Ranch Phase 5

INLET BASIN 13

Q5 =	8.9	Q100 =	18.4
SL =	0.025	SO =	0.02

5 YEAR		100 YEAR	
T	13.78	T	18.10
FW	2.04	FW	2.15
L1	21.6	L1	29.9
L2	13.0	L2	18.0
L3	46.3	L3	64.1

Li =	15.00		
5 YR Q =	8.9	100 YR Q	18.4
5 YR Qi =	5.7	100 YR Qi	9.2
5 YR Qfb =	3.2	100 YR Qfb	9.2

Villages at Wolf Ranch Phase 5

INLET BASIN 15

	Q5 =	10.6	Q100 =	21.2
	SL =	0.022	SO =	0.02

5 YEAR		100 YEAR	
T	15.07	T	19.55
FW	1.95	FW	2.04
L1	22.6	L1	30.7
L2	13.6	L2	18.5
L3	48.4	L3	65.9

	Li =	15.00		
	5 YR Q =	10.6	100 YR Q	21.2
	5 YR Qi =	6.6	100 YR Qi	10.3
	5 YR Qfb =	4.0	100 YR Qfb	10.9

Villages at Wolf Ranch Phase 5

INLET BASIN 16A

Q5 =	16.0	Q100 =	43.9	
SL =	0.024	SO =	0.02	

5 YEAR		100 YEAR	
T	17.30	T	25.26
FW	2.09	FW	2.24
L1	27.8	L1	43.5
L2	16.7	L2	26.1
L3	59.5	L3	93.2

Li =	15.00			
5 YR Q =	16		100 YR Q	43.9
5 YR Qi =	8.6		100 YR Qi	15.1
5 YR Qfb =	7.4		100 YR Qfb	28.8

Villages at Wolf Ranch Phase 5

INLET BASIN 16B

	Q5 =	13.5	Q100 =	41.8
	SL =	0.024	SO =	0.02

5 YEAR		100 YEAR	
T	16.24	T	24.80
FW	2.06	FW	2.23
L1	25.8	L1	42.6
L2	15.5	L2	25.6
L3	55.2	L3	91.2

	Li =	15.00		
	5 YR Q =	13.5	100 YR Q	41.8
	5 YR Qi =	7.9	100 YR Qi	14.7
	5 YR Qfb =	5.6	100 YR Qfb	27.1

Villages at Wolf Ranch Phase 5

INLET BASIN 17

Q5 =	8.4	Q100 =	33.7
SL =	0.015	SO =	0.02

5 YEAR		100 YEAR	
T	14.84	T	24.99
FW	1.60	FW	1.76
L1	18.3	L1	34.0
L2	11.0	L2	20.4
L3	39.2	L3	72.7

Li =	15.00		
5 YR Q =	8.4	100 YR Q	33.7
5 YR Qi =	5.7	100 YR Qi	14.9
5 YR Qfb =	2.7	100 YR Qfb	18.8

Villages at Wolf Ranch Phase 5

INLET BASIN 18

	Q5 =	5.3	Q100 =	14.1
	SL =	0.017	SO =	0.02

5 YEAR		100 YEAR	
T	12.20	T	17.60
FW	1.64	FW	1.76
L1	15.4	L1	23.9
L2	9.3	L2	14.3
L3	33.0	L3	51.2

	Li =	15.00		
	5 YR Q =	5.3	100 YR Q	14.1
	5 YR Qi =	3.9	100 YR Qi	8.6
	5 YR Qfb =	1.4	100 YR Qfb	5.5

Villages at Wolf Ranch Phase 5

INLET BASIN 19

Q5 =	8.4	Q100 =	17.9
SL =	0.015	SO =	0.02

5 YEAR		100 YEAR	
T	14.84	T	19.71
FW	1.60	FW	1.69
L1	18.3	L1	25.6
L2	11.0	L2	15.4
L3	39.2	L3	54.9

Li =	15.00		
5 YR Q =	8.4	100 YR Q	17.9
5 YR Qi =	5.7	100 YR Qi	10.5
5 YR Qfb =	2.7	100 YR Qfb	7.4

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN 20

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		5.9	12.4	s(x)=	0.02
	d =	0.38	0.50	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		5.9	12.4		
				L=	15
	d(max)=	0.09	0.30		

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN 21 & 22

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		10.1	38.9	s(x)=	0.02
	d =	0.46	0.77	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		14.4	48.8		
				L=	15
	d(max)=	0.35	0.98		

Villages at Wolf Ranch Phase 5

INLET BASIN 23

	Q5 =	6.4	Q100 =	13.8
	SL =	0.015	SO =	0.02

5 YEAR		100 YEAR	
T	13.40	T	17.88
FW	1.57	FW	1.66
L1	16.2	L1	22.8
L2	9.7	L2	13.7
L3	34.7	L3	48.9

	Li =	15.00		
	5 YR Q =	6.4	100 YR Q	13.8
	5 YR Qi =	4.6	100 YR Qi	8.6
	5 YR Qfb =	1.8	100 YR Qfb	5.2

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN 24 & 25

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		8.4	20.2	s(x)=	0.02
	d =	0.43	0.60	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		10.2	23.8		
				L=	15
	d(max)=	0.23	0.56		

Villages at Wolf Ranch Phase 5

INLET BASIN 26

Q5 =	6.7	Q100 =	22.0
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	12.92	T	20.18
FW	1.80	FW	1.96
L1	17.9	L1	30.4
L2	10.8	L2	18.3
L3	38.4	L3	65.2

Li =	15.00		
5 YR Q =	6.7	100 YR Q	22
5 YR Qi =	4.6	100 YR Qi	10.8
5 YR Qfb =	2.1	100 YR Qfb	11.2

Villages at Wolf Ranch Phase 5

INLET BASIN 27

Q5 =	10.2	Q100 =	28.8
SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	15.12	T	22.32
FW	1.86	FW	2.00
L1	21.6	L1	34.3
L2	13.0	L2	20.6
L3	46.3	L3	73.5

Li =	15.00		
5 YR Q =	10.2	100 YR Q	28.8
5 YR Qi =	6.5	100 YR Qi	12.6
5 YR Qfb =	3.7	100 YR Qfb	16.2

Villages at Wolf Ranch Phase 5

INLET BASIN 28

	Q5 =	6.3	Q100 =	21.5
	SL =	0.02	SO =	0.02

5 YEAR		100 YEAR	
T	12.62	T	20.00
FW	1.79	FW	1.96
L1	17.4	L1	30.1
L2	10.5	L2	18.1
L3	37.3	L3	64.6

	Li =	15.00		
	5 YR Q =	6.3	100 YR Q	21.5
	5 YR Qi =	4.4	100 YR Qi	10.7
	5 YR Qfb =	1.9	100 YR Qfb	10.8

Villages at Wolf Ranch Phase 5

INLET BASIN 29

Q5 =	9.3	Q100 =	38.9
SL =	0.02	SO =	0.02

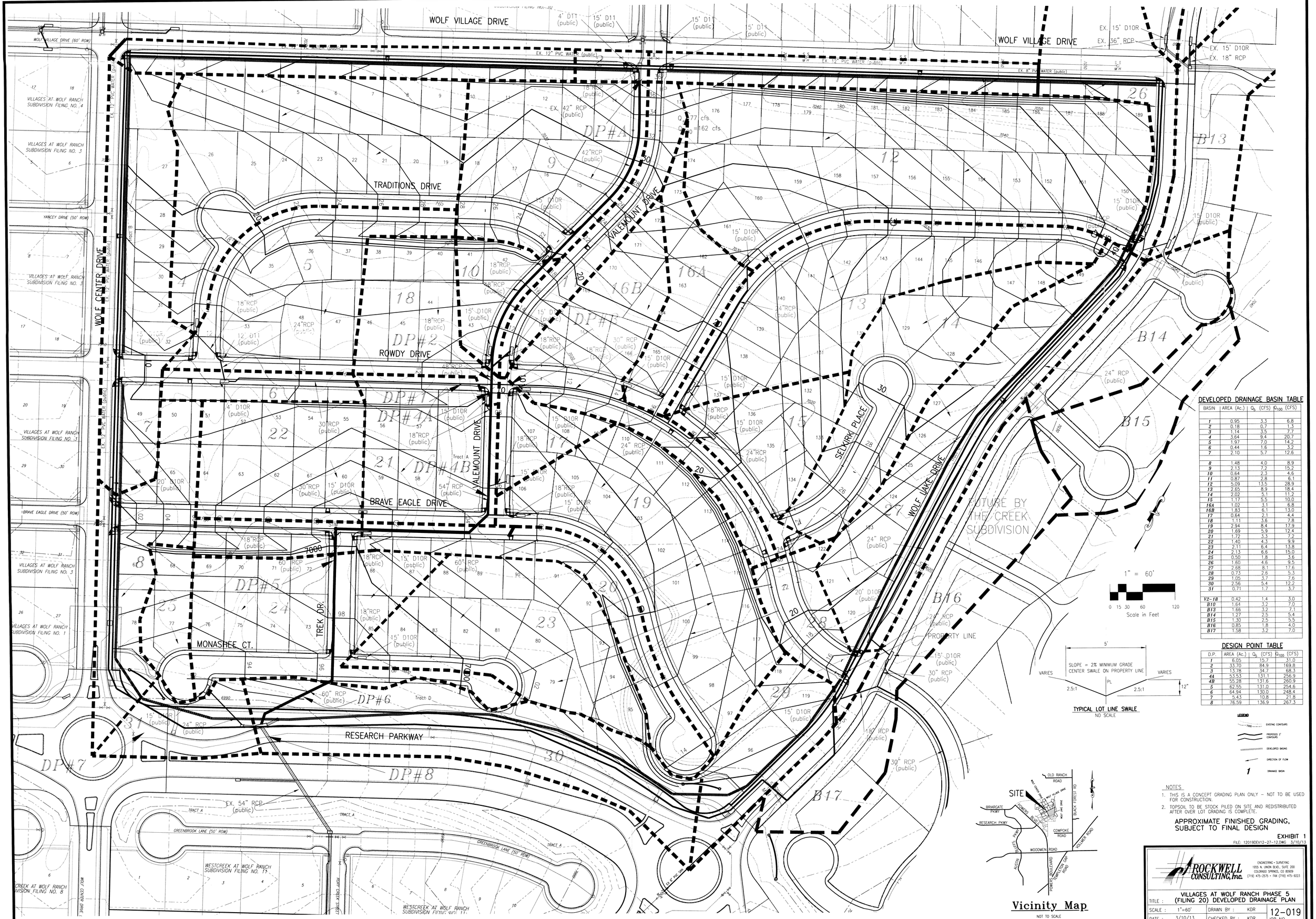
5 YEAR		100 YEAR	
T	14.61	T	24.98
FW	1.84	FW	2.04
L1	20.7	L1	39.2
L2	12.5	L2	23.5
L3	44.4	L3	84.0

Li =	15.00		
5 YR Q =	9.3	100 YR Q	38.9
5 YR Qi =	6.0	100 YR Qi	14.9
5 YR Qfb =	3.3	100 YR Qfb	24.0

Villages at Wolf Ranch Phase 5

Sump Inlet BASIN 30 & 31

		5 YEAR	100 YEAR		
APPROACH FLOWS (worse case)		11	30.6	s(x)=	0.02
	d =	0.48	0.70	s(l)=	0.002
				n=	0.016
TOTAL FLOWS		19.5	51.2		
				L=	20
	d(max)=	0.38	0.87		



DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
1	0.95	3.3	6.8
2	0.18	0.7	1.3
3	1.14	3.5	7.7
4	3.64	9.4	20.7
5	1.97	7.0	14.2
6	0.44	1.6	3.2
7	2.10	5.7	12.6
8	1.48	4.0	8.9
9	2.13	7.2	15.2
10	0.64	2.3	4.6
11	0.87	2.8	6.1
12	5.09	13.5	28.9
13	2.65	8.9	18.4
14	2.02	5.1	11.2
15	1.17	5.5	10.0
16A	1.02	3.1	6.8
16B	1.83	6.1	13.0
17	0.64	2.1	4.4
18	1.11	3.6	7.8
19	2.94	8.4	17.9
20	1.69	5.9	12.4
21	1.72	3.3	7.2
22	1.40	4.3	9.9
23	2.11	6.4	13.8
24	2.13	6.6	15.0
25	0.50	1.8	3.6
26	1.60	4.6	9.5
27	2.68	8.1	17.6
28	0.73	2.6	5.3
29	1.05	3.7	7.6
30	2.56	5.4	12.2
31	0.71	1.7	3.7
V2-18	0.42	1.4	3.0
B10	1.64	3.2	7.0
B13	1.66	3.2	7.1
B14	1.27	2.5	5.4
B15	1.30	2.5	5.5
B16	0.85	1.8	4.0
B17	1.58	3.2	7.0

DESIGN POINT TABLE

D.P.	AREA (Ac.)	Q_5 (CFS)	Q_{100} (CFS)
1	6.05	15.7	31.0
2	33.70	84.9	169.8
3	13.78	34.7	68.3
4A	53.53	131.1	256.9
4B	55.28	131.6	260.9
5	62.55	131.0	254.6
6	64.94	130.0	248.4
7	5.43	10.8	21.8
8	76.59	136.9	267.3

TYPICAL LOT LINE SWALE
NO SCALE

LEGEND
- 7000 — EXISTING CONTOURS
- PROPOSED 2' CONTOURS
- DEVELOPED BASINS
- DIRECTION OF FLOW
- 1 DRAINAGE BASIN

Vicinity Map
NOT TO SCALE

NOTES
1. THIS IS A CONCEPT GRADING PLAN ONLY – NOT TO BE USED FOR CONSTRUCTION.
2. TOPSOIL TO BE STOCK PILED ON SITE AND REDISTRIBUTED AFTER OVER LOT GRADING IS COMPLETE.

APPROXIMATE FINISHED GRADING, SUBJECT TO FINAL DESIGN

EXHIBIT 1

FILE: 12019DEV12-27-12.DWG 3/10/13

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ENGINEERING • SURVEYING
1955 N. UNION BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2575 • FAX (719) 475-9223

TITLE : VILLAGES AT WOLF RANCH PHASE 5 (FILING 20) DEVELOPED DRAINAGE PLAN

SCALE : 1"=60' | DRAWN BY : KDR | JOB NO. 12-019

DATE : 3/10/13 | CHECKED BY : KDR