

FINAL DRAINAGE REPORT
for
VILLAGES AT WOLF RANCH SUBDIVISION FILING NO. 19
and
AMENDMENT TO THE MDDP FOR VILLAGES II AT WOLF RANCH

AUGUST, 2012

Prepared for:

Villages at Wolf Ranch, LLC (Norwood)
111 South Tejon Street, Suite 222
Colorado Springs, CO 80903
(719) 593-2600

Prepared by:

Rockwell Consulting, Inc.
1955 N. Union Boulevard, Suite 200
Colorado Springs, CO 80909
(719) 475-2575

Project# 12-029

FINAL DRAINAGE REPORT
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AUGUST, 2012

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.



Kent D. Rockwell, P.E.



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:



Ralph A. Braden

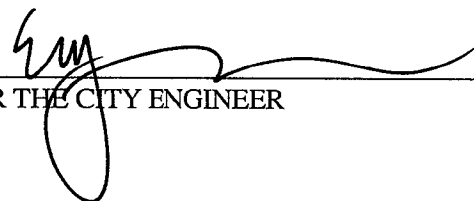
8/30/12
DATE

TITLE: Vice President, Norwood Limited, Inc.

ADDRESS: 111 South 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

9/20/12
DATE

FINAL DRAINAGE REPORT
for
VILLAGES AT WOLF RANCH SUBDIVISION FILING NO. 19
and
AMENDMENT TO THE MDDP FOR VILLAGES II AT WOLF RANCH

AUGUST, 2012

GENERAL LOCATION AND DESCRIPTION

The Villages at Wolf Ranch Subdivision Filing No. 19 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 northeast quarter of Section 36, Township 12 South, Range 66 West of the 6th P.M. The site is bound on the west by Tutt Boulevard, on the south by Leon Young Drive, on the north by unplatted land and on the east by Wolf Center Drive.

The approved "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" prepared by Rockwell Consulting, Inc., dated December, 2005, addressed the drainage patterns for the area southeast of the Villages at Wolf Ranch Subdivision Filing 19. Leon Young Drive abutting Filing No. 19 which acts as the access roadway to the proposed lots in Filing No. 19 was platted as part of adjacent Villages at Wolf Ranch Filing 15.

Flows within Leon Young were analyzed as part the Villages Filing 15 drainage studies including 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". Some of the drainage basin descriptions come from that document and are referenced herein. A copy of the portion of the Drainage Plan representing this site, with detailed descriptions of the flows, is included.

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 on a per filing basis for the residential lots as they are developed and platted.

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 Westcreek Development fall under the Pring Series (Soil 71), the Stapleton Series (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.

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 II 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

Historic drainage patterns and flows were addressed in several previous Master Development Drainage Plans. The historic drainage patterns have been altered due to on-going development throughout the 2000 acre Wolf Ranch Master Plan. Therefore, no additional analysis of the historic drainage basins are presented as part of the on-going developments with the overall Wolf Ranch Development.

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

In the above referenced MDDP, Basins 41 through 43 comprise the north side of Leon Young Drive from Wolf Lake Drive to Tutt Boulevard. Basin 43 of the MDDP will be modified to include the Villages Filing 19 lots and is describe in this report as Basin 63 and 64.

The drainage report for Villages Filing No. 16 located northeast of the Wolf Center Drive and Leon Young Drive intersection provides additional refinement of the MDDP Basins 41 and 42 descriptions. A copy of the Villages 16 drainage plan is included in the appendix of this report as reference for the following basins.

Excerpts from the Villages at Wolf Ranch Filing No. 16 Drainage Report:

Total flow rates of $Q_5 = 4.2$ cfs and $Q_{100} = 10.1$ cfs will enter Basin 21 from Basins 19 and 20.

Basin 21 consists of approximately 1.81 acres at the northwest corner of Leon Young Drive and Valemount Drive. Runoff rates of 5.6 cfs and 12.3 cfs generated from this basin during the 5 year and 100 year storms, respectively, flow westerly along the north side of Leon Young. Including the bypass flows from Basins 19 and 20, total flows of $Q_5 = 9.8$ cfs and $Q_{100} = 22.4$ cfs will reach a proposed 15' on-grade inlet at the west end of Basin 21. This inlet will collect flows of 6.3 cfs and 11.0 cfs. Runoff rates of $Q_5 = 3.5$ cfs and $Q_{100} = 11.4$ cfs will bypass this inlet and enter Basin 23.

Approximately 1.03 acres along the south side of Thurber Drive and the east side of Boylston comprise Basin 22. Flows of 3.5 cfs and 7.3 cfs will reach the west side of Boylston just north of Leon Young Drive. A 15' inlet will collect flows of 2.6 cfs and 4.7 cfs during the 5 year and 100 year storms, respectively. The remaining flows of $Q_5 = 0.9$ cfs and $Q_{100} = 2.6$ cfs will enter Basin 23 as street flows.

Basin 23 is located at the northwest corner of Leon Young and Boylston Drive. This 2.16 acre basin generates flows of 6.0 cfs during the 5 year storm and 13.0 cfs during the 100 year storm. Including the bypass flows from Basin 21 and 22, runoff rates of $Q_5 = 10.4$ cfs and $Q_{100} = 27.0$ cfs will reach the west end of Basin 23. A 15' inlet will collect flows of 6.6 cfs during the 5 year storm and 12.1 cfs during the 100 year storm. The remaining flows of $Q_5 = 3.8$ cfs and $Q_{100} = 14.9$ cfs will enter Basin 24 as street flows.

Basin 24 generates additional flows of 2.6 cfs during the 5 year storm and 5.6 cfs during the 100 year storm. Including the bypass flows from Basins 23 and 16, flows of $Q_5 = 9.2$ cfs and $Q_{100} = 37.0$ cfs will continue westerly along the north side of Leon Young Drive, across Wolf Center Drive

Flows of 1.1 cfs and 2.1 cfs are generated from the 0.28 acre Basin 25 which is located along the west side of Wolf Center Drive just north of Leon Young Drive.

A 15' on-grade inlet will be installed along the north side of Leon Young Drive just west of Wolf Center Drive. Flows rates of $Q_5 = 10.3$ cfs and $Q_{100} = 39.1$ cfs will approach this inlet from Basins 16, 23, 24 and 25. The inlet will collect flows of $Q_5 = 6.6$ cfs and $Q_{100} = 14.9$ cfs while flows of 3.7 cfs during the 5 year storm and 24.2 cfs during the 100 year storm will bypass this inlet. These flows were anticipated in downstream reports.

The existing 15' inlet (Inlet 63A) just west of the Wolf Center Drive and Leon Young Drive intersection along the north side of Leon Young mentioned above actually will collect flows of 6.8 cfs during the 5 year storm and 16.2 cfs during the 100 year storm. The bypass flows of 3.5 cfs during the 5 year storm and 22.9 cfs during the 100 year storm will enter Basin 63 as street flows.

Basin 63, consisting of the Villages Filing No. 19 lots between Wolf Center Drive and Thorndike Drive, generates flows of 9.8 cfs during the 5 year storm and 20.9 cfs during the 100 year storm. Combined flow rates of $Q_5 = 13.3$ cfs and $Q_{100} = 43.8$ cfs reach the west end of Basin 63. An additional 15' existing inlet (Inlet 63B) will collect flows of 8.3 cfs and 17.2 cfs during the 5 and 100 year storms, respectively. The remaining flow rates of $Q_5 = 5.0$ cfs and $Q_{100} = 26.6$ cfs bypassing this inlet will enter Basin 64 as street flows.

Basin 64 generates flow rates of 5.7 cfs and 12.2 cfs during the 5 and 100 year storms, respectively. Total flow rates of $Q_5 = 10.7$ cfs and $Q_{100} = 38.8$ cfs will reach the west end of Basin 64 as street flows. A third 15' existing inlet (Inlet 64) will collect runoff rates of 7.0 cfs during the 5 year storm and 16.0 cfs during the 100 year storm. The remaining flow rates of 3.7 cfs and 22.8 cfs during the 5 and 100 year storms, respectively, will flow westerly within Leon Young Drive and then flows southerly within Tutt Boulevard. These flows compare to flow rates of $Q_5 = 5.5$ cfs and $Q_{100} = 14.6$ cfs anticipated in the MDDP flowing southerly within Tutt Boulevard.

The downstream streets have the capacity to convey the additional 100 year flow rates over those anticipated in the MDDP.

DRAINAGE, BRIDGE AND POND FEES

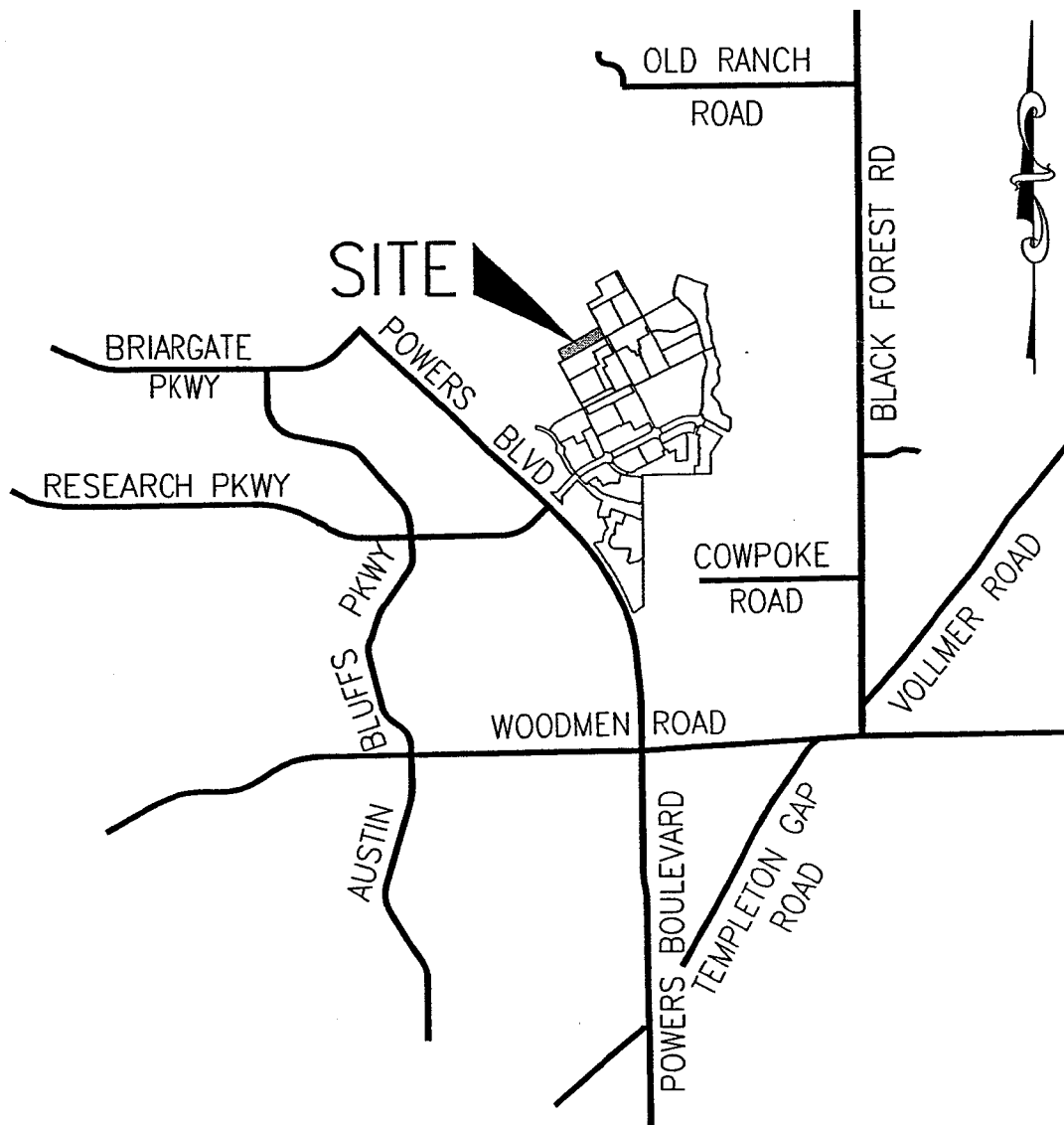
The Villages at Wolf Ranch Development is within the Cottonwood Creek Drainage Basin. The 2012 Drainage, Bridge and Pond Fees are listed below. Drainage facilities within this filing are all part of the overall Wolf Ranch Drainage system presented in the Wolf Ranch Master Development Drainage Plan.

Villages at Wolf Ranch Filing No. 19 Drainage Fees:

	AREA	\$/ACRE	TOTAL FEE
Capital Improvements Portion	3.540	\$ 8,312.00	\$ 29,424.48
Land Portion	3.540	\$ 2,942.00	\$ 10,414.68
Cash Portion	3.540	\$ 567.00	\$ 2,007.18
Bridge Fees	3.540	\$ 886.00	\$ 3,136.44
		Total	\$ 44,982.78

DRAINAGE FACILITIES

The drainage facilities required for Villages Filing No. 19 were constructed with adjacent subdivisions; therefore, no drainage facilities will be constructed with this filing.



Vicinity Map

NOT TO SCALE

FIGURE 1

FILE: 12029FP.DWG
DATE: 7/17/12

JOB NO. 12-029

ROCKWELL CONSULTING, Inc.
ENGINEERING • SURVEYING
1855 N. UNION BLVD., SUITE 200
COLORADO SPRINGS, CO 80909
(719) 475-2575 • FAX (719) 475-9223

VILLAGES AT WOLF RANCH SUBDIVISION FILING NO. 19

KNOW ALL MEN BY THESE PRESENTS:

That Villages at Wolf Ranch, LLC, a Colorado LLC being the Owner of the following described Tract of Land:

A portion of the Northeast Quarter of Section 36, Township 12 South, Range 66 West of the 6th P.M., City of Colorado Springs, El Paso County, Colorado, more particularly described as follows:

BEGINNING at the Northeast Right-of-Way corner of Leon Young Drive as shown in the plat of Villages at Wolf Ranch Subdivision Filing No. 15 as recorded at Reception No. 206712346 of the records of said El Paso County, the following course is on the Northernly boundary line of said Filing No. 15; thence 1) S61°44'34"W a distance of 1227.16 feet; thence N28°15'26"W a distance of 120.00 feet; thence N61°44'34"E a distance of 507.16 feet; thence N50°25'59"E a distance of 50.99 feet; thence N61°44'34"E a distance of 670.00 feet to a point on the Westernly boundary of Villages at Wolf Ranch Subdivision Filing No. 16 as recorded at Reception No. 206712432 of the records of said El Paso County; thence S26°15'26"E on said Westernly line of said Filing No. 16, a distance of 130.00 feet to the Point of Beginning, containing 3.540 acres of land, more or less.

IN WITNESS WHEREOF:

The aforementioned have executed these presents this _____ day of _____, 2012 A.D.

Villages at Wolf Ranch, L.L.C.
Nor'wood Limited, Inc. (Its' Manager)
A Colorado Corporation

Ralph A. Braden, Vice President

NOTARIAL:

STATE OF COLORADO }
COUNTY OF EL PASO } SS

The above and foregoing statement was acknowledged before me this _____ day of _____, 2012 A.D., by Ralph A. Braden as Vice President of Nor'wood Limited, Inc.

My Commission Expires: _____

Address: _____

Notary Public

DEDICATION:

The above owner has caused said tract of land to be platted into Lots, a Streets and Easements as shown on the plat. The undersigned does hereby dedicate, grant and convey to the City of Colorado Springs those hereby easements as shown on the plat; and further restricts the use of all Public Easements to the City of Colorado Springs and/or its assigns, provided however, that the sole right and authority to release or quit claim all of any such Public Easements shall remain exclusively vested in the City of Colorado Springs. All streets are hereby dedicated to the City of Colorado Springs for public use. This tract of land as herein platted shall be known as "VILLAGES AT WOLF RANCH SUBDIVISION FILING NO. 19", City of Colorado Springs, El Paso County, Colorado.

NOTICE IS HEREBY GIVEN:

That the area included in the Plat described herein, as stipulated in the Code of the City of Colorado Springs, 2001, as Amended.

No building permits shall be issued for building sites within this Plat until all required fees have been paid and all required public and private improvements have been installed as specified by the City of Colorado Springs, or alternatively, until acceptable assurances, including but not limited to, letters of credit, cash, subdivision bonds, or combinations thereof, guaranteeing the completion of all required public improvements including but not limited to drainage, street and erosion control and private drainage improvements have been placed on file with the City of Colorado Springs.

EASEMENTS:

All Lots will have a 5 foot wide front and 7 foot wide rear yard easement for public utilities and private drainage purposes only. All side lot lines will have a 5 foot wide easement for public utilities and private drainage purposes only. All lot lines abutting a public Right-of-Way are hereby platted with a 5 foot wide easement for public utilities, public drainage and public improvements. All lots abutting Leon Young Drive are hereby platted with a 6 foot wide easement for public improvements. All lots adjacent to two street right-of-ways are hereby platted with a 20 foot by 20 foot triangle easement for public improvements only. Surface maintenance of all public easements is vested in the property owners.

All utility easements shown or dedicated hereon for public utility purposes shall be subject to those terms and conditions as specified in the instrument recorded at Reception Number 209056689 of the records of El Paso County, Colorado (except for dual easements as defined in 7.7.607 of the City Code).

FEES:

DRAINAGE FEE: _____
BRIDGE FEE: _____
SCHOOL FEE: _____
PARK FEE: _____

PLAT RESTRICTION:

The City of Colorado Springs is a home rule municipality in the State of Colorado and has all those powers attendant thereto, including without limitation the general powers, the power to require restrictions and limitations on subdivision approval. As a condition of subdivision plat approval, all property contained within the boundaries or limits of this subdivision shall be subject to the following plat restriction.

As a means to promote efficient cost-effective resolution of disputes pertaining to the Property covered by this plat (the "Property") and to encourage and foster the development of housing, included but not limited to residential housing, multi-family housing and any and all related uses to be made within the Property and to further promote the affordability of housing, it is a Requirement that the following claims involving the Property or any improvements thereon shall be submitted to binding arbitration in lieu of submitting any such claim to a judicial proceeding:

Any and all claims:

- (1) That are between two or more of the following persons or entities:
 - (a) any owner or any portion of the Property;
 - (b) any common interest community association created with respect to the Property;
 - (c) the subdivider, developer or any contractor or anyone claiming under or through any such persons;
 - (d) any party that constructs any residential dwelling units upon the Property;
 - (e) any Construction Professional as defined in the Construction Defect Action Reform Act ("CADARA"), C.R.S. 13-80-802.5, et seq., as amended and
- (2) That pertains to any of
 - (a) the Property;
 - (b) any dwelling unit or improvement constructed on the Property, or common area development structure;
 - (c) the common interest community to be created for the Property or any portion thereof; or
 - (d) the Declaration or other documents governing such community.

The foregoing shall not preclude any of the foregoing parties from endeavoring to resolve any such claims to either negotiation or mediation before submitting such claim to binding arbitration. Additionally, the Property may also be submitted to a Declaration of Covenants, Conditions and Restrictions that may implement and expand upon the requirements of this paragraph and that may exempt certain claims from the requirement that such claims must be submitted to binding arbitration; provided, however, that any amendment or change to such Declaration of Covenants, Conditions or Restrictions shall not be subsequently amended to eliminate the requirement that any such claims, including construction defect claims as more particularly defined by the CADARA. Notwithstanding the foregoing, this restriction shall not be deemed to require that claims brought by a common interest community to recover unpaid assessments payable to such association or to obtain a Temporary Restraining Order injunction from a Court of law prohibiting a violation of such Covenants, Conditions and Restrictions shall be subject to binding arbitration.

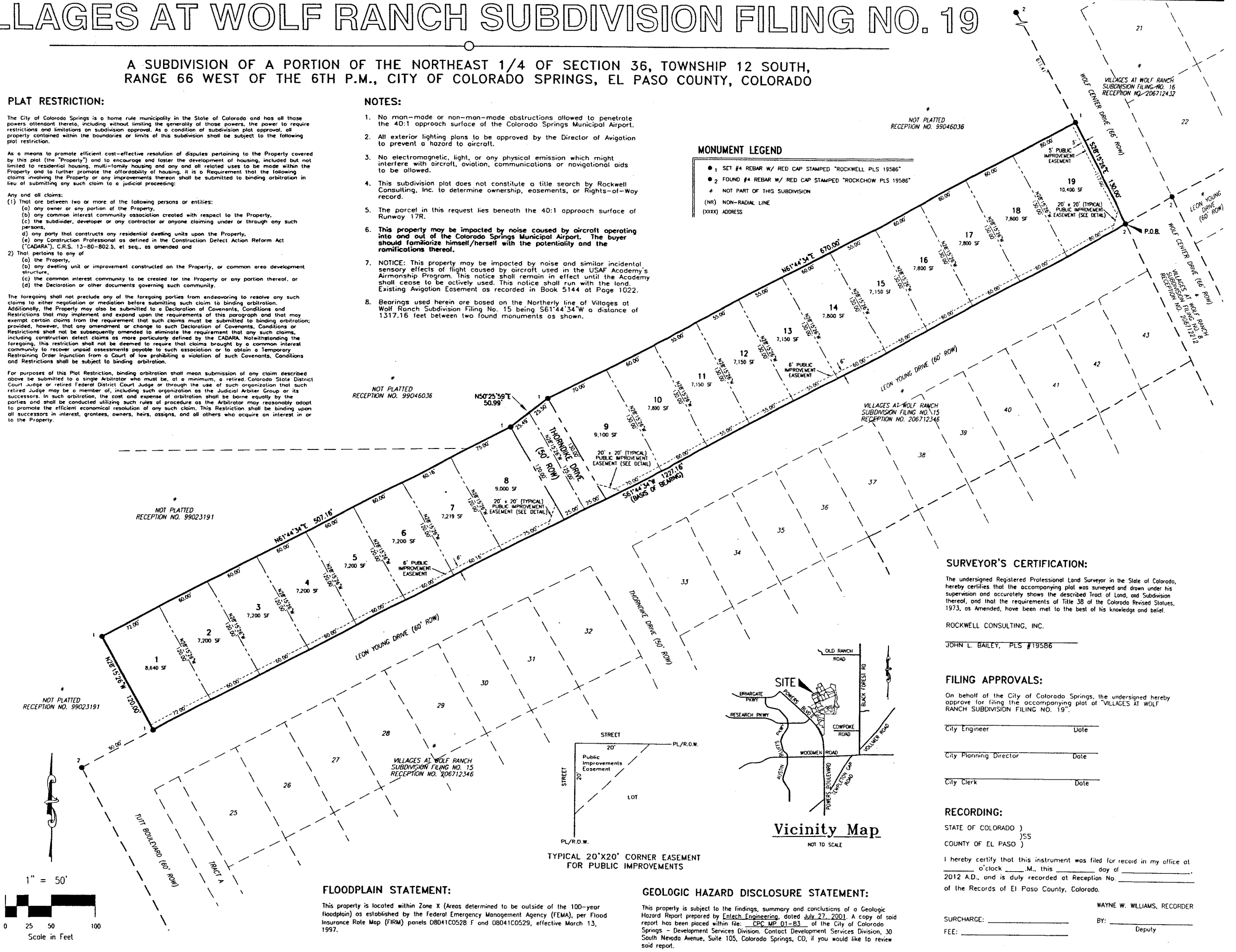
For purposes of this Plat Restriction, binding arbitration shall mean submission of any claim described above to either negotiation or mediation before submitting such claim to binding arbitration. Additionally, the Property may also be submitted to a Declaration of Covenants, Conditions and Restrictions that may implement and expand upon the requirements of this paragraph and that may exempt certain claims from the requirement that such claims must be submitted to binding arbitration; provided, however, that any amendment or change to such Declaration of Covenants, Conditions or Restrictions shall not be subsequently amended to eliminate the requirement that any such claims, including construction defect claims as more particularly defined by the CADARA. Notwithstanding the foregoing, this restriction shall not be deemed to require that claims brought by a common interest community to recover unpaid assessments payable to such association or to obtain a Temporary Restraining Order injunction from a Court of law prohibiting a violation of such Covenants, Conditions and Restrictions shall be subject to binding arbitration.

NOTES:

1. No man-made or non-man-made obstructions allowed to penetrate the 40:1 approach surface of the Colorado Springs Municipal Airport.
2. All exterior lighting plans to be approved by the Director of Aviation to prevent a hazard to aircraft.
3. No electromagnetic, light, or any physical emission which might interfere with aircraft, aviation, communications or navigational aids to be allowed.
4. This subdivision plat does not constitute a title search by Rockwell Consulting, Inc. to determine ownership, easements, or Rights-of-Way record.
5. The parcel in this request lies beneath the 40:1 approach surface of Runway 17R.
6. This property may be impacted by noise caused by aircraft operating into and out of the Colorado Springs Municipal Airport. The buyer should familiarize himself/herself with the potentially and the ramifications thereof.
7. NOTICE: This property may be impacted by noise and similar incidental sensory effects of light caused by aircraft used in the USAF Academy's Airmanship Program. This notice shall remain in effect until the Academy shall cease to be actively used. This notice shall run with the land. Existing Aviation Easement as recorded in Book 5144 at Page 1022.
8. Bearings used herein are based on the Northernly line of Villages at Wolf Ranch Subdivision Filing No. 15 being S61°44'34"W a distance of 1317.16 feet between two found monuments as shown.

MONUMENT LEGEND

- 1 SET #4 REBAR W/ RED CAP STAMPED "ROCKWELL PLS 19586"
- 2 FOUND #4 REBAR W/ RED CAP STAMPED "ROCKCHOW PLS 19586"
- * NOT PART OF THIS SUBDIVISION
- (NR) NON-RADIAL LINE
- (XXXX) ADDRESS



SURVEYOR'S CERTIFICATION:

The undersigned Registered Professional Land Surveyor in the State of Colorado, hereby certifies that the accompanying plat was surveyed and drawn under his supervision and accuracy shows the described tract of land, and Subdivision thereof, and that the requirements of Title 38 of the Colorado Revised Statutes, 1973, as Amended, have been met to the best of his knowledge and belief.

ROCKWELL CONSULTING, INC.

JOHN L. BAILEY, PLS #19586

FILING APPROVALS:

On behalf of the City of Colorado Springs, the undersigned hereby approve for filing the accompanying plat of "VILLAGES AT WOLF RANCH SUBDIVISION FILING NO. 19".

City Engineer _____ Date _____
City Planning Director _____ Date _____
City Clerk _____ Date _____

RECORDING:

STATE OF COLORADO }
COUNTY OF EL PASO } JSS

I hereby certify that this instrument was filed for record in my office at _____ o'clock _____ M., this _____ day of _____, 2012 A.D., and is duly recorded at Reception No. _____ of the Records of El Paso County, Colorado.

WAYNE W. WILLIAMS, RECORDER

SURCHARGE: _____ BY: _____
FEE: _____ Deputy

FLOODPLAIN STATEMENT:

This property is located within Zone X (Areas determined to be outside of the 100-year floodplain) as established by the Federal Emergency Management Agency (FEMA), per Flood Insurance Rate Map (FIRM) panels 08041C0528 F and 08041C0529, effective March 13, 1997.

GEOLOGIC HAZARD DISCLOSURE STATEMENT:

This property is subject to the findings, summary and conclusions of a Geologic Hazard Report prepared by Entech Engineering, dated July 27, 2001. A copy of said report has been placed within file: CPC MP 01-83 of the City of Colorado Springs - Development Services Division. Contact Development Services Division, 30 South Nevada Avenue, Suite 105, Colorado Springs, CO, if you would like to review said report.

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.



VILLAGES AT WOLF RANCH
SUBDIVISION FILING NO. 19
DRAWN BY: MC CHECKED BY: AB DATE: 7/17/12
J.L.R. 12-029 SHEET 1 OF 1

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: VILLAGES AT WOLF RANCH PHASE 2

BASIN: 63
 AREA: 3.49
 SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	3.49	0.70	0.80	100.00%
Street	0	0.90	0.90	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	3.49			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		4.46
Street	650	1.5	2.6	4.17	2.8	3.87
				<u>10.12</u>		<u>8.33</u>
Tc Total:				10.12		8.33

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

I5 4.0 in/hr I100 7.5 in/hr

PEAK FLOW: Q-CIA in cfs

Q5 9.8 cfs Q100 20.9 cfs

HYDROLOGY

RATIONAL METHODOLOGY

PROJECT: VILLAGES AT WOLF RANCH PHASE 2

BASIN: 64
 AREA: 1.88
 SOIL TYPE: C & D

RUNOFF COEFFICIENT, C

ZONE/DEVELOPMENT TYPE	AREA	C5	C100	% AREA
1/8 Acre Residential	1.88	0.70	0.80	100.00%
Street	0	0.90	0.90	0.00%
	0	0.00	0.00	0.00%
	<u>0</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00%</u>
	1.88			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		4.46
Street	500	2.0	2.8	2.98	3	2.78
				<u>8.93</u>		<u>7.24</u>
Tc Total:				8.93		7.24

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

I5	I100
<u>4.4 in/hr</u>	<u>8.1 in/hr</u>

PEAK FLOW: Q-CIA in cfs

Q5	Q100
<u>5.7 cfs</u>	<u>12.2 cfs</u>

Villages at Wolf Ranch Filing No. 19

INLET 63A

Q5 =	10.3	Q100 =	39.1
SL =	0.015	SO =	0.02

5 YEAR

100 YEAR

T	16.02
FW	1.62
L1	20.0
L2	12.0
L3	43.0

T	26.42
FW	1.78
L1	36.3
L2	21.8
L3	77.7

Li = 15.00

5 YR Q =	10.3	100 YR Q	39.1
5 YR Qi =	<u>6.8</u>	100 YR Qi	<u>16.2</u>
5 YR Qfb =	3.5	100 YR Qfb	22.9

Villages at Wolf Ranch Filing No. 19

INLET 63B

Q5 =	13.3	Q100 =	43.8
SL =	0.015	SO =	0.02

5 YEAR

T	17.63
FW	1.65
L1	22.5
L2	13.5
L3	48.1

100 YEAR

T	27.57
FW	1.80
L1	38.1
L2	22.9
L3	81.7

Li = 15.00

5 YR Q =	13.3	100 YR Q	43.8
5 YR Qi =	<u>8.3</u>	100 YR Qi	<u>17.2</u>
5 YR Qfb =	5.0	100 YR Qfb	26.6

Villages at Wolf Ranch Filing No. 19

INLET 64

Q5 =	10.7	Q100 =	38.8
SL =	0.0154	SO =	0.02

5 YEAR

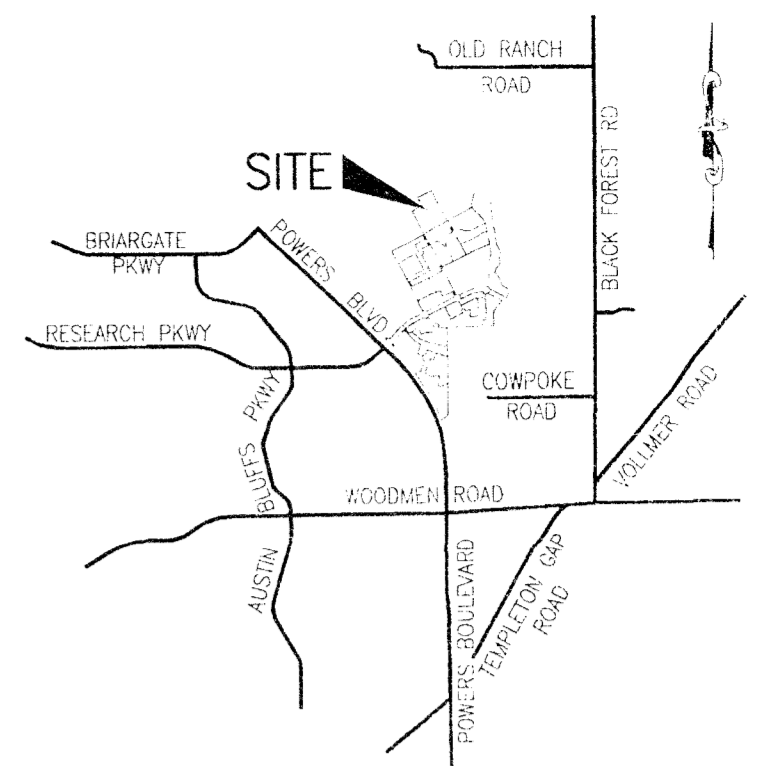
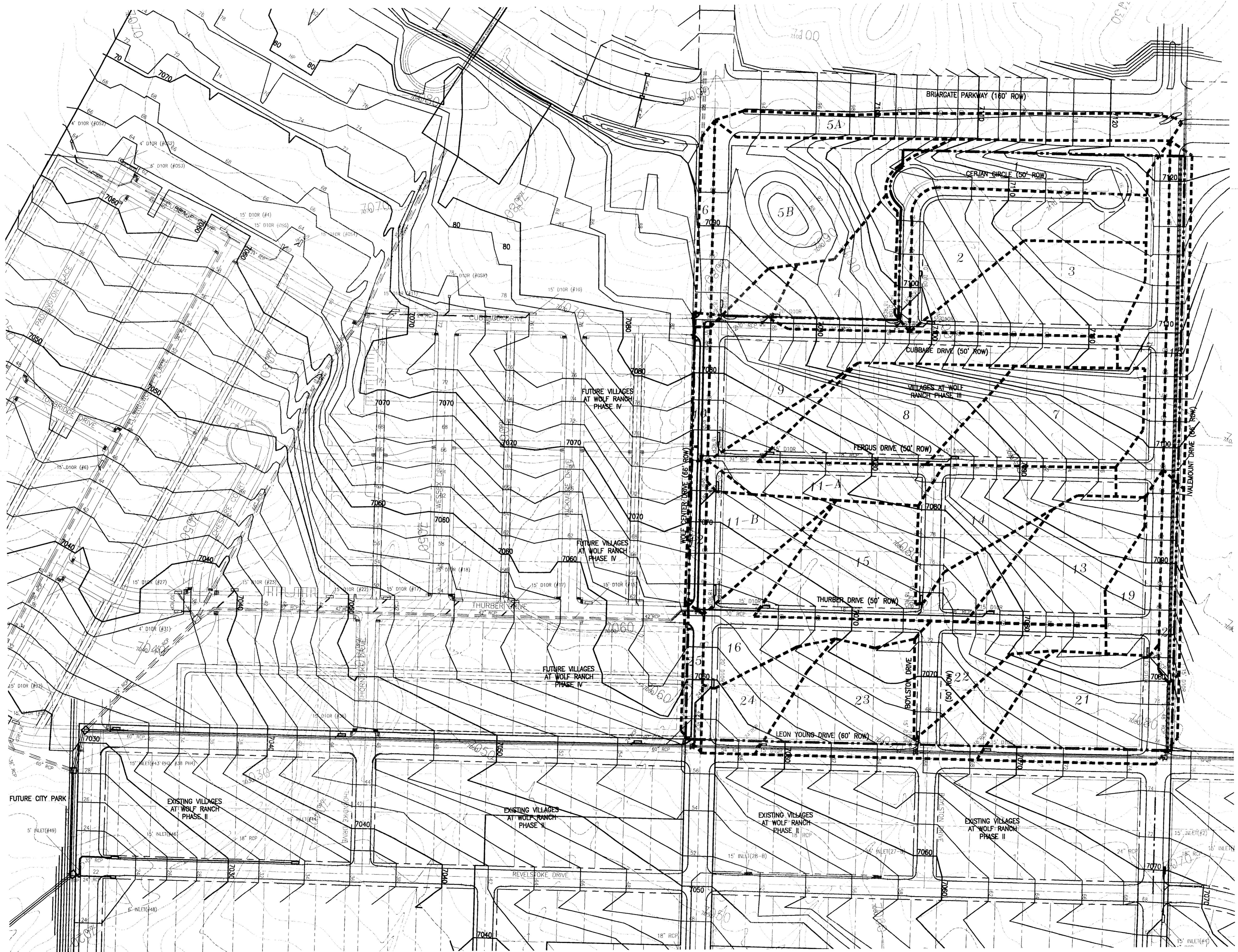
T	16.17
FW	1.65
L1	20.5
L2	12.3
L3	44.0

100 YEAR

T	26.21
FW	1.80
L1	36.4
L2	21.9
L3	78.0

Li = 15.00

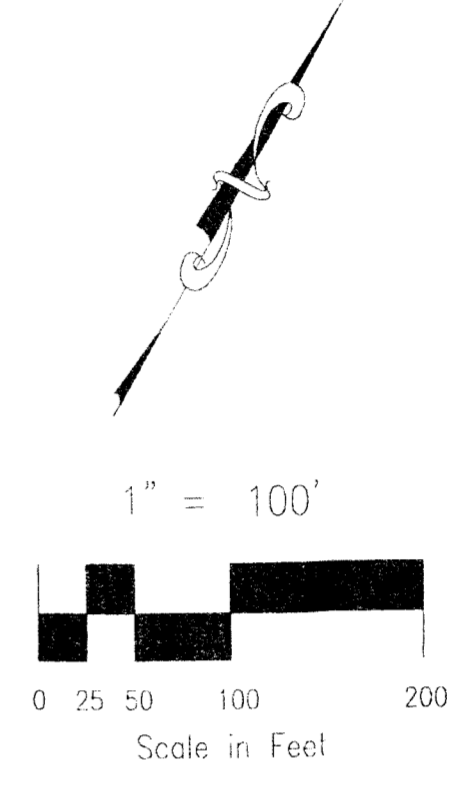
5 YR Q =	10.7	100 YR Q	38.8
5 YR Qi =	<u>7.0</u>	100 YR Qi	<u>16.0</u>
5 YR Qfb =	3.7	100 YR Qfb	22.8



Vicinity Map
NOT TO SCALE

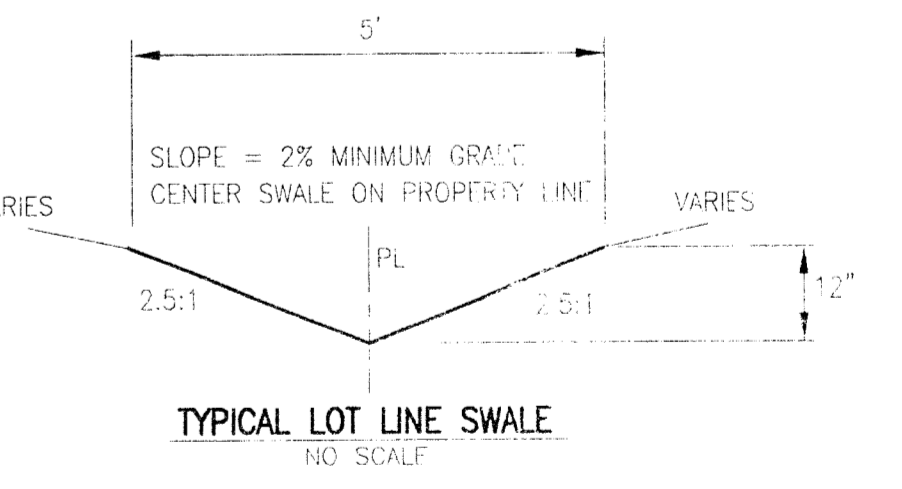
DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac)	Q _p (CFS)	T ₁₀₀ (MIN)
1	1.61	4.8	10.0
2	1.77	5.7	12.0
3	1.70	5.2	13.0
4	1.28	2.2	6.5
5A	1.15	2.8	6.0
5B	2.40	3.0	10.3
6	0.30	1.2	2.7
7	1.83	5.6	12.7
8	1.78	5.4	11.5
9	2.51	6.3	17.5
10	0.21	0.8	1.6
11-A	1.08	3.6	7.7
11-B	3.53	5.3	6.7
12	0.29	1.2	2.7
13	1.49	4.7	10.1
14	1.21	4.1	8.4
15	2.19	6.6	14.5
16	1.17	3.7	7.8
17	1.08	4.4	8.3
18	0.77	2.8	6.3
19	0.69	3.0	5.4
20	0.45	1.7	3.3
21	1.87	5.6	12.3
22	1.03	3.5	7.3
23	2.16	6.0	13.0
24	0.78	2.6	5.5
25	0.28	1.1	2.1



LEGEND

- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- PROPOSED 2' CONTOUR
- PROPOSED 10' CONTOUR
- DIRECTION OF FLOW
- DEVELOPED BASINS
- DIRECTION OF FLOW
- PROPOSED INLET & PIPE
- DRAINAGE BASIN
- DESIGN POINT



NOTES

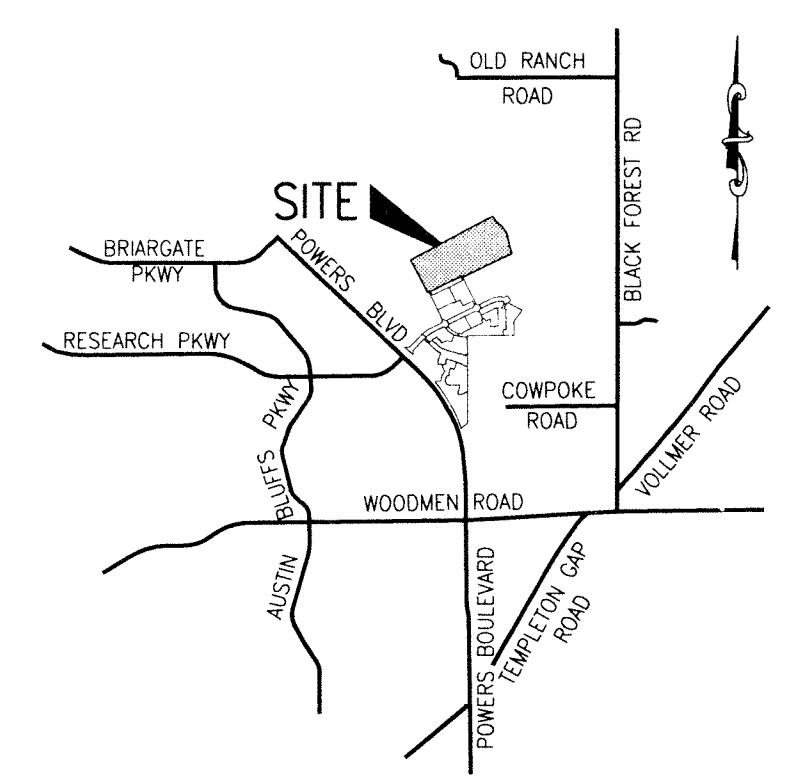
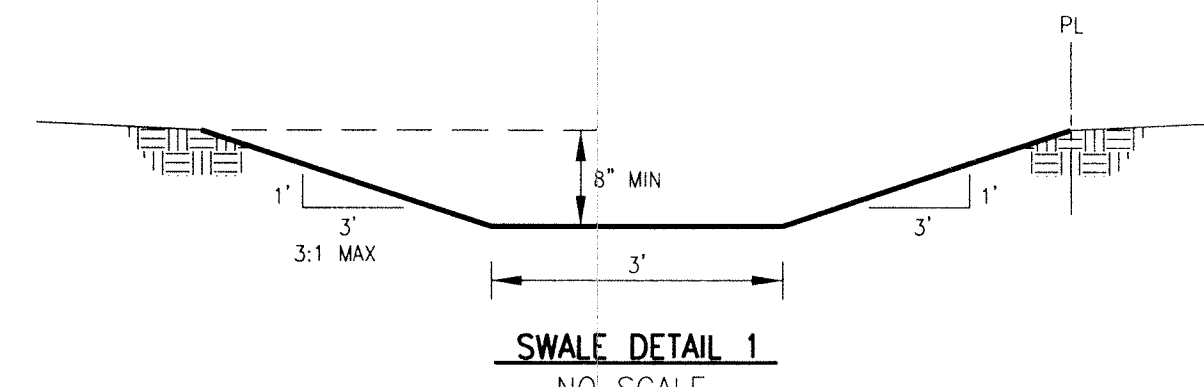
1. THIS IS A CONCEPT GRADING PLAN ONLY - NOT TO BE USED FOR CONSTRUCTION.
2. TOPSOIL TO BE STOCK PILED ON SITE AND REDISTRIBUTED AFTER OVER LOT GRADING IS COMPLETE.

APPROXIMATE FINISHED GRADING,
SUBJECT TO FINAL DESIGN

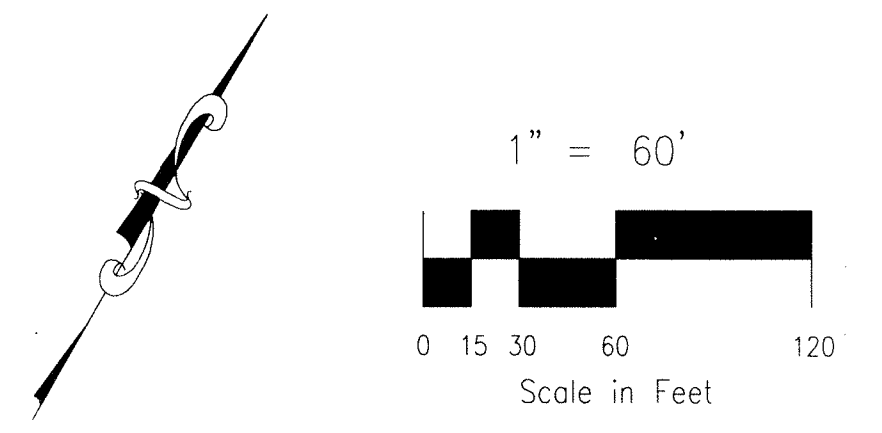
EXHIBIT 2
FILE: 0508903.DWG 9/26/06

ENGINEERING - SURVEYING
1655 N. ANDER BLVD., SUITE 200
CO. SPRING, MISSOURI 65933
(716) 475-7505 • FAX (716) 475-2202

VILLAGES AT WOLF RANCH PHASE 3
TITLE: (FILING 16-18) DEVELOPED DRAINAGE PLAN
SCALE: 1"=100' DRAWN BY: KD 05-089
DATE: 5/15/06 CHECKED BY: KDR JOB NO.



Vicinity Map
NOT TO SCALE



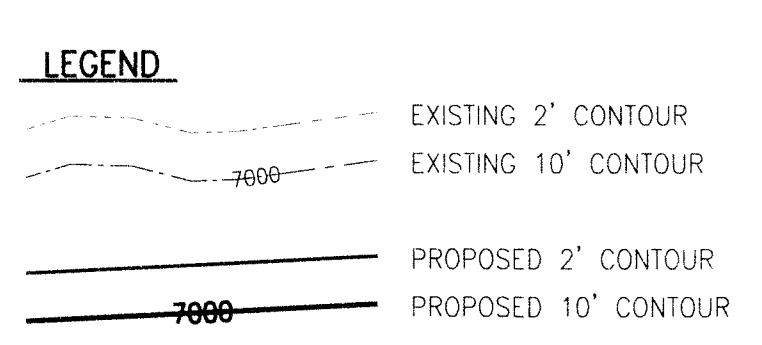
SEE ENCLOSED VILLAGES AT WOLF RANCH FILING NO. 16 DRAINAGE PLAN FOR CONTRIBUTING BASINS

DEVELOPED DRAINAGE BASIN TABLE

BASIN	AREA (Ac.)	Q _s (CFS)	Q ₁₀₀ (CFS)
1	2.27	6.2	13.4
2	1.0	3.6	7.2
3	5.67	15.9	33.6
4	1.31	3.9	8.1
5	1.78	5.1	12.5
6	2.18	7.0	14.8
7	1.64	5.5	11.8
8	1.13	3.3	7.1
9	1.14	4.1	8.9
10	3.16	9.0	19.2
11	0.60	2.0	4.3
12	0.37	1.3	2.7
13-A	1.76	5.4	11.7
13-B	1.48	4.1	8.9
14	1.17	3.9	8.4
15	1.08	3.8	8.2
16	0.53	1.9	3.8
17	0.98	2.8	6.3
18	0.52	1.7	3.7
19	1.16	3.7	7.8
20	8.25	25.4	53.5
21	1.29	4.1	8.8
22	0.93	2.8	6.3
23	1.98	6.1	12.5
24	0.85	2.6	5.0
25	0.12	0.6	1.0
26	1.51	4.7	10.1
27-A	1.45	4.6	9.8
27-B	1.94	5.7	12.2
28-A	1.54	4.8	10.3
28-B	1.70	5.2	10.8
29	3.04	8.3	17.0
30-A	1.10	3.2	6.9
30-B	4.29	11.9	25.4
31	2.95	8.8	19.1
32	0.65	2.0	4.5
33	0.45	1.4	3.2
34	1.50	4.7	10.1
35	1.52	3.8	8.3
36	2.08	6.2	13.1
37	1.21	3.8	7.9
38	1.63	4.7	10.4
39	1.83	5.3	11.5
40	1.31	4.1	8.8
41	1.34	4.4	9.8
42	1.19	3.9	7.6
43	1.70	5.3	10.1
44	2.98	8.2	21.5
45	1.61	5.0	10.2
46	2.22	6.5	13.9
47	1.57	4.2	8.6
48	2.18	6.7	13.9
49-A	0.32	1.3	1.9
49-B	0.30	1.2	2.3
50	3.14	9.7	20.1
51	1.21	5.9	11.3
52	0.91	3.0	6.4
53-A	3.5	12.0	22.7
53-B	0.88	2.8	6.1
54	1.78	5.0	10.8
55	1.64	5.0	11.0
56	7.32	9.3	23.4
57	2.56	10.0	20.6
58	1.54	5.5	14.7
59	0.98	3.9	7.5
60	0.76	2.7	5.1
61	0.80	4.9	9.5
62	1.82	5.8	16.8
63	3.49	9.6	20.9
64	1.88	5.7	12.2

DESIGN POINT TABLE

BASIN	AREA (Ac.)	Q _s (CFS)	Q ₁₀₀ (CFS)
DP#1	28.93	77.0	62.0
DP#2	29.97	77.6	184.6
DP#3	63.95	122.6	245.3
DP#4	15.21	32.9	57.7



- NOTES
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 - 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: 120290LV.DWG 8/24/12

VILLAGES AT WOLF RANCH PHASE 2 (FILING 19) DEVELOPED DRAINAGE PLAN
 TITLE : 1"=60" DRAWN BY : KDR 12-029
 DATE : 8/24/12 CHECKED BY : KDR JOB NO.

