MASTER DEVELOPMENT DRAINAGE PLAN

for

WESTGATE AT POWERS

Prepared for:

Dr. Martin List
c/o Signature Realty Capital Corp.
2082 Michelson Drive, Suite 212
Irvine, CA 92612

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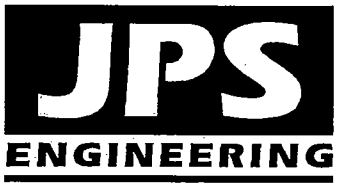
Revised April 30, 2012

Prepared by:



19 E. Willamette Avenue
Colorado Springs, CO 80903
(719)-477-9429
(719)-471-0766 FAX

JPS Project No. 020501

WESTGATE AT POWERS - MDDP
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JPS ENGINEERING

WESTGATE AT POWERS - MDDP
EXECUTIVE SUMMARY

A. Background

- Westgate at Powers is a proposed Master Plan consisting of approximately 59-acres at the northwest corner of Airport Road and Troy Hill Road in Colorado Springs. The proposed Master Plan includes a mix of commercial, office, retail, and apartment land uses.

B. General Drainage Concept

- The proposed development will include re-alignment and improvements to the Sand Creek Center Tributary Channel running through the site, and grading will be performed to raise developed areas beyond 100-year floodplain limits.
- Developed drainage from the eastern part of the site will be conveyed by the proposed streets and storm drainage system through stormwater quality detention basins and porous landscape detention areas prior to discharging into the Sand Creek Center Tributary Channel.
- Developed flows from the western part of the site will be conveyed by the proposed streets and storm drainage system and routed through an on-site detention pond prior to discharging into the main channel of Sand Creek.

C. Drainage Impacts

- Impacts of developed drainage from the site will be minimal in comparison to flows in the main channel of Sand Creek and the Sand Creek Center Tributary Channel. The Sand Creek Drainage Basin has a program of regional stormwater detention ponds to mitigate developed flow impacts within the basin.
- On-site extended detention ponds and porous landscape detention areas will be constructed to meet stormwater quality requirements.
- Public roadway and drainage facilities will be designed and constructed to City of Colorado Springs standards, and dedicated to the City for maintenance. The proposed stormwater quality detention ponds and landscape detention areas will be privately owned and maintained.
- The proposed development will contribute drainage and bridge fees during platting as required in the Sand Creek Basin. Major drainage improvements to the Sand Creek Center Tributary Channel will be reimbursable against required drainage fees.

WESTGATE AT POWERS
DRAINAGE REPORT STATEMENTS

1. 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/County for drainage reports and said report is in conformity with the master plan for the drainage basin. I accept responsibility for liability caused by negligent acts, errors or omissions on my part in preparing this report:

5/18/12

John P. Schwab Colorado P.E. No. 29891

COLORADO REGISTERED JOHN P. SCHWAB 29891 PROFESSIONAL ENGINEER

2. Developer's Statement:

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

By: Martin List 2009 Trust by Alan Cohen

Printed Name: MARTIN LIST 2009 TRUST by ALAN COHEN

Title: Trustee

5/18/12

Date

Dr. Martin List
c/o Signature Realty Capital Corp.
2082 Michelson Drive, Suite 212
Irvine, CA 92612

3. 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

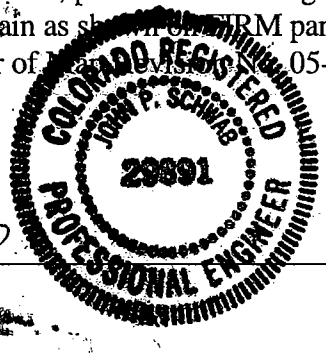
6/11/12

Date

Conditions:

FLOODPLAIN STATEMENT

To the best of my knowledge and belief, parts of the "Westgate at Powers" development are located within a FEMA designated floodplain as shown on FIRM panel No. 08041C0753F dated March 17, 1997, and revised by FEMA Letter of Map Revision No. 05-08-0368P dated May 23, 2007.



5/18/12

John P. Schwab, P.E. #29891

I. GENERAL LOCATION AND DESCRIPTION

A. Background

Westgate at Powers is a proposed Master Plan for a mixed-use development located on approximately 59-acres on the east side of Colorado Springs, Colorado. The development is located at the northwest corner of Powers Boulevard and Airport Road, as shown in Figure A1 (Appendix A). The proposed Westgate at Powers Master Plan provides a mixture of commercial, retail, office, and multi-family apartment land uses in this infill area within the City of Colorado Springs.

B. Scope

This report is provided in support of the proposed Master Plan for The Westgate at Powers development. The report is intended to fulfill the City of Colorado Springs requirements for a Master Development Drainage Plan (MDDP). The report will provide a summary of site drainage issues impacting the proposed development, including analysis of impacts from upstream drainage patterns, site-specific developed drainage patterns, and impacts on downstream facilities. This MDDP report was prepared based on the guidelines and criteria presented in the City of Colorado Springs "Drainage Criteria Manual" Volume 1 (October, 1994) and Volume 2 (November, 2002).

C. Site Location and Description

The site is comprised of several unplatted, vacant parcels (El Paso County Assessor's #4130-00-124, #64130-00-094, #64133-00-024, #64133-00-025, and #64133-00-022). The existing parcels are zoned PBC (planned business center) and PIP (planned industrial park). The site is located in the south half of Section 13, Township 14 South, Range 66 West of the 6th Principal Meridian. Ground elevations within the site range from 6,110 to 6,140 feet above mean sea level.

Airport Road borders the parcel to the south. The property is bounded by the existing Golden Acres Mobile Home Park to the southwest, and developed commercial properties to the south, across Airport Road. The Sand Creek Center Tributary Channel flows in a southerly direction through the east side of the Master Plan area.

The existing Frazier's Garden Acres Subdivision (0.5-acre lots) borders the site to the north, and vacant property zoned PIP borders the site to the northwest. Vacant property zoned PIP borders the site to the east, across Troy Hill Road. A development application has been submitted for the proposed "Pikes Peak Heights" residential development on the 40-acre site at the northwest boundary of this property.

The Westgate at Powers development will include a mixture of land uses including commercial, retail, office, and apartments, with associated parking and open space areas. Site improvements will include overlot grading and curb, gutter, and asphalt paving of the roads within the site.

The primary access to Westgate at Powers will be provided by a proposed re-alignment of the intersection of Troy Hill Road and Airport Road, moving the intersection westerly to align with Airport Creek Point. The proposed re-alignment is intended to provide for an at-grade full-movement intersection, with future signalization, which can remain in operation without significant disruption during future construction of the CDOT interchange at Powers Boulevard and Airport Road. The proposed Westgate at Powers Development Plan includes construction of a new roundabout in the center of the eastern part of the property, with a new industrial collector roadway (tentatively labeled as "Westgate Road") extending northwesterly from the roundabout through the northwest part of the development area.

Surface drainage in this area flows to the major drainage channel and associated tributaries of Sand Creek, which ultimately drains to Fountain Creek. This site is located entirely within the Sand Creek Drainage Basin. The eastern part of the Westgate at Powers property is bisected by the major drainage channel of the Sand Creek Center Tributary, which flows southwesterly through the site. The northwest corner of the property adjoins the main channel of Sand Creek.

The terrain is generally flat to gently rolling, with northeast to southwest slopes ranging from one to two percent. Historic drainage patterns from the site are conveyed overland to the south and west boundaries of the site. The site is currently vegetated with native grasses and limited shrubs.

D. General Soil Conditions

According to the Soil Survey of El Paso County prepared by the Soil Conservation Service, on-site soils are comprised of the following soil types (see Appendix B):

- Type 11 (central part of site) - "Bresser sandy loam": moderate permeability, slow surface runoff, slight to moderate erosion hazard (Hydrologic Group B)
- Type 28 (eastern part of site, following existing Sand Creek Center Tributary channel) – "Ellicott loamy coarse sand": rapid permeability, slow surface runoff, high erosion hazard (Hydrologic Group A)
- Type 78 (southwest corner of site, adjacent to Sand Creek channel) – "Sampson loam": moderate permeability, slow surface runoff, slight erosion hazard (Hydrologic group B)
- Type 96 (northern part of site) – "Truckton sandy loam": moderately rapid permeability, slow surface runoff, moderate erosion hazard (Hydrologic Group B)
- Type 97 (southeast part of site) – "Truckton sandy loam": moderately rapid permeability, slow surface runoff, moderate erosion hazard (Hydrologic Group B)

As shown in Figure B, the majority of the parcel is characterized as Truckton sandy loam, and classified as hydrologic soils group B.

E. References

ADP, "Final Drainage Report for Airport and Powers Filing No. 1," February, 2000.

City of Colorado Springs & El Paso County "Drainage Criteria Manual," revised October 12, 1994.

City of Colorado Springs "Drainage Criteria Manual Volume 2," November 1, 2002.

CDOT, "CDOT Drainage Design Manual," July, 1995.

FEMA, Flood Insurance Rate Map (FIRM) Number 08041C0753-F, March 17, 1997.

H.J. Kraettli & Sons, "Drainage Report for Golden Acres Mobile Home Park," May 7, 1973.

JPS Engineering, Inc., "Final Drainage Report for Westgate at Powers Filing No. 1," January, 2010 (approved by City 1/29/10).

JPS Engineering, Inc., "Westgate at Powers, Sand Creek Center Tributary Channel Design Report," November 18, 2009.

JPS Engineering, Inc., "Master Development Drainage Plan for Westgate at Powers," November 13, 2009 (submitted and reviewed with previous Concept Plan).

JR Engineering Ltd., "Final Drainage Report for The Villages at Sand Creek Filing No. 3," December, 1997.

Kiowa Engineering Corporation, "Sand Creek Drainage Basin Planning Study – Preliminary Design Report," March, 1996.

USDA/NRCS, "Soil Survey of El Paso County Area, Colorado," June, 1981.

II. DRAINAGE BASINS AND SUB-BASINS

A. Major Basin Description

Surface drainage in the easterly part of this master plan area flows to the Sand Creek Center Tributary channel, and surface drainage from the west side of the site flows to the main channel of Sand Creek. The proposed development lies completely within the Sand Creek Drainage Basin. The major drainage basins lying in and around the proposed development are depicted in Figure EX1 (Appendix A). The Sand Creek Drainage Basin comprises a total tributary area of 54.1 square miles. The proposed Westgate at Powers master plan area represents a total of 64 acres of development, or 0.2 percent of the total basin area.

The Center Tributary channel of Sand Creek running through this site drains a tributary area of 1.2 square miles, crossing Airport Road in an existing multiple box culvert (5-cell 6'x8' concrete box culvert). The existing channel meanders through the site, and the Sand Creek DBPS identified a recommendation for an improved "100-year riprap channel" through this site, with a bottom width of 50-feet and a depth of 5 feet. An existing box culvert crossing of Troy Hill Road (3-cell 16'x6' CBC) was installed by CDOT at the upstream boundary of this site.

B. Floodplain Impacts

The Westgate at Powers site is bisected by the FEMA 100-year floodplain of the existing Sand Creek Center Tributary channel, as delineated by the Federal Emergency Management Agency (FEMA). The floodplain limits in the vicinity of the site are shown in Flood Insurance Rate Map (FIRM) Number 08041C0753-F, dated March 17, 1997 (see Figure A2). The FEMA floodplain limits along the Sand Creek Center Tributary Channel were revised through a Letter of Map Revision No. 05-08-0368P, which was approved on May 23, 2007.

The Sand Creek DBPS identified a total projected developed flow of 2,010 cfs for the Sand Creek Center Tributary Channel at Airport Road. Flows at the downstream confluence with the East Fork of Sand Creek are projected to be in the range of 15,600 cfs. As such, on-site flows from the proposed Westgate at Powers master plan area are relatively small (approximately two percent) in comparison to projected flows in the East Fork of Sand Creek.

The proposed development plan for the eastern part of the master plan area includes re-aligning the existing Sand Creek Center Tributary Channel between Troy Hill Road and Airport Road, as depicted on the enclosed drainage plans. A FEMA Conditional Letter of Map Revision (CLOMR) will be required prior to construction of the proposed channel improvements, and a FEMA Letter of Map Revision (LOMR) will be processed to adjust the FEMA floodplain limits following completion of the channel improvements.

FEMA has approved a Conditional Letter of Map Revision (Case No. 11-08-0297R) dated July 21, 2011 for the proposed channelization improvements (see Appendix G).

A U.S. Army Corps of Engineers 404 Permit has also been issued for approval of the proposed channel improvements (see Appendix G). The 404 Permit (No. SPA-2010-00110-SPA) has an effective date of November 15, 2010, and establishes a time limit of December 31, 2015 for completion of the channelization work, unless an extension of time is requested and approved.

C. Sub-Basin Description

The developed drainage basins lying within the proposed development are depicted in Figure D1. The interior site layout has been delineated into several historic drainage basins (A-C) based on the proposed interior road layout and grading scheme. The natural drainage patterns will be impacted through development by site grading and concentration of runoff in street gutters, storm drains, and channels. The majority of sub-basins drain to the southwest, collecting in the interior roads and

storm sewer systems, with outfalls to the existing major drainage channels. On-site flows will be diverted to a system of permanent stormwater quality facilities located along the south and west boundaries of the site, and flows will discharge to the southwest, following historic drainage paths. The permanent stormwater quality facilities will include extended detention basins, retention ponds, and porous landscape detention areas.

III. DRAINAGE DESIGN CRITERIA

A. Development Criteria Reference

Kiowa Engineering completed the "Sand Creek Drainage Basin Planning Study (DBPS)" in 1996. The Sand Creek Basin comprises an expansive tributary area of over 54 square miles along the east side of Colorado Springs. The DBPS generally recommends mitigation of developed runoff flows through regional detention ponds, along with a program of channel improvements in selected areas of Sand Creek and its tributary channels.

B. Hydrologic Criteria

With the exception of the major drainage channels of Sand Creek and the Sand Creek Center Tributary channel, tributary drainage areas impacting this site are all less than 100-acres, so Rational Method procedures were utilized for calculation of peak flows within the on-site drainage basins. Rational method hydrologic calculations were based on the following assumptions:

• Design storm (minor)	5-year	
• Design storm (major)	100-year	
• Time of Concentration – Overland Flow	"Airport" equation (300' max. developed)	
• Time of Concentration – Gutter/Ditch Flow	"SCS Upland" equation (TR-55)	
• Rainfall Intensities	El Paso County I-D-F Curve	
• Hydrologic soil type	B	
	C5	C100
• Runoff Coefficients - undeveloped:		
Existing pasture/range areas	0.25	0.35
• Runoff Coefficients - developed:		
Proposed Office / Retail	0.75	0.80
Proposed MF Apartment Areas	0.75	0.80

Hydrologic calculations are enclosed in Appendix B, and peak design flows are identified on the drainage basin drawings.

IV. DRAINAGE FACILITY DESIGN

A. General Concept

Development of the Westgate at Powers project will require site grading and paving, resulting in additional impervious areas across the site. The general drainage pattern will consist of grading away from building sites to swales and gutters along the internal roads and parking areas, conveying runoff flows through the site. Surface runoff from the site will drain by sheet flow and curb and gutters to storm inlets at low points, and storm sewers will then convey developed flows to stormwater quality detention facilities, including extended detention basins and porous landscape detention areas, ultimately discharging into the major drainage channels.

The storm inlets and storm sewer system within the development will be designed as the "minor" drainage system, sized for 5-year developed peak flows. The internal road system and drainage channels will be designed as the "major" drainage system, sized for 100-year peak flows. Street flows within local streets will be maintained below allowable levels in accordance with City of Colorado Springs drainage criteria.

The developed drainage plan incorporates a program of permanent best management practices (BMP's) for management of stormwater runoff and stormwater quality. Key components of the stormwater management plan for the project include the following:

- Extended detention basins (EDB's) in selected locations
- Retention pond (RP)
- Porous landscape detention areas (PLD's) in selected locations to encourage stormwater infiltration and "low-impact development"
- Grass swales and grass buffer strips along channel banks

B. Specific Details

1. Existing Drainage Conditions

Historic drainage conditions are depicted in Figure EX1. The site has been divided into three major basins (A - C). The undeveloped site currently has no drainage facilities within the property. The existing off-site drainage basins northeast of the site generally combine with on-site basins as shown on Figure EX1, flowing southwesterly through the site within existing drainage swales and channels.

The site is impacted by a significant off-site drainage area upstream of the Sand Creek Center Tributary Channel, which flows southwesterly through Basin A on the east side of the master plan area. The upstream area is identified in the "Sand Creek DBPS" as Basin "42", and these flows enter the site through the existing box culvert crossing Troy Hill Road (3-cell 16'x6' concrete box culvert).

Flows from two smaller off-site areas on the east side of Troy Hill Road south of the major channel are conveyed through existing culverts across Troy Hill Road. Basin OA1 contributes off-site drainage through an existing 24-inch culvert crossing Troy Hill Road into the Westgate parcel. The east side of the Westgate at Powers site has been delineated as Basin A, which drains southwesterly to the Sand Creek Center Tributary channel. Flows from off-site Basin OA1 combine with on-site flows from Basin A, draining southwesterly to Design Point #1, with historic peak flows calculated as $Q_5 = 22.7$ cfs and $Q_{100} = 55.9$ cfs.

Off-site drainage from the area south of Basin OA1 flows through an existing 30-inch RCP culvert crossing Troy Hill Road on the north side of Airport Road. These flows continue westerly in an existing swale on the north side of Airport Road, outfalling into the Sand Creek Center Tributary Channel.

Basin B consists of the southwest part of the master plan area on the north side of the existing mobile home park. This area sheet flows to Design Point #2 at the southwest corner of the site, with historic peak flows of $Q_5 = 5.5$ cfs and $Q_{100} = 14.1$ cfs.

Basin C consists of the northwest part of the master plan area, which sheet flows westerly towards the main channel of Sand Creek at the western boundary of the site. Off-site flows from Basin OC1 combine with Basin C at Design Point #3, with historic peak flows of $Q_5 = 20.9$ cfs and $Q_{100} = 46.7$ cfs.

2. Developed Drainage Conditions

The developed drainage basins and projected flows are shown in Figure D1. The developed site has been divided into two major basins (A and C) and three design points (DP1-DP3), as shown on the enclosed Drainage Plan. Hydrologic calculations are enclosed in Appendix C.

Developed Basin A consists primarily of the proposed office, retail, and multi-family apartment area located between the existing Troy Hill Road and the re-aligned Sand Creek Center Tributary Channel. Surface runoff from Basin A will be conveyed southwesterly by sheet flow and curb and gutter to storm inlets in the proposed parking areas. Private storm sewer systems within the commercial development areas will intercept surface runoff and convey flows through a system of stormwater best management practices to provide stormwater quality treatment prior to discharge into the major drainage channel.

The developed drainage plan for Basins A1, A2, and A3 includes extended detention basins (EDB #A1, EDB #A2, and EDB #A3) within each development area for stormwater treatment. Final development plans for individual development areas may also consider implementation of porous landscape detention (PLD) areas for stormwater treatment.

A private storm sewer system (Storm Sewer A1) will intercept surface flows within Basin A1 and convey developed runoff into a proposed EDB-A1 at the southwest corner of this basin. The proposed EDB #A1 will provide stormwater quality enhancement prior to discharging into the Sand Creek Center Tributary Channel.

A public storm sewer extension will be constructed to convey the off-site flows from Basin OA1 (on the east side of Troy Hill Road) across Basin A4 at the north end of the Westgate site to the Sand Creek Center Tributary Channel. A porous landscape detention area (PLD #A4) will provide stormwater quality treatment for Basin A4 before developed flows discharge into public storm sewer A4 and flow into the Center Tributary Channel. Storm Sewer A4 will be a 24-inch RCP public system to match the size of the existing public culvert crossing Troy Hill Road.

Basins A5 and A6 comprise the proposed office/retail areas lying on the north side of the proposed Sand Creek Center Tributary Channel, east of the proposed Westgate Road extension. The developed drainage plan for Basins A5 and A6 includes porous landscape detention areas (PLD #A5 and PLD #A6) for stormwater treatment within each of these isolated development areas. Flows from these PLD facilities will discharge into the adjoining drainage channel.

Developed Basin A7 consists of the eastern fringe of the proposed apartment area planned for the entire northwest part of the Westgate at Powers site. Surface runoff from Basin A7 will be conveyed southeasterly by sheet flow and curb and gutter to storm inlets in the local street system serving this area. The storm sewer system will intercept surface flows and convey developed runoff to a proposed Retention Pond (RP #A7), which will discharge into the Sand Creek Center Tributary Channel. Design of the retention basin in this area is intended to blend with an aesthetic pond feature at the entry to the proposed apartment complex.

Basin A8 has been delineated as the re-aligned Sand Creek Center Tributary Channel and adjoining undeveloped areas.

Developed on-site flows from Basins A1-A8 combine at Design Point #1, with projected peak flows of $Q_5 = 60.9$ cfs and $Q_{100} = 117.7$ cfs.

Developed Basins C1, C2, and C3 consist of the proposed multi-family apartment areas in the northwest part of the site. Basin C4 consists of the open space area located at the northwest corner of the property adjacent to the main channel of Sand Creek. Surface runoff from Basins C1-C3 will be conveyed westerly by sheet flow and curb and gutter to a private storm sewer system serving this development area. The private storm sewer system will intercept surface flows and convey developed runoff into a proposed "Extended Detention Basin (EDB)" located in Basin C4. The proposed EDB #C4 will provide stormwater quality enhancement prior to discharging into the main channel of Sand Creek.

Based on the limited drainage capacity downstream of the southwest corner of the property, developed drainage within Basin C will be routed northwesterly through EDB #C4 prior to discharge to the main channel of Sand Creek. As such, developed flows exiting the property at Design Point #2 will be negligible. Runoff from Basins C1-C4 will combine at Design Point #3, with developed peak flows calculated as $Q_5 = 48.8$ cfs and $Q_{100} = 94.0$ cfs.

A drainage channel will be constructed along the north boundary of Basin C3 to intercept and convey historic off-site flows from Basin OC1 westerly to the Sand Creek main channel.

C. Comparison of Developed to Historic Discharges

Based on the hydrologic calculations in Appendix C, the total developed flows from the site will exceed historic flows from the parcel. Due to the increased impervious areas in the developed site, the total undetained flow from the site would be significantly higher than the historic flow. In accordance with the Sand Creek DBPS, the increase in developed flows for the overall basin will be mitigated by regional stormwater detention ponds. The comparison of developed to historic discharges at key design points is summarized as follows:

Design Point	Historic Flow			Developed Flow			Comparison of Developed to Historic Flow (Q_5%/Q_{100}%)
	Area (ac)	Q_5 (cfs)	Q_{100} (cfs)	Area (ac)	Q_5 (cfs)	Q_{100} (cfs)	
1	40.4	22.7	55.9	41.0	60.9	117.7	268% / 211% (increase)
2	13.0	5.5	14.1				(decrease / re-directed to DP3)
3	26.6	20.9	46.7	23.4	48.8	94.0	233% / 201% (increase)

D. Stormwater Quality

According to Colorado Springs drainage criteria, a combination of stormwater quality detention facilities, including extended detention basins (EDB), retention ponds (RP), and porous landscape detention (PLD) areas, will be provided within the site for stormwater quality enhancement purposes. The proposed extended detention basins and landscape detention areas will be sized to slowly release the "water quality capture volume," and these facilities will be designed to meet City of Colorado Springs Volume 2 stormwater quality criteria. Preliminary sizing parameters for the proposed detention basins are detailed in Appendix E. The preliminary program of permanent stormwater quality BMP"s is summarized as follows:

Basins	Proposed Stormwater Quality BMP
A1, A2, A3	EDB #A1, EDB #A2, EDB #A3
A4, A5, A6	PLD #A4, PLD #A5, PLD #A6
A7	RP #A7
C1-C3	EDB #C4

The proposed stormwater quality facilities will be privately owned and maintained by the respective Property Owners Associations. 15-foot wide gravel maintenance access roads rated for H20 loading will be provided for maintenance access along the perimeter of stormwater facilities.

E. On-Site Drainage Facility Design

Developed sub-basins and proposed drainage improvements are depicted in the enclosed Drainage Plan (Figure D1). Hydraulic calculations for preliminary sizing of on-site drainage facilities are enclosed in Appendix D, and summarized as follows:

1. Street / Curb & Gutter Capacity

The interior roads on this relatively flat parcel will be graded with a minimum longitudinal slope of 1.0 percent. In accordance with Colorado Springs and El Paso County Drainage Criteria, the allowable minor storm street capacity for residential streets at minimum slope is approximately 12 cfs per side. Storm inlets will be installed at low points and intersections, and other locations where allowable street capacities are exceeded.

2. Storm Sewer System / Culverts

Colorado Springs "Type D10R" curb-opening inlets will be specified where required along the interior streets. These inlets will convey runoff to a storm sewer system consisting of reinforced concrete pipe (RCP) or corrugated plastic (HDPE) pipe, with a minimum pipe diameter of 18-inches. Inlet sizes will be determined based on a maximum allowable ponding depth of 12 inches for the major (100-year) storm, including a 20 percent clogging factor. Preliminary storm sewer sizing has been developed assuming full flow conditions with minor storm flows at the proposed minimum slope for each pipe segment.

Preliminary culvert sizes have been identified based on inlet control nomographs assuming a maximum allowable headwater-to-depth ratio of 1.0 for minor storm flows. Riprap outlet protection sized for the 100-year storm event will be provided for erosion control at culvert and storm sewer pipe outlets. Detailed storm sewer and culvert hydraulic calculations will be enclosed in the Final Drainage Report for each phase of the development.

Preliminary sizing parameters for major culverts and storm drains within the site are tabulated in Appendix D.

3. Open Channels

The proposed re-alignment of the Sand Creek Center Tributary Channel is depicted on Sheet D1 of Appendix A. Hydrologic and hydraulic design criteria for the proposed major channel improvements are discussed in detail in the "Sand Creek Center Tributary Channel Design Report" by JPS Engineering. The proposed channel improvements have been designed in general conformance with the recommendations in the Sand Creek DBPS.

The proposed improvements to the Sand Creek Center Tributary Channel consist of a buried riprap channel lining and sand channel bottom. The channel improvements have been designed to convey the 100-year flow of 1,960 cfs, with a 5-foot deep trapezoidal channel cross-section, bottom width of 50 feet, side slopes of 3:1, and minimum freeboard meeting City DCM criteria. Riprap drop structures will be installed as necessary to maintain a longitudinal slope of 0.6 percent as recommended in the Sand Creek DBPS. The proposed channel banks will be seeded with native grasses for erosion control. Preliminary hydraulic calculations for sizing the open channel improvements are enclosed in Appendix D.

The proposed channel alignment has generally been designed to serve as a land use buffer between the proposed commercial and mixed use development areas on the east side of the channel and the proposed apartment land uses on the west side of the channel. Design of the sinuous channel alignment has incorporated feedback from City Engineering, City Planning, and the U.S. Army Corps of Engineers regarding planning and permitting considerations.

F. Analysis of Existing and Proposed Downstream Facilities

According to the "Sand Creek Drainage Basin Planning Study," the major channel of Sand Creek experiences 100-year flows of 12,290 cfs at this location, and the Sand Creek Center Tributary Channel experiences 100-year flows of 2,010 cfs. As such, the projected 100-year flows from the on-site development areas will have a minimal impact on the major drainage channels. The Sand Creek DBPS identified the existing box culvert crossing at Airport Road as "adequate" for projected flows.

The Sand Creek DBPS identifies the future land uses for this project site as industrial, and the DBPS hydrologic calculations assumed average impervious areas of 85-95 percent for industrial land uses. The proposed development plan for the Westgate at Powers includes a mixture of commercial and apartment land uses, with average impervious areas of approximately 70-80 percent. As such, the proposed development is entirely consistent with the Sand Creek DBPS.

G. Anticipated Drainage Problems and Solutions

The overall drainage plan for this site includes a system of improved public and private streets with curb and gutter, storm inlets, and storm sewers conveying developed flows to stormwater quality

detention ponds at the downstream limits of the site. The primary drainage problems anticipated within this development will consist of maintenance of these storm sewer systems, culverts, drainage channels, and detention pond facilities. Care will need to be taken to implement proper erosion control measures in the proposed channels and swales, which will be designed to meet allowable velocity criteria. Drop structures and riprap channel lining will be installed where necessary to minimize erosion concerns.

A trail system / maintenance road will be constructed along the major drainage channels to provide access to the major drainage facilities throughout the development. Proper construction and maintenance of the proposed detention facilities will minimize downstream drainage impacts. The proposed public streets and major drainage channels will be owned and maintained by the City of Colorado Springs. The proposed private detention ponds and storm sewer systems will be owned and maintained by the homeowners association.

V. EROSION CONTROL

Best management practices (BMP's) will be implemented for erosion control during construction. Erosion control measures will include installation of silt fence at the toe of disturbed slopes and hay bales protecting drainage ditches. Cut and fill slopes will be stabilized during excavation if necessary and vegetation will be established for stabilization of the disturbed areas. All channels will be designed to meet Colorado Springs criteria for slope and velocity. The proposed stormwater detention ponds will also serve as sediment basins during the construction period.

VI. COST ESTIMATE AND DRAINAGE FEES

The developer will be constructing the proposed improvements to Westgate Road, Troy Hill Road, and other public roads to City of Colorado Springs public street standards. Public drainage facilities will include curb and gutter, storm inlets, and storm drain pipe within the public right-of-way. The proposed stormwater quality detention ponds will be privately owned and maintained by the subdivision property owners association.

This parcel is located in the Sand Creek Drainage Basin, which is subject to a 2012 City of Colorado Springs drainage basin fee of $10,300 per acre, a bridge fee of $632 per acre, and a pond fee of $3,951 per acre (includes land plus facilities). A preliminary calculation of total required fees is summarized as follows:

Drainage Fee:	(58.9 ac.) @ ($10,300/ac.) =	$ 606,670.00
Bridge Fee:	(58.9 ac.) @ ($632/ac.) =	$ 37,224.80
Pond Fee:	(58.9 ac.) @ ($3,951/ac.) =	$ 232,713.90
Total Fees:		**$ 876,608.70**

Final calculations for required drainage and bridge fees will be prepared with the Final Drainage Report for each filing of subdivision platting.

The proposed development will include construction of the following regional drainage facilities identified in the approved DBPS:

- Riprap Bank Lining along Sand Creek Center Tributary Channel
- Drop Structures within Sand Creek Center Tributary Channel
- Multiple box culvert crossing Sand Creek Center Tributary Channel at Westgate Road (to be proposed for consideration as regional drainage improvement)

Costs for these regional drainage facilities should be eligible for reimbursement through the City of Colorado Springs drainage basin fee system. According to the preliminary cost estimate in Appendix F, the costs for regional drainage improvements are anticipated to exceed the drainage basin fee obligation for the project. As a result, the developer should be eligible for reimbursement of actual drainage improvement costs in excess of the drainage fee requirements.

In conjunction with development of this site, the 2-acre parcel located at the northwest corner of the property (EPC Parcel No. 64133-00-022, as shown on Figure EX1) within the main channel of Sand Creek will be dedicated to the City. Additionally, the adjoining area at the northwest corner of the Phase 2 apartment site will also be dedicated to the City as a drainage, trail, and utility tract.

VII. PHASING PLAN

The proposed phasing plan will depend on market conditions, but is generally anticipated to begin with development of the proposed multi-family and retail areas in the southeastern part of the master plan area, along the west side of the re-aligned Troy Hill Road alignment. Phase 1 will also include the east side of the proposed apartment complex in the northwest part of the site. Phase 2 will include development of the balance of the apartment complex area on the west side of the northwest part of the property.

Future phases are anticipated to include the proposed retail development areas along the east side of the re-aligned Troy Hill Road, as well as the proposed office areas on the north side of the roundabout.

The proposed re-alignment of the Sand Creek Center Tributary Channel will be completed with the initial phase of development, in conjunction with processing of a FEMA Letter of Map Revision to revise floodplain limits in this area. Phase 1 will also include the proposed re-alignment of Troy Hill Road, new roundabout, and re-configuration of the Airport Road intersection to align with Airport Creek Point.

Phase 1 will also include construction of the proposed box culvert crossing the Sand Creek Center Tributary Channel and extension of the new northwest collector roadway to the northern property boundary, providing access to the northwesterly apartment complex.

Based on the anticipated development-phasing plan, the proposed phasing plan for major infrastructure improvements is summarized as follows:

Phase	Major Infrastructure Improvements
1	Sand Creek Center Tributary Channel Re-Alignment & LOMR (Airport Road northeast to Phase 1 channel limit) Troy Hill Road Re-Alignment and Roundabout Storm Sewer A1, A2 EDB #A1 NW Collector Road (from roundabout NW to north boundary) Box Culvert A8 crossing Sand Creek Center Tributary Channel RP #A7 EDB #C4 (with temporary drainage channels from apt. site to EDB)
2	Storm Sewer C1, C2, C3
3	Sand Creek Center Tributary Channel (from Phase 1 limit to Troy Hill Road) EDB #A2, EDB #A3 PLD #A4, PLD #A5, PLD #A6 Storm Sewer A4

VIII. MAINTENANCE

All proposed road and drainage construction within the Westgate at Powers development will be performed to City of Colorado Springs Standards and Specifications. Roads and major drainage facilities within the public right-of-way will be maintained by the City of Colorado Springs upon final acceptance of these facilities after the warranty period. The Property Owners Association will maintain private storm sewer facilities and stormwater detention ponds within the private commercial development sites and proposed open space areas.

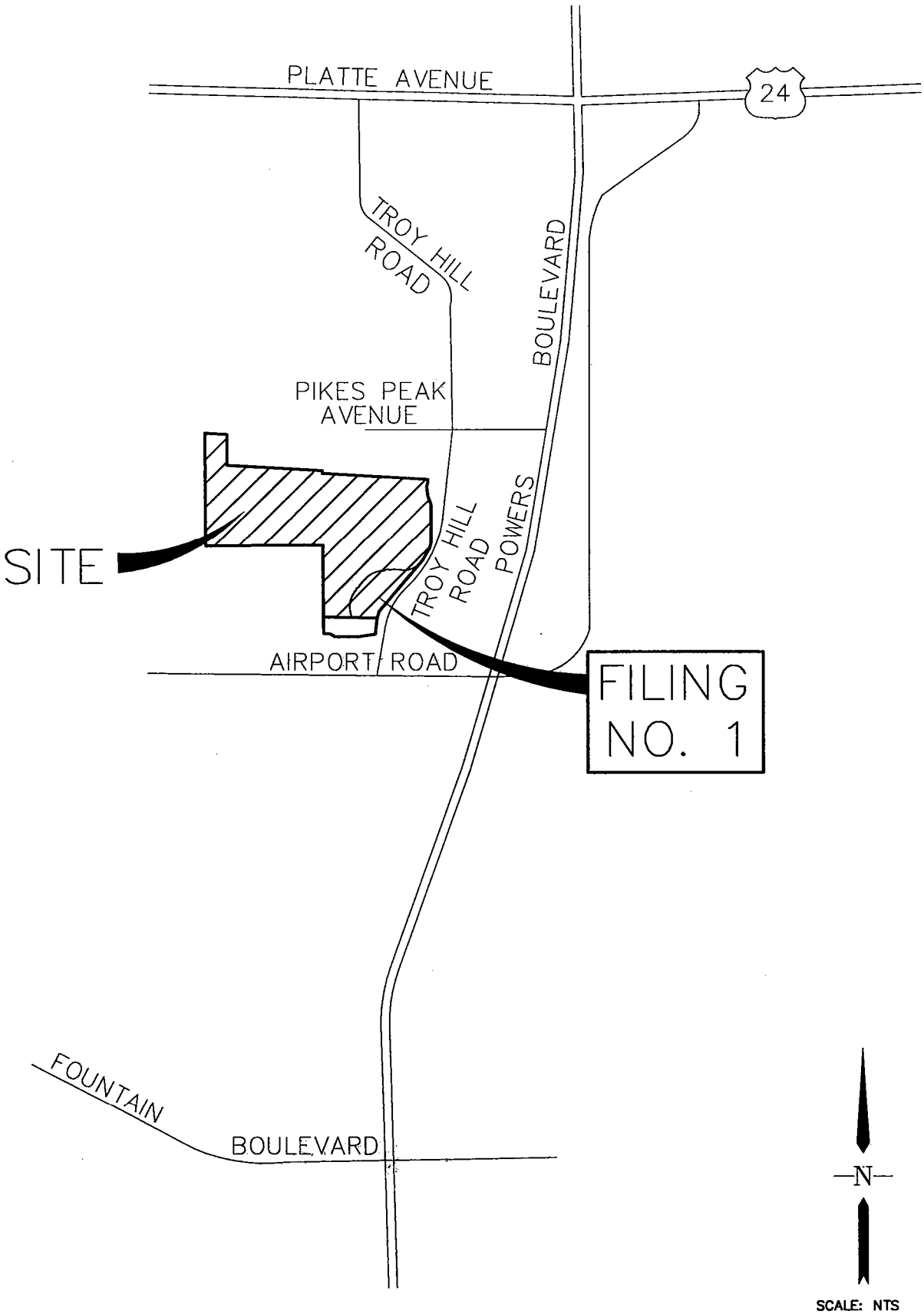
IX. SUMMARY

The Westgate at Powers is a proposed master plan consisting of a mix of commercial, retail, office, and multi-family apartment land uses at the northwest corner of Airport Road and Troy Hill Road. The proposed drainage patterns for the project will remain consistent with historic conditions and the overall drainage plan for this area. New drainage facilities constructed to City of Colorado Springs standards will safely convey developed runoff to adequate outfalls.

The development will include public street and drainage improvements within the site, re-alignment of the Sand Creek Center Tributary drainage channel, re-alignment of Troy Hill Road, and extension of Westgate Road through the site. Developed flows from the proposed site will be routed through on-site extended detention basins and porous landscape detention areas for stormwater quality purposes. Construction of the proposed stormwater facilities, in conjunction with proper erosion control practices during construction, will ensure that this developed site will not adversely affect downstream or surrounding areas.

APPENDIX A

FIGURES



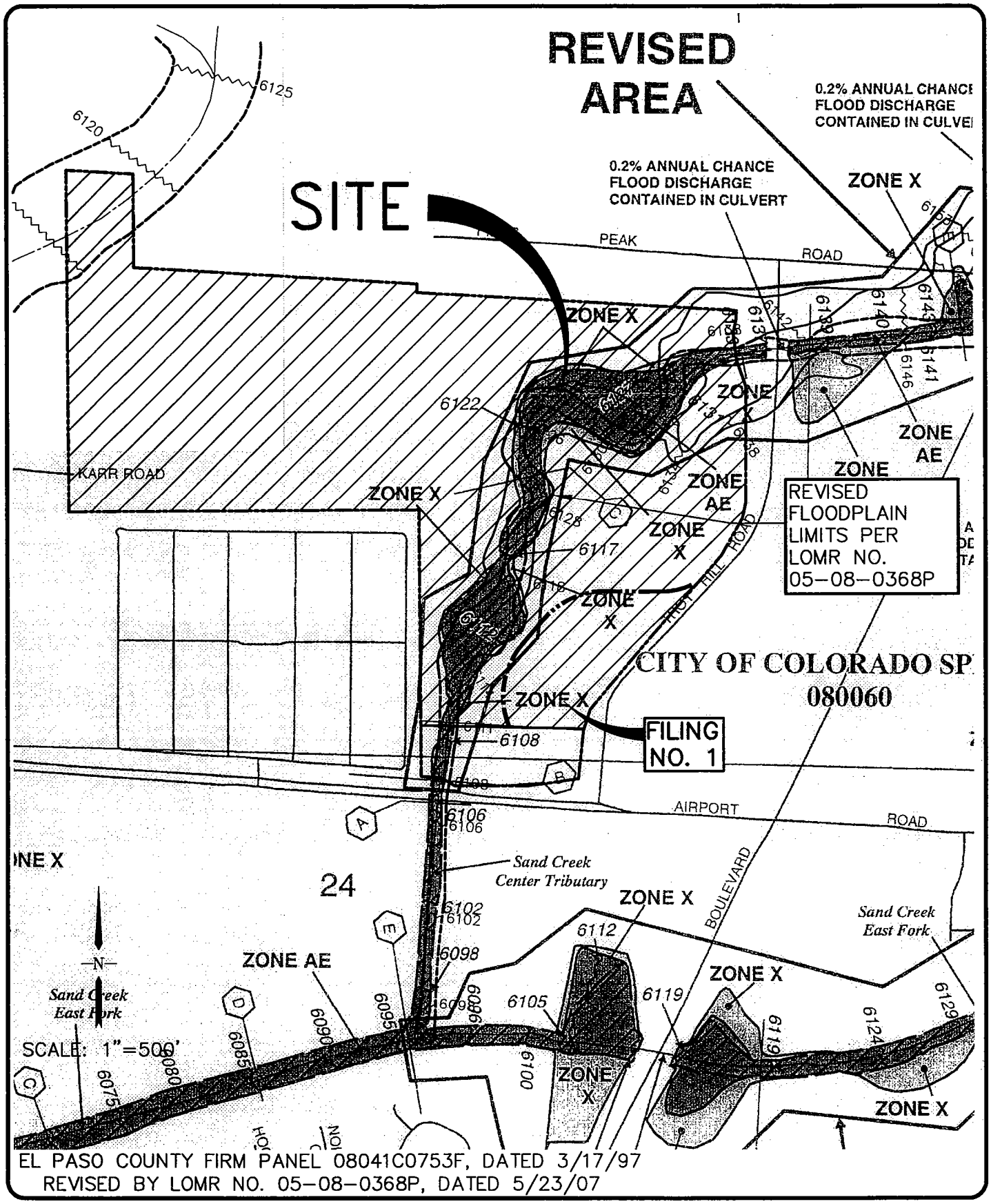
VICINITY MAP

JPS ENGINEERING

WESTGATE AT POWERS

FIGURE A1

JPS PROJ NO. 020501



FLOODPLAIN MAP	JPS ENGINEERING	WESTGATE AT POWERS
		FIGURE A2 JPS PROJ NO. 020501

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PROPOSED PIKES PEAK HEIGHTS SUBDIVISION

64133-00-023 ARMSTRONG FINANCIAL 17.99 AC.

64133-00-001 DABARBET, LLC 20.0 AC.

64133-00-022 LIST 2.0 AC.

FEMA 100-YEAR FLOODPLAIN LIMITS

SAND CREEK

ZONED PIP1

PIKES PEAK AVE.

64133-00-024 LIST 22.1 AC.

64133-00-004 LIST 1.00 AC.

FRAZIER'S GARDEN SUBDIVISION

64130-00-003 ERICKSON 4.02 AC.

ZONED PIP2

64133-00-002 DABARBET, LLC 19.1 AC.

64133-00-025 LIST 5.0 AC.

EXISTING BOX CULVERT (3 EA. 16'Wx6'H RCBC)

EXISTING 24" CULVERT

64133-00-134 LIST 25.72 AC.

CURRENT EFFECTIVE 100-YEAR FLOODWAY LIMITS

TRIBUTARY

64136-00-110 AIRPORT ASSOCIATES 8.1 AC.

EXISTING GOLDEN ACRES MOBILE HOME PARK

ZONED PUD

ZONED PBC

CENTER

TROUT CREEK ROAD

POWERS BLVD.

64130-00-105 CDOT 3.02 AC.

EXISTING CULVERT (30" RCP)

AIRPORT ROAD

EXISTING BOX CULVERT (5 EA 6'x8' RCBC)

ZONED RT-6

SAND CREEK EAST FORK

SC26 AC

OC1 10.0 AC

SC42 AC

3 20.9 46.7

C 16.6 AC

B 13.0 AC

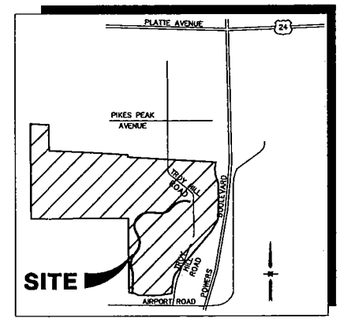
2 5.5 14.1

A 34.8 AC

OA1 5.6 AC

1 22.7 55.9

SC42 1170 2010



VICINITY MAP

NTS

DRAINAGE LEGEND

- RIPRAP
- FLOW DIRECTION ARROW
- FLOWLINE
- DRAINAGE BASIN BOUNDARY
- DESIGN POINT
- Q_5 (cfs)
- Q_{100}(cfs) (HISTORIC FLOW)
- BASIN DESIGNATION
- BASIN AREA (ACRES)

N

200' 0 200' 400'

Original Scale: 1"=200'
Contour Interval = 2 ft

JPS ENGINEERING

19 E. Willamette Ave.
Colorado Springs, CO 80903

PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

WESTGATE AT POWERS

HISTORIC DRAINAGE PLAN

No.	REVISION	BY	DATE

HORZ. SCALE:	1"=200'	DRAWN:	RMD
VERT. SCALE:	N/A	DESIGNED:	JPS
SURVEYED:	LDC	CHECKED:	JPS
CREATED:	2/2/05	LAST MODIFIED:	2/16/12
PROJECT NO:	020501	MODIFIED BY:	JPS

SHEET: EX1

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WESTGATE AT POWERS

MASTER DEVELOPMENT DRAINAGE PLAN

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Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

No.	REVISION	BY	DATE

HORZ. SCALE:	1"=100'
VERT. SCALE:	N/A
SURVEYED:	LDC
CREATED:	2/2/05
PROJECT NO:	020501
DRAWN:	BJJ
DESIGNED:	JPS
CHECKED:	JPS
LAST MODIFIED:	5/02/12
MODIFIED BY:	BJJ
SHEET:	D1

Original Scale: 1"=100'
Contour Interval = 2 ft

DRAINAGE LEGEND

- RIPRAP
- FLOW DIRECTION ARROW
- FLOWLINE
- FEMA 100-YEAR FLOODPLAIN LIMITS
- DRAINAGE BASIN BOUNDARY
- DESIGN POINT
- Q_5 (cfs)
- Q_{100}(cfs) (DEVELOPED FLOW)
- DEVELOPED BASIN DESIGNATION
- DEVELOPED BASIN AREA (ACRES)
- PLD — POROUS LANDSCAPE DETENTION AREA
- EDB — EXTENDED DETENTION BASIN

FEMA 100-YR FLOODPLAIN LIMITS
SAND CREEK
64133-00-024 LIST 22.1 AC.
64130-00-093 ESKRIDGE 4.02 AC.
64130-00-094 LIST 1.00 AC.
CURRENT FEMA 100-YEAR FLOODPLAIN LIMITS (TO BE REVISED WITH LOMR)
STORMWATER QUALITY DETENTION POND EDB #C4 (PRIVATE) (0.6 AC FT)
PROPOSED CHANNEL RE-ALIGNMENT W/ RIPRAP BANK LINING (B=50'; D=5'; Z=3:1)
PROPOSED CHANNEL
EXISTING BOX CULVERT (3 EA. 16'Wx6'H RCBC)
EXISTING 24" CULVERT OA1
FUTURE PLD #A5
FUTURE PLD #A6
FUTURE POND EDB #A3
FUTURE PLD #A4
PROPOSED COLLECTOR ROAD
64133-00-025 LIST 8.0 AC.
64130-00-124 LIST 28.72 AC.
64130-00-123 AIRPORT ASSOCIATES 6.5 AC.
PUBLIC STORM SEWER A4
STORMWATER QUALITY RETENTION POND RP #A7 (PVT) (0.2 AC FT)
PROPOSED BOX CULVERT A8 (3EA 16'WX6'H RCBC)
PROPOSED DROP STRUCTURE (TYP)
EXISTING MOBILE HOME PARK
PRIVATE STORM SEWER A1
STORMWATER QUALITY DETENTION POND EDB #A1 (PRIVATE) (0.2 AC FT)
EXISTING BOX CULVERT (5 EA. 6'x8' RCBC)
FUTURE POND EDB #A2
64130-00-105 CDOT 3.04 AC.
AIRPORT ROAD
POWERS BLVD.
RETAIL 8,000sf
RETAIL 7,200
BANK 4,000
FAST FOOD
FUTURE PHASE
PHASE 1
PHASE 2
C1 8.33 AC
C2 3.02 AC
C3 9.15 AC
C4 2.85 AC
OC1 10.0 AC
A1 5.73 AC
A2 5.25 AC
A3 12.36 AC
A4 1.96 AC
A5 2.68 AC
A6 1.64 AC
A7 5.10 AC
A8 6.23 AC
OA1 5.6 AC
RR
RP
EDB
PLD

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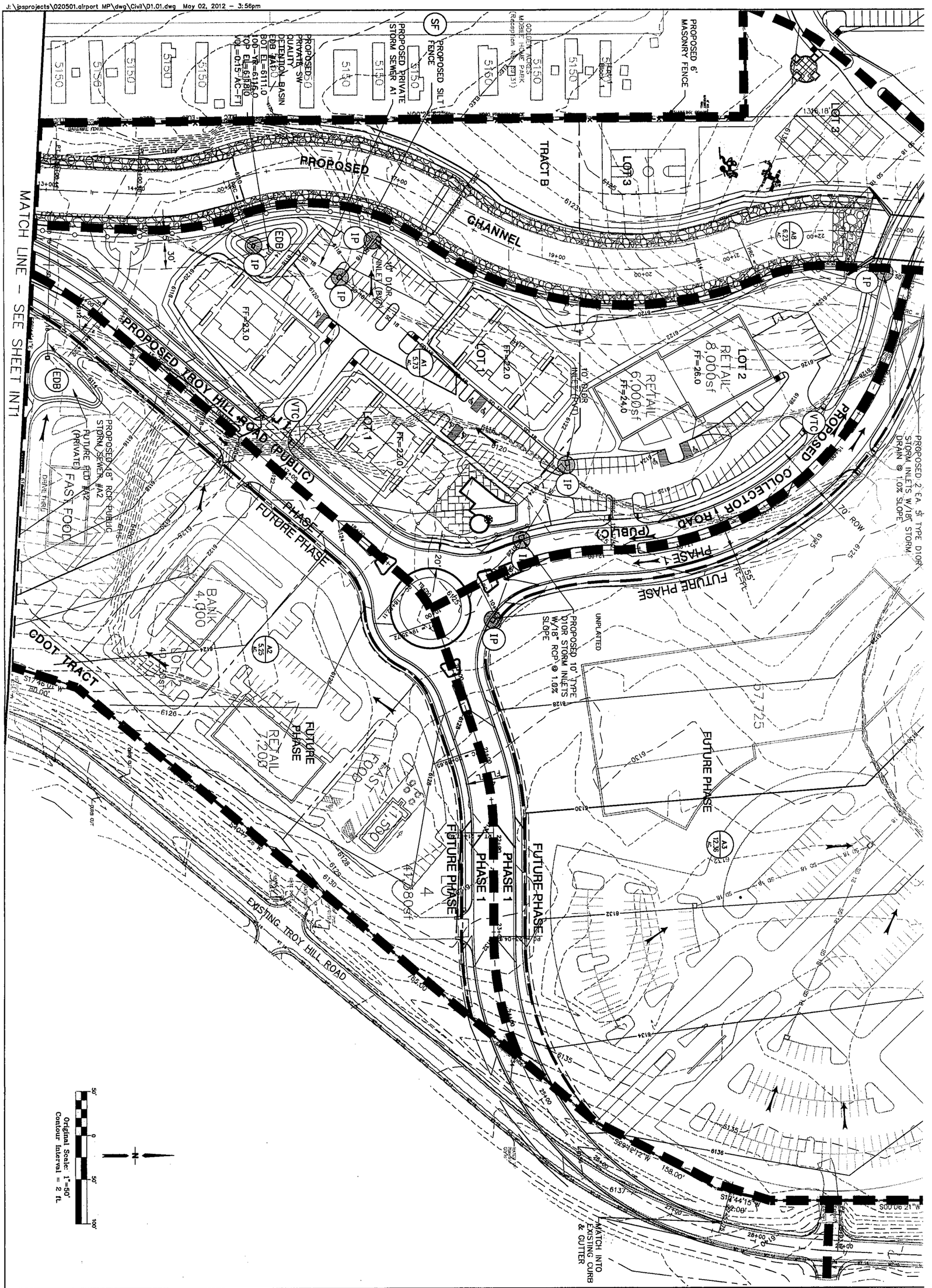


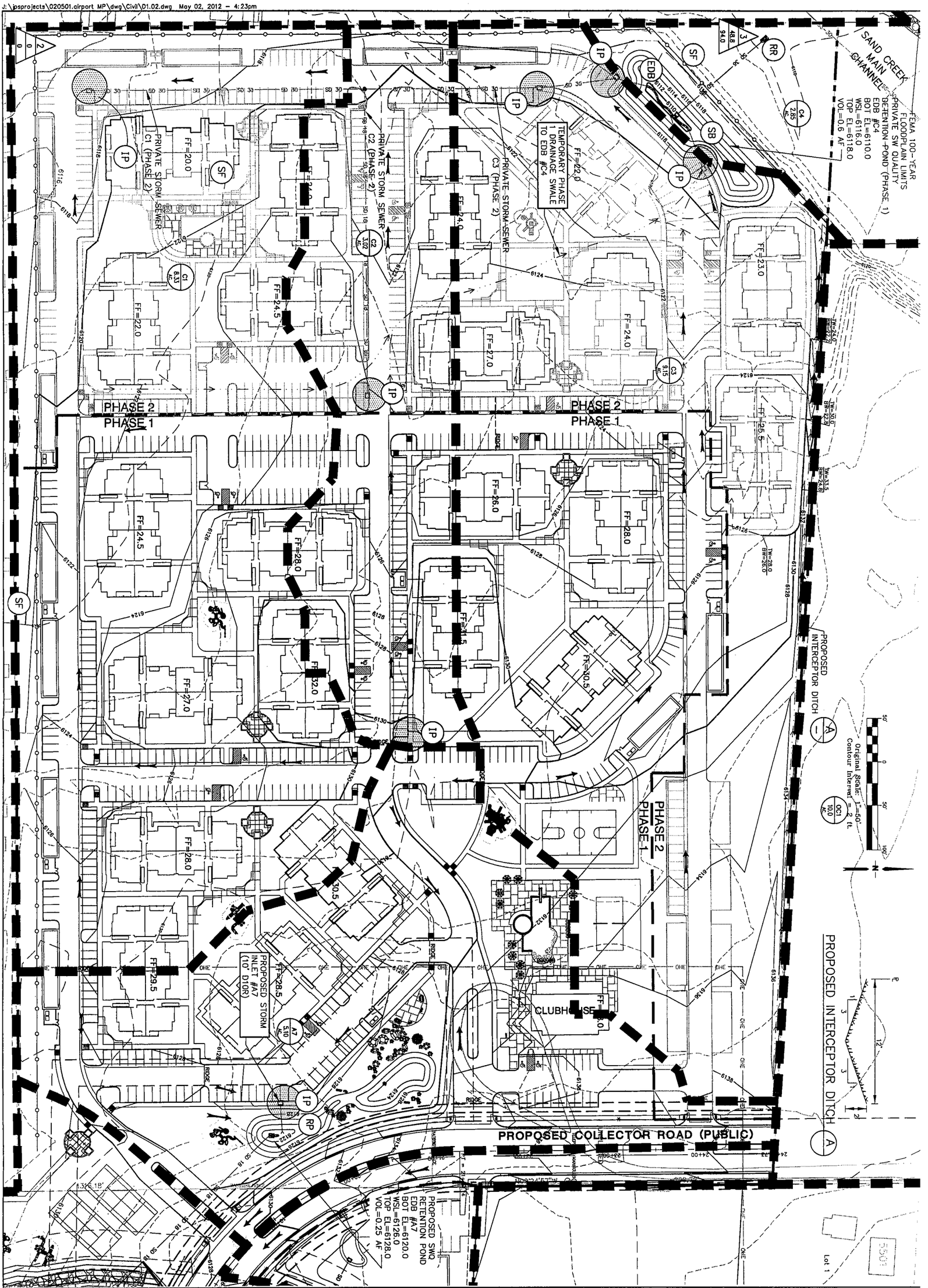
WESTGATE AT POWERS

SOUTH SITE DRAINAGE & EROSION CONTROL PLAN

No.	REVISION	BY	DATE

HORIZ. SCALE: 1"=50' DRAWN: BJJ
VERT. SCALE: N/A DESIGNED: BJJ
SURVEYED: LDC CHECKED: JPS
CREATED: 2/16/12 LAST MODIFIED: 5/02/12
PROJECT NO: 020501 MODIFIED BY: BJJ
SHEET: D1.01

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com



WESTGATE AT POWERS

NORTHWEST SITE DRAINAGE & EROSION CONTROL PLAN

No.	REVISION	BY	DATE

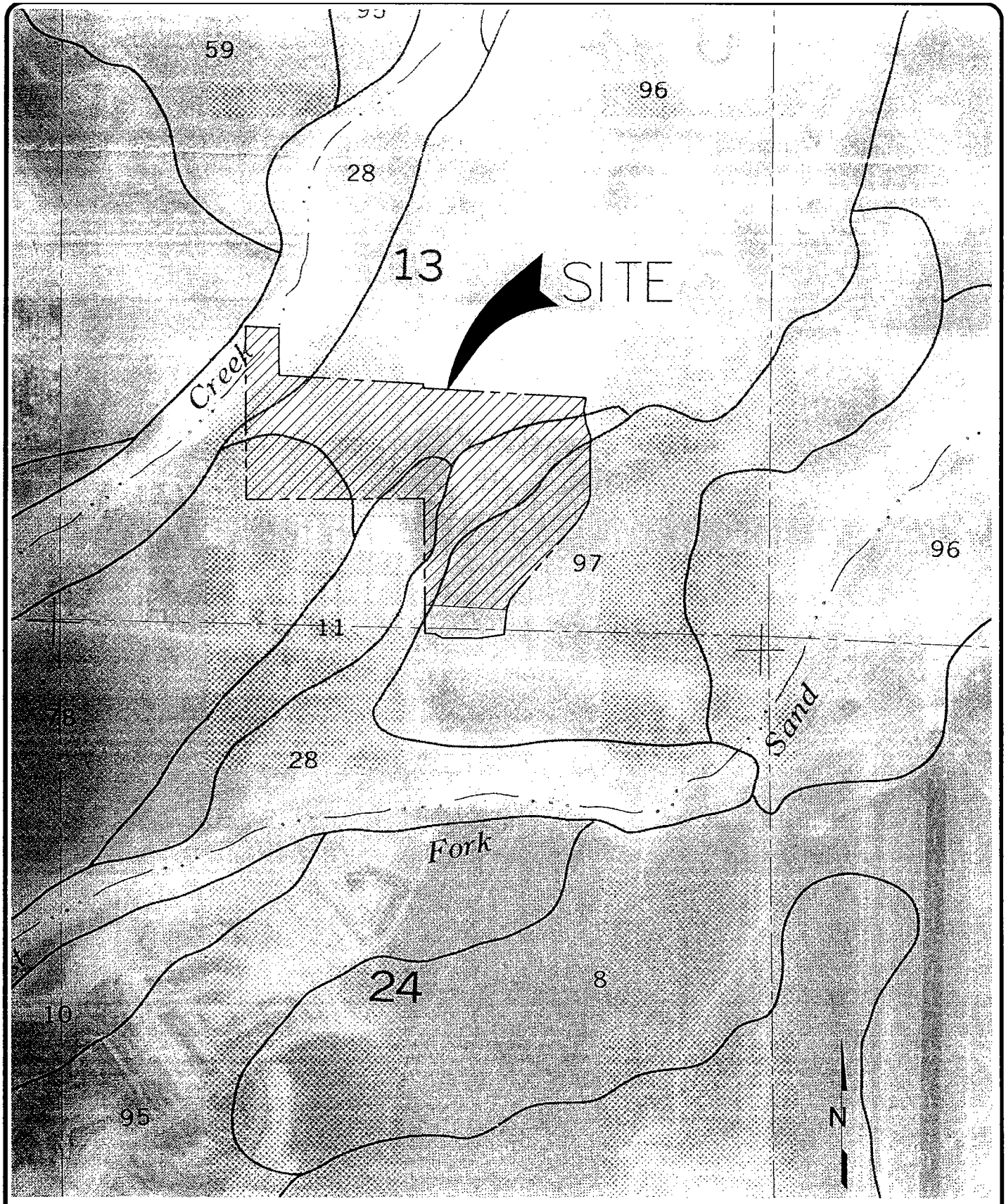
HORZ. SCALE: 1"=50'
VERT. SCALE:
SURVEYED: N/A
CREATED: 2/16/12
PROJECT NO: 020501
SHEET: D1.02

DRAWN: BJJ
DESIGNED: BJJ
CHECKED: JPS
LAST MODIFIED: 5/02/12
MODIFIED BY: BJJ

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

APPENDIX B

SCS SOILS INFORMATION



(EL PASO COUNTY SCS MAP NO. 17)

SCALE: 1"=500'

SCS SOILS MAP

JPS ENGINEERING

WESTGATE AT POWERS

FIGURE B

JPS PROJ NO. 020501

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Typically, the surface layer is dark grayish brown sandy loam about 10 inches thick. The subsoil is dark grayish brown and brown sandy loam about 26 inches thick. The substratum is light brownish gray gravelly sandy loam.

Included with this soil in mapping are small areas of Blakeland loamy sand, 1 to 9 percent slopes; Bresser sandy loam, 0 to 3 percent slopes; Truckton sandy loam, 0 to 3 percent slopes; Ellicott loamy coarse sand, 0 to 5 percent slopes; and Ustic Torrifluvents, loamy.

Permeability of this Blendon soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow, and the hazards of erosion and soil blowing are moderate.

Most areas of this soil are used as rangeland, but some small areas are cultivated. Some homesite development has taken place on this soil.

Native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, side-oats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of plant cover from the soil. Interseeding improves the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Proper location of livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are generally suited to this soil. Soil blowing is the principal limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is well suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, the provision of undisturbed nesting cover is vital and should be included in plans for habitat development. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for homesites. The main limitation for the construction of local roads and streets is a moderate frost action potential. Roads can be designed to overcome this limitation. Capability subclass IIIe.

11—Bresser sandy loam, 0 to 3 percent slopes. This deep, well drained soil formed in arkosic alluvium and residuum on terraces and uplands. Elevation ranges from 6,000 to 6,800 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The subsoil is brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown loamy coarse sand to a depth of 60 inches.

Included with this soil in mapping are small areas of Truckton sandy loam, 0 to 3 percent slopes; Ascalon sandy loam, 1 to 3 percent slopes; Fort Collins loam, 0 to 3 percent slopes; and Yoder gravelly sandy loam, 1 to 8 percent slopes. Some areas of Ustic Torrifluvents, loamy, occur along narrow drainageways.

Permeability of this Bresser soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow, the hazard of erosion is slight to moderate, and the hazard of soil blowing is moderate.

Most areas of this soil are cultivated. The remaining acreage is used as rangeland.

A rotation of winter wheat and fallow is used because precipitation is insufficient for annual cropping. A feedgrain crop such as millet or sorghum can be substituted for wheat in some years. Crop residue management and minimum tillage are needed to control erosion.

Native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, side-oats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of plant cover from the soil. Interseeding improves the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Proper location of livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are generally suited to this soil. Soil blowing is the principal limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is well suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, the provision of undisturbed nesting cover is vital and should be included in plans for habitat development. This is especially true in areas of intensive farming. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for homesites. Limiting the disturbance of the soil and the removal of existing plant cover during construction helps to control erosion. Capability subclass IIIc.

Woodland wildlife, such as mule deer and wild turkey, is attracted to this soil because of its potential to produce ponderosa pine, Gambel oak, and various grasses and shrubs. Water developments, such as guzzlers, would enhance populations of wild turkey as well as other kinds of wildlife. Where wildlife and livestock share the same range, proper grazing management is needed to prevent overuse and to reduce competition. Livestock watering facilities would also benefit wildlife on this soil.

This soil has good potential for use as homesites. The main limitation is the moderate shrink-swell potential in the subsoil and frost action potential. Special road design is necessary on this soil to overcome these limitations. Slope is also a limitation. Special planning is needed on this soil to minimize site disturbance and tree and seedling damage. During seasons of low precipitation, fire may become a hazard to homesites on this soil. The hazard can be minimized by installing firebreaks and reducing the amount of potential fuel on the forest floor. Capability subclass VIe.

27—Elbeth-Pring complex, 5 to 30 percent slopes. These moderately sloping to steep soils are on upland side slopes and ridges. Elevation ranges from 7,200 to 7,400 feet. The average annual precipitation is about 18 inches, the average annual air temperature is about 43 degrees F, and the average frost-free period is about 120 days.

The Elbeth soil makes up about 60 percent of the complex, the Pring about 20 percent, and other soils about 20 percent. The Elbeth soil has slopes of 5 to 15 percent, and the Pring soil has slopes of 5 to 30 percent.

Included with these soils in mapping are areas of Peyton-Pring complex, 8 to 15 percent slopes, Kettle-Rock outcrop complex, and ridges that are covered with gravel and cobbles.

The Elbeth soil is deep and well drained. It formed in material transported from arkose deposits. Typically, the surface layer is very dark grayish brown sandy loam about 3 inches thick. The subsurface layer is light gray loamy sand about 20 inches thick. The subsoil is brown sandy clay loam about 45 inches thick. The substratum is light brown sandy clay loam.

Permeability of the Elbeth soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is medium to rapid, and the hazard of erosion is moderate to high. Deep gullies occur throughout areas of this soil. Some soil slippage occurs on some of the steeper slopes.

The Pring soil is deep and well drained. It formed in arkosic sediment. Typically, the surface layer is dark grayish brown coarse sandy loam about 4 inches thick. The next layer is dark grayish brown coarse sandy loam about 10 inches thick. The underlying material is pale brown gravelly sandy loam to a depth of 60 inches.

Permeability of the Pring soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used for woodland, recreation, livestock grazing, and homesites.

The Elbeth soil is suited to the production of ponderosa pine. It is capable of producing about 2,240 cubic feet, or 4,900 board feet (International rule), of merchantable timber per acre from a fully stocked, even-aged stand of 80-year-old trees. Conventional methods can be used for harvesting, but operations may be restricted during wet periods. Reforestation, after harvesting, must be carefully managed to reduce competition of undesirable understory plants.

The Pring soil is suited to the production of native vegetation suitable for grazing by cattle and sheep. Rangeland vegetation is mainly mountain muhly, little bluestem, needleandthread, Parry oatgrass, and junegrass.

Deferment of grazing in spring promotes plant vigor and reproduction of the cool-season bunchgrasses. Fencing and proper location of livestock watering facilities may be needed to obtain proper distribution of grazing. Locating salt blocks in areas not generally grazed increases the use of the available forage.

Woodland wildlife such as mule deer and wild turkey is attracted to the Elbeth soil because of its potential to produce ponderosa pine, Gambel oak, and various grasses and shrubs. Water developments, such as guzzlers, would enhance populations of wild turkey as well as other kinds of wildlife. Where wildlife and livestock share the same range, proper grazing management is needed to prevent overuse and to reduce competition. Livestock watering facilities would also benefit wildlife on this soil.

The Pring soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

The main limitations of this complex for construction are the moderate shrink-swell potential in the subsoil of the Elbeth soil and the steep slopes of both soils. Special site or building designs for dwellings and roads are required to offset these limitations. Special practices must be used to minimize surface runoff and keep soil erosion to a minimum. Capability subclass VIe.

28—Ellicott loamy coarse sand, 0 to 5 percent slopes. This deep, somewhat excessively drained soil is on terraces and flood plains (fig. 1). The average annual precipitation is about 14 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown loamy coarse sand about 4 inches thick. The underlying material to a depth of 60 inches is light brownish gray coarse sand stratified with layers of loamy sand, loamy coarse sand, and coarse sandy loam.

Included with this soil in mapping are small areas of Ustic Torrifluvents, loamy; Fluvaquentic Haploquolls, nearly level; Blakeland loamy sand, 1 to 9 percent slopes; Blendon sandy loam; and Truckton sandy loam, 0 to 3 percent slopes.

Permeability of this Ellicott soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low. Surface runoff is slow, the hazard of erosion is high, and the hazard of soil blowing is moderate.

Almost all areas of this soil are used as rangeland.

The rangeland vegetation on this soil is mainly switchgrass, needleandthread, sand bluestem, and prairie sand reedgrass.

Seeding is a good practice if the range is in poor condition. Seeding of the native grasses is desirable. Yellow or white sweetclover may be added to the seeding mixture to provide a source of nitrogen for the grasses. Too much clover can create a danger of bloat by grazing animals. This soil is subject to flooding and should be managed to keep a heavy cover of grass to protect the soil. Fencing is a necessary practice in range management. Brush control and grazing management may help to improve deteriorated range.

Windbreaks and environmental plantings are fairly well suited to this soil. Blowing sand and low available water capacity are the principal limitations for the establishment of trees and shrubs. The soil is so loose that trees need to be planted in shallow furrows and plant cover needs to be maintained between the rows. Supplemental irrigation may be needed to insure survival of trees. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, and Siberian elm. Shrubs that are best suited to skunkbush sumac, lilac, and Siberian peashrub.

Rangeland wildlife, such as antelope, cottontail, coyote, and scaled quail, is best adapted to life on this droughty soil. Forage production is typically low, and proper livestock grazing management is needed if wildlife and livestock share the range. Livestock watering developments are also important and are used by various wildlife species.

The main limitation of this soil for construction is the hazard of flooding. All construction on this soil should be kept off the flood plain as much as possible. Capability subclass VIw.

29—Fluvaquentic Haplaquolls, nearly level. These deep, poorly drained soils are in marshes, in swales, and on creek bottoms. The average annual precipitation is about 14 inches, and the average annual air temperature is about 47 degrees F.

Included with these soils in mapping are small areas of Ustic Torrifluvents, loamy; Blakeland loamy sand, 1 to 9 percent slopes; Columbine gravelly sandy loam, 0 to 3 percent slopes; and Ellicott loamy coarse sand, 0 to 5 percent slopes.

These soils are stratified. Typically, the surface layer is light gray to very dark gray loamy fine sand to gravelly loam 2 to 6 inches thick. The underlying material, 48 to 58 inches thick, is very pale brown to gray, stratified heavy sandy clay loam to sand and gravel. The lower part of some of the soils, at depths ranging from 18 to 48 inches, ranges from light blueish gray to greenish gray. The water table is usually at a depth of less than 48 inches, and it is on the surface during part of the year.

Permeability of these soils is moderate. Effective rooting depth is limited by the water table. Available water capacity is moderate. Surface runoff is slow, and the hazard of erosion is slight. At times overflow deposits a damaging amount of silt and sand in the lower lying areas.

These soils are in meadow. They are used for native hay or for grazing.

These soils are well suited to the production of native vegetation suitable for grazing. The vegetation is mainly switchgrass, indiangrass, sedges, rushes, prairie cordgrass, western wheatgrass, and bluegrass. Cattails and bulrushes commonly grow in the swampy areas.

Management of distribution of livestock and stocking rates is necessary on these soils to avoid abuse of the range. In large areas, fences should be used to control grazing.

Wetland wildlife can be attracted to these soils and the wetland habitat enhanced by several means. Shallow water developments can be created by digging or by blasting potholes to create open-water areas. Fencing to control livestock use is beneficial, and it allows wetland plants such as cattails, reed canarygrass, and rushes to grow. Control of unplanned burning and prevention of drainage that would remove water from the wetlands are also good practices. These shallow marsh areas are often especially important for winter cover if natural vegetation is allowed to grow.

These soils are severely limited for use as homesites. The main limitations are a high water table and a hazard of periodic flooding. Community sewerage systems are needed because the high water table prevents septic tank absorption fields from functioning properly. Roads must also be designed to prevent frost-heave damage. Capability subclass Vw.

30—Fort Collins loam, 0 to 3 percent slopes. This deep, well drained soil formed in medium textured alluvium on uplands. Elevation ranges from 5,200 to 6,500 feet. The average annual precipitation ranges from about 13 inches at the lower elevations to about 15 inches at the higher elevations; the average annual temperature is about 49 degrees F; and the average frost-free period is about 145 days.

Typically, the surface layer is brown loam about 6 inches thick. The subsoil is brown clay loam about 15 inches thick. The substratum is pale brown loam.

Included with this soil in mapping are small areas of Stoneham sandy loam, 3 to 8 percent slopes; Keith silt loam, 0 to 3 percent slopes; Olney sandy loam, 0 to 3 percent slopes; Bresser sandy loam, 0 to 3 percent slopes; and Wiley silt loam, 1 to 3 percent slopes.

Permeability of this Fort Collins soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is medium, and the hazard of erosion is moderate.

This soil is used as rangeland and for dryland farming. Wheat and feed grains such as millet are the crops commonly grown. Crop residue management, minimum tillage

ble water capacity can influence seedling survival. Seedling mortality is severe on the Rizozo soil because of low available water capacity.

These soils are suited to habitat for wildlife such as antelope, mule deer, and wild turkey. The combination of juniper and pinyon on these soils makes them attractive to wild turkey, but a shortage of surface water may limit turkey populations. This limitation can be overcome by constructing watering facilities, such as guzzlers.

The main limitations of the Rizozo soil for construction are shallow depth to bedrock, a stony surface, and steep slopes. The main limitation of the Neville soil is its limited ability to support a load and shrink-swell potential. Buildings and roads must be designed to overcome these limitations. Access roads should have adequate cutslope grade and be provided with drains to control surface runoff. Capability subclass VIIe.

77—**Rock outcrop-Coldcreek-Tolman complex, 9 to 90 percent slopes.** This strongly sloping to extremely steep complex is on mountains. The average annual precipitation is about 20 inches, and the average annual air temperature is about 42 degrees F.

Rock outcrop makes up about 30 percent of the complex, the Coldcreek soil about 30 percent, the Tolman soil about 20 percent, and other soils about 20 percent.

Included with this complex in mapping are areas of Kutler-Broadmoor-Rock outcrop complex, 25 to 90 percent slopes; Fortwingate-Rock outcrop complex, 15 to 60 percent slopes; and Nederland cobbly sandy loam, 9 to 25 percent slopes. Areas of talus occur below some areas of Rock outcrop.

Rock outcrop occurs throughout the complex. It is most commonly on the upper part of the slopes. Runoff is rapid.

The Coldcreek soil is deep and well drained. It formed in mixed, acid igneous material. Typically, the surface layer is dark gray cobbly loam about 6 inches thick. The subsurface layer is light gray extremely cobbly sandy loam that is mixed with a lesser amount of brown clay loam and is about 25 inches thick. The subsoil is brown extremely cobbly clay loam that has coatings of light gray and is about 12 inches thick. Hard fractured bedrock is at a depth of about 43 inches.

Permeability of the Coldcreek soil is moderate. Effective rooting depth is 40 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate.

The Tolman soil is shallow and well drained. It formed in medium textured residuum derived from acid igneous rock. Typically, the surface layer is dark grayish brown gravelly sandy loam about 4 inches thick. The subsoil is brown very cobbly sandy clay loam about 9 inches thick. Hard igneous bedrock is at a depth of 13 inches.

Permeability of the Tolman soil is moderate. Effective rooting depth is 10 to 20 inches. Available water capacity is low. Surface runoff is medium, and the hazard of erosion is moderate.

The Coldcreek soil is used mainly for woodland, recreation, and wildlife habitat and as a source of gravel. The Tolman soil is used mainly as rangeland and for wildlife habitat.

The Coldcreek soil is suited to the production of Douglas-fir. It is capable of producing about 690 cubic feet, or 1,000 board feet (International rule), of merchantable timber per acre from a fully stocked, even-aged stand of 80-year-old trees. The main limitations for its use for timber production are slope, hazard of erosion, and the presence of stones on the surface. The stones can hinder felling, yarding, and other operations involving the use of equipment. Practices must be used to minimize erosion when harvesting timber.

The Tolman soil is suited to vegetation suitable for grazing and to the production of some firewood. Rangeland vegetation is mainly mountain muhly, big bluestem, little bluestem, side-oats grama, and western wheatgrass. The common shrubs and trees are mountainmahogany, skunkbush sumac, and Rocky Mountain juniper. There are lesser amounts of ponderosa pine.

Proper range management is necessary on the Tolman soil. Properly locating livestock watering facilities helps to control grazing. Deferment of grazing helps to maintain vigor and production of plants.

The Coldcreek soil is suited to habitat suitable for woodland wildlife, especially mule deer, wild turkey, and blue grouse. To encourage wild turkey in areas where there is little or no water, wildlife watering facilities, such as guzzlers, can be developed. Because of the steep slopes, livestock grazing should be discouraged, which would benefit the wildlife that use these areas.

Rangeland wildlife, such as antelope, cottontail, coyote, and scaled quail, is best adapted for life on the Tolman soil. Forage production is typically low, and proper livestock grazing management is necessary if wildlife and livestock share the range. Livestock watering developments are needed, and they are used by various wildlife species.

The main limitations of the soils of this complex for urban use or homesite development are rock outcrops, stones, depth to bedrock, especially on the Tolman soil, and steep slope. Homesites should be located in places where these limitations are the least severe. Special designs for buildings and roads are required to overcome these limitations. Capability subclass VIIe.

78—**Sampson loam, 0 to 3 percent slopes.** This deep, well drained soil formed in alluvium derived from sedimentary rock on terraces and alluvial fans and in small closed basins. Elevation ranges from about 5,500 to 6,500 feet. The average annual precipitation is about 14 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is about 145 days.

Typically, the surface layer is dark grayish brown loam about 6 inches thick. The subsoil, about 44 inches thick, is dark brown to brown clay loam that grades to light brownish gray sandy clay loam in the lower part. The substratum is light brownish gray sandy clay loam to a

depth of 60 inches. The lower part of the subsoil and the substratum have visible soft masses of lime.

Included with this soil in mapping are small areas of Bresser sandy loam, 0 to 3 percent slopes; Nunn clay loam, 0 to 3 percent slopes; and Olney sandy loam, 0 to 3 percent slopes. Also included are areas of Vona sandy loam, 1 to 3 percent slopes, and Ustic Torrifluvents, loamy.

Permeability of this Sampson soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is slow, and the hazard of erosion is slight.

About one-third of the acreage of this soil is used for irrigated corn and alfalfa and for dryfarmed wheat. The slow surface runoff and slight hazard of erosion reduce the need for use of intensive conservation practices. Most of the remaining acreage is used as rangeland.

This soil is well suited to the production of native vegetation suitable for grazing. Native vegetation is mainly blue grama, western wheatgrass, side-oats grama, sand dropseed, and galleta. Needleandthread, big bluestem, and native bluegrasses are also present where this soil occurs in the northern part of the survey area.

Fencing and properly locating livestock watering facilities help to control grazing. Deferment of grazing may be necessary to maintain a needed balance between livestock demands and forage production. In areas where the plant cover has been depleted, pitting can be used to help the native vegetation recover. Chemical control may be needed in disturbed areas where dense stands of pricklypear occur. Ample amounts of litter and forage should be left on the soil because of the high hazard of soil blowing.

Windbreaks and environmental plantings generally are well suited to this soil. Summer fallow a year prior to planting and continued cultivation for weed control are needed to insure the establishment and survival of plantings. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, Siberian peashrub, and American plum.

This soil is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided for in plans for habitat development. This is especially true in areas of intensive farming. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

The main limitations of this soil for homesites or urban use are limited ability to support a load, the shrink-swell potential of the subsoil, and frost-action potential. Special designs for buildings and roads and streets are necessary to overcome these limitations. Capability subclasses IVe, nonirrigated, and IIe, irrigated.

79—Satanta loam, 0 to 3 percent slopes. This deep, well drained soil formed in loamy eolian material derived from mixed sources on uplands. Elevation ranges from 5,900 to 6,500 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 145 days.

Typically, the surface layer is brown loam about 4 inches thick. The lower part of the subsoil has visible soft masses of lime. The subsoil is brown clay loam about 35 inches thick. The substratum is pale brown silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ascalon sandy loam, 1 to 3 percent slopes; Bresser sandy loam, 0 to 3 percent slopes; and Wiley silt loam, 1 to 3 percent slopes.

Permeability of this Satanta soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is slow, and the hazard of erosion is slight.

Most areas of this soil in the northeastern part of the survey area are cultivated. Most areas in the southwestern part are used as rangeland, for wildlife habitat, and for military maneuvers.

Wheat, fallow, and feed grains are used in a flexible cropping system because precipitation is insufficient for annual cropping. Minimum tillage and crop residue management usually are adequate to control erosion. This soil is one of the best in the survey area.

This soil is well suited to native vegetation suitable for grazing. The native vegetation is mainly western wheatgrass, needlegrasses, side-oats grama, and blue grama. If the range has deteriorated, blue grama, junegrass, and native bluegrasses increase. Sleepygrass and annuals replace these grasses if the range has seriously deteriorated.

Seeding is a good practice if the range is in poor condition. Seeding of the native vegetation is desirable, but the range can also be seeded with tame species of grass such as Nordan crested wheatgrass, Russian wildrye, pubescent wheatgrass, or intermediate wheatgrass. Use of deferred grazing and other good range management practices helps to maintain vigor and growth of plants. Fencing and properly locating livestock watering facilities help to control grazing.

Windbreaks and environmental plantings generally are well suited to this soil. Summer fallow a year prior to planting and continued cultivation for weed control are needed to insure the establishment and survival of plantings. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, Siberian peashrub, and American plum.

This soil is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting

Almost all areas of this soil are used as rangeland. A few areas of crops such as alfalfa and corn are grown under sprinkler irrigation.

This soil is well suited to the production of native vegetation suitable for grazing. It is best suited to deep-rooted grasses. The native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, sideoats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of the plant cover. Interseeding is used to improve the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are fairly well suited to this soil. Blowing sand is the main limitation for the establishment of trees and shrubs. The soil is so loose that trees need to be planted in shallow furrows and plant cover needs to be maintained between the rows. Supplemental irrigation may be needed to insure survival. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, and Siberian elm. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to openland and rangeland wildlife habitat. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for use as homesites. The main limitation of this soil for roads and streets is frost action potential. Special designs for roads are needed to minimize this limitation. Practices are needed to control soil blowing and water erosion on construction sites where the plant cover has been removed. Capability subclass VIe, nonirrigated.

96—Truckton sandy loam, 0 to 3 percent slopes. This deep, well drained soil formed in alluvium and residuum derived from arkosic sedimentary rock on uplands. Elevation ranges from 6,000 to 7,000 feet. The average annual precipitation is about 15 inches, the average annual air temperatue is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The next layer is dark grayish brown sandy loam about 3 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum is light yellowish brown coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Blakeland loamy sand, 1 to 9 percent slopes; Bresser sandy loam, 0 to 3 percent slopes; Ellicott loamy coarse sand, 0 to 5 percent slopes; and Ustic Torrifluvents, loamy.

Permeability of this Truckton soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow, and the hazards of erosion and soil blowing are moderate.

This soil is used mainly for cultivated crops. It is also used for livestock grazing, for wildlife habitat, and as homesites.

Crops are commonly grown in combination with summer fallow because moisture is insufficient for annual cropping. Alfalfa can also be grown on this soil. When this soil is used as cropland, crop residue management and minimum tillage are necessary conservation practices.

This soil is well suited to the production of native vegetation suitable for grazing (fig. 7). It favors deep-rooted grasses. The native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, sideoats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of the plant cover. Interseeding is used to improve the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings generally are suited to this soil. Soil blowing is the main limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided in plans for habitat development. This is especially true in areas of intensive farming. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for use as homesites. The main limitation of this soil for roads and streets is frost-action potential. Special designs for roads are needed to overcome this limitation. Capability subclasses IIIe, nonirrigated, and IIe, irrigated.

97—Truckton sandy loam, 3 to 9 percent slopes. This deep, well drained soil formed in alluvium and residuum derived from arkosic sedimentary rock on uplands. Elevation ranges from 6,000 to 7,000 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The next layer is dark grayish brown sandy loam about 3 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum is light yellowish brown coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Blakeland loamy sand, 1 to 9 percent slopes; Bresser sandy loam, 3 to 5 percent slopes; and Truckton sandy loam, 0 to 3 percent slopes. Also included are small areas of soils that have arkosic sandstone or shale at a depth of less than 40 inches.

Permeability of this Truckton soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow to medium, and the hazards of erosion and soil blowing are moderate.

More than half of this soil is used as rangeland, for wildlife habitat, and as homesites. The rest, consisting of the less sloping areas, is used for wheat and sorghum. Rangeland or pastureland is the most suitable use because the permanent plant cover protects the soil.

This soil is well suited to the production of native vegetation suitable for grazing. Native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, side-oats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of the plant cover from this soil. Interseeding improves the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings generally are well suited to this soil. Soil blowing is the main limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided for in plans for habitat development. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

The main limitation of this soil for construction is frost-action potential. Special designs for roads are needed to overcome this limitation. Because of the sandy nature of the soil, practices must be provided to minimize surface runoff and thus keep erosion to a minimum. Access roads must have adequate cut-slope grade and be provided with drains to control surface runoff. Capability subclasses VIe, nonirrigated, and IVe, irrigated.

98—Truckton-Blakeland complex, 9 to 20 percent slopes. These strongly sloping to moderately steep soils are on uplands. Elevation ranges from 6,000 to 7,000 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

The Truckton soil makes up about 60 percent of the complex, the Blakeland soil about 25 percent, and other soils about 15 percent.

Included with these soils in mapping are areas of Bresser sandy loam, 5 to 9 percent slopes, and Yoder gravelly sandy loam, 8 to 25 percent slopes.

The Truckton soil is deep and well drained. It formed in alluvium and residuum weathered from arkosic sedimentary rock. Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The next layer is dark grayish brown sandy loam about 3 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum is light yellowish brown coarse sandy loam to a depth of 60 inches or more.

Permeability of the Truckton soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium to rapid, and the hazard of erosion is moderate to high. Soil slippage is common on the upper part of slopes.

The Blakeland soil is deep and somewhat excessively drained. It formed in arkosic sandy alluvium and eolian sediment derived from arkosic sedimentary rock. Typically, the surface layer is dark grayish brown loamy sand about 11 inches thick. The underlying material is brown loamy sand about 16 inches thick; it grades to pale brown sand that extends to a depth of 60 inches or more.

Permeability of the Blakeland soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low to moderate. Surface runoff is medium, and the hazard of erosion is moderate to high, and the hazard of soil blowing is high. Soil slippage is common on the upper part of slopes.

The soils in this complex are used for grazing livestock and wildlife habitat.

These soils are suited to the production of native vegetation suitable for grazing. The native vegetation is dominantly western wheatgrass, side-oats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of the plant cover from these soils. Interseeding improves the existing vegetation. Deferment of grazing in spring improves plant vigor and soil stability. Properly locating livestock watering facilities helps to control grazing.

Soil blowing is the main limitation for the establishment of trees and shrubs on these soils. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Trees need to be planted in shallow furrows on the Blakeland soil because of its loose, sandy surface layer. Supplemental irrigation may be needed to insure survival. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

TABLE 16.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. See "flooding" in Glossary for definition of terms as "rare," "brief," and "very brief." The symbol > means greater than]

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Hardness	
					In		
Alamosa: 1	C	Frequent	Brief	May-Jun	>60	---	High.
Ascalon: 2, 3	B	None	---	---	>60	---	Moderate.
Badland: 4	D	---	---	---	---	---	---
Bijou: 5, 6, 7	B	None	---	---	>60	---	Low.
Blakeland: 8	A	None	---	---	>60	---	Low.
[1]9: Blakeland part	A	None	---	---	>60	---	Low.
Fluvaquentic Haplaquolls part	D	Common	Very brief	Mar-Aug	>60	---	High.
Blendon: 10	B	None	---	---	>60	---	Moderate.
Bresser: 11, 12, 13	B	None	---	---	>60	---	Low.
Brussett: 14, 15	B	None	---	---	>60	---	Moderate.
Chaseville: 16, 17	A	None	---	---	>60	---	Low.
[1]18: Chaseville part	A	None	---	---	>60	---	Low.
Midway part	D	None	---	---	10-20	Rippable	Moderate.
Columbine: 19	A	None to rare	---	---	>60	---	Low.
Connerton: [1]20: Connerton part	B	None	---	---	>60	---	High.
Rock outcrop part	D	---	---	---	---	---	---
Cruckton: 21	B	None	---	---	>60	---	Moderate.
Cushman: 22, 23	C	None	---	---	20-40	Rippable	Moderate.
[1]24: Cushman part	C	None	---	---	20-40	Rippable	Moderate.
Kutch part	C	None	---	---	20-40	Rippable	Moderate.
Elbeth: 25, 26	B	None	---	---	>60	---	Moderate.
[1]27: Elbeth part	B	None	---	---	>60	---	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Hardness	
					In		
Elbeth: Pring part	B	None	---	---	>60	---	Moderate.
Ellicott: 28	A	Frequent	Brief	Mar-Jun	>60	---	Low.
Fluvaquentic Haplaquolls: 29	B/D	Frequent	Brief	Mar-Jul	>60	---	High.
Fort Collins: 30, 31	B	None to rare	---	---	>60	---	Moderate.
Fortwingate: [1]32: Fortwingate part	C	None	---	---	20-40	Hard	Low.
Rock outcrop part	D	---	---	---	---	---	---
Heldt: 33	C	None	---	---	>60	---	Moderate.
Holderness: 34, 35, 36	C	None	---	---	>60	---	Moderate.
Jarre: 37	B	None	---	---	>60	---	Moderate.
[1]38: Jarre part	B	None	---	---	>60	---	Moderate.
Tecolote part	B	None	---	---	>60	---	Moderate.
Keith: 39	B	None	---	---	>60	---	High.
Kettle: 40, 41	B	None	---	---	>60	---	Moderate.
[1]42: Kettle part	B	None	---	---	>60	---	Moderate.
Rock outcrop part	D	---	---	---	---	---	---
Kim: 43	B	None	---	---	>60	---	Moderate.
Kutch: 44, 45	C	None	---	---	20-40	Rippable	Moderate.
Kutler: [1]46: Kutler part	C	None	---	---	20-40	Rippable	Low.
Broadmoor part	C	None	---	---	20-40	Rippable	Low.
Rock outcrop part	D	---	---	---	---	---	---
Limon: 47	C	Occasional	Brief	May-Sep	>60	---	Moderate.
Louviers: 48	D	None	---	---	10-20	Rippable	Moderate.
49	D	None	---	---	10-20	Rippable	Low.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Hardness	
					In		
Razor:							
[1]75:							
Razor part-----	C	None----------	---	---	20-40	Rippable	Moderate.
Midway part----	D	None----------	---	---	10-20	Rippable	Moderate.
Rizozo:							
[1]76:							
Rizozo part----	D	None----------	---	---	4-20	Hard	Low.
Neville part---	B	None----------	---	---	>60	---	High.
Rock outcrop:							
[1]77:							
Rock outcrop part----------	D	---	---	---	---	---	---
Coldcreek part-	B	None----------	---	---	40-60	Rippable	Moderate.
Tolman part----	D	None----------	---	---	10-20	Hard	Moderate.
Sampson:							
78----------	B	None----------	---	---	>60	---	Moderate.
Satanta:							
79, 80----------	B	None----------	---	---	>60	---	Moderate.
[1]81:							
Satanta part---	B	None----------	---	---	>60	---	Moderate.
Neville part---	B	None----------	---	---	>60	---	High.
Schamber:							
[1]82:							
Schamber part--	A	None----------	---	---	>60	---	Moderate.
Razor part-----	C	None----------	---	---	20-40	Rippable	Moderate.
Stapleton:							
83, 84----------	B	None----------	---	---	>60	---	Moderate.
[1]85:							
Stapleton part-	B	None----------	---	---	>60	---	Moderate.
Bernal part----	D	None----------	---	---	8-20	Hard	Moderate.
Stoneham:							
86, 87----------	B	None----------	---	---	>60	---	Moderate.
Stroupe:							
[1]88:							
Stroupe part---	C	None----------	---	---	20-40	Hard	Moderate.
Travessilla part----------	D	None----------	---	---	6-20	Hard	Low.
Rock outcrop part----------	D	---	---	---	---	---	---
Tassel:							
89----------	D	None----------	---	---	10-20	Rippable	Low.
Terry:							
90----------	B	None----------	---	---	20-40	Rippable	Moderate.
[1]91:							
Terry part-----	B	None----------	---	---	20-40	Rippable	Moderate.
Razor part-----	C	None----------	---	---	20-40	Rippable	Moderate.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Hardness	
					In		
Tomah: [1]92, [1]93:							
Tomah part	B	None	---	---	>60	---	Moderate.
Crowfoot part	B	None	---	---	>60	---	Moderate.
Travessilla: [1]94:							
Travessilla part	D	None	---	---	6-20	Hard	Low.
Rock outcrop part	D	---	---	---	---	---	---
Truckton: 95, 96, 97	B	None	---	---	>60	---	Moderate.
[1]98:							
Truckton part	B	None	---	---	>60	---	Moderate.
Blakeland part	A	None	---	---	>60	---	Low.
[1]99, [1]100:							
Truckton part	B	None	---	---	>60	---	Moderate.
Bresser part	B	None	---	---	>60	---	Low.
Ustic Torrifluvents: 101	B	Occasional	Very brief	Mar-Aug	>60	---	Moderate.
Valent: 102, 103	A	None	---	---	>60	---	Low.
Vona: 104, 105	B	None	---	---	>60	---	Moderate.
Wigton: 106	A	None	---	---	>60	---	Low.
Wiley: 107, 108	B	None	---	---	>60	---	Low.
Yoder: 109, 110	B	None	---	---	>60	---	Low.

[1]This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior characteristics of the map unit.

APPENDIX C

HYDROLOGIC CALCULATIONS

TABLE 5-1

RECOMMENDED AVERAGE RUNOFF COEFFICIENTS AND PERCENT IMPERVIOUS

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	"C" FREQUENCY 10 A&B*	10 C&D*	100 A&B*	100 C&D*
Business					
Commercial Areas	95	0.90	0.90	0.90	0.90
Neighborhood Areas	70	0.75	0.75	0.80	0.80
Residential					
1/8 Acre or less	65	0.60	0.70	0.70	0.80
1/4 Acre	40	0.50	0.60	0.60	0.70
1/3 Acre	30	0.40	0.50	0.55	0.60
1/2 Acre	25	0.35	0.45	0.45	0.55
1 Acre	20	0.30	0.40	0.40	0.50
Industrial					
Light Areas	80	0.70	0.70	0.80	0.80
Heavy Areas	90	0.80	0.80	0.90	0.90
Parks and Cemeteries	7	0.30	0.35	0.55	0.60
Playgrounds	13	0.30	0.35	0.60	0.65
Railroad Yard Areas	40	0.50	0.55	0.60	0.65
Undeveloped Areas					
Historic Flow Analysis- Greenbelts, Agricultural	2	0.15	0.25	0.20	0.30
Pasture/Meadow	0	0.25	0.30	0.35	0.45
Forest	0	0.10	0.15	0.15	0.20
Exposed Rock	100	0.90	0.90	0.95	0.95
Offsite Flow Analysis (when land use not defined)	45	0.55	0.60	0.65	0.70
Streets					
Paved	100	0.90	0.90	0.95	0.95
Gravel	80	0.80	0.80	0.85	0.85
Drive and Walks	100	0.90	0.90	0.95	0.95
Roofs	90	0.90	0.90	0.95	0.95
Lawns	0	0.25	0.30	0.35	0.45

* Hydrologic Soil Group

9/30/90

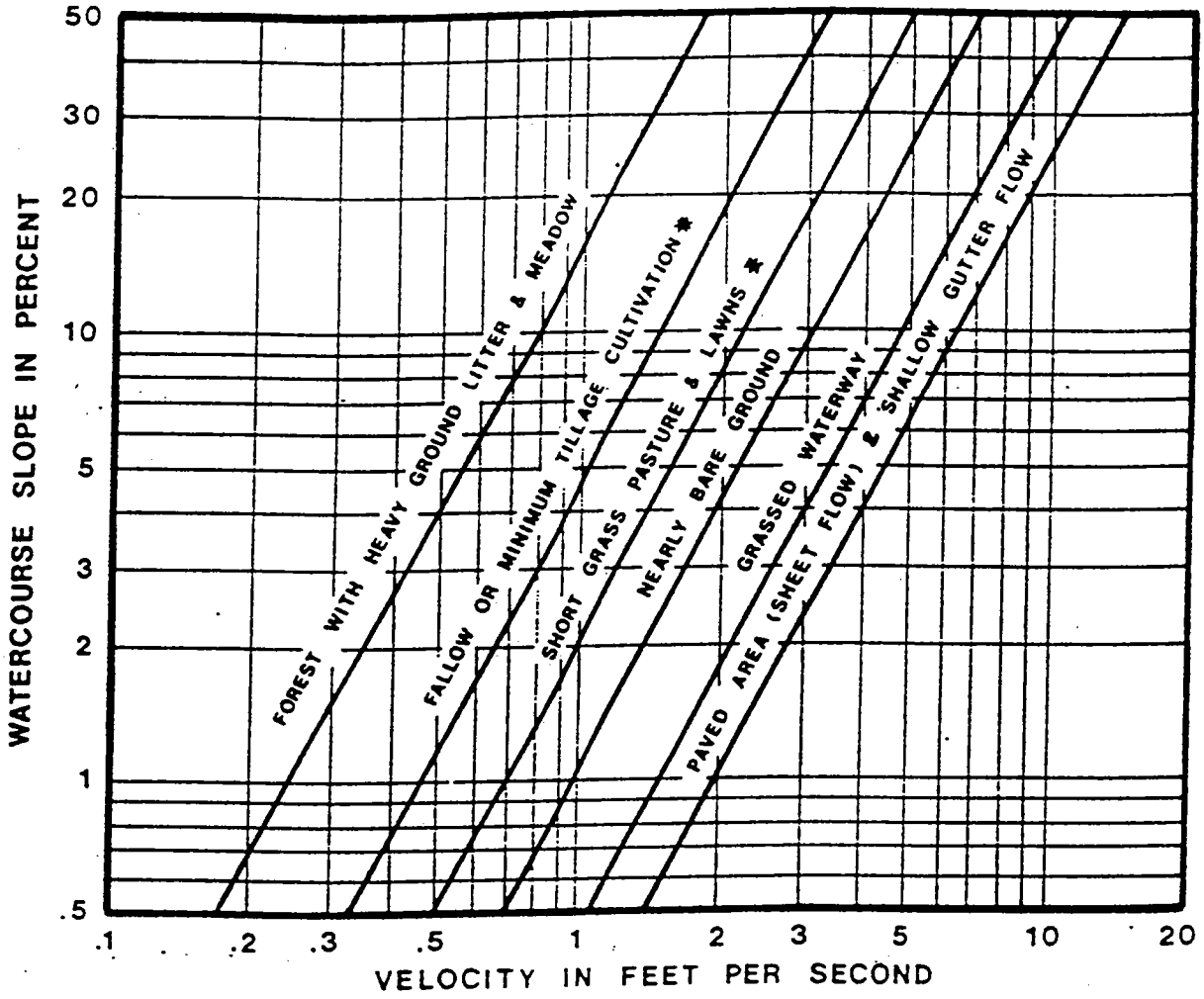
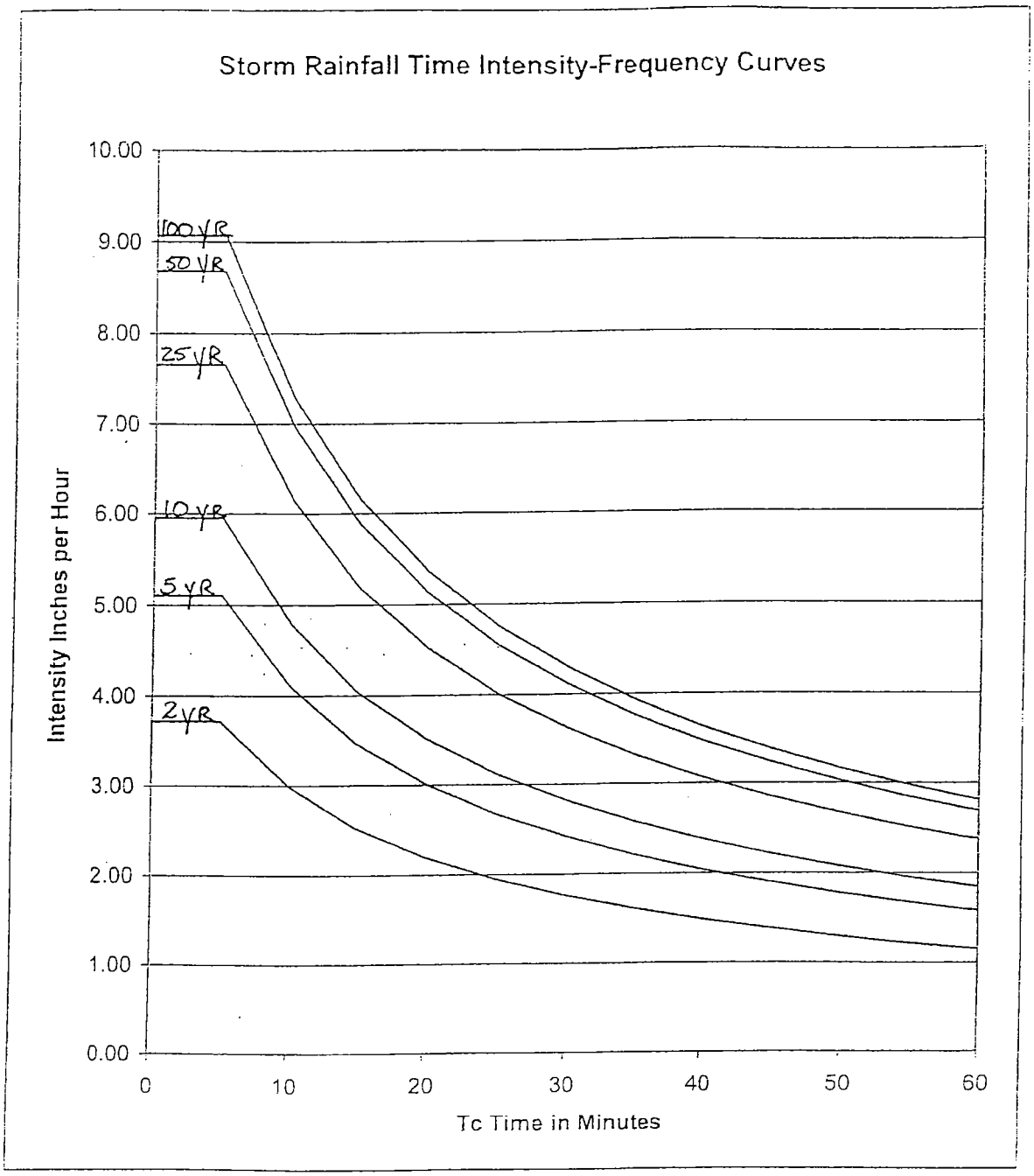


FIGURE 3-2. ESTIMATE OF AVERAGE FLOW VELOCITY FOR USE WITH THE RATIONAL FORMULA.

* MOST FREQUENTLY OCCURRING "UNDEVELOPED" LAND SURFACES IN THE DENVER REGION.

REFERENCE: "Urban Hydrology For Small Watersheds" Technical Release No 55, USDA, SCS Jan 1975.



Rainfall Depth - Duration - Frequency Table derived from Rainfall Atlas III for Colorado
Resource: Guo, James C.Y., (2001) "Urban Storm Water Modeling", Chapter 5: Runoff Prediction for Small Catchment, published by Auraria Campus Book Company, University of Colorado at Denver, Denver, Colorado.

WESTGATE AT POWERS
RATIONAL METHOD - DRAINAGE CALCULATIONS

HISTORIC FLOWS

BASIN	DESIGN POINT	AREA (AC)	C		OVERLAND LENGTH (FT)	SLOPE (%)	Tco [1] (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT K	SLOPE (%)	SCS [2] VELOCITY (FT/S)	Tt [3] (MIN)	TOTAL Tc [4] (MIN)	INTENSITY [5]		PEAK FLOW	
			5-YEAR [7]	100-YEAR [7]										5-YR (IN/HR)	100-YR (IN/HR)	Q5 [6] (CFS)	Q100 [6] (CFS)
OA1	OA1	5.6	0.250	0.350	300	4.0	16.7	450	1.50	2.7	2.46	3.0	19.7	3.00	5.10	4.20	10.00
A		34.8	0.250	0.350			0.0	1400	1.50	1.5	1.84	12.7	12.7				
OA1,A	1	40.4	0.250	0.350									32.4	2.25	3.95	22.73	55.85
B	2	13.0	0.250	0.350	1000	1.6	41.4	500	1.50	0.8	1.34	6.2	47.6	1.70	3.10	5.53	14.11
OC1		10.0	0.517	0.617	300	1.3	16.7	400	1.50	1.5	1.84	3.6	20.3	2.90	5.00	14.95	30.76
C		16.6	0.250	0.350			0.0	1250	1.50	1.44	1.80	11.6	11.6				
OC1,C	3	26.6	0.350	0.450									31.9	2.25	3.90	20.94	46.65

WESTGATE AT POWERS
RATIONAL METHOD - DRAINAGE CALCULATIONS

DEVELOPED FLOWS

BASIN	DESIGN POINT	AREA (AC)	C		OVERLAND LENGTH (FT)	SLOPE (%)	Tco [1] (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT K	SLOPE (%)	SCS [2] VELOCITY (FT/S)	Tt [3] (MIN)	TOTAL Tc [4] (MIN)	INTENSITY [5]		PEAK FLOW	
			5-YEAR[7]	100-YEAR [7]										5-YR (IN/HR)	100-YR (IN/HR)	Q5 [6] (CFS)	Q100 [6] (CFS)
OA1	OA1	5.60	0.750	0.800	300	3.0	7.6	450	2.00	2.7	3.29	2.3	9.9	4.13	7.34	17.33	32.90
A4	A4	1.96	0.750	0.800			0.0	375	2.00	1.5	2.45	2.6	2.6	5.10	9.09	7.50	14.25
OA1,A4	A4.1	7.56	0.750	0.800									12.4	3.76	6.70	21.34	40.51
A1	A1	5.73	0.750	0.800	20	2.0	2.2	700	2.00	2.6	3.22	3.6	5.9	4.89	8.71	21.03	39.93
A2	A2	5.25	0.750	0.800	80	6.3	3.1	900	2.00	2.3	3.03	4.9	8.0	4.44	7.91	17.50	33.23
A3	A3	12.36	0.750	0.800	50	2.0	3.5	1000	2.00	1.1	2.10	7.9	11.5	3.89	6.92	36.02	68.38
A5	A5	2.68	0.750	0.800	50	2.0	3.5	200	2.00	1.0	2.00	1.7	5.2	5.05	8.99	10.16	19.28
A6	A6	1.64	0.750	0.800	20	2.0	2.2	100	2.00	1.0	2.00	0.8	3.1	5.10	9.09	6.28	11.92
A7	A7	5.10	0.750	0.800	100	2.0	5.0	480	2.00	1.3	2.28	3.5	8.5	4.35	7.74	16.64	31.60
A1-A7	A7.1	34.72	0.750	0.800									11.5	3.89	6.92	101.17	192.09
A8		6.23	0.250	0.350			0.0	2276	1.00	1.2	1.08	35.2	35.2	2.21	3.93	3.44	8.56
A1-A8	**1**	**40.95**	**0.674**	**0.732**									**35.2**	2.21	3.93	**60.90**	**117.66**
OC1	OC1	10.00	0.700	0.800	300	1.3	11.4	400	1.50	1.5	1.84	3.6	15.1	3.46	6.15	24.19	49.22
C1	C1	8.33	0.750	0.800	50	2.0	3.5	1040	2.00	1.15	2.14	8.1	11.6	3.87	6.88	24.16	45.86
C2	C2	3.02	0.750	0.800	70	2.0	4.2	1100	2.00	2.5	3.16	5.8	10.0	4.10	7.31	9.30	17.65
C1,C2	C2.1	11.35	0.750	0.800									11.6	3.87	6.88	32.91	62.49
C3	C3	9.15	0.750	0.800	0		0.0	120	2.00	0.5	1.41	1.4	1.4	5.10	9.09	35.03	66.51
Tt from C1 to C3							0.0	670	2.00	1	2.00	5.6	5.6				
C1-C3	C3.1	20.50	0.750	0.800									17.2	3.25	5.78	49.92	94.79
C4		2.85	0.250	0.350	0		0.0	215	2.00	0.5	1.41	2.5	2.5	5.10	9.09		
C1-C4	**3**	23.35	**0.689**	**0.745**									**19.7**	3.03	5.40	**48.82**	**93.97**

RATIONAL METHOD ASSUMPTIONS:

1) OVERLAND FLOW Tco = (1.87*(1.1-RUNOFF COEFFICIENT)*(OVERLAND FLOW LENGTH^(0.5)/(SLOPE^(0.333))
2) SCS VELOCITY = K * ((SLOPE(%))^0.5)
   K = 0.70 FOR MEADOW / FOREST
   K = 1.0 FOR BARE SOIL
   K = 1.5 FOR GRASS CHANNEL
   K = 2.0 FOR PAVEMENT
3) GUTTER/SWALE FLOW, Tt = (CHANNEL LENGTH/ SCS VELOCITY) / 60 SEC
4) Tc = Tco + Tt
*** IF TOTAL TIME OF CONCENTRATION IS LESS THAN 5 MINUTES, THEN 5 MINUTES IS USED

5) INTENSITY BASED ON I-D-F CURVE IN EL PASO COUNTY DRAINAGE CRITERIA MANUAL, REVISED BY CITY OF COLORADO SPRINGS 1/1/03
   I = (A * P) / B + Td)^C
   5-YEAR VALUES: A = 26.65; P1 = 1.5 IN (1-HOUR DEPTH); B = 10.0; C = 0.76
   100-YEAR VALUES: A = 26.65; P = 2.67 IN (1-HOUR DEPTH); B = 10.0; C = 0.76

6) Q = CiA
7) WEIGHTED AVERAGE C VALUES FOR COMBINED BASINS

APPENDIX D

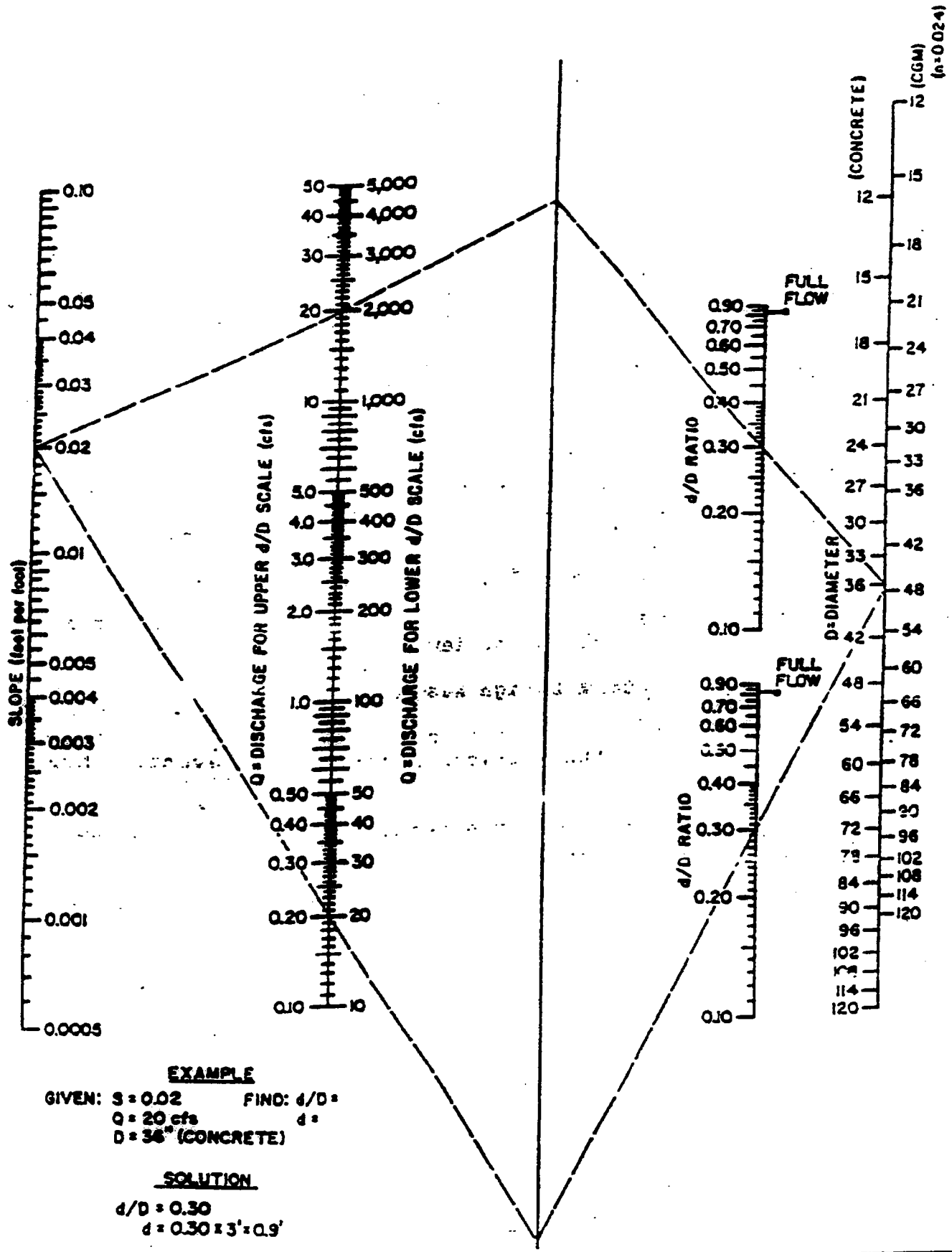
HYDRAULIC CALCULATIONS

JPS ENGINEERING

WESTGATE AT POWERS
PRELIMINARY STORM DRAIN SIZING SUMMARY

Design Point	Peak Flow (Q_5, cfs)	Peak Flow (Q_{100}, cfs)	Approx. Pipe Slope	Culvert / Storm Drain Size (in)
OA1	17.3	32.9	1.0%	24" RCP
A1	21.0	39.9	1.0%	24" RCP
A2	17.5	33.2	1.0%	24" RCP
A3	36.0	68.4	1.0%	30" RCP
A5	10.2	19.3	1.0%	18" RCP
A6	6.3	11.9	1.0%	18" RCP
A7	16.6	31.6	1.0%	24" RCP
A8	950	1,960	0.6%	3EA 16'X6' CBC
C1	24.2	45.9	0.5%	30" RCP
C2.1	32.9	62.5	0.5%	36" RCP
C3.1	49.9	94.8	1.0%	36" RCP

- Preliminary pipe sizing assumes surcharging of pipes for 100-year flows



EXAMPLE

GIVEN: S = 0.02 FIND: d/D =
Q = 20 cfs d =
D = 36" (CONCRETE)

SOLUTION

d/D = 0.30
d = 0.30 x 3' = 0.9'

HDR Infrastructure, Inc.
A Centerra Company

The City of Colorado Springs / El Paso County
Drainage Criteria Manual

Uniform Flow for Pipe Culverts

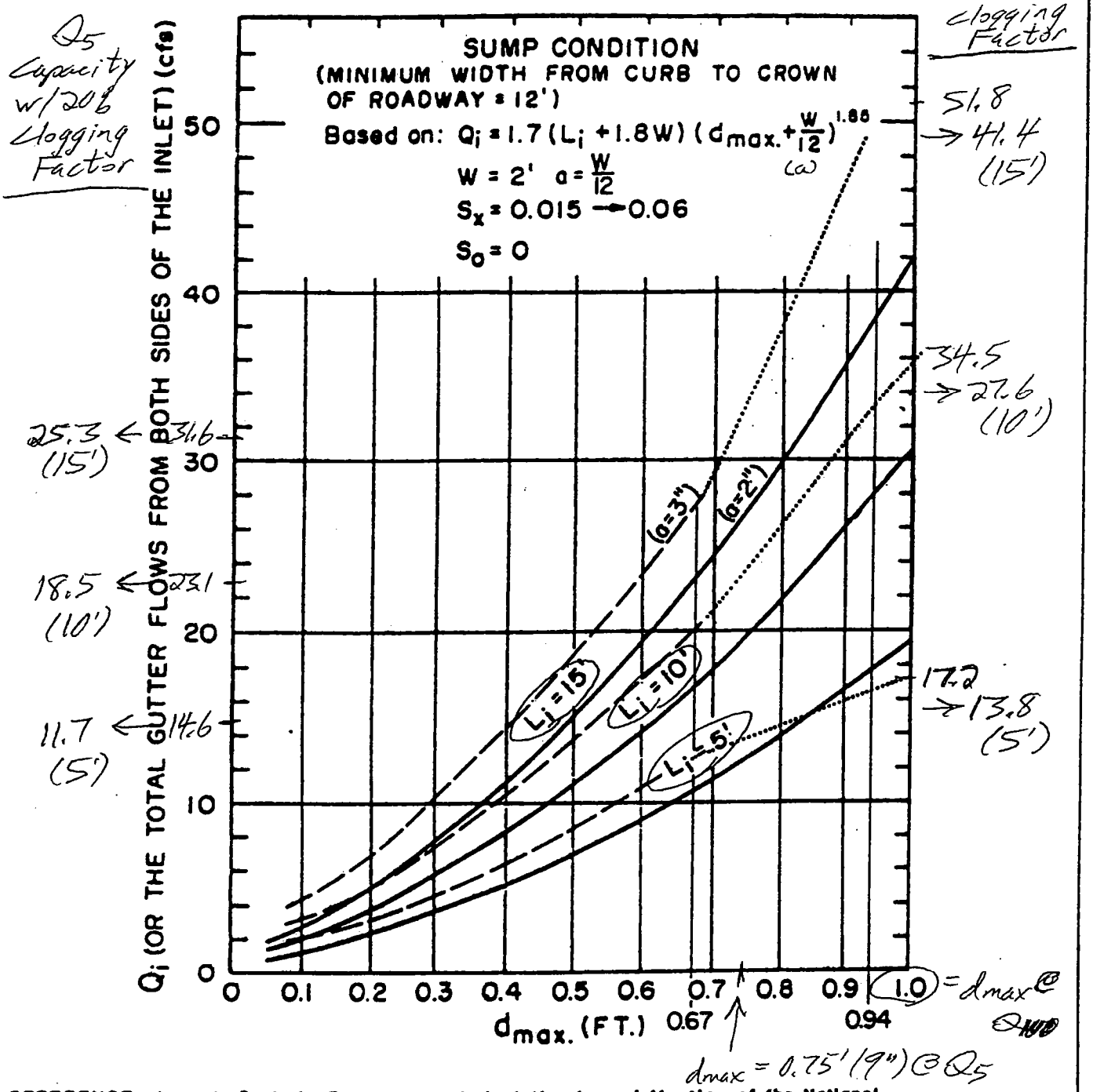
Date
OCT. 1987

Figure
8 - 1

Type R Sump Inlet Capacity

Q100 Capacity w/ 20% Clogging Factor

Q5 Capacity w/ 20% Clogging Factor



REFERENCE : Izzard, Carl. f., Report presented at the Annual Meeting of the National Transportation Board, January 1977; Simplified Method For Design of Curb-opening Inlets ——— (As Modified by El Paso County, per Type R Inlet)

Note: Depth of ponding measured at curb above depressed area ; a = 3", For $d \leq .67$

$Q_i = (1.7 L_i + 6.12)(d_{max} + .25)^{1.85}$; $Q_i = 3.60 L_i (d - .08)^{.5}$ For $d \geq .94$; Note : No Clogging Factor

9/30/90

HDR Infrastructure, Inc. A Centerra Company

The City of Colorado Springs / El Paso County Drainage Criteria Manual

Date: OCT. 1987

Figure: 7-11

Sump Capacity for Curb-opening Inlets

Sand Creek Center Irrigation Channel

Worksheet
Worksheet for Irregular Channel

Project Description	
Worksheet	Irregular Channel
Flow Element	Irregular Channel
Method	Manning's Formul
Solve For	Channel Depth

Input Data		
Slope	006000	ft/ft
Discharg	1,960.00	cfs = Q100 (Sand Creek DBPS)

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.028	
Water Surface Elev	3.72	ft
Elevation Range	.00 to 5.30	
Flow Area	227.6	ft²
Wetted Perimeter	73.54	ft
Top Width	72.33	ft
Actual Depth	3.72	ft
Critical Elevation	3.38	ft
Critical Slope	0.008416	ft/ft
Velocity	8.61	ft/s
Velocity Head	1.15	ft
Specific Energy	4.87	ft
Froude Number	0.86	< 0.9 OK
Flow Type	Subcritical	✓

Roughness Segments		
Start Station	End Station	Mannings Coefficient
0+45	0+75	0.035
0+75	1+25	0.025 – Sand Bottom
1+25	1+55	0.035

Natural Channel Points	
Station (ft)	Elevation (ft)
0+45	5.30
0+60	5.00
0+75	0.00
1+25	0.00
1+40	5.00
1+55	5.30

Check Freeboard

$FB = 1.0 + 0.025 (v)(d^{0.33})$ (DCM 10-3)

$= 1.0 + 0.025(8.61)(3.72)^{0.33}$

$= 1.33'$

Min. Channel Depth w/ Freeboard:

$\Delta = 3.72' + 1.33' = \underline{5.05'} < 5.3'$ Design OK

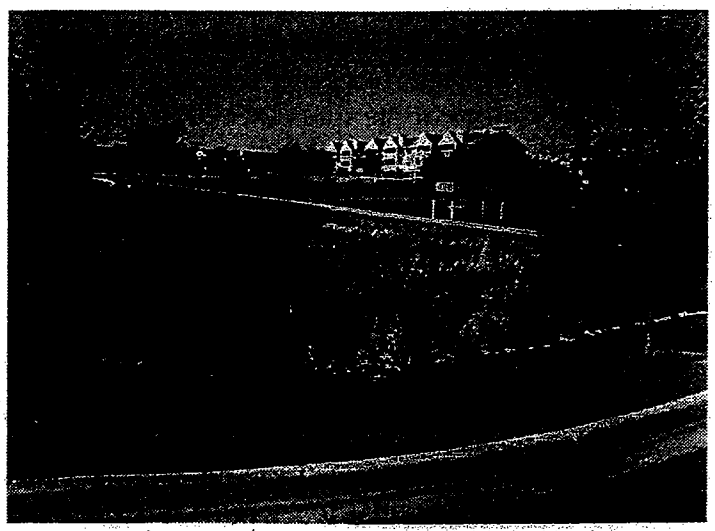
(w/ 15' bench @ 2' abv channel)

APPENDIX E

DETENTION POND CALCULATIONS

Porous Landscape Detention (PLD)

Porous landscape detention consists of a low lying vegetated area underlain by a sand bed with an underdrain. A shallow surcharge zone exists above the porous landscape detention for temporary storage of the WQCV. This BMP allows small amounts of WQCV to be provided on parking lots or adjacent to buildings without requiring the set aside of significant developable land areas.



Extended Detention Basin (EDB)

An extended detention basin is appropriate for larger sites and is designed to totally empty out sometime after stormwater runoff ends. The extended basin uses a much smaller outlet than a flood control detention basin which extends the emptying time for the more frequently occurring runoff events to facilitate pollutant removal.

Sand Filter Extended Detention Basin (SFB)

A sand filter extended detention basin consists of a sand bed and underdrain system. Above the vegetated sand bed is an extended detention basin sized to capture the WQCV. A sand filter extended detention basin provides pollutant removal through settling and filtering and is generally suited to offline, onsite configurations where there is no base flow and the sediment load is relatively low.

Design Procedure Form: Extended Detention Basin (EDB) - Sedimentation Facility

Designer: JPS
Company: JPS
Date: February 16, 2012
Project: WESTGATE AT POWERS
Location: POND A1

1. Basin Storage Volume	
A) Tributary Area's Imperviousness Ratio ($i = I_a / 100$)	I_a = 70.00 % i = 0.70
B) Contributing Watershed Area (Area)	Area = 5.700 acres
C) Water Quality Capture Volume (WQCV) (WQCV =1.0 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I))	WQCV = 0.28 watershed inches
D) Design Volume: Vol = (WQCV / 12) * Area * 1.2	Vol = 0.1568 acre-feet
2. Outlet Works	
A) Outlet Type (Check One)	X Orifice Plate Perforated Riser Pipe Other:
B) Depth at Outlet Above Lowest Perforation (H)	H = 3.00 feet
C) Recommended Maximum Outlet Area per Row, (A_o)	A_o = 0.8 square inches
D) Perforation Dimensions: i) Circular Perforation Diameter or ii) Width of 2" High Rectangular Perforations	 D = 1.000 inches W = inches
E) Number of Columns (nc, See Table 6a-1 For Maximum)	nc = 1 number
F) Actual Design Outlet Area per Row (A_o)	A_o = 0.8 square inches
G) Number of Rows (nr)	nr = 9 number
H) Total Outlet Area (A_{ot})	A_{ot} = 7.1 square inches
3. Trash Rack	
A) Needed Open Area: A_t = 0.5 * (Figure 7 Value) * A_{ot}	A_t = 242 square inches
B) Type of Outlet Opening (Check One)	X ≤ 2" Diameter **Round** 2" High **Rectangular** Other:
C) For 2", or Smaller, **Round Opening** (Ref.: Figure 6a):	
i) Width of Trash Rack and Concrete Opening (W_{conc}) from Table 6a-1	W_{conc} = 9 inches
ii) Height of Trash Rack Screen (H_{TR})	H_{TR} = 66 inches

Design Procedure Form: Retention Pond (RP) - Sedimentation Facility

Designer: JPS
Company: JPS
Date: February 16, 2012
Project: WESTGATE AT POWERS
Location: POND A7

1. Basin Storage Volume	
A) Tributary Area's Imperviousness Ratio (i = I_a / 100)	I_a = 70.00 % i = 0.70
B) Contributing Watershed Area (Area)	Area = 5.10 acres
C) Water Quality Capture Volume (WQCV) (WQCV =0.8 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I))	WQCV = 0.22 watershed inches
D) Design Volume: Vol = (WQCV / 12) * Area	Vol = 0.0935 acre-feet
2. Permanent Pool	
A) Volume: Vol-Pool = (1.2 to 2.0) * Vol in 1D, or 0.1122 to 0.187 acre-feet	Vol-Pool = 0.2000 acre-feet
B) Average Depth Zone 1 = Littoral Zone - 0.5' to 1.0' deep Zone 2 = Deeper Zone - 4 feet to 8 feet deep	Zone 1 = 1.00 feet Zone 2 = 4.00 feet
C) Maximum Zone 2 Pool Depth (should not exceed 12 feet)	Depth = feet
D) Permanent Pool Water Surface Area (Estimated Minimum) (Zone 1 - Littoral Zone = 25% to 40% of the total surface area) (Zone 2 - Deeper Zone = 60% to 75% of the total surface area) Total Estimated Minimum Surface Area (A_{Total})	% = acres = % = acres = % = acres =
3. Annual/Seasonal Water Balance (Q_{net} has to be positive)	Q_{inflow} = acre-feet/year Q_{evap} = acre-feet/year $Q_{seepage}$ = acre-feet/year $Q_{E.T.}$ = acre-feet/year Q_{net} = acre-feet/year
4. Outlet Works	
A) Outlet Type (Check One)	X Orifice Plate Perforated Riser Pipe Other:
B) Depth of WQCV at Outlet Above Lowest Perforation (H)	H = feet
C) Required Maximum Outlet Area per Row, (A_o)	A_o = square inches
D) Perforation Dimensions: i) Circular Perforation Diameter or ii) Width of 2" High Rectangular Perforations	 D = inches W = inches
E) Number of Columns (nc)	nc = Number

Design Procedure Form: Extended Detention Basin (EDB) - Sedimentation Facility

Designer: JPS
Company: JPS
Date: February 16, 2012
Project: WESTGATE AT POWERS
Location: POND C4

1. Basin Storage Volume	
A) Tributary Area's Imperviousness Ratio (i = I_a / 100)	I_a = 70.00 % i = 0.70
B) Contributing Watershed Area (Area)	Area = 20.500 acres
C) Water Quality Capture Volume (WQCV) (WQCV =1.0 * (0.91 * I^3 - 1.19 * I^2 + 0.78 * I))	WQCV = 0.28 watershed inches
D) Design Volume: Vol = (WQCV / 12) * Area * 1.2	Vol = 0.5638 acre-feet
2. Outlet Works	
A) Outlet Type (Check One)	X Orifice Plate Perforated Riser Pipe Other:
B) Depth at Outlet Above Lowest Perforation (H)	H = 5.00 feet
C) Recommended Maximum Outlet Area per Row, (A_o)	A_o = 1.7 square inches
D) Perforation Dimensions: i) Circular Perforation Diameter or ii) Width of 2" High Rectangular Perforations	 D = 1.500 inches W = inches
E) Number of Columns (nc, See Table 6a-1 For Maximum)	nc = 1 number
F) Actual Design Outlet Area per Row (A_o)	A_o = 1.8 square inches
G) Number of Rows (nr)	nr = 15 number
H) Total Outlet Area (A_{ot})	A_{ot} = 26.6 square inches
3. Trash Rack	
A) Needed Open Area: A_t = 0.5 * (Figure 7 Value) * A_{ot}	A_t = 849 square inches
B) Type of Outlet Opening (Check One)	X ≤ 2" Diameter **Round** 2" High **Rectangular** Other:
C) For 2", or Smaller, **Round Opening** (Ref.: Figure 6a):	
i) Width of Trash Rack and Concrete Opening (W_{conc}) from Table 6a-1	W_{conc} = 18 inches
ii) Height of Trash Rack Screen (H_{TR})	H_{TR} = 90 inches

APPENDIX F

DRAINAGE COST ESTIMATE

WESTGATE AT POWERS
ENGINEER'S COST ESTIMATE
REGIONAL DRAINAGE IMPROVEMENTS

Item No.	Description	Quantity	Unit	Unit Cost ($$$)	Total Cost ($$$)
	REGIONAL PUBLIC DRAINAGE FACILITIES (REIMBURSABLE)				
	SAND CREEK CENTER TRIBUTARY CHANNEL RE-ALIGNMENT & STABILIZATION (2,370 LF; BOTH SIDES):				
203	Channel Earthwork (50' bottom; 5' deep; 3:1 side slopes)	59000	CY	$2	$118,000
210	Topsoil & Seeding	19	AC	$2,500	$47,500
506	Riprap Channel Bank Protection (both sides)	8420	CY	$55	$463,100
506	Drop Structures	5	EA	$50,000	$250,000
	SUBTOTAL				**$878,600**
	Engineering / Admin. / Legal @ 10%				$87,860
	SUBTOTAL				**$966,460**
	Contingency @ 5%				$48,323
	TOTAL (REIMBURSABLE)				**$1,014,783**
	SAND CREEK CENTER TRIBUTARY CHANNEL STABILIZATION (additional 300 LF on CDOT parcel; both sides):				
203	Channel Earthwork (50' bottom; 5' deep; 3:1 side slopes)	7500	CY	$2	$15,000
210	Topsoil & Seeding	2.4	AC	$2,500	$6,000
506	Riprap Channel Bank Protection (both sides)	1100	CY	$55	$60,500
506	Drop Structures	1	EA	$50,000	$50,000
	SUBTOTAL				**$131,500**
	Engineering / Admin. / Legal @ 10%				$13,150
	SUBTOTAL				**$144,650**
	Contingency @ 5%				$7,233
	TOTAL (REIMBURSABLE)				**$151,883**
	TOTAL MAJOR DRAINAGE CHANNEL IMPROVEMENTS (REIMBURSABLE)				**$1,166,666**
	NW COLLECTOR ROAD CULVERT CROSSING				
603	3-Cell 16'w x 6'H Concrete Box Culvert	130	LF	$4,000	$520,000
	SUBTOTAL				**$520,000**
	Engineering / Admin. / Legal @ 10%				$52,000
	SUBTOTAL				**$572,000**
	Contingency @ 5%				$28,600
	TOTAL (REIMBURSABLE)				**$600,600**
	TOTAL				**$1,767,266**

The cost estimate submitted herein is based on time-honored practices within the construction industry. As such the engineer does not control the cost of labor, materials, equipment or a contractor's method of determining prices and competitive bidding practices or market conditions. The estimate represents our best judgement as design professionals using current information available at the time of the preparation. The engineer cannot guarantee that proposals, bids and/or construction costs will not vary from this cost estimate.

APPENDIX G

SAND CREEK CENTER TRIBUTARY CHANNEL CLOMR AND 404 PERMITS

Federal Emergency Management Agency

Washington, D.C. 20472

July 21, 2011

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 11-08-0297R
Community Name: City of Colorado Springs, CO
Community No.: 080060

The Honorable Steve Bach
Mayor, City of Colorado Springs
30 South Nevada Avenue
Colorado Springs, CO 80903

Dear Mayor Bach:

We are providing our comments with the enclosed Conditional Letter of Map Revision (CLOMR) on a proposed project within your community that, if constructed as proposed, could revise the effective Flood Insurance Study report and Flood Insurance Rate Map for your community.

If you have any questions regarding the floodplain management regulations for your community, the National Flood Insurance Program (NFIP) in general, or technical questions regarding this CLOMR, please contact the Director, Mitigation Division of the Federal Emergency Management Agency (FEMA) Regional Office in Denver, Colorado, at (303) 235-4830, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

David N. Bascom

David N. Bascom, CFM, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

For: Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:
Conditional Letter of Map Revision Comment Document

cc: Mr. Michael Augenstein
Floodplain Manager
City of Colorado Springs

Mr. John P. Schwab, P.E.
Principal
JPS Engineering, Inc.

Mr. Al Cohen
Signature Realty Capital Corporation

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	City of Colorado Springs El Paso County Colorado	CHANNELIZATION CULVERT	HYDRAULIC ANALYSIS FLOODWAY
	COMMUNITY NO.: 080060		
IDENTIFIER	SAND CREEK CENTER TRIBUTARY CHANNEL AIRPORT ROAD TO TROY HILL ROAD (CROSS SECTION 1000-3900)	APPROXIMATE LATITUDE & LONGITUDE: 38.827, -104.728 SOURCE: Other DATUM: NAD 83	

AFFECTED MAP PANELS	
TYPE: FIRM* NO.: 08041C0753 F DATE: March 17, 1997	* FIRM - Flood Insurance Rate Map ** FBFM - Flood Boundary and Floodway Map *** FHBM - Flood Hazard Boundary Map

FLOODING SOURCE(S) AND REACH DESCRIPTION

Sand Creek Center Tributary – from just upstream of Airport Road to just downstream of Troy Hill Road

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Sand Creek Center Tributary	Channelization	From aproximately 370 feet upstream of Airport Road to just downstream of Troy Hill Road.
	New Triple 16-foot by 6-foot Concrete Box Culvert	Approximately 1,240 feet upstream of Airport Road

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Sand Creek Center Tributary	Zone AE	Zone AE	Yes	Yes
	Floodway	Floodway	Yes	Yes
	BFEs*	BFEs	Yes	Yes
	Zone X (unshaded)	Zone X (shaded)	Yes	None

* BFEs - Base (1-percent-annual-chance) Flood Elevations

COMMENT

This document provides the Federal Emergency Management Agency's (FEMA's) comment regarding a request for a CLOMR for the project described above. This document is not a final determination; it only provides our comment on the proposed project in relation to the flood hazard information shown on the effective National Flood Insurance Program (NFIP) map. We reviewed the submitted data and the data used to prepare the effective flood hazard information for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. Your community is responsible for approving all floodplain development and for ensuring that all permits required by Federal or State/Commonwealth law have been received. State/Commonwealth, county, and community officials, based on their knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area (SFHA), the area subject to inundation by the base flood. If the State/Commonwealth, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Suite 204, Hanover, MD 21076. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

David N. Bascom, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

To determine the changes in flood hazards that will be caused by the proposed project, we compared the hydraulic modeling reflecting the proposed project (referred to as the proposed conditions model) to the hydraulic modeling used to prepare the Flood Insurance Study (FIS) (referred to as the effective model). If the effective model does not provide enough detail to evaluate the effects of the proposed project, an existing conditions model must be developed to provide this detail. This existing conditions model is then compared to the effective model and the proposed conditions model to differentiate the increases or decreases in flood hazards caused by more detailed modeling from the increases or decreases in flood hazards that will be caused by the proposed project.

The table below shows the changes in the BFEs:

BFE Comparison Table

Flooding Source: Sand Creek Center Tributary		BFE Change (feet)	Location of maximum change
Existing vs. Effective	Maximum increase	0	
	Maximum decrease	0	
Proposed vs. Existing	Maximum increase	1.4	Approximately 380 feet downstream of Troy Hill Road
	Maximum decrease	3.1	Approximately 1,040 feet downstream of Troy Hill Road
Proposed vs. Effective	Maximum increase	1.4	Approximately 380 feet downstream of Troy Hill Road
	Maximum decrease	3.1	Approximately 1,040 feet downstream of Troy Hill Road

Increases due to the proposed project that exceed those permitted under Paragraphs (c)(10) or (d)(3) of Section 60.3 of the NFIP regulations must adhere to Section 65.12 of the NFIP regulations. With this request, your community has complied with all requirements of Paragraph 65.12(a) of the NFIP regulations. Compliance with Paragraph 65.12(b) also is necessary before FEMA can issue a Letter of Map Revision when a community proposes to permit encroachments into the effective regulatory floodway that will cause BFE increases in excess of those permitted under Paragraph 60.3(d)(3).

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Suite 204, Hanover, MD 21076. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

David N. Bascom, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

Upon completion of the project, your community must submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report. If the project is built as proposed and the data below are received, a revision to the FIRM and FIS report would be warranted.

• Form 1, entitled "Overview & Concurrence Form". Detailed application and certification forms must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1 must be included. If as-built conditions differ from the proposed plans, please submit new forms, which may be accessed at http://www.fema.gov/plan/prevent/fhm/dl_mt-2.shtm, or annotated copies of the previously submitted forms showing the revised information.

• Hydraulic analyses, for as-built conditions, of the base flood; the 10-percent, 2-percent, and 0.2-percent-annual-chance floods; and the regulatory floodway, together with a topographic work map showing the revised floodplain and floodway boundaries. Please ensure that the revised information ties in with the current effective information at the downstream and upstream ends of the revised reach.

• An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised floodplain and floodway boundary delineations shown on the submitted work map and how they tie into the floodplain and floodway boundary delineations shown on the current effective FIRM at the downstream and upstream ends of the revised reach

• As-built plans, certified by a registered professional engineer, of all proposed project elements

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Suite 204, Hanover, MD 21076. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

David N. Bascom, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

• A copy of the public notice distributed by your community, stating its intent to revise the regulatory floodway, or a signed statement by your community that it has notified all affected property owners and affected adjacent jurisdictions

• Documentation of the individual legal notices sent to property owners who will be affected by any widening/shifting of the base floodplain and/or any BFE increases along Sand Creek Center Tributary

• FEMA's fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps may be accessed at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm. The fee at the time of the map revision submittal must be received before we can begin processing the request. Payment of this fee can be made through a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). Please forward the payment, along with the revision application, to the following address:

LOMC Clearinghouse
7390 Coca Cola Drive, Suite 204
Hanover, Maryland 21076

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM. Because the BFEs will change as a result of the project, a 90-day appeal period will be initiated for the revision, during which community officials and interested persons may appeal the revised BFEs based on scientific or technical data.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Suite 204, Hanover, MD 21076. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

David N. Bascom, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

COMMUNITY REMINDERS

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Jeanine D. Petterson
Director, Mitigation Division
Federal Emergency Management Agency, Region VIII
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80225-0267
(303) 235-4830

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 7390 Coca Cola Drive, Suite 204, Hanover, MD 21076. Additional Information about the NFIP is available on the FEMA website at http://www.fema.gov/nfip.

David N. Bascom, Program Specialist
Engineering Management Branch
Federal Insurance and Mitigation Administration

DEPARTMENT OF THE ARMY PERMIT

Permittee Martin LIST Trust ~~Signature Reality Capital Corp.~~

Permit No. SPA-2010-00110-SPA

Issuing Office Albuquerque District Corps of Engineers

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: To re-align 2,370 Linear Feet of Sand Creek, with buried riprap linings, and 50 foot width natural san bottom. The banks will be resloped to 3:1 ratio with channel depth at five feet. A twelve foot wide trail/maintenance road will be constructed on the east side of the creek. Five vertical drop structures with concrete cutoff walls and riprap plunge pools will be constructed in the channel. A box culvert will be constructed at the Westgate Road crossing.

The project will be constructed in accordance with the attached Public Notice in Sand Creek in Colorado Springs, El Paso County, Colorado, Application by Signature Reality Capital Corp., Application No. SPA-2010-00110-SPA."

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2015 . If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such

conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

After a detailed and careful review of all of the conditions contained in this permit, the permittee acknowledges that, although said conditions were required by the Corps of Engineers, nonetheless the permittee agreed to those conditions voluntarily to facilitate issuance of the permit; the permittee will comply fully with all the terms of all the permit conditions.

1. Only clean fill material shall be used in this project and will be from a source that is free of toxic and/or hazardous materials.

2. All disturbed areas will be planted/seeded with native species. A noxious weed program will be implemented until such time the prescribed plantings have been established.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Martin List Trust by
Alan Cohen Trustee

(PERMITTEE)

11/3/2010
(DATE)

Martin List Trust by
Alan Cohen, Trustee

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(DISTRICT ENGINEER)
B.A. Estok
Lieutenant Colonel, U.S. Army
District Commander

15 Nov 2010
(DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(TRANSFERREE) (DATE)

US Army Corps
of Engineers®
Albuquerque District

PUBLIC NOTICE

Application Number: SPA-2010-00110-SCO
Project Name: Westgate at Powers
Applicant: Signature Realty Capital Corp.
Waterway: Sand Creek Center Tributary
Public Notice Date: February 23, 2010

Comments Due: March 16, 2010
CE Contact Phone: 719-543-8102

SUBJECT: The U.S. Army Corps of Engineers, Albuquerque District, (Corps) is evaluating a permit application to construct the Westgate at Powers development by the Signature Realty Capitol Corp, on Sand Creek Center Tributary, which would result in impacts to approximately 7.6 acres and 2370 linear feet of waters of the United States waters of the United States in Sand Creek Center Tributary. This notice is to inform interested parties of the proposed activity and to solicit comments.

AUTHORITY: This application is being evaluated under Section 404 of the Clean Water Act for the discharge of dredged or fill material in waters of the United States (U.S.)

APPLICANT: Martin List - c/o
Signature Reality Capital Corp
2082 Michelson Drive, Suite 212
Irvine, California 92612

LOCATION: The project site is located on Sand Creek Center Tributary near the intersection of Troy Hill and Airport Roads, Section 13, Township 14 S, Range 66 W, Latitude 38.827221566407°, Longitude -104.727237224579°, Colorado Springs, El Paso County, Colorado.

PROJECT DESCRIPTION: The applicant proposes to construct the Westgate at Powers commercial development project. The project would channelize 2370 linear feet of the Creek with buried riprap bank linings and a 50 foot width natural sand bottom. The banks of the channel will be 3:1 slope with a channel depth of 5 feet. A fifteen foot wide trail and maintenance access road will be constructed along the east side of the channel. Five vertical drops with concrete cutoff walls and riprap plunge pools are proposed to stabilize the channel. In addition, a box culvert road crossing for Westgate Road is proposed. Based on the available information, the overall project purpose is to construct an improved drainage channel to accommodate development. The applicant believes there is a need to meet the both the development goals of the Westgate at Powers project and

regional drainage planning requirements. The attached drawings provide additional project details.

PROPOSED MITIGATION: The project will not impact wetlands thus no wetland mitigation is proposed.

OTHER AUTHORIZATIONS:

State Water Quality Certification: The applicant is required to obtain water quality certification, under Section 401 of the Clean Water Act, from Colorado Department of Public Health and Environment. Section 401 requires that any applicant for an individual Section 404 permit provide proof of water quality certification to the Corps of Engineers prior to permit issuance.

ADDITIONAL INFORMATION:

Environmental Setting. There are approximately 2370 linear feet of ephemeral streams that are waters of the U.S. within the proposed project area. The site is characterized by a wide sandy bottom stream channel with low banks and a couple dozen trees.

Alternatives. The applicant has provided information concerning project alternatives. Alternatives proposed by the applicant included two additional channel alignments. The first alternative would the same channel cross section as the preferred alternative but occur in the original alignment. The second alternative reviewed would have the same channel cross section but would closely follow the west property boundary and would not have any meanders. Other alternatives may develop during the review process for this permit application. Additional information concerning project alternatives may be available from the applicant or their agent. All reasonable project alternatives, in particular those which may be less damaging to the aquatic environment, will be considered.

EVALUATION FACTORS: The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the described activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which reasonably may be expected to accrue from the described activity, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the described activity will be considered, including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people. The activity's impact on the public interest will include application of the Section 404(b) (1) guidelines promulgated by the Administrator, Environmental Protection Agency (40 CFR Part 230).

News Release

The Corps is soliciting comments from the public, Federal, State, and local agencies and officials, Indian tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

HISTORIC PROPERTIES: The Corps consulted district files and records, the latest version of the National Register of Historic Places (NRHP), and state records of NRHP-eligible and potentially eligible historic properties to determine if there are any historic properties that may be affected by the proposed undertaking. The project area has not been recently surveyed for historic properties. Based on this initial information, the Corps has made a preliminary determination that the proposed project will not likely affect any historic properties that meet the criteria for inclusion in the NRHP.

ENDANGERED SPECIES: {The Corps has reviewed the U.S. Fish and Wildlife Service's latest published version of Federally-listed endangered and threatened species located in El Paso County, Colorado to determine if any listed species or their critical habitat may occur in the proposed project area. The Corps has made a preliminary determination that the proposed project will not affect any Federally-listed endangered or threatened species or their critical habitat that are protected by the Endangered Species Act.

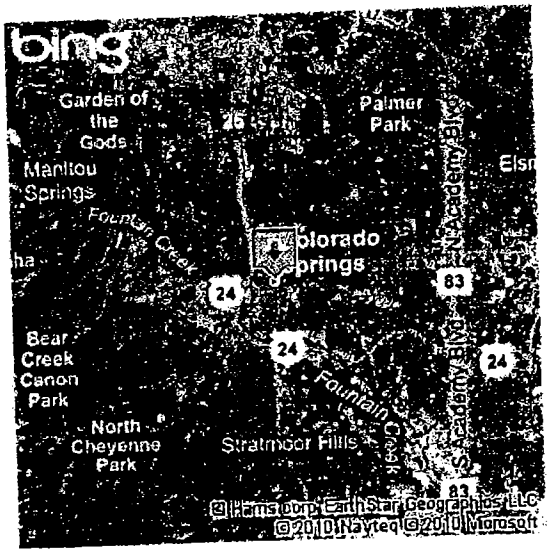
FLOODPLAIN MANAGEMENT: The Corps is sending a copy of this public notice to the local floodplain administrator. In accordance with 44 CFR part 60 (Flood Plain Management Regulations Criteria for Land Management and Use), the floodplain administrators of participating communities are required to review all proposed development to determine if a floodplain development permit is required and maintain records of such review.

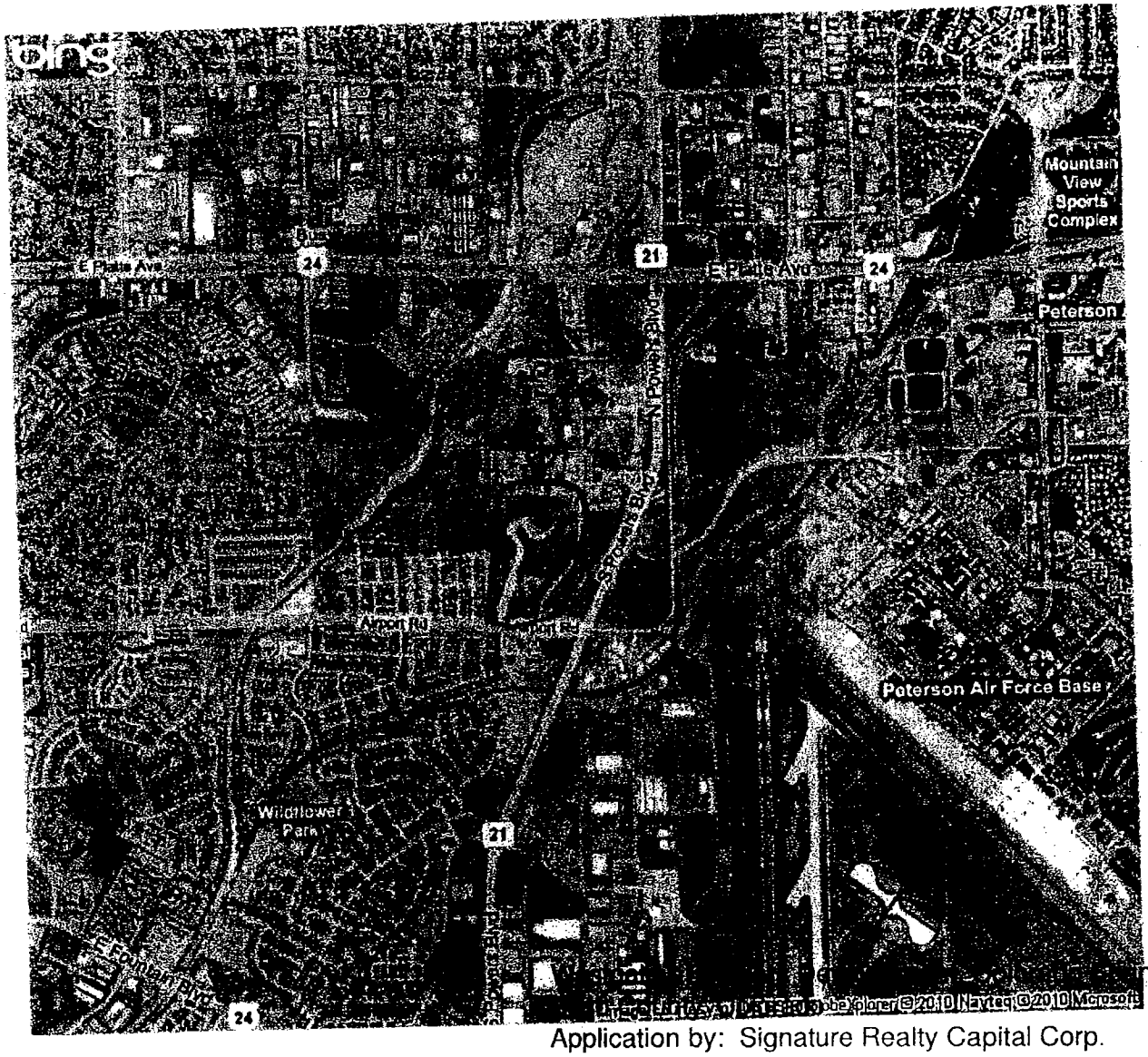
CLOSE OF COMMENT PERIOD: All comments pertaining to this Public Notice must reach this office on or before March 16, 2010, which is the close of the comment period. Extensions of the comment period may be granted for valid reasons provided a written request is received by the limiting date. If no comments are received by that date, it will be considered that there are no objections. Anyone may request, in writing, that a public hearing be held to consider this application. Requests shall specifically state, with particularity, the reason(s) for holding a public hearing. If the Corps determines that the information received in response to this notice is inadequate for thorough evaluation, a public hearing may be warranted. If a public hearing is warranted, interested parties will be notified of the time, date, and location. Comments and requests for additional information should be submitted to:

News Release

Colorado Springs, CO

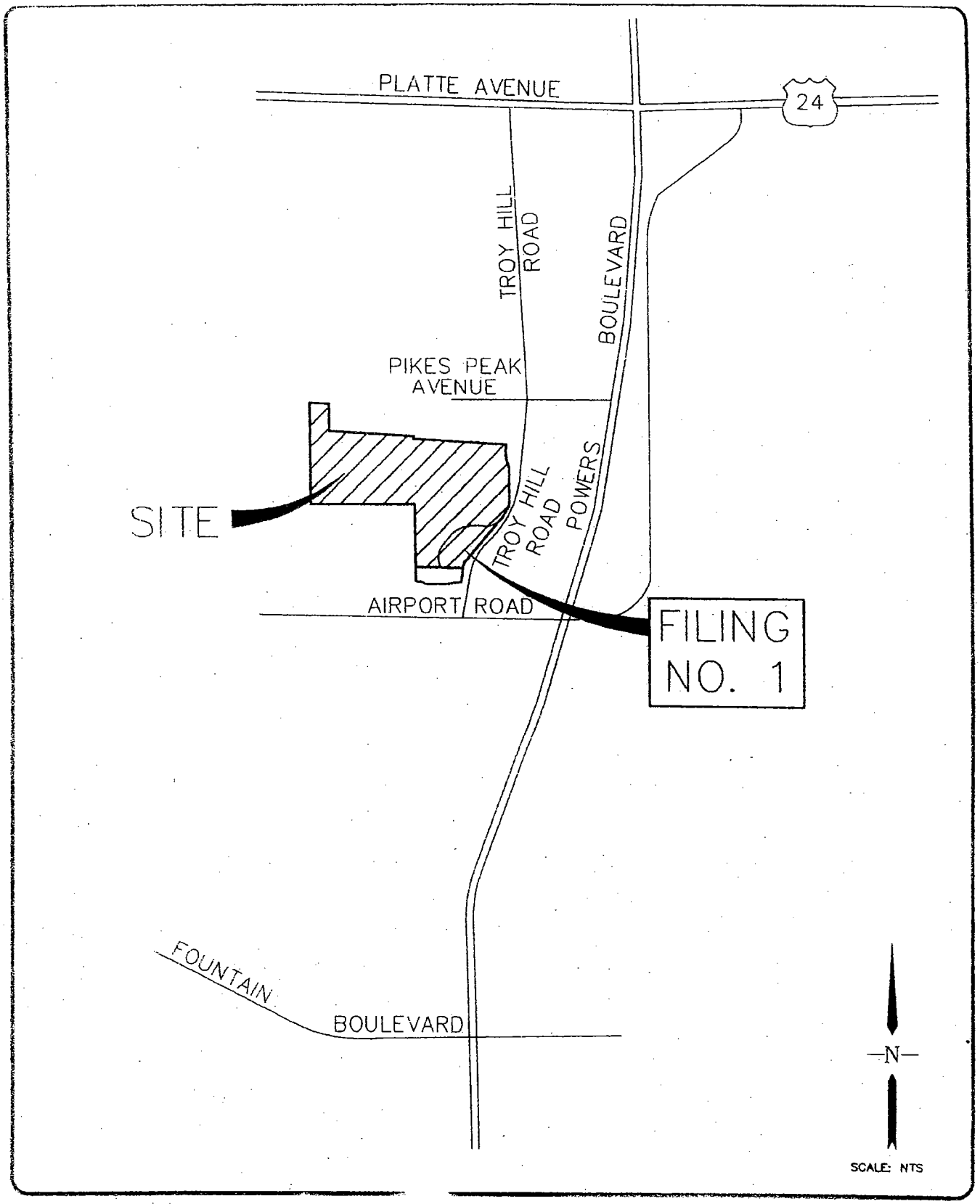
Westgate at Powers





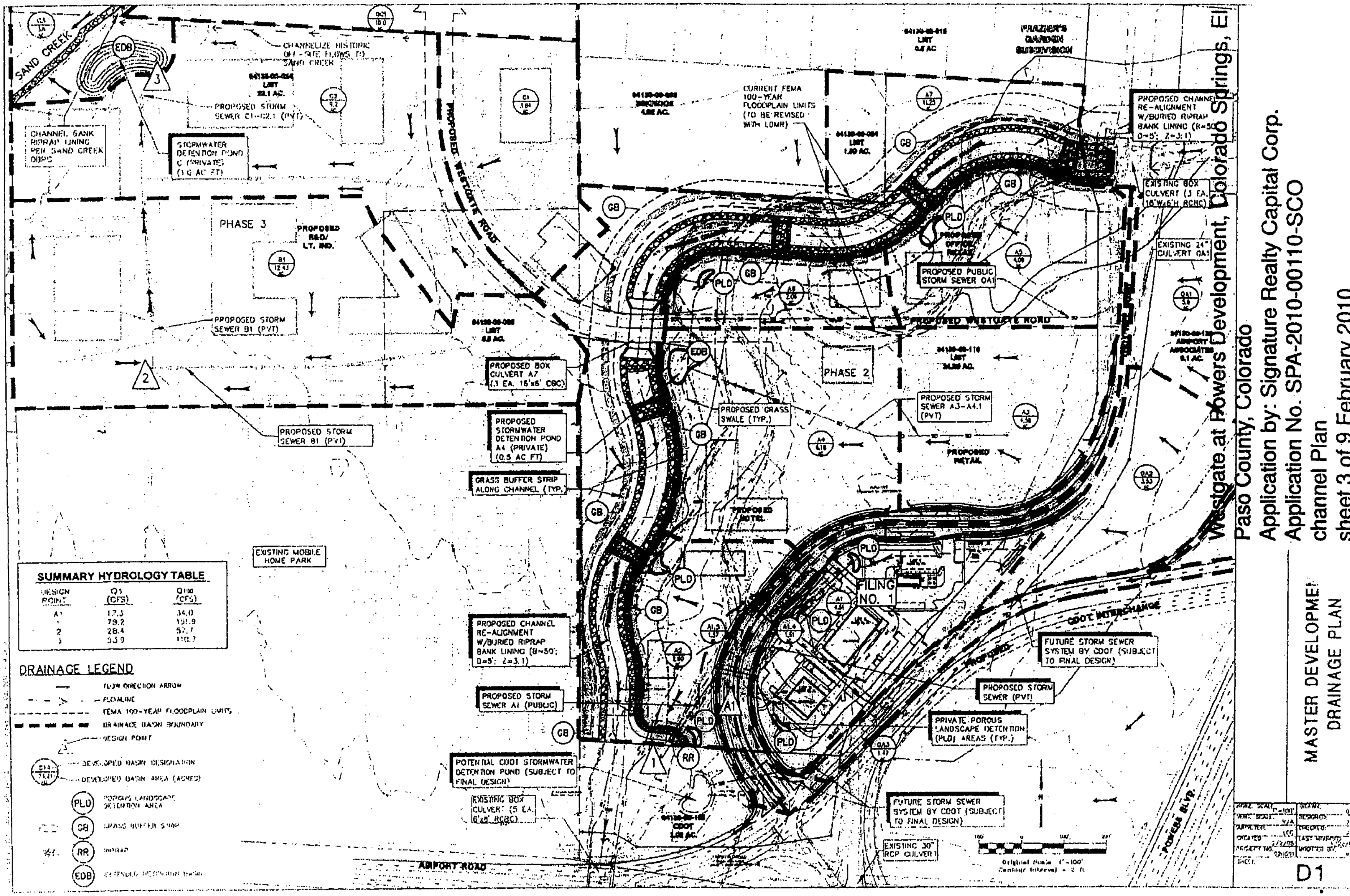
ngs, El

Application by: Signature Realty Capital Corp.
Application No. SPA-2010-00110-SCO
Vicinity Map
sheet 1 of 9 February 2010



VICINITY MAP

Westgate at Powers Development, Colorado Springs, El Paso County, Colorado
Application by: Signature Realty Capital Corp.
Application No. SPA-2010-00110-SCO
Vicinity Map
sheet 2 of 9 February 2010


SAND CREEK
CHANNELIZE HISTORIC OFF-SITE FLOWS TO SAND CREEK
PROPOSED STORM SEWER C1-C2.1 (PVT)
CHANNEL BANK RIPRAP LINING PER SAND CREEK DBPS
STORMWATER DETENTION POND C (PRIVATE) (1.0 AC FT)
PROPOSED WESTGATE ROAD
CURRENT FEMA 100-YEAR FLOODPLAIN LIMITS (TO BE REVISED WITH LOMR)
PROPOSED CHANNEL RE-ALIGNMENT W/BURIED RIPRAP BANK LINING (R=50 D=5'; Z=3:1)
EXISTING BOX CULVERT (3 EA. 16'Wx6'H RCBC)
EXISTING 24" CULVERT OA1
PHASE 3
PROPOSED R&D/ LT. IND.
PROPOSED STORM SEWER B1 (PVT)
PROPOSED PUBLIC STORM SEWER OA1
PROPOSED WESTGATE ROAD
PROPOSED BOX CULVERT A7 (3 EA. 15'x5' CBC)
PHASE 2
PROPOSED STORM SEWER A3-A4.1 (PVT)
PROPOSED STORMWATER DETENTION POND A4 (PRIVATE) (0.5 AC FT)
PROPOSED GRASS SWALE (TYP.)
PROPOSED STORM SEWER B1 (PVT)
PROPOSED RETAIL
GRASS BUFFER STRIP ALONG CHANNEL (TYP.)
PROPOSED HOTEL
EXISTING MOBILE HOME PARK
FILING NO. 1
CDOT INTERCHANGE
PROPOSED CHANNEL RE-ALIGNMENT W/BURIED RIPRAP BANK LINING (B=50'; D=5'; Z=3:1)
FUTURE STORM SEWER SYSTEM BY CDOT (SUBJECT TO FINAL DESIGN)
PROPOSED STORM SEWER A1 (PUBLIC)
PROPOSED STORM SEWER (PVT)
PRIVATE POROUS LANDSCAPE DETENTION (PLD) AREAS (TYP.)
POTENTIAL CDOT STORMWATER DETENTION POND (SUBJECT TO FINAL DESIGN)
EXISTING BOX CULVERT (5 EA. 6'x5' RCBC)
FUTURE STORM SEWER SYSTEM BY CDOT (SUBJECT TO FINAL DESIGN)
EXISTING 30" RCP CULVERT
AIRPORT ROAD
POWERS BLVD.
DRAINAGE LEGEND
FLOW DIRECTION ARROW
FLOWLINE
FEMA 100-YEAR FLOODPLAIN LIMITS
DRAINAGE BASIN BOUNDARY
DESIGN POINT
DEVELOPED BASIN DESIGNATION
DEVELOPED BASIN AREA (ACRES)
POROUS LANDSCAPE DETENTION AREA
GRASS BUFFER STRIP
RIPRAP
EXTENDED DETENTION BASIN
MASTER DEVELOPMENT DRAINAGE PLAN
D1

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
A1	17.3	34.0
1	79.2	151.9
2	28.4	57.7
3	53.9	110.7

Westgate at Powers Development, Colorado Springs, El Paso County, Colorado
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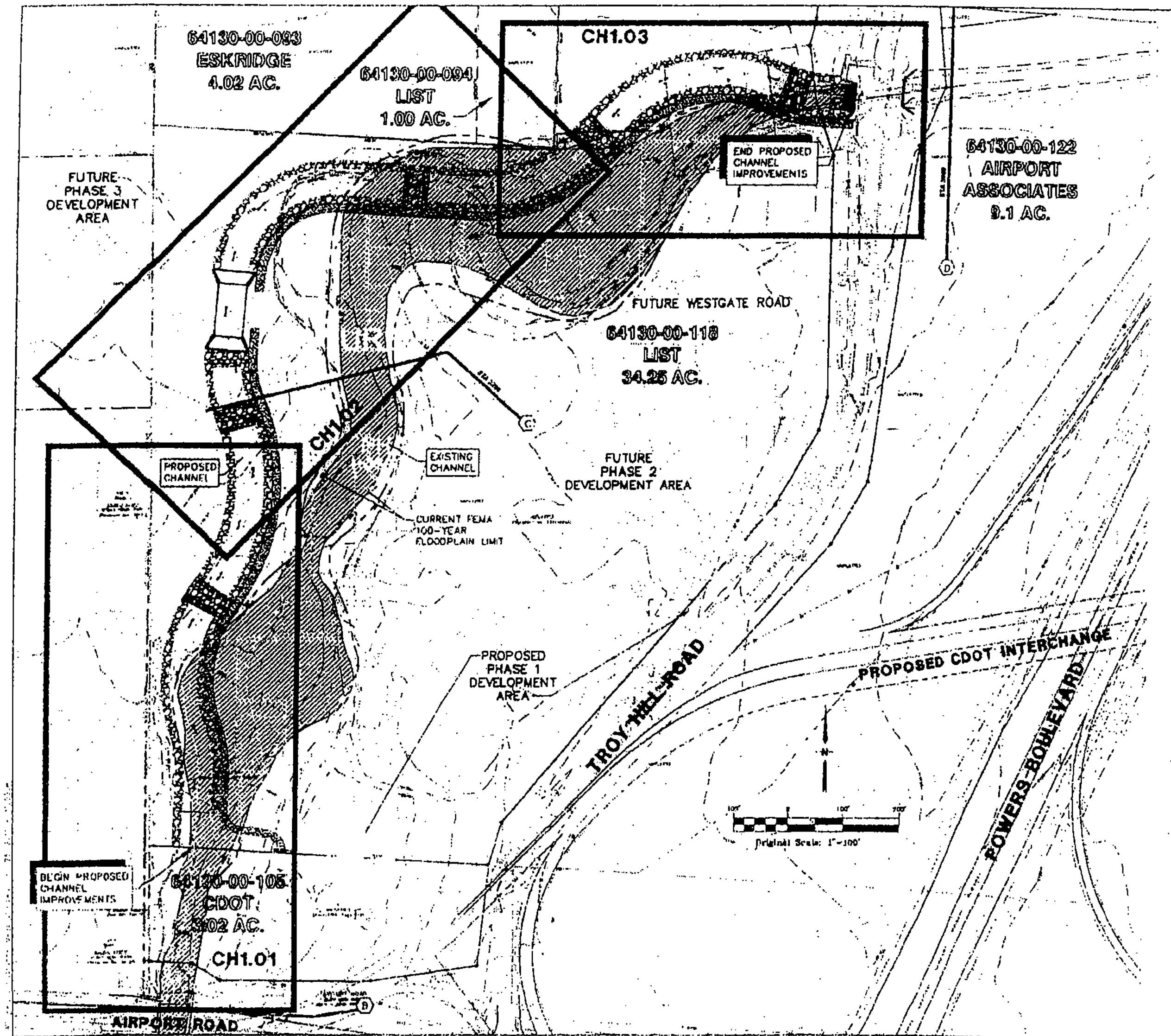


LEGEND:

- NEW/EXISTING
- SECTION LINE
- EASEMENT LINE
- CONTOUR (6230)
- PROPERTY LINE
- FENCE
- OVERHEAD ELECTRIC LINE / POWER POLE
- UNDERGROUND ELECTRIC
- SANITARY SEWER LINE
- UNDERGROUND ELECTRIC
- TELEPHONE - NEW/EXISTING
- GAS - NEW/EXISTING
- WATER - NEW/EXISTING
- PROPOSED RIPRAP BANK LINING
- PROPOSED GRADE
- FEMA 100-YEAR FLOODPLAIN LIMITS
- STREAMSIDE OVERLAY ZONE BOUNDARY
- GRASS BUFFER ZONE

SECTION NUMBER

SHEET ON WHICH SECTION IS SHOWN

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL MEET THE STANDARDS & SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS ENGINEERING DIVISION AND COLORADO SPRINGS UTILITIES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD LOCATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO ACTUAL CONSTRUCTION.
3. THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF THESE APPROVED PLANS AND ONE (1) COPY OF THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES.
   A. COLORADO SPRINGS ENGINEERING DIVISION STANDARD SPECIFICATIONS.
4. STORM DRAIN PIPE SHALL BE RCP CLASS III WITH CLASS C BEDDING UNLESS OTHERWISE NOTED.
5. STATIONING IS AT CENTERLINE UNLESS OTHERWISE NOTED. ALL ELEVATIONS ARE AT FLOWLINE UNLESS OTHERWISE NOTED. ALL DIMENSIONS ARE FROM FACE OF CURB UNLESS OTHERWISE NOTED. LENGTHS SHOWN FOR STORM SEWER PIPES ARE TO CENTER OF MANHOLE.
6. CONTRACTOR SHALL COORDINATE WITH GAS, ELECTRIC, TELEPHONE AND CABLE T.V. UTILITY SUPPLIERS FOR INSTALLATION OF ALL UTILITIES. MINIMUM COVER FOR ALL NON-CITY UTILITIES SHALL BE 36"
7. CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, DEBRIS, WASTE AND OTHER UNSUITABLE FILL MATERIAL FOUND WITHIN THE LIMITS OF EXCAVATION.
8. MATCH INTO EXISTING GRADES AT 3:1 MAX CUT AND FILL SLOPES
9. REVEGETATION OF ALL DISTURBED AREAS SHALL BE DONE WITH 6" TOPSOIL AND DRY LAND GRASS SEED AFTER FINE GRADING IS COMPLETE. ("FOOTHILLS SEED MIX")
10. EROSION CONTROL SHALL CONSIST OF SILT FENCE AND HAY BALES AS SHOWN ON THE DRAWING, AND TOPSOIL WITH GRASS SEED, WHICH WILL BE WATERED UNTIL VEGETATION HAS BEEN REESTABLISHED
11. THE EROSION CONTROL MEASURES OUTLINED ON THIS PLAN ARE THE RESPONSIBILITY OF THE DEVELOPER TO MONITOR AND REPLACE, REGRADE, AND REBUILD AS NECESSARY UNTIL VEGETATION IS REESTABLISHED
12. CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES IN A MANNER THAT WILL PROTECT ADJACENT PROPERTIES AND PUBLIC FACILITIES FROM THE ADVERSE EFFECTS OF EROSION AND SEDIMENTATION AS A RESULT OF CONSTRUCTION AND EARTHWORK ACTIVITIES WITHIN THE PROJECT SITE.
13. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS DETERMINED BY SITE CONDITIONS
14. THE CONTRACTOR WILL TAKE THE NECESSARY PRECAUTIONS TO PROTECT EXISTING UTILITIES FROM DAMAGE DUE TO THIS OPERATION. ANY DAMAGE TO THE UTILITIES WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE, AND ANY SERVICE DISRUPTION WILL BE SETTLED BY THE CONTRACTOR.
15. ALL BACKFILL, SUB-BASE, AND/OR BASE COURSE MATERIAL SHALL BE COMPACTED PER THE CITY OF COLORADO SPRINGS ENGINEERING DIVISION STANDARD SPECIFICATIONS, SECTION 305 (95% MAX. MODIFIED PROCTOR DENSITY).
16. ALL FINISHED GRADES SHALL HAVE A MINIMUM 0.5% SLOPE TO PROVIDE POSITIVE DRAINAGE
17. CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO BEGINNING WORK

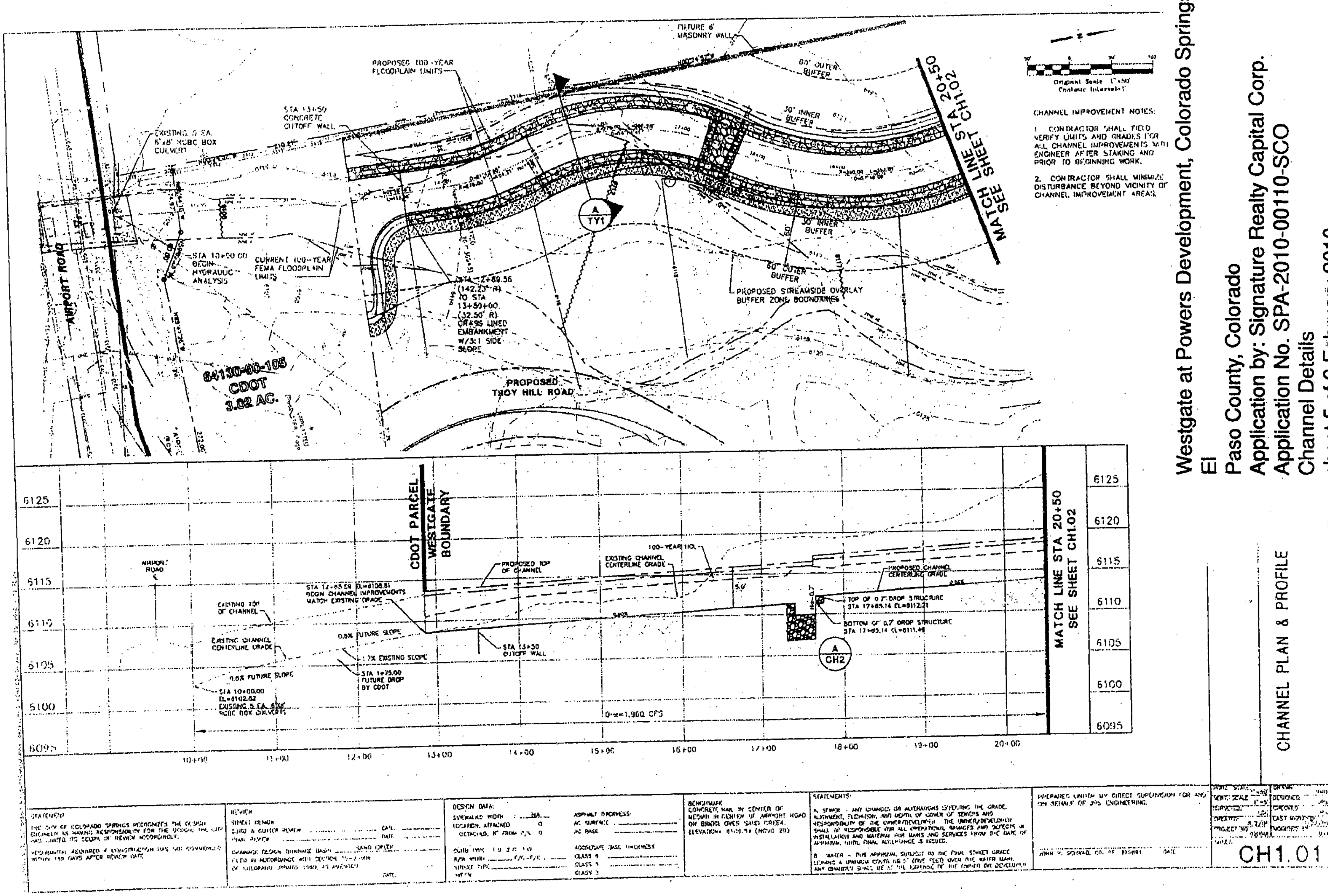
STATEMENT | REVIEW | DESIGN DATA | BENCHMARK | STATEMENTS

PREPARED UNDER MY DIRECT SUPERVISION FOR AND ON BEHALF OF JPS ENGINEERING

Westgate at Powers Development, Colorado Springs, El Paso County, Colorado
Application by: Signature Realty Capital Corp.
Application No. SPA-2010-00110-SCO
Channel Improvment Plan
sheet 4 of 9 February 2010

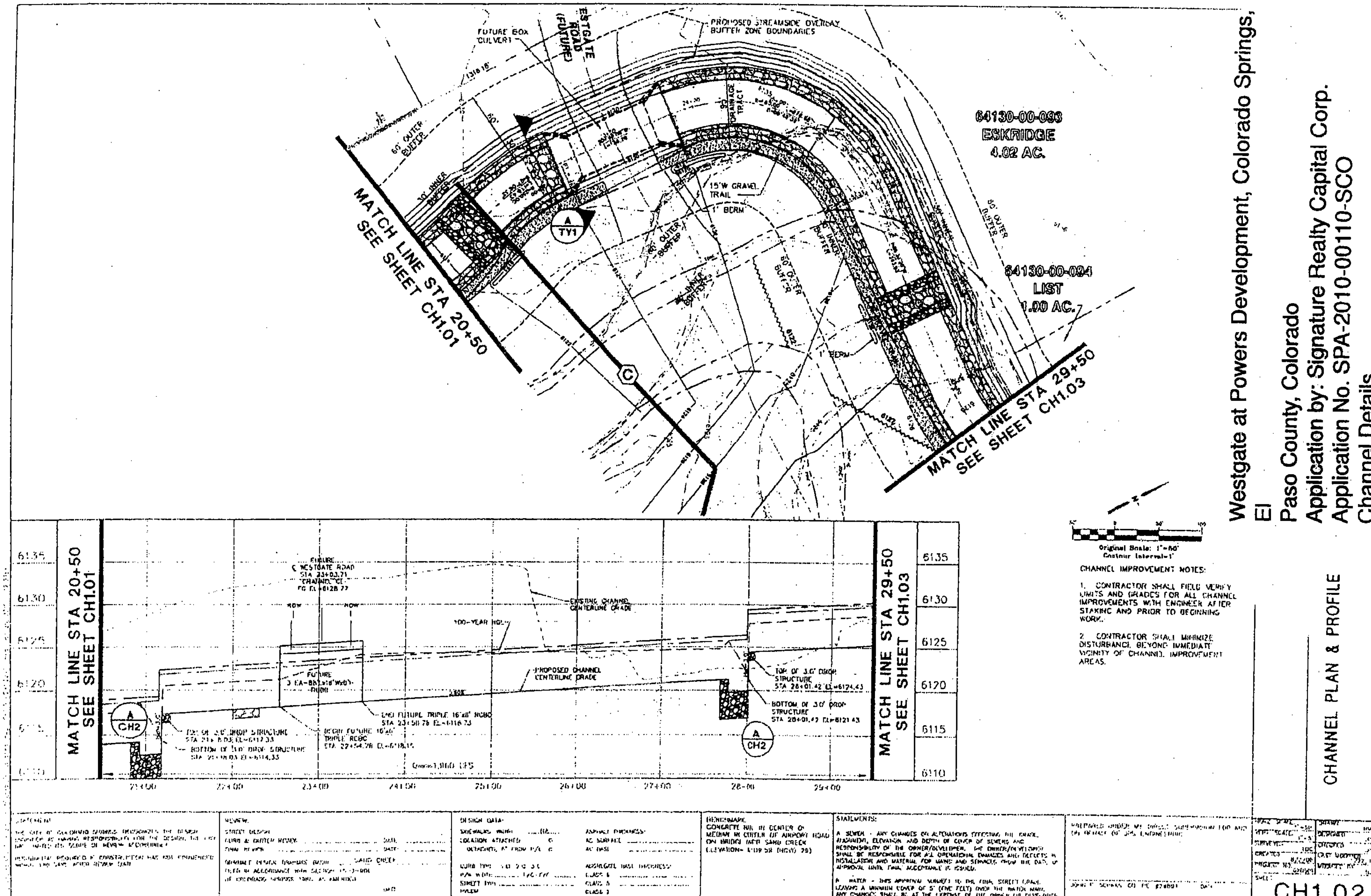
CHANNEL IMPROVEMENT PLAN & GENERAL NOTES

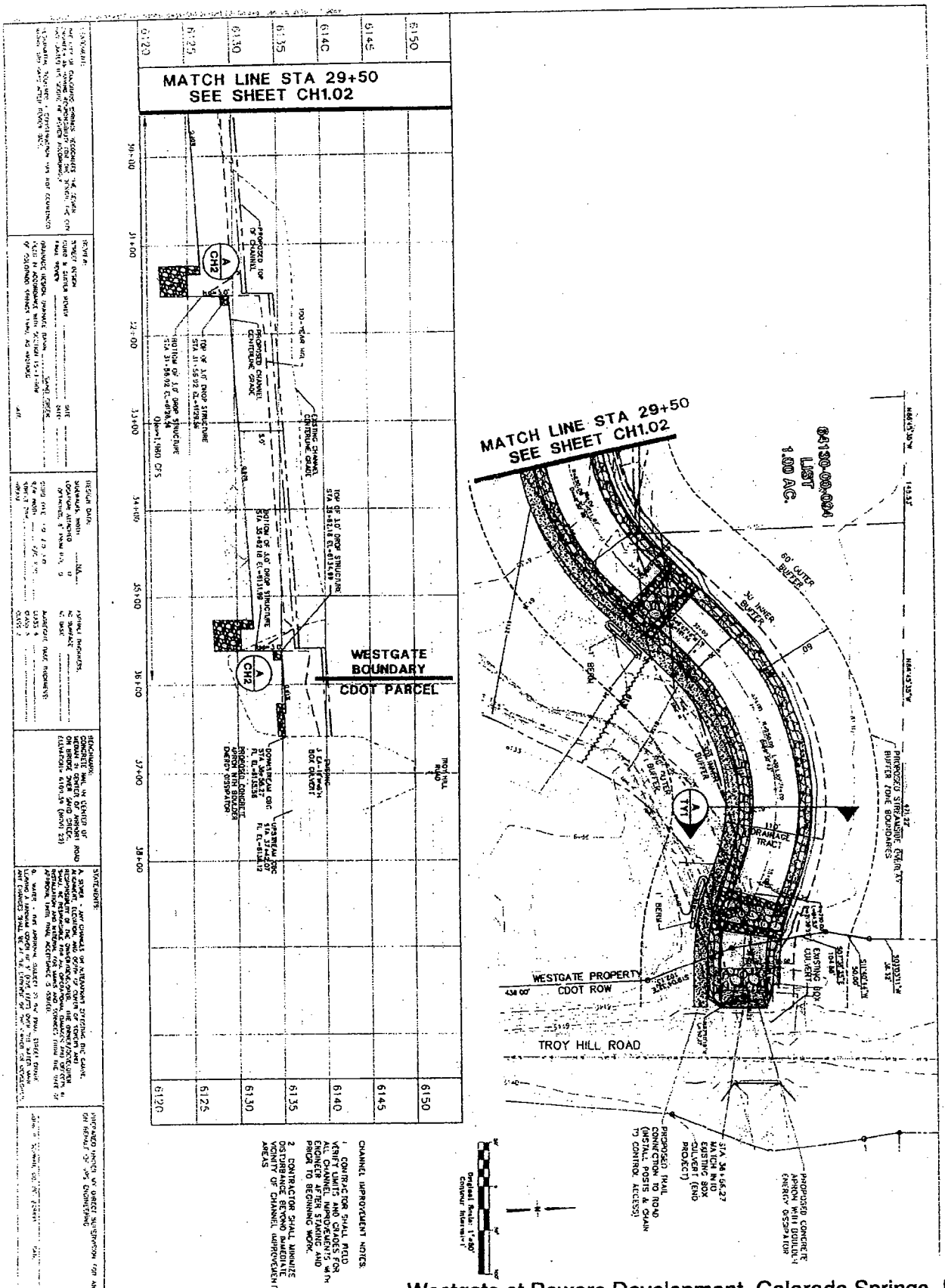
CH1


PROPOSED 100-YEAR FLOODPLAIN LIMITS
FUTURE 6' MASONRY WALL
60' OUTER BUFFER
50' INNER BUFFER
STA 13+50 CONCRETE CUTOFF WALL
EXISTING 5 EA. 6'x8' RCBC BOX CULVERT
STA 10+50.00 BEGIN HYDRAULIC ANALYSIS
CURRENT 100-YEAR FEMA FLOODPLAIN LIMITS
STA 12+89.56 (142.23' R) TO STA 13+50.00 (32.50' R) GRASS LINED EMBANKMENT W/3:1 SIDE SLOPE
PROPOSED STREAMSIDE OVERLAY BUFFER ZONE BOUNDARIES
AIRPORT ROAD
64130-00-105
CDOT
3.02 AC.
PROPOSED TROY HILL ROAD
MATCH LINE STA 20+50
SEE SHEET CH1.02
CHANNEL IMPROVEMENT NOTES:
1. CONTRACTOR SHALL FIELD VERIFY LIMITS AND GRADES FOR ALL CHANNEL IMPROVEMENTS WITH ENGINEER AFTER STAKING AND PRIOR TO BEGINNING WORK.
2. CONTRACTOR SHALL MINIMIZE DISTURBANCE BEYOND VICINITY OF CHANNEL IMPROVEMENT AREAS.
CDOT PARCEL
WESTGATE BOUNDARY
PROPOSED TOP OF CHANNEL
EXISTING CHANNEL CENTERLINE GRADE
100-YEAR HGL
PROPOSED CHANNEL CENTERLINE GRADE
TOP OF 0.7' DROP STRUCTURE STA 17+85.14 EL=6112.21
BOTTOM OF 0.7' DROP STRUCTURE STA 17+85.14 EL=6111.44
STA 12+85.59 EL=6108.81 BEGIN CHANNEL IMPROVEMENTS MATCH EXISTING GRADE
EXISTING TOP OF CHANNEL
EXISTING CHANNEL CENTERLINE GRADE
0.8% FUTURE SLOPE
1.7% EXISTING SLOPE
0.8% FUTURE SLOPE
STA 13+50 CUTOFF WALL
STA 1+75.00 FUTURE DROP BY CDOT
STA 10+00.00 EL=6102.62 EXISTING 5 EA. 6'x8' RCBC BOX CULVERTS
Q=1,960 CFS
6125
6120
6115
6110
6105
6100
6095
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00
CHANNEL PLAN & PROFILE
CH1.01

Westgate at Powers Development, Colorado Springs, El
Paso County, Colorado
Application by: Signature Realty Capital Corp.
Application No. SPA-2010-00110-SCO
Channel Details
sheet 5 of 9 February 2010

Westgate at Powers Development, Colorado Springs, El Paso County, Colorado
Application by: Signature Realty Capital Corp.
Application No. SPA-2010-00110-SCO
Channel Details
sheet 6 of 9 February 2010





Westgate at Powers Development, Colorado Springs, El Paso County, Colorado
Application by: Signature Realty Capital Corp.
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Channel Details
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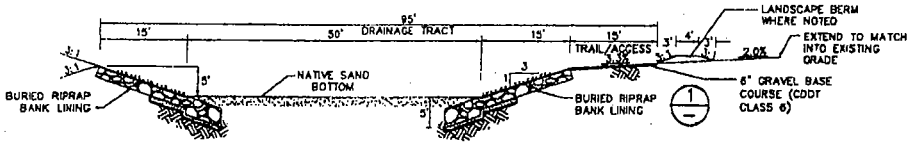
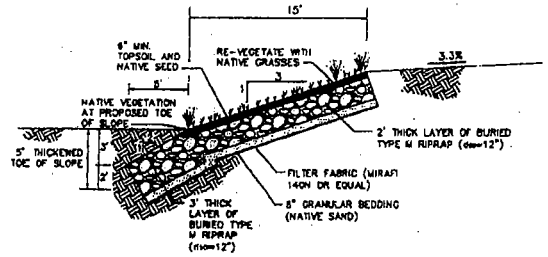


TYPICAL CHANNEL SECTION (A)
SCALE : 1"=10'



TYPICAL BURIED RIPRAP BANK STABILIZATION SECTION (1)
SCALE : 1"=5'

GENERAL CHANNEL CONSTRUCTION NOTES:

1. CONTRACTOR SHALL MAINTAIN FLOW CONVEYANCE IN CHANNEL THROUGHOUT CONSTRUCTION PERIOD.

2. RIPRAP SHALL CONSIST OF HARD, DENSE, DURABLE STONE, ANGULAR IN SHAPE AND RESISTANT TO WEATHERING. ROUNDED STONE OR BOULDERS WILL NOT BE ACCEPTED AS RIPRAP MATERIAL. THE STONE SHALL HAVE A SPECIFIC GRAVITY OF AT LEAST 2.5. EACH PIECE SHALL HAVE ITS GREATEST DIMENSION NOT GREATER THAN THREE TIMES ITS LEAST DIMENSION. FOLLOW SECTION 624 IN THE COLORADO SPRINGS ENGINEERING DIVISION STANDARD SPECIFICATIONS.

3. STONES WITH TYPICAL STONE DIMENSIONS THAT ARE EQUAL TO D50 AND LARGER SHALL BE PLACED AT THE TOP SURFACE WITH FACES AND SHAPES MATCHED TO MINIMIZE VOIDS AND FORM AS SMOOTH A SURFACE AS PRACTICAL. DUMPING AND BACKHOE PLACEMENT ALONE IS NOT SUFFICIENT TO ENSURE A PROPERLY INTERLOCKED SYSTEM. THE MATERIAL MAY BE MACHINE-PLACED AND THEN ARRANGED AS NECESSARY BY USE OF GRADE-ALL WITH MULTI-PRONG GRAPPLE DEVICE OR BY HAND TO INTERLOCK AND FORM A SUBSTANTIAL BOND.

4. TYPE 2 GRANULAR BEDDING SHALL CONFORM TO THE FOLLOWING GRADATION: (SLIGHTLY COARSER THAN CDOT'S CLASS A FILTER MATERIAL)

SIEVE	% PASSING
3"	90-100
3/4"	20-90
#4	0-20
#200	0-3

5. RIPRAP SHALL CONFORM TO THE FOLLOWING GRADATION:

	STONE SIZE d_{50} (inches)	% OF MATERIAL SMALLER THAN TYPICAL STONE	TYPICAL STONE DIMENSIONS (inches)
RIPRAP TYPE H	18	100 50-70 35-50 2-10	30 24 18 6
RIPRAP TYPE M	12	70-100 50-70 35-50 2-10	21 18 12 4

6. RIPRAP GRADATION SHALL CONFORM TO THE FOLLOWING LIMITS:

$\frac{D_{max}}{D_{50}} = 1.25$

$\frac{D_{max}}{D_{50}} = 2-3$

7. CONTRACTOR SHALL SUBMIT RIPRAP GRADATION TO ENGINEER FOR APPROVAL PRIOR TO DELIVERY.

8. GROUTED RIPRAP SHALL CONFORM TO SECTION 624.02 IN THE COLORADO SPRINGS ENGINEERING DIVISION STANDARD SPECIFICATIONS.

9. UTILITY INFORMATION AS SHOWN ON THE PLAN SHEETS IS PLOTTED FROM BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL CALL 1-800-922-1987 FOR UTILITY LOCATIONS AT LEAST THREE (3) WORKING DAYS PRIOR TO ANY DIGGING, NOT INCLUDING THE DAY OF ACTUAL CONTACT.

10. EROSION CONTROL MEASURES FOR THE PROJECT ARE REQUIRED. THE CONTRACTOR SHALL IMMEDIATELY RE-SEED AND MULCH ALL DISTURBED AREAS ALONG THE CHANNEL EMBANKMENT ONCE FINAL GRADES ARE REACHED AND/OR AS DIRECTED BY THE ENGINEER.

11. ALL CONSTRUCTION AND MATERIALS SHALL BE IN CONFORMANCE WITH THE COLORADO SPRINGS ENGINEERING DIVISION STANDARD SPECIFICATIONS, SEE SECTION 620, DRAINAGE CHANNELS.

12. ANY EXCAVATION SHALL BE DEWATERED TO THE EXTENT REQUIRED FOR CONSTRUCTION OPERATIONS TO PROCEED UNDER DRY CONDITION PER SECTION 621.04 IN THE COLORADO SPRINGS ENGINEERING DIVISION STANDARD SPECIFICATIONS MANUAL.

13. WITHIN THE LIMITS OF DISTURBANCE, THE CONTRACTOR SHALL CLEAR AND GRUB THE SITE, AS REQUIRED TO INSTALL THE PROPOSED CHANNEL IMPROVEMENTS. ALL SURFACE OBJECTS, TREES, STUMPS, ROOTS, AND OTHER PROTRUDING OBSTRUCTIONS SHALL BE CLEARED AND GRUBBED BY THE CONTRACTOR, INCLUDING MOWING, AS REQUIRED. ALL HOLES RESULTING FROM THE REMOVAL OF OBSTRUCTIONS SHALL BE BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED IN ACCORDANCE WITH CITY STANDARDS. ALL DEBRIS SHALL BE DISPOSED OF OFF SITE BY THE CONTRACTOR.

Westgate at Powers Development, Colorado Springs, El Paso County, Colorado
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Channel details
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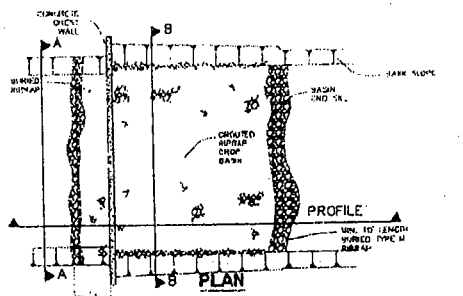
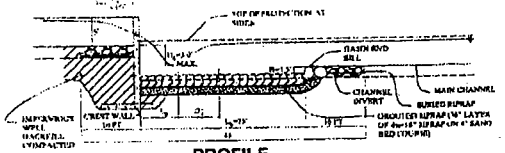
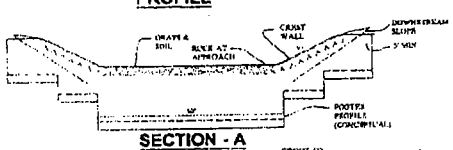
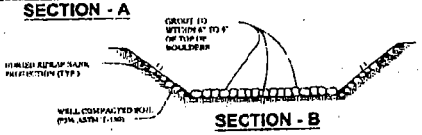
TYPICAL CHANNEL SECTIONS & DETAILS

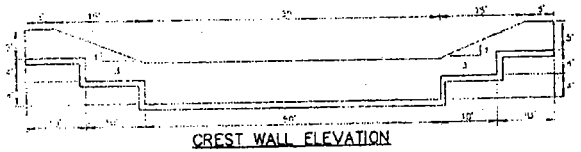
TY1

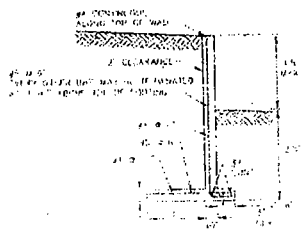









CREST WALL ELEVATION


CREST WALL REINFORCING DETAIL

VERTICAL RIPRAP DROP STRUCTURE DETAIL (A)

GROUT NOTES

MATERIAL SPECIFICATIONS

ALL GROUT SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH EQUAL TO 3200 PSI.

ONE CUBIC YARD OF GROUT SHALL HAVE A MINIMUM OF SIX (6) SACKS OF TYPE II PORTLAND CEMENT.

A MAXIMUM OF 25% TYPE F FLY ASH MAY BE SUBSTITUTED FOR THE PORTLAND CEMENT.

FOR TYPE A GROUT, THE AGGREGATE SHALL BE COMPRISED OF 70% NATURAL SAND (FINES) AND 30% ¾-INCH ROCK (COARSE).

THE GROUT SLUMP SHALL BE 4-INCHES TO 6-INCHES.

AIR ENTRAINMENT SHALL BE 5.5%-7.5%.

TO CONTROL SHRINKAGE AND CRACKING, 1.5 POUNDS OF FIBERMESH, OR EQUIVALENT, SHALL BE USED PER CUBIC YARD OF GROUT.

PLACEMENT SPECIFICATIONS

ALL TYPE A GROUT SHALL BE DELIVERED BY MEANS OF A LOW PRESSURE (LESS THAN 10 PSI) GROUT PUMP USING A 2-INCH DIAMETER NOZZLE.

FULL DEPTH PENETRATION OF THE GROUT INTO THE BOULDER VOIDS SHALL BE ACHIEVED BY INJECTING GROUT STARTING WITH THE NOZZLE NEAR THE BOTTOM AND RAISING IT AS GROUT FILLS, WHILE VIBRATING GROUT INTO PLACE USING A PENCIL VIBRATOR.

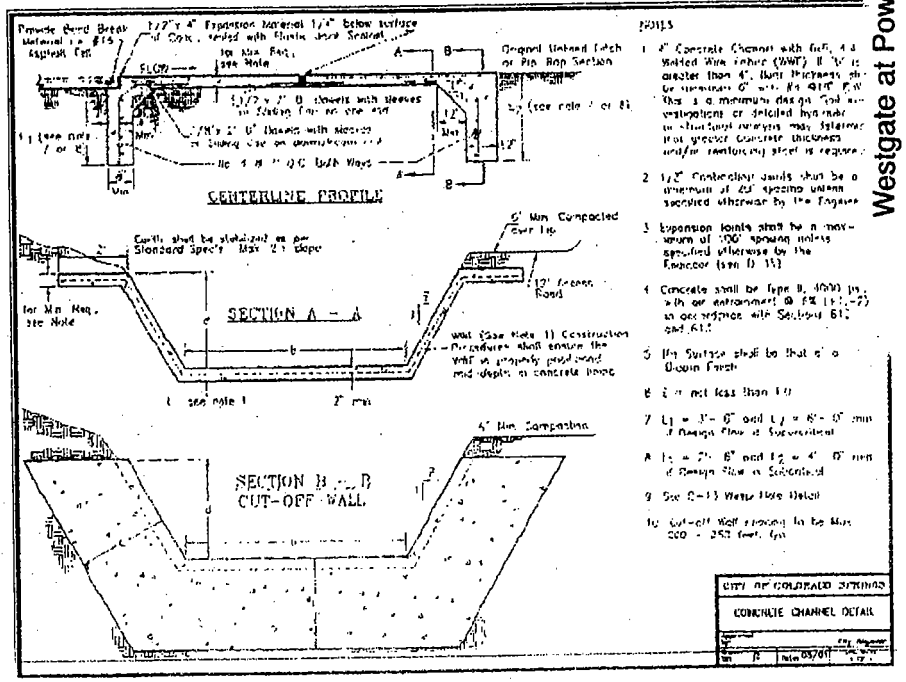
AFTER GROUT PLACEMENT, EXPOSED BOULDER FACES SHALL BE CLEANED WITH A WET BROOM.

ALL GROUT BETWEEN BOULDERS SHALL BE TREATED WITH A BROOM FINISH.

ALL FINISHED GROUT SURFACES SHALL BE SPRAYED WITH A CLEAR LIQUID MEMBRANE CURING COMPOUND AS SPECIFIED IN ASTM C-309.

SPECIAL PROCEDURES SHALL BE REQUIRED FOR GROUT PLACEMENT WHEN THE AIR TEMPERATURES ARE LESS THAN 40°F OR GREATER THAN 90°F. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER OF THE PROCEDURES TO BE USED FOR PROTECTING THE GROUT.

CLEAN BOULDERS BY BRUSHING AND WASHING BEFORE GROUTING.



Westgate at Powers Development, Colorado Springs, El Paso County, Colorado
Application by: Signature Realty Capital Corp.
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CHANNEL DETAILS

CH2

STATE OF COLORADO

Bill Ritter, Jr., Governor
Martha E. Rudolph, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
TDD Line (303) 691-7700
Located in Glendale, Colorado

http://www.cdphe.state.co.us

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090

Colorado Department
of Public Health
and Environment

May 13, 2010

Signature Realty Capital Corporation
Attn: Martin List
2082 Michelson Drive, Suite 212
Irvine, California 92612

Re: Section 401 Water Quality Certification
Colorado 401 Certification No.: 4254
US Army Corps of Engineers 404 Permit No.: SPA-2010-00110-SCO
Description: Construct a commercial development project to include riprap with vertical drop concrete walls to stabilize the channel. Install culvert and construct trail and maintenance access road
Location: Section 13, Township 14 South, Range 66 West, Latitude 38.827221566407, Longitude -104-727237224579 in El Paso County, Colorado
Watercourse: Sand Creek tributary, Arkansas River Basin, Segment COARFO04 of Fountain Creek Sub-basin
Designation: Use Protected

Dear Mr. List:

The Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division (Division) has completed its review of the subject Clean Water Act (CWA) Section 404 Permit Application, and our preliminary determination with the issuance of the State of Colorado 401 Certification Public Notice (5 CCR 1002-82.5(B)). This segment is designated "Use Protected" thus no antidegradation review is required (5 CCR 1002-31.8(2)).

This letter shall serve as official notification that the Division is issuing "Regular Certification" in accordance with 5 CCR 1002-82.5(A)(2).

The 401 Certification issued by the Division pursuant to 5 CCR 1002-82.3(C) shall apply to both the construction and operation of the project for which a federal license or permit is required, and shall apply to the water quality impacts associated with the project. This certification does not constitute a relinquishment of the Division's authority as defined in the Colorado Water Quality Control Act, nor does it fulfill or waive any other local, state, or federal regulations.

If you have any questions or need additional information, please contact me at (303) 692-3586.

Sincerely,

John C. Hranac
Water Quality Assessor
Water Quality Control Division
Colorado Department of Public Health and Environment

Attachment

cc: US Army Corps of Engineers, Southern Colorado Regulatory Office
File

JPS Engineering, Inc

WESTGATE AT POWERS

MASTER DEVELOPMENT DRAINAGE PLAN

JPS ENGINEERING

19 E. Willamette Ave.
Colorado Springs, CO
80903

PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

NO.	REVISION	BY	DATE

FEMA 100-YR FLOODPLAIN LIMITS

SAND CREEK

RR

C4 2.85 AC

3 / 48.8 / 94.0

EDB

C3 9.15 AC

64133-00-024 LIST 22.1 AC.

OC1 10.0 AC

PHASE 2 PHASE 1

STORMWATER QUALITY DETENTION POND EDB #C4 (PRIVATE) (0.6 AC FT)

64130-00-093 ESKRIDGE 4.02 AC.

CURRENT FEMA 100-YEAR FLOODPLAIN LIMITS (TO BE REVISED WITH LOMR)

FUTURE PLD #A5

FUTURE PLD A4

A5 2.68 AC

PROPOSED CHANNEL RE-ALIGNMENT W/ RIPRAP BANK LINING (B=50'; D=5'; Z=3:1)

PROPOSED CHANNEL

EXISTING BOX CULVERT (3 EA. 16'Wx6'H RCBC)

FUTURE PLD #A6

FUTURE POND EDB #A3

PROPOSED COLLECTOR ROAD

A6 1.64 AC

A8 6.23 AC

A4 1.96 AC

EXISTING 24" CULVERT OA1

C2 3.02 AC

A7 5.10 AC

64133-00-025 LIST 5.0 AC.

OA1 5.6 AC

TROY HILL ROAD

C1 8.33 AC

PUBLIC STORM SEWER A4

64130-00-123 AIRPORT ASSOCIATES 6.5 AC.

64130-00-124 LIST 28.72 AC.

2 / 0 / 0

STORMWATER QUALITY RETENTION POND RP #A7 (PVT) (0.2 AC FT)

PROPOSED BOX CULVERT A8 (3EA 16'WX6'H RCBC)

RETAIL 8,000sf

A3 12.36 AC

FUTURE PHASE PHASE 1

PROPOSED DROP STRUCTURE (TYP)

EXISTING MOBILE HOME PARK

PRIVATE STORM SEWER A1

A1 5.73 AC

PROPOSED CHANNEL

FUTURE PHASE PHASE 1

EAST FOOD

A2 5.25 AC

RETAIL 7,200

BANK 4,000

STORMWATER QUALITY DETENTION POND EDB #A1 (PRIVATE) (0.2 AC FT)

1 / 60.9 / 117.7

FAST FOOD

FUTURE POND EDB A2

EXISTING BOX CULVERT (5 EA. 6'x8' RCBC)

64130-00-105 CDOT 3.04 AC.

AIRPORT ROAD

POWERS BLVD.

N

100' 0 100' 200'

Original Scale: 1"=100'
Contour Interval = 2 ft

DRAINAGE LEGEND

- RIPRAP
- FLOW DIRECTION ARROW
- FLOWLINE
- FEMA 100-YEAR FLOODPLAIN LIMITS
- DRAINAGE BASIN BOUNDARY
- DESIGN POINT
- Q_5 (cfs)
- Q_{100} (cfs) (DEVELOPED FLOW)
- DEVELOPED BASIN DESIGNATION
- DEVELOPED BASIN AREA (ACRES)
- PLD — POROUS LANDSCAPE DETENTION AREA
- EDB — EXTENDED DETENTION BASIN

HORZ. SCALE:	1"=100'
VERT. SCALE:	N/A
SURVEYED:	LDC
CREATED:	2/2/05
PROJECT NO:	020501
DRAWN:	BJJ
DESIGNED:	JPS
CHECKED:	JPS
LAST MODIFIED:	5/02/12
MODIFIED BY:	BJJ
SHEET:	D1

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PROPOSED PIKES PEAK HEIGHTS SUBDIVISION

64133-00-001 DABARBET, LLC 29.8 AC.

64133-00-023 ARMSTRONG FINANCIAL 17.99 AC.

64133-00-022 LIST 2.0 AC.

SC26 AC.

OC1 10.0 AC.

SC42 AC.

FEMA 100-YEAR FLOODPLAIN LIMITS

ZONED PIP1

SAND CREEK

PIKES PEAK AVE.

64130-00-094 LIST 1.00 AC.

FRAZIER'S GARDEN SUBDIVISION

3 20.9 46.7

64133-00-024 LIST 22.1 AC.

C 16.6 AC.

64130-00-093 ESKRIDGE 4.02 AC.

ZONED PIP2

64133-00-002 DABARBET, LLC 19.1 AC.

B 13.0 AC.

64133-00-025 LIST 5.0 AC.

2 5.5 14.1

64130-00-124 LIST 28.72 AC.

A 34.8 AC.

EXISTING BOX CULVERT (3 EA. 16'Wx6'H RCBC)

EXISTING 24" CULVERT

OA1 5.6 AC.

CURRENT EFFECTIVE 100-YEAR FLOODWAY LIMITS

TRIBUTARY

CENTER

ZONED PBC

64130-00-119 AIRPORT ASSOCIATES 9.1 AC.

TROY HILL ROAD

POWERS BLVD.

EXISTING GOLDEN ACRES MOBILE HOME PARK

ZONED PUD

1 22.7 55.9

SC42 1170 2010

64130-00-105 CDOT 3.02 AC.

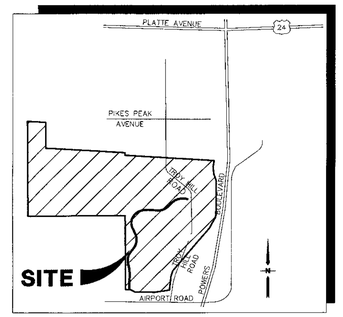
EXISTING CULVERT (30" RCP)

AIRPORT ROAD

EXISTING BOX CULVERT (5 EA. 6'x8' RCBC)

ZONED R1-6

SAND CREEK EAST FORK



VICINITY MAP

NTS

DRAINAGE LEGEND

- RIPRAP
- FLOW DIRECTION ARROW
- FLOWLINE
- DRAINAGE BASIN BOUNDARY
- DESIGN POINT
  - Q_5 (cfs)
  - Q_{100}(cfs) (HISTORIC FLOW)
- BASIN DESIGNATION
- BASIN AREA (ACRES)

200' 0 200' 400'

Original Scale: 1"=200'
Contour Interval = 2 ft.

WESTGATE AT POWERS

HISTORIC DRAINAGE PLAN

JPS ENGINEERING

19 E. Willamette Ave.
Colorado Springs, CO 80903

PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

NO.	REVISION	BY	DATE

HORZ. SCALE:	1"=200'	DRAWN:	RMD
VERT. SCALE:	N/A	DESIGNED:	JPS
SURVEYED:	LDC	CHECKED:	JPS
CREATED:	2/2/05	LAST MODIFIED:	2/16/12
PROJECT NO:	020501	MODIFIED BY:	JPS
SHEET:	EX1		

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